

Baseline Shellfish Data
For The Assessment Of
Potential Environmental
Impacts Associated With
Energy Activities In
Connecticut's Coastal Zone
Volume I

**CONNECTICUT
COASTAL ENERGY
IMPACT PROGRAM**

Submitted to:
Department of Agriculture
Aquaculture Division
State of Connecticut

CZIC COLLECTION

Prepared by:

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Southern Connecticut State University Foundation, Inc.
New Haven, Connecticut 06515
August, 1983

Coastal Zone Management Program

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ASSESSMENT OF POTENTIAL ENVIRONMENTAL
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CONNECTICUT COASTAL ENERGY IMPACT PROGRAM

PREPARED FOR THE STATE DEPARTMENT

OF AGRICULTURE AND

CONNECTICUT STATE OFFICE OF POLICY AND MANAGEMENT

Financial Assistance for this report has been provided by the Coastal Zone Management Act of 1972, as amended and administered by the Office of Ocean and Coastal Resource Management, N.O.A.A., Department of Commerce and the Connecticut State Office of Policy and Management.

DEDICATION

This report is dedicated to Captain Leroy Speer
who is the one individual most responsible for
the successful completion of this project.
His dedication and perserverance allowed us to
continue when all conditions seemed hopeless.

Executive Summary

Long Island Sound, because of its significant ecological, economic and social values, is one of the nation's most important natural resources. The large population centers and industrial areas bordering the Sound, however, have placed major stresses upon its aquatic environments. It is estimated that about 8% of the total U.S. population (17 million people) live within 40 kilometers of Long Island Sound. This dense population has created huge energy demands in the form of fuel oils, gasoline and electric power generation. The Sound, therefore, supports a variety of energy-related activities primarily in the form of transportation, transfer and storage of fuel oils, gasoline and potentially coal.

All three types of energy related activities have the potential to cause serious environmental impacts on Connecticut's coastal waters. Small spills can commonly occur, especially at transfer points, while accidents and equipment failures can cause large spills at any time. It is essential that the true impacts resulting from such spills be accurately assessed so that those responsible can pay the cost of restoring and rehabilitating affected habitats.

The future expansion of coastal energy activities and facilities is also a real possibility. These energy activities must coexist, however, with other equally vital activities such as sport and commercial fishing, recreation, commercial shellfishing and lobstering. Any expansion must therefore involve careful planning so that potential damage to vital resources can be minimized. One key to effective planning is accurate and current census data. With detailed ecological information, both public authorities and industry, can achieve the planning approaches which minimize environmental damages and best protect natural resources.

The major purposes of this project were to provide the natural resource data bases needed to assess the impact of energy related environmental accidents and to properly plan for future expansion of energy facilities and activities.

The subtidal areas of Long Island Sound under Connecticut Jurisdiction were divided into ten major sampling regions: (I) Greenwich - Stamford; (II) Stamford - Norwalk; (III) Norwalk - Bridgeport; (IV) Bridgeport - Milford; (V) Milford - New Haven; (VI) New Haven - Guilford; (VII) Guilford - Madison; (VIII) Madison - Old Saybrook; (IX) Old Saybrook - New London; (X) New London-Stonington.

Sampling transects were established using the 26000 series Loran-C Navigation Lines on National Ocean Survey Maps #12354 (July, 1982), #12363 (July, 1981) and #13205 (February, 1981). Sampling stations were fixed at subsequent intersection points of the corresponding east-west (60000 series) Navigation Lines. This method provided for random selection of sampling station positions and the most reliable method of relocating sampling stations during any future monitoring programs.

The natural resource inventory involved three major sampling tasks for each station: Benthos, oyster populations and clam populations.

An initial sample at each station was taken with a $1/25 \text{ m}^2$ Van Veen Grab. Sediment type was visually examined and placed into one of the following categories: sand, sandy shell, shell, muddy shell, mud. The depth of the redox layer and the extent of clumping were also determined for each sediment sample. Temperature and salinity values were also determined for each station.

The sediment sample was then washed through a 1 mm mesh screen, stained with rose bengal and preserved with 10% formalin. These samples will then be processed in the laboratory.

All stations having sandy, sandy shell, shell and muddy shell substrates were also sampled with a commercial oyster dredge. Two 2-minute tows were made at each station (samples being pooled) to obtain information on the condition of the beds.

Oysters were measured along the length axis (centimeters) and grouped into the following age-size classes, based on past growth studies in Long Island Sound: 0.1 - 2.0 (year olds); 2.5 - 5.7 (2 years); 5.8 - 7.5 (3 years); 7.6 - 9.0 (4 years); 9.1 - 10.0 (5 years); greater than 10.0 (6 years plus). The quality of the shell base was also evaluated. The abundance of oyster predators and competitors as well as associated epifaunal species were also documented.

Benthic stations were resampled using a hydraulic clam dredge to monitor the distribution and abundance of hard clams, razor clams and surf clams. The number and sizes of all clams are being recorded as well as any associated members of the clam community.

Only those designated stations located in depths of 55 feet or less can be effectively inventoried with the dredge rigging system aboard the Ellen J.

Region I was sampled at 9 stations and was dominated by mud substrate which occurred at 77.8% of all stations. Thirty-three species were identified from this region with a mean value of 56 individuals per station. The average species diversity value was 1.119. The three numerically dominant species were the coot clam, Mulinia lateralis, the nut clam, Nucula annulata and the trumpet worm Pectinaria gouldii.

Hard clams were the dominant shellfish species being found at four designated stations in moderate to very high numbers. Blue mussels were found at one station in high abundance.

Region II was sampled at 26 stations with mud substrate occurring at 69.2% of all stations. Twenty-four benthic species were identified from this region with an average of 114.2 individuals per station. The average species diversity value was 2.181. The three numerically dominant benthic species were the bivalves, Nucula annulata and Mulinia lateralis and the polychaete Pectinaria gouldii.

Hard clams were found in low abundance at two designated stations. Razor clams were found in low and moderate abundance at seven stations. One station also contained low numbers of blue mussels, and surf clams.

Region III was sampled at 52 stations with mud substrate occurring at 44.2% of all stations and "sandy-mud" at 25.0%. One hundred and twenty-five benthic species were identified in this region with an average of 137.2 individuals found at each station. The mean species diversity value was 2.091. The three dominant benthic species were Mulinia lateralis, Nucula annulata and the false quahog, Pitar morhuanna.

Hard clams were found in low and very high abundance at 6 designated stations. Oysters were found in low, moderate and very high numbers at 5 stations. Razor clams were found in low numbers at 7 stations, blue mussels at 4 stations and surf clams at 2 stations.

Region IV was inventoried at 41 stations with mud substrate occurring at 70.7% of all sampling stations. One hundred and three benthic species were identified in this region, with a mean of 152.1 individuals per station. The average species diversity value was 1.640. The three dominant benthic species were Mulinia lateralis, Nucula annulata and Nephtys incisa.

Hard clams were found at one station in high abundance. Oysters and blue mussels were found in low abundance at one station. Surf clams were reported in low numbers at 3 stations.

Region V was sampled at 58 stations with mud substrate occurring at 65.5% and sandy-gravel at 13.8% of all stations. One hundred and twenty benthic species were identified in this region, with an average of 166.7 individuals per sample. The mean species diversity value was 1.928. Mulinia lateralis, Nucula annulata and Nephtys incisa were found to be the dominant benthic organisms.

Hard clams were found in low and very high abundances at 8 stations. Oysters were found in low abundances at 3 designated stations. Razor clams occurred in low abundance at 16 stations. Surf clams and blue mussels each occurred in low abundance at 1 station. Whelks occurred in low abundance at 3 stations.

Region VI was sampled at 80 designated stations. Mud substrate occurred at 70.0% and "sandy-mud" at 12.5% of all stations. One hundred and thirty-two benthic species were identified in this region with a mean number of individuals per station of 217.3. The species diversity index value for all stations averaged 2.206. Nucula annulata, Mulinia lateralis and Nephtys incisa were the three dominant benthic species in this region.

Hard clams were found in low abundance at 2 stations. Oysters were reported in moderate and high densities at three stations and Razor clams were found in low to very high densities at 28 stations. Whelks were found in low abundance at 6 stations in this region.

Region VII was sampled at 53 stations with sand and muddy-sand substrates occurring at 62.2% of all sampling stations. One hundred and thirty-four benthic species were identified with a mean density of 293.0 individuals per station. The average species diversity value was 2.563. The three dominant benthic species in this region were: the bamboo worm, Clymenella zonalis, the polychaete, Asabellides oculatus and the mud worm, Spiophanes bombyx.

Razor clams occurred in low to moderate abundances at 28 stations. Whelks were found at 9 stations in low abundances. The blue mussel was found in low density at 1 station.

Region VIII was sampled at 39 stations with sand and sandy-shell substrates occurring at 66.7% of all stations. One hundred and thirty-eight benthic species were identified from this region with an average density of 78.0 individuals per station. The mean species diversity value was 2.020. The three numerically dominant benthic species were the amphipod, Protohaustorius wigleyi, the bivalve, Tellina agilis and the amphipod, Acanthohaustorius millsi.

Hard clams were recovered in low abundance at 1 station. Low abundances were also recorded for razor clams at 7 stations, steamer clams at 2 stations and at 1 station each for blue mussels and surf clams.

Region IX was sampled at 41 stations with sandy-gravel and sandy-shell substrates occurring at 58.6% of all sampling stations. Two hundred benthic species were identified in this region with an average of 178.3 individuals per each station. The mean species diversity index value was 3.209. The three numerically dominant benthic species were the caprellid amphipod, Aeginina longicornis, the polychaete, Cirratulus grandis and the polychaete, Ampharete artica.

Razor clams were reported in low abundances at 13 stations. Blue mussels were recovered in low moderate and very high numbers from 10 stations. Low abundances of steamer clams were found at 1 station and 4 stations contained low numbers of shells.

Region X was inventoried at 14 stations with mud, muddy-sand and sand substrates accounting for 67.2% of all sampling stations. One hundred and sixty-seven benthic species were identified with an average density of 432.6 individuals per station. The average species diversity value was 3.055. The three dominant benthic species were the amphipod, Ampelisca abdita, the polychaete, Aricidea jefferysii and the bamboo worm, Clymenella zonalis.

Hard clams were found in low and high abundance at 2 designated stations. Surf clams were found in low and moderate density at two stations. Razor clams occurred in low abundance at 3 stations. Blue mussels were found in low and high numbers at 3 stations and whelks were found in low numbers at three stations.

Erratum

The scientific name
Nucula proxima should be
changed to Nucula annulata
throughout the report.

I. INTRODUCTION

Long Island Sound, because of its significant ecological, economic and social values, is one of the nation's most important natural resources. The large population centers and industrial areas bordering the Sound, however, have placed major stresses upon its aquatic environments. It is estimated that about 8% of the total U. S. population (17 million people) live within 40 kilometers of Long Island Sound. This dense population has created huge energy demands in the form of fuel oils, gasoline and electric power generation. The Sound, therefore, supports a variety of energy-related activities, primarily in the form of transportation, transfer and storage of fuel oils, gasoline and potentially coal.

All three types of energy-related activities have the potential to cause serious environmental impacts on Connecticut's coastal waters. Small spills can commonly occur, especially at transfer points, while accidents and equipment failures can cause large spills at any time. It is essential that the true impacts resulting from such spills be accurately assessed so that those responsible can pay the cost of restoring and rehabilitating affected habitats.

The future expansion of coastal energy activities and facilities is also a real possibility. These energy activities must coexist, however, with other equally vital activities such as sport and commercial fishing, recreation, commercial shellfishing and lobstering. Any expansion must therefore involve

Careful planning so that potential damage to vital resources can be minimized. One key to effective planning is accurate and current census data. With detailed ecological information, both public authorities and industry can achieve the planning approaches which minimize environmental damages and best protect natural resources.

The major purposes of this project are to provide the natural resource data bases needed to assess the impact of energy-related environmental accidents and to properly plan for future expansion of energy facilities and activities.

II. OBJECTIVES

1. to provide the natural resource data base needed to assess the true impact of environmental accidents.

2. To provide the natural resource data that is needed to properly plan for future expansion of energy activities and facilities.

3. To locate and map the general distribution and abundance of shellfish in Connecticut's coastal zone and therefore facilitate management and protection of shellfish resources.

4. To provide valuable ecological data on Connecticut shellfish communities.

III. METHODS

Sampling Stations and Resource Maps.

The subtidal areas of Long Island Sound under Connecticut jurisdiction were divided into ten major sampling regions:

- I. Greenwich - Stamford
- II. Stamford - Norwalk
- III. Norwalk - Bridgeport
- IV. Bridgeport - Milford
- V. Milford - New Haven
- VI. New Haven - Guilford
- VII. Guilford - Madison
- VIII. Madison - Old Saybrook
- IX. Old Saybrook - New London
- X. New London - Stonington.

Sampling transects were established using the 26000 series Loran-C Navigation Lines on National Ocean Survey Maps #12354 (July, 1982), #12363 (July, 1981) and #13204 (February, 1981). Sampling stations were fixed at subsequent intersection points of the corresponding east-west (60000 series) Navigation Lines. This method provided for random selection of sampling station positions and the most reliable method of relocating sampling stations during any future monitoring programs.

Resource maps were drawn to scale (1:80,000) from the aforementioned National Ocean Survey Maps.

Sediment and Water Chemistry

Sediments were placed into the following major categories, using visual and texture examinations: mud, sandy-mud, muddy-sand, sand, muddy-sandy shell, shell, gravel, muddy-sandy gravel and rock. Other biologically important aspects of bottom sediments such as redox depth, degree of sediment clumping and the presence or absence of pioneering tubes were documented (Volume II). The depth (feet) at each station was measured using a recording fathometer and water temperature (C) and salinity recorded using a conductivity meter. Air temperature and general weather conditions were also noted.

Benthos

The benthos (bottom invertebrates) are of major ecological significance as energy converters and storage units and are therefore vital links in Long Island Sound food chains. The benthos can also be useful tools in the monitoring of environmental changes associated with pollutional stresses. This project has established the historic benchmark (benthic community structure) against which future change can be detected.

One benthic sample was taken at each station with a 1/25 square meter Van Veen grab. Sediments were washed through a 1-mm. mesh screen, stained with Rose Bengal and fixed in 10% buffered formalin. Specimens were identified to the lower possible taxonomic category using a variety of specialized keys (see bibliography) and enumerated. A reference collection of type specimens was also generated. The following aspects of benthic community structure were documented for each station: species richness (number of species), density (number of individuals), species diversity and dominance.

It must be remembered that all benthic data are presented as numbers per grab sample and not numbers per square meter.

Species Diversity

Species diversity is a mathematical measure of community structure that relates number of species in an ecological sample (species richness) with how evenly individuals are distributed among species (evenness). The diversity index has been a widely used ecological tool to monitor biological changes resulting from environmental stresses. This index, when used in conjunction with other community parameters (structure, density and species richness), can be useful in documenting the effects of oil spills. Increased polluttional stresses usually result in a decrease in the diversity index.

Low diversity values are usually found in areas receiving high levels of environmental stresses. When a community, however, is strongly dominated by large numbers of a single species, the index will be low because of low evenness, although species richness may be fairly high.

Diversity values were calculated using Brillouin's modification of the Shannon Index as recommended by Godfrey (1971 and 1978) when the sample size is small (small N values). All calculations were accomplished using a Fortran IV Diversity Program, written by Joseph C. Mauson and Paul J. Godfrey (Water Resources Research Center, University of Mass., Amherst, 1971). The following categories were established using H values:

Low Diversity (0.000 - 1.499)

Moderate Diversity (1.500 - 2.499)

High Diversity (greater than 2.500).

Shellfish

Shellfish Concentration Areas (SCA) are defined by the Connecticut Coastal Management Act (PL-79-535) as "actual, potential or historic areas in coastal waters in which one or more species of shellfish aggregate." These species include oysters (Crassostrea virginica), hardshell clams or quahogs (Mercenaria mercenaria), soft shell clams (Mya arenaria) and bay scallops (Aequipecten irradians). Shellfish Concentration Areas include both natural shellfish habitats and areas that have been cultivated for aquaculture purposes. At present, there are approximately 46,000 acres of state-owned shellfish beds and 18,000 acres under local jurisdiction (FEIS, 1980).

The most valuable molluscan shellfish species in Connecticut is the Eastern oyster, with the most important oyster industry extending from New Haven to Norwalk. The hard clam or quahog is the second most valuable molluscan shellfish in Connecticut's waters, although the industry is small when compared to that of the oyster. Because this fishery relies on natural sets and recruitment (bed cultivation is rarely practiced), quahog harvests are unpredictable. For example, over the last thirty years, hard clam landings have ranged from less than 10,000 pounds to over 400,000 pounds annually. The quahog fishery is limited as an offshore resource to a few large companies with most individual activity occurring in nearshore and intertidal areas within town jurisdiction. Many productive nearshore areas are closed due to water quality problems and harvesting is generally restricted (by state statutes and local regulations) to inefficient hand powered clamming methods (FEIS, 1980).

All sampling stations located shallower than the 50 foot contour line

were inventoried to determine the distribution and abundance of oysters and hard clams. All stations having shell and sandy-muddy shell substrata were sampled using a commercial oyster dredge. Two 2-minute tows were made at each station with both samples pooled for analysis.

Oysters were measured along the maximum length axis (centimeters) and grouped into the following age-size categories, based upon past growth studies in Long Island Sound: 1 - 2.0 (1-year-olds); 2.5 - 5.7 (2 years); 5.8 - 7.5 (3 years); 7.6 - 9.0 (4 years); 9.1 - 10.0 (5 years); greater than 10.0 (6 years plus). The quality of shell base was also evaluated. The abundance of oyster predators and competitors, as well as associated epifaunal species, was also documented (Volume II).

All stations exhibiting mud or muddy-sand substrata were inventoried using a commercial hydraulic clam dredge. Two 5-minute tows were taken at each station with both samples pooled for analysis. Clams were measured (millimeters) along the maximum length axis and grouped into the following size classes: juveniles (up to 48 mm); littlenecks (49 - 70 mm); cherrystones (71 - 92 mm) and chowders (greater than 93 mm).

The abundance of other shellfish species, although not currently of major economic or recreational importance, were recorded from oyster and clam tows. These species include the blue mussel (Mytilus edulis), the steamer clam (Mya arenaria), the surf clam (Spissula solidissima) and the whelks (Busycon canaliculata and Busycon carica).

The following abundance categories, based on the pooling of 2 dredge samples, were established for all shellfish species: 1-14 low, 15-29 moderate, 30-44 high, and 45 or greater, very high.

All biological samples were obtained using the Department of Agriculture - Aquaculture Division's research vessels; RV Shellfish and RV Ellen J; Leroy Speer, Captain.

IV. ECOLOGICAL RANKING SYSTEM

A numerical ranking system was developed to provide planners with a method of evaluating the general ecological value of any of the 413 stations inventoried during this study. This system assigns point values for ten major resource criteria evaluated for each station.

Criterion I - Number of Benthic Species per Grab (Station).

# per Grab	Ecological Value Points
0 - 9	2
10 - 19	5
20 - 29	10
30 plus	15

Criterion II - Number of Individuals per Grab (Station).

# per Grab	Ecological Value Points
0 - 99	2
100 - 199	5
200 - 299	10
300 plus	15

Criterion III - Species Diversity (H) Values per Grab (Station).

H Value Categories	Ecological Value Points
Low	5
Moderate	10
High	15

Criterion IV - Oyster Abundance per Station.

Abundance Category	Ecological Value Points
Low	2
Moderate	5
High	10
Very High	15

Criterion V - Hard Clam Abundance per Station.

Abundance Category	Ecological Value Points
Low	2
Moderate	5
High	10
Very High	15

Criterion VI - Blue Mussel Abundance per Station.

Abundance Category	Ecological Value Points
Low	1
Moderate	2
High	4
Very High	5

Criterion VII - Razor Clam Abundance per Station.

Abundance Category	Ecological Value Points
Low	1
Moderate	2
High	4
Very High	5

Criterion VIII - Steam Clam Abundance per Station.

Abundance Category	Ecological Value Points
Low	1
Moderate	2
High	4
Very High	5

Criterion IX - Surf Clam Abundance per Station.

Abundance Category	Ecological Value Points
Low	1
Moderate	2
High	4
Very High	5

Criterion X - Whelk Abundance per Station.

Abundance Category	Ecological Value Points
Low	1
Moderate	2
High	4
Very High	5

Ecological Value Points (EVP's) are summed for all ten criteria and the station is then placed into one of four Ecological Value Categories based on total points:

Category	Total EVP's
Reduced Ecological Value	Less than 24
Moderate Ecological Value	25 - 49
High Ecological Value	50 - 74
Very High Ecological Value	Greater than 75.

All of the information needed for EVP Calculations should be obtained from the resource maps provided for each region. An example of how the system works can be seen by calculating the ecological ranking of Station #153 in Region V.

Ecological Ranking System -- Calculation Sheet

Station Number 153

Region Number V

Criterion	Ecological Value Points
I	5
II	10
III	10
IV	2
V	15
VI	2
VII	2
VIII	0
IX	0
X	2

Total = 48

Ecological Value Category

Reduced	Less Than 24 EVP's
Moderate	25 - 49 EVP's
High	50 - 74 EVP's
Very High	Greater Than 75 EVP's

The point total for Station #153 (48) would place it in the upper range of the Moderate category or the lower portion of the High category. This would represent a borderline situation and therefore Station #153 could possibly be designated as Moderately-High.

Ecological Ranking System -- Calculation Sheet

Station Number _____

Region Number _____

Criterion	Ecological Value Points
I	
II	
III	
IV	
V	
VI	
VII	
VIII	
IX	
X	

Total = _____

Ecological Value Category

Reduced	Less Than 24 EVP's
Moderate	25 - 49 EVP's
High	50 - 74 EVP's
Very High	Greater Than 75 EVP's

V. RESULTS

A total of 413 sampling stations were established in the Connecticut waters of Long Island Sound with the fewest occurring in Region I (9) and the largest number in Region VI (80). The mean depth of all stations was 60.6 feet with the shallowest being 9 feet (Station #336) and the deepest 178 feet (Station #397). The dominant substratum encountered was mud which occurred at 44.8% of all sampling stations. Pure sand was reported at 15.7% of all stations with muddy-sand and sandy-mud together accounting for 19.2%. Shell stations accounted for 1.9% of the total.

A total of 324 benthic species (Table 458, Volume II) were reported from the 413 sampling stations, with polychaetes (129 species) and crustaceans (83 species) together accounting for 65.4% of the total. Region I exhibited the fewest species (33) and Region IX the highest (200). The greatest number of species reported from an individual station was 58 (Station #408). The mean number of species per station was lowest in Region I (5.6) and highest in Regions IX (28.2) and X (36.1).

The mean number of individuals, per station, for all stations throughout the Sound was 182.5 with Region I exhibiting the lowest (56) and Region X the highest (432.6). The greatest number of individuals reported at a single station was 1,632 (Station #411).

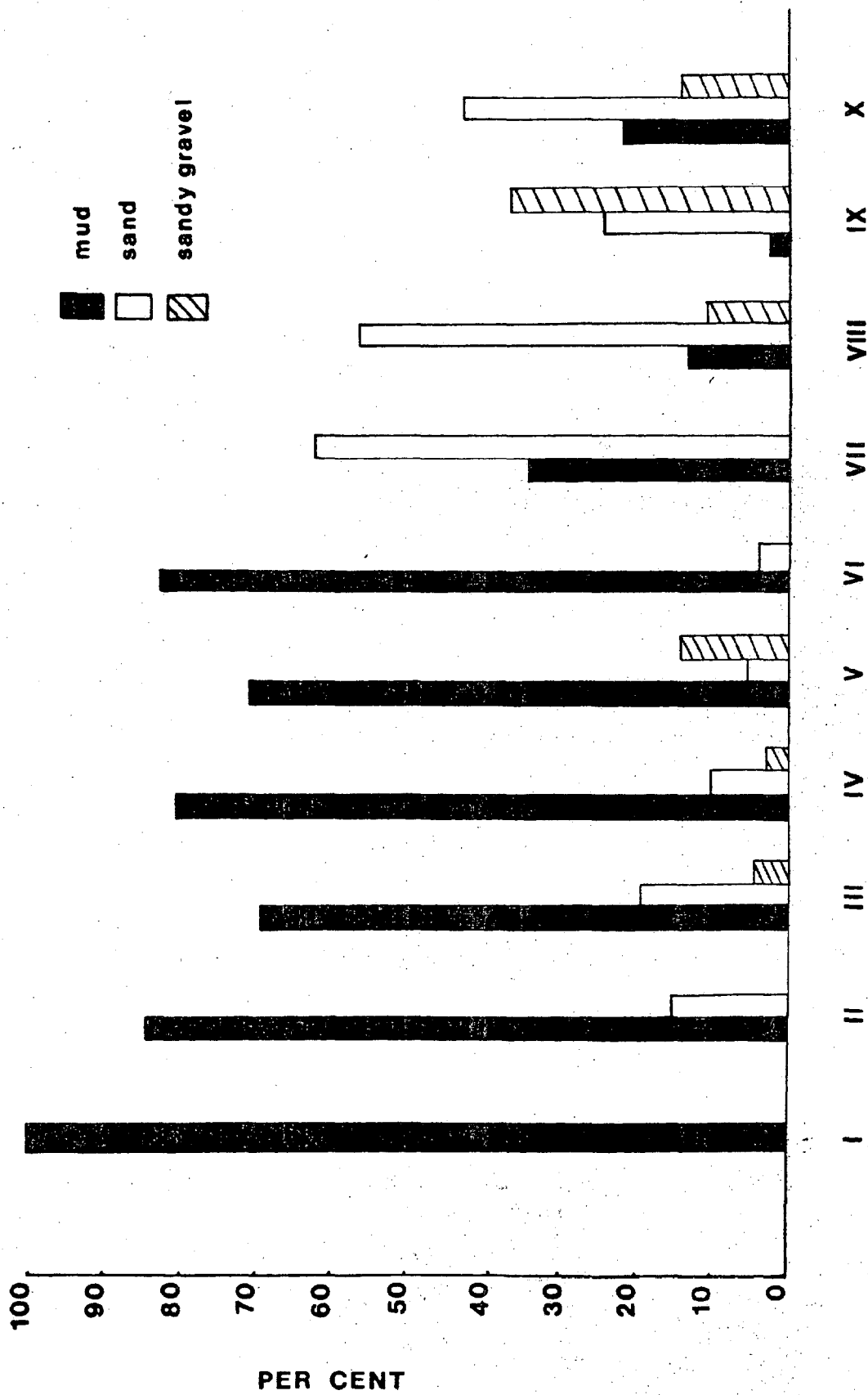
The mean benthic diversity value (H) for all sampling stations was 2.201 bits/individual, with Region I exhibiting the lowest mean value ($H = 1.119$) and Region IX the highest ($H = 3.209$). The highest diversity value recorded at an individual station was 4.442 (Station #394).

The Biological Index Values for all 413 sampling stations (Table 459, Volume II) revealed the dominant benthic invertebrates of Long Island Sound to be:

1. Mulinia lateralis
2. Nucula proxima
3. Nephtys incisa
4. Pitar morrhuana
5. Tellina agilis
6. Ampelisca abdita
7. Clymenella zonalis
Mediomastus ambiseta
Nassarius trivittatus
8. Asabellides aculata
9. Pectinaria gouldii
10. Yoldia limatula

Assessment of shellfish populations is most accurately described on a regional basis.

Long Island Sound can be conveniently divided into a Western half comprising Regions I-V (186 stations) and an Eastern half comprising Regions VI-X (227 stations). The mean sampling depth exhibited little variation between Eastern (65.4 feet) and Western (60.2 feet) portions. Substrate dominance did, however, exhibit strong differences between Eastern and Western sections (Figure 11). Mud and sandy-mud substrates occurred at 75.2% of the Western Long Island Sound stations and only at 40.9% of the stations in the Eastern half. Sandy substrates, however, were reported at 32.6% of Eastern stations



REGIONS

Figure 11. Percent Dominance of Substrate Types for the Ten Sampling Regions.

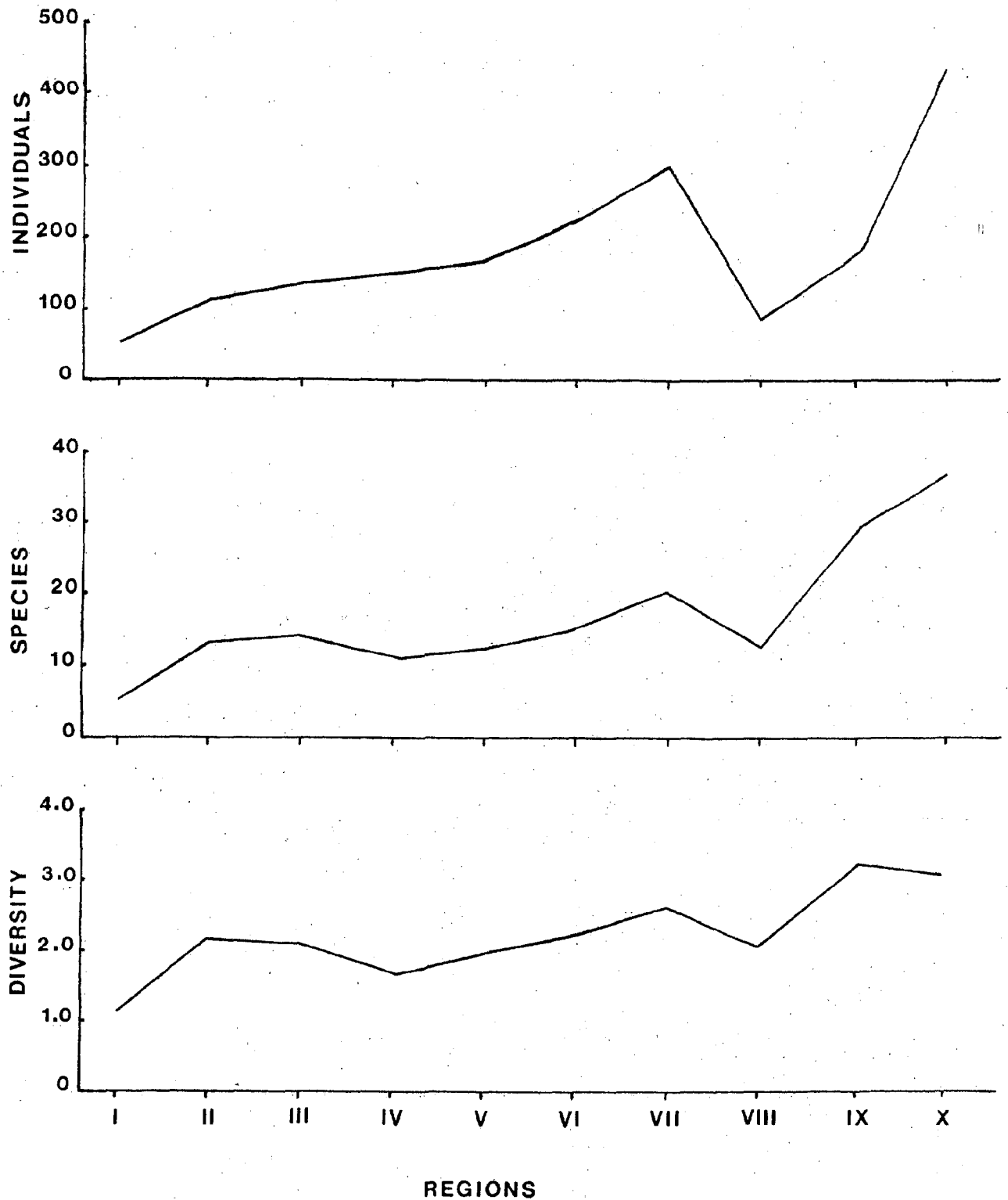


Figure 12. Mean Values for Number of Individuals, Number of Species, and Species Diversity per Station for the Ten Sampling Regions.

and only at 11.3% of those in the West.

The Eastern half of the Sound was found to support a more diverse and more dense assemblage of benthic organisms than the Western half (Fig. 12). The mean number of species per station was 58.1% greater in Eastern Long Island Sound ($x = 19.6$) than in Western regions ($x = 12.4$). The mean number of individuals showed similar trends being 54.3% greater in the East ($x = 220.7$) than in the West ($x = 143.0$). Mean species diversity values per station were also 30.8% higher in the Eastern half ($x = 2.495$) than in the Western half ($x = 1.907$) (Figure 12).

The numerical dominants as revealed by the Biological Index for Eastern and Western sections are summarized in Tables 21 and 22, Volume II. The coot clam, Mulinia lateralis, was the numerical dominant in the West and ranked second in the East. The nut clam, Nucula proxima, ranked first in the East and second in the West. The polychaete, Nephtys incisa, ranked third in both areas. The bivalve, Tellina agilis, ranked fourth in the Eastern Sound and sixth in the West. The fourth most abundant species was the trumpet worm, Pectinaria gouldii, in the West and the bamboo worm, Clymenella zonalis, in the East. Amphipoids played a more important ecological role in the Eastern Sound than in the West. Western Long Island Sound exhibited greater concentrations of hard clams and oysters while the East exhibited greater densities of razor clams.

REGION I

A total of nine stations (Fig. 1a) were inventoried from Region I with their respective Loran-C coordinates listed in Table 1. Sampling depths ranged from a low of 40 feet (Station #1) to a high of 56 feet (Station #9) with the mean depth being 50.4 feet (Fig. 1b).

Mud was the dominant substrate type occurring at 77.8% of all sampling stations (Fig. 1c).

A total of 33 benthic species were reported from Region I (Table 2) with Station #8 exhibiting the greatest number (14) and Stations #2, #3 and #5 the fewest (1) (Fig. 1d). The mean number of species per station was only 5.6. The mean number of individuals per station was 56, ranging from a high of 280 at Station #8, to a low of 4 at Station #3.

Species diversity values (Fig. 1e) ranged from a low of 0.0 at Stations #2, #3, and #5 to a high of 2.093 at #7, with a mean H value for all stations being 1.119. The mean values for species diversity (1.119), species richness (5.6) and density (56) all fall into the low category. The three numerically dominant benthic species for the entire region were the coot clam, Mulinia lateralis, the nut clam, Nucula proxima, and the trumpet worm, Pectinaria gouldii. Other dominants, in decreasing numerical importance, were: Nephtys incisa, Retusa canaliculata, Tubulanus pellucidus, Anadara transversa, Nassarius trivittatus, Pitar morrhuana and Mediomastus ambiseta.

Shellfish

Five designated stations were inventoried for oysters and hard clams within

the 50 foot contour line (Fig. 1f). Hard clams were recovered in low numbers at Station #3 and #7, moderate numbers at Station #4 and in very high numbers at Station #2. Cherrystone-sized clams dominated the population in Region I accounting for 60.7% of all individuals. No suitable substrate for oysters was found at any of the designated stations in Region I. The blue mussel was found at a single station in high abundance (Fig. 1g).

Figure 1a

SAMPLING STATION POSITIONS - REGION I

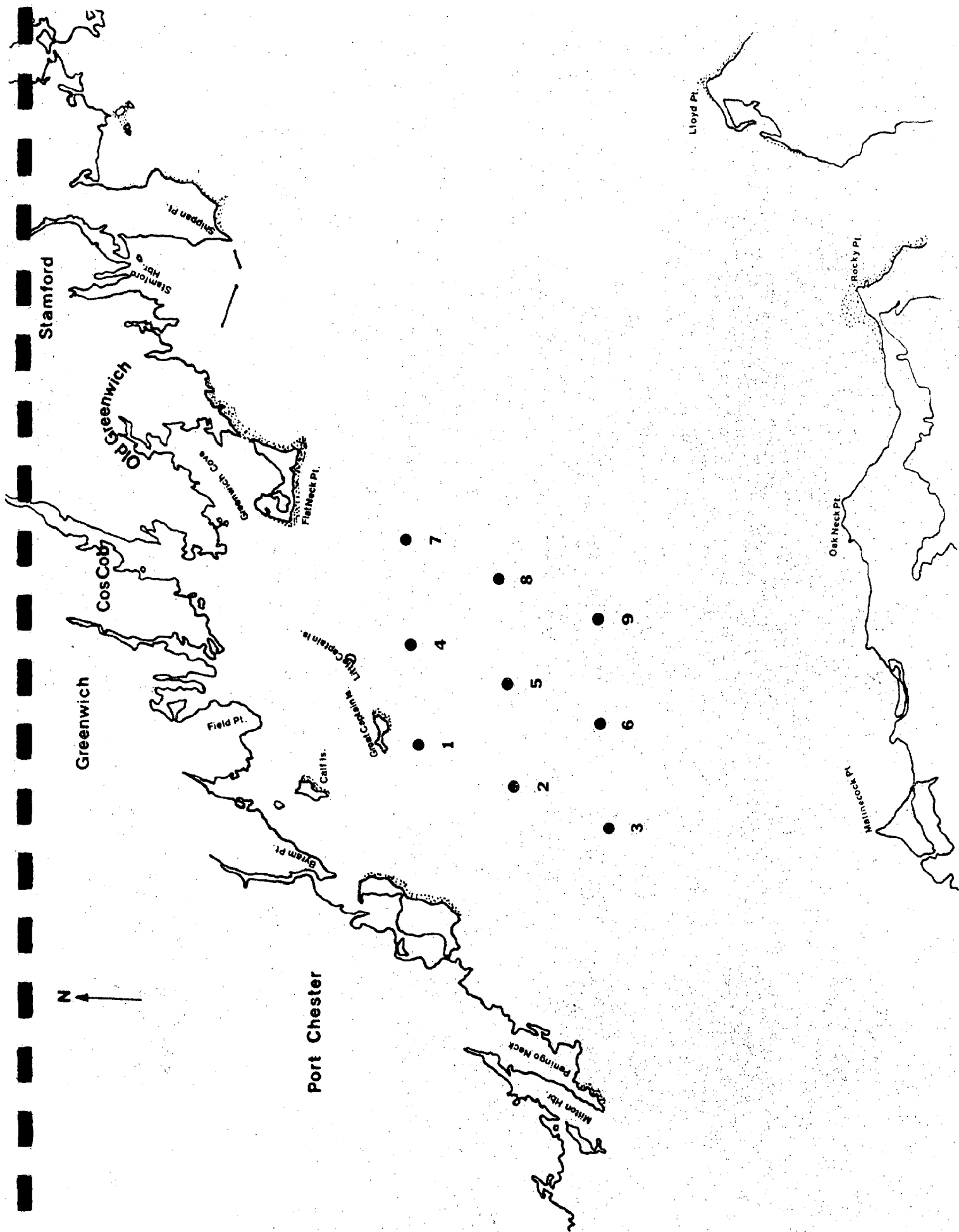


Figure 1b

DEPTH OF SAMPLING STATIONS (feet) - REGION I

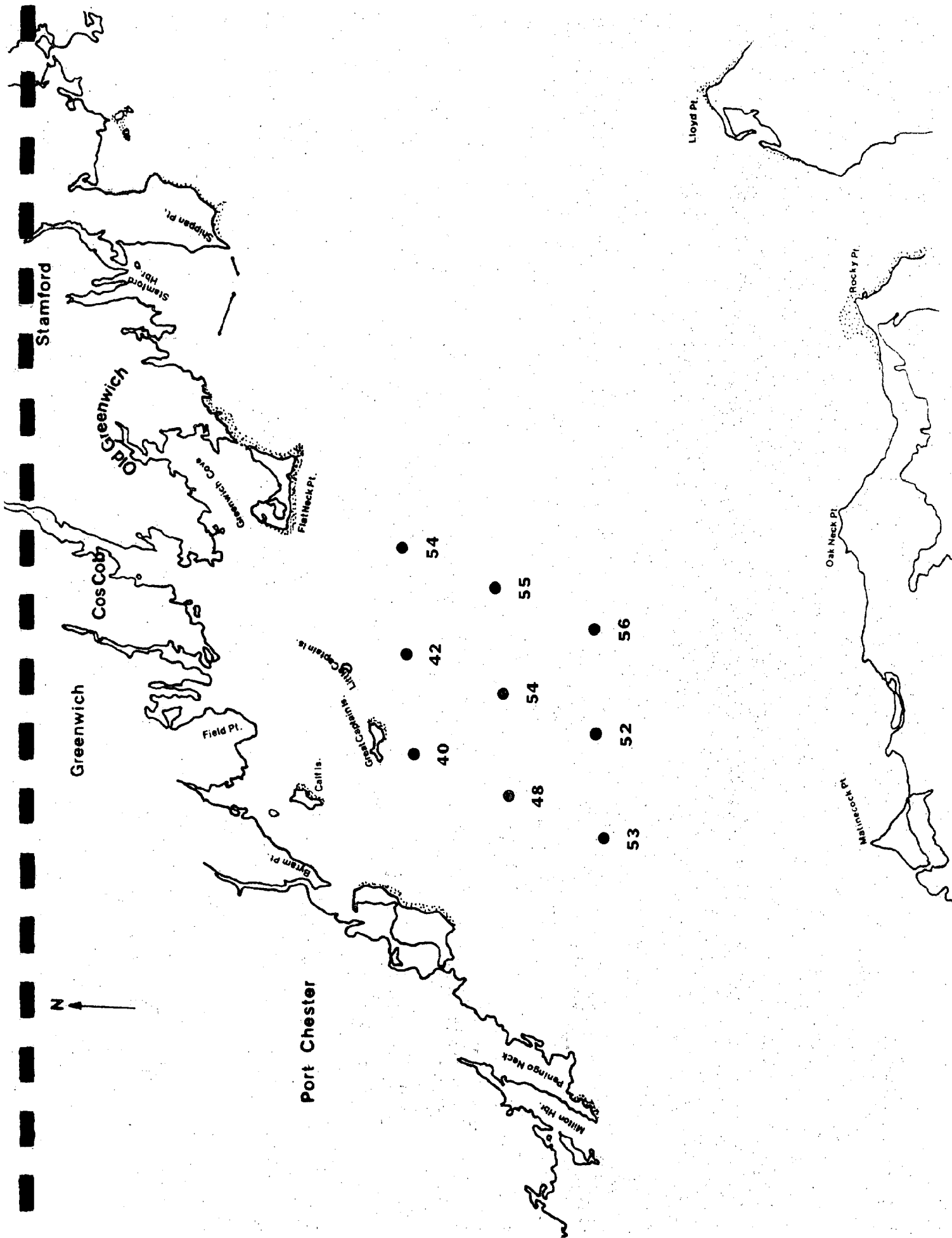


Figure 1c

SUBSTRATE COMPOSITION OF SAMPLING STATIONS - REGION I

<u>SUBSTRATE KEY</u>	
Mud	○
Sandy-mud	●
Muddy-sand	■
Sand	□
Muddy-sandy shell	▲
Shell	△
Gravel	☆
Muddy-sandy gravel	★
Rock	⊛

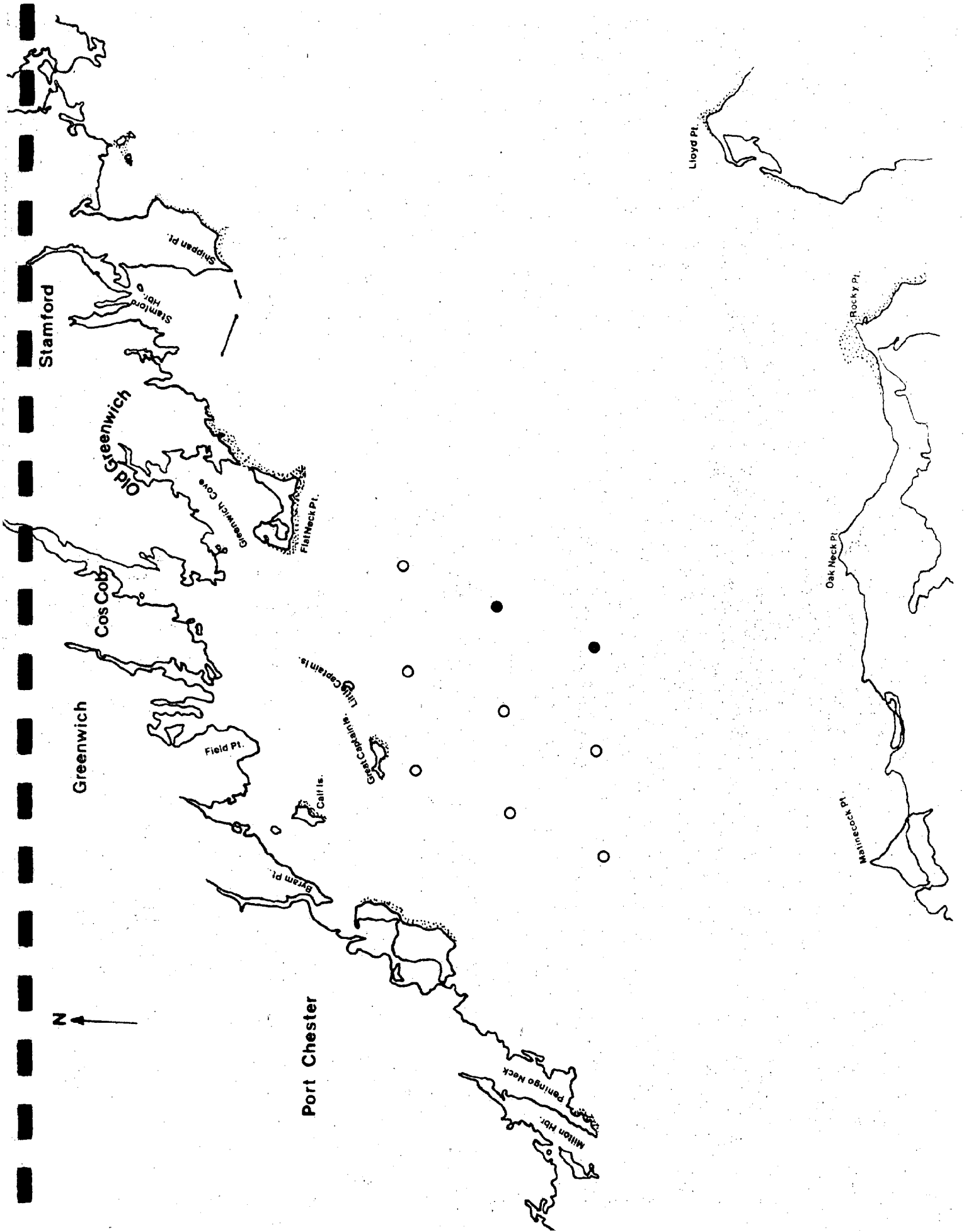


Figure 1d

NUMBER OF BENTHIC SPECIES - NUMBER OF INDIVIDUALS
PER GRAB SAMPLE - REGION I

Figure 1e

BENTHIC SPECIES DIVERSITY CATEGORIES - REGION I

DIVERSITY KEY

Low

Moderate

High

No organisms recovered



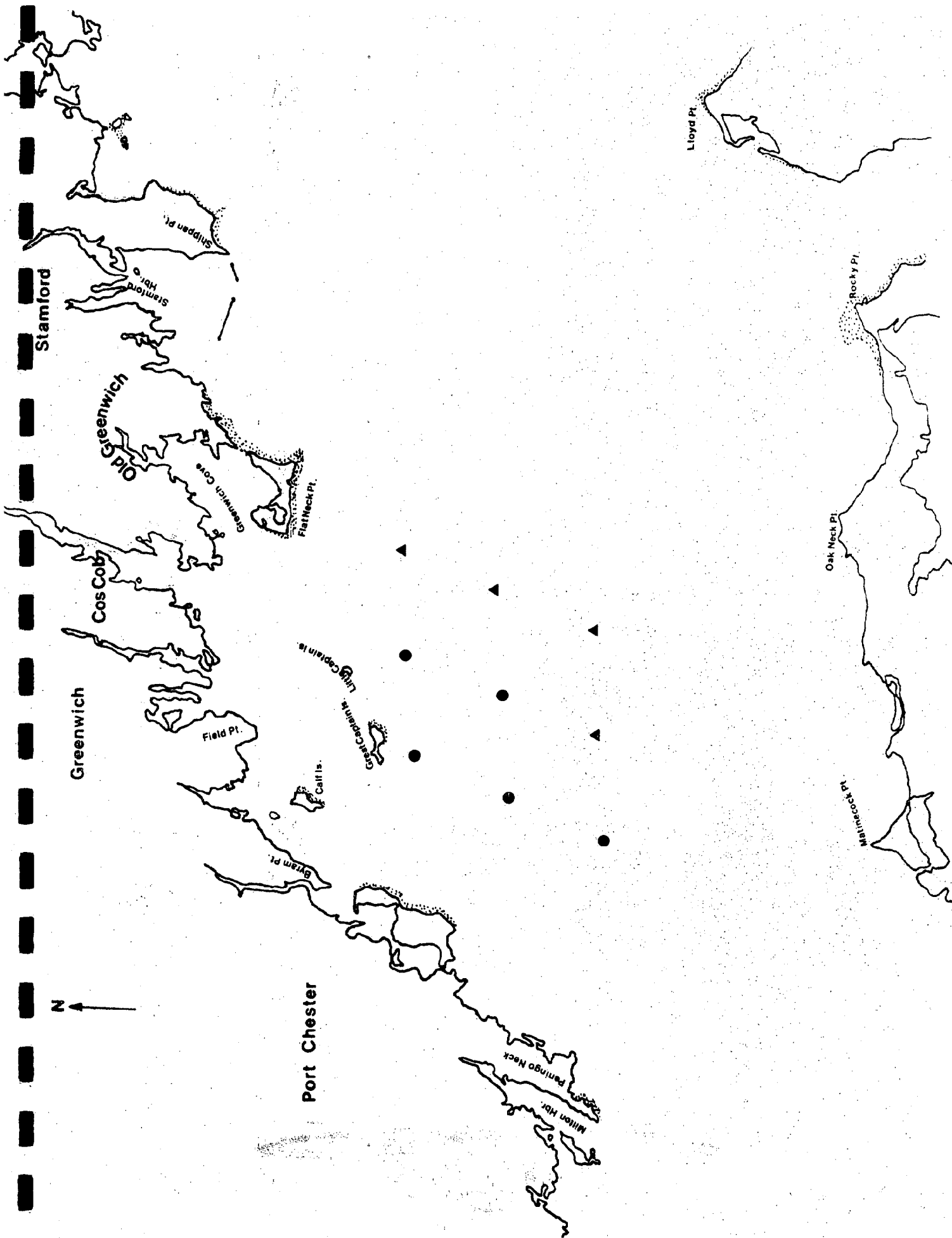


Figure 1f

EASTERN OYSTER AND HARD CLAM
ABUNDANCE CATEGORIES - REGION I

CLAM-OYSTER KEY

	Clams	Oysters
Low	●	○
Moderate	▲	△
High	■	□
Very high	★	☆
No clams/oysters recovered	--	

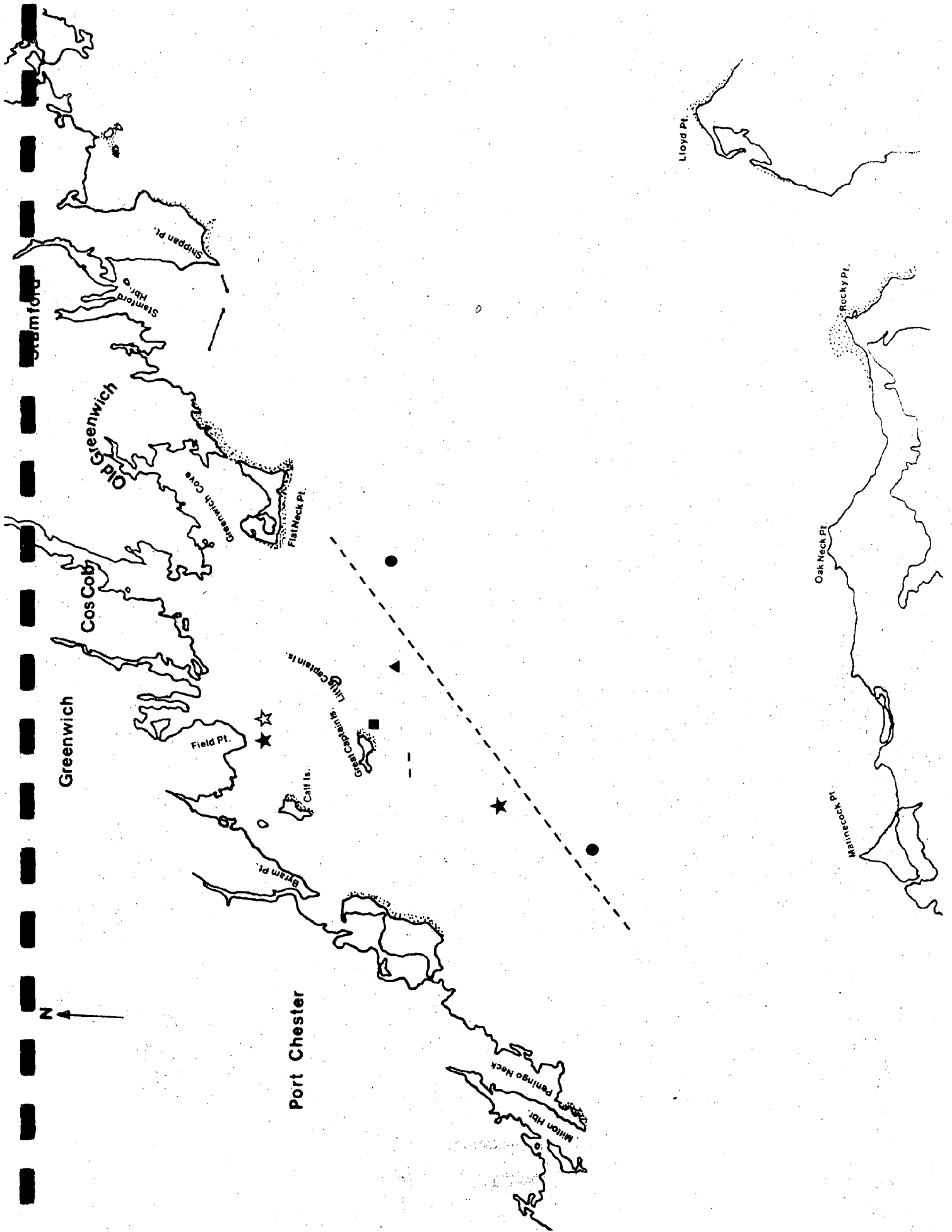
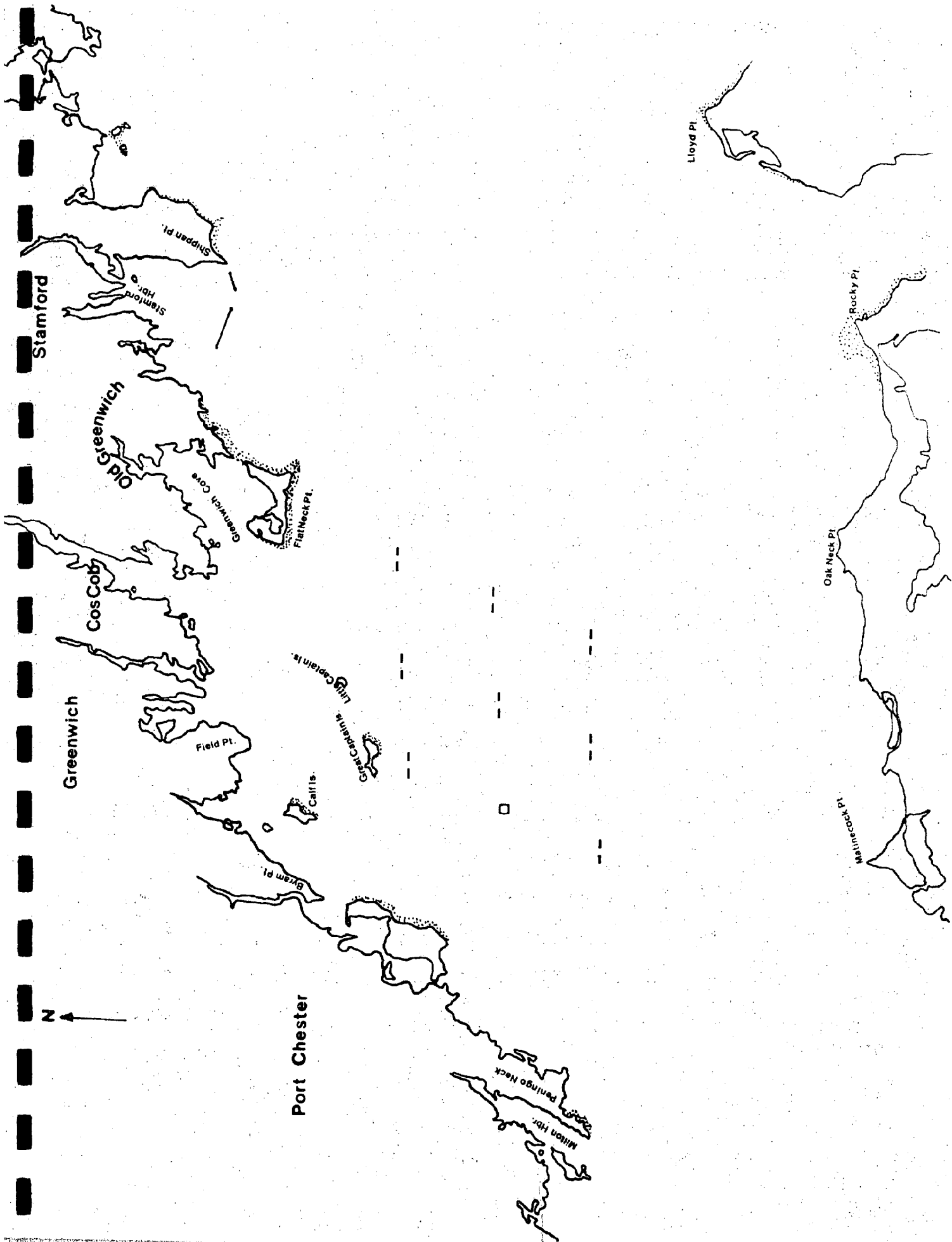


Figure 1g

ABUNDANCE CATEGORIES FOR MISCELLANEOUS
SHELLFISH SPECIES - REGION I

MISCELLANEOUS SHELLFISH KEY

	Whelk	Steamer Clam	Surf Clam
Low	*	☆	*
Moderate			*
		Razor Clam	Blue Mussel
Low		●	○
Moderate		▲	△
High		■	□
Very high		★	☆
None recovered		--	



REGION II

A total of 26 stations (Fig. 2a) were inventoried from Region II with their respective Loran-C coordinates listed in Table 3. Sampling depths ranged from a low of 21 feet (Station #31) to a high of 111 feet (Station #24), with the mean being 62.2 feet (Fig. 2b).

Mud was again the dominant substratum type occurring at 69.2% of all stations (Fig. 2c).

A total of 24 benthic species were reported for Region II (Table 4) with Station #18 exhibiting the greatest number (44) and Stations #11 and #19 the fewest (2) (Fig. 2d). The mean number of species per station was 13.3. The mean number of individuals per station was 114.2, ranging from a high of 879 at Station #18, to a low of 4 at Station #19.

Species Diversity values ranged from a low of 0.669 (Station #19) to a high of 3.781 (Station #10). The mean H value for all stations was 2.181.

The mean values for species diversity ($H = 2.181$) and species richness (13.3) fall into the moderate category, while the mean density of 114.2 individuals can be classified as low.

The three numerically dominant benthic species were the bivalves, Nucula proxima and Mulinia lateralis, and the polychaete, Pectinaria gouldii. Other numerically dominant organisms, in decreasing rank value, were: Nephtys incisa, Tubulanus pellucidus, Mediomastus ambiseta, Polydora websterii, Tellina agilis, Aricidea jefferysii and Polygordius appendiculatus.

Shellfish

Seven designated stations were inventoried for clams within the 50 foot

depth contour line (Fig. 2f). Hard clams were reported in low abundance from Stations #14 and #22, while no clams were found at Stations #10, #27, #31 and #32. The hard clam population was represented by all three size categories with chowders accounting for 30.0% of the total, cherrystones 21.3% and little-necks 14.3%.

No oysters were recovered from any of the stations within the contour line.

Razor clams were found in low abundance at Stations #10, #16, #24, #25, #26 and #30 and in moderate abundance at Station #18 (Fig. 2g). Station #18 also contained low numbers of blue mussels and surf clams.

Figure 2a

SAMPLING STATION POSITIONS - REGION II

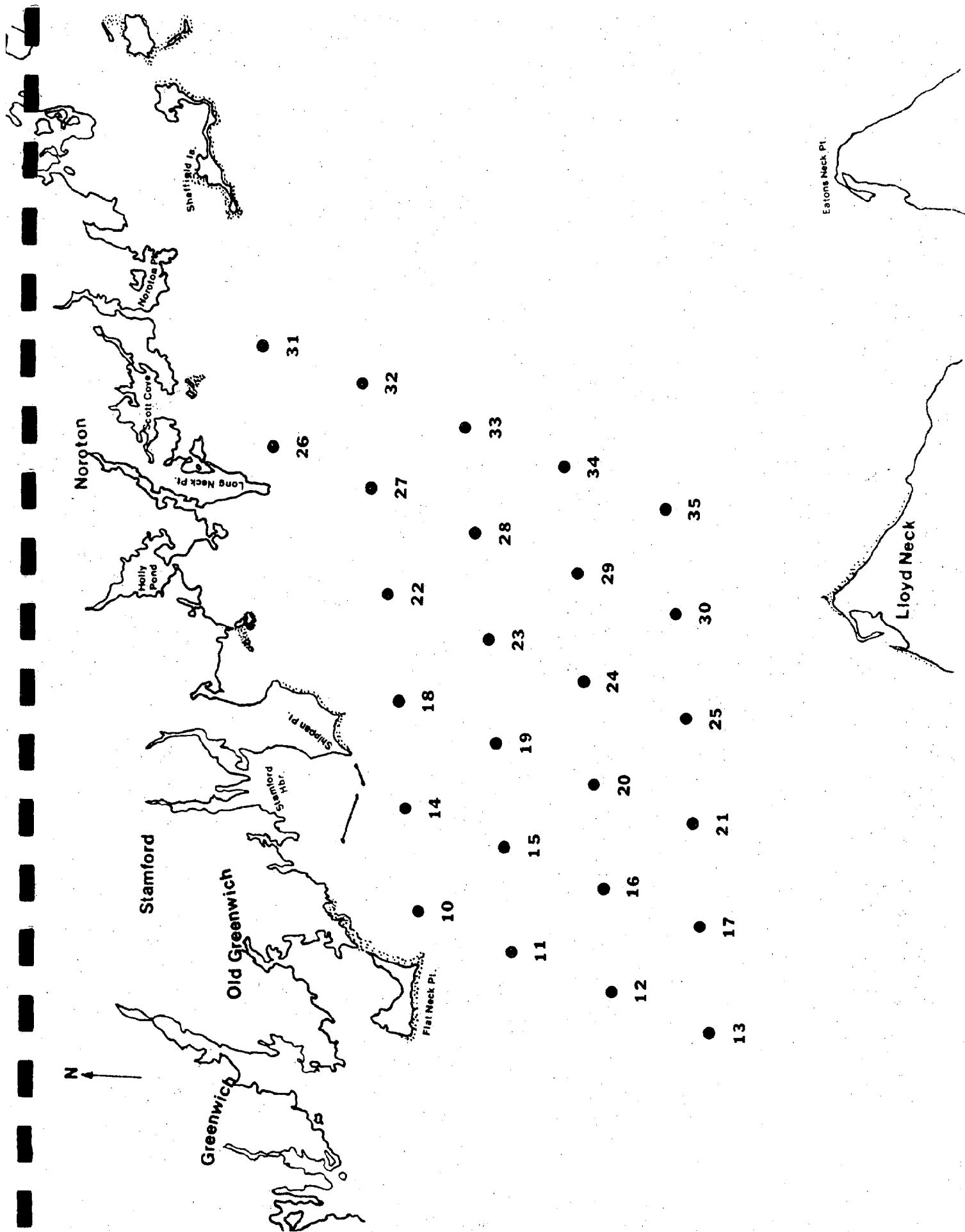


Figure 2b

DEPTH OF SAMPLING STATIONS (feet) - REGION II

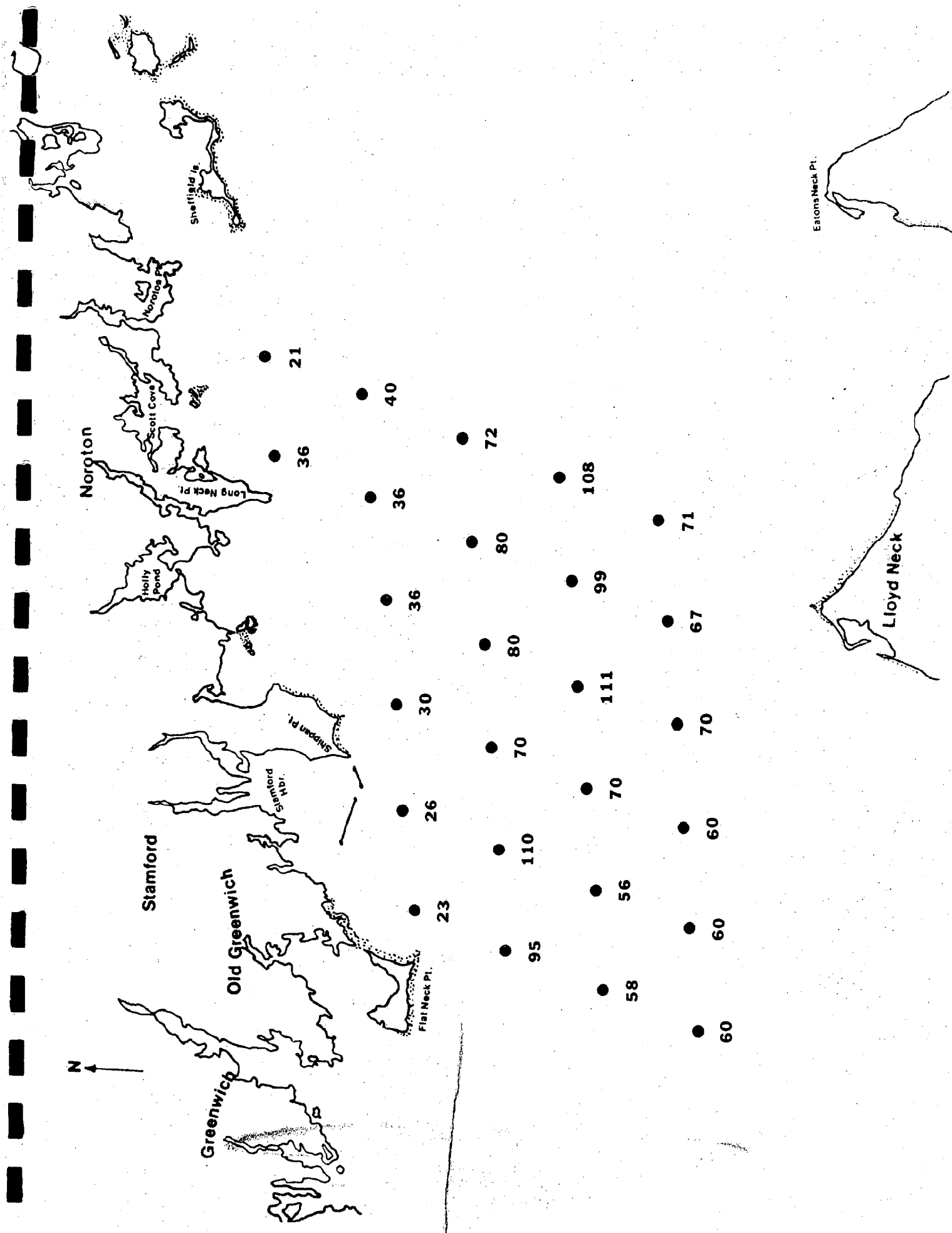


Figure 2c

SUBSTRATE COMPOSITION OF SAMPLING STATIONS - REGION II

<u>SUBSTRATE KEY</u>	
Mud	○
Sandy-mud	●
Muddy-sand	■
Sand	□
Muddy-sandy shell	▲
Shell	△
Gravel	☆
Muddy-sandy gravel	★
Rock	✱

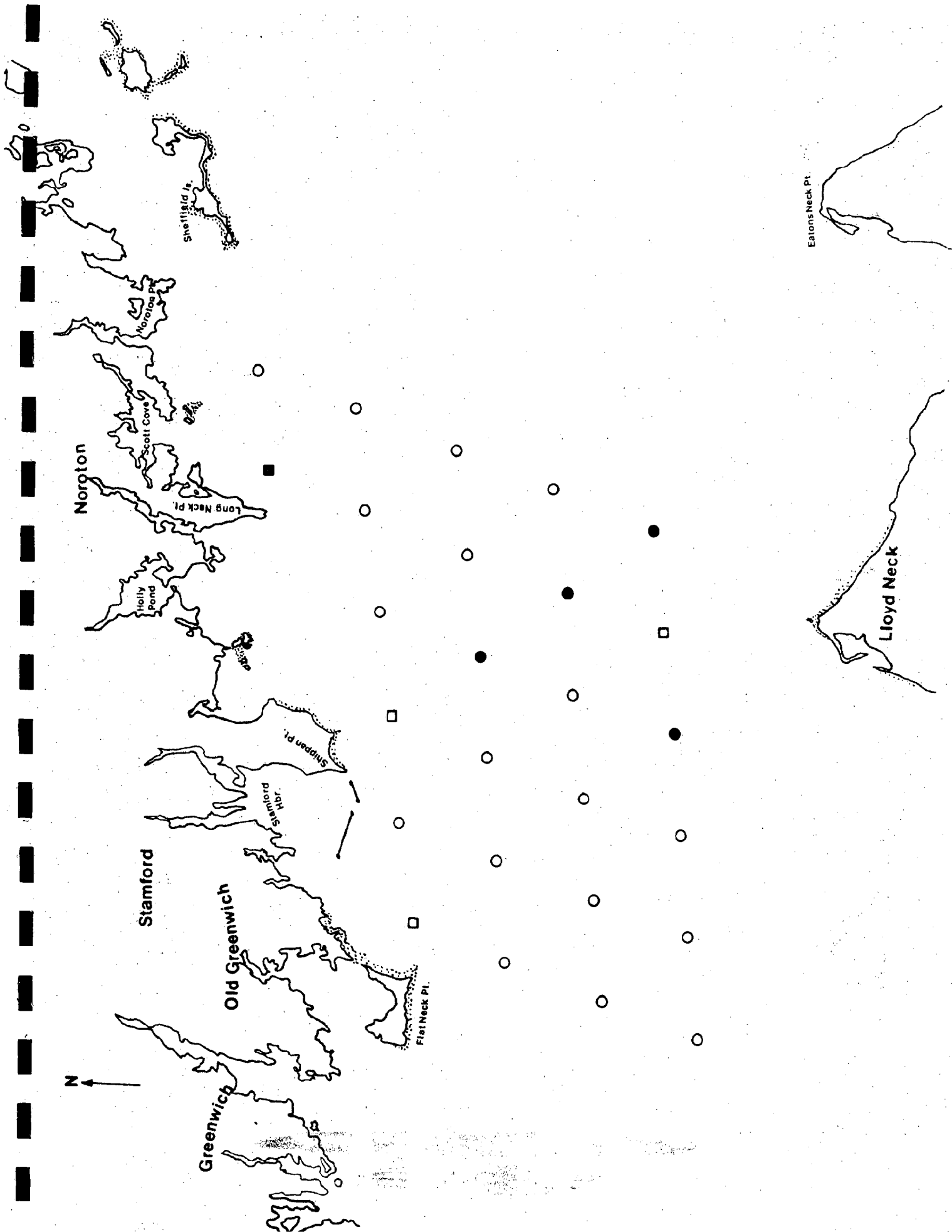


Figure 2d

NUMBER OF BENTHIC SPECIES - NUMBER OF INDIVIDUALS
PER GRAB SAMPLE - REGION II

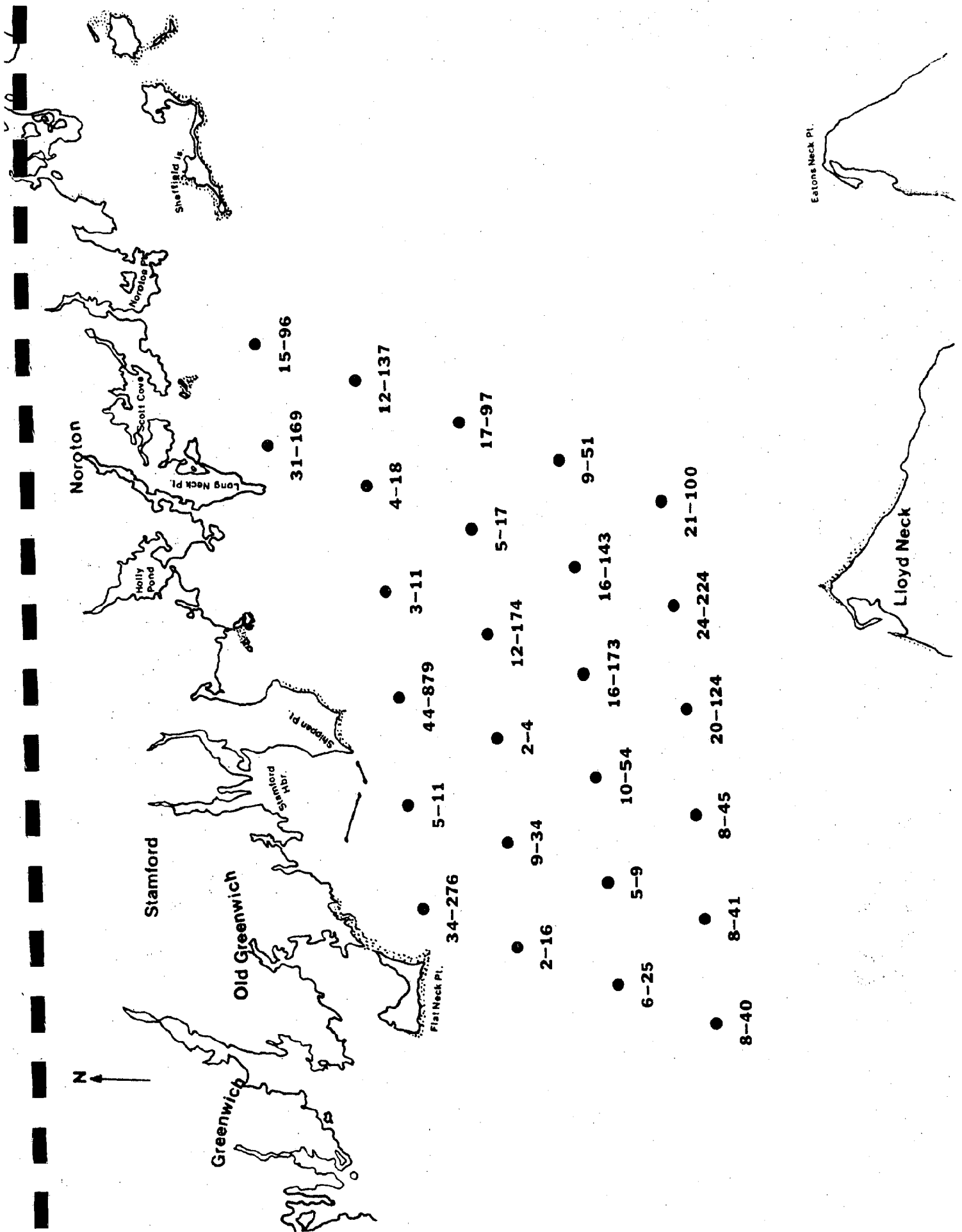


Figure 2e

BENTHIC SPECIES DIVERSITY CATEGORIES - REGION II

DIVERSITY KEY

● Low

▲ Moderate

■ High

-- No organisms recovered

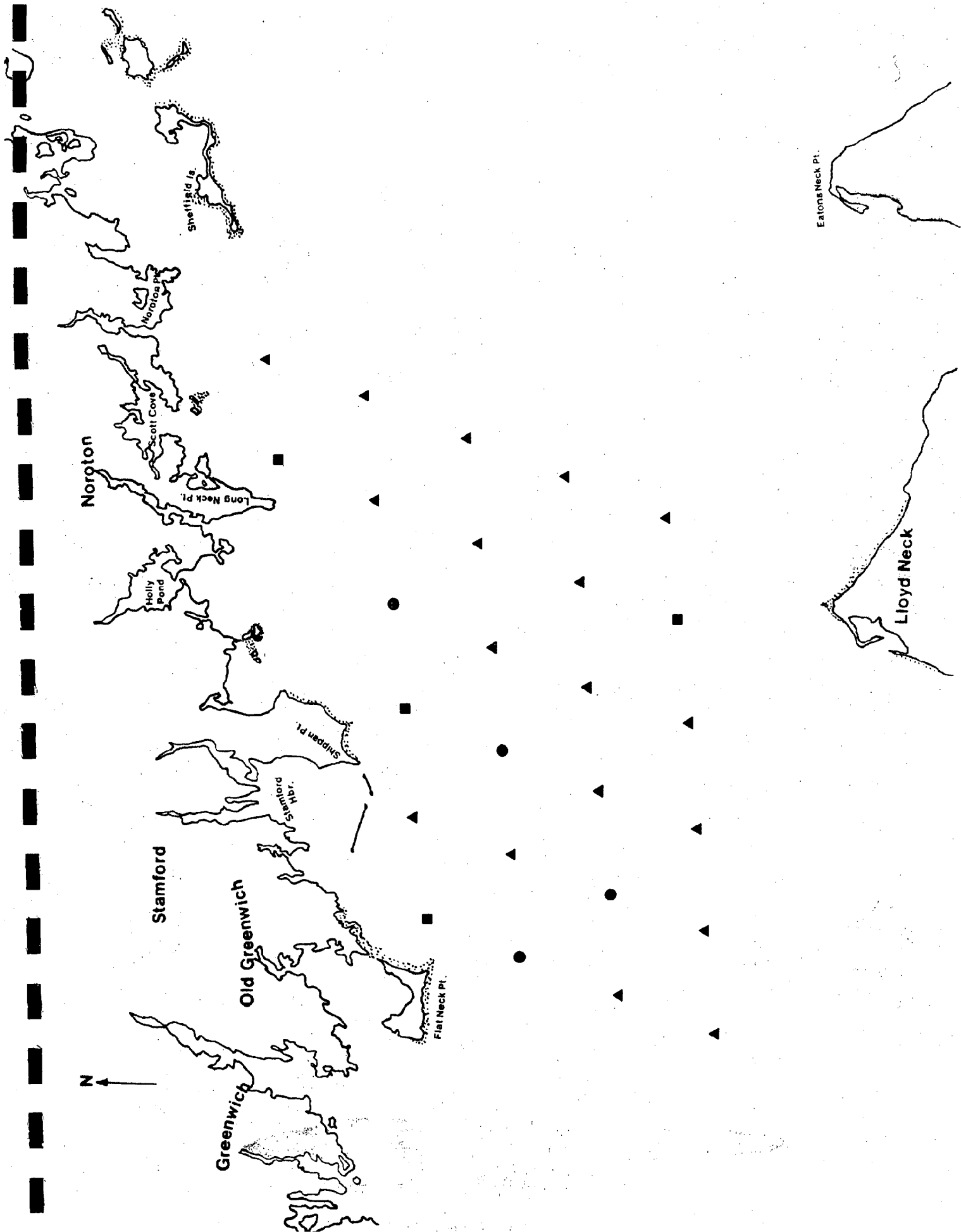


Figure 2f

EASTERN OYSTER AND HARD CLAM
ABUNDANCE CATEGORIES - REGION II

CLAM-OYSTER KEY

Low

Moderate

High

Very high

No clams/oysters recovered

Clams



Oysters



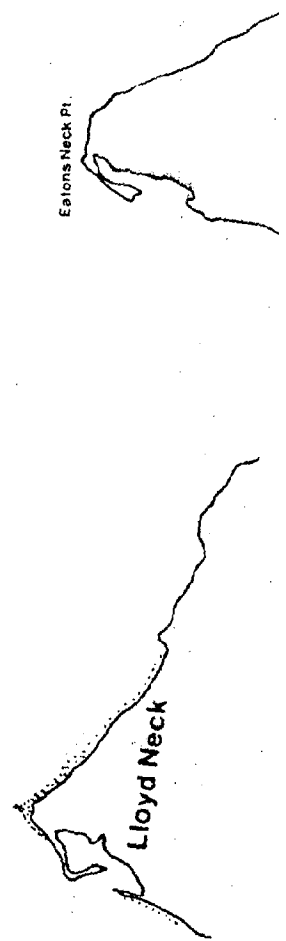
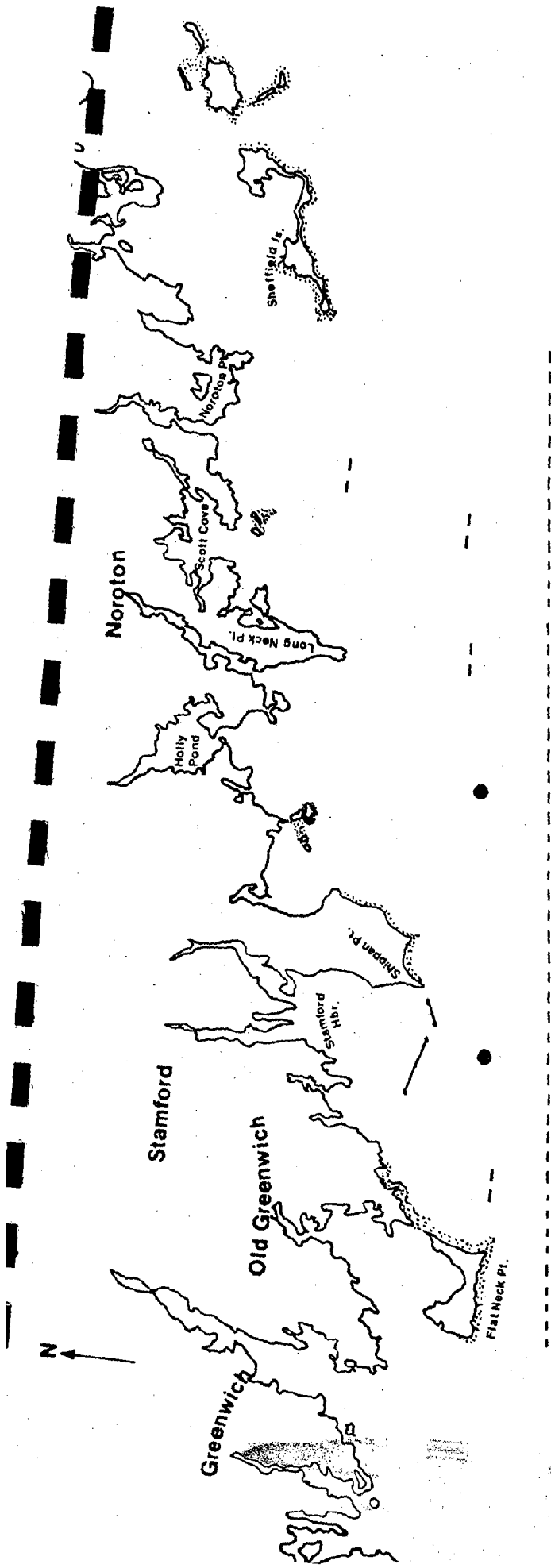
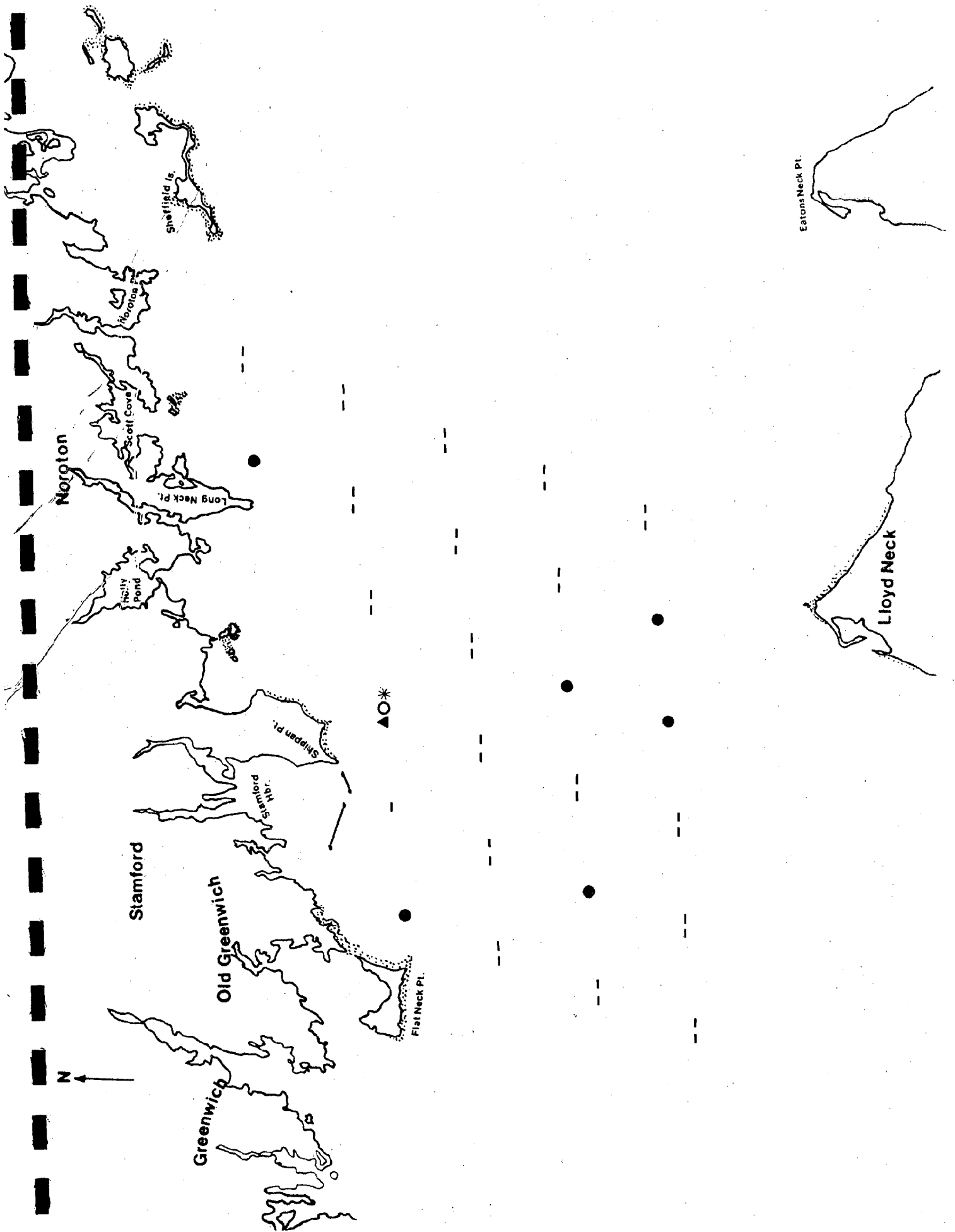


Figure 2g

ABUNDANCE CATEGORIES FOR MISCELLANEOUS
SHELLFISH SPECIES - REGION II

MISCELLANEOUS SHELLFISH KEY

	Whelk	Steamer Clam	Surf Clam
Low	*	⊕	*
Moderate			*
Low		●	○
Moderate		▲	△
High		■	□
Very high		★	☆
None recovered		--	
		Razor Clam	Blue Mussel



REGION III

A total of 52 stations (Fig. 3a) were inventoried from Region III with their respective Loran-C coordinates listed in Table 5. Sampling depths ranged from a low of 10 feet (Station #74) to a high of 132 feet (Station #79), with the mean being 65.2 feet (Fig. 3b).

Mud was the most encountered substratum type occurring at 44.2% of all stations and sandy-mud at 25.0% (Fig. 3c).

A total of 125 benthic species were recovered from Region III (Table 6) with stations #49 and #52 exhibiting the greatest number (35) and station #79 the fewest (3). The mean number of species per station was 14.3 (Fig. 3d). The mean number of individuals per station was 137.2, ranging from a high of 598 at Station #52, to a low of 4 at Station #82.

Species diversity values ranged from a low of 0.292 at Station #82, to a high of 3.795 at Station #52. The mean H Value for all stations was 2.091 (Fig. 3e).

The mean values for species diversity (2.091), species richness (14.3) and density (137.2) all fall into the moderate category.

The three numerically dominant benthic species were the coot clam, Mulinia lateralis, the nut clam, Nucula proxima, and the false quahog, Pitar morrhuana. Other dominants in decreasing rank value were: Asabellides oculata, Pectinaria gouldii, Tellina agilis, Ampelisca abdita, Clymenella zonalis, Aricidea jefferysii, Polycirrus eximus and Yoldia limatula.

Shellfish

Fifteen designated stations were inventoried for oysters and hard clams within the 50 foot depth contour line (Fig. 3f). Hard clams were reported in low abundance from Stations #56, #57, #61, and #67 and in very high abundance at Stations #46 and #81. The cherrystone stage dominated the clam population in Region III, accounting for 79.1% of all individuals.

Oysters were found in low numbers at Stations #51, #57 and #67, moderate numbers at Station #74 and very high numbers at Station #46.

Razor clams were found in low numbers at seven stations (Stations #36, #44, #49, #51, #52, #57 and #74) and blue mussels at four stations (Stations #46, #51, #56, and #57) (Fig. 3g). Surf clams were also reported at two stations (Stations #46 and #63).

Figure 3a

SAMPLING STATION POSITIONS - REGION III

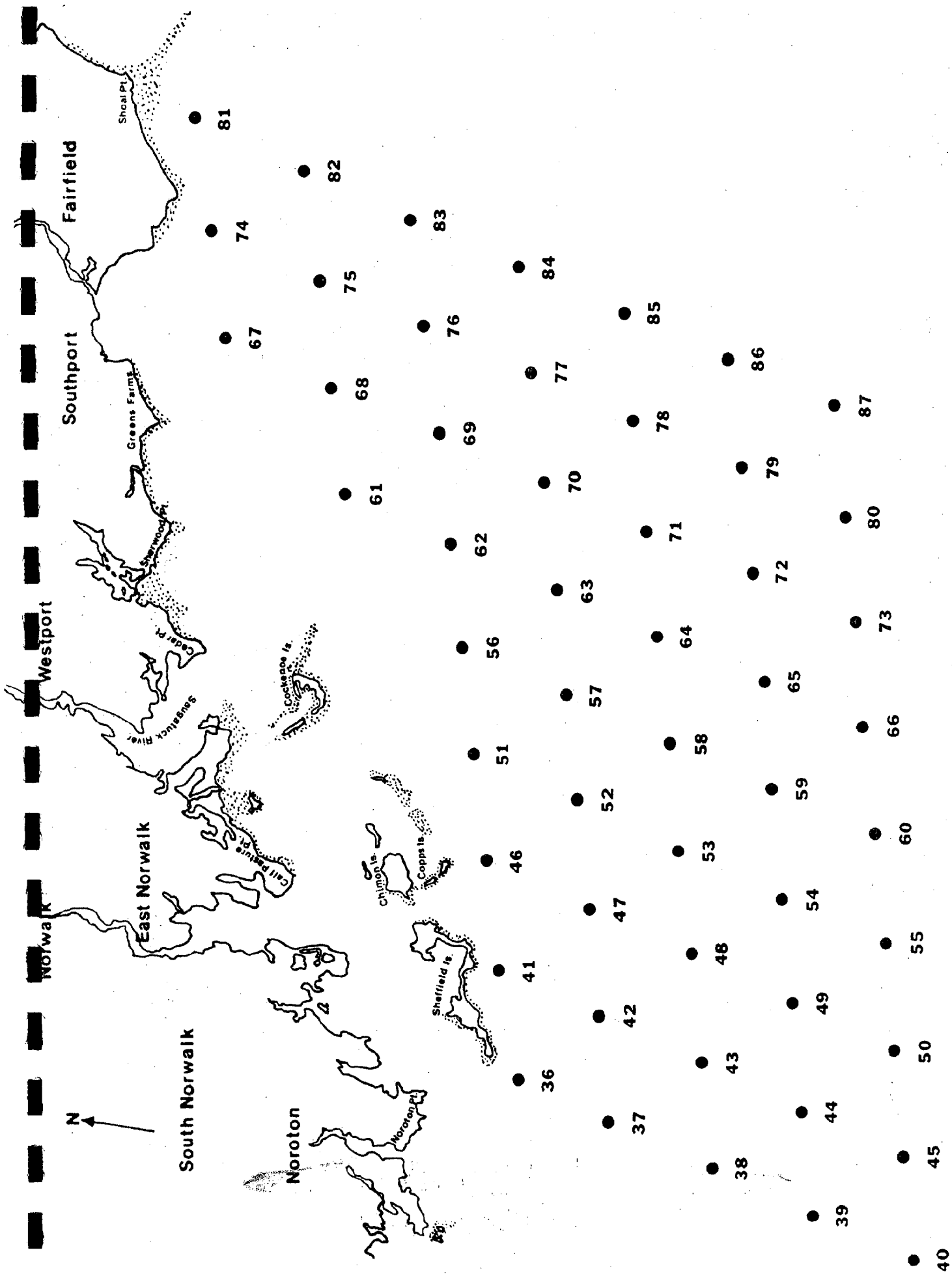


Figure 3b

DEPTH OF SAMPLING STATIONS (feet) - REGION III

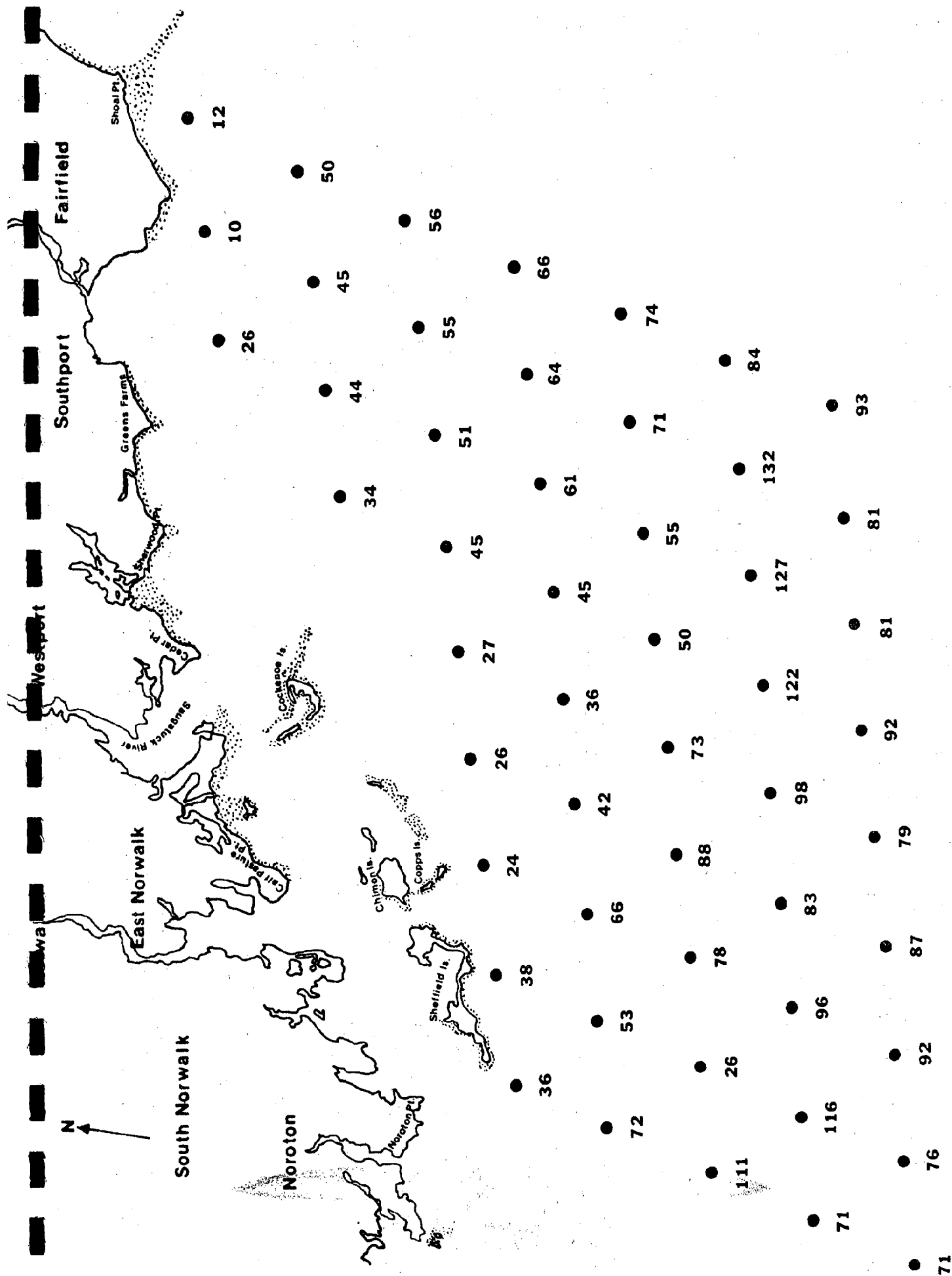


Figure 3c

SUBSTRATE COMPOSITION OF SAMPLING STATIONS - REGION III

<u>SUBSTRATE KEY</u>	
Mud	○
Sandy-mud	●
Muddy-sand	■
Sand	□
Muddy-sandy shell	▲
Shell	△
Gravel	☆
Muddy-sandy gravel	★
Rock	⊙

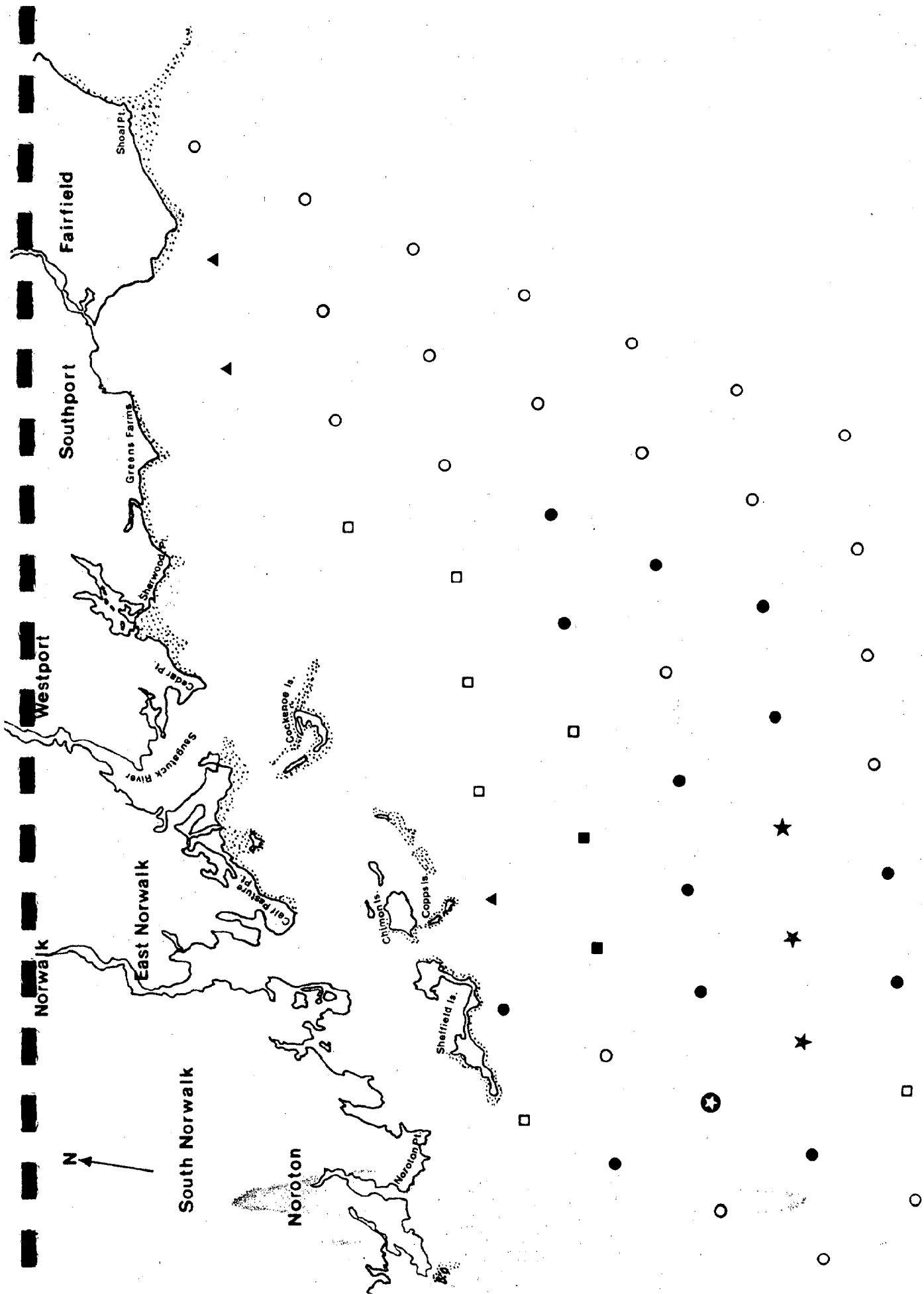


Figure 3d

NUMBER OF BENTHIC SPECIES - NUMBER OF INDIVIDUALS
PER GRAB SAMPLE - REGION III

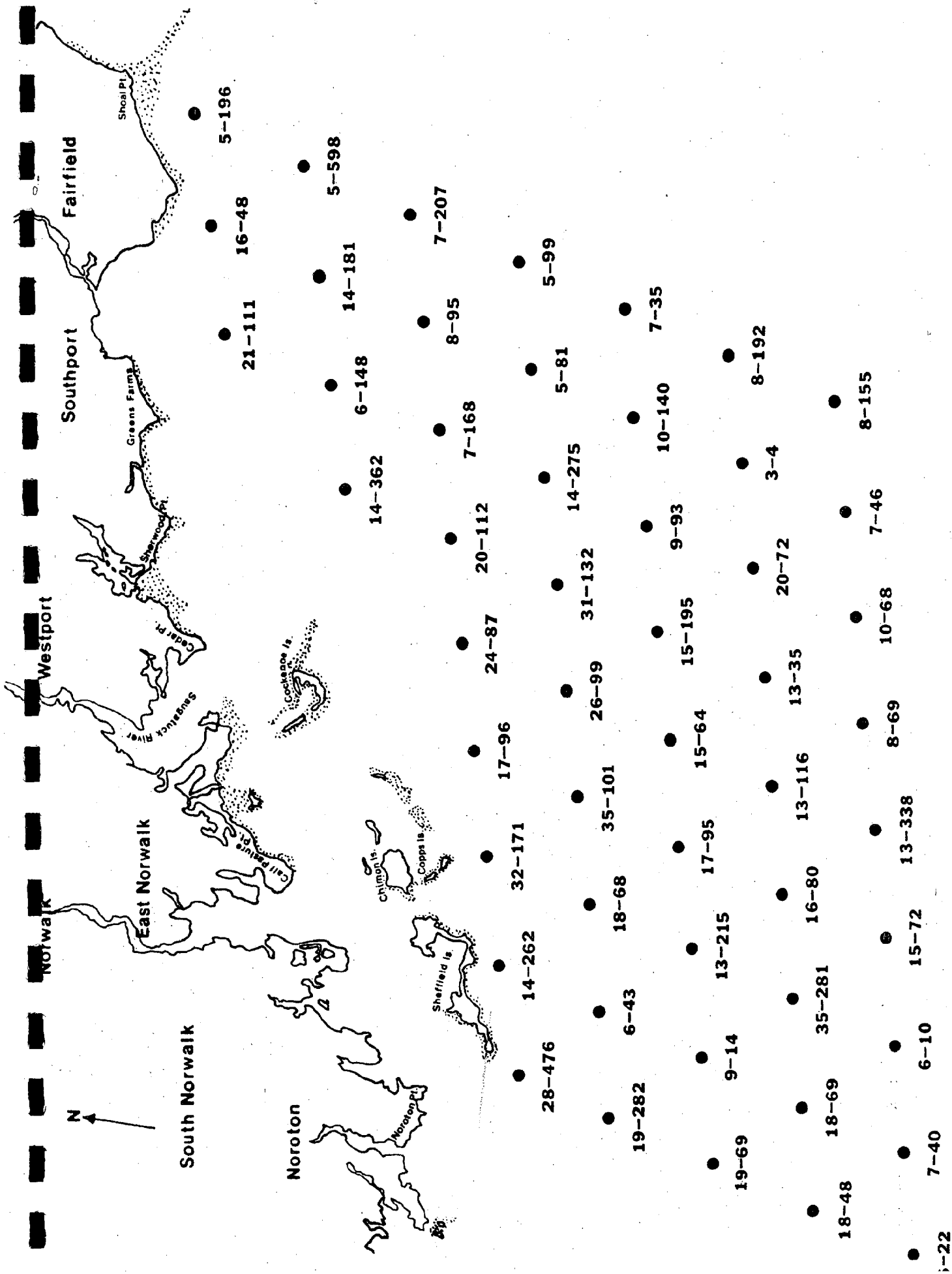


Figure 3 e

BENTHIC SPECIES DIVERSITY CATEGORIES - REGION III

<u>DIVERSITY KEY</u>	
Low	●
Moderate	▲
High	■
No organisms recovered	--

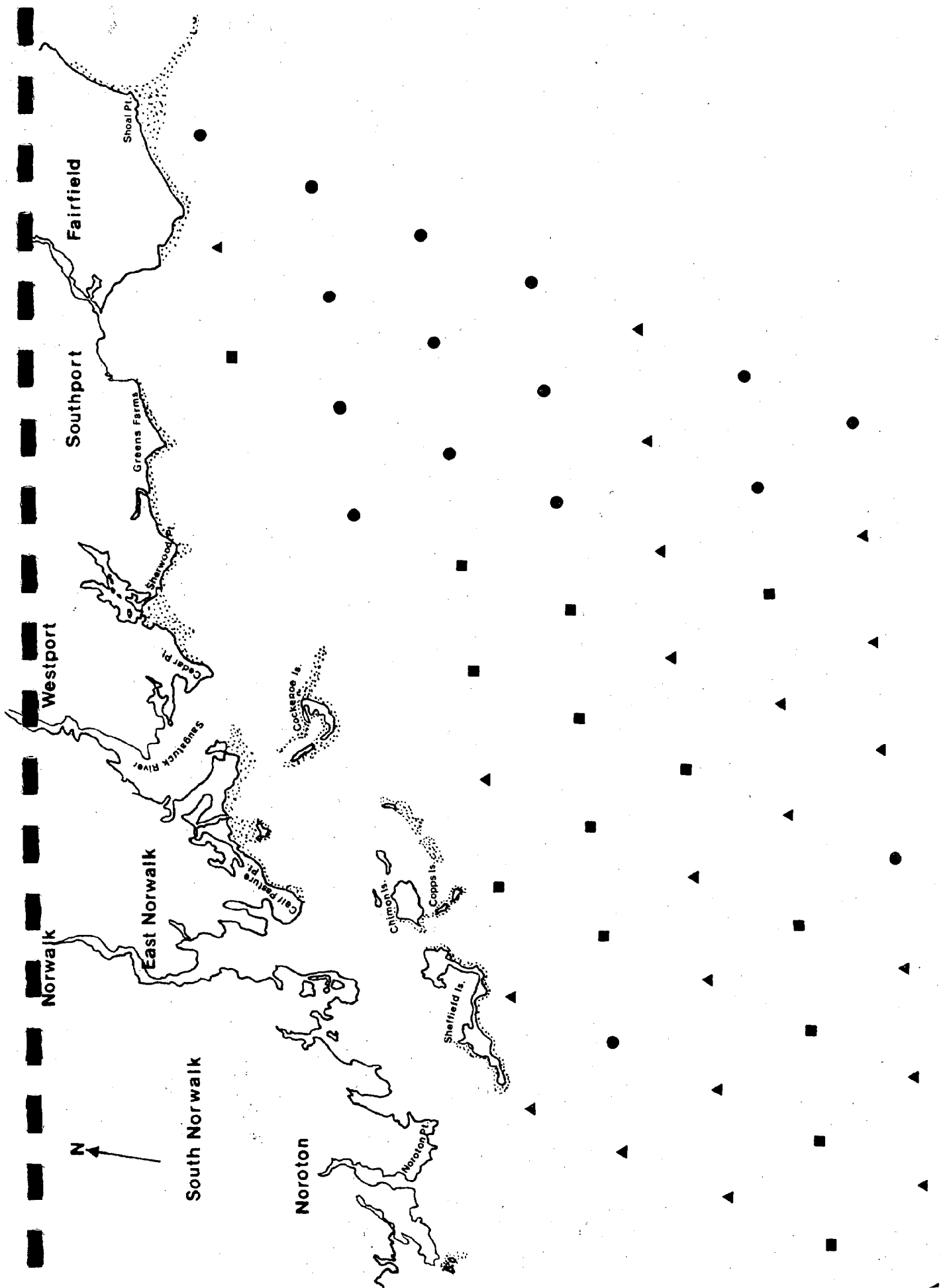


Figure 3f

EASTERN OYSTER AND HARD CLAM
ABUNDANCE CATEGORIES - REGION III

CLAM-OYSTER KEY

	Clams	Oysters
Low	●	○
Moderate	▲	△
High	■	□
Very high	★	☆
No clams/oysters recovered	--	

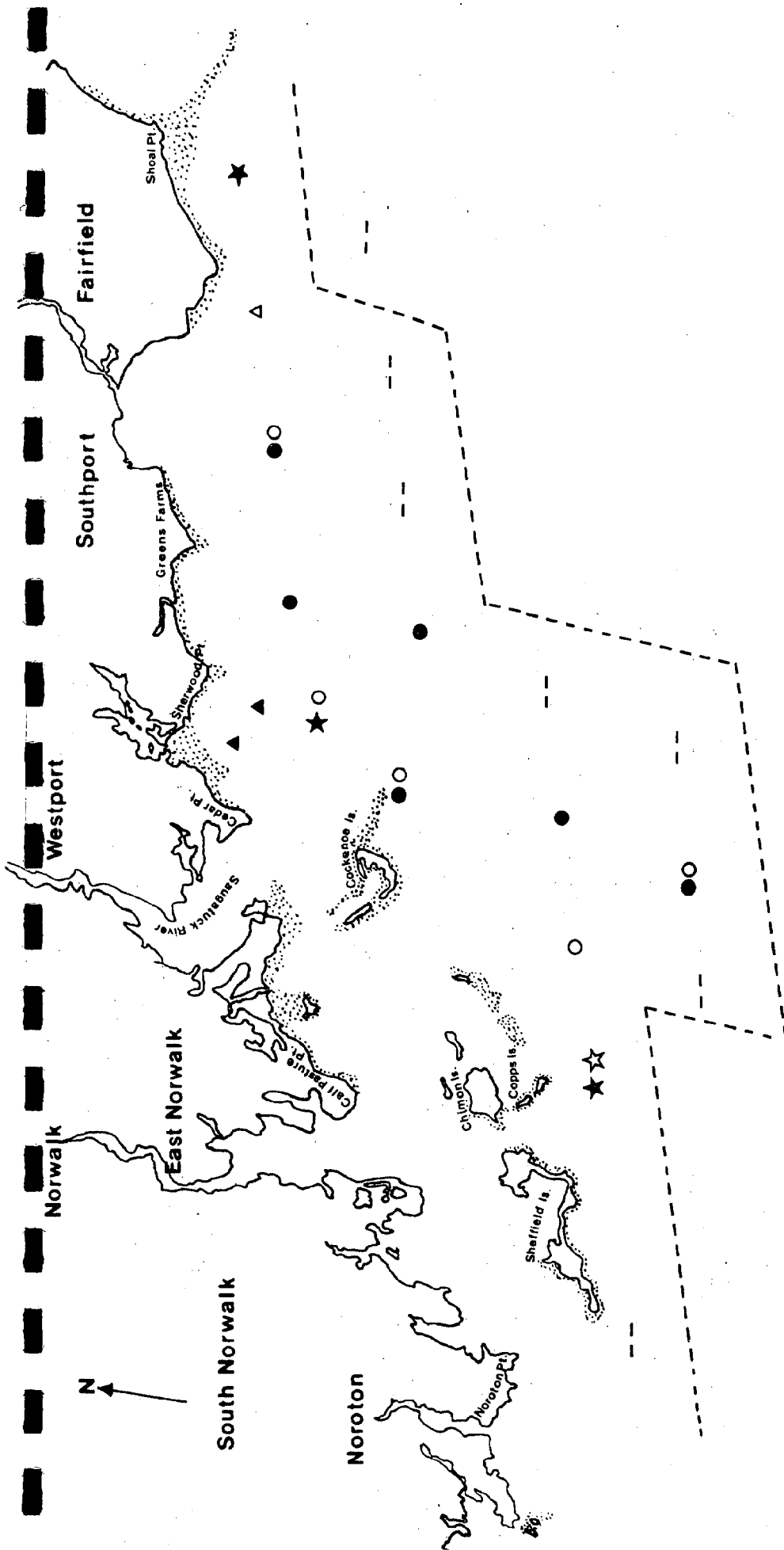
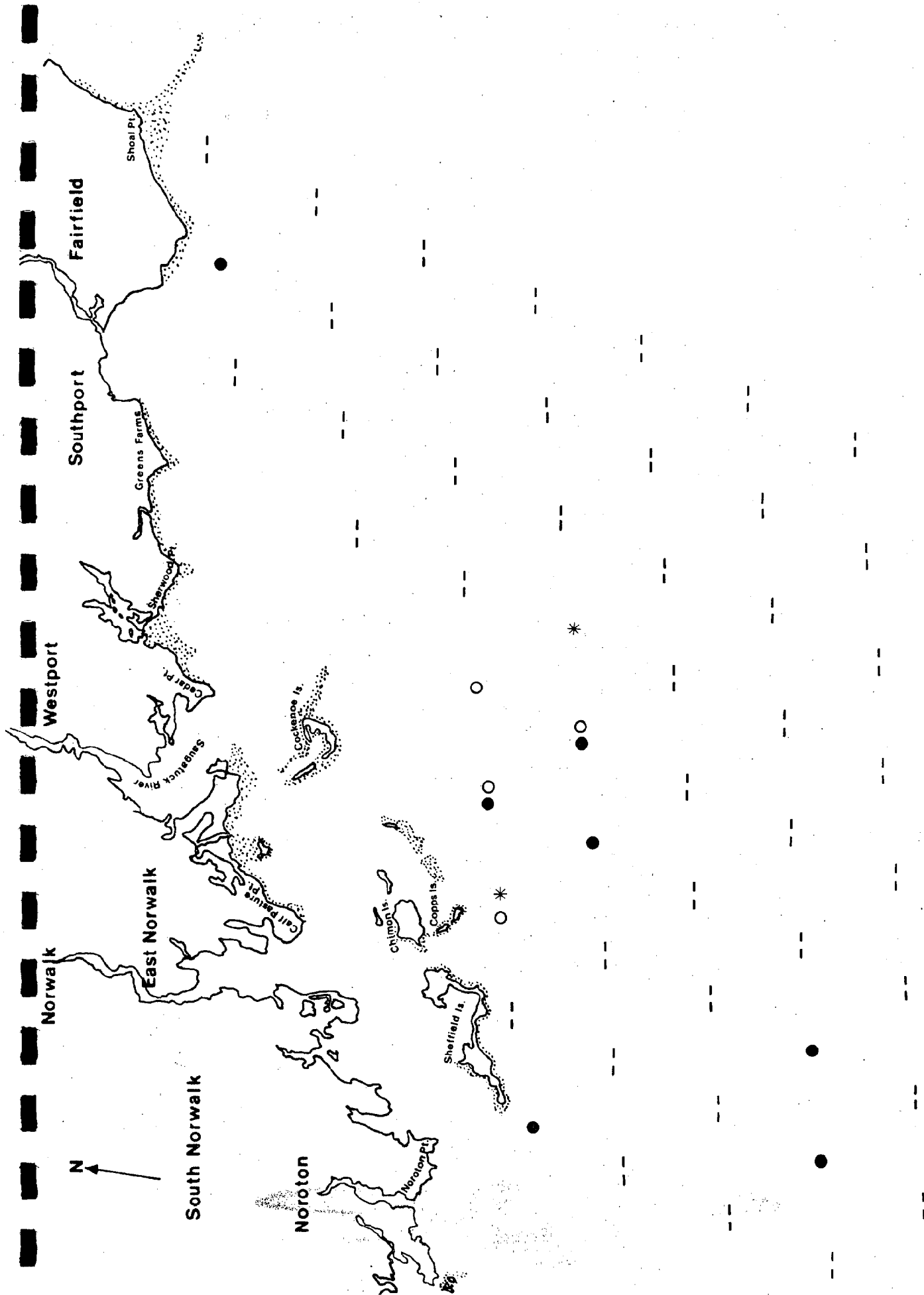


Figure 3g

ABUNDANCE CATEGORIES FOR MISCELLANEOUS
SHELLFISH SPECIES - REGION III

MISCELLANEOUS SHELLFISH KEY

	Whelk	Steamer Clam	Surf Clam
Low	*	★	*
Moderate			*
Low		●	○
Moderate		▲	△
High		■	□
Very high		★	☆
None recovered		--	
		Razor Clam	Blue Mussel



REGION IV

A total of 41 stations (Fig. 4a) were inventoried from Region IV with their respective Loran-C coordinates listed in Table 7. Sampling depths ranged from 14 feet (Station #117) to 117 feet (Station #97) with the mean depth being 65.0 feet (Fig. 4b).

Mud was the most frequently encountered substrate type occurring at 70.7% of all sampling stations (Fig. 4c).

A total of 103 benthic species were reported from Region IV (Table 8) with Station #128 exhibiting the greatest number (27 species) and Station #126 the fewest (0 species) (Fig. 4d). The mean number of species per station was 11.0. The mean number of individuals per station was 152.1, ranging from a high of 900 at Station #112 to a low of 0 at Station #126.

Species diversity values (Fig. 4e) ranged from a low of 0.323 at Station #116 (excluding the azoic Station #126) to a high of 3.428 at Station #128, with the mean H value for all stations being 1.640.

The mean values for species diversity (1.640), species richness (11.0) and density (152.1) all fall into the moderate category. The three numerically dominant benthic species were the coot clam, Mulinia lateralis, the nut clam, Nucula proxima, and the polychaete, Nephtys incisa. Other dominants, in decreasing rank importance, were Pitar morrhuana, Tellina agilis, Yoldia limatula, Mediomastus ambiseta, Asabellides oculatus, Nassarius trivittatus and Tubulanus pellucidus.

Shellfish

Fourteen designated stations were inventoried for hard clams and oysters

within the 50 foot depth contour line (Fig. 4f). Hard clams were reported from only a single station (Station #111), where they occurred in high abundance. The population was dominated by cherrystone-sized clams which represented 66.7% of all individuals.

Oysters were also reported in low numbers at the same single station (Station #111). Oysters were, however, reported in varying abundances from ten undesignated stations (Fig. 4f) which were located in the vast oyster Nuatral Bed Area off Bridgeport.

Surf clam populations (Fig. 4g) were reported in low numbers from Stations #118, #124 and #125. The blue mussel, Mytilus edulis, occurred in low numbers at a single station (Station #117).

Figure 4a

SAMPLING STATION POSITIONS - REGION IV

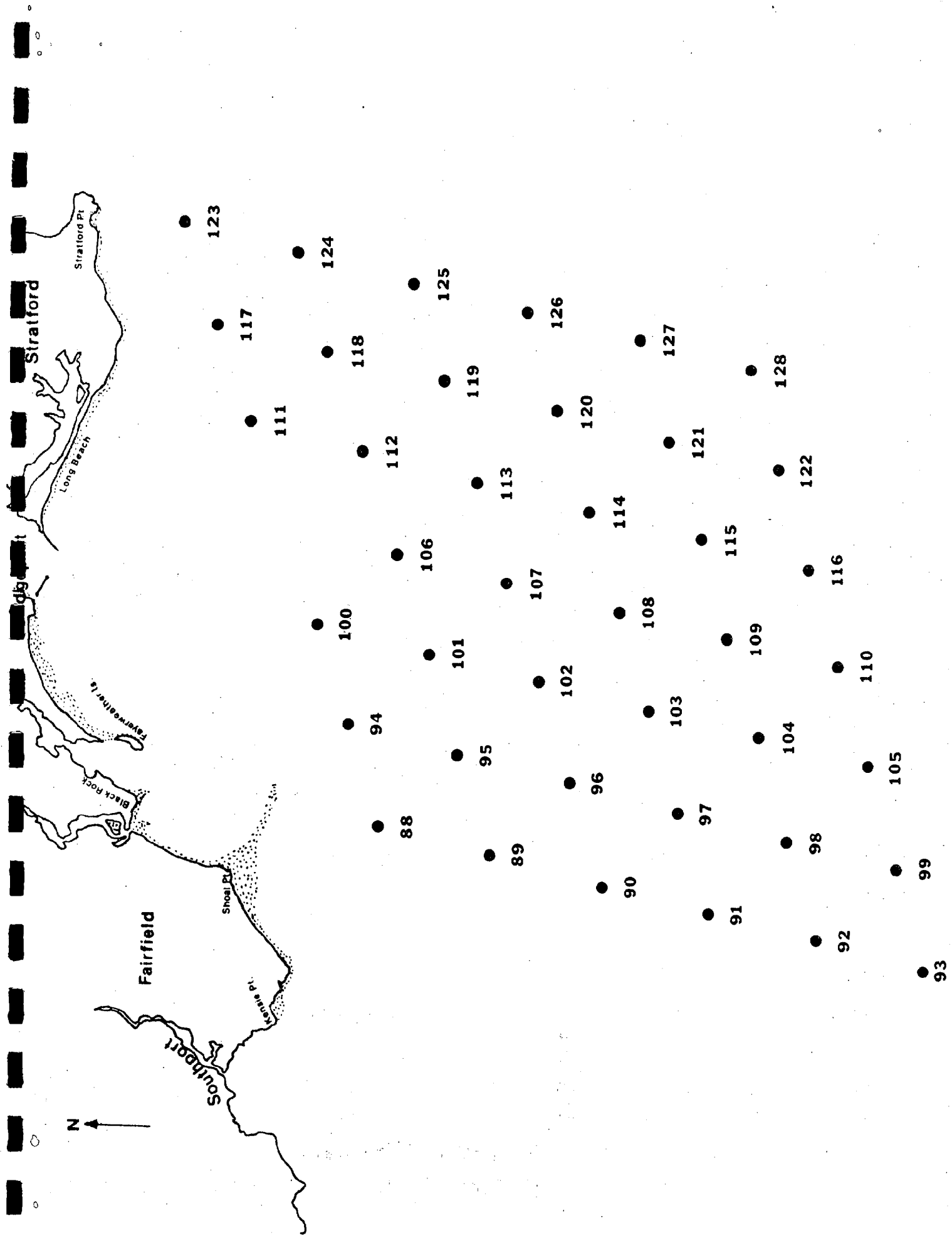


Figure 4b

DEPTH OF SAMPLING STATIONS (feet) - REGION IV

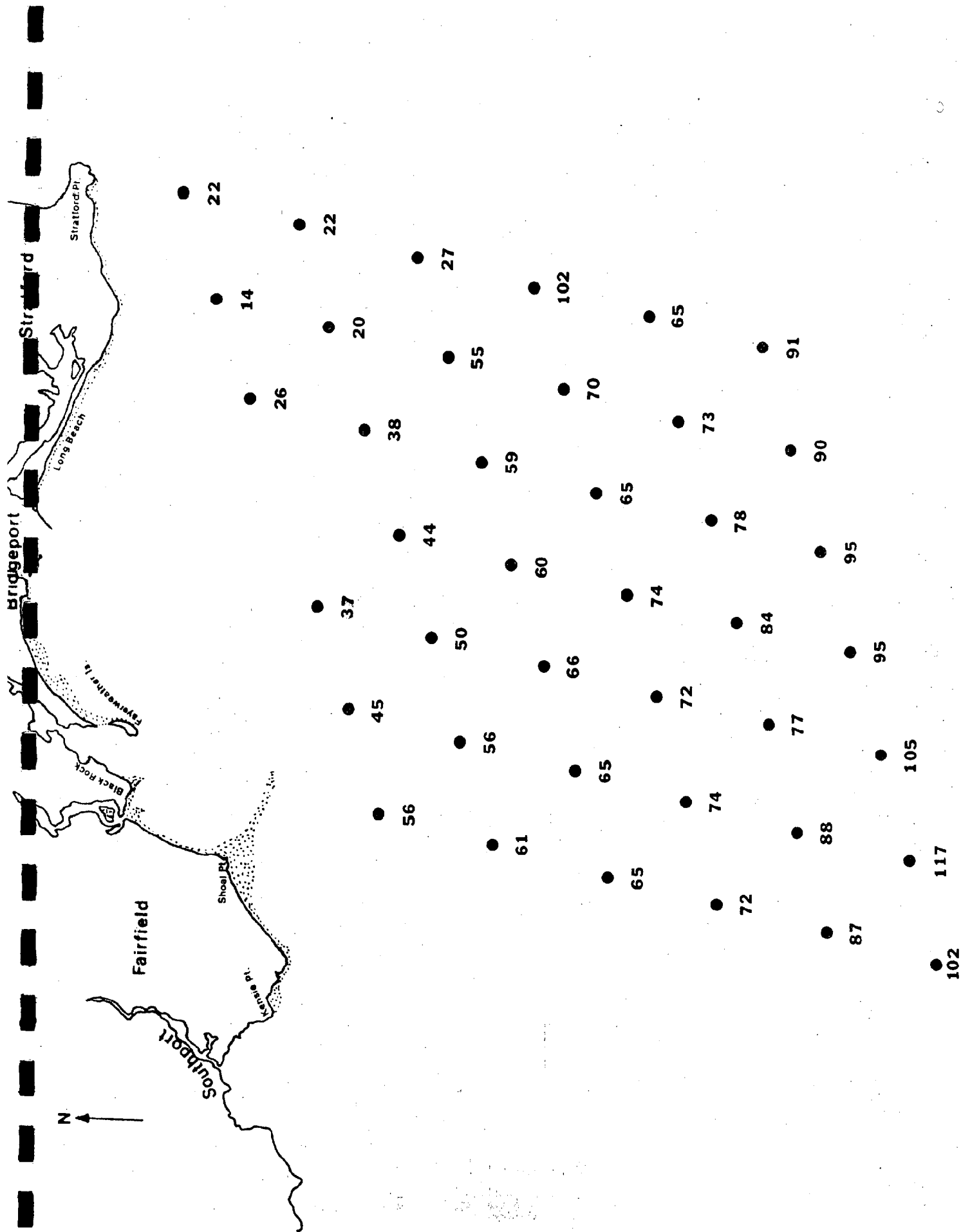


Figure 4c

SUBSTRATE COMPOSITION OF SAMPLING STATIONS - REGION IV

<u>SUBSTRATE KEY</u>	
Mud	○
Sandy-mud	●
Muddy-sand	■
Sand	□
Muddy-sandy shell	▲
Shell	△
Gravel	☆
Muddy-sandy gravel	★
Rock	⊛

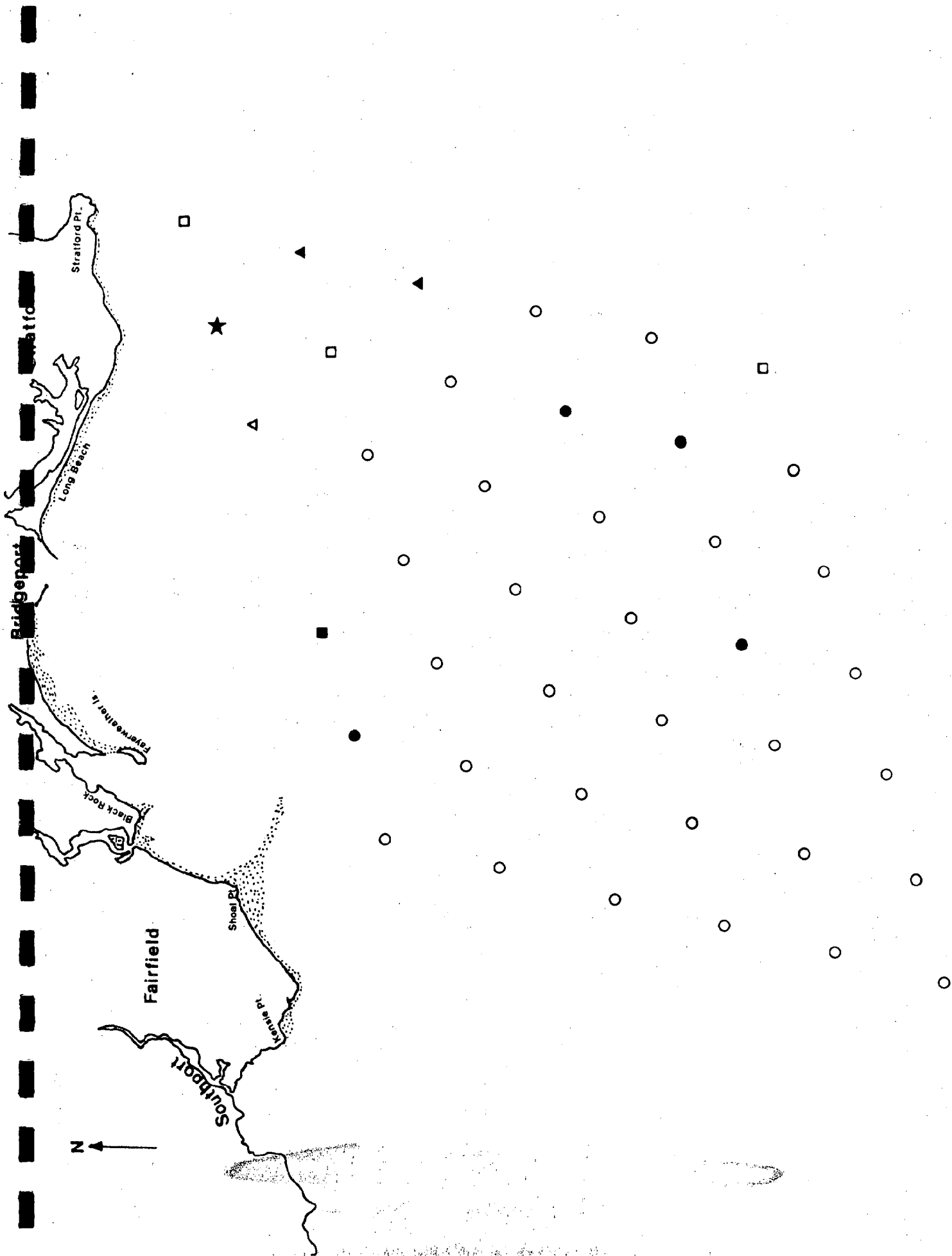


Figure 4d

NUMBER OF BENTHIC SPECIES - NUMBER OF INDIVIDUALS
PER GRAB SAMPLE - REGION IV

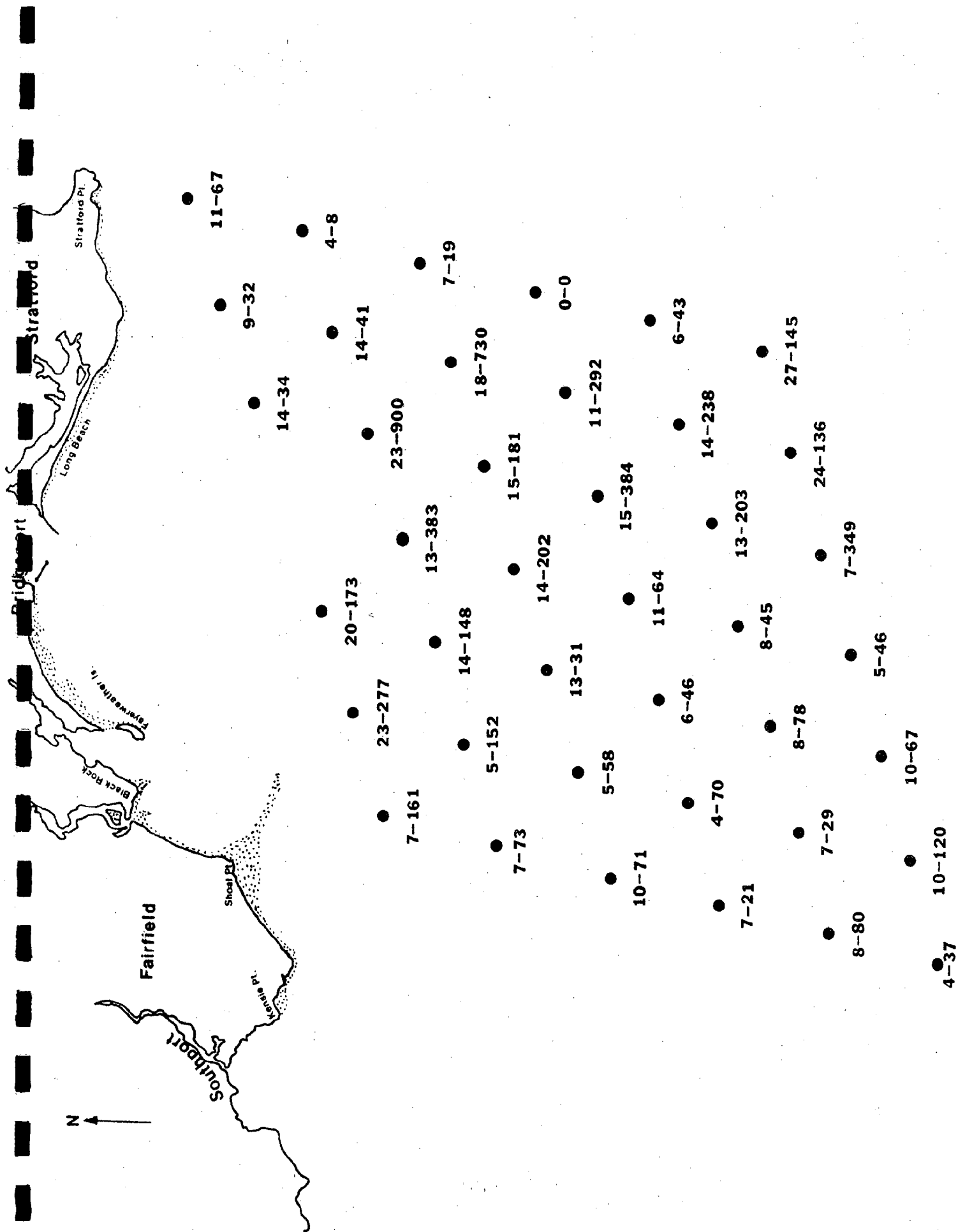


Figure 4e

BENTHIC SPECIES DIVERSITY CATEGORIES - REGION IV

DIVERSITY KEY

Low	●
Moderate	▲
High	■
No organisms recovered	--

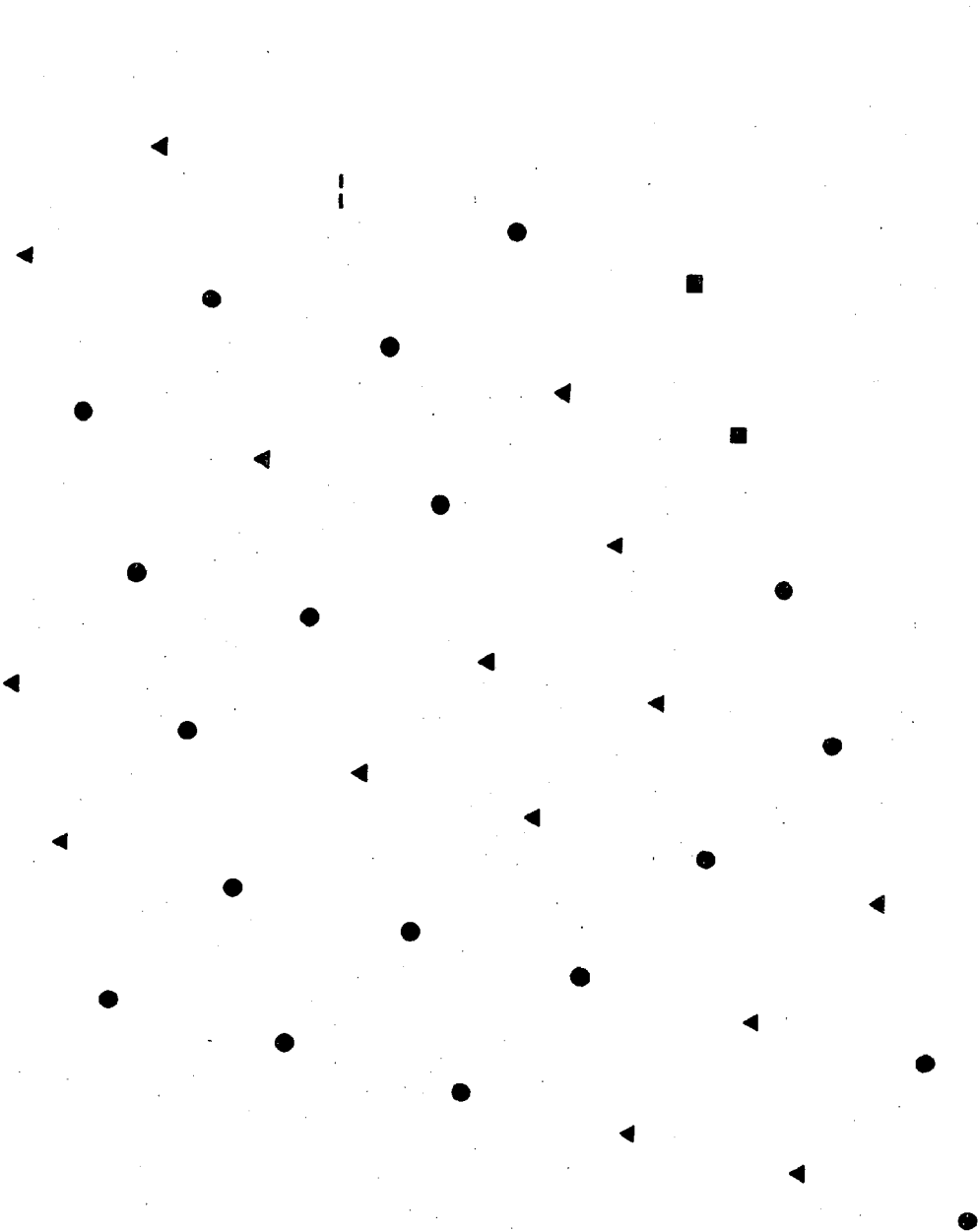
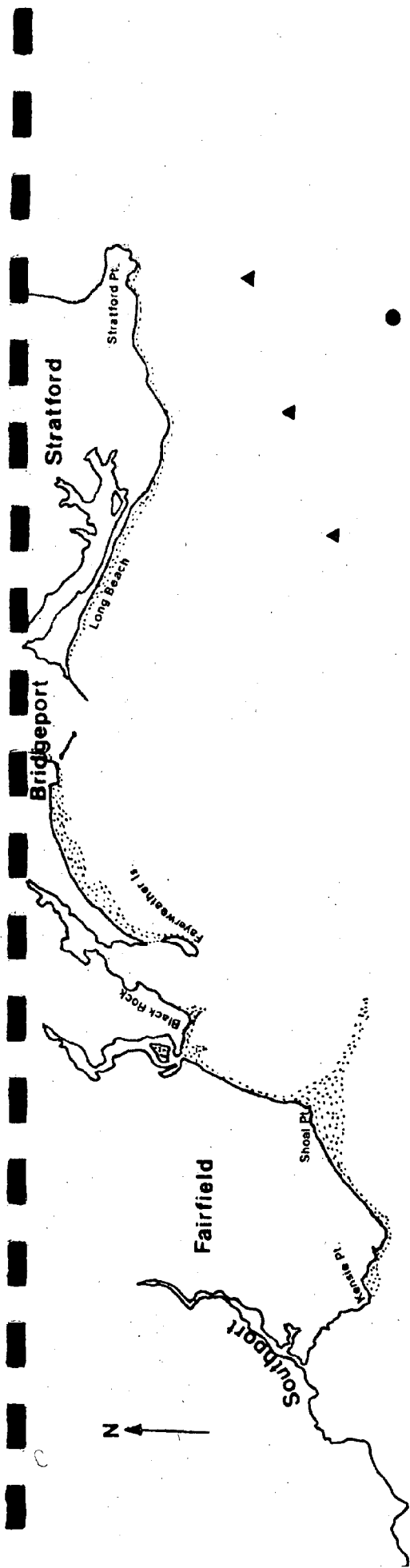


Figure 4f

EASTERN OYSTER AND HARD CLAM
ABUNDANCE CATEGORIES - REGION IV

<u>CLAM-OYSTER KEY</u>	
Low	Clams ●
Moderate	Clams ▲
High	Clams ■
Very high	Clams ★
No clams/oysters recovered	Clams --
	Oysters ○
	Oysters △
	Oysters □
	Oysters ☆

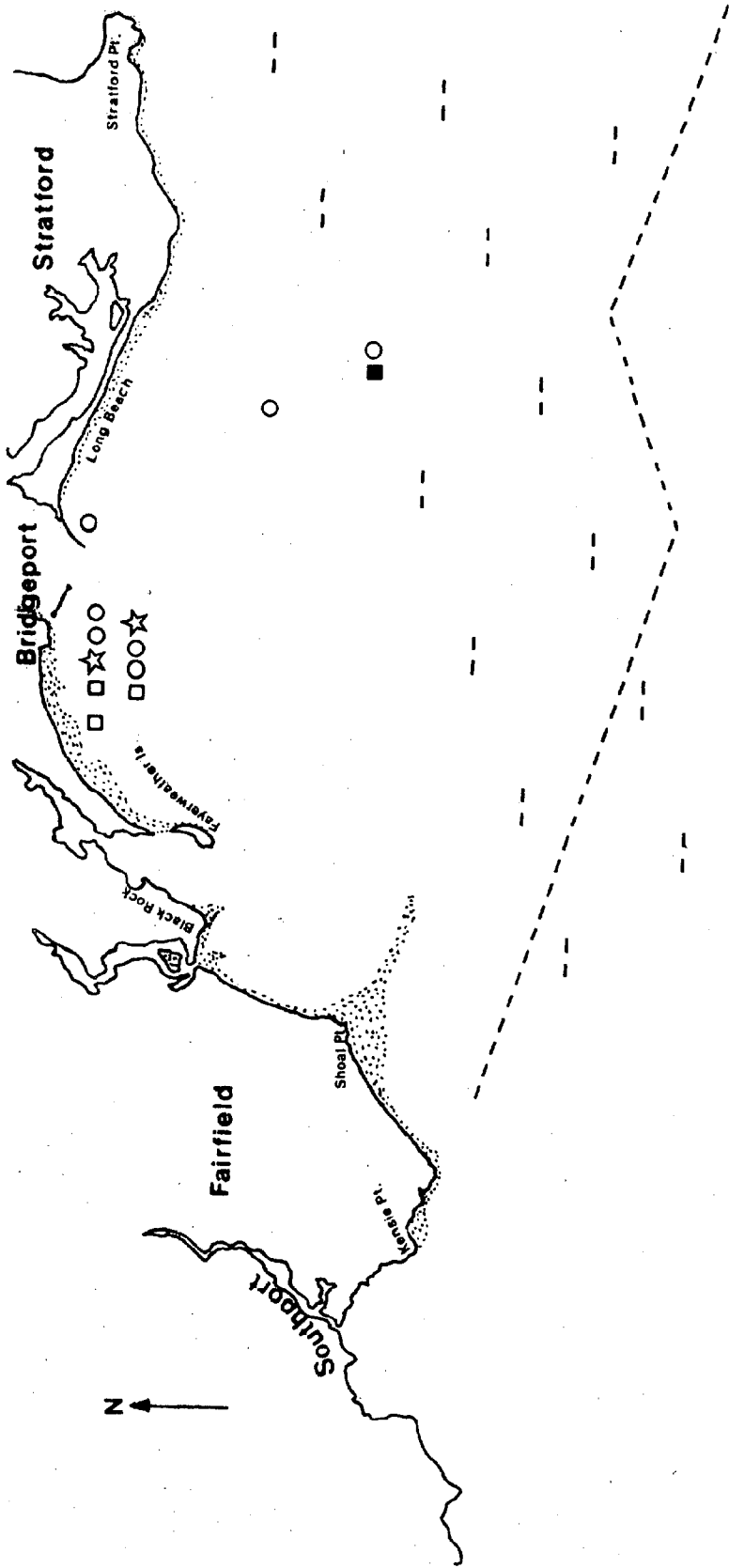
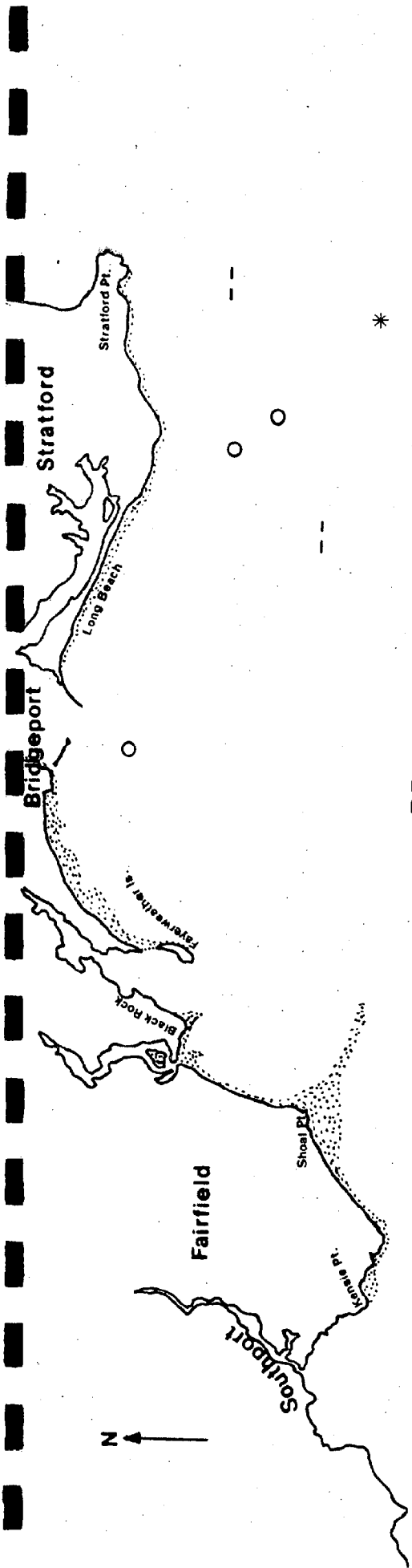


Figure 4g

ABUNDANCE CATEGORIES FOR MISCELLANEOUS
SHELLFISH SPECIES - REGION IV

MISCELLANEOUS SHELLFISH KEY

	Whelk	Steamer Clam	Surf Clam
Low	*	☆	*
Moderate			*
		Razor Clam	Blue Mussel
Low		●	○
Moderate		▲	△
High		■	□
Very high		★	☆
None recovered		--	



REGION V

A total of 58 stations (Fig. 5a) were inventoried from Region V with their respective Loran-C coordinates listed in Table 9. Sampling depths ranged from a low of 13 feet (Station #137) to a high of 114 feet (Station #142) with the mean depth being 52.4 feet (Fig. 5b).

Mud was the most frequently encountered substrate type occurring at 65.5% of all sampling stations (Fig. 5c). Sampling stations with sandy-gravel were the next principal category at 13.8% of all stations.

A total of 120 benthic species were reported from Region V (Table 10) with Station #144 exhibiting the greatest number (49 species) and Stations #137 and #151 the fewest (1 species) (Fig. 5d). The mean number of species per station was 12.6. The mean number of individuals per station was 166.7, ranging from a high of 1,324 at Station #144 to a low of 1 at Stations #151 and #137.

Species diversity values (Fig. 5e) ranged from a low of 0.0 at Station #151 and #137 to a high of 3.978 at Station #163, with the mean H value for all stations being 1.928.

The mean values for species diversity (1.928), species richness (12.6) and density (166.7) all fall into the moderate category.

The three numerically dominant benthic species for the entire region were the coot clam, Mulinia lateralis, the nut clam, Nucula proxima and the polychaete, Nephtys incisa. Other dominants, in decreasing rank importance, were Pitar morrhuana, Mediomastus ambiseta, Tellina agilis, Nassarius trivittatus, Asabellides oculatus, Yoldia limatula and Ampelisca abdita.

Shellfish

Twenty nine designated stations were inventoried for hard clams and oysters within the 50 foot depth contour line (Fig. 5f). Hard clams were reported in low abundance at Stations #138, #139, #154, and #171 and in very high abundance at Stations #153, #161, #162 and #176.

Oysters were found in low abundance at designated Stations #153, #154, and #179.

Six undesigned stations were established in the Natural Bed Areas of the Housatonic River (Fig. 5f). Five of these stations yielded very high numbers of oysters and one of low numbers.

Razor clams were widely distributed in Region V, occurring at 16 stations (Fig. 5g), all in the low abundance category. Surf clams (Station #145), blue mussels (Station #153) and whelks (Stations #153, #170 and #179) occurred in low abundance.

The undesigned stations in the Housatonic River (Fig. 5g) also yielded very high numbers of mussels.

Figure 5a

SAMPLING STATION POSITIONS - REGION V

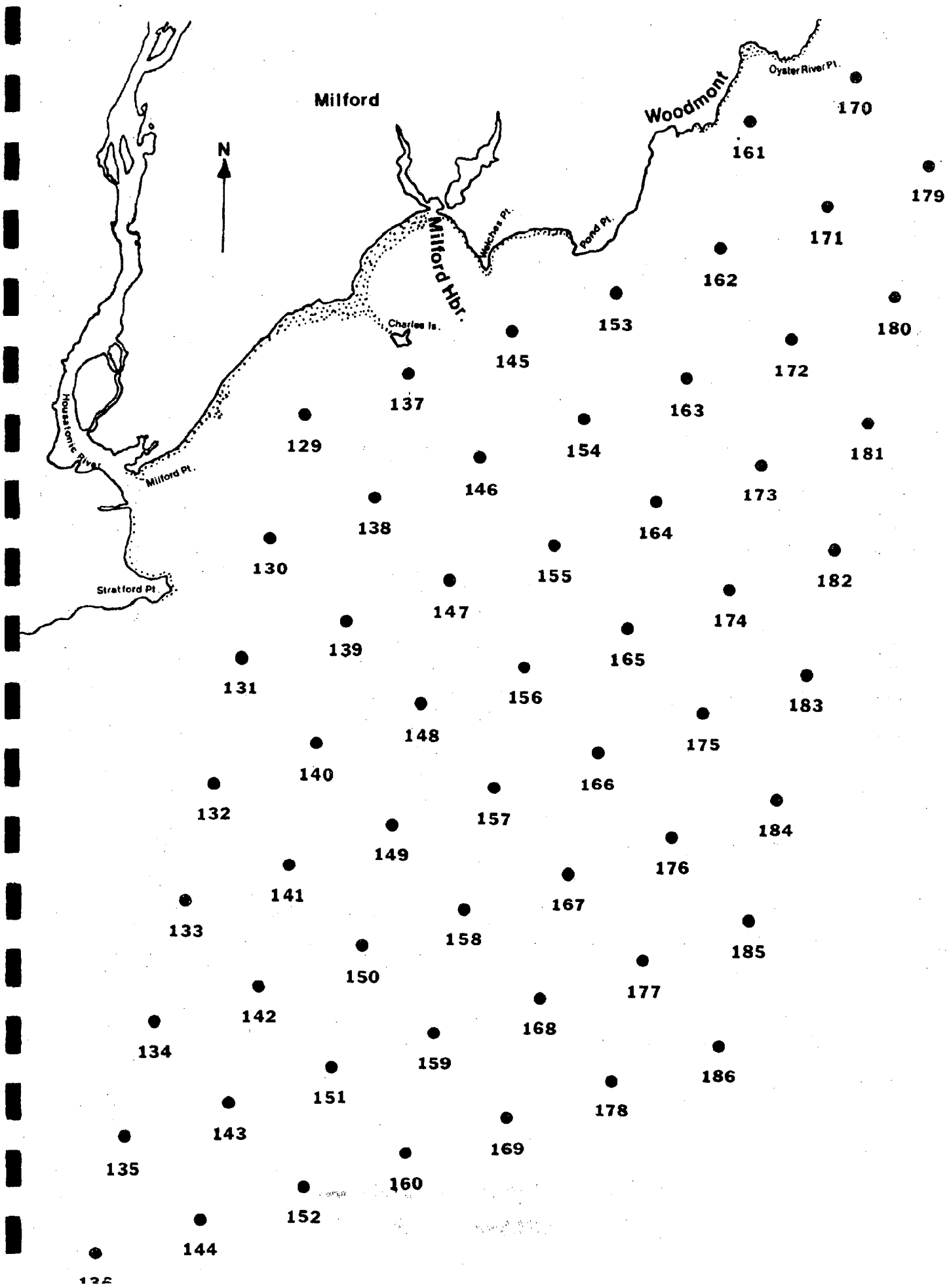


Figure 5b

DEPTH OF SAMPLING STATIONS (feet) - REGION V

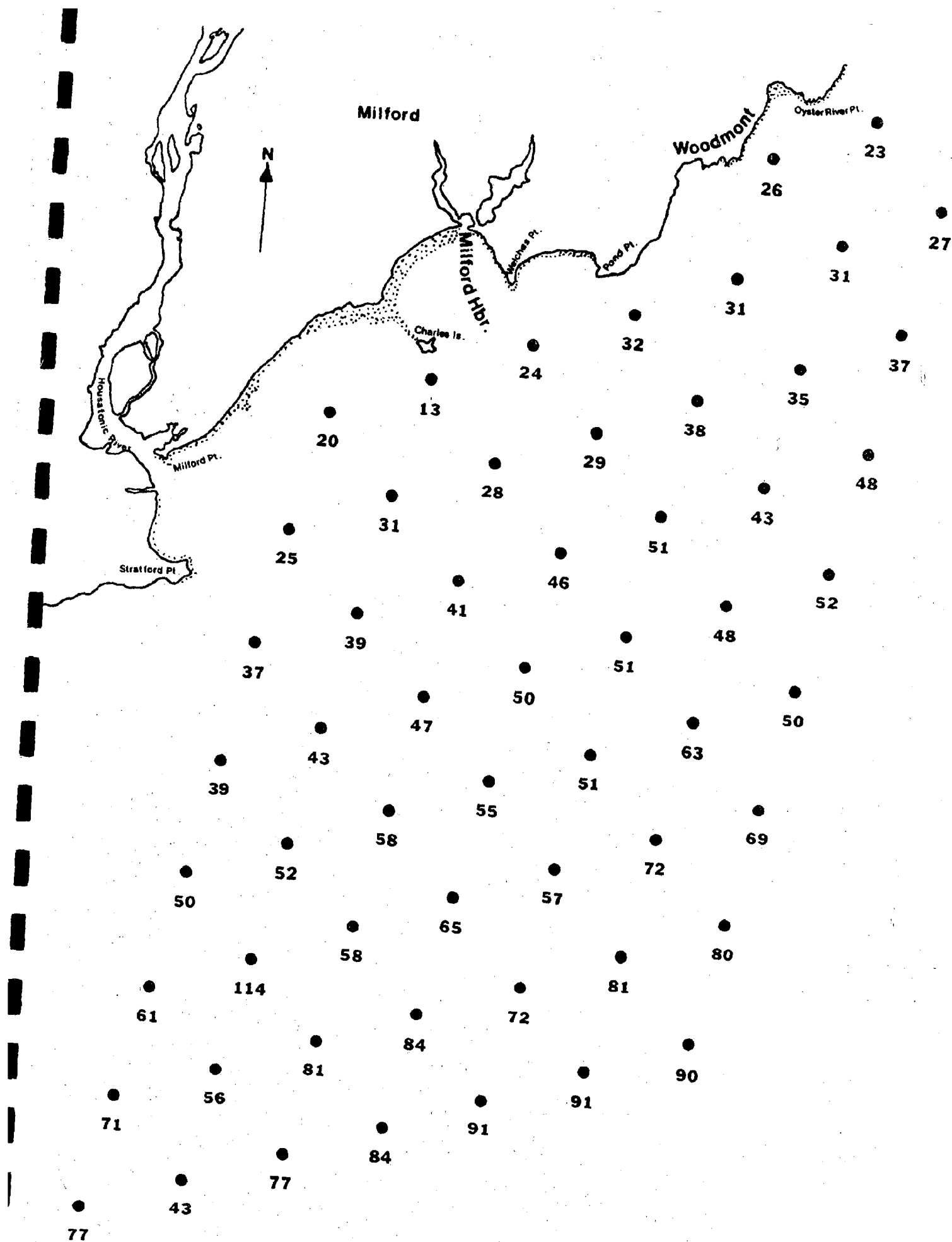


Figure 5c

SUBSTRATE COMPOSITION OF SAMPLING STATIONS - REGION V

SUBSTRATE KEY

Mud	○
Sandy-mud	●
Muddy-sand	■
Sand	□
Muddy-sandy shell	▲
Shell	△
Gravel	☆
Muddy-sandy gravel	★
Rock	⊙

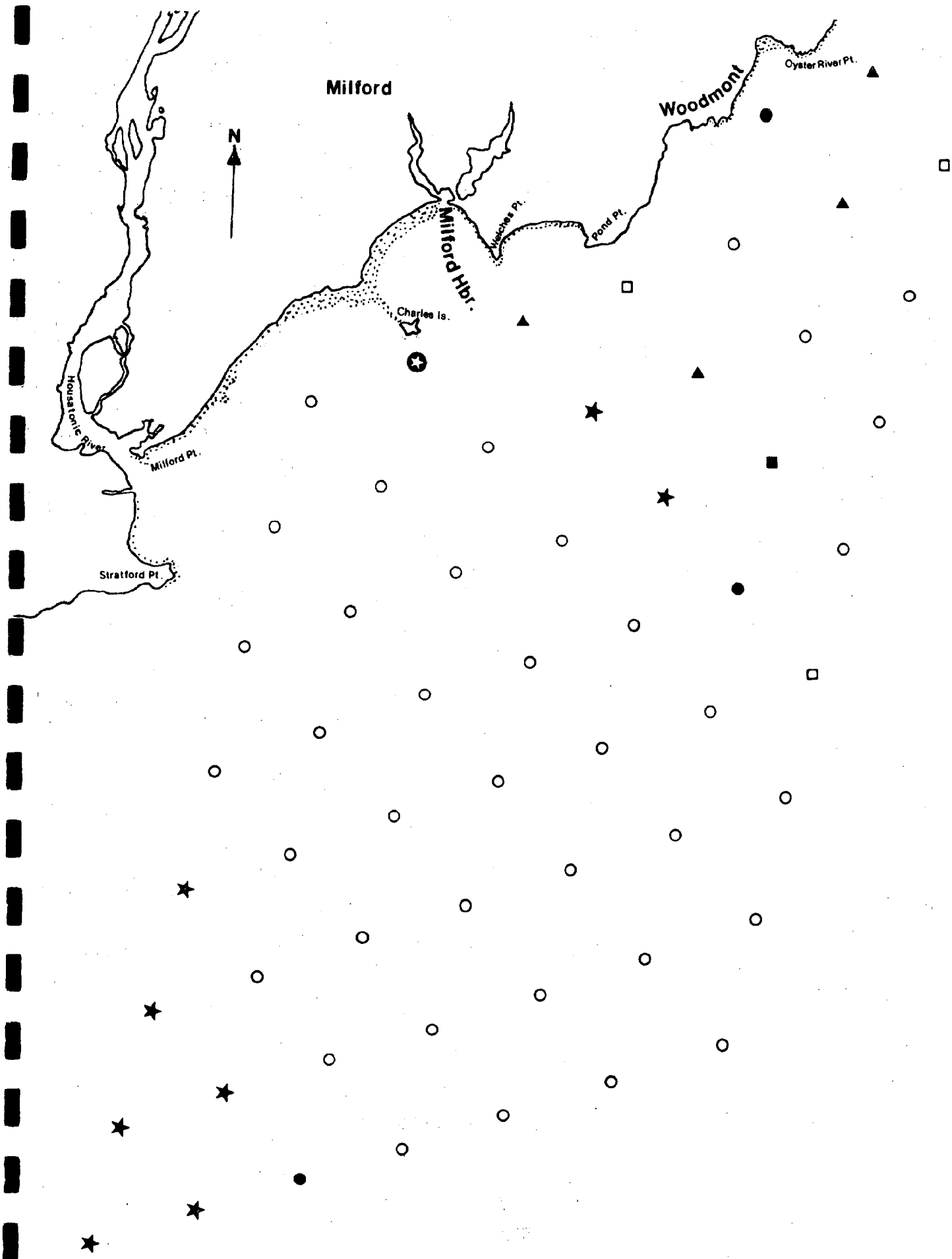


Figure 5d

NUMBER OF BENTHIC SPECIES - NUMBER OF INDIVIDUALS
PER GRAB SAMPLE - REGION V

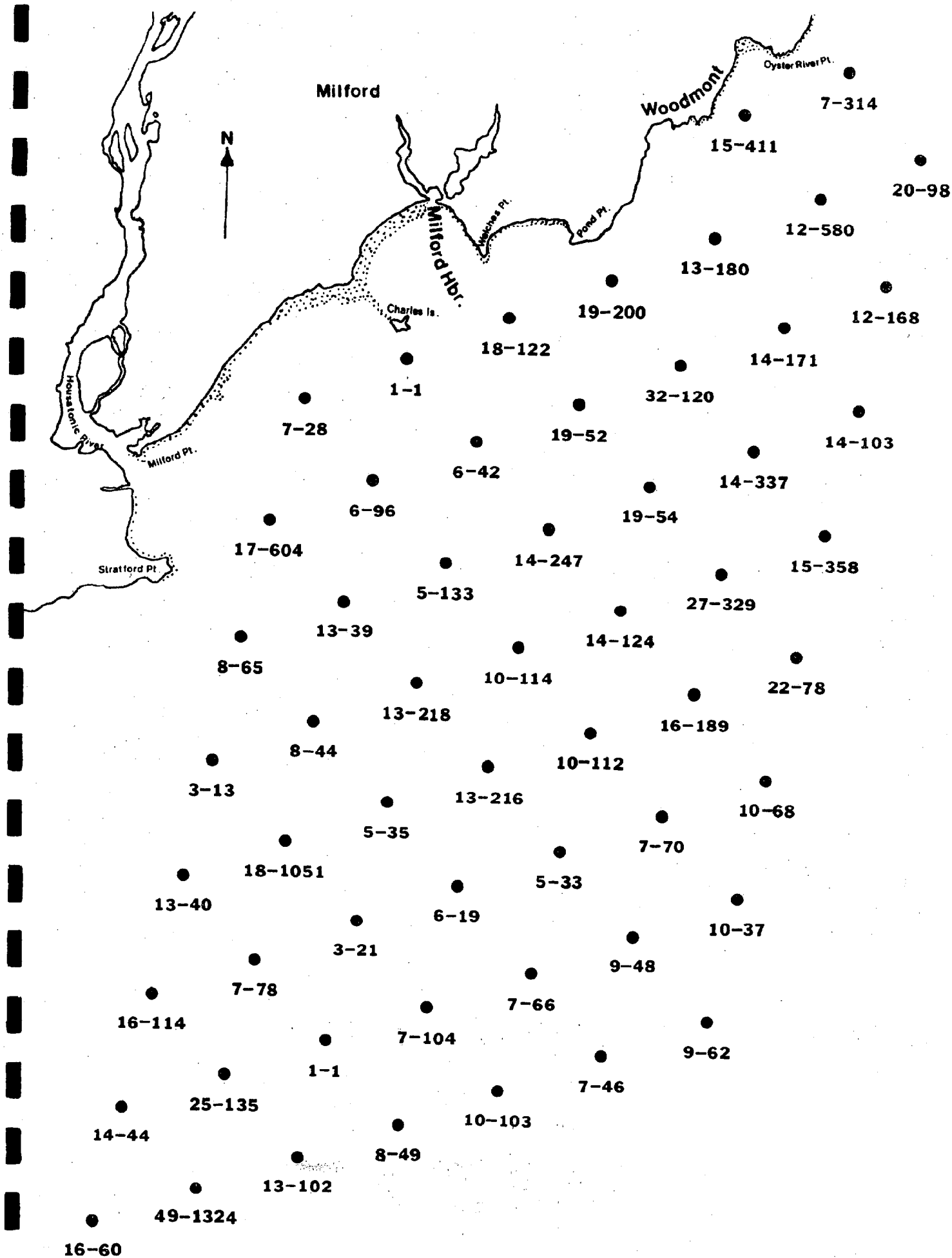


Figure 5e

BENTHIC SPECIES DIVERSITY CATEGORIES - REGION V

DIVERSITY KEY

Low	●
Moderate	▲
High	■
No organisms recovered	--

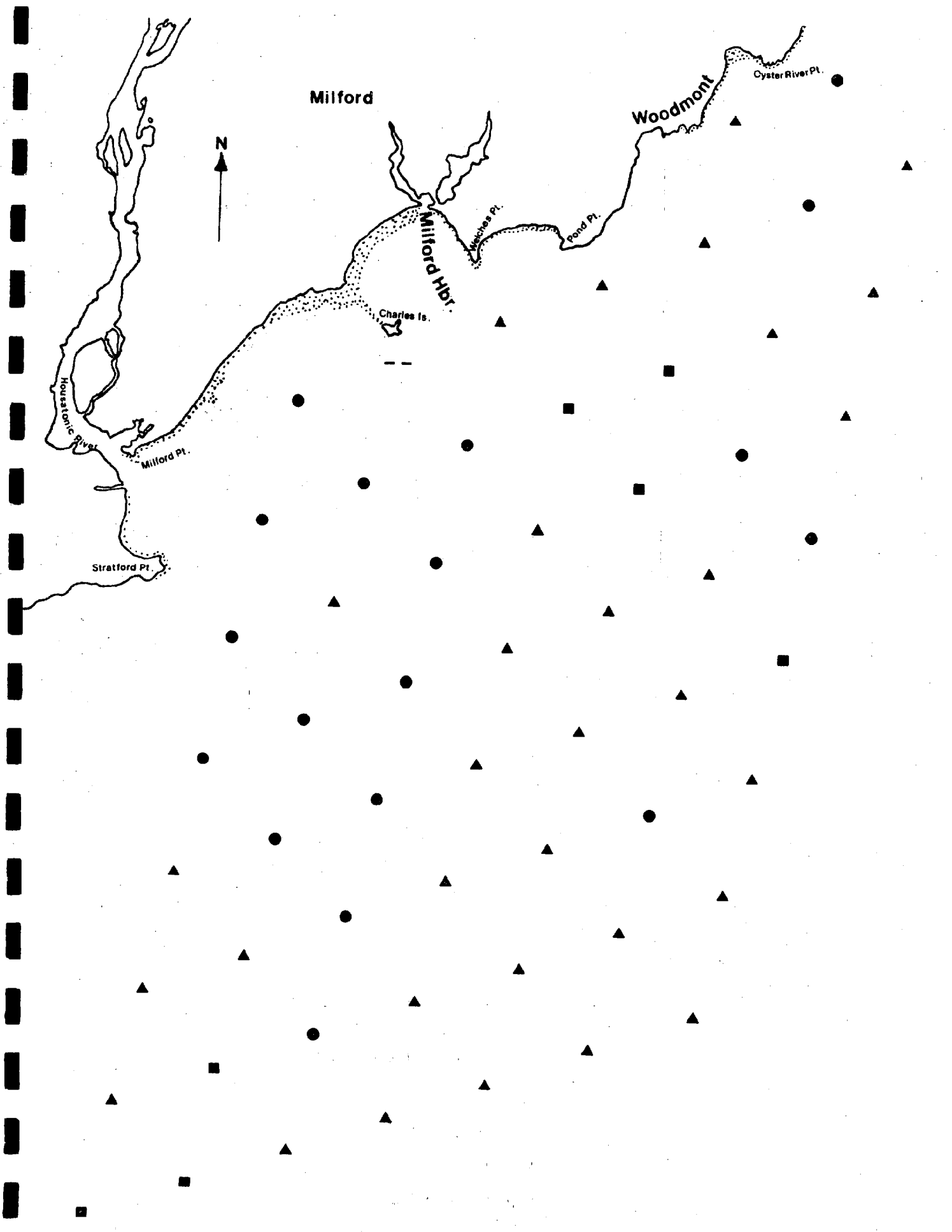


Figure 5f

EASTERN OYSTER AND HARD CLAM
ABUNDANCE CATEGORIES - REGION V

CLAM-OYSTER KEY

	Clams	Oysters
Low	●	○
Moderate	▲	△
High	■	□
Very high	★	☆
No clams/oysters recovered	--	

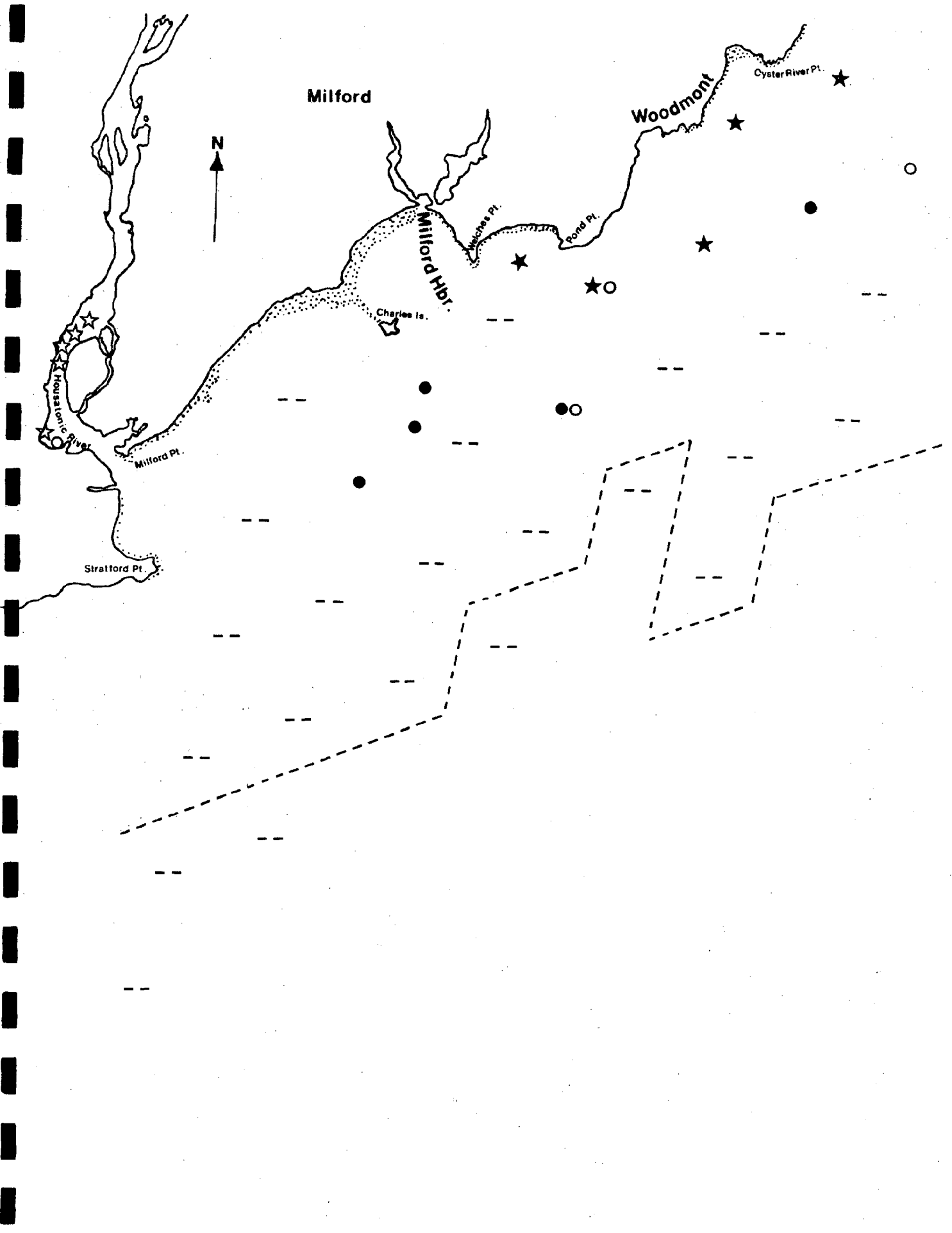
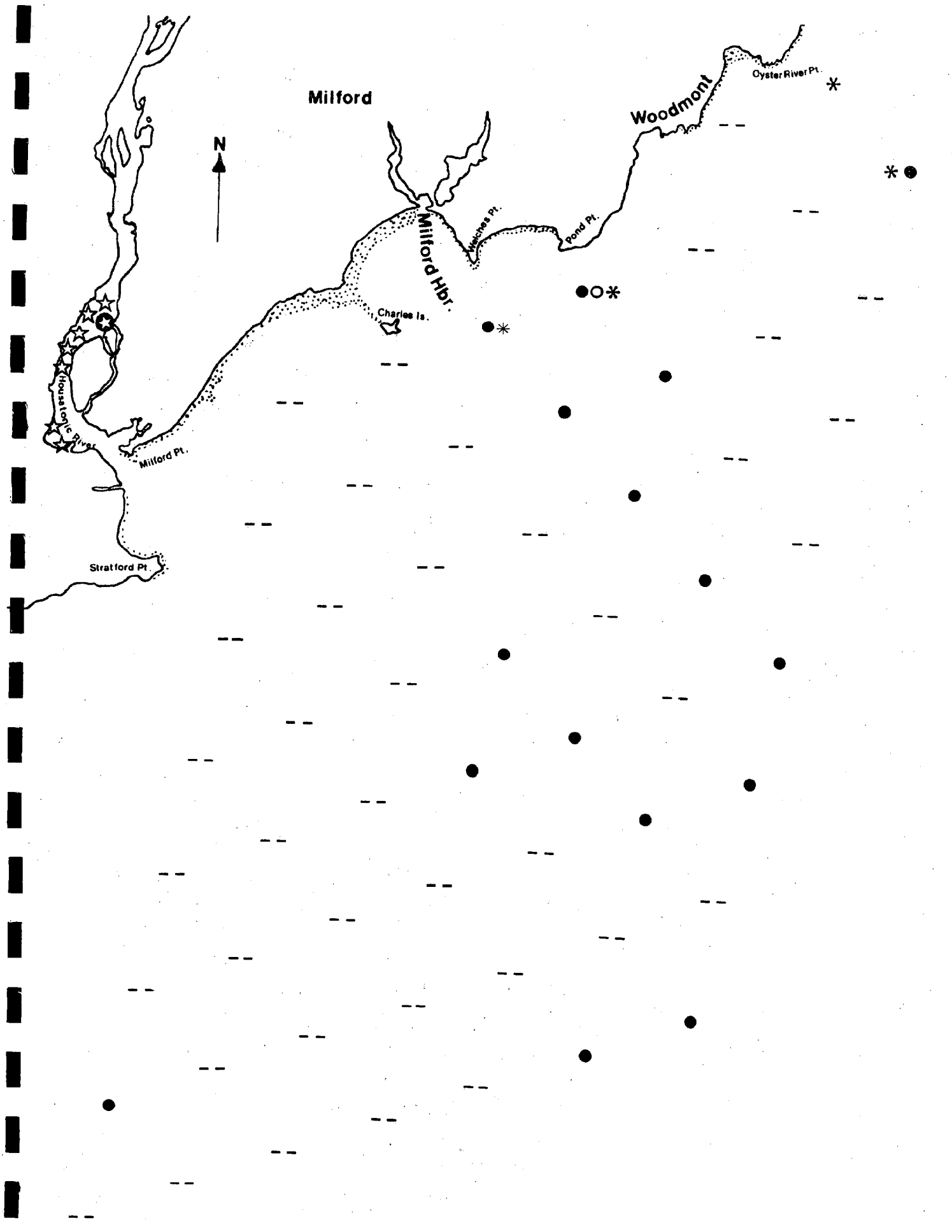


Figure 5g

ABUNDANCE CATEGORIES FOR MISCELLANEOUS
SHELLFISH SPECIES - REGION V

MISCELLANEOUS SHELLFISH KEY

	Whelk	Steamer Clam	Surf Clam
Low	*	★	*
Moderate			*
		Razor Clam	Blue Mussel
Low		●	○
Moderate		▲	△
High		■	□
Very high		★	☆
None recovered		--	



Region VI

A total of 80 stations (Fig. 6A-a and 6B-a) were inventoried from Region VI with their respective Loran-C coordinates listed in Table 11. (Due to the large size of this region, it has been divided onto two separate resource maps.) Sampling depths ranged from a low of 19 feet (Station # 187) to a high of 97 feet (Stations #217 and #266) with the mean depth being 61.4 feet (Figs. 6A-b and 6B-b.)

Mud was the most frequently encountered substrate type occurring at 70.0% of all sampling stations (Figs. 6A-c and 6B-c.) Sampling stations with sandy-mud was the next principal category at 12.5% of all stations.

A total of 132 benthic species were reported from Region VI (Table 12) with Station #202 exhibiting the greatest number (33 species) and Stations # 191 and #225 the least (5 species) (Figs. 6A-d and 6B-d.) The mean number of species per station was 15.1. The mean number of individuals per station was 217.3, ranging from a high of 1,473 at Station #226 to a low of 10 at Station #225. Species diversity values (Figs. 6A-e and 6B-e) ranged from a low of 0.662 at Station #199, to a high of 3.731 at Station #204, with the mean H value for all stations being 2.206.

The mean values for species diversity (2.206) and species richness (15.1) fall into the moderate category while mean density (217.3) ranks in the high category.

The three numerically dominant benthic species for the entire region were the nut clam, Nucula proxima, the coot clam, Mulinia lateralis, and the polychaete, Nephtys incisa. Other dominants, in decreasing numerical importance, were Pitar morrhuana, Ensis directus, Yoldia limatula, Mediomastus ambiseta, Tellina agilis, Ampelisca abdita, and Pectinaria gouldii.

Shellfish

Twenty-six designated stations were inventoried for hard clams and oysters within the 50 foot depth contour line (Figs. 6A-f and 6B-f.) Hard clams were reported at only two stations (Stations #187 and #195) both in low abundance. Quahog sized individuals were the only clams recovered.

Oysters were reported from three stations with moderate densities occurring at Station #188 and high densities at Stations # 187 and # 195.

Razor clams were the most abundant shellfish species in Region VI occurring at 28 stations (Figs. 6A-g and 6B-g.) Razor clams were found in very high densities at Stations # 187, #192, and #221 and in moderate densities at Stations # 189 and #213. Whelks were reported in low numbers at Stations #189, #195, #202, #226, #241, and #254.

Figure 6A-a

SAMPLING STATION POSITIONS - REGION VIA

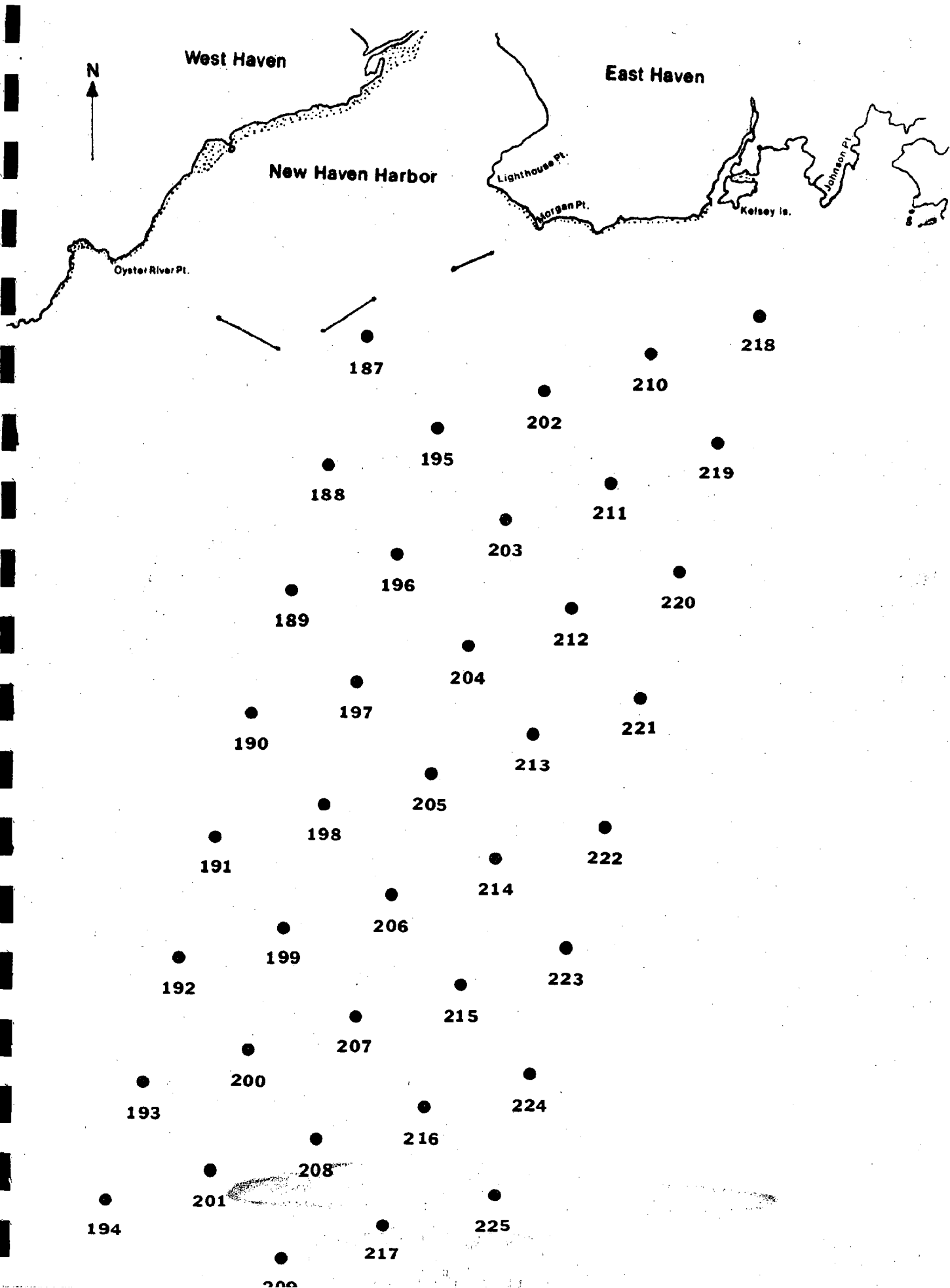


Figure 6A-b

DEPTH OF SAMPLING STATIONS (feet) - REGION VIA

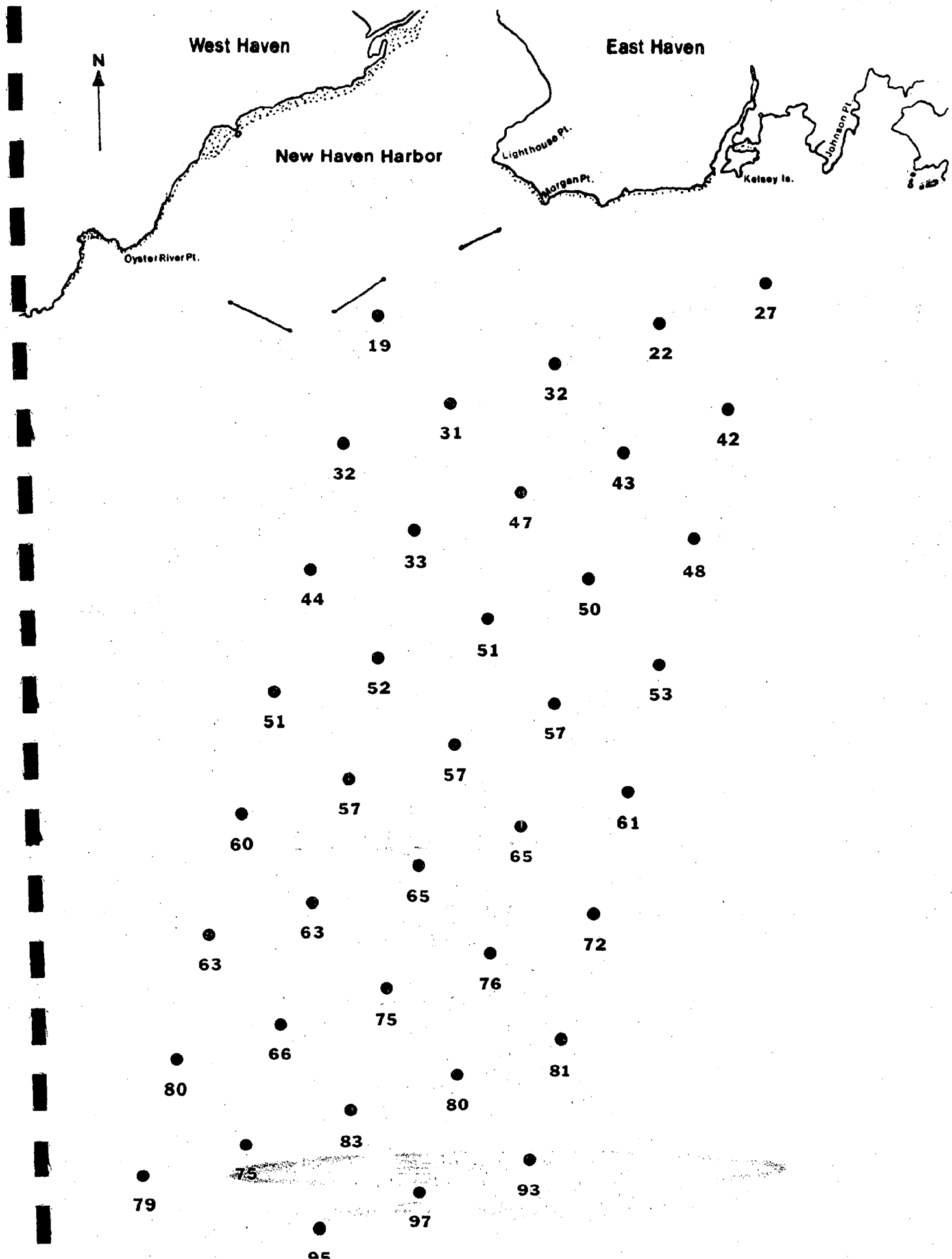


Figure 6A-c

SUBSTRATE COMPOSITION OF SAMPLING STATIONS - REGION VIA

SUBSTRATE KEY

Mud	○
Sandy-mud	●
Muddy-sand	■
Sand	□
Muddy-sandy shell	▲
Shell	△
Gravel	☆
Muddy-sandy gravel	★
Rock	⊛

West Haven

East Haven

N

New Haven Harbor

Oyster River Pt.

Lighthouse Pt.

Morgan Pt.

Kelley Is.

Johnson Pt.

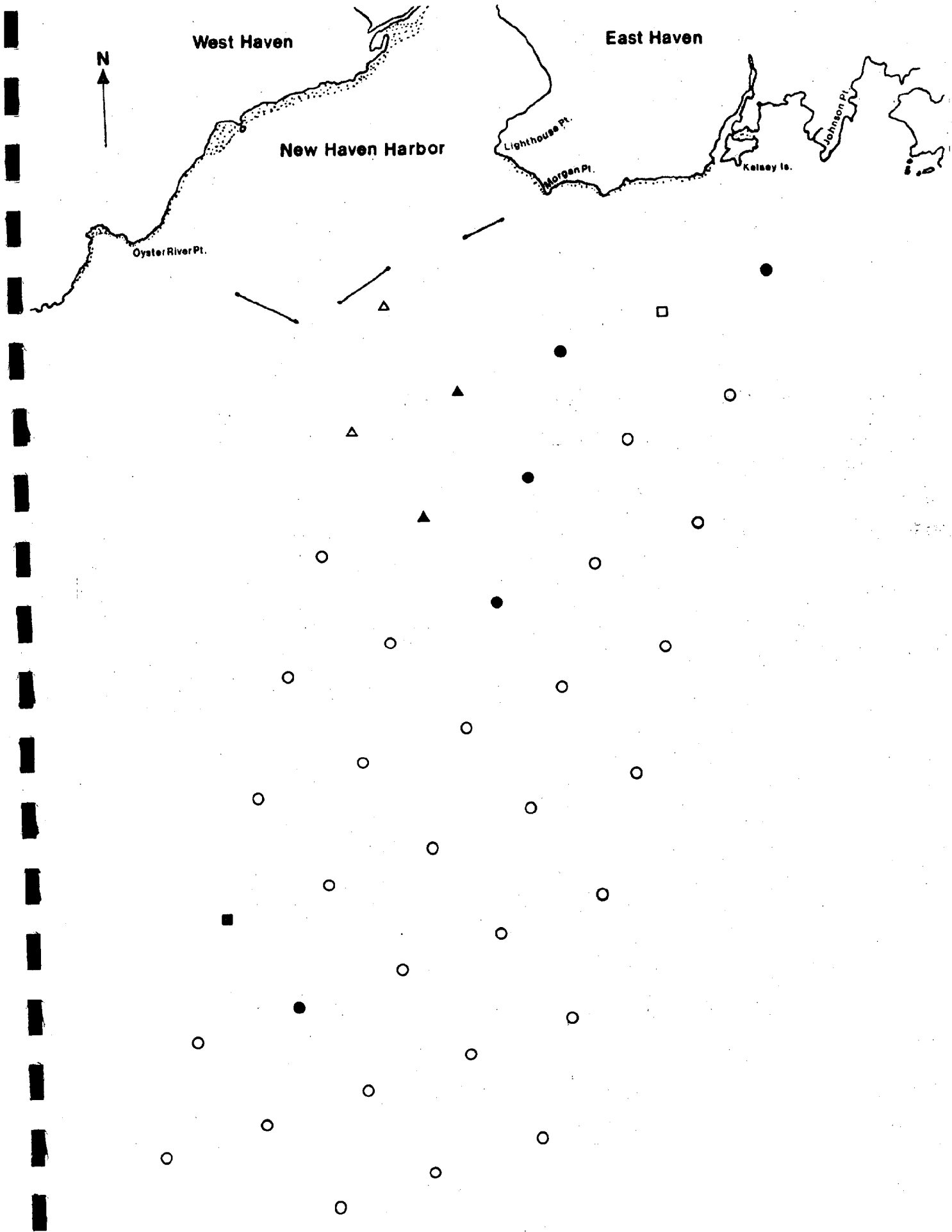


Figure 6A-d

NUMBER OF BENTHIC SPECIES - NUMBER OF INDIVIDUALS
PER GRAB SAMPLE - REGION VIA

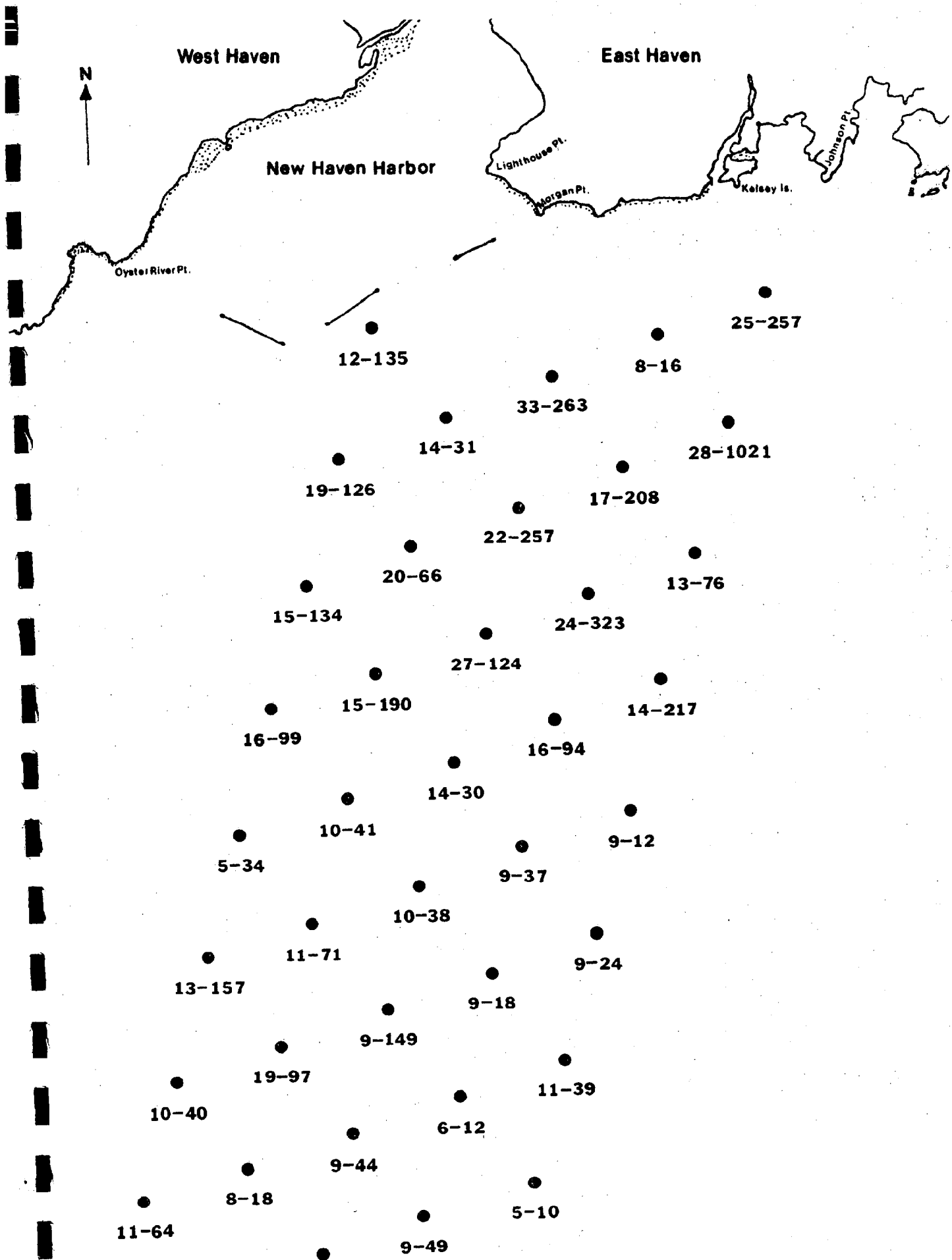


Figure 6A-e

BENTHIC SPECIES DIVERSITY CATEGORIES - REGION VIA

DIVERSITY KEY

Low	●
Moderate	▲
High	■
No organisms recovered	--

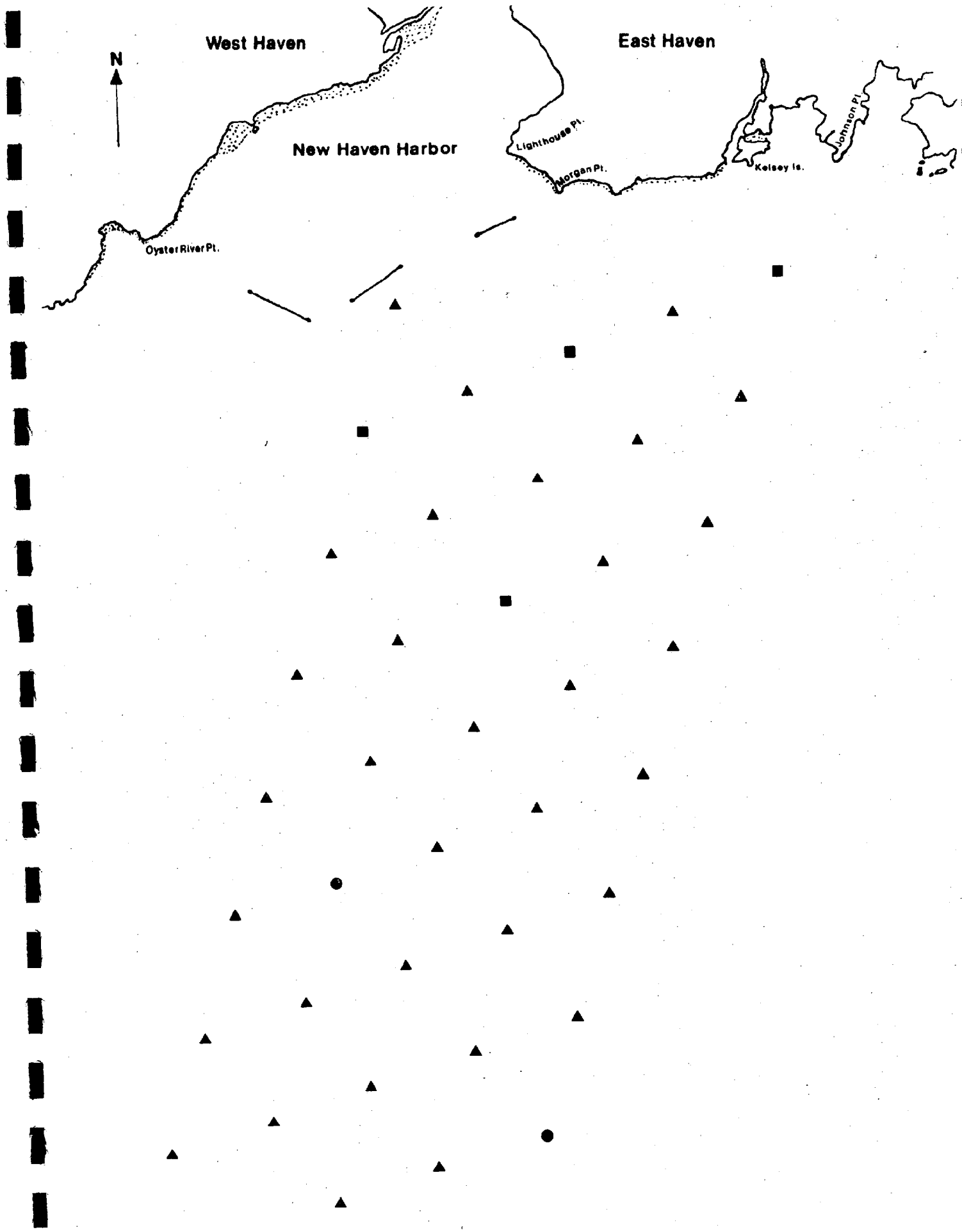


Figure 6A-f

EASTERN OYSTER AND HARD CLAM
ABUNDANCE CATEGORIES - REGION VIA

CLAM-OYSTER KEY

	Clams	Oysters
Low	●	○
Moderate	▲	△
High	■	□
Very high	★	☆
No clams/oysters recovered	--	

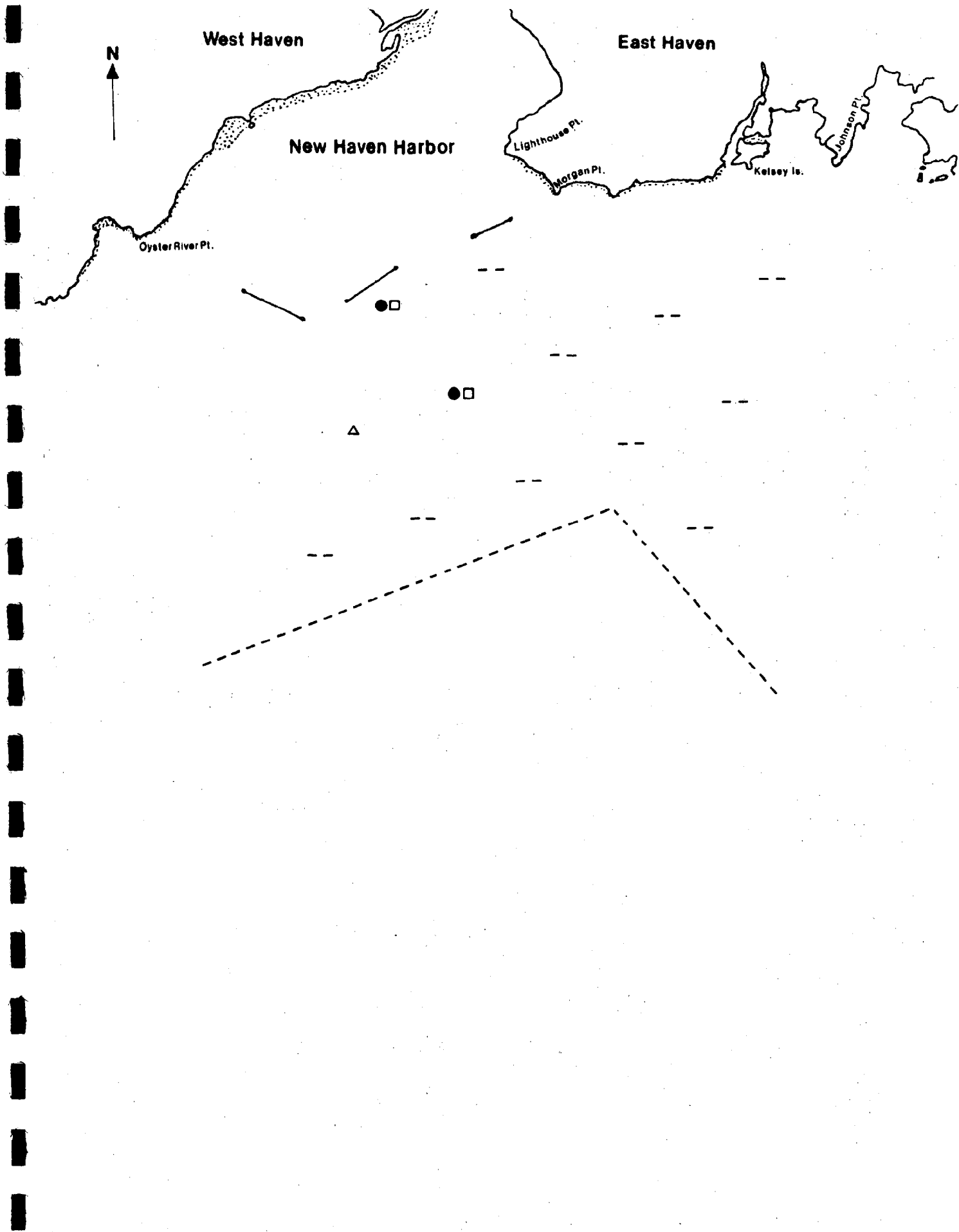


Figure 6A-g

ABUNDANCE CATEGORIES FOR MISCELLANEOUS
SHELLFISH SPECIES - REGION VIA

MISCELLANEOUS SHELLFISH KEY

	Whelk	Steamer Clam	Surf Clam
Low	*	⊙	*
Moderate			*
		Razor Clam	Blue Mussel
Low		●	○
Moderate		▲	△
High		■	□
Very high		★	☆
None recovered		--	

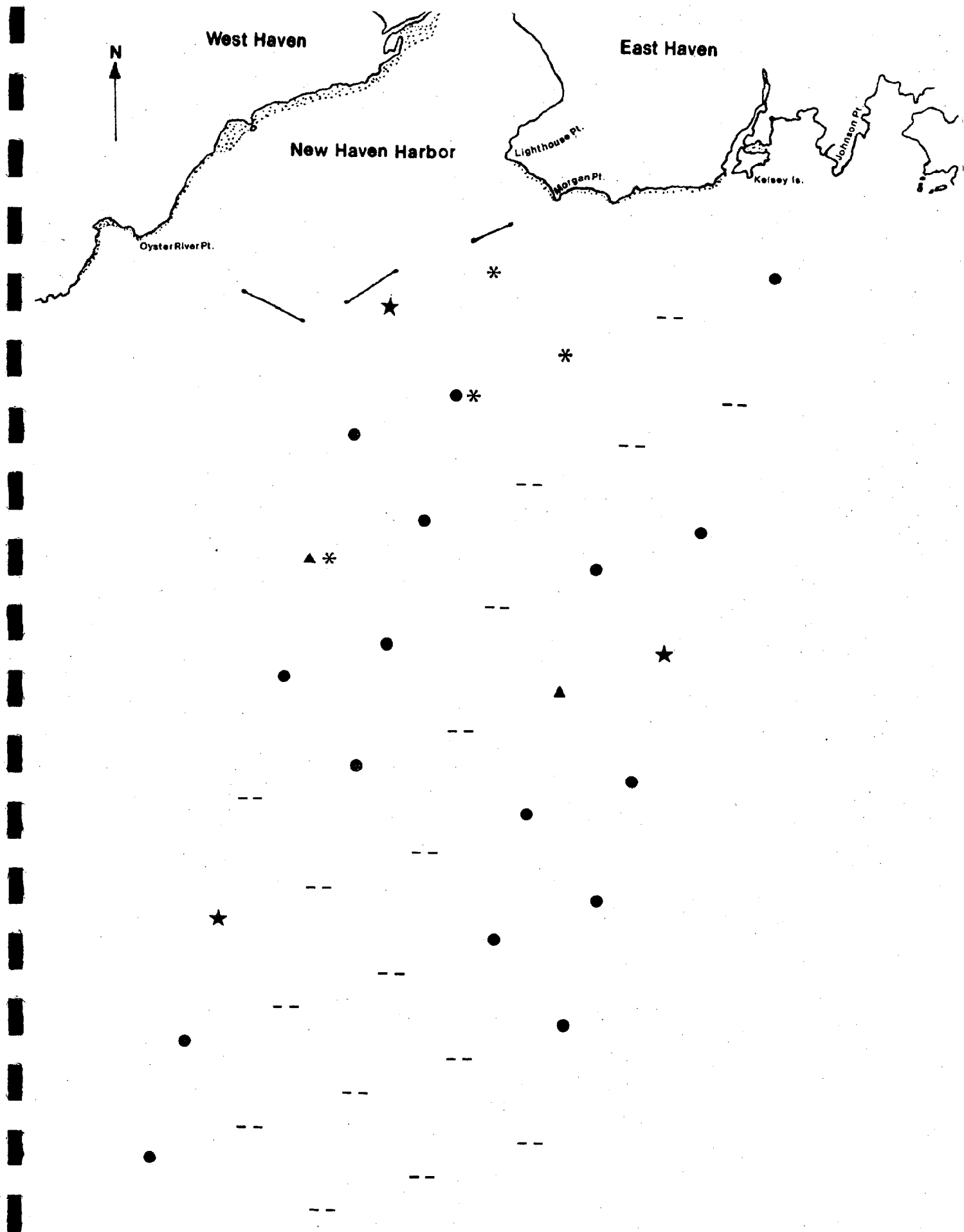


Figure 6B-a

SAMPLING STATION POSITIONS - REGION VIB

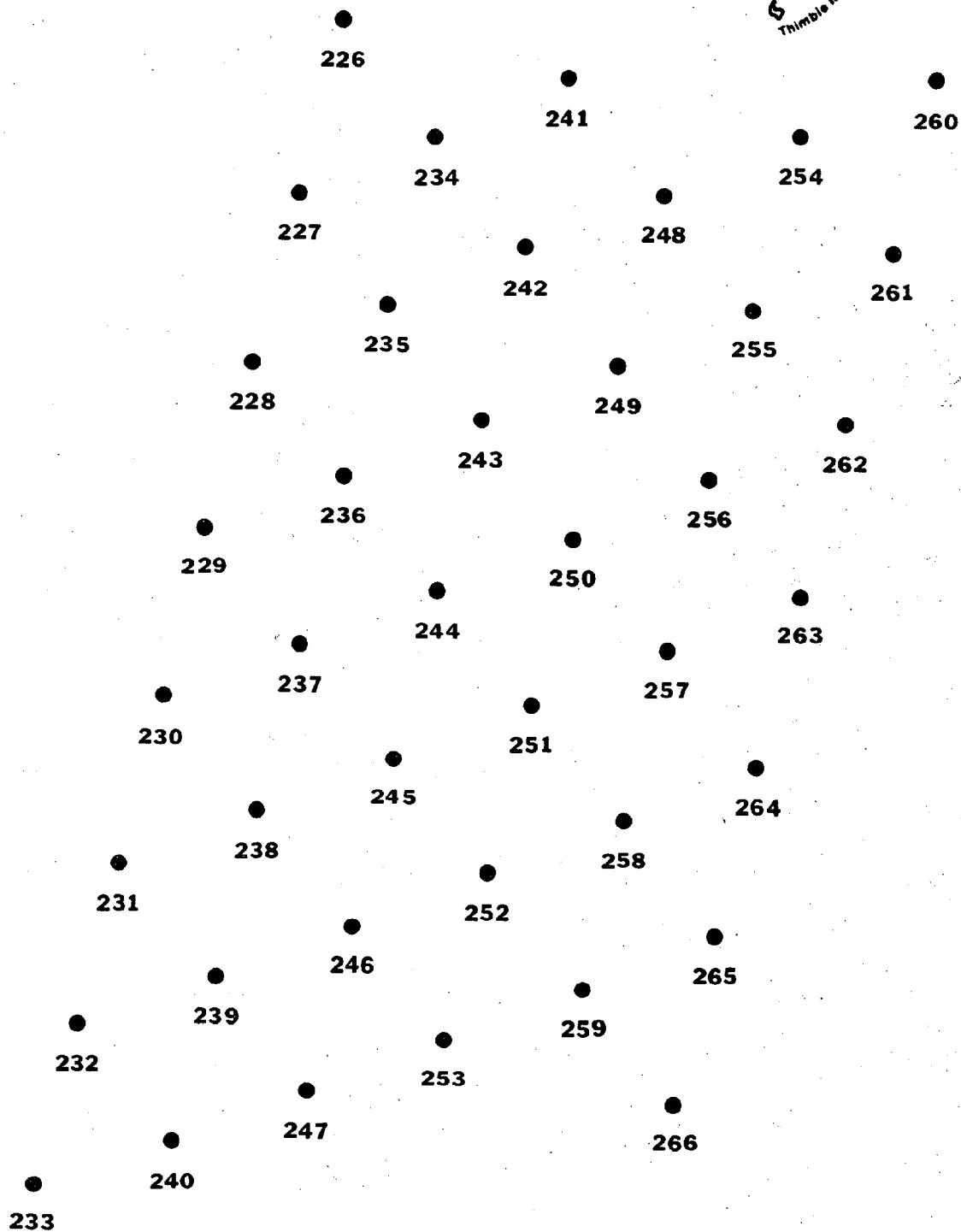
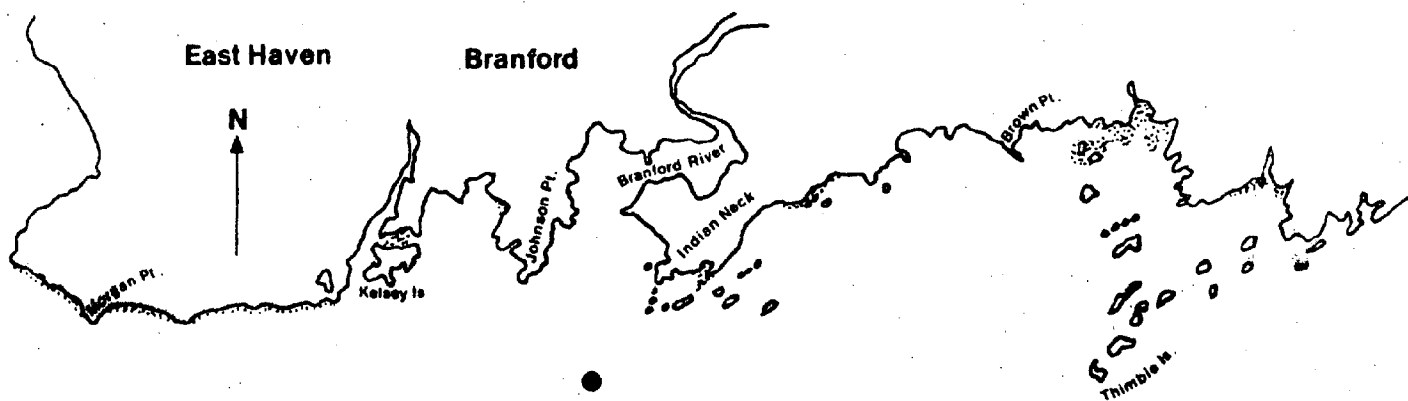


Figure 6B-b

DEPTH OF SAMPLING STATIONS (feet) - REGION VIB

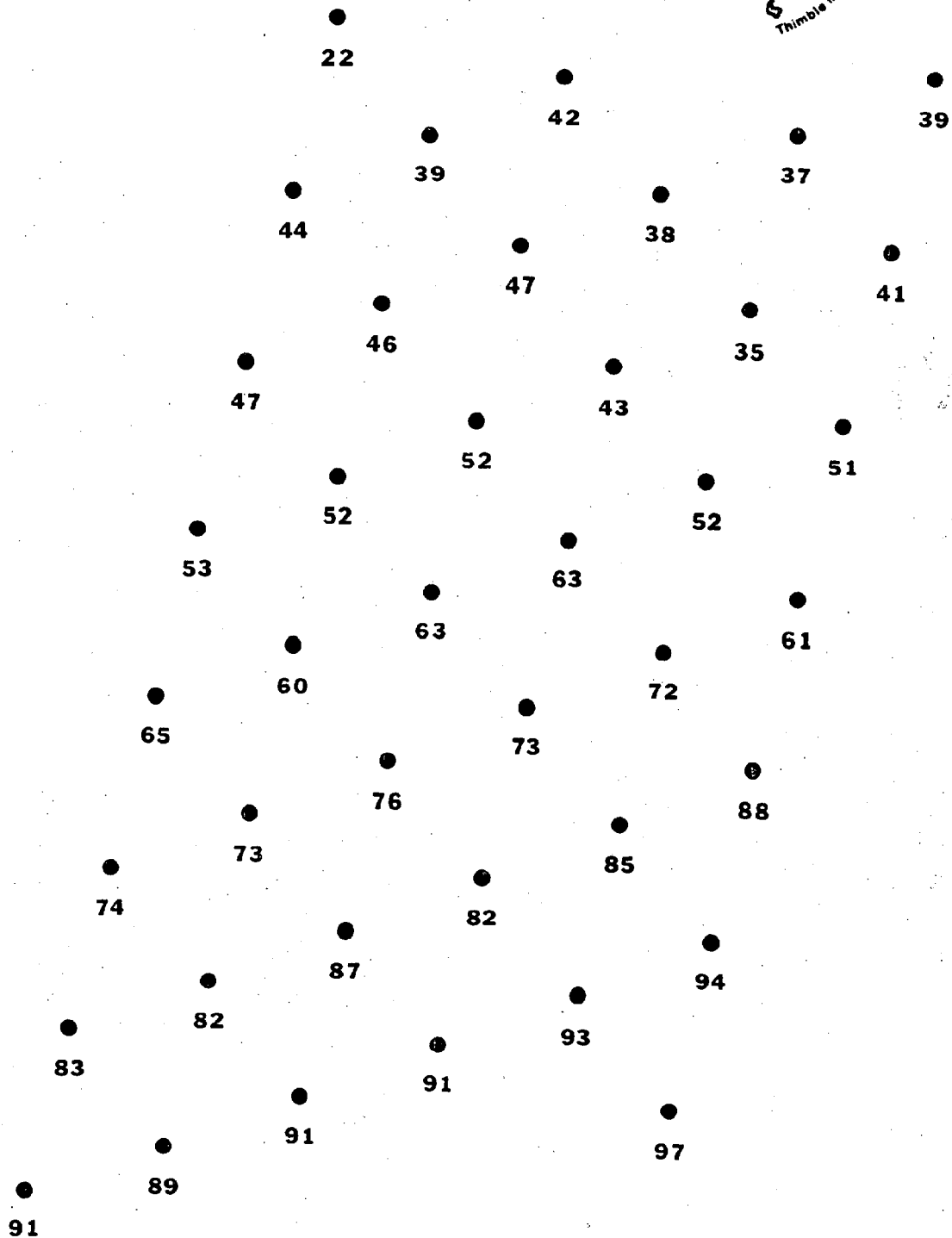
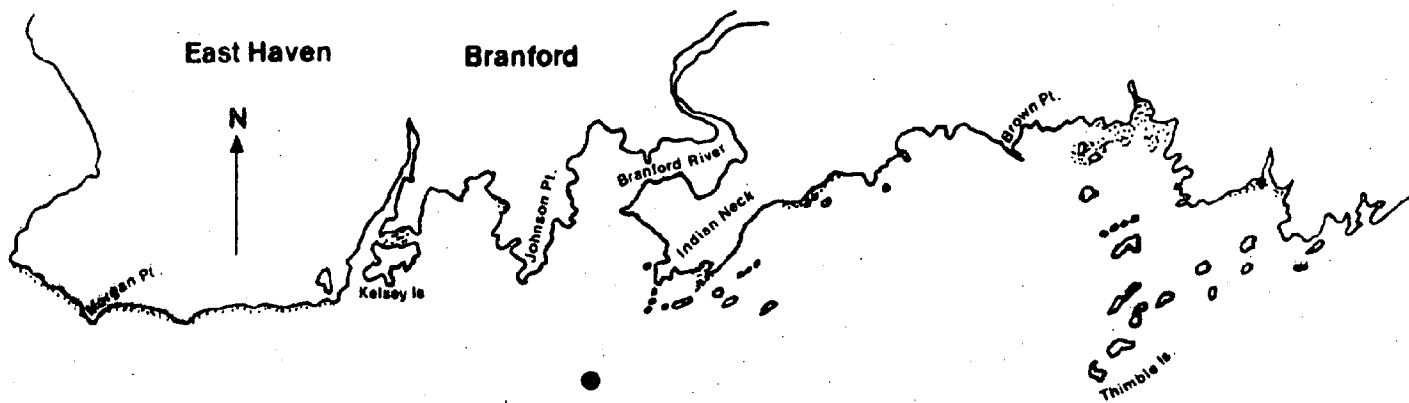


Figure 6B-c

SUBSTRATE COMPOSITION OF SAMPLING STATIONS - REGION VIB

SUBSTRATE KEY

Mud	○
Sandy-mud	●
Muddy-sand	■
Sand	□
Muddy-sandy shell	▲
Shell	△
Gravel	☆
Muddy-sandy gravel	★
Rock	⊗

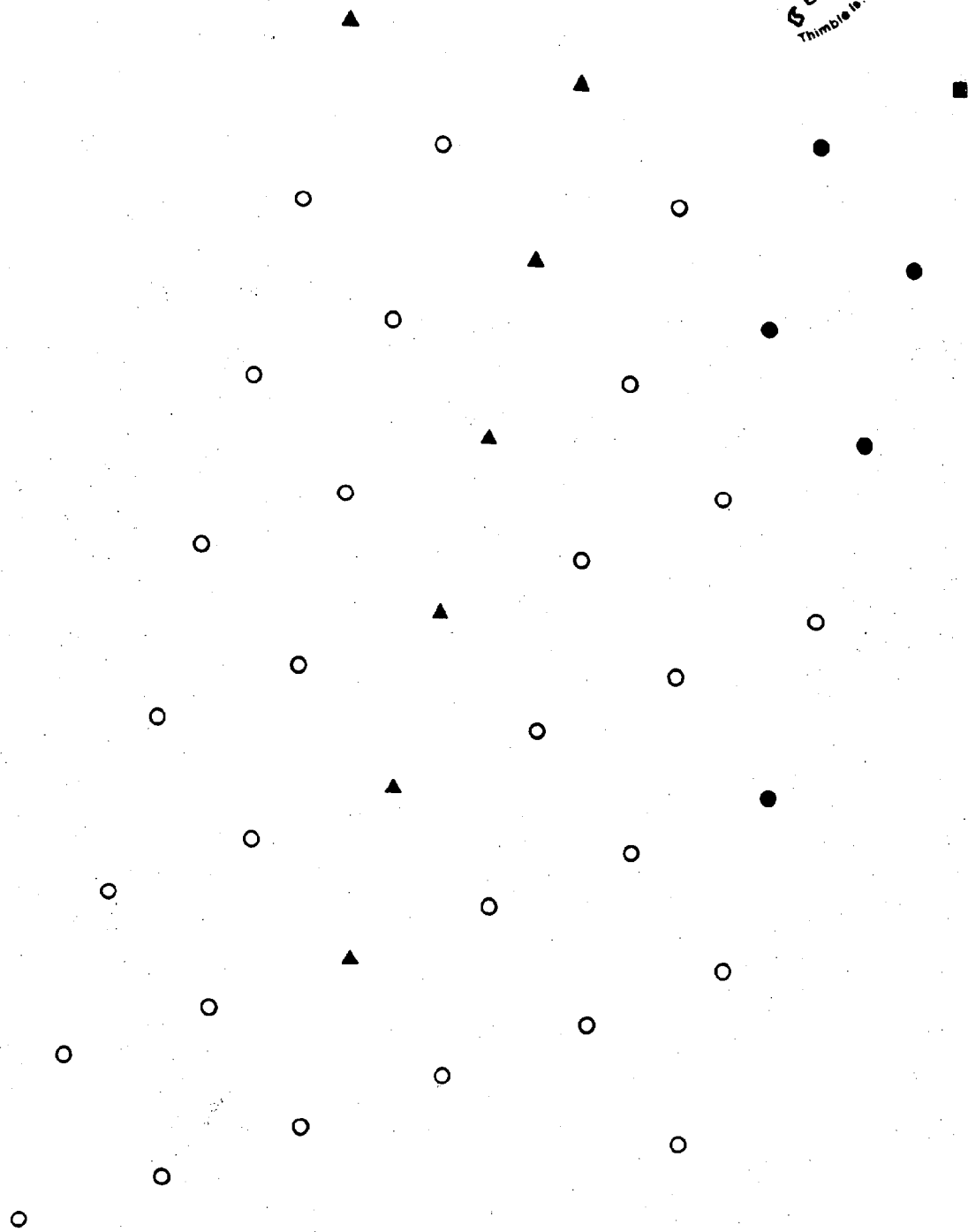
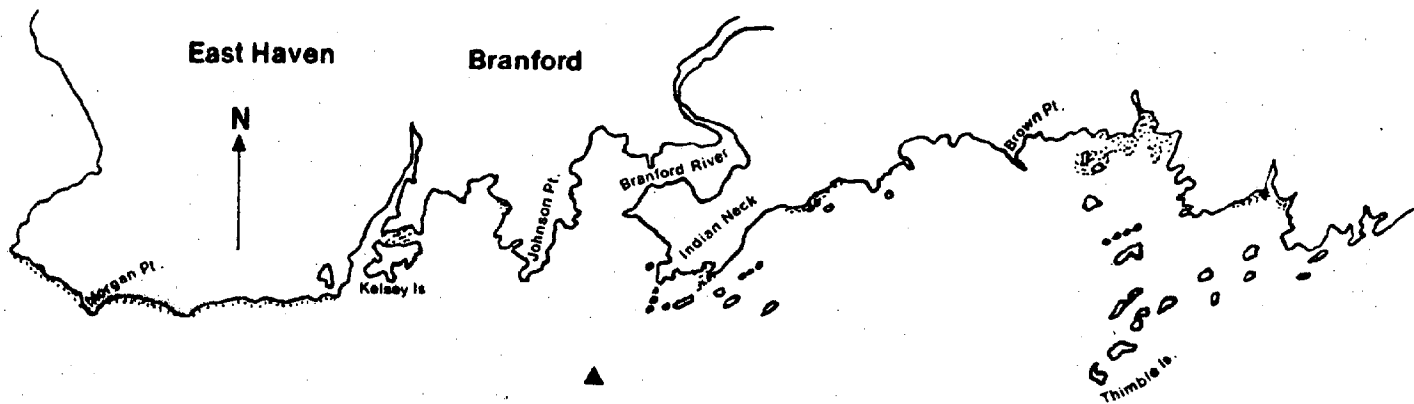


Figure 6B-d

NUMBER OF BENTHIC SPECIES - NUMBER OF INDIVIDUALS
PER GRAB SAMPLE - REGION VIB

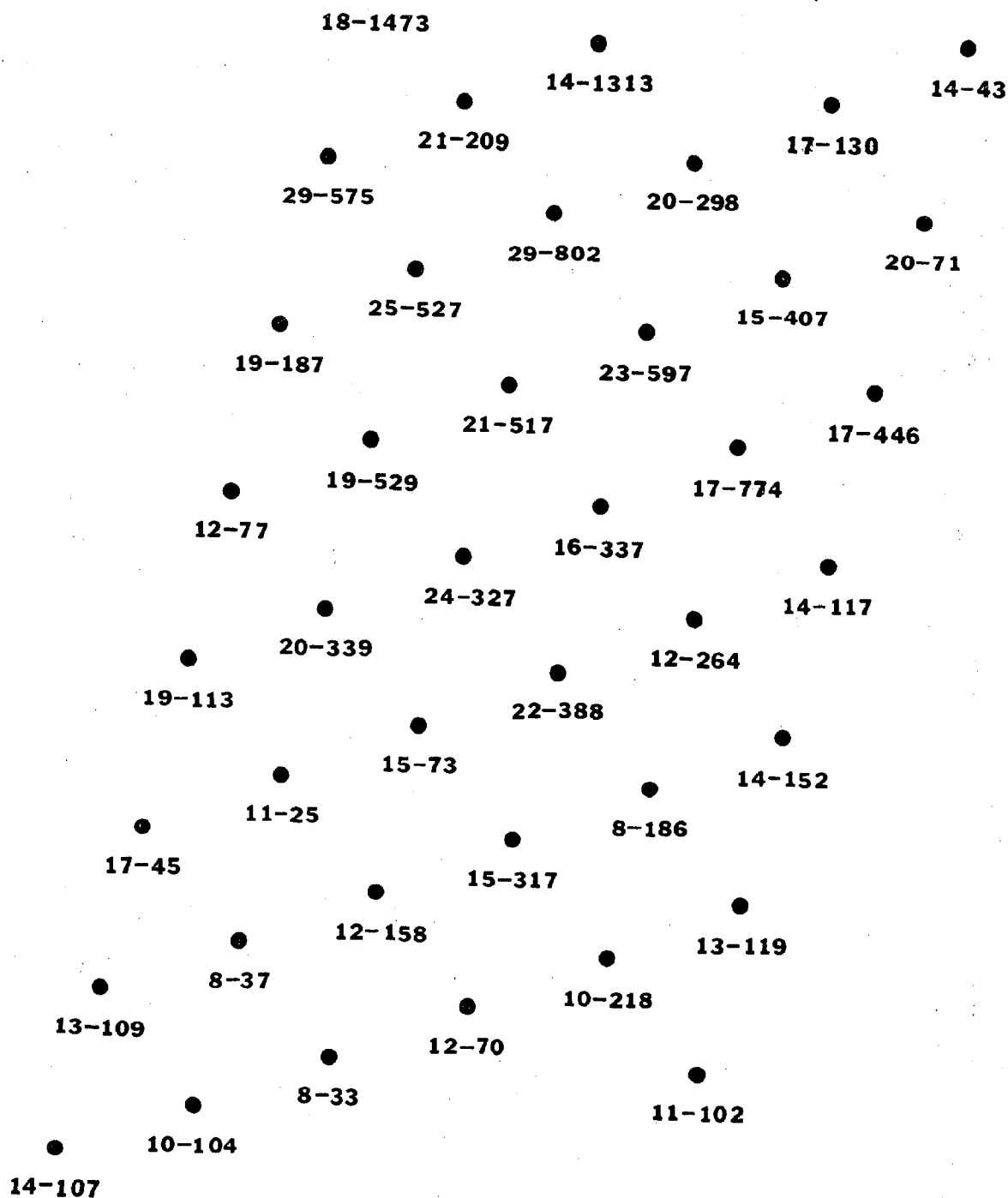
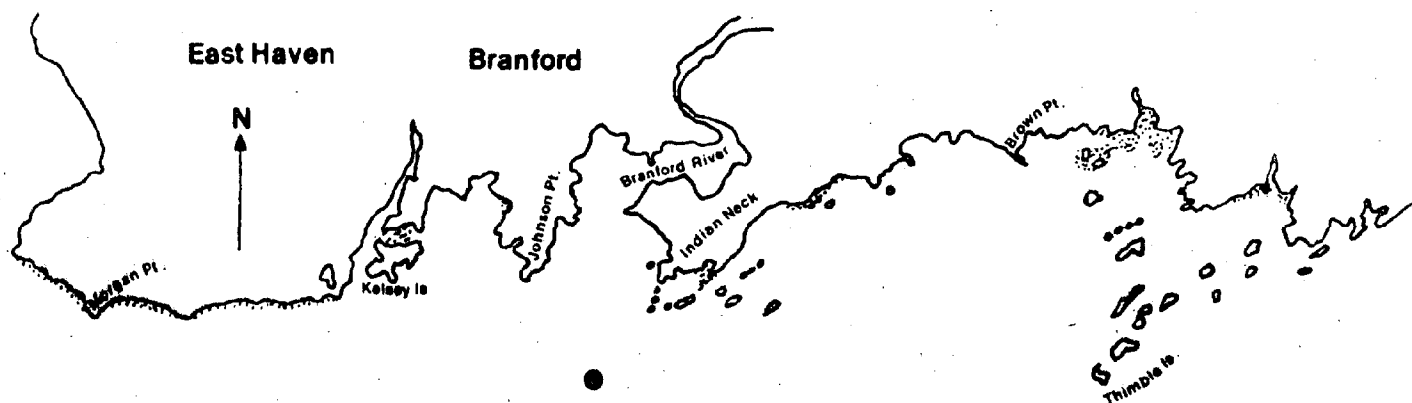


Figure 6B-e

BENTHIC SPECIES DIVERSITY CATEGORIES - REGION VIB

DIVERSITY KEY

Low	●
Moderate	▲
High	■
No organisms recovered	--

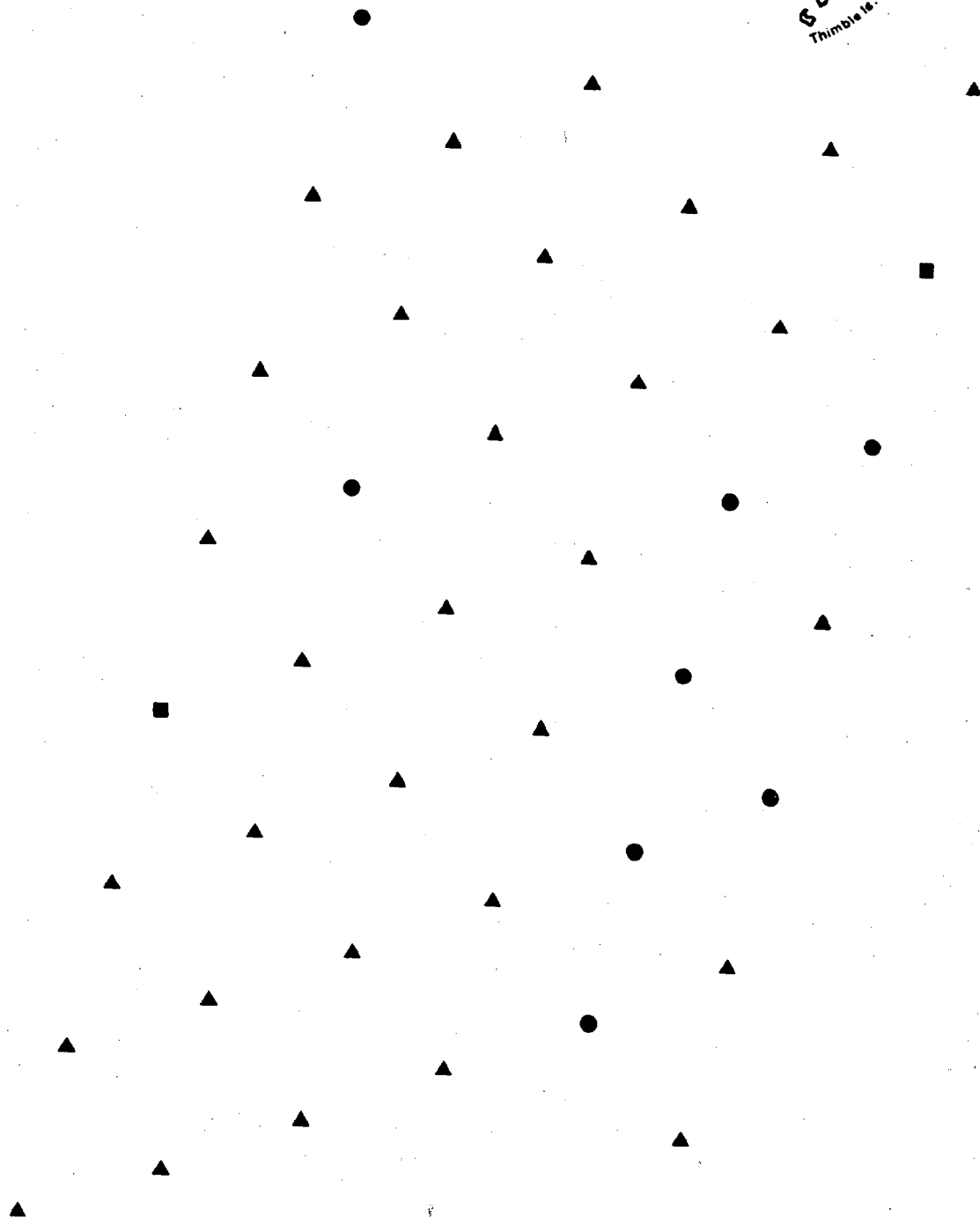
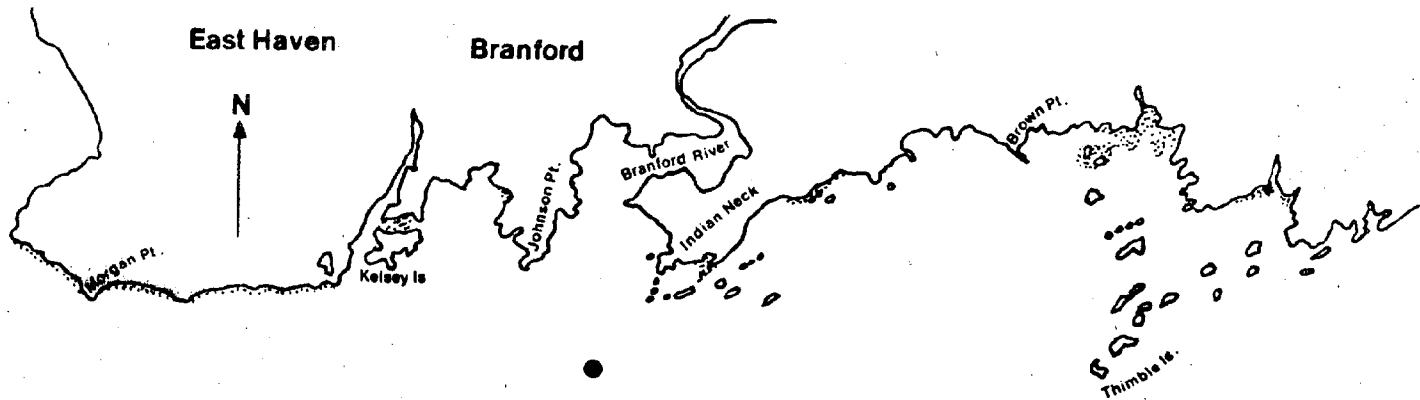


Figure 6B-f

EASTERN OYSTER AND HARD CLAM
ABUNDANCE CATEGORIES - REGION VIB

CLAM-OYSTER KEY

	Clams	Oysters
Low	●	○
Moderate	▲	△
High	■	□
Very high	★	☆
No clams/oysters recovered	--	

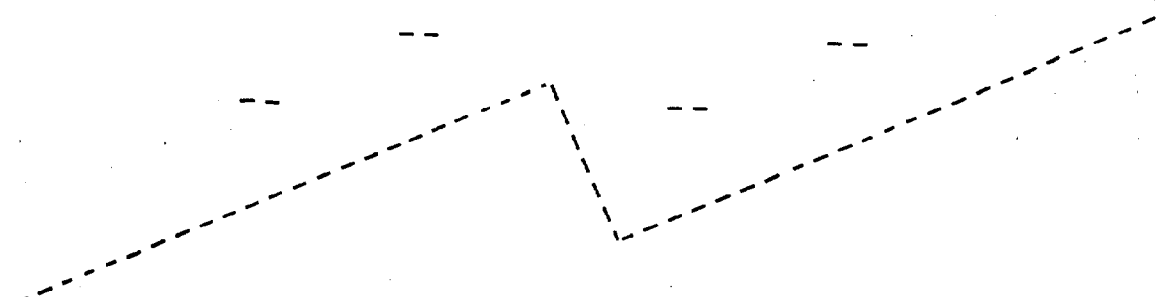
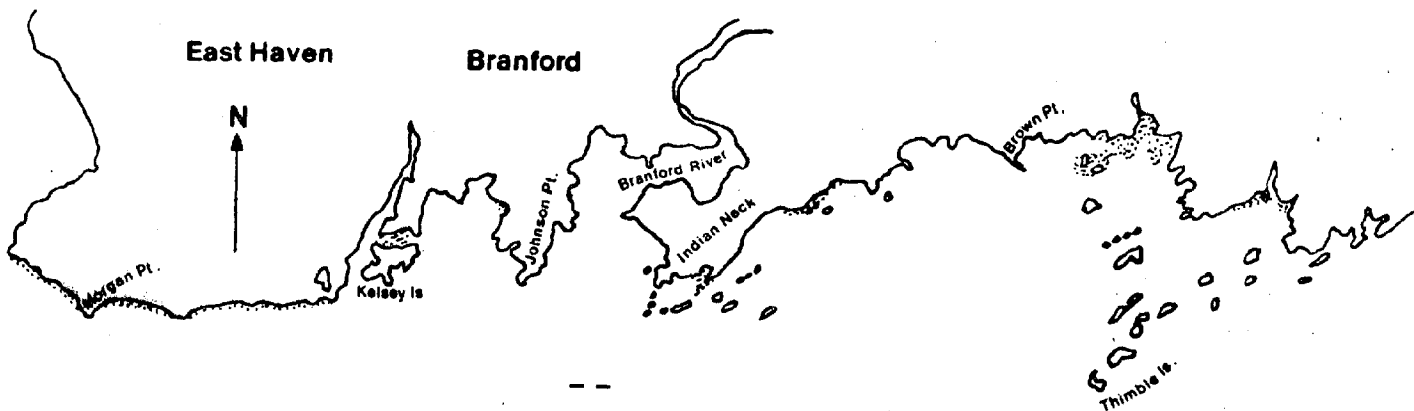
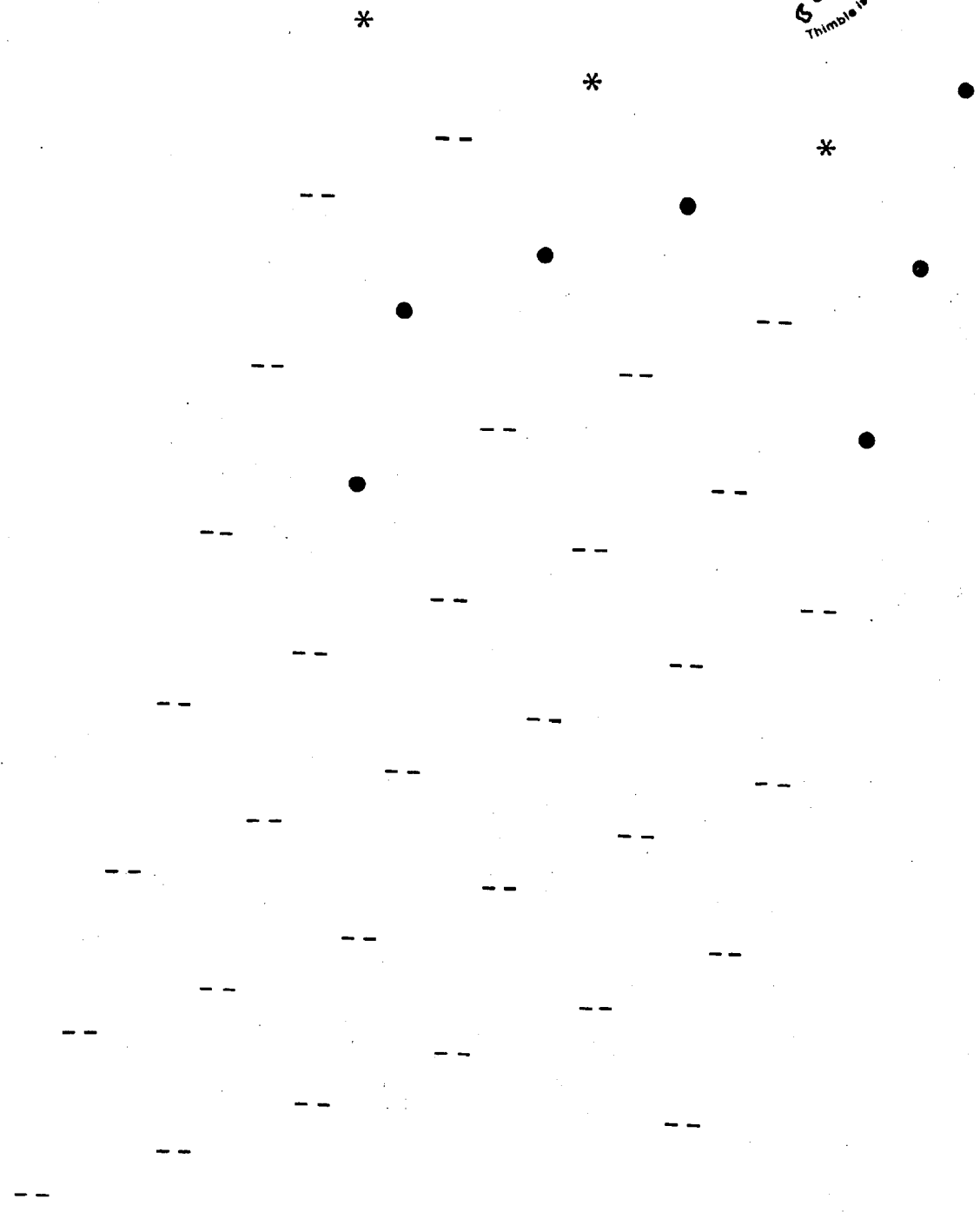
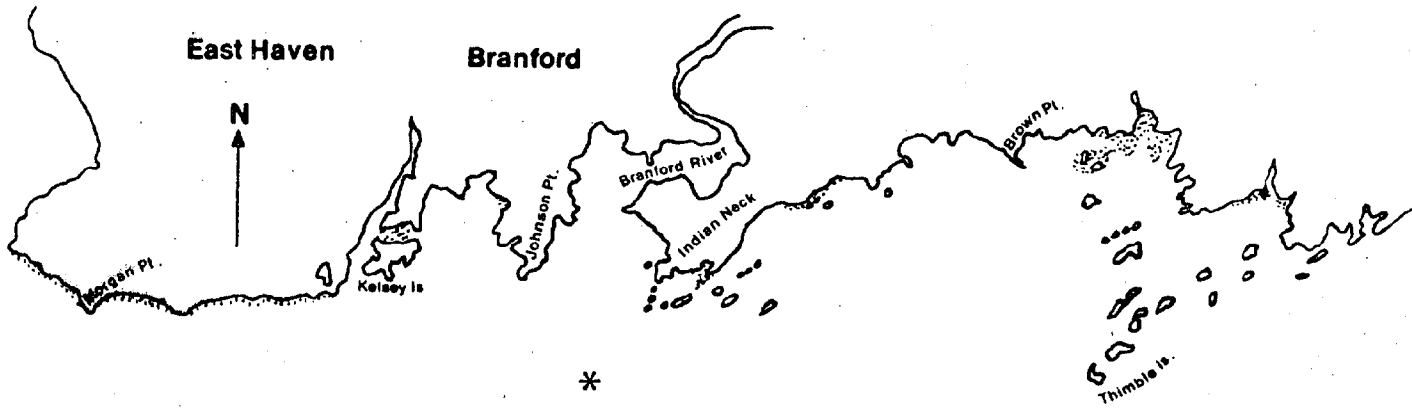


Figure 6B-g

ABUNDANCE CATEGORIES FOR MISCELLANEOUS
SHELLFISH SPECIES - REGION VIB

MISCELLANEOUS SHELLFISH KEY

	Whelk	Steamer Clam	Surf Clam
Low	*	★	*
Moderate			*
		Razor Clam	Blue Mussel
Low		●	○
Moderate		▲	△
High		■	□
Very high		★	☆
None recovered		--	



Region VII

A total of 53 stations (Fig. 7a) were inventoried from Region VII with their respective Loran-C coordinates listed in Table 13. Sampling depths ranged from a low of 13 feet (Station #267) to a high of 100 feet (Station #302) with the mean depth being 66.7 feet (fig. 7b.)

Sand and muddy-sand were the most frequently encountered substrate types occurring at 62.2% of all sampling stations (Fig. 7c,) while mud occurred at only 13.0% of the stations.

A total of 134 benthic species were reported from Region VII (Table 14,) with Station #280 exhibiting the greatest number (36 species) and Station #317 the least (4 species) (Fig. 7d.) The mean number of species per station was 20.1. The mean number of individuals per station was 293.0, ranging from a high of 1,285 at Station #277 to a low of 7 at Station #317.

Species diversity values (Fig. 7e) ranged from a low of 1.131 at Station #267 to a high of 3.363 at Station #280 with the mean H value for all stations being 2.563.

The mean values for species diversity (2.563,) species richness (20.1) and density (293.0) all fall into the high category.

The three numerically dominant benthic species for the entire region were the bamboo worm, Clymenella zonalis, the polychaete, Asabellides oculatus and the mud worm, Spiophanes bombyx. Other dominants, in decreasing numerical importance, were; Tellina agilis, Nassarius trivittatus, Mulinia lateralis, Mediomastus ambiseta, Nephtys picta, Ampelisca abdita and Ensis directus.

Shellfish

Sixteen designated stations were inventoried for hard clams and oysters within the 50 foot depth contour line (Fig. 7f.) Hard clams and oysters were not recovered from any of these stations. Hard clams occurred in low, moderate and very high densities at three undesigned stations (Fig. 7f,) with the chowder sized category accounting for the 100% of all individuals.

Razor clams were widely distributed throughout the region (Fig. 7g) occurring at 28 stations. Razor clams were present in low numbers at all stations except Stations #307 and #313 where moderate numbers were reported. Whelks were found in low numbers at nine stations (Stations #274, #281, #286, #292, #298, #299, #304, #309 and #315.) The blue mussel was found in low numbers at a single station (Station #281.)

Figure 7a

SAMPLING STATION POSITIONS - REGION VII

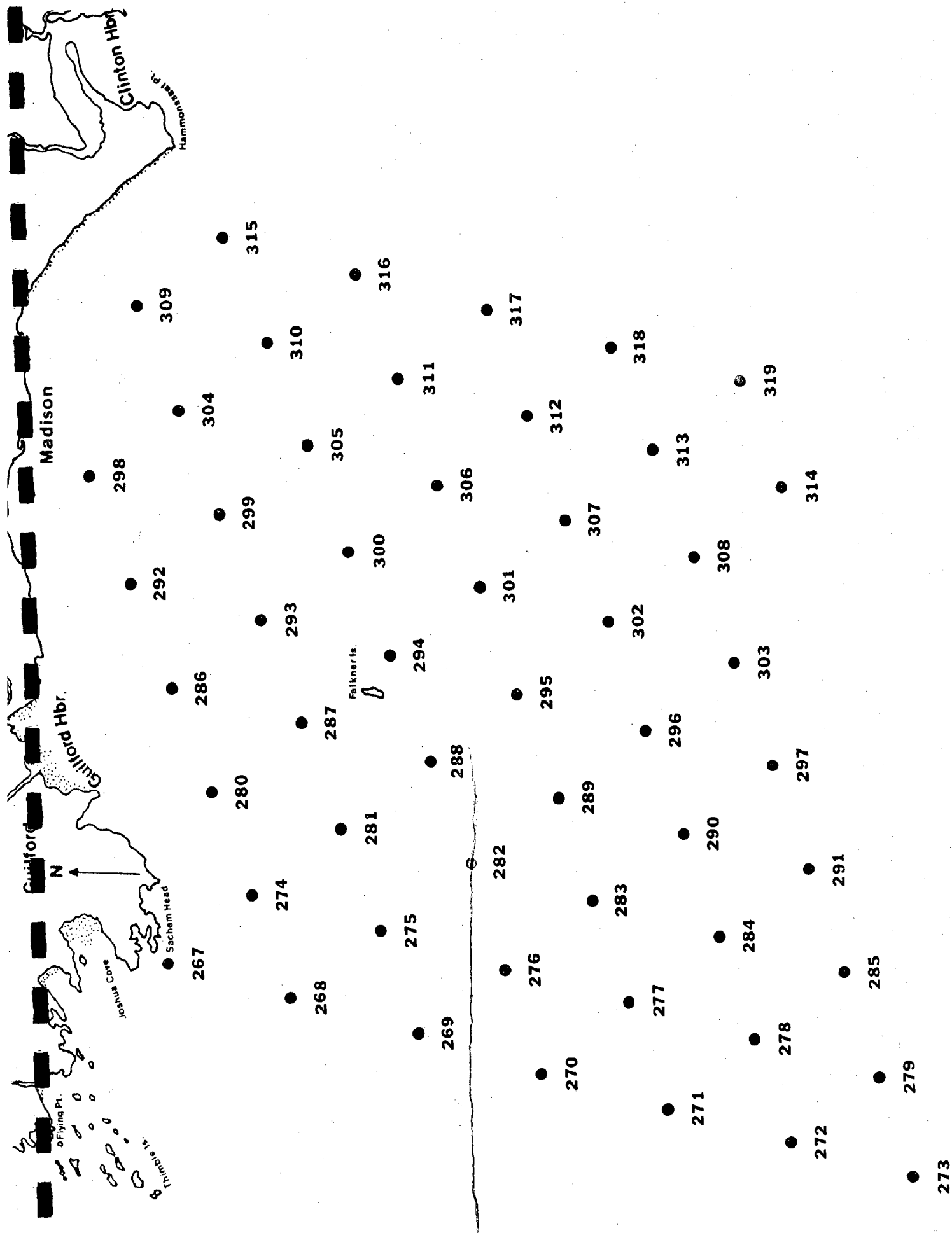


Figure 7b

DEPTH OF SAMPLING STATIONS (feet) - REGION VII

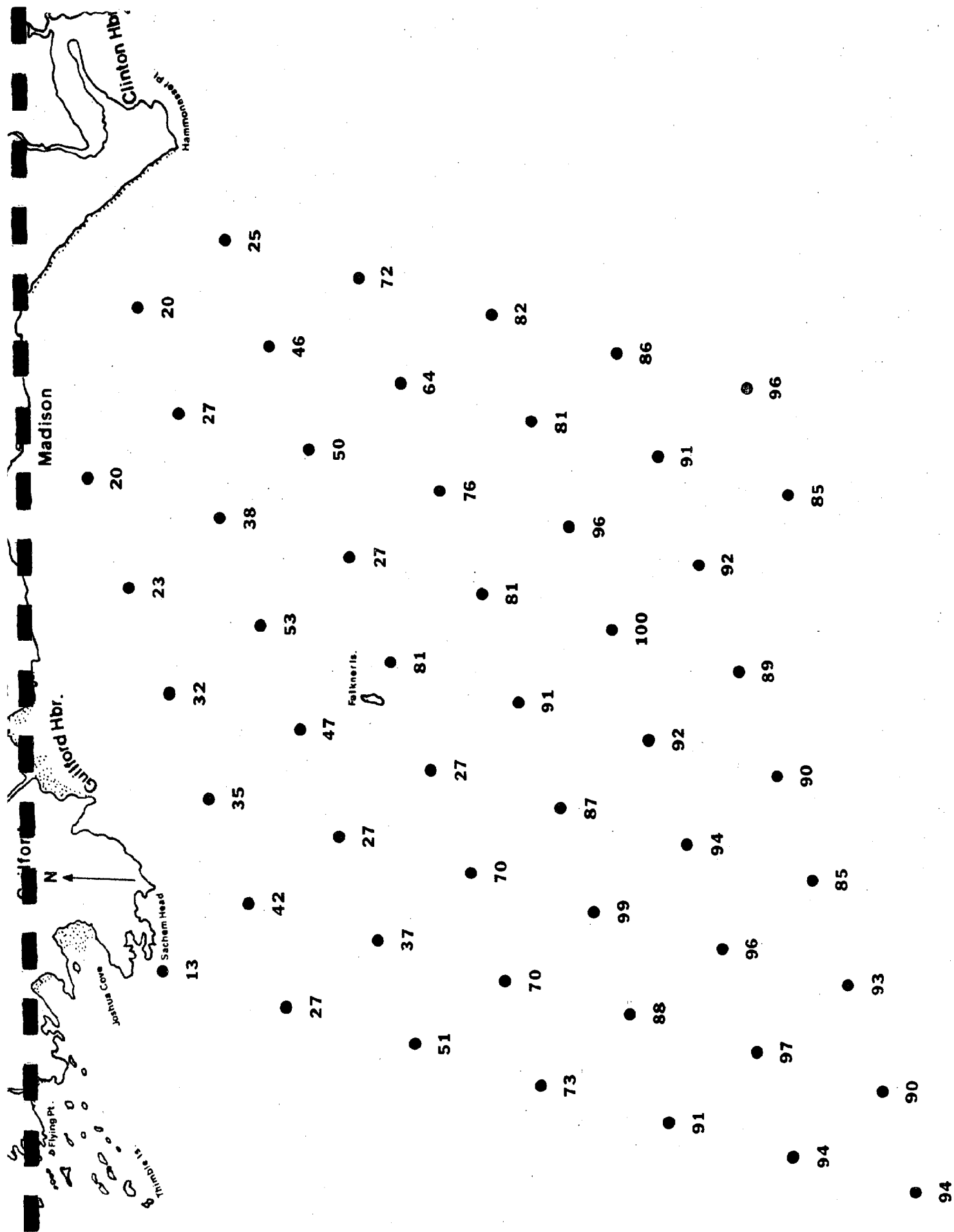


Figure 7c

SUBSTRATE COMPOSITION OF SAMPLING STATIONS - REGION VII

<u>SUBSTRATE KEY</u>	
Mud	○
Sandy-mud	●
Muddy-sand	■
Sand	□
Muddy-sandy shell	▲
Shell	△
Gravel	☆
Muddy-sandy gravel	★
Rock	⊙

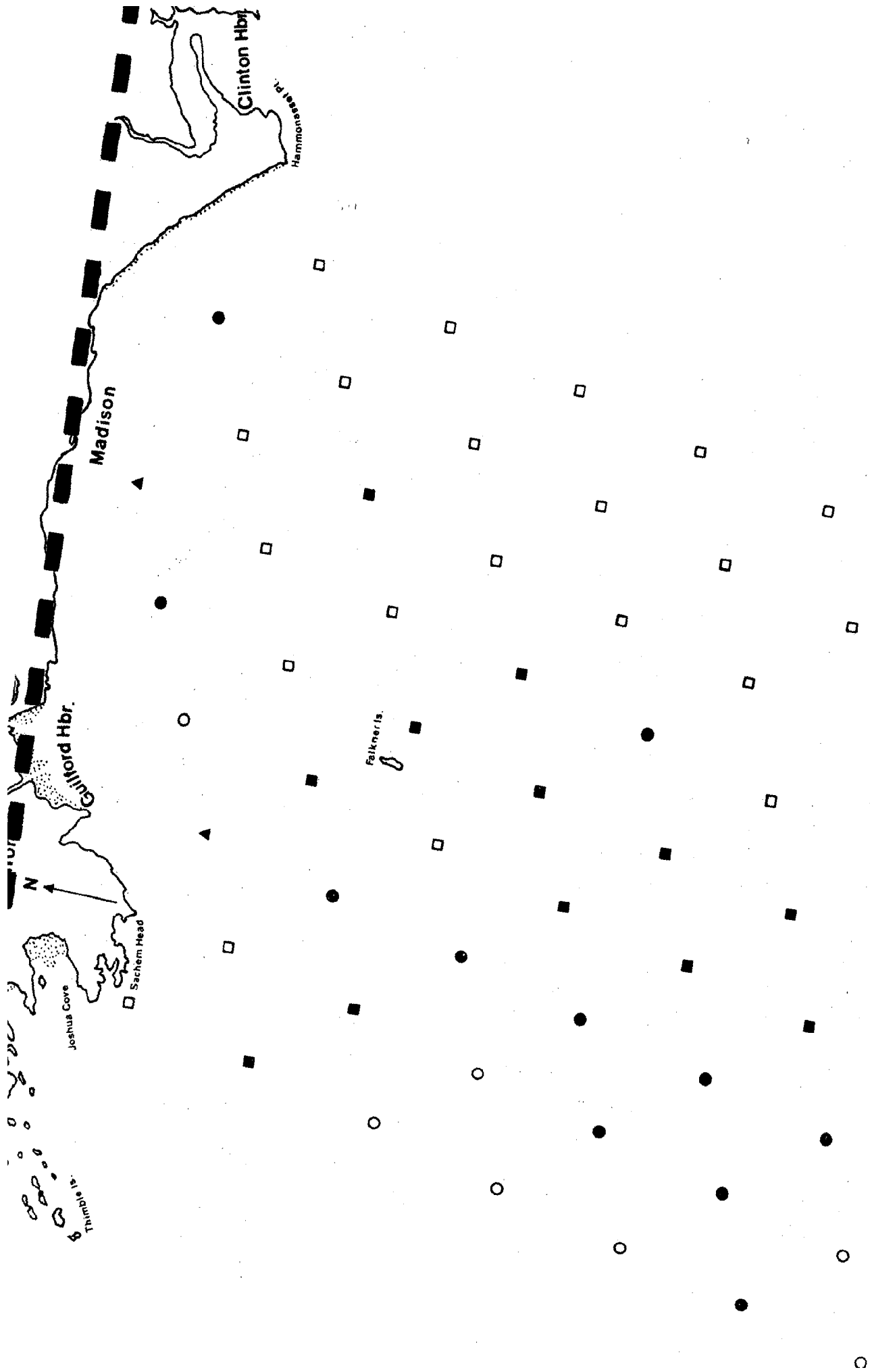


Figure 7d

NUMBER OF BENTHIC SPECIES - NUMBER OF INDIVIDUALS
PER GRAB SAMPLE - REGION VII

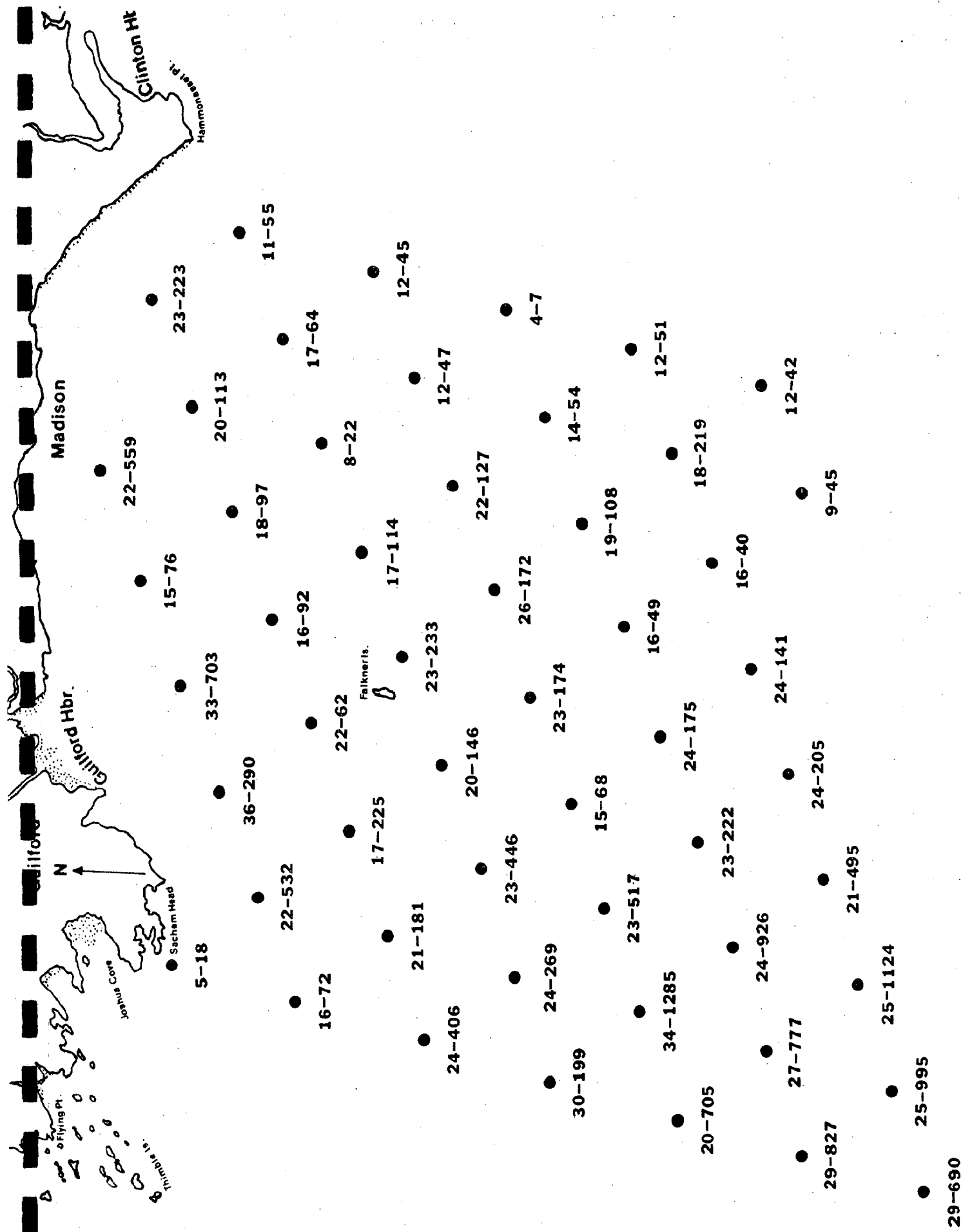


Figure 7e

BENTHIC SPECIES DIVERSITY CATEGORIES - REGION VII

DIVERSITY KEY

Low	●
Moderate	▲
High	■
No organisms recovered	--

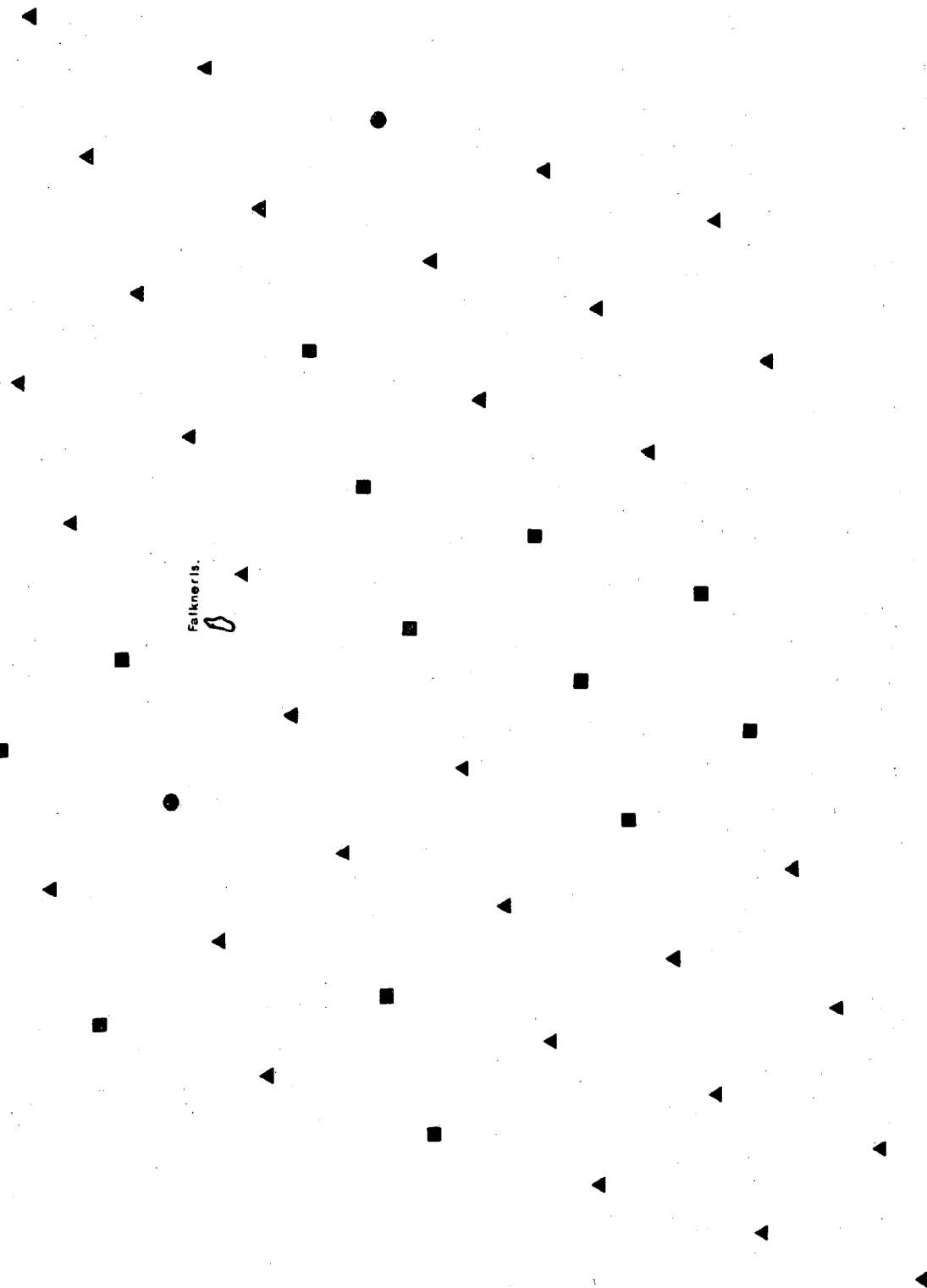
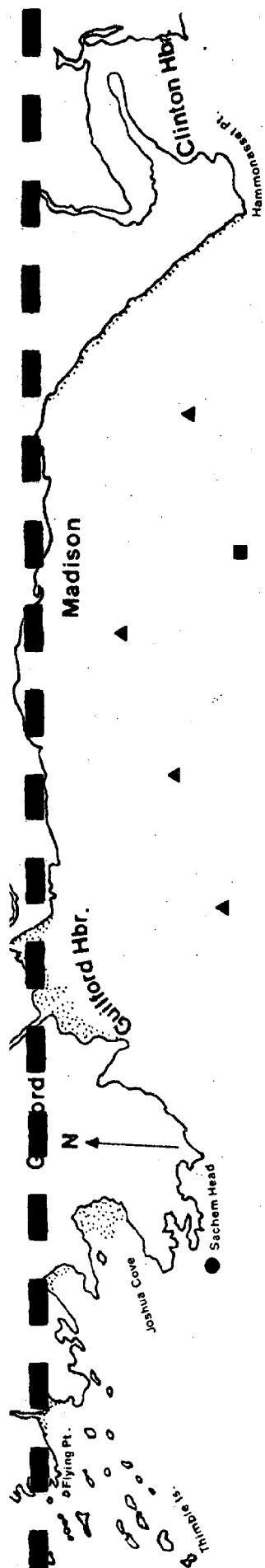


Figure 7f

EASTERN OYSTER AND HARD CLAM
ABUNDANCE CATEGORIES - REGION VII

<u>CLAM-OYSTER KEY</u>	
Low	Clams ●
Moderate	▲
High	■
Very high	★
No clams/oysters recovered	--
	Oysters
	○
	△
	□
	☆

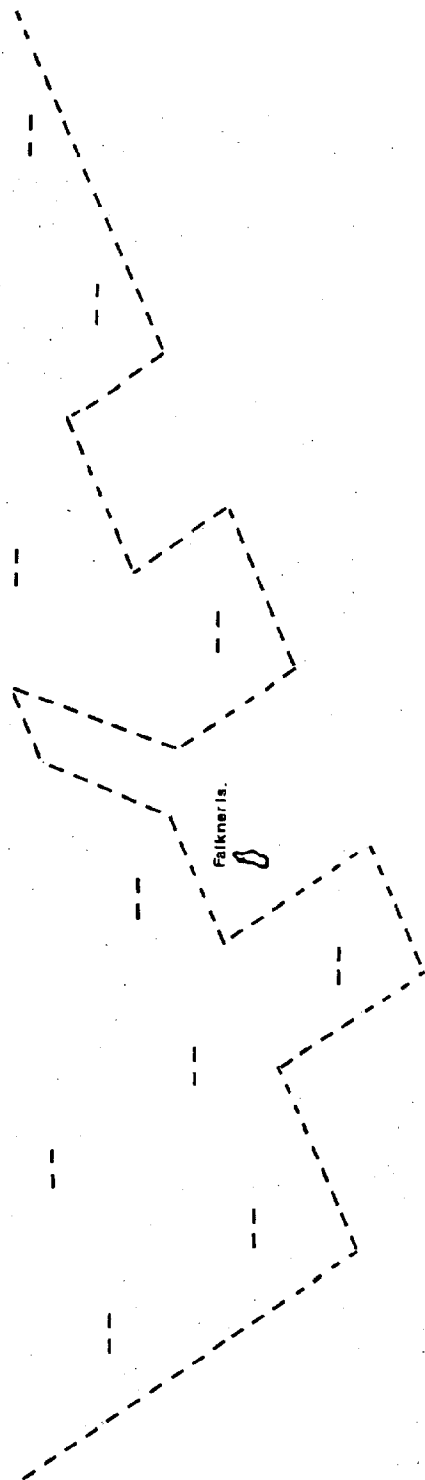
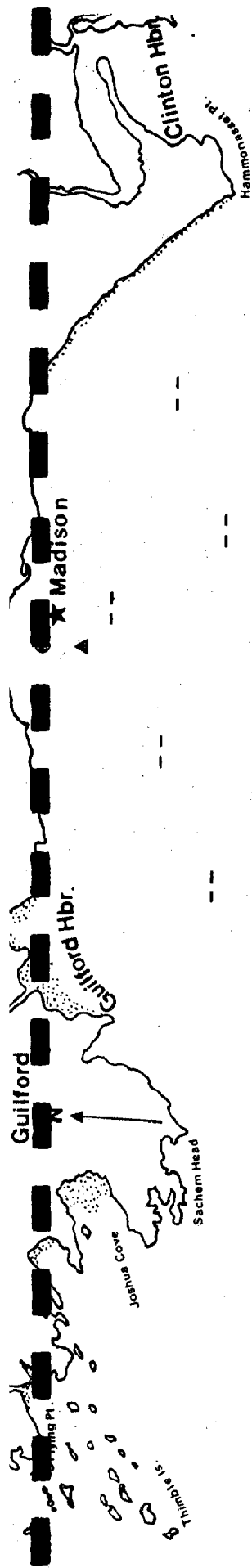
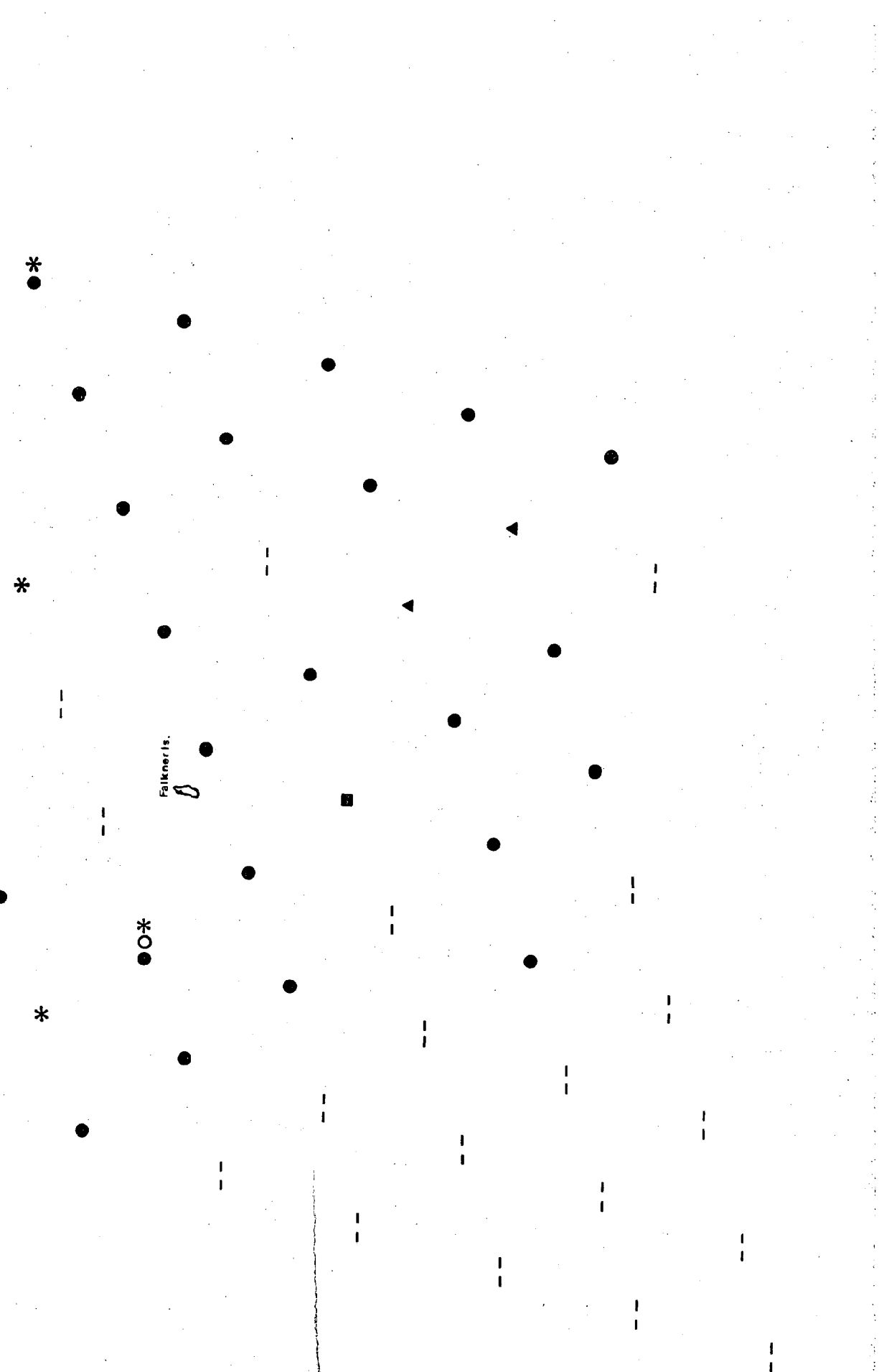
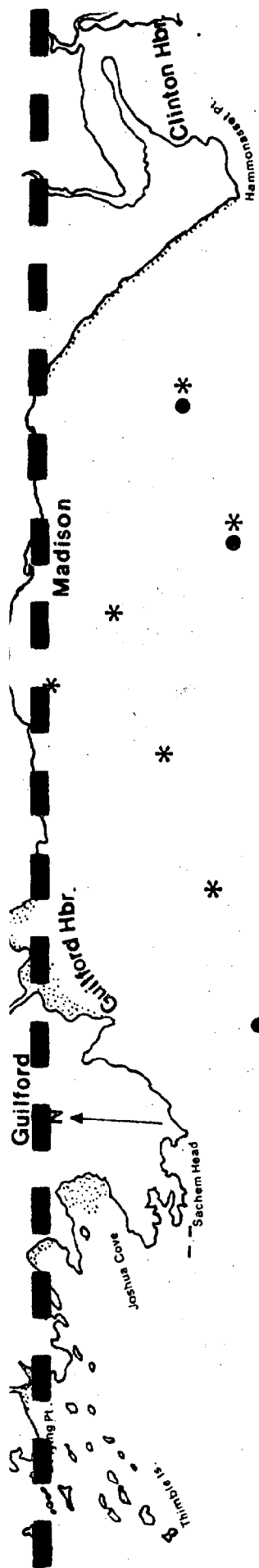


Figure 7g

ABUNDANCE CATEGORIES FOR MISCELLANEOUS
SHELLFISH SPECIES - REGION VII

MISCELLANEOUS SHELLFISH KEY

	Whelk	Steamer Clam	Surf Clam
Low	*	⊙	*
Moderate			*
Low		●	○
Moderate		▲	△
High		■	□
Very high		★	☆
None recovered		--	
		Razor Clam	Blue Mussel



Region VIII

A total of 39 stations (Fig. 8a) were inventoried from Region VIII with their respective Loran-C coordinates listed in Table 15. Sampling depths ranged from a low of 9 feet (Station #336) to a high of 170 feet (Station #358) with the mean depth being 65.4 feet (Fig. 8c.)

A total of 138 benthic species were reported from Region VIII (Table 16) with Station #329 exhibiting the greatest number (40 species) and Station #357 the least (0 species) (Fig. 8d.) The mean number of species per station was 12.5. The mean number of individuals per station was 78.0, ranging from a high of 976 at Station #354 to a low of 0 at Station #357.

Species diversity values (fig. 8e) ranged from a low of 0.0 at Station #357 to a high of 3.743 at Station #329, with the mean H value for all stations being 2.020.

The mean values for species diversity (2.020) and species richness (12.5) fall into the moderate category, while density (78.0) falls into the low category.

The three numerically dominant benthic species, for the entire region, were: The amphipod, Protohaustorius wigleyi, the bivalve, Tellina agilis and the amphipod, Acanthohaustorius millsii. Other dominants, in decreasing numerical importance, were: Nephtys picta, Aricidea jefferysii, Unicola irrorata, Nassarius trivittatus, Prionospio heterobranchia, Bathyporeia quoffyensis and Clitellio arenarius.

Shellfish

Nine designated stations were inventoried for hard clams and oysters within the 50 foot depth contour line (Fig. 8f.) Hard clams were recovered in low

abundance from only a single station (Station #340) with only the Chowder size category being represented. Oysters were not recovered from any of the designated stations.

Razor clams (Stations #320, #325, #326, #339, #340, #341 and #349) (Fig. 8g,) steamer clams (Stations #328 and #347,) surf clams (Station #38,) blue mussels (Station #328) and whelks (Stations #332 and #340) all occurred in low numbers in Region VIII.

Figure 8a

SAMPLING STATION POSITIONS - REGION VIII

10-30-61 no data
11-11-61

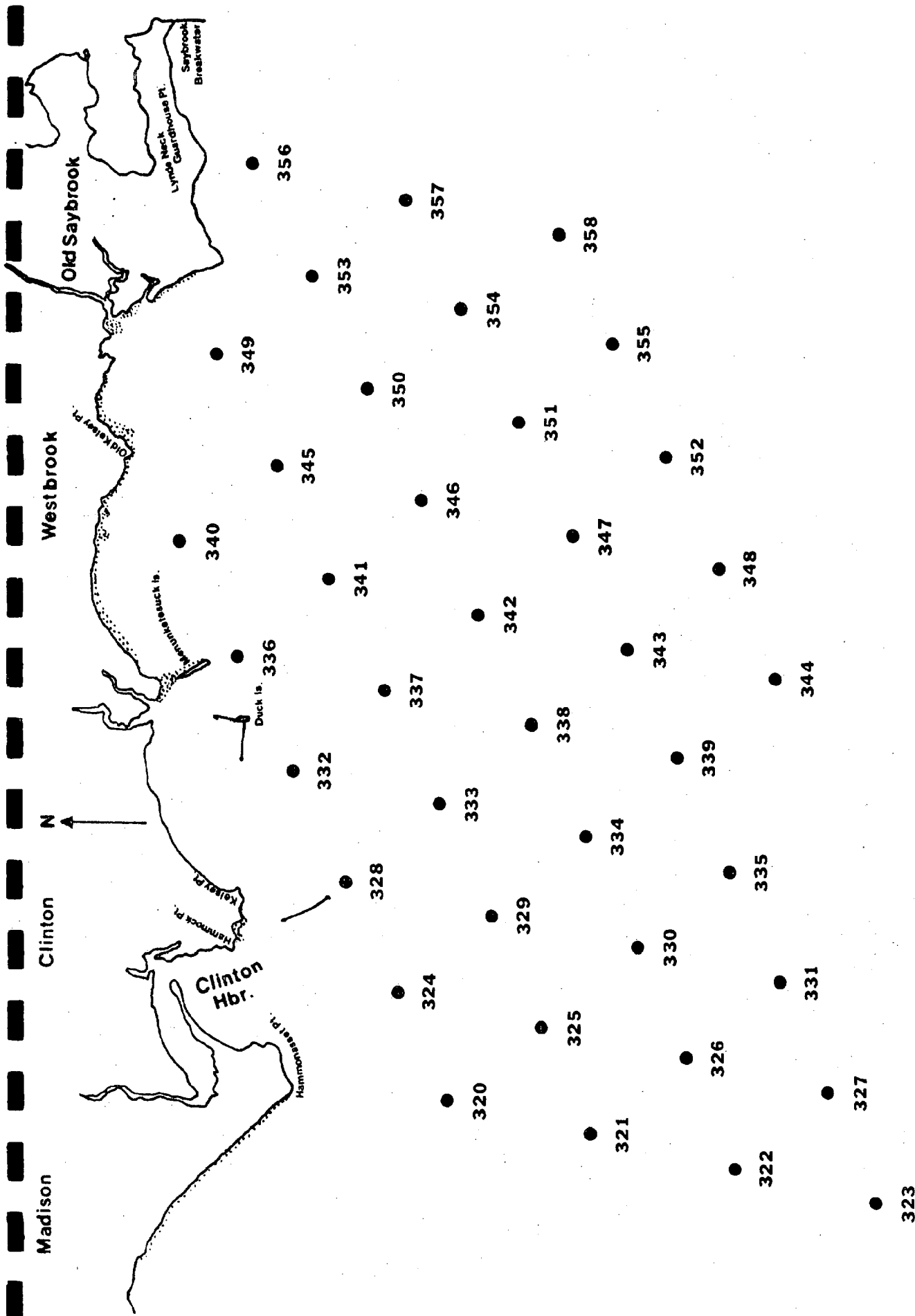


Figure 8b

DEPTH OF SAMPLING STATIONS (feet) - REGION VIII

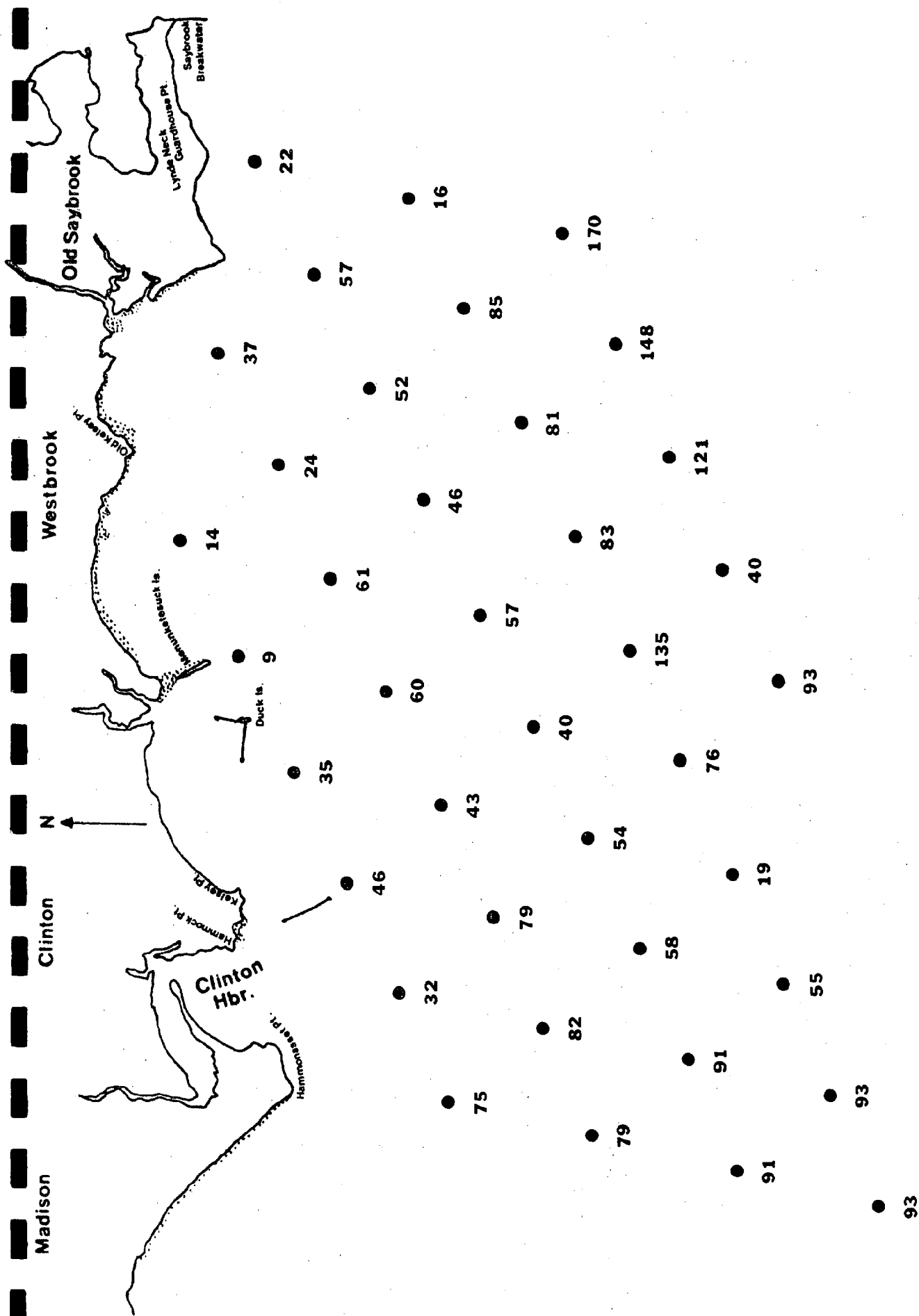


Figure 8c

SUBSTRATE COMPOSITION OF SAMPLING STATIONS - REGION VIII

<u>SUBSTRATE KEY</u>	
Mud	○
Sandy-mud	●
Muddy-sand	■
Sand	□
Muddy-sandy shell	▲
Shell	△
Gravel	☆
Muddy-sandy gravel	★
Rock	⊙

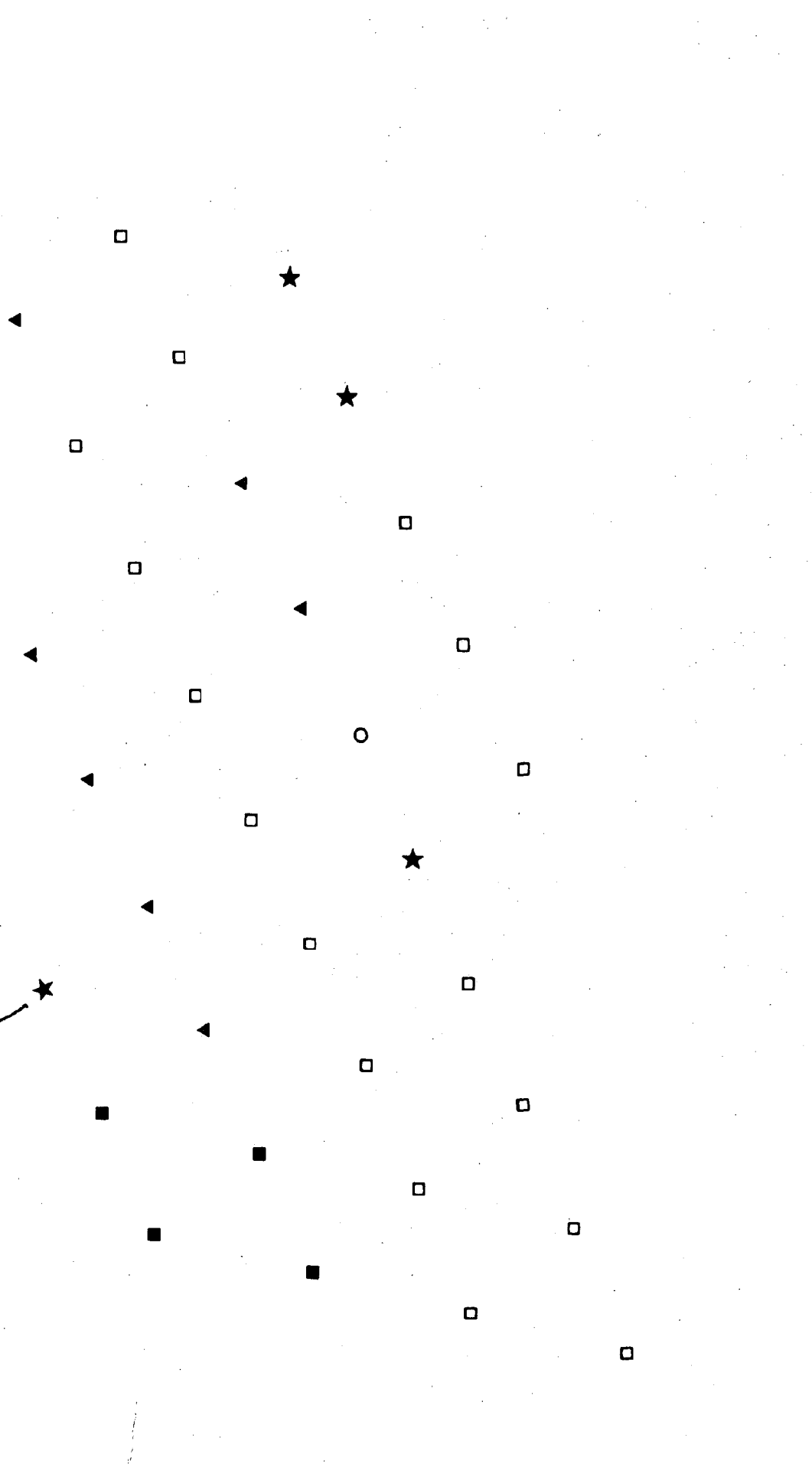
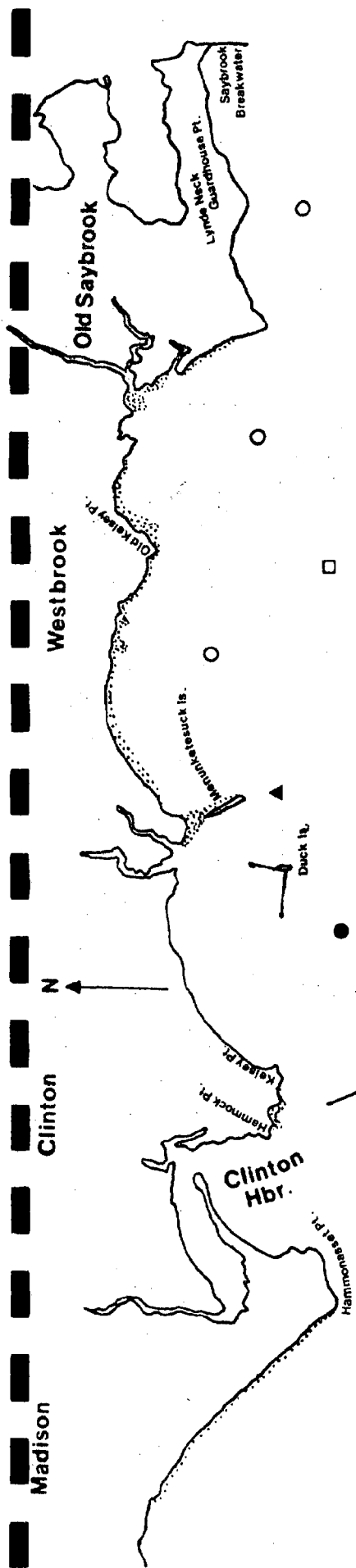


Figure 8d

NUMBER OF BENTHIC SPECIES - NUMBER OF INDIVIDUALS
PER GRAB SAMPLE - REGION VIII

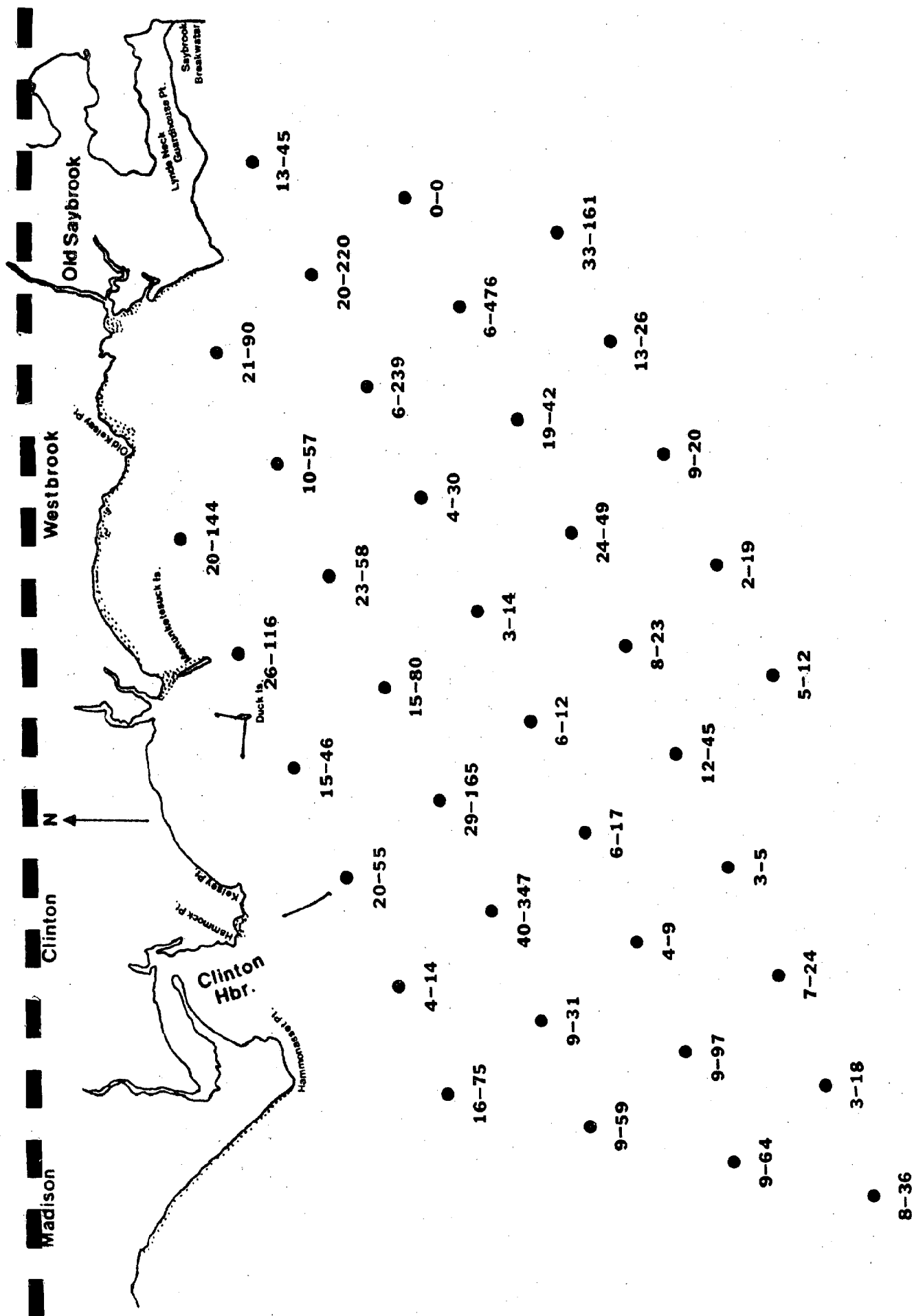


Figure 8e

BENTHIC SPECIES DIVERSITY CATEGORIES - REGION VIII

DIVERSITY KEY

Low	●
Moderate	▲
High	■
No organisms recovered	--

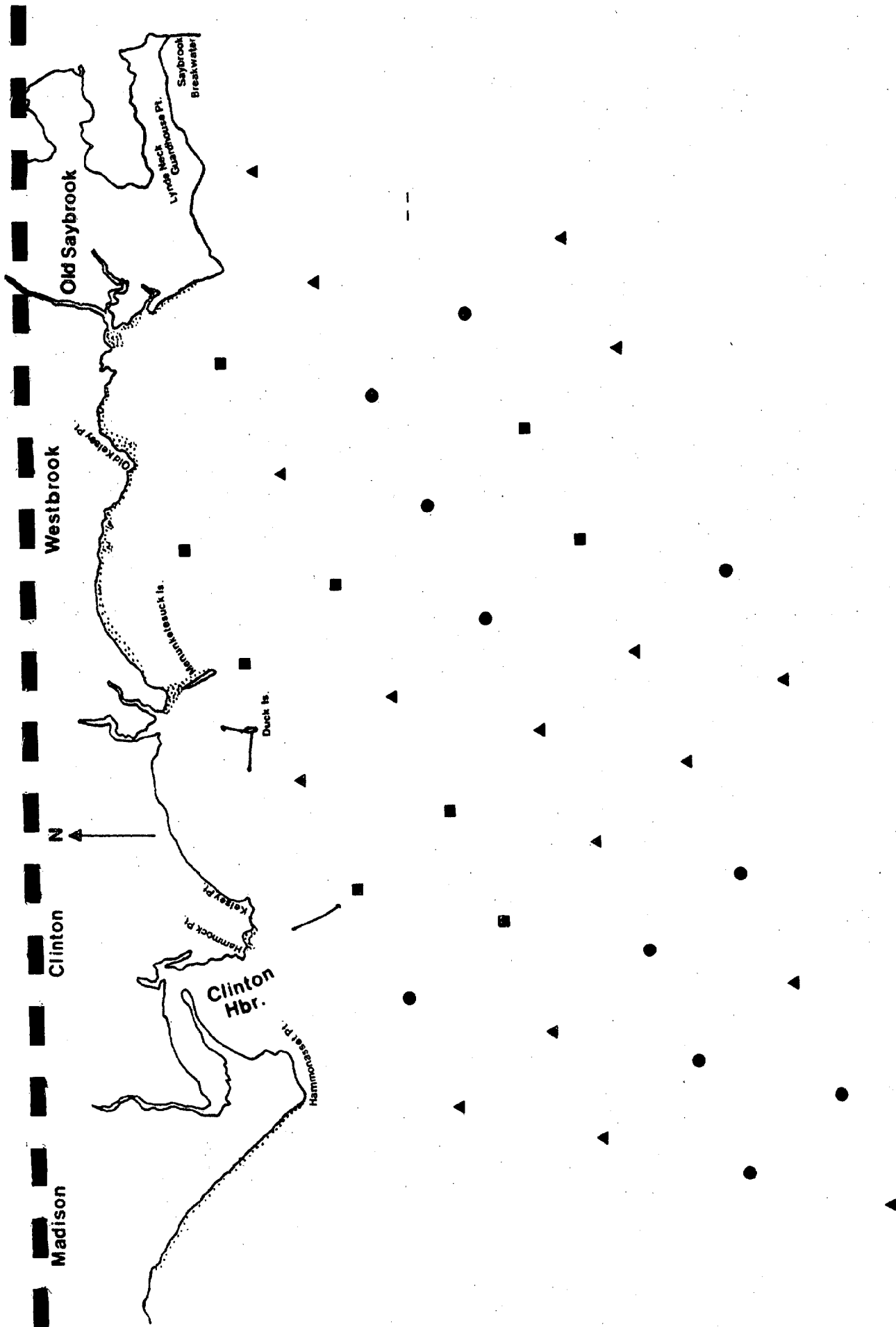


Figure 8f

EASTERN OYSTER AND HARD CLAM
ABUNDANCE CATEGORIES - REGION VIII

<u>CLAM-OYSTER KEY</u>	
Low	Clams ●
Moderate	▲
High	■
Very high	★
No clams/oysters recovered	--
	Oysters ○
	△
	□
	☆

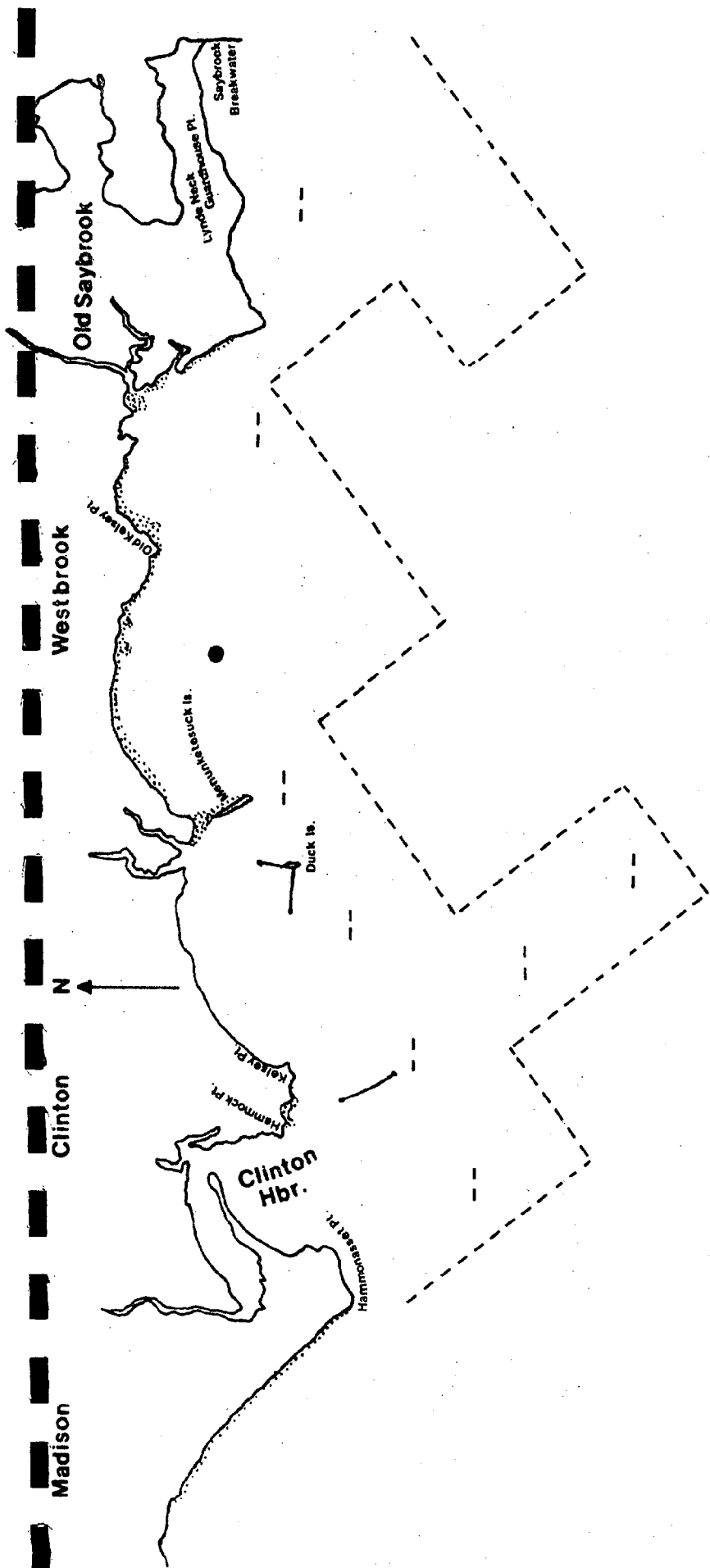
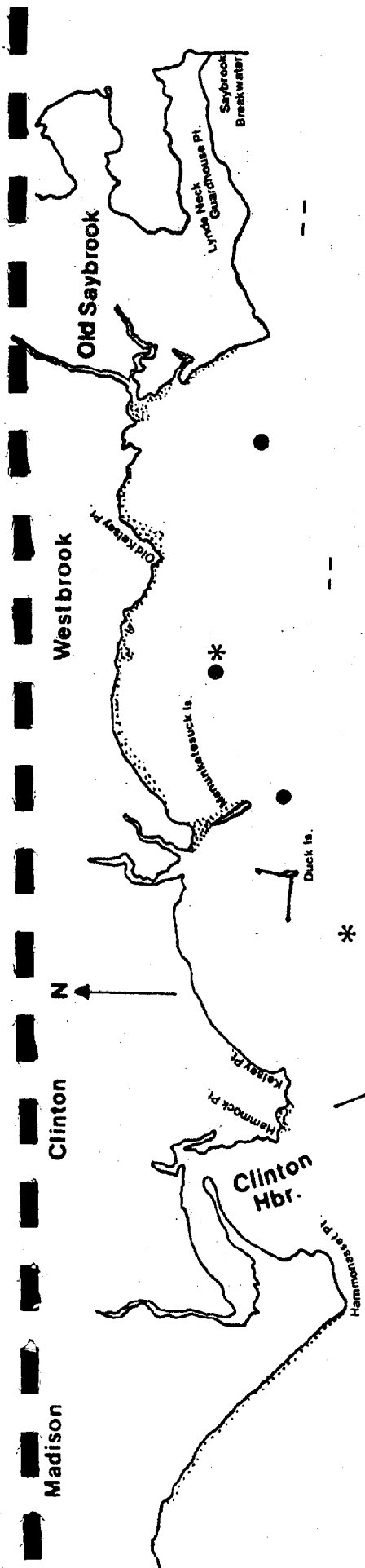


Figure 8g

ABUNDANCE CATEGORIES FOR MISCELLANEOUS
SHELLFISH SPECIES - REGION VIII

MISCELLANEOUS SHELLFISH KEY

	Whelk	Steamer Clam	Surf Clam
Low	*	☆	*
Moderate			*
Low		●	○
Moderate		▲	△
High		■	□
Very high		★	☆
None recovered		--	
		Razor Clam	Blue Mussel



Region IX

A total of 41 stations (Fig. 9a) were inventoried from Region IX with their respective Loran-C coordinates listed in Table 17. Sampling depths ranged from a low of 7 feet (Station #356) to a high of 178 feet (Station #397) with the mean depth being 83.0 feet (Fig. 9b.)

Sandy-gravel and sandy-shell were the most frequently encountered substrate type occurring at 58.6% of all the sampling stations (Fig. 9c.)

A total of 200 benthic species were reported from Region IX (Table 18) with Station #394 exhibiting the greatest number (55 species) and Station #365 the fewest (6 species) (Fig. 9d.) The mean number of species per station was 178.3, ranging from a high of 777 at Station #390 to a low of 15 at Station #359.

Species diversity values (fig. 9e) ranged from a low of 1.037 at Station #356, to a high of 4.442 at Station #394, with the mean H value for all stations being 3.209.

The mean values for species diversity (3.209) and species richness (28.8) fall into the high category, while density (178.3) can be considered moderate.

The three numerically dominant benthic species for the entire region were the Caprellid amphipod, Aeginina longicornis, the polychaete, Cirratulis grandis and the polychaete, Ampharete artica. Other dominants in decreasing numerical importance were; Prionospio heterobranchia, Uniciola irrorata, Spiophanes bombyx, Ampelisca abdita, Corophium acutum, Mitrella lunata and Prionospio tenuis.

Shellfish

Sixteen designated stations were inventoried for hard clams and oysters

within the 50 foot depth contour line (Fig. 9f.) No hard clams or oysters were reported from any of these stations.

Razor clams (Fig. 9g) were reported in low abundance from 13 stations within the region. Blue mussels were recovered from 10 stations, with moderate numbers occurring at Station #386 and very high numbers at Station #376. Steamer clams (Station #393) and whelks (Stations #368, #374, #384 and #387) also occurred in low abundance within the region.

Figure 9a

SAMPLING STATION POSITIONS - REGION IX

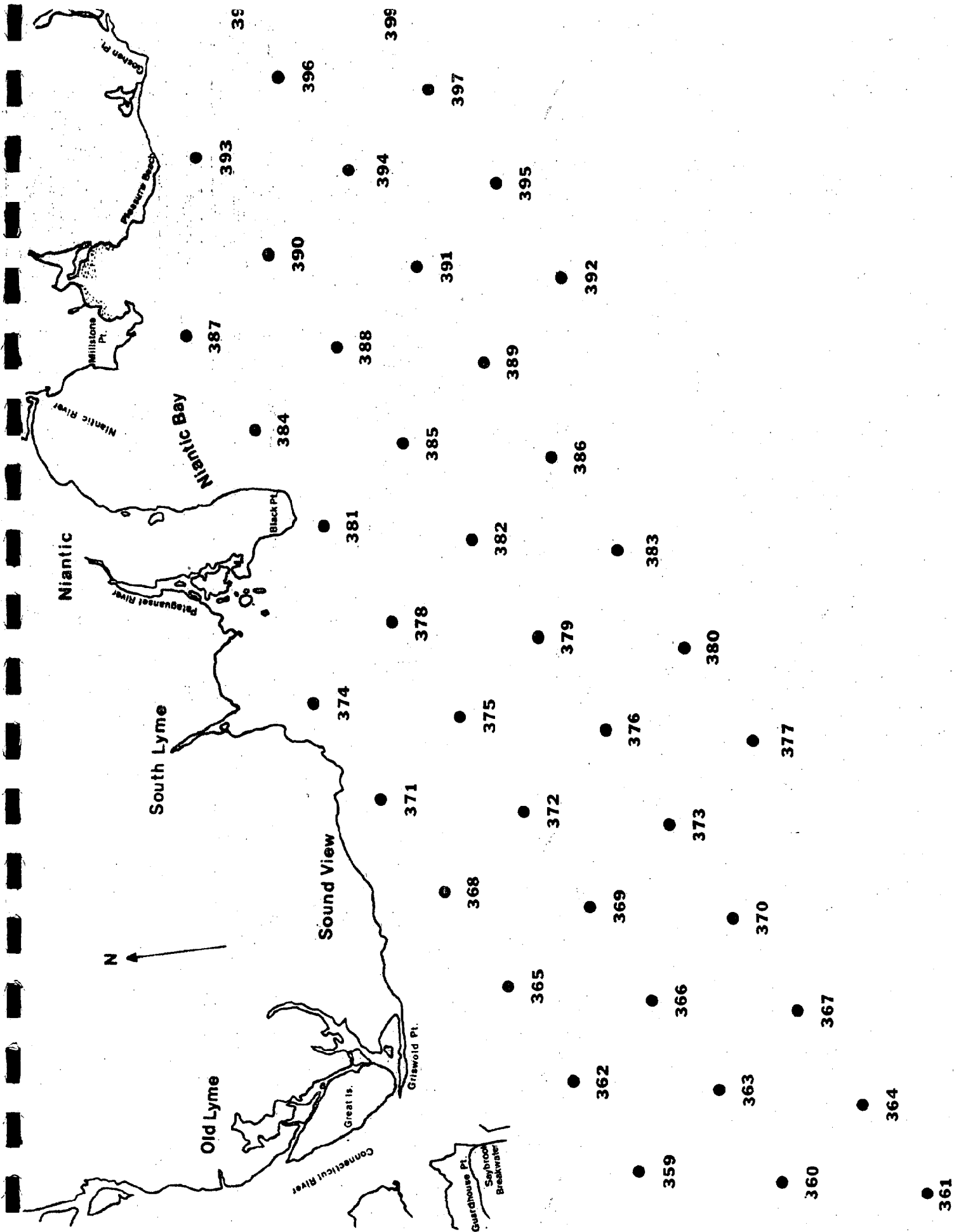


Figure 9b

DEPTH OF SAMPLING STATIONS (feet) - REGION IX

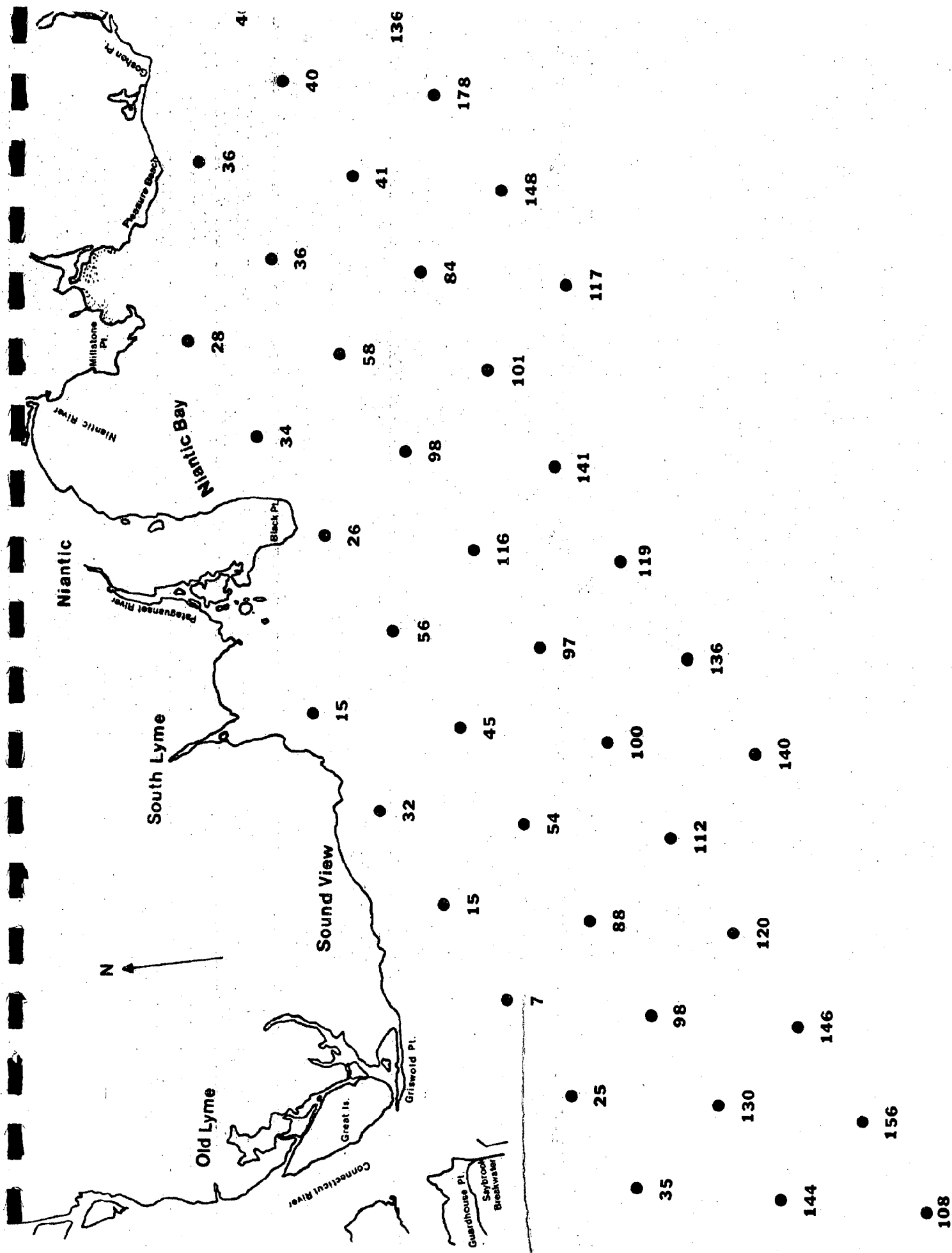


Figure 9c

SUBSTRATE COMPOSITION OF SAMPLING STATIONS - REGION IX

<u>SUBSTRATE KEY</u>	
Mud	○
Sandy-mud	●
Muddy-sand	■
Sand	□
Muddy-sandy shell	▲
Shell	△
Gravel	☆
Muddy-sandy gravel	★
Rock	⊙

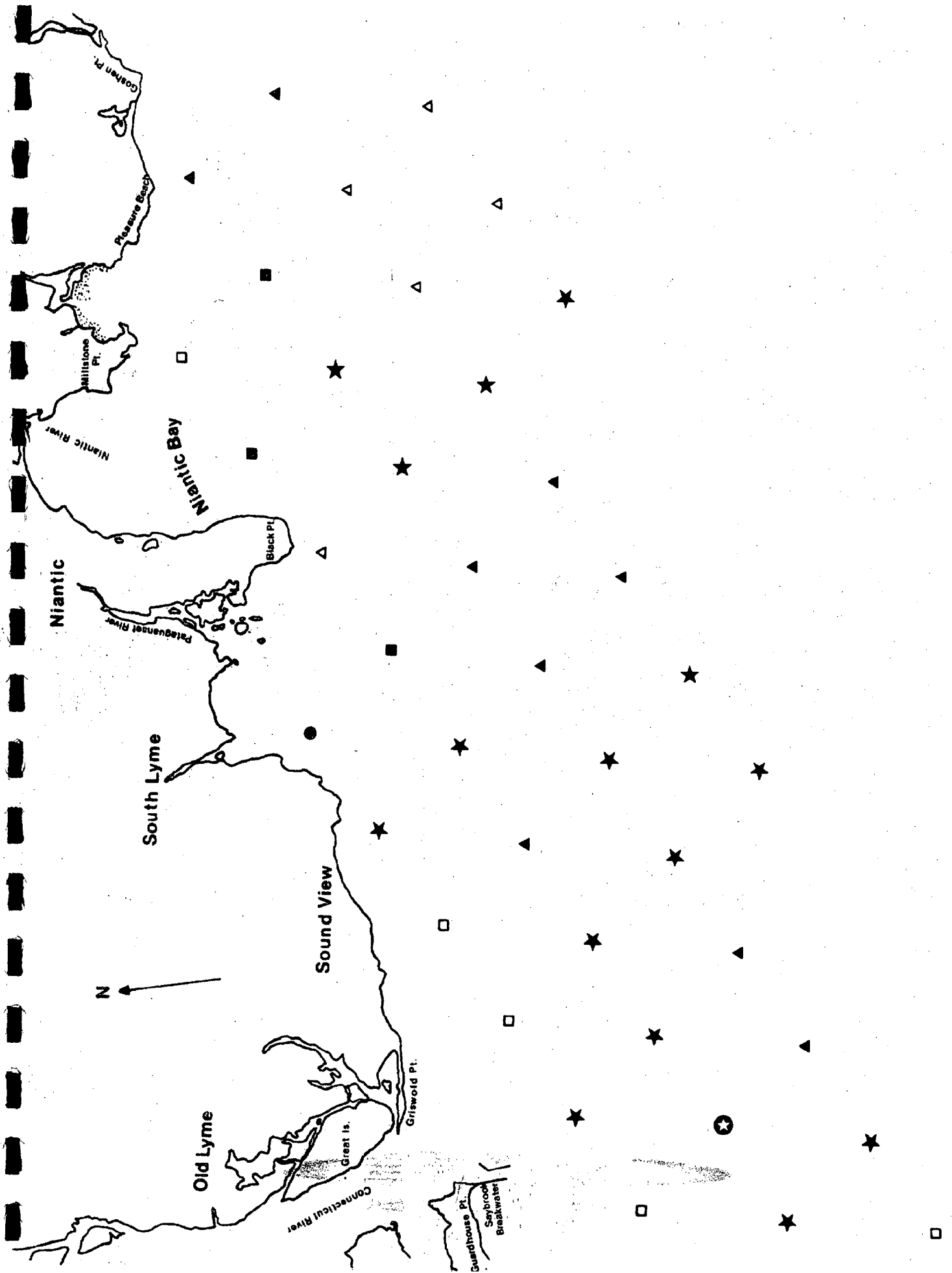


Figure 9d

NUMBER OF BENTHIC SPECIES - NUMBER OF INDIVIDUALS
PER GRAB SAMPLE - REGION IX

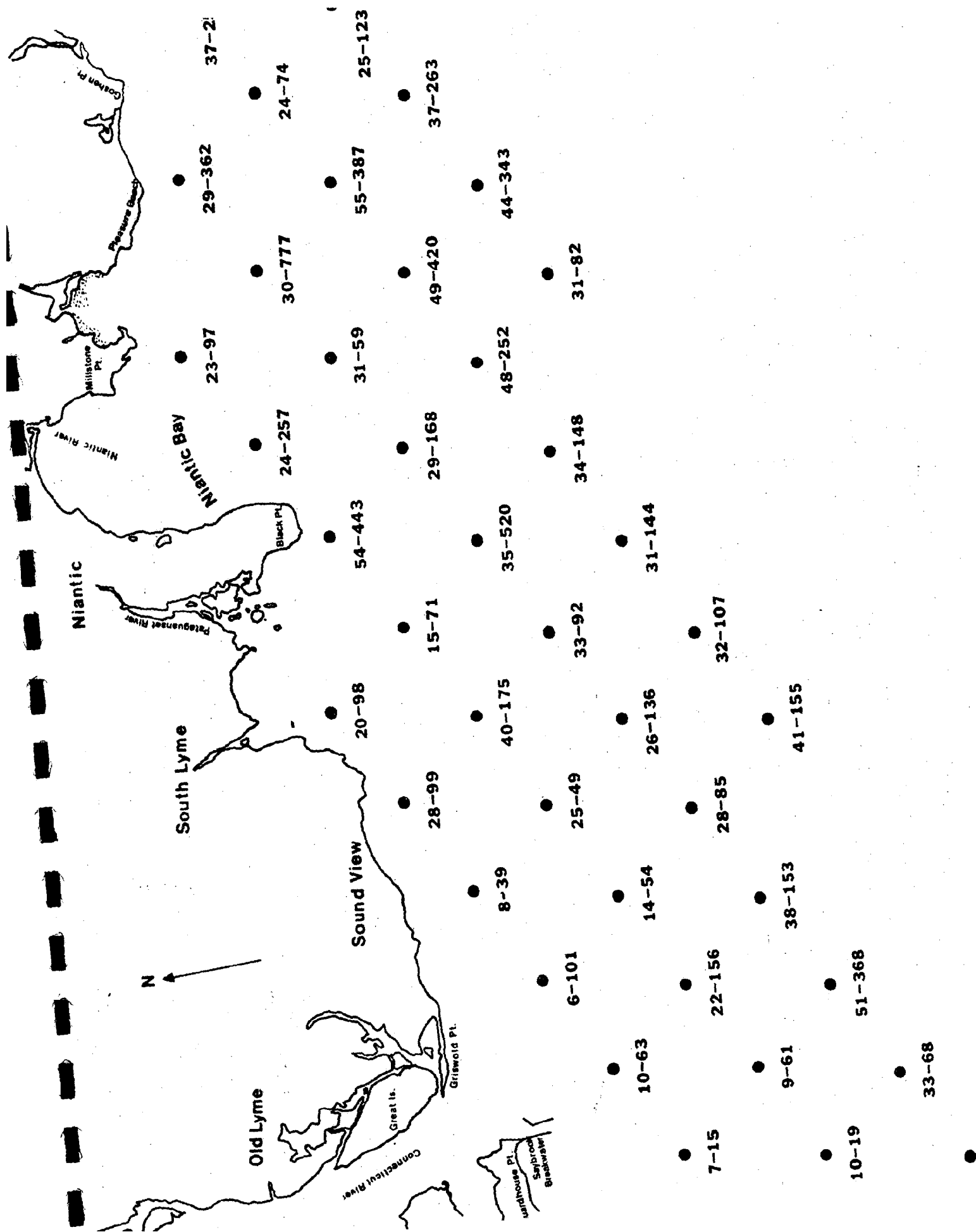


Figure 9e

BENTHIC SPECIES DIVERSITY CATEGORIES - REGION IX

<u>DIVERSITY KEY</u>	
Low	●
Moderate	▲
High	■
No organisms recovered	--

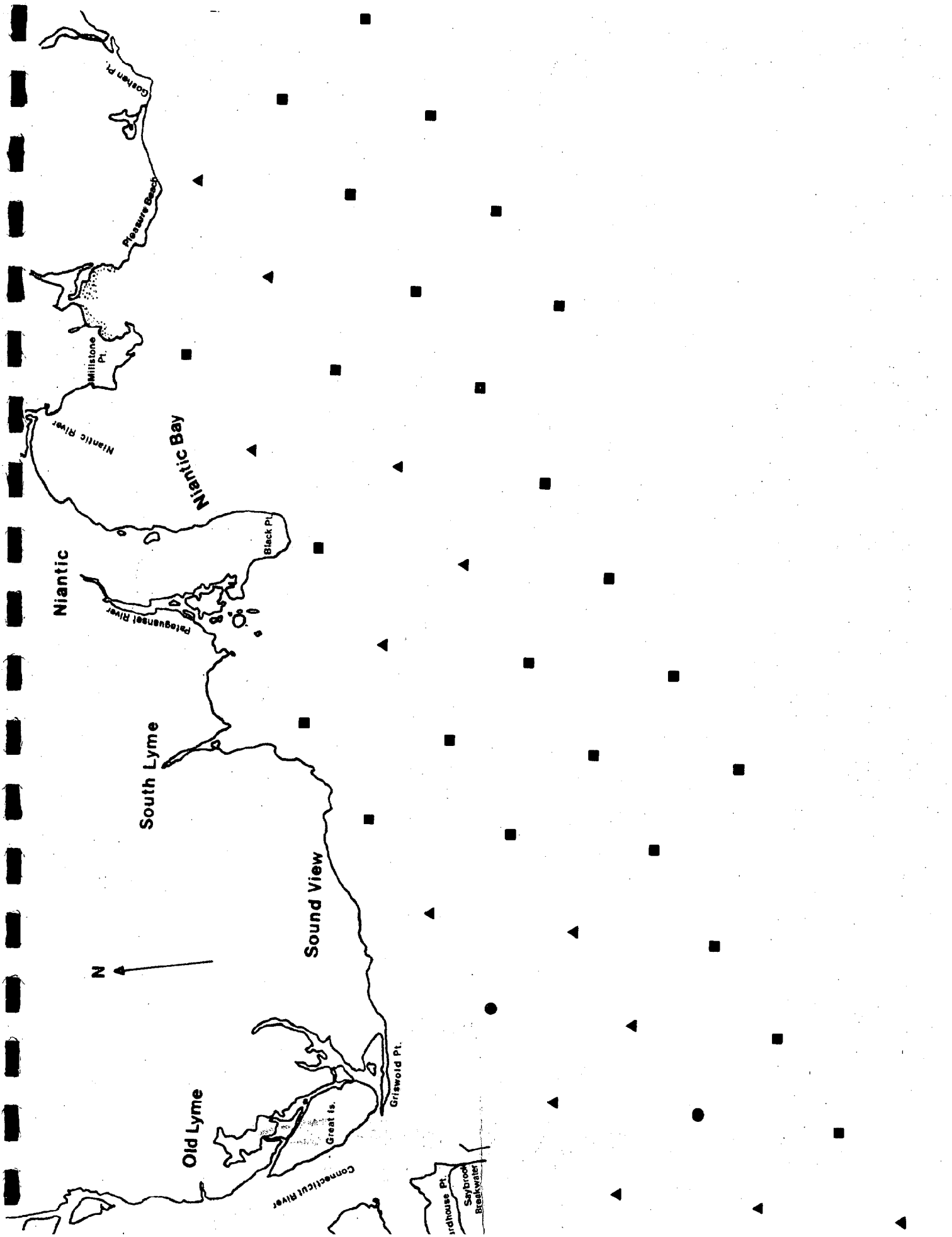


Figure 9f

EASTERN OYSTER AND HARD CLAM
ABUNDANCE CATEGORIES - REGION IX

CLAM-OYSTER KEY

	Clams	Oysters
Low	●	○
Moderate	▲	△
High	■	□
Very high	★	☆
No clams/oysters recovered	--	

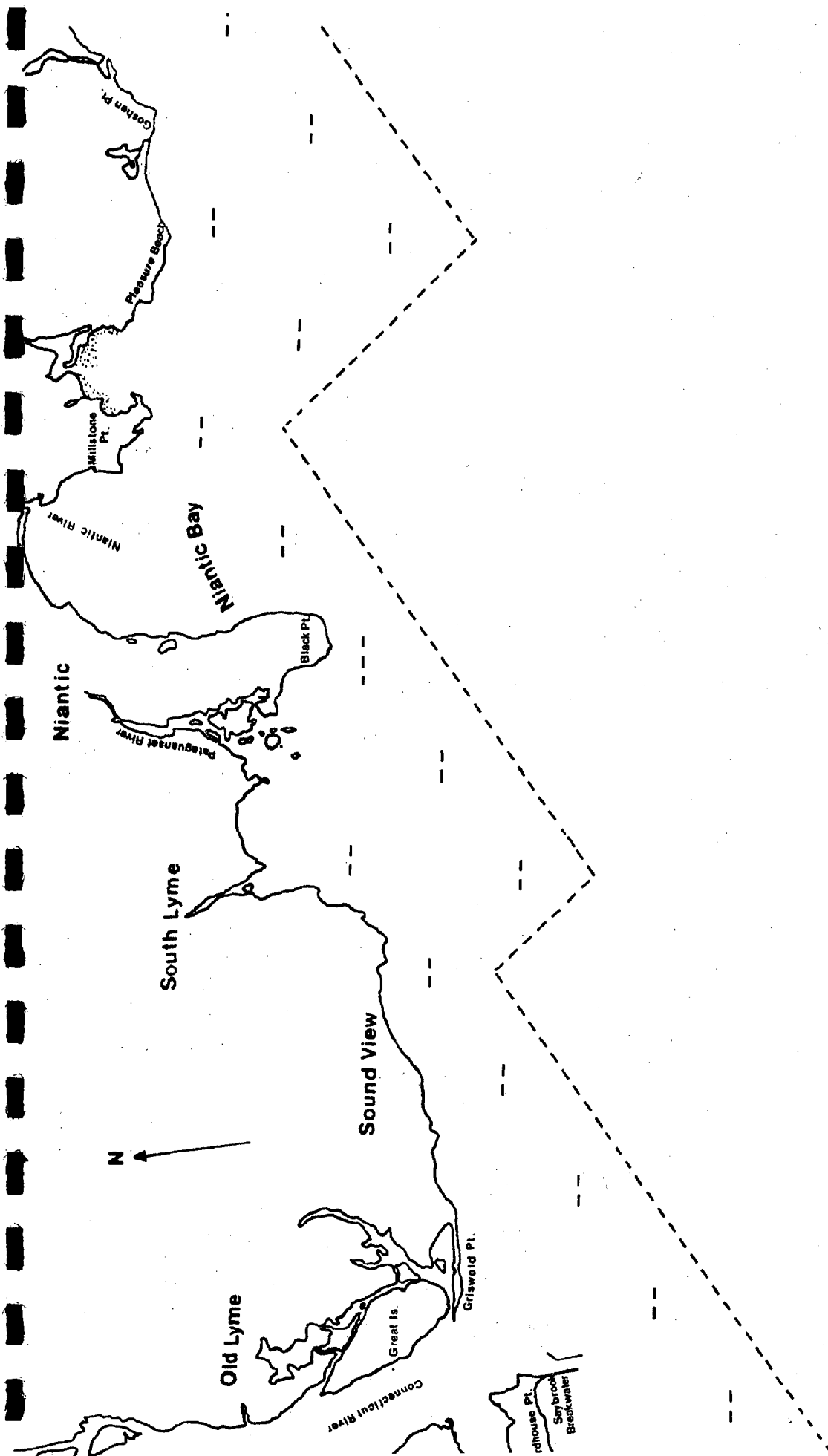
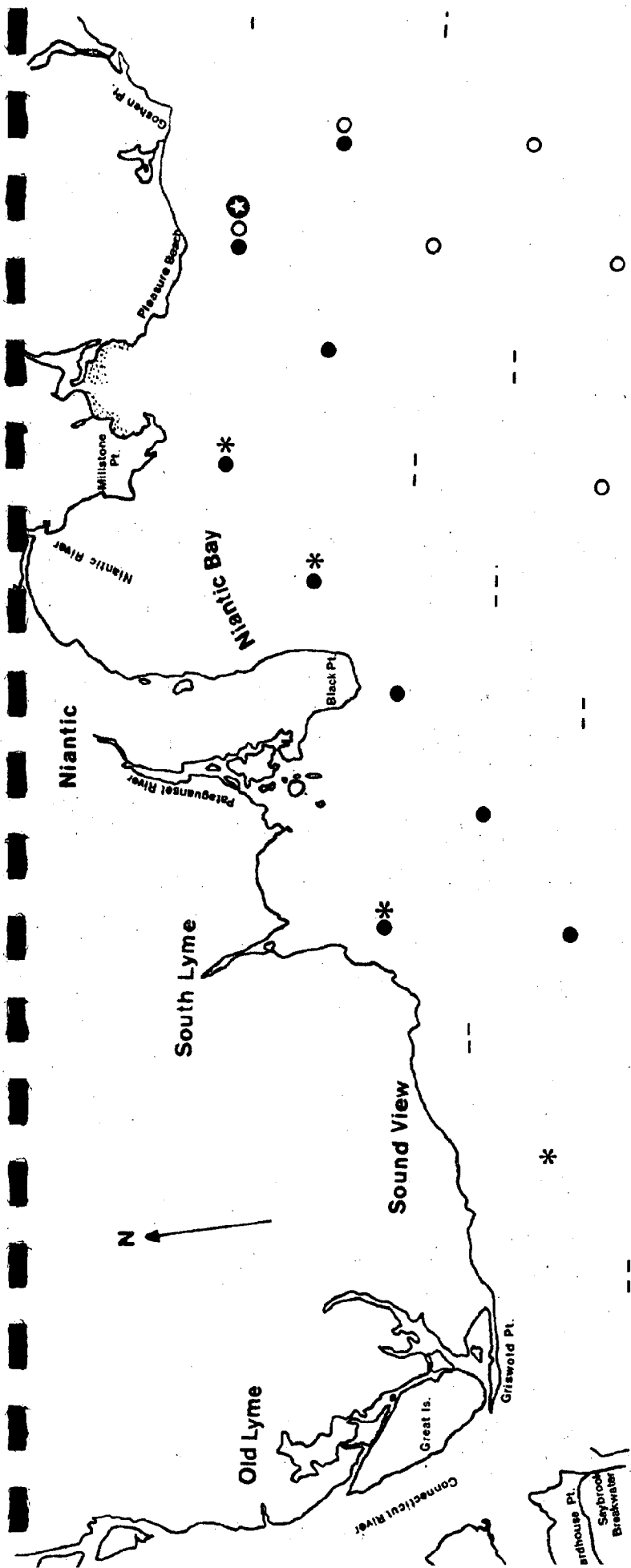


Figure 9g

ABUNDANCE CATEGORIES FOR MISCELLANEOUS
SHELLFISH SPECIES - REGION IX

MISCELLANEOUS SHELLFISH KEY

	Whelk	Steamer Clam	Surf Clam
Low	*	☆	*
Moderate			*
		Razor Clam	Blue Mussel
Low		●	○
Moderate		▲	△
High		■	□
Very high		★	☆
None recovered		--	



Region X

A total of 14 Stations (Fig. 10a) were inventoried from Region X with their respective Loran-C coordinates listed in Table 19. Sampling depths ranged from a low of 6 feet (Station #413) to a high of 84 feet (Station #408) with the mean depth being 34.7 feet (Fig. 10b.)

Region X exhibited a variety of substrate types with mud, muddy-sand and sand each occurring at 21.4% of all sampling stations (Fig. 10c.)

A total of 167 benthic species were reported from Region X (Table 20) with Station #408 exhibiting the greatest number (58 species) and Station #412 the fewest (10 species) (Fig. 10d.) The mean number of species per station was 36.1. The mean number of individuals per station was 432.6, ranging from a high of 1.632 at Station #411 to a low of 141 at Station #400.

Species diversity values (Fig. 10e) ranged from a low of 1.072 at Station #401, to a high of 4.399 at Station #405, with the mean H value for all stations being 3.055.

The mean value for species diversity (3.055) falls into the high category while species richness (36.1) and density (178.3) can be considered very high.

The three numerically dominant benthic species for the entire region were the amphipod, Ampelisca abdita, the polychaete, Aricidea jefferysii and the bamboo worm, Clymenella zonalis. Other dominants, in decreasing numerical importance, were: Leptocheirus pinguis, Cirratulus grandis, Prionospio tenuis, Prionospio heterobranchia, Lumbrinereis impatiens, Polycirrus eximus, Uniciola irrorata and Corophium acherusicum.

Shellfish

Ten designated stations were inventoried for hard clams and oysters within the 50 foot depth contour line (Fig. 10f.) Hard clams were found in low abundance at Station #405 and in very high numbers at Station #402. Cherrystone sized clams dominated the population, accounting for 60.5% of all individuals. Oysters were not reported for any of the ten stations.

Surf clams (fig. 10g) were reported in low numbers at Station #405 and in moderate numbers at Station #410, while razor clams occurred in low abundance at three stations (Stations #405, #406 and #407.) Blue mussels were found in low numbers at Station #408 and in very high numbers at Stations #410 and #411. Whelks were reported in low abundance at three stations (Stations # 402, #405 and #410.)

Figure 10a

SAMPLING STATION POSITIONS - REGION X

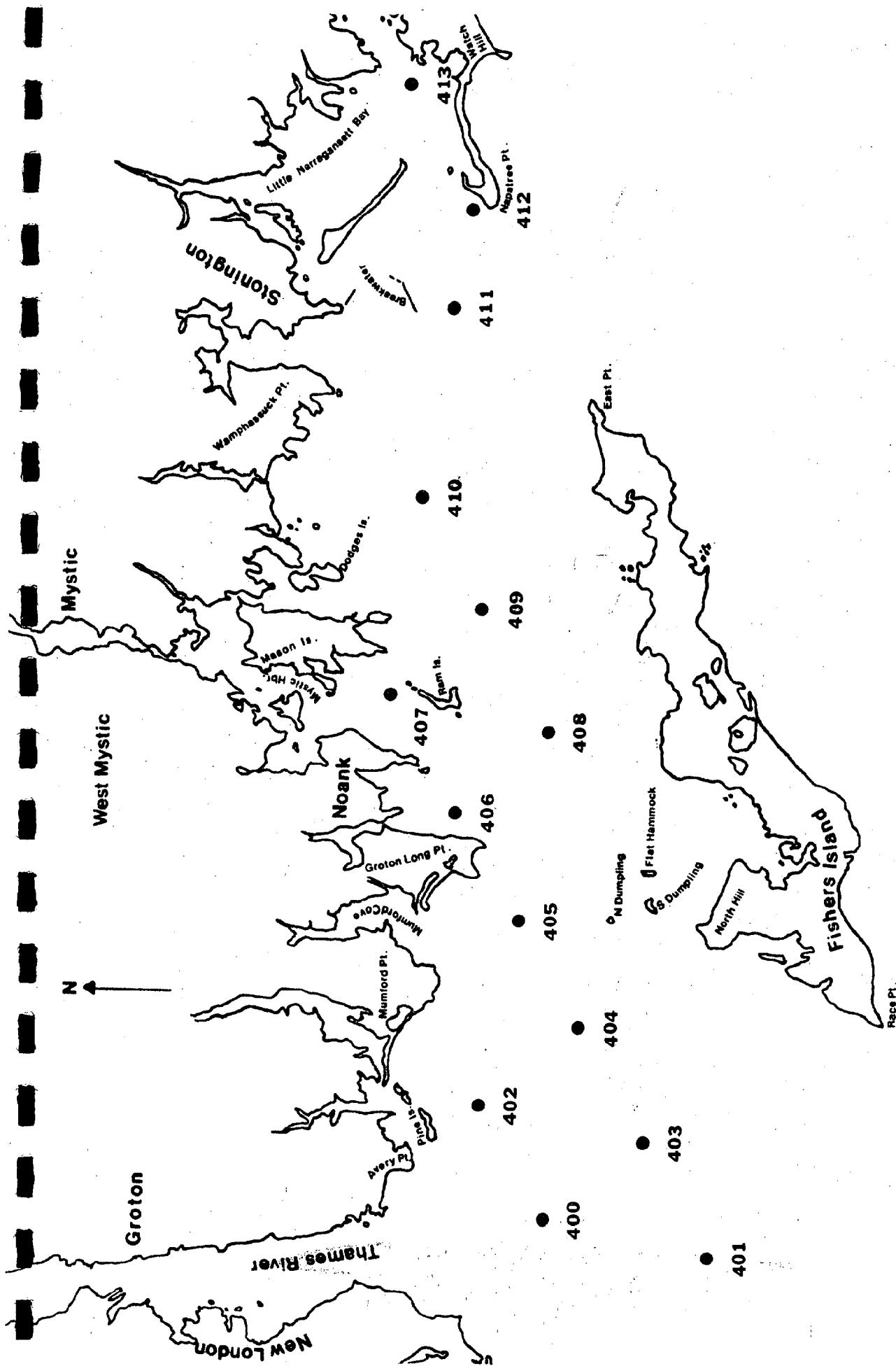


Figure 10b

DEPTH OF SAMPLING STATIONS (feet) - REGION X

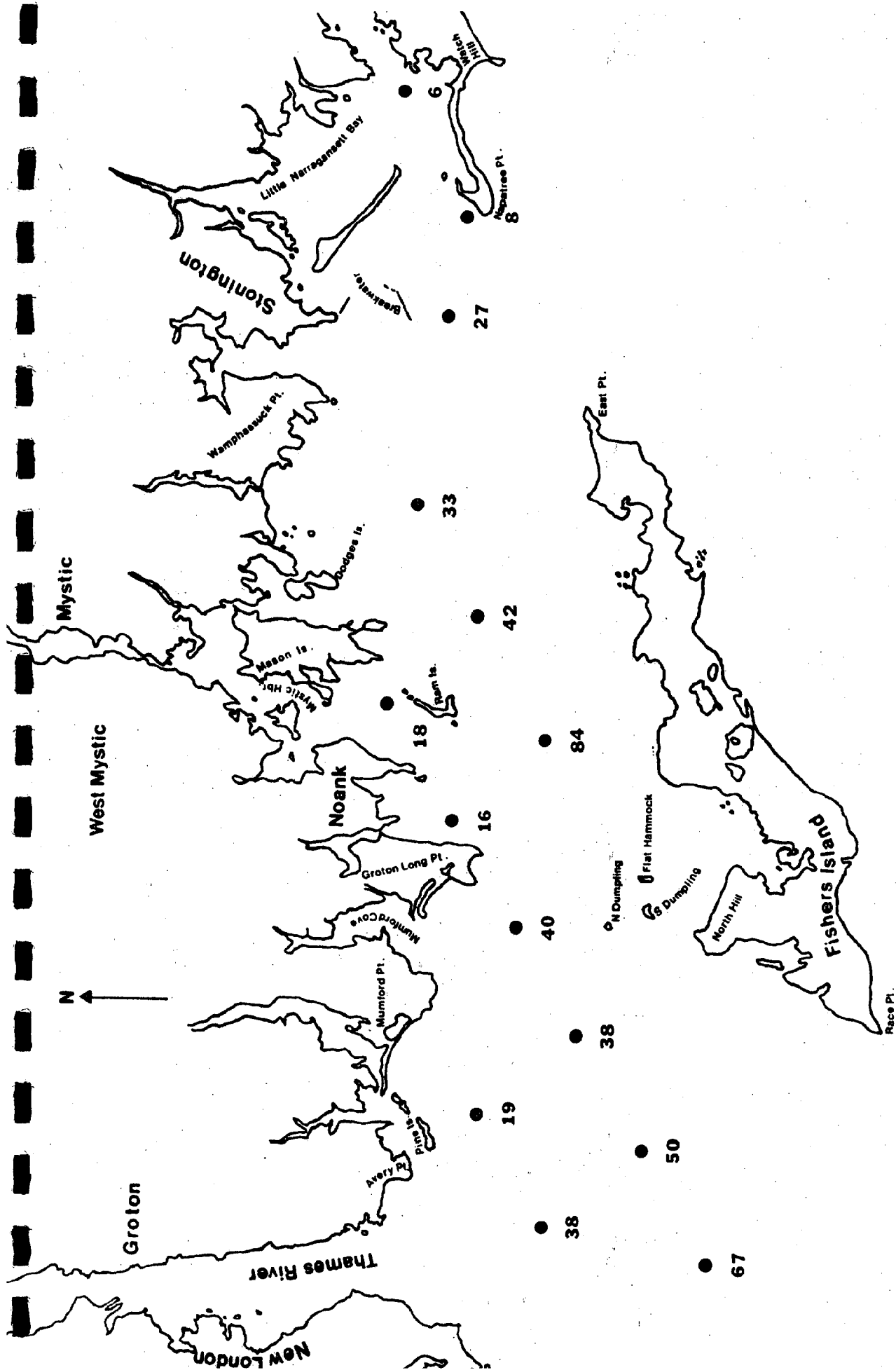


Figure 10c

SUBSTRATE COMPOSITION OF SAMPLING STATIONS - REGION X

<u>SUBSTRATE KEY</u>	
Mud	○
Sandy-mud	●
Muddy-sand	■
Sand	□
Muddy-sandy shell	▲
Shell	△
Gravel	☆
Muddy-sandy gravel	★
Rock	⊛

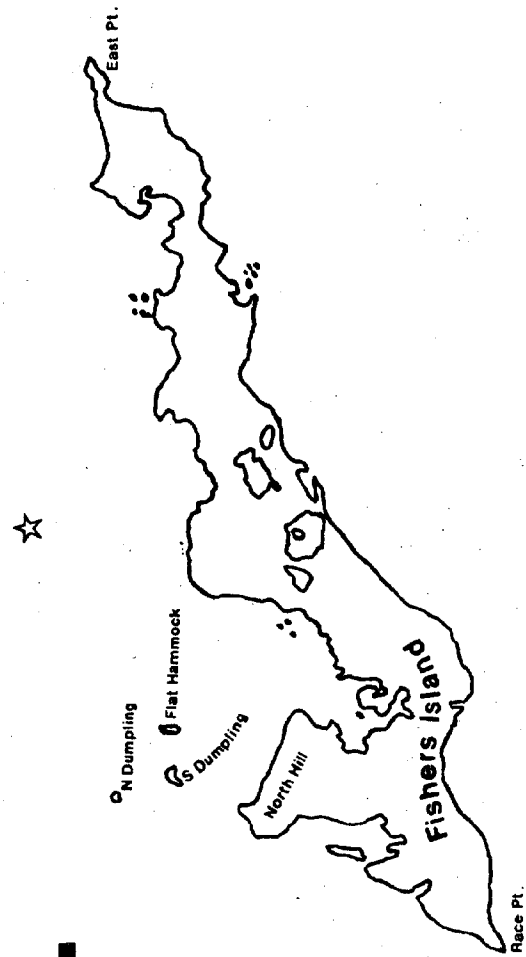
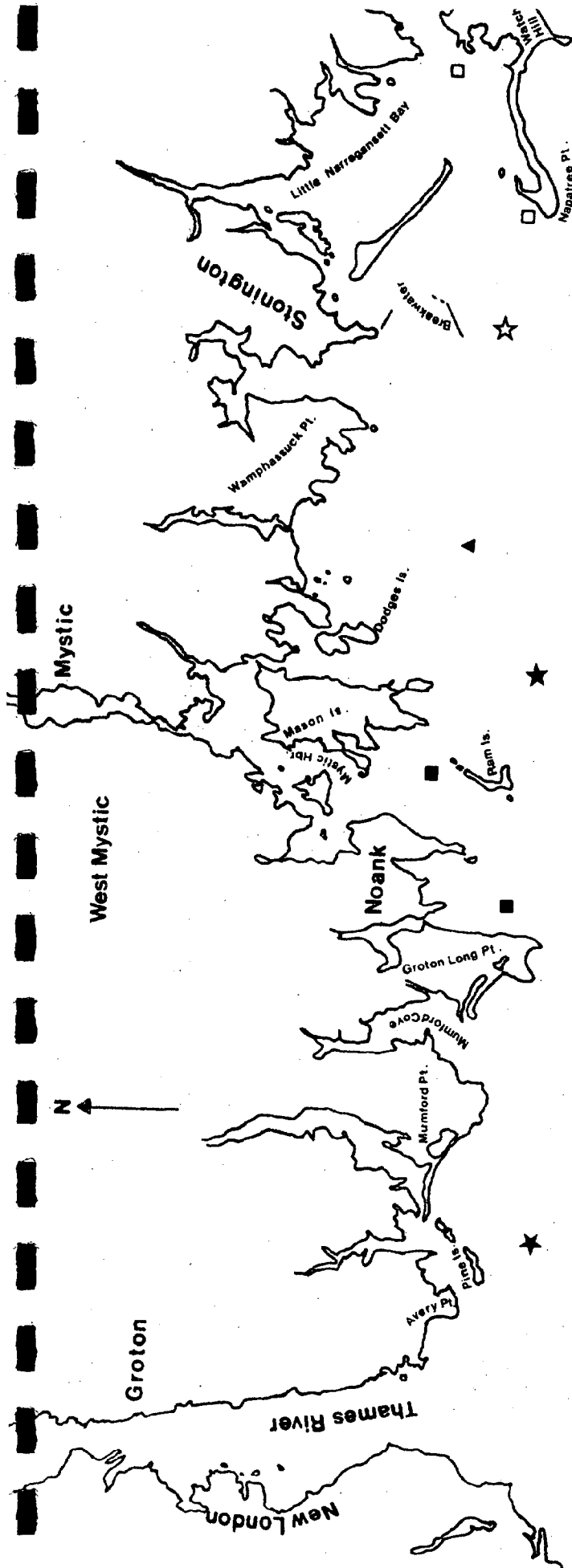


Figure 10d

NUMBER OF BENTHIC SPECIES - NUMBER OF INDIVIDUALS
PER GRAB SAMPLE - REGION X

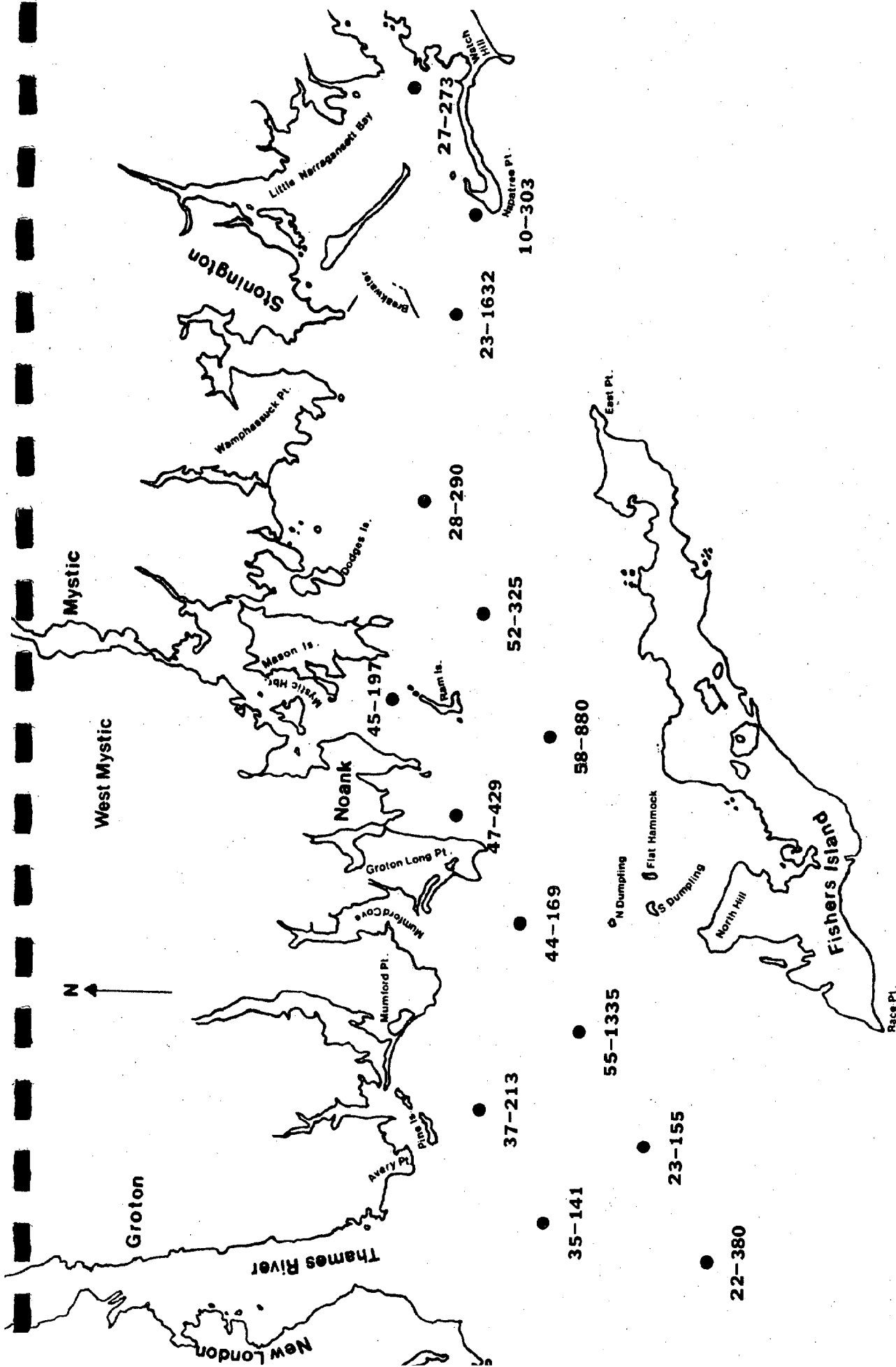


Figure 10e

BENTHIC SPECIES DIVERSITY CATEGORIES - REGION X

DIVERSITY KEY

Low	●
Moderate	▲
High	■
No organisms recovered	--

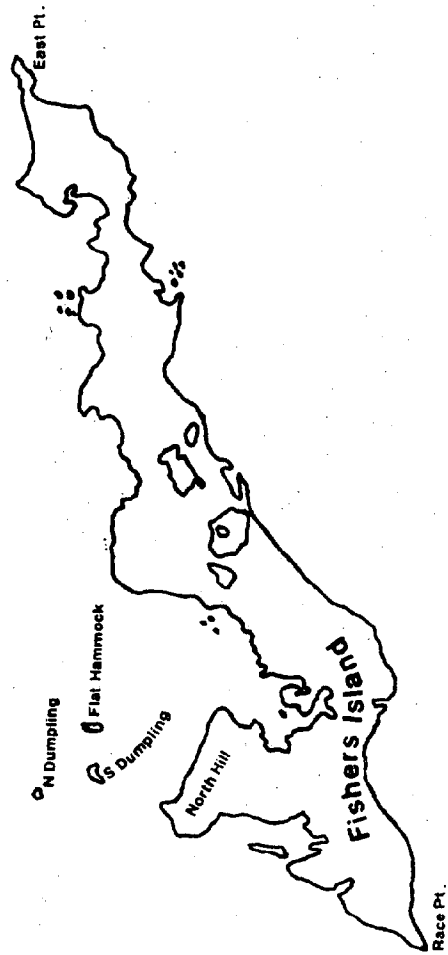
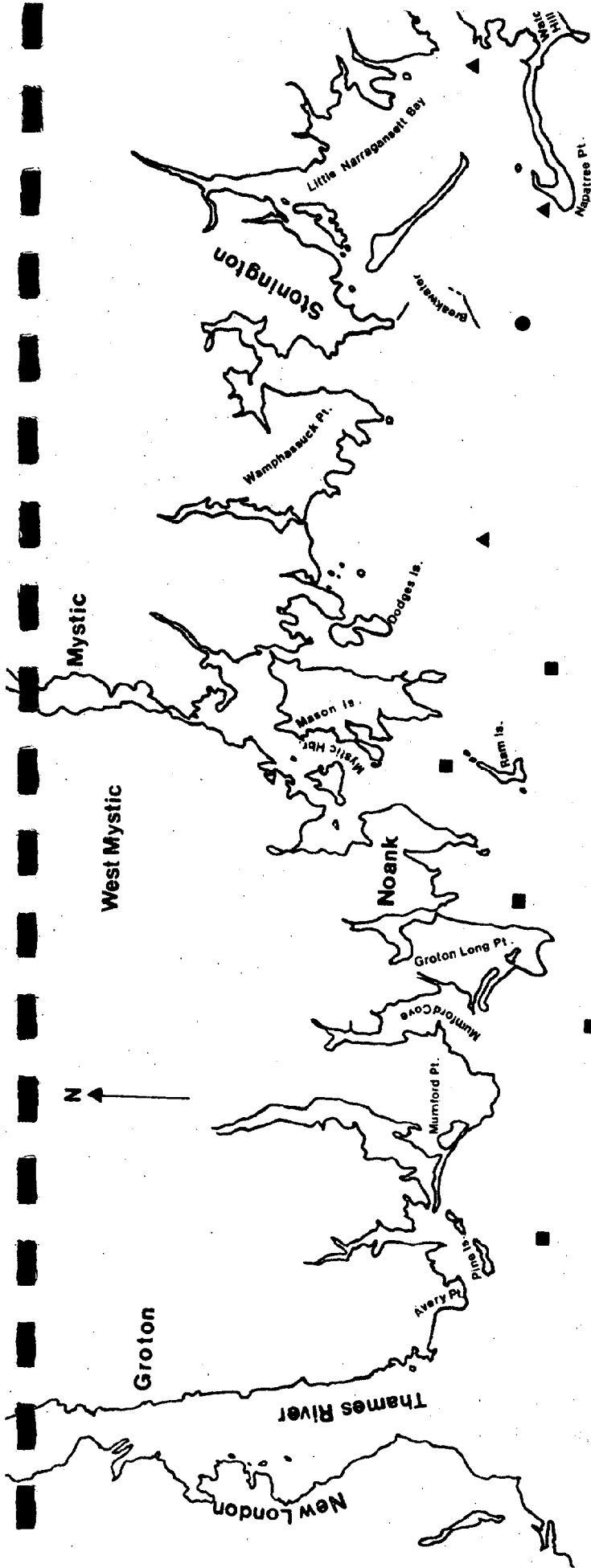


Figure 10f

EASTERN OYSTER AND HARD CLAM
ABUNDANCE CATEGORIES - REGION X

<u>CLAM-OYSTER KEY</u>	
Low	Clams ● Oysters ○
Moderate	▲ △
High	■ □
Very high	★ ☆
No clams/oysters recovered	--

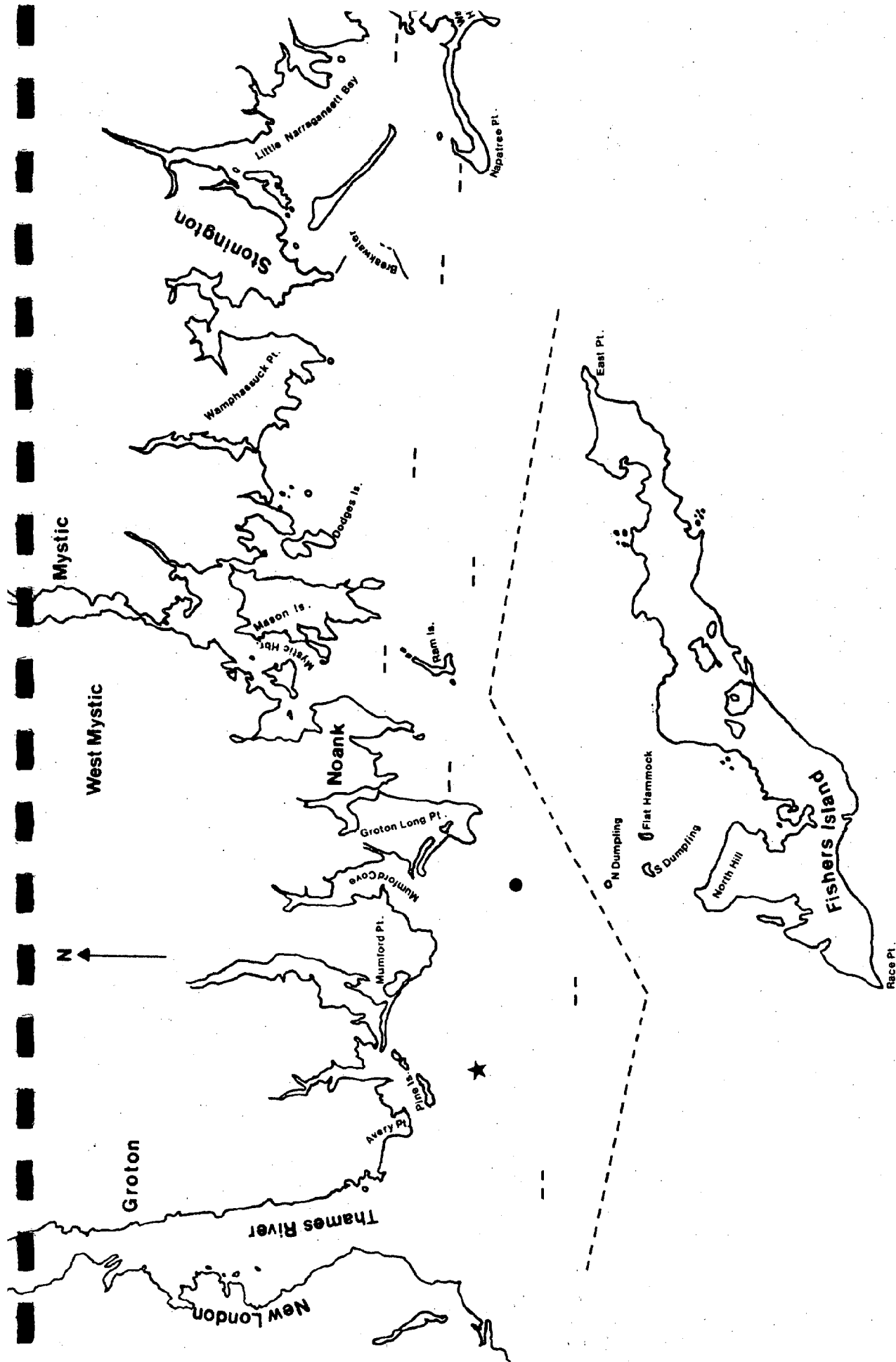


Figure 10g

ABUNDANCE CATEGORIES FOR MISCELLANEOUS
SHELLFISH SPECIES - REGION X

MISCELLANEOUS SHELLFISH KEY

	Whelk	Steamer Clam	Surf Clam
Low	*	⊙	*
Moderate			*
		Razor Clam	Blue Mussel
Low		●	○
Moderate		▲	△
High		■	□
Very high		★	☆
None recovered		--	

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TABLE 1. Station numbers for Region I

60012 1	26900 60008 2	60004 3
60014 4	26890 60010 5	60006 6
60016 7	26880 60012 8	60008 9

TABLE 2. Total species list for Region I

PHYLUM ANNELIDA

Class Oligochaeta	
Family Tubificidae	
Clitellio arenarius	
Class Polychaeta	(Bristle Worms)
Family Ampharetidae	(Ampharetid Worms)
Asabellides oculata	
Family Capitellidae	(Capitellid Thread Worms)
Mediomastus ambiseta	
Family Chaetopteridae	(Glassy Tube Worms)
Spiochaetopterus oculatus	
Family Nephtyidae	(Red-lined Worms)
Nephtys incisa	
Family Pectinariidae	(Trumpet Worm)
Pectinaria gouldii	
Family Polygordiidae	(Archiannelid)
Polygordius	
appendiculatus	
Family Spionidae	(Mud Worms)
Polydora websteri	

PHYLUM ARTHROPODA

Class Crustacea	
Subclass Malacostraca	
Order Decapoda	
Family Cancridae	(Rock Crab)
Cancer irroratus	(Rock Crab)
Family Majiidae	(Spider Crabs)
Libinia emarginata	
Family Paguridae	(Hermit Crabs)
Pagurus pollicaris	
Family Portunidae	(Swimming Crabs)
Ovalipes ocellatus	(Lady Crab)
Family Xanthidae	(Mud Crabs)
Neopanope texana sayi	
Order Stomatopoda	
Family Squillidae	
Squilla empusa	(Mantis shrimp)

PHYLUM ECHINODERMATA

Class Stellerioidea	(Brittle and Sea Stars)
Family Asteroiidae	
Asterias forbesi	(Forbes' Asterias)

(Region 1 cont.)

PHYLUM MOLLUSCA

Class Bivalvia

Family Arcidae

Anadara transversa

(Transverse Ark)

Family Lyonsiidae

Lyonsia hyalina

(Glassy Lyonsia)

Family Mactridae

Mulinia lateralis

(Little Surf Clam)

Family Mytilidae

Mytilus edulis

(Blue Mussel)

Family Nuculanidae

Yoldia limatula

(File Yoldia)

Family Nuculidae

Nucula proxima

(Near Nut Shell)

Family Ostreidae

Crassostrea virginica

(Eastern American Oyster)

Family Pandoridae

Pandora gouldiana

(Gould's Pandora)

Family Tellinidae

Tellina agilis

Family Veneridae

Mercenaria mercenaria

(Quahog)

Pitar morrhuana

(False Quahog)

Class Gastropoda

Family Calyptraeidae

Crepidula fornicata

(Common Slipper Shell)

Crepidula plana

(Flat Slipper Shell)

Family Nassariidae

Nassarius trivittatus

(New England Dog Whelk)

Family Natacidae

Polinices duplicata

(Lobed Moon Snail)

Family Retusidae

Retusa canaliculata

PHYLUM RHYNCHOCOELA

(Nemertean Worms)

Family Lineidae

Cerebratulus sp.

Family Tubulanidae

Tubulanus pellucidus

TABLE 3. Station numbers for Region II

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<26820>				
<60036> 31	<60032> 32	<60028> 33	<60024> 34	<60020> 35

TABLE 4. Total species list for Region II

PHYLUM ANNELIDA

Class Oligochaeta

Family Tubificidae

Clitellio arenarius

Class Polychaeta

Family Ampharetidae

(Bristle Worms)

(Ampharetid Worms)

Asabellides oculata

Family Capitellidae

(Capitellid Thread Worms)

Mediomastus ambiseta

Family Chaetopteridae

(Glassy Tube Worms)

Spiochaetopterus oculatus

Family Cirritulidae

(Fringed Worms)

Cirratulis grandis

Cossura longocirrata

Dodecaceria coralii

Family Flabelligeridae

(Flabelligerid Worms)

Flabelligera affinis

Pherusa affinis

Family Glyceridae

(Blood Worms)

Glycera americana

Glycera capitata

Family Maldanidae

(Bamboo Worms)

Clymenella zonalis

Family Nephtyidae

(Red-lined Worms)

Nephtys incisa

Nephtys picta

Family Nereidae

(Sand/Clam Worms)

Nereis zonata

Family Oweniidae

Owenia fusiformis

Family Paraonidae

(Paraonid Worms)

Aricidea jefferysii

Paraonis fulgens

Family Pectinariidae

(Trumpet Worm)

Pectinaria gouldii

Family Phyllodocidae

(Paddle Worms)

Eteone heteropoda

Eumida sanguinea

Phyllodoce arenae

Phyllodoce maculata

Family Pilargidae

Sigambra tentaculata

Family Polygordiidae

(Archiannelid)

Polygordius

appendiculatus

Family Polynoidae

(Scale Worms)

Harmothoe imbricata

Lepidonotus squamotus

Family Sabellaridae

(Sand Builder Worms)

Sabellaria vulgaris

Family Spionidae

(Mud Worms)

Polydora hamata

Polydora websteri

Prionospio

heterobranchia

Spiophanes bombyx

Streblospio benedicti

PHYLUM ANNELIDA (cont.)

Family Syllidae

(Syllid Worms)

Autolytus cornutus

Autolytus prismaticus

Eusyllis blomstrandii

Syllides longocirrata

Family Terebellidae

(Terebellid Worms)

Polycirrus sp.

PHYLUM ARTHROPODA

Class Crustacea

Subclass Malacostraca

Order Amphipoda

Suborder Caprellidea

(Skeleton Shrimp)

Family Caprellidae

Aeginina longicornis

Suborder Gammaridea

Family Ampeliscidae

Ampelisca abdita

Ampelisca vadorum

Family Aoridae

Leptocheirus pinguis

Unciola irrorata

Order Decapoda

Family Crangonidae

Crangon septemspinosa

(Sand Shrimp)

Family Majiidae

(Spider Crabs)

Libinia emarginata

Family Paguridae

(Hermit Crabs)

Pagurus pollicaris

Family Xanthidae

(Mud Crabs)

Neopanope texana sayi

Order Mysidacea

(Mysid Shrimp)

Family Mysidae

Mysidopsis bigelowi

Neomysis americana

PHYLUM ECHINODERMATA

Class Stellerioidea

(Brittle and Sea Stars)

Family Asteroiidae

Asterias forbesi

(Forbes' Asterias)

PHYLUM MOLLUSCA

Class Bivalvia

Family Arcidae

Anadara transversa

(Transverse Ark)

Family Lyonsiidae

Lyonsia arenosa

(Glassy Lyonsia)

Lyonsia hyalina

Family Mactridae

Mulinia lateralis

(Little Surf Clam)

Spisula solidissima

(Surf Clam)

Family Mytilidae

Mytilus edulis

(Blue Mussel)

Family Nuculanidae

Yoldia limatula

(File Yoldia)

Yoldia sp.

Family Nuculidae

Nucula proxima

(Near Nut Shell)

Family Pandoridae

Pandora gouldiana

(Gould's Pandora)

Family Solenidae

Ensis directus

(Common Razor Clam)

Family Tellinidae

Tellina agilis

Family Veneridae

Mercenaria mercenaria

(Quahog)

Pitar morrhuana

(False Quahog)

Class Gastropoda

Family Buccinidae

Buccinum undatum

(Waved Whelk)

Family Calyptraeidae

Crepidula fornicata

(Common Slipper Shell)

Crepidula plana

(Flat Slipper Shell)

Family Columbellidae

Mitrella lunata

(Crescent Mitrella)

Family Nassariidae

Nassarius trivittatus

(New England Dog Whelk)

Family Pyramidellidae

Turbonilla sp.

(Pyramid Shells)

Family Retusidae

Retusa canaliculata

PHYLUM PHORONIDA

Phoronis architecta

(Phoronid Worms)

PHYLUM PORIFERA

Family Clionidae

Cliona sp.

(Sponges)

(Boring Sponges)

PHYLUM RHYNCHOCOELA

Family Tubulanidae

Tubulanus pellucidus

(Nemertean Worms)

TABLE 5. Station numbers for Region III

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<60044> 52	<60040> 53	<60036> 54	<60032> 55	<60028> 56		
<26770>						
<60050> 57	<60046> 58	<60042> 59	<60038> 60	<60034> 61	<60030> 62	
<26760>						
<60052> 63	<60048> 64	<60044> 65	<60040> 66	<60036> 67	<60032> 68	
<26750>						
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<26740>						
<60060> 76	<60056> 77	<60052> 78	<60048> 79	<60044> 80	<60040> 81	<60036> 82
<26730>						
<60062> 83	<60058> 84	<60054> 85	<60050> 86	<60046> 87	<60042> 88	<60038> 89

TABLE 6. Total species list for Region III

PHYLUM ANNELIDA

Class Oligochaeta

Family Tubificidae

Clitellio arenarius

Class Polychaeta

(Bristle Worms)

Family Ampharetidae

(Ampharetid Worms)

Asabellides oculata

Family Arabellidae

(Arabellid Thread Worms)

Arabella iricolor

Driloneris longa

Family Capitellidae

(Capitellid Thread Worms)

Mediomastus ambiseta

Family Chaetopteridae

(Glassy Tube Worms)

Spiochaetopterus oculatus

Family Cirritulidae

(Fringed Worms)

Cirratulis grandis

Cossura longocirrata

Dodecaceria coralii

Family Flabelligeridae

(Flabelligerid Worms)

Flabelligera affinis

Pherusa affinis

Family Glyceridae

(Blood Worms)

Glycera americana

Glycera capitata

Family Hesionidae

(Swift-footed Worms)

Podarke obscura

Family Lumbrineridae

(Lumbrinerid Thread Worms)

Lumbrineris tenuis

Family Maldanidae

(Bamboo Worms)

Asychis elongata

Clymenella zonalis

Family Nephtyidae

(Red-lined Worms)

Nephtys bucera

Nephtys incisa

Nephtys picta

Family Nereidae

(Sand/Clam Worms)

Nereis virens

Nereis zonata

Family Onuphidae

(Plumed Worms)

Diopatra cuprea

Family Orbiniidae

(Orbinid Worms)

Orbinia americana

Scoloplos robustus

Family Oweniidae

Owenia fusiformis

Family Paraonidae

(Paraonid Worms)

Aricidea jefferysii

Paraonis fulgens

Family Pectinariidae

(Trumpet Worm)

Pectinaria gouldii

Family Phyllodoceidae

(Paddle Worms)

Eteone heteropoda

Eteone trilineata

Eumida sanguinea

Phyllodoce arenae

Family Pilargidae

Sigambra tentaculata

PHYLUM ANNELIDA (cont.)

Family Polygordiidae	(Archiannelid)
Polygordius appendiculatus	
Family Polynoidae	(Scale Worms)
Antinoella sarsi	
Harmothoe imbricata	
Lepidonotus squamotus	
Family Sabellaridae	(Sand Builder Worms)
Sabellaria vulgaris	
Family Sabellidae	(Fan Worms)
Potamilla reniformis	
Family Scalibregmidae	(T-headed Worm)
Scalibregma inflatum	
Family Serpulidae	
Hydroides dianthus	
Family Sigalionidae	(Burrowing Scale Worms)
Sthenelais limicola	
Family Spionidae	(Mud Worms)
Polydora hamata	
Polydora websteri	
Prionospio heterobranchia	
Spio filicornis	
Spiophanes bombyx	
Streblospio benedicti	
Family Syllidae	(Syllid Worms)
Autolytus cornutus	
Eusyllis blomstrandii	
Family Terebellidae	(Terebellid Worms)
Polycirrus sp.	

PHYLUM ARTHROPODA

Class Crustacea

Subclass Malacostraca

Order Amphipoda

Suborder Caprellidea

(Skeleton Shrimp)

Family Caprellidae

Aeginina longicornis

Hemiaegina minuta

Suborder Gammaridea

Family Ampeliscidae

Ampelisca abdita

Ampelisca vadorum

Family Aoridae

Leptocheirus pinguis

Unciola irrorata

Family Corophiidae

Corophium lacustre

Family Photidae

Photis sp.

Order Cumacea

Family Diastylidae

Oxyurostylis smithi

Order Decapoda

Family Cancridae

(Rock Crab)

Cancer irroratus

(Rock Crab)

Family Crangonidae

Crangon septemspinosa

(Sand Shrimp)

Family Majiidae

Libinia emarginata

(Spider Crabs)

Family Paguridae

Pagurus longicarpus

(Hermit Crabs)

Pagurus pollicaris

Family Portunidae

(Swimming Crabs)

Carcinus maenas

(Green Crab)

Ovalipes ocellatus

(Lady Crab)

Family Xanthidae

Eurypanopeus depressus

(Mud Crabs)

Panopeus herbstii

Order Isopoda

Family Idoteidae

Chirodotea coeca

Order Mysidacea

(Mysid Shrimp)

Family Mysidae

Neomysis americana

Subclass Ostracoda

Ostracod

PHYLUM CNIDARIA

Class Anthozoa

(Sea Anemones)

Family Astringiidae

Astringia danae

(Star Coral)

Family Metridiidae

Metridium senile

(Frilled Anemone)

Family Sagartidae

Actinothoe modesta

(Burrowing Anemone)

PHYLUM ECHINODERMATA

Class Echinoidea

(Sea Urchins and Sand Dollars)

Family Arbaciidae

Arbacia punctulata

(Purple Sea Urchin)

Class Stelleroidea

(Brittle and Sea Stars)

Family Asteroiidae

Asterias forbesi

(Forbes' Asterias)

PHYLUM MOLLUSCA

Class Bivalvia

Family Anomiidae

Anomia simplex

(Jingle Shell)

Family Arcidae

Anadara transversa

(Transverse Ark)

Family Astartidae

Astarte undata

Family Lyonsiidae

Lyonsia arenosa

Lyonsia hyalina

(Glassy Lyonsia)

Family Mactridae

Mulinia lateralis

(Little Surf Clam)

Spisula solidissima

(Surf Clam)

Family Mytilidae

Mytilus edulis

(Blue Mussel)

Family Nuculanidae

Yoldia limatula

(File Yoldia)

Yoldia sp.

Family Nuculidae

Nucula proxima

(Near Nut Shell)

Family Ostreidae

Crassostrea virginica

(Eastern American Oyster)

Family Pandoridae

Pandora glacialis

Pandora gouldiana

Pandora inornata

(Gould's Pandora)

Family Solenidae

Ensis directus

(Common Razor Clam)

Family Tellinidae

Tellina agilis

Family Thraciidae

Thracia septentrionalis

Family Veneridae

Mercenaria mercenaria

(Quahog)

Pitar morrhuana

(False Quahog)

Group 4 Bivalve

Class Gastropoda	(Snails)
Family Acteonidae	
Acteon punctostriatus	
Family Calyptraeidae	
Crepidula fornicata	(Common Slipper Shell)
Crepidula plana	(Flat Slipper Shell)
Family Cerithiidae	
Seila adamsii	(Wood Screw Shell)
Family Columbellidae	
Anachis avara	(Dove Shell)
Mitrella lunata	(Crescent Mitrella)
Family Corambidae	
Corambella depressa	(Nudibranch)
Family Muricidae	
Eupleura caudata	(Thick-lipped Oyster Drill)
Urosalpinx cinera	(Oyster Drill)
Family Nassariidae	
Nassarius trivittatus	(New England Dog Whelk)
Family Natacidae	
Lunatia heros	(Northern Moon Snail)
Polinices duplicata	(Lobed Moon Snail)
Polinices levicula	
Family Pyramidellidae	(Pyramid Shells)
Odostomia sp.	
Turbonilla sp.	
Family Retusidae	
Retusa canaliculata	
Retusa obtusa	
Family Rissoidae	
Rissoa sp.	
Family Scaphandridae	
Cylichna sp.	
PHYLUM PHORONIDA	(Phoronid Worms)
Phoronis architecta	
PHYLUM PLATYHELMINTHES	(Flatworms)
Family Stylochidae	
Stylochus ellipticus	(Oyster Flatworm)
PHYLUM PORIFERA	(Sponges)
Family Clionidae	
Cliona sp.	(Boring Sponges)
Family Microcionidae	
Microciona sp.	(Red Beard Sponge)
PHYLUM RHYNCHOCOELA	(Nemertean Worms)
Family Lineidae	
Cerebratulus lacteus	(Milky Ribbon Worm)
Family Ototyphlonemertidae	
Ototyphlonemertes pellucida	
Family Tubulanidae	
Tubulanus pellucidus	

Table 7. Station numbers for Region IV

<26720>					
<60060> 90	<60056> 91	<60052> 92	<60048> 93	<60044> 94	<60040> 95
<26710>					
<60062> 96	<60058> 97	<60054> 98	<60050> 99	<60046> 100	<60042> 101
<26700>					
<60064> 102	<60060> 103	<60056> 104	<60052> 105	<60048> 106	<60044> 107
<26690>					
<60062> 108	<60058> 109	<60054> 110	<60050> 111	<60046> 112	
<26680>					
<60068> 113	<60064> 114	<60060> 115	<60056> 116	<60052> 117	<60048> 118
<26670>					
<60070> 119	<60066> 120	<60062> 121	<60058> 122	<60054> 123	<60050> 124
<26660>					
<60072> 125	<60068> 126	<60064> 127	<60060> 128	<60056> 129	<60052> 130

TABLE 8. Total species list for Region IV

PHYLUM ANNELIDA

Class Oligochaeta

Family Tubificidae

Clitellio arenarius

Class Polychaeta

(Bristle Worms)

Family Ampharetidae

(Ampharetid Worms)

Asabellides oculata

Family Arabellidae

(Arabellid Thread Worms)

Driloneris longa

Family Capitellidae

(Capitellid Thread Worms)

Mediomastus ambiseta

Family Chaetopteridae

(Glassy Tube Worms)

Spiochaetopterus oculatus

Family Cirritulidae

(Fringed Worms)

Cirratulis cirratus

Cirratulis grandis

Cossura longocirrata

Family Flabelligeridae

(Flabelligerid Worms)

Flabelligera affinis

Pherusa affinis

Family Glyceridae

(Blood Worms)

Glycera americana

Family Maldanidae

(Bamboo Worms)

Asychis elongata

Clymenella zonalis

Family Nephtyidae

(Red-lined Worms)

Nephtys incisa

Nephtys picta

Family Onuphidae

(Plumed Worms)

Diopatra cuprea

Family Oweniidae

Owenia fusiformis

Family Paraonidae

(Paraonid Worms)

Aricidea jefferysii

Paraonis fulgens

Family Pectinariidae

(Trumpet Worm)

Pectinaria gouldii

Family Phyllodocidae

(Paddle Worms)

Phyllodoce groenlandica

Family Pilargidae

Sigambra tentaculata

Family Polygordiidae

(Archiannelid)

Polygordius

appendiculatus

Family Polynoidae

(Scale Worms)

Antinoella angusta

Antinoella sarsi

Harmothoe imbricata

Lepidonotus squamotus

Family Sabellaridae

(Sand Builder Worms)

Sabellaria vulgaris

Family Serpulidae

Hydroides dianthus

Family Spionidae (Mud Worms)
 Polydora websteri
 Prionospio heterobranchia
 Scolecolepides viridis
 Spiophanes bombyx
 Streblospio benedicti
 Family Syllidae (Syllid Worms)
 Autolytus cornutus
 Family Terebellidae (Terebellid Worms)
 Polycirrus sp.
 PHYLUM ARTHROPODA
 Class Crustacea
 Subclass Malacostraca
 Order Amphipoda
 Suborder Gammaridea
 Family Ampeliscidae
 Ampelisca abdita
 Ampelisca vadorum
 Family Aoridae
 Leptocheirus pinguis
 Unciola irrorata
 Family Corophiidae
 Corophium insidiosum
 Corophium lacustre
 Order Cumacea
 Family Diastylidae
 Oxyurostylis smithi
 Order Decapoda
 Family Cancridae (Rock Crab)
 Cancer irroratus (Rock Crab)
 Family Limulidae
 Limulus polyphemus (Horseshoe Crab)
 Family Majiidae (Spider Crabs)
 Libinia emarginata
 Family Paguridae (Hermit Crabs)
 Pagurus longicarpus
 Pagurus pollicaris
 Family Portunidae (Swimming Crabs)
 Ovalipes ocellatus (Lady Crab)
 Family Xanthidae (Mud Crabs)
 Neopanope texana sayi
 Rhithropanopeus harrissi
 Crab zoea
 Order Isopoda
 Family Idoteidae
 Chirodotea coeca
 Order Mysidacea (Mysid Shrimp)
 Family Mysidae
 Neomysis americana
 Subclass Ostracoda
 Ostracod
 PHYLUM CNIDARIA
 Class Anthozoa (Sea Anemones)
 Family Astringiidae
 Astrangia danae (Star Coral)
 Family Cerianthidae
 Ceriantheopsis americanus (Ceriantharian Anemone)

Family Sagartidae	
Actinothoe modesta	(Burrowing Anemone)
PHYLUM ECHINODERMATA	
Class Echinoidea	(Sea Urchins and Sand Dollars)
Family Arbaciidae	
Arbacia punctulata	(Purple Sea Urchin)
Class Stelleroidea	(Brittle and Sea Stars)
Family Asteriidae	
Asterias forbesi	(Forbes' Asterias)
PHYLUM MOLLUSCA	
Class Bivalvia	
Family Anomiidae	
Anomia simplex	(Jingle Shell)
Family Arcidae	
Anadara transversa	(Transverse Ark)
Family Astartidae	
Astarte undata	
Family Lyonsiidae	
Lyonsia arenosa	
Lyonsia hyalina	(Glassy Lyonsia)
Family Mactridae	
Mulinia lateralis	(Little Surf Clam)
Spisula solidissima	(Surf Clam)
Family Myidae	
Mya arenaria	(Soft-shelled Clam)
Family Mytilidae	
Mytilus edulis	(Blue Mussel)
Family Nuculanidae	
Yoldia limatula	(File Yoldia)
Yoldia sp.	
Family Nuculidae	
Nucula proxima	(Near Nut Shell)
Family Ostreidae	
Crassostrea virginica	(Eastern American Oyster)
Family Pandoridae	
Pandora glacialis	
Pandora gouldiana	(Gould's Pandora)
Family Petricolidae	
Petricola pholadiformis	(False Angel Wing)
Family Solenidae	
Ensis directus	(Common Razor Clam)
Family Tellinidae	
Tellina agilis	
Family Veneridae	
Gemma gemma	(Gem Shell)
Mercenaria mercenaria	(Quahog)
Pitar morrhuana	(False Quahog)
Class Gastropoda	(Snails)
Family Acteonidae	
Acteon punctostriatus	
Family Calyptraeidae	
Crepidula fornicata	(Common Slipper Shell)
Crepidula plana	(Flat Slipper Shell)
Family Columbellidae	
Mitrella lunata	(Crescent Mitrella)
Family Corambidae	
Corambella depressa	(Nudibranch)
Family Muricidae	
Eupleura caudata	(Thick-lipped Oyster Drill)
Urosalpinx cinera	(Oyster Drill)

Family Nassariidae	
<i>Nassarius trivittatus</i>	(New England Dog Whelk)
Family Pyramidellidae	(Pyramid Shells)
<i>Turbonilla</i> sp.	
Family Retusidae	
<i>Retusa canaliculata</i>	
<i>Retusa obtusa</i>	
Family Rissoidae	
<i>Rissoa</i> sp.	
Family Scaphandridae	
<i>Cylichna</i> sp.	
<i>Scaphander punctorostriatus</i>	
Group 4 Gastropod	(Shelled Opisthobranchia and Pulmonata)
PHYLUM PHORONIDA	(Phoronid Worms)
<i>Phoronis architecta</i>	
PHYLUM PORIFERA	(Sponges)
Family Clionidae	
<i>Cliona</i> sp.	(Boring Sponges)
Family Microcionidae	
<i>Microciona</i> sp.	(Red Beard Sponge)
PHYLUM RHYNCHOCOELA	(Nemertean Worms)
Family Cephalothricidae	
<i>Procephalothrix spiralis</i>	
Family Tubulanidae	
<i>Tubulanus pellucidus</i>	
PHYLUM SIPUNCULA	(Sipunculan Worms)
<i>Phascolopsis gouldii</i>	

TABLE 9. Station numbers for Region V

<26650>							
<60082>	<60078>	<60074>	<60070>	<60066>	<60062>	<60058>	<60054>
131	132	133	134	135	136	137	138
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<60080>	<60076>	<60072>	<60068>	<60064>	<60060>	<60056>	
139	140	141	142	143	144	145	
<26630>							
<60086>	<60082>	<60078>	<60074>	<60070>	<60066>	<60062>	<60058>
146	147	148	149	150	151	152	153
<26620>							
<60088>	<60084>	<60080>	<60076>	<60072>	<60068>	<60064>	<60060>
154	155	156	157	158	159	160	161
<26610>							
<60094>	<60090>	<60086>	<60082>	<60078>	<60074>	<60070>	<60066>
162	163	164	165	166	167	168	169
<26600>							
<60096>	<60092>	<60088>	<60084>	<60080>	<60076>	<60072>	<60068>
171	172	173	174	175	176	177	178
<26590>							
<60094>	<60090>	<60086>	<60082>	<60078>	<60074>	<60070>	<60066>
180	181	182	183	184	185	186	187

TABLE 10. Total species list for Region V

PHYLUM ANNELIDA

Class Oligochaeta

Family Tubificidae

Clitellio arenarius

Class Polychaeta

(Bristle Worms)

Family Ampharetidae

(Ampharetid Worms)

Asabellides oculata

Melinna cristata

Family Arabellidae

(Arabellid Thread Worms)

Driloneris longa

Family Capitellidae

(Capitellid Thread Worms)

Mediomastus ambiseta

Family Chaetopteridae

(Glassy Tube Worms)

Spiochaetopterus oculatus

Family Cirritulidae

(Fringed Worms)

Cirratulus grandis

Cossura longocirrata

Family Flabelligeridae

(Flabelligerid Worms)

Flabelligera affinis

Pherusa affinis

Family Glyceridae

(Blood Worms)

Glycera americana

Family Hesionidae

(Swift-footed Worms)

Podarke obscura

Family Lumbrineridae

(Lumbrinerid Thread Worms)

Lumbrineris tenuis

Family Maldanidae

(Bamboo Worms)

Asychis elongata

Clymenella torquata

Clymenella zonalis

Family Nephtyidae

(Red-lined Worms)

Nephtys incisa

Nephtys picta

Family Nereidae

(Sand/Clam Worms)

Nereis virens

Family Onuphidae

(Plumed Worms)

Diopatra cuprea

Family Oweniidae

Owenia fusiformis

Family Paraonidae

(Paraonid Worms)

Aricidea jefferysii

Paraonis fulgens

Family Pectinariidae

(Trumpet Worm)

Pectinaria gouldii

Family Phyllodocidae

(Paddle Worms)

Eteone trilineata

Eumida sanguinea

Phyllodoce arenae

Family Pilargidae

Sigambra tentaculata

Family Polygordiidae

(Archiannelid)

Polygordius

appendiculatus

Family Polynoidae

(Scale Worms)

Antinoella sarsi

Harmothoe imbricata

Lepidonotus squamotus

Family Sabellaridae	(Sand Builder Worms)
Sabellaria vulgaris	
Family Sabellidae	(Fan Worms)
Myxicola infundibulum	
Family Serpulidae	
Hydroides dianthus	
Family Sigalionidae	(Burrowing Scale Worms)
Pholoe minuta	
Family Spionidae	(Mud Worms)
Polydora hamata	
Polydora websteri	
Prionospio	
heterobranchia	
Spiophanes bombyx	
Streblospio benedicti	
Family Syllidae	(Syllid Worms)
Autolytus cornutus	
Autolytus fasciatus	
Eusyllis blomstrandii	
Exogone dispar	
Exogone verugera	
Family Terebellidae	(Terebellid Worms)
Polycirrus sp.	
PHYLUM ARTHROPODA	
Class Crustacea	
Subclass Malacostraca	
Order Amphipoda	
Suborder Caprellidea	(Skeleton Shrimp)
Family Caprellidae	
Aeginina longicornis	
Suborder Gammaridea	
Family Ampeliscidae	
Ampelisca abdita	
Ampelisca vadorum	
Family Aoridae	
Leptocheirus pinguis	
Unciola irrorata	
Family Corophiidae	
Corophium insidiosum	
Corophium lacustre	
Family Photidae	
Photis sp.	
Order Cumacea	
Family Diastylidae	
Oxyurostylis smithi	
Order Decapoda	
Family Cancridae	(Rock Crab)
Cancer irroratus	(Rock Crab)
Family Crangonidae	
Crangon septemspinosa	(Sand Shrimp)
Family Majiidae	(Spider Crabs)
Libinia emarginata	
Family Paguridae	(Hermit Crabs)
Pagurus longicarpus	
Pagurus pollicaris	
Family Portunidae	(Swimming Crabs)
Callinectes sapidus	(Blue Crab)
Ovalipes ocellatus	(Lady Crab)

Family Xanthidae	(Mud Crabs)
<i>Panopeus herbstii</i>	
<i>Rhithropanopeus harrissi</i>	
Crab zoea	
Order Isopoda	
Family Idoteidae	
<i>Edotea triloba</i>	
Order Mysidacea	(Mysid Shrimp)
Family Mysidae	
<i>Neomysis americana</i>	
Subclass Ostracoda	
Ostracod	
PHYLUM ASCHELMINTHES	(Round Worms)
Class Nematoda	
Nematode A	
Nematode B	
PHYLUM CNIDARIA	
Class Anthozoa	(Sea Anemones)
Family Astringiidae	
<i>Astringia danae</i>	(Star Coral)
Family Metridiidae	
<i>Metridium senile</i>	(Frilled Anemone)
PHYLUM ECHINODERMATA	
Class Echinoidea	(Sea Urchins and Sand Dollars)
Family Arbaciidae	
<i>Arbacia punctulata</i>	(Purple Sea Urchin)
Class Stelleroidea	(Brittle and Sea Stars)
Family Amphiuridae	
<i>Axiognathus squamatus</i>	(Dwarf Brittle Star)
Family Asteroiidae	
<i>Asterias forbesi</i>	(Forbes' Asterias)
PHYLUM MOLLUSCA	
Class Bivalvia	
Family Anomiidae	
<i>Anomia simplex</i>	(Jingle Shell)
Family Arcidae	
<i>Anadara transversa</i>	(Transverse Ark)
Family Astartidae	
<i>Astarte undata</i>	
Family Lyonsiidae	
<i>Lyonsia arenosa</i>	
<i>Lyonsia hyalina</i>	(Glassy Lyonsia)
Family Mactridae	
<i>Mulinia lateralis</i>	(Little Surf Clam)
<i>Spisula solidissima</i>	(Surf Clam)
Family Myidae	
<i>Mya arenaria</i>	(Soft-shelled Clam)
Family Mytilidae	
<i>Mytilus edulis</i>	(Blue Mussel)
Family Nuculanidae	
<i>Yoldia limatula</i>	(File Yoldia)
Family Nuculidae	
<i>Nucula proxima</i>	(Near Nut Shell)
Family Ostreidae	
<i>Crassostrea virginica</i>	(Eastern American Oyster)
Family Pandoridae	
<i>Pandora gouldiana</i>	(Gould's Pandora)

Family Solenidae	
<i>Ensis directus</i>	(Common Razor Clam)
Family Tellinidae	
<i>Tellina agilis</i>	
Family Veneridae	
<i>Mercenaria mercenaria</i>	(Quahog)
<i>Pitar morrhuana</i>	(False Quahog)
Class Gastropoda	(Snails)
Family Acteonidae	
<i>Acteon punctostriatus</i>	
Family Aporrhaidae	
<i>Aporrhais occidentalis</i>	
Family Buccinidae	
<i>Colus</i> sp.	
Family Calyptraeidae	
<i>Crepidula fornicata</i>	(Common Slipper Shell)
<i>Crepidula plana</i>	(Flat Slipper Shell)
Family Columbellidae	
<i>Mitrella lunata</i>	(Crescent Mitrella)
Family Corambidae	
<i>Corambella depressa</i>	(Nudibranch)
Family Melongenidae	
<i>Busycon canaliculatum</i>	(Channeled Whelk)
<i>Busycon carica</i>	(Knobbed Whelk)
Family Muricidae	
<i>Urosalpinx cinera</i>	(Oyster Drill)
Family Nassariidae	
<i>Nassarius trivittatus</i>	(New England Dog Whelk)
Family Natacidae	
<i>Polinices duplicata</i>	(Lobed Moon Snail)
Family Pleurobranchiidae	
<i>Pleurobranchaea tarda</i>	(Nudibranch)
Family Pyramidellidae	(Pyramid Shells)
<i>Odostomia</i> sp.	
Family Retusidae	
<i>Retusa canaliculata</i>	
<i>Retusa obtusa</i>	
Family Rissoidae	
<i>Rissoa</i> sp.	
Family Scaphandridae	
<i>Cylichna</i> sp.	
Family Turridae	
<i>Balcis</i> sp.	
PHYLUM PHORONIDA	(Phoronid Worms)
<i>Phoronis architecta</i>	
PHYLUM PORIFERA	(Sponges)
Family Clionidae	
<i>Cliona</i> sp.	(Boring Sponges)
Family Microcionidae	
<i>Microciona</i> sp.	(Red Beard Sponge)
PHYLUM RHYNCHOCOELA	(Nemertean Worms)
Family Cephalothricidae	
<i>Procephalothrix spiralis</i>	
Family Lineidae	
<i>Cerebratulus lacteus</i>	(Milky Ribbon Worm)
Family Tubulanidae	
<i>Tubulanus pellucidus</i>	
PHYLUM SIPUNCULA	(Sipunculan Worms)
<i>Phascolopsis gouldii</i>	

TABLE 11. Station numbers for Region VI

<26580>							
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<26480>							
<60104> 261	<60100> 262	<60096> 263	<60092> 264	<60088> 265	<60084> 266	<60080> 267	

TABLE 12. Total species list for Region VI

PHYLUM ANNELIDA

Class Oligochaeta

Family Tubificidae

Clitellio arenarius

Class Polychaeta

(Bristle Worms)

Family Ampharetidae

(Ampharetid Worms)

Asabellides oculata

Melinna sp.

Family Arabellidae

(Arabellid Thread Worms)

Driloneris longa

Driloneris magna

Family Capitellidae

(Capitellid Thread Worms)

Mediomastus ambiseta

Family Chaetopteridae

(Glassy Tube Worms)

Spiochaetopterus oculatus

Family Cirritulidae

(Fringed Worms)

Cirratulis grandis

Cossura longocirrata

Family Flabelligeridae

(Flabelligerid Worms)

Flabelligera affinis

Pherusa affinis

Family Glyceridae

(Blood Worms)

Glycera americana

Glycera capitata

Glycera dibranchiata

Family Lumbrineridae

(Lumbrinerid Thread Worms)

Lumbrineris acutus

Family Maldanidae

(Bamboo Worms)

Asychis elongata

Axiiothella mucosa

Clymenella torquata

Clymenella zonalis

Family Nephtyidae

(Red-lined Worms)

Nephtys incisa

Nephtys picta

Family Nereidae

(Sand/Clam Worms)

Nereis diversicolor

Nereis grayi

Nereis zonata

Family Onuphidae

(Plumed Worms)

Diopatra cuprea

Onuphis eremita

Family Orbiniidae

(Orbinid Worms)

Orbinia sp.

Family Oweniidae

Owenia fusiformis

Family Paraonidae

(Paraonid Worms)

Aricidea jefferysii

Paraonis fulgens

Family Pectinariidae

(Trumpet Worm)

Pectinaria gouldii

Family Phyllodoceidae

(Paddle Worms)

Eteone heteropoda

Phyllodoce arenae

Phyllodoce maculata

Family Pilargidae	
Cabira incerto	
Sigambra tentaculata	
Family Polygordiidae	(Archannelid)
Polygordius	
appendiculatus	
Family Polynoidae	(Scale Worms)
Antinoella angusta	
Antinoella sarsi	
Harmothoe imbricata	
Lepidonotus squamotus	
Family Sabellaridae	(Sand Builder Worms)
Sabellaria vulgaris	
Family Sabellidae	(Fan Worms)
Potamilla reniformis	
Family Serpulidae	
Hydroides dianthus	
Family Spionidae	(Mud Worms)
Polydora hamata	
Polydora websteri	
Prionospio	
heterobranchia	
Spiophanes bombyx	
Streblospio benedicti	
Family Syllidae	(Syllid Worms)
Autolytus cornutus	
Eusyllis blomstrandii	
Eusyllis lamelligera	
Parapionosyllis	
longocirrata	
Syllides longocirrata	
PHYLUM ARTHROPODA	
Class Crustacea	
Subclass Copepoda	
Calanoid Copepod	
Subclass Malacostraca	
Order Amphipoda	
Suborder Caprellidea	(Skeleton Shrimp)
Family Caprellidae	
Aeginina longicornis	
Suborder Gammaridea	
Family Ampeliscidae	
Ampelisca abdita	
Ampelisca vadorum	
Family Aoridae	
Leptocheirus pinguis	
Unciola irrorata	
Family Corophiidae	
Corophium insidiosum	
Corophium lacustre	
Order Cumacea	
Family Diastylidae	
Oxyurostylis smithi	
Order Decapoda	
Family Cancridae	(Rock Crab)
Cancer irroratus	(Rock Crab)
Family Crangonidae	
Crangon septemspinosa	(Sand Shrimp)
Family Majiidae	(Spider Crabs)
Libinia emarginata	

Family Paguridae	(Hermit Crabs)
<i>Pagurus longicarpus</i>	
<i>Pagurus pollicaris</i>	
Family Pinnotheridae	(Commensal Crabs)
<i>Pinnixa</i> sp.	
Family Portunidae	(Swimming Crabs)
<i>Ovalipes ocellatus</i>	(Lady Crab)
Family Xanthidae	(Mud Crabs)
<i>Neopanope texana sayi</i>	
Crab megalopa	
Crab zoea	
Order Isopoda	
Family Idoteidae	
<i>Chirodotea coeca</i>	
Order Mysidacea	(Mysid Shrimp)
Family Mysidae	
<i>Neomysis americana</i>	
Subclass Ostracoda	
Ostracod	
PHYLUM ASCHELMINTHES	(Round Worms)
Class Nematoda	
Nematode B	
PHYLUM CNIDARIA	
Class Anthozoa	(Sea Anemones)
Family Actinostolidae	
<i>Paranthus rapiformis</i>	
Family Astringiidae	
<i>Astringia danae</i>	(Star Coral)
Family Cerianthidae	
<i>Ceriantheopsis americanus</i>	(Ceriantharian Anemone)
Family Edwardsiidae	
<i>Edwardsia elegans</i>	(Burrowing Anemone)
<i>Fagesia lineata</i>	
PHYLUM ECHINODERMATA	
Class Echinoidea	(Sea Urchins and Sand Dollars)
Family Arbaciidae	
<i>Arbacia punctulata</i>	(Purple Sea Urchin)
Class Stellerioidea	(Brittle and Sea Stars)
Family Asteroiidae	
<i>Asterias forbesi</i>	(Forbes' Asterias)
PHYLUM MOLLUSCA	
Class Bivalvia	
Family Anomiidae	
<i>Anomia simplex</i>	(Jingle Shell)
Family Arcidae	
<i>Anadara transversa</i>	(Transverse Ark)
Family Lyonsiidae	
<i>Lyonsia arenosa</i>	
<i>Lyonsia hyalina</i>	(Glassy Lyonsia)
Family Mactridae	
<i>Mulinia lateralis</i>	(Little Surf Clam)
<i>Spisula solidissima</i>	(Surf Clam)
Family Nuculanidae	
<i>Yoldia limatula</i>	(File Yoldia)
<i>Yoldia</i> sp.	
Family Nuculidae	
<i>Nucula proxima</i>	(Near Nut Shell)
Family Ostreidae	
<i>Crassostrea virginica</i>	(Eastern American Oyster)

Family Pandoridae	
<i>Pandora glacialis</i>	
<i>Pandora gouldiana</i>	(Gould's Pandora)
Family Solenidae	
<i>Ensis directus</i>	(Common Razor Clam)
Family Tellinidae	
<i>Tellina agilis</i>	
Family Veneridae	
<i>Mercenaria mercenaria</i>	(Quahog)
<i>Pitar morrhuana</i>	(False Quahog)
Class Gastropoda	(Snails)
Family Acteonidae	
<i>Acteon punctostriatus</i>	
Family Calyptraeidae	
<i>Crepidula fornicata</i>	(Common Slipper Shell)
<i>Crepidula plana</i>	(Flat Slipper Shell)
Family Cerithiidae	
<i>Seila adamsii</i>	(Wood Screw Shell)
Family Columbellidae	
<i>Mitrella lunata</i>	(Crescent Mitrella)
Family Corambidae	
<i>Corambella depressa</i>	(Nudibranch)
Family Melongenidae	
<i>Busycon canaliculatum</i>	(Channeled Whelk)
<i>Busycon carica</i>	(Knobbed Whelk)
Family Muricidae	
<i>Eupleura caudata</i>	(Thick-lipped Oyster Drill)
<i>Urosalpinx cinera</i>	(Oyster Drill)
Family Nassariidae	
<i>Nassarius trivittatus</i>	(New England Dog Whelk)
Family Natacidae	
<i>Lunatia heros</i>	(Northern Moon Snail)
<i>Polinices duplicata</i>	(Lobed Moon Snail)
Family Pyramidellidae	(Pyramid Shells)
<i>Odostomia</i> sp.	
<i>Turbonilla</i> sp.	
Family Retusidae	
<i>Retusa canaliculata</i>	
<i>Retusa obtusa</i>	
Family Rissoidae	
<i>Rissoa</i> sp.	
Family Scaphandridae	
<i>Cylichna</i> sp.	
<i>Scaphander punctorostriatus</i>	
Family Turridae	
<i>Balcis</i> sp.	
Group 4 Gastropod	(Shelled Opisthobranchia and Pulmonata)
PHYLUM PHORONIDA	(Phoronid Worms)
<i>Phoronis architecta</i>	
PHYLUM PLATYHELMINTHES	(Flatworms)
Family Stylochidae	
<i>Stylochus ellipticus</i>	(Oyster Flatworm)
PHYLUM PORIFERA	(Sponges)
Family Clionidae	
<i>Cliona</i> sp.	(Boring Sponges)
Family Microcionidae	
<i>Microciona</i> sp.	(Red Beard Sponge)

PHYLUM RHYNCHOCOELA

(Nemertean Worms)

Family Lineidae

Cerebratulus lacteus

(Milky Ribbon Worm)

Micrura caeca

Family Tubulanidae

Tubulanus pellucidus

PHYLUM SIPUNCULA

(Sipunculan Worms)

Golfingia improvisa

Phascolopsis elegans

Phascolopsis gouldii

TABLE 13. Station numbers for Region VII

<60106> 268	<60102> 269	<60098> 270	<26470> <60094> 271	<60090> 272	<60086> 273	<60082> 274
<60104> 275	<60100> 276	<60096> 277	<26460> <60092> 278	<60088> 279	<60084> 280	
<60106> 281	<60102> 282	<60098> 283	<26450> <60094> 284	<60090> 285	<60086> 286	
<60108> 287	<60104> 288	<60100> 289	<26440> <60096> 290	<60092> 291	<60088> 292	
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<60110> 316	<60106> 317	<26390> <60102> 318	<60098> 319	<60094> 320		

TABLE 14. Total species list for Region VII

PHYLUM ANNELIDA

Class Oligochaeta

Family Tubificidae

Clitellio arenarius

Unknown Oligochaetes

Class Polychaeta

(Bristle Worms)

Family Ampharetidae

(Ampharetid Worms)

Amage auricula

Ampharete arctica

Asabellides oculata

Melinna cristata

Family Arabellidae

(Arabellid Thread Worms)

Arabella iricolor

Family Capitellidae

(Capitellid Thread Worms)

Capitella capitata

Mediomastus ambiseta

Family Chaetopteridae

(Glassy Tube Worms)

Spiochaetopterus oculatus

Family Cirritulidae

(Fringed Worms)

Cirratulus grandis

Family Dorvilleidae

(Four-eyed Dorvillids)

Stauronereis sociabilis

Family Flabelligeridae

(Flabelligerid Worms)

Flabelligera affinis

Pherusa affinis

Family Glyceridae

(Blood Worms)

Glycera americana

Glycera capitata

Glycera dibranchiata

Glycera tessellata

Family Goniadidae

(Chevron Worms)

Goniadella gracilis

Family Lumbrineridae

(Lumbrinerid Thread Worms)

Lumbrineris fragilis

Family Maldanidae

(Bamboo Worms)

Clymenella torquata

Clymenella zonalis

Family Nephtyidae

(Red-lined Worms)

Nephtys bucera

Nephtys incisa

Nephtys picta

Family Nereidae

(Sand/Clam Worms)

Nereis grayi

Nereis succinea

Family Onuphidae

(Plumed Worms)

Diopatra cuprea

Family Orbiniidae

(Orbinid Worms)

Scoloplos fragilis

Scoloplos robustus

Family Oweniidae

Owenia fusiformis

Family Paraonidae

(Paraonid Worms)

Aricidea jefferysii

Paraonis fulgens

Paraonis lyra

Family Pectinariidae

(Trumpet Worm)

Pectinaria gouldii

Family Phyllodocidae (Paddle Worms)
 Eteone lactea
 Phyllodoce arenae
 Phyllodoce maculata
 Family Polygordiidae (Archiannelid)
 Polygordius appendiculatus
 Family Polynoidae (Scale Worms)
 Antinoella sarsi
 Harmothoe imbricata
 Family Sabellaridae (Sand Builder Worms)
 Sabellaria vulgaris
 Family Sigalionidae (Burrowing Scale Worms)
 Pholoe minuta
 Family Spionidae (Mud Worms)
 Laonice cirrata
 Polydora ligni
 Polydora websteri
 Prionospio heterobranchia
 Prionospio steenstrupi
 Prionospio tenuis
 Pygospio elegans
 Scolecopides viridis
 Scolecopsis squamata
 Spiophanes bombyx
 Streblospio benedicti
 Family Syllidae (Syllid Worms)
 Autolytus cornutus
 Autolytus fasciatus
 Eusyllis blomstrandii
 Family Terebellidae (Terebellid Worms)
 Polycirrus eximus

PHYLUM ARTHROPODA
 Class Crustacea
 Subclass Copepoda
 Calanoid Copepod
 Subclass Malacostraca
 Order Amphipoda
 Suborder Caprellidea (Skeleton Shrimp)
 Family Caprellidae
 Aeginina longicornis
 Suborder Gammaridea
 Family Ampeliscidae
 Ampelisca abdita
 Ampelisca vadorum
 Ampelisca verrilli
 Family Aoridae
 Leptocheirus pinguis
 Unciola irrorata
 Unciola serrata
 Family Corophiidae
 Corophium acherusicum
 Corophium crassicornis
 Corophium insidiosum
 Family Gammaridae
 Gammarus lawrencianus
 Gammarus oceanicus

Family Haustoriidae
 Protohaustorius deichmanne
 Protohaustorius wigleyi
 Family Phoxocephalidae
 Phoxocephalus holbolli
 Trichophoxus epistomus
 Family Pleustidae
 Stenopleutes gracilis
 Family Podoceridae
 Dulichia porrecta
 Order Cumacea
 Family Diastylidae
 Oxyurostylis smithi
 Order Decapoda
 Family Cancridae (Rock Crab)
 Cancer irroratus (Rock Crab)
 Family Majiidae (Spider Crabs)
 Libinia emarginata
 Family Paguridae (Hermit Crabs)
 Pagurus longicarpus
 Pagurus pollicaris
 Family Pinnotheridae (Commensal Crabs)
 Pinnixa sp.
 Family Portunidae (Swimming Crabs)
 Ovalipes ocellatus (Lady Crab)
 Family Xanthidae (Mud Crabs)
 Neopanope texana sayi

 Crab zoea
 Order Isopoda
 Family Idoteidae
 Edotea triloba
 Order Mysidacea (Mysid Shrimp)
 Family Mysidae
 Praunus flexuosus
 PHYLUM ASCHELMINTHES (Round Worms)
 Class Nematoda
 Nematode A
 Nematode B
 Nematode C
 Nematode D
 PHYLUM CHAETOGNATHA (Arrow Worms)
 Sagitta sp.
 PHYLUM CNIDARIA
 Class Anthozoa (Sea Anemones)
 Family Actinidae
 Tealia felina (Northern Red Anemone)
 Family Cerianthidae
 Ceriantheopsis americanus (Ceriantharian Anemone)
 Family Edwardsiidae
 Edwardsia elegans (Burrowing Anemone)
 Family Metridiidae
 Metridium senile (Frilled Anemone)
 Family Sagartidae
 Actinothoe modesta (Burrowing Anemone)
 PHYLUM ECHINODERMATA
 Class Holothuroidea (Sea Cucumbers)
 Family Synaptidae
 Leptosynapta roseola

Class Stelleroidea	(Brittle and Sea Stars)
Family Asteriidae	
Asterias forbesi	(Forbes' Asterias)
PHYLUM MOLLUSCA	
Class Bivalvia	
Family Arcidae	
Anadara transversa	(Transverse Ark)
Family Lyonsiidae	
Lyonsia hyalina	(Glassy Lyonsia)
Family Mactridae	
Mulinia lateralis	(Little Surf Clam)
Family Mytilidae	
Mytilus edulis	(Blue Mussel)
Family Nuculanidae	
Yoldia limatula	(File Yoldia)
Family Nuculidae	
Nucula proxima	(Near Nut Shell)
Family Pandoridae	
Pandora gouldiana	(Gould's Pandora)
Family Solenidae	
Ensis directus	(Common Razor Clam)
Family Tellinidae	
Tellina agilis	
Family Veneridae	
Mercenaria mercenaria	(Quahog)
Pitar morrhuana	(False Quahog)
Class Gastropoda	(Snails)
Family Acteonidae	
Acteon punctostriatus	
Family Calyptraeidae	
Crepidula fornicata	(Common Slipper Shell)
Crepidula plana	(Flat Slipper Shell)
Family Columbellidae	
Mitrella lunata	(Crescent Mitrella)
Family Epitoniidae	
Epitonium sp.	
Family Hydrobiidae	
Hydrobia minuta	(Swamp Hydrobia)
Family Melongenidae	
Busycon canaliculatum	(Channeled Whelk)
Busycon carica	(Knobbed Whelk)
Family Muricidae	
Urosalpinx cinera	(Oyster Drill)
Family Nassariidae	
Nassarius trivittatus	(New England Dog Whelk)
Family Natacidae	
Polinices duplicata	(Lobed Moon Snail)
Family Pyramidellidae	(Pyramid Shells)
Odostomia sp.	
Turbonilla sp.	
Family Retusidae	
Retusa canaliculata	
Retusa obtusa	
Family Rissoidae	
Rissoa sp.	
Family Scaphandridae	
Cylichna sp.	
Scaphander punctorostriatus	
Family Turridae	
Balcis sp.	

PHYLUM PHORONIDA

(Phoronid Worms)

Phoronis architecta

PHYLUM RHYNCHOCOELA

(Nemertean Worms)

Family Lineidae

Cerebratulus sp.

Family Tubulanidae

Tubulanus pellucidus

PHYLUM SIPUNCULA

(Sipunculan Worms)

Phascolopsis gouldii

TABLE 15. Station Numbers for Region VIII

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TABLE 16. Total species list for Region VIII

PHYLUM ANNELIDA

Class Oligochaeta

Family Tubificidae

Clitellio arenarius

Class Polychaeta

(Bristle Worms)

Family Ampharetidae

(Ampharetid Worms)

Ampharete arctica

Amphisamytha sp.

Asabellides oculata

Family Capitellidae

(Capitellid Thread Worms)

Capitella capitata

Mediomastus ambiseta

Family Cirratulidae

(Fringed Worms)

Chaetozone setosa

Cirratulus cirratus

Cirratulus grandis

Family Dorvilleidae

(Four-eyed Dorvillids)

Stauronereis caecus

Family Eunicida

(Red-gilled Worms)

Eunice pennata

Family Flabelligeridae

(Flabelligerid Worms)

Flabelligera affinis

Pherusa affinis

Family Glyceridae

(Blood Worms)

Glycera americana

Glycera capitata

Glycera dibranchiata

Family Goniadidae

(Chevron Worms)

Goniadella gracilis

Family Hesionidae

(Swift-footed Worms)

Podarke obscura

Family Lumbrineridae

(Lumbrinerid Thread Worms)

Lumbrineris tenuis

Family Magelonidae

(Rosy Magelona)

Magelona rosea

Family Maldanidae

(Bamboo Worms)

Clymenella torquata

Clymenella zonalis

Family Nephtyidae

(Red-lined Worms)

Nephtys bucera

Nephtys incisa

Nephtys paradoxa

Nephtys picta

Family Nereidae

(Sand/Clam Worms)

Nereis zonata

Family Orbiniidae

(Orbinid Worms)

Scoloplos robustus

Family Oweniidae

Owenia fusiformis

Family Paraonidae

(Paraonid Worms)

Aricidea jefferysii

Paraonis fulgens

Family Phyllodocidae

(Paddle Worms)

Eteone trilineata

Eumida sanguinea

Phyllodoce arenae

Phyllodoce maculata

Family Pilargidae
 Sigambra tentaculata
 Family Polygordiidae (Archiannelid)
 Polygordius
 appendiculatus
 Family Polynoidae (Scale Worms)
 Antinoella sarsi
 Harmothoe imbricata
 Lepidonotus squamotus
 Family Sabellaridae (Sand Builder Worms)
 Sabellaria vulgaris
 Family Sabellidae (Fan Worms)
 Potamilla reniformis
 Family Scalibregmidae (T-headed Worm)
 Scalibregma inflatum
 Family Serpulidae
 Hydroides dianthus
 Family Sigalionidae (Burrowing Scale Worms)
 Pholoe minuta
 Sigalion arenicola
 Family Spionidae (Mud Worms)
 Laonice cirrata
 Polydora caeca
 Polydora websteri
 Prionospio
 heterobranchia
 Prionospio steenstrupi
 Prionospio tenuis
 Pygospio elegans
 Scolecopelides viridis
 Spio multioculata
 Spiophanes bombyx
 Streblospio benedicti
 Family Syllidae (Syllid Worms)
 Autolytus cornutus
 Autolytus fasciatus
 Parapionosyllis
 longocirrata
 Syllides longocirrata
 Family Terebellidae (Terebellid Worms)
 Polycirrus eximus
 Unknown Polychaetes
 Polychaete C

PHYLUM ARTHROPODA

Class Crustacea

Subclass Cephalocarida

Hutchinsoniella macracantha

Subclass Copepoda

Calanoid Copepod

Subclass Malacostraca

Order Amphipoda

Suborder Caprellidea

(Skeleton Shrimp)

Family Caprellidae

Aeginina longicornis

Suborder Gammaridea

Family Ampeliscidae

Ampelisca abdita

Ampelisca verrilli

Family Aoridae
 Pseudunciola obliquua
 Unciola irrorata
 Unciola serrata
 Family Corophiidae
 Corophium acherusicum
 Corophium crassicorne
 Erichthonius brasiliensis
 Family Haustoriidae
 Acanthohaustorius millsii
 Bathyporeia quoddyensis
 Parahaustorius attentuatus
 Protohaustorius deichmanne
 Protohaustorius wigleyi
 Family Ischyroceridae
 Ischyrocerus anguipes
 Family Lysianassidae
 Psammonyx nobilis
 Family Phoxocephalidae
 Paraphoxus spinosus
 Phoxocephalus holbolli
 Trichophoxus epistomus
 Family Pleustidae
 Stenopleutes gracilis
 Order Cumacea
 Family Diastylidae
 Oxyurostylis smithi
 Order Decapoda
 Family Cancridae (Rock Crab)
 Cancer irroratus (Rock Crab)
 Family Majiidae (Spider Crabs)
 Libinia emarginata
 Family Paguridae (Hermit Crabs)
 Pagurus longicarpus
 Pagurus pollicaris
 Family Pinnotheridae (Commensal Crabs)
 Pinnotheres maculatus
 Family Portunidae (Swimming Crabs)
 Ovalipes ocellatus (Lady Crab)
 Family Xanthidae (Mud Crabs)
 Rhithropanopeus harrissi

 Crab zoea
 Order Isopoda
 Family Aegidae
 Aega psora
 Family Idoteidae
 Chirodotea tuftsi
 Idotea phosphorea
 Order Mysidacea (Mysid Shrimp)
 Family Mysidae
 Praunus flexuosus
 Order Tanaidacea (Tanaid Isopods)
 Family Paratanidae
 Leptochelia savignyi
 Leptognatha caeca

PHYLUM ASCHELMINTHES	(Round Worms)
Class Nematoda	
Nematode	
Nematode B	
Nematode C	
Nematode D	
PHYLUM CHAETOGNATHA	(Arrow Worms)
Sagitta sp.	
PHYLUM CNIDARIA	
Class Anthozoa	(Sea Anemones)
Family Cerianthidae	
Ceriantheopsis americanus	(Ceriantharian Anemone)
PHYLUM ECHINODERMATA	
Class Echinoidea	(Sea Urchins and Sand Dollars)
Family Arbaciidae	
Arbacia punctulata	(Purple Sea Urchin)
Class Stelleriidea	(Brittle and Sea Stars)
Family Amphiuridae	
Axiognathus squamatus	(Dwarf Brittle Star)
Family Asteriidae	
Asterias forbesi	(Forbes' Asterias)
PHYLUM MOLLUSCA	
Class Bivalvia	
Family Arcidae	
Anadara transversa	(Transverse Ark)
Family Lyonsiidae	
Lyonsia arenosa	
Family Mactridae	
Mulinia lateralis	(Little Surf Clam)
Spisula solidissima	(Surf Clam)
Family Myidae	
Mya arenaria	(Soft-shelled Clam)
Family Mytilidae	
Crenella glandula	
Musculus discors	
Mytilus edulis	(Blue Mussel)
Family Nuculanidae	
Yoldia limatula	(File Yoldia)
Family Nuculidae	
Nucula proxima	(Near Nut Shell)
Family Ostreidae	
Crassostrea virginica	(Eastern American Oyster)
Family Pandoridae	
Pandora gouldiana	(Gould's Pandora)
Family Petricolidae	
Petricola pholadiformis	(False Angel Wing)
Family Solenidae	
Ensis directus	(Common Razor Clam)
Family Tellinidae	
Macoma tenta	
Tellina agilis	
Family Veneridae	
Mercenaria mercenaria	(Quahog)
Class Gastropoda	(Snails)
Family Calyptraeidae	
Crepidula fornicata	(Common Slipper Shell)
Crepidula plana	(Flat Slipper Shell)

Family Columbellidae	
<i>Anachis avara</i>	(Dove Shell)
<i>Mitrella lunata</i>	(Crescent Mitrella)
Family Melongenidae	
<i>Busycon canaliculatum</i>	(Channeled Whelk)
Family Nassariidae	
<i>Nassarius trivittatus</i>	(New England Dog Whelk)
Family Natacidae	
<i>Lunatia heros</i>	(Northern Moon Snail)
Family Pyramidellidae	(Pyramid Shells)
<i>Turbonilla</i> sp.	
Family Rissoidae	
<i>Rissoa</i> sp.	
PHYLUM PHORONIDA	(Phoronid Worms)
<i>Phoronis architecta</i>	
PHYLUM PORIFERA	(Sponges)
Family Haliclonidae	
<i>Haliclona canaliculata</i>	(Sulphur Sponge)
PHYLUM RHYNCHOCOELA	(Nemertean Worms)
Family Lineidae	
<i>Cerebratulus</i> sp.	
Family Tubulanidae	
<i>Tubulanus pellucidus</i>	

TABLE 17. Station numbers for Region IX

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<60128> 396	<26160> <60124> 397		
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TABLE 18. Total species list for Region IX

HYLUM ANNELIDA

Class Oligochaeta

Family Tubificidae

Clitellio arenarius

Unknown Oligochaetes

Class Polychaeta

(Bristle Worms)

Family Ampharetidae

(Ampharetid Worms)

Ampharete arctica

Asabellides oculata

Schistocomus sp.

Family Arabellidae

(Arabellid Thread Worms)

Arabella iricolor

Driloneris longa

Family Capitellidae

(Capitellid Thread Worms)

Capitella capitata

Mediomastus ambiseta

Family Cirratulidae

(Fringed Worms)

Cirratulis cirratus

Cirratulis grandis

Cossura longocirrata

Family Eunicida

(Red-gilled Worms)

Marphysa belli

Family Flabelligeridae

(Flabelligerid Worms)

Flabelligera affinis

Pherusa affinis

Family Glyceridae

(Blood Worms)

Glycera americana

Glycera dibranchiata

Family Goniadidae

(Chevron Worms)

Goniadella gracilis

Family Hesionidae

(Swift-footed Worms)

Podarke obscura

Family Lumbrineridae

(Lumbrinerid Thread Worms)

Lumbrineris acutus

Lumbrineris fragilis

Lumbrineris impatiens

Lumbrineris tenuis

Family Magelonidae

(Rosy Magelona)

Magelona rosea

Family Maldanidae

(Bamboo Worms)

Clymenella torquata

Clymenella zonalis

Family Nephtyidae

(Red-lined Worms)

Nephtys bucera

Nephtys caeca

Nephtys discors

Nephtys incisa

Nephtys picta

Family Nereidae

(Sand/Clam Worms)

Lycastopsis pontica

Nereis grayi

Nereis succinea

Nereis virens

Nereis zonata

Family Orbiniidae

(Orbinid Worms)

Scoloplos fragilis

Scoloplos robustus

Family Oweniidae	
<i>Owenia fusiformis</i>	
Family Paraonidae	(Paraonid Worms)
<i>Aricidea jefferysii</i>	
<i>Paraonis fulgens</i>	
Family Pectinariidae	(Trumpet Worm)
<i>Pectinaria gouldii</i>	
Family Phyllodocidae	(Paddle Worms)
<i>Eteone heteropoda</i>	
<i>Eteone lactea</i>	
<i>Eteone longa</i>	
<i>Eteone trilineata</i>	
<i>Eumida sanguinea</i>	
<i>Phyllodoce arenae</i>	
<i>Phyllodoce maculata</i>	
Family Polygordiidae	(Archiannelid)
<i>Polygordius</i>	
<i>appendiculatus</i>	
Family Polynoidae	(Scale Worms)
<i>Antinoella sarsi</i>	
<i>Harmothoe imbricata</i>	
<i>Harmothoe nodosa</i>	
<i>Lepidonotus squamotus</i>	
Family Sabellaridae	(Sand Builder Worms)
<i>Sabellaria vulgaris</i>	
Family Sabellidae	(Fan Worms)
<i>Potamilla neglecta</i>	
<i>Potamilla reniformis</i>	
Family Scalibregmidae	(T-headed Worm)
<i>Scalibregma inflatum</i>	
Family Sigalionidae	(Burrowing Scale Worms)
<i>Pholoe minuta</i>	
Family Spionidae	(Mud Worms)
<i>Polydora caeca</i>	
<i>Polydora commensalis</i>	
<i>Polydora hamata</i>	
<i>Polydora ligni</i>	
<i>Polydora websteri</i>	
<i>Prionospio</i>	
<i>heterobranchia</i>	
<i>Prionospio steenstrupi</i>	
<i>Prionospio tenuis</i>	
<i>Pygospio elegans</i>	
<i>Scolecoplepides viridis</i>	
<i>Scoleciepis squamata</i>	
<i>Spiophanes bombyx</i>	
<i>Streblospio benedicti</i>	
Family Syllidae	(Syllid Worms)
<i>Autolytus cornutus</i>	
<i>Autolytus fasciatus</i>	
<i>Eusyllis blomstrandii</i>	
<i>Exogone dispar</i>	
<i>Parapionosyllis</i>	
<i>longocirrata</i>	
<i>Syllides longocirrata</i>	
<i>Syllides setosa</i>	

Family Terebellidae (Terebellid Worms)
 Amphitrite ornata
 Loimia medusa
 Polycirrus eximus
 Polycirrus sp.
 Unknown Polychaetes
 Polychaete B
 Polychaete C

PHYLUM ARTHROPODA

Class Crustacea

Subclass Copepoda

Calanoid Copepod

Subclass Malacostraca

Order Amphipoda

Suborder Caprellidea (Skeleton Shrimp)

Family Caprellidae

Aeginina longicornis

Caprella linearis

Suborder Gammaridea

Family Ampeliscidae

Ampelisca abdita

Ampelisca vadorum

Ampelisca verrilli

Family Aoridae

Leptocheirus pinguis

Unciola irrorata

Unciola serrata

Family Corophiidae

Corophium acherusicum

Corophium crassicorne

Corophium insidiosum

Erichthonius brasiliensis

Family Haustoriidae

Acanthohaustorius millsi

Bathyporeia quoddyensis

Protohaustorius wigleyi

Family Ischyroceridae

Ischyrocerus anguipes

Family Lysianassidae

Lysianopsis alba

Psammonyx nobilis

Family Melitidae

Maera danae

Family Phoxocephalidae

Paraphoxus spinosus

Phoxocephalus holbolli

Trichophoxus epistomus

Family Pleustidae

Stenopleutes gracilis

Family Podoceridae

Dulichia porrecta

Dulichia sp.

Family Stenothoidae

Parametopella cypris

Stenothoe minuta

Order Decapoda

Family Callinassidae

(Mud Shrimp)

Callinassa atlantica

Family Cancridae

(Rock Crab)

Cancer irroratus

(Rock Crab)

Family Crangonidae
 Crangon septemspinosa (Sand Shrimp)
 Family Majiidae (Spider Crabs)
 Libinia dubia
 Libinia emarginata
 Libinia sp.
 Family Paguridae (Hermit Crabs)
 Pagurus longicarpus
 Pagurus pollicaris
 Family Palaemonidae (Shore Shrimps)
 Palaemonetes sp.
 Family Pinnotheridae (Commensal Crabs)
 Pinnixa sp.
 Pinnotheres maculatus
 Family Portunidae (Swimming Crabs)
 Ovalipes ocellatus (Lady Crab)
 Crab megalopa
 Crab zoea
 Order Isopoda
 Family Anthuridae
 Cyathura burbancki
 Cyathura polita
 Family Idoteidae
 Chirodotea coeca
 Erichsoniella filiformis
 Idotea phosphorea
 Order Mysidacea (Mysid Shrimp)
 Family Mysidae
 Mysidopsis bigelowi
 Praunus flexuosus
 Order Stomatopoda
 Family Squillidae
 Squilla empusa (Mantis shrimp)
 Order Tanaidacea (Tanaid Isopods)
 Family Paratanidae
 Leptochelia savignyi
 Leptognatha caeca
 Subclass Ostracoda
 Ostracod
 Class Pantopoda (Sea Spiders)
 Family Ammotheidae
 Achelia spinosa
 Family Nymphonidae
 Nymphon macrum
 Family Phoxichilidiidae
 Anoplodactylus lentus
 Family Tanystylidae
 Tanystylum orbiculare
 PHYLUM ASCHELMINTHES (Round Worms)
 Class Nematoda
 Nematode A
 Nematode B
 Nematode C
 Nematode D

PHYLUM CNIDARIA

- Class Anthozoa (Sea Anemones)
 - Family Actinidae
 - Tealia felina* (Northern Red Anemone)
 - Family Cerianthidae
 - Ceriantheopsis americanus* (Ceriantharian Anemone)
 - Family Edwardsiidae
 - Edwardsia elegans* (Burrowing Anemone)
 - Pagesia lineata*
 - Family Sagartidae
 - Actinothoe modesta* (Burrowing Anemone)

PHYLUM ECHINODERMATA

- Class Holothuroidea (Sea Cucumbers)
 - Family Phyllophoridae
 - Pentamera pulcherima*
- Class Stelleroidea (Brittle and Sea Stars)
 - Family Amphiuridae
 - Axiognathus squamatus* (Dwarf Brittle Star)
 - Family Asteroiidae
 - Asterias forbesi* (Forbes' Asterias)
 - Family Echinasteridae
 - Henrica sanguinolenta* (Blood Star)

PHYLUM MOLLUSCA

- Class Bivalvia
 - Family Anomiidae
 - Anomia aculeata*
 - Family Arcidae
 - Anadara transversa* (Transverse Ark)
 - Family Astartidae
 - Astarte castanea* (Chestnut Astarte)
 - Astarte undata*
 - Family Cardiidae
 - Cerastoderma pinnulatum* (Little Cockle)
 - Family Carditidae
 - Cardita borealis*
 - Family Hiatellidae
 - Hiatella striata*
 - Family Lyonsiidae
 - Lyonsia arenosa*
 - Lyonsia hyalina* (Glassy Lyonsia)
 - Family Myidae
 - Mya arenaria* (Soft-shelled Clam)
 - Family Mytilidae
 - Crenella glandula*
 - Modiolus demissus* (Ribbed Mussel)
 - Musculus discors*
 - Mytilus edulis* (Blue Mussel)
 - Family Nuculanidae
 - Yoldia limatula* (File Yoldia)
 - Family Nuculidae
 - Nucula proxima* (Near Nut Shell)
 - Family Ostreidae
 - Crassostrea virginica* (Eastern American Oyster)
 - Family Pandoridae
 - Pandora gouldiana* (Gould's Pandora)
 - Family Petricolidae
 - Petricola pholadiformis* (False Angel Wing)
 - Family Solemyacidae
 - Solemya velum* (Veiled Clam)

Family Solenidae	
<i>Ensis directus</i>	(Common Razor Clam)
Family Tellinidae	
<i>Macoma calcarea</i>	(Chalky Macoma)
<i>Macoma tenta</i>	
<i>Tellina agilis</i>	
Family Veneridae	
<i>Pitar morrhuana</i>	(False Quahog)
Class Gastropoda	(Snails)
Family Calyptraeidae	
<i>Crepidula fornicata</i>	(Common Slipper Shell)
<i>Crepidula plana</i>	(Flat Slipper Shell)
Family Columbellidae	
<i>Anachis avara</i>	(Dove Shell)
<i>Mitrella lunata</i>	(Crescent Mitrella)
<i>Mitrella zonalis</i>	
Family Corambidae	
<i>Corambella depressa</i>	
Family Hydrobiidae	
<i>Hydrobia minuta</i>	(Swamp Hydrobia)
Family Lamellidoridae	
<i>Onchidoris muricata</i>	(Nudibranch)
Family Melongenidae	
<i>Busycon canaliculatum</i>	(Channeled Whelk)
<i>Busycon carica</i>	(Knobbed Whelk)
Family Nassariidae	
<i>Nassarius trivittatus</i>	(New England Dog Whelk)
Family Natacidae	
<i>Lunatia heros</i>	(Northern Moon Snail)
<i>Polinices duplicata</i>	(Lobed Moon Snail)
Family Pyramidellidae	(Pyramid Shells)
<i>Odostomia</i> sp.	
<i>Turbonilla</i> sp.	
Family Retusidae	
<i>Retusa obtusa</i>	
Family Rissoidae	
<i>Rissoa</i> sp.	
Family Turridae	
<i>Balcis</i> sp.	
Class Polyplacophora	(Chitons)
Family Chaetopleuridae	
<i>Chaetopleura apiculata</i>	
PHYLUM PHORONIDA	(Phoronid Worms)
<i>Phoronis architecta</i>	
PHYLUM RHYNCHOCOELA	(Nemertean Worms)
Family Tubulanidae	
<i>Tubulanus pellucidus</i>	

TABLE 19. Station numbers for Region X

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413	

TABLE 20. Total species list for Region X

PHYLUM ANNELIDA

Class Oligochaeta

Family Tubificidae

Clitellio arenarius

Unknown Oligochaetes

Class Polychaeta

(Bristle Worms)

Family Ampharetidae

(Ampharetid Worms)

Ampharete arctica

Family Arabellidae

(Arabellid Thread Worms)

Driloneris longa

Family Capitellidae

(Capitellid Thread Worms)

Capitella capitata

Mediomastus ambiseta

Family Chaetopteridae

(Glassy Tube Worms)

Spiochaetopterus oculatus

Family Cirritulidae

(Fringed Worms)

Cirratulis cirratus

Cirratulis grandis

Dodecaceria coralii

Tharyx acutus

Family Dorvilleidae

(Four-eyed Dorvillids)

Stauronereis caecus

Family Eunicida

(Red-gilled Worms)

Marphysa belli

Family Flabelligeridae

(Flabelligerid Worms)

Pherusa affinis

Family Glyceridae

(Blood Worms)

Glycera americana

Glycera capitata

Family Lumbrineridae

(Lumbrinerid Thread Worms)

Lumbrineris brevipes

Lumbrineris fragilis

Lumbrineris impatiens

Lumbrineris tenuis

Family Magelonidae

(Rosy Magelona)

Magelona rosea

Family Maldanidae

(Bamboo Worms)

Asychis elongata

Clymenella torquata

Clymenella zonalis

Family Nephtyidae

(Red-lined Worms)

Nephtys bucera

Nephtys discors

Nephtys incisa

Nephtys paradoxa

Nephtys picta

Family Nereidae

(Sand/Clam Worms)

Nereis grayi

Nereis succinea

Nereis virens

Nereis zonata

Family Onuphidae

(Plumed Worms)

Diopatra cuprea

Family Orbinidae

(Orbinid Worms)

Scoloplos fragilis

Scoloplos robustus

Family Paraonidae	(Paraonid Worms)
Aricidea jefferysii	
Paraonis fulgens	
Paraonis lyra	
Family Pectinariidae	(Trumpet Worm)
Pectinaria gouldii	
Family Phyllodoceidae	(Paddle Worms)
Eteone heteropoda	
Eteone longa	
Eumida sanguinea	
Phyllodoce arenae	
Phyllodoce maculata	
Family Polygordiidae	(Archannelid)
Polygordius	
appendiculatus	
Family Polynoidae	(Scale Worms)
Harmothoe imbricata	
Harmothoe nodosa	
Lepidonotus squamotus	
Family Sabellidae	(Fan Worms)
Potamilla neglecta	
Potamilla reniformis	
Family Scalibregmidae	(T-headed Worm)
Scalibregma inflatum	
Family Sigalionidae	(Burrowing Scale Worms)
Pholoe minuta	
Family Spionidae	(Mud Worms)
Polydora caeca	
Polydora websteri	
Prionospio	
heterobranchia	
Prionospio steenstrupi	
Prionospio tenuis	
Pygospio elegans	
Scolecopides viridis	
Spiophanes bombyx	
Streblospio benedicti	
Family Syllidae	(Syllid Worms)
Autolytus cornutus	
Autolytus fasciatus	
Autolytus prismaticus	
Eusyllis lamelligera	
Exogone dispar	
Exogone verugera	
Parapionosyllis	
longocirrata	
Syllides setosa	
Family Terebellidae	(Terebellid Worms)
Pista sp.	
Polycirrus eximus	
Polycirrus sp.	
Terebellides stroemi	

Family Nuculidae	
Nucula proxima	(Near Nut Shell)
Family Pandoridae	
Pandora gouldiana	(Gould's Pandora)
Family Solemyacidae	
Solemya velum	(Veiled Clam)
Family Solenidae	
Ensis directus	(Common Razor Clam)
Family Tellinidae	
Macoma calcarea	(Chalky Macoma)
Macoma tenta	
Tellina agilis	
Family Veneridae	
Mercenaria mercenaria	(Quahog)
Pitar morrhuana	(False Quahog)
Class Gastropoda	(Snails)
Family Atyidae	
Haminoea solitaria	
Family Calyptraeidae	
Crepidula fornicata	(Common Slipper Shell)
Crepidula plana	(Flat Slipper Shell)
Family Cerithiidae	
Seila adamsii	(Wood Screw Shell)
Family Columbellidae	
Anachis avara	(Dove Shell)
Mitrella lunata	(Crescent Mitrella)
Family Hydrobia	
Hydrobia minuta	
Family Lacunidae	
Lacuna vincta	(Chink Shell)
Family Melongenidae	
Busycon canaliculatum	(Channeled Whelk)
Family Muricidae	
Urosalpinx cinerea	
Family Nassariidae	
Nassarius trivittatus	(New England Dog Whelk)
Family Natacidae	
Lunatia heros	(Northern Moon Snail)
Polinices duplicata	(Lobed Moon Snail)
Family Pyramidellidae	(Pyramid Shells)
Odostomia sp.	
Turbonilla sp.	
Family Rissoidae	
Rissoa sp.	
Family Scaphandridae	
Scaphander punctorostriatus	
Family Turridae	
Balcis sp.	
Class Polyplacophora	(Chitons)
Family Chaetopleuridae	
Chaetopleura apiculata	
PHYLUM PHORONIDA	(Phoronid Worms)
Phoronis architecta	
PHYLUM PORIFERA	(Sponges)
Family Clionidae	
Cliona sp.	(Boring Sponges)
Family Microcionidae	
Microciona sp.	(Red Beard Sponge)

Family Portunidae	(Swimming Crabs)
Ovalipes ocellatus	(Lady Crab)
Crab megalopa	
Order Isopoda	
Family Anthuridae	
Cyathura polita	
Family Idoteidae	
Chirodotea tuftsi	
Erichsoniella filiformis	
Idotea phosphorea	
Order Tanaidacea	(Tanaid Isopods)
Family Paratanidae	
Leptognatha caeca	
Subclass Ostracoda	
Ostracod	
Class Pantopoda	(Sea Spiders)
Family Tanystylidae	
Tanystylum orbiculare	
PHYLUM ASCHELMINTHES	(Round Worms)
Class Nematoda	
Nematode A	
Nematode B	
PHYLUM CNIDARIA	
Class Anthozoa	(Sea Anemones)
Family Edwardsiidae	
Edwardsia elegans	(Burrowing Anemone)
PHYLUM ECHINODERMATA	
Class Echinoidea	(Sea Urchins and Sand Dollars)
Family Arbaciidae	
Arbacia punctulata	(Purple Sea Urchin)
Family Echinarachnidae	
Echinarachnius parma	(Sand Dollar)
Class Stelleroidea	(Brittle and Sea Stars)
Family Amphiuridae	
Axiognathus squamatus	(Dwarf Brittle Star)
Family Asteroiidae	
Asterias forbesi	(Forbes' Asterias)
PHYLUM MOLLUSCA	
Class Bivalvia	
Family Arcidae	
Anadara transversa	(Transverse Ark)
Family Astartidae	
Astarte castanea	(Chestnut Astarte)
Astarte undata	
Family Cardiidae	
Cerastoderma pinnulatum	(Little Cockle)
Family Carditidae	
Cardita borealis	
Family Lyonsiidae	
Lyonsia arenosa	
Lyonsia hyalina	(Glassy Lyonsia)
Family Mactridae	
Mulinia lateralis	(Little Surf Clam)
Spisula solidissima	(Surf Clam)
Family Mytilidae	
Crenella glandula	
Modiolus modiolus	(Horse Mussel)
Musculus discors	
Mytilus edulis	(Blue Mussel)

PHYLUM RHYNCHOCOELA

(Nemertean Worms)

Family Tubulanidae

Tubulanus pellucidus

PHYLUM RHYNCHOCOELA

(Nemertean Worms)

Family Tubulanidae

Tubulanus pellucidus

