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

Volume I

Coastal Zone Management Program

CONNECTICUT COASTAL ENERGY IMPACT PROGRAM

Submitted to:
Department of Agriculture
Aquaculture Division
State of Connecticut

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Prepared by:

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August, 1983

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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 accurage 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 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 mussell 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 whelks 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 campling stations. Two hundred benthic species were identified in this region with an average of 178.3 inidivduals 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, Cirratulis 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 shelks.

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 activites 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 pollutional 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

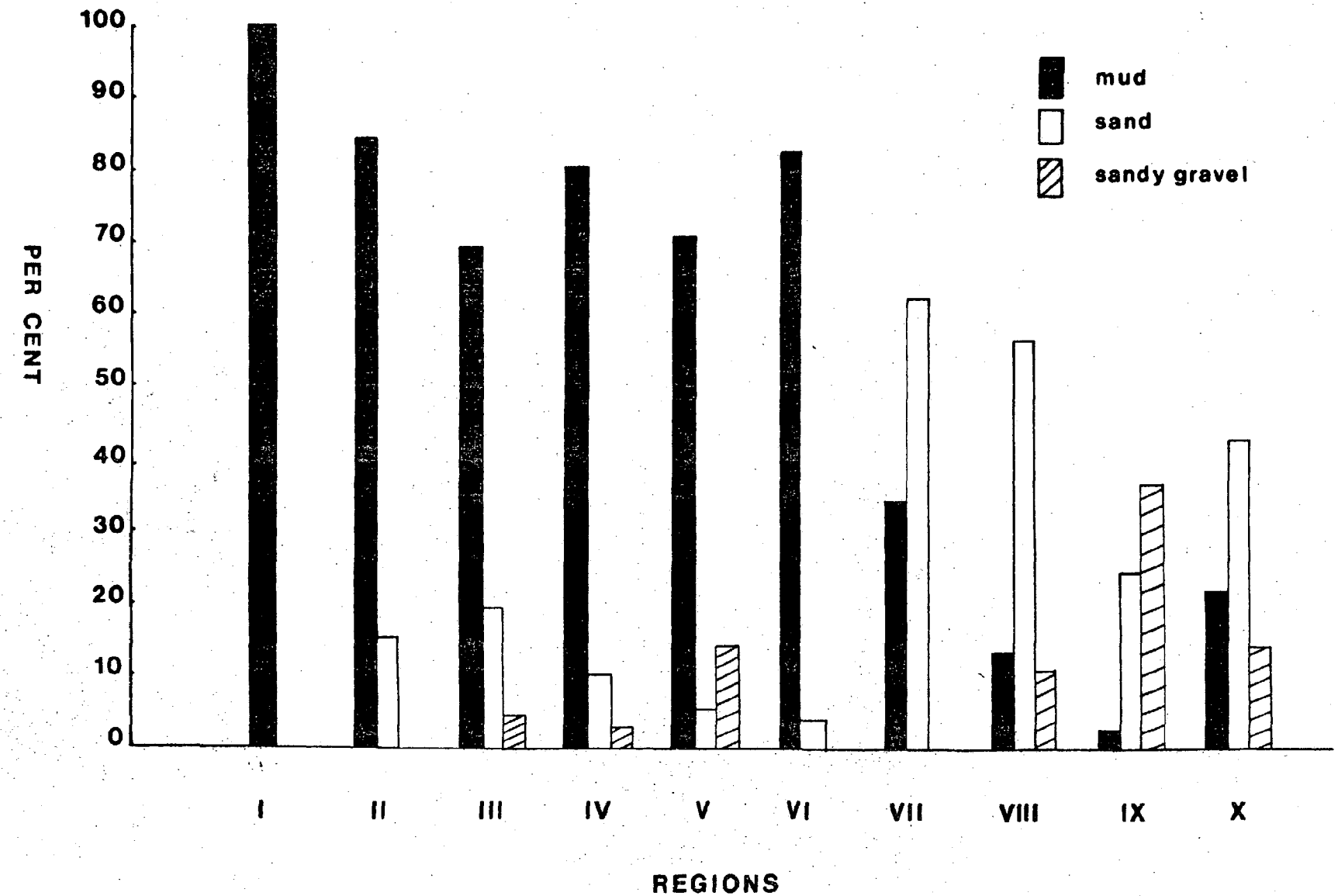


Figure 11. Percent Dominance of Substrate Types for the Ten Sampling Regions.

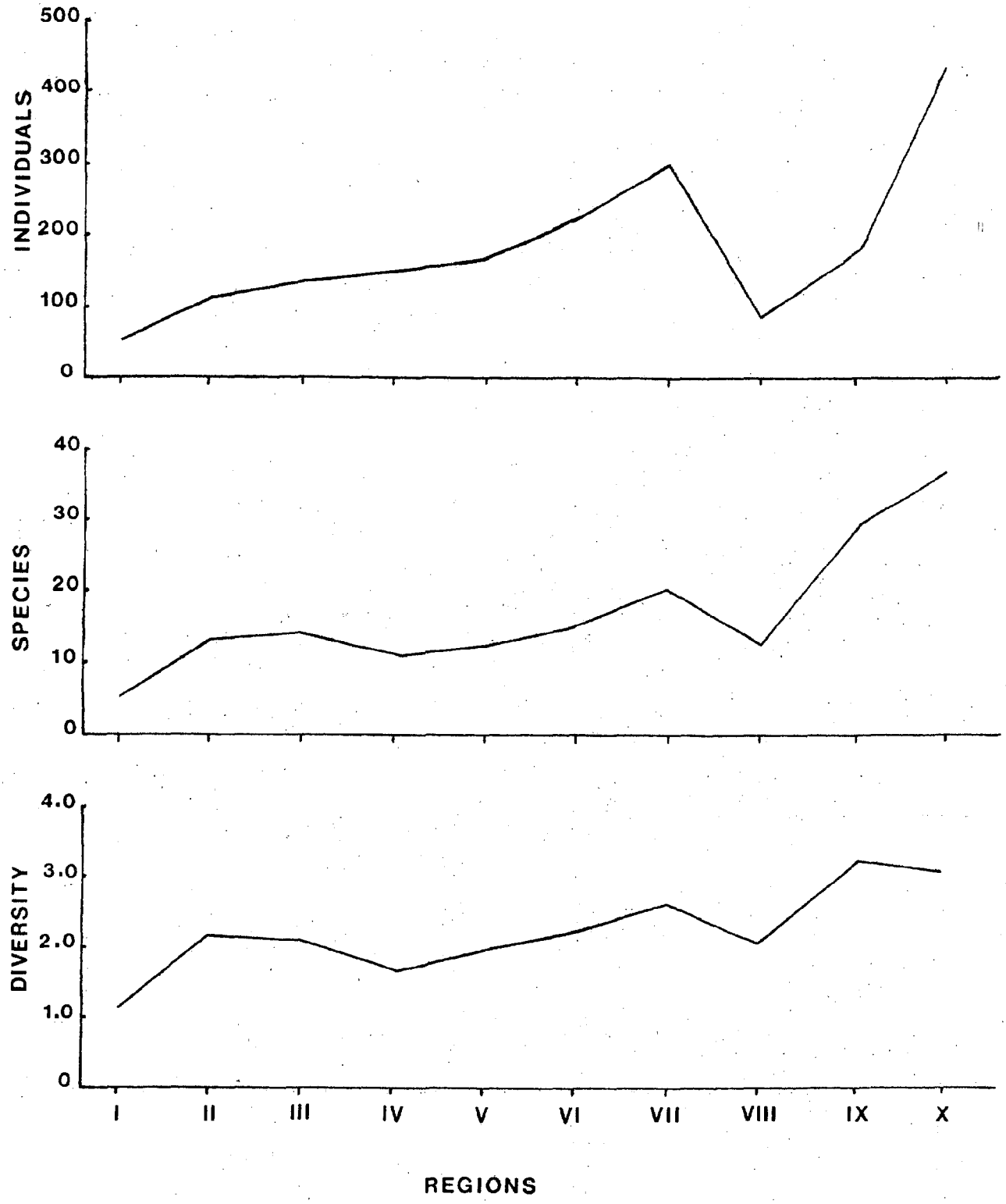


Figure 12. Mean Values for Number of Individuals, Number of Species, and Species Diversity per Station for the Ten Sampling Regions.

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 trivattatus*, *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

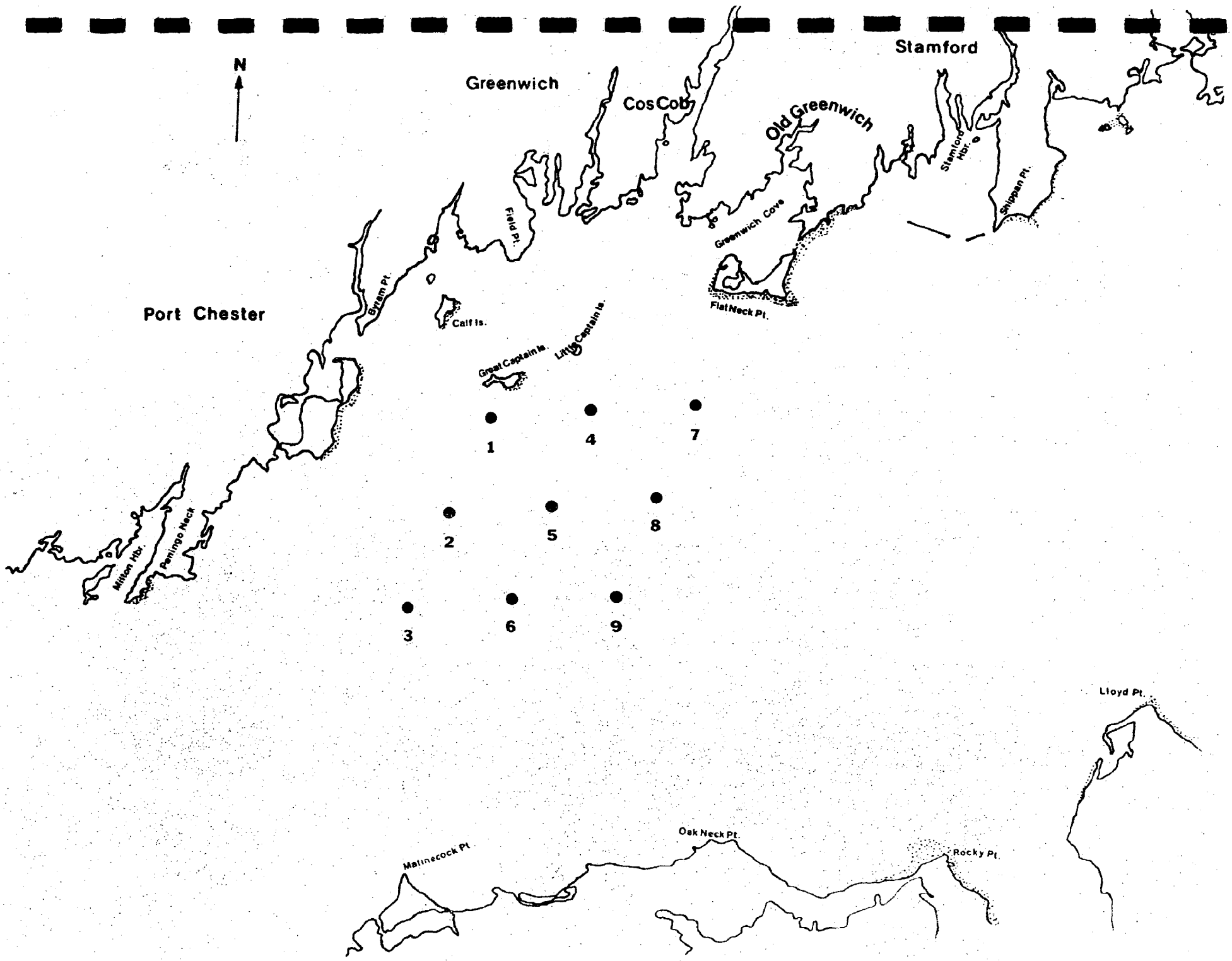

N
Greenwich
Cos Cob
Old Greenwich
Stamford
Stamford Hbr.
Shippan Pt.
Greenwich Cove
Flat Neck Pt.
Field Pt.
Byram Pt.
Port Chester
Calf Is.
Great Captain Is.
Little Captain Is.
1
2
3
4
5
6
7
8
9
Milton Hbr.
Peningo Neck
Lloyd Pt.
Oak Neck Pt.
Mamaroneck Pt.
Rocky Pt.

Figure 1b

DEPTH OF SAMPLING STATIONS (feet) - REGION I

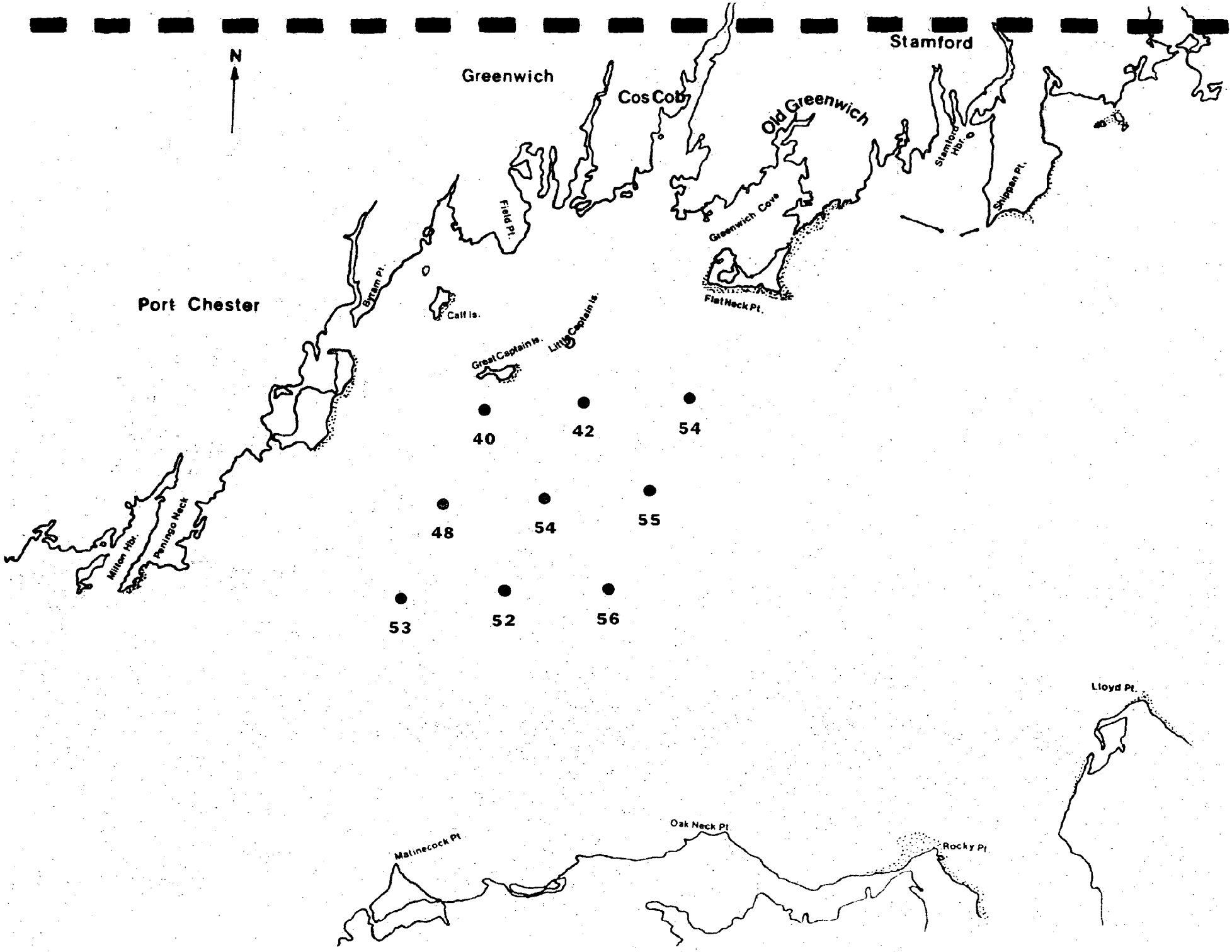

N
Greenwich
Cos Cob
Old Greenwich
Stamford
Stamford Hbr.
Shippan Pt.
Greenwich Cove
Field Pt.
Flat Neck Pt.
Bream Pt.
Port Chester
Calf Is.
Great Captain Is.
Little Captain Is.
40
42
54
48
54
55
53
52
56
Milton Hbr.
Peningo Neck
Lloyd Pt.
Oak Neck Pt.
Matinecock Pt.
Rocky Pt.

Figure 1c

SUBSTRATE COMPOSITION OF SAMPLING STATIONS - REGION I

SUBSTRATE KEY

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

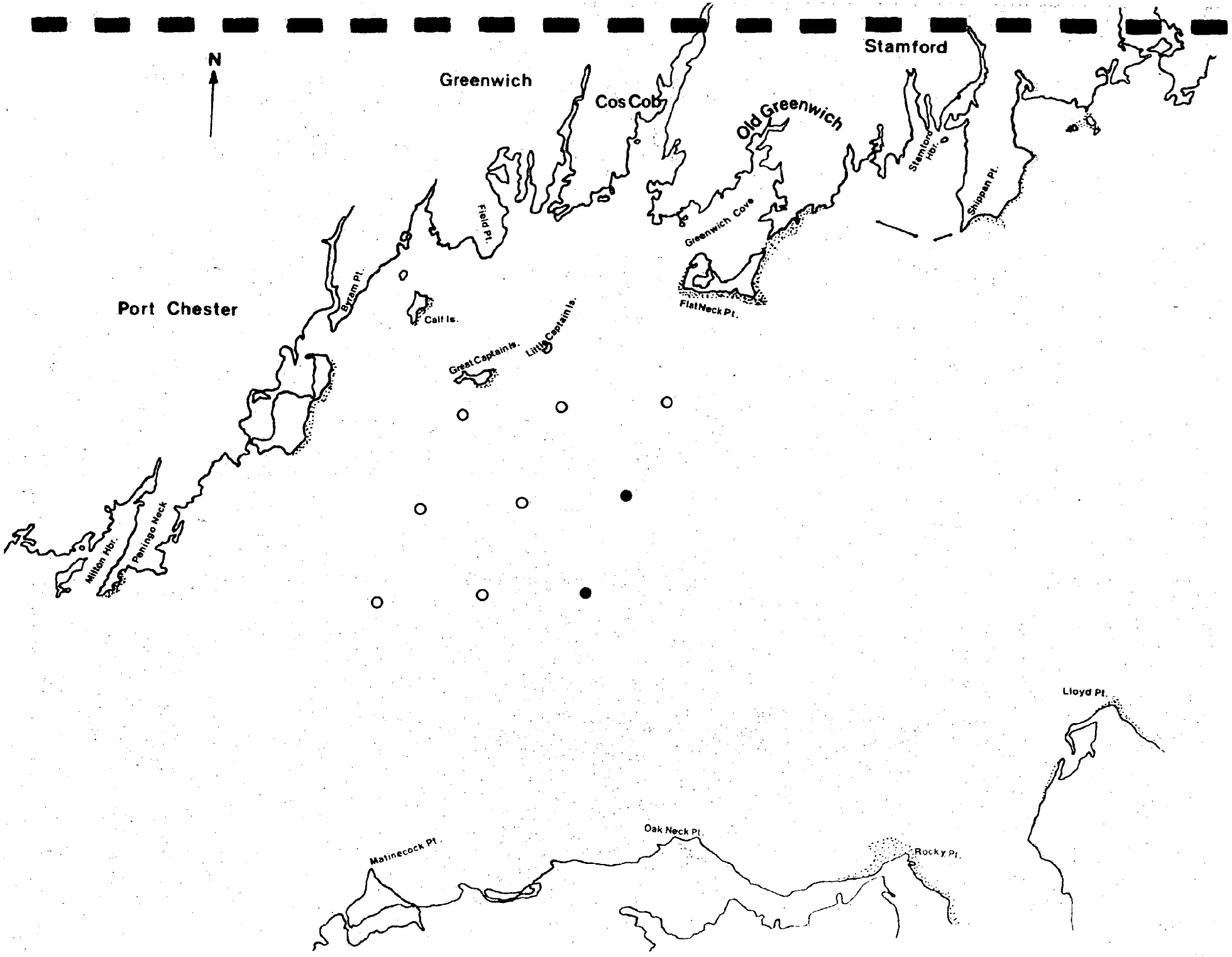

N
Greenwich
Cos Cob
Old Greenwich
Stamford
Stamford Hbr.
Shippan Pt.
Greenwich Cove
Flat Neck Pt.
Field Pt.
Byram Pt.
Port Chester
Calf Is.
Great Captain Is.
Little Captain Is.
Milton Hbr.
Peningo Neck
Lloyd Pt.
Matinecock Pt.
Oak Neck Pt.
Rocky Pt.

Figure 1d

NUMBER OF BENTHIC SPECIES - NUMBER OF INDIVIDUALS

PER GRAB SAMPLE - REGION I

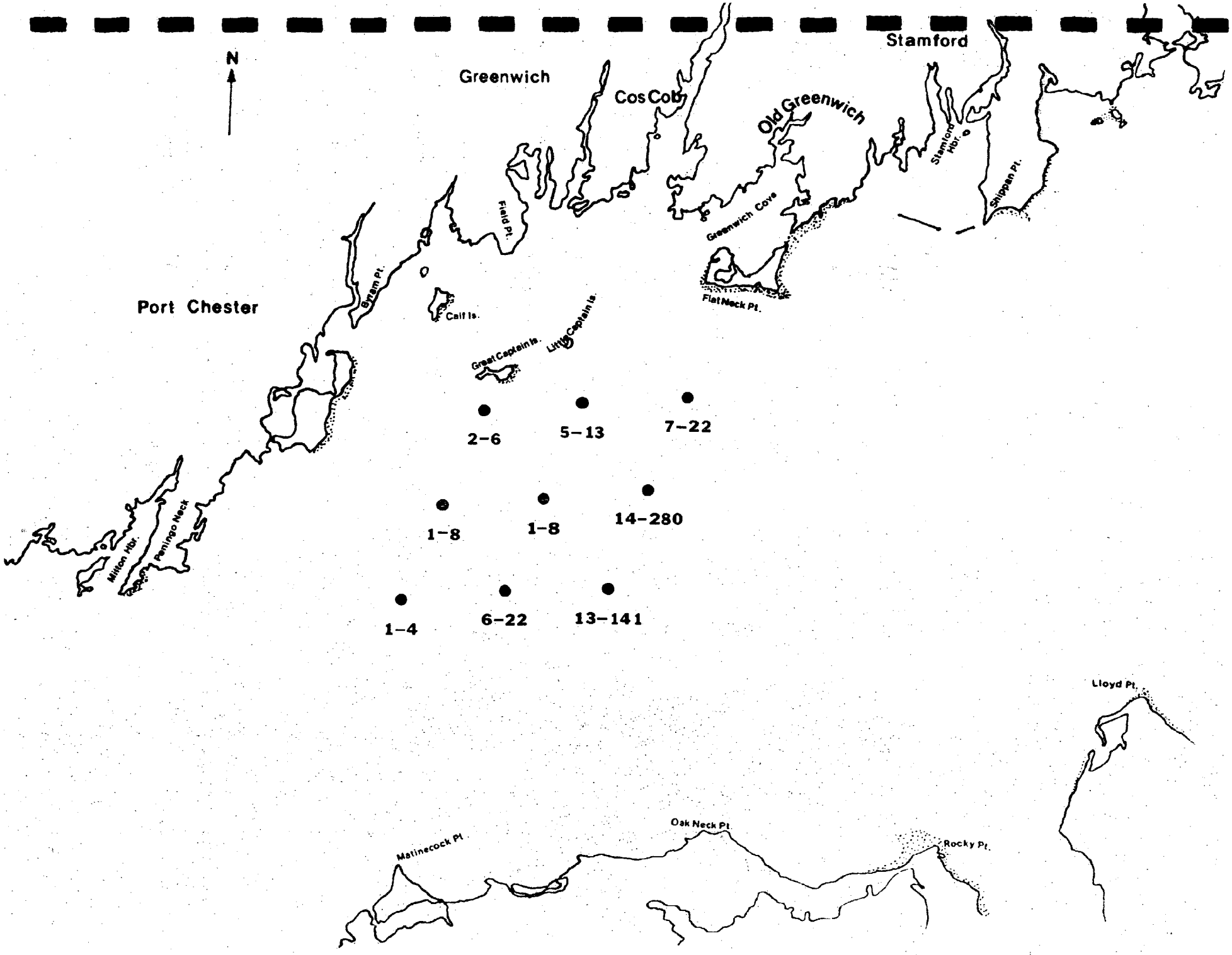

N
Greenwich
Cos Cob
Old Greenwich
Stamford
Stamford Hbr.
Shippan Pt.
Greenwich Cove
Field Pt.
Flat Neck Pt.
Port Chester
Bram Pt.
Calf Is.
Great Captain Is.
Little Captain Is.
2-6
5-13
7-22
1-8
1-8
14-280
1-4
6-22
13-141
Milton Hbr.
Peningo Neck
Lloyd Pt.
Oak Neck Pt.
Matinecock Pt.
Rocky Pt.

Figure 1e

BENTHIC SPECIES DIVERSITY CATEGORIES - REGION I

<u>DIVERSITY KEY</u>

Low	●
Moderate	▲
High	■
No organisms recovered	--

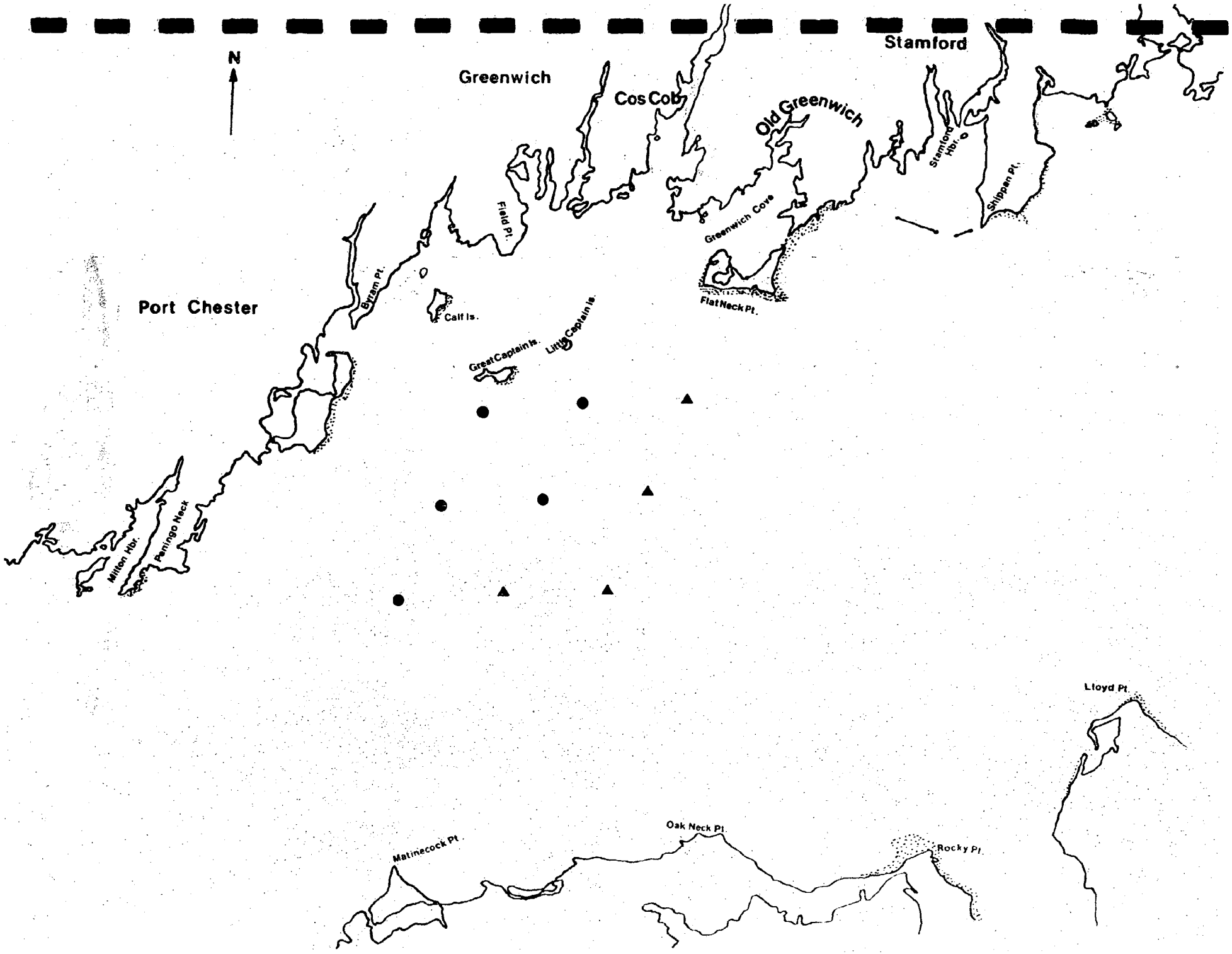

N
Greenwich
Cos Cob
Old Greenwich
Stamford
Stamford Hbr.
Shippan Pt.
Greenwich Cove
Field Pt.
Byram Pt.
Port Chester
Calf Is.
Great Captain Is.
Little Captain Is.
Flat Neck Pt.
Milton Hbr.
Peningo Neck
Lloyd Pt.
Oak Neck Pt.
Rocky Pt.
Matinecock Pt.

Figure 1f

EASTERN OYSTER AND HARD CLAM

ABUNDANCE CATEGORIES - REGION I

<u>CLAM-OYSTER KEY</u>

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

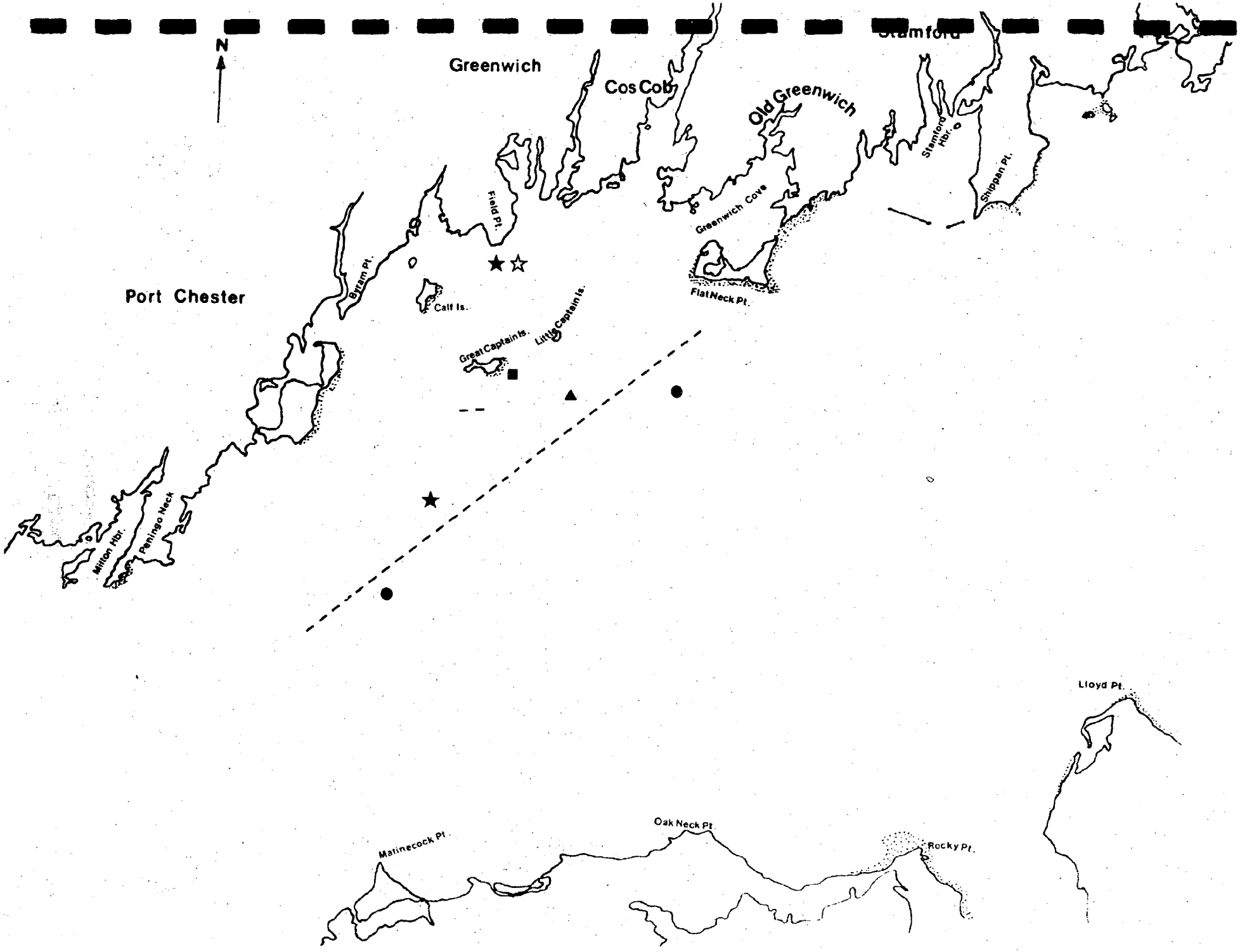

N
Greenwich
Cos Cob
Old Greenwich
Stamford
Stamford Hbr.
Shippan Pt.
Greenwich Cove
Field Pt.
Byram Pt.
Port Chester
Calf Is.
Great Captain Is.
Little Captain Is.
Flat Neck Pt.
Milton Hbr.
Peningo Neck
Lloyd Pt.
Oak Neck Pt.
Matinecock Pt.
Rocky Pt.

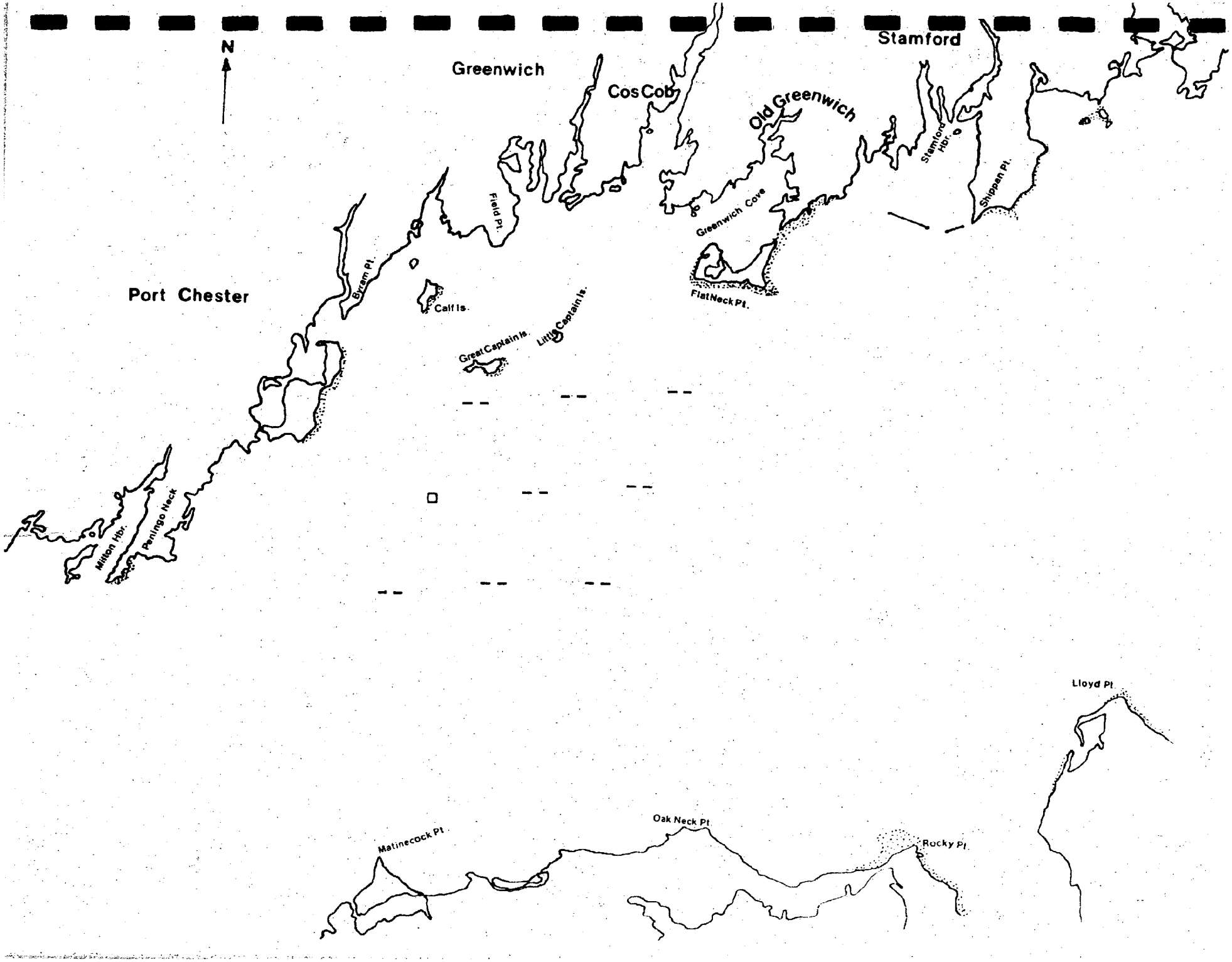
Figure 1g

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		--	


N
Greenwich
Cos Cob
Stamford
Old Greenwich
Stamford Hbr.
Shippan Pt.
Greenwich Cove
Field Pt.
Byram Pt.
Port Chester
Calf Is.
Great Captain Is.
Little Captain Is.
Flat Neck Pt.
Milton Hbr.
Peningo Neck
Lloyd Pt.
Matinecock Pt.
Oak Neck Pt.
Rocky Pt.

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 littlenecks 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

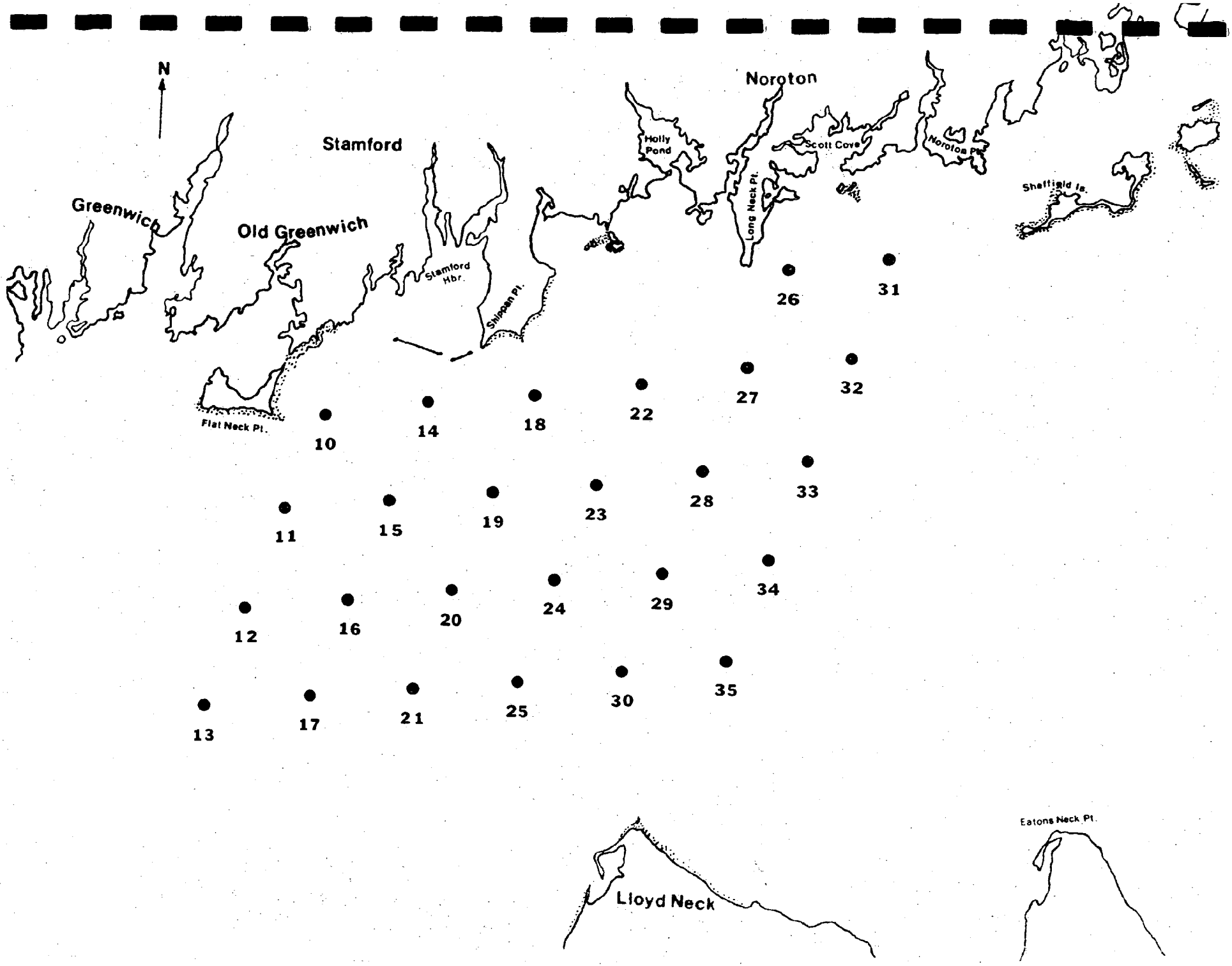

N
Stamford
Greenwich
Old Greenwich
Stamford Hbr.
Shippan Pt.
Flat Neck Pt.
Noroton
Holly Pond
Scott Cove
Long Neck Pt.
Noroton Pt.
Sheffield Is.
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
Lloyd Neck
Eatons Neck Pt.

Figure 2b

DEPTH OF SAMPLING STATIONS (feet) - REGION II

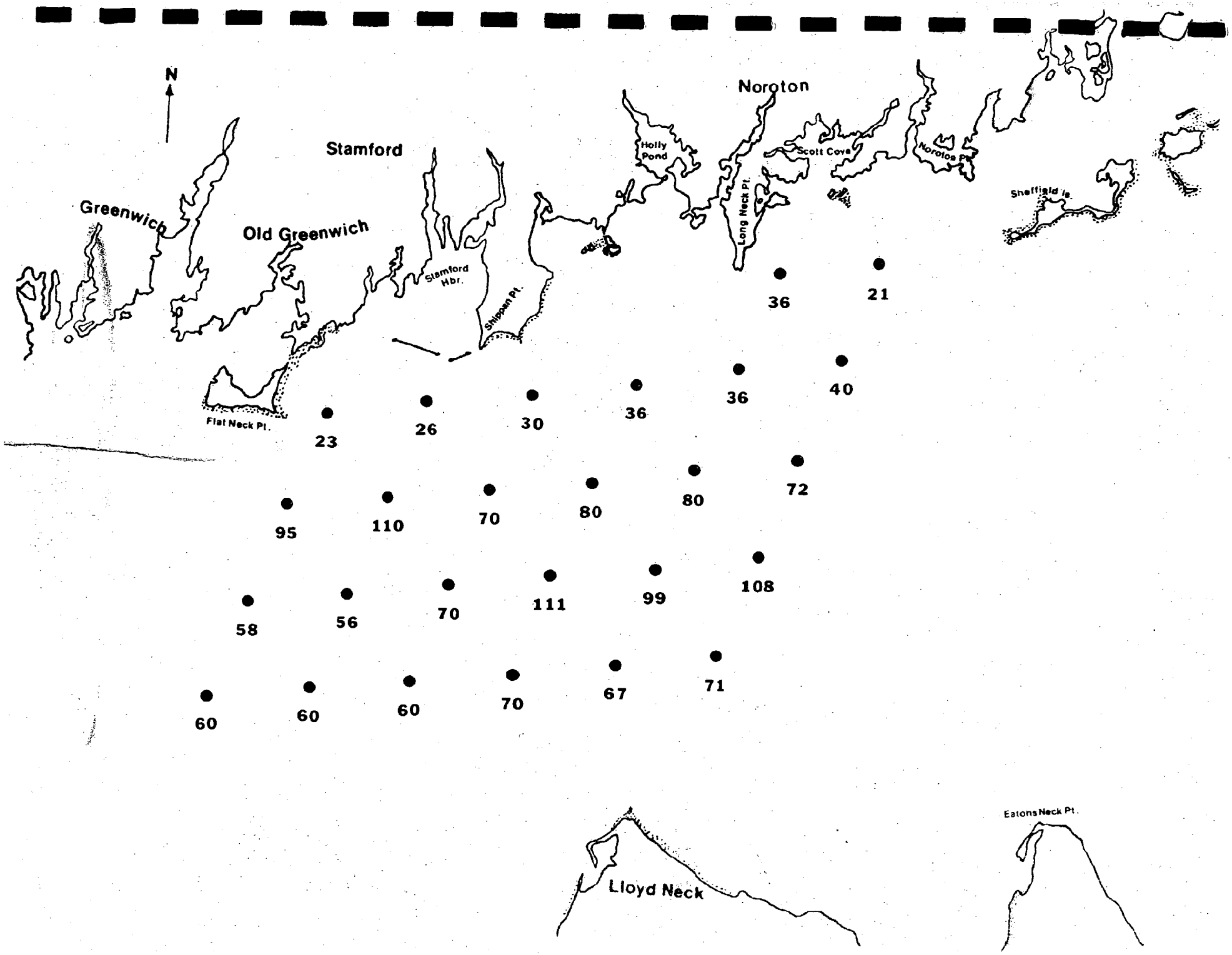

N
Stamford
Greenwich
Old Greenwich
Stamford Hbr.
Shippan Pt.
Flat Neck Pt.
Noroton
Holly Pond
Long Neck Pt.
Scott Cove
Noroton Pt.
Sheffield Is.
36
21
36
40
36
30
26
23
72
80
80
70
110
95
108
99
111
70
56
58
71
67
70
60
60
60
Lloyd Neck
Eatons Neck Pt.

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	✪

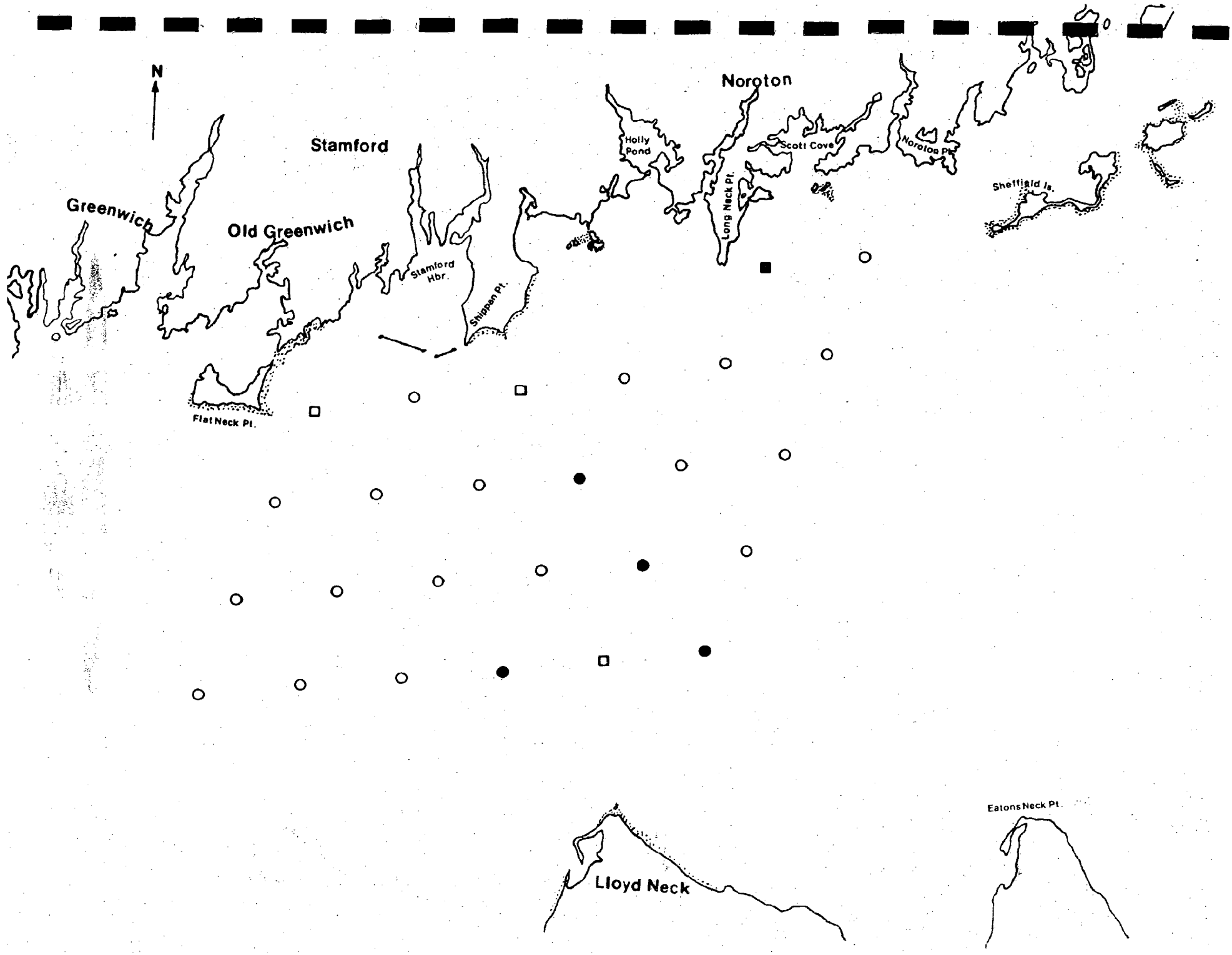

N
Greenwich
Old Greenwich
Stamford
Stamford Hbr.
Shippan Pt.
Flat Neck Pt.
Holly Pond
Noroton
Long Neck Pt.
Scott Cove
Noroton Pt.
Sheffield Is.
Lloyd Neck
Eatons Neck Pt.

Figure 2d

NUMBER OF BENTHIC SPECIES - NUMBER OF INDIVIDUALS

PER GRAB SAMPLE - REGION II

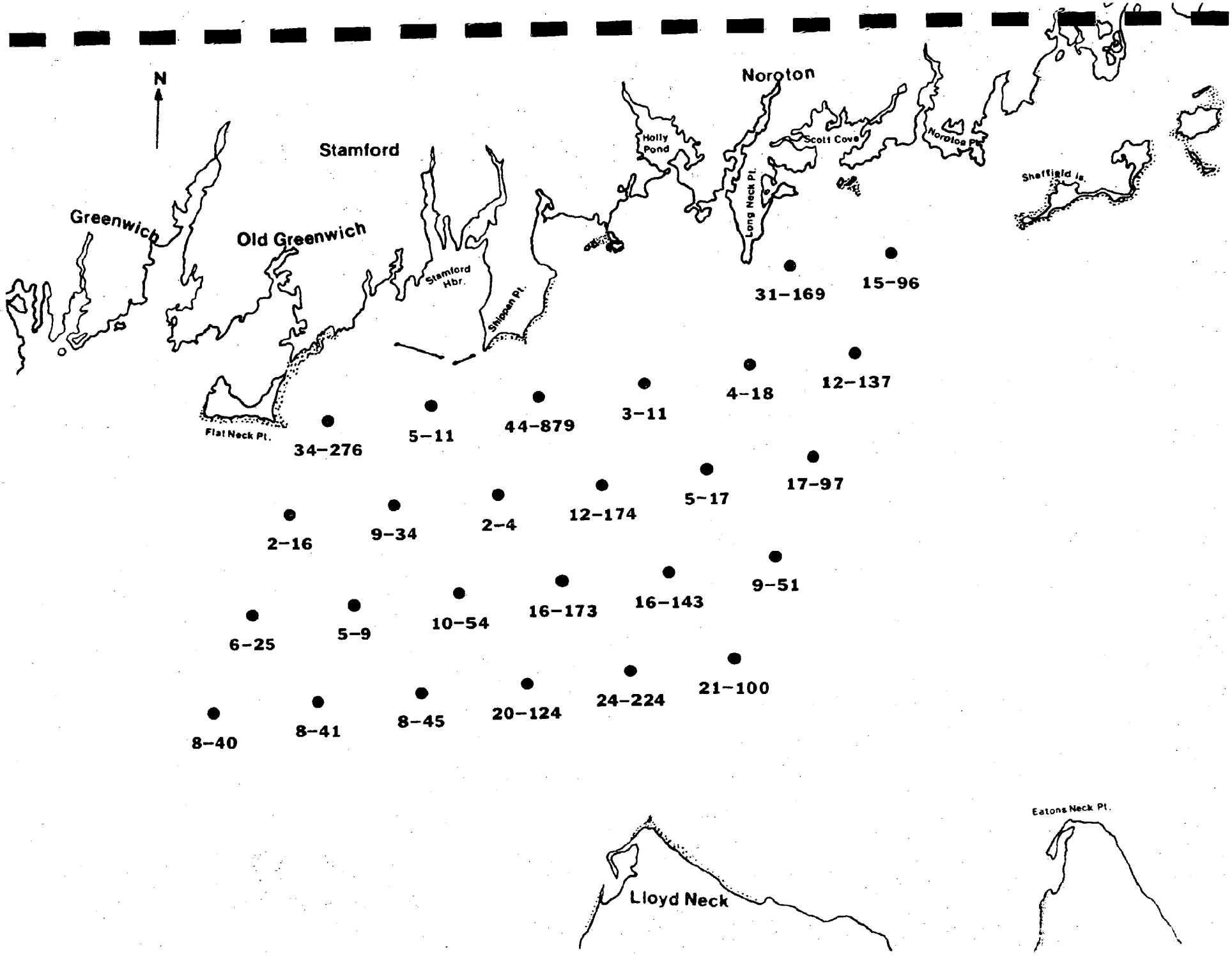

N
Stamford
Greenwich
Old Greenwich
Stamford Hbr.
Shippan Pt.
Flat Neck Pt.
Noroton
Holly Pond
Long Neck Pt.
Scott Cove
Noroton Pt.
Sheffield Is.
31-169
15-96
4-18
12-137
3-11
44-879
5-11
34-276
17-97
5-17
12-174
2-4
9-34
2-16
9-51
16-143
16-173
10-54
5-9
6-25
21-100
24-224
20-124
8-45
8-41
8-40
Lloyd Neck
Eatons Neck Pt.

Figure 2e

BENTHIC SPECIES DIVERSITY CATEGORIES - REGION II

<u>DIVERSITY KEY</u>

Low	●
Moderate	▲
High	■
No organisms recovered	--

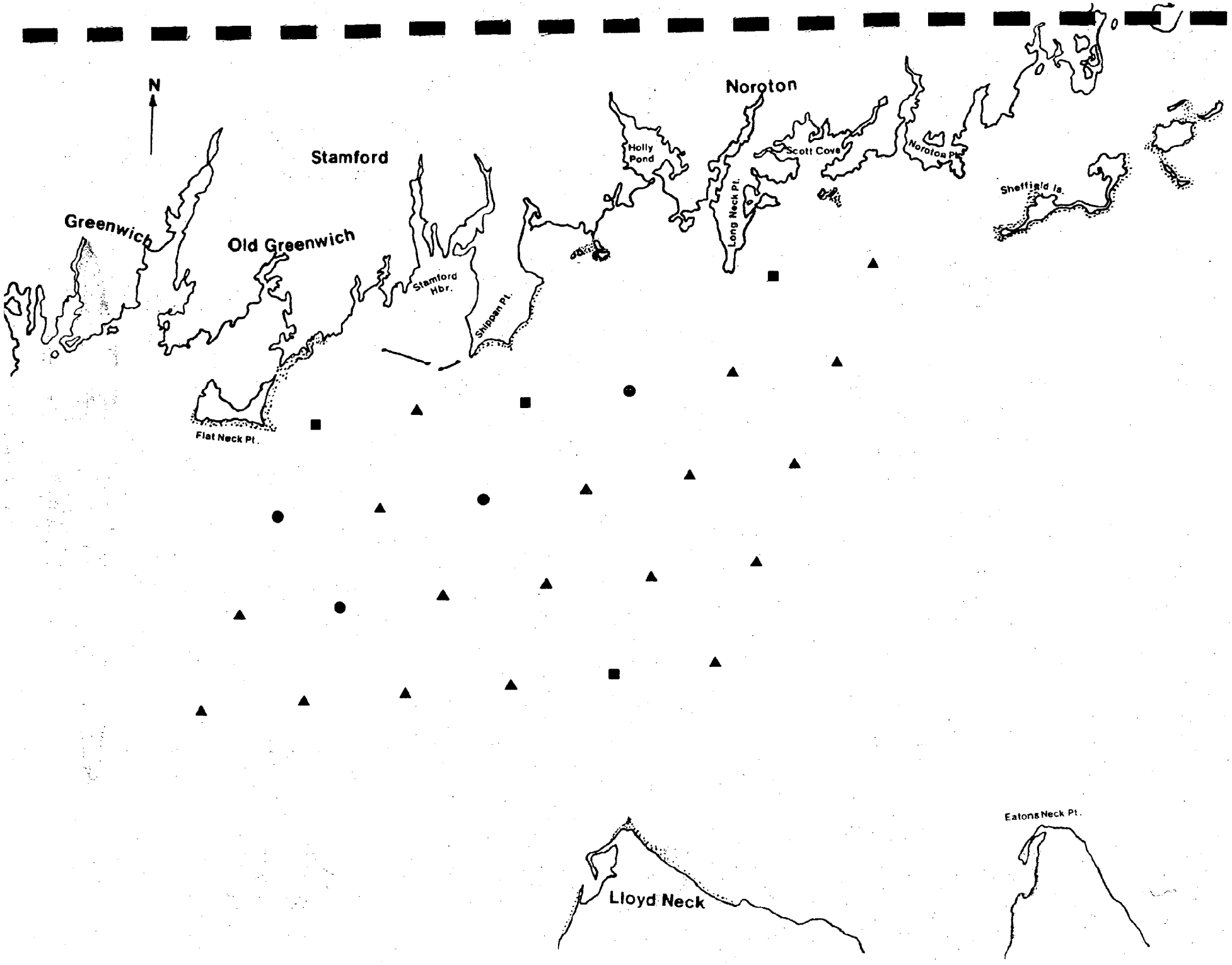

N
Greenwich
Old Greenwich
Stamford
Stamford Hbr.
Shippan Pt.
Flat Neck Pt.
Holly Pond
Noroton
Long Neck Pt.
Scott Cove
Noroton Pt.
Sheffield Is.
Lloyd Neck
Eatons Neck Pt.

Figure 2f

EASTERN OYSTER AND HARD CLAM

ABUNDANCE CATEGORIES - REGION II

CLAM-OYSTER KEY

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

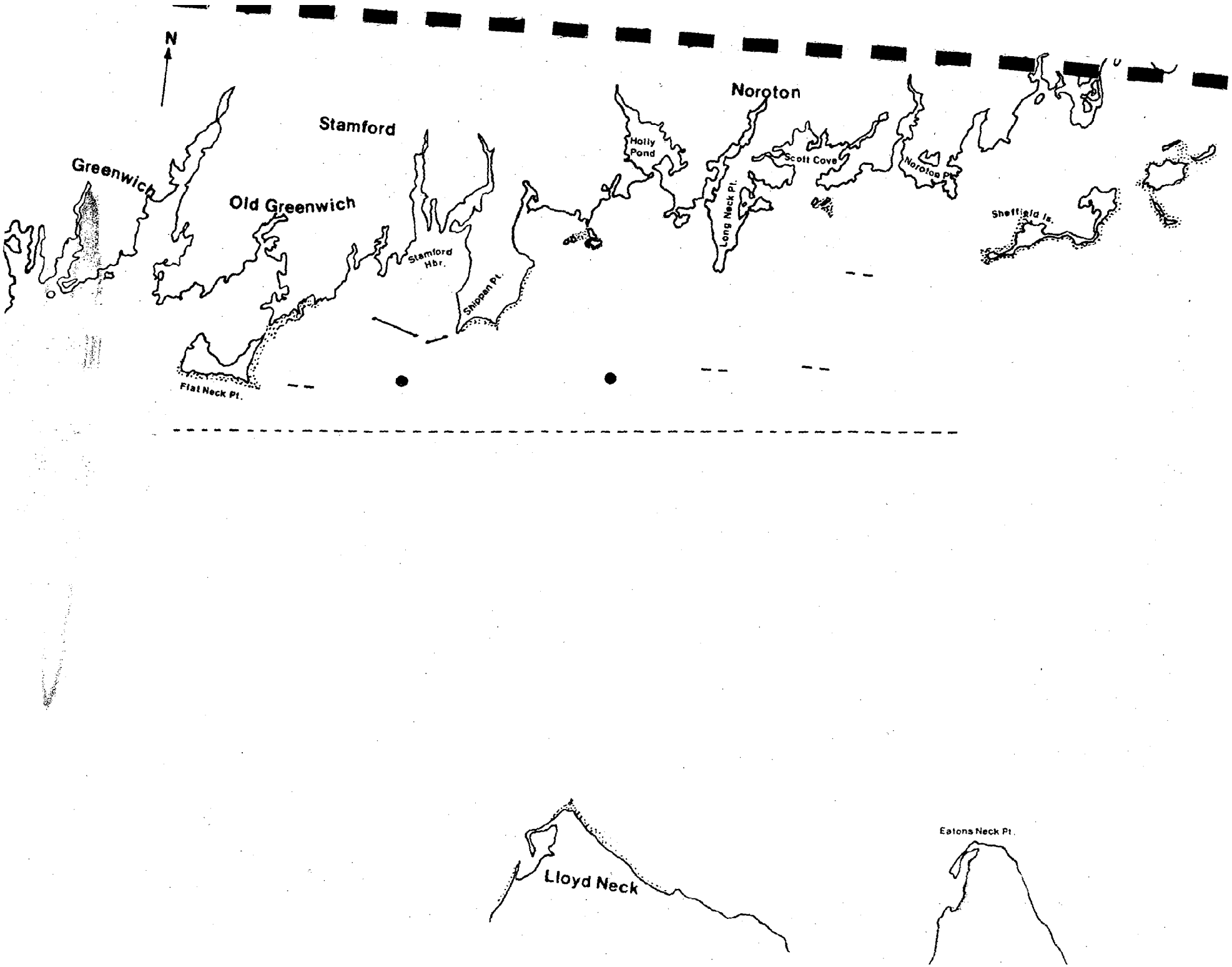

N
Greenwich
Stamford
Old Greenwich
Stamford Hbr.
Shippan Pt.
Flat Neck Pt.
Holly Pond
Norton
Long Neck Pt.
Scott Cove
Noroton Pt.
Sheffield Is.
Lloyd Neck
Eatons Neck Pt.

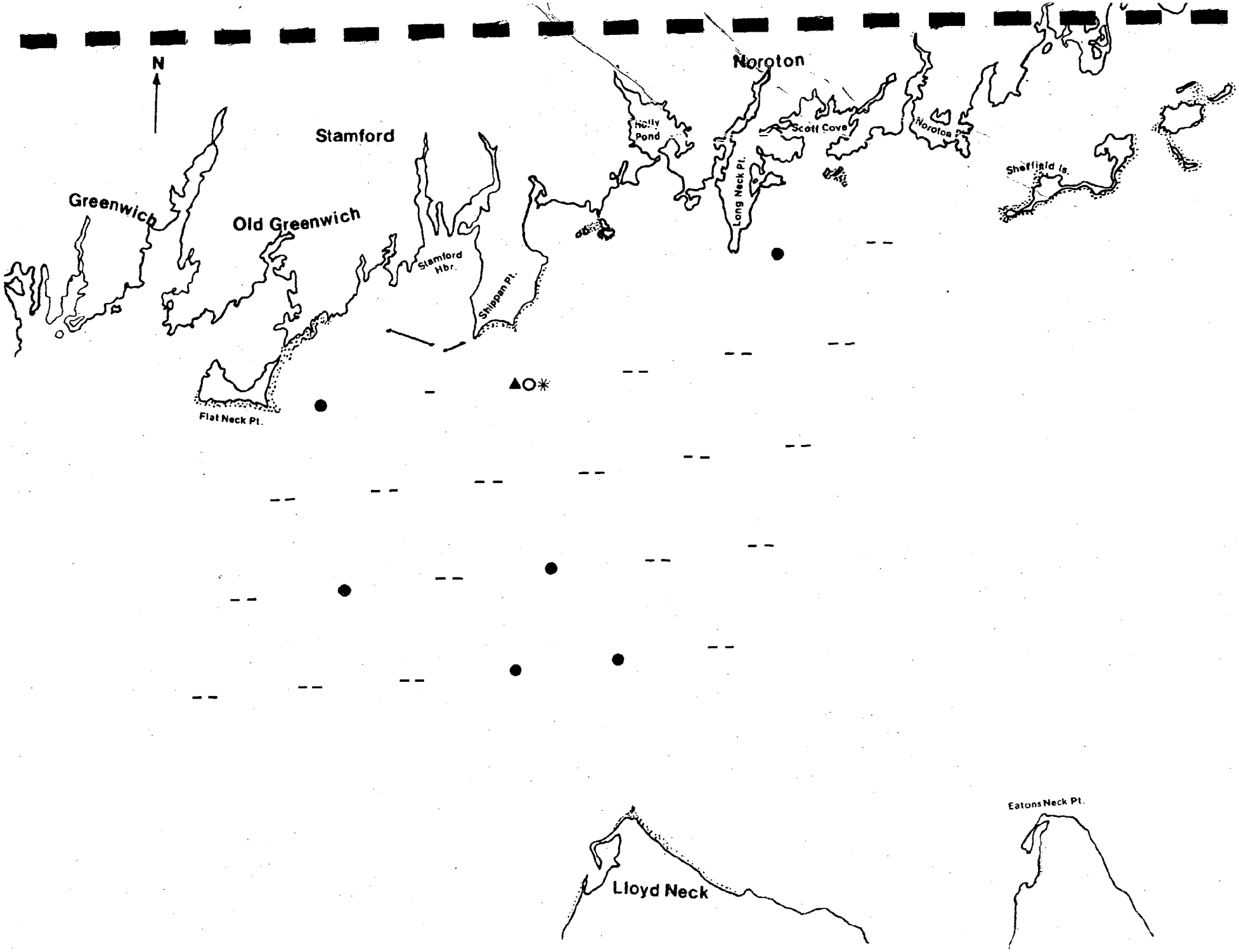
Figure 2g

ABUNDANCE CATEGORIES FOR MISCELLANEOUS

SHELLFISH SPECIES - REGION II

MISCELLANEOUS SHELLFISH KEY

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


N
Stamford
Greenwich
Old Greenwich
Stamford Hbr.
Shippan Pt.
Flat Neck Pt.
Noroton
Holly Pond
Scott Cove
Long Neck Pt.
Noroton Pt.
Sheffield Is.
Lloyd Neck
Eatons Neck Pt.

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

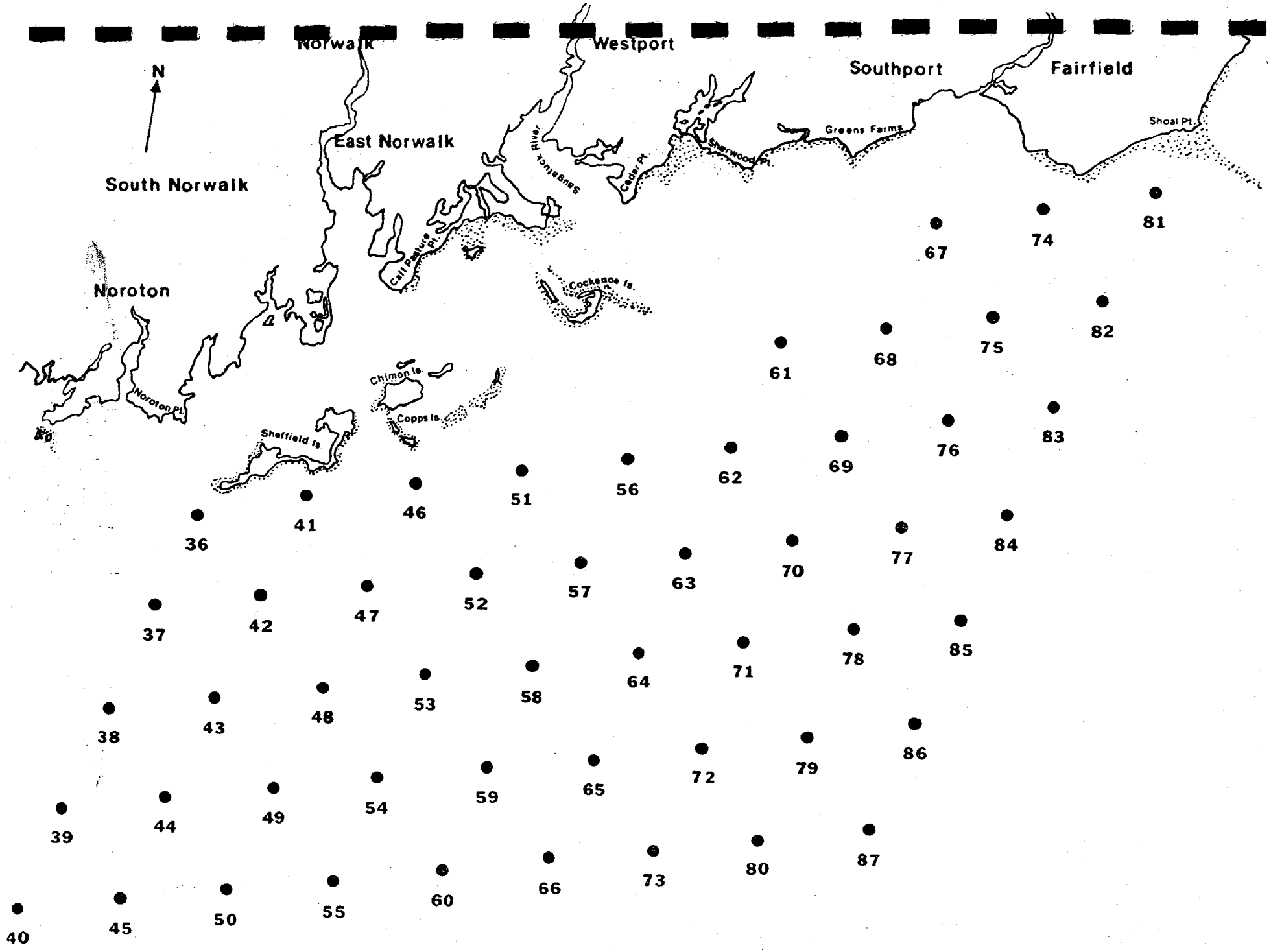

N
Norwalk
Westport
Southport
Fairfield
South Norwalk
East Norwalk
Noroton
Sasqanock River
Cedar Pt.
Sherwood Pt.
Greens Farms
Shoal Pt.
Cat Pasture Pt.
Cockenoe Is.
Chimon Is.
Copps Is.
Sheffield Is.
Noroton Pt.
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60
61
62
63
64
65
66
67
68
69
70
71
72
73
74
75
76
77
78
79
80
81
82
83
84
85
86
87

Figure 3b

DEPTH OF SAMPLING STATIONS (feet) - REGION III

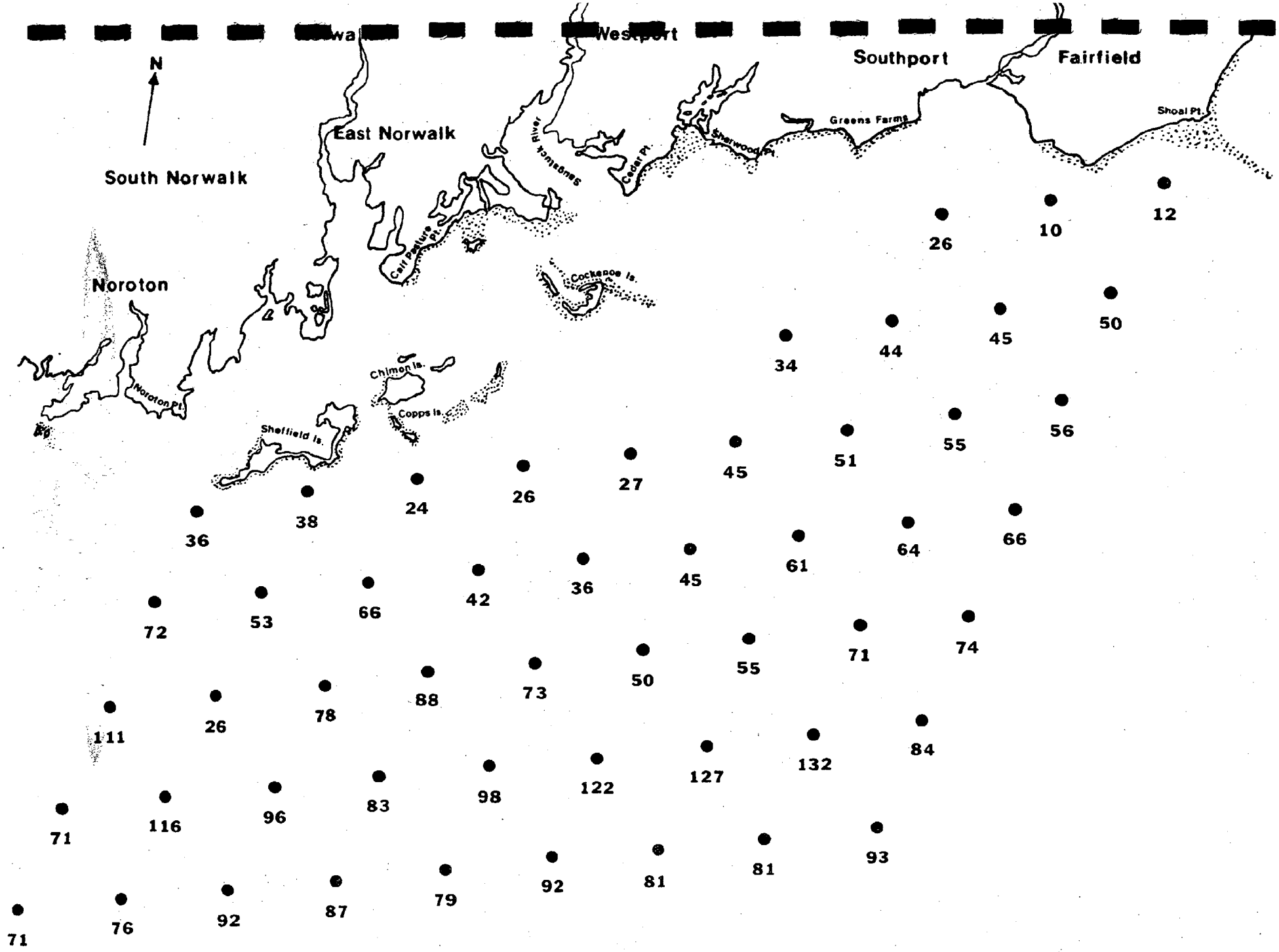

Westport
Southport
Fairfield
N
South Norwalk
East Norwalk
Noroton
Noroton Pt.
Saugatuck River
Cedar Pt.
Sherwood Pt.
Greens Farms
Shoal Pt.
Calf Pasture Pt.
Cockenoe Is.
Chimon Is.
Copps Is.
Sheffield Is.
12
10
26
50
45
44
34
56
55
51
45
27
26
24
38
36
66
64
61
45
36
42
66
53
72
74
71
55
50
73
88
78
26
111
84
132
127
122
98
83
96
116
71
93
81
81
92
79
87
92
76
71

Figure 3c

SUBSTRATE COMPOSITION OF SAMPLING STATIONS - REGION III

SUBSTRATE KEY

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

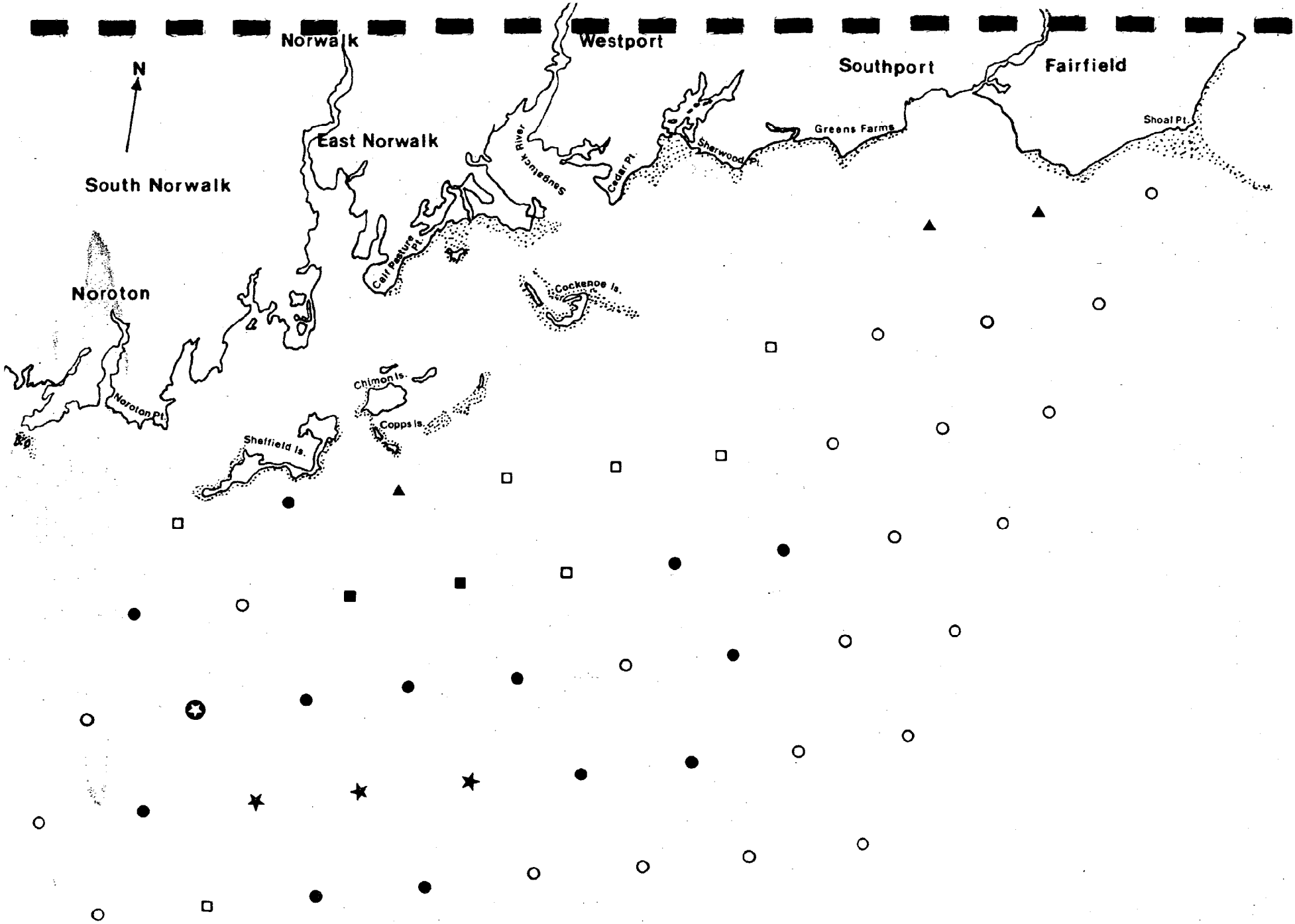

Norwalk
Westport
Southport
Fairfield
N
East Norwalk
South Norwalk
Noroton
Saugatuck River
Cedar Pt.
Sherwood Pt.
Greens Farms
Shoal Pt.
Calf Pasture Pt.
Cockenoe Is.
Chimon Is.
Copps Is.
Sheffield Is.
Noroton Pt.

Figure 3d

NUMBER OF BENTHIC SPECIES - NUMBER OF INDIVIDUALS

PER GRAB SAMPLE - REGION III

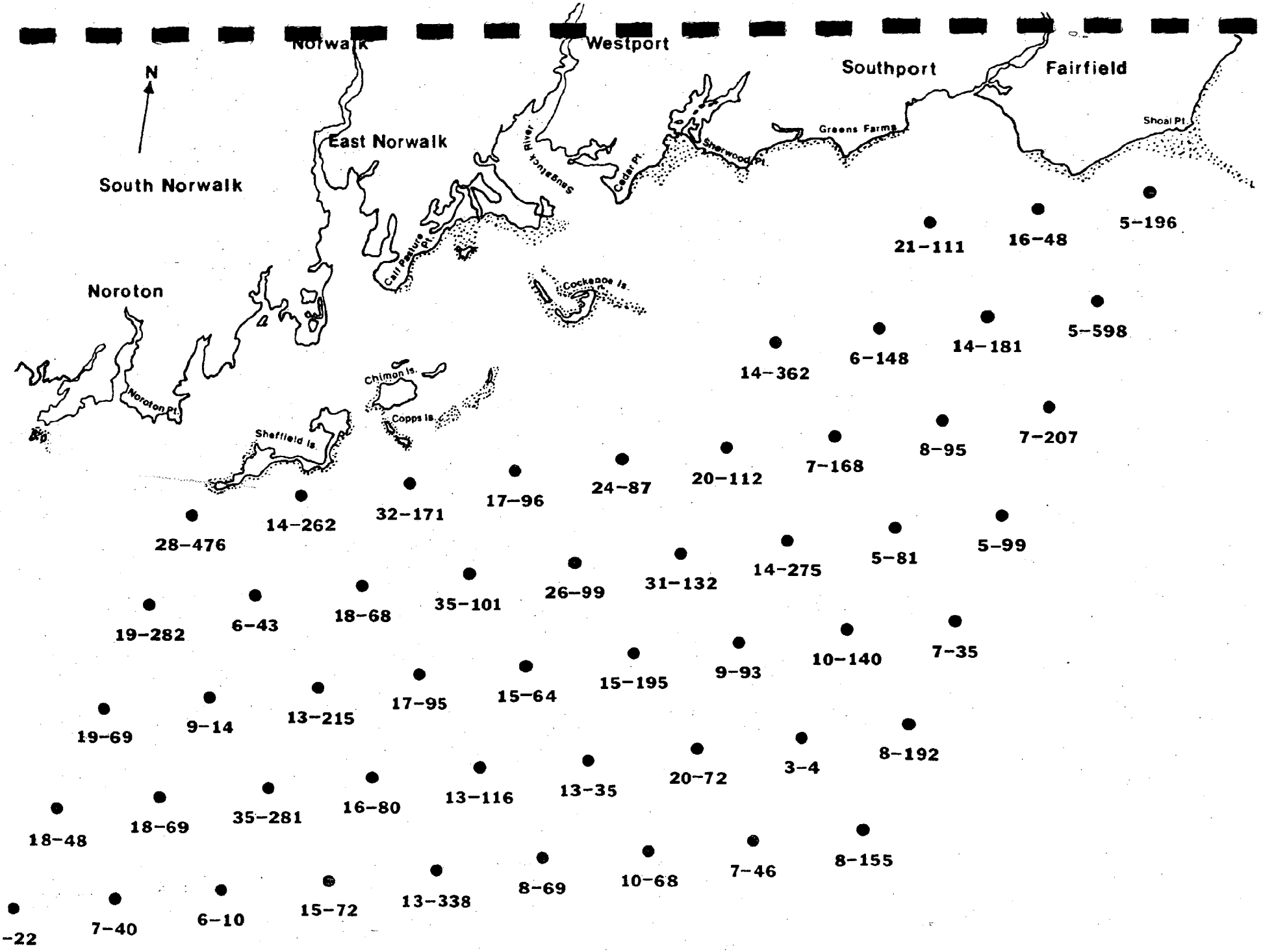

Norwalk
Westport
Southport
Fairfield
N
South Norwalk
East Norwalk
Sasqanock River
Cedar Pt.
Sherwood Pt.
Greens Farms
Shoal Pt.
Calf Pasture Pt.
Cockenoe Is.
Noroton
Noroton Pt.
Chimon Is.
Copps Is.
Sheffield Is.
5-196
21-111
16-48
5-598
14-181
6-148
14-362
7-207
8-95
7-168
20-112
24-87
17-96
32-171
14-262
28-476
5-99
5-81
14-275
31-132
26-99
35-101
18-68
6-43
19-282
7-35
10-140
9-93
15-195
15-64
17-95
13-215
9-14
19-69
8-192
3-4
20-72
13-35
13-116
16-80
35-281
18-69
18-48
8-155
7-46
10-68
8-69
13-338
15-72
6-10
7-40
-22

Figure 3 e

BENTHIC SPECIES DIVERSITY CATEGORIES - REGION III

<u>DIVERSITY KEY</u>

Low	●
Moderate	▲
High	■
No organisms recovered	--

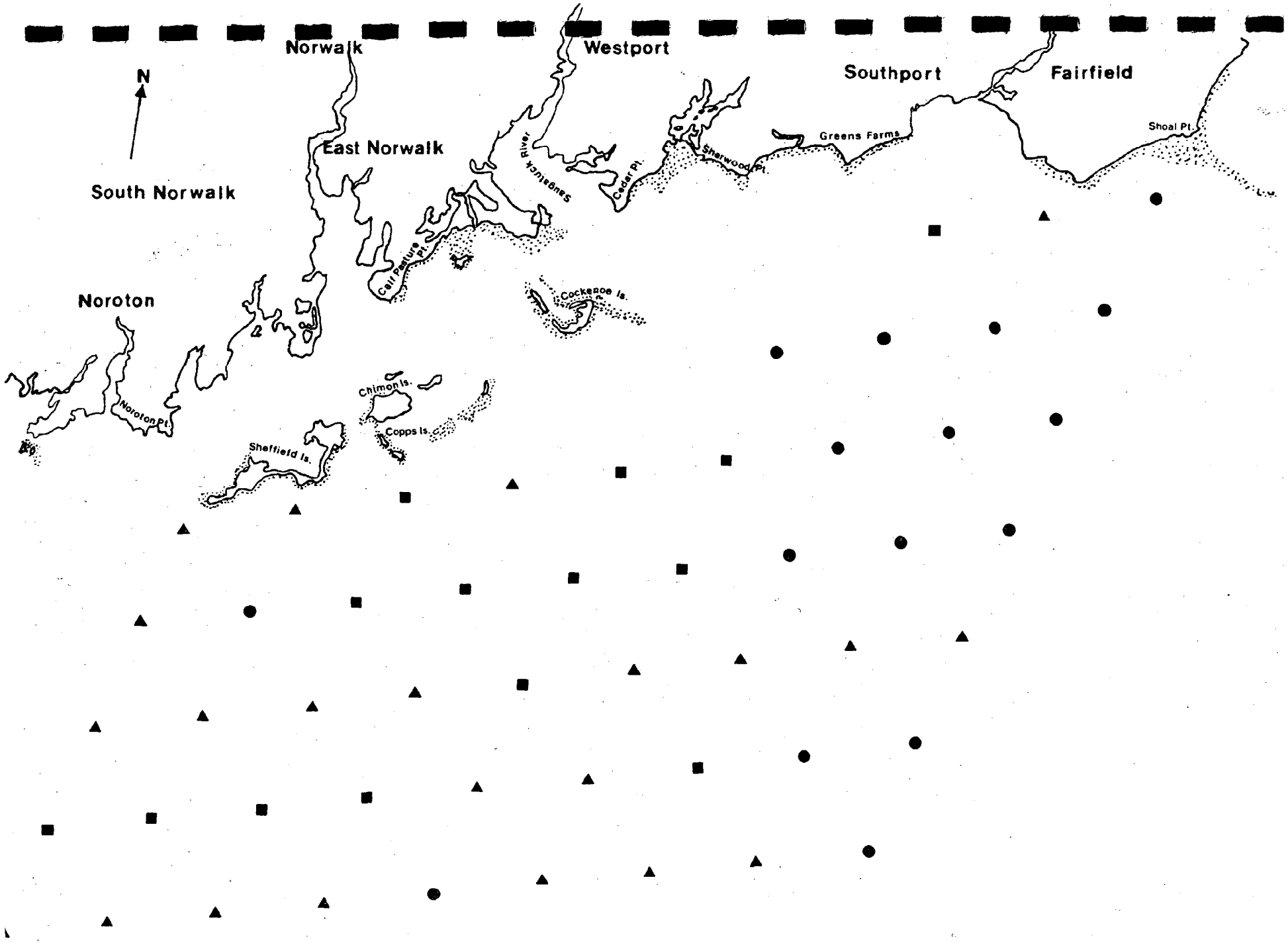

Norwalk
Westport
Southport
Fairfield
N
East Norwalk
South Norwalk
Noroton
Saugatuck River
Cedar Pt.
Sherwood Pt.
Greens Farms
Shoal Pt.
Calf Pasture Pt.
Cockenoe Is.
Chimon Is.
Copps Is.
Sheffield Is.
Noroton Pt.

Figure 3f

EASTERN OYSTER AND HARD CLAM

ABUNDANCE CATEGORIES - REGION III

<u>CLAM-OYSTER KEY</u>

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

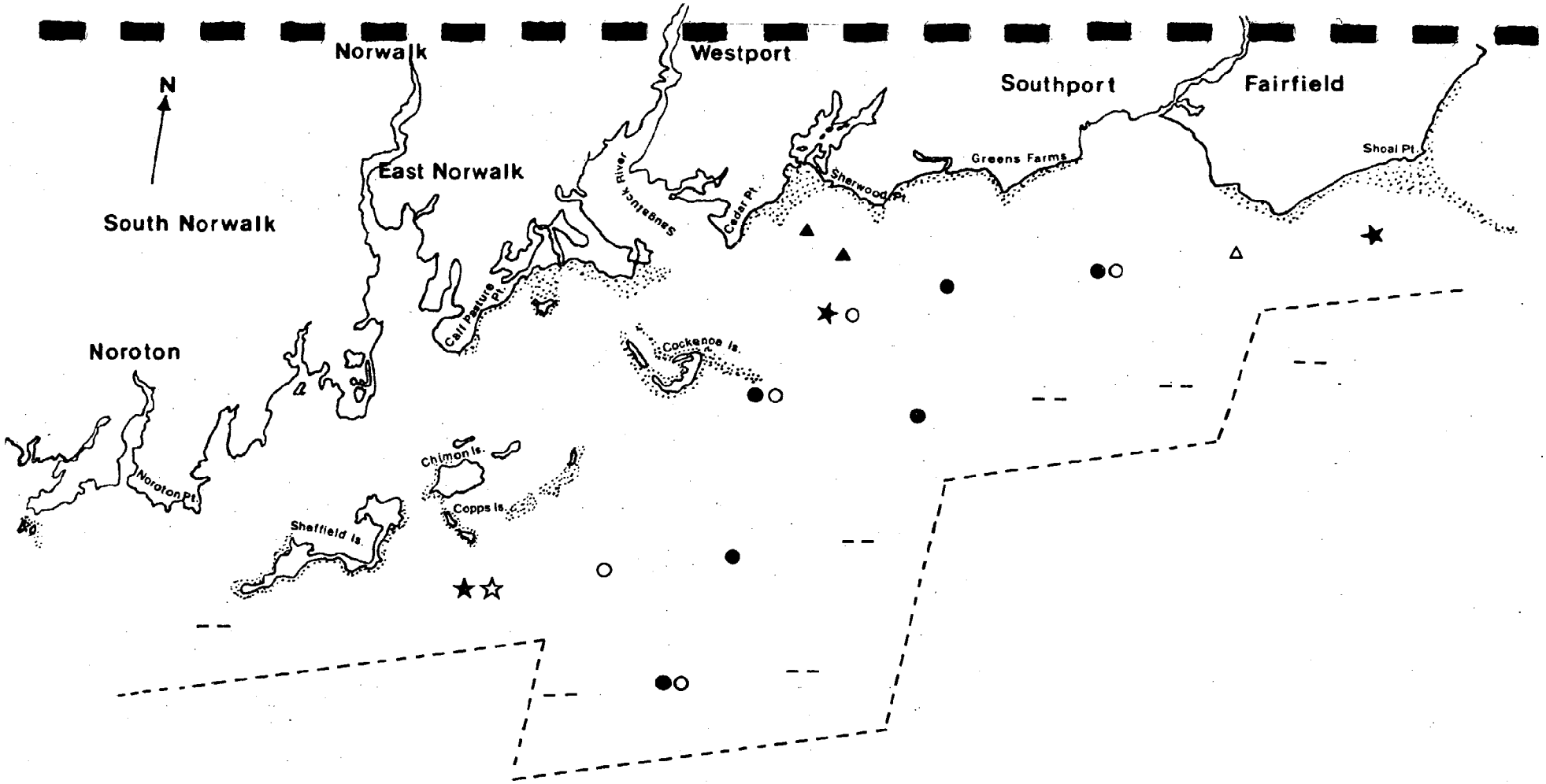

N
Norwalk
Westport
Southport
Fairfield
South Norwalk
East Norwalk
Noroton
Saugatuck River
Cedar Pt.
Sherwood Pt.
Greens Farms
Shoal Pt.
Calf Pasture Pt.
Cockenoe Is.
Chimon Is.
Copps Is.
Sheffield Is.
Noroton Pt.

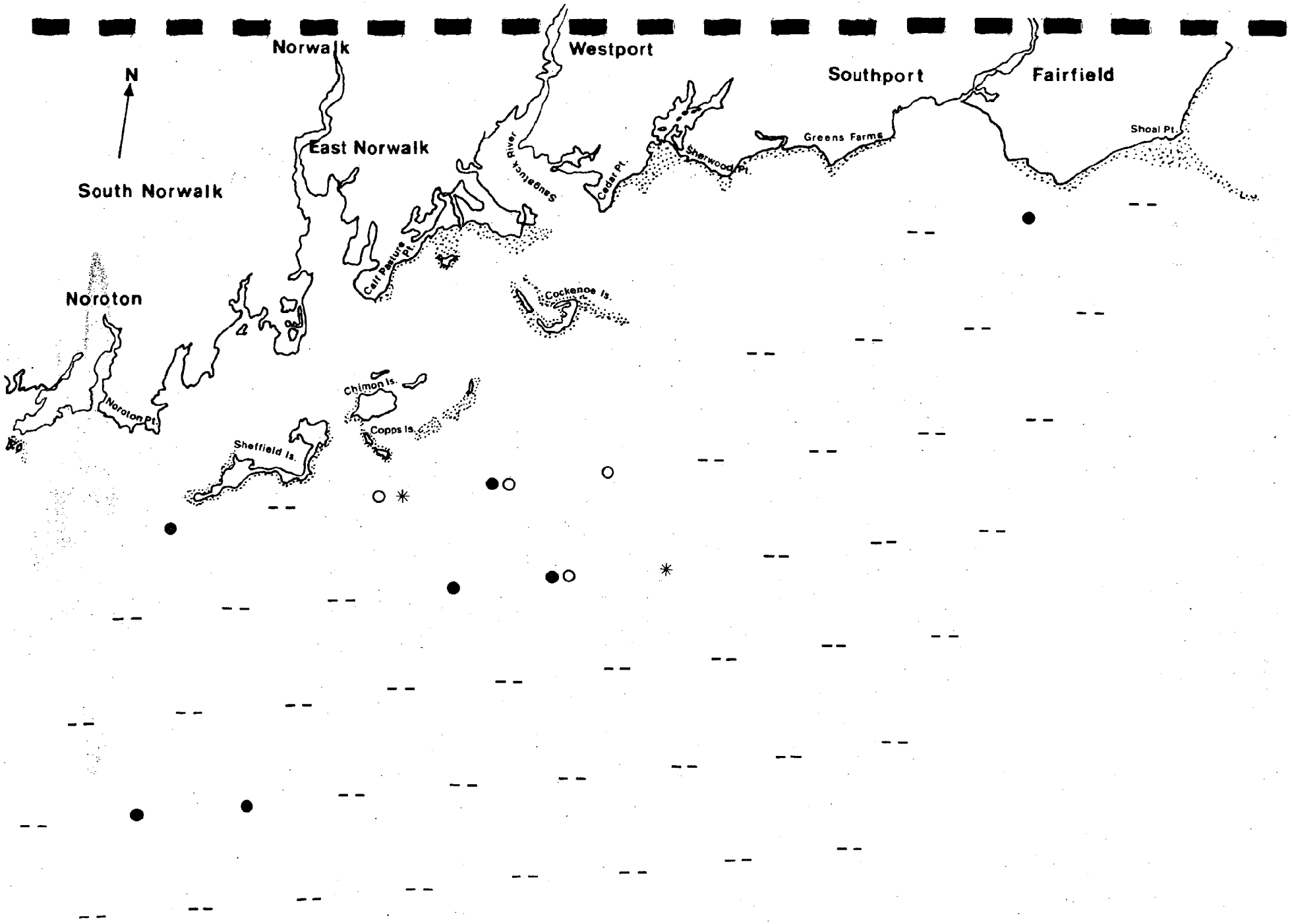
Figure 3g

ABUNDANCE CATEGORIES FOR MISCELLANEOUS

SHELLFISH SPECIES - REGION III

MISCELLANEOUS SHELLFISH KEY

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


N
Norwalk
Westport
Southport
Fairfield
East Norwalk
South Norwalk
Noroton
Noroton Pt.
Sheffield Is.
Chimon Is.
Copps Is.
Calf Pasture Pt.
Saugatuck River
Cockenoe Is.
Cedar Pt.
Sherwood Pt.
Greens Farms
Shoal Pt.

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

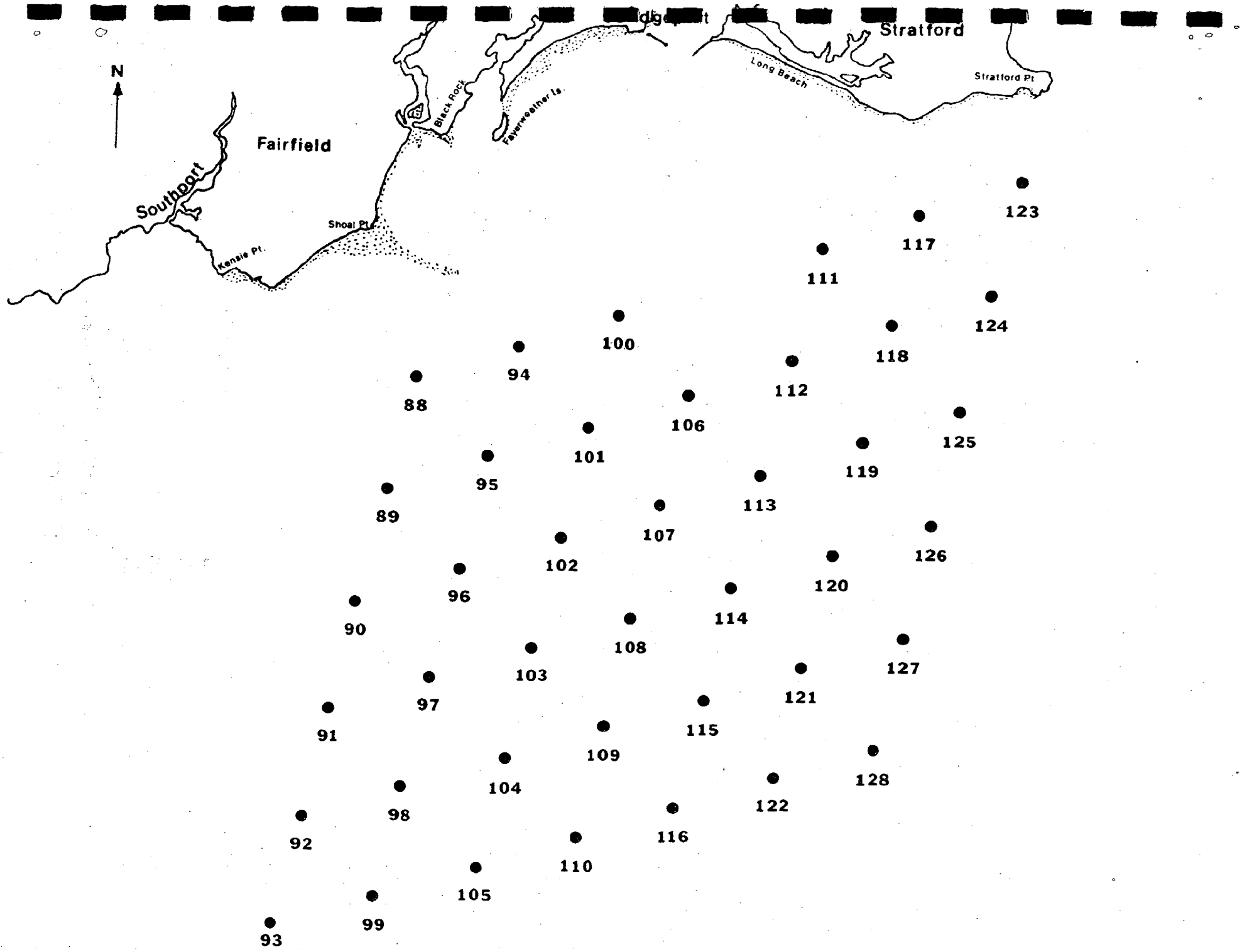

N
Fairfield
Southport
Kensie Pt.
Shoal Pt.
Black Rock
Feverweather Is.
Long Beach
Stratford
Stratford Pt
88
89
90
91
92
93
94
95
96
97
98
99
100
101
102
103
104
105
106
107
108
109
110
111
112
113
114
115
116
117
118
119
120
121
122
123
124
125
126
127
128

Figure 4b

DEPTH OF SAMPLING STATIONS (feet) - REGION IV

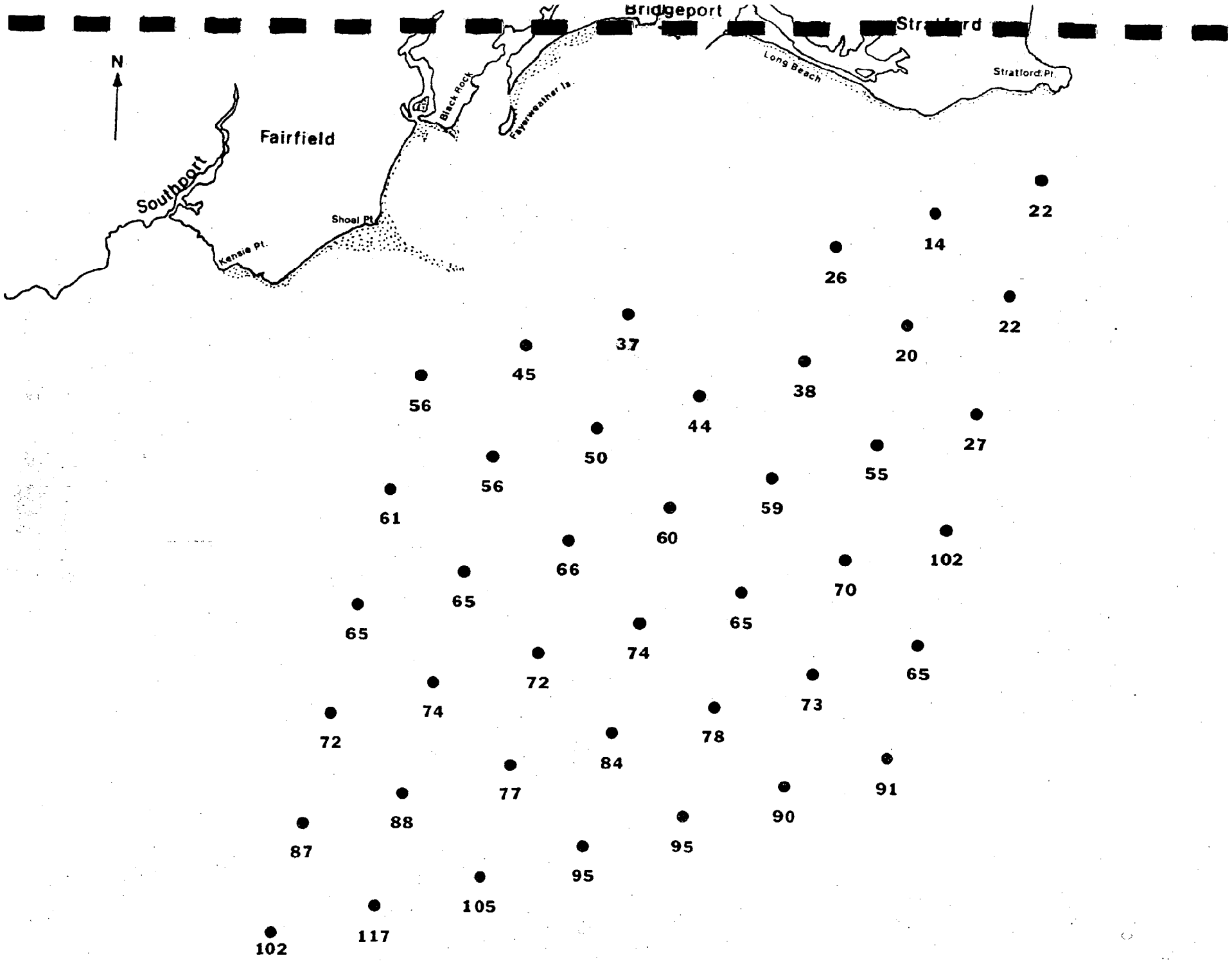

Bridgeport
Stratford
N
Fairfield
Southport
Black Rock
Fayerweather Is.
Long Beach
Stratford Pt.
Shoal Pt.
Kensie Pt.
22
14
26
22
20
37
45
38
56
44
27
50
55
56
59
61
60
102
66
70
65
65
74
65
72
73
74
78
72
84
91
77
90
88
95
87
95
105
117
102

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	✪

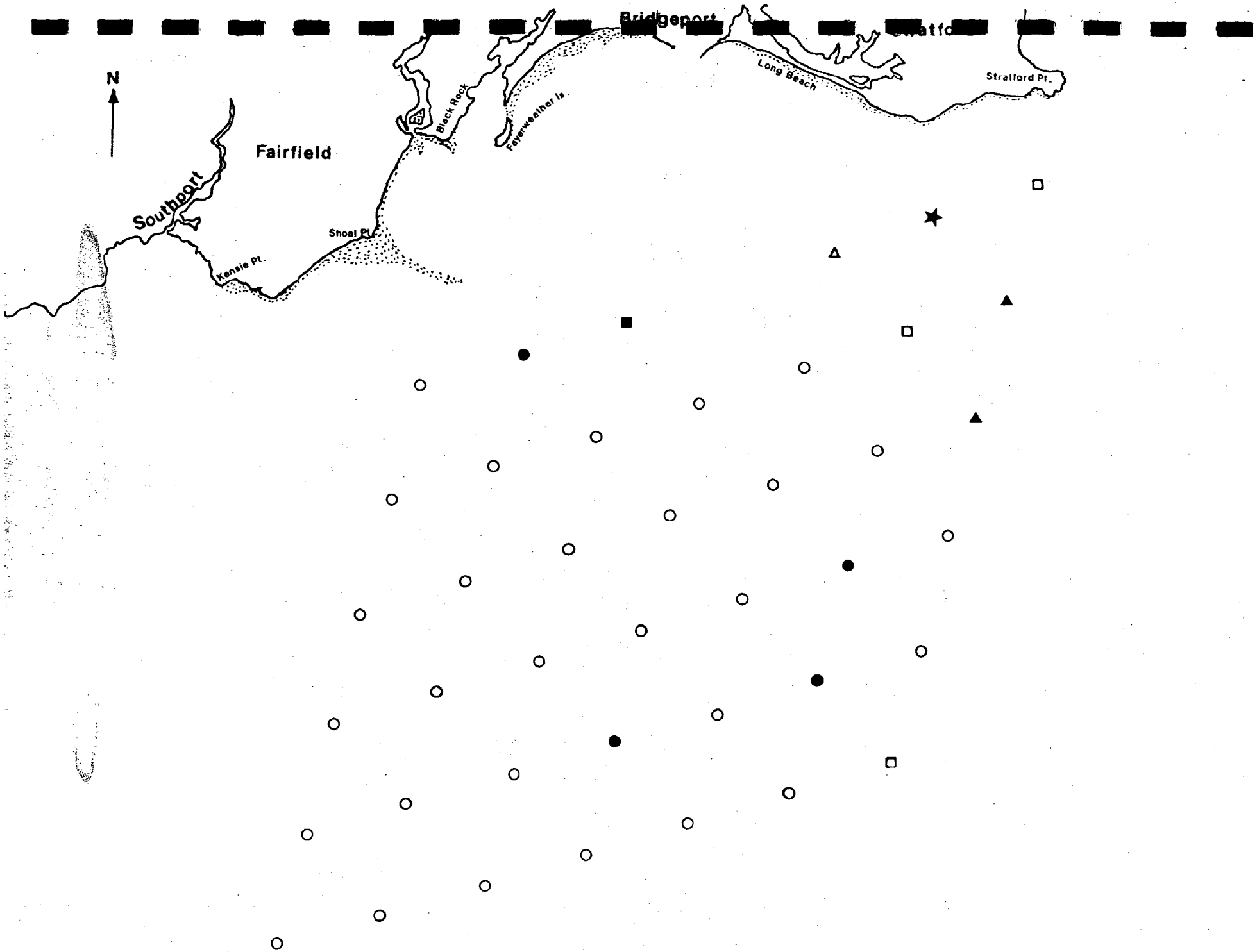

Bridgeport
N
Fairfield
Southport
Kensie Pt.
Shoal Pt.
Black Rock
Fayerweather Is.
Long Beach
Stratford Pt.

Figure 4d

NUMBER OF BENTHIC SPECIES - NUMBER OF INDIVIDUALS

PER GRAB SAMPLE - REGION IV

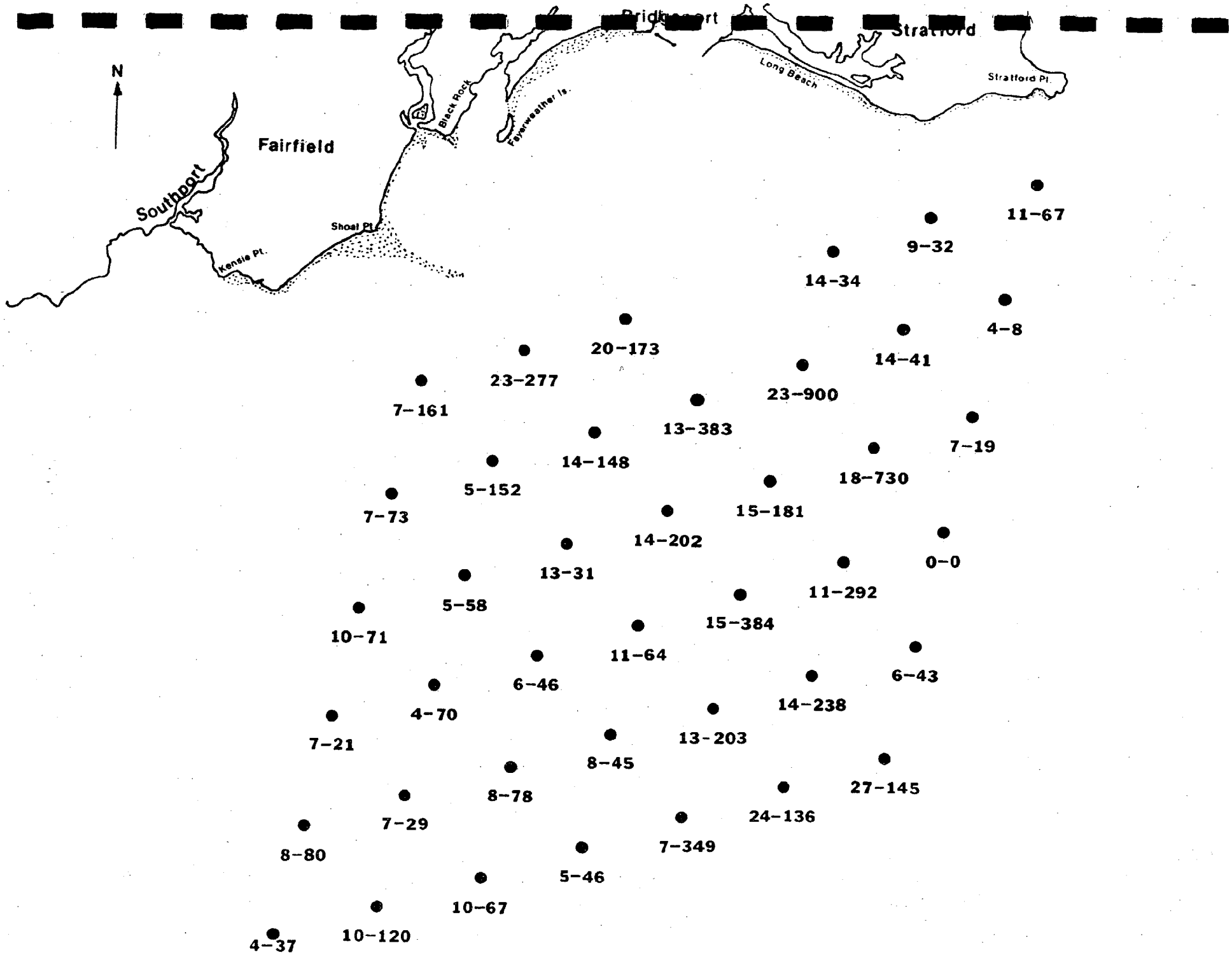

Bridgeport
Stratford
N
Fairfield
Southport
Black Rock
Feeweather Is.
Long Beach
Stratford Pt.
Shoal Pt.
Kensie Pt.
11-67
9-32
14-34
4-8
20-173
14-41
23-277
23-900
7-161
13-383
7-19
14-148
18-730
5-152
15-181
7-73
14-202
0-0
13-31
11-292
5-58
15-384
10-71
11-64
6-43
6-46
14-238
4-70
13-203
7-21
8-45
27-145
8-78
24-136
7-29
7-349
8-80
5-46
10-67
10-120
4-37

Figure 4e

BENTHIC SPECIES DIVERSITY CATEGORIES - REGION IV

DIVERSITY KEY

Low	●
Moderate	▲
High	■
No organisms recovered	--

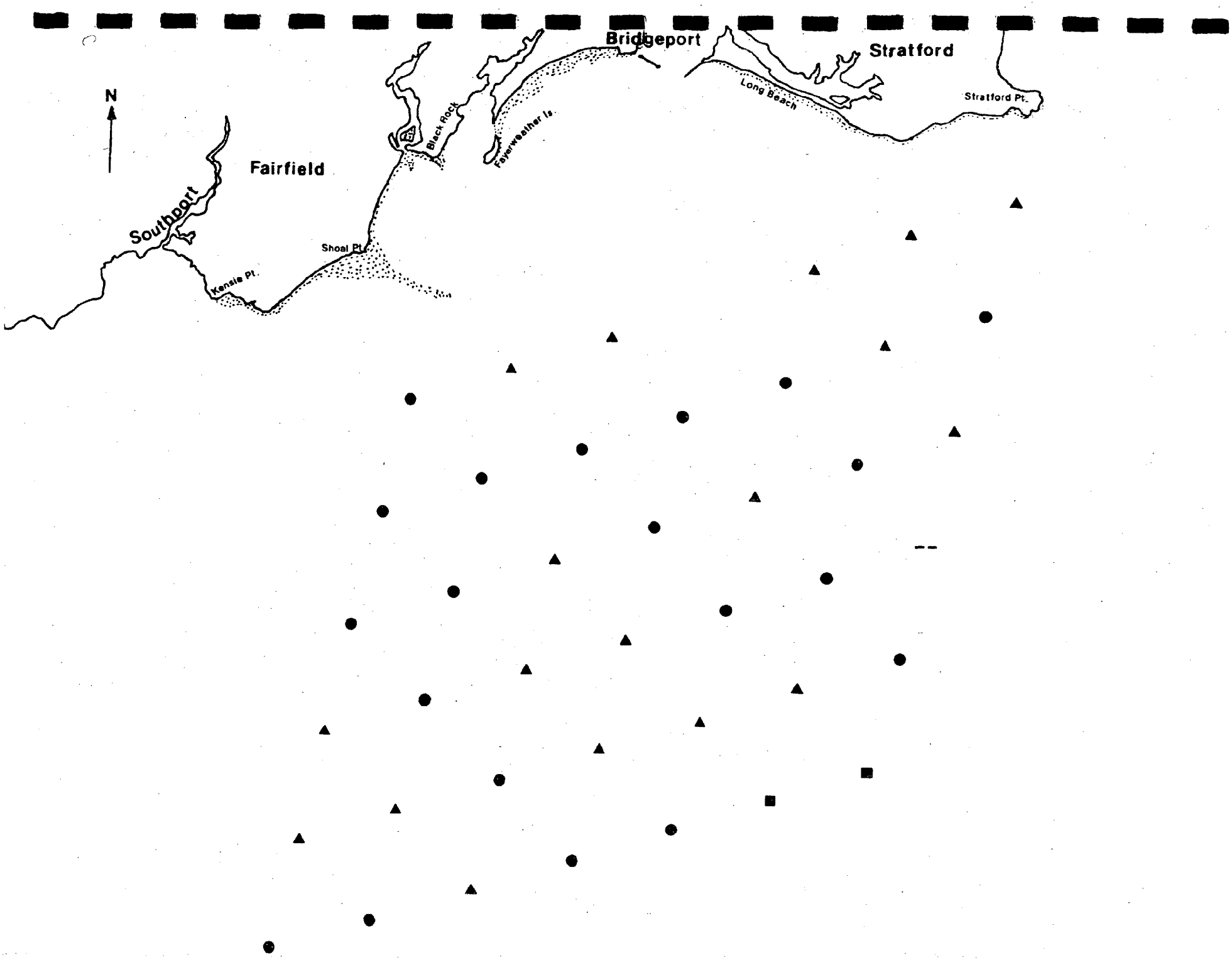

N
Fairfield
Southport
Kensie Pt.
Shoal Pt.
Black Rock
Fayerweather Is.
Bridgeport
Long Beach
Stratford
Stratford Pt.

Figure 4f

EASTERN OYSTER AND HARD CLAM

ABUNDANCE CATEGORIES - REGION IV

CLAM-OYSTER KEY

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

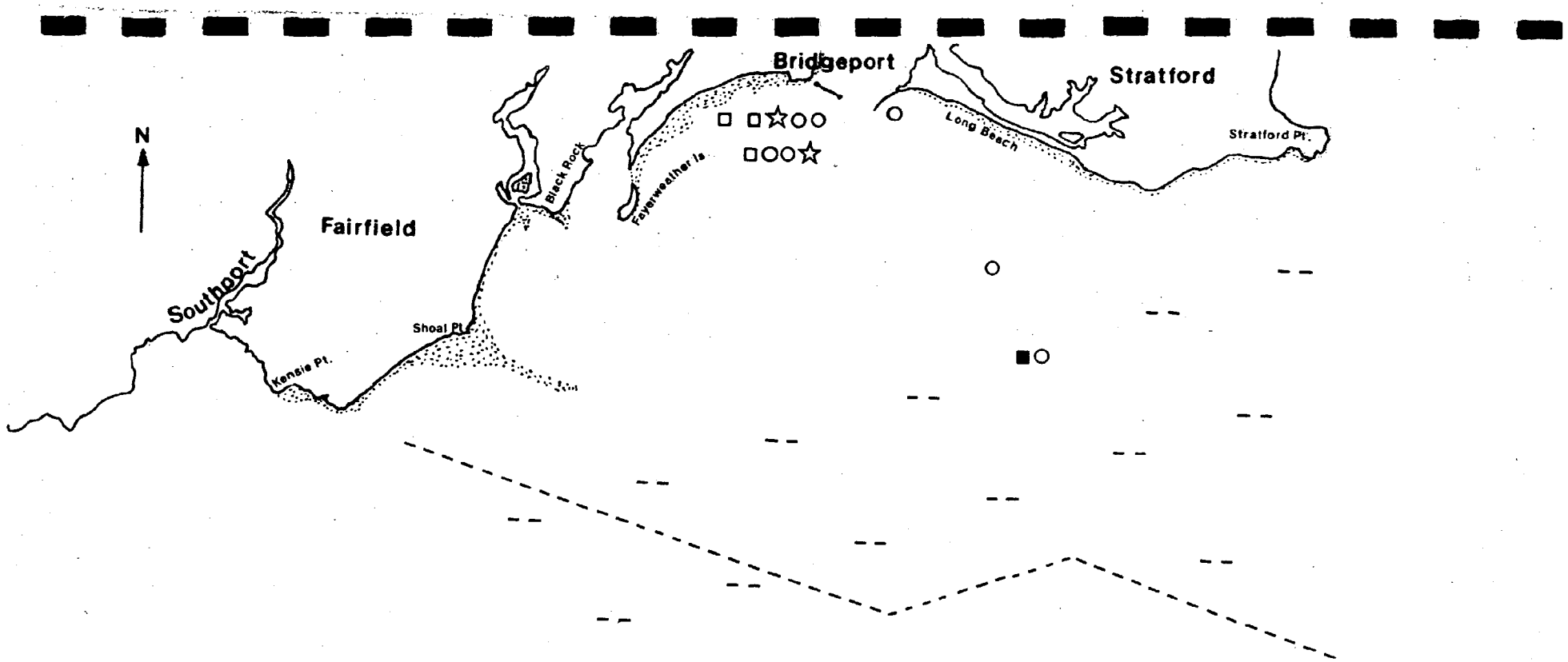

N
Southport
Fairfield
Kensie Pt.
Shoal Pt.
Black Rock
Fayerweather Is
Bridgeport
Long Beach
Stratford
Stratford Pt.

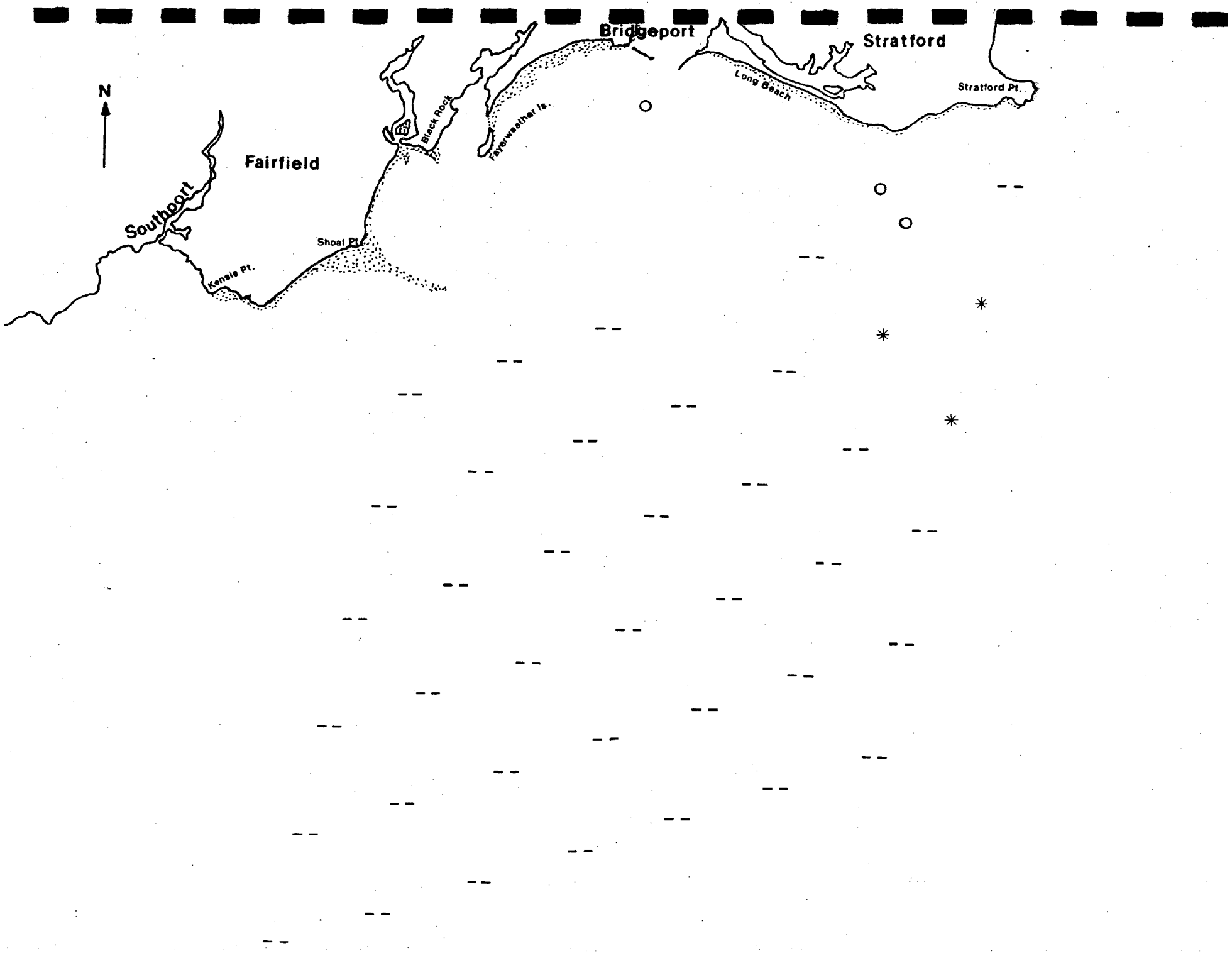
Figure 4g

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		--	


N
Fairfield
Southport
Kensie Pt.
Shoal Pt.
Black Rock
Fayerweather Is.
Bridgeport
Long Beach
Stratford
Stratford Pt.

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

Figure 5a

SAMPLING STATION POSITIONS - REGION V

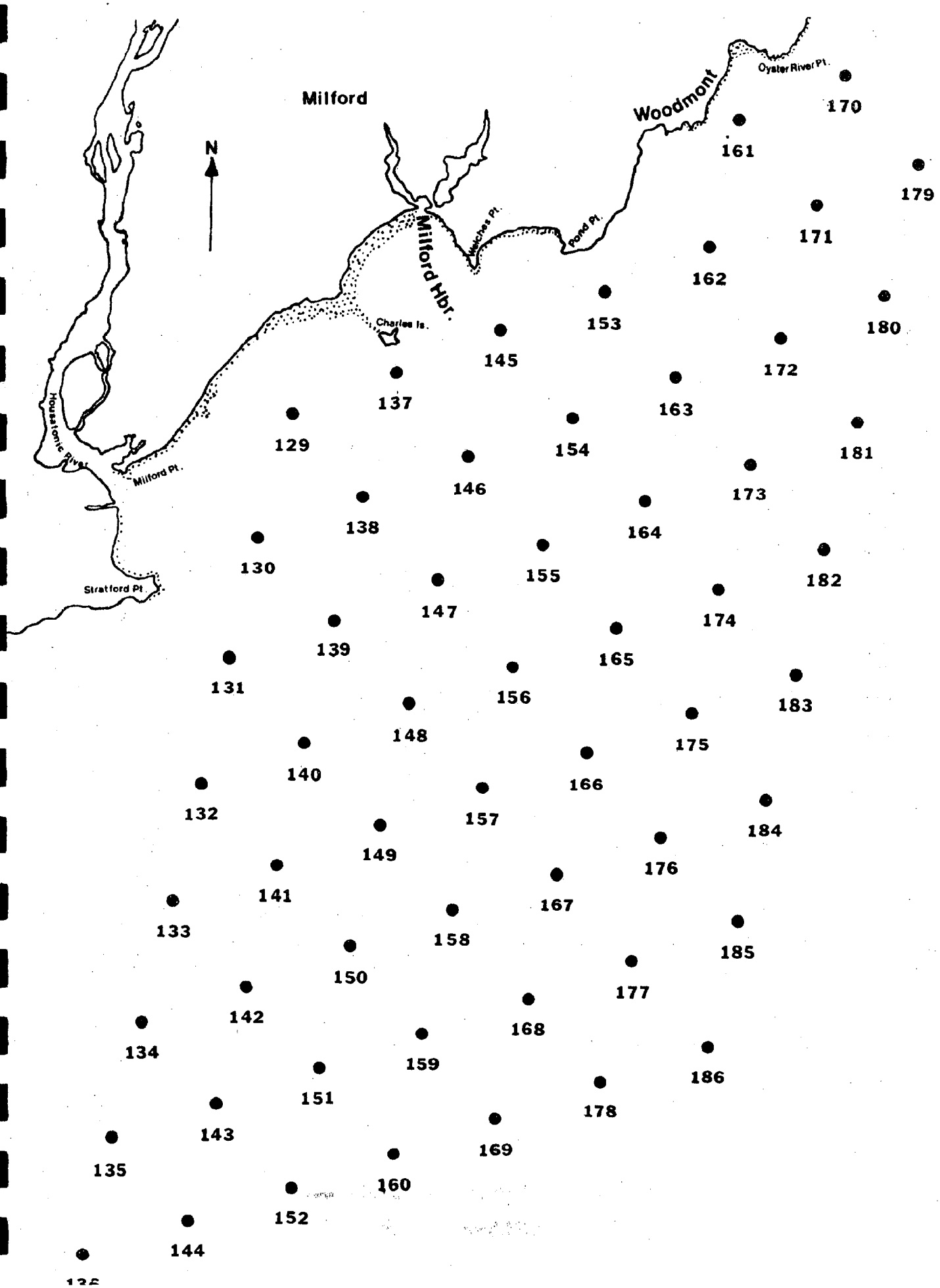

Milford
N
Woodmont
Oyster River Pt.
Milford Hbr.
Matches Pt.
Pond Pt.
Charles Is.
Housatonic River
Milford Pt.
Stratford Pt.
170
161
179
171
162
153
180
145
172
137
163
129
154
181
146
173
138
164
130
155
182
147
174
139
165
131
156
183
148
175
140
166
132
157
184
149
176
141
167
133
158
185
150
177
142
168
134
159
186
151
178
143
169
135
160
152
144
136

Figure 5b

DEPTH OF SAMPLING STATIONS (feet) - REGION V

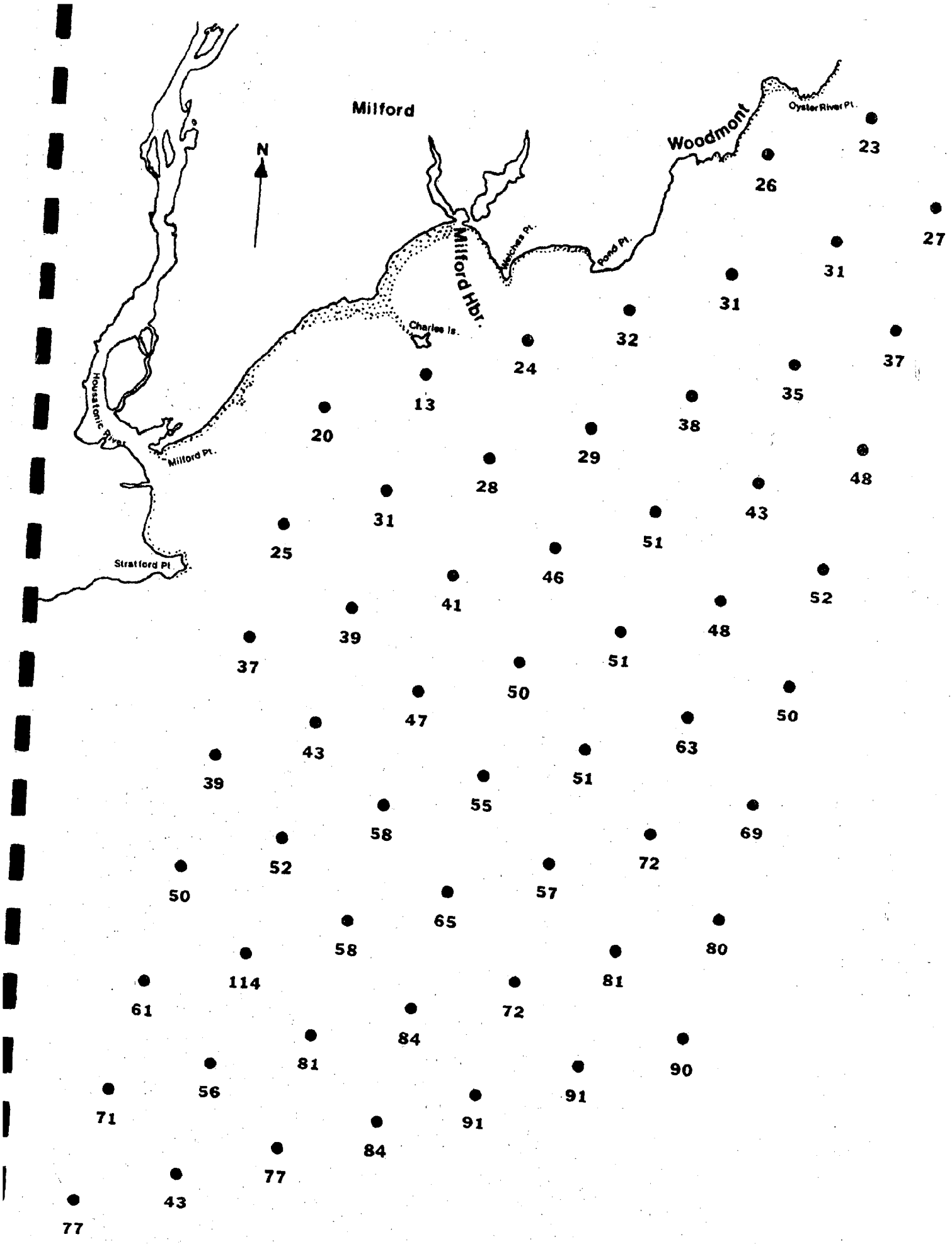

Milford
N
Woodmont
Oyster River Pt.
Milford Hbr.
Meches Pt.
Pond Pt.
Charles Is.
Housatonic River
Milford Pt.
Stratford Pt.
23
26
27
31
31
32
37
24
35
13
38
20
29
48
28
43
31
51
25
46
52
41
48
39
37
51
50
50
47
63
43
39
51
55
58
69
52
72
50
57
65
80
58
114
81
61
72
84
81
90
56
91
71
91
84
77
43
77

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	✪

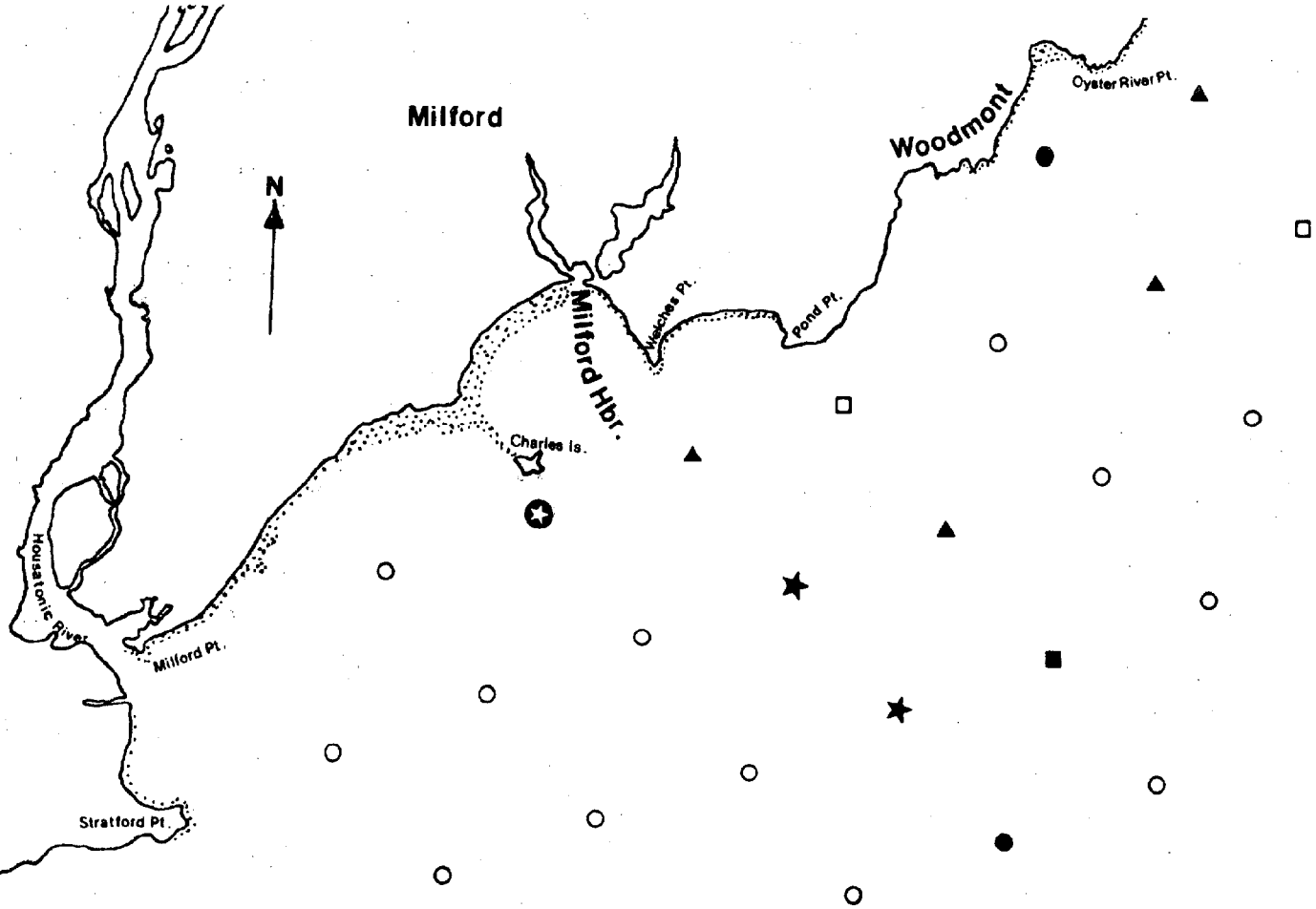

Milford
N
Woodmont
Oyster River Pt.
Milford Hbr.
Hotchkiss Pt.
Pond Pt.
Charles Is.
Housatonic River
Milford Pt.
Stratford Pt.

Figure 5d

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

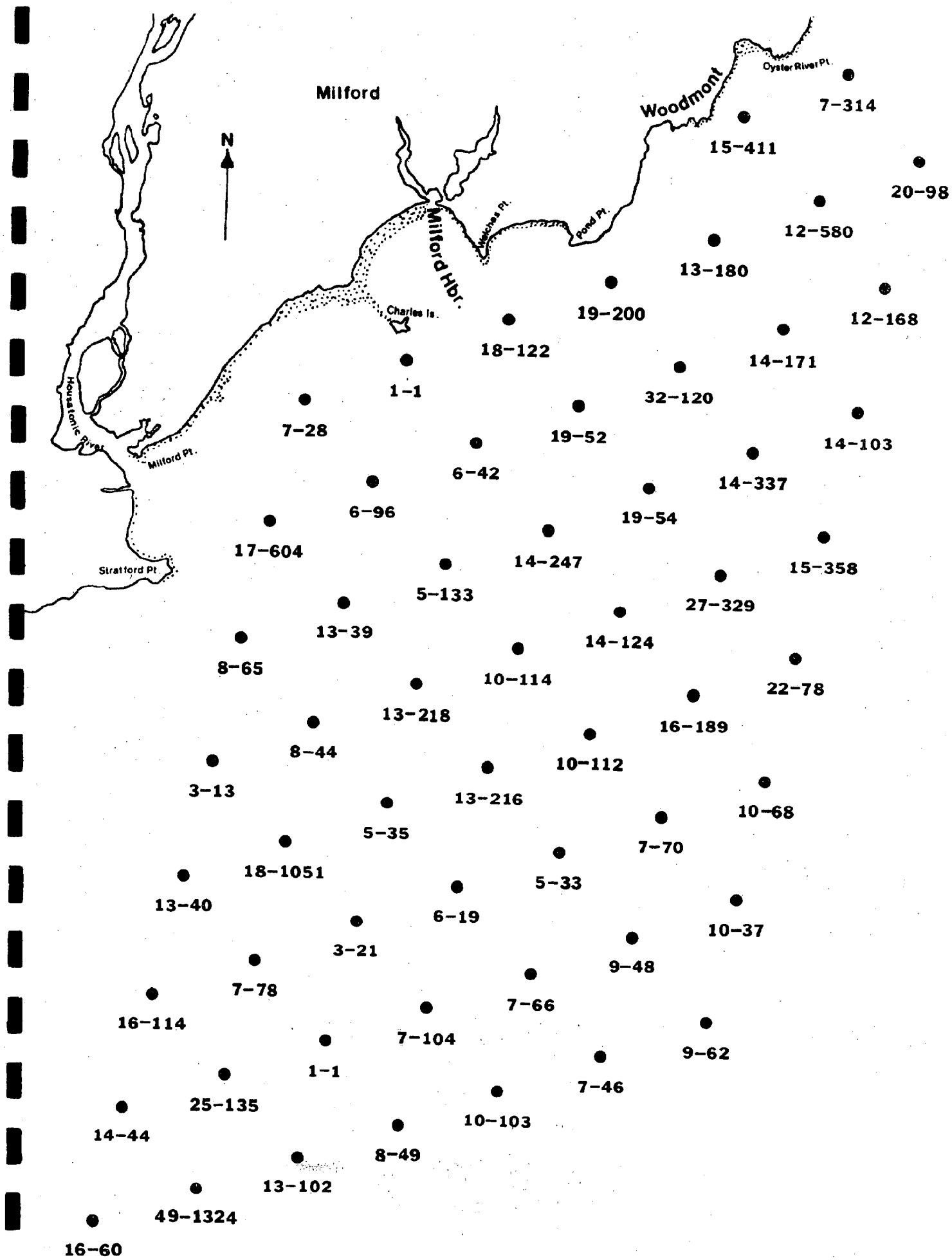

Milford
N
Woodmont
Oyster River Pt.
7-314
15-411
20-98
12-580
13-180
12-168
Milford Hbr.
Welches Pt.
Pond Pt.
Charles Is.
19-200
18-122
14-171
1-1
32-120
7-28
19-52
14-103
Housatonic River
Milford Pt.
6-42
14-337
6-96
19-54
17-604
14-247
15-358
Stratford Pt.
5-133
27-329
13-39
14-124
8-65
10-114
22-78
13-218
16-189
8-44
10-112
3-13
13-216
10-68
5-35
7-70
18-1051
5-33
13-40
6-19
10-37
3-21
9-48
7-78
7-66
16-114
7-104
9-62
1-1
7-46
25-135
10-103
14-44
8-49
13-102
49-1324
16-60

Figure 5e

BENTHIC SPECIES DIVERSITY CATEGORIES - REGION V

DIVERSITY KEY

Low	●
Moderate	▲
High	■
No organisms recovered	--

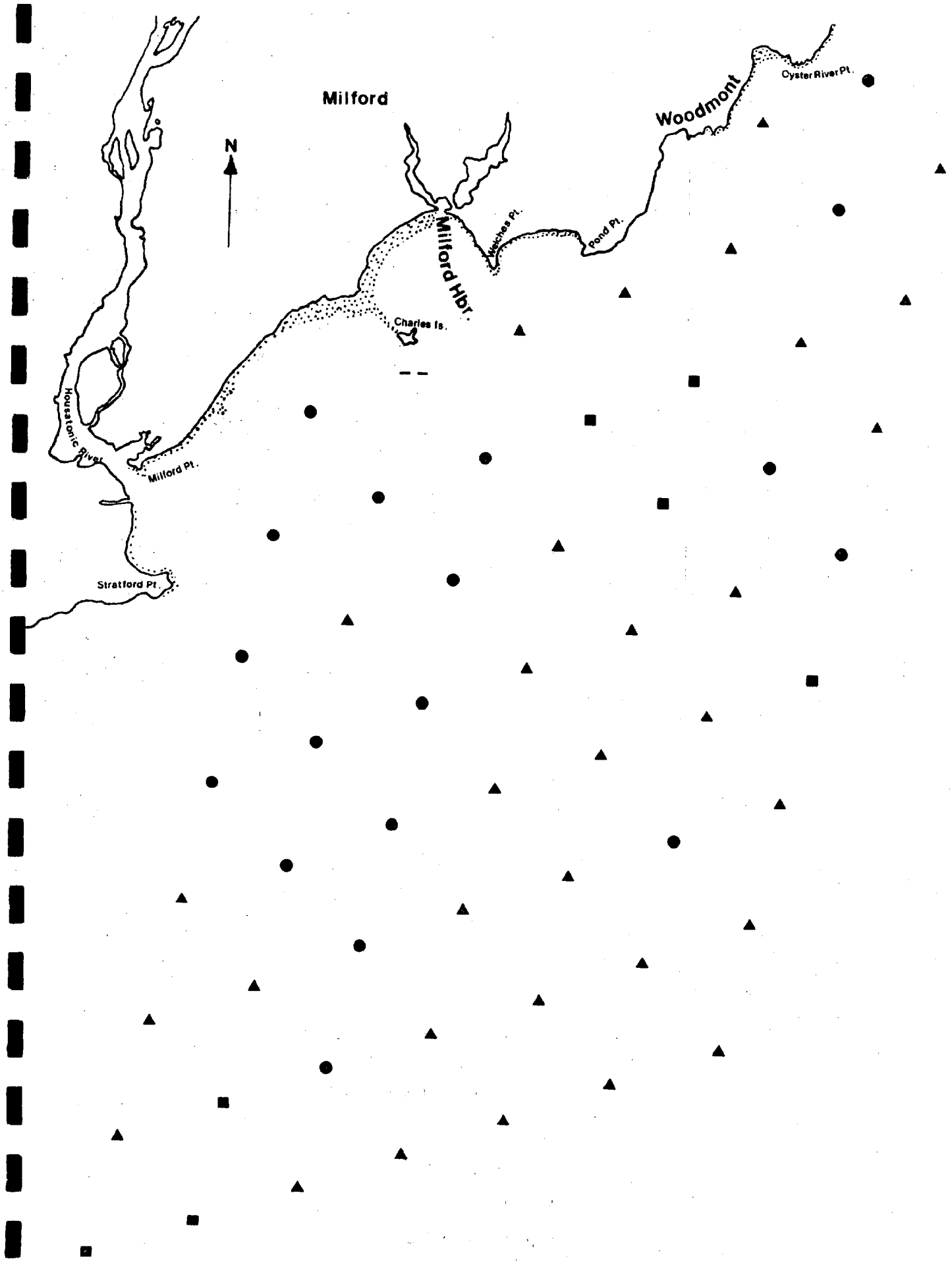

Milford
N
Woodmont
Oyster River Pt.
Milford Hbr.
Meaches Pt.
Pond Pt.
Charles Is.
Housatonic River
Milford Pt.
Stratford Pt.

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	--	

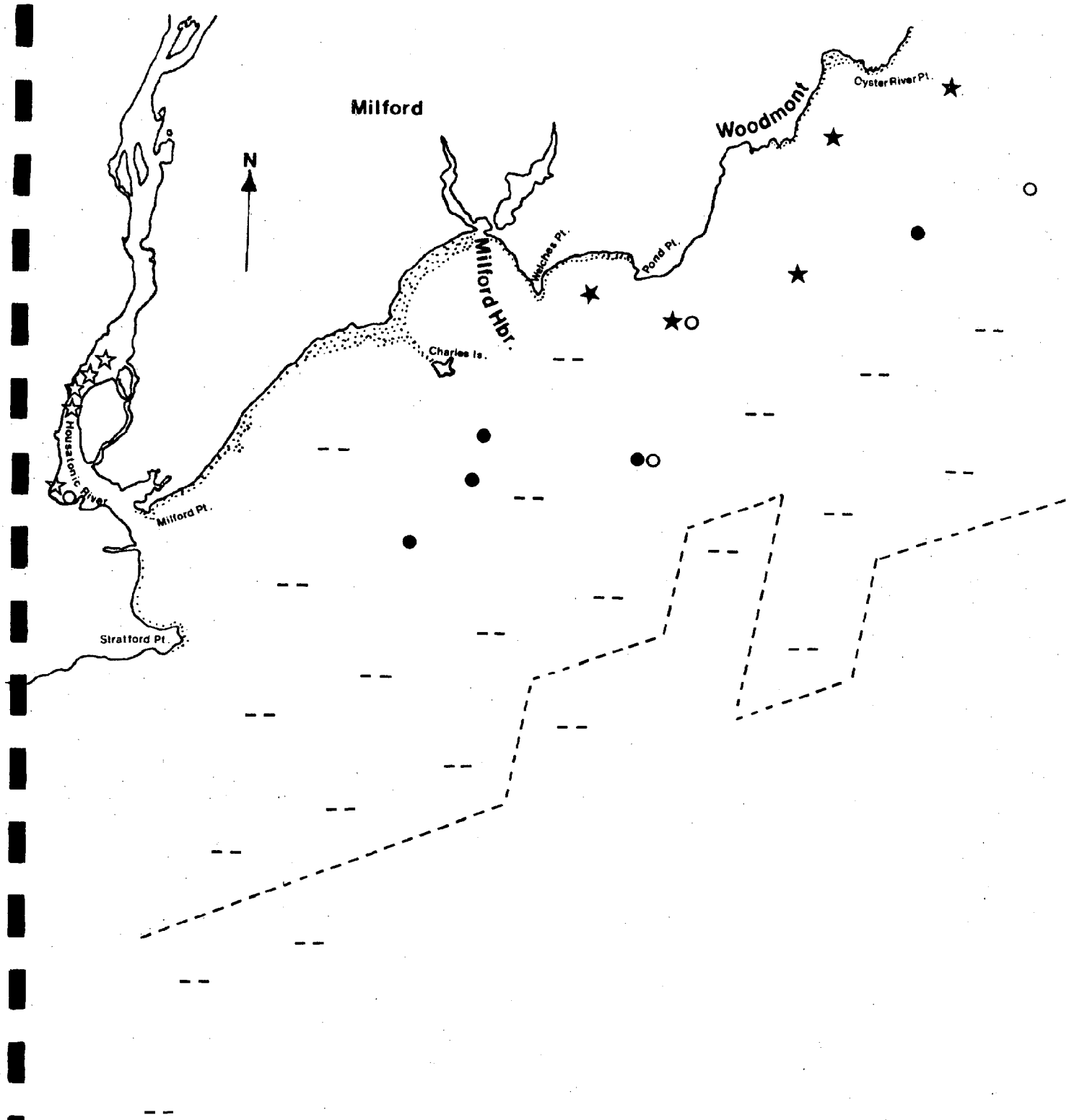

Milford
N
Woodmont
Oyster River Pt.
Milford Hbr.
Welches Pt.
Pond Pt.
Charles Is.
Housatonic River
Milford Pt.
Stratford Pt.

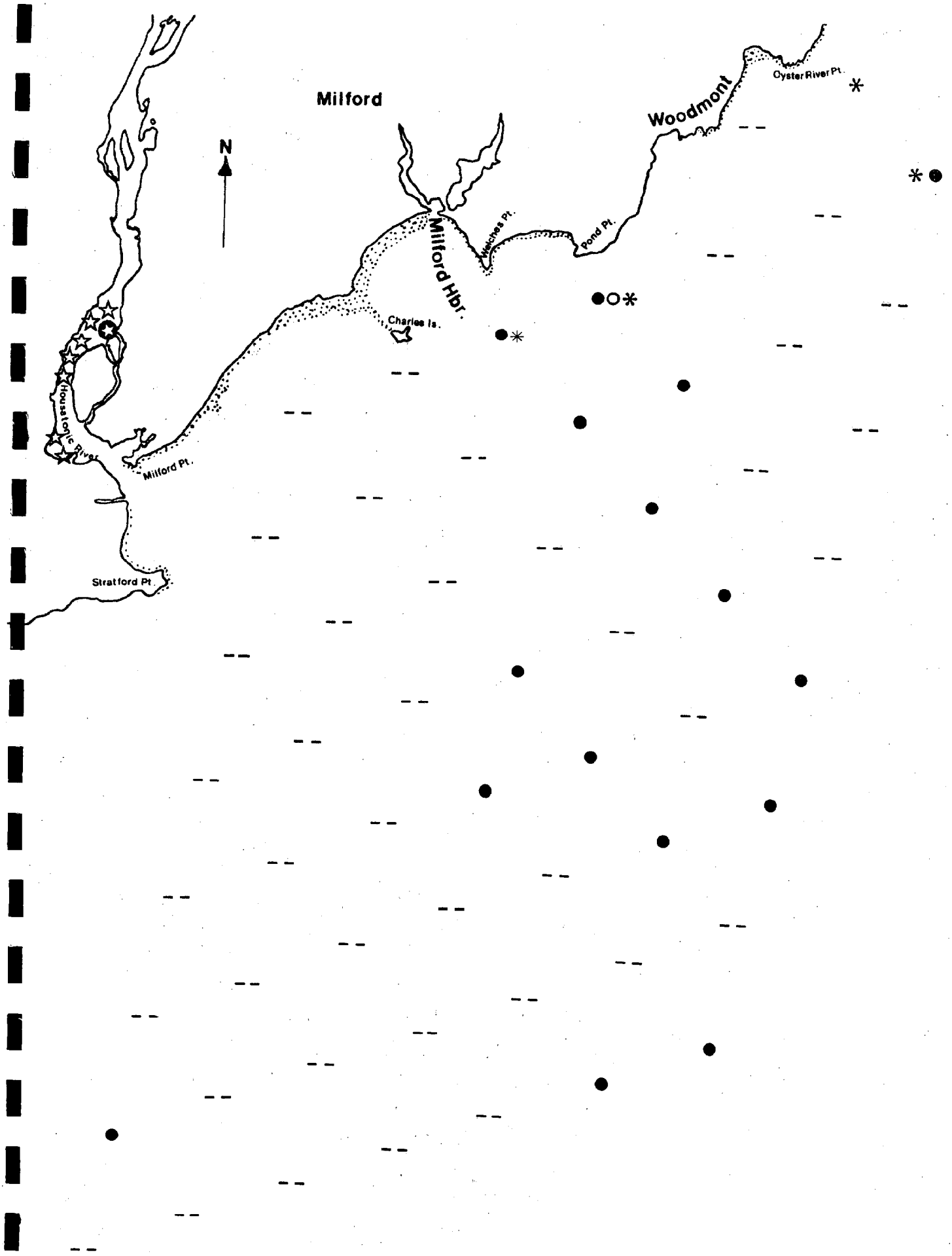
Figure 5g

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		--	


Milford
N
Woodmont
Oyster River Pt.
Milford Hbr.
Pond Pt.
Charles Is.
Housatonic River
Milford Pt.
Stratford Pt.

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 occuring 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 occuring at Station #188 and high densities at Stations # 187 and # 195.

Razor clams were the most abundant shellfish species in Region VI occuring 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

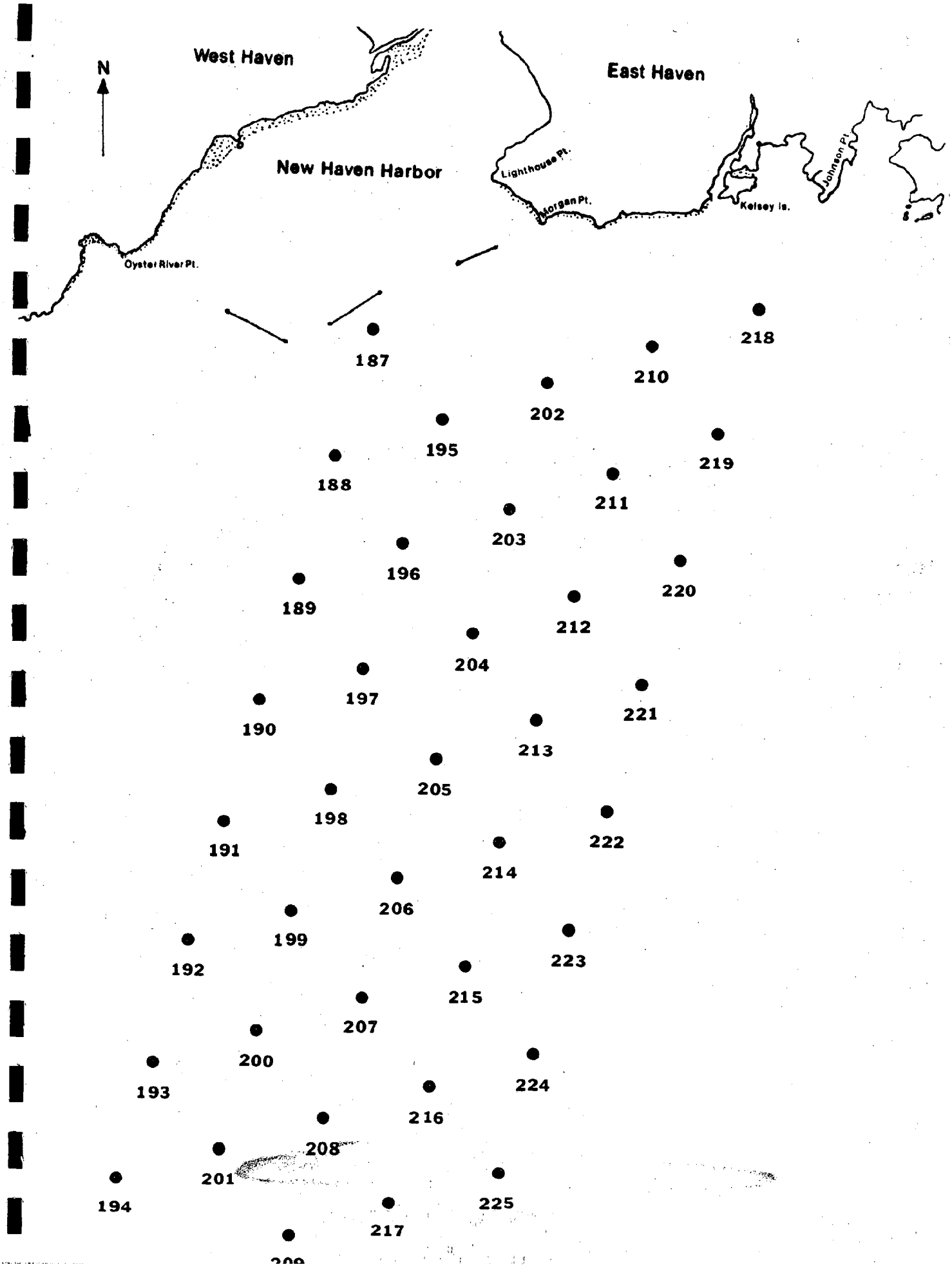

West Haven
N
East Haven
New Haven Harbor
Lighthouse Pt.
Morgan Pt.
Kelsey Is.
Johnson Pt.
Oyster River Pt.
187
188
189
190
191
192
193
194
195
196
197
198
199
200
201
202
203
204
205
206
207
208
209
210
211
212
213
214
215
216
217
218
219
220
221
222
223
224
225

Figure 6A-b

DEPTH OF SAMPLING STATIONS (feet) - REGION VIA

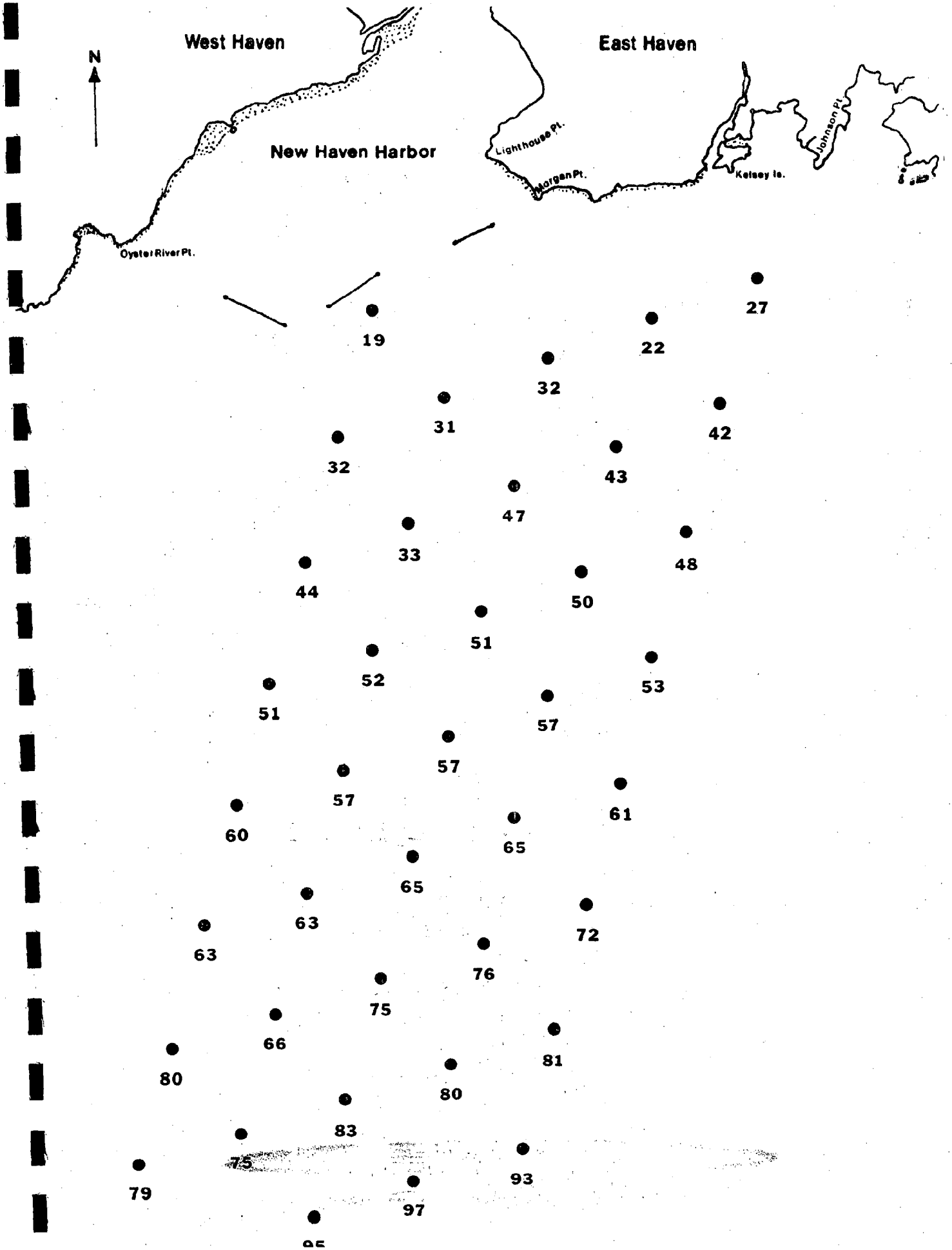

West Haven
East Haven
N
New Haven Harbor
Lighthouse Pt.
Morgan Pt.
Kelsey Is.
Johnson Pt.
Oyster River Pt.
27
19
22
32
31
42
32
43
47
33
48
44
50
51
52
53
51
57
57
57
61
60
65
65
63
72
63
76
75
66
81
80
80
83
75
93
79
97
95

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	✪

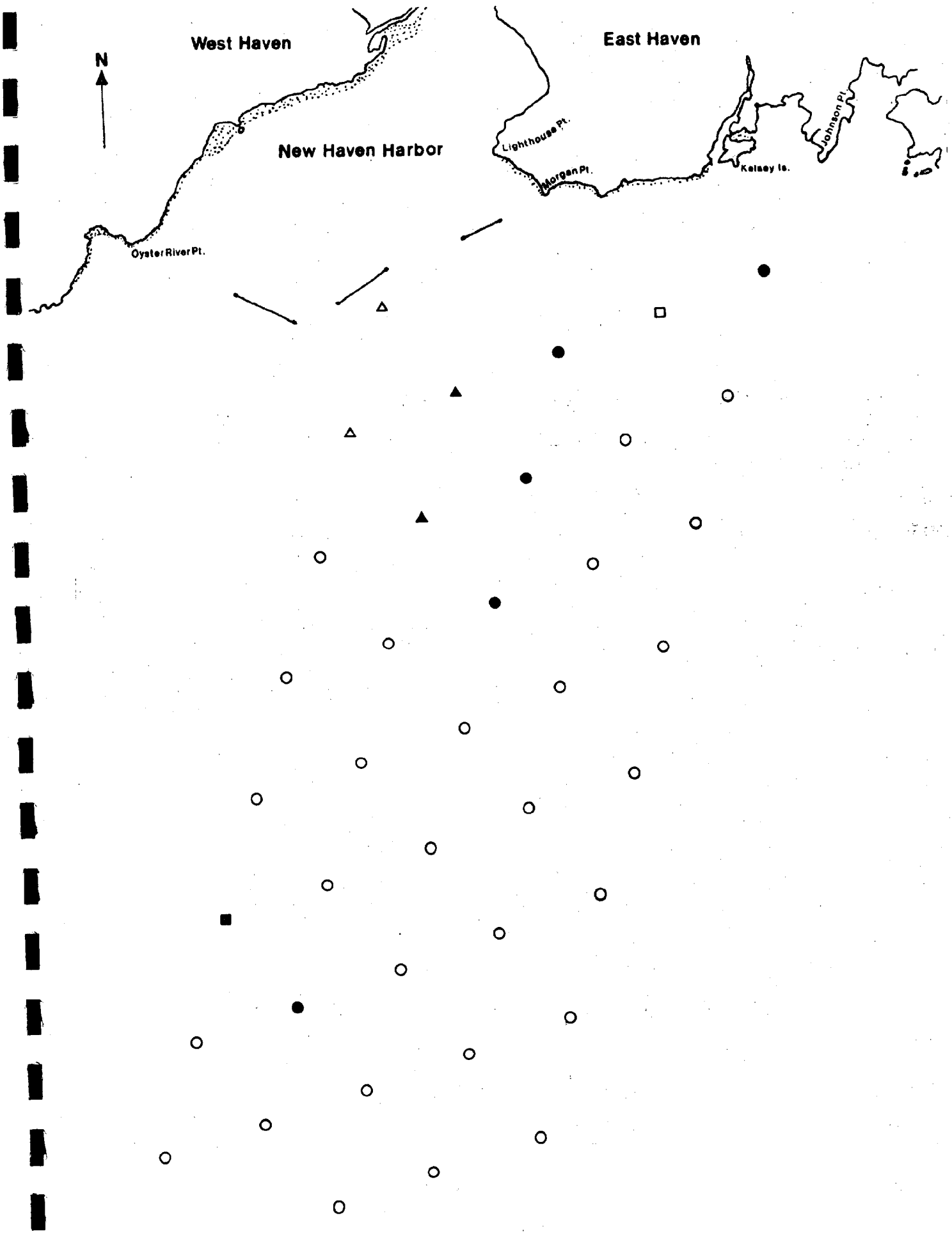

West Haven
N
New Haven Harbor
East Haven
Lighthouse Pt.
Morgan Pt.
Kelsey Is.
Johnson Pt.
Oyster River Pt.

Figure 6A-d

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

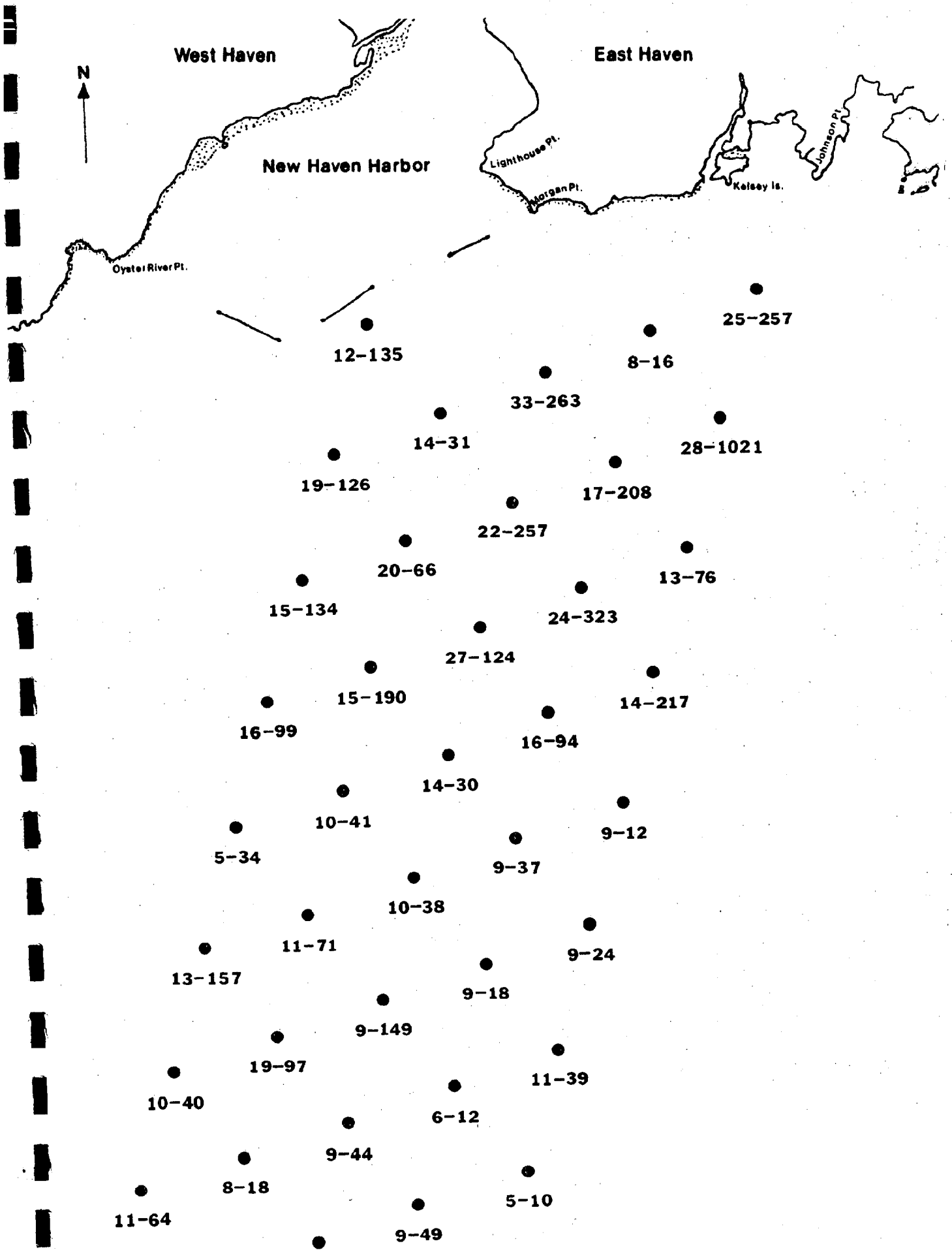

West Haven
East Haven
N
New Haven Harbor
Lighthouse Pt.
Morgan Pt.
Kelsey Is.
Johnson Pt.
Oyster River Pt.
25-257
12-135
8-16
33-263
14-31
28-1021
19-126
17-208
22-257
20-66
13-76
15-134
24-323
27-124
15-190
14-217
16-99
16-94
14-30
10-41
9-12
5-34
9-37
10-38
11-71
9-24
13-157
9-18
9-149
19-97
11-39
10-40
6-12
9-44
8-18
5-10
11-64
9-49

Figure 6A-e

BENTHIC SPECIES DIVERSITY CATEGORIES - REGION VIA

DIVERSITY KEY

Low	●
Moderate	▲
High	■
No organisms recovered	--

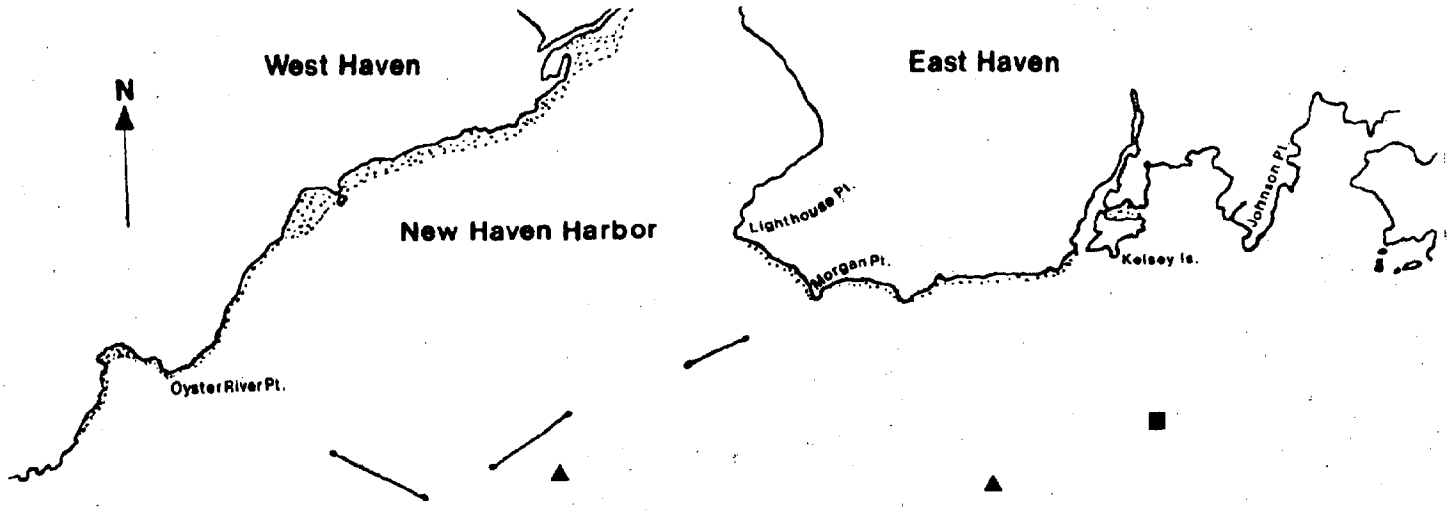

West Haven
N
New Haven Harbor
East Haven
Lighthouse Pt.
Morgan Pt.
Kelsey Is.
Johnson Pt.
Oyster River Pt.

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	--	

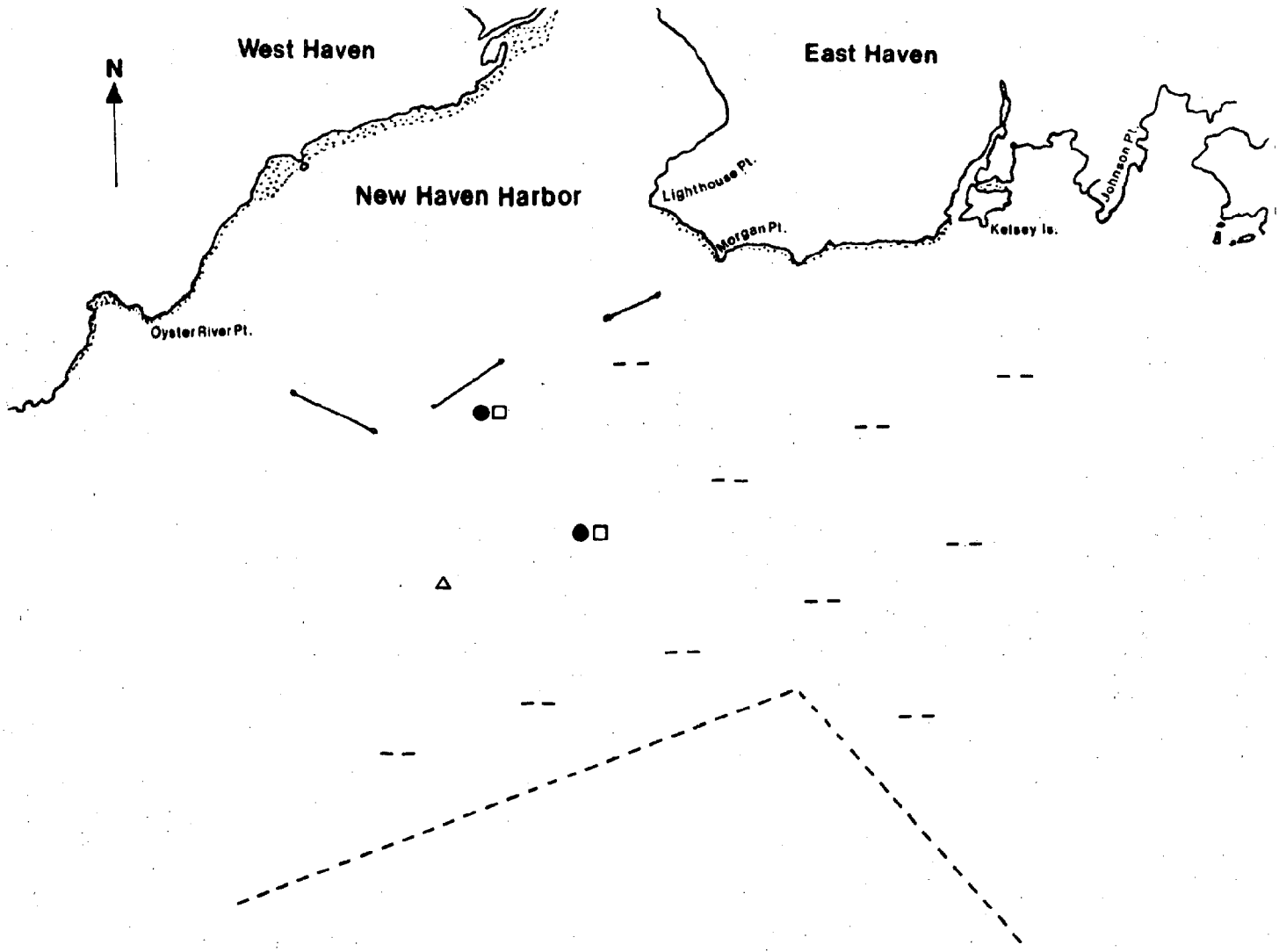

West Haven
N
East Haven
New Haven Harbor
Lighthouse Pt.
Morgan Pt.
Kelsey Is.
Johnson Pt.
Oyster River Pt.

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		--	

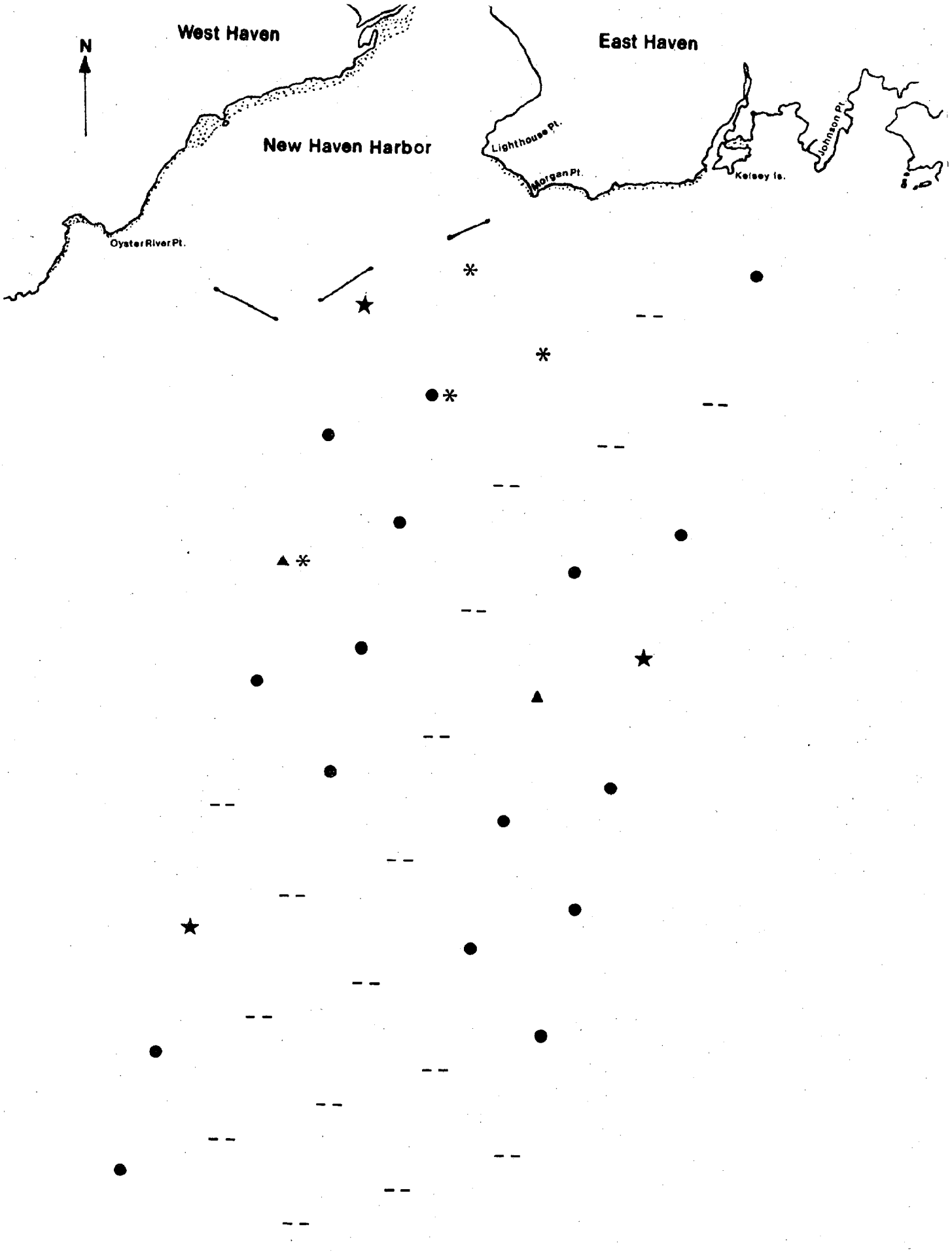

N
West Haven
East Haven
New Haven Harbor
Lighthouse Pt.
Morgan Pt.
Kelsey Is.
Johnson Pt.
Oyster River Pt.

Figure 6B-a

SAMPLING STATION POSITIONS - REGION VIB

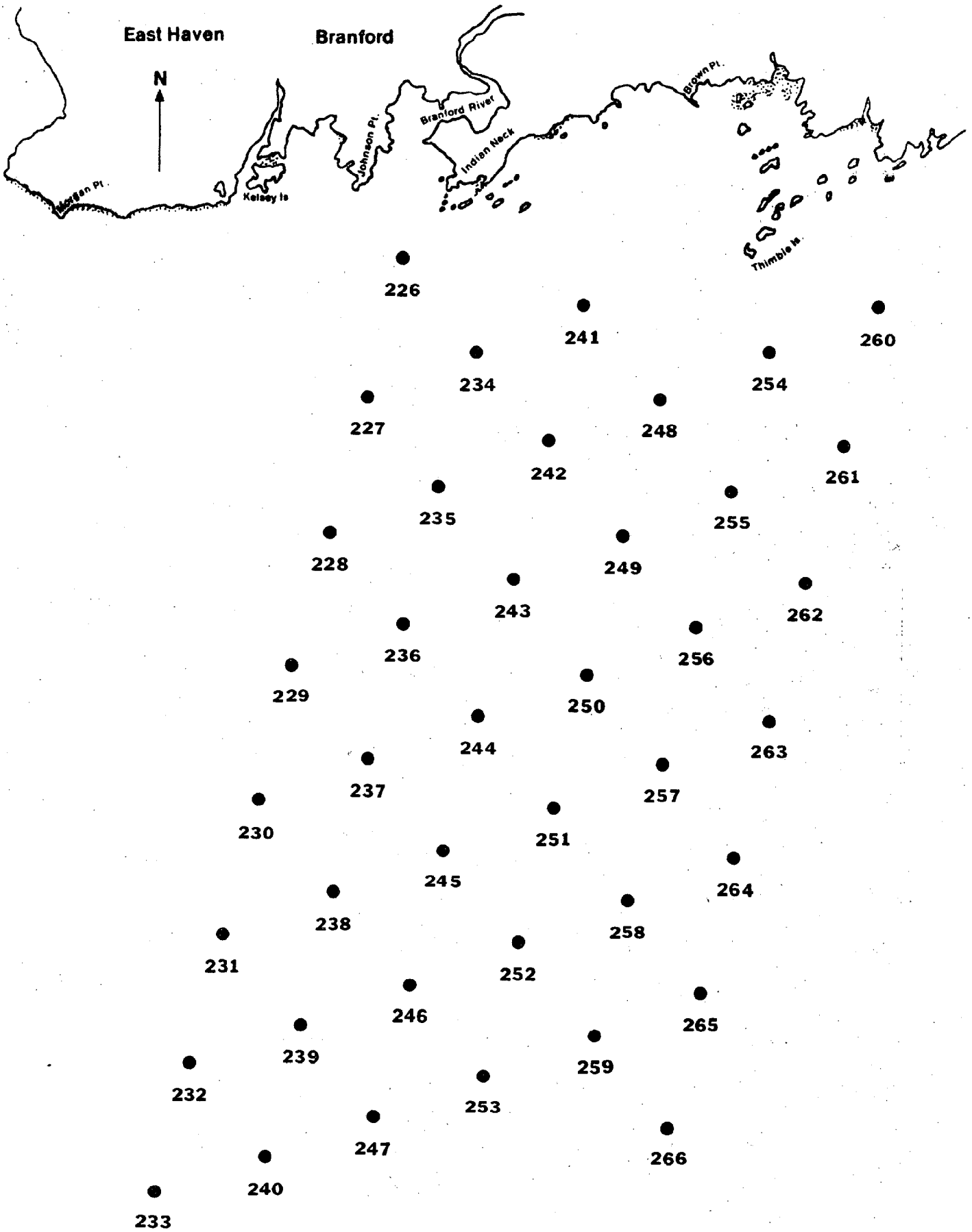
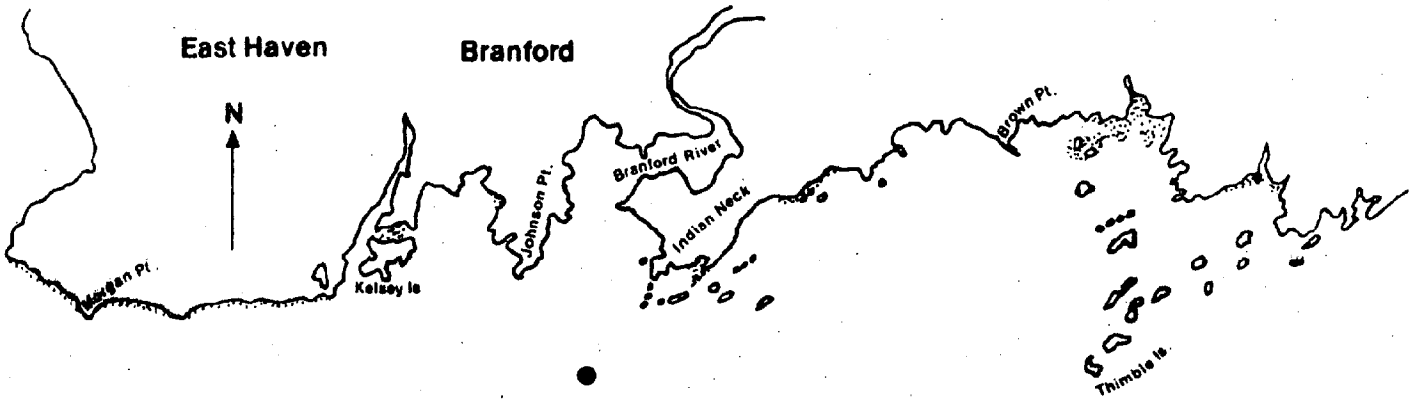

East Haven
Branford
N
Morgan Pt.
Kelsey Is
Johnson Pt.
Branford River
Indian Neck
Brown Pt.
Thimble Is.
226
241
260
234
254
227
248
242
261
235
255
228
249
243
262
236
256
229
250
244
263
237
257
230
251
245
264
238
258
231
252
246
265
239
259
232
253
247
266
240
233

Figure 6B-b

DEPTH OF SAMPLING STATIONS (feet) - REGION VIB



22

42 39

39 37

44 38

47 41

46 35

47 43

52 51

52 52

53 63

63 61

60 72

65 73

76 88

73 85

74 82

87 94

82 93

83 91

91 97

89

91

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	✪

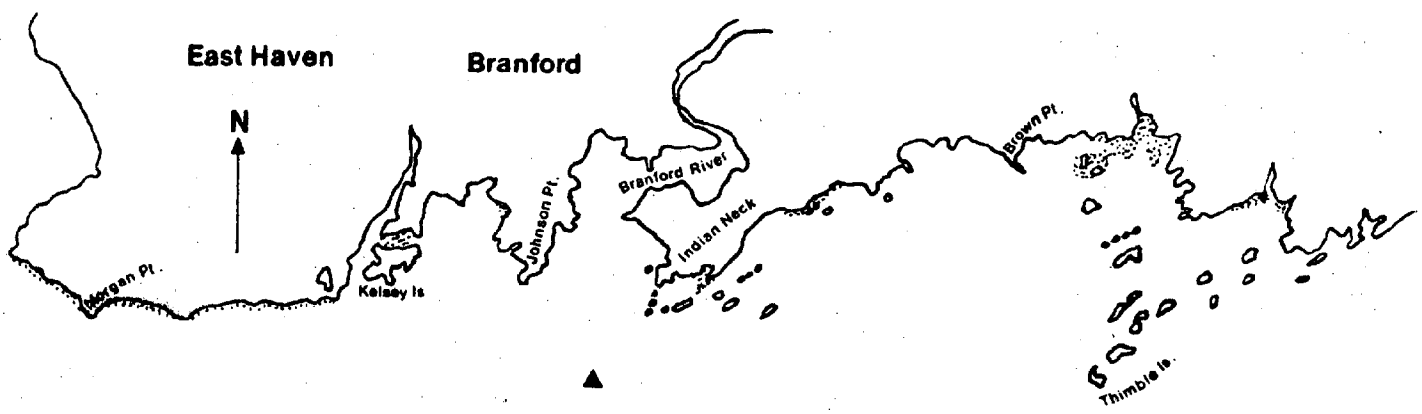
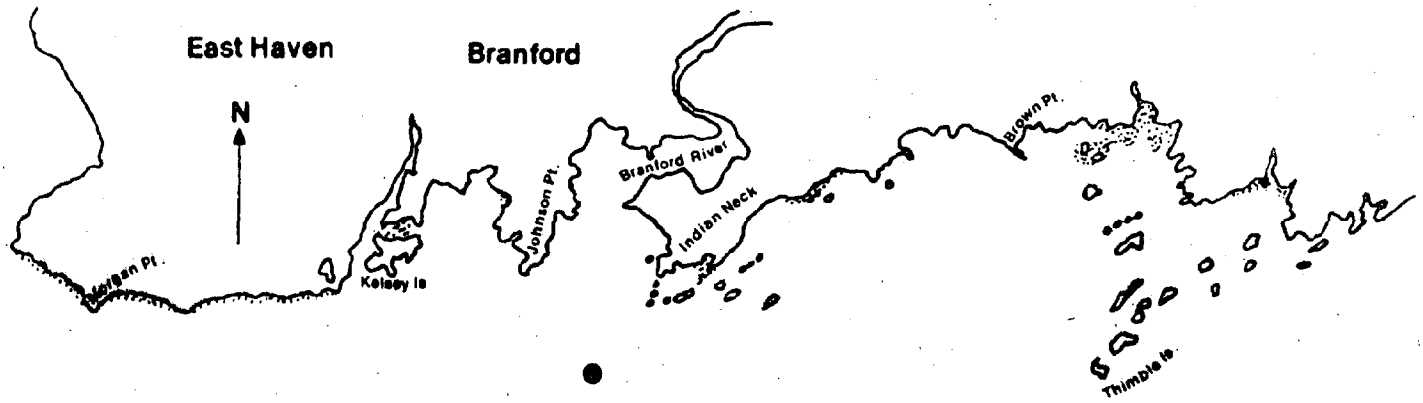

East Haven
Branford
N
Jackson Pt.
Kelsey Is
Johnson Pt.
Branford River
Indian Neck
Brown Pt.
Thimble Is.

Figure 6B-d

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



18-1473

14-1313

14-43

21-209

17-130

29-575

20-298

29-802

20-71

25-527

15-407

19-187

23-597

21-517

17-446

19-529

17-774

12-77

16-337

24-327

14-117

20-339

12-264

19-113

22-388

15-73

14-152

11-25

8-186

17-45

15-317

12-158

13-119

8-37

10-218

13-109

12-70

8-33

11-102

10-104

14-107

Figure 6B-e

BENTHIC SPECIES DIVERSITY CATEGORIES - REGION VIB

DIVERSITY KEY

Low	●
Moderate	▲
High	■
No organisms recovered	--

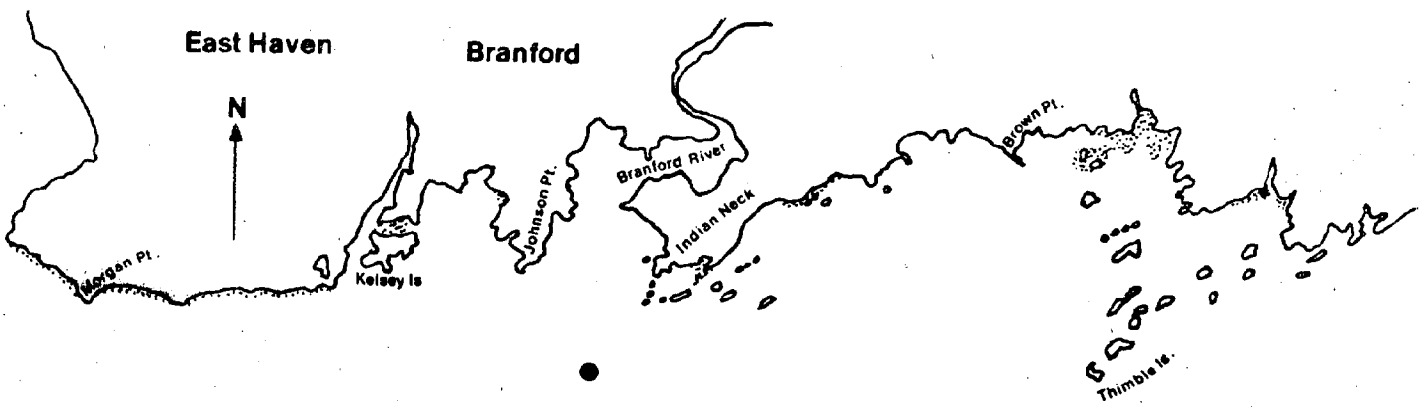

East Haven
Branford
N
Morgan Pt.
Kelsey Is
Johnson Pt.
Branford River
Indian Neck
Brown Pt.
Thimble Is.

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	--	

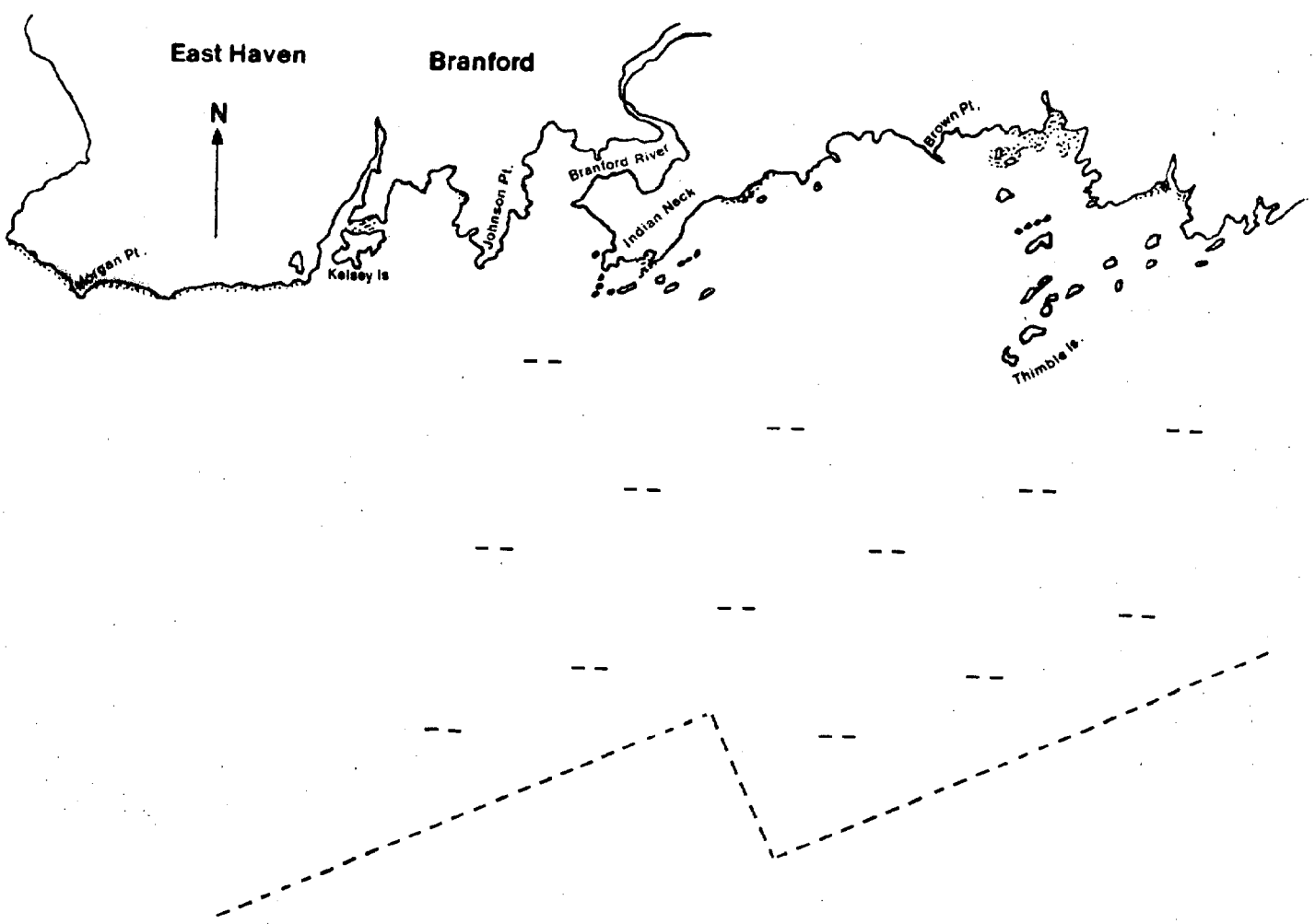

East Haven
Branford
N
Morgan Pt.
Kelsey Is
Johnson Pt.
Branford River
Indian Neck
Brown Pt.
Thimble Is.

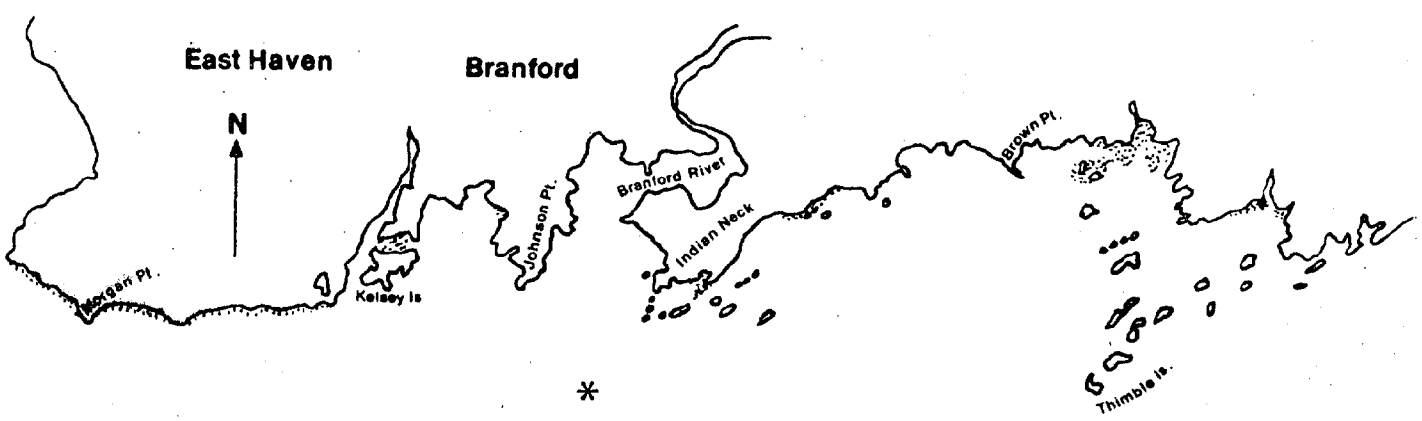
Figure 6B-g

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		--	


East Haven
Branford
N
Morgan Pt.
Kelsey Is
Johnson Pt.
Branford River
Indian Neck
Brown Pt.
Thimble Is.

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 occuring at 62.2% of all sampling stations (Fig. 7c,) while mud occured 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 occured in low, moderate and very high densities at three undesignated stations (Fig. 7f,) with the chowder sized category accounting for the 100% of all individuals.

Razor clams were widely distribuded throughout the region (Fig. 7g) occuring 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

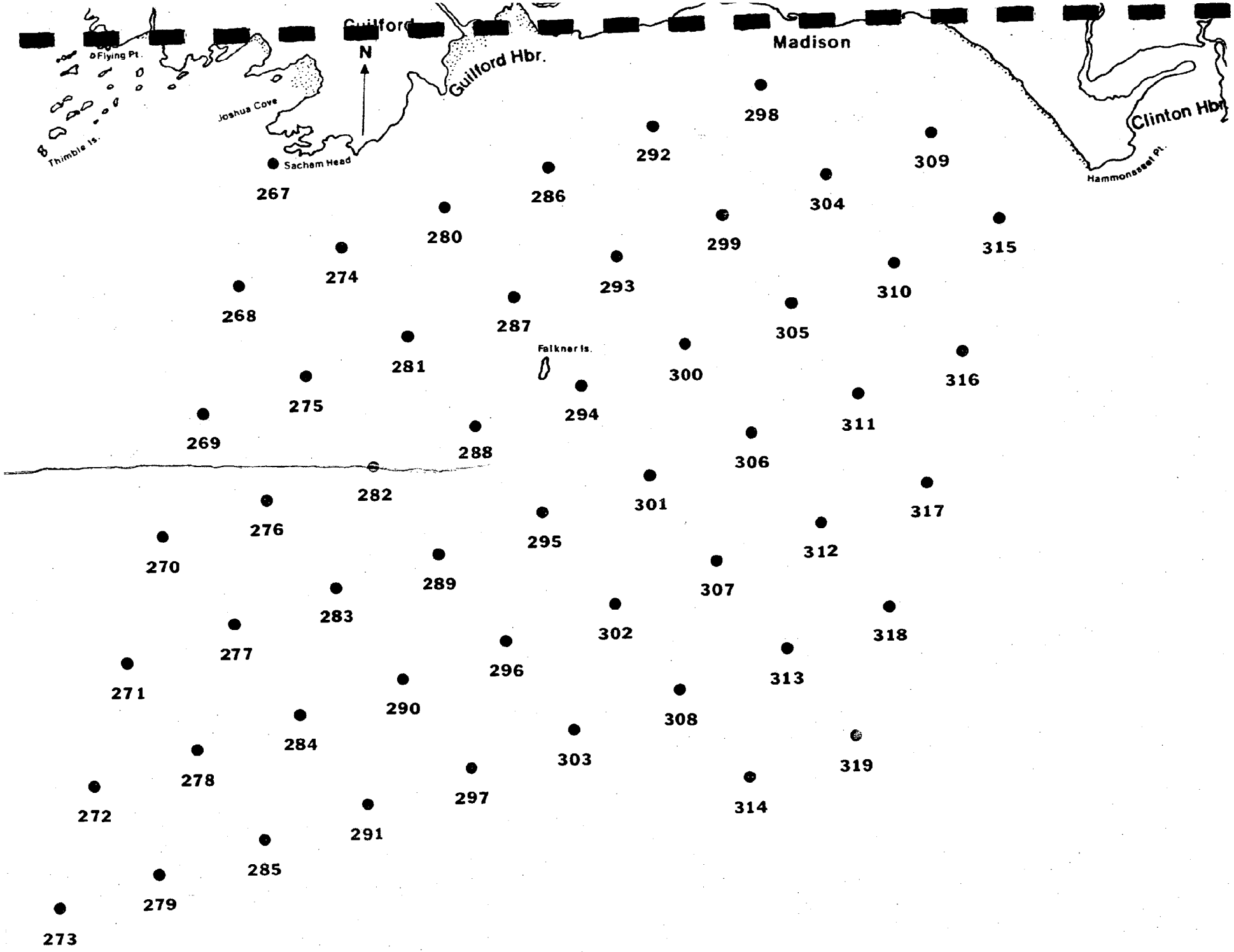

Guilford
Madison
N
Flying Pt.
Joshua Cove
Guilford Hbr.
Clinton Hbr.
Thimble Is.
Sachem Head
Hammonasset Pt.
Falkner Is.
267
268
269
270
271
272
273
274
275
276
277
278
279
280
281
282
283
284
285
286
287
288
289
290
291
292
293
294
295
296
297
298
299
300
301
302
303
304
305
306
307
308
309
310
311
312
313
314
315
316
317
318
319

Figure 7b

DEPTH OF SAMPLING STATIONS (feet) - REGION VII

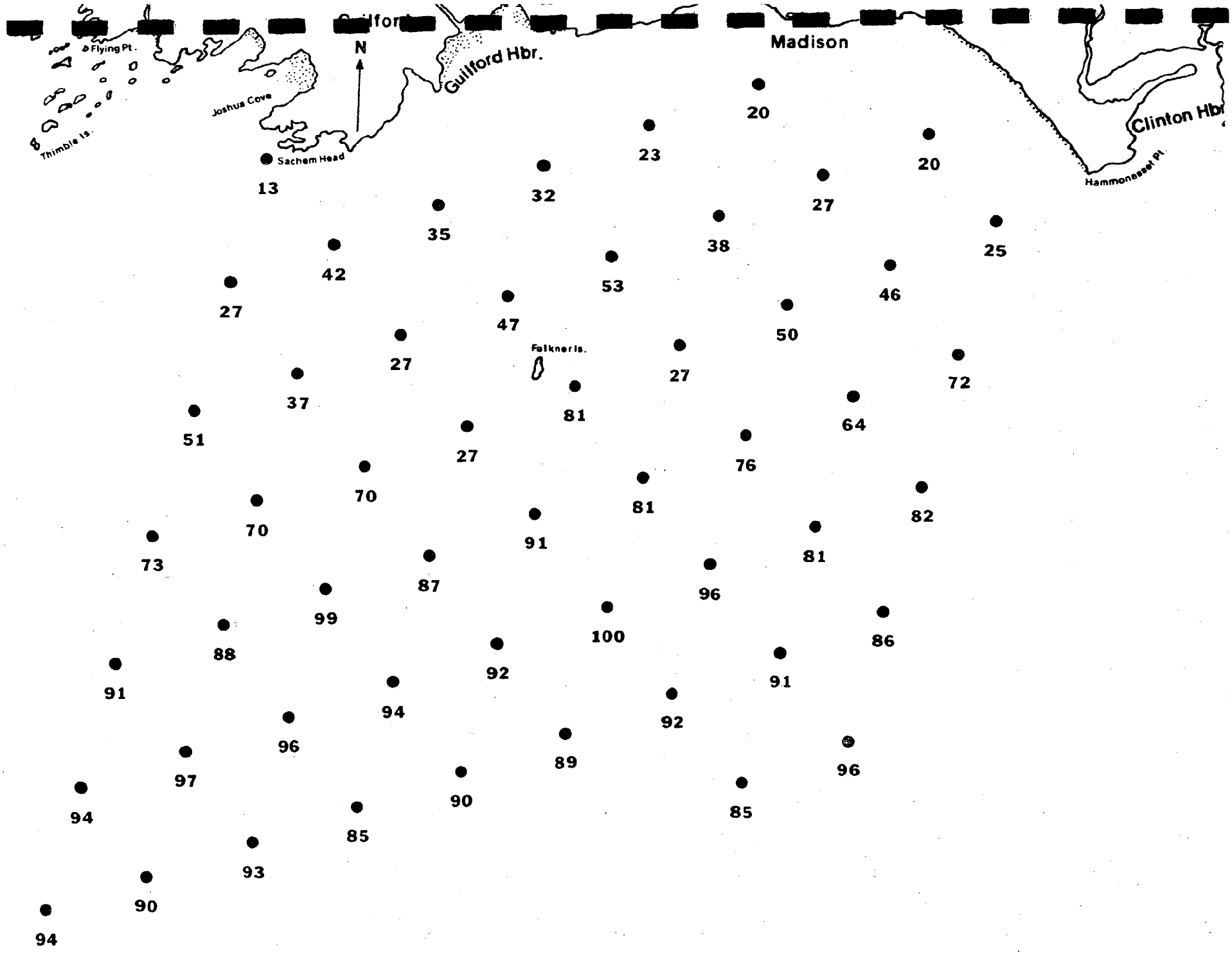

Guilford
Madison
Flying Pt.
Joshua Cove
Thimble Is.
Sachem Head
N
Guilford Hbr.
Clinton Hbr
Hammonasset Pt.
Falkner Is.
13
20
23
20
32
27
35
38
25
42
53
46
27
47
50
27
27
72
37
81
64
51
27
76
70
81
82
70
91
81
73
87
96
99
100
86
88
92
91
91
94
92
96
89
96
97
90
85
94
85
93
90
94

Figure 7c

SUBSTRATE COMPOSITION OF SAMPLING STATIONS - REGION VII

SUBSTRATE KEY

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

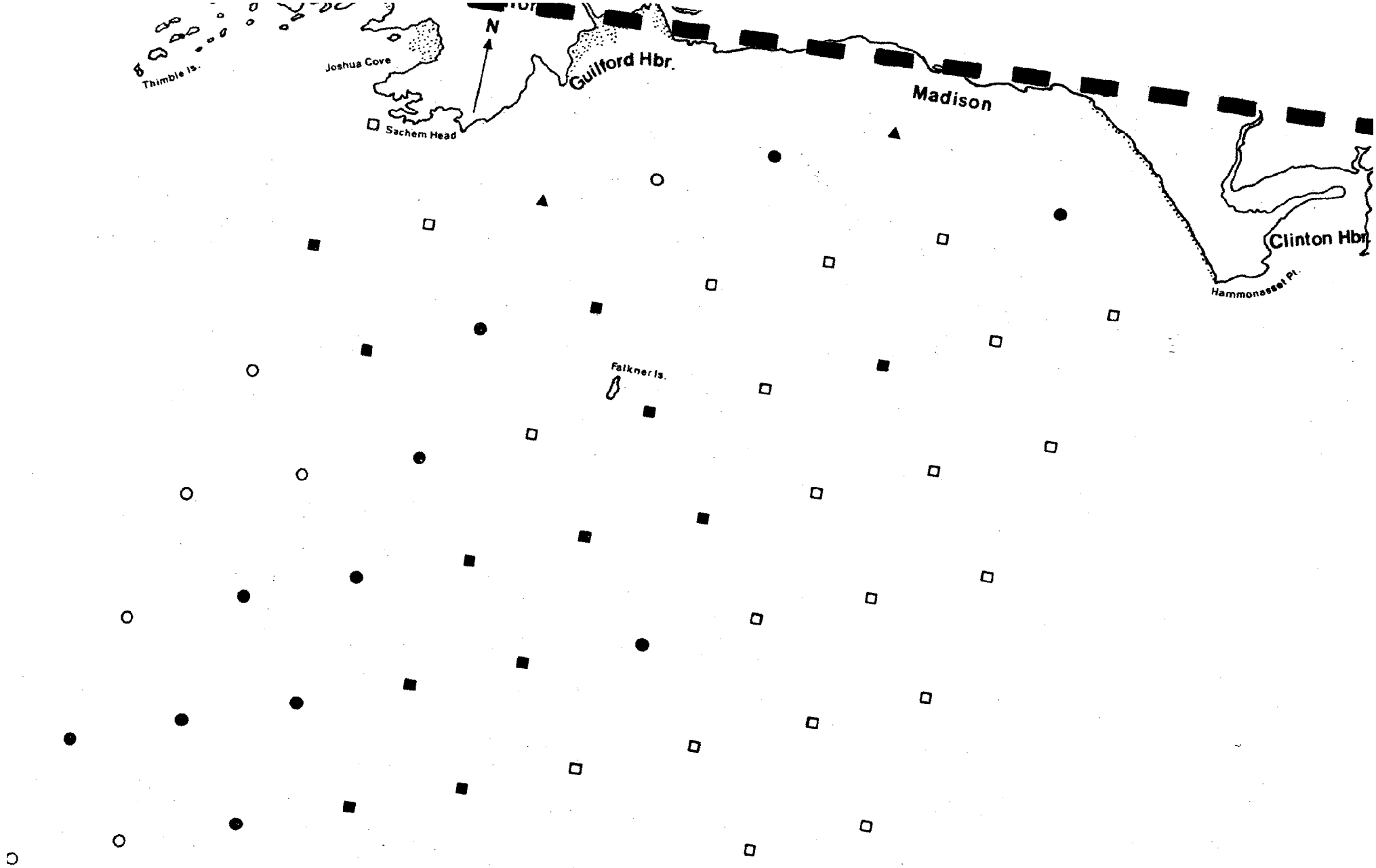

Thimble Is.
Joshua Cove
N
Sachem Head
Guilford Hbr.
Madison
Clinton Hbr.
Hammonasset Pt.
Falkner Is.

Figure 7d

NUMBER OF BENTHIC SPECIES - NUMBER OF INDIVIDUALS

PER GRAB SAMPLE - REGION VII

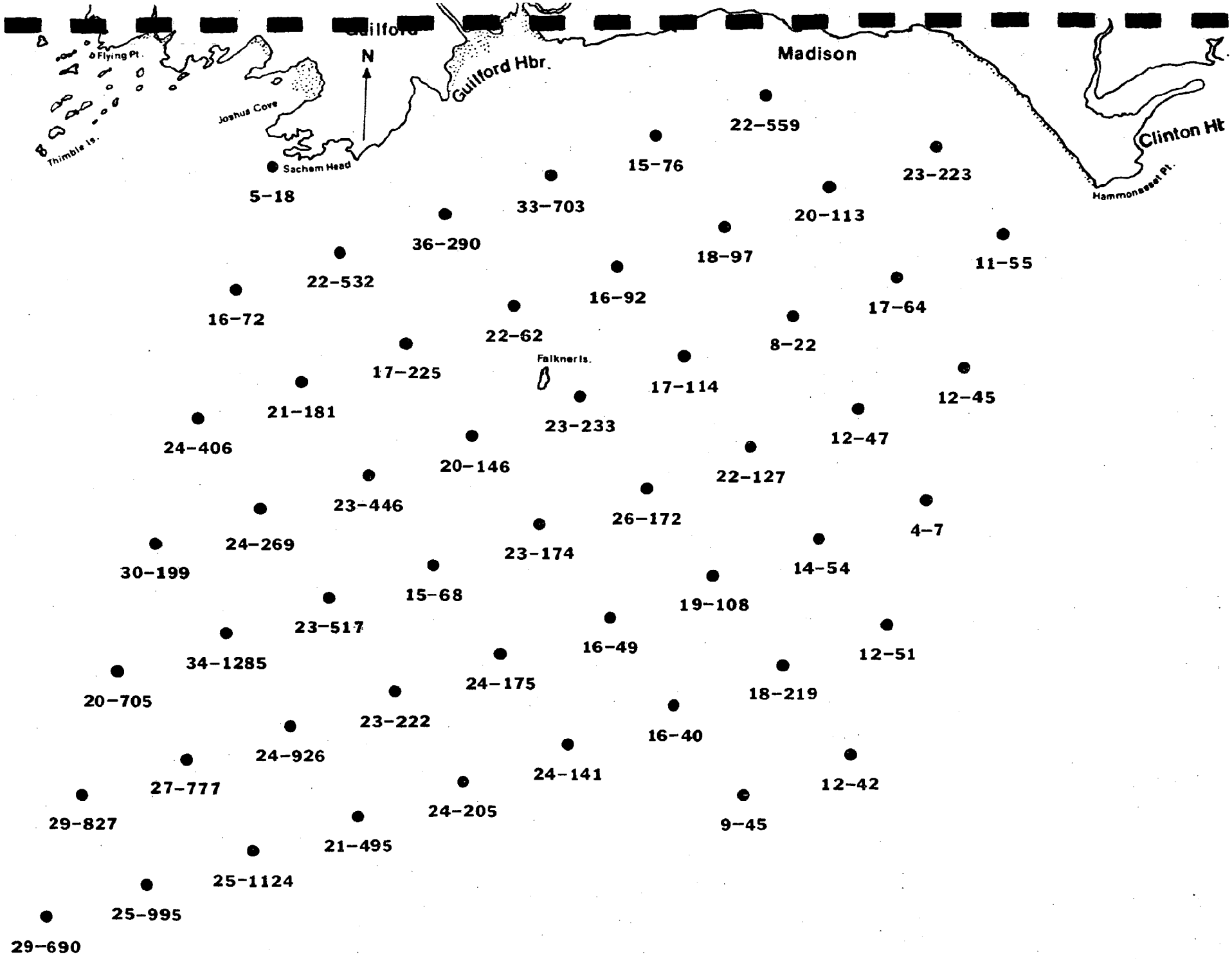

Guilford
Madison
Guilford Hbr.
Clinton Ht
Flying Pt.
Joshua Cove
Thimble Is.
Sachem Head
Hammonasset Pt.
N
Falkner Is.
22-559
15-76
23-223
5-18
33-703
20-113
36-290
18-97
11-55
22-532
16-92
17-64
16-72
22-62
8-22
17-225
17-114
12-45
21-181
23-233
12-47
24-406
20-146
22-127
23-446
26-172
4-7
24-269
23-174
14-54
30-199
15-68
19-108
23-517
16-49
12-51
34-1285
24-175
18-219
20-705
23-222
16-40
24-926
24-141
12-42
27-777
24-205
9-45
29-827
21-495
25-1124
25-995
29-690

Figure 7e

BENTHIC SPECIES DIVERSITY CATEGORIES - REGION VII

<u>DIVERSITY KEY</u>

Low	●
Moderate	▲
High	■
No organisms recovered	--

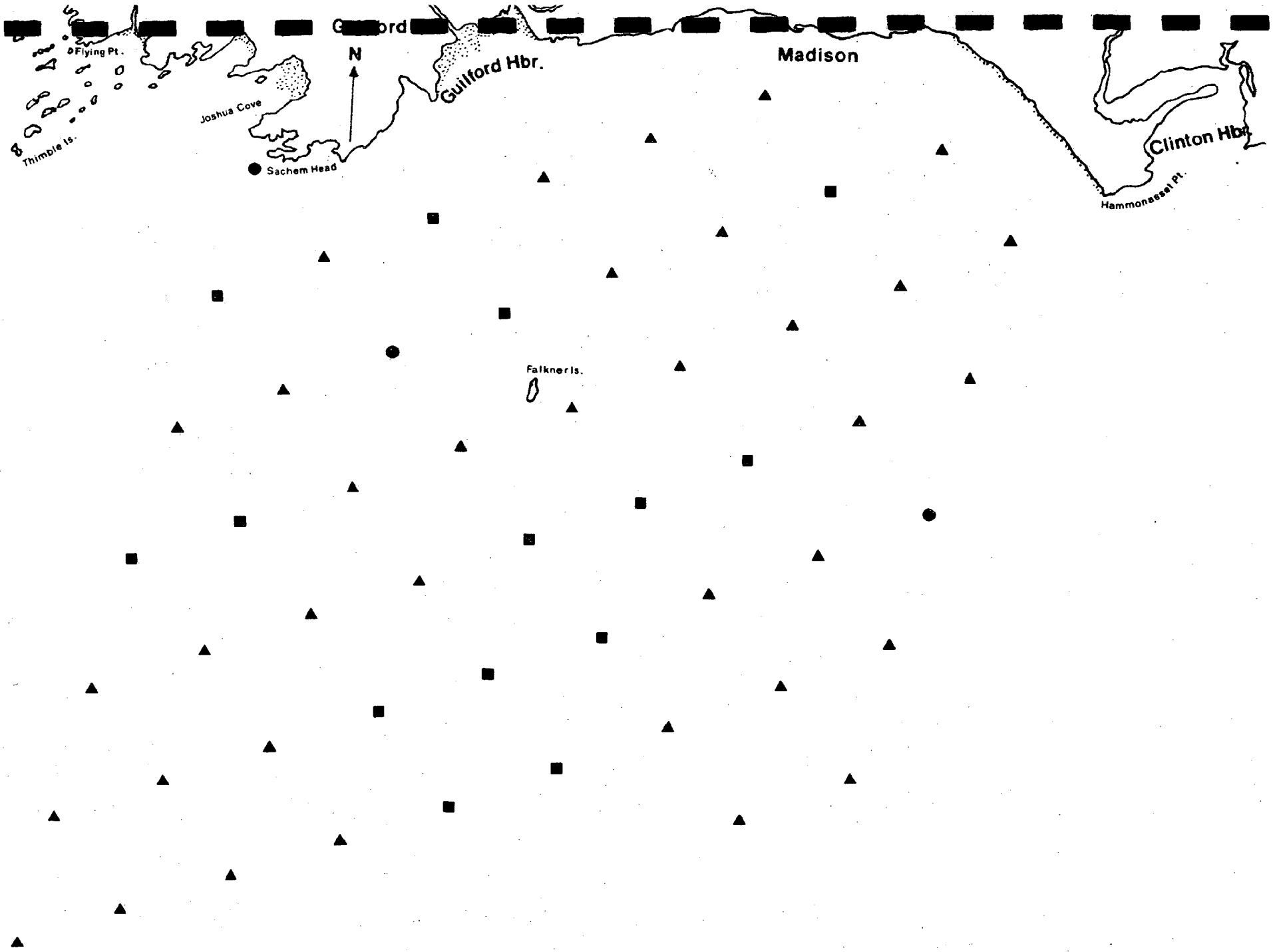

Guilford
Madison
Flying Pt.
Thimble Is.
Joshua Cove
N
Guilford Hbr.
Sachem Head
Clinton Hbr.
Hammonasset Pt.
Falkner Is.

Figure 7f

EASTERN OYSTER AND HARD CLAM

ABUNDANCE CATEGORIES - REGION VII

CLAM-OYSTER KEY

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

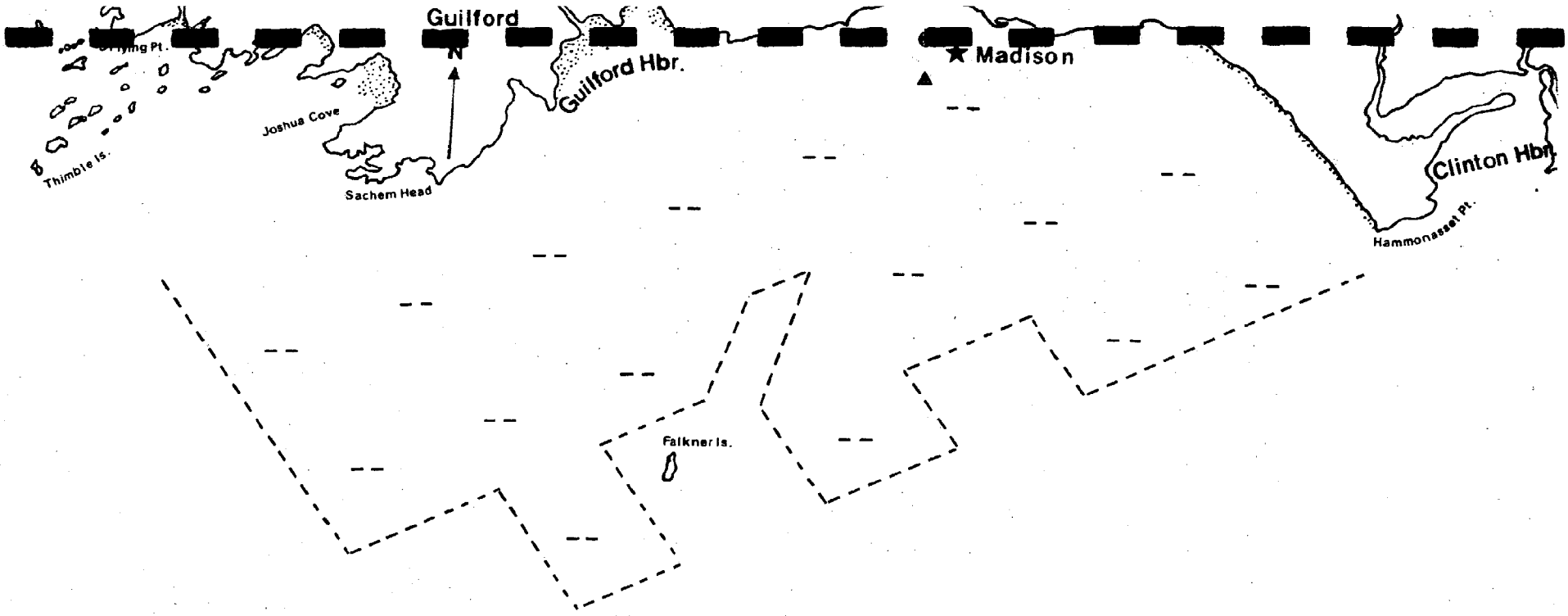

Guilford
N
Madison
Guilford Hbr.
Joshua Cove
Thimble Is.
Sachem Head
Clinton Hbr.
Hammonasset Pt.
Falkner Is.

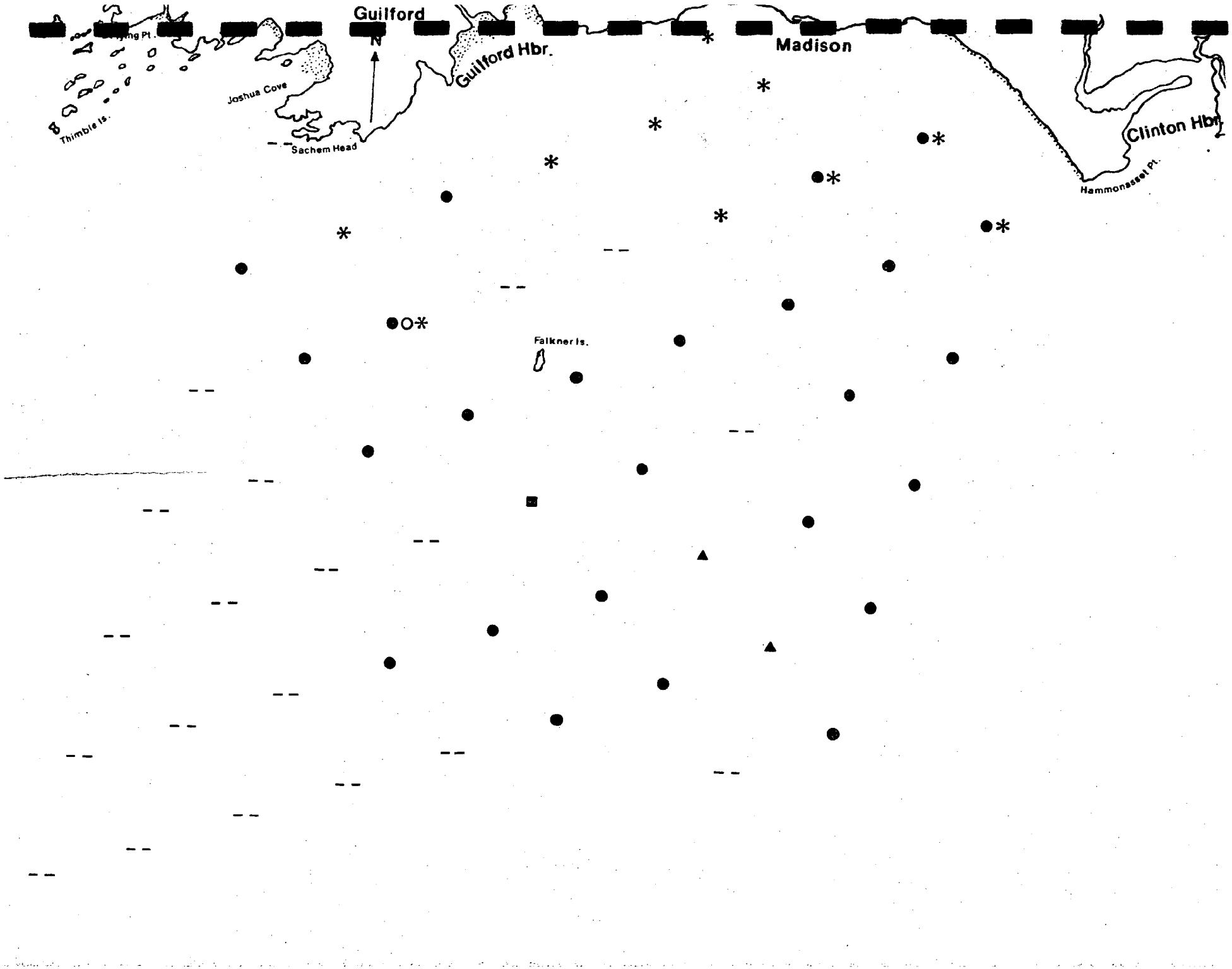
Figure 7g

ABUNDANCE CATEGORIES FOR MISCELLANEOUS

SHELLFISH SPECIES - REGION VII

MISCELLANEOUS SHELLFISH KEY

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


Guilford
N
Madison
Guilford Hbr.
Joshua Cove
Thimble Is.
Sachem Head
Clinton Hbr
Hammonasset Pt.
Falkner Is.

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 millsi. 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 occured in low numbers in Region VIII.

Figure 8a

SAMPLING STATION POSITIONS - REGION VIII

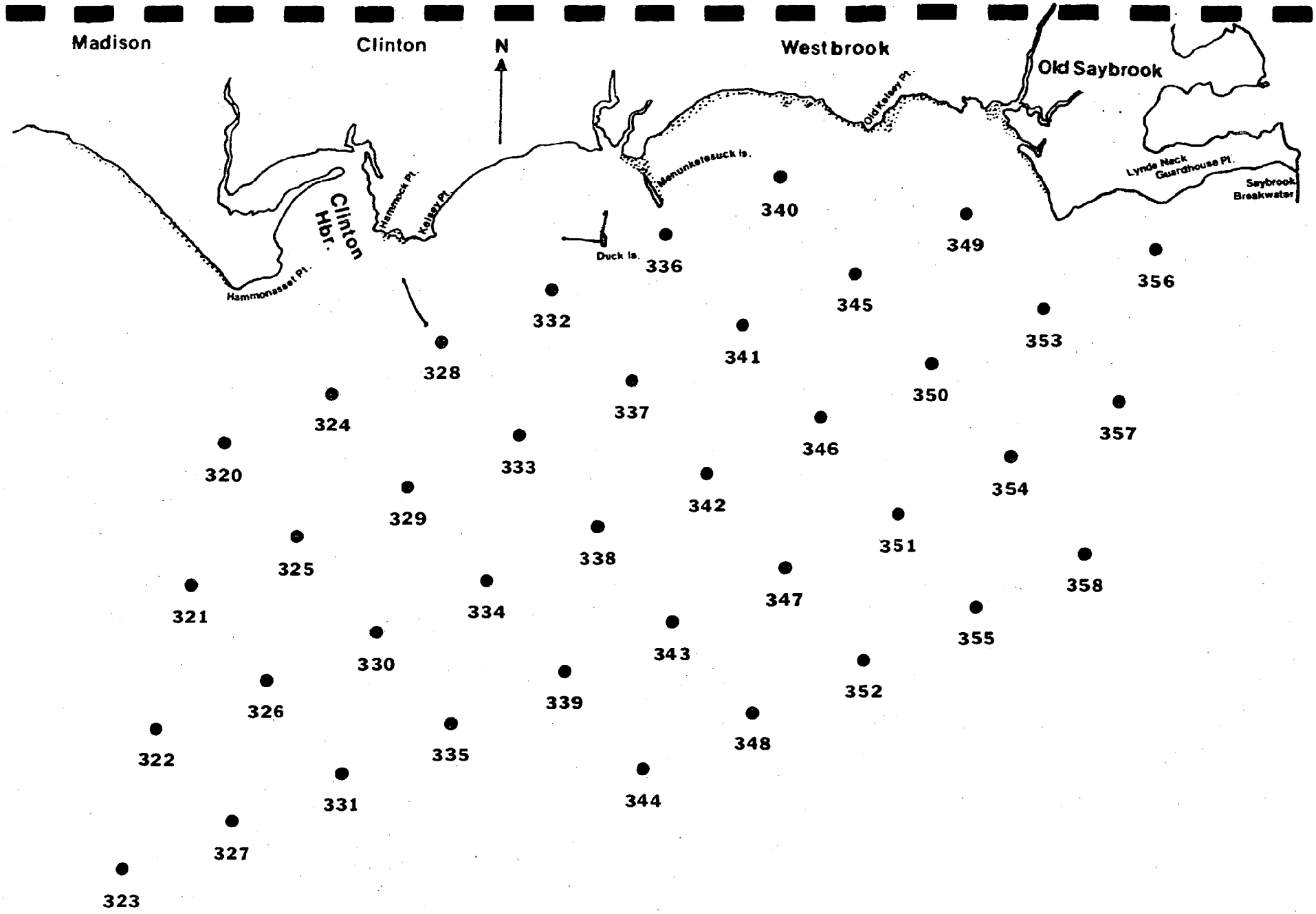

Madison
Clinton
N
Westbrook
Old Saybrook
Old Kelsey Pt.
Menunketesuck Is.
Lynde Neck
Guardhouse Pt.
Saybrook Breakwater
Clinton Hbr.
Hammock Pt.
Kelsey Pt.
Hammonasset Pt.
Duck Is.
320
321
322
323
324
325
326
327
328
329
330
331
332
333
334
335
336
337
338
339
340
341
342
343
344
345
346
347
348
349
350
351
352
353
354
355
356
357
358

Figure 8b

DEPTH OF SAMPLING STATIONS (feet) - REGION VIII

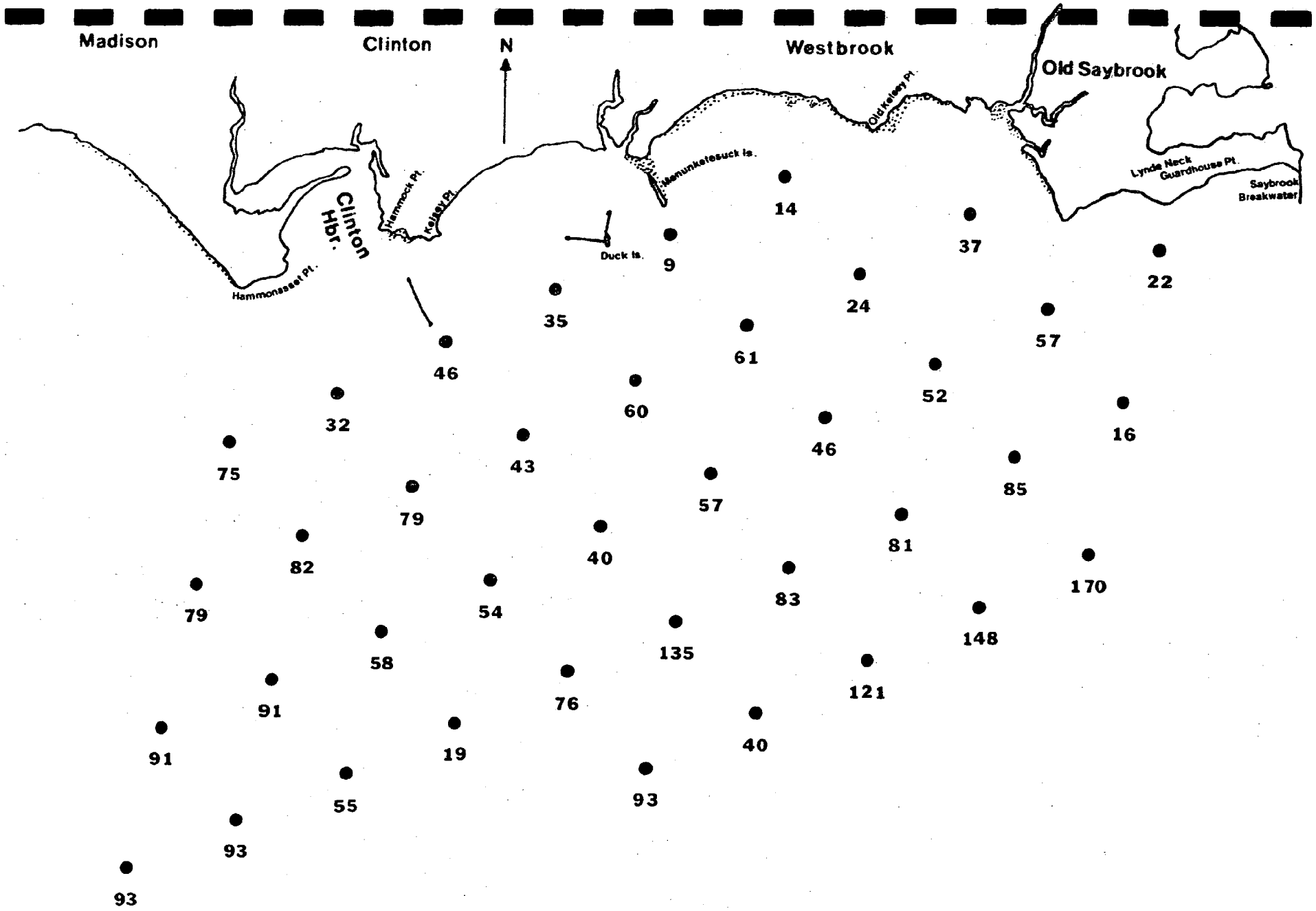

Madison
Clinton
N
Westbrook
Old Saybrook
Old Kelsey Pt.
Menunketesuck Is.
Lynde Neck
Guardhouse Pt.
Saybrook
Breakwater
Clinton
Hbr.
Hammock Pt.
Kelsey Pt.
Duck Is.
Hammonasset Pt.
14
37
22
9
24
35
57
61
46
52
60
32
16
46
75
43
85
57
79
81
40
82
170
83
79
54
148
135
58
121
76
91
40
91
19
93
55
93
93

Figure 8c

SUBSTRATE COMPOSITION OF SAMPLING STATIONS - REGION VIII

SUBSTRATE KEY

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

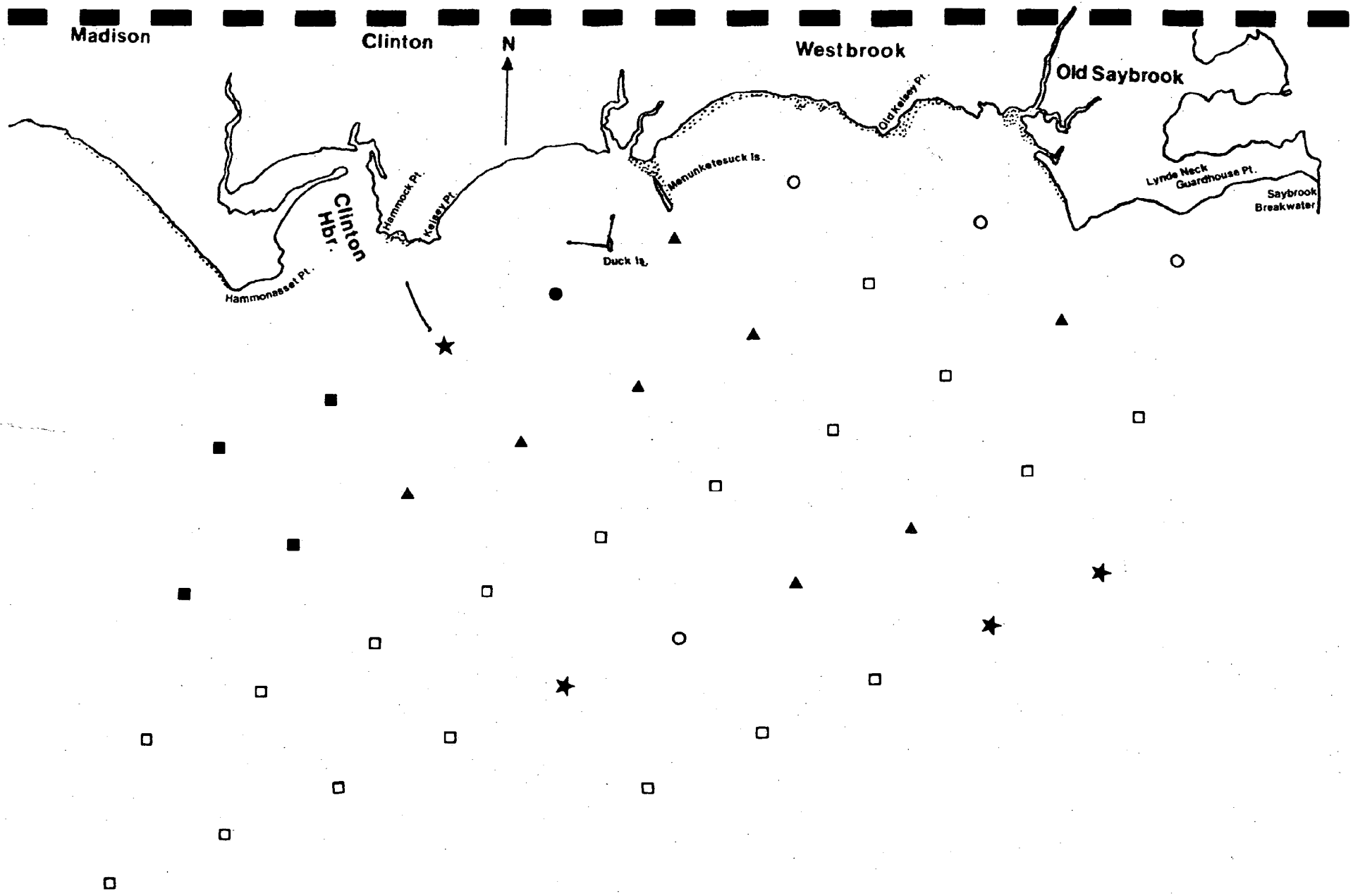

Madison
Clinton
N
Westbrook
Old Saybrook
Old Kelsey Pt.
Menunketesuck Is.
Lynde Neck
Guardhouse Pt.
Saybrook
Breakwater
Hammock Pt.
Kelsey Pt.
Clinton
Hbr.
Duck Is.
Hammonasset Pt.

Figure 8d

NUMBER OF BENTHIC SPECIES - NUMBER OF INDIVIDUALS

PER GRAB SAMPLE - REGION VIII

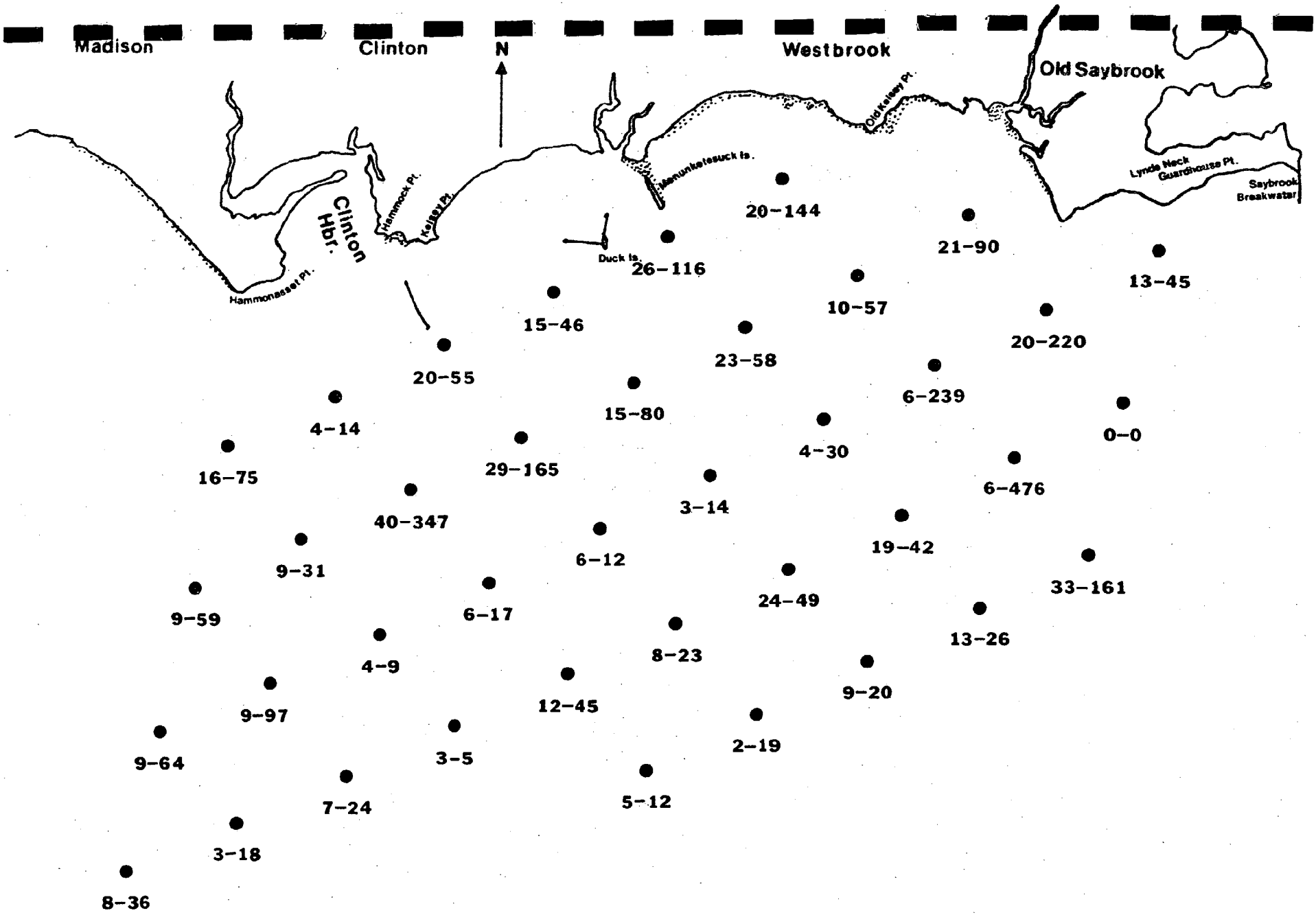

Madison
Clinton
N
Westbrook
Old Saybrook
Old Kelsey Pt.
Menunketesuck Is.
Lynde Neck
Guardhouse Pt.
Saybrook
Breakwater
Clinton
Hbr.
Hammock Pt.
Kelsey Pt.
Duck Is.
Hammonasset Pt.
20-144
21-90
13-45
26-116
10-57
15-46
20-220
23-58
20-55
6-239
15-80
0-0
4-14
4-30
29-165
6-476
16-75
3-14
40-347
19-42
6-12
9-31
33-161
24-49
6-17
9-59
13-26
8-23
4-9
9-20
12-45
9-97
2-19
3-5
9-64
5-12
7-24
3-18
8-36

Figure 8e

BENTHIC SPECIES DIVERSITY CATEGORIES - REGION VIII

DIVERSITY KEY

Low	●
Moderate	▲
High	■
No organisms recovered	--

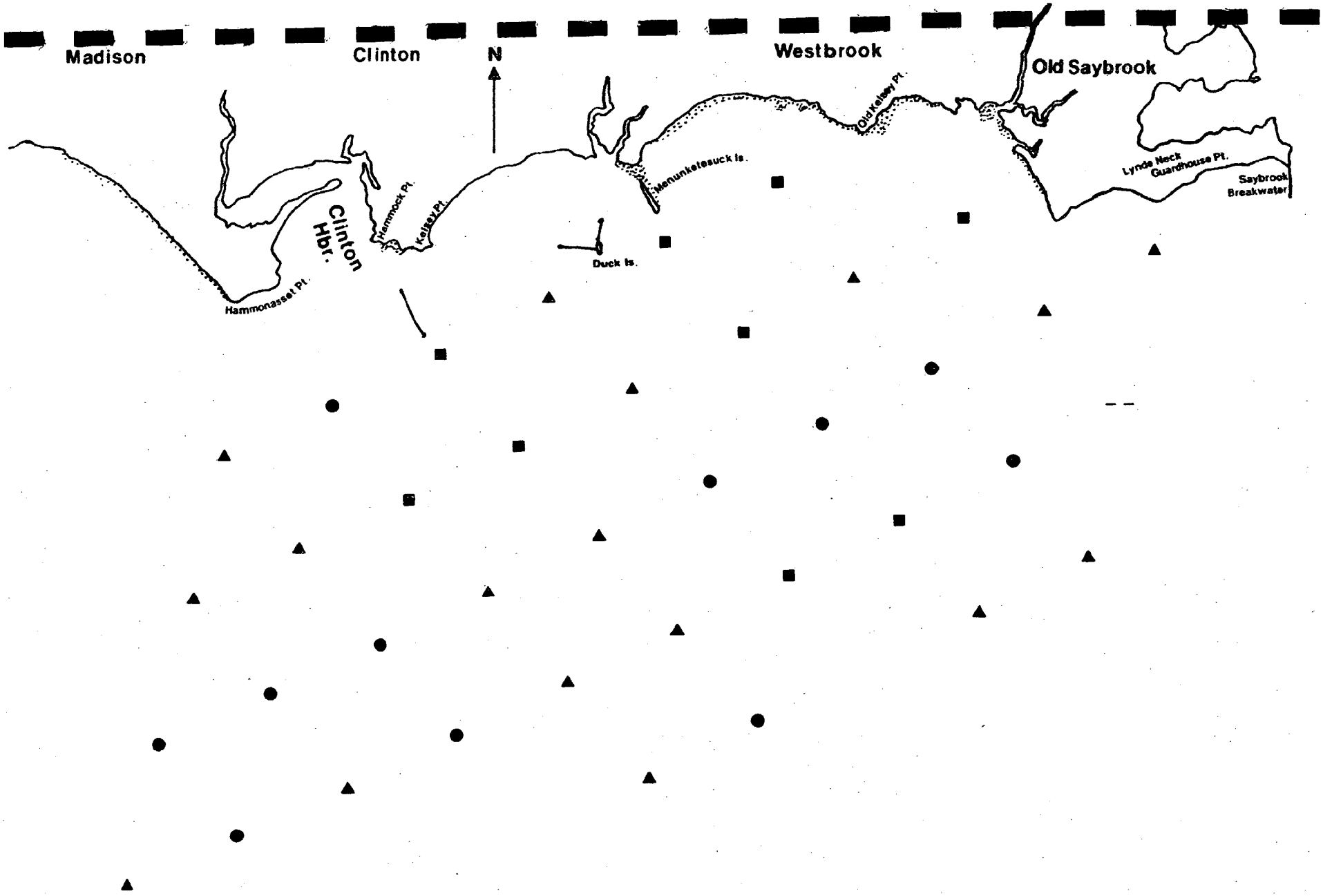

Madison
Clinton
N
Westbrook
Old Saybrook
Old Kelsey Pt.
Menunketesuck Is.
Lynde Neck
Guardhouse Pt.
Saybrook
Breakwater
Hammock Pt.
Kelsey Pt.
Clinton
Hbr.
Duck Is.
Hammonasset Pt.

Figure 8f

EASTERN OYSTER AND HARD CLAM

ABUNDANCE CATEGORIES - REGION VIII

CLAM-OYSTER KEY

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

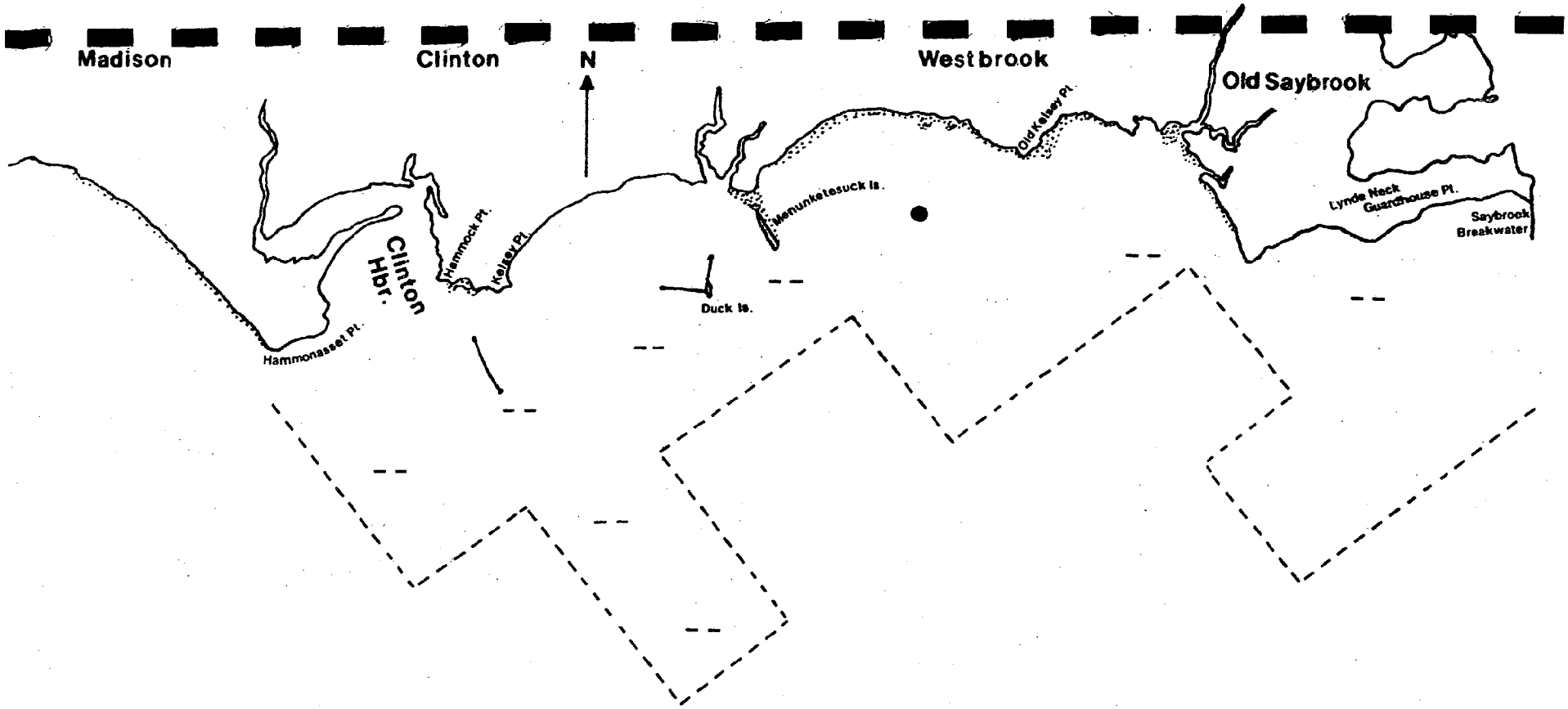

Madison
Clinton
N
Westbrook
Old Saybrook
Old Kelsey Pt.
Menunketesuck Is.
Lynde Neck
Guardhouse Pt.
Saybrook
Breakwater
Hammock Pt.
Kelsey Pt.
Clinton
Hbr.
Duck Is.
Hammonasset Pt.

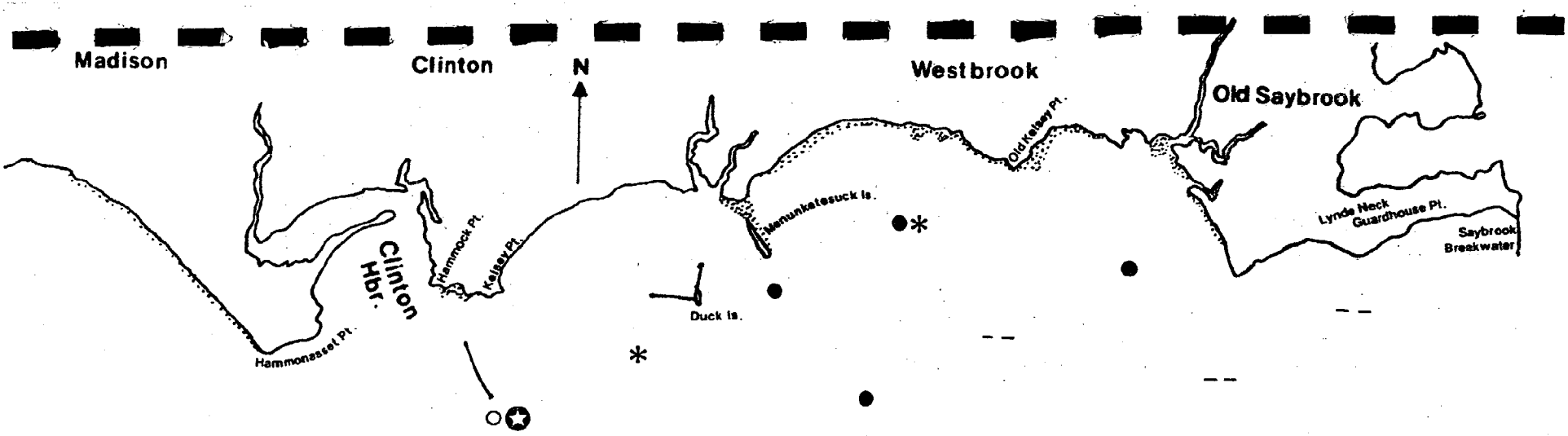
Figure 8g

ABUNDANCE CATEGORIES FOR MISCELLANEOUS

SHELLFISH SPECIES - REGION VIII

MISCELLANEOUS SHELLFISH KEY

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


Madison
Clinton
N
Westbrook
Old Saybrook
Old Kelsey Pt.
Menunketesuck Is.
Lynde Neck
Guardhouse Pt.
Saybrook
Breakwater
Clinton
Hbr.
Hammock Pt.
Kelsey Pt.
Duck Is.
Hammonasset Pt.

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 occuring 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 occuring at Station #386 and very high numbers at Station #376. Steamer clams (Station #393) and whelks (Stations #368, #374, #384 and #387) also occured in low abundance within the region.

Figure 9a

SAMPLING STATION POSITIONS - REGION IX

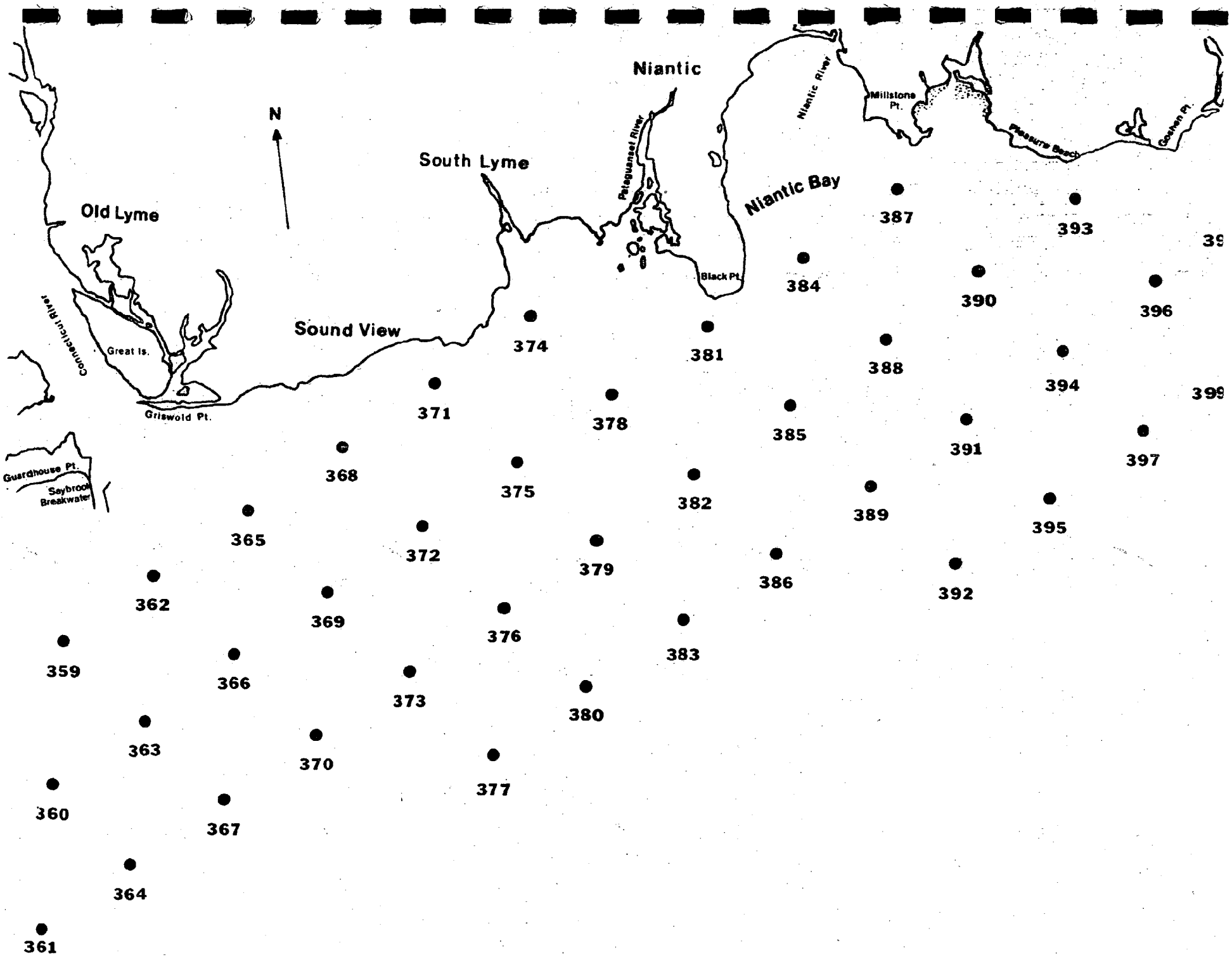

N
Old Lyme
South Lyme
Niantic
Niantic River
Pataguanset River
Niantic Bay
Millstone Pt.
Pleasure Beach
Goshen Pt.
Black Pt.
Sound View
Connecticut River
Great Is.
Griswold Pt.
Guardhouse Pt.
Saybrook Breakwater
359
360
361
362
363
364
365
366
367
368
369
370
371
372
373
374
375
376
377
378
379
380
381
382
383
384
385
386
387
388
389
390
391
392
393
394
395
396
397
39
399

Figure 9b

DEPTH OF SAMPLING STATIONS (feet) - REGION IX

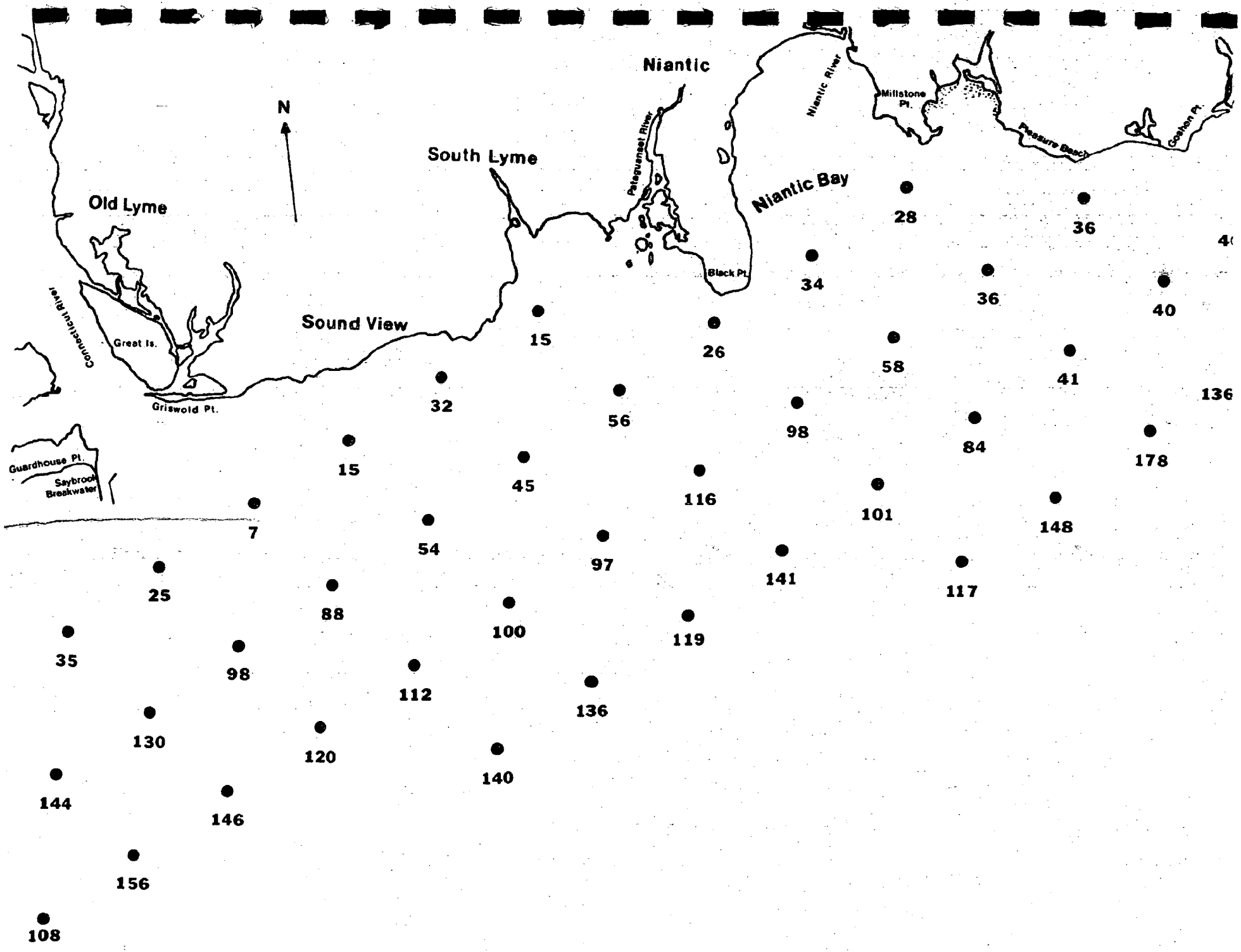

N
Niantic
Niantic River
Millstone Pt.
Pleasure Beach
Goshen Pt.
South Lyme
Pataguanset River
Niantic Bay
Old Lyme
Black Pt.
Sound View
Connecticut River
Great Is.
Griswold Pt.
Guardhouse Pt.
Saybrook Breakwater
28
36
34
36
40
15
26
58
41
136
32
56
98
84
178
15
45
116
101
148
7
54
97
141
117
25
88
100
119
35
98
112
136
130
120
140
144
146
156
108

Figure 9c

SUBSTRATE COMPOSITION OF SAMPLING STATIONS - REGION IX

SUBSTRATE KEY

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

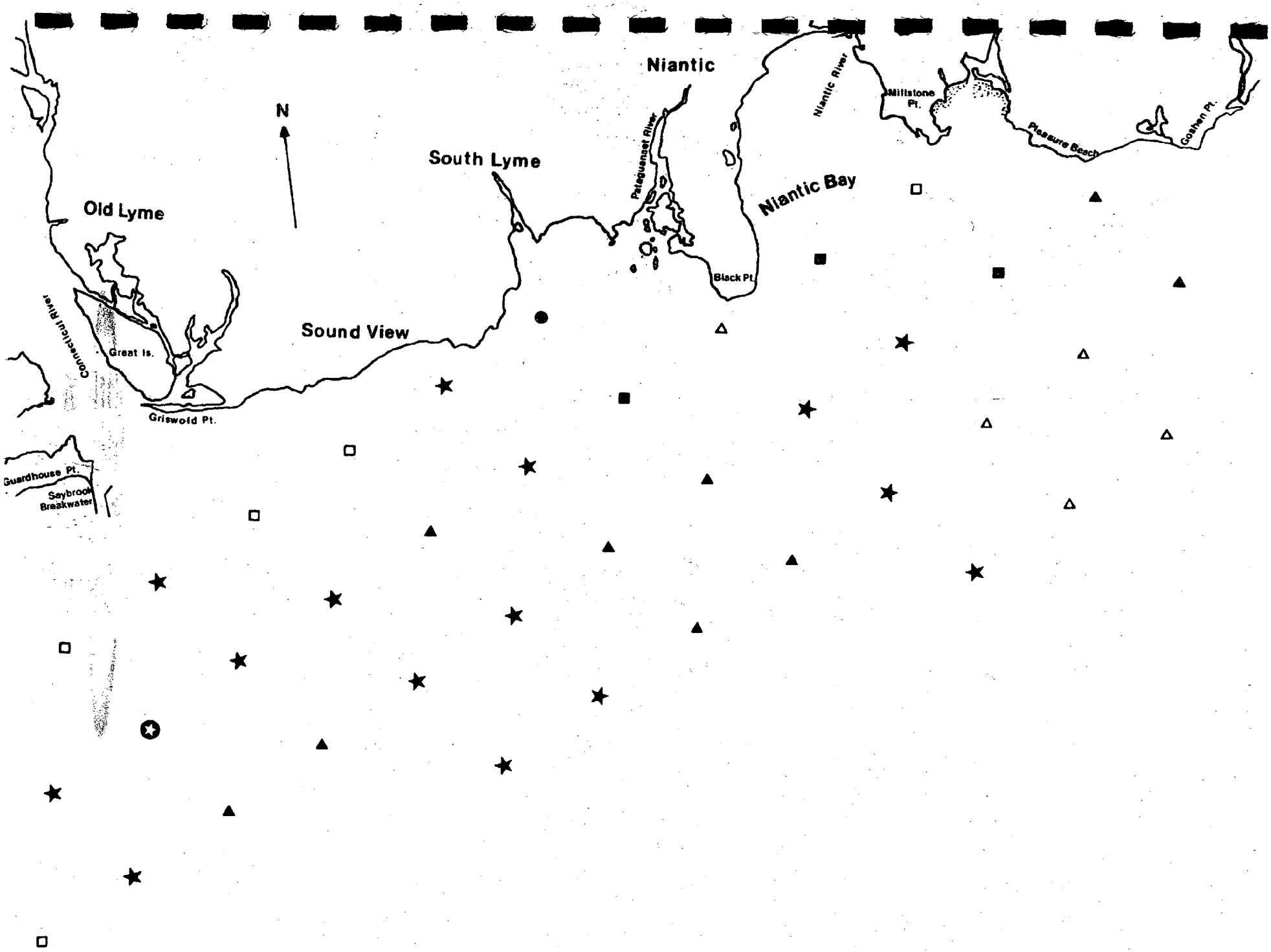

Niantic
N
South Lyme
Old Lyme
Pataguanset River
Niantic River
Millstone Pt.
Pleasure Beach
Goshen Pt.
Niantic Bay
Black Pt.
Sound View
Connecticut River
Great Is.
Griswold Pt.
Guardhouse Pt.
Saybrook Breakwater

Figure 9d

NUMBER OF BENTHIC SPECIES - NUMBER OF INDIVIDUALS

PER GRAB SAMPLE - REGION IX

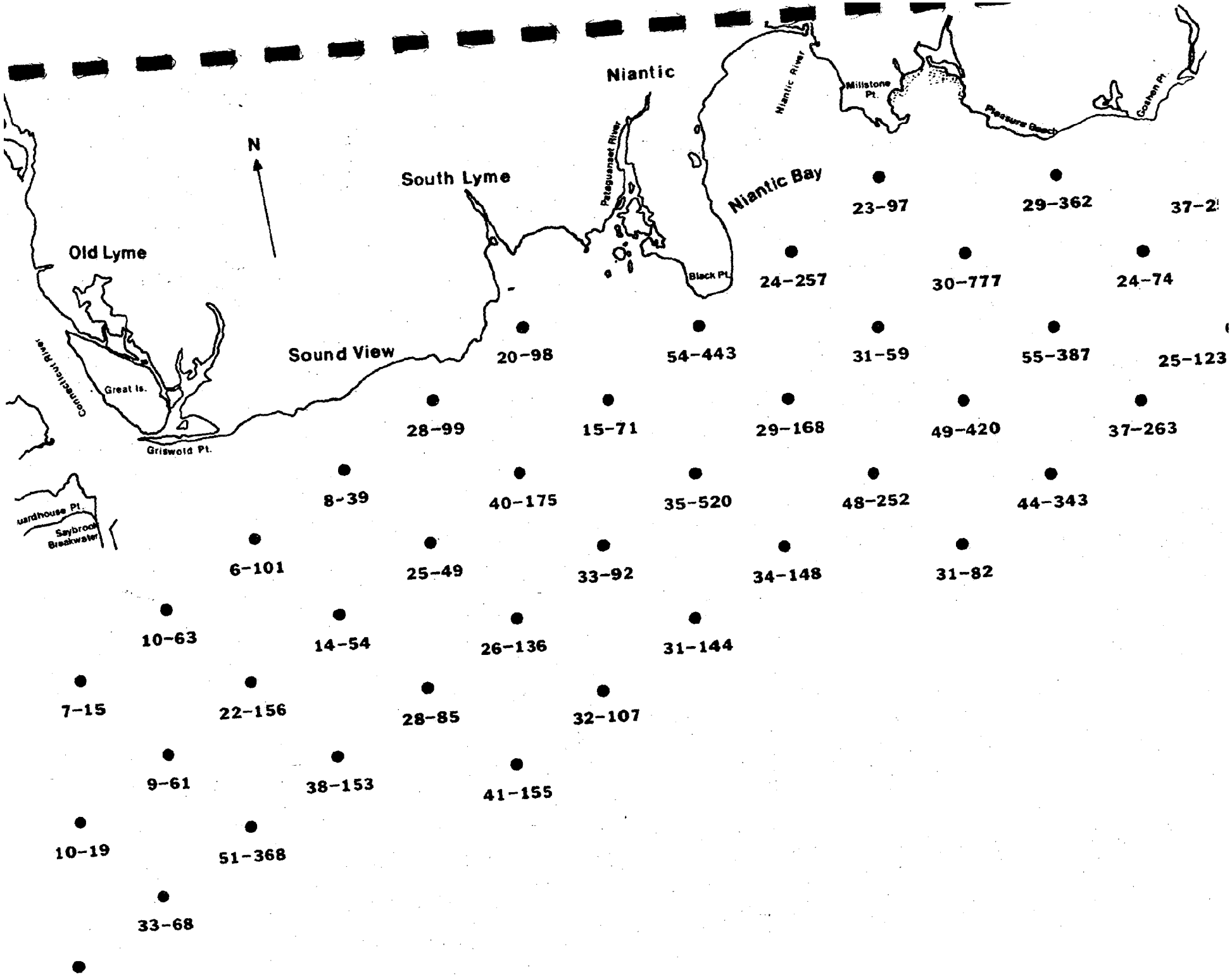
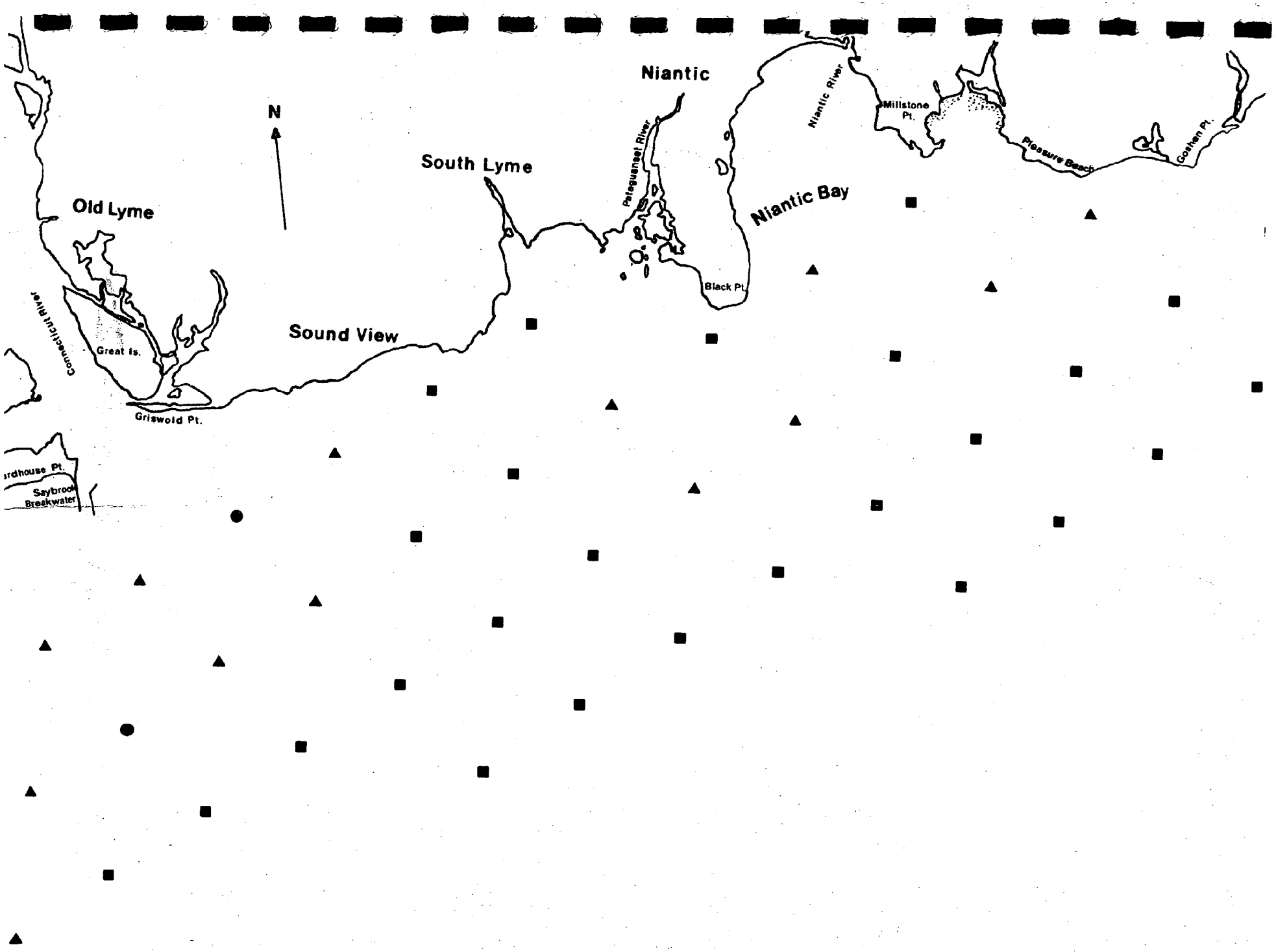

Niantic
N
South Lyme
Old Lyme
Niantic Bay
Niantic River
Millstone Pt.
Pleasure Beach
Goshen Pt.
Pataguanset River
Black Pt.
Sound View
Great Is.
Connecticut River
Griswold Pt.
Saybrook Breakwater
23-97
29-362
37-2
24-257
30-777
24-74
20-98
54-443
31-59
55-387
25-123
28-99
15-71
29-168
49-420
37-263
8-39
40-175
35-520
48-252
44-343
6-101
25-49
33-92
34-148
31-82
10-63
14-54
26-136
31-144
7-15
22-156
28-85
32-107
9-61
38-153
41-155
10-19
51-368
33-68

Figure 9e

BENTHIC SPECIES DIVERSITY CATEGORIES - REGION IX

DIVERSITY KEY

Low	●
Moderate	▲
High	■
No organisms recovered	- -



Niantic
N
South Lyme
Old Lyme
Pataguanset River
Niantic River
Millstone Pt.
Pleasure Beach
Goshen Pt.
Niantic Bay
Black Pt.
Sound View
Connecticut River
Great Is.
Griswold Pt.
rdhouse Pt.
Saybrook Breakwater

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	--	

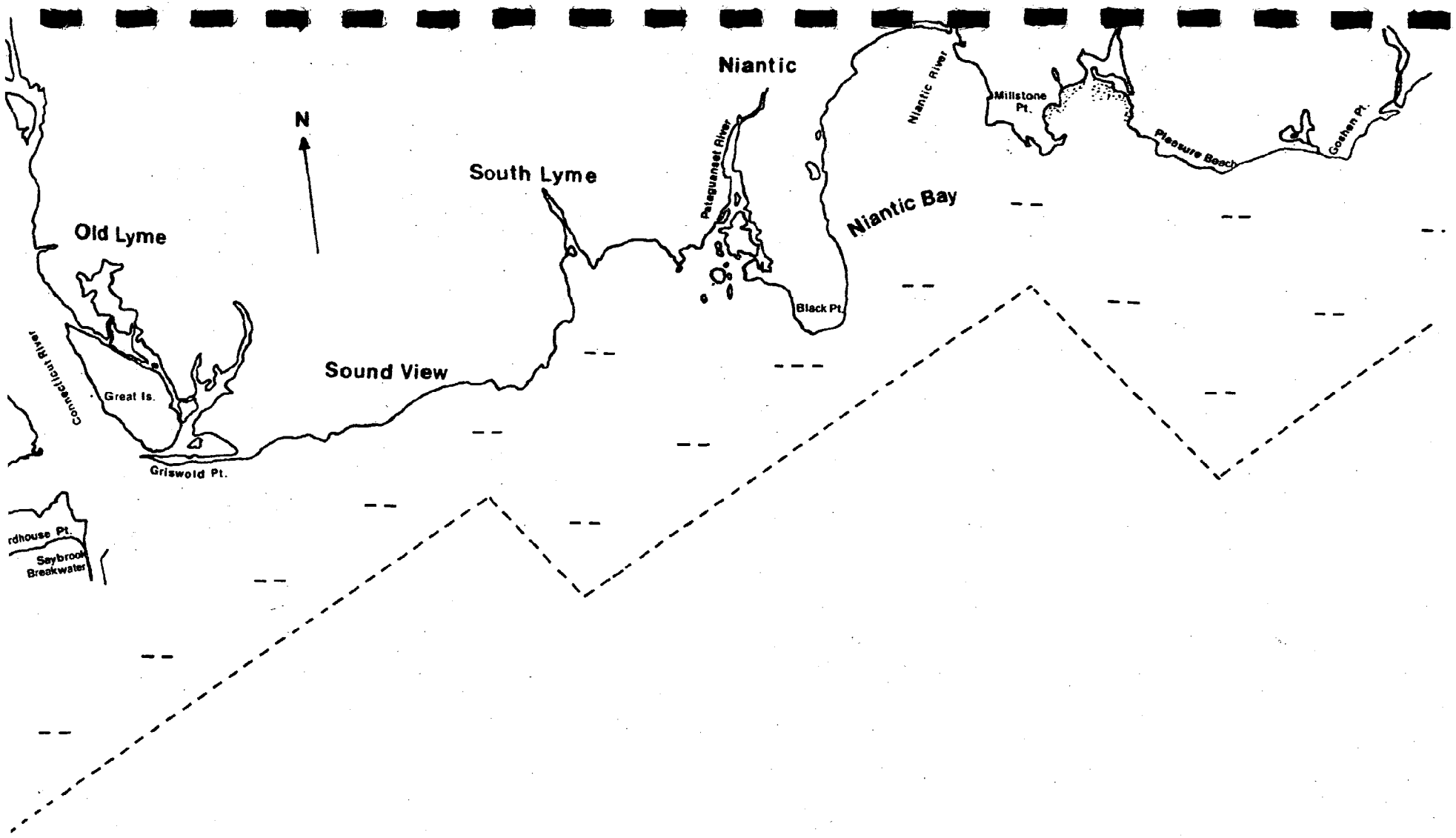

N
Old Lyme
Connecticut River
Great Is.
Griswold Pt.
Sound View
South Lyme
Niantic
Pataguanset River
Black Pt.
Niantic Bay
Niantic River
Millstone Pt.
Pleasure Beach
Goshen Pt.
rdhouse Pt.
Saybrook Breakwater

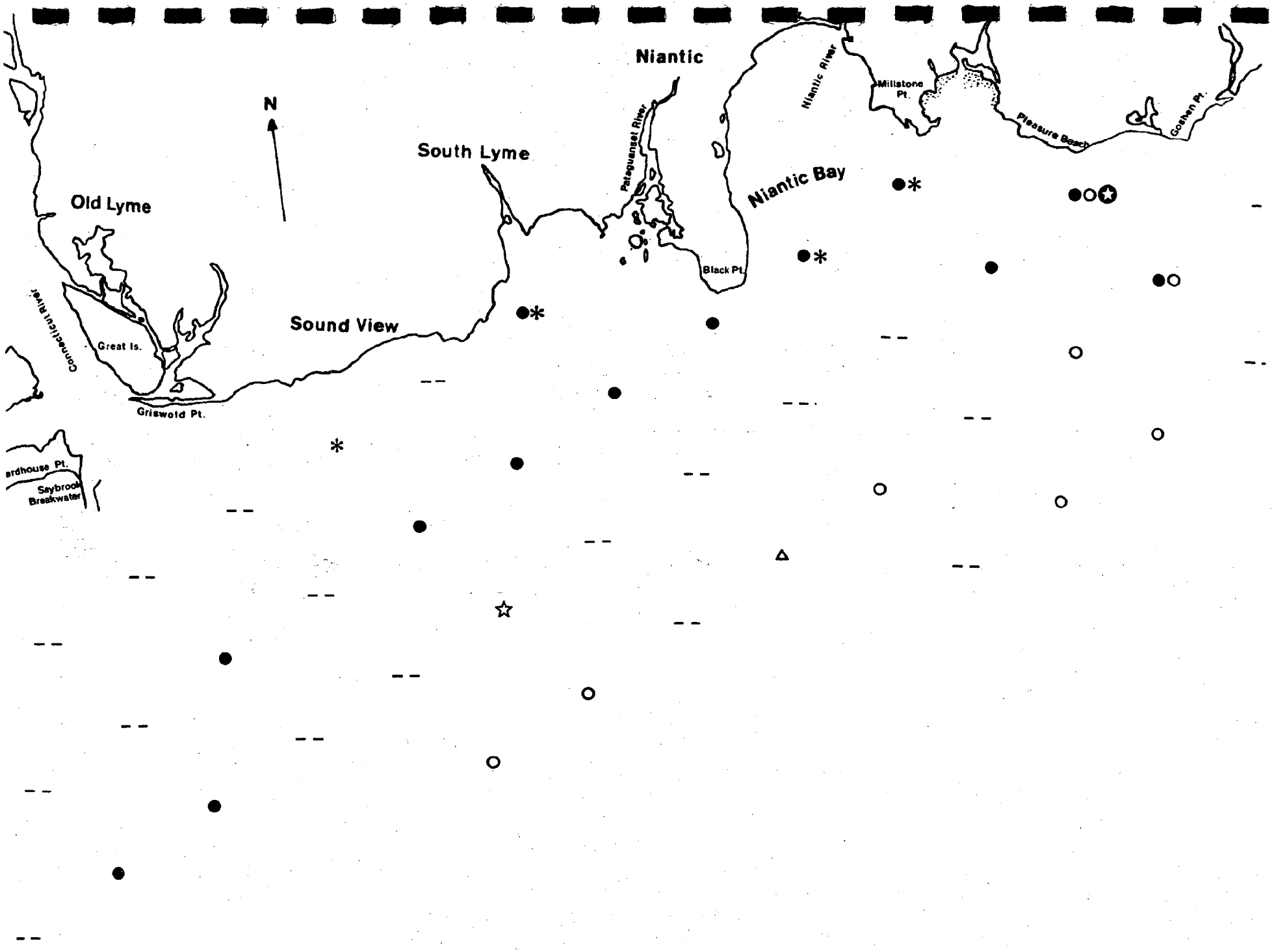
Figure 9g

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		--	


Niantic
N
South Lyme
Old Lyme
Pataguanset River
Niantic River
Millstone Pt.
Pleasure Beach
Goshen Pt.
Niantic Bay
Black Pt.
Sound View
Connecticut River
Great Is.
Griswold Pt.
Seybrook Breakwater

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 occuring 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, Cirratulis 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 occured 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

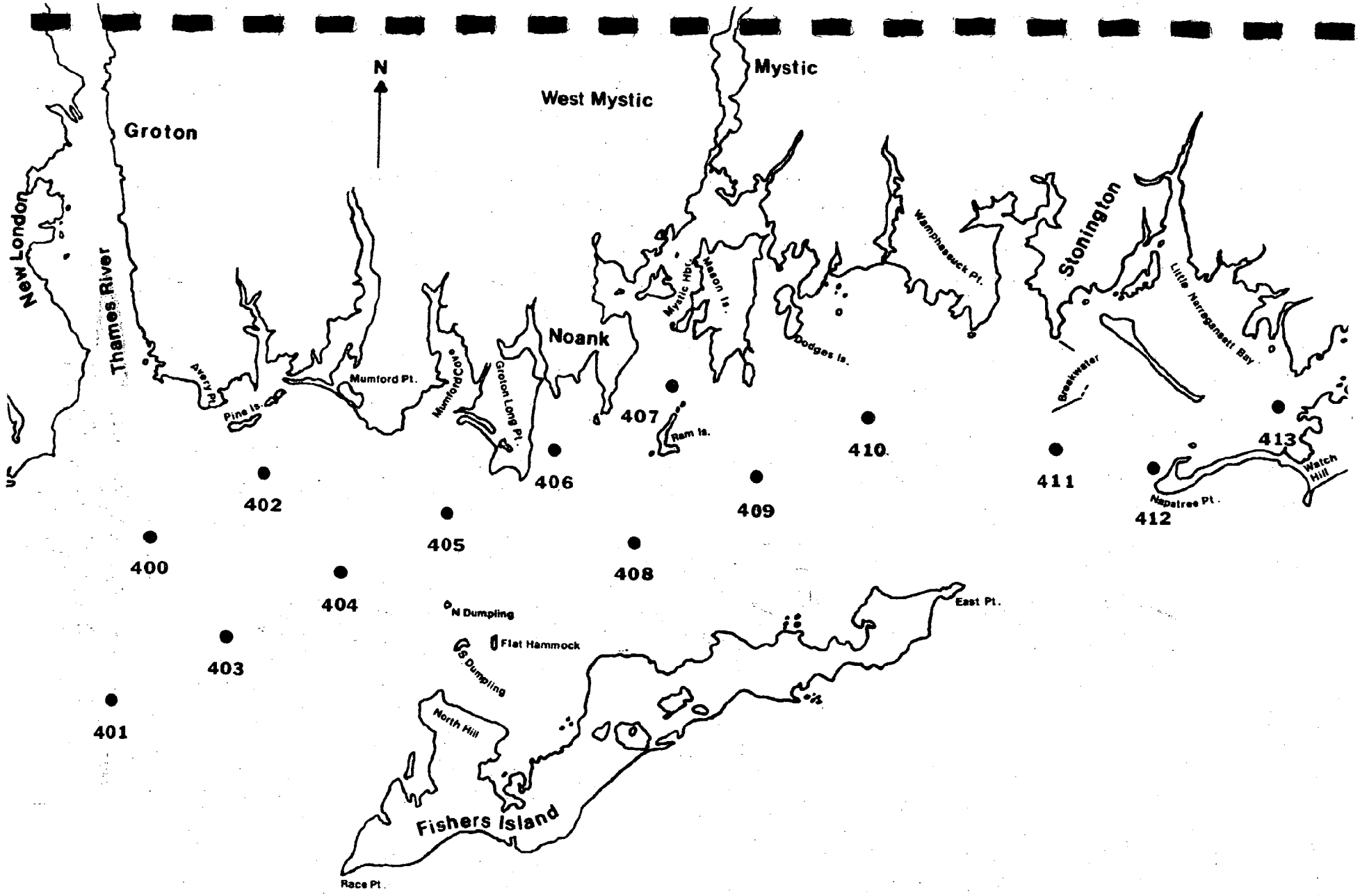
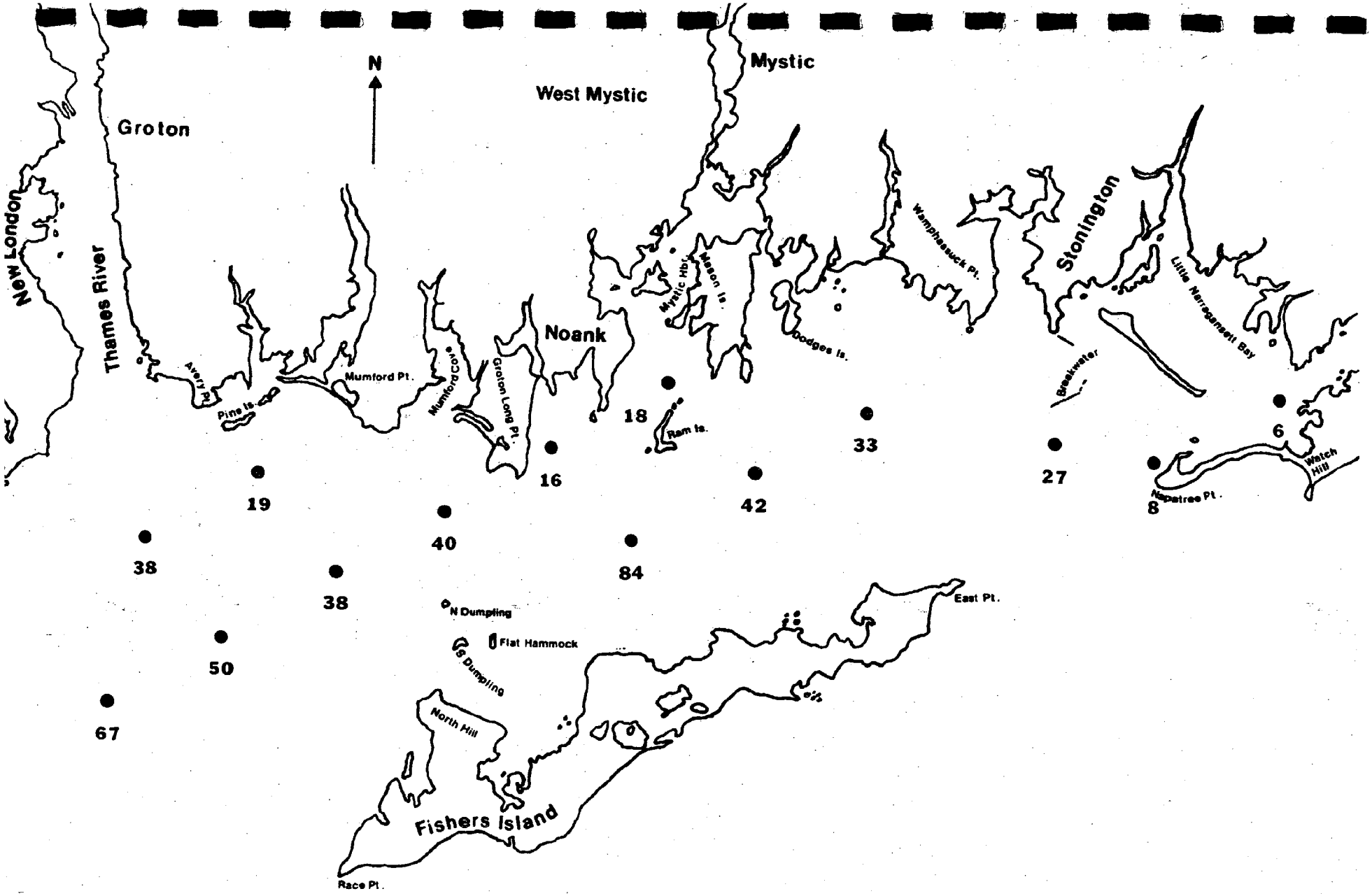

N
New London
Thames River
Groton
West Mystic
Mystic
Noank
Stonington
Avery Pt.
Pine Is.
Mumford Pt.
Mumford Cove
Groton Long Pt.
Mystic Hbr.
Mason Is.
Dodges Is.
Wamphassuck Pt.
Breakwater
Little Narragansett Bay
Watch Hill
Napatree Pt.
Ram Is.
400
401
402
403
404
405
406
407
408
409
410
411
412
413
N Dumpling
S Dumpling
Flat Hammock
North Hill
Fishers Island
East Pt.
Race Pt.

Figure 10b

DEPTH OF SAMPLING STATIONS (feet) - REGION X



N
Mystic
West Mystic
Groton
New London
Thames River
Avery Pt.
Pine Is.
Mumford Pt.
Mumford Cove
Groton Long Pt.
Noank
Mystic Hbr.
Mason Is.
Dodges Is.
Wamphassuck Pt.
Stonington
Little Narragansett Bay
Breakwater
Ram Is.
Napatree Pt.
Watch Hill
18
16
19
40
38
38
50
67
84
42
33
27
8
6
N Dumpling
Flat Hammock
S Dumpling
North Hill
Fishers Island
East Pt.
Race Pt.

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	✪

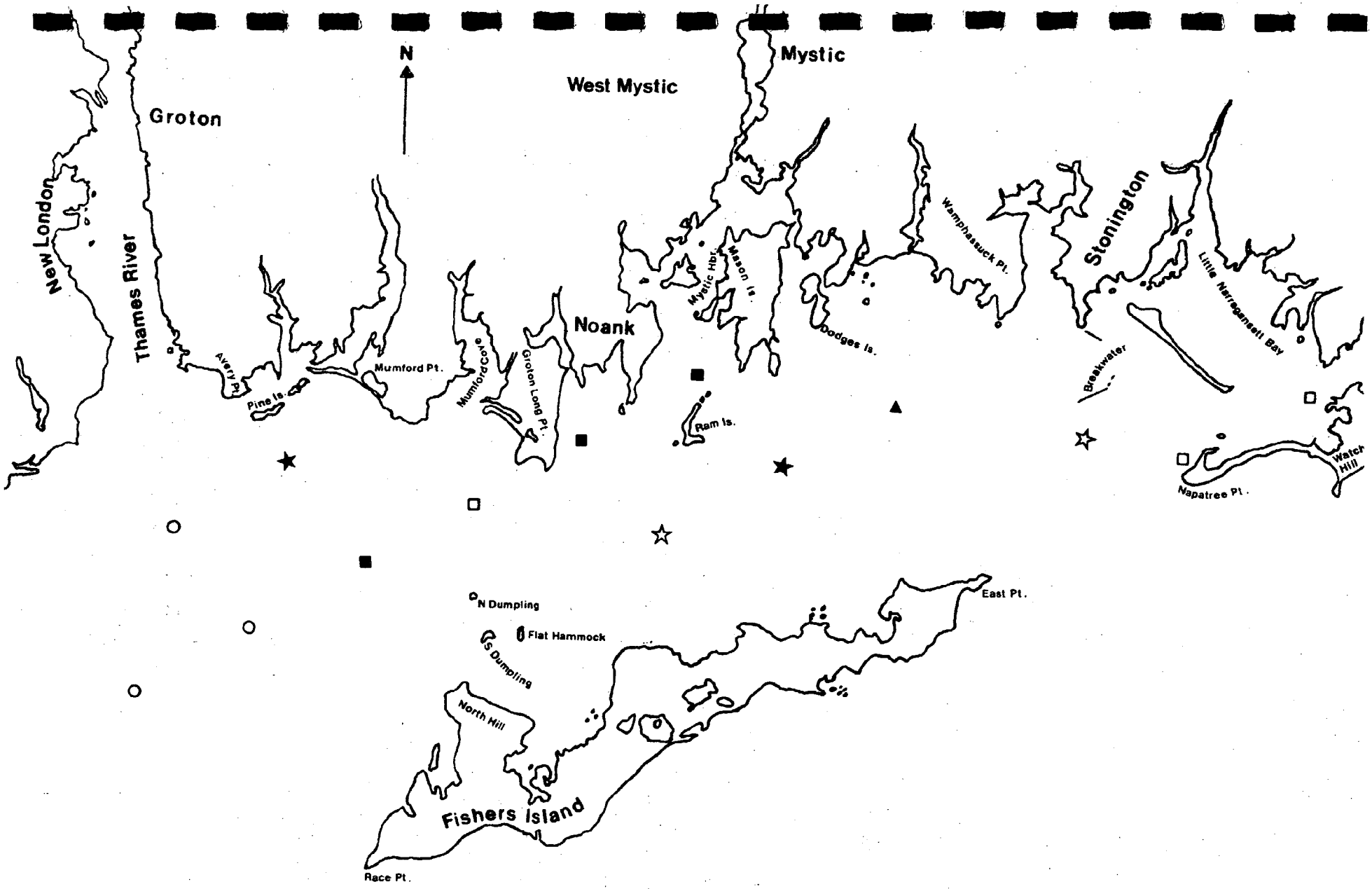

N
Mystic
West Mystic
Groton
New London
Thames River
Avery Pt.
Pine Is.
Mumford Pt.
Mumford Cove
Groton Long Pt.
Noank
Mystic Hbr.
Mason Is.
Ram Is.
Dodges Is.
Wamphassuck Pt.
Stonington
Breakwater
Little Narragansett Bay
Watch Hill
Napatree Pt.
N Dumpling
Flat Hammock
S Dumpling
North Hill
Fishers Island
East Pt.
Race Pt.

Figure 10d

NUMBER OF BENTHIC SPECIES - NUMBER OF INDIVIDUALS

PER GRAB SAMPLE - REGION X

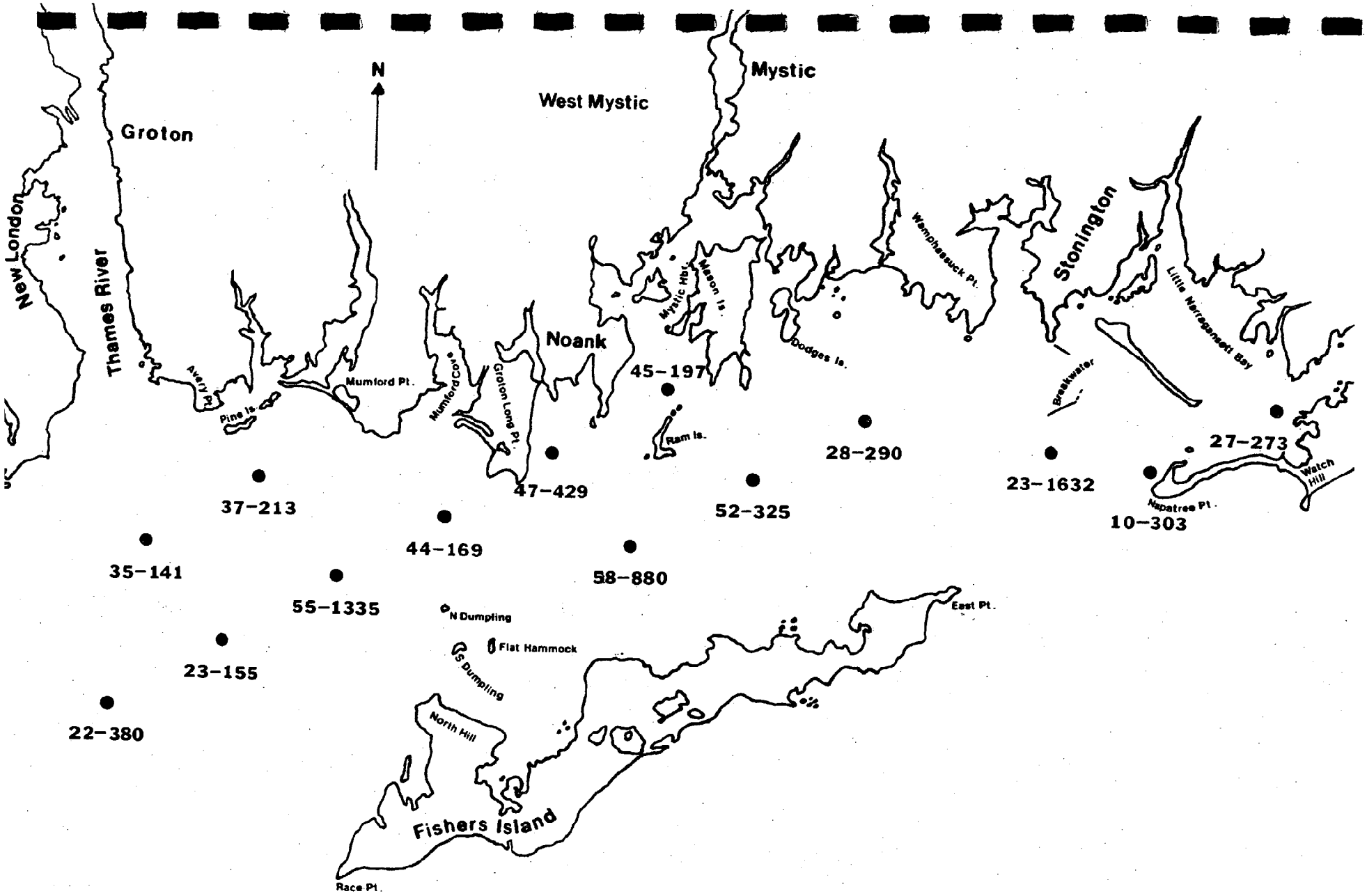
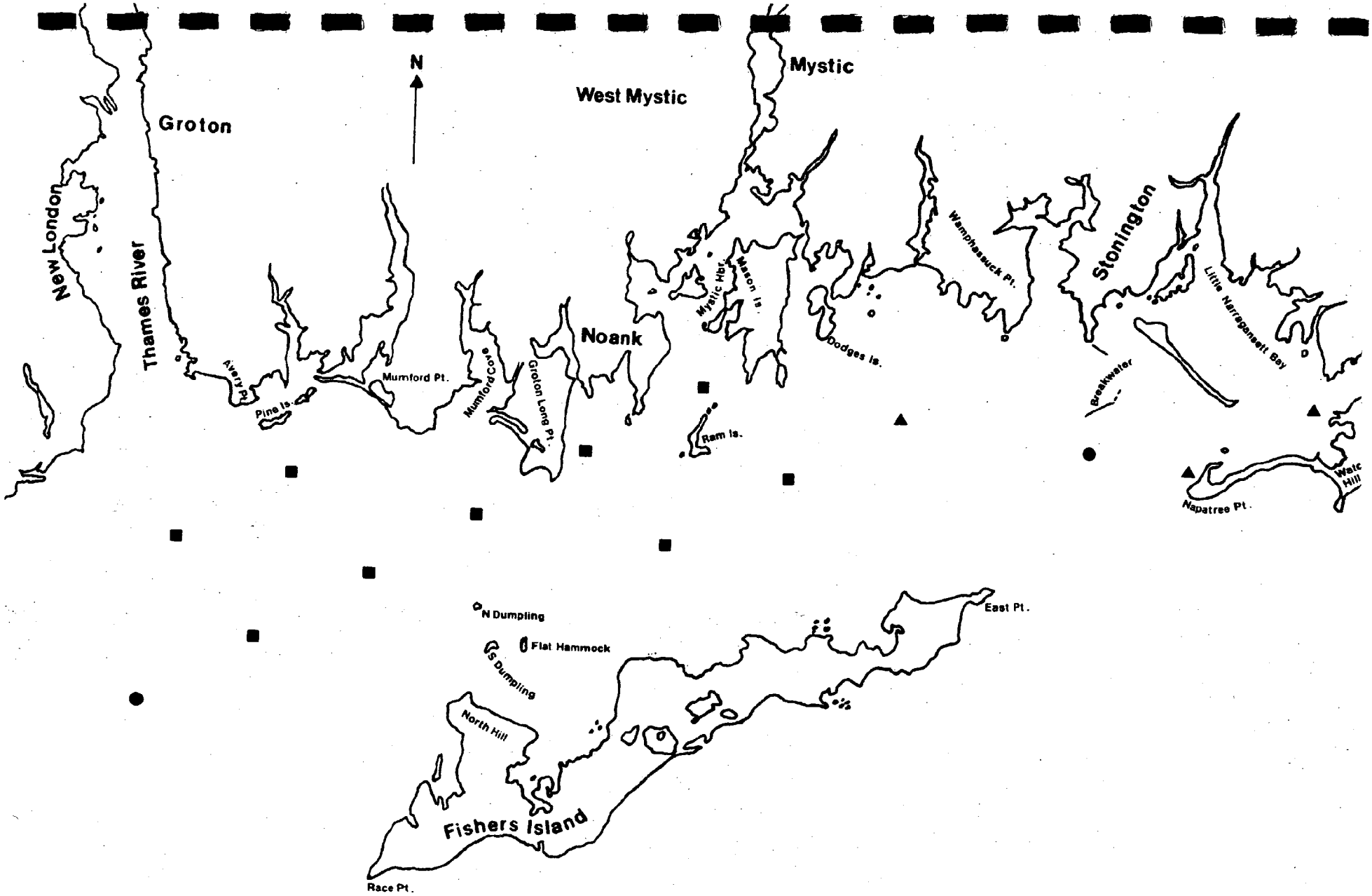

N
New London
Thames River
Groton
West Mystic
Mystic
Noank
Stonington
Avery Pt.
Pine Is.
Mumford Pt.
Mumford Cove
Groton Long Pt.
Mystic Hbr.
Mason Is.
Dodges Is.
Wamphassuck Pt.
Greatwater
Little Narragansett Bay
Watch Hill
Napatree Pt.
Ram Is.
45-197
28-290
23-1632
27-273
10-303
47-429
52-325
37-213
44-169
58-880
35-141
55-1335
23-155
22-380
N Dumpling
Flat Hammock
S Dumpling
North Hill
Fishers Island
Race Pt.
East Pt.

Figure 10e

BENTHIC SPECIES DIVERSITY CATEGORIES - REGION X

<u>DIVERSITY KEY</u>

Low	●
Moderate	▲
High	■
No organisms recovered	--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Mystic
West Mystic
Groton
New London
Thames River
Avery Pt.
Pine Is.
Mumford Pt.
Mumford Cove
Groton Long Pt.
Noank
Mystic Hbr.
Mason Is.
Ram Is.
Dodges Is.
Wamphassuck Pt.
Stonington
Breakwater
Little Narragansett Bay
Napatree Pt.
N Dumpling
Flat Hammock
S Dumpling
North Hill
Fishers Island
East Pt.
Race Pt.

Figure 10f

EASTERN OYSTER AND HARD CLAM

ABUNDANCE CATEGORIES - REGION X

<u>CLAM-OYSTER KEY</u>

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

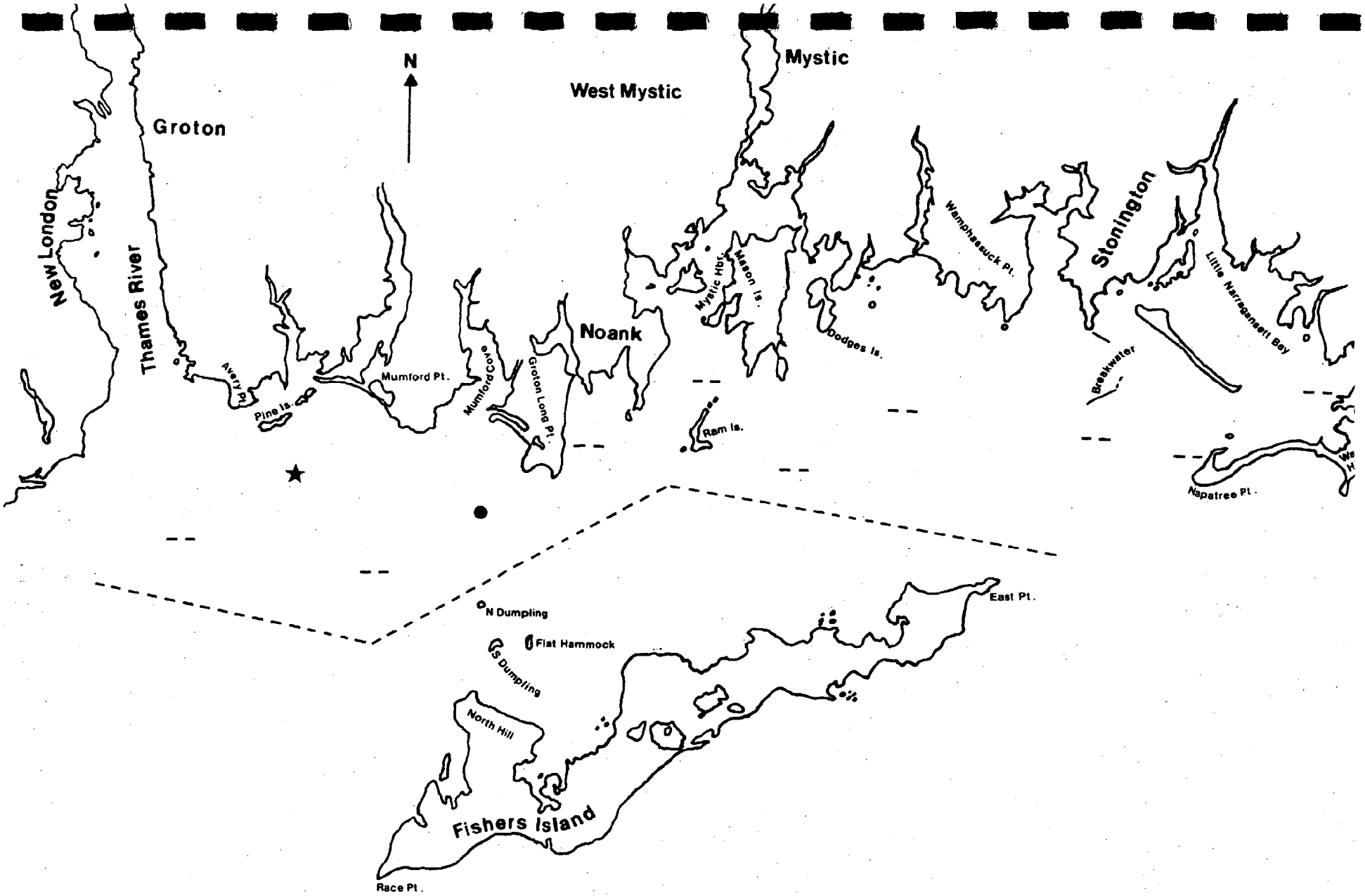
N
Mystic
West Mystic
Groton
New London
Thames River
Avery Pt.
Pine Is.
Mumford Pt.
Mumford Cove
Groton Long Pt.
Noank
Mystic Hbr.
Mason Is.
Dodges Is.
Wamphassuck Pt.
Stonington
Breakwater
Little Narragansett Bay
Ram Is.
Napatree Pt.
N Dumpling
Flat Hammock
S Dumpling
North Hill
Fishers Island
East Pt.
Race Pt.

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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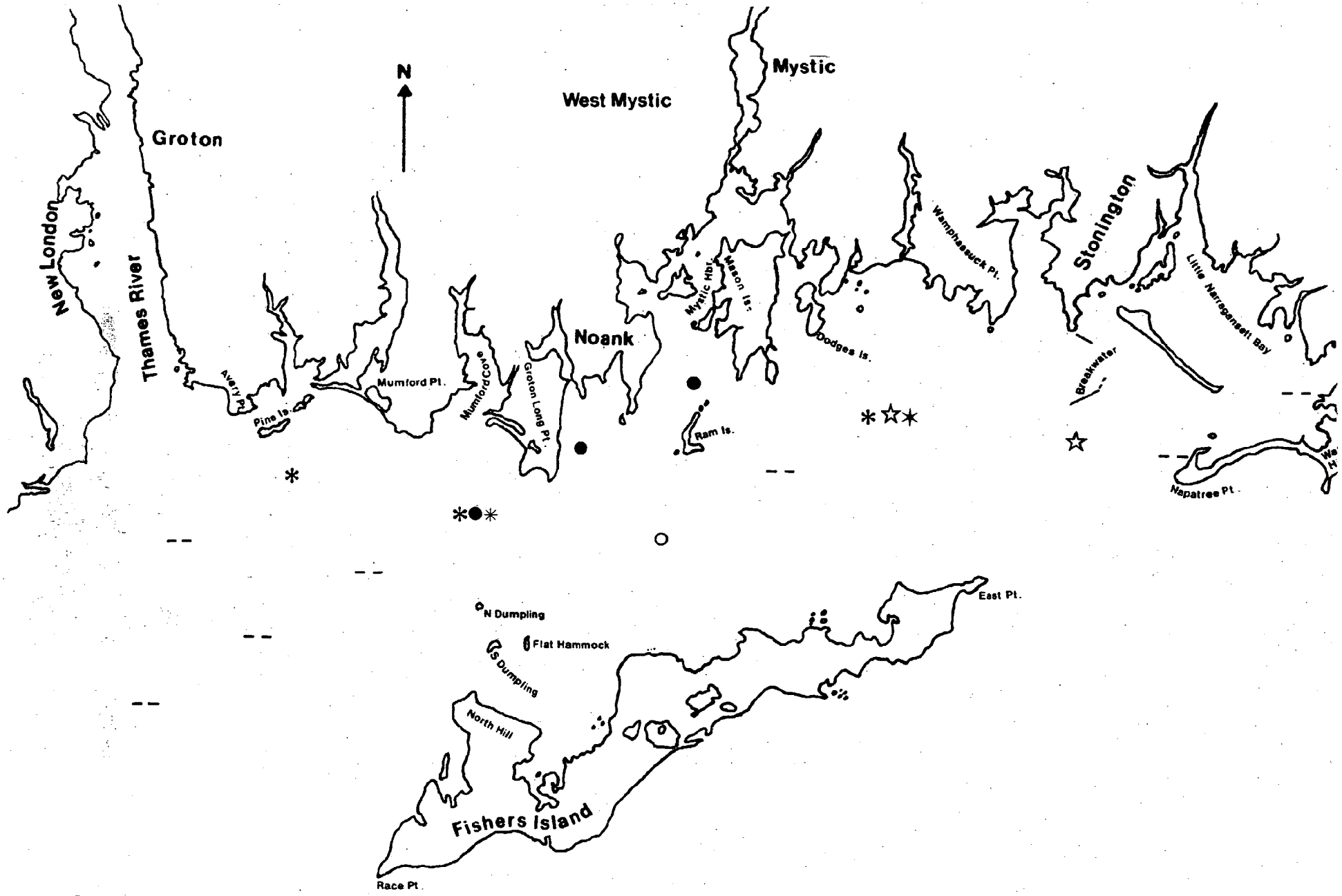
N
West Mystic
Mystic
Groton
New London
Thames River
Avery Pt.
Pine Is.
Mumford Pt.
Mumford Cove
Groton Long Pt.
Noank
Mystic Hbr.
Mason Is.
Ram Is.
Dodges Is.
Wamphassuck Pt.
Stonington
Breakwater
Little Narragansett Bay
Napatree Pt.
N Dumpling
Flat Hammock
S Dumpling
North Hill
Fishers Island
East Pt.
Race Pt.

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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 Stelleroidea	(Brittle and Sea Stars)
Family Asteriidae	
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	(Snails)
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

		<26870>		
<60022>	<60018>	<60014>	<60010>	
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<60024>	<60020>	<60016>	<60012>	
14	15	16	17	
		<26850>		
<60026>	<60022>	<60018>	<60014>	
18	19	20	21	
		<26840>		
<60028>	<60024>	<60020>	<60016>	
22	23	24	25	
		<26830>		
<60034>	<60030>	<60026>	<60022>	<60018>
26	27	28	29	30
		<26820>		
<60036>	<60032>	<60028>	<60024>	<60020>
31	32	33	34	35

TABLE 4. Total species list for Region II

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 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 blomstrandi	
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 Stelleroidea	(Brittle and Sea Stars)
Family Asteriidae	
Asterias forbesi	(Forbes' Asterias)

PHYLUM MOLLUSCA	
Class Bivalvia	
Family Arcidae	
Anadara transversa	(Transverse Ark)
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 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 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	(Pyramid Shells)
Turbonilla sp.	
Family Retusidae	
Retusa canaliculata	
PHYLUM PHORONIDA	(Phoronid Worms)
Phoronis architecta	
PHYLUM PORIFERA	(Sponges)
Family Clionidae	
Cliona sp.	(Boring Sponges)
PHYLUM RHYNCHOCOELA	(Nemertean Worms)
Family Tubulanidae	
Tubulanus pellucidus	

TABLE 5. Station numbers for Region III

		<26810>				
<60038>	<60034>	<60030>	<60026>	<60022>		
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		<26800>				
<60040>	<60036>	<60032>	<60028>	<60024>		
41	42	43	44	45		
		<26790>				
<60042>	<60038>	<60034>	<60030>	<60026>	<60024>	
46	47	48	49	50	51	
		<26780>				
<60044>	<60040>	<60036>	<60032>	<60028>		
52	53	54	55	56		
		<26770>				
<60050>	<60046>	<60042>	<60038>	<60034>	<60030>	
57	58	59	60	61	62	
		<26760>				
<60052>	<60048>	<60044>	<60040>	<60036>	<60032>	
63	64	65	66	67	68	
			<26750>			
<60058>	<60054>	<60050>	<60046>	<60042>	<60038>	<60034>
69	70	71	72	73	74	75
			<26740>			
<60060>	<60056>	<60052>	<60048>	<60044>	<60040>	<60036>
76	77	78	79	80	81	82
			<26730>			
<60062>	<60058>	<60054>	<60050>	<60046>	<60042>	<60038>
83	84	85	86	87	88	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 Phyllodocidae (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 blomstrandi	
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	(Spider Crabs)
Libinia emarginata	
Family Paguridae	(Hermit Crabs)
Pagurus longicarpus	
Pagurus pollicaris	
Family Portunidae	(Swimming Crabs)
Carcinus maenas	(Green Crab)
Ovalipes ocellatus	(Lady Crab)
Family Xanthidae	(Mud Crabs)
Eurypanopeus depressus	
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 Astrangiidae	
Astrangia 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 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 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)
Pandora inornata	
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>			
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96	97	98	99	100	101
		<26700>			
<60064>	<60060>	<60056>	<60052>	<60048>	<60044>
102	103	104	105	106	107
		<26690>			
<60062>	<60058>	<60054>	<60050>	<60046>	
108	109	110	111	112	
		<26680>			
<60068>	<60064>	<60060>	<60056>	<60052>	<60048>
113	114	115	116	117	118
		<26670>			
<60070>	<60066>	<60062>	<60058>	<60054>	<60050>
119	120	121	122	123	124
		<26660>			
<60072>	<60068>	<60064>	<60060>	<60056>	<60052>
125	126	127	128	129	130

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

TABLE 9. Station numbers for Region V

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<60082>	<60078>	<60074>	<60070>	<60066>	<60062>	<60058>	<60054>
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			<26640>			
<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>	<60062>
162	163	164	165	166	167	168	169	170

				<26600>				
<60096>	<60092>	<60088>	<60084>	<60080>	<60076>	<60072>	<60068>	<60064>
171	172	173	174	175	176	177	178	179

			<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)
    - Cirratulis 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 blomstrandi	
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)
Panopeus herbstii	
Rhithropanopeus harrissi	
Crab zoea	
Order Isopoda	
Family Idoteidae	
Edotea triloba	
Order Mysidacea	(Mysid Shrimp)
Family Mysidae	
Neomysis americana	
Subclass Ostracoda	
Ostracod	
PHYLUM ASCHELMINTHES	(Round Worms)
Class Nematoda	
Nematode A	
Nematode B	
PHYLUM CNIDARIA	
Class Anthozoa	(Sea Anemones)
Family Astrangiidae	
Astrangia danae	(Star Coral)
Family Metridiidae	
Metridium senile	(Frilled Anemone)
PHYLUM ECHINODERMATA	
Class Echinoidea	(Sea Urchins and Sand Dollars)
Family Arbaciidae	
Arbacia punctulata	(Purple Sea Urchin)
Class Stelleroidea	(Brittle and Sea Stars)
Family Amphiuridae	
Axiognathus squamatus	(Dwarf Brittle Star)
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)
Family Nuculidae	
Nucula proxima	(Near Nut Shell)
Family Ostreidae	
Crassostrea virginica	(Eastern American Oyster)
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 Aporrhaidae	
Aporrhais occidentalis	
Family Buccinidae	
Colus sp.	
Family Calyptraeidae	
Crepidula fornicata	(Common Slipper Shell)
Crepidula plana	(Flat Slipper Shell)
Family Columbellidae	
Mitrella lunata	(Crescent Mitrella)
Family Corambidae	
Corambella depressa	(Nudibranch)
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 Pleurobranchiidae	
Pleurobranchaea tarda	(Nudibranch)
Family Pyramidellidae	(Pyramid Shells)
Odostomia sp.	
Family Retusidae	
Retusa canaliculata	
Retusa obtusa	
Family Rissoidae	
Rissoa sp.	
Family Scaphandridae	
Cylichna sp.	
Family Turridae	
Balcis sp.	
PHYLUM PHORONIDA	(Phoronid Worms)
Phoronis architecta	
PHYLUM PORIFERA	(Sponges)
Family Clionidae	
Cliona sp.	(Boring Sponges)
Family Microcionidae	
Microciona sp.	(Red Beard Sponge)
PHYLUM RHYNCHOCOELA	(Nemertean Worms)
Family Cephalothricidae	
Procephalothrix spiralis	
Family Lineidae	
Cerebratulus lacteus	(Milky Ribbon Worm)
Family Tubulanidae	
Tubulanus pellucidus	
PHYLUM SIPUNCULA	(Sipunculan Worms)
Phascolopsis gouldii	

TABLE 11. Station numbers for Region VI

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<60096>	<60092>	<60088>	<60084>	<60080>	<60076>	<60072>	<6006[illegible]>
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196	197	198	199	200	201	202	
			<26560>				
<60096>	<60092>	<60088>	<60084>	<60080>	<60076>	<60072>	<60068>
203	204	205	206	207	208	209	210
			<26550>				
<60098>	<60094>	<60090>	<60086>	<60082>	<60078>	<60074>	<6007[illegible]>
211	212	213	214	215	216	217	218
			<26540>				
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			<26510>				
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249	250	251	252	253	254		
		<26490>					
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255	256	257	258	259	260		
			<26480>				
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261	262	263	264	265	266	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
    - Axiothella 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 Phyllodocidae (Paddle Worms)
    - Eteone heteropoda
    - Phyllodoce arenae
    - Phyllodoce maculata

Family Pilargidae
Cabira incerto
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 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 blomstrandi
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)
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 megalopa	
Crab zoea	
Order Isopoda	
Family Idoteidae	
Chirodotea coeca	
Order Mysidacea	(Mysid Shrimp)
Family Mysidae	
Neomysis americana	
Subclass Ostracoda	
Ostracod	
PHYLUM ASCHELMINTHES	(Round Worms)
Class Nematoda	
Nematode B	
PHYLUM CNIDARIA	
Class Anthozoa	(Sea Anemones)
Family Actinostolidae	
Paranthus rapiformis	
Family Astrangiidae	
Astrangia danae	(Star Coral)
Family Cerianthidae	
Ceriantheopsis americanus	(Ceriantharian Anemone)
Family Edwardsiidae	
Edwardsia elegans	(Burrowing Anemone)
Fagesia lineata	
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 Lyonsiidae	
Lyonsia arenosa	
Lyonsia hyalina	(Glassy Lyonsia)
Family Mactridae	
Mulinia lateralis	(Little Surf Clam)
Spisula solidissima	(Surf Clam)
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 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 Cerithiidae	
Seila adamsii	(Wood Screw Shell)
Family Columbellidae	
Mitrella lunata	(Crescent Mitrella)
Family Corambidae	
Corambella depressa	(Nudibranch)
Family Melongenidae	
Busycon canaliculatum	(Channeled Whelk)
Busycon carica	(Knobbed Whelk)
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)
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.	
Group 4 Gastropod	(Shelled Opistobranchia and Pulmonata)
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)
Micrura caeca	
Family Tubulanidae	
Tubulanus pellucidus	
PHYLUM SIPUNCULA	(Sipunculan Worms)
Golfingia improvisa	
Phascolopsis elegans	
Phascolopsis gouldii	

TABLE 13. Station numbers for Region VII

			<26470>			
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			<26450>			
<60106>	<60102>	<60098>	<60094>	<60090>	<60086>	
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			<26440>			
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287	288	289	290	291	292	
			<26430>			
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293	294	295	296	297	298	
			<26420>			
<60112>	<60108>	<60104>	<60100>	<60096>	<60092>	
299	300	301	302	303	304	
		<26410>				
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305	306	307	308	309		
			<26400>			
<60112>	<60108>	<60104>	<60100>	<60096>	<60092>	
310	311	312	313	314	315	
		<26390>				
<60110>	<60106>	<60102>	<60098>	<60094>		
316	317	318	319	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)
    - Cirratulis 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 tesselata
  - 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
Scolecolepides viridis
Scoleiepis squamata
Spiophanes bombyx
Streblospio benedicti
Family Syllidae (Syllid Worms)
Autolytus cornutus
Autolytus fasciatus
Eusyllis blomstrandi
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 crassicorne
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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		<26350>		
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337	338	339	340	
		<26330>		
<60118>	<60114>	<60110>	<60106>	<60102>
341	342	343	344	345
		<26320>		
<60116>	<60112>	<60108>	<60104>	
346	347	348	349	
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<60114>	<60110>	<60106>		
350	351	352		
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<60116>	<60112>	<60108>		
353	354	355		
	<26290>			
<60118>	<60114>	<60110>		
356	357	358		

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 Cirritulidae	(Fringed Worms)
Chaetozone setosa	
Cirratulis cirratus	
Cirratulis 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	
Nepthys 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
Scolecolepides 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 millsi
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 Stelleroidea	(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	
Anachis avara	(Dove Shell)
Mitrella lunata	(Crescent Mitrella)
Family Melongenidae	
Busycon canaliculatum	(Channeled Whelk)
Family Nassariidae	
Nassarius trivittatus	(New England Dog Whelk)
Family Natacidae	
Lunatia heros	(Northern Moon Snail)
Family Pyramidellidae	(Pyramid Shells)
Turbonilla sp.	
Family Rissoidae	
Rissoa sp.	
HYLUM PHORONIDA	(Phoronid Worms)
Phoronis architecta	
PHYLUM PORIFERA	(Sponges)
Family Haliclonidae	
Haliclona canaliculata	(Sulpher Sponge)
PHYLUM RHYNCHOCOELA	(Nemertean Worms)
Family Lineidae	
Cerebratulus sp.	
Family Tubulanidae	
Tubulanus pellucidus	

TABLE 17. Station numbers for Region IX

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<60128>	<60124>		
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<26150>			
<60130>	<60126>		
398	399		

TABLE 18. Total species list for Region IX

PHYLUM 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 Cirritulidae	(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	
Nepthys caeca	
Nepthys 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
  Owenia fusiformis
Family Paraonidae (Paraonid Worms)
  Aricidea jefferysii
  Paraonis fulgens
Family Pectinariidae (Trumpet Worm)
  Pectinaria gouldii
Family Phyllodocidae (Paddle Worms)
  Eteone heteropoda
  Eteone lactea
  Eteone longa
  Eteone trilineata
  Eumida sanguinea
  Phyllodoce arenae
  Phyllodoce maculata
Family Polygordiidae (Archiannelid)
  Polygordius appendiculatus
Family Polynoidae (Scale Worms)
  Antinoella sarsi
  Harmothoe imbricata
  Harmothoe nodosa
  Lepidonotus squamotus
Family Sabellaridae (Sand Builder Worms)
  Sabellaria vulgaris
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 commensalis
  Polydora hamata
  Polydora ligni
  Polydora websteri
  Prionospio heterobranchia
  Prionospio steenstrupi
  Prionospio tenuis
  Pygospio elegans
  Scolecolepides viridis
  Scoleiepis squamata
  Spiophanes bombyx
  Streblospio benedicti
Family Syllidae (Syllid Worms)
  Autolytus cornutus
  Autolytus fasciatus
  Eusyllis blomstrandi
  Exogone dispar
  Parapionosyllis longocirrata
  Syllides longocirrata
  Syllides setosa

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 Callianassidae (Mud Shrimp)
Callianassa 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)
Fagesia 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 Asteriidae
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	
Ensis directus	(Common Razor Clam)
Family Tellinidae	
Macoma calcarea	(Chalky Macoma)
Macoma tenta	
Tellina agilis	
Family Veneridae	
Pitar morrhuana	(False Quahog)
Class Gastropoda	(Snails)
Family Calyptraeidae	
Crepidula fornicata	(Common Slipper Shell)
Crepidula plana	(Flat Slipper Shell)
Family Columbellidae	
Anachis avara	(Dove Shell)
Mitrella lunata	(Crescent Mitrella)
Mitrella zonalis	
Family Corambidae	
Corambella depressa	
Family Hydrobiidae	
Hydrobia minuta	(Swamp Hydrobia)
Family Lamellidoridae	
Onchidoris muricata	(Nudibranch)
Family Melongenidae	
Busycon canaliculatum	(Channeled Whelk)
Busycon carica	(Knobbed Whelk)
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 Retusidae	
Retusa obtusa	
Family Rissoidae	
Rissoa sp.	
Family Turridae	
Balcis sp.	
Class Polyplacophora	(Chitons)
Family Chaetopleuridae	
Chaetopleura apiculata	
PHYLUM PHORONIDA	(Phoronid Worms)
Phoronis architecta	
PHYLUM RHYNCHOCOELA	(Nemertean Worms)
Family Tubulanidae	
Tubulanus pellucidus	

TABLE 19. Station numbers for Region X

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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
    - Nepthys discors
    - Nephtys incisa
    - Nepthys paradoxa
    - Nephtys picta
  - Family Nereidae (Sand/Clam Worms)
    - Nereis grayi
    - Nereis succinea
    - Nereis virens
    - Nereis zonata
  - Family Onuphidae (Plumed Worms)
    - Diopatra cuprea
  - Family Orbiniidae (Orbinid Worms)
    - Scoloplos fragilis
    - Scoloplos robustus

Family Paraonidae	(Paraonid Worms)
Aricidea jefferysii	
Paraonis fulgens	
Paraonis lyra	
Family Pectinariidae	(Trumpet Worm)
Pectinaria gouldii	
Family Phyllodocidae	(Paddle Worms)
Eteone heteropoda	
Eteone longa	
Eumida sanguinea	
Phyllodoce arenae	
Phyllodoce maculata	
Family Polygordiidae	(Archiannelid)
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	
Scolecolepides 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 Asteriidae	
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

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