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DELINEATION OF FOOD WEB RELATIONSHIPS
OF RESIDENT AND MIGRATORY FINFISH
SPECIES IN LITTLE EGG HARBOR, NEW JERSEY

- INTERIM REPORT, COVERING THE PERIOD FROM JULY 1973 - JUNE 1975

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Study Objectives

The long term objective of this study is to quantitatively map the trophic relationships existing between the various organisms inhabiting the Little Egg Harbor estuarine system. The present work is aimed at determining the roles and importance of estuarine organisms to finfish populations. Through examining the stomach contents of the various finfish species utilizing the system, the organisms important as fish food are being enumerated. Interactions between and within fish species regarding the utilization of available food sources are being examined. The delineation of finfish food chains will provide information necessary to evaluate the role of various estuarine habitats in the production and maintenance of fish populations.

Procedures:

The diets of estuarine finfish are being determined through analysis of their stomach contents. Fish were collected at sampling stations selected for finfish distribution studies. Collection was accomplished by use of seines, otter trawl and gill nets. Fish captured at a given station were immediately placed in marked containers of 10% formalin. Upon return from the field, a subsample of fish collected at each station was removed for stomach analysis. Individual fish were weighed, and measured to the nearest centimeter. The stomachs of larger fish were removed and placed in vials of 10% buffered formalin. Small fish were preserved whole. Stomachs were removed in a variety of ways depending on the species concerned. Generally a cut was made ventrally from anus to gill isthmus with additional incisions dorsally so that the skin could be folded back to expose the digestive tract. Hemostats were placed on the esophagus and intestine proximal to the stomach and the tract severed distal of the hemostats allowing the stomach to be removed with a minimum loss of contents. In fish which lack a readily distinguishable stomach such as the tautog, the anterior portion of the tract was removed with care taken to include any bulging areas. Content analysis is accomplished as follows:

1. The stomach is placed on a gridded plastic culture dish under low power of a 10X to 70X stereo dissecting scope.
2. The stomach is opened by pinching the tissue to the plate with a scalpel.
3. Contents are removed with a probe and scalpel.

4. The contents are spread over a portion of the dish and items separated into different cells of the grid by species or type.

5. For identification, individual organisms are removed to a second plate to be keyed.

6. After all item types are identified as far as possible, the organisms are counted and what appears to be the smallest and largest individuals of each group measured to obtain a size range.

7. The volume of each item group is determined by displacement in distilled water in graduated cylinders to the nearest .05 ml. Excess water is removed from the organisms prior to displacement measurements by touching the animal or item with a piece of lens paper. Where content items are too small and too few to obtain a volume figure, a judgment is made by the observer as to the "most important" species or type group in the stomach contents. For the final report, volume estimates will be made for each content item on the basis of the average volumes found for items of similar species and size.

8. Data sheets record fish species, length (nearest cm), weight (nearest gm), station captured, time, date, tide, content item, number, volume and size range.

Water quality data gathered at time of collection is cataloged by the fish distribution study, project number 3-223R.

9. A type collection is being maintained of organisms identified in the stomach contents. Prior to preparation of the final report, this collection will be reassessed and rekeyed to insure proper enumeration of food organisms. Also, items presently identified to higher taxonomic categories will be

further keyed to the species level where possible.

Data Presentation:

In the final report, findings will be presented by fish species and region within the study area. For each fish species, a table will be prepared listing the items occurring in the stomach contents and giving the size range of the item, the percent of the sample in which the item occurred (percent occurrence) and the percent of the total content volume made up by that item. When a sufficient sample size is available the content items will be subdivided by fish specimen size and or season of collection. In addition, an attempt will be made to examine variations in diet with region (via diversity indexes and item occurrence), and the allocation of food resources between species within sampling stations will be studied.

For the present report items are given by percent occurrence and percent importance over-all species within the various subdivisions of the sampling area (Table 4). The study area is divided into 5 regions or areas on the basis of physical similarities and salinity ranges (Table 10, Fig. 1-5). Food or Content items are divided into nine categories: Fish, Annelids, Molluscs, Isopods and Tanaids, Amphipods, Decapods, Zooplankton, Insecta and Other.

Definitions: (Table 4,5,6,7)

%O = percent occurrence = the percent of the fish
sampled in which at least one of
the given content items occurred
in the stomach.

%I = percent importance = the percent of individuals in the total fish sample in which the given item dominated volumetrically (based on displacement measurements or observer judgment).

Findings:

Table two lists the stomach content items by category found in each of the fish species examined. Table 4 gives occurrence of food items by area. It is important to note that items are listed to point of identification and a series such as Polychaete remains, Nereis sp. and Nereis succines may represent many different species or a single species in various states of recognition.

Category I - Fish

Fifteen fish species were collected from stomachs of the specimens examined to date. Fish, including fish eggs, appeared as food items for 28 species. Needlefish, bluefish, northern sennet, silver perch, striped bass, summer flounder and weakfish depended heavily on fish as food. Of fish identified in the stomach contents, bay anchovy and silversides appeared most frequently. There appears to be a significant trend for cannibalism among needlefish. A limited sample of striped bass was found to be utilizing American sandlance as a major food source. Fish eggs comprised a significant portion of the bay anchovy and spot diets. Unfortunately, fish deteriorate very rapidly after consumption and thus a majority of fish remains recovered from the stomachs could not be identified to the species level.

The sample did not include a large number of adult fish. Much of the study area is utilized primarily as a nursery ground by those marine species such as weakfish and bluefish which are known to rely heavily on a fish diet. A larger sample of adults has been collected from the inlet area over the past segment and analysis of these stomachs should provide additional data on the importance of various forage species in the area. Of interest was the finding of a young searobin in a summer flounder stomach and the occurrence of naked gobies in the winter flounder diet. Young bluefish appear to be the major fish eaters in the system.

Fish were found to be the most important food category, volumetrically, in 28.6 % of the sample taken from inlet stations. This value dropped to 7.6% and 7.1% in Creek and Mill Creek stations, 4.9% in the Bay proper and zero in the Lagoon stations. These values reflect, primarily, the proportion of larger fish in the various sample areas rather than an absence of forage species. Sandlance, fish remains, bay anchovy and hake comprised the species occurring at least once as the most important item in the inlet specimens examined. In bay areas, four spine stickleback, bay anchovy, silver perch, naked goby, silversides, spot, and needlefish^{fn} appeared as forage species. In creek station samples, bay anchovy, killifish, and spot were items of importance while stickleback, killifish and pipefish appeared in Mill Creek stations.

fn: occurred only in the stomachs of other needlefish.

Category II Annelida

Unidentified oligochaetes occurred in the stomach contents of sticklebacks and spot. A minimum of sixteen polychaete species were found in the stomach contents of 19 fish species. Winter flounder relied heavily on polychaetes as a food source. Stickleback and spot also consumed significant numbers of polychaete worms. Among those species utilized by winter flounder, Pista palmata, capitellids, Nereis sp., Polydora sp. and Maldanopsis elongata appeared most often in the flounder diet. Clam worms, Nereis spp., occurred in 6 species. As with the fish items, polychaetes deteriorate rapidly in the stomachs and unidentified polychaete remains form a major component of the annelid category in Table Z.

Annelids comprised the most important items in 16.1% of the inlet sample, 13.4 % of the bay sample, 12% of the mill creek sample and 4.3 % of the other tidal creek samples. They did not appear as items of importance in fish collected from the lagoon stations. In the inlets, Glycera americana, capitellids and Nereis sp. were of importance, while Pista palmata, capitellids and Nereis sp. dominated most frequently in bay samples. Oligochaetes, Nereis sp. and S. viridis appeared as items of importance in the Mill Creek sample. In the creek stations, Nereis sp., Maldanopsis elongata, Polydora sp., and P. palmata dominated the stomach contents of some specimens.

Category III - Amphipoda

Amphipods form a major fish food resource in Little Egg Harbor. At least 33 species occurred in the stomach contents of 28 fish species. Of these, 19 were identified to the species level with an additional 6 to genus and 4 to family. Ampelisca spp. and Cymadusa compta dominated the category..

Gammarus spp. occurred in eight species and was a major item in lower salinity areas. Three species of Ampelisca; A. abdita, A. vadorum, and A. verilli were identified, A. abdita, the smallest of the three in size dominated the genus in numbers. Black seabass, mummichog, sticklebacks, pipefish, spot, tautog, weakfish, white perch and again winter flounder ~~utilized~~ amphipods heavily. Caprellids occurred in 3 fish species, most frequently in the diet of pipefish.

Amphipods were most important in the creek stations where they comprised the major food item in 18.0% of the fish examined. Ampelisca spp., predominantly A. abdita, accounted for 67.7% of the total importance for this category in the creeks. Other frequently occurring items were Cymadusa compta and Gammarus sp., Amphipods were the dominant items in 12.9% of the bay samples again with Ampelisca spp. predominating although A. vadorum was most frequently encountered at this area. In Mill Creek, Leptocheirus plumulosus, Corophium sp. and Cymadusa compta were important food items. While amphipods appeared as the dominant item in 11.9% of the samples from lagoon stations, most of the recovered organisms were digested to a point beyond species identification. Two individuals of the genus Erichthonius were recognized. Twelve species were present in the Inlet station samples. Amphipods, however, dominated in only 1.8% of this group on a volumetric basis. Eleven Caprellids were taken from inlet, bay and mill creek specimens.

Category IV - Isopoda and Tanaidacea

Nine species (plus one tentative identification) of isopods and tanaids were recovered from the stomachs of 16 fish species. The genus Idotea (tentatively 3 species) occurred most frequently with I. balthica dominating.

Eels, black seabass, pipefish, toadfish and tautog preyed most frequently on Idotea. Cyathura polita occurred in six species with banded killifish, spot and winter flounder the major consumers. Edotea triloba and Erichsonella spp. occurred in the diets of 4 and 5 species respectively.

In general, this category does not appear to represent a major fish food resource in the system. In creek stations, isopods were the most important items in 1.4% of the sample with C. polita, E. filiformis and I. balthica represented. No isopods or tanaids were collected from lagoon specimens and only I. balthica from inlet stations. The exception is possibly Mill Creek where C. polita was the dominant item in 4.4% of the fish sample and I. balthica in 1.6%.

Category V - Mollusca

Six gastropods and ten bivalve species were recovered from the stomachs of 12 fish species. With the exception of Mya arenaria in the American eel and bivalve siphons in winter flounder,

adult molluscs do not appear to be important as a direct source of fish food. A majority of the siphons recovered from winter flounder have been identified as Mercenaria mercenaria through comparison with the siphons of the bivalves found in the study area. These siphon tips occurred in 34.1 % of the flounder sample and comprised 12.64% of the total diet volume for this species. A supplementary report on these findings is being prepared.

The flounder - mercenaria relationship is largely responsible for the category values of table 4 in which molluscs represent the major diet item in 2.7% of the bay sample, 2.8% of the creek sample and 1.8% of the inlet sample. Again, molluscs were not recovered from specimens taken at lagoon stations.

Category VI - Decapoda

Decapods formed a major food source for finfish utilizing the Little Egg Harbor study area. A minimum of eight species were found in the stomachs of 25 fish species. Caridean shrimp were of special importance. Crangon septemspinosa formed a significant portion of the diets of alewife, black sea bass, bluefish, spotted hake, striped bass, summer flounder, tautog, weakfish, and white perch. Palaemonetes spp. occurred frequently in the stomach contents of the alewife, black seabass, bluefish, spotted hake and winter flounder. P. vulgaris appears to be the dominant grass shrimp species in the area. Shrimp are a major staple of the recreationally and commercially important finfish species utilizing Little Egg Harbor.

Brachyuran crabs formed a substantial part of the eel, black seabass, oyster toadfish, summer flounder and tautog diets. The blueclaw crab, Callinectes sapidus, occurring in 33.3% of the eel stomachs, 13.3% of the tautog and 12.5% of the seabass and summer flounder stomachs. Xanthids dominated by Neopanope texanna occurred in eels, seabass, toadfish, hake, summer

flounder, tautog, weakfish, white perch and winter flounder diets. This group was often of considerable importance in individual stomachs.

Decapods dominated the stomach contents of 23.3% of the inlet sample, 13.8% of the creek sample, 6.7% of the bay sample, 3.2% of the mill creek sample and 2.4% of the lagoon samples. *Crangon septemspinosus* was the dominant organism in each case. No crabs appeared in the lagoon specimens.

Category VII - Zooplankton

As expected zooplankton formed a major food source for young and small fish utilizing the study area. Mysid shrimp were included in this category. Calanoid copepods dominated the diets of American sand lance, bay anchovy, blueback herring, four-spine stickleback and three spine stickleback. They occurred in 33.3% of the alewife, 20% of the Atlantic menhaden, 43.3% of the Atlantic silversides, 25.0% of northern pipefish, 21.0% of the spot, 25.0% of the spotted hake and 47.4% of the tide-water silversides examined. Harpacticoid copepods were important in bay anchovy, blueback herring, stickleback and spot diets.

Neomysis americana represents a major food item in the Little Egg Harbor area. This organism occurred in 21 species of fish. It represented a significant if not dominant item in the diets of the alewife, northern pipefish, young summer flounder, three-spine stickleback, young weakfish and young white perch. In addition it was found in 40% or more of the blueback herring and silver perch samples, and 20% of the silversides, anchovy, and spotted hake. Gastropod, crab, and/or shrimp larvae were

seasonally important in the diets of Atlantic needlefish, anchovy, blueback herring and pipefish. Turbellarians occurred somewhat unexpectedly in six fish species; being found in 24.2% of the bay anchovys, and 18.8% of the pipefish. The percent importance values for this category in table 4 are largely a function of the proportion of forage and young fish in the area samples. In the inlet, mill creek and lagoon samples, Calanoid copepods were of major importance while *N. americana* dominated in the creek specimens. These items were of about equal importance in the bay samples.

Category VIII - Insecta

Adult, winged insects were important in the diet of Atlantic needlefish. Chironimidae larvae appear to form a significant portion of the white perch diet. Water mites (Order Acari), and insects of the orders Coleoptera, Plecoptera and Family Cicadellidae as well as Dipterans and ants appear to form minor constituents of the diets of at least nine fish species.

Category IX - Other

A variety of organisms and materials which do not fit in the previous categories are listed under this grouping in tables 2 and 4. Various algae appeared in recognizable amounts in fifteen species of fish. Diatoms and other algae formed a dominant item in the menhaden and sheepshead minnow diet and were important in the banded killifish specimens examined. Plant detritus, listed as fibrous plant remains, occurred in 21 species. This material appears to form a major food source or food carrier for white mullet. It did not occur in volumes significant enough to indicate that it was being purposely or

actively consumed by other species. Its ingestion appears to be incidental to the capture of other prey. The nutritional value of this material or the bacteria associated with it may, however, complement the diets of a number of fish species. Hydroid stolons and polyps occurred frequently in low volumes in the stomachs of silversides, spot, tautog and winter flounder.

There was a high occurrence of nematodes in the stomach contents of spot and oyster toadfish. The vast majority of nematodes recovered from the stomachs appeared to be in good condition and apparently were not being digested by the fish. Thus it is believed that these are functioning as parasitic or commensal organisms rather than a food source.

The items listed in this category formed a significant portion of the diets of the fish collected at lagoon stations. Algae was found to be the most important content item in 21.4% of the fish examined from this area to date.

Tidal Pool

The stomach contents of 118 fish collected from a tidal pool on the Diner Pt. Creek marsh were analyzed. The tidal pool, measuring approximately 25 x 50 feet, was sampled seasonally with the results given in table 5. The pool had a soft mud bottom and was probably flooded by every higher than mean high tide.

Table 6 gives results of the stomach analyses for each season sample on a per species basis. In the summer sample, dinoflagelates dominated the stomach contents of mummichogs and sheepshead minnows while rainwater killifish preyed mainly on Chironimidae larva. Cladocerans dominated the contents of two

silverside specimens.

In the fall sample, mummichog and sheepshead diets turned to other algae possibly due to a scarcity of dinoflagelates in the pool during this time. The mummichogs also devoured chironimidae larva and copepods while sheepshead remained almost totally herbivorous. In the winter the mummichogs maintained a diverse diet relying somewhat more on animal foods than algae. Harpacticoid copepods formed the main course for silversides while sheepshead continued feeding on algae.

Only one mummichog specimen was obtained in the spring sample. This fish contained a variety of plant and animal items with Gammarus mucronatus the dominant item volumetrically. The sheepshead diet was most diverse during this season. Although algae remained the predominant content item, chironimidae larva and calanoid and harpacticoid copepods were also consumed. Two rainwater killifish contained various algae, chironimidae larva and G. mucronatus.

Table 7 totals the tidal pool results over the four samples by species and table 8 gives results over species by season. Totals are heavily influenced by the dominance of dinoflagelates in the summer sample. Table nine ranks the content items by % importance in the total sample. Plant matter apparently plays a more important role in the trophic structure of the tide pool than it does in open water. This situation is also suggested in the case of the lagoon systems in the study area.

Discussion

The stomach analysis work to date has demonstrated the extreme complexity of the trophic structure in the Little Egg Harbor study area. Although certain species, including Crangon septemspinosus, Neomysis americana, and Ampelisca spp., apparently dominate finfish diets, other organisms are important foods for given fish species or fish sizes at certain seasons and in certain areas of the system. The importance of various organisms is a function of the size and nature of fish populations utilizing the various sampling stations in inlet, bay and creek areas. Such utilization will be clarified with completion of the fish distribution studies (report scheduled for September 1975). The lagoon system appears to be atypical in comparison with the other areas studied. There was a noticeable absence of bottom associated food items in the stomach contents of fish collected from this area. The consumer levels in the trophic structure of the lagoon system appear markedly less complex than found in the other study areas.

Plans for the 1975-1976 Study Segment

Hopefully time will be sufficient to complete stomach analysis work on the remaining fish sample. Efforts will be made to obtain volume estimates, on the basis of sample averages, for individuals of all species and content items for which such estimates are not presently available.

Study Participants

Fish Collection: Barry **Preim** Ferdinand Metzger
Fish Processing: Barry **Preim** Ferdinand Metzger
Stomach Content Analysis: Patrick Festa

Report by:

Patrick J. Festa
Project Leader

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TABLE 1

List of common and scientific names of fishes
used in this report.

(Am. Fisheries Soc. SP. Pub. No. 6, 1970)

<u>Common</u>	<u>Scientific</u>
Alewife	<i>Alosa pseudoharengus</i>
American eel	<i>Anquilla rostrate</i>
Atlantic menhaden	<i>Brevoortia tyrannus</i>
Atlantic needlefish	<i>Strongylura marina</i>
Atlantic silversides	<i>Menidia menidia</i>
Banded killifish	<i>Fundulus diaphanus</i>
Bay anchovy	<i>Anchoa mitchilli</i>
Black sea bass	<i>Centropristes striatus</i>
Blueback herring	<i>Alosa aestivalis</i>
Bluefish	<i>Pomotomus saltatrix</i>
Brown bullhead	<i>Ictalurus nebulosus</i>
Crevalle jack	<i>Caranx hippos</i>
Cunner	<i>Tautoglabrus adspersus</i>
Four spined stickleback	<i>Apeltes quadracus</i>
Golden shiner	<i>Notemigonus crysoleucas</i>
Hogchoker	<i>Trinectes maculatus</i>
Lizzard fish	<i>Synodus foetens</i>
Mummichog	<i>Fundulus heteroclitus</i>
Naked goby	<i>Gobiosoma bosci</i>
Northern pipefish	<i>Syngnathus fuscus</i>
Northern puffer	<i>Sphaeroides maculatus</i>
Northern sennet	<i>Sphyraena borealis</i>
Oyster toadfish	<i>Opsanus tau</i>
Pinfish	<i>Lagodon rhomboides</i>
Planehead filefish	<i>Monacanthus hispidus</i>
Rainwater killifish	<i>Lucania parva</i>
Redfin pickerel	<i>Esox americanus</i>
Red hake	<i>Urophycis chuss</i>
Scup	<i>Stentomus chrysops</i>
Sheepshead minnow	<i>Cyprinodon variegatus</i>
Silver perch	<i>Bairdiella chrysura</i>
Snapper	<i>Lutjanus sp.</i>
Spot	<i>Leiostomus xanthurus</i>
Spotted hake	<i>Urophycis regius</i>
Spotted seahorse	<i>Hippocampus erectus</i>
Striped bass	<i>Morone saxatilis</i>
Striped killifish	<i>Fundulus majalis</i>
Striped mullet	<i>Mugil cephalus</i>
Summer flounder	<i>Paralichthys dentatus</i>
Tautog	<i>Tautoga onitis</i>
Tidewater silversides	<i>Menidia beryllina</i>
Weakfish	<i>Cynoscion regalis</i>
White mullet	<i>Mugil curema</i>
Windowpane flounder	<i>Scophthalmus aquosus</i>
Winter flounder	<i>Pseudopleuronectes americanus</i>
White perch	<i>Morone americanus</i>

TABLE 2
OCCURRENCE OF STOMACH CONTENT ITEMS BY FISH SPECIES

% occurrence in stomachs containing food given for sample size
of five or more

X= Presence in smaller sample

I Category: Fish	Ameri- can Eel	Atlantic needle fish	Black seas- s	Blue fish	Brown bull- head	Gray Jack	Spine- stick back	Atl. silver sides	Lizzard Fish	Miami- choc	Northern sennet Bay	Anchovy
<i>Apeltes quadracus</i>		7.1										
<i>Ammodytes americanus</i>												
<i>Anchoa mitchilli</i>				18.2								
<i>Brevoortia tyrannus</i>				9.1								
<i>Bairdiella chrysur</i>												
<i>Gobiosoma bosci</i>												
<i>Fundulus sp.</i> (<i>Etropus microstomus</i>)										10.0		
<i>Menidia menidia</i>												
<i>Menidia sp.</i>				9.1							16.7	
<i>Prionotus sp.</i>												
<i>Leiostomus xanthurus</i>				9.1								
<i>Strongylura marina</i>		14.3										
<i>Syngnathus fusus</i>	11.1											
<i>Urophycis sp.</i>												
Fish remains		21.4	12.5	54.5	X	X			X		50.0	
Fish eggs	11.1						14	9.0				12.9

TABLE 2 (Cont'd.)

II Category: Annelida	Atlantic needle- fish	Atlantic silver- sides	Banded killi- fish	Bay anchovy	Bluefish	Brown bull- head	Cun- ner
Class Oligochaeta							
Fam. Aphroditidae							
<i>Clymenella torquata</i>							
<i>Glycera americana</i>							
<i>Glycera</i> sp.							
<i>Lumbrineris</i> sp.							
Fam. Lumbrinereidae							
Fam. Capitellidae							
Fam. Terebellidae							
<i>Terebellides</i> sp.							
<i>Pista palmata</i>							
Fam. Folyneidae							
Fam. Phyllodoceidae							
<i>Phyllococe</i> sp.							
<i>Phyllococe maculata</i>							
Fam. Syllidae							
<i>Sabella microphthalma</i>							
<i>Nephtys</i> sp.							
<i>Nereis</i> sp.	7.1			3.2	9.1	X	
<i>Nereis succinea</i>							
Fam. Spoinidae							
<i>Polydora</i> sp.				14.5			
<i>Scolecopides viridis</i>						X	
<i>Maldanopsis elongata</i>							
Polychaete remains	14.3	1.5	22.2				X

TABLE 2 (Cont'd) II CATEGORY: ANNELIDA

Category:	4-spined stickle- back	Golden shiner	Hogchoker	Oyster toadfish	Planehead filefish
Annélida					
Class Oligochaeta	2.9				
Fam. Aphroditidae					
<i>Clymenella torquata</i>					
<i>Glycera americana</i>					
<i>Glycera</i> sp.					
<i>Lumbrineris</i> sp.					
Fam. Lumbrinereidae					
Fam. Capitellidae			X		
Fam. Terebellidae					
<i>Terebellides</i> sp.					
<i>Pista palmata</i>					
Fam. Polyneidae					
Fam. Phyllodocidae					
<i>Phyllodoce</i> sp.			X		
<i>Phyllodoce maculata</i>	1.4				
Fam. Syllidae	1.4				
<i>Sabella microph- thalma</i>					
<i>Nephtys</i> sp.					
<i>Nereis</i> sp.					
<i>Nereis succinea</i>					
Fam. Spionidae	1.4				
<i>Polydora</i> sp.					
<i>Polydora ligni</i>	2.9				
<i>Scolecopides viridis</i>					
<i>Maldanopsis elongata</i>					
Polychaete remains	5.8	X	X	5.9	X

TABLE 2 (Cont'd.) - II Category: Annelida

II Category-Annelida	Scup	Snapper	Spot	Striped bass	Tautog	White Perch	Winter flounder
Class Oligochaeta			3.2				
Fam. Aphroditidae							1.2
<i>Clymenella torquata</i>	X					2.4	
<i>Glycera americana</i>							4.7
<i>Glycera</i> sp.						1.8	1.2
<i>Lumbrineris</i> sp.					6.7		
Fam. Lumbrinereidae							1.2
Fam. Capitellidae							19.0
Fam. Terebellidae							1.2
<i>Terebellides</i> sp.							2.4
<i>Pista palmata</i>	X						23.5
Fam. Polyneidae							2.4
Fam. Phyllodocidae							1.2
<i>Phyllodoce</i> sp.							
<i>Phyllodoce maculata</i>							3.5
Fam. Syllidae							
<i>Sabella micropthalma</i>							2.4
<i>Nephtys</i> sp.			3.2				1.2
<i>Nereis</i> sp.						5.3	8.2
<i>Nereis succinea</i>							1.2
Fam. Spionidae							
<i>Polydora</i> sp.							4.7
<i>Polydora ligni</i>							8.2
<i>Scolecopides viridis</i>							
<i>Maldanopsis elongata</i>		X					7.2
Polychaete remains			21.0	10.0	13.3	28.1	24.7

TABLE 2 (Cont'd.): III Category: Amphipoda

III Category: Amphipoda	Americ an eel	Atlantic silver- sides	Banded killi- fish	Bay Anchovy	Black sea bass	Brown bull head	Cunner	4spined stickle- back	Hog- choker	Mummi- c hog
Ampelisca sp.	11.1	1.5		4.8						
Ampelisca abdita		4.5		1.6						
Ampelisca vaderum		1.5					1.4			
Ampelisca verilli (Batea catharinen- sis)										
Casco bigelowi										
Cerapus tubularis										
Corophium sp.				1.6						
Corophium (Tuberculatum)				1.6						
Corophium (lucustre										
Cymadusa compta					12.5		4.3			20.0
Erichthonius brasiliensis				1.6			1.4			
Erichthonius rubricornis							1.4			
Erichthonius sp.										
Gammarus faciatus										
Gammarus mucronatus	11.1									
Gammarus diaberi										
Gammarus sp.		1.5			12.5		5.8			10.0
Lembos sp.										
Leptocheirus pinguis									X	
Leptocheirus plumulosus						X	1.4			
Leptocheirus sp.										
Fam. Lysianassidae					25.0					
Elasmopus laevis					25.0		X	1.4		
Fam. Hyalidae										
Marinogammarus sp.										
Microdeutopus sp.						X				
Microdeutopus (gryllotalpa								1.4		
Microprotopus rauel										
Orchestia platensis										
Monoculodes sp.										
Melita sp.										
Maera danae										
Fam. Photidae		1.5								
Fam. Stenothoidae										
Parametopella cyris										
Stenothoe minuta										
Fam. Talitridae								1.4		
Unciola sp.										
S.O. Gammaridea remains	11.1	4.5	44.4	1.6	25.0	X	X	13.0		20.0
Order Caprellidea								2.9		

TABLE 2 (CONT'D): III Category: Amphipoda

III Category: Amphipoda	Naked Naked goby	Northern pipefish	Northern Puffer	Oyster toadfish	Pinfish	Plane- head filefish	Scup	Spot	Spotted hake	Spotted seahorse	Summer flounder	Trutog	3 spined stickle- back
<i>Ampelisca</i> sp		6.3			X		X	35.5					
<i>Ampelisca abdita</i>		6.3								X			
<i>Ampelisca vadorum</i>									6.3				
<i>Ampelisca verilli</i> (<i>Batea catharinensis</i>)													
<i>Casco bigelowi</i>													
<i>Cerapus tubularis</i>			X								12.5		
<i>Corophium</i> sp.								1.6			12.5	20.0	
<i>Corophium</i> (<i>tuberculatum</i>)													
<i>Corophium</i> (<i>lucustre</i>)		6.3											
<i>Cymadusa compta</i>		6.3		11.8					18.8			13.3	
<i>Erichthonius</i> <i>brasiliensis</i>													
<i>Erichthonius</i> <i>rubricornis</i>													
<i>Erichthonius</i> sp.						X						13.3	
<i>Gammarus faciatius</i>													
<i>Gammarus mucronatus</i>													
<i>Gammarus diaberi</i>													
<i>Gammarus</i> sp.													16.7
<i>Lembos</i> sp.												6.7	
<i>Leptocheirus</i> <i>pinguis</i>													
<i>Leptocheirus</i> <i>plumulosus</i>													
<i>Leptocheirus</i> sp.													
Fam. Lysianassidae													
<i>Elasmopus laevis</i>	X							1.6				6.7	
Fam. Hyalidae									6.3				
<i>Marinogammarus</i> sp.				5.9									
<i>Microdeutopus</i> sp.								1.6					
<i>Microdeutopus</i> (<i>gryllotalpa</i>)													
<i>Microprotopus ranei</i>													
<i>Orchestia platensis</i>													
<i>Monoculodes</i> sp.													
<i>Melita</i> sp.													
<i>Maera danae</i>					X							6.7	
Fam. Photidae													
Fam. Stenothoidae													
<i>Parametopella cypris</i>			X										
<i>Stenothoe minuta</i>		6.3											
Fam. Talitridae													
<i>Unciola</i> sp.					X								
S.O. Gammaridea remains		6.3	X	17.6				35.5				13.3	16.7
Order Caprellidea		12.5											

TABLE 2 (Cont'd): III CATEGORY: AMPHIPODA

III Category: Amphipoda	Tidewater Silver- sides	Weakfish	White perch	Window pane	Winter flounder
<i>Ampelisca</i> sp.		15.0			10.6
<i>Ampelisca abdita</i>		5.0			16.5
<i>Ampelisca vadorum</i>					18.8
<i>Ampelisca verilli</i>					3.5
(<i>Batea catharinensis</i>)					1.2
<i>Casco bigelowi</i>					2.4
<i>Cerapus tubularis</i>					
<i>Corophium</i> sp.			5.3		5.9
<i>Corophium</i> (<i>tuberculatum</i>)					1.2
<i>Corophium</i> (<i>lucustre</i>)			1.8		
<i>Cymadusa compta</i>			3.5	X	7.1
<i>Erichthonius</i> <i>brasiliensis</i>					
<i>Erichthonius</i> <i>rubricornis</i>					
<i>Erichthonius</i> sp.					1.2
<i>Gammarus faciatus</i>			7.0		
<i>Gammarus mucronatus</i>					
<i>Gammarus diaberi</i>			1.8		
<i>Gammarus</i> sp.					
<i>Lembos</i> sp.			3.5		1.2
<i>Leptocheirus</i> <i>pinguis</i>					
<i>Leptocheirus</i> <i>plumulosus</i>			15.8		1.2
<i>Leptocheirus</i> sp.					
Fam. <i>Lysianassidae</i>					
<i>Elasmopus laevis</i>					4.7
Fam. <i>Hyalidae</i>					
<i>Marinogammarus</i> sp.					
<i>Microdeutopus</i> sp.					2.4
<i>Microdeutopus</i> (<i>gryllotalpa</i>)					3.5
<i>Microdeutopus ranei</i>					2.4
<i>Orchestia platensis</i>			1.8		
<i>Monoculodes</i> sp.			1.8		
<i>Melita</i> sp.					1.2
<i>Maera danae</i>					3.5
Fam. <i>Photidae</i>			1.8		
Fam. <i>Stenothoidae</i>					1.2
<i>Parametopella cypris</i>					
<i>Stenothoe minuta</i>					
Fam. <i>Talitridae</i>					
<i>Unciola</i> sp.					1.2
S.O. <i>Gammaridae</i> remains	5.3	5.0			10.6
Order <i>Caprellidea</i>					1.2

TABLE 2 (CONT'd): CATEGORY IV: Isopoda & Tanaidacea

IV Category: Isopoda & Tanaidacea	American Eel	Banded Killifish	Bay anchovy	Black Sea Bass	Brown bull- head	4 spine stickle back	Northern pipe- fish	Northern Puffer
<i>Cyathura polita</i>		33.3			X			
<i>Cirolana</i> sp.					X			
<i>Edotea triloba</i>					X	1.4		
<i>Erichsonella</i> sp.								
<i>Erichsonella</i> <i>attenuata</i>							6.3	
<i>Erichsonella</i> <i>filiformis</i>	11.1							
<i>Idotea</i> sp.								
<i>Idotea balthica</i>	11.1			37.5				
<i>Idotea phosphorea</i>							12.5	X
<i>Idotea</i> (<i>metallica</i>)						1.4		
<i>Lepotochelia</i> <i>savignyi</i>			1.6					
<i>Tanais cavolini</i>								
Isopoda remains			3.2				6.3	
IV Category: Isopoda & Tanaidacea	Oyster Toad fish	Scup	Snap- per	Spot	Spotted Hake	Tautog	White Perch	Winter flound- er
<i>Cyathura polita</i>		X		9.7			5.3	15.3
<i>Cirolana</i> sp.								
<i>Edotea triloba</i>				1.6				4.7
<i>Erichsonella</i> sp.				1.6		6.7		
<i>Erichsonella</i> <i>attenuata</i>	11.8					6.7		
<i>Erichsonella</i> <i>filiformis</i>						26.7		
<i>Idotea</i> sp.			X		6.3			
<i>Idotea balthica</i>	29.4				6.3	20.0		8.2
<i>Idotea</i> <i>phosphorea</i>								
<i>Idotea</i> (<i>Metallica</i>)								
<i>Lepotochelia</i> <i>savignyi</i>								
<i>Tanais cavolini</i>				6.5				1.2
Isopoda remains						20.0		

TABLE 2 (Cont'd) V CATEGORY: MOLLUSCA

V CATEGORY: Mollusca	American Eel	Brown bull- head	4-spine stickle- back	Oyster toad- fish	Plane- head file- fish	Scup	Sil- ver perch
<i>Bittium alternatum</i>							
<i>Bittium</i> sp.			1.4				20.0
<i>Crepidula</i> sp.			1.4	5.9			
<i>Gemma gemma</i>							
<i>Haminoea solitaria</i>				11.8			
<i>Laevicardium mortoni</i>							
Bivalve siphons							
<i>Mitrella lunata</i>	11.1						
<i>Modiolus demissus</i>							
<i>Mya arenaria</i>	11.1						
<i>Mytilus edulis</i>			1.4				
<i>Nassarius</i> sp.		X		11.8			
<i>Petricola pholadiformis</i>							
Fam. Tellinidae							
<i>Tagelus divisus</i>							
Fam. Veneridae						X	
Bivalve remains		X			X		
Shell fragments							
<i>Littorina</i> sp.							
V CATEGORY: Mollusca	Snapper	Spot	Striped Bass	White perch	Winter flounder		
<i>Bittium alternatum</i>					2.4		
<i>Bittium</i> sp.					1.2		
<i>Crepidula</i> sp.					2.4		
<i>Gemma gemma</i>		1.6					
<i>Haminoea solitaria</i>					1.2		
<i>Laevicardium Mortoni</i>					1.2		
Bivalve siphons				1.8	34.1		
<i>Mitrella lunata</i>					1.2		
<i>Modiolus demissus</i>		3.2					
<i>Mya arenaria</i>							
<i>Mytilus edulis</i>			10.0				
<i>Nassarius</i> sp.							
<i>Petricola pholadiformis</i>					1.2		
Fam. Tellinidae					1.2		
<i>Tagelus divisus</i>					1.2		
Fam. Veneridae		4.8					
Bivalve remains	X	1.6		1.8			
Shell fragments			10.0				
<i>Littorina</i> sp.		1.6					

TABLE 2 (Cont'd) VI CATEGORY DECAPODA

VI Category: Decapoda CARIDEAN SHRIMP	Oyster toad fish	Pin fish	Silver perch	Snapper	Spot	spotted hake	Spotted sea horse	
<i>Crangon septemspinosus</i>	5.9	X	6.0			43.8	X	
<i>Palaemonetes vulgaris</i>	5.9					12.5		
<i>Palaemonetes pugio</i>						6.3		
<i>Palaemonetes (intermedius)</i>								
<i>Palaemonetes sp.</i>	5.9							
Caridean remains			20.0	X				
<u>BRACHYURAN / CRABS</u>								
<i>Ovalipes ocellatus</i>								
Brachyuran remains					1.6			
<i>Callinectes sapidus</i>								
Fam. Xanthidae	5.9				1.6			
<i>Eurypanopeus depressus</i>								
<i>Neopanope texanna sayi</i>	11.8					6.3		
<i>Rhithropanopeus harrisii</i>	5.9							
<u>VI Category: Decapoda CARIDEAN SHRIMP</u>								
<i>Crangon septemspinosus</i>	X	40.0	75.0	13.3	40.0	63.2	X	8.2
<i>Palaemonetes vulgaris</i>						3.5	X	10.6
<i>Palaemonetes pugio</i>								2.4
<i>Palaemonetes (intermedius)</i>						1.8	X	
<i>Palaemonetes sp.</i>								3.5
Caridean remains			12.5				X	
<u>BRACHYURAN / N CRABS</u>								
<i>Ovalipes ocellatus</i>				6.7				
Brachyuran remains				6.7				1.2
<i>Callinectes sapidus</i>			12.5	13.3	5.0	1.8		3.5
Fam. Xanthidae				33.3	5.0			2.4
<i>Eurypanopeus depressus</i>								3.5
<i>Neopanope texanna sayi</i>			12.5	13.3		1.8		5.9
<i>Rhithropanopeus harrisii</i>			12.5			1.8		2.4

TABLE 2 (CONT'D): VI Category:

VI Category: Decapoda	Ale- wife	American eel	Atlantic silver- sides	Bay Anchovy	Black sea bass	Blue- fish	Brown bullhead	Crevalle jack	Mumi- chog	Northern sennet
<u>CARIDEAN SHRIMP</u>										
<i>Crangon septem- spinosa</i>	16.7		3.0	1.6	50.0	18.2		X	10.0	
<i>Palaemonetes vulgaris</i>	16.7				12.5	18.2				
<i>Palaemonetes pugio</i>										
<i>Palaemonetes (intermedius)</i>										
<i>Palaemonetes</i> sp.			1.5							
Caridean remains										16.7
<u>BRACHYURAN CRABS</u>										
<i>Ovalipes ocellatus</i>					12.5					
Brachyuran remains		11.1					X			
<i>Callinectes sapidus</i>		33.3			12.5					
Fam. Xanthidae		11.1	3.0							
<i>Eurypanopeus depressus</i>					12.5					
<i>Neopanope texanna sayi</i>		11.1			25.0					
<i>Rhithropanopeus harrisii</i>		11.1			12.5					

TABLE 2: Cont'd): VII Category Zooplankton

VII: Category: Zooplankton *	Alewife	Atlantic men- haden	Atlantic needle- fish	American sand- lance	Atlantic silver sides	Banded killi- fish	Bay anchovy
Order Calanoida	33.3	20.0		80.0	43.3		80.6
Order Harpacticoida			7.1		7.5		43.6
Order Cyclopoida							3.2
S. Class Copepoda						22.2	
S. Class Ostracoda					1.5		38.7
Order Cladocera			7.1				11.3
Order Cumacea						44.4	3.2
Class Turbellaria							24.2
Cirripedia nauplii							1.6
Gastropoda larva							33.9
Polychaete larva							4.8
Caridean larva			7.1				8.1
Brachyuran larva			21.4				14.5
Copepoda mauplii							
Bivalve larva							1.6
Mysidopsis bigelowi					1.5		
Neomysis americana	66.7				28.4		29.0
Mysid remains					6.0		4.8
**Includes Order Mysidacea							
VII Category: Zooplankton *	Black Seabass	Blueback Herring	Blue fish	Brown bull- head	Crevalle jack	Cunner	4-spine stickle back
Order Calanoida		100.0					55.1
Order Harpacticoida		20.0		X			40.6
Order Cyclopoida							
S. Class Copepoda							
S. Class Ostracoda		10.0					4.3
Order Cladocera							
Order Cumacea							
Class Turbellaria							4.3
Cirripedia nauplii							
Gastropoda larva							
Polychaete larva		10.0					
Caridean larva		20.0					
Brachyuran larva			9.1			X	
Copepoda nauplii							2.9
Bivalve larva							
Mysidopsis bigelowi							
Neomysis americana	12.5	40.0	9.1		X		13.0
Mysid remains		20.0					1.4
*Includes Order Mysidacea							

TABLE 2: Cont'd) VII Category: Zooplankton

VII Category Zooplankton	Hog- choker	Northern pipefish	Northern Puffer	Northern sennet	Oyster toad- fish	Rain- water killi- fish	Scup
Order Calanoida		25.0	X			X	
Order Harpacticoida	X	12.5			5.9	X	
Order Cyclopoida							
S. Class Copepoda		6.3					
S. Class Ostracoda			X				
Order Cladocera							
Order Cumacea							
Class Turbellaria		18.8	X				
Cirripedia nauplii							
Gastropoda larva							
Polychaeta larva							
Caridean larva		6.3					
Brachyuran larva		12.5					
Copepoda nauplii							
Bivalve larva							
Mysidopsis bigelowi							
Neomysis americana		56.3		16.7			X
Mysid remains							
VII Category: Zooplankton	Silver perch	Snapper	Spot	Spotted Wake	Spotted sea horse	Summer flounder	Tautog
Order Calanoida		X	21.0	25.0			6.7
Order Harpacticoida			37.1				
Order Cyclopoida							
S. Class Copepoda			48.4				
S. Class Ostracoda			1.6	6.3			
Order Cladocera			1.6				
Order Cumacea			4.8				
Class Turbellaria			3.2				
Cirripedia nauplii							
Gastropoda larva			1.6				
Polychaete larva							
Caridean larva			1.6				
Brachyuran larva							
Copepoda nauplii							
Bivalve larva			1.6				
Mysidopsis bigelowi							
Neomysis americana	40.0		8.1	31.3	X	62.5	
Mysid remains			1.6			12.5	

TABLE 2 (Cont'd): VII Category Zooplankton

VII Category: Zooplankton	3 spined stickle- back	Tide water silver sides	Weak- fish	White perch	Window- pane	Winter flounder
Order Calanoida	66.7	47.4		17.5		
Order Harpacticoida	16.7					5.9
Order Cyclopoida						
S. Class Copepoda	16.7	36.8				
S. Class Ostracoda						1.2
Order Cladocera		5.3				
Order Cumacea		5.3				3.5
Class Turbellaria		15.8				
Cirripedia nauplii						
Gastropoda larva						
Polychaete larva						
Caridean larva				3.5		
Brachyuran larva				1.8		
Copepoda nauplii						
Bivalve larva						
Mysidopsis bigelowi						
Neomysis americana	66.7		65.0	66.7	X	12.9
Mysid remains				1.8		

TABLE 2 (Cont'd) VIII Category: Insecta

VIII Category: Insecta	Alewife	Atlantic needle- fish	Atlantic silver sides	Bay anchovy	Brown Bullhead
Order Coleoptera	16.7				
Order Diptera (adult)		42.9	3.0		
Order Diptera (larva)					
Chironimidae larva				4.8	X
Chironimidae pupae					
Other larva					
Order Acari					
Adult Insect remains					
Winged ants		21.4	1.5		
Fam. Cicadellidae			1.5		
Order Plecoptera					

VII Category: Insecta	Four-spined stickleback	Spot	Tidewater silversides	White perch
Order Coleoptera				
Order Diptera (adult)				1.8
Order Diptera (larva)		3.2		
Chironimidae larva	1.4	4.8		17.5
Chironimidae pupae				3.5
Other larva		3.2		
Order Acari	1.4		5.3	
Adult Insect remains			5.3	1.8
Winged ants				
Fam. Cicadellidae				
Order Plecoptera				1.8

TABLE 2(Cont'd) IX Category: Other

IX Category: Other	Ale- wife	Amer- ican eel	Atla- ntic men- haden	Atla- ntic needle fish	Amer- ican sand lance	Atla- ntic silver sides	Banded killi- fish
Limulus polyphemous							
Pagurus longicarpus							
Molgula manhattensis							
Class Hydrozoa						3.0	
Phylum Bryozoa							
S. Class Cirripedia							
Class Cestoda		11.1					
Class Nematoda						1.5	11.1
Order Actiniaria							
Terrestrial seed pods						3.0	
Diatoms			100.0				11.1
(Englenoid)						1.5	
Other algae	33.3	11.1	100.0			9.0	55.5
Fibrous plant remains	33.3	33.3				11.9	11.1
Unidentified eggs				7.1			
Sediment							33.3
Unidentified remains		11.1			20.0		

IX Category: Other	Bay Anchovy	Black sea bass	Blue- back herring	Frown bull head	Cunner	Four spined stickleback back
Limulus polyphemous						
Pagurus longicarpus		12.5				
Molgula manhattensis						
Class Hydrozoa					X	
Phylum Bryozoa						
S. Class Cirripedia						
Class Cestoda						
Class Nematoda	1.6					10.1
Order Actiniaria						
Terrestrial seed pods						
Diatoms						
(Englenoid)						
Other algae			10.0			8.7
Fibrous plant remains	3.2		10.0	X		5.8
Unidentified eggs						
Sediment	1.6			X		4.3
Unidentified remains	1.6					

TABLE 2 (Cont'd) IX Category: Other

IX Category: Other	Golden Shiner	Hog choker	Mummi- chog	Northern pipefish	Northern puffer
Limulus polyphemous					
Pagurus longicarpus					
Molgula manhattensis					
Class Hydrozoa					X
Phylum Bryozoa					
S. Class Cirripedia					
Class Cestoda					
Class Nematoda			30.0	12.5	
Order Actiniaria					
Terrestrial seed pods					
Diatoms (Englenoid)					
Other algae				10.0	
Fibrous plant remains		X	10.0		X
Unidentified eggs					
Sediment		X			
Unidentified remains	X	X	10.0	6.3	
IX Category: Other	Oyster Toadfish	Plane- head Filefish	Rain water Killifish	Sheeps- head Minnow	Spot
Limulus polyphemous					
Pagurus longicarpus					
Molgula manhattensis					
Class Hydrozoa		X			11.3
Phylum Bryozoa					
S. Class Cirripedia					
Class Cestoda					
Class Nematoda	47.1				54.8
Order Actiniaria					
Terrestrial seed pods					
Diatoms (Englenoid)		X		100.0	
Other algae		X	X	100.0	1.6
Fibrous plant remains	23.5			20.0	
Sediment				40.0	12.9
Unidentified remains	11.8				3.2

TABLE 2 (Cont'd) - IX Category: Other

IX Category: Other	Spotted Hake	Red hake	Striped mullet	Summer flounder	Tautog	Four- spined stickle back
Limulus polyphemous						
Pagurus longicarpus						
Molgula manhattensis						
Class Hydrozoa					6.7	
Phylum Bryozoa				12.5	6.7	
S. Class Cirripedia					6.7	
Class Cestoda						
Class Nematoda	18.8	X		12.5		
Order Actiniaria						
Terrestrial seed pods						
Diatoms			X			
(Englenoid)						
Other algae			X			16.7
Fibrous plant remains	12.5			37.5	20.0	
Unidentified eggs						
Sediment			X		13.3	
Unidentified remains					20.0	
IX Category: Other	Tide water silver- sides	Weak- fish	White mullet	White perch	Window pane	Winter flounder
Limulus polyphemous						1.2
Pagurus longicarpus						
Molgula manhattensis						2.4
Class Hydrozoa				1.8		8.2
Phylum Bryozoa						
S. Class Cirripedia				1.8		2.4
Class Cestoda						1.2
Class Nematoda				1.8		11.8
Order Actiniaria					X	
Terrestrial seed pods				1.8		
Diatoms	5.3					
(Englenoid)						
Other algae	15.8					
Fibrous plant remains		5.0	100.0	19.3	X	35.3
Unidentified eggs						
Sediment			100.0	1.8		14.1
Unidentified remains		5.0		5.3		5.9

TABLE 3
COLLECTION DATA BY FISH SPECIES FOR JULY '73 - JUNE '75

Species	Size of Specimens (cm)	No. of Stomachs Examined	No. of Empty Stomachs	Months Collected	Stations Collected
Alewife	9-34	6	0	Jan., Mar, April, May	T4, T24, T15, GS17
American eel	12-60	9	0	April, June, July	T8, T16, T23, S7, S2
Atlantic menhaden	13-16	5	0	July	S9
Atlantic needlefish	5-58	14	0	June, July	S2, S3, S6, S7
American sandlance	9.4 - 11.5	5	0	November	S5, T1
Atlantic silversides	4-12	71	4	Jan-July	T2, T4, T10, T12, T15, T23, T24, T25, S1, S2, S9, S13, S16, GS20
Banded killifish	3-8	9	0	Jan, July	S16, S18
Bay anchovy	5-11	67	5	Mar-July	T2, T4, T7, T8, T10, T11, T12, T15, T23, T24, T26, S7.
Black seabass	10-19	9	1	June-Sept, Nov.	T3, T9, T26, T14, T12, T8
Blueback herring	7-10	10	0	Feb, Apr, May	T25, T15, T12, GS20
Bluefish	6-33	12	1	June, July	T10, T26, S2, S6, Little Egg Inlet
Brown bullhead	21-26	3	0	May, Sept.	T15
Crevalle jack	4-8	6	2	July	S7, S16
Cunner	4	1	0	August	T5
Fourspine stickleback	3-6	73	4	Jan-July	T8, T10, T11, T15, T16, T23, T2, T4, T12, S2, S18, S16, S15, S17, S19, S10, S9, S3

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TABLE 3 (Cont'd)

Species	Size of Specimens (cm)	No. of Stomachs Examined	No. of Empty Stomachs	Months Collected	Stations Collected
Golden shiner	15	2	0	August	T15
Hogchoker	4-17	5	2	Apr., May, Nov.	T15, T16
Lizzardfish	10	1	0	July	S6
Mummichog*	4-10	13	3	Nov., Jan.	S18, S7, S2
Naked goby	5	1	0	June	T4
Northern pipefish	9-21	16	0	Mar. - July	T13, T2, T12, S2 T23, T4, T8, T7
Northern puffer	3	1	0	July	T10
Northern sennet	10-13	6	0	July	S6, S2
Oyster toadfish	4-28	22	5	July, Sept., Oct., Apr., June	T9, T8, T13, T14, T4, T10, S2, S7, S6
Pinfish	6-7	2	0	July	S6
Planehead filefish	13	1	0	October	T5
Rainwater killifish	3-4	3	1	Jan., June, July	S6, S2, S15
Redfin pickerel	14-26	2	1	July, Sept.	S18, T15
Red hake	13	1	0	June	T12
Scup	14	1	0	Oct.	T6
Sheepshead minnow *	3-5	6	1	Jan., June November	S9, S18, S15, S16, S2
Silver perch	6-12	5	0	Oct.	T10, S13
Snapper	4-5	2	0	June	S2
Spot	3-18	62	0	July-Oct., June	T16, S13, T23 T14, T15, T2, T10, S9, S7, T9, T26, T13, S2, S6, S16, GS18, T1, T26
Spotted hake	5-19	16	0	April-June	T4, T12, T2, T8, T10, S2
Spotted seahorse	8	1	0	June	T10
Striped bass	43.4-56.4	12	2	Nov, Jan, May	T1, GS17, T23

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 TABLE 3 (Cont'd)

Species	Size of Specimens (cm)	No. of Stomachs Examined	No. of Empty Stomachs	Months Collected	Stations Collected
Striped killifish	5-11	4	3	July, Jan.	S1, S2
Striped mullet	11-16	5	1	Oct., Jan.	S6, S9
Summer flounder	8-36	9	1	June-Oct.	T9, T24, T25, T11, T7, T10
Tautog	6-32	15	0	Sept.-Dec. April, June	T2, T14, T26, S13, S6, T12, T5, T8, T4
Threespine stickleback	3-7	6	0	Jan-Mar.	S13, S9, T11, T23, T24
Tidewater silversides	5-6	23	4	July, Feb., April	S18, S10, T15, T18
Weakfish	5-17	20	0	Aug.-Oct.	T13, T23, T25, T18, T14, T26, T6, T15
White mullet	12-14	5	0	July	S7, S16
White perch	7-36	58	1	Aug.-Feb. Apr., May	T15, T16, T17, T18, T8, S17, GS17, GS20, GS13
Window pane	15-34	3	0	Aug., Sept.	T1, T14, T5
Winter flounder	6-32	85	2	July-June	T9, S16, T1, T4, T5, T2, T10, T11, T12, T7, T23, T16, T14, T13, T6, T25

TABLE 4
FOOD ITEMS BY AREA: FISH

%

%O = Percent Occurrence
%I = Percent Importance (See Text)

Fish	Inlet			Bay			Creek			Mill Creek			Lagoon		
	#	%O	%I	#	%O	%I	#	%O	%I	#	%O	%I	#	%O	%I
Apeltes quadracus				5	1.8	0.9				1	0.5	0.5			
Ammodytes americanus	23	10.7	7.1												
Anchoa mitchilli	1	1.8	1.8	1	0.4	0.4	5	1.4	0.9						
Brevoortia tyrannua							1	0.5							
Bairdiella chrysur				3	0.4	0.4									
Gobiosoma bosci				1	0.4		1	0.5		1	0.5				
Fundulus sp.							1	0.5	0.5	2	1.1	0.5			
(Etropus microstomus)	2	1.8													
Menidia menidia	1	1.8													
Menidia sp.				2	0.9	0.4									
Prionotus sp							1	0.5							
Leiostomus xanthurus				1	0.4	0.4	7	0.9	0.9						
Strongylura Marina				2	0.9	0.9									
Syngnathus fusus										1	0.5	0.5			
Urophycis sp.	1	1.8	1.8												
Fish remains	17	8.9	3.6	7	3.1	0.9	19	8.1	5.2	19	7.1	4.4			
Fish eggs	5	1.8	1.4	21	4.0	0.4	20	4.3		1756	5.5	1.1			
Total fish *	45		28.6	22		4.9	35		7.6	24		7.1	0		0

* Fish eggs excluded from number totals

TABLE 4 (Cont'd)
FOOD ITEMS BY AREA: ANNELIDA

Phylum Annelida	Inlet			Bay			Creek			Mill Creek			Lagoon		
	#	%C	%I	#	%C	%I	#	%C	%I	#	%C	%I	#	%C	%I
Class															
Oligochaeta				24	0.4	0.4					135	1.1	1.1	1	2.4
Fam. Aphroditidae				1	0.4										
Clymenella torquata				5	1.3	0.4	1	0.5							
Glycera americana	2	3.6	3.6	14	0.9	0.4									
Glycera sp.				1	0.4					1	0.5				
Lumbrineris sp.				2	0.4										
Fam. Lumbrine-reidae							1	0.5							
Fam. Capitellidae	218	7.1	7.1	14	2.7	1.3									
Fam. Terebellidae				1	0.4	0.4									
Terebellides sp.				5	0.9										
Pista palmata				145	8.5	4.9	16	1.4	0.5						
Fam. Polynoidae	4	1.8		1	0.4										
Fam. Phyllodoceidae				1	0.4										
Phyllodoce sp.				8	0.9										
Phyllodoce maculata				6	1.8	0.4									
Fam. Syllidae				1	0.4										
Sabella microphthalma				1	0.4		1	0.5							
Nephrys sp.							2	0.5							
Nereis sp.	24	12.5	1.8	8	1.8	0.9	7	0.9	0.9	5	2.2	0.5	1	2.4	
Nereis succinea							1	0.5							
Fam. Spionidae				1	0.4										
Polydora sp.				8+	2.2		33	2.8	0.5	6	0.5				
Polydora ligni				54	3.6		22	0.5							
Scolecopides viridis									0.5	40	0.5	0.5			
Maldanopsis elongata				11	2.2	0.4	12	0.9	0.9						
Polychaete remains	4+	7.1	3.6	15+	8.9	3.6	17	6.2	1.4	53+	15.3	9.8	1	2.4	
Total polychaete	252		16.1	327		13.4	113		4.3	240		12.0	3		0

TABLE 4 FOOD ITEMS BY AREA: AMPHIPODA (Cont'd)

Order Amphipoda	Inlet			Bay			Creek			Mill Creek			Lagoon		
	#	%O	%I	#	%O	%I	#	%O	%I	#	%O	%I	#	%O	%I
Ampelisca sp	1	1.8		101	4.5	0.9	2	133	8.5	4	1.6				
Ampelisca abdita				57	4.9	1.3		4.7	2.8						
Ampelisca vadorum				115	7.1	3.1	36	1.4	0.9						
Ampelisca verilli				7	1.3	0.4									
(Batea catharinensis)				4	0.4										
Casco bigelowi	1	1.8						9	0.5						
Cerapus tubularis				3	0.4			2	0.5						
Corophium sp.	2	1.8		9	2.7		2	0.9		208	3.3	1.6			
Corophium (tuberculatum)				1	0.4	0.4	2	0.5							
Cymadusa compta	36	1.8		21			39	2.8	0.5	26	2.7	1.1			
Erichthonius brasiliensis							2	0.9							
Erichthonius rubricornis							1	0.5	0.5						
Erichthonius sp.	20	3.6					27	0.5	0.5	5	0.5		2	2.4	
Gammarus faciatius										32	2.7	0.5			
Gammarus mucronatus				4	0.4	0.4									
Gammarus sp.				2	0.9	0.9	9	1.4	0.5						
Lembos sp.	28	1.8													
Leprocheirus pinguis										1	0.5				
Leptocheirus plumulosus	1	1.8								303	6.6	2.7			
Leptocheirus sp.										2	0.5				
Fam. Lysianassidae										2	1.1				
Elasmopus laevis	33	3.6	1.8	16	1.3	0.9	3	0.9		7	1.1				
Fam. Hyalidae				1	0.4										
Marinogammarus sp.				1	0.4										
Microdeutopus sp.	7	7.1		3	0.9					2	0.5				
Microdeutopus (gryllotalpa)				1	0.4										
Microprotopus ranei					14	0.9									
Orchestia platensis										1	0.5				
Monoculodes sp.										1	0.5				
Melita sp.				1	0.4										
Maera danae	2	3.6		3	0.9										
Fam. Photidae	3	1.8								3	0.5	0.5			
Fam. Stenothoidae										1	0.5				
Parametopella cyris															
Stenothoe minuta				1	0.4					14	0.5				
Fam. Talitridae				2	0.4	0.4									
Unciola sp.				3	0.4		3	0.5	0.5						
S.O. Gammaridea remains	19	10.7		109	8.0	2.2	46	10.0	3.3	35	6.6	1.1	66	16.7	11.9
Order Caprellidea	2	1.8		5	1.3					4	0.5	0.5			
Gammarus (diaberi)										16	0.5	0.5			
Corophium (Lacustre)										1	0.5				
Total Amphipoda	155	1.8		484	12.9		1089			180	667	8.7	98		11.9

TABLE 4 Cont'd. - FOOD ITEMS BY AREA: ISOPODA & TANAIDACEA

Orders Isopoda & Tanaidacea	Inlet			Bay			Creek			Mill Creek			Lagoon		
	#	%O	%I	#	%O	%I	#	%O	%I	#	%O	%I	#	%O	%I
Cyathura polita				24	4.9		5	2.4	0.5	31	6.6	4.4			
Cirolana sp.										1	0.5				
Edotea triloba				6	1.3		3	1.4		11	1.1				
Erichsonella sp				2	0.4										
Erichsonella attenuata							3	0.5		3	1.1				
Erichsonella filiformis				7	0.4	0.4	1	0.5	0.5						
Idotea sp.				1	0.4		1	0.5		1	0.5				
Idotea balthica	15	8.9		17	2.7		18	2.4	0.5	38	2.2	1.6			
Idotea phosphorea				6	1.3	0.4	1	0.5							
Idotea (metallica)							1	0.5							
Lepotochelia savignyi										1	0.5				
Tanais cavolini							1	0.5		72	2.2				
Isopoda remains				3	1.3										
	15			66		0.9	34		1.4	158		6.0	0		0

TABLE 4 (Cont'd.)
FOOD ITEMS BY AREA: MOLLUSKA

Molluska	Inlet			Bay			Creek			Mill Creek			Lagoon			
	#	%O	%I	#	%O	%I	#	%O	%I	#	%O	%I	#	%O	%I	
<i>Bittium alternatum</i>	1	1.8		4	0.9											
<i>Bittium</i> sp.				1	0.4		1	0.5								
<i>Crepidula</i> sp.				11	0.9		2	0.9	0.5							
<i>Gemma gemma</i>							1	0.5								
<i>Haminoea solitaria</i>	1	1.8					2	0.5								
<i>Laevicardium mortini</i>				1	0.4											
Bivalve siphons	6	23.6	1.8	256	9.8	2.2	47	2.4	1.4	1	0.5					
<i>Mitrella lunata</i>							1	0.5		1	0.5					
<i>Modiolus demissus</i>													1	0.5	0.5	
<i>Mya arenaria</i>													1	0.5	0.5	
<i>Mytilus edulis</i>				6	0.4		1	0.5								
<i>Nassarius</i> sp.							2	0.9	0.5	1	0.5					
<i>Petricola pholadiformis</i>				7	0.4	0.4										
Fam. tellinidae	1	1.8														
<i>Tagelus divisus</i>	1	1.8														
Fam. Veneridae				2	0.4		26	0.9	0.5							
Bivalve remains				3	0.9		---	0.5		4	1.1	0.5				
Shell fragments																
<i>Littorina</i> sp.							3	0.5								
Total Molluska	10		1.8	29		2.7	86		2.8	8		1.1	0			0

TABLE 4 : food items by area: Decapoda (Cont'd)

Caridean shrimp	Inlet			Bay			Creek			Mill Creek			Lagoon		
	#	%O	%I	#	%O	%I	#	%O	%I	#	%O	%I	#	%O	%I
<i>Crangon septemspinosus</i>	86	23.2	14.3	58	7.6	3.6	77	13.3	10.0	36	4.4	2.2	8	2.4	2.4
<i>Palaemonetes vulgaris</i>	56	3.6	1.8	20	2.7	1.3	74	3.3	2.8	36	1.6	0.5			
<i>Palaemonetes pugio</i>	1	1.8	1.8	1	0.4	0.4	1	0.5							
<i>Palaemonetes (intermedius)</i>										3	0.5				
<i>Palaemonetes sp.</i>	4	3.6		3	1.3	0.4	2	0.9							
Caridean remains	11	1.8		1	0.4	0.4	1	0.5	0.5						
Total Caridea	159		17.9	83		6.3	155		13.3	75		2.7	8		2.4
Brachyuran crabs															
<i>Ovalipes ocellatus</i>	5	3.6													
Brachyuran remains	1	1.8		2	0.9	0.4	1	0.5	0.5	3	1.1				
<i>Callinectes sapidus</i>	2	3.6					4	1.9	0.9	7	3.3	1.6			
Fam. Xanthidae	6	3.6	1.8	21	2.7	1.8	3	0.9		3	1.6	1.1			
<i>Eurypanopeus depressus</i>				8	1.3					1	0.5				
<i>Neopanope texanna sayi</i>	1	1.8		19	2.2	0.9	5	0.9	0.9	4	1.6	1.6			
<i>Rhithropanopeus harrisii</i>				17	1.3	0.4	3	0.9	0.5	3	1.1	0.5			
Total Brachyuran	15		5.4	67		3.6	16		2.8	21		4.9	0		0

TABLE 4 FOOD ITEMS BY AREA: ZOOPLANKTON (Cont'd)

Zooplankton	Inlet		Bay		Creek		Mill Creek		Lagoon		
	#	%I	#	%O	#	%I	#	%O	#	%I	
Order Calanoida	2097	8.9	3594	22.8	14.7	4.7	32253	35.0	24.6	1079	28.6
Order Harpacticoida	2203	5.4	3683	17.0	5.8	7.6	1920	15.8	2.2	55	19.0
Order Cyclopoida							2	1.1			
S. Class Copepoda			1	0.4	0.4	15.6	6.6	2065	6.6	1657	14.3
S. Class Ostracoda			33	7.1	0.4	4.7	22	4.4		1	2.4
Order Cladocera			1822	2.7	2.2	0.5	1732	1.6	1.1		
Order Onchocera			21	2.2	0.4	0.9	7	2.7			
Class Hirbellaria			42	4.0	0.4	2.4	4	1.6			
Cirripedia nauplii						0.5	4				
Gastropoda larva			232	3.6		5.7	385				
Polychaete larva			2	0.4		0.9	47			6	2.4
Caridean larva	1	1.8	30	3.1	0.9	1.9	24	1.1		501	4.8
Branchyuran larva	18	7.1	1127	6.7	3.1	2.8	22	1.1			
Copepoda nauplii			12	0.9							
Eiv-lva larva						0.9	27				
Mysidopsis bigelowi									0.5	1	2.4
Neomysis americana	159	5.4	512	19.2	14.3	22.3	517	14.2	7.7	39	9.5
Mysid remains			1	0.4		2.8	24	2.7	0.5		
Total Zooplankton	4478		11112		42.0	30.8	8963	38721	39.9	3339	40.5

TABLE 4 FOOD ITEMS BY AREA: INSECTA (Cont'd.)

Insecta	Inlet			Bay			Creek			Mill Creek			Lagoon		
	#	%O	%I	#	%O	%I	#	%O	%I	#	%O	%I	#	%O	%I
Order Coleoptera							1	0.5							
Order Diptera (adult)				63	3.1	0.4									
Order Dipteran larva											6	1.1			
Non-dipteran larva							1	0.5		1	0.5				
Order Acari										2	1.1				
Adult insect remains										1	0.5				
Winged ants	4	1.8	1.8	2	0.9		25	0.5	0.5						
Chironimidae pupae										2	1.1				
Fam. Cicadellidae							1	0.5							
Order Plecoptera										1	0.5	0.5			
Total Insecta	4		1.8	65		0.4	28		0.5	37		0.5	0		0

TABLE 4 FOOD ITEMS BY AREA: OTHER (Cont'd.)

Other	Inlet			Bay			Creek			Mill Creek			Lagoon			
	#	%O	%I	#	%O	%I	#	%O	%I	#	%O	%I	#	%O	%I	
Limulus polyphemous	3	1.8														
Pagurus longicarpus	1	1.8														
Molgula manhattensis				1	0.4											
Class Hydrozoa		3.6			3.6	0.4	--	2.4		--	2.2					
Phylum Bryozoa					0.9											
S. Class Cirripedia (Euglenoid)					0.4		--	0.5		--	0.5					
Class Cestoda							125	0.9								
Class Nematoda	642	12.5	1.8	86	6.7	0.4	871	11.8		480	2.2		13	9.5		
Order Actiniaria	1	1.8														
Sediment		10.7	1.8		6.3	0.4	--	5.2	0.9	--	3.8			9.5	2.4	
Terrestrial seed pods							2	0.5					16	2.4		
Algae (other than diatoms)		5.4	1.8		2.2	0.9	--	2.8		--	9.3	2.7		26.2	21.4	
Diatoms					0.4		--	0.9		--	2.2	0.5		16.7		
Fibrous plant remains		8.9	1.8			0.9	--	14.2	2.4	--	13.1	0.5		9.5	2.4	
Unidentified eggs							1	0.5								
Unidentified remains		5.4	1.8		0.9	0.9	--	2.8	1.9	--	2.7	1.1		4.8	4.8	
Total Other	653		8.9	87		4.0	1000		5.2	480		4.9	29		31.0	
		TOTALS FOR TABLES			THROUGH											
Sample size	56			217			201			172			39			
No empty stomachs	2			13			18			11			6			

TABLE 5
COLLECTION DATA FOR TIDAL POOL STATION 58

<u>Sampling Date:</u>	<u>8/30/73</u>	<u>10/12/73</u>	<u>1/23/74</u>	<u>5/22/74</u>
Salinity ppt:	25.44	30.32	15.81	29.78
D.O. mg/l:	6.86	6.04	5.00	10.00
Temp °C:	33.0	17.0	6.5	---
Sample size	47	29	38	13
Mummichog	37	11	14	1
Sheepshead minnow	2	18	12	10
Tidewater silversides	2	0	8	0
Rainwater killifish	6	0	4	2
Empty	1	0	8	0
Stomach analysis	46	29	30	13

TABLE 6
STOMACH CONTENT ANALYSIS BY SPECIES

Current Item	Mummichog				Sheeps-head				Tidepool Summer 73 Siversides				Rainwater Killifish				Total			
	FO	%	FI	%I	FO	%	FI	%I	FO	%	FI	%I	FO	%	FI	%I	FO	%	FI	%I
Algae other than dino or diatoms	5	138	1	2.8													5	100	1	2.2
Dinoflagelates	33	91.7	32	88.9	2	100	2	100					3	50			38	82.6	34	73.9
Diatoms	20	56							1	50							21	45.7		
Chironimidae larva	6	16.7	1	2.8									6	100	5	83.3	12	26.1	6	13.0
Fibrous plant remains	3	8.3	1	2.8													3	6.5	1	2.2
Cladocera									2	100	2	100					2	4.3	2	4.3
Gammarid re.	1	2.8											2	33	1	16.7	3	6.5	1	2.2
Harpacticoid copepods	6	16.7							2	100			5	33			13	28.3		
Gastropod larva																				
Calanoid copepods	2	5.6							1	50			1	16.7			4	8.7		
Cycloid scales	2	5.6															2	4.3		
Ostracoda	7	19.4															7	15.2		
Adult insect remains	3	8.3	1	2.8					1	50							4	8.7	1	2.2
Nematodes	1	2.8			2	100											3	6.5		

100.

TABLE 6 (Contd) STOMACH CONTENT ANALYSIS BY SPECIES
TIDE POOL - FALL '73

Content Item	Mummichog				Sheepshead				Total			
	f.O	%O	fI	%I	f.O	%O	fI	%I	fO	%O	fI	%I
Algae other than listed	7	63.6	6	54.5	17	84.4	13	72.2	24	82.8	19	65.5
Dinoflagelates	6	34.5	2	18.2	3	16.7	1	5.6	9	31.0	3	10.3
Diatoms	9	81.8			18	100.	2	11.1	27	93.1	2	6.9
Chironimidae larva	3	27.3	2	18.2					3	10.3	2	6.9
Fibrous plant remains	7	63.6			18	100.	2	11.1	7	24.1	2	6.9
Copepod-nondiscript	2	18.2	1	9.1					2	6.9	1	3.4
Gammarid remains					1	5.6			1	3.4		
Harpacticoid copecods	3	27.3			2	11.1			5	17.2		
Gastropos larva	1	9.1							1	3.4		
Calanoid copepods	1	9.1							1	3.4		
Cycloid scales	2	18.2							2	6.9		
Chironimidae pupa	2	18.2							2	6.9		
Nematoda					2	11.1			2	6.9		
												99.9

TABLE 6 (CONT'D.)

STOMACH CONTENT ANALYSIS BY SPECIES

TIDE POOL - WINTER '74

Current Item	Mummichog				Sheepshead				Tidewater Silversides				Total			
	f.O	%O	fI	%I	f.O	%O	fI	%I	f.O	%O	fI	%I	f.O	%O	fI	%I
Algae other than dino. or diatoms	11	84.6	4	30.8	8	88.9	5	55.6	5	62.5	1	12.5	24	80.0	10	33.3
Dinoflagelates	6	46.2			2	22.2	1	11.1					8	26.7	1	3.3
Diatoms	10	76.9			9		3	33.3	2	25.0			19	63.3	3	10.0
Chironimidae larva	7	53.8	4	30.8									7	23.3	4	13.3
Copepoda-nondescript	1	7.7							2	25.0	2	25.0	3	10.0	2	6.7
Gammarid remains	1	7.7	1	7.7									4	13.3	1	3.3
Harpacticoid copepods	4	30.8	1	7.7					6	75.0	5	62.5	10	33.3	6	20.0
Calanoid copepods	1	7.7											1	3.3		
Nematodes	2	15.4											2	6.7		
Gammarus macronatus	2	15.4	2	15.4									2	6.7	2	6.7
Hydroid re.	2	15.4											2	6.7		
Polychaete re.	2	15.4	1	7.7									2	6.7	1	3.3
Nematoda																
																99.9

TABLE 6 (CONT'D)
 STOMACH CONTENT ANALYSIS BY SPECIES
 TIDE POOL SPRING - 1974

Content item	Mummichog				Sheepshead				Rainwater... Killifish				Total			
	fO	%O	fI	%I	fO	%O	fI	%I	fO	%O	fI	%I	fO	%O	fI	%I
Algae other than dino or diatoms	1	100.			10	100.	5	50.0	1	50.0			12	92.3	5	38.5
dinoflagelates	1	100.			9	90.0	1	10.0	1	50.0			11	84.6	1	7.7
Diatoms	1	100.			10	100.							11	84.6		
Chironimidae larva	1	100.			1	10.0			2	100.	1	50.	4	30.8	1	7.7
Fibrous Plant remains					6	60.0							6	46.2		
Copepoda nondescript					2	20.0	1	10.0					2	15.4	1	7.7
Harpacticoid copepods					4	40.0	1	10.0					4	30.8	1	7.7
Calanoid copepods	1	100.			2	20.0	1	10.0	1	50.			4	30.8	1	7.7
Gammarus mucronatus	1	100.	1	100.					2	100.	1	50.	3	23.1	2	15.4
Hydroid re.					3	30.0							3	23.1		
Copepod nauplii					4	40.0	1	10.0					4	30.8	1	7.7
Nematoda	1	100.											1	7.7		

100.1

TABLE 7
STOMACH CONTENT ANALYSIS
FOR TIDE POOL BY SPECIES
4 SEASONS COMBINED

Species	Mummichog		Sheepshead Minnow		Tidewater Silversides		Rainwater Killifish		Total	
	Sample Size		Sample Size		Sample Size		Sample Size		Sample Size	
Content Item	%O	%I	%O	%I	%O	%I	%O	%I	%O	%I
Algae except dia and dino	39.3	18.0	89.7	59.0	50.0	10.0	12.5		55.1	29.7
Dinoflagelates	75.4	55.7	41.0	12.8			50.0		55.9	33.1
Diatoms	65.6		94.9	12.8	30.0				78.0	4.2
Chironimidae larvae	27.9	11.5	2.6				100.	75.0	22.0	11.0
Fibrous plant remains	16.4	1.6	61.5	5.1					13.6	2.5
Cladocera					20.0	20.0			1.7	1.7
Copepoda nondescript	4.9	1.6	5.1	2.6	20.0	20.0			5.9	3.4
Gammarid remains	3.3	1.6	2.6				25.0	12.5	6.8	1.7
Harpacticoid copepods	21.3	1.6	15.4	2.6	80.0	50.0	62.5		27.1	5.9
Gastropod larva	1.6								0.8	
Calanoid copepods	8.2		5.1	2.6	10.		12.5		7.6	0.8
Cycloid scales	6.6								3.4	
Chironimidae pupa	3.3								1.7	
Ostracoda	11.5								5.9	
Adult insect remains	6.6	1.6			10.				3.4	0.8
Nematodes	4.9		10.3						5.1	
Gammarus mucronatus	4.9	4.9					25.0	12.5	4.2	3.4
Hydroid remains	3.3		7.7						4.2	
Polycheate remains	4.9	1.6							1.7	0.8
Copepod nauplii			10.3	2.6					3.4	0.8

99.8

TABLE 8
STOMACH CONTENT ANALYSIS FOR TIDE POOL BY SEASONS
ALL SPECIES COMBINED

Seasons	Summer		Fall		Winter		Spring		Total	
Sample Size	46		29		30		13		118	
Content Item	%O	%I	%O	%I	%O	%I	%O	%I	%O	%I
Algae except dia.& dino	10.9	2.2	82.8	65.5	80.0	33.3	92.3	38.5	55.1	29.7
Dinoflagelates	82.6	73.9	31.0	10.3	26.7	3.3	84.6	7.7	55.9	33.1
Diatoms	45.7		93.1	6.9	63.3	10.0	84.6		78.0	4.2
Chironimidae larva	26.1	13.0	10.3	6.9	23.3	13.3	30.8	7.7	22.0	11.0
Fibrous plant remains	6.5	2.2	24.1	6.9			46.2		13.6	2.5
Cladocera	4.3	4.3							1.7	1.7
Copepoda-nondescript			6.9	3.4	10.0	6.7	15.4	7.7	5.9	3.4
Gammarid remains	6.5	2.2	3.4		13.3	3.3			6.8	1.7
Harpacticoid copepods	28.3		17.2		33.3	20.0	30.8	7.7	27.1	5.9
Gastropod larva			3.4						0.8	
Calanoid copepods	8.7		3.4		3.3		30.8	7.7	7.6	0.8
Cycloid scales	4.3		6.9						3.4	
Chironimidae pupa			6.9						1.7	
Ostracoda	15.2								5.9	
Adult insect remains	8.7	2.2							3.4	0.8
Nematodes	6.5		6.9				7.7		5.1	
Gammarus mucronatus					6.7	6.7	23.1	15.4	4.2	3.4
Hydroid remains							23.1		4.2	
Polycheate remains									1.7	0.8
Copepod nauplii							30.8	7.7	3.4	0.8
										99.8

TABLE 9
RANK IN IMPORTANCE OF FOOD ITEMS IN TIDAL POOL (S8)

<u>Content Item</u>	<u>% Importance</u>	<u>% Occurrence</u>
Dinoflagelates	33.1	59.9
Algae other than diatoms or dino.	29.7	55.1
Chironimidae larva	11.0	22.0
Harpacticoid copepods	5.9	27.1
Diatoms	4.2	78.0
Copepods-nondescript	3.4	5.9
Gammarus mucronatus	3.4	4.2
Fibrous plant remains	2.5	13.6
Gammarus sp. remains	1.7	6.8
Cladocera	1.7	1.7
Calanoid copepods	0.8	7.6
Adult insect remains	0.8	3.4
Copepad nauplii	0.8	3.4
Polycheate remains	0.8	1.7
Ostracoda	--	5.9
Nematodes	--	5.1
Hydroid remains	--	4.2
Cycloid scales	--	3.4
Chironimidae pupa	--	1.7
Gastropod larva	--	0.8

RANK OF FOOD GROUPS BY IMPORTANCE

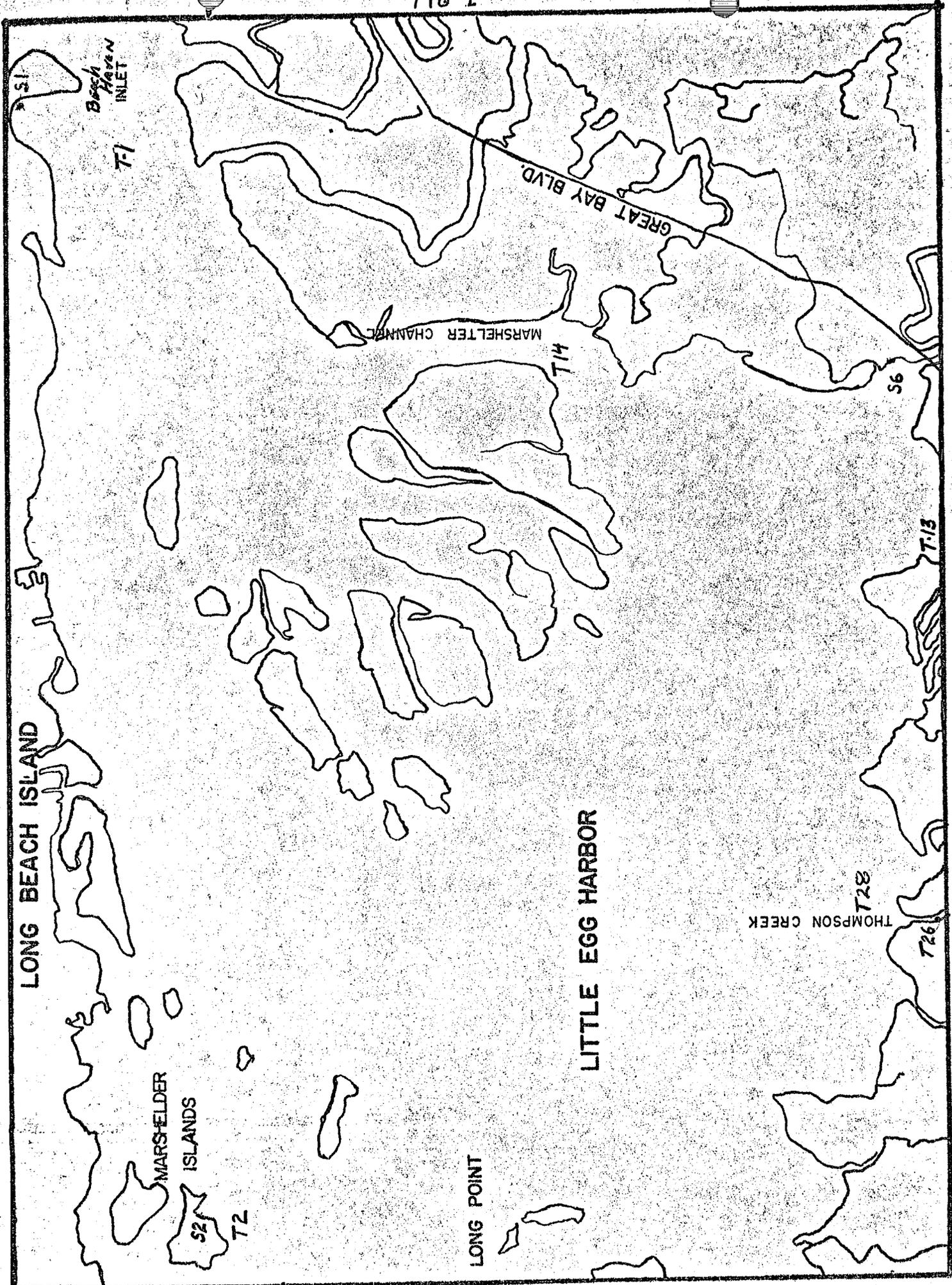
All algae	67.0
Insects	11.8
Copepods	10.9
Amphipods	5.1
Detritus	2.5

TABLE 10

<u>Category</u>	<u>Stations Included</u>	<u>Location Map</u>
Inlet Stations	Ti*, S1, T14, T5, S5	Fig. 1 Fig. 5
Bay Stations	S2, T2, T28, T12, T11, T3, S3, T7, T4, T6	Fig. 1 Fig. 2 Fig. 4 Fig. 5
Creek Stations	S6, T13, S7, T26, T25, T24, S13, T9, GS13, T23, T27	Fig. 1 Fig. 2 Fig. 2 Fig. 4
Mill Creek Stations	T8, S18, T16, T15 S16, S15, T17, T18, S17 GS17	Fig. 2 & Fig. 3 Fig. 3 Fig. 3
Lagoon Stations	S9, S20, S19, S10, GS20	Fig. 3
Tidal Pool Station	S8	Fig. 2

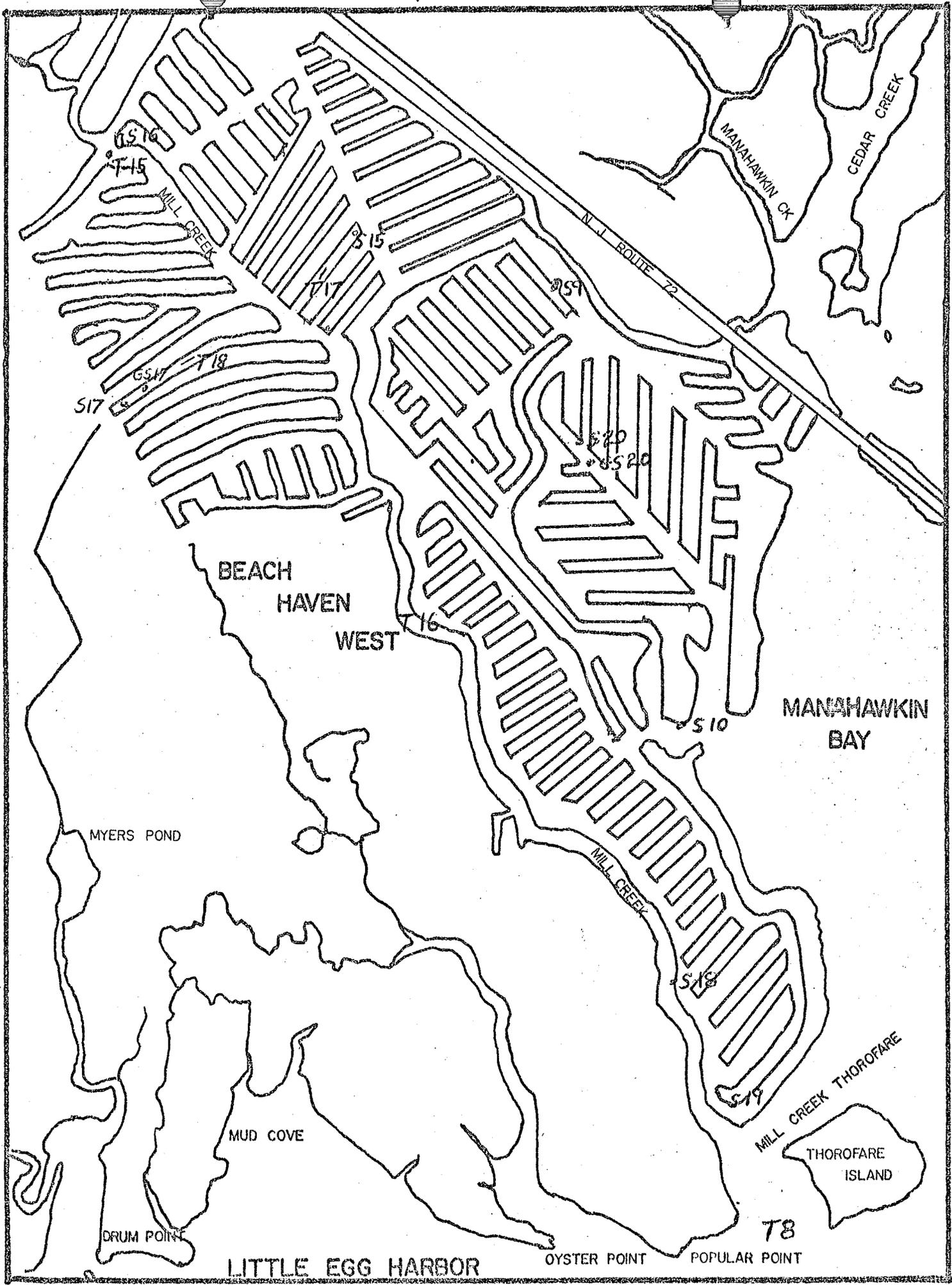
* Prefix T denotes trawl stations
 Prefix S denotes seine stations
 Prefix GS denotes gill net stations

Fig 1



0.57 upper end Thompson C.

FIG 3



LITTLE EGG HARBOR

OYSTER POINT

POPULAR POINT

78

MYERS POND

MUD COVE

DRUM POINT

BEACH HAVEN WEST

MANAHAWKIN BAY

THOROFARE ISLAND

MILL CREEK THOROFARE

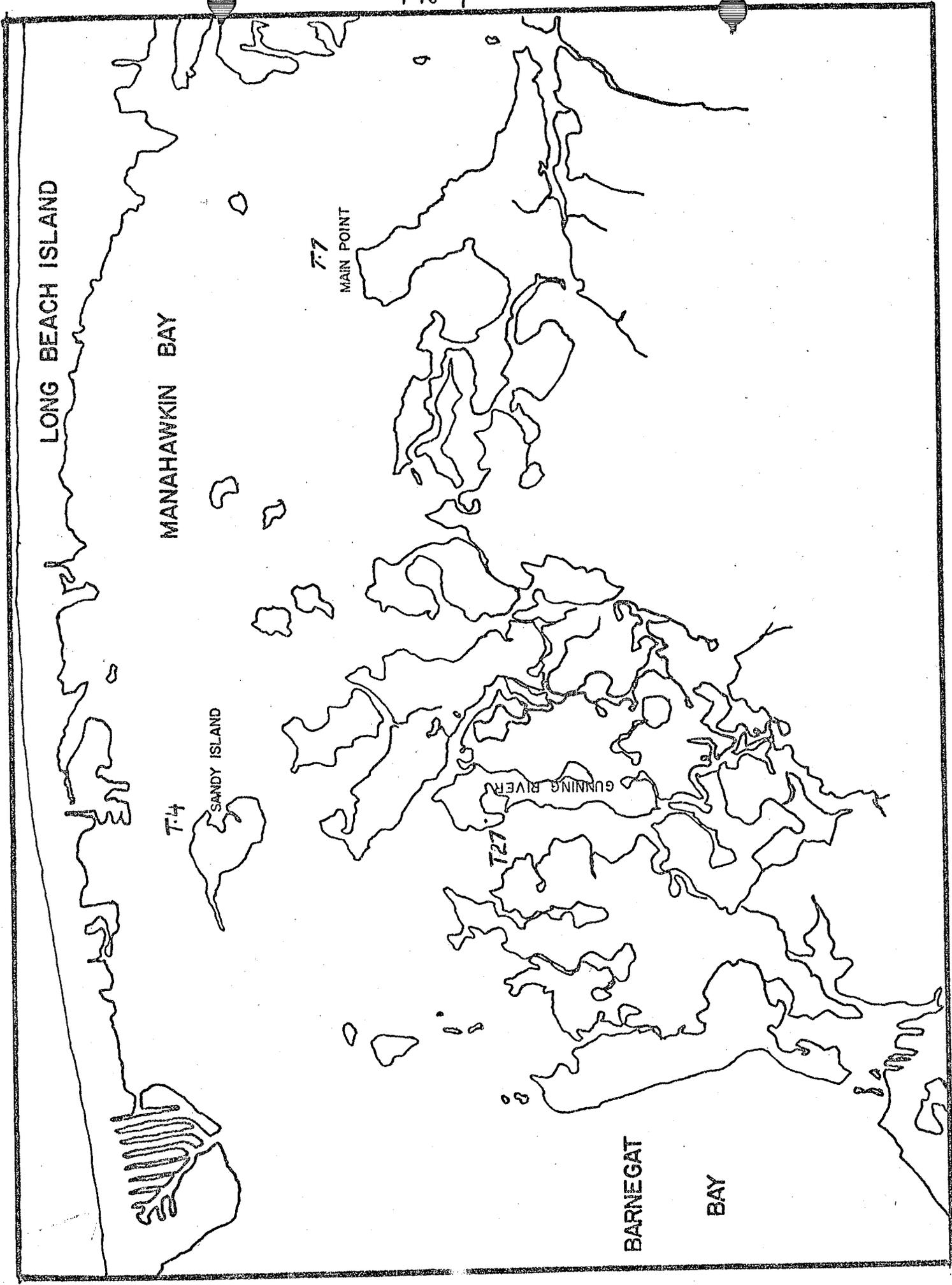
MILL CREEK

MILL CREEK

MANAHAWKIN CK

CEDAR CREEK

N.J. ROUTE 72



LONG BEACH

BARNEGAT LIGHT

75

CLAM ISLAND

DOUBLE CREEK CHANNEL

BARNEGAT BAY

ISLAND BEACH

