NOAA Technical Memorandum NMFS-F/NEC-28

Food of Seventeen Species of Northwest Atlantic Fish

U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
Northeast Fisheries Center
Woods Hole, Massachusetts

January 1984

PREFACE

This issue of the NOAA Technical Memorandum NMFS-F/NEC series was originally presented as two May 1983 issues of the Woods Hole Laboratory Reference Document series numbered 82-16 and 82-17 by Ray E. Bowman and William L. Michaels, and by William L. Michaels and Ray E. Bowman, respectively. In its present form, most of the initial information is intact and given as two separate sections accordingly. However, the "Abstract," "Introduction," and "Method and Materials" have been combined and are found only in Part 1 to avoid duplication. The "Acknowledgements" have been deleted; that information is presented below.

We are especially grateful to Dr. Marvin Grosslein for suggestions regarding the preparation of the manuscript and also to Dr. Richard Langton, Janet Murphy, Brian Hayden, Margaret McBride, Jacqueline Murray, James Towns, Daniel Couture, Eleanore Beale, Elke Bergholz-Nelson, Edward Brown-Ledger, Caroline Karp, Lisa Urry, John Hauser, and numerous other summer students and survey technicians who helped collect stomachs, analyze stomach contents, code and enter the information into the computer system, and tabulate the data.

This work is a component of the Marine Monitoring Assessment and Prediction Program, MARMAP of the National Oceanic and Atmospheric Administration.

ABSTRACT

The stomach contents of 16,631 fish representing 17 species common to Northwest Atlantic continental shelf waters have been analyzed. Fish were collected during annual spring and autumn bottom trawl surveys conducted in offshore waters between Cape Hatteras, North Carolina, and Western Nova Scotia in the years 1973-1976. In the first section, major types of food within the entire study region are determined by examining the diet of predators according to fish length and within geographic areas traditionally referred to as the Middle Atlantic, Southern New England, Georges Bank, Gulf of Maine, and Western Nova Scotia. A complete listing of all items identified in the stomachs of each species, and yearly and seasonal differences or similarities in the quantity and type of prey are noted and discussed in the second section. Examination of stomach contents revealed some species of prey were widespread while others were more characteristic of a particular geographic area. Organisms of major importance as prey throughout the entire region sampled were Unciola irrorata, Dichelopandalus leptocerus, Cancer sp., Meganyctiphanes norvegica, Neomysis americana, Loligo pealei, silver hake (Merluccius bilinearis), and herring (Clupeidae). The identification of principal prey utilized by fishes within various geographic areas established that much dietary overlap occurs between species. However, some principal dietary components were often unique to fishes within a particular area, and even more frequently were identified as prey within larger regions which can be characterized as temperate (Middle Atlantic, Southern New England and Georges Bank) or boreal (Gulf of Maine and Western Nova Scotia). The majority of fish prey were found to be fish eggs, fish larvae or juvenile fish, and were taken to some extent by all predators sampled. The mean stomach content weight, when expressed as a percentage body weight according to fish length, indicated smaller fish of most species tend to have relatively larger quantities of food in their stomachs. Increases in the abundance of prey such as American sand lance or Loligo sp. during 1976 were reflected in the diets of Atlantic cod and silver hake for the same year.

TABLE OF CONTENTS

PART 2: EXAMINATION BY YEAR & LISTING OF PREY SPECIES

PART 1

EXAMINATION BY PREDATOR LENGTH & GEOGRAPHIC AREA

by

Ray E. Bowman and William L. Michaels

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

INTRODUCTION

A significant element of the research program at the Northeast Fisheries Center, located in Woods Hole, Massachusetts, has been to describe the complex predator-prey interactions of Northwest Atlantic fishes which contribute to the limits and variability of fish production (Edwards and Bowman 1979; Grosslein et al. 1979, 1980; Cohen et al. 1981, 1982). Principal prey categories and dominant species of prey of many predators have been previously documented (Edwards and Bowman 1979; Langton and Bowman 1980, 1981). However, detailed analysis of the total species composition of prey in relation to size of predator is necessary for quantitative analyses of predator-prey interactions. In addition, temporal and spatial variability must be considered.

The energy flow through pelagic and benthic components of the food web within various marine shelf ecosystems has been described (Okata 1978; Edwards and Bowman 1979; Grosslein et al. 1979, 1980; Cohen et al. 1981). Classification of food organisms into general categories or broad taxonomic levels is almost a necessity when examining entire ecosystems, although major prey species are usually noted in such studies. Because the names of many important or subdominant prey species are often omitted in large scale investigations, their importance to the structure and function of particular communities within the ecosystem may be overlooked. For example, Bowman and Towns (1981) documented that the gammarid amphipod, Gammarus annulatus, was a major prey item for many fishes inhabiting the Nantucket Shoals area off Cape Cod, Massachusetts; but G. annulatus would seldom, if ever, be mentioned as an important prey in the Northwest Atlantic ecosystem.

In this paper we document the principal species of prey in relation to size of predator and within various geographic areas (Part I), during the spring and autumn for each year from 1973 through 1976 (Part II), and provide a complete listing of organisms (Part II) consumed by 17 species of fish caught within various regions located in offshore waters extending from Cape Hatteras, North Carolina, to Browns Bank, Nova Scotia.

BACKGROUND

Large scale studies of the diet of Northwest Atlantic fishes have been undertaken during bottom trawl surveys conducted by the Northeast Fisheries Center (NEFC) since 1963. The area sampled covers continental shelf waters extending from Cape Hatteras, North Carolina, to Browns Bank, Nova Scotia, and is routinely surveyed during the spring and autumn of each year. The area has traditionally been subdivided into five geographic areas, namely the Middle Atlantic, Southern New England, Georges Bank, the Gulf of Maine, and Western Nova Scotia (Figure 1). Fishes within each geographic area have been characterized according to their general dietary preferences based on results obtained from initial food studies (1963-1972) (Bowman et al. 1976; Edwards and Bowman 1979; Grosslein et al. 1980; Langton and Bowman 1980, 1981). Species making up the largest portion of the adult fish biomass in the entire study area are euryphagic or stenophagic feeders which fall into one of four

generalized feeding categories as follows: (1) principally piscivorous (including squids); (2) predators on plankton other than fish or squid; (3) principal consumers of benthic epifaunal crustaceans; (4) those which feed primarily on benthic infauna and non-crustacean epifauna.

More intensive feeding studies were initiated in 1973 to help determine the feeding chronology, digestion rate, consumption, and gross growth efficiency of selected fish species. Species were chosen according to their general feeding category, relative abundance within a geographic area, and commercial value. The feeding category of a particular species is made up of the principal prey of various trophic levels that link up and tend to focus energy toward the selected fish species (Tyler et al. 1981). The overall plan was to monitor the food of at least one species representative of each general feeding category within each of the five geographical areas to determine spatial and temporal changes that occur (if any) in prey organisms. Species selected for the present study were little skate, Raja erinacea (Mitchill); Atlantic cod, Gadus morhua (Linnaeus); haddock, Melanogrammus aeglefinus (Linnaeus); silver hake, Merluccius bilinearis (Mitchill); pollock, Pollachius virens (Linnaeus); red hake, Urophycis chuss (Walbaum); spotted hake, Urophycis regia (Walbaum), white hake, Urophycis tenuis (Mitchill); ocean pout, Macrozoarces americanus (Schneider); scup, Stenotomus chrysops (Linnaeus); butterfish, Peprilus triacanthus (Peck); redfish, Sebastes marinus (Linnaeus); longhorn sculpin, Myoxocephalus octodecemspinosus (Mitchill); fourspot flounder, Paralichthys oblongus (Mitchill); witch flounder, Glyptocephalus cynoglossus (Linnaeus); American plaice, Hippoglossoides platessoides (Fabricius); and yellowtail flounder, Limanda ferruginea (Storer)[1].

[1]All common and scientific names of fishes after Robins (1980).

METHODS AND MATERIALS

COLLECTION

Fish stomachs representing 17 species were collected during eight bottom trawl survey cruises (Table 1). The surveys were conducted during the spring and autumn for the years 1973-1976 as follows: 16 March-15 May 1973; 26 September-20 November 1973; 12 March-4 May 1974; 20 September-14 November 1974; 4 March-12 May 1975; 15 October-18 November 1975; 4 March-8 May 1976; and 20 October-23 November 1976. On spring cruises a two-seam modified Yankee No. 41 trawl was fished, and during fall cruises a standard Yankee No. 36 was used. The cod end and upper belly of both trawls were lined with 13 mm mesh netting to retain smaller fish. A scheme of stratified random trawling was conducted within the study area and fishing continued over 24 hours per day. All tows were 30 minutes in duration at a vessel speed of 3.5 kn in the direction of the next station. Bottom water depths ranged from 27 to 365 meters.

During each cruise technicians were instructed to sample 50 juveniles and 50 adults per selected species from each geographic area. No more than 10 fish from each age group were to be taken at a particular station, and fish were not to be sampled at two consecutive stations. The only exception to this collection method occurred when, as the cruise progressed, it seemed that 50 juvenile or 50 adult fish of a species would not be collected within a particular area. In this case fish were collected as necessary to obtain the sample size requested. Stomachs of large fish were excised aboard ship, individually wrapped in gauze with a label denoting vessel, cruise, station, species, fork length (FL) when applicable, otherwise total length (TL), sex, and maturity, and preserved in a 4.0 percent formaldehyde solution (by volume). Small fish were preserved whole.

ANALYSIS

In the laboratory the preserved stomachs were individually opened and their contents emptied onto a 0.25 mm mesh opening screen sieve to permit washing without the loss of any food items. The stomach contents were sorted, identified, counted, and damp dried on absorbent paper. Major prey items and commonly occurring but relatively minor prey, in terms of weight, were identified to species whenever practical. The wet weight of all stomach content groups was determined to the nearest 0.001 g and all information recorded. A stomach was considered empty when no food items could be identified and the material found in the stomach weighed less than 0.001 g. Data were analyzed with the aid of FORTRAN IV programs written for use on a Honeywell SIGMA 7 computer system located at the Woods Hole Oceanographic Institution in Woods Hole, Massachusetts.

PRESENTATION OF DATA

In the first two sections of the results (Part I), food data are presented in terms of the mean stomach content weight and the percentage weight each prey group made up of the total stomach contents weight. All

tables follow a standard format to aid in making dietary comparisons. Two tables are presented for each predator species. The first table lists the stomach contents for five centimeter fish length categories; the second table, which may be found in the appendix, lists the food eaten by predators within each geographic area. However, when describing foods eaten within geographic areas all species are discussed together in the text, and five summary tables (one for each geographic area) are furnished. Part II of this manuscript includes tables listing all stomach contents identified, the number of each item, the total weight of all stomach content groups and the percentage of the total weight made up by stomach content groups for each predator species. A second set of tables lists the major stomach content groups identified within both the spring and fall of each year (1973-1976). In all the above noted tables subtotals of the percentage weight of major stomach content groups are offset to the left. The number of fish stomachs examined, number of empty stomachs, mean stomach content weight, and mean fish length are given at the bottom of the tables.

The last section of the results in Part I includes calculations of the percentage body weight of the stomach contents representing various fish length categories sampled for individual predator species. The mean stomach content weight of various size fish of each species was converted to percentage body weight (%BW) by first determining the median value of each five centimeter length category and transforming the value to whole fish weight utilizing length/weight equations for each species which were available in the literature or as NEFC laboratory data; subsequently, the mean stomach content weight values for each category were divided by the whole fish weights and multiplied by 100. The %BW calculations were then plotted and comparisons were made between the type of diet, %BW of stomach contents, and gut morphology of the various species. Gut morphological measurements were extracted from data given in a paper by Edwards and Bowman (1979) for all species except spotted hake. Spotted hake data were obtained from NEFC laboratory information.

VARIABILITY

Sources of potential variation in the data presented in Part I and Part II of this paper include size, sex, and maturity stage of fish, as well as the time of day, area, season, bottom depth, and temperature when or where the fish were caught. Each variable considered in Part I and Part II is treated separately, i.e., the data were pooled over other variables with no attempt to determine the possible confounding effects of different variables on the results. Dietary trends noted within the variables examined here should be considered only as preliminary observations.

RESULTS

The stomach contents of a total of 16,631 fish were examined. The number of fish stomachs gathered from each species during the spring and autumn for the years 1973-1976 are listed in Table 1. The total number of stomachs collected for each predator is given in the right-hand column in the table. A summary of the number of each species sampled for stomach content analyses within various geographic areas of the Northwest Atlantic for the combined years 1973-1976 is given in Table 2. Also presented in Table 2 is the predator class, shown in the left hand column, which identifies principal types of prey eaten by the various predators. The stomachs of five species were collected in the Middle Atlantic and Western Nova Scotia; seven species were sampled in Southern New England, the Gulf of Maine, and on Georges Bank.

Immediately below we discuss the more important prey groups identified in the length specific analysis of the food data for each species. When shifts in the type of prey consumed occur, apparently related to predator length, they are noted. Subsequent to the aforementioned evaluation we describe the relatively important foods, overall, of the combined species sampled within each geographic area. Finally, relationships between the %BW of the stomach contents, type of food consumed, and gut morphology among species are presented.

FOOD IN RELATION TO FISH LENGTH

LITTLE SKATE

Crustaceans were the dominant prey of all little skate sampled (i.e., 6-55 cm TL, Table 3). However, fish ≤35 cm TL preyed mostly on amphipods such as Unciola irrorata, Gammarus annulatus, Leptocheirus pinguis, and Monoculodes edwardsi while those >35 cm TL ate large quantities of decapods (e.g., Cancer borealis, C. irroratus, Crangon septemspinosa, Pagurus acadianus, and Dichelopandalus leptocerus. Polychaetes, mollusks, and fish were also taken as food but principally only by fish >20 cm TL.

ATLANTIC COD

Atlantic cod ≤50 cm FL fed mainly on decapod crustaceans with Hyas coarctatus, Pagurus acadianus, Dichelopandalus leptocerus, and Pandalus montagui being especially important prey (Table 4). The stomachs of Atlantic cod >50 cm FL contained large quantities of fish; more important species identified, in terms of percentage weight, were Clupea harengus and other herrings, Merluccius bilinearis and other hakes, Ammodytes americanus, Cottidae, Scomber scombrus, and Sebastes marinus. Also of importance in their diet were decapod crabs (represented by Cancer irroratus more than any other species) and mollusks (e.g., pelecypods and cephalopods). Small quantities of Coelenterata, Polychaeta, and Echinodermata were identified in the stomachs of fish within several length categories ≤50 and >50 cm FL.

HADDOCK

The smallest haddock sampled (6-25 cm FL) had eaten mostly various crustaceans such as euphausiids (Meganyctiphanes norvegica), amphipods (e.g., Unciola irrorata, U. serrata, and Leptocheirus pinguis), and decapods (mainly Dichelopandalus leptocerus) as can be seen in Table 5. Polychaetes were also an important prey of small haddock. Fish >25 cm FL also preyed upon amphipods, but less intensively than the smaller haddock. The diet of larger haddock also included fairly large quantities of polychaetes and echinoderms (mainly Stronglocentrotus drobachiensis, Echinarachnius parma, Ophiura sarsi, and Ophiopholis aculeata). Coelenterates, mollusks, and fish were identified as part of the diet of both small and large haddock.

SILVER HAKE

Silver hake of all lengths preyed principally on either fish or crustaceans (Table 6). However, the bulk of the food of silver hake <20 cm FL was crustaceans (>80% of the diet on average), whereas the food of individuals >20 cm FL was mostly fish and some squid (together these two prey categories averaged well over 50% of the diet). Crustacea eaten by silver hake 1-20 cm FL were found to be amphipods (especially Ampeliscidae and Parathemisto in the 1-5 cm fish length category), decapods (e.g., Crangon septemspinosa and Dichelopandalus leptocerus), euphausiids (exclusively Meganyctiphanes norvegica), mysids (only Neomysis americana identified), and copepods. Fish (mainly juvenile silver hake, Merluccius bilinearis, and American sand lance, Ammodytes americanus) were also consumed by small silver hake. The diet of silver hake >20 cm FL was primarily fish and included, in part, Clupeidae, Merluccius bilinearis, Ammodytes americanus, Scomber scombrus, and Peprilus triacanthus. Loligo pealei, the long-finned squid, was also important in the diet of large silver hake.

POLLOCK

Crustaceans were an important dietary constituent of pollock within all length categories, but were especially notable as a food of pollock <75 cm FL (Table 7). Crustaceans made up more than 60% of the diet of fish within most length categories <75 cm FL. The largest contributors to the crustacean prey were Euphausiacea (Meganyctiphanes norvegica and Thysanoessa inermis) and decapod shrimp (species of consequence were Pasiphaea multidentata, Pandalus borealis, and Dichelopandalus leptocerus). Fish, although an important food for pollock as small as 26-30 cm FL, were heavily preyed upon by pollock >65 cm FL (fish made up >50% of the diet of pollock within four length categories >65 cm FL). Fish taxon identified as important prey of large pollock were Clupeidae, Merluccius bilinearis, Pollachius virens, Aethoprora metopoclampa, Scomber scombrus and Sebastes marinus. Loligo squid was found to be of consequence only in the diet of the largest pollock sampled (>90 cm FL).

RED HAKE

Red hake <25 cm TL preyed almost exclusively on Crustacea (Table 8). Amphipods (mostly Unciola irrorata and Leptocheirus pinguis) and decapods (principally Crangon septemspinosa and Dichelopandalus leptocerus) were the crustaceans found to be of considerable importance as prey of small red hake. Red hake >25 cm TL also ate substantial quantities of crustaceans (especially the two species of decapods noted immediately above along with Cancer sp., Munida sp., and Pagurus acadianus). In addition to crustaceans, large red hake preyed heavily upon fish (Clupeidae, Ophidiidae, and Pleuronectiformes were identified) and squid. Polychaetes were found in the stomachs of both small and large red hake.

SPOTTED HAKE

The diet of spotted hake <25 cm TL consisted primarily of crustaceans, whereas fish and squid were the principal food of fish >25 cm TL (Table 9) as was previously noted for red hake. However, spotted hake prey differed from that of red hake in that spotted hake 1-10 cm TL ate large quantities of amphipods (>50% of their stomach contents by weight), and spotted hake 11-25 cm TL consumed considerable amounts of amphipods, decapods (mostly Crangon septemspinosa and Dichelopandalus leptocerus) and euphausiids (almost exclusively Meganyctiphanes norvegica). The majority of fish and squid found in the stomachs of spotted hake >25 cm TL were not identified (but Merluccius bilinearis and Ophidiidae were recognized as fairly important prey). Spotted hake >25 cm TL also took considerable quantities of decapods as prey (e.g., Cancer irroratus, Crangon septemspinosa, Munida iris, and Dichelopandalus leptocerus).

WHITE HAKE

More than one-half of the food of white hake (Table 10) 16-40 cm TL was Crustacea (decapod shrimp, Dichelopandalus leptocerus and Pandalus borealis; and the euphausiid, Meganyctiphanes norvegica were the principal species identified). Fish >40 cm TL preyed almost exclusively on Pisces, namely species such as Argentina silus, Clupea harengus, Merluccius bilinearis, Urophycis chuss, U. tenuis, Scomber scombrus, Sebastes marinus, and Pseudopleuronectes americanus. Small quantities of Mollusca were identified in the dietary of both small and large white hake.

OCEAN POUT

Amphipod crustaceans (most identified as being in the family Corophiidae) accounted for a large percentage of the diet of 11-35 cm TL ocean pout (Table 11). Also of importance as food for fish in the above mentioned length range were the decapod crab, Cancer irroratus, polychaete worms, mollusks, and echinoderms (especially Echinarachnius parma which made up 88.1% of the identified stomach contents of fish in the 26-30 cm TL category). Echinoderms contributed more than 50% to the dietary of ocean pout in all length categories >35 cm TL. Echinarachnius parma, in particular, was an especially important food. Other echinoderms identified as food were the ophiuroids

Euryale sp. and Ophiopholis aculeata. Prey groups of lesser dietary importance to fish >35 cm TL were Polychaeta, various Crustacea such as amphipods and decapods, and Mollusca (primarily Placopecten sp.).

SCUP

The stomach contents of all scup sampled consistently contained substantial quantities (>25%) of polychaetes (various families identified are listed in Table 12). Crustaceans were also found to be an important food of scup of various sizes. However, scup 6-10 cm FL consumed the largest quantities of Crustacea (44.4%). Amphipods (primarily Unciola irrorata, Leptocheirus pinguis and unidentified Gammaridae were noted), decapods, and mysids were the predominant crustaceans identified. Mollusks, in particular squid, were a notable prey of scup 11-15 cm FL, 21-25 cm FL, and 26-30 cm FL. Coelenterata, Nemertea, Echinodermata, and Pisces, are noteworthy prey of scup, but they are of less dietary importance than the items mentioned above.

BUTTERFISH

Large percentages of the stomach contents of butterfish were made up by unidentified animal remains (included in the Miscellaneous stomach content grouping) in all fish length categories (Table 13). Several prey groups were important constituents of the diet of butterfish ranging from 6 to 25 cm FL. They include Coelenterata, Polychaeta (see various families listed in Table 13), Crustacea (mainly the amphipod Parathemisto sp., but also Decapoda and Copepoda), Mollusca, and Thaliacea (mostly Larvacea and Hemimyaria). Coelenterata and Thaliacea were especially important food of the few large fish sampled (21-25 cm FL). Dietary items such as Ctenophora and Nemertea also made up a small percentage of the gut contents of butterfish (note 11-15 and 16-20 cm FL categories).

REDFISH

Little variation was observed in the diet of redfish of varying lengths. Crustaceans dominated the diet of all redfish sampled, with the decapods, Dichelopandalus leptocerus and Pasiphaea multidentata, and the euphausiid Meganyctiphanes norvegica being especially important food (Table 14). Fish was the only other prey group identified, and they were taken by larger redfish (e.g., Myoxocephalus octodecemspinosa were eaten by redfish 21-25 cm FL, and Merluccius bilinearis were consumed by 31-35 cm FL predators).

LONGHORN SCULPIN

As with redfish noted immediately above, crustaceans constituted the major portion of the diet of all longhorn sculpin sampled (Table 15). However, longhorn sculpin 1-15 cm TL preyed heavily on amphipods (e.g., Unciola irrorata and Leptocheirus pinguis) and small decapods (mainly Crangon septemspinosa), and longhorn sculpin >15 cm TL took prey such as Cancer irroratus, Hyas coarctatus, Pagurus sp. and Dichelopandalus leptocerus. Also included in the crustacean portion of their diet were isopods and mysids

(exclusively Neomysis americana) which were eaten to some extent by almost all length categories sampled. The only other major prey groups identified in the stomach contents of longhorn sculpin were Polychaeta and Pisces which made up greater percentages of the diet of longhorn sculpin >15 cm TL than fish <16 cm TL.

FOURSPOT FLOUNDER

Fourspot flounder of all length categories sampled fed intensively on decapod crustaceans (Table 16). Cancer irroratus, Crangon septemspinosa, Munida sp., and Dichelopandalus leptocerus were some of the most important prey included in the diet of this flounder. Another important crustacean prey group identified was the Mysidacea (almost solely Neomysis americana) which was taken by fish >15 cm TL. Mollusca (almost totally squid) tended to make up larger percentages of the food of fourspot falling within the longer fish length categories (26-35 cm TL), whereas fish prey made up the largest percentage of the stomach contents of relatively small fourspot flounder (16-20 cm TL).

WITCH FLOUNDER

Polychaetes were of considerable importance in the diet of witch flounder of all sizes. A fairly extensive list of polychaete prey is presented in Table 17. The smallest (≤20 cm TL) witch flounder sampled were feeding very heavily on the euphausiid crustacean, Meganyctiphanes norvegica (69.8% of their diet). Euphausiids were also eaten in large quantities by fish 26-30 cm TL (34.9%). Generally, the percentage of the witch flounder diet made up of crustaceans became progressively smaller as the size of fish increased. Conversely, the portion of their diet consisting of Echinodermata (the principal contributor to this prey group was Holothuroidea) tended to get larger for fish length categories representing longer and longer fish. The remainder of the witch flounder diet (for fish of varying lengths) included relatively small amounts of Coelenterata, Mollusca, and Ascidiacea.

AMERICAN PLAICE

Polychaeta, Crustacea, Mollusca, and Echinodermata all accounted for large percentages of the food of American plaice ≤25 cm TL (Table 18). Polychaetes were especially important prey of fish ≤20 cm. American plaice >25 cm TL fed to a lesser extent on polychaetes, crustaceans, and mollusks and much more heavily on echinoderms such as the echinoid, Echinarachnius parma, and the Ophiuroid, Ophiura sarsi. The aforementioned was especially evident for fish within the three longest length categories (i.e., >40 cm TL) where Echinodermata made up >80% of all food.

YELLOWTAIL FLOUNDER

Yellowtail flounder of all sizes preyed on Crustacea, but the percentage of their diet made up by crustaceans steadily decreases as fish length increases (Table 19). Amphipods (e.g., Byblis serrata, Unciola irrorata, and

Leptocheirus pinguis) and decapods (e.g., Crangon septemspinosa and Dichelopandalus leptocerus) were identified as the major contributors to the Crustacea portion of the yellowtail flounder stomach contents. For the most part, fish <20 cm TL ate amphipods and decapods, while those >20 cm TL fed on a variety of polychaetes. Other stomach content groups which contributed to the diet of yellowtail flounder include Coelenterata, Nemertea, Mollusca, and Urochordata, all of which were eaten principally by fish >15 cm TL.

FOOD ACCORDING TO GEOGRAPHIC AREA

Examination of the stomach contents revealed some species of prey were fairly widespread while others were more characteristic of a particular region (Middle Atlantic, Southern New England and Georges Bank, or the Gulf of Maine and Western Nova Scotia) or geographic area. The controlling factor for the distribution of many prey species is likely water temperature and/or bottom sediment type.

Organisms taken as prey throughout the entire study area during the 1973-1976 period were Polychaeta (various families), Unciola irrorata (amphipod), Dichelopandalus leptocerus (decapod shrimp), Cancer sp. (decapod crab), Meganyctiphanes norvegica (euphausiid), Neomysis americana (mysid), Loligo pealei (squid), Merluccius bilinearis (silver hake), and Clupeidae (herring). The stomach contents of at least one predator species sampled in all areas except the Middle Atlantic included Aphrodita sp. (polychaete), Leptocheirus pinguis (amphipod), Axius serratus and Pagurus sp. (decapods), Echinoidea, Holothuroidea, and Scomber scombrus (Atlantic mackerel). One prey species, Ammodytes americanus (American sand lance), was consumed by one or more predators in each area except Western Nova Scotia. The remaining stomach content groups discussed below were either characteristic as a food of at least one predator species within a particular geographic area (or areas), or were identified as important prey of one or more species sampled only in the Middle Atlantic, Southern New England, and Georges Bank, or the Gulf of Maine and Western Nova Scotia regions. Major prey groups of all species considered together are listed in Tables 20-24 for ease of comparing prey between geographic areas (also see Appendices A-Q for a listing of prey taken by predators sampled within each area).

No major prey species were identified as unique food sources for the fish in the Middle Atlantic (Table 20). In Southern New England, Gammarus annulatus (an amphipod consumed by little skate) and Stenotomus chrysops (scup, which were eaten by silver hake) can be considered as principally endemic food sources (Table 21). Scallop viscera was the only dietary item found to be fed on solely by fish on Georges Bank (it was eaten by Atlantic cod, haddock, and ocean pout), and this occurrence probably resulted from the fish feeding on the viscera after scallop fishermen discarded it (on Georges Bank) after removing the adductor muscle, as has been reported previously by Wigley 1956; Bowman 1975; and Bowman and Langton 1978 (Table 22). Food found peculiar to Gulf of Maine fishes included Geryon quinquedens (red crab), which were eaten by Atlantic cod; Pollachius virens (pollock), consumed by larger pollock; and Urophycis tenuis (white hake), identified as prey of bigger white hake (Table 23). Two species of fish were the only prey identified as being

taken solely by predators sampled in Western Nova Scotia (Table 24); namely Gadus morhua (Atlantic cod), ingested by Atlantic cod of greater size, and Melanogrammus aeglefinus (haddock), devoured by Atlantic cod and haddock longer in length.

Organisms identified in the diet of predators within two or three geographic areas are given immediately below. Ophiuroidea (brittle stars) was of dietary importance to fishes on Georges Bank (Atlantic cod, haddock, and ocean pout), in the Gulf of Maine (Atlantic cod, witch flounder, haddock, and American plaice), and in Western Nova Scotia (Atlantic cod, haddock, witch flounder, and American plaice). Sebastes marinus (redfish) was eaten by Atlantic cod on Georges Bank (but it only accounted for <0.1% of their diet); in the Gulf of Maine by white hake, Atlantic cod, and pollock; and in Western Nova Scotia by Atlantic cod. Hippoglossoides platessoides (American plaice) was preyed upon by Atlantic cod on Georges Bank and in Western Nova Scotia. The last stomach content category within this group was the Thaliacea, which were identified in the stomach contents of butterfish sampled in the Middle Atlantic and Southern New England.

Two species were noted as major prey of fishes sampled in the Middle Atlantic, Southern New England, and Georges Bank region. Crangon septemspinosa was consumed by silver hake, spotted hake, and fourspot flounder in the Middle Atlantic; silver hake, red hake, little hake, and yellowtail flounder in Southern New England; and silver hake, little skate, longhorn sculpin, and yellowtail flounder on Georges Bank. Peprilus triacanthus (butterfish) was taken as prey by silver hake sampled in all three geographic areas. The two species of prey mentioned immediately above, and other organisms, identified as principal food in this region and commented on in above paragraphs, are known to be primarily associated with warm waters. For example, butterfish and scup are principally located in the southern part of our sampling area (Bigelow and Schroeder 1953; NEFC data[2]) and the distribution of Thaliacea, Gammarus annulatus, Crangon septemspinosa, and Placopecten magellanicus (sea scallop) is mainly within the three geographic areas referred to above (Gosner, 1971; NEFC data[2]).

Three species were noted as co-occurring prey of fishes in the Gulf of Maine and Western Nova Scotia region. Only the stomachs of fishes sampled in the Gulf of Maine and Western Nova Scotia contained fairly large quantities of Pandalus borealis (white hake, pollock, redfish, and American plaice in the Gulf of Maine, and pollock and American plaice in Western Nova Scotia), Pasiphaea multidentata (pollock and redfish in the Gulf of Maine, and pollock in Western Nova Scotia), and Thysanoessa inermis (pollock; only <0.1% in the Gulf of Maine, and 1.5% in Western Nova Scotia). These three species along with other prey noted in above paragraphs as being relatively unique food of fishes within either the Gulf of Maine or Western Nova Scotia are organisms which primarily inhabit cold waters (Gosner 1971; Bigelow and Schroeder 1953; NEFC data[2]). It should be mentioned that Geryon quinquedens, a cold water species taken by Atlantic cod in the Gulf of Maine also occur in large numbers in the cold deep slope waters (mostly below 366 m) south of Cape Cod, beyond

---

[2]Contact authors for further information.

the sampling depth range of the bottom trawl surveys. Surprisingly, large populations of juvenile Atlantic cod and haddock occur on Georges Bank, but they were only identified in the stomachs of Atlantic cod and haddock sampled in Western Nova Scotia. The last species to be noted here is redfish, which is a fish common to and preyed upon in the Gulf of Maine and Western Nova Scotia (although <0.1% of the Atlantic cod diet on Georges Bank was also redfish).

PERCENTAGE BODY WEIGHT OF STOMACH CONTENTS

Comparison of %BW of mean stomach content weight data to fish size, fish diet, dietary caloric value and gut morphology of the various species revealed striking relationships exist between many species. Appendix R lists the fish length-weight equations (and their sources) which were used to convert mean stomach content values to %BW. Figure 2 illustrates how the %BW of stomach contents differ with fish size for the various species (data from which figures were drawn are listed in Appendix S). It can be seen in the figure that the smaller fish of many species tend to have larger quantities of food in their stomachs, in terms of %BW, than the larger fish (e.g., see little skate, scup, butterfish, witch flounder, yellowtail flounder, and longhorn sculpin in Figure 2) and that the stomachs of the largest fish of several species contain more food in terms of %BW than the medium size fishes (e.g., see Atlantic cod, haddock, silver hake, pollock, red hake, and fourspot flounder). The %BW of the stomach contents of various size fish of other species were highly variable (e.g., see spotted hake, white hake, ocean pout, redfish, and American plaice). A possible explanation for these phenomena is given in the discussion.

The average %BW of the stomach contents was calculated (excluding all fish 1-5 cm in length since they were obtained for so few species) and compared with the composition of the diet, dietary caloric value, and gut morphology for each species. The latter two data sets were taken from a paper by Edwards and Bowman 1979. All data are listed in Table 25 where species have been grouped into three categories (i.e., gadiformes, pleuronectiformes, and other fishes) to exemplify relationships noted between species. Further, fish within each group are listed in descending order according to their average %BW. Of interest is that, overall, within each group the species whose stomachs contain the largest quantities of food tend to feed primarily on fish, squid, and decapods (which are high in caloric value) and also have fairly large stomachs in comparison to their intestine (see Nikolsky 1963 for a discussion of morphological differences between various types of predators). The size of stomach is indicated by the S/I ratio which was calculated by dividing the stomach tissue weight by the weight of the intestine and pylorus. Fishes whose stomachs contained the smallest quantities of food fed on prey of relatively low caloric value (e.g., echinoids, ophiuroids, polychaetes, holothurians, and thaliaceans) and had relatively large intestines (their S/I ratios were generally <0.5. Pollock (within the "gadiformes") and redfish (within the "other fishes") were exceptions to the trend noted above in that the stomachs of both species contained small quantities of food (0.41 and 0.10%BW, respectively) of relatively high caloric value, and they also have fairly large stomachs. It

should also be noted that ocean pout and American plaice, both of which fed on large quantities of echinoids and ophiuroids (both low in caloric value as a food) have the smallest S/I ratios within their groups. The points brought out above provide some evidence that a relationship exists between the quantity and type (or caloric value) of food consumed, and the digestive tract morphology of a particular species.

DISCUSSION

Previous investigations have established that the food eaten by many predators changes as they grow in length. Vinogradov (1972) and Bowman (1980b) documented that silver hake in the Northwest Atlantic eat mostly crustaceans when they are juveniles and are piscivores when adults. Daan (1973) studied North Sea cod and found a pronounced shift from crustaceans to fish in their diet as they increased in length. Similar dietary trends have been noted for such species as red hake, white hake, and pollock (Vinogradov 1972, Tyler 1971, Steele 1963, respectively). Prey selection by individual fish is principally dependent on the mouth morphology of the predator (particularly mouth size), and the physical and behavioral adaptations of the particular species for obtaining available prey. Food related size classes for fish have been identified as "threshold lengths" by Parker and Larkin (1959) and as "feeding stanzas" by Paloheimo and Dickie (1965) and Tyler (1972). Hahm and Langton (1980) examined predator to prey weight ratios and showed that different predators select different size frequencies of prey. Hahm and Langton's work concentrated on a subset of the data considered in the present study. Data presented herein corroborates information from these earlier investigations, and further, documents that dietary shifts related to fish size occur in other species as well (e.g., little skate, haddock, spotted hake, ocean pout, longhorn sculpin, American plaice, and yellowtail flounder).

Overall, the analysis of the stomach contents reported on here indicates that the smallest fish of each species sampled (juveniles) prey mostly on amphipods, euphausiids (almost exclusively Meganyctophanes norvegica) mysids (mostly Neomysis americana) and decapod shrimp (principally Crangon septemspinosis and Dichelopandalus leptocerus). The juveniles of four species (i.e., scup, witch flounder, American plaice, and yellowtail flounder) also fed to varying degrees on polychaetes, and one predator, namely butterfish also took larvaceans as food. The larger adult fish of many species (i.e., Atlantic cod, silver hake, pollock, red hake, spotted hake, and white hake) fed intensively on fish or squid, while others (i.e., little skate, longhorn sculpin, and to a lesser extent, fourspot flounder) ate mostly decapod crabs and shrimp. Of particular interest is that most, if not all, fish consumed are either eggs, larvae, juveniles, or species of relatively small size (e.g., see Table 26 for names and sizes of fish eaten by Atlantic cod, the largest predator sampled). Also note that all species collected prey to some degree on fish (Table 27). Adult haddock, ocean pout, American plaice, and yellowtail flounder took some combination of echinoderms and/or polychaetes as their principal food. These data are fairly consistent with previous reports on the food of the same species. For example, Bowman (1981) reported on the diet of the juveniles of ten species of Northwest Atlantic groundfish. He found that relatively few prey groups (e.g., copepods, amphipods, Meganyctiphanes norvegica, Crangon septemspinosa, and Neomysis americana) account for a large portion of the food of juvenile fish. Langton and Bowman (1980, 1981) studied the dietary habits of gadiform and pleuronectid fishes collected in the same geographic areas as the present study during the years 1969-1972. Our results for the same species agree well with their findings. Our data are also in agreement with McEachran's conclusions (1973) on little skate. He noted little skate <41 cm TL consumed mostly amphipods, while skates >41 cm TL fed primarily on decapod crabs and shrimp during the 1969-1970 period in the Northwest Atlantic.

The composition of the diet of few, if any, fish species remains the same throughout their life. However, the type of food eaten by some species varies little as they grow. Rae (1969) observed only a slight change in the diet of different size witch flounder caught on Icelandic fishing grounds off Scotland. He noted crustaceans were eaten more often than polychaetes by smaller fish (11-20 cm TL), but for all other size classes of fish (up to 50 cm TL) polychaetes were the most frequent prey consumed. Witch flounder caught in the Gulf of Maine and Western Nova Scotia for the present study had similar dietary habits to the Northeast Atlantic witch flounder studied by Rae (loc. cit.). Only the stomachs of fish <20 cm TL contained large quantities of crustaceans (e.g., 69.8% Meganyctiphanes norvegica; see Table 17); for all other length categories polychaetes made up the largest portion of the stomach contents. Other predators whose diets only differed slightly between length categories were redfish (prey was almost exclusively euphausiids and decapod shrimp), scup (food consisted mainly of polychaetes), butterfish (hydrozoans, polychaetes, and amphipods were important prey), and to a lesser extent fourspot flounder (decapod shrimp was the principal prey of all fourspot flounder sampled; however, some squid and decapod crabs were also taken by fish >20 cm TL).

Predation patterns of fishes within each particular geographic area have not changed substantially over time. Langton and Bowman (1980, 1981) described the food of gadiform and pleuronectiform fishes in the same study area for the years 1969-1972. Many of the same or similar differences between areas reported on here were established during their investigations. The identification in this paper of the principal prey utilized by fishes within various geographic areas also establishes that many prey species are widespread in the study area. However, other organisms utilized as food are often restricted to relatively small geographic areas.

Seasonal and spatial changes in the type and quantity of food consumed according to prey availability are well documented (Tyler 1971, 1972; Turuk 1976). The data presented here and in previous reports (e.g., Langton and Bowman 1980, 1981) represent collections made during similar seasons and in the same geographic sampling areas. Therefore, the consistent similarities and differences noted in the prey consumed between areas are a measure of the relative abundance of species utilized as prey. Because the most abundant predators within each geographic area were chosen for this analysis, the principal species of prey consumed within each area likely represent a significant biomass. This can be documented for at least one species, namely Pandalus borealis, a common prey of fishes in the Gulf of Maine and Western Nova Scotia region. Commercial vessels landed more than 10,000 tons of this species annually during the early 1970's and the estimated biomass was more than 20,000 tons during the same period in the Gulf of Maine and Western Nova Scotia region (Clark et al., 1979). Prey considered here to be generally restricted to specific areas likely tend to also segregate the fish species which have developed prey-specific efficiencies. The affinity of some fish species to concentrate in the vicinity of large concentrations of favored food has been established (Templeman, 1965; Tyler, 1971).

Observations on the relationships between %BW of stomach contents, prey types consumed, gut morphology, caloric value of food, and daily ration have been described in some detail by Edwards and Bowman (1979). They noted the caloric value of food (also digestibility of prey) and the S/I ratio (or gut

morphology) are related in that fishes which eat food of low caloric value (e.g., polychaetes and thalaceans) and/or food which is hard to digest (e.g., echinoderms) tend to have heavier (and usually longer) intestines (thereby reducing the S/I ratio) than fish which do not. Fish which feed on prey high in caloric value (e.g., fish and squid) generally have relatively small intestines.

Edwards and Bowman (loc. cit.) also hypothesized on the feeding behavior of various size fish. They suggested that small fish feed several times per day; medium size fish feed for the most part only once per day; and large fish (which eat mostly large prey organisms) feed during a particular period of the day, but not necessarily every day. The results presented herein indirectly support their hypothesis in that the stomachs of small juveniles of many species contained large quantities of food in terms of average %BW, which would be expected if they fed several times throughout the day. In this regard it should also be mentioned here that in addition to possibly feeding more than once per day the juveniles of at least two species (haddock and silver hake) are known to have heavier (larger) stomachs, in terms of %BW of stomach tissue, capable of holding relatively more food than the stomachs of adults (Bowman 1980a, 1980b). Moderate size fish, for the most part, had the smallest %BW values of stomach contents (possibly indicating they may only feed once per day and digest the majority of their food in less than 24 hr). Large fish of species which take relatively large prey had the highest %BW of stomach content values, an expected result if their prey remains in their stomachs over long periods of time while being digested. Certainly there may be other explanations for the above results, but the given hypothesis based principally on empirical data seems reasonable.

LITERATURE CITED

Bigelow, H. B., and W. C. Schroeder. 1953. Fishes of the Gulf of Maine. U.S. Fish Wildl. Serv., Fish. Bull. 53, 577 p.

Bowman, R. E. 1975. Food habits of Atlantic cod, haddock, and silver hake in the Northwest Atlantic, 1969-1972. U.S. Nat. Mar. Fish. Serv., Northeast Fish. Ctr., Woods Hole Lab. Ref. Doc. 75-01, 53 p.

Bowman, R. E., R. O. Maurer, Jr., and J. A. Murphy. 1976. Stomach contents of twenty-nine fish species from five regions in the Northwest Atlantic--DATA REPORT. U.S. Nat. Mar. Fish. Serv., Northeast Fish. Ctr., Woods Hole Lab. Ref. Doc. 76-10, 37 p.

Bowman, R. E., and R. W. Langton. 1978. Fish predation on oil contaminated prey from the region of the ARGO MERCHANT oil spill. In: In the wake of the ARGO MERCHANT, Proc. Symp., Center for Ocean Management Studies, Univ. R.I., p. 137-141.

Bowman, R. E. 1980a. Food of Northwest Atlantic juvenile haddock. M.A. Thesis, Bridgewater State College, Bridgewater, MA., April 1980, 95 p.

Bowman, R. E. 1980b. Food of silver hake (Merluccius bilinearis). U.S. Nat. Mar. Fish. Serv., Northeast Fish. Ctr., Woods Hole Lab. Ref. Doc. 80-31, 46 p.

Bowman, R. E. 1981. Food of ten species of Northwest Atlantic juvenile groundfish. U.S. Fish. Bull. 79(1):200-206.

Bowman, R. E., and J. P. Towns. 1981. Comparison of the stomach contents of fish and squid collected in waters of Cape Ann, Cape Cod, and Nantucket, Massachusetts, with special emphasis on Atlantic mackerel. U.S. Nat. Mar. Fish. Serv., Northeast Fish. Ctr., Woods Hole Lab. Ref. Doc. 81-31, 61 p.

Brown, B. E., and R. C. Hennemuth. 1971. Length-weight relations of haddock from commercial landings in New England, 1931-1955. U.S. Dept. Comm., NOAA Tech. Rep., NMFS, SSRF-638, 13 p.

Clark, S. H., R. J. Essig, and D. Hansford. 1979. Gulf of Maine northern shrimp-current status and future outlook. U.S. Nat. Mar. Fish. Serv., Northeast Fish. Ctr., Woods Hole Lab. Ref. Doc. 79-51, 16 p.

Cohen, E., M. Grosslein, M. Sissenwine, F. Serchuk, and R. Bowman. 1981. Stomach content studies in relation to multispecies fisheries analysis and modeling for the Northwest Atlantic. International Council for the Exploration of the Sea. C.M. 1981/G:66, 14 p.

Cohen, E., M. Grosslein, M. Sissenwine, F. Steimle, and W. Wright. 1982. Energy budget of Georges Bank. In: Multispecies approaches to fisheries management advice. Canadian Spec. Publ. Fish. Aqua. Sci. 59, 169 p.

Daan, N. 1973. A quantitative analysis of the food intake of North Sea cod, Gadus morhua. Neth. J. Sea Res. 6(4):479-517.

Edwards, R. L., and R. E. Bowman. 1979. Food consumed by continental shelf fishes. In: Predator-prey systems in fish communities and their role in fisheries management. Sport Fishing Institute, Publ., Wash. D.C., pp. 387-406.

Gosner, K. L. 1971. Guide to identification of marine and estuarine invertebrates. John Wiley and Sons, Inc., N.Y., 693 p.

Grosslein, M. D., B. E. Brown, and R. C. Hennemuth. 1979. Research assessment and management of a marine ecosystem in the Northwest Atlantic--A case study. In: Environmental biomonitoring, assessment, prediction, and management--Certain case studies and related quantitative issues. Statistical Ecology, Vol. II, International Cooperative Publishing House, Fairland, Maryland, pp. 289-357.

Grosslein, M. D., R. W. Langton, and M. P. Sissenwine. 1980. Recent fluctuations in pelagic fish stocks of the Northwest Atlantic-Georges Bank region, in relation to species interactions. Rapp. P.-v. Reun. Cons. int. Explor. Mer, 177:374-404.

Hahm, W., and R. Langton. 1980. Prey selection based on predator/prey weight ratios for some Northwest Atlantic fish. International Council for the Exploration of the Sea. C.M. 1980/L:62, 9 p.

Kohler, A. C., D. N. Fitzgerald, R. G. Halliday, J. S. Scott, and A. V. Tyler. 1970. Length-weight relationships of marine fishes of the Canadian Atlantic region. Fish. Res. Bd. Canada, Tech. Rep. No. 164, 11 p., and appendices.

Langton, R. W., and R. E. Bowman. 1980. Food of fifteen Northwest Atlantic gadiform fishes. U.S. Dept. Comm., NOAA Tech. Rep., NMFS, SSRF-740, 23 p.

Langton, R. W., and R. E. Bowman. 1981. Food of eight Northwest Atlantic pleuronectiform fishes. U.S. Dept. Comm., NOAA Tech. Rep., NMFS, SSRF-749, 16 p.

Lux, F. E. 1969. Length-weight relationships of six New England flatfishes. Trans. Amer. Fish. Soc. 98(4):617-621.

McEachran, J. D. 1973. Biology of seven species of skates (Pisces:Rajidae). Ph.D. dissertation. College of William and Mary, VA, 126 p.

Nikolsky, G. V. 1963. The ecology of fishes. Academic Press Publ., N.Y., 352 p.

Okata, A., K. Ishikawa, and K. Kosai. 1978. On the predator-prey relationships around larval and juvenile fishes in shallow sea community. Jap. Bull. Fish. Exp. St. Ibaraki-Ken, 22:7-17.

Paloheimo, J. E., and L. M. Dickie. 1965. Food and growth of fishes. I. A growth curve derived from experimental data. J. Fish. Res. Bd. Canada, 22:521-542.

Parker, R. R., and P. A. Larkin. 1959. A concept of growth in fishes. J. Fish. Res. Bd. Canada, 16:721-745.

Rae, B. B. 1969. The food of the witch. Mar. Res. Dep. Agric. Fish. Scotl. 1969(2), 23 p.

Robins, C. R., Chairman. 1980. A list of common and scientific names of fishes from the United States and Canada. 4th ed. Amer. Fish. Soc. Spec. Publ. No. 12, 174 p.

Steele, D. H. 1963. Pollock [Pollachius virens (L.)] in the Bay of Fundy. J. Fish. Res. Bd. Canada, 20:1267-1314.

Templeman, W. 1965. Some instances of cod and haddock behaviour and concentrations in the Newfoundland and Labrador areas in relation to food. Int. Comm. Northwest Atl. Fish., Spec. Publ. 6:449-461.

Turuk, T. N. 1976. Year-to-year seasonal fluctuations in feeding and biological indices of the Flemish Cap Bank cod. Sci. Coun. Meeting-June 1981. Serial No. N361. NAFO SCR Doc. 81/VI/76.

Tyler, A. V. 1971. Monthly changes in stomach contents of demersal fishes in Passamaquoddy Bay, N.B. Fish. Res. Bd. Canada, Tech. Rep. 288, 114 p.

Tyler, A. V. 1972. Food resource division among northern, marine, demersal fishes. J. Fish. Res. Bd. Canada, 29:997-1003.

Tyler, A. V., W. L. Gabriel, and W. J. Overholtz. 1981. Adaptive management based on structure of fish assemblages of northern continental shelves. Tech. Paper No. 5546, Oregon Agric. Exp. Sta. Dept. Fish. Wildl., Oregon State Univ., Corvallis, Oregon, 29 p.

Vinogradov, V. I. 1972. Studies of the food habits of silver and red hake in the Northwest Atlantic area, 1965-67. Int. Comm. Northwest Atl. Fish., Res. Bull. 9:41-50.

Waring, G. T. 1980. A preliminary stock assessment of the little skate, Raja erinacea, in the Northwest Atlantic. M. A. Thesis, Bridgwater State College, Bridgewater, MA. February 1980, 122 p.

Wigley, R. L. 1956. Food habits of Georges Bank haddock. U.S. Fish. Wildl. Serv., Sci. Rep. Fish. 165, 26 p.

Wilk, S. J., W. W. Morse, and D. E. Ralph. 1978. Length-weight relationships of fishes collected in the New York Bight. Bull. N. J. Acad. Sci. 23(2):58-64.

Table 1. Number of fish stomachs collected from each species sampled for the spring and autumn of the years 1973-1976.

Predator	Year and Season								Total
	1973		1974		1975		1976		
	Spring	Autumn	Spring	Autumn	Spring	Autumn	Spring	Autumn	
Little skate	134	76	156	113	164	124	204	150	1121
Atlantic cod	172	361	224	191	180	200	214	172	1714
Haddock	107	213	121	260	122	268	165	223	1479
Silver hake	196	515	389	333	274	357	309	352	2725
Pollock	89	135	95	52	76	64	117	64	692
Red hake	46	84	82	47	56	54	109	112	590
Spotted hake	47	79	30	74	67	54	96	94	541
White hake	45	103	79	87	70	56	56	59	555
Ocean pout	83	21	115	7	72	7	102	32	439
Scup	44	30	20	91	59	167	120	191	722
Butterfish	61	140	35	168	51	161	201	265	1082
Redfish	55	114	53	49	55	53	58	46	483
Longhorn sculpin	50	73	104	71	142	106	106	61	713
Fourspot flounder	45	87	41	58	20	27	51	56	385
Witch flounder	150	142	123	107	62	120	98	45	847
American plaice	193	246	231	218	165	158	207	104	1522
Yellowtail flounder	121	128	137	120	152	73	164	126	1021
								Total	16631

Table 2. Number of each species of fish sampled for stomach content analyses within various geographic areas of the Northwest Atlantic for the years 1973-1976, combined.

Predator class	Predator	Geographic Area				
		Middle Atlantic	Southern New England	Georges Bank	Gulf of Maine	Western Nova Scotia
Fish and squid	Silver hake	789	918	915		
	Atlantic cod			591	418	669
	White hake				470	
	Pollock				374	295
Planktonic invertebrates	Butterfish	678	394			
	Redfish				466	
Epifaunal crustaceans	Little skate		486	579		
	Red hake		481			
	Spotted hake	531				
	Fourspot flounder	366				
	Longhorn sculpin			692		
Benthic infauna and non-crustacean epifauna	Haddock			642	87	747
	American plaice				714	784
	Yellowtail flounder		502	502		
	Witch flounder				426	386
	Scup	450	262			
	Ocean pout		239	184		

Table 3. Composition of the stomach contents of little skate, expressed as a percentage of the total stomach contents weight versus fish length, for little skate collected in the Northwest Atlantic from 1973 through 1976.

Stomach contents	Length category (cm) 6-10	11-15	16-20	21-25	26-30	31-35	36-40	41-45	46-50	51-55
COELENTERATA	-	-	-	-	-	-	0.4	1.3	0.4	0.2
NEMERTEA	-	-	-	0.6	-	0.1	<0.1	0.7	1.2	-
POLYCHAETA	1.1	-	4.7	15.9	6.0	8.2	13.6	12.2	7.9	30.5
Flabelligeridae	-	-	-	-	0.3	0.2	2.4	0.5	0.2	0.2
Aphroditidae	-	-	-	-	-	-	0.8	1.3	1.8	6.5
Glyceridae	-	-	-	-	-	-	0.4	2.3	0.4	2.9
Nephtyidae	-	-	-	-	0.3	-	0.9	1.5	0.6	2.8
Nereidae	-	-	-	-	-	1.1	<0.1	0.4	1.2	6.7
Other Polychaeta	1.1	-	4.7	15.9	5.4	6.9	9.1	6.2	3.7	11.4
CRUSTACEA	63.2	78.5	84.4	68.7	86.0	69.4	62.9	67.0	68.8	51.6
Amphipoda	29.2	39.3	39.3	46.0	35.1	32.7	18.1	14.7	10.7	4.0
Ampeliscidae	-	3.0	6.0	3.0	2.9	1.4	1.2	1.4	0.3	<0.1
Unciola irrorata	-	10.3	13.7	9.0	2.7	1.8	2.4	1.6	0.5	<0.1
Other Corophiidae	-	0.7	0.1	0.3	0.1	0.7	5.7	1.3	0.2	-
Gammarus annulatus	-	6.3	-	10.1	5.2	-	0.1	0.1	1.8	-
Other Gammaridae	16.0	-	6.1	5.1	7.3	10.1	1.4	1.0	1.2	0.4
Leptocheirus pinguis	-	3.6	3.1	3.2	4.7	4.3	5.0	5.3	3.9	2.6
Monoculodes edwardsi	2.4	1.0	3.3	7.9	10.1	7.8	1.1	2.0	1.1	0.1
Other Oedicerotidae	10.8	8.4	1.2	1.3	0.9	2.4	0.2	0.9	1.1	0.5
Other Amphipoda	-	6.0	5.8	6.1	1.2	4.2	1.0	1.1	0.6	0.4
Decapoda	4.9	24.3	32.7	15.3	40.2	21.4	36.2	45.1	53.8	42.9
Axius serratus	-	-	-	-	-	-	1.0	1.1	2.6	1.8
Cancer borealis	-	-	-	-	-	<0.1	0.7	0.7	2.6	5.2
Cancer irroratus	-	-	-	0.2	15.7	1.3	0.5	7.2	5.2	5.3
Other Cancridae	-	-	0.8	0.2	2.1	3.4	4.4	4.0	2.9	16.5
Crangon septemspinosa	4.6	14.4	29.5	12.3	16.3	13.2	15.3	8.7	6.3	5.8
Other Crangonidae	0.3	4.8	1.2	1.6	0.6	1.9	0.6	1.2	0.5	0.9
Pagurus acadianus	-	-	-	-	-	-	5.7	9.3	13.4	0.8
Other Paguridae	-	-	0.3	0.1	0.3	0.6	2.2	1.9	11.0	2.7
Dichelopandalus leptocerus	-	2.3	-	-	3.3	0.1	3.8	5.9	4.0	0.8
Other Decapoda	-	2.8	0.9	0.9	1.9	0.9	2.0	5.1	5.3	3.9
Isopoda	1.3	0.3	0.1	1.2	1.6	6.3	2.3	1.3	0.8	2.0
Cirolanidae	0.4	0.3	0.1	1.0	1.5	6.3	2.3	1.3	0.8	2.0
Other Isopoda	0.9	-	<0.1	0.2	0.1	-	<0.1	-	<0.1	-
Other Crustacea	27.8	14.6	12.3	6.2	9.1	9.0	6.3	5.9	3.5	2.7
MOLLUSCA	-	-	-	0.4	0.1	3.2	5.5	3.0	4.2	2.8
Pelecypoda	-	-	-	0.4	-	3.1	3.9	2.2	3.7	0.5
Other Mollusca	-	-	-	-	0.1	0.1	1.6	0.8	0.5	2.3
PISCES	-	1.0	0.2	0.1	0.5	3.1	3.5	5.0	7.0	2.8
Ulvaria subbifurcata	-	-	-	-	-	-	-	-	3.6	-
Other Pisces	-	1.0	0.2	0.1	0.5	3.1	3.5	5.0	3.4	2.8
MISCELLANEOUS	35.7	20.5	10.7	14.3	7.4	16.0	14.1	10.8	10.5	12.1
Number of stomachs examined	43	52	73	44	42	70	110	247	391	45
Number of empty stomachs	6	2	3	2	2	6	9	18	50	2
Mean stomach content weight(g)	0.018	0.051	0.158	0.257	0.522	0.537	0.874	1.268	1.624	1.395
Mean fish TL (cm)	9	13	17	22	28	33	38	43	47	51

Table 4. Composition of the stomach contents of Atlantic cod, expressed as a percentage of the total stomach contents weight versus fish length, for Atlantic cod collected in the Northwest Atlantic from 1973 through 1976.

Stomach contents	Length category (cm) 6-10	11-15	16-20	21-25	26-30	31-35	36-40	41-45	46-50	51-55	56-60
COELENTERATA	-	-	-	-	-	0.5	0.4	0.2	1.1	0.8	0.7
POLYCHAETA	0.7	-	0.6	1.1	2.5	5.0	4.3	3.3	5.1	4.2	2.4
Aphroditidae	-	-	-	-	-	2.8	0.3	1.7	4.1	3.8	0.9
Other Polychaeta	0.7	-	0.6	1.1	2.5	2.2	4.0	1.6	1.0	0.4	1.5
CRUSTACEA	88.3	78.5	81.0	28.4	83.0	49.7	57.6	37.9	42.1	35.0	38.5
Decapoda	51.3	10.3	42.9	16.5	51.9	39.0	44.0	31.5	38.4	32.3	34.4
Axius serratus	-	-	-	-	-	-	3.0	0.2	6.3	1.8	0.8
Cancer borealis	-	-	-	-	-	-	-	-	0.3	2.1	0.6
Cancer irroratus	-	-	-	-	<0.1	0.1	1.0	0.2	0.9	5.0	10.5
Geryon quinquedens	-	-	-	-	-	-	-	-	-	-	-
Hyas coarctatus	-	-	-	-	3.2	2.2	5.4	2.7	3.0	3.3	6.1
Pagurus acadianus	-	-	-	-	1.0	0.1	0.6	0.4	8.5	4.7	3.4
Dichelopandalus leptocerus	40.1	3.7	8.9	5.0	24.9	13.4	12.6	10.2	9.0	3.1	2.9
Pandalus montagui	-	-	-	3.4	7.3	4.2	3.0	6.8	1.7	8.5	3.2
Other Pandalidae	-	-	4.4	1.1	5.4	1.4	2.1	0.3	3.3	0.3	1.2
Other Decapoda	11.2	6.6	29.6	7.0	10.1	17.6	16.3	10.7	5.4	3.5	5.7
Other Crustacea	37.0	68.2	38.1	11.9	31.1	10.7	13.6	6.4	3.7	2.7	4.1
MOLLUSCA	-	-	-	-	-	3.8	8.3	7.1	10.9	14.7	22.2
Pelecypoda	-	-	-	-	-	1.8	0.1	3.7	6.3	10.5	11.8
Cyrtodaria siliqua	-	-	-	-	-	-	-	-	-	-	-
Pectinidae	-	-	-	-	-	-	-	3.7	5.5	9.5	11.8
Other Pelecypoda	-	-	-	-	-	1.8	0.1	-	0.8	1.0	<0.1
Cephalopoda	-	-	-	-	-	-	0.1	1.4	-	1.4	1.0
Loligo sp.	-	-	-	-	-	-	-	-	-	-	-
Other Cephalopoda	-	-	-	-	-	-	0.1	1.4	-	1.4	1.0
Other Mollusca	-	-	-	-	-	2.0	8.1	2.0	4.6	2.8	9.4
ECHINODERMATA	-	-	-	-	1.3	11.3	2.4	9.4	1.7	3.2	6.0
Ophiuroidea	-	-	-	-	0.1	4.9	2.4	5.6	1.4	2.3	4.7
Holothuroidea	-	-	-	-	-	5.3	-	3.8	0.3	0.7	0.5
Other Echinodermata	-	-	-	-	1.2	1.1	<0.1	-	<0.1	0.2	0.8
PISCES	6.3	5.6	1.8	65.8	3.7	15.8	16.1	31.3	29.0	39.0	25.0
Batrochoididae	-	-	-	-	-	-	-	-	-	-	-
Clupea harengus	-	-	-	-	-	-	-	-	2.7	4.7	-
Other Clupeidae	-	-	-	-	-	-	-	-	-	12.0	4.9
Gadus morhua	-	-	-	-	-	-	-	-	-	-	-
Melanogrammus aeglefinus	-	-	-	-	-	-	-	-	-	-	-
Merluccius bilinearis	-	-	-	-	-	-	-	-	-	-	-
Other Gadidae	-	-	-	-	-	-	-	-	-	-	-
Ammodytes americanus	-	-	-	-	-	6.7	-	14.5	9.9	13.3	1.3
Cottidae	-	-	-	-	-	-	0.2	0.4	0.2	0.2	<0.1
Scomber scombrus	-	-	-	-	-	-	-	-	1.6	-	1.8
Pomatomus saltatrix	-	-	-	-	-	-	-	-	-	-	-
Sebastes marinus	-	-	-	-	-	-	-	-	3.3	-	-
Hippoglossoides platessoides	-	-	-	-	-	-	-	-	-	-	-
Other Pleuronectiformes	-	-	-	-	-	-	4.8	-	0.1	-	0.1
Other Pisces	6.3	5.6	1.8	65.8	3.7	9.1	11.1	16.4	11.2	8.8	16.9
MISCELLANEOUS	3.0	15.9	11.2	4.6	9.1	13.2	9.7	10.2	4.6	2.8	4.2
SAND AND ROCK	1.7	-	5.4	0.1	0.4	0.7	1.2	0.6	5.5	0.3	1.0
Number of stomachs examined	35	83	51	41	81	116	120	117	139	115	126
Number of empty stomachs	8	14	10	7	6	9	10	8	6	14	13
Mean stomach content weight(g)	0.035	0.081	0.142	1.117	1.165	2.054	2.651	4.614	7.972	12.759	12.430
Mean fish FL (cm)	8	12	18	23	28	33	38	43	48	53	58

Table 4. (continued)

Stomach contents	Length category (cm) 61-65	66-70	71-75	76-80	81-85	86-90	91-95	96-100	101-105	106-110	>110
COELENTERATA	3.1	3.8	0.3	-	0.6	-	-	-	-	-	-
POLYCHAETA	1.1	0.5	1.0	0.8	0.1	0.8	-	2.4	-	0.1	0.3
Aphroditidae	0.4	0.3	0.6	0.6	<0.1	0.8	-	2.4	-	-	0.3
Other Polychaeta	0.7	0.2	0.4	0.2	0.1	<0.1	-	<0.1	-	0.1	-
CRUSTACEA	32.5	26.8	16.9	20.0	13.9	6.0	16.5	18.2	11.3	14.3	5.3
Decapoda	29.8	26.0	15.8	19.6	13.8	6.0	15.5	18.0	11.0	14.3	4.9
Axius serratus	3.1	0.2	0.1	-	0.1	-	11.1	-	2.0	-	-
Cancer borealis	1.3	0.9	0.7	1.0	0.8	-	3.7	5.5	-	4.1	4.7
Cancer irroratus	10.2	11.2	8.9	10.0	7.6	1.5	-	7.0	-	8.9	-
Geryon quinquedens	-	-	-	-	-	1.5	-	4.5	7.2	-	-
Hyas coarctatus	1.6	0.4	1.0	3.8	0.9	0.3	-	0.2	-	0.4	-
Pagurus acadianus	5.1	4.6	1.2	2.1	0.6	0.4	-	-	-	0.7	-
Dichelopandalus leptocerus	3.8	1.9	0.3	0.3	1.5	1.1	0.4	0.2	0.1	-	-
Pandalus montagui	0.9	0.3	0.1	0.2	0.2	0.5	0.3	-	-	-	-
Other Pandalidae	1.3	0.8	0.4	<0.1	0.8	-	<0.1	0.2	1.1	0.2	0.2
Other Decapoda	2.5	5.7	3.1	2.2	1.3	0.7	-	0.4	0.6	-	<0.1
Other Crustacea	2.7	0.8	1.1	0.4	0.1	<0.1	1.0	0.2	0.3	<0.1	0.4
MOLLUSCA	15.5	9.3	9.1	15.4	8.4	1.8	8.6	28.8	-	1.4	15.4
Pelecypoda	12.2	5.5	3.2	10.8	4.9	0.7	-	6.2	-	-	-
Cyrtodaria siliqua	-	-	-	-	3.0	-	-	4.1	-	-	-
Pectinidae	8.2	3.6	3.0	10.8	1.9	-	-	-	-	-	-
Other Pelecypoda	4.0	1.9	0.2	-	<0.1	0.7	-	2.1	-	-	-
Cephalopoda	-	0.5	4.5	1.4	2.2	<0.1	4.9	22.3	-	-	15.3
Loligo sp.	-	-	0.3	-	-	-	-	22.3	-	-	15.3
Other Cephalopoda	-	0.5	4.2	1.4	2.2	<0.1	4.9	<0.1	-	-	-
Other Mollusca	3.3	3.3	1.4	3.2	1.3	1.1	3.7	0.3	-	1.4	0.1
ECHINODERMATA	3.4	1.4	3.5	2.4	2.1	0.2	1.3	0.2	0.6	0.6	0.3
Ophiuroidea	2.2	0.7	2.3	0.3	1.5	-	-	0.2	-	-	-
Holothuroidea	0.7	0.5	1.2	2.0	0.2	0.2	1.3	-	0.6	0.4	-
Other Echinodermata	0.5	0.2	-	0.1	0.4	-	-	-	-	0.2	0.3
PISCES	40.0	54.2	64.4	58.8	68.0	88.9	72.4	49.2	87.5	81.5	78.5
Batrachoididae	-	-	-	-	-	-	-	-	-	-	7.1
Clupea harengus	3.4	-	9.3	-	-	4.0	-	-	35.1	-	-
Other Clupeidae	1.1	2.0	18.1	22.8	4.5	47.9	8.5	8.0	-	23.2	-
Gadus morhua	-	-	-	16.3	-	-	-	-	-	-	-
Melanogrammus aeglefinus	-	-	-	-	-	-	-	-	-	24.1	-
Merluccius bilinearis	9.5	0.6	-	-	14.0	0.8	9.6	-	-	-	-
Other Gadidae	1.0	10.4	-	-	2.8	0.2	-	0.9	-	-	-
Ammodytes americanus	4.0	16.1	0.6	1.9	-	-	-	-	-	-	-
Cottidae	0.1	0.2	0.5	-	8.4	7.1	-	-	3.3	5.1	-
Scomber scombrus	3.4	5.7	25.4	-	4.8	7.7	48.9	33.4	-	-	-
Pomatomus saltatrix	-	-	-	-	-	-	-	-	-	-	9.8
Sebastes marinus	5.0	5.4	-	2.2	-	-	1.7	-	-	-	19.1
Hippoglossoides platessoides	-	-	-	-	-	-	-	-	-	6.1	22.4
Other Pleuronectiformes	0.2	1.3	-	-	-	-	-	3.5	22.5	-	7.0
Other Pisces	12.3	12.5	10.5	15.6	33.5	21.2	3.7	3.4	26.6	23.0	13.1
MISCELLANEOUS	3.7	2.9	4.1	2.4	2.8	2.2	1.1	1.0	0.4	1.8	0.2
SAND AND ROCK	0.7	1.1	0.7	0.2	4.1	0.1	0.1	0.2	0.2	0.3	-
Number of stomachs examined	122	119	111	84	71	44	32	30	19	16	14
Number of empty stomachs	10	9	9	9	4	5	4	2	3	3	0
Mean stomach content weight(g)	22.413	28.836	28.526	38.681	45.193	57.401	70.366	146.907	122.095	165.948	188.910
Mean fish FL (cm)	62	67	72	77	82	88	92	97	102	108	124

Table 5. Composition of the stomach contents of haddock, expressed as a percentage of the total stomach contents weight versus fish length, for haddock collected in the Northwest Atlantic from 1973 through 1976.

Stomach contents	Length category (cm) 6-10	11-15	16-20	21-25	26-30	31-35	36-40	41-45
COELENTERATA	-	-	-	-	0.3	-	2.4	2.1
Ceriantharia	-	-	-	-	-	-	-	-
Other Anthozoa	-	-	-	-	0.3	-	2.4	2.1
POLYCHAETA	9.2	19.3	16.2	15.8	12.1	10.3	8.4	26.5
Spionphanes bombyx	-	-	-	-	-	-	0.2	4.6
Other Spionidae	-	-	0.5	-	-	-	-	-
Nicomache lumbricalis	-	-	-	-	-	-	-	-
Sabellidae	-	1.7	-	-	-	<0.1	-	0.4
Aphroditidae	-	-	-	-	0.1	2.2	2.4	1.3
Other Polychaeta	9.2	17.6	15.7	15.8	12.0	8.1	5.8	20.2
CRUSTACEA	76.9	57.4	50.4	41.4	31.5	31.1	32.1	16.5
Amphipoda	7.3	16.3	21.7	26.1	19.1	11.4	16.3	8.7
Unciola irrorata	-	5.5	8.8	10.7	7.0	3.8	4.7	3.9
Unciola serrata	-	-	-	-	-	0.3	-	-
Gammaridae	0.8	3.5	4.3	4.4	4.6	1.8	2.9	1.8
Leptocheirus pinguis	-	1.8	2.4	2.2	0.7	0.3	0.7	0.2
Other Amphipoda	6.5	5.5	6.2	8.8	6.8	5.2	8.0	2.8
Decapoda	-	15.9	21.1	5.3	10.8	13.4	9.6	5.3
Axius serratus	-	-	-	-	4.5	0.2	-	0.2
Dichelopandalus leptocerus	-	1.0	5.2	-	3.4	4.5	2.3	0.6
Paguridae	-	2.7	4.5	-	0.1	4.8	2.7	1.5
Other Decapoda	-	12.2	11.4	5.3	2.8	3.9	4.6	3.0
Euphausiacea	61.7	20.6	2.7	1.1	-	4.5	3.6	0.2
Meganyctiphanes norvegica	-	8.6	-	0.8	-	4.5	3.5	0.2
Other Euphausiacea	61.7	12.0	2.7	0.3	-	<0.1	0.1	-
Other Crustacea	7.9	4.6	4.9	8.9	1.6	1.8	2.6	2.3
MOLLUSCA	-	0.2	0.3	0.8	2.2	3.0	2.6	1.6
Pelecypoda	-	0.1	-	<0.1	0.8	2.3	1.7	1.1
Placopecten sp.	-	-	-	-	-	-	-	-
Other Pelecypoda	-	0.1	-	<0.1	0.8	2.3	1.7	1.1
Gastropoda	-	0.1	-	0.4	-	-	0.4	0.1
Cephalopoda	-	-	-	-	1.3	-	<0.1	-
Other Mollusca	-	-	0.3	0.4	0.1	0.7	0.5	0.4
ECHINODERMATA	-	2.6	8.0	0.6	21.0	17.7	25.0	19.0
Echinoidea	-	-	-	0.2	2.2	2.0	4.9	2.9
Strongylocentrotus drobachiensis	-	-	-	0.1	0.2	0.2	0.1	0.1
Echinarachnius parma	-	-	-	0.1	2.0	1.5	4.7	2.7
Other Echinoidea	-	-	-	-	-	0.3	0.1	0.1
Ophiuroidea	-	2.6	8.0	0.4	15.3	14.9	18.2	12.5
Ophiura sarsi	-	1.4	5.5	-	4.0	13.8	10.7	4.3
Ophiura sp.	-	0.3	<0.1	-	4.7	0.1	0.3	1.3
Amphiuridae	-	-	-	-	-	-	-	-
Ophiopholis aculeata	-	-	-	-	4.1	0.4	3.9	3.1
Other Ophiuroidea	-	0.9	2.5	0.4	2.5	0.6	3.3	3.8
Holothuroidea	-	-	-	-	-	<0.1	<0.1	0.9
Psolus sp.	-	-	-	-	-	-	-	0.9
Other Holothuroidea	-	-	-	-	-	<0.1	<0.1	-
Other Echinodermata	-	-	-	-	3.5	0.8	1.9	2.7
PISCES	-	2.8	1.8	0.8	0.7	0.5	5.0	0.7
Melanogrammus aeglefinus	-	-	-	-	-	-	-	-
Clupeidae	-	-	-	-	-	-	-	-
Other Pisces	-	2.8	1.8	0.8	0.7	0.5	5.0	0.7
MISCELLANEOUS	12.2	16.6	20.6	35.9	27.9	33.0	17.8	21.3
SAND AND ROCK	1.7	1.1	2.7	4.7	4.3	4.4	6.7	12.3
Number of stomachs examined	17	208	102	91	84	178	154	120
Number of empty stomachs	4	13	3	5	9	3	9	7
Mean stomach content weight(g)	0.031	0.078	0.132	0.344	0.679	1.063	1.346	2.562
Mean fish FL (cm)	9	13	16	22	28	33	37	43

Table 5. (continued)

Stomach contents	Length category (cm) 46-50	51-55	56-60	61-65	66-70	71-75	76-80	>80
COELENTERATA	<0.1	<0.1	2.2	0.1	-	5.8	7.4	-
Ceriantharia	-	-	-	0.1	-	5.8	7.4	-
Other Anthozoa	<0.1	<0.1	2.2	-	-	-	-	-
POLYCHAETA	9.6	21.4	12.4	11.8	11.7	12.9	48.1	27.6
Spionphanes bombyx	0.7	-	-	0.7	-	1.4	-	1.8
Other Spionidae	0.3	-	0.1	0.8	1.4	4.1	-	-
Nicomache lumbricalis	-	-	-	-	-	-	-	14.8
Sabellidae	0.1	0.7	0.1	0.2	0.1	2.8	1.7	-
Aphroditidae	0.2	0.8	0.8	0.7	3.0	0.4	-	7.0
Other Polychaeta	8.3	19.9	11.4	9.4	7.2	4.2	46.4	4.0
CRUSTACEA	17.5	11.2	12.2	12.9	22.7	15.9	1.9	11.5
Amphipoda	3.9	4.4	3.8	6.6	12.9	12.5	0.3	0.4
Unciola irrorata	1.0	1.5	1.8	2.0	10.1	3.1	0.1	0.3
Unciola serrata	0.3	-	-	0.1	<0.1	8.8	-	-
Gammaridae	1.6	1.2	0.9	1.9	1.0	<0.1	-	<0.1
Leptocheirus pinguis	0.4	1.1	0.5	1.5	1.4	0.5	0.2	-
Other Amphipoda	0.6	0.6	0.6	1.1	0.4	0.1	-	0.1
Decapoda	10.3	3.6	6.6	5.3	9.0	3.3	0.2	10.6
Axius serratus	<0.1	1.7	1.4	3.8	4.0	2.4	-	-
Dichelopandalus leptocerus	1.2	0.6	0.6	-	0.1	0.1	-	0.5
Paguridae	0.8	0.5	0.5	0.3	2.3	-	-	-
Other Decapoda	8.3	0.8	4.1	1.2	2.6	0.8	0.2	10.1
Euphausiacea	2.2	0.2	0.3	0.3	0.6	<0.1	1.4	0.3
Meganyctiphanes norvegica	2.2	0.2	0.3	0.3	0.6	-	1.4	0.3
Other Euphausiacea	<0.1	-	<0.1	-	-	<0.1	-	-
Other Crustacea	1.1	3.0	1.5	0.7	0.2	0.1	-	0.2
MOLLUSCA	15.3	3.2	6.9	2.1	3.6	0.2	0.5	0.3
Pelecypoda	2.0	2.9	2.6	-	3.4	0.1	0.4	0.3
Placopecten sp.	0.6	2.5	0.1	-	2.4	-	-	-
Other Pelecypoda	1.4	0.4	2.5	-	1.0	0.1	0.4	0.3
Gastropoda	0.3	0.2	3.6	0.6	<0.1	0.1	0.1	-
Cephalopoda	11.7	-	-	0.9	-	-	-	-
Other Mollusca	1.3	0.1	0.7	0.6	0.2	-	-	<0.1
ECHINODERMATA	26.2	38.1	27.2	40.5	38.0	27.9	19.8	5.9
Echinoidea	3.8	6.6	4.3	4.6	0.6	1.0	0.3	-
Strongylocentrotus drobachiensis	0.2	4.7	2.3	3.3	0.4	0.3	-	-
Echinarachnius parma	3.3	1.9	1.6	1.2	0.2	0.7	0.3	-
Other Echinoidea	0.3	<0.1	0.4	0.1	<0.1	<0.1	-	-
Ophiuroidea	18.9	28.5	20.6	29.0	29.3	24.7	18.9	5.9
Ophiura sarsi	3.5	4.3	3.5	7.9	14.2	7.3	1.1	0.2
Ophiura sp.	1.3	2.4	1.0	4.9	-	-	-	-
Amphiuridae	-	-	0.6	-	-	2.1	-	-
Ophiopholis aculeata	9.3	17.8	11.4	12.6	11.5	9.7	7.2	0.4
Other Ophiuroidea	4.8	4.0	4.1	3.6	3.6	5.6	10.6	5.3
Holothuroidea	2.6	0.8	0.5	1.7	3.1	2.0	-	-
Psolus sp.	0.6	0.7	-	1.2	2.5	-	-	-
Other Holothuroidea	2.0	0.1	0.5	0.5	0.6	2.0	-	-
Other Echinodermata	0.9	2.2	1.8	5.2	5.0	0.2	0.6	-
PISCES	0.2	1.1	6.5	0.2	0.3	-	-	21.9
Melanogrammus aeglefinus	-	-	6.1	-	-	-	-	-
Clupeidae	-	-	-	-	-	-	-	21.0
Other Pisces	0.2	1.1	0.4	0.2	0.3	-	-	0.9
MISCELLANEOUS	22.8	18.8	16.1	20.3	14.6	5.0	7.8	3.0
SAND AND ROCK	8.4	6.2	16.5	12.1	9.1	33.3	14.5	29.8
Number of stomachs examined	130	129	115	83	50	35	14	9
Number of empty stomachs	7	12	12	1	1	2	0	0
Mean stomach content weight(g)	3,520	4,216	5,530	7,438	9,595	20,607	20,099	24,021
Mean fish FL (cm)	47	52	57	63	67	73	78	83

Table 6. Composition of the stomach contents of silver hake, expressed as a percentage of the total stomach contents weight versus fish length, for silver hake collected in the Northwest Atlantic from 1973 through 1976.

Stomach contents	Length category (cm) 1-5	6-10	11-15	16-20	21-25	26-30	31-35	36-40	41-45	46-50	>50
POLYCHAETA	-	0.4	0.5	-	0.1	0.3	0.2	<0.1	0.1	-	-
CRUSTACEA	89.7	80.3	81.6	77.3	28.0	55.5	21.3	2.3	0.5	0.2	0.2
Amphipoda	58.7	18.9	6.1	1.2	1.7	1.3	0.7	<0.1	<0.1	-	<0.1
Ampeliscidae	11.0	4.9	0.1	0.5	0.6	0.5	0.2	<0.1	-	-	<0.1
Oedicerotidae	3.1	3.4	4.1	0.1	<0.1	0.2	0.1	<0.1	-	-	-
Parathemisto sp.	42.1	6.2	0.3	0.4	0.6	0.4	0.3	-	-	-	-
Other Amphipoda	2.5	4.4	1.6	0.2	0.5	0.2	0.1	<0.1	<0.1	-	-
Decapoda	11.8	23.9	31.1	7.0	16.2	20.0	10.5	1.6	0.3	0.1	0.1
Crangon septemspinosa	7.7	16.0	18.7	3.7	4.3	6.1	4.3	0.3	0.1	-	<0.1
Dichelopandalus leptocerus	-	1.7	5.3	2.1	10.7	12.0	4.3	1.2	0.2	-	0.1
Other Decapoda	4.1	6.2	7.1	1.2	1.2	1.9	1.9	0.1	-	0.1	-
Euphausiacea	1.9	5.7	23.7	64.4	7.8	26.4	8.8	0.6	0.2	0.1	-
Meganyctiphanes norvegica	1.9	5.7	23.7	64.4	7.8	26.4	8.8	0.6	0.2	0.1	-
Mysidacea	4.2	22.1	12.8	3.9	0.2	6.7	0.6	<0.1	<0.1	-	0.1
Neomysis americana	4.2	22.1	12.8	3.9	0.2	6.7	0.6	<0.1	<0.1	-	0.1
Cumacea	0.8	1.1	0.2	<0.1	0.2	<0.1	<0.1	-	-	-	-
Copepoda	1.7	<0.1	<0.1	-	<0.1	-	-	-	-	-	-
Other Crustacea	10.6	8.6	7.7	0.8	1.9	1.1	0.7	0.1	<0.1	<0.1	<0.1
MOLLUSCA	-	-	-	-	17.8	3.4	14.9	14.3	0.1	12.0	-
Loligo pealei	-	-	-	-	15.3	-	13.5	10.0	-	12.0	-
Other Cephalopoda	-	-	-	-	2.5	3.4	1.4	4.3	0.1	<0.1	-
PISCES	4.8	13.9	14.0	19.9	52.8	38.7	62.4	83.4	98.9	87.8	99.8
Scomberesox saurus	-	-	-	-	-	-	-	5.6	-	-	-
Clupeidae	-	-	-	-	-	-	3.5	3.5	8.0	-	-
Merluccius bilinearis	-	2.0	4.0	-	22.1	5.0	6.9	24.2	5.9	-	-
Phycis chesteri	-	-	-	-	-	-	1.2	-	-	-	-
Ammodytes americanus	-	6.3	2.0	-	-	<0.1	3.1	0.4	7.7	-	-
Scomber scombrus	-	-	-	-	-	-	7.8	8.8	6.1	6.8	15.9
Stenotomus chrysops	-	-	-	-	-	-	-	-	10.5	-	-
Peprilus triacanthus	-	-	-	-	-	-	2.7	3.4	-	-	20.6
Other Pisces	4.8	5.6	8.0	19.9	30.7	33.7	37.2	37.5	60.7	81.0	63.7
MISCELLANEOUS	5.5	5.4	3.9	2.8	1.3	2.1	1.2	<0.1	0.4	<0.1	-
Number of stomachs examined	344	603	216	86	243	444	428	147	61	28	22
Number of empty stomachs	60	75	38	26	108	192	189	63	29	11	12
Mean stomach content weight(g)	0.066	0.025	0.104	0.370	0.452	0.545	1.440	7.278	10.321	32.081	20.262
Mean fish FL (cm)	4	7	12	18	23	28	32	37	42	48	54

Table 7. Composition of the stomach contents of pollock, expressed as a percentage of the total stomach contents weight versus fish length, for pollock collected in the Northwest Atlantic from 1973 through 1976.

Stomach contents	Length category (cm) 16-20	21-25	26-30	31-35	36-40	41-45	46-50	51-55	56-60
CRUSTACEA	99.9	87.9	66.1	84.7	79.3	66.6	30.7	96.7	60.4
Decapoda	-	-	-	2.1	17.9	28.8	5.5	53.1	4.5
Dichelopandalus leptocerus	-	-	-	0.7	0.3	2.8	-	-	2.7
Pandalus borealis	-	-	-	-	-	-	-	6.9	-
Pasiphaea multidentata	-	-	-	-	17.3	19.1	-	44.1	-
Other Decapoda	-	-	-	1.4	0.3	6.9	5.5	2.1	1.8
Euphausiacea	91.3	10.8	53.0	75.0	60.1	37.1	22.7	43.0	49.7
Meganyctiphanes norvegica	84.2	3.6	47.7	64.1	57.4	33.7	9.8	43.0	49.3
Thysanoessa inermis	-	-	4.2	10.3	-	-	12.9	-	-
Other Euphausiacea	7.1	7.2	1.1	0.6	2.7	3.4	<0.1	-	0.4
Mysidacea	-	-	0.5	-	-	0.7	-	-	-
Neomysis americana	-	-	0.5	-	-	0.7	-	-	-
Other Crustacea	8.6	77.1	12.6	7.6	1.3	-	2.5	0.6	6.2
MOLLUSCA	-	-	-	-	1.1	-	-	-	1.0
Loligo sp.	-	-	-	-	-	-	-	-	-
Other Cephalopoda	-	-	-	-	1.1	-	-	-	1.0
PISCES	-	-	31.0	4.2	13.5	24.6	54.3	0.7	30.8
Clupeidae	-	-	-	-	-	-	-	-	-
Merluccius bilinearis	-	-	-	-	-	-	-	-	-
Merluccius sp.	-	-	-	-	-	-	-	-	25.2
Pollachius virens	-	-	-	-	-	-	-	-	-
Aethoprora metopoclampa	-	-	-	-	-	-	-	-	-
Scomber scombrus	-	-	-	-	-	-	-	-	-
Sebastes marinus	-	-	-	-	-	-	-	-	-
Other Pisces	-	-	31.0	4.2	13.5	24.6	54.3	0.7	5.6
MISCELLANEOUS	0.1	12.1	2.9	11.1	6.1	8.8	15.0	2.6	7.8
Number of stomachs examined	15	12	36	50	43	26	15	17	56
Number of empty stomachs	1	3	5	12	4	7	5	3	7
Mean stomach content weight(g)	1.006	0.392	1.506	1.231	2.631	3.235	0.817	3.619	2.904
Mean fish FL (cm)	17	22	28	33	38	42	48	53	58

Table 7. (continued)

Stomach contents	Length category (cm) 61-65	66-70	71-75	76-80	81-85	86-90	91-95	>95
CRUSTACEA	67.2	32.7	63.0	42.8	54.2	32.9	12.1	15.2
Decapoda	10.1	4.6	46.5	17.1	36.9	28.2	10.7	2.4
Dichelopandalus leptocerus	0.6	2.7	1.4	0.6	1.6	12.8	0.2	0.1
Pandalus borealis	-	1.3	<0.1	0.1	1.1	3.0	-	-
Pasiphaea multidentata	8.4	0.6	45.0	16.1	33.0	12.2	9.8	2.2
Other Decapoda	1.1	<0.1	0.1	0.3	1.2	0.3	0.7	0.1
Euphausiacea	55.5	24.8	16.0	23.1	15.8	4.4	1.1	12.8
Meganyctiphanes norvegica	55.2	22.4	14.0	18.4	14.7	3.8	1.1	12.8
Thysanoessa inermis	-	-	-	3.8	0.4	-	-	-
Other Euphausiacea	0.3	2.4	2.0	0.9	0.7	0.6	-	-
Mysidacea	-	-	-	-	-	-	-	-
Neomysis americana	-	-	-	-	-	-	-	-
Other Crustacea	1.6	3.3	0.5	2.6	1.5	0.2	0.3	-
MOLLUSCA	0.6	-	0.4	<0.1	2.6	0.3	12.0	75.6
Loligo sp.	-	-	-	-	-	-	10.7	75.6
Other Cephalopoda	0.6	-	0.4	<0.1	2.6	0.3	1.3	<0.1
PISCES	29.4	57.1	29.0	50.2	35.1	65.7	74.0	6.5
Clupeidae	-	9.1	14.6	11.5	-	-	-	-
Merluccius bilinearis	6.1	-	-	-	12.7	1.3	35.8	-
Merluccius sp.	-	-	-	-	-	-	-	-
Pollachius virens	-	-	-	15.0	-	27.9	-	-
Aethoprora metopoclampa	23.0	-	-	-	-	-	-	-
Scomber scombrus	-	-	-	-	-	-	9.9	-
Sebastes marinus	-	-	-	-	-	-	2.8	-
Other Pisces	0.3	48.0	14.4	23.7	22.4	36.5	25.5	6.5
MISCELLANEOUS	2.8	10.2	7.6	7.0	8.1	1.1	1.9	2.7
Number of stomachs examined	54	55	63	60	74	60	33	16
Number of empty stomachs	8	12	12	11	16	6	4	2
Mean stomach content weight(g)	6.686	6.360	8.372	12.060	14.536	33.342	43.649	37.601
Mean fish FL (cm)	63	67	73	78	83	87	92	100

Table 8. Composition of the stomach contents of red hake, expressed as a percentage of the total stomach contents weight versus fish length, for red hake collected in the Northwest Atlantic from 1973 through 1976.

Stomach contents	Length category (cm) 1-5	6-10	11-15	16-20	21-25	26-30	31-35	36-40	41-45	>45
POLYCHAETA	-	14.8	5.6	-	20.2	7.9	3.8	1.6	4.5	1.0
Aphrodita hastata	-	-	-	-	-	-	-	-	3.5	-
Other Polychaeta	-	14.8	5.6	-	20.2	7.9	3.8	1.6	1.0	1.0
SIPUNCULIDA	-	-	-	-	-	11.2	-	-	-	-
CRUSTACEA	48.7	77.2	83.8	84.3	52.8	40.4	50.8	38.3	36.4	12.4
Amphipoda	16.7	29.3	23.6	62.4	20.1	12.1	7.8	5.9	2.0	0.7
Aeginella sp.	-	-	-	-	-	-	1.9	1.5	0.6	-
Unciola irrorata	3.0	4.9	1.7	-	3.0	4.2	0.7	0.2	<0.1	<0.1
Gammaridae	7.0	8.0	5.2	32.9	10.0	1.1	1.6	<0.1	0.2	0.1
Leptocheirus pinguis	-	6.0	9.5	-	3.5	4.4	1.0	0.4	0.2	0.4
Other Amphipoda	6.7	10.4	7.2	29.5	3.6	2.4	2.6	3.8	0.1	0.2
Decapoda	3.0	36.6	24.3	10.5	22.0	20.8	34.3	27.9	32.5	10.2
Axius serratus	-	-	-	-	-	0.7	2.7	0.5	0.6	0.2
Cancer borealis	-	-	-	-	-	-	0.3	4.1	2.7	5.5
Cancer irroratus	-	-	-	-	1.1	<0.1	2.4	1.9	0.6	2.0
Crangon septemSpinosa	1.3	5.4	12.4	2.2	5.7	7.2	4.7	2.1	3.0	-
Munida sp.	-	-	-	-	-	-	0.4	6.0	3.4	-
Pagurus acadianus	-	-	-	-	-	-	6.9	-	-	-
Dichelopandalus Teptocerus	-	22.3	4.6	-	13.4	7.0	10.9	7.6	16.4	0.9
Other Decapoda	1.7	8.9	7.3	8.3	1.8	5.9	6.0	5.7	5.8	1.6
Isopoda	-	<0.1	-	-	1.5	0.5	3.1	0.2	0.2	-
Other Crustacea	29.0	11.3	35.9	11.4	9.2	7.0	5.6	4.3	1.7	1.5
MOLLUSCA	-	-	-	-	4.6	0.1	1.3	33.8	5.7	14.6
Gastropoda	-	-	-	-	0.1	-	-	3.9	0.6	14.6
Cephalopoda	-	-	-	-	4.5	-	1.1	29.4	5.1	-
Other Mollusca	-	-	-	-	-	0.1	0.2	0.5	<0.1	-
ECHINODERMATA	-	-	-	-	0.5	0.7	1.6	8.3	0.9	-
Holothuroidea	-	-	-	-	-	0.7	1.6	8.3	0.9	-
Other Echinodermata	-	-	-	-	0.5	-	-	-	-	-
PISCES	-	-	-	-	4.1	22.3	25.8	15.0	49.9	61.3
Clupeidae	-	-	-	-	-	-	-	-	0.1	20.4
Ophidiidae	-	-	-	-	-	-	-	-	5.3	-
Pleuronectiformes	-	-	-	-	-	10.5	-	-	4.9	3.4
Other Pisces	-	-	-	-	4.1	11.8	25.8	15.0	39.6	37.5
MISCELLANEOUS	51.3	8.0	10.6	15.7	17.8	17.4	16.7	3.0	2.6	10.7
Number of stomachs examined	76	73	44	15	50	103	96	73	40	18
Number of empty stomachs	18	12	4	2	7	20	21	17	8	4
Mean stomach content weight(g)	0.006	0.031	0.089	0.175	0.247	0.614	0.989	2.857	7.416	5.391
Mean fish TL (cm)	4	7	12	17	23	28	32	37	42	49

Table 9. Composition of the stomach contents of spotted hake, expressed as a percentage of the total stomach contents weight versus fish length, for spotted hake collected in the Northwest Atlantic from 1973 through 1976.

Stomach contents	Length category (cm) 1-5	6-10	11-15	16-20	21-25	26-30	31-35	>35
CRUSTACEA	100.0	76.6	85.5	89.9	81.1	34.9	23.0	0.8
Amphipoda	77.3	50.0	35.2	6.0	1.7	0.1	-	-
Decapoda	-	3.9	22.9	39.6	21.8	16.5	17.7	0.3
Cancer irroratus	-	-	-	0.9	2.2	0.6	4.2	-
Crangon septemspinosa	-	3.5	15.5	17.7	3.8	1.5	3.3	-
Munida iris	-	-	-	3.3	1.6	8.7	-	-
Munida sp.	-	-	-	0.2	2.7	0.1	7.0	0.3
Dichelopandalus leptocerus	-	-	3.4	11.7	8.6	4.5	0.9	-
Other Decapoda	-	0.4	4.0	5.8	2.9	1.1	2.3	-
Euphausiacea	-	13.1	18.7	36.8	54.3	16.1	0.2	0.5
Meganyctiphanes norvegica	-	0.7	12.0	36.5	54.2	16.0	0.2	0.5
Other Euphausiacea	-	12.4	6.7	0.3	0.1	0.1	-	-
Other Crustacea	22.7	9.6	8.7	7.5	3.3	2.2	5.1	-
MOLLUSCA	-	-	-	0.4	8.0	41.0	15.6	97.3
Cephalopoda	-	-	-	0.2	7.7	40.9	15.6	97.3
Other Mollusca	-	-	-	0.2	0.3	0.1	-	-
PISCES	-	21.2	7.4	3.1	9.1	17.3	55.2	1.9
Merluccius bilinearis	-	-	-	-	1.4	0.4	-	-
Ophidiidae	-	-	-	-	-	5.3	9.2	-
Other Pisces	-	21.2	7.4	3.1	7.7	11.6	46.0	1.9
MISCELLANEOUS	-	2.2	7.1	6.6	1.8	6.8	6.2	<0.1
Number of stomachs examined	2	53	50	139	167	82	37	11
Number of empty stomachs	0	10	7	11	24	15	12	4
Mean stomach content weight(g)	0.022	0.041	0.140	0.329	1.287	2.845	2.667	13.790
Mean fish TL (cm)	5	8	13	18	22	27	32	38

Table 10. Composition of the stomach contents of white hake, expressed as a percentage of the total stomach contents weight versus fish length, for white hake collected in the Northwest Atlantic from 1973 through 1976.

Stomach contents	Length category (cm) 16-20	21-25	26-30	31-35	36-40	41-45	46-50	51-55
CRUSTACEA	85.1	94.1	94.1	83.4	55.0	28.7	26.7	16.2
Decapoda	7.6	27.1	35.0	25.6	22.8	13.3	19.4	12.8
Dichelopandalus leptocerus	-	-	13.3	8.4	5.4	3.8	5.0	6.7
Pandalus borealis	-	-	-	7.3	9.5	4.9	5.8	2.8
Other Decapoda	7.6	27.1	21.7	9.9	7.9	4.6	8.6	3.3
Euphausiacea	33.5	29.7	56.4	50.2	31.9	14.6	6.0	2.6
Meganyctiphanes norvegica	33.5	29.7	56.4	50.2	30.9	14.6	5.9	2.6
Other Euphausiacea	-	-	-	-	1.0	-	0.1	-
Other Crustacea	44.0	37.3	2.7	7.6	0.3	0.8	1.3	0.8
MOLLUSCA	-	-	0.2	-	1.5	1.8	6.7	-
PISCES	-	-	-	13.4	41.1	68.4	58.4	75.8
Argentina silus	-	-	-	-	-	-	-	-
Clupea harengus	-	-	-	-	-	-	-	-
Other Clupeidae	-	-	-	-	-	6.9	0.6	-
Merluccius bilinearis	-	-	-	-	-	17.1	-	5.0
Urophycis chuss	-	-	-	-	-	-	-	-
Urophycis tenuis	-	-	-	-	-	-	-	-
Other Gadidae	-	-	-	-	-	-	-	4.0
Scomber scombrus	-	-	-	-	-	-	7.0	-
Sebastes marinus	-	-	-	-	-	-	-	-
Pseudopleuronectes americanus	-	-	-	-	-	-	-	-
Other Pisces	-	-	-	13.4	41.1	44.4	50.8	66.8
MISCELLANEOUS	14.9	5.9	5.7	3.2	2.4	1.1	8.2	8.0
Number of stomachs examined	9	15	37	41	52	61	60	41
Number of empty stomachs	3	5	6	9	15	18	18	13
Mean stomach content weight(g)	0.197	0.373	1.306	4.065	3.019	9.463	8.572	9.754
Mean fish TL (cm)	19	24	28	32	38	42	47	53

Table 10. (continued)

Stomach contents	Length category (cm) 56-60	61-65	66-70	71-75	76-80	81-85	86-90	>90
CRUSTACEA	11.2	5.4	2.2	3.3	5.3	30.3	0.1	0.1
Decapoda	9.3	5.2	1.9	3.1	4.7	30.3	-	0.1
Dichelopandalus leptocerus	0.8	2.1	0.5	0.2	-	13.8	-	-
Pandalus borealis	5.8	1.8	0.5	-	2.6	-	-	-
Other Decapoda	2.7	1.3	0.9	2.9	2.1	16.5	-	0.1
Euphausiacea	0.2	0.2	0.2	0.1	0.4	-	0.1	<0.1
Meganyctiphanes norvegica	0.2	0.2	0.2	0.1	0.4	-	0.1	<0.1
Other Euphausiacea	-	-	<0.1	<0.1	-	-	-	-
Other Crustacea	1.7	<0.1	0.1	0.1	0.2	-	-	-
MOLLUSCA	-	-	0.4	-	<0.1	7.1	-	0.2
PISCES	88.1	84.5	97.3	96.6	93.7	62.6	99.9	99.7
Argentina silus	-	52.7	-	-	-	-	-	-
Clupea harengus	18.2	-	-	-	-	-	-	-
Other Clupeidae	-	-	13.8	0.6	-	-	-	-
Merluccius bilinearis	15.4	11.3	7.4	19.4	3.5	-	-	1.1
Urophycis chuss	-	-	4.7	1.9	-	-	-	-
Urophycis tenuis	-	0.7	-	-	-	-	-	87.3
Other Gadidae	-	11.4	-	0.6	3.2	-	-	-
Scomber scombrus	-	-	-	-	3.1	-	-	-
Sebastes marinus	-	-	-	2.6	3.8	-	-	-
Pseudopleuronectes americanus	-	-	-	-	-	-	-	11.2
Other Pisces	54.5	8.4	71.4	71.5	80.1	62.6	99.9	0.1
MISCELLANEOUS	0.7	10.1	0.1	0.1	1.0	<0.1	-	<0.1
Number of stomachs examined	47	38	44	42	25	11	5	7
Number of empty stomachs	14	20	12	10	7	7	3	1
Mean stomach content weight(g)	19.733	23.049	38.091	51.081	43.771	5.217	20.850	359.022
Mean fish TL (cm)	57	63	67	73	78	82	87	101

Table 11. Composition of the stomach contents of ocean pout, expressed as a percentage of the total stomach contents weight versus fish length, for ocean pout collected in the Northwest Atlantic from 1973 through 1976.

Stomach contents	Length category (cm) 11-15	16-20	21-25	26-30	31-35	36-40	41-45	46-50
POLYCHAETA	-	-	-	0.3	15.8	5.6	1.2	7.6
Aphroditidae	-	-	-	-	-	-	-	7.0
Other Polychaeta	-	-	-	0.3	15.8	5.6	1.2	0.6
CRUSTACEA	82.5	70.1	74.7	6.5	28.8	19.8	15.8	24.6
Amphipoda	82.5	53.0	74.7	4.8	27.8	7.4	7.8	9.6
Byblis serrata	-	-	-	-	-	-	-	-
Corophiidae	40.2	12.0	5.1	1.0	11.7	1.1	0.5	1.7
Other Amphipoda	42.3	41.0	69.6	3.8	16.1	6.3	7.3	7.9
Decapoda	-	17.1	-	1.5	0.3	10.1	8.0	14.9
Cancer irroratus	-	17.1	-	-	-	-	2.8	4.7
Other Cancridae	-	-	-	0.2	-	1.6	5.2	8.0
Other Decapoda	-	-	-	1.3	0.3	8.5	<0.1	2.2
Other Crustacea	-	-	-	0.2	0.7	2.3	<0.1	0.1
MOLLUSCA	-	-	-	0.1	5.4	5.9	4.4	5.0
Placopecten sp.	-	-	-	-	-	-	-	1.4
Other Mollusca	-	-	-	0.1	5.4	5.9	4.4	3.6
ECHINODERMATA	2.1	-	-	88.1	-	61.6	73.7	59.8
Echinoidea	-	-	-	88.1	-	61.6	73.2	56.8
Echinarachinus parma	-	-	-	88.1	-	10.5	35.0	32.5
Other Echinoidea	-	-	-	-	-	51.1	38.2	24.3
Ophiuroidea	2.1	-	-	<0.1	-	<0.1	0.5	-
Euryale sp.	-	-	-	-	-	-	-	-
Ophiopholis aculeata	-	-	-	-	-	-	-	-
Other Ophiuroidea	2.1	-	-	<0.1	-	<0.1	0.5	-
Other Echinodermata	-	-	-	-	-	-	-	2.9
MISCELLANEOUS	-	15.2	5.9	3.9	36.0	3.6	3.8	2.2
SAND AND ROCK	15.4	14.7	19.4	1.1	14.0	3.5	1.1	0.8
Number of stomachs examined	8	6	12	26	27	46	37	50
Number of empty stomachs	3	1	6	15	16	13	15	16
Mean stomach content weight(g)	0.012	0.061	0.051	0.736	0.061	1.210	1.504	1.625
Mean fish TL (cm)	14	17	22	28	33	37	42	48

Table 11. (continued)

Stomach contents	Length category(cm) 51-55	56-60	61-65	66-70	71-75	76-80	81-85	>85
POLYCHAETA	0.3	2.8	2.5	-	-	-	2.0	-
Aphroditidae	-	1.9	1.9	-	-	-	-	-
Other Polychaeta	0.3	0.9	0.6	-	-	-	2.0	-
CRUSTACEA	8.7	9.6	7.8	3.6	1.5	2.8	7.3	6.2
Amphipoda	2.6	6.2	2.5	0.2	<0.1	2.7	-	<0.1
Byblis serrata	-	2.5	0.8	<0.1	-	-	-	-
Corophiidae	0.4	0.2	0.7	0.1	<0.1	2.7	-	<0.1
Other Amphipoda	2.2	3.5	1.0	0.1	<0.1	<0.1	-	-
Decapoda	6.1	3.0	4.6	3.3	1.5	0.1	7.3	6.2
Cancer irroratus	<0.1	1.3	3.2	1.1	-	-	-	-
Other Cancridae	1.8	0.3	-	-	0.4	0.1	-	-
Other Decapoda	4.3	1.4	1.4	2.2	1.1	-	7.3	6.2
Other Crustacea	-	0.4	0.6	0.1	-	-	-	-
MOLLUSCA	0.8	1.9	0.2	0.4	-	-	-	30.2
Placopecten sp.	0.3	0.6	-	0.4	-	-	-	30.2
Other Mollusca	0.5	1.3	0.2	-	-	-	-	-
ECHINODERMATA	85.7	78.9	87.9	95.9	98.4	93.7	89.4	56.6
Echinoidea	78.7	78.7	82.0	95.6	98.4	92.2	7.6	28.6
Echinarachinus parma	68.1	65.6	72.6	87.1	89.2	45.1	-	-
Other Echinoidea	10.6	13.1	9.4	8.5	9.2	47.1	7.6	28.6
Ophiuroidea	<0.1	<0.1	1.6	0.1	-	-	81.8	28.0
Euryale sp.	-	-	-	-	-	-	-	20.1
Ophiopholis aculeata	-	<0.1	1.6	0.1	-	-	81.8	-
Other Ophiuroidea	<0.1	-	<0.1	-	-	-	-	7.9
Other Echinodermata	7.0	0.2	4.3	0.3	-	1.5	-	-
MISCELLANEOUS	3.0	4.7	1.4	0.1	0.1	0.1	1.3	0.6
SAND AND ROCK	1.5	2.1	0.2	-	-	3.4	-	6.4
Number of stomachs examined	54	61	42	26	16	11	2	10
Number of empty stomachs	12	19	10	6	4	4	0	4
Mean stomach content weight(g)	5.085	6.173	6.757	17.212	21.103	24.962	14.206	12.376
Mean fish TL (cm)	52	57	62	68	73	77	82	89

Table 12. Composition of the stomach contents of scup, expressed as a percentage of the total stomach contents weight versus fish length, for scup collected in the Northwest Atlantic from 1973 through 1976.

Stomach contents	Length category (cm) 6-10	11-15	16-20	21-25	26-30	>30
COELENTERATA	-	-	0.1	3.9	8.6	-
Cerianthidea	-	-	-	-	5.3	-
Anthozoa	-	-	0.1	3.9	3.3	-
NEMERTEA	0.5	0.1	-	4.0	-	-
POLYCHAETA	31.3	32.0	45.8	42.9	30.6	25.8
Maldanidae	1.2	2.0	1.1	0.8	<0.1	-
Opheliidae	2.5	0.1	0.9	0.3	<0.1	-
Scalibregmidae	-	-	-	2.9	18.8	25.8
Ampharetidae	1.2	2.3	2.5	0.1	-	-
Sabellidae	4.9	-	1.2	9.4	0.1	-
Glyceridae	1.2	0.4	8.0	6.7	3.4	-
Lumbrineridae	1.6	4.1	13.0	2.7	0.1	-
Nephtyidae	5.7	0.7	3.2	6.5	0.4	-
Sigalionidae	0.5	6.6	0.8	0.1	-	-
Other Polychaeta	12.5	15.8	15.1	13.4	7.9	-
CRUSTACEA	44.4	11.7	16.5	12.7	3.1	1.0
Amphipoda	15.7	6.4	7.1	8.9	1.4	1.0
Byblis serrata	0.4	1.0	0.7	0.9	0.1	-
Caprellidae	1.2	1.3	0.3	0.2	0.2	0.3
Unciola irrorata	3.6	1.2	2.8	0.7	0.3	-
Gammaridae	5.9	1.0	0.4	3.4	0.5	-
Leptocheirus pinguis	3.4	1.3	1.3	3.3	-	-
Other Amphipoda	1.2	0.6	1.6	0.4	0.3	0.7
Decapoda	9.6	2.1	7.0	0.6	1.7	-
Mysidacea	9.4	0.3	0.1	-	-	-
Other Crustacea	9.7	2.9	2.3	3.2	-	-
MOLLUSCA	0.1	17.9	1.4	9.7	26.8	49.0
Pelecypoda	-	0.4	0.4	1.4	6.2	-
Gastropoda	0.1	2.9	1.0	0.4	0.2	-
Acoela sp.	-	2.9	1.0	-	-	-
Other Gastropoda	0.1	-	<0.1	0.4	0.2	-
Cephalopoda	-	12.4	-	6.9	20.3	-
Other Mollusca	-	2.2	<0.1	1.0	0.1	49.0
ECHINODERMATA	-	0.9	0.1	0.8	2.5	-
PISCES	-	0.3	8.0	-	-	4.8
MISCELLANEOUS	23.7	37.0	28.0	23.4	20.6	-
SAND AND ROCK	-	0.1	0.1	2.6	7.8	19.4
Number of stomachs examined	154	213	163	138	42	11
Number of empty stomachs	52	84	61	49	17	8
Mean stomach content weight(g)	0.043	0.131	0.233	0.244	0.294	0.171
Mean fish FL (cm)	8	12	17	23	27	33

Table 13. Composition of the stomach contents of butterfish, expressed as a percentage of the total stomach contents weight versus fish length, for butterfish collected in the Northwest Atlantic from 1973 through 1976.

Stomach contents	Length category(cm) 1-5	6-10	11-15	16-20	21-25
COELENTERATA	-	1.5	1.5	9.1	60.4
Hydrozoa	-	-	-	9.0	-
Other Coelenterata	-	1.5	1.5	0.1	60.4
CTENOPHORA	-	-	3.2	2.2	-
NEMERTEA	-	-	-	1.6	-
POLYCHAETA	-	0.3	11.1	17.3	-
Glyceridae	-	-	1.1	-	-
Goniadidae	-	-	4.8	3.0	-
Lumbrineridae	-	-	0.2	1.3	-
Tomopteris helgolandica	-	-	2.2	4.8	-
Other Tomopteridae	-	-	1.0	8.1	-
Other Polychaeta	-	0.3	1.8	0.1	-
CRUSTACEA	-	4.8	13.1	3.7	0.2
Amphipoda	-	2.0	5.4	2.2	0.2
Parathemisto sp.	-	1.5	5.2	1.8	0.2
Other Amphipoda	-	0.5	0.2	0.4	-
Decapoda	-	0.1	1.4	1.0	-
Axiidae	-	-	1.4	0.9	-
Other Decapoda	-	0.1	<0.1	0.1	-
Copepoda	-	0.1	5.3	<0.1	-
Other Crustacea	-	2.6	1.0	0.5	-
MOLLUSCA	-	2.3	0.5	14.5	-
Loligo sp.	-	-	-	14.5	-
Other Mollusca	-	2.3	0.5	-	-
THALIACEA	-	12.0	21.8	17.2	32.5
Larvacea	-	7.6	12.8	2.9	32.5
Hemimyaria	-	-	3.0	13.9	-
Other Thaliacea	-	4.4	6.0	0.4	-
MISCELLANEOUS	100.0	79.1	48.8	34.4	6.9
Number of stomachs examined	23	160	551	330	15
Number of empty stomachs	2	23	156	129	6
Mean stomach content weight(g)	0.013	0.042	0.091	0.156	0.194
Mean fish FL (cm)	4	8	13	17	21

Table 14. Composition of the stomach contents of redfish, expressed as a percentage of the total stomach contents weight versus fish length, for redfish collected in the Northwest Atlantic from 1973 through 1976.

Stomach contents	Length category(cm) 6-10	11-15	16-20	21-25	26-30	31-35	36-40	>40
CRUSTACEA	41.2	96.0	98.7	23.8	94.1	83.7	95.3	99.8
Decapoda	41.2	22.7	36.6	21.7	20.3	21.7	37.4	42.2
Dichelopandalus leptocerus	-	-	36.6	-	10.7	3.8	5.3	-
Pandalus borealis	-	-	-	-	-	-	3.0	-
Other Pandalidae	-	-	-	-	-	-	5.6	-
Pasiphaea multidentata	-	-	-	-	3.7	16.7	13.6	17.3
Other Pasiphaeidae	-	-	-	-	-	0.2	4.8	24.9
Other Decapoda	41.2	22.7	-	21.7	5.9	1.0	5.1	-
Euphausiacea	-	60.0	3.8	1.7	69.5	59.9	53.8	53.8
Meganyctiphanes norvegica	-	57.8	3.8	-	53.8	59.7	52.0	53.8
Other Euphausiacea	-	2.2	-	1.7	15.7	0.2	1.8	-
Other Crustacea	-	13.3	58.3	0.4	4.3	2.1	4.1	3.8
PISCES	-	-	-	75.4	1.3	15.9	3.2	-
Merluccius bilinearis	-	-	-	-	-	4.6	-	-
Myoxocephalus octodecemspinosa	-	-	-	75.4	-	-	-	-
Other Pisces	-	-	-	-	1.3	11.3	3.2	-
MISCELLANEOUS	58.8	4.0	1.3	0.8	4.6	0.4	1.5	0.2
Number of stomachs examined	2	12	21	25	90	164	134	18
Number of empty stomachs	1	4	19	20	66	79	39	7
Mean stomach content weight(g)	0.017	0.053	0.040	0.229	0.412	1.087	1.100	2.017
Mean fish FL (cm)	9	12	18	24	28	32	37	42

Table 15. Composition of the stomach contents of longhorn sculpin, expressed as a percentage of the total stomach contents weight versus fish length, for longhorn sculpin collected in the Northwest Atlantic from 1973-1976.

Stomach contents	Length category(cm) 1-5	6-10	11-15	16-20	21-25	26-30	31-35	>35
POLYCHAETA	0.6	0.2	0.2	0.6	2.0	0.9	1.0	1.0
CRUSTACEA	84.0	91.4	78.7	92.3	87.7	83.2	92.3	99.0
Amphipoda	26.3	29.5	14.9	0.9	4.9	4.2	5.2	0.1
Unciola irrorata	7.0	2.2	0.2	0.2	2.6	0.7	0.8	-
Gammaridae	3.9	10.7	6.5	0.3	0.1	0.6	1.2	-
Anonyx liljeborgi	-	-	-	-	-	1.0	-	-
Other Lysianassidae	-	4.5	-	-	0.1	0.5	-	-
Leptocheirus pinguis	2.4	1.9	3.0	0.2	1.8	0.3	0.8	-
Other Amphipoda	13.0	10.2	5.2	0.2	0.3	1.1	2.4	0.1
Decapoda	49.5	50.7	60.0	86.8	75.3	65.1	83.9	98.9
Axius serratus	-	-	0.1	0.5	-	-	2.1	-
Cancer borealis	-	-	-	0.5	4.5	2.4	1.6	-
Cancer irroratus	-	0.1	0.6	65.2	15.6	25.6	48.2	98.9
Other Cancridae	-	1.5	0.4	1.3	4.2	1.9	8.4	-
Crangon septemspinosa	20.2	29.1	17.2	1.2	9.9	7.1	1.0	-
Hyas araneus	-	-	-	-	-	0.4	1.2	-
Hyas coarctatus	-	-	-	0.2	0.1	3.4	2.5	-
Pagurus acadianus	-	0.3	-	-	4.5	2.5	2.4	-
Pagurus sp.	-	0.3	16.2	-	2.5	3.8	0.6	-
Other Paguridae	-	-	0.3	-	0.3	1.5	1.7	-
Dichelopandalus leptocerus	-	7.3	11.0	5.5	19.7	12.2	7.7	-
Other Pandalidae	-	3.1	-	2.9	1.1	0.2	0.9	-
Other Decapoda	29.3	9.0	14.2	9.5	12.9	4.1	5.6	-
Isopoda	4.8	2.5	0.9	0.1	0.1	0.7	0.5	-
Mysidacea	-	1.5	0.3	-	5.4	11.7	-	-
Neomysis americana	-	1.5	0.3	-	5.4	11.7	-	-
Other Crustacea	3.4	7.2	2.6	4.5	2.0	1.5	2.7	-
PISCES	-	1.6	-	4.6	3.0	8.8	4.4	-
Rajidae	-	-	-	-	-	1.2	-	-
Pisces eggs	-	-	-	-	-	4.9	-	-
Other Pisces	-	1.6	-	4.6	3.0	2.7	4.4	-
MISCELLANEOUS	15.4	6.7	19.0	2.0	5.6	4.2	2.2	-
SAND AND ROCK	-	0.1	2.1	0.5	1.7	2.9	0.1	-
Number of stomachs examined	36	163	40	54	134	224	56	2
Number of empty stomachs	8	34	4	19	33	51	9	0
Mean stomach content weight(g)	0.009	0.050	0.244	0.374	0.535	1.266	2.302	3.768
Mean fish TL (cm)	4	7	12	18	23	27	31	37

Table 16. Composition of the stomach contents of fourspot flounder, expressed as a percentage of the total stomach contents weight versus fish length, for fourspot flounder collected in the Northwest Atlantic from 1973 through 1976.

Stomach contents	Length category (cm) 11-15	16-20	21-25	26-30	31-35	>35
CRUSTACEA	100.0	66.5	75.9	65.6	51.9	82.4
Amphipoda	-	0.9	0.8	0.6	-	-
Decapoda	100.0	39.8	55.4	53.3	47.7	82.4
Cancer irroratus	-	-	6.5	5.0	8.8	-
Other Cancridae	-	1.0	6.0	2.4	11.4	14.3
Crangon septemspinosa	100.0	15.8	10.7	4.6	7.4	44.8
Other Crangonidae	-	0.8	2.2	0.1	-	23.3
Munida iris	-	-	2.9	1.1	4.9	-
Munida sp.	-	15.9	2.3	0.8	9.2	-
Dichelopandalus leptocerus	-	-	17.6	30.6	5.5	-
Other Pandalidae	-	1.7	1.0	2.6	-	-
Other Decapoda	-	4.6	6.2	6.1	0.5	-
Mysidacea	-	22.6	11.1	6.8	3.2	-
Neomysis americana	-	22.6	11.1	6.7	3.2	-
Other Mysidacea	-	-	-	0.1	-	-
Other Crustacea	-	3.2	8.6	4.9	1.0	-
MOLLUSCA	-	0.3	8.4	12.4	44.6	-
Cephalopoda	-	0.3	8.2	12.4	44.6	-
Rossia sp.	-	-	-	10.1	-	-
Other Cephalopoda	-	0.3	8.2	2.3	44.6	-
Other Mollusca	-	-	0.2	-	-	-
PISCES	-	28.3	12.8	14.9	2.0	-
MISCELLANEOUS	-	4.9	2.9	7.1	1.5	17.6
Number of stomachs examined	4	40	165	132	36	6
Number of empty stomachs	3	18	58	44	18	3
Mean stomach content weight(g)	0.014	0.134	0.185	0.367	0.783	0.047
Mean fish TL (cm)	15	18	23	27	32	42

Table 17. Composition of the stomach contents of witch flounder, expressed as a percentage of the total stomach contents weight versus fish length, for witch flounder collected in the Northwest Atlantic from 1973 through 1976.

Stomach contents	Length category (cm) <20	21-25	26-30	31-35	36-40	41-45	46-50	51-55	56-60	>60
COELENTERATA	0.2	-	-	-	<0.1	5.9	-	<0.1	3.8	0.6
Ceriantharia	-	-	-	-	-	-	-	-	3.8	0.6
Anthozoa	0.2	-	-	-	<0.1	5.9	-	<0.1	-	-
POLYCHAETA	19.2	65.4	45.1	65.6	60.4	66.2	62.3	60.3	64.2	97.7
Spionidae	-	0.5	-	-	0.1	-	1.8	1.0	2.1	0.1
Maldanidae	-	-	0.5	0.8	0.1	0.4	0.5	1.7	0.2	-
Sternaspidae	-	1.7	0.6	3.8	2.5	3.7	2.0	2.4	2.4	-
Capitellidae	-	0.2	-	2.9	0.7	0.9	0.9	1.6	0.6	<0.1
Ampharetidae	2.3	1.1	1.3	1.5	1.0	1.8	1.5	1.1	0.3	<0.1
Sabellidae	0.4	-	1.2	0.4	0.2	2.7	0.9	2.5	0.6	-
Arabellidae	-	-	-	-	-	2.6	-	0.9	0.1	-
Eunice pennata	-	-	-	-	-	-	3.8	2.0	6.7	-
Goniadidae	-	0.2	-	0.4	2.5	3.1	3.7	4.2	0.1	-
Lumbrineris sp.	-	7.6	1.6	1.5	1.7	0.3	0.6	1.9	0.5	-
Other Lumbrineridae	1.3	13.5	4.2	10.1	5.8	8.7	2.6	7.3	7.1	<0.1
Nephtyidae	6.4	-	3.6	1.3	2.7	4.0	1.8	1.6	2.6	-
Onuphis eremita	-	-	-	-	-	0.3	1.9	2.1	-	-
Onuphis opalina	-	-	7.7	-	0.4	3.0	0.6	0.7	-	-
Onuphis sp.	-	1.7	0.3	1.1	3.5	3.0	1.3	0.1	1.8	-
Other Onuphidae	-	-	2.4	7.1	4.6	5.9	3.3	2.6	0.8	0.3
Eteone sp.	-	-	-	-	-	-	-	0.1	-	-
Other Phyllodocidae	-	-	-	-	0.4	<0.1	1.4	<0.1	2.0	-
Other Polychaeta	8.8	38.9	21.7	34.7	34.2	25.8	33.7	26.5	36.3	97.3
CRUSTACEA	73.5	15.3	37.1	1.2	10.8	6.5	2.7	3.9	3.6	0.5
Amphipoda	2.1	14.1	1.4	0.8	2.0	1.7	1.8	1.0	0.9	0.1
Gammaridae	1.5	1.1	1.1	0.6	0.7	0.8	0.7	0.6	0.2	0.1
Other Amphipoda	0.6	13.0	0.3	0.2	1.3	0.9	1.1	0.4	0.7	<0.1
Euphausiacea	69.8	-	34.9	0.1	8.5	3.1	-	1.2	1.7	-
Meganyctiphanes norvegica	69.8	-	34.9	0.1	8.5	3.1	-	1.2	1.7	-
Other Crustacea	1.6	1.2	0.8	0.3	0.3	1.7	0.9	1.7	1.0	0.4
MOLLUSCA	0.1	1.8	0.5	1.7	2.6	0.8	1.5	1.5	2.0	-
Yoldia sp.	-	-	<0.1	0.9	2.1	0.3	0.5	0.9	1.0	-
Other Mollusca	0.1	1.8	0.5	0.8	0.5	0.5	1.0	0.6	1.0	-
ECHINODERMATA	-	0.1	4.8	5.7	9.8	12.1	18.2	18.8	7.9	-
Ophiuroidea	-	0.1	-	-	-	-	0.9	0.5	3.5	-
Ophiura sarsi	-	-	-	-	-	-	0.6	0.1	3.4	-
Other Ophiuroidea	-	0.1	-	-	-	-	0.3	0.4	0.1	-
Holothuroidea	-	-	4.8	5.7	9.8	12.0	17.3	15.3	4.4	-
Havelockia scabra	-	-	-	-	-	0.2	1.5	0.1	-	-
Dendrochirotida	-	-	-	-	-	-	1.9	0.7	-	-
Other Holothuroidea	-	-	4.8	5.7	9.8	11.8	13.9	14.5	4.4	-
Other Echinodermata	-	-	-	-	-	0.1	-	2.2	-	-
ASCIDIACEA	-	1.2	1.1	1.4	0.6	0.1	2.9	0.6	0.5	-
MISCELLANEOUS	7.0	16.2	11.4	24.4	15.7	8.1	12.3	14.9	15.8	1.2
SAND AND ROCK	-	-	-	-	0.1	0.3	0.1	0.8	2.2	<0.1
Number of stomachs examined	44	22	32	63	95	147	199	154	74	7
Number of empty stomachs	4	1	6	9	8	20	17	10	5	0
Mean stomach content weight(g)	0.130	0.186	0.228	0.223	0.347	0.417	0.566	0.908	1.003	5.957
Mean fish TL (cm)	12	22	28	33	37	43	48	52	57	66

Table 18. Composition of the stomach contents of American plaice, expressed as a percentage of the total stomach contents weight versus fish length, for American plaice collected in the Northwest Atlantic from 1973 through 1976.

Stomach contents	Length category (cm) 6-10	11-15	16-20	21-25	26-30	31-35	36-40	41-45	46-50	>50
POLYCHAETA	65.5	38.2	37.9	11.8	5.3	6.2	6.5	0.8	0.3	0.4
CRUSTACEA	25.3	28.5	27.8	34.3	33.1	24.4	25.5	3.7	0.9	0.3
Decapoda	-	0.4	0.1	24.7	26.4	13.0	21.3	1.7	0.8	<0.1
Dichelopandalus leptocerus	-	-	-	11.2	9.9	-	13.5	1.7	-	-
Pandalus borealis	-	-	-	-	-	5.7	2.6	-	-	-
Other Decapoda	-	0.4	0.1	13.5	16.5	7.3	5.2	-	0.8	<0.1
Euphausiacea	-	13.3	16.7	5.5	2.8	9.0	4.2	1.9	0.1	0.2
Meganyctiphanes norvegica	-	12.3	16.7	5.5	2.8	8.9	4.1	1.9	0.1	0.2
Other Euphausiacea	-	1.0	-	-	-	0.1	0.1	-	-	-
Other Crustacea	25.3	14.8	11.0	4.1	3.9	2.4	<0.1	0.1	-	0.1
MOLLUSCA	0.5	12.6	18.5	30.9	8.4	6.2	10.0	5.6	0.8	0.4
Pelecypoda	0.5	12.5	15.2	19.3	7.6	3.5	10.0	4.3	0.7	0.4
Cerastoderma pinnulatum	-	-	-	-	-	-	3.0	3.5	-	-
Other Pelecypoda	0.5	12.5	15.2	19.3	7.6	3.5	7.0	0.8	0.7	0.4
Other Mollusca	-	0.1	3.3	11.6	0.8	2.7	-	1.3	0.1	<0.1
ECHINODERMATA	-	11.1	4.3	17.9	49.8	51.5	53.5	81.2	96.4	97.5
Echinoidea	-	-	-	12.5	25.2	23.9	14.3	31.1	78.7	90.5
Strongylocentrotus drobachiensis	-	-	-	-	-	3.2	0.4	3.2	<0.1	0.3
Echinarachnius parma	-	-	-	12.3	23.3	15.7	13.8	27.7	69.5	52.1
Echinarachnius sp.	-	-	-	-	-	-	-	-	4.9	36.9
Other Echinoidea	-	-	-	0.2	1.9	5.0	0.1	0.2	4.3	1.2
Ophiuroidea	-	11.1	4.1	5.0	22.7	26.2	32.8	43.3	11.8	6.0
Ophiura sarsi	-	6.9	3.5	3.2	16.1	22.4	21.4	39.8	9.8	5.7
Other Ophiuroidea	-	4.2	0.6	1.8	6.6	3.8	11.4	3.5	2.0	0.3
Other Echinodermata	-	-	0.2	0.4	1.9	1.4	6.4	6.8	5.9	1.0
MISCELLANEOUS	8.5	9.0	10.7	4.9	2.6	4.5	3.4	3.9	0.8	0.7
SAND AND ROCK	0.2	0.6	0.8	0.2	0.8	7.2	1.1	4.8	0.8	0.7
Number of stomachs examined	138	214	156	151	172	198	176	134	76	78
Number of empty stomachs	59	76	59	66	85	84	85	54	27	28
Mean stomach content weight(g)	0.004	0.031	0.063	0.170	0.268	0.648	0.928	1.172	4.678	9.310
Mean fish TL (cm)	8	13	18	23	28	33	37	42	47	56

Table 19. Composition of the stomach contents of yellowtail flounder, expressed as a percentage of the total stomach contents weight versus fish length, for yellowtail flounder collected in the Northwest Atlantic from 1973 through 1976.

Stomach contents	Length category(cm) 1-5	6-10	11-15	16-20	21-25	26-30	31-35	36-40	41-45	>45
COELENTERATA	-	-	-	-	-	1.1	0.7	4.3	8.1	2.6
NEMERTEA	-	-	-	0.5	<0.1	0.5	0.9	0.3	0.2	0.6
POLYCHAETA	-	22.5	11.9	13.6	32.7	31.4	48.9	46.5	47.9	31.0
Splonphanes bombyx	-	11.7	-	-	5.8	0.9	10.3	12.0	12.0	10.6
Other Spionidae	-	-	-	-	0.6	1.8	2.7	4.9	9.8	-
Flabelligeridae	-	-	-	6.2	1.2	0.1	1.2	0.4	<0.1	-
Maldanidae	-	-	-	-	3.6	0.4	1.0	1.0	0.2	-
Ampharetidae	-	-	-	-	0.6	1.7	1.3	0.2	-	-
Sabellidae	-	-	-	-	2.0	1.0	3.3	0.9	0.2	-
Lumbrineridae	-	-	-	-	0.5	3.1	3.5	1.1	0.1	1.5
Nephtyidae	-	-	-	-	0.5	0.3	2.8	0.9	0.2	0.3
Other Polychaeta	-	10.8	11.9	7.4	17.9	22.1	22.8	25.1	25.4	18.6
CRUSTACEA	100.0	61.0	61.8	50.8	32.3	37.7	20.7	15.4	8.6	5.5
Amphipoda	-	32.7	13.6	31.5	22.1	25.5	14.2	13.3	8.4	5.4
Dyblis serrata	-	1.7	-	2.0	0.6	1.2	1.2	2.4	2.5	1.6
Other Ampeliscidae	-	14.7	0.8	1.8	0.7	2.4	2.3	1.4	0.6	0.6
Unciola irrorata	-	2.2	3.6	15.3	12.9	11.9	5.3	3.4	0.3	<0.1
Gammaridae	-	3.8	5.0	1.5	1.6	4.2	2.1	1.4	2.8	1.3
Leptocheirus pinguis	-	-	-	8.5	4.8	3.8	1.9	3.1	2.0	-
Other Amphipoda	-	10.3	4.2	2.4	1.5	2.0	1.4	1.6	0.2	1.9
Decapoda	41.4	9.1	47.5	14.7	5.8	8.6	5.7	1.6	0.1	-
Crangon septemspinosa	41.4	9.1	12.0	-	3.3	7.1	2.5	0.7	0.1	-
Dichelopandalus Leptocerus	-	-	31.8	-	-	0.6	2.0	0.7	-	-
Other Decapoda	-	-	3.6	14.7	2.6	0.8	1.2	0.2	-	-
Other Crustacea	58.6	19.2	0.7	4.6	4.4	3.6	0.8	0.5	0.1	0.1
MOLLUSCA	-	0.2	-	-	0.1	0.3	0.6	0.3	1.8	-
Bivalvia	-	0.2	-	-	0.1	0.3	0.6	0.3	1.8	-
UROCHORDATA	-	-	-	-	0.2	0.7	1.4	0.3	-	-
Ascidiacea	-	-	-	-	0.2	0.7	1.4	0.3	-	-
MISCELLANEOUS	-	0.9	0.6	1.7	10.2	8.2	10.2	17.1	22.7	34.5
SAND AND ROCK	-	15.4	25.7	33.4	24.5	20.1	16.6	15.8	10.7	25.8
Number of stomachs examined	39	77	21	23	63	186	337	191	60	20
Number of empty stomachs	22	25	6	9	16	63	108	62	20	4
Mean stomach content weight(g)	0.001	0.021	0.072	0.103	0.230	0.241	0.375	0.563	0.950	3.166
Mean fish TL (cm)	3	8	12	18	23	28	32	37	42	48

Table 20. Food of fishes representing generalized dietary categories in the Middle Atlantic. Data are expressed as a percentage of the total stomach contents weight.

Stomach contents	Middle Atlantic Fishes				
	Silver hake	Spotted hake	Fourspot flounder	Butterfish	Scup
POLYCHAETA	0.1	-	-	9.5	41.4
Aphrodita sp.	-	-	-	-	-
Other Polychaeta	0.1	-	-	9.5	41.4
CRUSTACEA	7.3	43.3	64.5	6.3	7.5
Amphipoda	0.5	1.4	0.5	4.9	2.0
Unciola irrorata	-	-	-	-	0.3
Leptocheirus pinguis	-	-	-	-	-
Gammarus annulatus	-	-	-	-	-
Other Amphipoda	0.5	1.4	0.5	4.9	1.7
Decapoda	4.9	16.4	52.2	0.1	3.7
Axius serratus	-	-	-	-	-
Cancer sp.	-	1.4	12.1	-	-
Geryon quinquedens	-	-	-	-	-
Pagurus sp.	-	-	-	-	-
Crangon septemspinosa	2.4	3.3	7.7	-	-
Dichelopandalus leptocerus	1.8	4.7	19.7	-	-
Pandalus borealis	-	-	-	-	-
Pasiphaea multidentata	-	-	-	-	-
Other Decapoda	0.7	7.0	12.7	0.1	3.7
Euphausiacea	1.2	22.6	-	-	-
Meganyctiphanes norvegica	1.2	22.4	-	-	-
Thysanoessa inermis	-	-	-	-	-
Other Euphausiacea	-	0.2	-	-	-
Mysidacea	0.3	-	7.1	-	-
Neomysis americana	0.3	-	7.1	-	-
Other Mysidacea	-	-	<0.1	-	-
Other Crustacea	0.4	2.9	4.7	1.3	1.8
MOLLUSCA	4.3	37.1	19.2	10.1	12.9
Loligo pealei	2.9	-	-	9.6	-
Other Cephalopoda	1.4	36.9	19.1	-	6.4
Scallop viscera	-	-	-	-	-
Other Mullusca	-	0.2	0.1	0.5	6.5
THALIACEA	-	-	-	25.2	-
ECHINODERMATA	-	-	-	-	1.2
Echinoidea	-	-	-	-	-
Ophiuroidea	-	-	-	-	-
Holothuroidea	-	-	-	-	-
Other Echinodermata	-	-	-	-	1.2
PISCES	87.5	15.9	11.9	-	0.3
Merluccius bilinearis	20.8	0.5	-	-	-
Clupeidae	3.2	-	-	-	-
Scomber scombrus	-	-	-	-	-
Ammodytes americanus	1.7	-	-	-	-
Stenotomus chrysops	-	-	-	-	-
Peprilus triacanthus	1.4	-	-	-	-
Sebastes marinus	-	-	-	-	-
Hippoglossoides platessoides	-	-	-	-	-
Gadus morhua	-	-	-	-	-
Melanogrammus aeglefinus	-	-	-	-	-
Pollachius virens	-	-	-	-	-
Urophycis tenuis	-	-	-	-	-
Other Pisces	60.4	15.4	11.9	-	0.3
MISCELLANEOUS	0.8	3.7	4.4	48.9	36.7
Number of fish examined	789	531	366	678	450
Number of empty stomachs	180	82	138	203	192
Mean stomach content weight(g)	1.544	1.404	0.301	0.115	0.119

Table 21. Food of fishes representing generalized dietary categories in Southern New England. Data are expressed as a percentage of the total stomach contents weight.

Stomach contents	Southern New England Fishes						
	Silver hake	Red hake	Little skate	Butterfish	Scup	Yellowtail flounder	Ocean pout
POLYCHAETA	0.1	3.9	15.5	20.3	32.4	47.7	2.7
Aphrodita sp.	-	1.4	2.4	-	-	-	1.9
Other Polychaeta	0.1	2.5	13.1	20.3	32.4	47.7	0.8
CRUSTACEA	7.3	34.0	61.4	12.0	22.2	24.9	6.3
Amphipoda	0.2	5.1	22.9	0.9	12.9	19.0	3.6
Unciola irrorata	-	0.6	2.4	-	2.9	6.9	-
Leptocheirus pinguis	-	0.9	7.9	-	3.6	3.3	-
Gammarus annulatus	-	-	4.1	-	-	-	-
Other Amphipoda	0.2	3.6	8.5	0.9	6.4	8.8	3.6
Decapoda	2.6	25.0	30.5	3.4	3.8	4.7	2.6
Axius serratus	-	0.6	4.3	3.3	-	-	-
Cancer sp.	-	4.3	11.4	-	-	-	1.0
Geryon quinquedens	-	-	-	-	-	-	-
Pagurus sp.	-	0.9	2.5	-	-	-	-
Crangon septemspinosa	1.0	3.0	5.9	-	-	2.2	-
Dichelopandalus leptocerus	1.2	7.8	2.7	-	-	1.9	-
Pandalus borealis	-	-	-	-	-	-	-
Pasiphaea multidentata	-	-	-	-	-	-	-
Other Decapoda	0.4	8.4	3.7	0.1	3.8	0.6	1.6
Euphausiacea	3.4	-	-	-	-	-	-
Meganyctiphanes norvegica	3.4	-	-	-	-	-	-
Thysanoessa inermis	-	-	-	-	-	-	-
Other Euphausiacea	-	-	-	-	-	-	-
Mysidacea	0.7	-	-	-	1.3	-	-
Neomysis americana	0.7	-	-	-	-	-	-
Other Mysidacea	-	-	-	-	1.3	-	-
Other Crustacea	0.4	3.9	8.0	7.7	4.2	1.2	0.1
MOLLUSCA	13.7	13.9	4.8	<0.1	10.5	0.6	0.8
Loligo pealei	13.0	-	-	-	-	-	-
Other Cephalopoda	0.7	10.6	-	-	8.4	-	-
Scallop viscera	-	-	-	-	-	-	-
Other Mollusca	-	3.3	4.8	<0.1	2.1	0.6	0.8
THALIACEA	-	-	-	8.5	-	-	-
ECHINODERMATA	-	3.0	-	-	0.4	-	88.3
Echinoidea	-	-	-	-	-	-	88.2
Ophiuroidea	-	-	-	-	-	-	-
Holothuroidea	-	3.0	-	-	-	-	-
Other Echinodermata	-	<0.1	-	-	0.4	-	0.1
PISCES	78.4	37.7	4.8	-	5.3	-	-
Merluccius bilinearis	7.9	-	-	-	-	-	-
Clupeidae	1.3	2.7	-	-	-	-	-
Scomber scombrus	6.0	-	-	-	-	-	-
Ammodytes americanus	0.4	-	-	-	-	-	-
Stenotomus chrysops	4.1	-	-	-	-	-	-
Peprilus triacanthus	2.2	-	-	-	-	-	-
Sebastes marinus	-	-	-	-	-	-	-
Hippoglossoides platessoides	-	-	-	-	-	-	-
Gadus morhua	-	-	-	-	-	-	-
Melanogrammus aeglefinus	-	-	-	-	-	-	-
Pollachius virens	-	-	-	-	-	-	-
Urophycis tenuis	-	-	-	-	-	-	-
Other Pisces	56.5	35.0	4.8	-	5.3	-	-
MISCELLANEOUS	0.5	7.5	13.5	59.2	29.2	26.8	1.9
Number of fish examined	918	481	486	394	262	502	239
Number of empty stomachs	357	97	35	108	76	163	78
Mean stomach content weight (g)	1.815	1.532	0.810	0.087	0.219	0.323	3.959

Table 22. Food of fishes representing generalized dietary categories on Georges Bank. Data are expressed as a percentage of the total stomach contents weight.

Stomach contents	Georges Bank Fishes						
	Silver hake	Atlantic cod	Little skate	Longhorn sculpin	Haddock	Yellowtail flounder	Ocean pout
POLYCHAETA	0.1	1.7	8.7	1.1	25.4	40.6	0.1
Aphrodita sp.	-	1.4	1.5	-	1.1	-	-
Other Polychaeta	0.1	0.3	7.2	1.1	24.3	40.6	0.1
CRUSTACEA	16.4	28.0	72.0	86.4	17.1	13.8	6.4
Amphipoda	0.4	-	10.1	2.9	10.7	10.3	2.0
Unciola irrorata	-	-	0.3	0.7	4.2	2.8	-
Leptocheirus pinguis	-	-	2.6	0.6	0.8	1.6	-
Gammarus annulatus	-	-	-	-	-	-	-
Other Amphipoda	0.4	-	7.2	1.6	5.7	5.9	2.0
Decapoda	6.5	27.1	56.6	74.0	4.9	2.9	4.1
Axius serratus	-	<0.1	<0.1	0.6	0.7	-	-
Cancer sp.	-	17.1	12.0	38.9	-	-	1.9
Geryon quinquedens	-	-	-	-	-	-	-
Pagurus sp.	-	3.8	26.3	6.5	0.3	-	-
Crangon septemspinosa	1.3	-	8.6	6.3	-	1.8	-
Dichelopandalus leptocerus	4.4	1.6	3.4	11.5	0.3	0.4	-
Pandalus borealis	-	-	-	-	-	-	-
Pasiphaea multidentata	-	-	-	-	-	-	-
Other Decapoda	0.8	4.6	6.3	10.2	3.6	0.7	2.2
Euphausiacea	7.9	-	-	-	0.1	-	-
Meganyctiphanes norvegica	7.9	-	-	-	0.1	-	-
Thysanoessa inermis	-	-	-	-	-	-	-
Other Euphausiacea	-	-	-	-	<0.1	-	-
Mysidacea	1.2	-	-	7.3	-	-	-
Neomysis americana	1.2	-	-	7.3	-	-	-
Other Mysidacea	-	-	-	-	-	-	-
Other Crustacea	0.4	0.9	5.3	2.2	1.4	0.6	0.3
MOLLUSCA	6.7	13.4	0.7	-	3.3	0.6	3.6
Loligo pealei	6.7	2.3	-	-	-	-	-
Other Cephalopoda	<0.1	0.3	-	-	<0.1	-	-
Scallop viscera	-	7.3	-	-	1.2	-	3.1
Other Mollusca	-	3.5	0.7	-	2.1	0.6	0.5
THALIACEA	-	-	-	-	-	-	-
ECHINODERMATA	-	1.3	-	-	18.5	-	86.6
Echinoidea	-	-	-	-	1.0	-	79.4
Ophiuroidea	-	0.8	-	-	16.6	-	4.5
Holothuroidea	-	0.3	-	-	0.7	-	-
Other Echinodermata	-	0.2	-	-	0.2	-	2.7
PISCES	76.4	50.2	6.8	6.6	0.4	-	-
Merluccius bilinearis	0.4	0.2	-	-	-	-	-
Clupeidae	5.0	29.1	-	-	-	-	-
Scomber scomorus	21.1	3.5	-	-	-	-	-
Ammodytes americanus	4.8	0.4	-	-	-	-	-
Stenotomus chrysops	-	-	-	-	-	-	-
Peprilus triacanthus	8.9	-	-	-	-	-	-
Sebastes marinus	-	<0.1	-	-	-	-	-
Hippoglossoides platessoides	-	0.9	-	-	-	-	-
Gadus morhua	-	-	-	-	-	-	-
Melanogrammus aeglefinus	-	-	-	-	-	-	-
Pollachius virens	-	-	-	-	-	-	-
Urophycis tenuis	-	-	-	-	-	-	-
Other Pisces	36.2	16.1	6.8	6.6	0.4	-	-
MISCELLANEOUS	0.4	5.4	11.8	5.9	35.3	45.0	3.3
Number of fish examined	915	591	579	692	642	502	423
Number of empty stomachs	268	31	62	159	33	169	140
Mean stomach content weight (g)	1.080	29.254	1.234	0.732	3.893	0.512	5.603

Table 23. Food of fishes representing generalized dietary categories in the Gulf of Maine. Data are expressed as a percentage of the total stomach contents weight.

Stomach contents	Gulf of Maine Fishes						
	White hake	Atlantic cod	Pollock	Redfish	Witch flounder	Haddock	American plaice
POLYCHAETA	-	0.6	-	-	67.3	3.6	4.0
Aphrodita sp.	-	0.4	-	-	-	0.8	-
Other Polychaeta	-	0.2	-	-	67.3	2.8	4.0
CRUSTACEA	9.3	9.7	37.0	89.5	3.5	6.4	7.7
Amphipoda	-	-	-	-	0.9	0.6	-
Unciola irrorata	-	-	-	-	0.1	0.4	-
Leptocheirus pinguis	-	-	-	-	0.1	-	-
Gammarus annulatus	-	-	-	-	-	-	-
Other Amphipoda	-	-	-	-	0.7	0.2	-
Decapoda	5.7	8.4	24.7	27.8	-	3.1	6.6
Axius serratus	-	<0.1	-	-	-	2.7	-
Cancer sp.	-	0.9	-	-	-	-	-
Geryon quinquedens	-	3.5	-	-	-	-	-
Pagurus sp.	-	<0.1	-	-	-	<0.1	-
Crangon septemspinosa	-	-	-	-	-	-	-
Dichelopandalus leptocerus	1.4	0.9	0.7	3.5	-	0.1	1.4
Pandalus borealis	1.9	-	1.7	1.1	-	-	1.4
Pasiphaea multidentata	-	-	21.9	18.2	-	-	-
Other Decapoda	2.4	3.1	0.4	5.0	-	0.3	3.8
Euphausiacea	3.1	-	10.9	58.4	1.7	2.0	0.7
Meganyctiphanes norvegica	3.1	-	10.1	55.1	1.7	1.7	0.6
Thysanoessa inermis	-	-	<0.1	-	-	-	-
Other Euphausiacea	<0.1	-	0.8	3.3	-	0.3	0.1
Mysidacea	-	-	<0.1	-	-	-	-
Neomysis americana	-	-	<0.1	-	-	-	-
Other Mysidacea	-	-	-	-	-	-	-
Other Crustacea	0.5	1.3	1.4	3.3	0.9	0.7	0.4
MOLLUSCA	0.5	17.9	8.5	-	0.8	0.6	5.4
Loligo pealei	-	15.6	7.3	-	-	-	-
Other Cephalopoda	-	2.1	1.2	-	-	-	-
Scallop viscera	-	-	-	-	-	-	-
Other Mollusca	0.5	0.2	-	-	0.8	0.6	5.4
THALIACEA	-	-	-	-	-	-	-
ECHINODERMATA	-	1.9	-	-	11.8	74.8	76.6
Echinoidea	-	-	-	-	-	2.2	3.7
Ophiuroidea	-	1.3	-	-	1.6	59.1	58.5
Holothuroidea	-	0.2	-	-	10.2	0.9	-
Other Echinodermata	-	0.4	-	-	-	12.6	14.4
PISCES	88.6	68.8	49.4	9.2	-	0.9	-
Merluccius bilinearis	8.9	5.4	2.3	2.0	-	-	-
Clupeidae	4.2	13.2	1.8	-	-	-	-
Scomber scombrus	0.7	10.9	3.1	-	-	-	-
Ammodytes americanus	-	9.4	-	-	-	-	-
Stenotomus chrysops	-	-	-	-	-	-	-
Peprilus triacanthus	-	-	-	-	-	-	-
Sebastes marinus	0.9	3.5	0.9	-	-	-	-
Hippoglossoides platessoides	-	-	-	-	-	-	-
Gadus morhua	-	-	-	-	-	-	-
Melanogrammus aeglefinus	-	-	-	-	-	-	-
Pollachius virens	-	-	14.4	-	-	-	-
Urophycis tenuis	20.4	-	-	-	-	-	-
Other Pisces	53.5	26.4	26.9	7.2	-	0.9	-
MISCELLANEOUS	1.6	1.1	5.1	1.3	16.6	13.7	6.3
Number of fish examined	470	418	374	466	426	87	714
Number of empty stomachs	149	54	65	232	33	12	328
Mean stomach content weight(g)	22.987	27.321	12.400	0.875	0.614	3.951	0.429

Table 24. Food of fishes representing generalized dietary categories in Western Nova Scotia. Data are expressed as a percentage of the total stomach contents weight.

Stomach contents	Western Nova Scotia Fishes				
	Atlantic cod	Pollock	Haddock	Witch flounder	American plaice
POLYCHAETA	1.0	-	11.2	55.2	2.1
Aphrodita sp.	0.6	-	1.5	-	-
Other Polychaeta	0.4	-	9.7	55.2	2.1
CRUSTACEA	17.2	42.1	15.6	9.5	7.3
Amphipoda	-	-	4.6	2.4	-
Unciola irrorata	-	-	1.9	-	-
Leptocheirus pinguis	-	-	0.8	-	-
Gammarus annulatus	-	-	-	-	-
Other Amphipoda	-	-	1.9	2.4	-
Decapoda	15.5	16.4	8.5	-	4.5
Axius serratus	3.0	-	2.8	-	-
Cancer sp.	1.9	-	-	-	-
Geryon quinquedens	-	-	-	-	-
Pagurus sp.	0.1	-	1.6	-	-
Crangon septemspinosa	-	-	-	-	-
Dichelopandalus leptocerus	2.5	9.9	1.1	-	2.3
Pandalus borealis	-	0.1	-	-	0.6
Pasiphaea multidentata	-	5.8	-	-	-
Other Decapoda	8.0	0.6	3.0	-	1.6
Euphausiacea	-	24.6	1.6	5.2	2.2
Meganyctiphanes norvegica	-	22.4	1.5	5.2	2.2
Thysanoessa inermis	-	1.5	-	-	-
Other Euphausiacea	-	0.7	0.1	-	<0.1
Mysidacea	-	<0.1	-	-	-
Neomysis americana	-	<0.1	-	-	-
Other Mysidacea	-	-	-	-	-
Other Crustacea	1.7	1.1	0.9	1.9	0.6
MOLLUSCA	6.0	10.0	5.1	2.5	3.0
Loligo pealei	-	9.8	-	-	-
Other Cephalopoda	1.2	0.2	2.8	-	-
Scallop viscera	-	-	-	-	-
Other Mollusca	4.8	-	2.3	2.5	3.0
THALIACEA	-	-	-	-	-
ECHINODERMATA	3.5	-	32.1	16.5	84.0
Echinoidea	-	-	5.7	-	74.0
Ophiuroidea	1.4	-	21.8	0.3	9.5
Holothuroidea	1.9	-	2.1	16.0	-
Other Echinodermata	0.2	-	2.5	0.2	0.5
PISCES	66.6	45.0	5.1	-	-
Merluccius bilinearis	-	21.6	-	-	-
Clupeidae	5.4	4.0	2.3	-	-
Scomber scombrus	7.1	-	-	-	-
Ammodytes americanus	-	-	-	-	-
Stenotomus chrysops	-	-	-	-	-
Peprilus triacanthus	-	-	-	-	-
Sebastes marinus	15.5	-	-	-	-
Hippoglossoides platessoides	5.9	-	-	-	-
Gadus morhua	5.2	-	-	-	-
Melanogrammus aeglefinus	6.3	-	2.0	-	-
Pollachius virens	-	-	-	-	-
Urophycis tenuis	-	-	-	-	-
Other Pisces	21.2	19.4	0.8	-	-
MISCELLANEOUS	5.7	2.9	30.9	16.3	3.6
Number of fish examined	669	295	747	386	784
Number of empty stomachs	77	50	44	41	288
Mean stomach content weight (g)	15.135	9.345	2.631	0.499	1.542

Table 25. Listing of predators arranged to illustrate differences and similarities in % BW of stomach contents, overall composition of diet, caloric value of diet, and gut measurements.

Species	%BW[1]	Major prey	Caloric value(Kcal) per gram food[2]	S/I[2,3]
Gadiformes				
Silver hake	1.43	Fish, squid, decapods	1.152	1.40
Spotted hake	1.09	Squid, euphausiids, decapods	1.056	1.14
White hake	1.02	Fish, decapods, euphausiids	1.173	0.73
Red hake	0.75	Fish, decapods, squid	1.050	0.68
Atlantic cod	0.73	Fish, decapods, squid	1.092	0.68
Ocean pout	0.51	Echinoids, decapods, ophiuroids	0.582	0.29
Pollock	0.41	Fish, decapods, euphausiids	1.084	0.48
Haddock	0.26	Ophiuroids, polychaetes, amphipods	0.809	0.40
Pleuronectiformes				
Fourspot flounder	0.28	Decapods, squid, fish	1.114	2.14
Yellowtail flndr	0.25	Polychaetes, amphipods, decapods	0.921	0.67
American plaice	0.23	Echinoids, ophiuroids, decapods	0.600	0.30
Witch flounder	0.14	Polychaetes, holothurians euphausiids	0.831	0.60
Other Fishes				
Longhorn sculpin	0.71	Decapods, mysids, fish	1.059	1.05
Little skate	0.44	Decapods, amphipods, polychaetes	1.019	1.46
Butterfish	0.24	Thaliaceans, polychaetes, squid	0.351	0.47
Scup	0.23	Polychaetes, squid, amphipods	0.636	0.17
Redfish	0.10	Euphausiids, decapods, fish	0.963	0.53

[1]Average of all fish length categories except 1-5 cm group.

[2]Taken from Edwards and Bowman 1979.

[3]Stomach tissue weight(s) divided by weight of intestine and pylorus (I).

Table 26. Fish prey consumed by Atlantic cod collected in the Northwest Atlantic during the years 1973-1976. Note the majority of fish consumed are juveniles.

Cruise	Number sampled	Mean length (cm)	Mean length of predators with fish prey (cm)	Percentage of predators with fish prey	Prey species	Length (cm) of prey species ( )=No. of pre
1973 Spring	172	49.7	78.4	19.2	Atl. herring	18
					Pearlsides	5
					L.H. sculpin	
					Flatfish	
					Rockeel	7.5, 7.5
					L.H. sculpin	
					Alligatorfish	
					Ocean pout	10
1973 Autumn	362	52.2	69.7	21.0	Herring	
					Flatfish	4,10.4
					Redfish	5.5,17,10
					Ocean pout	9
					Hookear sculpin	6
					Skate	14.7,14.7, 14.7, 9
					Sculpin	2.5, 8.5
					Yellowtail	6
					Unid. fish	6,17,18,15,5,
1974 Spring	224	62.6	76.3	32.1	Atl. mackerel	18(12),16.5,1 16(5), 18(8), 16(4),16.5, 17(18), 18(4)
					Herring	16(6), 20, 16
					Amer. plaice	
					Silver hake	18, 19(6)
					Gadids	17
					Redfish	14, 12(5)
					Flatfish	7, 6
					Unid. fish	16(17)
1974 Autumn	191	51.5	61.1	31.4	Windowpane	6
					Flatfish	3.5
					L. H. sculpin	4.8, 5.5
					Herring	20(3)
					Redfish	13, 17
					Unid. fish	5

Table 26. (continued)

Cruise	Number sampled	Mean length (cm)	Mean length of predators with fish prey (cm)	Percentage of predators with fish prey	Prey species	Lengths of prey species (cm) ( )=#
1975 Spring	178	60.7	66.9	22.5	Summer flounder	10,7,6,4
					Gadids	5-14(31)
					Atl. mackerel	18,17(8),19
					L.H. sculpin	4,8,4.8
					Silver hake	7.0(4), 6(14), 12,13
					Fish larvae	
					Unid. eel	1.6
					Unid. fish	15
1975 Autumn	200	48.9	54.7	26.5	Flatfish	2.5
					Unid. fish	33,9,3,18,6, 16,16,4,14,17,6
1976 Spring	213	45.5	69.3	13.6	Am. sand lance	12,17,14,18(4), 14
					L.H. sculpin	6.5, 19(2)
					Alligatorfish	12
					Hake	
					Flatfish	
					Atl. herring	28(5)
					Gadids	17
					Unid. fish	4.5,7.5
1976 Autumn	171	57.2	62.8	21.0	Am. sand lance	15,19(82)
					Sculpin	6.5
					Red hake	9.5
					Gadid	8.3(2)

Table 27. Number of species of fish prey identified in the stomach contents of fishes collected in the Northwest Atlantic during the years 1973-1976.

Predator	Number of prey fish species	Number of fish, eggs, larvae		
Little skate	10 species - eggs and larvae	37	16	3
Silver hake	13 species	277		
Atlantic cod	30 species - eggs and larvae	502	150,425	1
Haddock	10 species - eggs	23	39	
Pollock	16 species - larvae	184		1
White hake	15 species	124		
Red hake	5 species	21		
Spotted hake	7 species - larvae	125		47
American plaice	3 species	12		
Fourspot flounder	2 species	11		
Yellowtail flounder	1 species	7		
Witch flounder	1 species - eggs	1	625	
Butterfish	1 species - larvae	4		4
Scup	1 species	4		
Redfish	4 species + larvae	8		10
L.H. sculpin	5 species + eggs	125	15	
Ocean pout	1 species	1		

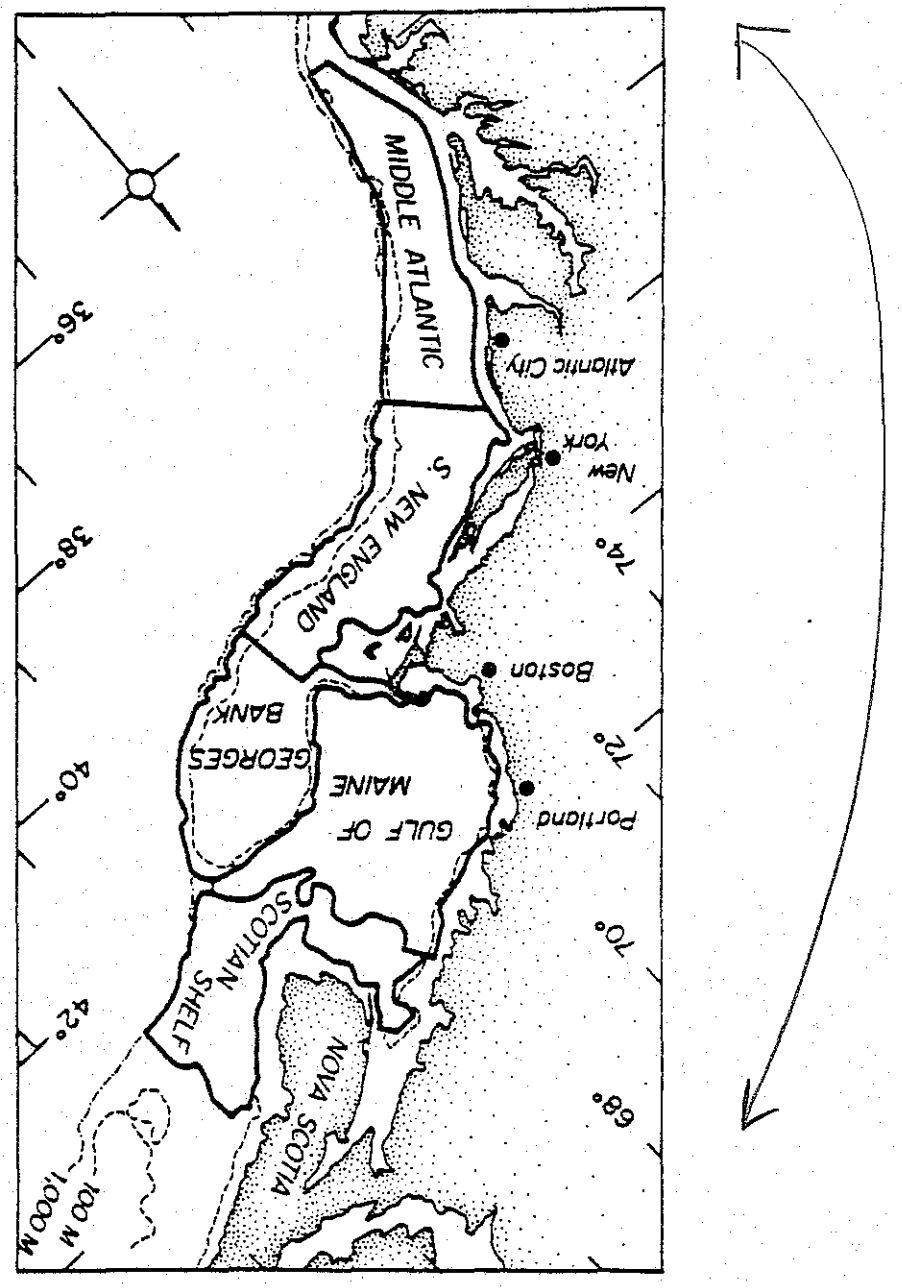

Figure 1. Geographic areas of the Northwest Atlantic sampled for fish feeding studies during 1973-1976.

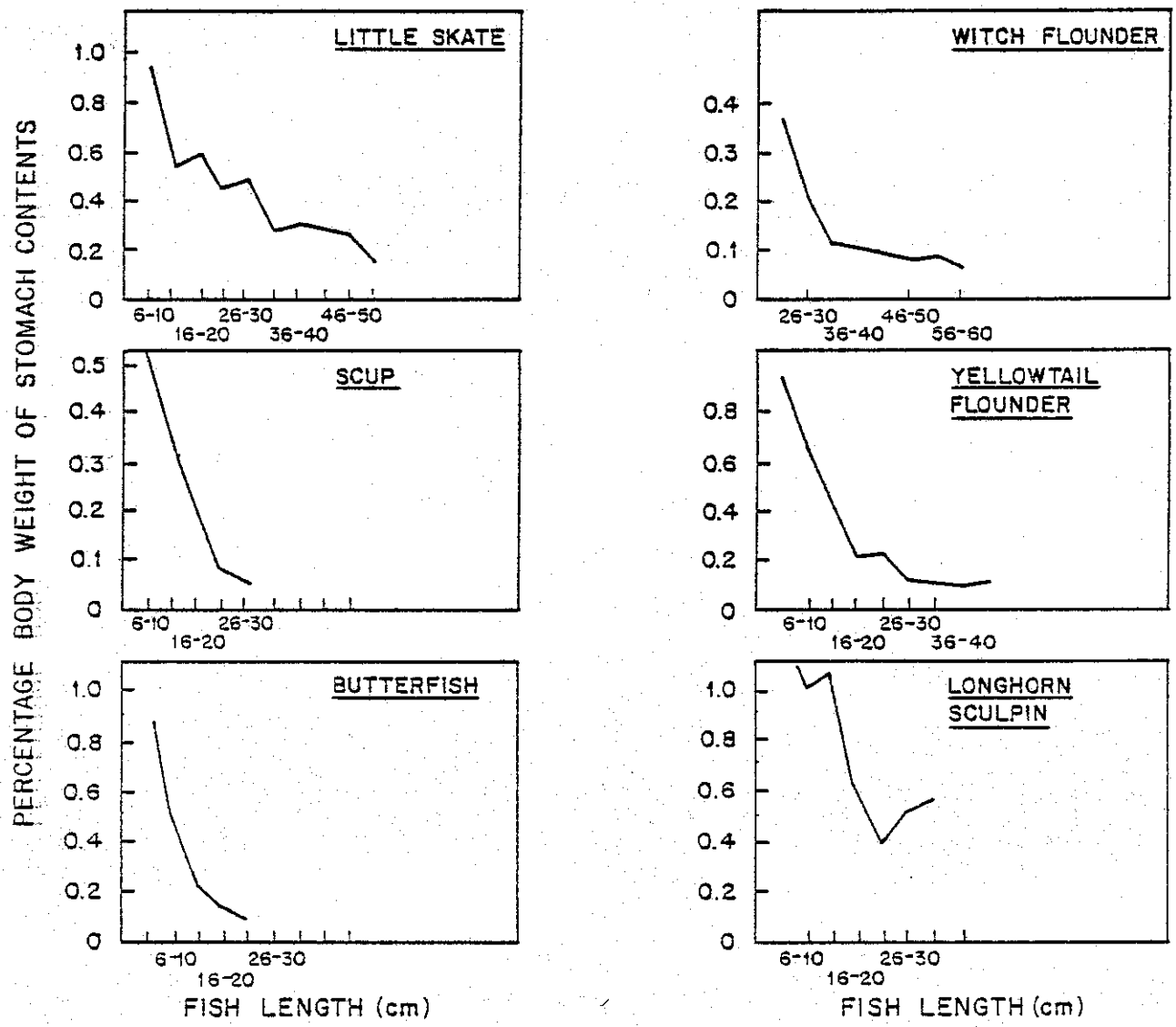

Figure 2. Average percentage total body weight of stomach contents versus fish length for seventeen species of fish sampled in the Northwest Atlantic during the years 1973-1976.

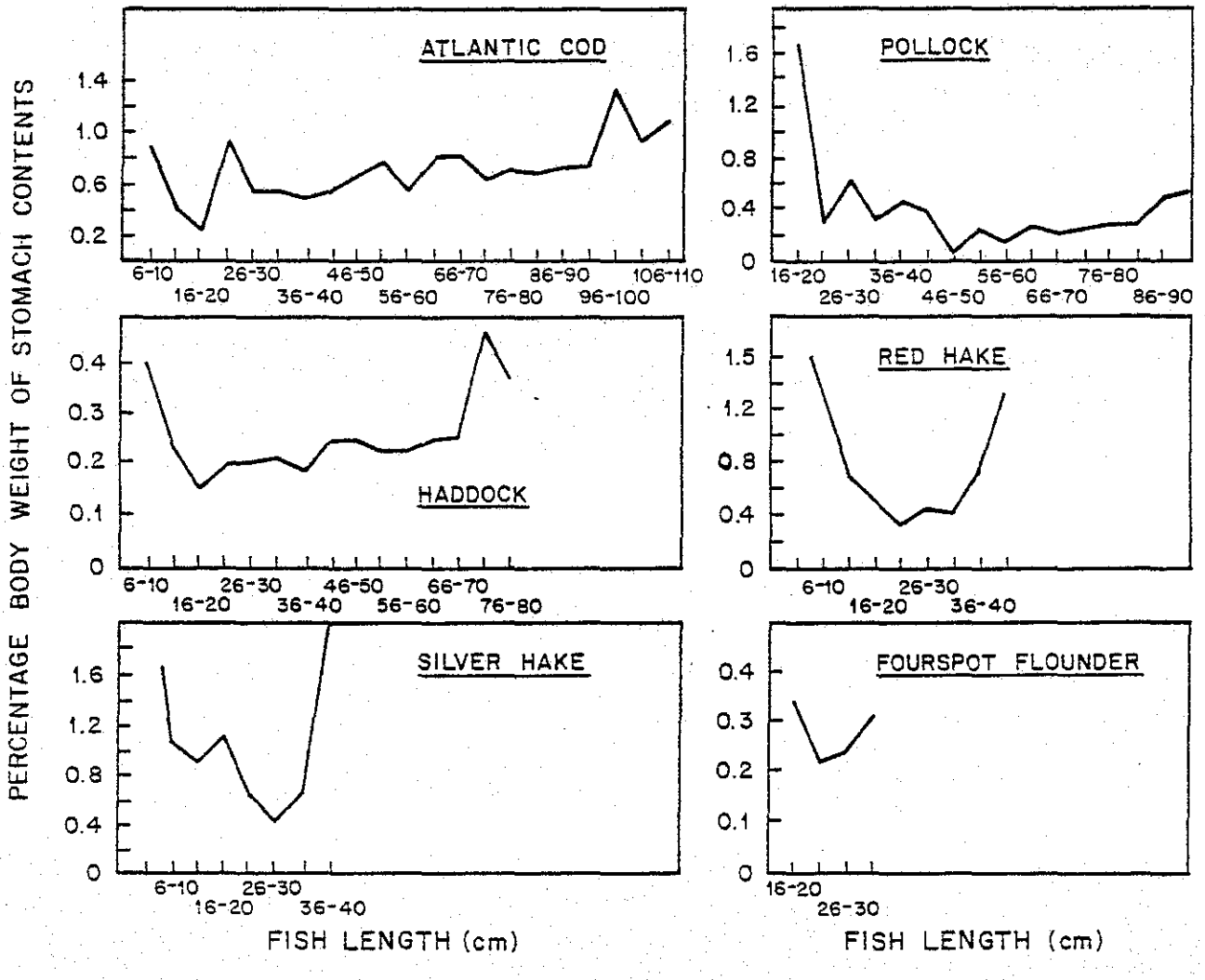

Figure 2. (continued)

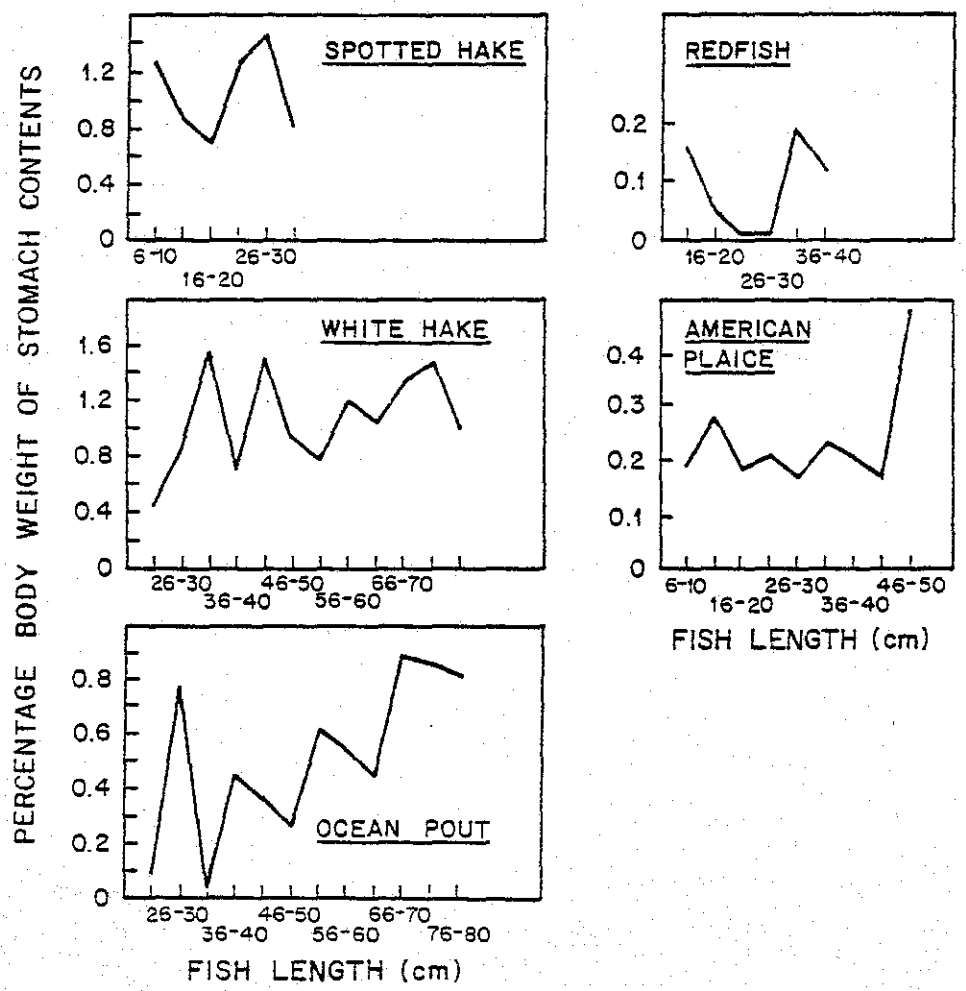

Figure 2. (continued)

APPENDIX A. Geographic breakdown of the stomach contents of little skate collected in Southern New England and on Georges Bank during the years 1973-1976 (data are expressed as a percentage weight).

Stomach contents	Southern New England	Georges Bank	Total
COELENTERATA	1.4	0.2	0.6
NEMERTEA	0.5	1.1	0.9
POLYCHAETA	15.5	8.7	11.1
Flabelligeridae	0.6	0.3	0.4
Aphroditidae	2.4	1.5	1.8
Glyceridae	0.4	1.4	1.0
Nephtyidae	2.6	0.2	1.1
Nereidae	1.1	1.2	1.2
Other Polychaeta	8.4	4.1	5.6
CRUSTACEA	61.4	72.0	68.2
Amphipoda	22.9	10.1	14.7
Ampeliscidae	1.7	0.4	0.9
Unciola irrorata	2.4	0.3	1.0
Other Corophiidae	3.1	<0.1	1.1
Gammarus annulatus	4.1	-	1.5
Other Gammaridae	1.6	1.8	1.7
Leptocheirus pinguis	7.9	2.6	4.5
Monoculodes edwardsi	0.9	2.5	1.9
Other Oedicerotidae	0.1	1.6	1.1
Other Amphipoda	1.1	0.9	1.0
Decapoda	30.5	56.6	47.2
Axius serratus	4.3	<0.1	1.5
Cancer borealis	3.0	1.5	2.0
Cancer irroratus	4.8	5.8	5.4
Other Cancridae	3.6	4.7	4.4
Crangon septemspinosa	5.9	8.6	7.6
Other Crangonidae	1.1	0.7	0.8
Pagurus acadianus	0.9	16.3	10.8
Other Paguridae	1.6	10.0	7.0
Dichelopandalus leptocerus	2.7	3.4	3.3
Other Decapoda	2.6	5.6	4.4
Isopoda	2.0	0.9	1.3
Cirolanidae	2.0	0.9	1.3
Other Isopoda	<0.1	<0.1	<0.1
Other Crustacea	6.0	4.4	5.0
MOLLUSCA	4.8	0.7	2.2
Pelecypoda	2.9	0.5	1.4
Other Mollusca	1.9	0.2	0.8
PISCES	4.8	6.8	6.1
Ulvaria subbifurcata	-	3.2	2.1
Other Pisces	4.8	3.6	4.0
MISCELLANEOUS	11.6	10.5	10.9
Number of stomachs examined	486	579	1065
Number of empty stomachs	35	62	97
Mean stomach content weight(g)	0.810	1.234	1.041
Mean fish TL (cm)	38	38	38

APPENDIX B. Geographic breakdown of the stomach contents of Atlantic cod collected on Georges Bank, in the Gulf of Maine, and in Western Nova Scotia during the years 1973-1976 (data are expressed as a percentage weight).

Stomach contents	Georges Bank	Gulf of Maine	Western Nova Scotia	Total
COELENTERATA	0.8	<0.1	1.1	0.6
POLYCHAETA	1.7	0.6	1.0	1.2
Aphroditidae	1.4	0.4	0.6	0.9
Other Polychaeta	0.3	0.2	0.4	0.3
CRUSTACEA	28.0	9.7	17.2	19.7
Decapoda	27.1	8.4	15.5	18.5
Axius serratus	<0.1	<0.1	3.0	0.8
Cancer borealis	3.0	0.9	1.7	2.0
Cancer irroratus	14.1	-	0.2	6.3
Geryon quinquedens	-	3.5	-	1.0
Hyas coarctatus	0.9	0.8	2.4	1.3
Pagurus acadianus	3.8	<0.1	0.1	1.7
Dichelopandalus leptocerus	1.6	0.9	2.5	1.6
Pandalus montagui	0.4	0.4	2.0	0.8
Other Pandalidae	0.1	1.2	0.8	0.6
Other Decapoda	3.2	0.7	2.8	2.4
Other Crustacea	0.9	1.3	1.7	1.2
MOLLUSCA	13.4	17.9	6.0	12.8
Pelecypoda	8.2	-	4.3	4.8
Cyrtodaria siliqua	-	-	2.7	0.7
Pectinidae	7.3	-	-	3.2
Other Pelecypoda	0.9	-	1.6	0.9
Cephalopoda	2.6	17.7	1.2	6.7
Loligo sp.	2.3	15.6	-	5.8
Other Cephalopoda	0.3	2.1	1.2	0.9
Other Mollusca	2.6	0.2	0.5	1.3
ECHINODERMATA	1.3	1.9	3.5	2.1
Ophiuroidea	0.8	1.3	1.4	1.1
Holothuroidea	0.3	0.2	1.9	0.7
Other Echinodermata	0.2	0.4	0.2	0.3
PISCES	50.2	68.8	66.6	60.0
Batrachoididae	-	4.8	-	1.4
Clupea harengus	1.7	9.5	-	3.6
Other Clupeidae	17.4	3.7	5.4	10.2
Gadus morhua	-	-	5.2	1.3
Melanogrammus aeglefinus	-	-	6.3	1.6
Merluccius bilinearis	0.2	5.4	-	1.7
Other Gadidae	1.1	1.8	1.5	1.4
Ammodytes americanus	0.4	9.4	-	3.0
Cottidae	2.4	<0.1	2.7	1.8
Scomber scombrus	3.5	10.9	7.1	6.6
Pomatomus saltatrix	4.5	-	-	2.0
Sebastes marinus	<0.1	3.5	15.5	5.1
Hippoglossoides platessoides	0.9	-	5.9	1.9
Other Pleuronectiformes	3.7	5.6	<0.1	3.3
Other Pisces	14.4	14.2	17.0	15.1
MISCELLANEOUS	3.1	1.1	3.9	2.8
SAND AND ROCK	1.5	<0.1	0.7	0.8
Number of stomachs examined	591	418	669	1678
Number of empty stomachs	31	54	77	162
Mean stomach content weight(g)	29.254	27.821	15.135	23.268
Mean fish TL (cm)	53	56	50	53

APPENDIX C. Geographic breakdown of the stomach contents of haddock collected on Georges Bank, in the Gulf of Maine, and in Western Nova Scotia during the years 1973-1976 (data are expressed as a percentage weight).

Stomach contents	Georges Bank	Gulf of Maine	Western Nova Scotia	Total
COELENTERATA	3.0	-	0.7	1.8
Ceriantharia	3.0	-	-	1.5
Other Anthozoa	<0.1	-	0.7	0.3
POLYCHAETA	25.4	3.6	11.2	18.1
Spionphanes bombyx	1.3	-	-	0.7
Other Spionidae	1.9	-	-	1.0
Nicomache lumbricalis	1.3	-	-	0.7
Sabellidae	1.4	0.1	0.3	0.9
Aphroditidae	1.1	0.8	1.5	1.2
Other Polychaeta	18.4	2.7	9.4	13.6
CRUSTACEA	17.1	6.4	15.6	15.7
Amphipoda	10.7	0.6	4.6	7.5
Unciola irrorata	4.2	0.4	1.9	3.0
Unciola serrata	2.5	-	0.1	1.3
Gammaridae	1.7	0.1	0.7	1.2
Leptocheirus pinguis	0.8	-	0.8	0.7
Other Amphipoda	1.5	0.1	1.1	1.3
Decapoda	4.9	3.1	8.5	6.2
Axius serratus	0.7	2.7	2.8	1.7
Dichelopandalus leptocerus	0.3	0.1	1.1	0.6
Paguridae	0.3	<0.1	1.6	0.8
Other Decapoda	3.6	0.3	3.0	3.1
Euphausiacea	0.1	2.0	1.6	0.9
Meganyctiphanes norvegica	0.1	1.7	1.5	0.8
Other Euphausiacea	<0.1	0.3	0.1	0.1
Other Crustacea	1.4	0.7	0.9	1.1
MOLLUSCA	3.3	0.6	5.1	3.8
Pelecypoda	2.2	0.5	1.2	1.7
Placopecten sp.	1.2	-	-	0.6
Other Pelecypoda	1.0	0.5	1.2	1.1
Gastropoda	1.0	0.1	0.3	0.6
Cephalopoda	<0.1	-	2.8	1.1
Other Mollusca	0.1	-	0.8	0.4
ECHINODERMATA	18.5	74.8	32.1	28.1
Echinoidea	1.0	2.2	5.7	3.0
Strongylocentrotus drobachiensis	0.4	2.2	2.9	1.6
Echinarachnius parma	0.5	-	2.6	1.3
Other Echinoidea	0.1	-	0.2	0.1
Ophiuroidea	16.6	59.1	21.8	21.8
Ophiura sarsi	5.3	16.1	5.3	6.1
Ophiura sp.	1.2	-	1.7	1.3
Amphiuridae	-	-	1.2	0.7
Ophiopholis aculeata	8.0	16.0	10.2	9.5
Other Ophiuroidea	2.1	27.0	3.4	4.2
Holothuroidea	0.7	0.9	2.1	1.3
Psolus sp.	-	-	1.5	0.6
Other Holothuroidea	0.7	0.9	0.6	0.7
Other Echinodermata	0.2	12.6	2.5	2.0
PISCES	0.4	0.9	5.1	2.4
Melanogrammus aeglefinus	-	-	2.0	0.8
Clupeidae	-	-	2.3	0.9
Other Pisces	0.4	0.9	0.8	0.7
MISCELLANEOUS	10.3	12.5	23.1	15.7
SAND AND ROCK	22.0	1.2	7.1	14.4
Number of stomachs examined	642	87	747	1476
Number of empty stomachs	33	12	44	89
Mean stomach content weight(g)	3.893	3.951	2.631	3.258
Mean fish FL (cm)	40	38	37	38

APPENDIX D. Geographic breakdown of the stomach contents of silver hake collected in the Middle Atlantic, Southern New England, and on Georges Bank during the years 1973-1976 (data are expressed as a percentage weight).

Stomach contents	Middle Atlantic	Southern New England	Georges Bank	Total
POLYCHAETA	0.1	0.1	0.1	0.1
CRUSTACEA	7.3	7.3	16.4	9.5
Amphipoda	0.5	0.2	0.4	0.3
Ampeliscidae	0.1	0.1	0.1	0.1
Oedicerotidae	0.2	<0.1	0.1	0.1
Parathemisto sp.	0.1	0.1	0.1	0.1
Other Amphipoda	0.1	<0.1	0.1	<0.1
Decapoda	4.9	2.6	6.5	4.1
Crangon septemspinosa	2.4	1.0	1.3	1.1
Dichelopandalus leptocerus	1.8	1.2	4.4	2.2
Other Decapoda	0.7	0.4	0.8	0.8
Euphausiacea	1.2	3.4	7.9	3.9
Meganyctiphanes norvegica	1.2	3.4	7.9	3.9
Mysidacea	0.3	0.7	1.2	0.7
Neomysis americana	0.3	0.7	1.2	0.7
Cumacea	-	0.1	<0.1	<0.1
Copepoda	<0.1	<0.1	<0.1	0.1
Other Crustacea	0.4	0.3	0.4	0.4
MOLLUSCA	4.3	13.7	6.7	8.9
Loligo pealei	2.9	13.0	6.7	8.2
Other Cephalopoda	1.4	0.7	<0.1	0.7
PISCES	87.5	78.4	76.4	80.8
Scomberesox saurus	-	-	6.1	1.6
Clupeidae	3.2	1.3	5.0	2.8
Merluccius bilinearis	20.8	7.9	0.4	10.0
Phycis chesteri	-	-	0.8	0.2
Ammodytes americanus	1.7	0.4	4.8	1.9
Scomber scombrus	-	6.0	21.1	8.0
Stenotomus chrysops	-	4.1	-	1.8
Peprilus triacanthus	1.4	2.2	8.9	3.7
Other Pisces	60.4	56.5	29.3	50.8
MISCELLANEOUS	0.8	0.5	0.4	0.7
Number of stomachs examined	789	918	915	2622
Number of empty stomachs	180	357	268	805
Mean stomach content weight(g)	1.544	1.815	1.080	1.477
Mean fish FL (cm)	17	22	20	20

APPENDIX E. Geographic breakdown of the stomach contents of pollock collected in the Gulf of Maine and Western Nova Scotia during the years 1973-1976 (data are expressed as a percentage weight).

Stomach contents	Gulf of Maine	Western Nova Scotia	Total
CRUSTACEA	37.0	42.1	38.9
Decapoda	24.7	16.4	21.6
Dichelopandalus leptocerus	0.7	9.9	4.1
Pandalus borealis	1.7	0.1	1.1
Pasiphaea multidentata	21.9	5.8	15.9
Other Decapoda	0.4	0.6	0.5
Euphausiacea	10.9	24.6	16.0
Meganyctiphanes norvegica	10.1	22.4	14.7
Thysanoessa inermis	<0.1	1.5	0.6
Other Euphausiacea	0.8	0.7	0.7
Mysidacea	<0.1	<0.1	0.1
Neomysis americana	<0.1	<0.1	0.1
Other Crustacea	1.4	1.1	1.2
MOLLUSCA	8.5	10.0	9.0
Loligo sp.	7.3	9.8	8.2
Other Cephalopoda	1.2	0.2	0.8
PISCES	49.4	45.0	47.7
Clupeidae	1.8	4.0	2.6
Merluccius bilinearis	2.3	21.6	9.5
Merluccius sp.	-	1.5	0.6
Pollachius virens	14.4	-	9.0
Aethoprora metopoclampa	-	3.0	1.1
Scomber scombrus	3.1	-	1.9
Sebastes marinus	0.9	-	0.6
Other Pisces	26.9	14.9	22.4
MISCELLANEOUS	5.1	2.9	4.4
Number of stomachs examined	374	295	669
Number of empty stomachs	65	50	115
Mean stomach content weight(g)	12.400	9.345	11.053
Mean fish FL (cm)	66	59	63

APPENDIX F. Stomach contents of red hake collected in Southern New England during the years 1973-1976 (data are expressed as a percentage weight).

Stomach contents	Southern New England	
POLYCHAETA	3.9	
Aphrodita hastata		1.4
Other Polychaeta		2.5
SIPUNCULIDA	1.0	
CRUSTACEA	34.0	
Amphipoda	5.1	
Aeginella sp.		0.9
Unciola irrorata		0.6
Gammaridae		0.6
Leptocheirus pinguis		0.9
Other Amphipoda		2.1
Decapoda	25.0	
Axius serratus		0.6
Cancer borealis		3.0
Cancer irroratus		1.3
Crangon septemspinosa		3.0
Munida sp.		3.1
Pagurus acadianus		0.9
Dichelopandalus leptocerus		7.8
Other Decapoda		5.3
Isopoda	0.4	
Other Crustacea	3.5	
MOLLUSCA	13.9	
Gastropoda		3.0
Cephalopoda		10.6
Other Mollusca		0.3
ECHINODERMATA	3.0	
Holothuroidea		3.0
Other Echinodermata		<0.1
PISCES	37.7	
Clupeidae		2.7
Ophidiidae		2.1
Pleuronectiformes		3.3
Other Pisces		29.6
MISCELLANEOUS	6.5	
Number of stomachs examined	481	
Number of empty stomachs	97	
Mean stomach content weight(g)	1.532	
Mean fish TL (cm)	27	

APPENDIX G. Stomach contents of spotted hake collected in the Middle Atlantic during the years 1973-1976 (data are expressed as a percentage weight).

Stomach contents	Middle Atlantic
CRUSTACEA	43.3
Amphipoda	1.4
Decapoda	16.4
Cancer irroratus	1.4
Crangon septemspinosa	3.3
Munida iris	3.4
Munida sp.	1.8
Dichelopandalus leptocerus	4.7
Other Decapoda	1.8
Euphausiacea	22.6
Meganyctiphanes norvegica	22.4
Other Euphausiacea	0.2
Other Crustacea	2.9
MOLLUSCA	37.1
Cephalopoda	36.9
Other Mollusca	0.2
PISCES	15.9
Merluccius bilinearis	0.5
Ophidiidae	2.9
Other Pisces	12.5
MISCELLANEOUS	3.7
Number of stomachs examined	531
Number of empty stomachs	82
Mean stomach content weight(g)	1.404
Mean fish TL (cm)	21

APPENDIX H. Stomach contents of white hake collected in the Gulf of Maine during the years 1973-1976 (data are expressed as a percentage weight).

Stomach contents	Gulf of Maine
CRUSTACEA	9.3
Decapoda	5.7
Dichelopandalus leptocerus	1.4
Pandalus borealis	1.9
Other Decapoda	2.4
Euphausiacea	3.1
Meganyctiphanes norvegica	3.1
Other Euphausiacea	<0.1
Other Crustacea	0.5
MOLLUSCA	0.5
PISCES	88.6
Argentina silus	4.3
Clupea harengus	1.6
Other Clupeidae	2.6
Merluccius bilinearis	8.9
Urophycis chuss	1.1
Urophycis tenuis	20.4
Other Gadidae	1.5
Scomber scombrus	0.7
Sebastes marinus	0.9
Pseudopleuronectes americanus	2.6
Other Pisces	44.0
MISCELLANEOUS	1.6
Number of stomachs examined	470
Number of empty stomachs	149
Mean stomach content weight(g)	22.987
Mean fish TL (cm)	53

APPENDIX I. Geographic breakdown of the stomach contents of ocean pout collected in Southern New England and on Georges Bank during the years 1973-1976 (data are expressed as a percentage weight).

Stomach contents	Southern New England	Georges Bank	Total
POLYCHAETA	2.7	0.1	1.1
Aphroditidae	1.9	-	0.8
Other Polychaeta	0.8	0.1	0.3
CRUSTACEA	6.3	6.4	6.4
Amphipoda	3.6	2.0	2.7
Byblis serrata	1.3	-	0.5
Corophiidae	0.2	0.8	0.6
Other Amphipoda	2.1	1.2	1.6
Decapoda	2.6	4.1	3.5
Cancer irroratus	0.1	1.5	0.9
Other Cancridae	0.9	0.4	0.6
Other Decapoda	1.6	2.2	2.0
Other Crustacea	0.1	0.3	0.2
MOLLUSCA	0.8	3.6	2.5
Placopecten sp.	-	3.1	1.9
Other Mollusca	0.8	0.5	0.6
ECHINODERMATA	88.3	86.6	87.3
Echinoidea	88.2	79.4	82.9
Echinarachnius parma	78.1	58.7	66.4
Other Echinoidea	10.1	20.7	16.5
Ophiuroidea	-	4.5	2.7
Euryale sp.	-	1.8	1.1
Ophiopholis aculeata	-	2.0	1.2
Other Ophiuroidea	-	0.7	0.4
Other Echinodermata	0.1	2.7	1.7
MISCELLANEOUS	1.7	1.1	1.3
SAND AND ROCK	0.2	2.2	1.4
Number of stomachs examined	239	184	423
Number of empty stomachs	78	62	140
Mean stomach content weight(g)	3.959	7.739	5.603
Mean fish TL (cm)	46	55	50

APPENDIX J. Geographic breakdown of the stomach contents of scup collected in the Middle Atlantic and Southern New England during the years 1973-1976 (data are expressed as a percentage weight).

Stomach contents	Middle Atlantic	Southern New England	Total
COELENTERATA	1.6	2.6	2.1
Cerianthidea	-	1.1	0.6
Anthozoa	1.6	1.5	1.5
NEMERTEA	0.1	-	<0.1
POLYCHAETA	41.4	32.4	36.6
Maldanidae	0.4	1.8	1.1
Opheliidae	-	0.5	0.3
Scalibregmidae	-	6.6	3.4
Ampharetidae	0.1	2.9	1.5
Sabellidae	<0.1	0.7	0.4
Glyceridae	6.6	4.1	5.3
Lumbrineridae	12.8	0.5	6.4
Nephtyidae	0.7	2.3	1.5
Sigalionidae	4.1	0.1	2.0
Other Polychaeta	16.7	12.9	14.7
CRUSTACEA	7.5	22.2	15.1
Amphipoda	2.0	12.9	6.9
Byblis serrata	0.5	1.1	0.8
Caprellidae	<0.1	1.2	0.6
Unciola irrorata	0.3	2.9	1.6
Gammaridae	0.6	3.0	1.1
Leptocheirus pinguis	-	3.6	1.9
Other Amphipoda	0.6	1.1	0.9
Decapoda	3.7	3.8	3.8
Mysidacea	-	1.3	0.7
Other Crustacea	1.8	4.2	3.7
MOLLUSCA	12.9	10.5	11.7
Pelecypoda	1.3	1.3	1.3
Gastropoda	2.3	0.2	1.2
Acoela sp.	2.2	-	1.1
Other Gastropoda	0.1	0.2	0.1
Cephalopoda	6.4	8.4	7.4
Other Mollusca	2.9	0.6	1.8
ECHINODERMATA	1.2	0.4	0.8
PISCES	0.3	5.3	2.9
MISCELLAENOUS	34.3	23.3	28.8
SAND AND ROCK	0.7	3.3	2.0
Number of stomachs examined	450	262	712
Number of empty stomachs	192	76	268
Mean stomach content weight(g)	0.119	0.219	0.156
Mean fish FL (cm)	15	16	15

APPENDIX K. Geographic breakdown of the stomach contents of butterfish collected in the Middle Atlantic and Southern New England during the years 1973-1976 (data are expressed as a percentage weight).

Stomach contents	Middle Atlantic	Southern New England	Total
COELENTERATA	9.3	-	6.5
Hydrozoa	8.2	-	5.7
Other Coelenterata	1.1	-	0.8
CTENOPHORA	3.5	-	2.4
NEMERTEA	0.8	0.6	0.7
POLYCHAETA	9.5	20.3	12.8
Glyceridae	0.7	-	0.5
Goniadidae	5.0	-	3.5
Lumbrineridae	0.9	0.2	0.7
Tomopteridae heloglandica	1.1	7.9	3.2
Other Tomopteridae	0.6	12.2	4.1
Other Polychaeta	1.2	<0.1	0.8
CRUSTACEA	6.3	12.0	8.0
Amphipoda	4.9	0.9	3.7
Parathemisto sp.	4.7	0.1	3.3
Other Amphipoda	0.2	0.8	0.4
Decapoda	0.1	3.4	1.1
Axiidae	-	3.3	1.0
Other Decapoda	0.1	0.1	0.1
Copepoda	0.4	6.9	2.2
Other Crustacea	0.9	0.8	1.0
MOLLUSCA	10.1	<0.1	7.0
Loligo sp.	9.6	-	6.7
Other Mollusca	0.5	<0.1	0.3
THALIACEA	25.2	8.5	20.2
Larvacea	8.2	8.5	8.3
Hemimyaria	12.5	-	8.9
Other Thaliacea	4.5	<0.1	3.0
MISCELLANEOUS	35.3	58.6	42.4
Number of stomachs examined	678	394	1072
Number of empty stomachs	203	108	311
Mean stomach content weight(g)	0.115	0.087	0.105
Mean fish FL (cm)	13	14	13

APPENDIX L. Stomach contents of redfish collected in the Gulf of Maine during the years 1973-1976 (data are expressed as a percentage weight).

Stomach contents	Gulf of Maine
CRUSTACEA	89.5
Decapoda	27.8
Dichelopandalus leptocerus	3.5
Pandalus borealis	1.1
Other Pandalidae	2.0
Pasiphaea multidentata	14.1
Other Pasiphaeidae	4.1
Other Decapoda	3.0
Euphausiacea	58.4
Meganyctiphanes norvegica	55.1
Other Euphausiacea	3.3
Other Crustacea	3.3
PISCES	9.2
Merluccius bilinearis	2.0
Myoxocephalus octodecemspinosa	1.1
Other Pisces	6.1
MISCELLANEOUS	1.3
Number of stomachs examined	466
Number of empty stomachs	232
Mean stomach content weight(g)	0.875
Mean fish FL (cm)	31

APPENDIX M. Stomach contents of longhorn sculpin collected on Georges Bank during the years 1973-1976 (data are expressed as a percentage weight).

Stomach contents	Georges Bank
POLYCHAETA	1.1
CRUSTACEA	86.4
Amphipoda	2.9
Unciola irrorata	0.7
Gammaridae	0.4
Anonyx liljeborgi	0.6
Other Lysianassidae	0.1
Leptocheirus pinguis	0.6
Other Amphipoda	0.5
Decapoda	74.0
Axius serratus	0.6
Cancer borealis	2.4
Cancer irroratus	32.7
Other Cancridae	3.8
Crangon septemspinosa	6.3
Hyas araneus	0.5
Hyas coarctatus	2.4
Pagurus acadianus	2.3
Pagurus sp.	2.9
Other Paguridae	1.3
Dichelopandalus leptocerus	11.5
Other Pandalidae	0.5
Other Decapoda	6.8
Isopoda	0.5
Mysidacea	7.3
Neomysis americana	7.3
Other Crustacea	1.7
PISCES	6.6
Rajidae	0.7
Pisces eggs	1.5
Other Pisces	4.4
MISCELLANEOUS	4.0
SAND AND ROCK	1.9
Number of stomachs examined	692
Number of empty stomachs	159
Mean stomach content weight(g)	0.732
Mean fish TL (cm)	19

APPENDIX N. Stomach contents of fourspot flounder collected in the Middle Atlantic during the years 1973-1976 (data are expressed as a percentage weight).

Stomach contents	Middle Atlantic
CRUSTACEA	64.5
Amphipoda	0.5
Decapoda	52.2
Cancer irroratus	6.4
Other Cancridae	5.7
Crangon septemspinosa	7.7
Other Crangonidae	0.7
Munida iris	2.6
Munida sp.	4.1
Dichelopandalus leptocerus	19.7
Other Pandalidae	1.5
Other Decapoda	3.8
Mysidacea	7.1
Neomysis americana	7.1
Other Mysidacea	<0.1
Other Crustacea	4.7
MOLLUSCA	19.2
Cephalopoda	19.1
Rossia sp.	4.4
Other Cephalopoda	14.7
Other Mollusca	0.1
PISCES	11.9
MISCELLANEOUS	4.4
Number of stomachs examined	366
Number of empty stomachs	138
Mean stomach content weight(g)	0.301
Mean fish TL (cm)	25

APPENDIX O. Geographic breakdown of the stomach contents of witch flounder collected in the Gulf of Maine and Western Nova Scotia during the years 1973-1976 (data are expressed as a percentage weight).

Stomach contents	Gulf of Maine	Western Nova Scotia	Total
COELENTERATA	0.1	3.4	1.5
Ceriantharia	0.1	1.4	0.7
Anthozoa	-	2.0	0.8
POLYCHAETA	67.3	55.2	62.2
Spionidae	1.9	-	1.1
Maldanidae	1.2	0.1	0.7
Sternaspidae	1.6	3.4	2.4
Capitellidae	1.6	0.4	1.1
Ampharetidae	1.8	0.4	1.2
Sabellidae	1.6	1.4	1.5
Arabellidae	1.2	-	0.7
Eunice pennata	1.1	4.8	2.7
Goniadidae	4.0	1.3	2.9
Lumbrineris sp.	1.1	1.6	1.3
Other Lumbrineridae	8.0	3.8	6.2
Nephtyidae	2.8	1.8	2.4
Onuphis eremita	0.3	2.4	1.2
Onuphis opalina	0.9	1.1	1.0
Onuphis sp.	0.7	2.3	1.4
Other Onuphidae	3.8	2.5	3.2
Eteone sp.	0.4	-	0.2
Other Phyllodocidae	0.1	1.2	0.6
Other Polychaeta	33.2	26.7	30.4
CRUSTACEA	3.5	9.5	6.0
Amphipoda	0.9	2.4	1.5
Gammaridae	0.4	0.9	0.6
Other Amphipoda	0.5	1.5	0.9
Euphausiacea	1.7	5.2	3.2
Meganyctiphanes norvegica	1.7	5.2	3.2
Other Crustacea	0.9	1.9	1.3
MOLLUSCA	0.8	2.5	1.5
Yoldia sp.	0.4	1.4	0.8
Other Mollusca	0.4	1.1	0.7
ECHINODERMATA	11.8	16.5	13.8
Ophiuroidea	1.6	0.3	1.1
Ophiura sarsi	1.2	0.2	0.8
Other Ophiuroidea	0.4	0.1	0.3
Holothuroidea	10.2	16.0	12.6
Havelockia scabra	1.3	-	0.7
Dendrochirotida	1.5	-	0.9
Other Holothuroidea	7.4	16.0	11.0
Other Echinodermata	-	0.2	0.1
ASCIDIACEA	0.8	1.4	1.1
MISCELLANEOUS	15.5	10.1	13.2
SAND AND ROCK	0.2	1.4	0.7
Number of stomachs examined	426	386	812
Number of empty stomachs	33	41	74
Mean stomach content weight(g)	0.614	0.499	0.559
Mean fish TL (cm)	43	44	43

APPENDIX P. Geographic breakdown of the stomach contents of American plaice collected in the Gulf of Maine and Western Nova Scotia during the years 1973-1976 (data are expressed as a percentage weight).

Stomach contents	Gulf of Maine	Western Nova Scotia	Total
POLYCHAETA	4.0	2.1	2.5
CRUSTACEA	7.7	7.3	7.4
Decapoda	6.6	4.5	4.9
Dichelopandalus leptocerus	1.4	2.3	2.1
Pandalus borealis	1.4	0.6	0.8
Other Decapoda	3.8	1.6	2.0
Euphausiacea	0.7	2.2	1.9
Meganyctiphnes norvegica	0.6	2.2	1.9
Other Euphausiacea	0.1	<0.1	<0.1
Other Crustacea	0.4	0.6	0.6
MOLLUSCA	5.4	3.0	3.5
Pelecypoda	5.2	2.4	3.0
Cerastoderma pinnulatum	3.4	-	0.7
Other Pelecypoda	1.8	2.4	2.3
Other Mollusca	0.2	0.6	0.5
ECHINODERMATA	76.6	84.0	82.6
Echinoidea	3.7	74.0	59.9
Strongylocentrotus drobachiensis	-	1.1	0.9
Echinarachnius parma	-	57.6	46.0
Echinarachnius sp.	1.7	12.2	10.1
Other Echinoidea	2.0	3.1	2.9
Ophiuroidea	58.5	9.5	19.4
Ophiura sarsi	41.6	7.7	14.6
Other Ophiuroidea	16.9	1.8	4.8
Other Echinodermata	14.4	0.5	3.3
MISCELLANEOUS	5.1	1.4	2.0
SAND AND ROCK	1.2	2.2	2.0
Number of stomachs examined	714	784	1498
Number of empty stomachs	328	288	616
Mean stomach content weight(g)	0.429	1.542	1.012
Mean fish TL (cm)	29	26	27

APPENDIX Q. Geographic breakdown of the stomach contents of yellowtail flounder collected in Southern New England and on Georges Bank during the years 1973-1976 (data are expressed as a percentage weight).

Stomach contents	Southern New England	Georges Bank	Total
COELENTERATA	1.9	3.5	2.9
NEMERTEA	0.6	0.5	0.5
POLYCHAETA	47.7	40.6	43.3
Spionphanes bombyx	4.4	13.2	9.8
Other Spionidae	4.4	3.1	3.6
Flabelligeridae	1.2	0.1	0.5
Malanidae	0.9	0.6	0.7
Ampharetidae	1.5	0.1	0.6
Sabellidae	3.3	0.3	1.5
Lumbrineridae	2.6	1.5	1.9
Nephtyidae	2.7	0.3	1.2
Other Polychaeta	26.7	21.4	23.5
CRUSTACEA	24.9	13.8	18.1
Amphipoda	19.0	10.3	13.6
Byblis serrata	2.2	1.4	1.7
Other Ampeliscidae	2.4	1.0	1.5
Unciola irrorata	6.9	2.8	4.4
Gammaridae	2.3	1.7	1.9
Leptocheirus pinguis	3.3	1.6	2.3
Other Amphipoda	1.9	1.8	1.8
Decapoda	4.7	2.9	3.7
Crangon septemspinosa	2.2	1.8	2.0
Dichelopandalus leptocerus	1.9	0.4	1.0
Other Decapoda	0.6	0.7	0.7
Other Crustacea	1.2	0.6	0.8
MOLLUSCA	0.6	0.6	0.6
Bivalvia	0.6	0.6	0.6
UROCHORDATA	0.8	0.4	0.6
Ascidiacea	0.8	0.4	0.6
MISCELLANEOUS	15.7	17.9	17.1
SAND AND ROCK	7.8	22.7	16.9
Number of stomachs examined	502	502	1004
Number of empty stomachs	163	169	332
Mean stomach content weight(g)	0.323	0.512	0.417
Mean fish TL (cm)	30	29	30

APPENDIX R. Length-weight equation parameters for various species of Northwest Atlantic fish. All measurements are in millimeters or grams. The length-weight equation is of the form $W = aL^b$.

Species	a	b	Source
Little skate	$.2662 \times 10^{-5}$	3.1200	Waring, 1978
Atlantic cod	$.6031 \times 10^{-5}$	3.0979	Wilk et al., 1978
Haddock	$.4284 \times 10^{-4}$	2.8053	Brown, 1971
Silver hake	$.3555 \times 10^{-5}$	3.1109	Wilk et al., 1978
Pollock	$.1542 \times 10^{-4}$	2.9393	Kohler et al., 1970
Red hake	$.2841 \times 10^{-5}$	3.1510	Wilk et al., 1978
Spotted hake	$.4118 \times 10^{-5}$	3.1406	Wilk et al., 1978
White hake	$.1927 \times 10^{-5}$	3.2351	Wilk et al., 1978
Ocean pout	$.6529 \times 10^{-6}$	3.3475	Wilk et al., 1978
Scup	$.9502 \times 10^{-5}$	3.1693	Wilk et al., 1978
Butterfish	$.1541 \times 10^{-4}$	3.0602	Wilk et al., 1978
Redfish	$.1962 \times 10^{-4}$	2.9621	Kohler et al., 1970
Longhorn sculpin	$.1008 \times 10^{-4}$	3.0260	Wilk et al., 1978
Fourspot flounder	$.7010 \times 10^{-5}$	3.0095	Wilk et al., 1978
Witch flounder	$.2123 \times 10^{-6}$	3.5617	Wilk et al., 1978
American plaice	$.1109 \times 10^{-5}$	3.3450	Lux 1969
Yellowtail flounder	$.4514 \times 10^{-5}$	3.1257	Wilk et al., 1978

APPENDIX S. Total body weight and % BW of stomach contents by fish length for seventeen fish species sampled in the Northwest Atlantic during the years 1973-1976.

Species	Median fish length(mm)																				
	25	75	125	175	225	275	325	375	425	475	525	575	625	675	725	775	825	875	925	975	1025	1075
Little skate																						
BW(g)		1.9	9.3	26.5	58.1	108.6	182.9	285.9	422.5	597.7	816.8											
% BW stom. cont.		0.95	0.55	0.60	0.44	0.48	0.29	0.31	0.30	0.27	0.17											
Atlantic cod																						
BW(g)		3.9	18.9	53.6	116.7	217.4	364.7	568.2	837.3	1181.7	1611.3	2135.8	2765.3	3509.8	4379.6	5384.7	6535.4	7842.2	93154.0	10966.0	12803.0	14839.0
% BW stom. cont.		0.90	0.43	0.26	0.95	0.54	0.56	0.47	0.55	0.67	0.79	0.58	0.81	0.82	0.65	0.72	0.69	0.73	0.76	1.34	0.95	1.10
Haddock																						
BW(g)		7.8	32.7	84.0	170.0	298.5	476.9	712.5	1012.2	1378.9	1831.1	2363.4	2986.3	3705.9	4528.5	5460.2						
% BW stom. cont.		0.40	0.24	0.16	0.20	0.21	0.22	0.19	0.25	0.25	0.23	0.23	0.25	0.26	0.46	0.37						
Silver hake																						
BW(g)	0.1	2.4	11.9	33.8	73.8	137.8	231.8	361.7	533.9	754.7												
% BW stom. cont.	82.50	1.03	0.88	1.10	0.61	0.40	0.62	2.01	1.93	4.25												
Pollock																						
BW(g)				60.4	126.4	228.0	372.6	567.5	819.8	1136.8	1525.6	1993.3	2546.9	3193.4	3939.8	4793.0	5759.9	6847.4	8062.4			
% BW stom. cont.				1.67	0.31	0.66	0.33	0.46	0.39	0.07	0.24	0.15	0.26	0.20	0.21	0.25	0.25	0.49	0.54			
Red hake																						
BW(g)	0.1	2.3	11.5	33.2	73.3	138.0	233.6	366.6	543.9													
% BW stom. cont.	8.31	1.35	0.77	0.53	0.34	0.45	0.42	0.78	1.36													
Spotted hake																						
BW(g)		3.2	15.8	45.5	100.4	188.9	319.6															
% BW stom. cont.		1.30	0.89	0.72	1.28	1.51	0.83															
White hake																						
BW(g)					78.4	150.1	257.7	409.4	613.7	879.5	1215.8	1631.9	2137.1	2741.3	3454.3	4286.1	5246.9					
% BW stom. cont.					0.48	0.87	1.58	0.74	1.54	0.97	0.80	1.21	1.08	1.39	1.49	1.02	0.10					
Ocean pout																						
BW(g)					48.8	95.6	167.3	270.0	410.6	595.8	832.9	1129.4	1493.0	1931.7	2453.7	3067.5						
% BW stom. cont.					0.10	0.77	0.04	0.45	0.37	0.27	0.61	0.55	0.45	0.89	0.86	0.81						
Scup																						
BW(g)		8.3	42.0	122.1	270.8	511.4																
% BW stom. cont.		0.52	0.31	0.19	0.09	0.06																
Butterfish																						
BW(g)	0.3	8.4	40.3	112.7	243.2																	
% BW stom. cont.	4.45	0.50	0.23	0.14	0.08																	
Redfish																						
BW(g)			3.19	86.5	182.0	329.8	540.9	826.5														
% BW stom. cont.			0.17	0.05	0.01	0.01	0.20	0.13														
Longhorn sculpin																						
BW(g)	0.2	4.8	22.3	61.8	132.2	242.6	402.2															
% BW stom. cont.	5.26	1.05	1.09	0.61	0.40	0.52	0.57															
Fourspot flounder																						
BW(g)				39.5	84.1	153.8	254.2															
% BW stom. cont.				0.34	0.22	0.24	0.31															
Witch flounder																						
BW(g)					50.7	103.5	187.7	312.5	488.1	725.3	1036.0	1432.4										
% BW stom. cont.					0.37	0.22	0.12	0.11	0.09	0.08	0.09	0.07										
American plaice																						
BW(g)		2.1	11.5	35.3	81.8	160.1	280.0	451.9	686.9	996.5												
% BW stom. cont.		0.19	0.27	0.18	0.21	0.17	0.23	0.21	0.17	0.47												
Yellowtail flounder																						
BW(g)	0.1	3.3	16.2	46.3	101.6	190.2	320.6	501.4	741.5													
% BW stom. cont.	0.95	0.64	0.45	0.22	0.23	0.13	0.12	0.11	0.13													

PART 2

EXAMINATION BY YEAR & LISTING OF PREY SPECIES

by

William L. Michaels and Ray E. Bowman

LIST OF TABLES

INTRODUCTION
&
METHODS AND MATERIALS

The "Introduction" and "Methods and Materials" for Part 2 are identical to those in Part I: Examination by Predator Length & Geographic Area by Ray E. Bowman and William L. Michaels. Please consult Part 1.

RESULTS

Below we note the principal prey in terms of percentage weight of the total stomach contents and the numbers of various prey organisms (when pertinent) first, and then discuss seasonal and yearly variations in the diet for each individual predator species.

LITTLE SKATE

The stomach contents of little skate (Table 1) indicate they fed principally on benthic crustaceans (67.4%). Decapods (47.4%) were the most important prey group identified, and Pagurus acadianus (10.0%), Crangon septemspinosa (9.0%), Cancer irroratus (5.3%), Dichelopandalus leptocerus (4.1%), Cancer borealis (1.9%), and Axius serratus (1.9%) were the more important species identified. C. irroratus , C. septemspinosa, and P. acadianus were a common food during both spring and autumn (Table 18). A wide array of amphipods (more than thirty species represented by almost 20,000 individuals) made up a substantial percentage of little skate prey (14.0%). The most common species identified were Leptocheirus pinguis (4.3%), Monoculodes edwardsi (1.8%), Gammarus annulatus (1.4%), Unciola irrorata (1.2%), and Byblis serrata (0.5%). Polychaetes (10.7%) also comprised a significant portion of the stomach contents with Aphroditidae (1.7%), Glyceridae (1.0%), Nepthyidae (0.9%), and Nereidae (0.9%) being identified as food. Incidental, prey groups included fish eggs and larvae (5.6%), and Pelecypoda (3.0%).

Little skate showed no strong seasonal variation in their foods habits. Most of the above mentioned prey were consumed fairly consistently in the the spring and autumn of the years 1973 through 1976 (Table 18).

ATLANTIC COD

Fish (61.5%) accounted for more than half of the Atlantic cod diet (Table 2), although they also fed on a wide variety of invertebrates. Major fish prey were identified as Scomber scombrus (10.5%), Clupeidae (9.5%), Sebastes marinus (4.7%), Clupea harengus (3.3%), Pleuronectiformes (3.0%), Ammodytes americanus (2.8%), and Merluccius bilinearis (2.3%). Over 150,000 fish eggs made up a portion (0.3%) of the unidentified fish remains. Decapoda (17.9%) constituted most of the crustacean component (19.0%) of the stomach contents. Predominant species of crabs included Cancer irroratus (5.9%), Cancer borealis (1.9%), Pagurus acadianus (1.7%), Axius serratus (1.3%), and Hyas coarctatus (1.2%). Pandalid shrimp (2.8%), especially Dichelopandalus leptocerus (1.5%), also made up a portion of the decapod prey. Remaining stomach content groups included Pelecypoda (4.4%), Gastropoda (1.7%), Echinoidea (1.8%), Ophiuroidea (1.0%), Polychaeta (1.1%) especially Aphrodita sp. (0.8%), and Loligo sp. (5.2%) which constituted most of the Cephalopoda (6.2%).

The invertebrate portion of the stomach contents of Atlantic cod appeared to be fairly consistent over the four year period sampled (Table 19). However, certain species of fish and squid were predominant in the cod diet only during certain seasons and years. Clupea harengus (43.9%) was the most important prey in the autumn of 1974. Ammodytes americanus (24.1%), Scomber scombrus (24.5%), and Loligo sp. (48.3%) were important prey during the autumns of 1976, 1974, and 1976, respectively.

HADDOCK

Prey identified for haddock (Table 3) was a diverse assortment of benthic organisms. Echinoderms (28.0%) were the predominant prey group with Ophiuroidea (21.9%) such as Ophiopholis aculeata (9.5%) and Ophiura sarsi (6.1%) observed as the most commonly occurring species in the diet of haddock. A large array of polychaetes (18.1%) were identified, with the families Spionidae (1.6%) and Aphroditidae (1.2%) being most important. Unciola irrorata (3.0%), Unciola serrata (1.4%), Leptocheirus pinguis (0.7%), and Monoculodes edwardsi (0.3%) were some of the dominant species of Amphipoda (7.5%) identified. A wide range of decapod species were consumed, however, only Axius serratus (1.7%) and Dichelopandalus leptocerus (0.6%) occurred in significant amounts. Mollusks (3.8%), mostly Pelecypoda (1.6%), were also identified in the stomach contents. The fish (2.3%) component of the haddock dietary included Clupeidae (1.0%) and Melanogrammus aeglefinus (0.8%) among other species of little dietary importance.

Ophiuroids and fish were consumed in larger quantities by haddock in autumn while polychaetes made up a larger percentage of their food during spring (Table 20). Twice as many haddock stomachs were sampled in the autumn than the spring. Overall, only 6% of the haddock stomachs were found to be empty.

SILVER HAKE

Fish (80.7%) dominated the stomach contents of silver hake (Table 4). Merluccius bilinearis (9.2%), Ophidiidae (7.5%), Peprilus triacanthus (3.5%), Clupeidae (2.7%), and Ammodytes americanus (1.8%) were some of the fish prey identified. Another important prey species of silver hake was the squid, Loligo pealei (7.6%). Shrimp-like crustaceans formed the remaining bulk of the diet and included, among others, Meganyctiphanes norvegica (3.7%), Dichelopandalus leptocercus (2.0%), and Crangon septemspinosa (1.4%).

Fish and the above mentioned shrimp were consistently eaten along with small quantities of mysids and amphipods throughout the 1973-1976 period (Table 21). However, the fish component of the diet varied according to year and season. For example, Stenotomus chrysops (18.4%) were identified in the stomach contents of silver hake only during the autumn of 1976. A. americanus (33.4%) were also eaten intensively during the autumn of 1976. In both the spring and autumn of 1973, silver hake displayed cannibalism by preying on their own juveniles. Scomber scombrus (33.3%) were consumed by silver hake during the spring of 1975.

POLLOCK

More than one-half of the diet of pollock was fish (47.2%) and squid (7.7%) (Table 5). Predominant fish prey were Merluccius bilinearis (9.4%), Pollachius virens (8.4%), and Clupeidae (2.4%). Longfin squid, Loligo sp. (7.7%) was also an important prey. Crustaceans (40.0%) were secondary in importance in the pollock's diet. Pollock displayed a strong preference for shrimp-like prey. The prevailing decapod shrimp (20.6%) taken as food were Pasiphaea multidentata (15.2%), Dichelopandalus leptocerus (3.9%), and Pandalus borealis (1.0%). Other shrimp-like crustaceans included the euphausiid, Meganyctiphanes norvegica (13.8%) and the mysid, Neomysis americana (3.0%). Over 23,000 N. americana and over 13,000 M. norvegica were identified in the stomach contents of the 669 pollock sampled.

No seasonal trends in the food habits of pollock were apparent (Table 22). The major dietary component of pollock during the autumn of 1976 was Loligo sp. (81.2%) which was not consumed during any other year of season. In the autumn of 1974 and the spring of 1976, pollock preyed upon its own juveniles (19.7% and 51.9%, respecitvely). M. bilinearis (46.1%) was intensively eaten by pollock during the spring of 1974. Pollock fed heavily on the mysid, N. americanus (17.7%) in the spring of 1975.

RED HAKE

Crustaceans (38.1%) and fish (34.8%) were the most important constituents of the red hake diet. However, most of the fish were unidentified (27.2%). The only major fish prey identified were Pleuronectiformes (3.1%), Clupeidae (2.5%), and Ophidiidae (2.0%) (Table 6). A variety of decapods (29.0%) made up a significant portion of the diet. Dichelopandalus leptocerus (12.4%) was the most common prey identified. Other important decapods included Crangon septemspinosa (3.1%), Munida sp. (2.9%), Cancer borealis (2.8%), Cancer irroratus (1.3%), Pagurus acadianus (0.8%), and Axius serratus (0.7%). Leptocheirus pinguis (0.8%), Unciola irrorata (0.6%), and the caprellid, Aeginella sp. (0.8%) were amphipods frequently found in their diet. Dietary groups of lesser importance were Cephalopoda (9.8%), Polychaeta (3.7%), Gastropoda (3.0%), and Holothuroidea (2.7%). The polychaete, Aphrodita hastata (1.3%) was the only prey identified to species within these lesser groups.

In the autumn of 1975, holothuroideans (81.6%) constituted a major portion of the red hake's diet (Table 23). Red hake fed heavily on clupeids (28.8%) in the spring of 1973. C. septemspinosa was eaten during the spring and autumn of all years, but in the autumn of 1974 especially large quantities were consumed (14.0%). Overall, the food habits of red hake appeared to be relatively consistent during the entire sampling period.

SPOTTED HAKE

Almost half of the diet of spotted hake was crustaceans (43.6%) including groups such as euphausiids (23.1%), decapods (16.3%), and amphipods (1.4%) (Table 7). The euphausiid, Meganyctiphanes norvegica (22.9%) was the single most important prey species. Dichelopandalus leptocerus (4.7%), Munida iris (3.3%), Crangon septemspinosa (3.2%), and Cancer irroratus (1.4%) were the dominant decapods identified. The stomach contents of spotted hake contained a significant number of amphipods, with the hyperiids Parathemisto sp. (0.4%) and Euthemisto bispinosa (0.4%) being the more common. Mollusks (35.5%) were the second most important prey, with unidentified cephalopods (36.5%) comprising the bulk of this group. Among fish (15.9%), Ophidiidae (2.8%) was the major family identified. Numerous larval and juvenile fish were also identified in the stomach contents (e.g., Merluccius bilinearis (0.5%), Pleuronectiformes (0.2%), Pristidae (0.1%), and other unidentified fish larvae (0.6%)).

Seasonal and yearly observations revealed that the euphausiid, M. norvegica was eaten only during the spring of 1975 and 1976. Another observation was that D. leptocerus made up large percentages of the diet in the autumn of all years (Table 24). Ophidiidae (28.5%) were intensively preyed upon during the autumn of 1974.

WHITE HAKE

White hake ate mostly fish (88.5%) (Table 8). The majority of the fish prey was unidentified (45.3%) because it was well digested. Fish identified as food of white hake were Urophycis tenius (19.4%), Merluccius bilinearis (8.5%), Argentina silus (4.1%), Clupeidae (2.6%), Pseudopleuronectes americanus (2.5%), Clupea harengus (1.5%), and Urophycis chuss (1.1%). The second most important prey group, crustaceans (9.1%), was mostly made up of shrimp such as the euphausiid, Meganyctiphanes norvegica (3.0%) and the decapod shrimps (5.8%) Pandalus borealis (1.8%) and Dichelopandalus leptocerus (1.3%). The white hake sampled were fairly long and had a relatively large mean stomach content weight (23.0 g for a mean fish length of about 51 cm).

Various types of shrimp were consumed during the spring and autumn of the four years sampled (Table 25). The largest amounts of P. borealis (14.7%) and M. norvegica (11.7%) eaten occurred during the autumn of 1976 and spring of 1975, respectively. Variation in fish prey showed Scomber scombrus (6.5%) and P. americanus (26.4%) were fed on by white hake only in the autumn of 1973. Clupea harengus were consumed in the spring and autumn of 1975 (7.5% and 7.8%, respectively) while other unidentified clupeids (35.0%) occurred in the white hake diet during the autumn of 1976. White hake preyed intensively on its own juveniles (51.9%) in the autumn of 1974. During the spring of 1975 and 1976, juvenile M. bilinearis (26.5% and 10.7%, respectively) were preyed on by white hake.

OCEAN POUT

The sand dollar, Echinarachnius parma (66.3%) was the most important prey species identified for ocean pout (Table 9). Decapods (3.8%) preyed upon were mostly crabs, with Cancer irroratus (0.9%) being the major species. Amphipods (2.6%) accounted for a small quantity of the stomach contents (but was made up of almost 11,000 organisms), with Unciola irrorata (0.5%) and Byblis serrata (0.5%) being common species identified. Of somewhat lesser importance as food were two types of brittle stars, Ophiopholis aculeata (1.2%) and Euryale sp. (1.0%), and the mollusk, Placopecten sp. (1.8%). Similarly, polychaetes (1.1%) made up only a small portion of the diet of ocean pout.

The number of stomachs sampled and the mean stomach content weight of ocean pout was much higher during the spring of the years 1973 through 1976 (Table 26). During the spring ocean pout fed almost entirely on E. parma. The smallest amount of E.parma eaten during spring occurred in 1974 (18.8%). Crustacea (6.5%) appeared more important as food during the autumn. C. irroratus (24.6%) were heavily preyed upon in the autumn of 1975. During the autumn of 1974, ocean pout preyed intensively on O. aculeata (47.8%).

SCUP

The diet of scup included large percentage of polychaetes (39.1%) (Table 10). Major polychaete families identified as food were Lumbrineridae (5.9%), Glyceridae (4.9%), Nepthyidae (3.4%), Sabellidae (3.3%), Scalibregmidae (3.1%), and Sigalionidae (1.8%). Among crustaceans (14.2%), scup fed more often on amphipods (7.2%) than decapods (3.6%). Leptocheirus pinguis (1.8%), Gammaridae (1.7%), and Unciola irrorata (1.6%) were the main amphipods identified. Principal decapods consumed were Pagurus sp. (0.4%) and Cancer irroratus (0.4%). Cephalopods (6.9%) were the common mollusks (10.8%) preyed upon. Anthozoa (1.5%) were also identified in the stomach contents of scup.

With the exception of Scalibregmidae (22.5%) which were identified as food in the spring of 1976, scup consumed polychaete worms, such as Glyceridae, Lumbrineridae, Nephtyidae, and Sigalionidae, mostly during the autumn (Table 27). Anthozoa (31.7%) and unidentified mollusks (33.6%) made up the bulk of the diet of scup in the spring of 1973, while most of the stomach contents for the spring of 1974 and 1975 were unidentified (60.8% and 60.4%, respectively).

BUTTERFISH

Chordata (20.1%) was the largest single prey group eaten by butterfish and included Larvacea (8.3%), Thaliacea (11.8%), and a trace amount of Ascidacea (Table 11). The second most important prey was polychaete worms (12.8%). Tomopteridae (7.3%), especially Tomopteris helgolandica (3.2%), and Goniadidae (3.5%) were the predominant polychaetes identified. The crustacean portion of the diet consisted mostly of amphipods (3.6%) and copepods (2.7%). The remaining stomach contents were Mollusca (7.0%) of which most was Loligo sp. (6.7%), Hydrozoa (5.7%), Ctenophora (2.4%), and fish larvae (0.3%).

The food habits of butterfish appeared to change throughout the eight seasons, however, no seasonal trends could be determined (Table 28). The hyperiid amphipod, Parathemisto sp. occurred in large quantities in the stomach contents only during the spring of 1974 (59.3%). Butterfish fed on the polychaetes Goniadidae (24.5%) and Tomopteridae (26.0%) during the autumn of 1974 and spring of 1976, respectively. The squid, Loligo sp. made up a major portion of the diet of butterfish in the autumn of 1976 (25.8%). In the spring of 1975, butterfish fed intensively on Hemimyaria (85.6%). Most butterfish samples were obtained in the autumn periods.

REDFISH

Redfish fed pricipally on Meganyctiphanes norvegica (57.9%) (Table 12). Decapod shrimp, including Pasiphaea multidentata (13.8%), Dichelopandalus leptocerus (4.5%), and Pandalus borealis (1.1%) made up most of the remaining portion of identified crustacean prey. Juvenile fish (9.1%) were also eaten by redfish. Merluccius bilinearis (2.0%) made up the largest quantity of juvenile fish in the redfish diet. Approximately one-half of the redfish sampled had empty stomachs.

Redfish preyed heavily on M. norvegica throughout almost all seasons and years sampled (Table 29). High percentages of P. multidentata were found in the autumn samples for all years except 1976. During the autumn of 1976, D. leptoceras (61.2%) made up most of the redfish diet. Redfish preyed intensively on fish (70.7%), such as Merluccius bilinearis (31.5%) and Myoxocephalus octodecemspinosa (16.5%) in the spring of 1974.

LONGHORN SCULPIN

Nearly three-fourths of the diet (Table 13) of longhorn sculpin was decapods (72.1%). Cancer irroratus (31.4%) was the predominant decapod prey. Dichelopandalus leptocerus (11.5%), Crangon septemspinosa (6.2%), Pagurus acadianus (2.5%), Hyas coarctatus (2.5%), and Cancer borealis (2.3%) were also identified. A wide variety of amphipods (4.9%), especially Leptocheirus pinguis (0.7%) and Unciola irrorata (1.0%), as well as the mysid, Neomysis americana (7.0%) made up most of the remaining crustacean prey. Unidentified fish eggs (3.8%) constituted part of the fish portion (6.4%) of the diet of longhorn sculpin.

Decapods were the major prey of longhorn sculpin throughout the sampling period (Table 30). The highest percentage of any single prey eaten by longhorn sculpin during a particular year and season was C. irroratus (67.3%) during the autumn of 1976. However, C. irroratus were consumed more often during the spring of other years (e.g., 1973, 1974, and 1975) than during autumn. Longhorn sculpin fed heavily on C. borealis (27.3%) in the autumn of 1975 and on D. leptoceras (49.1%) during the autumn of 1974. The mysid, N. americana was identified as food solely in spring samples for this predator. Juvenile skates, Rajidae (4.6%) and fish eggs (3.8%) were consumed by longhorn sculpin during the spring of 1976 and 1975, respectively.

FOURSPOT FLOUNDER

Fourspot flounder ate principally crustaceans (65.1%), with decapods (52.0%) consituting more than one-half of their diet (Table 14). Dichelopandalus leptoceras (19.3%) contributed the largest percentage to the diet of any species of prey eaten by fourspot flounder. Other decapods identified as food were Crangon septemspinosa (7.6%), Cancer irroratus (6.2%), Cancridae (5.2%), Munida sp. (4.0%), and Munida iris (2.5%). Over 1,000 mysids, Neomysis americana (7.8%) were found in the stomachs. Mollusca (18.7%) was of secondary importance in the fourspot diet, and included mostly Rossia sp. (4.3%) and other unidentified cephalopods (14.3%). Fish (11.7%), most of which was unidentified (10.8%), comprised the majority of the remaining stomach contents.

Little seasonal variation in diet was observed for fourspot flounder (Table 31). Decapods were important prey of fourspot flounder in the spring and autumn of the years 1973-1976. With the exception of the spring of 1975, fish were consumed fairly consistently throughout all seasons and years. The squid, Rossia sp. (30.2%) was an important food during the spring of 1973.

WITCH FLOUNDER

Witch flounder ate large quantities of polychaete worms (62.1%) (Table 15). Only a small number of polychaetes were identified to species; Eunice pennata (2.3%), Onuphis eremita (1.0%), and Onuphis oplina (0.8%) were among those identified. However, a large number of polychaete families were identified. Lumbrineridae (6.6%), Onuphidae (5.9%), Eunicidae (2.8%), Goniadidae (2.5%), Sternaspidae (2.1%), Nephtyidae (2.1%), Sabellidae (1.3%), and Ampharetidae (1.1%), were some of the more important groups. Eteone sp. (7.4%) was the single most important polychaete genera identified as food. Holothuroidea (11.4%), Anthozoa (5.1%) (most identified as Metridium sp., 3.8%), and the euphausiid, Meganyctiphanes norvegica (2.7%) were also flound in the stomachs. Approximately 625 fish eggs (0.1%) were included as part of the stomach contents of witch flounder. Only 9% of the stomachs were emtpy.

Polychaetes made up the major portion of the diet of witch flounder during the spring and fall of all years sampled (Table 32). Goniadid and sabellid polychaetes appeared to be consumed more often in the autumn during all years. E. pennata was a major prey item during the spring of 1974 and 1975 (11.3 and 2.4%, respectively). Eteone sp. (34.1%) was especially important as a food in the spring of 1975. During the autumn of 1974, M. norvegica (21.7%) was important in the diet of witch flounder. Holothurians were consumed almost exclusively in the spring. The anemone, Metridium sp. was identified as a food of witch flounder only during the spring of 1975.

AMERICAN PLAICE

American plaice were very selective in their feeding. They preyed almost exclusively on echinoderms (85.7%), especially Echinarachnius parma (64.1%) (Table 16). Brittle stars (Ophuroidea, 15.7%) were the second most important

prey and they were mostly Ophiura sarsi (11.7%). Pelecypoda (2.4%) such as Cerastoderma pinnulatum (0.6%), Yoldia limatula (0.5%), Yolida thraciaeformis (0.5%), and Chlamys islandica (0.3%), constituted most of the remaining stomach contents. Many of the stomachs examined were empty (41.1%).

American plaice tended to consume large quantities of O. sarsi in the autumn, while Echinoidea were dominant in their diet in the spring (Table 33). The highest percentage of sand dollars, Echinarachnius sp. (90.0%) were eaten by American plaice during the spring of 1975. Stomach samples taken in the autumn of 1974 contained high percentages of the euphausiid, M. norvegica (26.5%). American plaice consumed notable quantities of the mollusk, C. pinnulatum (10.3%), during the spring of 1976.

YELLOWTAIL FLOUNDER

Much of the food of yellowtail was found to be polychaete worms (43.0%) (Table 17). Some of the many polychaetes identified were Spionphanes bombyx (9.7%), Spionidae (3.6%), Lumbrineridae (1.6%), and Nephtyidae (1.2%). A large number (over 12 thousand) of amphipods (13.6%) were also consumed and they included Unciola irrorata (4.3%), Leptocheirus pinguis (2.3%) and Byblis serrata (1.7%). Crangon septemspinosa (1.9%) and Dichelopandalus leptocerus (0.9%) constituted the bulk of the decapod prey (3.5%). Anthozoans (2.1%) were of limited dietary importance.

The diet of yellowtail flounder was mostly polychaete worms and amphipods during both spring and autumn for all the years sampled. However, the quantities of both prey groups were consistently higher during the spring than in autumn (Table 34). The polychaete S. bombyx was consumed during both spring and autumn for the years 1973-1976, but they made up the highest percentages during the spring of 1974 (13.6%) and the autumn of 1976 (16.5%). Sand and rock (49.7%) accounted for a large portion of the stomach contents of yellowtail flounder during the autumn of 1976. About one-third of all stomachs examined were empty.

DISCUSSION

The food of the seventeen species of marine fish examined here revealed that there were generally four types of predators; (1) piscivores (including squids), (2) planktonic invertebrate feeders, (3) epifaunal crustacean consumers, and (4) those that eat benthic infauna and non-crustacean epifauna. The food of a particular predator is likely influenced by the various morphological differences between fishes, environmental factors, and prey size, distribution and behavior.

General body design and especially mouth morphology, often reflect the feeding strategy of a species. Most piscivores are adapted for chasing, holding, and swallowing large prey. Their body design is usually fusiform, (suitable for pursuing fast moving fish prey) and they have a large mouth gape along with long, sharp teeth for seizing and holding large organisms. Predators which feed on plankton generally have a laterally compressed, deep bodied shape. Their gibbose body allows them to drift easily in the water column and also enables them to maneuver quickly when sucking or filtering zooplankton from the water. The small planktonic prey of these fishes is then retained in the buccal cavity by filamentous gill rakers. Benthivores have developed many unique morphological features for specialized feeding (e.g., flatfishes, gadids, sparids etc.). Some benthic feeders actively swim above the bottom when feeding, while others hide on or in the bottom to capture prey. Large-mouthed benthic predators often feed on large organisms such as crabs; those with smaller mouths usually feed on small crustaceans and polychaetes. Mouth orientation is some indication as to whether a benthivore feeds on prey swimming above the bottom or on sedentary organisms lying on or in the bottom.

Fish vision, smell, taste, and touch are also used to varying degrees for detecting foods. For example, eyesight is usually better developed in predators that actively pursue their prey (e.g., large well developed eyes such as those of silver hake). The lateral line may also enhance a fish's ability to locate prey. Olfaction is a sense utilized by many flatfish for finding food. Some benthivores (e.g., many gadiform fishes) have barbels and fins which serve as chemoreceptors as well as tactile organs.

Environmental conditions such as temperature, depth, light, turbidity, and substrate influence prey availability and therefore affect feeding in fishes. Since most of the study area is within a temperate zone, the feeding behavior of many of the fishes is likely affected the most by seasonally related changes (e.g., temperature, light, prey distribution). Some of the fishes studied here undergo seasonal migrations, while others remain relatively stationary. Keast (1979) notes that generalized feeders are more adaptable to changing environments than specialist. Therefore, generalists are more likely to reflect seasonal shifts in their diet (as prey availability changes). Below we provide information concerning body morphology, predator and prey distributions, and environmental factors as they possibly relate to the food consumed for each particular species.

LITTLE SKATE

The body of little skate is uniquely modified for lying flat on the bottom and to feed on the benthos. Its body has no anal fin, and enlarged pectoral fins. The mouth is positioned ventrally and has lips with several rows of dermal plates rather than teeth (Lagler et al., 1977). Their relatively small mouth seems perfectly adapted for consuming small, slow-moving prey off the bottom.

The basic food of little skate was decapods (47.4%) and amphipods (14.0%), while polychaete worms (10.7%) were of secondary importance (Table 1). Maurer and Bowman (1975) examined the food of 393 little skates collected during the 1969-1972 period and identified similar food for skate. Bigelow and Schroeder (1953) found the amphipod, Leptocheirus sp. to comprise almost half of the stomach contents of little skate they sampled in Long Island Sound. In fish from the Woods Hole area, they noted 29% of the skates examined had eaten crabs and 15% fed on the bottom-dwelling shrimp, Crangon. Our results also showed that Leptocheirus pinguis (4.3%) and Crangon septemspinosa (9.0%) were common prey species, although decapod crabs (32.7%) were the predominant food. Little skate can be considered an intermediate (between generalist and specialist) feeder because of the wide array of benthic organisms it eats. Its morphology enables little skate to feed principally on slow moving, bottom-dwelling organisms.

Spring-autumn bottom trawl survey data compiled by Azarovitz (1982) suggests that little skate do not undergo large scale seasonal migrations. However, Bigelow and Schroeder (1953) report that little skate occasionally migrate to warmer, deeper waters during the winter and spring in the Gulf of Maine, even though it tolerates a wide temperature range. In Long Island Sound, little skate are known to migrate to deeper, colder waters during the summer when water temperatures are elevated. In the present study, seasonal movements, if any, of little skate had little effect on its diet, since similar prey were consumed during both spring and autumn (Table 18).

ATLANTIC COD

Cod feeds efficiently on a large assortment of animals found swimming near or on the bottom. Their heavy, fusiform body and broad caudal fin allows cod to swim rapidly forward for short distances to catch prey. Cod spend much of their time searching along the bottom with a chin barbel which serves as a tactile organ for locating food (Nikolsky, 1963). Its wide mouth gapes back as far as the eye and is equipped with many small teeth (Bigelow and Schroeder, 1953). Bigelow and Schroeder report that cod average 6 to 12 pounds but can exceed over 100 pounds in body weight. The size of this predator is important when considering their prey because smaller cod tend to feed mostly on small crustaceans while larger cod feed more on large crustaceans and fish (Langton and Bowman, 1980).

In this study, the major prey of cod was fish (61.5%) and decapods (17.9%) while squid (6.2%) and pelecypods (4.4%) were secondary in importance (Table 2). The food of 1250 cod sampled during an earlier period (1969-1972) was similar to the food reported on here (Bowman, 1975; Langton and Bowman,

1980). The wide variety of prey types eaten by cod suggest that it is a generalized feeder and likely feeds on the most abundant organisms available.

Bigelow and Schroeder (1953) report that cod generally fast during their spring spawning period. However, for unknown reasons, the mean stomach content weight of cod sampled for our study was higher during spring (28.7 g) than in autumn (20.8 g). Atlantic cod are known to migrate offshore and northward into colder waters during the warm months of autumn (Bigelow and Schroeder, 1953; also see Azarovitz, 1982). Although cod undergo seasonal migrations, we found the invertebrate portion of its diet to be relatively consistent between spring and autumn (fish prey did vary somewhat by season) (Table 19).

HADDOCK

Haddock have a small, ventral mouth with soft, muscular lips adapted for sucking or burrowing into the substrate to feed. Its body is fusiform; the anterior portion which is heavier, possibly helps them to remain in a forwardly titled position when feeding (Bigelow and Schroeder, 1953). The chin barbel on haddock likely functions as a chemoreceptor and tactile organ for locating foods within muds (Nikolsky, 1963). Haddock is more suited for feeding on the benthos rather than for capturing large or rapidly moving prey.

Haddock is a good example of a generalized feeder. The prey list for haddock in the present study extended over seven pages and showed that haddock feed on a diverse assortment of benthic invertebrates (Table 3). Ophiuroids (21.9%) were their major food, and small, benthic crustaceans (15.8%) and polychaetes (18.1%) were secondary prey. Langton and Bowman (1980), Bowman (1975), and Bigelow and Schroeder (1953) reported similar foods for haddock. Haddock are highly opportunistic since they feed on almost all available benthic prey at a given location.

Bottom trawl survey data (Azarovitz, 1982) show that most haddock are caught on Georges Bank in the spring; and that large numbers are obtained in the Gulf of Maine during autumn. Bigelow and Schroeder (1953) suggest that haddock undergo irregular seasonal migrations from deep to shallow waters when waters cool. They report that haddock prefer cold water (34-50 F) and are generally found in bottom water 25-75 fathoms deep. Of interest is that more haddock were apparently available when bottom trawling in autumn than in spring since twice as many were sampled in autumn for this study. We also found larger quantities of ophiuroids and fish consumed in autumn, while more polychaete worms were eaten during the spring (Table 20). Bowman (1977) analyzed the contents of 407 haddock stomachs collected during the spring and fall of the years 1969-1972 (in his study, more stomachs were sampled during autumn than spring also). He reported that haddock fed more intensively on ophiuroids during the autumn than in spring in the Georges Bank, Gulf of Maine, and Western Nova Scotian regions. The apparent seasonal shift in the diet of haddock is likely due to its moving to areas where organisms available as prey differ.

SILVER HAKE

Silver hake are adapted for swimming for prolonged periods and chasing their prey. They are a streamlined, fusiform fish and strong swift swimmers, as well as extremely voracious predators (Bigelow and Schroeder, 1953). Their large terminal mouth, equipped with two or more rows of needle-sharp recurved canines and projecting lower jaw, is suitable for seizing large, rapidly swimming prey out of the water column. Silver hake have typical physiological characteristics of fish eaters as described by Nikolsky (1963) (e.g., short gill rakers serving to protect gills, large stomach for large prey, pyloric caecae to neutralize high acidity in stomach, and short intestine).

Appropriately, fish (80.7%) was the predominant food identified in this study. Squid (9.2%) and shrimp (4.0%) made up the remaining bulk of their diet (Table 4). According to Langton and Bowman (1980), fish accounted for more than three-fourths of the diet of silver hake in the 1969-1972 period. They suggested that shrimp were eaten mostly by smaller silver hake. Bowman (1980) suggested that silver hake reduced feeding during their spawning period in the late summer-autumn period and fed more intensively in the spring and early summer. His findings were based on a subset of the present data. Variation in the feeding intensity of silver hake according to season is likely influenced somewhat by their northward and/or shoreward migrations during the summer months (Bigelow and Schroeder, 1953; Azarovitz, 1982).

POLLOCK

Pollock has a deep, streamlined body tapering to a pointed nose and slender caudal peduncle. Their moderate-sized mouth has small pointed teeth and a projecting lower jaw (Bigelow and Schroeder, 1953). Pollock seem suited for sustained swimming while searching for food and for taking moderate-sized prey found in the water column. The long and slender gill rakers of pollock may help retain smaller prey within the buccal cavity (Nikolsky, 1963). Pollock do not appear to be adapted for feeding on organisms found on the bottom.

The food of pollock was mostly organisms that are normally found swimming off the bottom. Its diet was mainly fish (47.2%) and free-swimming shrimp (38.8%) which agrees well with reports by Langton and Bowman (1980). We also found squid (7.7%) was fed upon when available. Similarly, Maurer and Bowman (1975) found pollock collected during the years from 1969 through 1972, to have fed on fish (31.9%) and shrimp (65.5%) (the shrimp consisted mainly of Pasiphaea sp. and Meganyctiphanes norvegica).

The distribution of pollock is similar in spring and autumn (Azarovitz, 1982). Bigelow and Schroeder (1953) noted that large pollock occur in deep offshore waters. Pollock apparently feed on the same prey types throughout both spring and autumn (Table 22).

RED HAKE

Red hake seem to be adapted for feeding on bottom organisms. Its body is elongated, has a large mouth, and a chin barbel. Herrick (1902) reported that red hake kept in an aquarium fed chiefly by sense of touch using their long pelvic fin rays. The sensitive tips of these ventral fins were dragged along the bottom as red hake searched for food.

Bigelow and Schroeder (1953) claim that bivalve mollusks and echinoderms are seldom found in the stomach contents of red hake and that small crustaceans were their main food. We found red hake depending on a wide assortment of animals for food, such as fish (34.8%), shrimp (17.6%), crabs (9.8%), and squid (9.8%) (Table 6). Langton and Bowman (1980) also found red hake to be a diverse feeder, but dependent principally on crustaceans and fish for food. One prey in particular, Dichelopandalus leptocerus was identified as a major prey of red hake by Langton and Bowman and our data confirm their results.

Red hake apparently depend for the most part on the same prey during both spring and fall (Bowman, 1977). The data presented here corroborate previous findings. Bottom trawl survey data (Azarovitz, 1982) doesn't show any obvious seasonal shifts in the distribution of red hake. Bigelow and Schroeder (1953) also claim that red hake don't undertake long seasonal migrations with the exception of a slight offshore movement into deeper waters with the onset of warming water temperatures during the summer.

SPOTTED HAKE

The body design of spotted hake is similar to that of red hake and gives an indication that they are adapted for feeding along the bottom. A laboratory study by Barans (1969) found spotted hake depend primarily on vision for locating prey, and in addition, use its chemoreceptive pelvic fins to test the palatibility of food. We found spotted hake fed on a variety of crustaceans (43.6%), squid (36.5%), and fish (15.9%) (Table 7). The diet of spotted hake was similar to red hake with the exception that spotted hake fed intensively on the euphausiid, Meganyctiphanes norvegica (22.9%). Hildebrand and Schroeder (1928) found spotted hake collected in Chesapeake Bay feed exclusively on mysids. Our data indicate that mysids were of little importance as a food. In another study, Sikora et al. (1972) found 341 juvenile spotted hake feeding primarily on crustaceans, while fish were of secondary importance in their diet. During the 1969-72 period, Maurer and Bowman (1975) examined the stomach contents of 333 spotted hake and found their prey to be principally crustaceans and fish.

Spotted hake tended to feed intensively on Dichelopandalus leptocerus during autumn in the 1973-1976 period, and on Meganyctiphanes norvegica during spring in the years 1975-1976. Bottom trawl survey data indicate spotted hake migrate to deep water in spring (Azarovitz, 1982). This migration may be responsible for, to some extent, the seasonal variation we noted in the type of prey they consume.

WHITE HAKE

Being predominantly a fish-eater (Table 8), white hake are a more specialized feeder than red hake or spotted hake. All three hakes generally have the same body design (generally adapted for feeding along the bottom), however, white hake grows to larger sizes than the other two hakes. White hake we sampled were twice the size (average length of 51 cm) of either the red or spotted hake taken. The large size of white hake enable them to capture and feed on larger prey such as fish. Crustaceans were secondary in importance in their diet. Small white hake feed more intensively on crustaceans than fish. Past feeding studies on white hake, such as those by Langton and Bowman (1980), Maurer and Bowman (1975), and Petrov (1973), also identified fish as the principal food of this predator.

White hake apparently move into shoal waters during summer months (Azarovitz, 1982). These movements, combined with differences in the seasonal distribution of various prey organisms, likely affect prey availability. For example, during the spring of 1975 and 1976, juvenile Merluccius bilinearis were taken as food in large quantities by white hake. During spring both species tend to be concentrated in deep slope or basin waters (Azarovtiz, 1982).

OCEAN POUT

Ocean pout have an eel-like body form with large pectoral fins and no swim-bladder, and is typically a bottom dwelling fish. Its large gaping mouth and thick fleshy lips are equipped with blunt conical teeth. This species is apparently suited for crushing various organisms taken off the bottom. We found ocean pout to be specialized feeders. Approximately two-thirds of their diet consisted of sand dollars, Echinarchnius parma; most other prey items were incidental. Bigelow and Schroeder (1953) reported that bottom dwelling mollusks, as well as sand dollars, were major prey of ocean pout. Our results showed that mollusks only made up 2.4% of the ocean pout's diet. Maurer and Bowman (1975) examined the gut contents of 238 ocean pout collected from the same study area during the 1969-72 period. They also found ocean pout to feed heavily on sand dollars, while amphipods were of secondary importance as food.

During the autumn the number of ocean pout collected was much less than in the spring (Table 26). Bottom trawl surveys (Azarovitz, 1982) indicate few ocean pout are caught during the fall compared to spring. Bigelow and Schroeder (1953) suggest that ocean pout move to rocky bottoms during the autumn where they deposit and guard their eggs. After their eggs hatch, ocean pout move back to smoother, sandy bottoms where their preferred food is apparently more abundant. A possible reason for catching fewer of ocean pout during the fall may be that the rocky areas where they are found cannot be effectively fished. Therefore, little is known about the diet of ocean pout during the autumn. The 67 ocean pout (total) collected during the autumn of the years 1973-1976 had extremely small quantities of food in their stomachs. A possible explanation may be that they fast during their spawning period. Sand dollars were eaten for the most part only during the spring. Theroux (personal communication, 1982)[1] claims that sand dollars prefer sandy bottoms. Since ocean pout tend to inhabit sandy bottoms during the spring,

this possibly explains why sand dollars were found in such large quantities in the gut contents of samples obtained in spring.

SCUP

Scup occur near the bottom and feed on a variety of benthic organisms such as small crustacans, annelid worms, mollusks, and sand dollars (Bigelow and Schroeder, 1953). The laterally compressed, deep body of scup enables them to drift above the bottom in search of their food. As scup swim slightly off the bottom, they can eat organisms on or in the bottom using their small, semi-ventral mouth.

We found scup fed on a variety of benthic organisms (Table 10). Polychaete worms were the preferred food. Amphipods, decapod shrimp, mollusks, and fish were also of some dietary importance. Our work corroborates the investigation by Maurer and Bowman (1975) who found scup collected during 1969-1972 had eaten similar food. They also identified polychaete worms as the primary food. However, in addition they noted one-fifth of the stomach contents of the scup they examined were anemones, Ceriantharia, while we found only an insignificant amount of this prey. Hildebrand and Schroeder (1928) examined 24 scup from Chesapeake Bay and found their gut contents consisted of crustaceans, mollusks, worms, insect larvae, and small fish.

Scup undertake an inshore migration during the autumn (Azarovitz, 1982; Morse, 1978). Bigelow and Schroeder (1953) claim that scup cease feeding during spawning in summer months. In our data the mean stomach content weight was consistently less for the spring samples, some indication that these samples may have been influenced by the beginning of the spawning period (Table 27). With the exception of Scalibregmidae, which Appy et al. (1980) indicate are mostly found in deep water, scup were caught, and fed most intensively on polychaetes, during the autumn months when the fish were concentrated in inshore areas.

BUTTERFISH

The body of butterfish is laterally compressed, deep-bodied, and has well developed pectoral fins; thus permitting butterfish to maintain control while drifting in the water column and to quickly maneuver when preying on plankton. Small organisms can readily be sucked into its small, semi-dorsal mouth and retained in the buccal cavity by elongated gill rankers.

We found planktonic prey to be predominant in the stomach contents of butterfish (Table 11). Larvaceans, salps, young squid, copepods, hyperiid

---

[1]National Marine Fisheries Service, Woods Hole Laboratory, Woods Hole, MA 02543

amphipods, hydroids, and polychaetes made up most of the butterfish's diet. Butterfish stomach contents examined by Maurer and Bowman (1975) contained similar food, with larvaceans and salps being the principal prey, and chaetognaths (Sagitta sp.) and ascidians as secondary food. Bigelow and Schroeder (1953) report butterfish feed on small fish, squid, amphipods, shrimp, and ctenophores. We found ctenophores and larval fish to be incidental food.

Butterfish are concentrated in deeper water (and at warmer bottom temperatures) during the spring (Azarovitz, 1982). This species' seasonal migration likely influences the type of food it ingests. However, we could not discern any distinct seasonal trends in their diet based on our data (Table 28). The food of butterfish seemed very unpredicatable. For example, butterfish fed exclusively on larvaceans in the spring of 1973, and on hydroids and polychaetes in the autumn of 1973. In the following year, the spring food was primarily the hyperiid, Parathemisto sp., while polychaetes and ctenophores occurred in the fall samples. Butterfish appear to be opportunistic feeders and take whatever prey is available.

REDFISH

The perch-like body and enlarged pectoral fins of redfish enable this species to drift and maneuver in the water column when capturing planktonic shrimp and larval fish with its semi-dorsal, moderate-sized mouth. Its large eyes give some indication that redfish are visual feeders.

Redfish are very selective when feeding, as their diet is made up almost exclusively of free-swimming shrimp (Table 12). More than half their diet included the euphausiid, M. norvegica, while decapod shrimps (especially Pasiphaea sp.) were secondary food. Incidental prey included larval fish, hyperiid amphipods, copepods and mysids. Bigelow and Schroeder (1953) documented that shrimp were the major prey of redfish, and also noted that small fish and small mollusks were occasionally taken as food. We identified no mollusks as food in the redfish stomachs we examined. Maurer and Bowman (1975) examined the stomach contents of 921 redfish, and their data indicated Meganyctiphanes (68.4%) and Pasiphaea (14.3%) were the most common prey.

The diet of redfish is fairly consistent with M. norvegica being the single most important prey throughout all seasons and years (Table 29). There is little evidence that redfish undergo extensive seasonal migrations (Bigelow and Schroeder, 1953 and Azarovitz, 1982) which may explain the lack of any obvious seasonal variation in its diet.

LONGHORN SCULPIN

The dorso-ventrally flattened head and large mouth of longhorn sculpin enable them to feed on relatively large benthic organisms. Bigelow and Shroeder (1953) described longhorn sculpin as voracious scavengers which feed on shrimp, crabs, amphipods, hydroids, annelid worms, mollusks, squid, ascidians, and fish fry. The stomach contents we examined reveal that

longhorn sculpin fed mostly on various shrimps and crabs (Table 13), while amphipods, mysids, and fish were secondary foods. With the exception of not finding any mysids as food, Maurer and Bowman (1975) reported similar findings for the prey taken by 908 longhorn sculpin collected during the years 1969-72.

Bottom trawl survey data indicate longhorn sculpin are generally widespread in the sampling area throughout the year (Azarovitz, 1982). Bigelow and Schroeder (1953) report that longhorn sculpin may undergo slight irregular offshore movements. We found the diet of longhorn sculpin to be irregular throughout the seasons and years sampled, possibly due to shifts in available prey. Bowman (1977) also noted that the diet of longhorn sculpin apparently does not undergo large scale seasonal fluctuations.

FOURSPOT FLOUNDER

Fourspot flounder, as other flatfishes, have laterally compressed bodies oriented horizontally instead of vertically. Horizontal orientation provides flatfish with a feeding advantage for preying on certain organisms. Keenleyside (1979) described the foraging of a flounder as a stalking strategy. The flounder visually locates its prey, moves along the bottom using the dorsal and anal fin undulation for propulsion, and then leaps forward to capture its prey with a vigorous downward thrust of its caudal fin. Morris (1981) suggests that interspecific competition between flatfish species maybe reduced because of differences in mouth morphology. The mouth size, shape, and dentition determine the particular type of organism a flounder may select as food. Fourspot flounder have relatively large mouths with needle-like teeth. The mouth opens in an upward orientation. This mouth structure suggests that fourspot flounder is well adapted for feeding on fairly large organisms that move along slightly above or near the bottom.

We found that fourspot flounder feed on relatively large, fast-moving prey. Crabs and shrimps were principal foods, while squid and fish were next in dietary importance (Table 14). Bigelow and Schroeder (1953) also found fourspot flounder to feed mostly on crabs, shrimp, squid, fish, and some polychaetes (in total, we found only five polychaete worms in the 366 stomachs examined). Similarly, the prey composition of fourspot flounder determined from the examination of the contents of 1,096 stomachs collected during the years 1969-1972 (Langton and Bowman, 1981) differed little from our results.

Our results (Table 31) tend to confirm the report by Bowman (1977), in which he indicated that the diet of fourspot flounder doesn't change substantially from one season to the next. Although fourspot tend to be more widely distributed in autumn (especially in the shoal areas) they don't appear to undergo large scale migrations. This possibly explains why little seasonal variation is noted in their diet.

WITCH FLOUNDER

Witch flounder feed almost exclusively on polychaete worms (Langton and Bowman, 1981; and see Table 15). The witch's mouth structure seems perfectly suited for picking or sucking worms out of the bottom. Their mouth is small, equipped with incisor-like teeth, and opens downward (Morris, 1981). Holothurians, amphipods, anemones, and fish eggs were some of the other organisms we identified as food of witch flounder.

There is little evidence that witch flounder undertake seasonal migrations (Azarovitz, 1982). Witch flounder feed almost exclusively on polychaete worms during both spring and autumn (Table 32). However, we also noted that holothurians were a fairly important food during spring, while goniadid and sabellid polychaetes were more commonly eaten in the autumn.

AMERICAN PLAICE

The mouth structure of American plaice is similar to that of fourspot flounder; a large mouth with long conical teeth (Morris, 1981). However, the mouth of American plaice is oriented downward while that of fourspot is oriented upward. The mouth morphology of plaice is better adapted for capturing large organisms on the bottom.

We found the stomach contents of plaice to contain almost exclusively the sand dollar, Echinarachnius parma (Table 16). Ophiuroids, especially Ophiura sarsi, were the second most important prey. Langton and Bowman (1981) and Bigelow and Schroeder (1953) also report that plaice feed chiefly on sand dollars and brittle stars. Shrimp, euphausiids, polychaete worms, and bivalves were some of the incidental organisms we identified as food.

American plaice generally move little throughout the year (Bigelow and Schroeder, 1953; and Azarovitz, 1982); however, we observed a notable seasonal shift in its diet. Ophiuroids (brittle stars) were eaten mostly during autumn and echinoids (sand dollars) were dominant prey in spring (Table 33). If the distribution of American plaice is fairly constant, then one possible explanation for their dietary change is that the availability of brittle stars or sand dollars may vary throughout the year in particular areas. Of interest is that Bowman (1977) also found plaice to prey on almost twice as many ophiuroids during autumn than spring in the Gulf of Maine.

YELLOWTAIL FLOUNDER

Bigelow and Schroeder (1953) described the diet of yellowtail flounder as consisting of prey such as worms, amphipods, mysids, small shrimp, and small shellfish. Langton and Bowman (1981) analyzed the contents of 2,645 yellowtail flounder stomachs and identified polychaetes as primary prey. They ranked amphipods secondary in importance as a food of yellowtail. They also noted that the yellowtail flounder's diet is for the most part similar throughout its geographic range. Our food data on yellowtail flounder gives credence to the above mentioned reports. We found almost half of the gut

contents of yellowtail to be made up of polychaete worms; the next largest dietary component was amphipods (Table 17). The organisms consumed by yellowtail flounder indicate this predator is principally a benthivore. Its mouth morphology is well suited to accommodate its benthic feeding behavior. The mouth is relatively small and has a single row of fine teeth, and also has a pronounced downward orientation (Morris, 1981).

The spring and autumn distribution of yellowtail flounder is similar according to bottom trawl survey information compiled by Azarovitz (1982). However, Bigelow and Schroeder (1953) report that yellowtail flounder move into deep, cool waters during summer when inshore waters rise in temperature. If this migration does occur, it may possibly explain why larger quantities of food (more available prey?) were found during spring (in all years except 1976) in the stomachs of the yellowtail we examined (Table 34).

VARIATION IN FEEDING INTENSITY

The seasonal or yearly abundance of particular organisms within various marine areas can sometimes be directly correlated with fluctuations noted in the diet of marine fishes. For example, Grosslein et al. (1980) reported an increase in the abundance of American sand lance in the Northwest Atlantic during 1976 based on bottom trawl survey information. The increase in abundance of sand lance during 1976 was apparently reflected in the diets of Atlantic cod and silver hake for the same year (1976; see Tables 19 and 21). The squid, Loligo sp., is another example of a prey species which fish intensively feed upon when it is available. Atlantic cod, pollock, silver hake, and butterfish feed intensively on Loligo sp. when it was somewhat more abundant in the Northwest Atlantic during the autumn of 1976 (Lange, 1982). The reason Loligo made up large percentages of various predators diets in the autumn and not in spring was likely because Loligo is more available as prey in autumn, since they have a much wider distribution during that season (they are particularly more abundant in shallow regions; Azarovitz, 1982). Yearly fluctuations in organisms taken as prey usually can readily be associated with increases or decreases in abundance of those same organisms when abundance indices are available. However, for most prey species (in particular the benthos) little documentation exists concerning yearly variation in their abundance, and for this reason, dietary information gathered from fishes serves as one potential indicator that fluctuations in their abundance or distribution occur.

MAJOR PREY SPECIES

The stomach contents of the seventeen fish species studied provide a good indication of which species are utilized for food by fishes on the continental shelf. Prey listings for the various predators studied not only give an indication of prey diversity, but also indicate that relatively few species make up the bulk of the combined diets (Tables 1-17). For example, the most important mysid utilized as food was Neomysis americana, and Meganyctiphanes norvegica was the predominant euphausiid taken as prey. Crangon septemspinosa, Dichelopanadlus leptocerus, Axius serratus, Pandalus

borealis, and Pasiphaea multidentata were the dominant decapod shrimp identified as food. Cancer irroratus was the predominant crab, but Cancer borealis, Pagurus acadianus, Hyas coarctatus, and Munida iris were also important prey. The sand dollar, Echinarachnius parma was taken as food in large quantities by at least two species. Ophiura sarsi and Ophiopholis aculeata were the two most common brittle stars noted as food. American sand lance, Atlantic mackerel, clupeid fish, and the squid, Loglio sp. were common prey of several species. Lumbrinerid and spionid (especially Spionphanes bombyx) polychaetes were prevalent in the diet of fishes which feed on worms. Among amphipods, species such as Unicola irrorata, Leptocheirus pinguis, Parathemisto sp., Byblis serratus, Monocluoides edwardsi, and Unciola serrata were taken in large quantities as food.

LITERATURE CITED

Appy, T.D., L.E. Linkletter, and M.J. Dadswell. 1980. A guide to the marine flora and fauna of the Bay of Fundy: Annelida: Polychaeta. Fish. Mar. Serv. Tech. Rep. No. 920, 124 p.

Azarovitz, T. 1982. Personal communication - draft report. National Marine Fisheries Service, Woods Hole, Mass. 02543. (617) 548-5123.

Barans, C.A. 1969. Distribution, growth, and behaviour of the spotted hake in the Chesapeake Bight. M.A. Thesis, College of William and Mary, Williamsburg, VA.

Bigelow, H.B. and W.C. Schroeder. 1953. Fishes of the Gulf of Maine. U.S. Fish. Wildl. Serv., Fish. Bull. 53, 577p.

Bowman, R.E. 1975. Food habits of Atlantic cod, haddock, and silver hake in the Northwest Atlantic, 1969-1972. U.S. Nat. Mar. Fish. Serv., Northeast Fisheries Center, Woods Hole Lab. Ref. Doc. No. 75-01, 53 p.

Bowman, R.E. 1977. Seasonal food habits of demersal fish in the Northwest Atlantic - 1972. U.S. Nat. Mar. Fish. Serv., Northeast Fisheries Center, Woods Hole Lab. Ref. Doc. 77-01, 31 p.

Bowman, R.E. 1980. Food of silver hake (Merluccius bilinearis). U.S. Nat. Mar. Fish. Serv., Northeast Fisheries Center, Woods Hole Lab. Ref. Doc. 80-31, 46 p.

Grosslein, M.D., R.W. Langton, and M.P. Sissenwine. 1980. Recent fluctuations in pelagic fish stocks of the northwest Atlantic, Georges Bank region, in relation to species interactions. Rapp. P.-v. Reun. Cons. Int. Explor. Mer. 177: 374-404.

Herrick, C.J. 1902. The organ and sense of taste in fishes. Bull. U.S. Fish. Commision 22: 239-272.

Hildebrand, S.F. and W.C. Schroeder. 1928. Fishes of Chesapeake Bay. Bull. (U.S.) Bur. Fish. 43(1), 388 p.

Keast, A. 1979. Patterns of predation in generalist feeders. In Predator-prey systems in fisheries management. Sport Fish. Inst., Washington, D.C., 13 p.

Kennleyside, M.H.A. 1979. Zoophysiology. Volumer 11. Diversity and adaptations in fish behaviour. Springer-Verlag Berlin Heidelberg, N.Y., 208 p.

Lagler, K.F., J.E. Bardach, R.R. Miller, and D.R. May Passino. 1977. Ichthyology. John Wiley & Sons, Inc., N.Y., 506 p.

Lange, A.M.T. 1982. Status of the squid (Loligo pealei and Illex illecebrosus) populations off the northeastern USA. U.S. Nat. Mar. Fish. Serv., Northeast Fisheries Center, Woods Hole Lab. Ref. Doc. 82-27, 20 p.

Langton, R.W. and R.E. Bowman. 1981. Food of eight northwest Atlantic pleuronectiform fishes. U.S. Dept. Commer., NOAA Techn. Rep., NMFS SSRF-749, 16 p.

Langton, R.W. and R.E. Bowman. 1980. Food of fifteen northwest Atlantic gadiform fishes. U.S. Dept. Commer., NOAA, Tech. Rept., NMFS SSRF-740, 23 p.

Maurer, R.O. and R.E. Bowman. 1975. Food habits of marine fishes of the northwest Atlantic - data report. U.S. Nat. Mar. Fish. Serv., Northeast Fisheries Center, Woods Hole Lab. Ref. Doc. No. 75-3, 90 p.

Morris, T.L. 1981. Mouth structure relative to food habits for seven northwest Atlantic pleuronectiform fish species. ICES C.M. 1981/G:67, 10 p.

Morse, W.W. 1978. Biological and fisheries data on scup, Stenotomus chrysops (Linnaeus). U.S. Dept. Commer., Nat. Mar. Fish. Serv., Sandy Hook Lab., N.J., Tech. Ser. Rep. No. 12, 41 p.

Nikolsky, G.V. 1963. The ecology of fishes. Academic Press, Inc., N.Y. 352 p.

Petrov, V.N. 1973. Maturity, feeding, length and age composition of white hake, Urophycis tenuis (Mitch.) in ICNAF Subarea 3, 1969-72. Int. Comm. Northwest Atl. Fish. Redb. 1973 (III): 101-104.

Sikora, W.B., R.W. Heard, and M.D. Dahlberg. 1972. The occurrence and food habits of two species of hake, Urophycis regius and U. floridanus in Georgia estuaries. Trans. Am. Fish. Soc. 101: 513-525.

Table 1 . Listing of all stomach content categories identified for little skate (Raja erinacea) sampled in the Northwest Atlantic during the years 1973-1976. Data are presented as a percentage of the total stomach contents weight, total weight in grams, and number of organisms for each stomach content category.

Stomach contents	Number of organisms		Weight (g)		Percentage weight	
FORAMINIFERIDA	3		0.000		0.00	
COELENTERATA	4		7.029		0.59	
Ceriantharia		3		6.966		0.58
Anthozoa		1		0.063		0.01
NEMERTEA	11		9.788		0.82	
PRIAPULIDA	1		0.003		0.00	
NEMATODA	967		1.745		0.15	
POLYCHAETA	362		127.631		10.67	
Spionidae		2		0.006		0.00
Pherusa arenosa		1		0.660		0.06
Flabelligeridae		47		5.463		0.46
Maldanidae		25		3.610		0.30
Ammotrypane sp.		12		0.161		0.01
Opheliidae		16		1.072		0.09
Sternaspidae		1		0.026		0.00
Ampharetidae		3		0.047		0.00
Sabellidae		2		0.825		0.07
Aphrodita hastata		1		3.055		0.25
Aphroditidae		41		17.217		1.44
Arabella iricolor		7		1.038		0.09
Glyceridae		13		11.703		0.98
Goniadidae		1		0.071		0.01
Lumbrineridae		14		4.322		0.36
Nephtys sp.		3		1.391		0.12
Nephtyidae		47		10.156		0.85
Nereis succinea		1		0.016		0.00
Nereis sp.		9		2.901		0.24
Nereidae		19		10.291		0.86
Onuphidae		1		0.104		0.01
Polynoidae		1		0.333		0.03
Sigalionidae		7		0.440		0.04
Polychaeta tubes		4		0.998		0.08
Unidentified Polychaeta		84		51.725		4.32
SIPUNCULIDA	3		27.51		0.23	
Golfingia appendiculata		1		0.393		0.03
Unidentified Sipunculida		2		2.358		0.20
CRUSTACEA	25758		807.846		67.42	
Amphipoda		19678		167.161		13.99
Oediceros sp.		15		0.123		0.01
Ampelisca macrocephala		53		0.477		0.04
Ampelisca eschrichti		8		0.209		0.02
Ampelisca vadorum		43		0.246		0.02
Ampelisca sp.		4		0.048		0.00
Byblis serrata		1520		5.861		0.49
Byblis sp.		11		0.063		0.01
Ampeliscidae		423		2.608		0.22
Amphilochoides odontonyx		1		0.015		0.00
Ampithoe sp.		34		0.543		0.05
Microdeutopus gryllotalpa		1		0.003		0.00
Aoridae		298		2.461		0.21

Table 1. (continued)

Stomach contents	Number of organisms	Weight (g)	Percentage weight
Amphipoda (con't)			
Calliopius laeviusculus	56	0.564	0.05
Aeginina longicornis	28	0.112	0.01
Caprellidae	170	1.177	0.10
Ericthonius braziliensis	7	0.010	0.00
Ericthonius rubricornis	897	0.926	0.08
Ericthonius sp.	57	0.061	0.01
Unciola irrorata	2329	14.427	1.20
Unciola serrata	9	0.194	0.02
Unciola sp.	1162	11.221	0.94
Corophiidae	20	0.011	0.00
Casco bigelowi	8	0.195	0.02
Gammarus annulatus	979	16.259	1.36
Melita dentata	1	0.003	0.00
Gammaridae	866	19.504	1.63
Haustoriidae	5	0.009	0.00
Amphiporeia gigantea	63	0.710	0.06
Bathyporeia quoddyensis	4	0.035	0.00
Parahaustorius attenuatus	1	0.019	0.00
Protohaustorius deichmanni	1	0.005	0.00
Haustoriidae	131	1.126	0.09
Hyperiidae	14	0.021	0.00
Anonyx sarsi	3	0.097	0.01
Anonyx sp.	1	0.042	0.00
Hippomedon serratus	16	0.196	0.02
Orchomenella minuta	3	0.062	0.01
Lysianassidae	108	1.354	0.11
Monoculodes edwardsi	3713	21.035	1.76
Monoculodes intermedius	327	4.755	0.40
Monoculodes sp.	97	1.047	0.09
Oedicerotidae	798	5.806	0.48
Pardalisca cuspidata	30	0.197	0.02
Leptocheirus pinguis	4945	51.606	4.31
Leptocheirus sp.	1	0.158	0.01
Trichophoxus epistomus	5	0.014	0.00
Phoxocephalidae	18	0.073	0.01
Stenopleustes sp.	21	0.406	0.03
Podoceridae	290	0.289	0.02
Pontogeneia inermis	78	0.324	0.03
Amphipoda tubes	0	0.141	0.01
Unidentified Amphipoda	5	0.313	0.03
Decapoda	4725	567.933	47.38
Axius serratus	29	22.252	1.86
Cancer borealis	82	22.816	1.90
Cancer irroratus	331	63.050	5.26
Cancer sp.	6	0.200	0.02
Cancridae	563	47.324	3.95
Crangon septemspinosa	2758	107.363	8.96
Sclerocrangon boreas	1	0.119	0.01
Crangonidae	129	1.494	0.12
Munida iris	2	0.488	0.04

Table 1. (continued)

Stomach contents	Number of organisms	Weight (g)	Percentage weight
Decapoda (con't)			
Munida sp.	1	0.226	0.02
Homaridae	0	0.025	0.00
Eualus pusiolus	24	0.251	0.02
Lebbeus polaris	1	0.134	0.01
Hippolytidae	5	0.149	0.01
Hyas coarctatus	13	3.807	0.32
Hyas sp.	10	1.823	0.15
Pagurus acadianus	93	120.116	10.03
Pagurus annulipes	4	0.876	0.07
Pagurus sp.	97	66.390	5.54
Paguridae	77	12.755	1.06
Dichelopandalus leptocerus	199	48.547	4.05
Pandalus sp.	1	0.264	0.02
Pandalidae	15	1.631	0.14
Ovalipes ocellatus	5	1.606	0.13
Portunus sp.	4	0.583	0.05
Decapod crab	141	27.903	2.33
Decapod shrimp	125	3.647	0.30
Unidentified Decapoda	9	12.094	1.01
Isopoda	500	15.763	1.31
Aegidae	1	0.023	0.00
Cirolana polita	171	7.335	0.61
Cirolana sp.	234	8.020	0.67
Chiridotea almyra	1	0.003	0.00
Chiridotea tuftsi	5	0.018	0.00
Chiridotea sp.	60	0.230	0.02
Edotea sp.	1	0.000	0.00
Synidotea sp.	4	0.005	0.00
Unidentified Isopoda	23	0.129	0.01
Cumacea	392	0.804	0.07
Leptocuma minor	43	0.088	0.01
Diastylis sculpta	54	0.095	0.01
Diastylis sp.	4	0.015	0.00
Lamprops quadriplicata	9	0.056	0.00
Lamprops sp.	14	0.007	0.00
Petalosarsia declivis	1	0.000	0.00
Unidentified Cumacea	267	0.543	0.05
Euphausiacea	8	0.097	0.00
Meganyctiphanes norvegica	2	0.040	0.00
Unidentified Euphausiacea	6	0.057	0.00
Mysidacea	395	4.828	0.40
Erythrops erythrophthalma	51	0.042	0.00
Neomysis americana	288	4.638	0.39
Unidentified Mysidacea	56	0.148	0.01
Copepoda	54	0.024	0.00
Calanoid copepod	43	0.017	0.00
Unidentified Copepoda	11	0.007	0.00
Stomatopoda	4	0.157	0.01
Crustacea eggs	0	0.279	0.02
Unidentified Crustacea	2	50.800	4.24

Table 1. (continued)

Stomach contents	Number of organisms		Weight (g)		Percentage weight	
MOLLUSCA	28		44.880		3.74	
Pelecypoda	13		35.902		3.00	
Gastropoda	1		0.033		0.00	
Cephalapoda	12		2.310		0.19	
Rossia tenera	1		0.312		0.03	
Octopoda	1		0.268		0.02	
Unidentified Cephalapoda	10		1.730		0.14	
Unidentified Mollusca	2		6.635		0.55	
ECHINODERMATA	2		0.449		0.03	
Echinoidea	1		0.291		0.02	
Echinarachnius parma	1		0.291		0.02	
Ophiuroidea	1		0.158		0.01	
CHORDATA	2		0.002		0.00	
Larvacea	2		0.002		0.00	
Oikopleura sp.	2		0.002		0.00	
CEPHALOCHORDATA	0		0.008		0.00	
PISCES	77		67.103		5.59	
Anguilla rostrata	1		0.170		0.01	
Merluccius bilinearis	1		0.702		0.06	
Gadidae	1		0.151		0.01	
Ammodytes americanus	2		1.271		0.11	
Myoxocephalus sp.	3		2.604		0.22	
Tautogolabrus adspersus	1		0.405		0.03	
Pholis gunnellus	3		1.848		0.15	
Sebastes marinus	1		0.247		0.02	
Ulvaria subbifurcata	1		22.766		1.90	
Paralichthys dentatus	1		2.756		0.23	
Pleuronectiformes	22		3.379		0.28	
Fish eggs	16		0.121		0.01	
Fish larvae	3		0.177		0.01	
Unidentified Pisces	21		30.506		2.55	
UNIDENTIFIED EGGS	0		0.265		0.02	
ANIMAL REMAINS	13		125.703		10.51	
PLANT REMAINS	1		0.018		0.00	
ROCK	8		0.271		0.02	
SAND	0		2.570		0.21	
TOTAL	27240		1198.062		100.00	

Number of stomachs examined	1065
Number of empty stomachs	97
Mean stomach content weight (g)	1.041
Mean number of organisms per stomach	25.58
Mean fish TL (cm)	38

Table 2 . Listing of all stomach content categories identified for Atlantic cod (Gadus morhua) sampled in the Northwest Atlantic during the years 1973-1976. Data are presented as a percentage of the total stomach contents weight, total weight in grams, and number of organisms for each stomach content category.

Stomach contents	Number of organisms		Weight (g)		Percentage weight	
PROTOZOA	27		0.000		0.00	
Foraminiferida		27		0.000		0.00
COELENTERATA	99		262.913		0.62	
Hydrozoa		0		5.874		0.01
Anthozoa		98		254.050		0.60
Metridium sp.		3		28.778		0.07
Actiniaria		3		5.325		0.01
Ceriantharia		41		39.109		0.09
Unidentified Anthozoa		51		180.838		0.43
Unidentified Coelenterata		1		2.989		0.01
CTENOPHORA	0		18.389		0.04	
CESTODA	24		0.004		0.00	
TREMATODA	3601		0.464		0.00	
NEMERTEA	10		5.232		0.01	
NEMATODA	742		2.451		0.01	
POLYCHAETA	249		465.054		1.09	
Polydora ciliata		1		0.004		0.00
Spionphanes bombyx		0		0.979		0.00
Spionidae		0		2.902		0.01
Pherusa sp.		2		0.356		0.00
Flabelligeridae		11		3.828		0.01
Maldanidae		2		0.078		0.00
Ophelia sp.		2		7.704		0.02
Terebellidae		4		0.820		0.00
Sabellidae		1		0.266		0.00
Alciopidae		1		0.492		0.00
Aphrodita hastata		3		20.040		0.05
Aphroditidae		45		321.987		0.76
Arabella iricolor		1		0.332		0.00
Arabellidae		0		0.179		0.00
Eunice pennata		9		3.743		0.01
Eunice sp.		1		0.295		0.00
Eunicidae		5		1.979		0.00
Goniada sp.		3		6.650		0.02
Ophioglycera gigantea		3		0.167		0.00
Lumbrineris sp.		4		4.555		0.01
Lumbrineridae		11		4.381		0.01
Nephtyidae		6		3.349		0.01
Nereidae		15		2.335		0.01
Onuphis eremita		2		1.115		0.00
Onuphis sp.		9		0.300		0.00
Onuphidae		3		0.701		0.00
Eteone sp.		5		0.013		0.00
Phyllodoce sp.		11		0.373		0.00
Phyllodocidae		7		1.152		0.00
Ephesiella minuta		1		0.233		0.00
Polychaeta tubes		10		5.992		0.01
Unidentified Polychaeta		71		67.754		0.16

Table 2. (continued)

Stomach contents	Number of organisms		Weight (g)		Percentage weight	
OLIGOCHAETA	1		0.006		0.00	
SIPUNCULIDA	9		11.851		0.03	
Golfingia sp.		6		11.713		0.03
Phascolion strombi		2		0.042		0.00
Unidentified Sipunculida		1		0.096		0.00
CRUSTACEA	17538		8041.550		19.00	
Amphipoda	7363		64.709		0.13	
Ampelisca sp.		5		0.241		0.00
Haploops setosa		5		0.233		0.00
Ampelisicidae		32		0.664		0.00
Aoridae		13		0.108		0.00
Calliopius laeviusculus		20		0.302		0.00
Calliopiidae		36		0.910		0.00
Aeginella spinosa		33		0.696		0.00
Aeginina longicornis		42		0.208		0.00
Caprellidae		109		0.926		0.00
Ericthonius rubricornis		132		0.110		0.00
Ericthonius sp.		3		0.015		0.00
Unciola irrorata		1838		11.962		0.03
Unciola serrata		147		1.351		0.00
Unciola sp.		18		0.188		0.00
Corophiidae		6		0.032		0.00
Eusirus cuspidatus		2		0.228		0.00
Rachotropis aculeata		65		0.358		0.00
Eusiridae		1		0.094		0.00
Gammarus annulatus		345		3.027		0.01
Gammarus sp.		7		0.070		0.00
Gammaridae		277		7.295		0.02
Melita dentata		22		0.317		0.00
Parathemisto sp.		266		1.555		0.00
Hyperiidae		852		2.864		0.01
Anonyx liljeborgi		1		0.002		0.00
Anonyx sarsi		250		5.424		0.01
Hippomedon serratus		14		0.146		0.00
Orchomenella minuta		5		0.002		0.00
Ocrhomenella pinguis		6		0.131		0.00
Tmetonyx nobilis		1		0.037		0.00
Psammonyx nobilis		121		2.177		0.01
Lysianassidae		91		1.233		0.00
Monoculodes edwardsi		4		0.035		0.00
Monoculodes sp.		1		0.014		0.00
Oedicerotidae		17		0.103		0.00
Leptocheirus pinguis		283		4.240		0.01
Padoceropsis sp.		1		0.006		0.00
Harpinia propinqua		1		0.00		0.00
Pontogeneia inermis		2222		13.829		0.03
Pontogeneia sp.		35		2.128		0.00
Stegocephalus inflatus		3		0.314		0.00
Tiron spiniferum		9		0.015		0.00
Leucothoe spinicarpa		14		0.168		0.00
Amphipoda tubes		0		0.715		0.00
Unidentified Amphipoda		8		0.236		0.00

Table 2. (continued)

Stomach contents	Number of organisms	Weight (g)	Percentage weight
Decapoda	4931	7554.128	17.88
Axius serratus	117	557.847	1.32
Axiidae	3	6.156	0.01
Calianassa atlantica	2	63.825	0.15
Cancer borealis	61	798.563	1.89
Cancer irroratus	519	2465.457	5.85
Cancridae	86	86.003	0.20
Crangon septemspinosa	585	67.501	0.16
Pontophilus norvegicus	3	0.614	0.00
Sabinea sarsii	1	0.269	0.00
Crangonidae	36	4.028	0.01
Geryon quinquedens	15	403.257	0.96
Caridion gordoni	9	0.670	0.00
Eualus gaimardii	57	0.105	0.00
Eualus pusiolus	392	9.709	0.02
Lebbeus groenlandicus	47	11.180	0.03
Lebbeus polaris	19	3.579	0.01
Lebbeus zebra	1	0.411	0.00
Lebbeus sp.	5	0.186	0.00
Spirontocaris liljeborgii	6	0.657	0.00
Spirontocaris spina	15	1.952	0.00
Spirontocaris sp.	43	4.271	0.01
Hippolytidae	31	4.814	0.01
Hyas araneus	24	26.494	0.06
Hyas coarctatus	374	492.690	1.17
Hyas sp.	114	88.747	0.21
Majidae	1	0.045	0.00
Pagurus acadianus	126	710.135	1.68
Pagurus annulipes	1	0.520	0.00
Pagurus longicarpus	1	2.200	0.01
Pagurus pubescens	24	76.528	0.18
Pagurus arcuatus	1	0.497	0.00
Pagurus sp.	45	58.432	0.14
Paguridae	52	27.232	0.06
Dichelopandalus leptocerus	1066	628.082	1.49
Pandalus borealis	36	148.178	0.35
Pandalus montagui	487	325.516	0.77
Pandalus sp.	1	2.153	0.01
Pandalidae	127	82.668	0.20
Pasiphaea multidentata	12	12.614	0.03
Pasiphaeidae	1	1.068	0.00
Penaeidae	4	0.137	0.00
Decapod crab	49	207.007	0.49
Decapod shrimp	298	89.580	0.21
Unidentified Decapoda	34	82.551	0.19
Isopoda	211	12.492	0.02
Aegidae	12	0.225	0.00
Anthuridae	3	0.042	0.00
Cirolana borealis	1	0.253	0.00

Table 2. (continued)

Stomach contents	Number of organisms		Weight (g)		Percentage weight	
Cirolana polita		77		5.106		0.01
Cirolana sp.		90		5.056		0.01
Cymothoidae		1		0.903		0.00
Chiridotea tuftsi		3		0.051		0.00
Chiridotea sp.		2		0.007		0.00
Janira alta		1		0.000		0.00
Unidentified Isopoda		21		0.849		0.00
Cumacea	62		0.103		0.00	
Diastylis polita		3		0.006		0.00
Diastylis rathkii		5		0.026		0.00
Oxyurostylis sp.		44		0.045		0.00
Unidentified Cumacea		10		0.026		0.00
Euphausiacea	1445		141.398		0.34	
Meganyctiphanes norvegica		1397		134.220		0.32
Thysanoessa sp.		1		0.011		0.00
Unidentified Euphausiacea		47		7.167		0.02
Mysidacea	552		8.829		0.02	
Mysis mixta		6		0.133		0.00
Neomysis americana		545		8.616		0.02
Unidentified Mysidacea		1		0.080		0.00
Cirripedia	1		1.016		0.00	
Copepoda	2959		0.976		0.00	
Calanoid copepod		169		0.060		0.00
Unidentified Copopoda		2790		0.916		0.00
Stomatopoda	1		0.000		0.00	
Unidentified Crustacea	13		257.899		0.61	
PYCNOGONIDA	2		0.199		0.00	
Pycnogonum littorale		2		0.199		0.00
MOLLUSCA	331		5325.793		12.63	
Pelecypoda	80		1857.215		4.41	
Arctica islandica		12		50.887		0.12
Cerastoderma pinnulatum		11		0.470		0.00
Cyrtodaria siliqua		8		277.010		0.66
Anomia simplex		1		0.063		0.00
Crenella sp.		1		0.049		0.00
Musculus niger		1		0.490		0.00
Placopecten magellanicus		0		7.263		0.02
Pectinidae		7		1257.277		2.98
Yoldia sp.		1		0.175		0.00
Unidentified Pelecypoda		38		263.531		0.63
Gastropoda	189		707.231		1.67	
Acoela		1		0.216		0.00
Aporrhais occidentalis		1		0.075		0.00
Crepidula sp.		1		0.193		0.00
Diaphana sp.		1		0.000		0.00
Buccinum sp.		4		50.808		0.12
Turridae		1		0.255		0.00
Unidentified Gastropoda		180		655.684		1.55
Cephalopoda	46		2628.705		6.24	

Table 2. (continued)

Stomach contents	Number of organisms		Weight (g)		Percentage weight	
Loligo sp.		11		2208.626		5.24
Octopoda		1		17.187		0.04
Unidentified Cephalopoda		34		402.892		0.96
Unidentified Mollusca	16		132.642		0.31	
CHAETOGNATHA	34		1.230		0.00	
ECHINODERMATA	728		781.379		1.84	
Asteroidea	9		27.400		0.06	
Asterias forbesi		1		1.151		0.00
Unidentified Asteriidae		1		0.134		0.00
Ctenodiscus crispatus		7		26.115		0.06
Echinoidea	10		25.165		0.05	
Strongylocentrotus drobachiensis		8		14.616		0.03
Echinarachnius parma		1		9.417		0.02
Unidentified Echinoidea		1		1.132		0.00
Ophiuroidea	660		438.722		1.04	
Amphipholis sp.		1		0.006		0.00
Ophiopholis aculeata		517		374.266		0.89
Ophiura robusta		1		0.001		0.00
Ophiura sarsi		29		22.383		0.05
Ophiura sp.		58		2.249		0.01
Unidentified Ophiuroidea		54		39.817		0.09
Crinoidea	0		2.457		0.01	
Holothuroidea	48		256.482		0.61	
Leptosynapta inhaerens		1		28.348		0.07
Synapta sp.		2		5.173		0.01
Unidentified Holothuroidea		45		222.961		0.53
Unidentified Echinodermata	1		31.153		0.07	
BRACHIOPODA	1		0.069		0.00	
CHORDATA	7		12.541		0.03	
Larvacea	5		5.199		0.01	
Oikopleura sp.		5		5.199		0.01
Ascidiacea	2		7.342		0.02	
PISCES	150928		25901.140		61.45	
Raja radiata		2		9.842		0.02
Rajidae		4		65.923		0.16
Batrachoididae		2		561.565		1.33
Alosa aestivalis		1		158.294		0.38
Clupea harengus		17		1398.913		3.32
Clupeidae		50		4022.867		9.54
Maurolicus pennanti		1		0.958		0.00
Brosme brosme		1		40.887		0.10
Gadus morhua		3		530.500		1.26
Melanogrammus aeglefinus		1		639.676		1.52
Merluccius bilinearis		29		981.216		2.33
Urophycis chuss		1		4.137		0.01
Urophycis sp.		1		17.215		0.04
Gadidae		35		493.829		1.17
Gadiformes		2		4.608		0.01
Aspidophoroides monopterygius		2		4.037		0.01
Ammodytes americanus		92		1162.079		2.76
Hemitripterus americanus		1		99.459		0.24

Table 2. (continued)

Stomach contents	Number of organisms	Weight (g)	Percentage weight
Myoxocephalus octodecemspinosus	15	176.461	0.42
Myoxocephalus scorpius	1	6.434	0.02
Cottidae	7	411.924	0.98
Pholis gunnellus	8	10.809	0.03
Pomatomus saltatrix	1	780.000	1.85
Scomber scombrus	86	4431.855	10.51
Scombridae	1	231.860	0.55
Sebastes marinus	20	1982.653	4.70
Macrozoarces americanus	2	4.929	0.01
Paralichthys dentatus	4	29.501	0.07
Scophthalmus aquosus	1	2.325	0.01
Hippoglossoides platessoides	2	755.039	1.79
Limanda ferruginea	1	2.908	0.01
Pleuronectidae	1	1.084	0.00
Pleuronectiformes	13	1263.931	3.00
Fish eggs	150425	105.171	0.25
Fish larvae	1	0.023	0.00
Unidentified Pisces	93	5508.228	13.05
UNIDENTIFIED EGGS	16	14.762	0.04
ANIMAL REMAINS	1	956.659	2.27
PLANT REMAINS	0	9.014	0.02
ROCK	254	227.333	0.54
SAND	0	109.495	0.26
MISCELLANEOUS	3	16.190	0.12
TOTAL	174605	42163.718	100.00

Number of stomachs examined	1678
Number of empty stomachs	162
Mean stomach content weight (g)	23.268
Mean number of organisms per stomach	104.06
Mean fish TL (cm)	53

Table 3 . Listing of all stomach content categories identified for haddock (Melanogrammus aeglefinus) sampled in the Northwest Atlantic during the years 1973-1976. Data are presented as a percentage of the total stomach contents weight, total weight in grams, and number of organisms for each stomach content category.

Stomach contents	Number of organisms		Weight (g)		Percentage weight	
PROTOZOA	34		0.000		0.00	
Foraminiferida		34		0.000		0.00
COELENTERATA	1286		89.005		1.86	
Hydrozoa		0		0.022		0.00
Anthozoa		1286		88.983		1.86
Actiniaria		0		11.407		0.24
Ceriantharia		1286		63.226		1.32
Unidentified Anthozoa		7		14.350		0.30
CESTODA	4		0.411		0.01	
TREMATODA	114		0.002		0.00	
NEMERTEA	43		16.043		0.33	
Cerebratulus sp.		32		2.431		0.05
Unidentified Nemertea		11		13.612		0.28
ACANTHOCEPHALA	12		0.040		0.00	
NEMATODA	599		0.817		0.02	
POLYCHAETA	2503		864.298		18.06	
Cirratulidae		3		0.043		0.00
Polydora ciliata		6		0.714		0.01
Spionphanes bombyx		0		32.006		0.67
Spionidae		1		46.433		0.97
Flabelligeridae		10		2.818		0.06
Clymenella torquata		1		5.082		0.11
Nicomache lumbricalis		908		31.894		0.67
Maldanidae		32		4.462		0.09
Ammotrypane aulogaster		52		2.183		0.05
Ophelia denticulata		1		0.248		0.01
Travisia sp.		5		0.242		0.01
Opheliidae		24		0.808		0.02
Oweniidae		4		0.271		0.01
Scalibregmidae		4		0.568		0.01
Sternaspis sp.		9		1.400		0.03
Sternaspidae		15		0.532		0.01
Scoleciformia		1		2.937		0.06
Capitellidae		30		1.226		0.03
Ampharetidae		103		8.431		0.18
Pectinaria gouldii		3		0.111		0.00
Pectinaria hyperborea		1		0.159		0.00
Pectinaria sp.		13		0.640		0.01
Pectinariidae		20		1.077		0.02
Terebellidae		15		1.848		0.04
Myxicola infundibulum		11		3.880		0.08
Sabellidae		59		37.192		0.78
Serpulidae		6		1.393		0.03
Amphinomidae		1		0.005		0.00
Aphrodita hastata		2		5.938		0.12
Laetmonice filicornis		9		0.495		0.01
Aphroditidae		35		52.368		1.09
Arabella iricolor		7		4.155		0.09
Arabellidae		1		0.304		0.01
Eunice pennata		73		7.542		0.16

Table 3. (continued)

Stomach contents	Number of organisms		Weight (g)		Percentage weight	
POLYCHAETA (con't)						
Eunice sp.		38		4.977		0.10
Marphysa belli		1		0.132		0.00
Eunicidae		15		1.978		0.04
Euphrosinidae		2		0.024		0.00
Glyceridae		66		4.899		0.10
Goniadidae		29		2.694		0.06
Hesionidae		0		0.026		0.00
Lumbrineris fragilis		1		0.811		0.02
Lumbrineris sp.		3		0.762		0.02
Lumbrineridae		32		6.161		0.13
Nephtyidae		47		10.108		0.21
Nereis sp.		20		2.506		0.05
Nereidae		44		4.041		0.08
Hyalinoecia tubicola		7		0.239		0.00
Onuphis eremita		75		11.491		0.24
Onuphis sp.		87		7.722		0.16
Onuphidae		20		1.737		0.04
Orbiniidae		7		0.050		0.00
Aricidea sp.		1		0.020		0.00
Paraonidae		5		0.001		0.00
Eteone longa		2		0.035		0.00
Phyllodoce arenae		5		0.543		0.01
Phyllodoce maculata		23		0.080		0.00
Phyllodoce mucosa		4		0.005		0.00
Phyllodoce sp.		17		0.539		0.01
Phyllodocidae		198		3.065		0.06
Polynoidae		15		1.783		0.04
Sigalionidae		4		0.171		0.00
Exogone sp.		1		0.000		0.00
Syllidae		3		0.003		0.00
Tomopteris helgolandica		9		0.087		0.00
Polychaeta tubes		87		403.754		8.44
Unidentified Polychaeta		170		134.449		2.81
OLIGOCHAETA	5		0.747		0.02	
SIPUNCULIDA	28		1.878		0.04	
Aspidosiphon sp.		1		0.026		0.00
Phascolion strombi		2		0.051		0.00
Unidentified Sipunculida		25		1.801		0.04
CRUSTACEA	37992		756.225		15.80	
Amphipoda	32602		359.268		7.48	
Ampelisca agassizi		73		0.048		0.00
Ampelisca macrocephala		17		0.348		0.01
Ampelisca eschrichti		4		0.213		0.00
Ampelisca vadorum		220		1.291		0.03
Ampelisca sp.		54		0.401		0.01
Byblis serrata		457		3.763		0.08
Haploops tubicola		26		0.493		0.01
Haploops setosa		64		0.920		0.02
Ampeliscidae		349		3.907		0.08
Ampithoe rubricata		1		0.055		0.00

Table 3. (continued)

Stomach contents	Number of organisms	Weight (g)	Percentage weight
Amphipoda (con't)			
Microdeutopus gryllotalpa	7	0.139	0.00
Aoridae	621	6.148	0.13
Calliopius laeviusculus	34	0.249	0.00
Calliopiidae	52	0.035	0.00
Aeginina longicornis	283	2.406	0.05
Caprellidae	117	1.040	0.02
Corophium sp.	1	0.109	0.00
Ericthonius braziliensis	9	0.008	0.00
Ericthonius rubricornis	3540	4.992	0.11
Ericthonius sp.	600	0.930	0.02
Unciola irrorata	15445	144.175	3.01
Unciola serrata	2572	65.314	1.37
Unciola sp.	154	1.193	0.03
Corophiidae	170	0.494	0.01
Eusirus cuspidatus	1	0.034	0.00
Rachotropis aculeata	2	0.164	0.00
Eusiridae	1	0.019	0.00
Casco bigelowi	1	0.005	0.00
Gammarus sp.	11	0.221	0.00
Gammaridae	1319	54.024	1.13
Melita dentata	82	0.700	0.01
Maera danae	2	0.041	0.00
Acanthohaustorius millsi	10	0.023	0.00
Acanthohaustorius spinosus	1	0.007	0.00
Parahaustorius longimerus	9	0.256	0.01
Parahaustorius sp.	1	0.014	0.00
Protohaustorius wigleyi	14	0.029	0.00
Pseudohaustorius sp.	19	0.058	0.00
Haustoriidae	59	0.502	0.01
Euthemisto bispinosa	1	0.013	0.00
Parathemisto sp.	35	0.366	0.01
Hyperiidae	20	0.096	0.00
Ischyrocerus sp.	124	0.073	0.00
Anonyx sarsi	123	2.343	0.05
Anonyx sp.	5	0.015	0.00
Hippomedon serratus	26	0.370	0.01
Orchemenella pinguis	10	0.211	0.00
Orchomenella sp.	10	0.180	0.00
Lysianopsis alba	1	0.045	0.00
Psammonyx nobilis	158	1.143	0.02
Other Lysianassidae	139	1.635	0.03
Monoculodes edwardsi	1722	12.031	0.25
Monoculodes sp.	29	0.244	0.01
Paroediceros lynceus	1	0.005	0.00
Oedicerotidae	92	0.385	0.01
Pardalisca sp.	1	0.050	0.00
Leptocheirus pinguis	2998	35.247	0.74
Phoxocephalus holbolli	14	0.042	0.00

Table 3. (continued)

Stomach contents	Number of organisms	Weight (g)	Percentage weight
Amphipoda (con't)			
Trichophoxus epistomus	65	0.221	0.00
Phoxocephalidae	51	0.148	0.00
Pleustes panoplus	6	0.031	0.00
Pleustes sp.	2	0.013	0.00
Stenopleustes gracilis	13	0.011	0.00
Stenopleustes sp.	2	0.074	0.00
Dulichia sp.	7	0.048	0.00
Pontogeneia inermis	501	2.838	0.06
Proboloides sp.	1	0.000	0.00
Stenothoidae	1	0.000	0.00
Syrrhoe crenulata	8	0.014	0.00
Tironidae	25	0.042	0.00
Atylus sp.	1	0.100	0.00
Amphipoda tubes	0	1.783	0.04
Unidentified Amphipoda	7	4.683	0.10
Decapoda	3364	299.313	6.29
Axius serratus	40	81.153	1.70
Calocaris templemani	2	21.352	0.45
Axiidae	506	1.508	0.03
Callianassa atlantica	0	0.919	0.02
Cancer borealis	6	0.819	0.02
Cancer irroratus	148	8.002	0.17
Cancer sp.	1	0.128	0.00
Cancridae	236	4.548	0.10
Crangon septemspinosa	96	8.175	0.17
Sabinea sp.	1	0.086	0.00
Crangonidae	39	2.312	0.05
Munida sp.	4	20.090	0.42
Munidopsis sp.	1	0.220	0.00
Eualus pusiolus	1419	13.219	0.28
Lebbeus groenlandicus	1	0.632	0.01
Lebbeus sp.	1	0.247	0.01
Spirontocaris spinus	8	0.737	0.02
Spirontocaris sp.	4	0.340	0.01
Hippolytidae	94	2.474	0.05
Hyas coarctatus	133	15.194	0.32
Hyas sp.	71	2.290	0.05
Pelia mutica	20	0.110	0.00
Pagurus acadianus	11	2.833	0.06
Pagurus politus	2	0.879	0.02
Pagurus pubescens	38	8.546	0.18
Pagurus arcuatus	1	6.239	0.13
Pagurus sp.	47	14.158	0.30
Paguridae	62	7.364	0.15
Dichelopandalus leptocerus	79	29.651	0.62
Pandalus borealis	1	4.068	0.09
Pandalus montagui	45	16.172	0.34
Pandalidae	15	2.303	0.05
Pasiphaea multidentata	2	0.013	0.00
Pasiphaeidae	0	0.025	0.00
Penaeus setiferus	1	0.013	0.00

Table 3. (continued)

Stomach contents	Number of organisms		Weight (g)		Percentage weight	
Decapoda (con't)						
Portunidae		1		0.318		0.01
Decapod crab		26		6.108		0.13
Decapod shrimp		146		10.147		0.21
Unidentified Decapoda		56		5.921		0.12
Isopoda	310		6.502		0.13	
Calathura sp.		4		0.053		0.00
Cyathura sp.		1		0.000		0.00
Anthuridae		27		0.365		0.01
Cirolana borealis		1		0.059		0.00
Cirolana polita		32		1.367		0.03
Cirolana sp.		46		2.563		0.05
Chiridotea tuftsi		76		0.632		0.01
Chiridotea sp.		40		0.478		0.01
Jaera marina		2		0.001		0.00
Jaera sp.		19		0.016		0.00
Ligia oceanica		2		0.005		0.00
Unidentified Isopoda		60		0.963		0.02
Cumacea	493		1.110		0.02	
Diastylis polita		3		0.011		0.00
Diastylis quadrispinosa		38		0.080		0.00
Diastylis sculpta		3		0.025		0.00
Diastylis sp.		99		0.218		0.00
Leptostylis sp.		4		0.002		0.00
Lamprops quadriplicata		34		0.020		0.00
Petalosarsia declivis		16		0.009		0.00
Unidentified Cumacea		296		0.745		0.02
Euphausiacea	479		40.654		0.85	
Meganyctiphanes norvegica		414		37.284		0.78
Thysanoessa sp.		17		0.273		0.01
Unidentified Euphausiacea		48		3.097		0.06
Mysidacea	684		11.813		0.25	
Neomysis americana		664		11.779		0.25
Unidentified Mysidacea		20		0.034		0.00
Copepoda	29		0.013		0.00	
Calanoid copepod		8		0.005		0.00
Unidentified Copepoda		21		0.008		0.00
Ostracoda	24		0.032		0.00	
Tanaidacea	3		0.001		0.00	
Unidentified Crustacea	4		37.519		0.78	
PYCNOGONIDA	12	0.505		0.01		
MOLLUSCA	13207	183.744		3.80		
Polyplacophora	12		1.147		0.02	
Pelecypoda	903		79.164		1.64	
Astarte sp.		2		0.071		0.00
Cerastoderma pinnulatum		131		11.518		0.24
Lucinidae		1		0.171		0.00
Mulinia lateralis		1		0.592		0.01
Spisula sp.		2		0.005		0.00
Tellina sp.		1		0.003		0.00
Anomia sp.		1		0.00		0.00

Table 3. (continued)

Stomach contents	Number of organisms		Weight (g)		Percentage weight	
Pelecypoda (con't)						
Anadara sp.		5		0.253		0.01
Bathyarca sp.		37		2.261		0.05
Limatula subauriculata		77		1.590		0.03
Crenella glandula		1		0.167		0.00
Crenella sp.		1		0.000		0.00
Chlamys islandica		136		10.711		0.22
Pecten sp.		2		0.008		0.00
Placopecten magellanicus		168		29.108		0.61
Pectinidae		22		0.929		0.02
Nuculana pernula		2		0.538		0.01
Nuculana tenuisulcata		2		0.111		0.00
Yoldia limatula		1		0.414		0.01
Yoldia sapotilla		1		0.394		0.01
Yoldia sp.		22		3.750		0.08
Nucula proxima		3		0.112		0.00
Nucula sp.		27		0.494		0.01
Cuspidaria sp.		3		0.032		0.00
Unidentified Pelecypoda		254		15.932		0.33
Scaphopoda	4		0.411		0.01	
Dentalium entale		1		0.021		0.00
Unidentified Scaphopoda		3		0.390		0.01
Gastropoda	12274		31.678		0.65	
Corambidae		1		0.038		0.00
Clione limacina		1		0.026		0.00
Pteropoda		11		1.137		0.02
Buccinidae		12175		22.643		0.47
Colus sp.		1		0.543		0.01
Oenopota harpularia		1		0.084		0.00
Unidentified Gastropoda		84		7.207		0.15
Cephalopoda	4		54.683		1.14	
Unidentified Mollusca	10		16.661		0.34	
CHAETOGNATHA	3		0.151		0.00	
ECHINODERMATA	5703		1338.341		27.97	
Asteroidea	14		3.579		0.07	
Asterias sp.		2		0.097		0.00
Unidentified Asteroidea		12		3.482		0.07
Echinoidea	543		130.730		2.74	
Strongylocentrotus drobachiensis		143		56.822		1.19
Echinarachnius parma		381		68.204		1.43
Unidentified Echinoidea		19		5.704		0.12
Ophiuroidea	5083		1046.377		21.87	
Amphipholis squamata		20		3.490		0.07
Axiognathus squamatus		17		2.608		0.05
Amphiuridae		0		18.636		0.39
Ophiopholis aculeata		893		456.406		9.54
Ophiolepis elegans		3		0.133		0.00
Ophiura robusta		10		0.256		0.01
Ophiura sarsi		2615		291.732		6.10
Ophiura sp.		1348		62.543		1.31
Unidentified Ophiuroidea		177		210.573		4.40

Table 3. (continued)

Stomach contents	Number of organisms		Weight (g)		Percentage weight	
ECHINODERMATA (con't)						
Crinoidea	0		1.917		0.04	
Holothuroidea	48		62.134		1.29	
Synapta sp.		1		6.915		0.14
Havelockia scabra		2		2.118		0.04
Psolus sp.		16		29.025		0.61
Unidentified Holothuroidea		29		24.076		0.50
Unidentified Echinodermata	15		93.604		1.96	
BRYOZOA	0		0.015		0.00	
BRACHIOPODA	1		0.081		0.00	
CHORDATA	3737		18.720		0.40	
Larvacea	3668		11.896		0.25	
Oikopleura labradoriensis		4		0.021		0.00
Oikopleura sp.		3642		11.260		0.24
Unidentified Larvacea		22		0.615		0.01
Ascidiacea	65		5.052		0.11	
Thaliacea	4		1.772		0.04	
PISCES	62		112.117		2.34	
Congridae		1		0.089		0.00
Clupeidae		1		45.329		0.95
Maurolicus pennanti		1		0.985		0.02
Melanogrammus aeglefinus		1		38.848		0.81
Merluccius bilinearis		1		2.146		0.04
Gadidae		1		0.150		0.00
Myoxocephalus octodecemspinosus		2		0.891		0.02
Myoxocephalus scorpius		1		1.139		0.02
Cottidae		2		2.417		0.05
Pleuronectiformes		2		0.728		0.02
Fish eggs		39		0.044		0.00
Unidentified Pisces		10		19.395		0.41
ANIMAL REMAINS	120		709.818		14.88	
PLANT REMAINS	0		0.024		0.00	
ROCK	421		111.747		2.34	
SAND	0		580.070		12.12	
TOTAL	65886		4784.867		100.00	

Number of stomachs examined	1476
Number of empty stomachs	89
Mean stomach content weight (g)	3.258
Mean number of organisms per stomach	44.64
Mean fish FL (cm)	38

Table 4 . Listing of all stomach content categories identified for silver hake (Merluccius bilinearis) sampled in the Northwest Atlantic during the years 1973-1976. Data are presented as a percentage of the total stomach contents weight, total weight in grams, and number of organisms for each stomach content category.

Stomach contents	Number of organisms		Weight (g)		Percentage weight	
CESTODA	27		0.012		0.00	
TREMATODA	294		0.004		0.00	
NEMERTEA	2		0.009		0.00	
ACANTHOCEPHALA	4		0.008		0.00	
NEMATODA	72		0.063		0.00	
POLYCHAETA	5		2.443		0.06	
Nephtyidae		2		0.466		0.01
Unidentified Polychaeta		3		1.977		0.05
CRUSTACEA	19561		395.930		9.36	
Amphipoda	5348		15.124		0.36	
Ampelisca agassizi		1185		2.124		0.05
Ampelisca spinipes		13		0.044		0.00
Ampelisca vadorum		125		0.215		0.01
Ampelisca sp.		9		0.029		0.00
Byblis serrata		160		0.871		0.02
Byblis sp.		27		0.168		0.00
Ampeliscidae		193		0.639		0.02
Aoridae		2		0.011		0.00
Aeginina longicornis		1		0.010		0.00
Caprellidae		2		0.005		0.00
Ericthonius rubricornis		7		0.008		0.00
Ericthonius sp.		11		0.008		0.00
Unciola irrorata		3		0.023		0.00
Corophiidae		2		0.006		0.00
Eusirus cuspidatus		1		0.006		0.00
Eusiridae		1		0.002		0.00
Gammaridae		288		2.219		0.05
Parathemisto sp.		2262		4.168		0.10
Hyperiidae		234		1.162		0.03
Hippomedon serratus		26		0.339		0.01
Lysianassidae		20		0.220		0.01
Monoculodes edwardsi		92		0.296		0.01
Monoculodes intermedius		7		0.043		0.00
Monoculodes sp.		113		0.369		0.01
Oedicerotidae		494		1.746		0.04
Leptocheirus pinguis		9		0.063		0.00
Leptocheirus sp.		1		0.002		0.00
Phoxocephalus holbolli		5		0.011		0.00
Phoxocephalidae		1		0.003		0.00
Pontogeneia inermis		39		0.140		0.00
Syrrhoe crenulata		8		0.034		0.00
Tiron acanthurus		7		0.031		0.00
Unidentified Amphipoda		0		0.109		0.00
Decapoda	1720		169.024		3.99	
Cancer irroratus		1		0.031		0.00
Cancridae		4		0.116		0.00
Argis sp.		2		0.014		0.00
Crangon septemspinosa		911		57.636		1.36
Sclerocrangon boreas		2		0.239		0.01
Crangonidae		87		1.774		0.04

Table 4. (continued)

Stomach contents	Number of organisms		Weight (g)		Percentage weight	
Decapoda (con't)						
Paguridae		1		0.025		0.00
Dichelopandalus leptocerus		434		85.521		2.02
Pandalus borealis		2		0.564		0.01
Pandalidae		6		0.455		0.01
Pasiphaea multidentata		7		4.927		0.12
Decapod larvae		18		0.017		0.00
Decapod crab		1		0.000		0.00
Decapod shrimp		187		13.922		0.33
Unidentified Decapoda		57		3.783		0.09
Cumacea	261		0.456		0.01	
Leptocuma sp.		46		0.029		0.00
Diastylis sp.		1		0.006		0.00
Diastylidae		1		0.015		0.00
Lampropidae		3		0.013		0.00
Petalosarsia declivis		2		0.006		0.00
Pseudocumidae		1		0.001		0.00
Unidentified Cumacea		207		0.386		0.01
Euphausiacea	7245		168.259		3.98	
Euphausia krohnii		3		0.017		0.00
Euphausia sp.		375		3.175		0.08
Meganyctiphanes norvegica		6644		157.725		3.73
Unidentified Euphausiacea		223		7.342		0.17
Mysidacea	4766		29.153		0.69	
Erythrops erythrophthalma		5		0.007		0.00
Neomysis americana		4411		28.196		0.67
Unidentified Mysidacea		350		0.950		0.02
Copepoda	199		0.045		0.00	
Centropages bradyi		48		0.003		0.00
Centropages sp.		1		0.000		0.00
Calanoid copepod		129		0.024		0.00
Unidentified Copepoda		21		0.018		0.00
Unidentified Crustacea	22		13.869		0.33	
MOLLUSCA	23		390.431		9.23	
Gastropoda	2		0.000		0.00	
Cephalapoda	21		390.431		9.23	
Loligo pealei		8		321.419		7.60
Rossia sp.		1		0.784		0.02
Unidentified Cephalapoda		12		68.228		1.61
CHAETOGNATHA	17		0.224		0.01	
ECHINODERMATA	3		3.365		0.08	
Ophiuroidea	1		2.536		0.06	
Unidentified Echinodermata	2		0.829		0.02	
CHORDATA	1		0.024		0.00	
Ascidiacea	1		0.024		0.00	
PISCES	276		3410.538		80.71	
Scomberesox saurus		1		62.410		1.48
Clupeidae		5		113.148		2.68
Merluccius bilinearis		54		388.658		9.20
Phycis chesteri		1		7.773		0.18
Gadidae		3		1.561		0.04

Table 4. (continued)

Stomach contents	Number of organisms	Weight (g)	Percentage weight
PISCES (con't)			
Ammodytes americanus	47	76.644	1.81
Ophidiidae	2	7.057	0.17
Scomber scombrus	12	317.854	7.52
Sebastes marinus	1	2.157	0.05
Stenotomus chrysops	1	68.153	1.61
Pegrilus triacanthus	3	146.309	3.46
Paralichthys dentatus	1	4.906	0.12
Bothidae	1	0.428	0.01
Pleuronectiformes	2	0.612	0.01
Unidentified Pisces	142	2212.868	52.37
UNIDENTIFIED EGGS	0	0.005	0.00
ANIMAL REMAINS	3	22.109	0.55
PLANT REMAINS	0	0.010	0.00
ROCK	4	0.165	0.00
TOTAL	20292	4225.340	100.00

Number of stomachs examined	2622
Number of empty stomachs	805
Mean stomach content weight (g)	1.477
Mean number of organisms per stomach	7.74
Mean fish FL (cm)	20

Table 5 . Listing of all stomach content categories identified for pollock (*Pollachius virens*) sampled in the Northwest Atlantic during the years 1973-1976. Data are presented as a percentage of the total stomach contents weight, total weight in grams, and number of organisms for each stomach category.

Stomach contents	Number of organisms		Weight (g)		Percentage weight	
SIPHONOPHORA	0		0.020		0.00	
COELENTERATA	5		0.057		0.00	
CESTODA	1		0.006		0.00	
TREMATODA	189		0.017		0.00	
NEMATODA	833		16.240		0.21	
POLYCHAETA	16		5.689		0.07	
Aphrodita sp.		1		0.687		0.01
Eunice pennata		2		0.475		0.01
Eunice sp.		5		1.309		0.02
Nereis succinea		1		0.358		0.00
Nereidae		5		0.322		0.00
Tomopteris sp.		1		0.165		0.00
Polychaeta tubes		0		0.217		0.00
Unidentified Polychaeta		1		2.156		0.03
CRUSTACEA	56198		3161.642		40.03	
Amphipoda	14523		36.731		0.47	
Ampelisca macrocephala		2		0.066		0.00
Ampelisca sp.		11		0.633		0.01
Ampeliscidae		2		0.013		0.00
Caprellidae		56		0.550		0.01
Erichthonius rubricornis		434		0.797		0.01
Gammaridae		31		2.264		0.03
Hyperia glaba		2		0.034		0.00
Parathemisto sp.		13822		27.549		0.35
Hyperiidae		161		2.388		0.03
Lysianassidae		2		0.983		0.01
Amphipoda tubes		0		1.454		0.02
Decapoda	1593		1638.538		20.75	
Crangon septemspinosa		15		1.320		0.02
Lebbeus polaris		2		0.367		0.00
Dichelopandalus leptocerus		231		307.855		3.90
Pandalus borealis		27		81.516		1.03
Pandalus propinquus		3		4.195		0.05
Pandalidae		8		3.378		0.04
Pasiphaea multidentata		1278		1200.948		15.21
Pasiphaeidae		0		1.278		0.02
Penaeus sp.		0		3.901		0.05
Decapod crab		2		5.248		0.07
Decapod shrimp		13		4.151		0.05
Unidentified Decapoda		14		24.381		0.31
Isopoda	12		0.366		0.00	
Cirolana sp.		11		0.330		0.00
Unidentified Isopoda		1		0.036		0.00
Euphausiacea	17042		1192.578		15.10	
Euphausia sp.		42		5.600		0.07
Meganyctiphanes norvegica		13219		1092.740		13.84
Thysanoessa inermis		3274		42.424		0.54
Thysanoessa sp.		1		0.288		0.00
Unidentified Euphausiacea		506		51.526		0.65
Mysidacea	23006		236.287		2.99	
Neomysis americana		23006		236.287		2.99

Table 5. (continued)

Stomach contents	Number of organisms		Weight (g)		Percentage weight	
CRUSTACEA (con't)						
Copepoda	17		0.028		0.00	
Crustacea larvae	0		0.003		0.00	
Unidentified Crustacea	5		57.111		0.72	
MOLLUSCA	38		669.021		8.47	
Pteropoda	7		0.048		0.00	
Gastropoda	8		0.008		0.00	
Cephalopoda	23		668.965		8.47	
Loligo sp.		3		609.406		7.72
Octopoda		1		1.639		0.02
Unidentified Cephalopoda		19		57.920		0.73
BRACHIOPODA	1		0.011		0.00	
CHORDATA	1		0.013		0.00	
Ascidiacea	1		0.013		0.00	
PISCES	185		3731.081		47.24	
Nemichthys scolopaceus		2		24.732		0.31
Clupeidae		6		192.061		2.43
Maurolicus pennanti		8		2.017		0.03
Maurolicus sp.		1		1.103		0.01
Enchelyopus cimbrius		3		29.998		0.38
Melanogrammus aeglefinus		1		14.040		0.18
Merluccius bilinearis		18		742.529		9.40
Pollachius virens		8		666.121		8.44
Aethoprora metopoclampa		39		83.113		1.05
Myctophidae		1		0.873		0.01
Ammodytes americanus		1		15.729		0.20
Artediellus uncinatus		1		0.510		0.01
Cottidae		1		1.379		0.02
Scomber scombrus		1		142.335		1.80
Sebastes marinus		1		39.810		0.50
Pleuronectiformes		1		0.108		0.00
Fish larvae		1		0.000		0.00
Unidentified Pisces		91		1774.623		22.47
ANIMAL REMAINS	27		297.035		3.78	
PLANT REMAINS	0		1.589		0.02	
ROCK	27		13.879		0.18	
BIRD FEATHERS	3		0.028		0.00	
TOTAL	57524		7896.328		100.00	

Number of stomachs examined	669
Number of empty stomachs	115
Mean stomach content weight (g)	11.053
Mean number of organisms per stomach	85.99
Mean fish FL (cm)	63

Table 6 . Listing of all stomach content categories identified for red hake (Urophycis chuss) sampled in the Northwest Atlantic during the years 1973-1976. Data are presented as a percentage of the total stomach contents weight, total weight in grams, and number of organisms for each stomach content category.

Stomach contents	Number of organisms		Weight (g)		Percentage Weight	
COELENTERATA	1		0.202		0.03	
Anthozoa		1		0.202		0.03
TREMATODA	216		0.002		0.00	
NEMERTEA	127		1.430		0.18	
NEMATODA	3		0.000		0.00	
POLYCHAETA	50		29.332		3.67	
Flabelligeridae		15		0.957		0.12
Maldanidae		9		0.119		0.01
Sternaspidae		1		0.035		0.00
Sabellidae		4		0.681		0.09
Aphrodita hastata		3		10.495		1.31
Aphroditidae		1		1.961		0.25
Lumbrineridae		8		1.902		0.24
Nephtyidae		4		0.820		0.10
Nereidae		1		0.041		0.01
Phyllodocidae		3		0.296		0.04
Sigalionidae		1		0.019		0.00
Polychaeta tubes		0		0.031		0.00
Unidentified Polychaeta		7		11.975		1.50
SIPUNCULIDA	1		7.078		0.89	
CRUSTACEA	11969		304.285		38.10	
Amphipoda		9552		39.995		5.00
Ampelisca agassizi		1843		2.704		0.34
Ampelisca macrocephala		1		0.021		0.00
Ampelisca abdita		4591		3.419		0.43
Ampelisca vadorum		497		1.443		0.18
Ampelisca sp.		32		0.032		0.00
Byblis serrata		50		0.248		0.03
Ampeliscidae		194		0.303		0.04
Aoridae		19		0.064		0.01
Argissa sp.		8		0.027		0.00
Aeginella sp.		267		6.478		0.81
Caprellidae		166		0.893		0.11
Corophium sp.		4		0.003		0.00
Ericthonius hunteri		5		0.007		0.00
Ericthonius rubricornis		20		0.033		0.00
Ericthonius sp.		19		0.013		0.00
Unciola irrorata		851		4.408		0.55
Corophiidae		28		0.055		0.01
Casco bigelowi		8		0.326		0.04
Maera sp.		1		0.110		0.01
Melita dentata		1		0.006		0.00
Gammaridae		209		5.555		0.70
Haustoriidae		3		0.122		0.02
Parathemisto sp.		38		0.048		0.01
Hyperiidae		26		0.057		0.01
Anonyx sarsi		8		0.634		0.08
Lysianassidae		77		0.288		0.04
Monoculodes edwardsi		44		0.150		0.02
Oedicerotidae		4		0.022		0.00
Leptocheirus pinguis		525		6.659		0.83

Table 6. (continued)

Stomach contents	Number of organisms		Weight (g)		Percentage Weight	
Trichophoxus epistomus		2		0.002		0.00
Phoxcephalidae		1		0.000		0.00
Dulichia porrecta		4		0.002		0.00
Pontogeneia inermis		5		0.002		0.00
Amphipoda tubes		1		1.755		0.22
Unidentified Amphipoda		0		4.106		0.51
Decapoda	1646		231.651		29.02	
Axius serratus		14		5.787		0.72
Acanthocarpus alexandri		1		0.374		0.05
Cancer borealis		16		22.327		2.80
Cancer irroratus		39		9.961		1.25
Cancridae		83		2.598		0.33
Crangon septemspinosa		833		24.441		3.06
Sclerocrangon boreas		5		0.461		0.06
Crangonidae		29		0.553		0.07
Munida sp.		18		22.895		2.87
Eualus pusiolus		2		0.091		0.01
Lebbeus sp.		3		0.129		0.02
Hippolytidae		1		0.043		0.01
Pagurus acadianus		1		6.555		0.82
Pagurus politus		1		0.655		0.08
Pagurus sp.		2		0.051		0.01
Paguridae		2		0.716		0.09
Dichelopandalus leptocerus		491		98.745		12.36
Pandalidae		8		1.380		0.17
Decapod crab		16		12.539		1.57
Decapod shrimp		74		8.296		1.04
Unidentified Decapoda		7		13.054		1.63
Isopoda	226		4.362		0.55	
Cirolana polita		19		1.552		0.19
Cirolana sp.		85		2.217		0.28
Chiridotea sp.		19		0.059		0.01
Edotea sp.		86		0.290		0.04
Unidentified Isopoda		17		0.244		0.03
Cumacea	223		0.415		0.05	
Petalosarsia sp.		26		0.060		0.01
Unidentified Cumacea		197		0.355		0.04
Euphausiacea	18		2.728		0.34	
Meganyctiphanes norvegica		8		0.822		0.10
Unidentified Euphausiacea		10		1.906		0.24
Mysidacea	278		0.893		0.11	
Neomysis americana		260		0.816		0.10
Unidentified Mysidacea		18		0.077		0.01
Copepoda	23		0.003		0.00	
Calanoid copepod		1		0.003		0.00
Unidentified Copepoda		22		0.000		0.00
Unidentified Crustacea	3		24.238		3.03	
MOLLUSCA	27		103.170		12.90	
Pelecypoda	5		1.180		0.14	
Clycocardia borealis		1		0.909		0.11
Unidentified Pelecypoda		4		0.271		0.03

Table 6. (continued)

Stomach contents	Number of organisms		Weight (g)		Percentage weight	
Gastropoda	16		23.998		3.00	
Cephalapoda	6		77.881		9.75	
Unidentified Mollusca	0		0.111		0.01	
CHAETOGNATHA	230		0.582		0.07	
ECHINODERMATA	5		21.957		2.75	
Asteroidea	1		0.059		0.01	
Holothuroidea	4		21.898		2.74	
PISCES	21		277.967		34.80	
Clupeidae		1		19.835		2.48
Gadidae		1		0.240		0.03
Ammodytes americanus		1		0.150		0.02
Ophidiidae		1		15.695		1.97
Pleuronectiformes		7		24.464		3.06
Unidentified Pisces		10		217.583		27.24
ANIMAL REMAINS	0		50.309		6.32	
PLANT REMAINS	0		0.561		0.07	
ROCK	13		1.068		0.13	
SAND	0		0.751		0.09	
TOTAL	12663		798.694		100.00	

Number of stomachs examined	481
Number of empty stomachs	97
Mean stomach content weight (g)	1.532
Mean number of organisms per stomach	26.33
Mean fish TL (cm)	27

Table 7 . Listing of all stomach content categories identified for spotted hake (Urophycis regia) sampled in the Northwest Atlantic during the years 1973-1976. Data are presented as a percentage of the total stomach contents weight, total weight in grams, and number of organisms for each stomach content category.

Stomach contents	Number of organisms		Weight (g)		Percentage weight	
TREMATODA	30		0.000		0.00	
ACANTHOCEPHALA	0		0.014		0.00	
NEMATODA	29		0.004		0.00	
POLYCHAETA	12		1.724		0.23	
Onuphis conchylega		1		0.080		0.01
Polychaeta tubes		1		0.000		0.00
Unidentified Polychaeta		10		1.644		0.22
CRUSTACEA	7597		328.524		43.59	
Amphipoda	2610		10.190		1.35	
Ampelisca vadorum		167		0.891		0.12
Byblis serrata		146		1.322		0.18
Ampeliscidae		90		0.164		0.02
Aoridae		12		0.040		0.01
Caprellidae		1		0.182		0.02
Ericthonius rubricornis		30		0.046		0.01
Ericthonius sp.		7		0.005		0.00
Unciola irrorata		236		0.480		0.06
Corophiidae		5		0.011		0.00
Gammaridae		35		0.469		0.06
Euthemisto bispinosa		246		2.801		0.37
Parathemisto sp.		1608		2.993		0.40
Hyperiidae		7		0.575		0.08
Hippomedon sp.		5		0.051		0.01
Lysianassidae		5		0.031		0.00
Leptocheirus pinguis		7		0.086		0.01
Phoxocephalidae		3		0.007		0.00
Amphipoda tubes		0		0.036		0.00
Decapoda	1709		122.716		16.28	
Cancer borealis		9		1.467		0.19
Cancer irroratus		103		10.716		1.42
Cancridae		46		2.858		0.38
Crangon septemspinosa		989		24.229		3.22
Pontophilus brevirostris		43		0.609		0.08
Pontophilus sp.		1		0.097		0.01
Crangonidae		33		1.510		0.20
Munida iris		87		25.098		3.33
Munida sp.		53		13.448		1.78
Paguridae		1		0.018		0.00
Dichelopandalus leptocerus		267		35.567		4.72
Pandalidae		2		0.097		0.01
Decapod crab		3		0.652		0.09
Decapod shrimp		68		5.545		0.74
Unidentified Decapoda		4		0.805		0.11
Isopoda	45		1.344		0.18	
Cirolana polita		25		0.523		0.07
Cirolana sp.		18		0.738		0.10
Unidentified Isopoda		2		0.083		0.01
Cumacea	3		0.006		0.00	
Euphausiacea	3220		173.690		23.05	
Meganyctiphanes norvegica		3203		172.563		22.90
Unidentified Euphausiacea		17		1.127		0.15

Table 7. (continued)

Stomach contents	Number of organisms		Weight (g)		Percentage weight	
CRUSTACEA (con't)						
Mysidacea	6		0.100		0.01	
Neomysis americana		6		0.024		0.00
Unidentified Mysidacea		0		0.086		0.01
Copepoda	1		0.009		0.00	
Unidentified Crustacea	3		20.469		2.72	
MOLLUSCA	52		276.163		36.64	
Pelecypoda	19		0.491		0.06	
Pectinidae		17		0.017		0.00
Unidentified Pelecypoda		2		0.474		0.06
Gastropoda	2		0.352		0.05	
Cephalopoda	31		274.943		36.48	
Unidentified Mollusca	0		0.377		0.05	
CHAETOGNATHA	0		0.019		0.00	
CHORDATA	0		0.827		0.11	
Larvacea	0		0.827		0.11	
PISCES	172		119.703		15.88	
Pristidae		52		0.423		0.06
Merluccius bilinearis		21		3.910		0.52
Myctophidae		1		0.327		0.04
Myoxocephalus octodecemspinosus		1		0.383		0.05
Cottidae		2		0.836		0.11
Ophidiidae		4		21.431		2.84
Pleuronectiformes		20		1.313		0.17
Fish larvae		47		4.666		0.62
Unidentified Pisces		24		86.414		11.47
ANIMAL REMAINS	0		26.534		3.54	
ROCK	5		0.099		0.01	
TOTAL	7897		753.611		100.00	

Number of stomachs examined	531
Number of empty stomachs	82
Mean stomach content weight (g)	1.404
Mean number of organisms per stomach	14.87
Mean fish TL (cm)	21

Table 8 . Listing of all stomach content categories identified for white hake (Urophycis tenuis) sampled in the Northwest Atlantic during the years 1973-1976. Data are presented as a percentage of the total stomach contents weight, total weight in grams, and number of organisms for each stomach content category.

Stomach contents	Number of organisms		Weight (g)		Percentage weight	
TREMATODA	223		0.039		0.00	
NEMERTEA	1		0.046		0.00	
NEMATODA	80		1.080		0.01	
POLYCHAETA	2		7.841		0.07	
Aphroditidae		2		5.704		0.05
Unidentified Polychaeta		0		2.137		0.02
CRUSTACEA	3664		1030.449		9.07	
Amphipoda	1069		15.568		0.13	
Ampeliscidae		7		0.034		0.00
Caprellidae		10		0.055		0.00
Ericthonius rubricornis		51		0.035		0.00
Unciola irrorata		18		0.116		0.00
Casco bigelowi		1		0.044		0.00
Gammarus annulatus		866		13.288		0.12
Other Gammaridae		42		0.913		0.01
Parathemisto sp.		15		0.132		0.00
Hyperiidae		4		0.020		0.00
Anonyx sp.		1		0.046		0.00
Hippomedon serratus		2		0.036		0.00
Lysianassidae		9		0.205		0.00
Leptocheirus pinguis		43		0.496		0.00
Amphipoda tubes		0		0.148		0.00
Decapoda	465		633.183		5.57	
Axius serratus		1		1.373		0.01
Calocaris sp.		1		3.347		0.03
Axiidae		1		0.500		0.00
Cancer borealis		9		39.575		0.35
Cancridae		1		0.476		0.00
Crangon septemspinosa		95		11.325		0.10
Pontophilus norvegicus		1		0.388		0.00
Crangonidae		5		0.371		0.00
Lebbeus polaris		5		1.697		0.01
Lebbeus sp.		5		0.067		0.00
Hippolytidae		1		0.049		0.00
Pagurus pubescens		1		2.604		0.02
Pagurus sp.		1		0.139		0.00
Dichelopandalus leptocerus		125		150.170		1.33
Pandalus borealis		42		203.761		1.80
Pandalus montagui		5		3.428		0.03
Pandalus propinquus		5		9.537		0.08
Pandalus sp.		1		1.522		0.01
Pandalidae		8		14.100		0.12
Pasiphaea multidentata		59		43.851		0.39
Pasiphaea tarda		17		19.903		0.18
Pasiphaea sp.		5		6.425		0.06
Decapod crab		3		20.807		0.18
Decapod shrimp		64		87.797		0.78
Unidentified Decapoda		4		9.971		0.09
Isopoda	65		5.645		0.05	
Cirolana borealis		1		0.100		0.00

Table 8. (continued)

Stomach contents	Number of organisms		Weight (g)		Percentage weight	
Cirolana polita		11		0.807		0.01
Cirolana sp.		31		2.002		0.02
Unidentified Isopoda		22		2.736		0.02
Euphausiacea	1992		344.512		3.04	
Meganyctiphanes norvegica		1983		342.156		3.02
Unidentified Euphausiacea		9		2.356		0.02
Mysidacea	71		8.100		0.07	
Neomysis americana		65		8.072		0.07
Unidentified Mysidacea		6		0.028		0.00
Other Crustacea	2		23.441		0.21	
MOLLUSCA	13		63.310		0.55	
Pelecypoda	5		6.672		0.05	
Astarte undata		4		5.091		0.04
Unidentified Pelecypoda		1		1.581		0.01
Gastropoda	0		0.021		0.00	
Cephalopoda	8		56.617		0.50	
Octopoda		1		6.300		0.06
Unidentified Cephalopoda		7		50.317		0.44
ECHINODERMATA	1		0.075		0.00	
Ophiuroidea	1		0.075		0.00	
Ophiura sarsi		1		0.075		0.00
CHORDATA	1		0.151		0.00	
Thaliacea	1		0.151		0.00	
PISCES	124		10013.340		88.51	
Synaphobranchidae		1		1.480		0.01
Argentina silus		1		461.590		4.08
Clupea harengus		0		168.380		1.49
Clupeidae		2		288.456		2.55
Enchelyopus cimbrius		2		51.518		0.46
Merluccius bilinearis		32		966.233		8.54
Urophycis chuss		2		119.150		1.05
Urophycis tenius		2		2199.220		19.44
Gadidae		2		112.175		0.99
Triglops nybelini		1		22.965		0.20
Scomber scombrus		2		69.691		0.62
Sebastes marinus		2		97.172		0.86
Lycenchelys verrilli		0		27.279		0.24
Hippoglossoides platessoides		2		25.780		0.23
Pseudopleuronectes americanus		1		281.500		2.49
Pleuronectiformes		1		1.050		0.01
Unidentified Pisces		71		5119.701		45.25
ANIMAL REMAINS	5		196.569		1.77	
PLANT REMAINS	0		0.148		0.00	
ROCK	16		2.458		0.02	
TOTAL	4130		11315.506		100.00	

Number of stomachs examined	470
Number of empty stomachs	149
Mean stomach content weight (g)	22.987
Mean number of organisms per stomach	8.79
Mean fish TL (cm)	53

Table 9 . Listing of all stomach content categories identified for ocean pout (Macrozoarces americanus) sampled in the Northwest Atlantic during the years 1973-1976. Data are presented as a percentage of the total stomach contents weight, total weight in grams, and number of organisms for each stomach content category.

Stomach contents	Number of organisms	Weight (g)	Percentage weight
NEMERTEA	10	0.029	0.00
ACANTHOCEPHALA	1	0.000	0.00
NEMATODA	77	0.949	0.04
POLYCHAETA	44	27.464	1.14
Spionidae	1	0.000	0.00
Flabelligeridae	3	0.199	0.01
Sternaspidae	1	0.009	0.00
Aphroditidae	17	17.937	0.74
Eunice sp.	5	0.035	0.00
Nephtys incisa	3	0.147	0.01
Nephtyidae	1	1.183	0.05
Polychaeta tubes	3	0.301	0.01
Unidentified Polychaeta	10	7.653	0.32
CRUSTACEA	11090	157.762	6.51
Amphipoda	10774	63.529	2.57
Ampelisca agassizi	3244	2.493	0.10
Ampelisca vadorum	483	4.536	0.19
Byblis serrata	2820	12.086	0.50
Ampeliscidae	70	0.250	0.01
Aoridae	20	0.038	0.00
Caprellidae	18	0.107	0.00
Ericthonius rubricornis	1059	0.653	0.03
Ericthonius sp.	130	0.079	0.00
Unciola irrorata	1892	11.235	0.46
Unciola serrata	12	0.095	0.00
Unciola sp.	115	1.475	0.06
Corophiidae	44	0.270	0.01
Melita dentata	8	0.039	0.00
Melita sp.	1	0.004	0.00
Gammaridae	111	7.869	0.33
Haustoriidae	2	0.005	0.00
Lysianassidae	6	0.028	0.00
Monoculodes sp.	2	0.073	0.00
Leptocheirus pinguis	283	2.144	0.09
Pontogeneia inermis	453	4.576	0.19
Amphipoda tubes	0	14.469	0.60
Unidentified Amphipoda	1	0.005	0.00
Decapoda	193	89.445	3.75
Axius serratus	2	2.132	0.09
Cancer borealis	9	6.982	0.29
Cancer irroratus	46	22.746	0.94
Cancridae	31	7.175	0.30
Crangon septemspinosa	4	0.150	0.01
Crangonidae	1	0.010	0.00
Eualus pusiolus	25	0.531	0.02
Hyas coarctatus	14	4.587	0.19
Pagurus acadianus	2	1.598	0.07
Pagurus pubescens	3	0.308	0.01
Pagurus sp.	6	6.877	0.28
Paguridae	3	1.109	0.05
Pandalidae	2	0.309	0.01
Parthenopidae	1	3.210	0.13

Table 9. (continued)

Stomach contents	Number of organisms		Weight (g)		Percentage weight	
Decapod crab		40		28.946		1.20
Decapod shrimp		3		3.672		0.15
Unidentified Decapoda		1		0.185		0.01
Isopoda	13		0.071		0.00	
Cirolana sp.		3		0.018		0.00
Chiridotea coeca		4		0.018		0.00
Chiridotea tuftsi		2		0.010		0.00
Chiridotea sp.		3		0.022		0.00
Unidentified Isopoda		1		0.003		0.00
Cumacea	38		0.059		0.00	
Diastylis sp.		1		0.001		0.00
Unidentified Cumacea		37		0.058		0.00
Mysidacea	72		0.559		0.02	
Neomysis americana		72		0.559		0.02
Unidentified Crustacea	0		4.099		0.17	
MOLLUSCA	428		57.765		2.39	
Pelecypoda	423		48.796		2.02	
Astarte sp.		1		0.082		0.00
Cerastoderma pinnulatum		1		0.007		0.00
Clycocardia borealis		1		0.160		0.01
Spisula sp.		1		0.012		0.00
Pecten sp.		1		0.441		0.02
Placopecten sp.		14		43.477		1.80
Yoldia iris		47		1.387		0.06
Nucula proxima		340		1.306		0.05
Nucula sp.		2		0.062		0.00
Unidentified Pelecypoda		15		1.862		0.08
Gastropoda	5		2.988		0.12	
Unidentified Mollusca	0		5.981		0.25	
ECHINODERMATA	486		2101.663		86.96	
Echinoidea	396		1998.714		82.71	
Strongylocentrotus drobachiensis		4		4.429		0.18
Echinarachnius parma		344		1602.554		66.32
Unidentified Echinoidea		48		391.731		16.21
Ophiuroidea	90		63.117		2.60	
Euryale sp.		37		24.905		1.03
Amphioplus abditus		2		0.033		0.00
Ophiopholis aculeata		18		28.087		1.16
Ophiura sarsi		3		0.257		0.01
Ophiura sp.		2		0.069		0.00
Unidentified Ophiuroidea		28		9.766		0.40
Unidentified Echinodermata	0		39.832		1.65	
BRYOZOA	0		0.036		0.00	
CHORDATA	3		0.026		0.00	
Larvacea	2		0.006		0.00	
Oikopleura sp.		2		0.006		0.00
Ascidiacea	1		0.020		0.00	

Table 9. (continued)

Stomach contents	Number of organisms	Weight (g)	Percentage weight
PISCES	0	0.014	0.00
UNIDENTIFIED EGGS	0	2.061	0.09
ANIMAL REMAINS	0	35.403	1.47
PLANT REMAINS	2	0.041	0.00
ROCK	31	9.380	0.39
SAND	4	23.645	0.98
TOTAL	12176	2416.138	100.00

Number of stomachs examined	423
Number of empty stomachs	140
Mean stomach content weight (g)	5.603
Mean number of organisms per stomach	28.78
Mean fish TL (cm)	50

Table 10 . Listing of all stomach content categories identified for scup (Stenotomus chrysops) sampled in the Northwest Atlantic during the years 1973-1976. Data are presented as a percentage of the total stomach contents weight, total weight in grams, and number of organisms for each stomach content category.

Stomach contents	Number of organisms		Weight (g)		Percentage weight	
COELENTERATA	80		2.396		1.99	
Ceriantharia		0		0.655		0.54
Anthozoa		80		1.741		1.45
TREMATODA	6		0.000		0.00	
NEMERTEA	5		1.407		1.17	
NEMATODA	8		0.070		0.06	
POLYCHAETA	630		47.031		39.09	
Cirratulidae		3		0.344		0.29
Spionphanes bombyx		0		0.049		0.04
Spionidae		6		0.028		0.02
Flabelligeridae		25		0.512		0.43
Maldanidae		18		1.332		1.11
Ammotrypane sp.		11		0.206		0.17
Travisia sp.		1		0.111		0.09
Opheliidae		6		0.311		0.26
Oweniidae		0		0.284		0.24
Scalibregmidae		34		3.768		3.13
Capitellidae		30		0.064		0.05
Ampharetidae		265		1.714		1.42
Sabellidae		50		3.943		3.28
Amphinomidae		1		0.036		0.03
Eunice sp.		2		0.001		0.00
Glyceridae		15		5.895		4.90
Goniadidae		2		0.020		0.02
Lumbrineris sp.		0		0.068		0.06
Lumbrineridae		50		7.047		5.86
Nephtyidae		25		4.045		3.36
Onuphidae		4		0.196		0.16
Paraonidae		4		0.006		0.00
Phyllodocidae		22		0.287		0.24
Polynoidae		1		0.181		0.15
Sigalionidae		6		2.200		1.83
Polychaeta tubes		4		0.481		0.40
Unidentified Polychaeta		45		13.902		11.55
SIPUNCULIDA	2		0.034		0.03	
Golfingia appendiculata		1		0.003		0.00
Unidentified Sipunculida		1		0.031		0.03
CRUSTACEA	3068		17.054		14.16	
Amphipoda		2623		8.675		7.19
Ampelisca agassizi		86		0.120		0.10
Ampelisca vadorum		12		0.023		0.02
Ampelisca sp.		3		0.005		0.00
Byblis serrata		978		0.881		0.73
Ampeliscidae		190		0.355		0.29
Aoridae		8		0.048		0.04
Caprellidae		61		0.672		0.56
Ericthonius rubricornis		293		0.405		0.34
Ericthonius sp.		49		0.034		0.03
Unciola irrorata		565		1.883		1.56
Corophiidae		3		0.002		0.00

Table 10. (continued)

Stomach contents	Number of organisms		Weight (g)		Percentage weight	
Gammarus sp.		26		0.148		0.12
Gammaridae		106		1.890		1.57
Hyperiidae		12		0.024		0.02
Lysianassidae		3		0.015		0.01
Leptocheirus pinguis		224		2.162		1.80
Phoxocephalidae		1		0.005		0.00
Unidentified Amphipoda		3		0.003		0.00
Decapoda	65		4.270		3.56	
Cancer irroratus		6		0.449		0.37
Cancridae		10		0.107		0.09
Crangon septemspinosa		6		0.140		0.12
Pagurus acadianus		1		0.031		0.03
Pagurus sp.		16		0.492		0.41
Paguridae		3		0.027		0.02
Dichelopandalus leptocerus		3		0.368		0.31
Decapod crab		15		0.964		0.80
Decapod shrimp		4		1.683		1.40
Unidentified Decapoda		1		0.009		0.01
Isopoda	8		0.095		0.08	
Cirolana sp.		5		0.081		0.07
Chiridotea sp.		2		0.010		0.01
Unidentified Isopoda		1		0.005		0.00
Cumacea	10		0.023		0.02	
Euphausiacea	18		0.066		0.05	
Meganyctiphanes norvegica		18		0.066		0.05
Mysidacea	323		0.734		0.61	
Neomysis americana		264		0.580		0.48
Unidentified Mysidacea		59		0.154		0.13
Copepoda	19		0.253		0.21	
Calanoid copepod		7		0.044		0.04
Unidentified Copepoda		12		0.209		0.17
Unidentified Crustacea	2		2.938		2.44	
MOLLUSCA	90		12.998		10.79	
Pelecypoda	13		1.471		1.22	
Pectinidae		0		0.327		0.27
Unidentified Pelecypoda		13		1.144		0.95
Gastropoda	54		13.41		1.11	
Acoela		33		1.164		0.97
Limacina retroversa		6		0.017		0.01
Unidentified Gastropoda		15		0.160		0.13
Cephalopoda	14		8.280		6.88	
Unidentified Mollusca	9		1.906		1.58	
CHAETOGNATHA	0		0.022		0.02	
ECHINODERMATA	23		0.887		0.73	
Asteroidea	2		0.006		0.00	
Asteriidae		1		0.002		0.00
Unidentified Asteroidea		1		0.004		0.00
Echinoidea	17		0.473		0.39	
Echinarachnius parma		16		0.414		0.34
Aceste sp.		1		0.000		0.00
Unidentified Echinoidea		0		0.059		0.05

Table 10. (continued)

Stomach contents	Number of organisms		Weight (g)		Percentage weight	
Ophiuroidea	4		0.009		0.01	
Unidentified Echinodermata	0		0.399		0.33	
CHORDATA	7		0.325		0.27	
Thaliacea	7		0.325		0.27	
Salpa sp.		7		0.325		0.27
PISCES	4		3.215		2.67	
ANIMAL REMAINS	0		32.563		27.07	
PLANT REMAINS	3		0.081		0.07	
ROCK	4		0.107		0.09	
SAND	0		2.155		1.79	
TOTAL	3930		120.345		100.00	

Number of stomachs examined	712
Number of empty stomachs	268
Mean stomach content weight (g)	0.156
Mean number of organisms per stomach	5.52
Mean fish FL (cm)	15

Table 11 . Listing of all stomach content categories identified for butterfish (Peprilus triacanthus) sampled in the Northwest Atlantic during the years 1973-1976. Data are presented as a percentage of the total stomach contents weight, total weight in grams, and number of organisms for each stomach content category.

Stomach contents	Number of organisms		Weight (g)		Percentage weight	
COELENTERATA	0		7.268		6.47	
Hydrozoa		0		6.405		5.70
Unidentified Coelenterata		0		0.863		0.77
CTENOPHORA	0		2.722		2.42	
TREMATODA	123		0.138		0.12	
NEMERTEA	2		0.835		0.74	
NEMATODA	6		0.003		0.00	
POLYCHAETA	1431		14.344		12.78	
Spionidae		1		0.000		0.00
Glyceridae		1		0.568		0.51
Goniadidae		4		3.900		3.47
Lumbrineridae		6		0.738		0.66
Nephtyidae		1		0.435		0.39
Phyllodocidae		4		0.008		0.01
Tomopteris helgolandica		0		3.557		3.17
Tomopteridae		1414		4.667		4.15
Unidentified Polychaeta		0		0.471		0.42
CRUSTACEA	2555		8.815		7.86	
Amphipoda		1984		4.001		3.57
Byblis serrata		4		0.017		0.02
Ampeliscidae		5		0.022		0.02
Gammarus annulatus		15		0.115		0.10
Gammaridae		14		0.018		0.02
Haustoriidae		2		0.000		0.00
Parathemisto sp.		1715		3.670		3.27
Hyperiidae		229		0.159		0.14
Decapoda		410		1.209		1.08
Axiidae		357		1.120		1.00
Crangon septemspinosa		1		0.015		0.01
Lucifer faxoni		1		0.001		0.00
Decapoda larvae		24		0.029		0.03
Decapod crab		22		0.026		0.02
Decapod shrimp		3		0.007		0.01
Unidentified Decapoda		2		0.011		0.01
Euphausiacea		11		0.129		0.11
Meganyctiphanes norvegica		5		0.104		0.09
Unidentified Euphausiacea		6		0.025		0.02
Mysidacea		39		0.112		0.10
Neomysis americana		35		0.096		0.09
Unidentified Mysidacea		4		0.016		0.01
Copepoda		108		2.653		2.36
Temora sp.		1		0.000		0.00
Pseudocalanus sp.		2		0.002		0.00
Calanoid copepod		5		1.078		0.96
Unidentified Copepoda		100		1.573		1.40
Stomatopoda		3		0.076		0.07
Unidentified Crustacea		0		0.635		0.57
MOLLUSCA	490		7.852		6.99	
Gastropoda		489		0.380		0.34
Limacina retroversa		478		0.355		0.32

Table 11. (continued)

Stomach contents	Number of organisms		Weight (g)		Percentage weight	
Pteropoda		11		0.000		0.00
Unidentified Gastropoda		0		0.025		0.02
Cephalopoda	1		7.472		6.65	
Loligo sp.		1		7.472		6.65
CHAETOGNATHA	72		0.446		0.40	
ECHINODERMATA	1		0.036		0.03	
Holothuroidea		1		0.036		0.03
CHORDATA	201		22.558		20.07	
Larvacea		2		9.314		8.29
Oikopleura sp.		2		0.014		0.01
Unidentified Larvacea		0		9.300		8.28
Ascidacea		1		0.000		0.00
Ciona sp.		1		0.000		0.00
Thaliacea		198		13.244		11.78
Salpa sp.		16		0.225		0.20
Hemimyaria		182		9.735		8.66
Unidentified Thaliacea		0		3.284		2.92
PISCES	8		0.340		0.30	
Fish larvae		4		0.047		0.04
Unidentified Pisces		4		0.293		0.26
ANIMAL REMAINS	0		46.976		41.79	
SAND	0		0.029		0.03	
TOTAL	4889		112.362		100.00	

Number of stomachs examined	1072
Number of empty stomachs	311
Mean stomach content weight (g)	0.105
Mean number of organisms per stomach	4.56
Mean fish FL (cm)	13

Table 12 . Listing of all stomach content categories identified for redfish (Sebastes marinus) sampled in the Northwest Atlantic during the years 1973-1976. Data are presented as a percentage of the total stomach contents weight, total weight in grams, and number of organisms for each stomach content category.

Stomach contents	Number of organisms		Weight (g)		Percentage weight	
TREMATODA	25		0.000		0.00	
POLYCHAETA	2		0.000		0.00	
CRUSTACEA	2514		373.910		89.64	
Amphipoda		158		1.336		0.32
Parathemisto sp.		132		1.181		0.28
Hyperiidae		23		0.121		0.03
Lysianassidae		3		0.034		0.01
Decapoda		138		118.281		28.35
Crangon septemspinosa		9		0.719		0.17
Pontophilus norvegicus		1		0.455		0.11
Caridion gordoni		1		0.101		0.02
Dichelopandalus leptocerus		29		18.840		4.52
Pandalus borealis		1		4.446		1.07
Pandalus montagui		1		0.387		0.09
Pandalidae		1		7.938		1.90
Pasiphaea multidentata		71		57.452		13.78
Pasiphaeidae		13		16.489		3.95
Decapod shrimp		5		5.098		1.22
Unidentified Decapoda		6		6.356		1.52
Euphausiacea		1690		241.448		57.90
Meganyctiphanes norvegica		1611		227.980		54.67
Unidentified Euphausiacea		79		13.468		3.23
Mysidacea		55		0.672		0.15
Erythrops erythrophthalma		47		0.133		0.03
Mysis mixta		3		0.097		0.02
Neomysis americana		4		0.436		0.10
Unidentified Mysidacea		1		0.006		0.00
Copepoda		470		0.758		0.18
Calanus sp.		48		0.122		0.03
Calanoid copepod		14		0.011		0.00
Unidentified Copepoda		408		0.625		0.15
Unidentified Crustacea		3		11.415		2.74
PISCES	18		37.988		9.11	
Maurolicus pennanti		1		0.492		0.12
Merluccius bilinearis		1		8.235		1.97
Myoxocephalus octodecemspinosus		1		4.319		1.04
Hippoglossoides platessoides		1		0.487		0.12
Fish larvae		10		0.006		0.00
Unidentified Pisces		4		24.449		5.86
ANIMAL REMAINS	0		5.109		1.25	
TOTAL	2559		417.007		100.00	

Number of stomachs examined	466
Number of empty stomachs	232
Mean stomach content weight (g)	0.875
Mean number of organisms per stomach	5.49
Mean fish FL (cm)	31

Table 13 . Listing of all stomach content categories identified for longhorn sculpin (Myoxocephalus octodecimspinosus) sampled in the Northwest Atlantic during the years 1973-1976. Data are presented as a percentage of the total stomach contents weight, total weight in grams, and number of organisms for each stomach content category.

Stomach contents	Number of organisms		Weight (g)		Percentage weight	
PROTOZOA	5		0.002		0.00	
Foraminiferida		5		0.002		0.00
COELENTERATA	0		0.000		0.00	
Hydrozoa		0		0.000		0.00
CESTODA	2		0.007		0.00	
TREMATODA	3		0.000		0.00	
NEMATODA	28		0.013		0.00	
POLYCHAETA	14		5.543		1.03	
Flabelligeridae		2		0.486		0.09
Sabellidae		3		0.953		0.18
Aphroditidae		1		1.646		0.31
Eunice pennata		1		0.104		0.02
Nereis succinea		1		0.077		0.01
Nereidae		1		0.024		0.00
Polynoidae		1		0.007		0.00
Sphaerodorum gracilis		1		0.381		0.07
Polychaeta tubes		1		0.219		0.04
Unidentified Polychaeta		2		1.646		0.31
CRUSTACEA	6975		441.718		86.59	
Amphipoda		1703		6.946		4.87
Ampelisca sp.		1		0.016		0.00
Byblis serrata		98		0.599		0.11
Ampeliscidae		9		0.039		0.01
Aoridae		16		0.289		0.05
Calliopius laeviusculus		7		0.144		0.03
Calliopiidae		5		0.104		0.02
Aeginina longicornis		15		0.075		0.01
Aeginina sp.		1		0.003		0.00
Caprellidae		51		0.236		0.04
Corophium sp.		11		0.210		0.04
Ericthonius rubricornis		25		0.036		0.01
Ericthonius sp.		12		0.016		0.00
Unciola irrorata		570		5.179		0.97
Unciola serrata		2		0.046		0.01
Unciola sp.		22		0.192		0.02
Corophiidae		21		0.120		0.02
Gammarellus angulosus		41		0.415		0.08
Gammarus annulatus		48		0.958		0.18
Gammarus sp.		10		0.405		0.08
Gammaridae		158		2.996		0.56
Melita dentata		7		0.132		0.02
Haustoriidae		1		0.002		0.00
Parathemisto sp.		1		0.013		0.00
Ischyroceridae		6		0.022		0.00
Anonyx liljeborgi		73		2.875		0.54
Hippomedon serratus		2		0.033		0.01
Orchomenella minuta		1		0.016		0.00

Table 13. (continued)

Stomach contents	Number of organisms	Weight (g)	Percentage weight
Orchomenella pinguis	5	0.071	0.01
Tmetonyx nobilis	11	0.313	0.06
Psammonyx nobilis	117	1.812	0.34
Lysianassidae	13	0.258	0.05
Monoculodes edwardsi	5	0.051	0.01
Monoculodes sp.	5	0.064	0.01
Oedicerotidae	18	0.180	0.03
Paramphithoe hystrix	1	0.025	0.00
Leptocheirus pinguis	276	3.706	0.70
Pontogeneia inermis	35	0.170	0.05
Tiron spiniferum	1	0.002	0.00
Unidentified Amphipoda	2	4.136	0.78
Decapoda	1479	383.749	72.12
Axius serratus	3	2.812	0.53
Cancer borealis	26	12.003	2.26
Cancer irroratus	348	167.036	31.38
Cancridae	101	19.578	3.68
Crangon septemspinosa	494	32.742	6.15
Crangonidae	41	1.330	0.25
Eualus pusiolus	19	0.377	0.07
Hippolytidae	1	0.100	0.02
Hyas araneus	3	2.585	0.49
Hyas coarctatus	29	13.071	2.46
Hyas sp.	3	0.310	0.06
Pagurus acadianus	19	13.332	2.50
Pagurus sp.	38	14.797	2.78
Paguridae	11	6.751	1.27
Dichelopandalus leptocerus	181	61.305	11.52
Pandalus borealis	2	0.040	0.01
Pandalus montagui	14	1.386	0.26
Pandalidae	9	1.896	0.36
Pasiphaea multidentata	2	0.159	0.03
Pinnotheres sp.	1	0.570	0.11
Ovalipes ocellatus	1	0.332	0.06
Portunidae	2	1.549	0.29
Decapod crab	29	14.254	2.68
Decapod shrimp	75	7.262	1.36
Unidentified Decapoda	27	8.172	1.54
Isopoda	110	3.010	0.58
Aegidae	41	1.174	0.22
Cirolana polita	5	0.268	0.05
Cirolana sp.	15	0.560	0.11
Chiridotea tuftsi	1	0.009	0.00
Chiridotea sp.	36	0.361	0.07
Idotea baltica	2	0.141	0.03
Idotea sp.	4	0.407	0.08
Unidentified Isopoda	6	0.090	0.02
Cumacea	11	0.037	0.01
Mysidacea	3672	37.055	6.96
Neomysis americana	3669	37.044	6.96

Table 13. (continued)

Stomach contents	Number of organisms		Weight (g)		Percentage weight	
Unidentified Mysidacea		3		0.011		0.00
Cirripedia	0		0.000		0.00	
Unidentified Crustacea	0		10.921		2.05	
MOLLUSCA	9		1.173		0.22	
Pelecypoda	4		0.838		0.16	
Ensis directus		1		0.782		0.15
Unidentified Pelecypoda		3		0.056		0.01
Gastropoda	5		0.153		0.03	
Unidentified Mollusca	0		0.182		0.03	
ECHINODERMATA	2		2.468		0.46	
Echinoidea	1		1.700		0.32	
Strongylocentrotus drobachiensis		1		1.700		0.32
Ophiuroidea	1		0.223		0.04	
Ophiopholis aculeata		1		0.223		0.04
Unidentified Echinodermata	0		0.545		0.10	
BRYZOA	1		0.258		0.05	
PISCES	140		33.879		6.37	
Rajidae		1		3.341		0.63
Dysomma anguillare		1		0.334		0.06
Myoxocephalus octodecemspinosus		2		1.432		0.27
Cottidae		2		0.621		0.12
Pholis gunnellus		1		0.456		0.09
Fish eggs		15		19.971		3.75
Unidentified Pisces		118		7.724		1.45
UNIDENTIFIED EGGS	0		0.054		0.01	
ANIMAL REMAINS	1		18.139		3.41	
ROCK	36		9.266		1.74	
SAND	22		0.638		0.12	
TOTAL	7238		532.264		100.00	

Number of stomachs examined	692
Number of empty stomachs	159
Mean stomach content weight (g)	0.732
Mean number of organisms per stomach	10.46
Mean fish TL (cm)	19

Table 14 . Listing of all stomach content categories identified for fourspot flounder (Paralichthys oblongus) sampled in the Northwest Atlantic during the years 1973-1976. Data are presented as a percentage of the total stomach contents weight, total weight in grams, and number of organisms for each stomach content category.

Stomach contents	Number of organisms		Weight (g)		Percentage weight	
CESTODA	1		0.015		0.01	
NEMERTEA	3		0.078		0.07	
NEMATODA	10		0.032		0.03	
POLYCHAETA	5		0.346		0.31	
CRUSTACEA	2203		73.501		65.11	
Amphipoda	102		0.588		0.52	
Ampelisca sp.		10		0.008		0.01
Ampeliscidae		5		0.003		0.00
Aoridae		6		0.028		0.02
Unciola irrorata		44		0.290		0.26
Gammaridae		8		0.023		0.02
Hyperiidae		4		0.001		0.00
Leotocheirus pinguis		25		0.235		0.21
Decapoda	1027		58.658		51.96	
Cancer borealis		5		0.424		0.38
Cancer irroratus		119		7.014		6.21
Cancer sp.		1		0.019		0.02
Cancridae		79		5.848		5.18
Crangon septemspinosa		489		8.526		7.55
Sclerocrangon boreas		2		0.093		0.08
Crangonidae		50		0.717		0.63
Munida iris		29		2.829		2.51
Munida sp.		33		4.528		4.01
Dichelopandalus leptoceras		120		21.735		19.25
Pandalidae		9		1.641		1.45
Decapod larvae		33		0.155		0.14
Decapod crab		15		0.617		0.55
Decapod shrimp		42		4.404		3.90
Unidentified Decapoda		1		0.108		0.10
Cumacea	1		0.002		0.00	
Euphausiacea	3		0.377		0.33	
Mysidacea	1064		8.821		7.82	
Neomysis americana		1051		8.780		7.78
Unidentified Mysidacea		13		0.041		0.04
Stomatopoda	1		0.011		0.01	
Unidentified Crustacea	5		5.044		4.47	
MOLLUSCA	15		21.164		18.73	
Gastropoda	1		0.005		0.00	
Cephalopoda	14		21.097		18.68	
Illex sp.		1		0.014		0.01
Rossia sp.		3		4.892		4.33
Unidentified Cephalopoda		10		16.191		14.34
Unidentified Mollusca	0		0.062		0.05	

Table 14. (continued)

Stomach contents	Number of organisms		Weight (g)		Percentage weight	
PISCES	11		13.226		11.71	
Gadidae		1		0.792		0.70
Pleuronectiformes		5		0.290		0.26
Unidentified Pisces		5		12.144		10.75
ANIMAL REMAINS	3		4.235		3.77	
PLANT REMAINS	0		0.003		0.00	
ROCK	3		0.296		0.26	
TOTAL	2254		112.918		100.00	

Number of stomachs examined	366
Number of empty stomachs	138
Mean stomach content weight (g)	0.301
Mean number of organisms per stomach	6.16
Mean fish TL (cm)	25

Table 15 . Listing of all stomach content categories identified for witch flounder (Glyptocephalus cynoglossus) sampled in the Northwest Atlantic during the years 1973-1976. Data are presented as a percentage of the total stomach contents weight, total weight in grams, and number of organisms for each stomach content category.

Stomach contents	Number of organisms		Weight (g)		Percentage weight	
COELENTERATA	65		26.554		5.09	
Anthozoa		65		26.554		5.09
Metridium sp.		0		19.632		3.76
Ceriantharia		17		3.063		0.59
Unidentified Anthozoa		48		3.859		0.74
CESTODA	2		0.207		0.04	
TREMATODA	65		0.016		0.00	
NEMERTEA	3		0.297		0.06	
PRIAPULIDA	4		2.455		0.47	
NEMATODA	69		0.280		0.05	
POLYCHAETA	6431		324.282		62.09	
Cirratulidae		75		0.111		0.02
Polydora sp.		27		2.621		0.50
Spionidae		741		2.422		0.46
Spioniformia		2		0.181		0.03
Flabelligeridae		15		0.859		0.16
Maldanidae		440		3.435		0.66
Ammotrypane sp.		196		0.891		0.17
Opheliidae		3		0.241		0.05
Oweniidae		33		1.192		0.23
Scalibregmidae		1		0.007		0.00
Sternaspidae		229		11.140		2.13
Capitellidae		78		4.818		0.92
Ampharetidae		572		5.547		1.06
Pectinariidae		1		0.019		0.00
Terebellidae		102		1.714		0.33
Sabellidae		194		6.903		1.32
Alciopidae		5		0.112		0.02
Aphroditidae		0		0.207		0.04
Drilonereis sp.		4		1.266		0.24
Arabellidae		3		1.790		0.34
Eunice pennata		43		12.024		2.30
Eunice sp.		6		0.311		0.06
Eunicidae		18		2.047		0.39
Glyceridae		3		0.026		0.00
Goniada brunnea		1		0.169		0.03
Goniada maculata		1		0.045		0.01
Goniada sp.		8		1.174		0.22
Goniadidae		108		11.648		2.23
Hesionidae		1		0.000		0.00
Lumbrineris sp.		46		5.833		1.12
Ninoe nigripes		3		0.097		0.02
Lumbrineridae		272		28.364		5.43
Nephtys sp.		3		0.530		0.10
Nephtyidae		58		10.271		1.97
Nereis sp.		6		0.879		0.17
Nereidae		2		0.224		0.04
Hyalinoecia tubicola		7		0.293		0.06
Onuphis eremita		37		5.352		1.03

Table 15. (continued)

Stomach contents	Number of organisms		Weight (g)		Percentage weight	
POLYCHAETA (con't)						
Onuphis opalina		81		4.381		0.84
Onuphis sp.		72		6.218		1.19
Onuphidae		252		14.678		2.81
Naineris quadricuspida		1		0.332		0.06
Orbiniidae		5		0.380		0.07
Paraonidae		108		0.036		0.01
Eteone trilineata		2		0.157		0.03
Eteone sp.		2501		38.752		7.43
Phyllodoce sp.		1		0.032		0.01
Phyllodocidae		20		3.244		0.62
Polynoidae		14		0.512		0.10
Syllidae		1		0.000		0.00
Nereidiformia		2		0.474		0.09
Polychaeta tubes		3		35.297		6.76
Unidentified Polychaeta		24		95.026		18.21
OLIGOCHAETA	1		0.049		0.01	
SIPUNCULIDA	22		1.204		0.23	
Golfingia sp.		1		0.064		0.01
Unidentified Sipunculida		21		1.140		0.22
CRUSTACEA	1122		27.184		5.21	
Amphipoda		732		7.007		1.36
Byblis serrata		10		0.068		0.01
Ampeliscidae		33		0.368		0.07
Aoridae		23		0.170		0.03
Caprellidae		8		0.047		0.01
Ericthonius rubricornis		36		0.036		0.01
Ericthonius sp.		3		0.090		0.02
Unciola irrorata		300		1.644		0.32
Unciola sp.		2		0.038		0.01
Corophiidae		2		0.042		0.01
Casco bigelowi		7		0.148		0.03
Gammaridae		216		2.601		0.50
Anonyx sp.		6		0.324		0.06
Lysianassidae		15		0.633		0.12
Leptocheirus pinguis		25		0.360		0.07
Trichophoxus epistomus		3		0.000		0.00
Phoxocephalidae		10		0.006		0.00
Pontogeneia inermis		8		0.027		0.01
Amphipoda tubes		1		0.149		0.03
Unidentified Amphipoda		24		0.256		0.05
Decapoda		15		1.499		0.28
Crangon septemspinosa		3		0.257		0.05
Pagurus sp.		1		0.062		0.01
Pasiphaea multidentata		1		0.093		0.02
Decapod crab		1		0.544		0.10
Decapod shrimp		9		0.371		0.07
Unidentified Decapoda		1		0.172		0.03
Isopoda		46		2.450		0.47
Anthuridae		7		0.266		0.05

Table 15. (continued)

Stomach contents	Number of organisms		Weight (g)		Percentage weight	
Isopoda (con't)						
Cirolana polita		5		0.714		0.14
Cirolana sp.		21		1.234		0.24
Chiridotea sp.		8		0.023		0.00
Unidentified Isopoda		5		0.213		0.04
Cumacea	26		0.019		0.00	
Euphausiacea	271		14.259		2.73	
Meganyctiphanes norvegica		271		14.259		2.73
Mysidacea	5		0.010		0.00	
Neomysis americana		4		0.008		0.00
Unidentified Mysidacea		1		0.002		0.00
Copepoda	15		0.004		0.00	
Ostracoda	2		0.008		0.00	
Unidentified Crustacea	10		1.928		0.37	
MOLLUSCA	316		6.950		1.32	
Pelecypoda	299		6.471		1.23	
Spisula sp.		2		0.002		0.00
Yoldia iris		1		0.017		0.00
Yoldia sp.		54		3.600		0.69
Nucula sp.		38		0.274		0.05
Unidentified Pelecypoda		204		2.578		0.49
Scaphopoda	2		0.010		0.00	
Gastropoda	15		0.358		0.07	
Polinices sp.		1		0.189		0.04
Unidentified Gastropoda		14		0.169		0.03
Unidentified Mollusca	0		0.111		0.02	
ECHINODERMATA	539		64.540		12.36	
Ophiuroidea	60		4.505		0.86	
Amphipholis sp.		2		0.645		0.12
Ophiura sarsi		57		3.428		0.66
Unidentified Ophiuroidea		1		0.432		0.08
Holothuroidea	475		59.479		11.39	
Leptosynapta sp.		8		1.941		0.37
Stereoderma sp.		9		1.060		0.20
Havelockia scabra		27		3.292		0.63
Dendrochirotida		19		3.084		0.59
Unidentified Holothuroidea		412		50.102		9.60
Unidentified Echinodermata	4		0.556		0.11	
CHORDATA	101		4.884		0.94	
Ascidiacea	101		4.884		0.94	
PISCES	625		0.574		0.11	
Fish eggs		625		0.433		0.08
Unidentified Pisces		0		0.141		0.03
ANIMAL REMAINS	5		55.994		10.79	
PLANT REMAINS	0		3.220		0.62	
ROCK	41		2.461		0.47	
SAND	0		0.728		0.14	
TOTAL	9411		521.879		100.00	

Number of stomachs examined	812
Number of empty stomachs	74
Mean stomach content weight (g)	0.559
Mean number of organisms per stomach	11.59
Mean fish TL (cm)	43

Table 16 . Listing of all stomach content categories identified for American plaice (Hippoglossoides platessoides) sampled in the Northwest Atlantic during the years 1973-1976. Data are presented as a percentage of the total stomach contents weight, total weight in grams, and number of organisms for each stomach content category.

Stomach contents	Number of organisms		Weight (g)		Percentage weight	
PORIFERA	1		0.029		0.00	
COELENTERATA	10		1.522		0.08	
Anthozoa		10		1.522		0.08
Zoantharia		6		0.977		0.05
Metridium sp.		0		0.356		0.02
Unidentified Anthozoa		4		0.189		0.01
TREMATODA	455		0.224		0.01	
NEMERTEA	10		0.033		0.00	
ACANTHOCEPHALA	4		0.009		0.00	
PRIAPULIDA	1		0.230		0.01	
NEMATODA	379		1.876		0.10	
POLYCHAETA	904		38.279		2.00	
Cirratulidae		0		0.039		0.00
Spionidae		1		0.000		0.00
Maldane sp.		8		0.202		0.01
Nicomache lumbricalis		22		0.567		0.03
Maldanidae		9		0.606		0.03
Ammotrypane sp.		1		0.024		0.00
Opheliidae		1		0.029		0.00
Myriochele heeri		2		0.000		0.00
Oweniidae		33		1.179		0.06
Scalibregmidae		1		0.003		0.00
Sternaspidae		3		0.056		0.00
Ampharetidae		529		2.091		0.11
Terebellidae		3		0.516		0.03
Terebelliformia		2		0.023		0.00
Potamilla neglecta		55		1.289		0.07
Sabellidae		129		3.285		0.17
Sabelliformia		0		0.035		0.00
Aphroditidae		3		1.762		0.09
Eunice norvegica		5		1.611		0.09
Eunice sp.		3		0.073		0.00
Goniadidae		3		0.029		0.00
Lumbrineris sp.		1		0.007		0.00
Ninoe nigripes		1		0.100		0.01
Lumbrineridae		2		0.588		0.03
Nephtys incisa		1		0.088		0.00
Nephtys sp.		6		0.705		0.04
Nephtyidae		8		2.141		0.11
Nereis virens		1		1.190		0.06
Nereidae		2		0.054		0.00
Onuphis sp.		1		0.035		0.00
Onuphidae		3		0.046		0.00
Paraonidae		1		0.021		0.00
Phyllodocidae		1		0.008		0.00
Polynoidae		16		1.711		0.09
Syllidae		3		0.000		0.00
Nereidiformia		1		0.140		0.01
Polychaeta tubes		19		15.106		0.80
Unidentified Polychaeta		24		2.920		0.16

Table 16. (continued)

Stomach contents	Number of organisms		Weight (g)		Percentage weight	
CRUSTACEA	1424		113.384		5.99	
Amphipoda	889		4.334		0.20	
Ampelisca sp.		3		0.005		0.00
Ampeliscidae		23		0.053		0.00
Ampithoidae		1		0.016		0.00
Lembos smithi		20		0.251		0.01
Aoridae		27		0.099		0.01
Caprellidae		6		0.008		0.00
Ericthonius rubricornis		264		0.225		0.01
Ericthonius sp.		38		0.025		0.00
Unciola inermis		4		0.034		0.00
Unciola irrorata		101		0.370		0.02
Unciola serrata		142		1.027		0.05
Unciola sp.		60		0.466		0.02
Corophiidae		129		0.155		0.01
Casco bigelowi		1		0.045		0.00
Gammarus sp.		1		0.034		0.00
Gammaridae		58		0.403		0.02
Lysianassidae		1		0.013		0.00
Oedicerotidae		1		0.000		0.00
Leptocheirus pinguis		5		0.044		0.00
Dulichia porrecta		1		0.000		0.00
Tiron acanthurus		1		0.003		0.00
Amphipoda tubes		0		0.614		0.03
Unidentified Amphipoda		2		0.444		0.02
Decapoda	113		75.819		5.04	
Cancridae		5		0.055		0.00
Crangon septemspinosa		16		0.343		0.02
Hippolytidae		1		0.526		0.03
Pagurus acadianus		18		7.281		0.39
Pagurus annulipes		3		0.612		0.03
Pagurus pubescens		4		3.376		0.18
Pagurus arcuatus		2		1.252		0.07
Pagurus sp.		7		1.476		0.08
Paguridae		7		4.693		0.25
Dichelopandalus leptocerus		29		32.570		1.73
Pandalus borealis		2		11.605		0.62
Pandalus montagui		3		4.050		0.22
Pandalidae		0		0.633		0.03
Decapod shrimp		16		7.217		0.38
Unidentified Decapoda		0		0.130		0.01
Isopoda	4		0.50		0.00	
Anthuridae		1		0.012		0.00
Chiridotea tuftsi		1		0.018		0.00
Unidentified Isopoda		2		0.020		0.00
Cumacea	11		0.039		0.00	
Euphausiacea	341		28.827		1.53	
Meganyctiphanes norvegica		313		28.456		1.51
Unidentified Euphausiacea		28		0.371		0.02
Mysidacea	49		0.108		0.00	

Table 16. (continued)

Stomach contents	Number of organisms		Weight (g)		Percentage weight	
Erythrops erythrophthalma		14		0.020		0.00
Pseudomma affine		3		0.016		0.00
Pseudomma sp.		1		0.018		0.00
Unidentified Mysidacea		31		0.054		0.00
Cirripedia	1		0.015		0.00	
Copepoda	11		0.004		0.00	
Tanaidacea	3		0.000		0.00	
Unidentified Crustacea	2		4.188		0.22	
PYCNOGONIDA	1		0.003		0.00	
MOLLUSCA	379		55.052		2.91	
Pelecypoda	252		44.436		2.35	
Cerastoderma pinnulatum		72		10.435		0.55
Cerastoderma sp.		5		0.761		0.04
Clinocardium sp.		1		0.255		0.01
Microcardium peramabile		1		0.042		0.00
Bathyarca sp.		13		0.270		0.01
Chlamys islandica		21		5.945		0.32
Chlamys sp.		10		0.112		0.01
Pecten pustulosus		1		0.027		0.00
Pecten sp.		2		1.538		0.08
Nuculana tenuisulcata		2		0.387		0.02
Nuculana sp.		12		2.063		0.11
Yoldia limatula		43		8.614		0.46
Yoldia sapotilla		1		0.007		0.00
Yoldia thraciaeformis		7		8.494		0.45
Yoldia sp.		21		4.303		0.23
Nucula sp.		1		0.014		0.00
Unidentified Pelecypoda		39		1.169		0.06
Scaphopoda	2		0.207		0.01	
Dantalium sp.		1		0.190		0.01
Siphonodentalium sp.		1		0.017		0.00
Gastropoda	113		7.197		0.38	
Acoela		67		0.324		0.02
Aporrhais occidentalis		24		3.278		0.17
Littorina obtusata		1		0.156		0.01
Natica pusilla		1		0.051		0.00
Colus sp.		1		0.582		0.03
Lora bicarinata		1		0.890		0.05
Gastropoda operculum		10		1.556		0.08
Unidentified Gastropoda		8		0.360		0.02
Unidentified Mollusca	12		3.212		0.17	
ECHINODERMATA	2751		1611.172		85.65	
Asteroidea	2		3.555		0.19	
Asteriidae		1		3.460		0.18
Ctenodiscus crispatus		1		0.095		0.01
Echinoidea	838		1262.451		67.12	
Strongylocentrotus drobachiensis		24		13.327		0.71
Echinarachnius parma		740		1205.383		64.09
Agassiza sp.		1		3.092		0.16

Table 16. (continued)

Stomach contents	Number of organisms		Weight (g)		Percentage weight	
Brisaster fragilis		1		0.465		0.02
Unidentified Echinoidea		72		40.184		2.14
Ophiuroidea	1893		294.827		1.566	
Amphioplus sp.		5		0.192		0.01
Axiognathus squamatus		11		4.192		0.22
Ophiacantha bidentata		13		5.109		0.27
Ophiopholis aculeata		1		0.809		0.04
Ophiopholis sp.		11		2.400		0.13
Ophiocien scutatum		1		0.031		0.00
Ophiolepis elegans		1		0.036		0.00
Ophiura robusta		9		6.673		0.35
Ophiura sarsi		1653		220.685		11.73
Ophiura sp.		101		5.045		0.27
Ophiothrix sp.		3		0.314		0.02
Unidentified Ophiuroidea		84		49.341		2.62
Crinoidea	0		0.944		0.55	
Unidentified Echinodermata	18		49.395		2.63	
BRYOZOA	0		0.004		0.00	
CHORDATA	10		1.532		0.08	
Ascidiacea	10		1.532		0.08	
PISCES	12		5.733		0.30	
Merluccius bilinearis		1		0.679		0.04
Lycenchelys verrilli		1		1.025		0.05
Macrozoarces americanus		6		0.240		0.01
Unidentified Pisces		4		3.789		0.20
UNIDENTIFIED EGGS	27		0.544		0.03	
ANIMAL REMAINS	13		19.106		1.15	
PLANT REMAINS	1		2.072		0.11	
ROCK	113		27.305		1.45	
SAND	0		2.534		0.13	
TOTAL	6495		1880.643		100.00	

Number of stomachs examined	1498
Number of empty stomachs	616
Mean stomach content weight (g)	1.012
Mean number of organisms per stomach	4.34
Mean fish TL (cm)	27

Table 17 . Listing of all stomach content categories identified for yellowtail flounder (Limanda ferruginea) sampled in the Northwest Atlantic during the years 1973-1976. Data are presented as a percentage of the total stomach contents weight, total weight in grams, and number of organisms for each stomach content category.

Stomach contents	Number of organisms		Weight (g)		Percentage weight	
COELENTERATA	41		12.187		2.88	
Hydrozoa		0		0.012		0.00
Anthozoa		41		12.175		2.88
Actiniaria		2		0.043		0.01
Ceriantharia		5		3.136		0.74
Unidentified Anthozoa		34		8.996		2.13
TREMATODA	5		0.000		0.00	
NEMERTEA	18		2.162		0.51	
NEMATODA	44		0.016		0.00	
POLYCHAETA	7350		181.655		42.97	
Tharyx sp.		0		0.731		0.17
Cirratulidae		387		1.714		0.41
Spionphanes bombyx		3103		40.919		9.68
Spionidae		1453		15.180		3.59
Arenicolidae		1		0.001		0.00
Flabelligera sp.		1		0.007		0.00
Pherusa arenosa		3		0.571		0.14
Pherusa sp.		5		0.213		0.05
Flabelligeridae		26		1.460		0.35
Praxillella sp.		17		0.073		0.02
Maldanidae		112		2.922		0.69
Ammotrypane aulogaster		19		0.189		0.04
Ophelia sp.		8		0.092		0.02
Opheliidae		25		0.536		0.13
Oweniidae		2		0.246		0.06
Scalibregma inflatum		235		0.374		0.09
Scalibregmidae		91		1.453		0.34
Sternaspidae		3		0.098		0.02
Ampharetidae		281		2.657		0.63
Pectinariidae		100		3.159		0.75
Trichobranchus gracialis		2		0.008		0.00
Terebellidae		5		0.023		0.01
Sabellidae		149		5.985		1.42
Serpulidae		0		0.072		0.02
Amphinomidae		1		0.005		0.00
Arabella iricolor		3		1.730		0.41
Arabellidae		0		0.188		0.04
Dorvilleidae		204		0.536		0.13
Eunice sp.		2		0.017		0.00
Glyceridae		19		0.369		0.09
Goniadella gracilis		1		0.039		0.01
Goniadidae		7		0.039		0.01
Lumbrineris brevipes		1		0.395		0.09
Lumbrineris sp.		1		0.698		0.17
Lumbrineridae		126		6.938		1.64
Nephtyidae		47		5.038		1.19
Nereis sp.		1		0.051		0.01
Nereidae		9		1.441		0.34
Onuphis eremita		1		0.034		0.01
Onuphis sp.		3		0.100		0.02
Orbiniidae		6		0.027		0.01

Table 17. (continued)

Stomach contents	Number of organisms	Weight (g)	Percentage weight
POLYCHAETA (con't)			
Paraonidae	24	0.047	0.01
Eteone sp.	1	0.000	0.00
Phyllodoce sp.	22	0.077	0.02
Phyllodocidae	25	0.231	0.05
Polynoidae	6	0.214	0.05
Sigalionidae	5	0.118	0.03
Sphaerodoridae	1	0.000	0.00
Syllidae	4	0.063	0.01
Polychaeta tubes	6	33.582	7.94
Unidentified Polychaeta	796	50.995	12.06
ARCHIANNELIDA	17	0.022	0.01
OLIGOCHAETA	0	0.024	0.01
SIPUNCULIDA	1	0.004	0.00
CRUSTACEA	13602	76.069	17.99
Amphipoda	12350	57.685	13.62
Ampelisca agassizi	1850	1.709	0.40
Ampelisca macrocephala	3	0.021	0.00
Ampelisca vadorum	390	0.990	0.23
Ampelisca sp.	392	1.207	0.29
Byblis serrata	1438	7.281	1.72
Haploops sp.	28	0.079	0.02
Ampeliscidae	1042	2.588	0.61
Aoridae	48	0.568	0.13
Calliopius laeviusculus	4	0.012	0.00
Caprellidae	109	0.381	0.09
Ericthonius rubricornis	707	0.885	0.21
Ericthonius sp.	43	0.069	0.02
Unciola irrorata	4451	18.284	4.32
Unciola sp.	31	0.348	0.08
Pseudunciola obliquua	67	0.025	0.01
Corophiidae	73	0.297	0.07
Casco bigelowi	1	0.016	0.00
Gammaridae	205	8.084	1.91
Haustoriidae	31	0.696	0.16
Ischyroceridae	1	0.005	0.00
Anonyx sarsi	15	0.147	0.03
Orchomenella pinguis	12	0.237	0.06
Orchomenella sp.	19	0.759	0.18
Psammonyx nobilis	8	0.111	0.03
Lysianassidae	18	0.219	0.05
Monoculodes edwardsi	12	0.055	0.01
Monoculodes sp.	5	0.055	0.01
Synchelidium sp.	2	0.005	0.00
Oedicerotidae	13	0.037	0.01
Leptocheirus pinguis	1207	9.497	2.25
Phoxocephalus holbolli	15	0.026	0.01
Trichophoxus epistomus	32	0.061	0.01
Phoxocephalidae	43	0.064	0.02
Pleustes panoplus	3	0.026	0.01

Table 17. (continued)

Stomach contents	Number of organisms		Weight (g)		Percentage weight	
CRUSTACEA (con't)						
Dulichia porrecta		28		0.014		0.00
Stegocephalus inflatus		4		0.031		0.01
Amphipoda tubes		0		2.742		0.65
Unidentified Amphipoda		0		0.054		0.01
Decapoda	400		14.877		3.51	
Axius serratus		1		0.209		0.05
Cancer irroratus		15		0.069		0.02
Cancridae		34		0.313		0.07
Crangon septemspinosa		235		7.998		1.89
Other Crangonidae		4		0.129		0.03
Pagurus sp.		36		0.133		0.03
Paguridae		9		0.090		0.02
Dichelopandalus leptocerus		26		3.965		0.94
Pasiphaea multidentata		4		0.314		0.07
Decapod crab		14		0.135		0.03
Decapod shrimp		21		1.447		0.34
Unidentified Decapoda		1		0.075		0.02
Isopoda	87		0.891		0.21	
Anthuridae		4		0.005		0.00
Cirolana polita		4		0.179		0.04
Cirolana sp.		13		0.152		0.04
Chiridotea tuftsi		8		0.147		0.03
Chiridotea sp.		50		0.332		0.08
Idotea sp.		2		0.003		0.00
Unidentified Isopoda		6		0.073		0.02
Cumacea	345		0.450		0.11	
Euphausiacea	75		0.561		0.14	
Euphausia sp.		1		0.023		0.01
Meganyctiphanes norvegica		56		0.466		0.11
Unidentified Euphausiacea		18		0.072		0.02
Mysidacea	170		0.710		0.17	
Neomysis americana		170		0.710		0.17
Copepoda	170		0.087		0.02	
Unidentified Crustacea	5		0.808		0.19	
MOLLUSCA	81		2.474		0.59	
Pelecypoda	77		2.433		0.58	
Mercenaria mercenaria		3		0.196		0.05
Pecten sp.		8		0.041		0.01
Unidentified Pelecypoda		66		2.196		0.52
Gastropoda	3		0.012		0.00	
Cyclostrematidae		2		0.012		0.00
Unidentified Gastropoda		1		0.000		0.00
Unidentified Mollusca	1		0.029		0.01	
ECHINODERMATA	23		0.367		0.09	
Echinoidea	17		0.300		0.07	
Echinarachnius parma		16		0.286		0.07
Unidentified Echinoidea		1		0.014		0.00
Ophiuroidea	5		0.022		0.01	
Holothuroidea	1		0.039		0.01	
Unidentified Echinodermata	0		0.006		0.00	

Table 17. (continued)

Stomach contents	Number of organisms		Weight (g)		Percentage weight	
CHORDATA	71		2.446		0.58	
Ascidiacea		71		2.446		0.58
PISCES	7		0.970		0.23	
UNIDENTIFIED EGGS	0		0.863		0.20	
ANIMAL REMAINS	0		71.781		16.97	
PLANT REMAINS	0		0.328		0.08	
ROCK	12		0.050		0.01	
SAND	0		71.508		16.91	
TOTAL	21272		422.926		100.00	

Number of stomachs examined	1004
Number of empty stomachs	332
Mean stomach content weight (g)	0.417
Mean number of organisms per stomach	21.19
Mean fish TL (cm)	30

Table 18. Percentage weight of the total stomach contents of major stomach content categories of little skate (Raja erinacea) sampled during the spring and autumn in the Northwest Atlantic for each year from 1973 through 1976.

Stomach Contents	1973		1974		1975		1976	
	Spring	Autumn	Spring	Autumn	Spring	Autumn	Spring	Autumn
COELENTERATA	-	0.15	0.11	5.62	-	2.75	-	0.05
NEMERTEA	0.40	0.27	0.48	0.06	2.19	-	-	-
POLYCHAETA	6.63	14.70	12.29	10.03	4.96	20.59	10.92	19.80
Flabelligeridae	-	-	2.26	-	0.27	0.44	0.35	0.81
Aphroditidae	1.01	4.41	4.46	1.33	0.28	1.91	1.98	1.64
Glyceridae	0.39	-	1.44	-	0.47	0.06	-	5.39
Nephtyidae	0.27	-	1.01	1.55	0.97	0.81	1.94	0.55
Nereidae	-	-	0.05	0.04	0.39	11.67	0.04	-
Other Polychaeta	4.96	10.29	3.07	7.11	2.58	5.70	6.61	11.41
CRUSTACEA	70.76	75.95	72.42	59.80	71.67	64.81	54.94	62.87
Amphipoda	25.01	6.36	17.79	12.15	7.78	28.18	21.03	5.72
Ampeliscidae	0.37	0.21	0.36	0.71	0.87	1.79	0.32	1.72
Unciola irrorata	5.40	0.42	1.77	0.49	0.28	0.11	1.73	0.53
Other Corophiidae	0.01	-	0.01	-	0.06	0.08	6.70	-
Gammarus annulatus	-	-	-	-	-	18.71	0.29	-
Other Gammaridae	2.37	5.47	0.79	0.96	1.62	2.53	0.55	0.90
Leptocheirus pinguis	9.92	0.07	5.54	7.37	1.82	4.15	7.24	2.37
Monoculodes edwardsi	2.54	-	7.77	-	0.71	-	2.81	0.03
Other Oedicerotidae	3.91	-	0.33	-	1.57	0.09	0.27	-
Other Amphipoda	0.49	0.19	1.22	2.62	0.85	0.72	1.12	0.17
Decapoda	40.35	64.63	39.83	40.65	59.60	32.03	30.91	48.86
Axius serratus	5.58	-	1.86	0.36	1.47	0.78	-	4.81
Cancer borealis	-	13.88	2.46	6.19	0.22	1.64	0.56	-
Cancer irroratus	5.37	5.45	3.52	1.44	5.17	8.21	0.23	13.90
Other Cancridae	1.09	12.77	3.89	5.35	5.06	1.23	1.64	2.08
Crangon septemspinosa	7.02	2.14	13.04	17.42	5.41	3.97	12.08	9.20
Other Crangonidae	0.02	9.49	0.01	0.16	0.10	0.63	0.17	0.15
Pagurus acadianus	8.57	0.49	1.57	1.30	22.42	0.08	0.96	13.36
Other Paguridae	3.64	15.40	1.92	4.32	9.46	4.71	9.10	0.19
Dichelopandalus leptocerus	2.75	-	5.96	0.65	5.10	7.99	4.18	2.22
Other Decapoda	6.31	5.01	5.60	3.46	5.19	2.79	1.99	2.95
Isopoda	1.37	0.68	1.80	2.68	0.81	1.67	1.35	1.54
Cirolanidae	1.36	0.64	1.78	2.66	0.79	1.60	1.31	1.48
Other Isopoda	0.01	0.04	0.02	0.02	0.02	0.07	0.04	0.06
Other Crustacea	4.03	4.28	13.00	4.32	3.48	2.93	1.65	6.75
MOLLUSCA	2.56	0.75	1.55	5.01	0.09	3.87	15.35	2.85
Pelecypoda	2.03	-	0.06	4.03	-	2.69	15.35	0.21
Other Mollusca	0.53	0.75	1.49	0.98	0.09	1.18	-	2.64
PISCES	1.14	0.82	5.19	5.74	9.37	0.82	5.67	4.94
Ulvaria subbifurcata	-	-	-	-	5.92	-	-	-
Other Pisces	1.14	0.82	5.19	5.74	3.45	0.82	5.67	4.94
MISCELLANEOUS	18.51	7.36	7.96	13.74	11.72	7.16	13.12	9.49
Number of stomachs examined	134	76	156	113	164	124	204	150
Number of empty stomachs	12	12	19	8	9	15	19	6
Mean stomach content weight(g)	0.876	1.091	0.843	0.692	2.346	0.678	0.886	0.925
Mean length (cm)	37	43	36	40	47	36	34	40

Table 19. Percentage weight of the total stomach contents of major stomach content categories of Atlantic cod (Gadus morhua) sampled during the spring and autumn in the Northwest Atlantic for each year from 1973 through 1976.

Stomach Contents	1973		1974		1975		1976	
	Spring	Autumn	Spring	Autumn	Spring	Autumn	Spring	Autumn
COELENTERATA	0.14	0.10	-	0.12	2.29	0.05	0.78	2.05
POLYCHAETA	1.95	1.55	0.75	0.18	1.41	3.07	0.38	0.53
Aphroditidae	1.76	1.37	0.57	0.16	0.60	2.94	0.10	0.03
Other Polychaeta	0.19	0.18	0.18	0.02	0.81	0.13	0.28	0.50
CRUSTACEA	13.22	11.09	17.95	9.20	52.14	36.77	19.58	7.41
Decapoda	11.18	10.48	16.89	7.88	51.50	35.05	17.78	6.61
Axius serratus	0.12	0.06	5.12	0.03	1.46	0.79	0.03	-
Cancer borealis	0.13	-	3.49	0.50	4.15	11.48	0.60	0.32
Cancer irroratus	-	2.60	0.09	2.81	24.74	12.96	12.56	2.37
Geryon quinquedens	-	2.22	1.86	-	1.12	-	-	-
Hyas coarctatus	2.10	0.26	2.21	0.38	1.87	0.86	0.91	0.19
Pagurus acadianus	0.26	1.56	1.33	0.55	6.57	2.44	1.01	0.16
Dichelopandalus leptocerus	4.31	0.93	0.50	0.56	3.95	2.62	0.45	0.24
Pandalus montagui	2.23	0.40	0.39	1.55	1.08	1.33	-	-
Other Pandalidae	0.38	0.91	0.46	0.64	0.03	0.25	0.43	1.00
Other Decapoda	1.65	1.54	1.44	0.86	6.53	2.52	1.99	2.33
Other Crustacea	2.04	0.61	1.06	1.32	0.64	1.72	1.80	0.80
MOLLUSCA	2.20	2.64	6.63	9.17	2.74	6.80	29.02	55.90
Pelecypoda	1.62	0.03	0.50	8.85	1.52	3.12	26.69	0.17
Cyrtodaria siliqua	-	-	-	5.75	0.90	-	-	-
Pectinidae	-	0.03	0.12	2.89	-	3.12	25.12	0.14
Other Pelecypoda	1.62	-	0.38	0.21	0.62	-	1.57	0.03
Cephalopoda	-	1.33	0.52	0.25	0.62	0.25	0.37	53.05
Loligo sp.	-	-	-	0.22	-	-	-	48.35
Other Cephalopoda	-	1.33	0.52	0.03	0.62	0.25	0.37	4.70
Other Mollusca	0.58	1.28	5.61	0.07	0.60	3.43	1.96	0.70
ECHINODERMATA	2.24	1.18	2.21	0.45	2.98	4.89	1.78	1.05
Ophiuroidea	1.21	0.65	1.12	0.45	2.02	1.93	1.12	0.52
Holothuroidea	0.74	0.45	0.58	-	0.93	2.82	0.54	0.29
Other Echinodermata	0.29	0.08	0.51	-	0.03	0.14	0.12	0.24
PISCES	76.94	80.64	70.83	78.68	32.34	44.44	42.58	30.79
Batrachoididae	-	-	6.30	-	-	-	-	-
Clupea harengus	4.07	4.83	-	-	-	-	19.49	-
Other Clupeidae	2.55	2.28	14.19	43.91	-	10.80	3.48	-
Gadus morhua	11.23	-	-	-	-	-	-	-
Melanogrammus aeglefinus	13.54	-	-	-	-	-	-	-
Merluccius bilinearis	-	4.85	2.65	-	6.93	-	-	-
Other Gadidae	-	3.18	0.25	-	3.68	-	1.05	0.19
Ammodytes americanus	-	-	-	-	-	-	1.54	24.14
Cottidae	1.66	3.42	-	0.06	2.21	-	5.54	0.02
Scomber scombrus	-	24.54	19.75	-	13.41	-	-	-
Pomatomus saltatrix	-	9.61	-	-	-	-	-	-
Sebastes marinus	-	8.98	2.65	18.84	-	-	2.66	-
Hippoglossoides platessoides	12.55	-	1.82	-	-	-	-	-
Other Pleuronectiformes	22.83	0.38	0.03	0.07	0.60	0.01	3.67	-
Other Pisces	8.51	18.57	23.17	15.80	5.51	33.63	5.35	6.44
MISCELLANEOUS	2.99	1.90	1.28	1.74	5.00	3.71	5.09	2.05
SAND AND ROCK	0.30	0.90	0.35	0.46	1.10	0.27	0.79	2.24
Number of stomachs examined	172	361	224	191	180	200	214	172
Number of empty stomachs	15	57	8	15	8	15	25	24
Mean stomach content weight (g)	27.471	22.494	39.789	25.175	28.128	9.052	19.515	26.441
Mean length (cm)	49	52	62	51	55	49	45	57

Table 20. Percentage weight of the total stomach contents of major stomach content categories of haddock (Melanogrammus aeglefinus) sampled during the spring and autumn in the Northwest Atlantic for each year from 1973 through 1976.

Stomach Contents	1973		1974		1975		1976	
	Spring	Autumn	Spring	Autumn	Spring	Autumn	Spring	Autumn
COELENTERATA	7.22	0.03	2.65	0.07	-	-	0.01	1.71
Ceriantharia	7.20	-	0.16	-	-	-	-	-
Other Anthozoa	0.02	0.03	2.49	0.07	-	-	0.01	1.71
POLYCHAETA	17.44	10.57	24.21	6.07	45.47	6.70	10.37	5.79
Spionphanes bombyx	-	-	6.99	-	-	-	-	-
Other Spionidae	5.15	-	-	-	-	0.02	0.57	-
Nicomache lumbricalis	-	-	-	-	3.71	-	-	-
Sabellidae	0.18	3.35	0.78	-	0.45	0.33	0.01	0.08
Aphroditidae	1.50	1.60	5.79	0.02	0.69	0.98	-	0.58
Other Polychaeta	10.61	5.62	12.65	6.05	40.62	5.37	9.79	5.13
CRUSTACEA	14.16	6.22	23.62	27.74	20.45	18.59	23.52	10.10
Amphipoda	11.45	2.74	8.32	4.01	11.35	5.37	15.60	5.66
Unciola irrorata	9.52	1.22	3.64	1.07	0.31	3.47	4.08	0.60
Unciola serrata	-	-	-	-	7.60	-	-	-
Gammaridae	0.10	0.17	0.90	1.46	0.99	0.59	5.61	2.14
Leptocheirus pinguis	1.57	0.62	0.30	0.66	0.27	0.23	2.89	0.15
Other Amphipoda	0.26	0.73	3.48	0.82	2.18	1.08	1.02	0.77
Decapoda	2.15	2.91	15.30	14.23	6.55	11.06	7.73	4.57
Axius serratus	1.14	-	10.02	-	0.44	3.60	0.05	1.21
Dichelopandalus leptocerus	-	0.24	0.05	3.79	0.55	1.07	0.28	1.09
Paguridae	0.13	1.50	0.20	1.76	-	1.22	2.72	0.90
Other Decapoda	0.86	1.17	5.03	8.68	5.76	5.17	4.68	1.37
Euphausiacea	0.20	0.21	1.25	7.59	0.12	0.39	0.26	0.74
Meganyctiphanes norvegica	0.19	0.20	1.17	6.81	0.11	0.38	0.12	0.74
Other Euphausiacea	0.01	0.01	0.08	0.78	0.01	0.01	0.14	-
Other Crustacea	0.38	0.36	0.75	1.91	2.43	1.77	1.93	1.13
MOLLUSCA	0.54	2.55	1.05	1.56	0.68	11.17	9.08	9.62
Pelecypoda	0.48	2.10	0.60	0.63	0.42	10.68	1.27	1.26
Placopecten sp.	-	-	-	-	-	8.96	-	-
Other Pelecypoda	0.48	2.10	0.60	0.63	0.42	1.72	1.27	1.26
Gastropoda	0.02	0.16	0.37	0.50	0.07	0.14	7.72	0.58
Cephalopoda	-	-	0.01	-	0.08	-	-	6.69
Other Mollusca	0.04	0.29	0.07	0.43	0.11	0.35	0.09	1.29
ECHINODERMATA	13.75	47.55	15.15	49.07	7.20	40.39	19.96	41.58
Echinoidea	4.00	5.18	2.39	2.44	0.15	3.40	1.99	3.13
Stronglocentrotus drobachiensis	0.01	4.61	0.52	1.65	-	2.86	1.10	0.65
Echinarachnius parma	3.96	0.47	1.83	0.79	0.14	-	0.06	2.47
Other Echinoidea	0.03	0.10	0.04	0.02	0.01	0.54	0.83	-
Ophiuroidea	8.26	38.71	12.43	45.69	5.67	34.61	12.69	31.25
Ophiura sarsi	0.15	9.27	2.29	2.69	0.04	30.36	-	11.06
Ophiura sp.	1.51	3.06	-	6.96	0.07	0.02	0.06	0.09
Amphiuridae	-	2.06	-	-	0.71	-	-	-
Ophiopholis aculeata	6.31	21.00	6.77	20.88	1.29	1.98	11.69	8.31
Other Ophiuroidea	0.29	3.32	3.37	15.16	1.56	2.25	0.84	11.79
Holothuroidea	0.87	0.45	0.27	0.37	5.38	-	5.08	0.32
Psolus sp.	0.48	0.21	-	-	2.32	-	-	0.38
Other Holothuroidea	0.39	0.24	0.27	0.37	1.06	-	5.08	0.14
Other Echinodermata	0.62	3.21	0.06	0.57	-	2.38	0.30	6.69
PISCES	0.16	6.08	0.49	2.39	0.01	1.34	0.01	5.20
Melanogrammus aeglefinus	-	-	-	-	-	-	-	4.82
Clupeidae	-	5.00	-	-	-	-	-	-
Other Pisces	0.16	1.08	0.49	2.39	0.01	1.34	0.01	0.38
MISCELLANEOUS	11.88	22.38	6.40	9.56	20.99	15.98	15.45	14.55
SAND AND ROCK	34.85	4.62	26.43	3.54	5.20	5.84	21.60	11.45
Number of stomachs examined	107	213	121	260	122	268	165	225
Number of empty stomachs	5	16	5	20	2	4	15	24
Mean stomach content weight(g)	8.110	4.252	3.782	1.131	7.041	1.212	1.790	3.614
Mean length (cm)	49	47	44	30	42	30	29	46

Table 21. Percentage weight of the total stomach contents of major stomach content categories of silver hake (Merluccius bilinearis) sampled during the spring and autumn in the Northwest Atlantic for each year from 1973 through 1976.

Stomach Contents	1973		1974		1975		1976	
	Spring	Autumn	Spring	Autumn	Spring	Autumn	Spring	Autumn
POLYCHAETA	0.01	-	0.02	-	0.09	0.02	0.35	0.01
CRUSTACEA	4.19	12.09	8.76	6.42	13.38	9.18	21.33	4.46
Amphipoda	0.02	0.58	0.18	0.53	0.32	0.67	0.58	0.70
Ampeliscidae	-	0.42	0.01	0.28	0.03	0.19	-	0.07
Oedicerotidae	-	0.01	0.12	0.06	0.12	0.01	0.12	-
Parathemisto sp.	-	-	0.05	0.08	-	0.30	0.33	0.37
Other Amphipoda	0.02	0.15	-	0.11	0.17	0.17	0.13	0.26
Decapoda	3.67	9.30	0.78	5.93	5.31	4.95	6.98	2.85
Crangon septemspinosa	1.14	1.23	0.39	0.97	1.54	0.75	4.19	1.13
Dichelopandalus leptocerus	1.64	7.62	-	2.06	0.74	3.45	2.65	1.50
Pasiphaea multidentata	0.46	-	0.01	-	-	-	-	-
Other Decapoda	0.43	0.45	0.38	0.90	1.03	0.75	0.14	0.21
Euphausiacea	0.28	1.18	6.81	1.40	9.53	1.83	10.10	0.02
Meganyctiphanes norvegica	0.22	0.94	6.65	1.38	8.77	0.09	10.08	0.02
Other Euphausiacea	0.06	0.24	0.16	0.02	0.76	1.74	0.02	-
Mysidacea	0.07	0.36	0.95	0.36	0.14	1.25	2.82	0.04
Neomysis americana	0.07	0.36	0.89	0.34	0.14	1.25	2.79	-
Other Mysidacea	-	-	0.06	0.02	-	-	0.03	0.04
Other Crustacea	0.15	0.67	0.04	0.20	0.08	0.48	0.85	0.87
MOLLUSCA	19.00	5.49	1.29	-	16.62	-	4.90	15.45
Loligo pealei	18.84	4.40	-	-	7.95	-	4.04	13.35
Other Cephalopoda	0.16	1.09	1.29	-	8.67	-	0.86	2.10
PISCES	76.40	82.34	89.20	93.21	68.56	90.54	72.75	78.84
Scomberesox saurus	-	-	-	16.01	-	-	-	-
Clupeidae	-	-	-	10.04	-	33.02	-	-
Merluccius bilinearis	17.35	17.47	-	1.03	1.74	0.50	-	33.37
Phycis chesteri	-	-	-	-	1.68	-	-	-
Ammodytes americanus	-	-	-	-	1.96	-	13.65	-
Scomber scombrus	-	15.82	12.06	-	33.25	-	-	-
Stenotomus chrysops	-	-	-	-	-	-	-	18.37
Peprilus triacanthus	3.55	23.03	-	-	3.72	-	-	-
Other Pisces	55.50	26.02	77.14	66.13	26.21	57.02	59.10	27.10
MISCELLANEOUS	0.40	0.08	0.73	0.37	1.35	0.26	0.69	1.24
Number of stomachs examined	196	515	389	333	274	357	309	552
Number of empty stomachs	69	193	105	75	70	93	102	121
Mean stomach content weight (g)	5.350	0.775	2.145	1.171	1.691	0.628	1.602	1.054
Mean length (cm)	23	19	21	16	23	16	24	20

Table 22. Percentage weight of the total stomach contents of major stomach content categories of pollock (Pollachius virens) sampled during the spring and autumn in the Northwest Atlantic for each year from 1973 through 1976.

Stomach Contents	1973		1974		1975		1976	
	Spring	Autumn	Spring	Autumn	Spring	Autumn	Spring	Autumn
CRUSTACEA	64.38	54.94	26.38	27.63	65.66	40.85	15.56	6.88
Decapoda	14.99	39.50	22.57	0.54	27.21	7.24	0.15	2.32
Dichelopandalus leptocerus	0.21	0.77	21.02	0.42	0.39	1.21	-	0.58
Pandalus borealis	0.95	1.81	-	-	0.59	5.64	-	1.66
Pasiphaea multidentata	12.77	36.73	0.04	-	25.00	-	-	-
Other Decapoda	1.06	0.19	1.51	0.12	1.23	0.39	0.15	0.08
Euphausiacea	44.73	14.59	3.70	26.83	20.46	32.38	12.19	2.51
Meganyctiphanes norvegica	44.25	14.57	2.81	26.83	17.47	31.55	8.10	2.51
Thysanoessa inermis	-	-	-	-	0.02	-	3.95	-
Other Euphausiacea	0.48	0.02	0.89	-	2.97	0.83	0.14	-
Mysidacea	-	-	-	-	17.69	0.29	-	-
Neomysis americana	-	-	-	-	17.69	0.29	-	-
Other Crustacea	4.66	0.85	0.11	0.26	0.30	0.94	3.22	2.02
MOLLUSCA	-	0.31	0.14	0.30	0.17	0.11	0.50	86.65
Loligo sp.	-	-	-	-	-	-	-	81.17
Other Cephalopoda	-	0.31	0.14	0.30	0.17	0.11	0.50	5.48
PISCES	28.93	42.91	69.62	65.03	30.56	53.58	77.07	0.53
Clupeidae	-	-	2.44	14.03	6.24	-	-	-
Merluccius bilinearis	-	-	46.09	-	10.62	-	-	-
Pollachius virens	-	-	-	19.70	-	-	51.91	-
Aethoprora metopoclampa	25.42	-	-	-	-	-	-	-
Scomber scombrus	-	6.33	-	-	-	-	-	-
Sebastes marinus	-	1.77	-	-	-	-	-	-
Other Pisces	3.51	34.81	21.09	31.30	13.70	53.58	25.16	0.53
MISCELLANEOUS	6.69	1.84	3.86	7.04	3.61	5.46	6.87	5.94
Number of stomachs examined	89	135	95	52	76	64	117	64
Number of empty stomachs	14	18	26	9	5	0	33	13
Mean stomach content weight(g)	3.674	16.659	13.731	10.571	17.507	4.851	9.184	11.730
Mean length (cm)	59	61	66	71	64	64	51	73

Table 23. Percentage weight of the total stomach contents of major stomach content categories of red hake (Urophycis chuss) sampled during the spring and autumn in the Northwest Atlantic for each year from 1973 through 1976.

Stomach Contents	1973		1974		1975		1976	
	Spring	Autumn	Spring	Autumn	Spring	Autumn	Spring	Autumn
POLYCHAETA	3.73	6.78	7.28	2.93	2.06	0.34	1.47	4.58
Aphrodita hastata	-	-	5.49	-	1.47	-	-	-
Other Polychaeta	3.73	6.78	1.79	2.93	0.59	0.34	1.47	4.58
SIPUNCULIDA	-	-	-	8.27	-	-	-	-
CRUSTACEA	32.60	18.65	15.84	71.69	66.29	11.39	24.54	35.17
Amphipoda	1.71	2.12	10.16	2.38	3.19	3.93	7.15	2.95
Aeginella sp.	-	-	4.33	-	-	-	-	-
Unciola irrorata	0.32	-	0.14	0.13	0.05	0.43	1.32	1.17
Gammaridae	0.22	1.36	0.24	0.09	1.51	0.13	1.48	0.29
Leptocheirus pinguis	0.13	-	1.08	1.25	0.29	0.34	1.36	0.87
Other Amphipoda	1.04	0.76	4.37	0.91	1.34	3.03	2.99	0.62
Decapoda	25.62	6.38	3.74	65.87	59.63	2.36	13.61	26.04
Axius serratus	4.24	-	0.37	3.23	0.82	-	-	0.85
Cancer borealis	-	-	1.75	5.92	7.56	-	-	-
Cancer irroratus	-	-	-	1.94	2.47	-	1.75	1.23
Crangon septemspinosa	0.95	0.14	0.33	14.03	2.89	0.47	0.68	3.92
Munida sp.	-	-	0.15	-	4.77	-	9.67	-
Pagurus acadianus	-	-	-	-	4.22	-	-	-
Dichelopandalus leptocerus	6.96	0.59	-	37.30	26.15	1.00	0.49	14.64
Other Decapoda	13.47	5.65	1.14	3.45	10.75	0.89	1.02	5.40
Isopoda	0.56	0.67	0.03	-	1.02	0.01	0.07	1.52
Other Crustacea	4.71	9.48	1.91	3.44	2.45	5.09	3.71	4.66
MOLLUSCA	11.80	2.64	0.03	9.92	15.17	0.01	39.53	-
Gastropoda	11.80	0.05	-	-	1.08	-	8.98	-
Cephalopoda	-	2.59	0.03	9.91	13.44	-	30.40	-
Other Mollusca	-	-	-	0.01	0.65	0.01	0.15	-
ECHINODERMATA	2.60	0.28	-	-	-	81.60	-	2.04
Holothuroidea	2.60	-	-	-	-	81.60	-	2.04
Other Echinodermata	-	0.28	-	-	-	-	-	-
PISCES	46.17	64.35	75.53	0.24	9.18	1.31	32.75	38.10
Clupeidae	28.79	-	-	-	-	-	-	-
Ophidiidae	-	-	-	-	-	-	9.94	-
Pleuronectiformes	-	-	-	-	1.05	-	9.85	5.25
Other Pisces	17.38	64.35	75.53	0.24	8.13	1.31	12.96	32.85
MISCELLANEOUS	3.10	7.30	1.32	6.95	7.30	5.35	1.71	20.11
Number of stomachs examined	46	84	82	47	56	54	109	112
Number of empty stomachs	9	17	16	5	8	12	34	12
Mean stomach content weight(g)	1.498	0.254	1.826	1.820	2.771	0.392	1.448	1.242
Mean length (cm)	31	14	16	30	28	24	30	23

Table 24. Percentage weight of the total stomach contents of major stomach content categories of spotted hake (Urophycis regia) sampled during the spring and autumn in the Northwest Atlantic for each year from 1973 through 1976.

Stomach Contents	1973		1974		1975		1976	
	Spring	Autumn	Spring	Autumn	Spring	Autumn	Spring	Autumn
CRUSTACEA	20.39	92.52	33.78	53.00	44.73	95.92	33.89	44.51
Amphipoda	1.34	5.85	11.91	3.16	-	18.00	0.47	0.62
Decapoda	13.86	72.27	19.95	46.39	6.17	66.02	12.81	33.56
Cancer irroratus	-	0.09	7.75	0.05	0.85	17.71	2.00	1.53
Crangon septemspinosa	4.37	24.02	-	2.91	0.14	0.83	1.53	18.69
Munida iris	6.16	6.14	6.87	-	4.00	-	-	-
Munida sp.	0.87	-	0.16	2.27	0.41	2.96	8.18	4.54
Dichelopandalus leptocerus	0.89	29.53	-	37.20	0.01	39.95	0.57	5.25
Other Decapoda	1.57	12.49	5.17	3.96	0.76	4.57	0.53	3.55
Euphausiacea	-	0.20	0.73	-	38.48	0.48	16.61	-
Meganyctiphanes norvegica	-	-	-	-	38.48	-	15.55	-
Other Euphausiacea	-	0.20	0.73	-	-	0.48	1.06	-
Other Crustacea	5.19	14.20	1.19	3.45	0.08	11.42	4.00	10.33
MOLLUSCA	45.75	1.02	56.35	5.92	47.90	1.87	7.00	27.23
Cephalopoda	45.75	-	56.35	5.44	47.82	-	6.94	27.23
Other Mollusca	-	1.02	-	0.48	0.08	1.87	0.06	-
PISCES	32.63	2.39	9.73	39.50	5.28	0.70	46.49	14.74
Merluccius bilinearis	-	-	-	-	0.27	-	-	4.77
Ophidiidae	9.55	-	-	28.45	-	-	-	-
Other Pisces	23.08	2.39	9.73	11.05	5.01	0.70	46.49	9.97
MISCELLANEOUS	1.23	4.07	0.14	1.58	2.09	1.51	12.62	13.52
Number of stomachs examined	47	79	30	74	67	54	96	94
Number of empty stomachs	5	3	10	13	4	11	24	13
Mean stomach content weight(g)	2.018	0.316	0.533	0.588	6.200	0.354	0.852	0.618
Mean length (cm)	21	19	21	20	27	21	18	21

Table 25. Percentage weight of the total stomach contents of major stomach content categories of white hake (Urophycis tenuis) sampled during the spring and autumn in the Northwest Atlantic for each year from 1973 through 1976.

Stomach Contents	1973		1974		1975		1976	
	Spring	Autumn	Spring	Autumn	Spring	Autumn	Spring	Autumn
CRUSTACEA	11.27	7.50	5.44	2.23	13.26	27.09	6.95	31.47
Decapoda	5.32	6.34	4.26	1.34	1.47	25.80	6.41	29.37
Dichelopandalus leptocerus	1.35	1.22	1.22	0.05	0.69	3.84	1.86	8.81
Pandalus borealis	2.70	0.08	0.37	0.70	-	7.40	0.98	14.66
Other Decapoda	1.27	5.04	2.67	0.59	0.78	14.56	3.57	5.90
Euphausiacea	4.08	0.19	1.13	0.78	11.76	0.68	0.06	-
Meganyctiphanes norvegica	4.08	0.17	1.13	0.78	11.73	0.44	0.03	-
Other Euphausiacea	-	0.02	-	-	0.03	0.24	0.03	-
Other Crustacea	1.87	0.97	0.05	0.11	0.03	0.61	0.48	2.10
MOLLUSCA	0.10	0.49	-	-	0.28	2.79	0.23	4.97
PISCES	88.46	89.98	92.42	97.32	83.01	69.94	91.84	54.97
Argentina silus	-	-	-	-	20.41	-	-	-
Clupea harengus	-	-	-	-	7.45	7.68	-	-
Other Clupeidae	-	-	-	0.07	-	-	-	34.97
Merluccius bilinearis	-	-	9.36	4.37	26.45	-	10.67	-
Urophycis chuss	-	-	-	-	5.27	-	-	-
Urophycis tenuis	-	-	0.69	51.85	-	-	-	-
Other Gadidae	21.06	-	-	-	0.56	-	-	-
Scomber scombrus	-	6.54	-	-	-	-	-	-
Sebastes marinus	-	3.89	-	1.32	-	-	-	-
Pseudopleuronectes americanus	-	26.42	-	-	-	-	-	-
Other Pisces	67.40	53.13	82.37	39.71	22.87	62.26	81.17	20.00
MISCELLANEOUS	0.17	2.03	2.14	0.45	3.45	0.18	0.98	8.59
Number of stomachs examined	45	103	79	87	70	56	56	59
Number of empty stomachs	16	42	33	18	12	15	14	18
Mean stomach content weight(g)	15.944	10.346	11.365	48.617	32.301	9.268	16.471	11.909
Mean length (cm)	49	51	48	51	52	54	44	55

Table 26. Percentage weight of the total stomach contents of major stomach content categories of ocean pout (Macrozoarces americanus) sampled during the spring and autumn in the Northwest Atlantic for each year from 1973 through 1976.

Stomach Contents	1973		1974		1975		1976	
	Spring	Autumn	Spring	Autumn	Spring	Autumn	Spring	Autumn
POLYCHAETA	2.23	-	1.16	-	0.03	-	1.81	-
Aphroditidae	1.98	-	1.05	-	-	-	-	-
Other Polychaeta	0.25	-	0.11	-	0.03	-	1.81	-
CRUSTACEA	2.97	60.06	9.89	34.34	5.58	24.56	8.92	15.87
Amphipoda	1.20	-	3.40	-	1.44	-	6.22	8.03
Byblis serrata	-	-	-	-	0.65	-	1.65	-
Corophiidae	0.04	-	0.20	-	0.22	-	2.62	7.07
Other Amphipoda	1.16	-	3.20	-	0.57	-	1.95	0.96
Decapoda	1.76	-	6.16	34.34	3.89	24.56	2.63	7.68
Cancer irroratus	-	-	1.55	0.66	1.45	24.56	0.39	-
Other Cancridae	0.27	-	1.09	-	0.48	-	0.68	2.47
Other Decapoda	1.49	-	3.52	33.68	1.96	-	1.56	5.21
Other Crustacea	0.01	60.06	0.33	-	0.25	-	0.07	0.16
MOLLUSCA	0.53	-	1.91	5.56	0.07	33.80	10.75	-
Placopecten sp.	-	-	-	-	-	33.80	10.70	-
Other Mollusca	0.53	-	1.91	5.56	0.07	-	0.05	-
ECHINODERMATA	94.05		82.01	58.90	91.40	14.64	74.34	37.73
Echinoidea	81.53	-	79.98	-	91.35	-	72.93	-
Echinarachinus parma	75.64	-	18.75	-	86.09	14.64	72.30	-
Other Echinoidea	5.89	-	61.23	-	5.26	-	0.63	-
Ophiuroidea	7.59	-	1.92	47.84	0.03	-	0.08	0.05
Euryale sp.	3.92	-	-	-	-	-	-	-
Ophiopholis aculeata	3.66	-	-	47.84	-	-	0.07	-
Other Ophiuroidea	0.01	-	-	-	0.03	-	0.01	0.05
Other Echinodermata	4.93	-	0.11	11.06	0.02	-	1.33	37.68
MISCELLANEOUS	0.18	36.54	0.60	-	2.84	25.97	1.94	32.01
SAND AND ROCK	0.04	3.40	4.43	1.20	0.08	1.03	2.24	14.39
Number of stomachs examined	83	21	115	7	72	7	102	32
Number of empty stomachs	24	17	33	4	6	3	38	22
Mean stomach content weight (g)	7.660	0.048	4.416	1.362	11.939	0.487	3.878	0.114
Mean length (cm)	52	33	46	49	63	47	54	40

Table 27. Percentage weight of the total stomach contents of major stomach content categories of scup (Stenotomus chrysops) sampled during the spring and autumn in the Northwest Atlantic for each year from 1973 through 1976.

Stomach Contents	1973		1974		1975		1976	
	Spring	Autumn	Spring	Autumn	Spring	Autumn	Spring	Autumn
COELENTERATA	31.73	-	-	0.10	-	2.08	6.93	-
Cerianthidea	-	-	-	-	-	-	3.91	-
Anthozoa	31.73	-	-	0.10	-	2.08	3.02	-
NEMERTEA	-	-	-	5.31	-	0.21	-	0.15
POLYCHAETA	23.75	59.70	4.42	52.10	21.37	26.91	39.80	33.82
Maldanidae	-	0.08	-	0.94	0.06	0.38	1.60	1.77
Opheliidae	-	-	-	-	-	0.67	0.02	1.15
Scalibregmidae	-	-	-	-	-	-	22.48	-
Ampharetidae	-	-	-	0.16	-	0.47	0.03	3.77
Sabellidae	-	-	-	13.54	-	0.92	0.10	0.64
Glyceridae	-	21.81	-	3.05	0.24	1.12	4.17	4.63
Lumbrineridae	4.58	22.74	-	13.11	0.07	0.81	0.06	2.60
Nephtyidae	-	1.16	-	9.51	-	2.24	0.30	2.48
Sigalionidae	-	11.47	-	3.69	-	0.18	-	0.06
Other Polychaeta	19.17	2.44	4.42	8.10	21.00	20.12	11.04	16.72
CRUSTACEA	4.95	3.34	34.70	5.90	6.39	38.98	4.68	16.29
Amphipoda	2.68	0.68	0.49	2.36	3.27	15.18	3.13	11.20
Byblis serrata	-	-	0.49	0.83	-	3.73	0.27	0.01
Caprellidae	-	-	-	-	-	0.18	0.21	1.36
Unciola irrorata	-	-	-	0.32	-	1.10	0.60	3.60
Gammaridae	-	-	-	0.15	2.58	7.38	1.23	1.04
Leptocheirus pinguis	-	-	-	0.37	-	2.31	-	4.00
Other Amphipoda	2.68	0.68	-	0.69	0.69	0.48	0.82	1.19
Decapoda	-	-	-	2.17	0.17	14.55	1.55	1.48
Mysidacea	-	-	-	-	-	3.10	-	0.53
Other Crustacea	2.27	2.66	34.21	1.37	2.95	6.15	-	3.08
MOLLUSCA	33.60	-	-	13.93	1.23	18.71	6.23	10.16
Pelecypoda	-	-	-	0.47	0.45	2.60	5.36	-
Gastropoda	-	-	-	0.14	0.32	-	0.82	2.72
Acoela sp.	-	-	-	0.14	-	-	-	2.67
Other Gastropoda	-	-	-	-	-	-	-	0.05
Cephalopoda	-	-	-	13.32	-	14.12	-	5.95
Other Mollusca	33.60	-	-	-	0.46	1.99	0.05	1.49
ECHINODERMATA	-	-	-	-	5.39	0.10	1.98	0.58
PISCES	-	-	-	0.35	-	0.85	-	7.07
MISCELLANEOUS	5.97	36.96	60.88	22.21	60.42	10.35	30.78	31.93
SAND AND ROCK	-	-	-	0.10	5.20	1.81	9.60	-
Number of stomachs examined	44	30	20	91	59	167	120	191
Number of empty stomachs	26	4	7	18	18	73	52	73
Mean stomach content weight(g)	0.062	0.345	0.031	0.284	0.091	0.099	0.140	0.221
Mean length (cm)	21	15	15	14	19	13	20	14

Table 28. Percentage weight of the total stomach contents of major stomach content categories of butterfish (Peprilus triacanthus) sampled during the spring and autumn in the Northwest Atlantic for each year from 1973 through 1976.

Stomach Contents	1973		1974		1975		1976	
	Spring	Autumn	Spring	Autumn	Spring	Autumn	Spring	Autumn
COELENTERATA	-	14.15	-	-	-	-	20.24	-
Hydrozoa	-	-	-	-	-	-	20.24	-
Other Coelenterata	-	14.15	-	-	-	-	-	-
CTENOPHORA	-	-	-	17.11	-	-	-	
NEMERTEA	-	-	-	-	-	3.07	1.98	-
POLYCHAETA	-	11.25	-	29.45	-	0.23	28.03	0.30
Glyceridae	-	9.31	-	-	-	-	-	-
Goniadidae	-	-	-	24.51	-	-	-	-
Lumbrineridae	-	0.33	-	-	-	-	2.04	0.25
Tomopteridae helgolandica	-	-	-	-	-	-	11.24	-
Other Tomopteridae	-	-	-	-	-	-	14.75	-
Other Polychaeta	-	1.61	-	4.94	-	0.23	-	0.05
CRUSTACEA	0.35	2.91	59.27	1.99	0.12	18.06	9.27	3.31
Amphipoda	0.05	0.22	59.27	0.37	0.10	1.23	0.97	1.24
Parathemisto sp.	-	-	59.27	-	-	0.25	0.78	0.83
Other Amphipoda	0.05	0.22	-	0.37	0.10	0.98	0.19	0.41
Decapoda	0.05	0.27	-	0.31	-	16.67	-	0.01
Axiidae	-	-	-	-	-	16.38	-	-
Other Decapoda	0.05	0.27	-	0.31	-	0.29	-	0.01
Copepoda	0.25	-	-	0.04	0.02	0.16	7.51	0.83
Other Crustacea	-	2.42	-	1.27	-	-	0.79	1.23
MOLLUSCA	-	-	-	-	3.05	-	0.08	25.84
Loligo sp.	-	-	-	-	-	-	-	25.84
Other Mollusca	-	-	-	-	3.05	-	0.08	-
THALIACEA	70.57	4.84	-	32.04	85.68	-	8.97	0.48
Larvacea	70.57	-	-	13.28	0.12	-	8.95	0.48
Hemimyaria	-	-	-	-	85.56	-	-	-
Other Thaliacea	-	4.84	-	18.76	-	-	0.02	-
MISCELLANEOUS	29.06	66.85	40.73	19.41	11.15	78.64	31.43	70.07
Number of stomachs examined	61	140	35	168	51	161	201	265
Number of empty stomachs	25	30	19	51	11	87	62	31
Mean stomach content weight(g)	0.098	0.044	0.153	0.095	0.228	0.043	0.157	0.109
Mean length (cm)	21	15	15	14	19	13	20	14

Table 29. Percentage weight of the total stomach contents of major stomach content categories of redfish (Sebastes marinus) sampled during the spring and autumn in the Northwest Atlantic for each year from 1973 through 1976.

Stomach Contents	1973		1974		1975		1976	
	Spring	Autumn	Spring	Autumn	Spring	Autumn	Spring	Autumn
CRUSTACEA	96.97	95.22	29.15	92.32	91.55	96.78	96.02	72.43
Decapoda	15.06	25.75	22.39	60.32	11.60	51.78	18.05	61.24
Dichelopandalus leptoceras	1.38	-	12.58	9.56	2.92	-	11.09	61.24
Pandalus borealis	-	4.33	-	-	-	-	-	-
Other Pandalidae	1.62	-	-	-	6.36	0.65	-	-
Pasiphaea multidentata	-	20.30	9.73	37.30	2.24	23.10	-	-
Other Pasiphaeidae	-	-	-	-	-	27.29	-	-
Other Decapoda	12.06	1.12	0.08	13.46	0.08	0.74	6.96	-
Euphausiacea	70.25	67.26	3.97	31.62	78.36	42.82	62.10	1.07
Meganyctiphanes norvegica	59.04	67.26	3.97	31.62	70.07	42.82	59.92	1.07
Other Euphausiacea	11.21	-	-	-	8.29	-	2.18	-
Other Crustacea	11.66	2.21	2.79	0.38	1.59	2.18	15.87	10.12
PISCES	2.90	4.66	70.70	6.46	7.52	0.83	2.37	7.52
Merluccius bilinearis	-	-	31.52	-	-	-	-	-
Myoxocephalus octodecemspinosa	-	-	16.53	-	-	-	-	-
Other Pisces	2.90	4.66	22.65	6.46	7.52	0.83	2.37	7.52
MISCELLANEOUS	0.13	0.12	0.15	1.22	0.93	2.39	1.61	20.05
Number of stomachs examined	55	114	53	49	55	53	58	46
Number of empty stomachs	25	58	35	22	18	19	26	39
Mean stomach content weight(g)	0.407	0.901	0.493	0.964	2.269	1.115	0.486	0.141
Mean length (cm)	30	31	33	32	20	35	32	28

Table 30. Percentage weight of the total stomach contents of major stomach content categories of longhorn sculpin (Myoxocephalus octodecimspinosus) sampled during the spring and autumn in the Northwest Atlantic for each year from 1973 through 1976.

Stomach Contents	1973		1974		1975		1976	
	Spring	Autumn	Spring	Autumn	Spring	Autumn	Spring	Autumn
POLYCHAETA	0.23	-	0.27	-	0.50	8.87	0.75	3.13
CRUSTACEA	86.80	88.27	95.33	74.02	85.05	81.61	87.37	90.41
Amphipoda	10.80	1.26	2.09	0.24	4.03	5.48	15.94	0.40
Unciola irrorata	7.04	-	0.50	0.04	0.32	0.36	2.30	0.19
Gammaridae	0.29	0.04	0.60	-	0.95	0.60	3.29	0.07
Anonyx liljeborgi	-	-	-	-	1.44	-	-	-
Other Lysianassidae	-	0.17	0.13	-	0.22	-	-	-
Leptocheirus pinguis	2.98	1.01	0.27	0.11	0.41	3.52	1.13	0.07
Other Amphipoda	0.49	0.04	0.59	0.09	0.69	1.00	9.22	0.07
Decapoda	71.87	85.67	79.80	71.87	64.31	75.68	62.77	88.08
Axius serratus	-	-	-	-	1.35	-	0.01	0.13
Cancer borealis	3.88	-	4.55	9.82	-	27.28	-	-
Cancer irroratus	12.91	2.30	23.96	-	40.63	9.22	15.47	67.30
Other Cancridae	1.81	46.48	0.06	-	1.68	0.77	1.39	0.24
Crangon septemspinosa	5.47	18.84	13.60	2.55	3.15	1.46	6.89	5.26
Hyas araneus	-	-	3.34	-	0.26	-	-	-
Hyas coarctatus	19.03	0.12	-	2.29	0.49	15.97	3.39	-
Pagurus acadianus	7.10	-	-	-	1.43	0.07	6.65	4.14
Pagurus sp.	0.77	5.58	17.65	0.43	0.79	0.03	0.04	0.11
Other Paguridae	0.42	-	-	-	1.32	-	5.18	0.30
Dichelopandalus leptocerus	11.67	6.68	7.90	49.07	9.41	-	10.79	5.13
Other Pandalidae	1.21	1.91	-	-	0.31	11.62	-	0.05
Other Decapoda	7.60	3.76	8.74	7.71	3.49	9.26	12.96	5.42
Isopoda	0.06	0.15	0.09	0.38	0.96	0.22	1.06	0.01
Mysidacea	0.41	-	13.21	-	13.85	-	1.49	-
Neomysis americana	0.41	-	13.21	-	13.85	-	1.49	-
Other Crustacea	3.66	1.19	0.14	1.53	1.90	0.23	6.11	1.92
PISCES	5.61	7.49	2.00	11.41	7.97	0.99	7.66	2.88
Rajidae	-	-	-	-	-	-	4.64	-
Pisces eggs	-	-	-	-	3.81	-	-	-
Other Pisces	5.61	7.49	2.00	11.41	4.16	0.99	3.02	2.88
MISCELLANEOUS	6.67	4.10	2.13	7.83	3.88	7.97	2.59	3.20
SAND AND ROCK	0.69	0.14	0.27	6.74	2.60	0.56	1.63	0.38
Number of stomachs examined	50	73	104	71	142	106	106	61
Number of empty stomachs	6	23	14	31	17	40	15	14
Mean stomach content weight(g)	0.672	0.421	0.597	0.569	1.405	0.135	0.680	1.305
Mean length (cm)	26	23	16	22	17	16	21	25

Table 31. Percentage weight of the total stomach contents of major stomach content categories of fourspot flounder (Paralichthys oblongus) sampled during the spring and autumn in the Northwest Atlantic for each year from 1973 through 1976.

Stomach Contents	1973		1974		1975		1976	
	Spring	Autumn	Spring	Autumn	Spring	Autumn	Spring	Autumn
CRUSTACEA	61.99	63.98	73.91	63.61	60.27	50.25	90.01	58.84
Amphipoda	0.10	2.52	2.89	0.02	-	-	0.05	-
Decapoda	57.66	53.02	27.46	61.53	39.29	47.57	55.91	48.81
Cancer irroratus	-	10.83	-	1.35	-	1.13	12.54	18.59
Other Cancridae	0.62	10.51	5.95	2.81	-	0.29	13.81	7.35
Crangon septemspinosa	0.87	14.20	3.79	7.72	30.36	0.79	13.80	13.76
Other Crangonidae	-	-	-	2.68	-	0.24	1.70	-
Munida iris	11.48	0.85	11.29	0.51	-	-	-	-
Munida sp.	16.17	-	1.23	0.51	-	-	8.50	-
Dichelopandalus leptocerus	20.86	6.35	-	33.53	-	43.59	-	5.83
Other Pandalidae	-	1.85	3.07	7.88	-	-	-	-
Other Decapoda	7.66	8.43	2.13	4.54	8.93	1.53	5.56	3.28
Mysidacea	-	-	36.51	-	-	-	30.89	-
Neomysis americana	-	-	36.51	-	-	-	30.59	-
Other Mysidacea	-	-	-	-	-	-	0.20	-
Other Crustacea	4.23	8.44	7.05	2.06	20.98	2.68	3.16	10.03
MOLLUSCA	30.40	0.03	0.97	20.64	37.28	46.66	0.02	2.95
Cephalopoda	30.40	0.03	0.06	20.64	37.28	46.66	-	2.95
Rossia sp.	30.19	-	-	-	-	-	-	-
Other Cephalopoda	0.21	0.03	0.06	20.64	37.28	46.66	-	2.95
Other Mollusca	-	-	0.91	-	-	-	0.02	-
PISCES	7.61	30.51	22.54	12.98	-	1.65	3.99	22.49
MISCELLANEOUS	-	5.48	2.58	2.77	2.45	1.44	5.98	15.72
Number of stomachs examined	45	87	41	58	20	27	51	56
Number of empty stomachs	25	37	15	14	17	7	16	13
Mean stomach content weight (g)	0.360	0.166	0.167	0.255	0.022	0.998	0.403	0.228
Mean length (cm)	23	22	25	24	27	29	27	26

Table 32. Percentage weight of the total stomach contents of major stomach content categories of witch flounder (Glyptocephalus cynoglossus) sampled during the spring and autumn in the Northwest Atlantic for each year from 1973 through 1976.

Stomach Contents	1973		1974		1975		1976	
	Spring	Autumn	Spring	Autumn	Spring	Autumn	Spring	Autumn
COELENTERATA	3.99	-	0.02	-	19.71	0.08	0.59	-
Metridium sp.	-	-	-	-	17.29	-	-	-
Ceriantharia	-	-	-	-	2.42	-	-	-
Anthozoa	3.99	-	0.02	-	-	0.08	0.59	
POLYCHAETA	65.85	79.21	62.03	40.28	56.04	55.63	68.10	82.15
Spionidae	0.02	-	-	0.23	2.31	0.07	4.27	-
Maldanidae	2.37	-	0.41	0.20	0.08	0.30	0.50	0.05
Sternaspidae	3.64	4.30	1.20	0.37	-	4.29	2.77	1.58
Capitellidae	-	0.17	2.49	0.97	-	1.28	2.81	0.04
Ampharetidae	0.47	0.20	1.34	1.53	0.13	3.74	1.00	0.97
Sabellidae	0.20	4.00	0.01	2.06	-	1.26	0.04	10.90
Arabellidae	-	-	2.07	-	-	0.15	-	-
Eunice pennata	-	-	11.32	-	2.42	-	-	-
Goniadidae	0.31	6.54	2.07	10.75	0.78	1.85	0.15	5.02
Lumbrineris sp.	1.79	1.62	-	-	2.99	-	-	-
Other Lumbrineridae	4.07	2.75	3.39	3.31	-	16.65	2.89	24.95
Nephtyidae	1.56	4.38	1.12	1.12	0.47	4.69	3.73	1.83
Onuphis eremita	-	1.66	5.60	-	-	-	-	-
Onuphis opalina	-	-	4.59	-	0.55	-	-	-
Onuphis sp.	3.14	1.61	-	-	-	-	4.73	-
Other Onuphidae	0.26	-	8.38	3.64	0.78	5.53	2.42	1.56
Eteone sp.	-	-	-	-	34.12	-	-	-
Other Phyllodocidae	0.03	2.32	0.01	0.06	-	3.47	-	-
Other Polychaeta	47.99	49.66	18.03	16.04	11.41	12.35	42.79	35.25
CRUSTACEA	5.97	7.99	3.37	24.77	1.11	2.80	2.17	1.75
Amphipoda	0.54	3.78	1.99	1.21	0.47	1.73	1.02	1.42
Gammaridae	0.38	1.61	0.85	0.23	0.17	0.54	0.50	0.24
Other Amphipoda	0.16	2.17	1.14	0.98	0.30	1.19	0.52	1.18
Euphausiacea	4.21	2.56	-	21.67	-	-	0.16	-
Meganyctiphanes norvegica	4.21	2.56	-	21.67	-	-	0.16	-
Other Crustacea	1.22	1.65	1.38	1.89	0.64	1.07	0.99	0.33
MOLLUSCA	0.80	1.15	0.15	1.55	0.21	6.27	1.36	0.20
Yoldia sp.	-	-	-	1.19	0.01	4.79	0.27	-
Other Mollusca	0.80	1.15	0.15	0.36	0.20	1.48	1.09	0.20
ECHINODERMATA	19.53	1.65	25.07	9.96	8.25	2.28	18.39	-
Ophiuroidea	-	0.29	0.40	7.21	0.79	0.16	-	-
Ophiura sarsi	-	-	0.40	7.21	-	0.16	-	-
Other Ophiuroidea	-	0.29	-	-	0.79	-	-	-
Holothuroidea	19.53	1.36	23.99	2.75	7.46	2.12	18.39	-
Havelockia scabra	-	-	-	-	2.90	-	-	-
Dendrochirotida	-	-	-	-	2.85	1.45	-	-
Other Holothuroidea	19.53	1.36	23.99	2.75	1.71	0.67	18.39	-
Other Echinodermata	-	-	0.68	-	-	-	-	-
ASCIDIACEA	0.72	1.13	1.91	3.61	-	1.00	-	-
MISCELLANEOUS	2.52	7.91	7.36	19.59	14.66	29.17	9.39	15.07
SAND AND ROCK	0.62	0.96	0.09	0.24	0.02	2.77	-	0.83
Number of stomachs examined	150	142	123	107	62	120	98	45
Number of empty stomachs	13	12	15	10	4	13	9	5
Mean stomach content weight (g)	0.633	0.322	0.666	0.389	1.852	0.515	0.540	0.656
Mean length (cm)	43	45	42	41	44	42	41	45

Table 33. Percentage weight of the total stomach contents of major stomach content categories of American plaice (Hippoglossoides platessoides) sampled during the spring and autumn in the Northwest Atlantic for each year from 1973 through 1976.

Stomach Contents	1973		1974		1975		1976	
	Spring	Autumn	Spring	Autumn	Spring	Autumn	Spring	Autumn
POLYCHAETA	3.06	4.93	15.90	2.03	0.86	4.04	2.36	0.19
CRUSTACEA	6.86	14.32	9.07	36.25	2.29	6.08	2.62	10.54
Decapoda	6.08	12.54	7.30	9.27	2.02	5.88	1.78	6.88
Dichelopandalus leptocerus	1.55	2.29	5.81	2.18	1.85	-	0.41	-
Pandalus borealis	1.87	5.79	-	-	-	-	-	-
Other Decapoda	2.66	4.46	1.49	7.09	0.17	5.88	1.37	6.88
Euphausiacea	0.56	-	-	26.51	0.06	0.07	0.26	-
Meganyctiphanes norvegica	0.56	-	-	26.51	0.05	-	0.26	-
Other Euphausiacea	-	-	-	-	0.01	0.07	-	-
Other Crustacea	0.22	1.78	1.77	0.47	0.21	0.13	0.58	3.66
MOLLUSCA	4.13	5.88	0.38	0.44	0.83	6.78	19.59	3.50
Pelecypoda	1.83	5.09	0.36	0.10	0.55	6.78	18.81	3.50
Cerastoderma pinnulatum	-	-	-	0.01	-	-	10.34	-
Other Pelecypoda	1.83	5.09	0.36	0.09	0.55	6.78	8.74	3.50
Other Mollusca	2.30	0.79	0.02	0.34	0.28	-	0.78	-
ECHINODERMATA	79.87	65.64	60.13	56.49	95.42	80.10	68.03	64.69
Echinoidea	63.77	1.42	44.29	8.68	91.83	3.42	23.10	30.11
Strongylocentrotus drobachiensis	3.21	1.42	-	-	-	3.37	-	1.89
Echinarachnius parma	60.42	-	0.63	8.68	64.41	-	19.75	28.16
Echinarachnius sp.	-	-	-	-	25.54	-	-	-
Other Echinoidea	0.14	-	43.66	-	1.88	0.05	3.35	0.06
Ophiuroidea	14.13	55.93	15.84	47.79	3.06	72.93	19.73	26.25
Ophiura sarsi	10.86	47.48	8.75	47.39	0.21	72.01	3.02	20.69
Other Ophiuroidea	3.27	8.45	7.09	0.40	2.85	0.92	16.71	5.56
Other Echinodermata	1.97	8.29	-	0.02	0.53	3.75	25.20	8.33
MISCELLANEOUS	4.23	1.64	1.13	4.71	0.58	2.19	0.48	16.10
SAND AND ROCK	1.85	7.59	13.39	0.08	0.02	0.81	6.92	4.98
Number of stomachs examined	193	246	231	218	165	158	207	104
Number of empty stomachs	56	122	121	86	28	47	102	68
Mean stomach content weight(g)	1.197	0.512	0.185	0.456	6.903	0.618	0.487	0.424
Mean length (cm)	27	34	20	27	30	28	24	35

Table 34. Percentage weight of the total stomach contents of major stomach content categories of yellowtail flounder (Limanda ferruginea) sampled during the spring and autumn in the Northwest Atlantic for each year from 1973 through 1976.

Stomach Contents	1973		1974		1975		1976	
	Spring	Autumn	Spring	Autumn	Spring	Autumn	Spring	Autumn
COELENTERATA	0.50	-	0.12	0.05	4.18	4.91	6.48	0.75
NEMERTEA	1.17	0.47	0.86	0.04	0.40	0.87	0.74	0.06
POLYCHAETA	36.07	35.42	57.10	21.63	46.27	12.83	56.30	30.22
Spionphanes bombyx	2.57	0.39	13.56	9.64	9.31	6.80	6.13	16.50
Other Spionidae	0.36	-	4.96	1.76	-	1.35	12.96	-
Flabelligeridae	2.22	2.42	0.60	0.12	0.51	0.27	0.10	0.21
Maldanidae	2.22	0.40	2.00	0.11	0.23	0.14	0.44	0.60
Ampharetidae	0.88	0.10	1.33	0.06	0.63	0.34	0.92	0.10
Sabellidae	0.37	5.31	3.89	-	-	0.08	2.86	0.89
Lumbrineridae	5.55	2.36	2.84	3.97	0.23	1.51	2.26	1.03
Nephtyidae	4.19	2.01	2.30	1.26	0.07	-	1.83	0.14
Other Polychaeta	17.71	22.43	25.62	4.71	35.29	2.34	28.80	10.75
CRUSTACEA	41.36	18.83	17.65	20.43	18.06	13.62	16.20	9.91
Amphipoda	38.11	15.43	9.83	9.59	13.03	9.99	13.20	8.32
Byblis serrata	0.77	-	0.12	0.05	0.46	0.55	3.35	3.82
Other Ampeliscidae	2.26	3.49	2.03	0.17	3.44	-	0.33	0.21
Unciola irrorata	19.45	5.42	1.97	3.16	1.00	1.47	6.16	2.30
Gammaridae	7.16	1.10	1.09	0.09	2.24	0.14	1.88	0.67
Leptocheirus pinguis	6.59	2.64	0.88	5.13	2.63	5.78	0.78	0.89
Other Amphipoda	1.88	2.78	3.74	0.99	3.26	2.05	0.70	0.43
Decapoda	2.11	1.89	5.90	10.28	4.09	3.37	2.39	1.32
Crangon septemspinosa	0.42	-	0.97	6.99	2.76	2.22	1.89	0.41
Dichelopandalus leptocerus	-	-	4.89	1.77	0.62	-	0.21	0.34
Other Decapoda	1.69	1.89	0.04	1.52	0.71	1.15	0.29	0.57
Other Crustacea	1.14	1.51	1.92	0.56	0.94	0.26	0.61	0.27
MOLLUSCA	1.15	0.34	0.10	0.24	0.37	0.22	0.06	1.66
Bivalvia	1.15	0.34	0.10	0.24	0.37	0.22	0.06	1.66
UROCHORDATA	2.99	1.98	0.16	2.88	-	3.11	-	-
Ascidiacea	2.99	1.98	0.16	2.88	-	3.11	-	-
MISCELLANEOUS	12.06	39.65	4.85	32.66	26.37	56.97	13.01	7.71
SAND AND ROCK	4.70	3.31	19.16	22.07	4.35	7.47	7.21	49.69
Number of stomachs examined	121	128	137	120	152	73	164	126
Number of empty stomachs	31	63	34	52	44	39	21	53
Mean stomach content weight (g)	0.293	0.088	0.341	0.227	0.751	0.135	0.570	0.673
Mean length (cm)	27	31	28	20	32	32	30	32