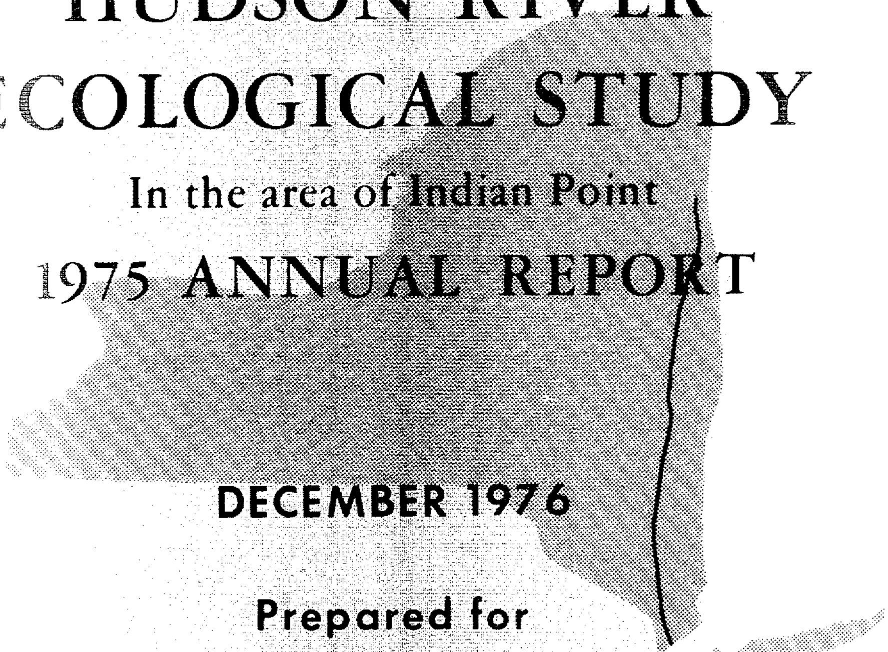
HUDSON RIVER ECOLOGICAL STUDY

In the area of Indian Point

1975 ANNUAL REPORT



DECEMBER 1976

Prepared for

CONSOLIDATED EDISON COMPANY OF NEW YORK, INC.

4 Irving Place
New York, New York 10003

1419

by

TEXAS INSTRUMENTS INCORPORATED
ECOLOGICAL SERVICES

P.O. Box 5621
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FOREWORD

This report is one in a series of reports presenting the results of ecological studies of the Hudson River in the vicinity of Indian Point prepared by the Ecological Services branch of Texas Instruments Incorporated (TI) for Consolidated Edison Company of New York, Inc. The studies conducted by TI were begun in 1972. Other reports from this study have included annual impingement reports, a thermal effects report, and a report on the relative contribution of striped bass from the Hudson River to the mid-Atlantic fishery.

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SECTION I

INTRODUCTION

Ecological studies dealing with potential influences due to the operation of the Indian Point generating station have been ongoing since June of 1969. The initial efforts, by Raytheon Company in 1969-1970, laid the foundation for subsequent studies by collecting basic environmental and biological data concerning fish abundance in the area of Indian Point. The scope of work was expanded in 1971 and implemented in 1972 to permit direct empirical/experimental assessment and mathematical modeling of plant impact on the Hudson River estuary from Haverstraw Bay to the Newburgh-Beacon Bridge. Aspects of the studies are currently under study by Texas Instruments Incorporated (population dynamics, impingement monitoring, environmental), New York University (entrainment), and Lawler, Matusky, and Skelly Engineers (modeling and engineering aspects). Since February 1974, the efforts of these contractors have contributed to a multiplant program jointly funded by Consolidated Edison Company of New York, Inc., Orange and Rockland Utilities, Inc., and Central Hudson Gas and Electric Corp.

This report presents the results of the 1975 study of the fish populations of the Hudson River in the vicinity of Indian Point and the comparison of the results of the studies since 1972 to assess the effects of once-through cooling at the Indian Point nuclear power-generating station on these fish populations. The studies were designed to yield information concerning the contribution of selected fish species to the community -- seasonal species composition and relative abundance; population attributes of selected species -- distribution, age composition, growth rate, and fecundity of striped bass, white perch, and Atlantic tomcod; and physicochemical conditions -- changes in temperature, dissolved oxygen concentration, salinity, hydrogen ion concentration, and turbidity of the river. Comparisons between changes in population or community structure and changes in environmental factors were made when possible. Comparisons between years were made to provide information about interactions between plant operation and population as community attributes.

The scopes of work of the studies presented and compared in this report were characterized by the following objectives:

- Determine the seasonal species' composition relative abundance, and distribution of fish at specific standard stations in the vicinity of Indian Point.
- Measure water quality data necessary for comparison with selected fish species' abundance, movements, and distribution in the vicinity of Indian Point.
- Assess the biological characteristics of Hudson River striped bass, white perch, and Atlantic tomcod in the vicinity of Indian Point.

The results and comparisons are presented in three major sections. The description of the physicochemical conditions of the river is presented in Section III. Population attributes of selected fishes and community structure of fishes in the vicinity of Indian Point are presented in Sections IV and V, respectively.

The results of the studies since 1972 provide no evidence of any unidirectional changes in either the population attributes or the community structure. Therefore, there is no evidence that operation of the Indian Point nuclear power-generating station with once-through cooling has affected the fish populations inhabiting the Indian Point area.

SECTION II

SUMMARY AND CONCLUSIONS

A. SUMMARY

This report addresses the ecology of selected fishes in the vicinity of the Indian Point Nuclear Generating station and the effects of plant operation on these fishes. Specific program efforts directed toward describing the ecological effects of plant operation included examination of certain physicochemical factors; the abundance, distribution, and variety of fishes at standard sampling stations; and various characteristics of striped bass (*Morone saxatilis*), white perch (*Morone americana*), and Atlantic tomcod (*Microgadus tomcod*) relative to their age structure, growth, reproduction, and food.

1. Physicochemical Variables

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No trends related to power plant operation are discernible in the data collected over the period 1972-1975 for conductivity, temperature, dissolved oxygen, turbidity, or hydrogen ion concentrations (pH). All except pH are controlled in large part by seasonal changes in temperature, precipitation, runoff, and tidal activity.

Conductivity (salinity) at Indian Point is controlled principally by freshwater flow and turbulent mixing of saline and fresh waters caused by oscillating tidal currents. High freshwater flow and large tidal variations promote mixing. Saline water intrudes furthest up the Hudson estuary when tidal amplitude is low (<30 cm) and freshwater flow is minimal. It regularly reaches Indian Point during winter and spring, and extends north of Indian Point during summer and early fall.

Temperatures in the Hudson River change with the seasonal air temperature, ranging from near 0°C in winter to 27°C in mid- to late summer; temperatures of shallow protected areas in the estuary may be 2-3°C warmer than channel areas during summer. Large increases in freshwater runoff can temporarily halt, reverse, or reinforce the prevailing change in water temperature during spring or fall.

Dissolved oxygen concentrations vary inversely with temperature, being lowest (about 5 ppm) during July-August and highest (about 14 ppm) in January-March. Biological oxygen demand associated with suspended and/or dissolved organic materials may cause localized depressions of dissolved oxygen. The importation of organic materials into the Indian Point region occurs when freshwater flows rapidly increase, transporting large quantities of watershed-derived materials.

Turbidity is controlled primarily by freshwater flow and follows a seasonal pattern. Major peaks in turbidity occur in spring and in fall in association with peak freshwater runoff; minor peaks are associated with runoff or plankton blooms.

Hydrogen ion concentrations (pH) changed little throughout 1972-75 at Indian Point. The pH values recorded have departed little from the range 6.5-7.5 with a mean near 7.0.

2. Standard-Station Fisheries

No major changes in species composition, relative abundance, or local distribution were observed at sampling stations during the 1972-1975 period. Sixty species of fishes have been collected at the standard-sampling sites in the vicinity of Indian Point. More species were captured in beach seines than in trawls; surface trawls collected fewer species than bottom trawls. Thirteen species were more frequently caught and more abundant than the remaining species; these thirteen are striped bass, white perch, Atlantic tomcod, American shad (*Alosa sapidissima*), Alewife (*Alosa pseudoharengus*), blueback herring (*Alosa aestivalis*), bay anchovy (*Anchoa mitchilli*), bluefish (*Pomatomas saltatrix*), hogchoker (*Trinectes maculatus*), banded killifish (*Fundulus diaphanus*), spottail shiner (*Notropis hudsonius*), tessellated darter (*Etheostoma olmstedi*), and pumpkinseed (*Lepomis gibbosus*).

Local abundance of most species is strongly influenced by seasonal changes in temperature and salinity. Movements of striped bass, white perch, and Atlantic tomcod within the estuary are associated with changes in the location of the salt front. Striped bass, bluefish, blueback herring, and bay anchovy were relatively more abundant at beach-seine stations with little or no cover and near open water. Stations with vegetation and located in protected areas away from the open river were characterized by high relative abundance of white perch, alewife, banded killifish, spottail shiner, and pumpkinseed.

3. Biological Characteristics

Data on age, growth, and reproductive capabilities of white perch, striped bass, and Atlantic tomcod have not revealed any strong unidirectional trends for the 1972-1975 period.

Fecundity of striped bass and white perch increases with the age of the fish. Fecundities for striped bass, white perch, and Atlantic tomcod are 600,000 - 2,000,000; 14,000 - 67,000; and 11,000 - 22,000 respectively, depending on size and age of individual fish.

The age at maturity varies by sex and species. Atlantic tomcod mature and spawn at 11-13 months. Male striped bass are all mature by age III, while females mature between ages V and VII. White perch females mature between ages II and V while males mature between ages II and IV.

Growth of white perch and striped bass is fastest during summer (July) in the vicinity of Indian Point and is minimal after September or October. Atlantic tomcod grow fastest in spring and fall, with summer being a period of little or no growth. This summer growth cessation is sufficient to produce marks on scales and otoliths which are useful in aging Atlantic tomcod from the Hudson river.

Food organisms utilized by young striped bass, white perch, and Atlantic tomcod are essentially small invertebrates (isopods, amphipods, copepods, and insect larvae). Larger white perch and Atlantic tomcod maintain this diet of invertebrates and also consume some fish eggs and larvae when available. Striped bass more than 75 mm long become increasingly piscivorous, feeding primarily on clupeids (shad and herring) and anchovies, so that striped bass 150-200 mm long eat fish almost exclusively. White perch and Atlantic tomcod rarely utilize small fish (other than eggs and larvae) as food.

B. CONCLUSIONS

The following conclusions concerning ecological effects of Indian Point Nuclear generating station operation may be drawn from Texas Instruments' studies from 1972-1975.

- The operation of Indian Point Units 1 and 2 with once-through cooling systems has not perceptibly changed the variation or distribution of conductivity (salinity), temperature, dissolved oxygen, turbidity, or pH in the vicinity of the Indian Point station, in spite of the increased power production when Unit 2 became operational in 1973.
- No detectable alteration has occurred in the fish community near Indian Point, either in terms of species composition or relative abundance, which can be attributed to plant operations during the period 1972-1975.
- No changes in biological characteristics of the striped bass, white perch, and Atlantic tomcod for the period 1972-1975 can be discerned which are attributable to Indian Point plant operations.

SECTION III

PHYSICOCHEMICAL STUDIES

A. INTRODUCTION

Investigation to define the major physical and chemical characteristics of the Hudson River estuary in the vicinity of Indian Point and to relate these characteristics to the distribution, movement, and abundance of fishes in the region has continued since 1972. Temperature, dissolved oxygen, conductivity/salinity, pH, and turbidity have received primary attention. In addition, freshwater flow, tidal variation, river morphometry, and general meteorological conditions have been considered.

This section describes selected physicochemical conditions of the estuary in the vicinity of Indian Point.

B. STUDY AREA

1. Physical Description

The estuarine portion of the Hudson River is defined as the tidal region of the river that extends northward approximately 153 mi from Battery Park on Manhattan Island to the Troy Dam near Albany, New York. Based on certain morphometric features (Figure III-1), the estuary can be divided into three regions:

- A lower region below Stony Point (RM 37.5), where the channel remains essentially straight and shallow with an increasing width and cross-sectional area from south to north

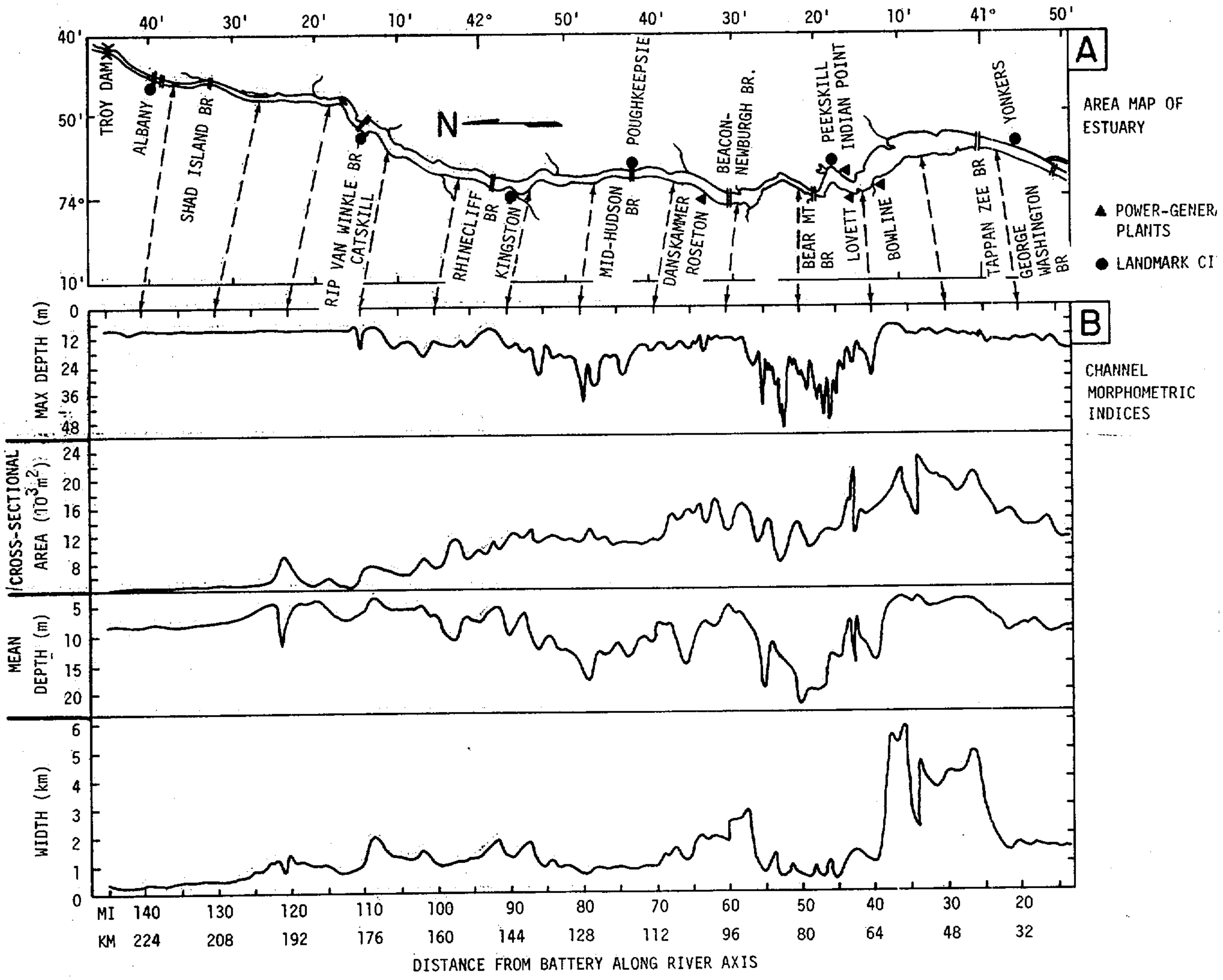


Figure III-1. Major Morphometric Characteristics of Lower Hudson River Estuary

- A midregion between Stony Point and Breakneck Mountain (RM 37.5-57.5) that includes the deepest regions of the estuary and is characterized by changes in flow direction, depth, width, cross-sectional area, and channel shape

- A progressively narrowing (south-to-north) upper region above Breakneck Mountain, where the channel again becomes relatively straight and shallow

There are distinct relationships among river depth, width, and cross-sectional area: in general, as the depth increases, the width and cross-sectional area decrease. Extreme channel depths of approximately 175 ft (MLW) occur, but depths of 30 to 65 ft are most common. The deepest region of the estuary is near West Point, New York, where the river cuts through the Hudson Highlands.

The Indian Point study area between Iona Island and Haverstraw Bay lies within the highly variable midregion of the estuary. Extensive shallow bay areas and a decrease in channel width characterize the northern and southern boundaries of the Indian Point section (Figure III-2). Within these boundaries, deep channel areas predominate and shoal areas are limited. However, a large shoal area occurs on the western edge of the channel opposite the Indian Point power plant. An additional morphometric feature is the series of deep holes that exist in this region (Figure III-1).

2. Hydrology

Freshwater flow into the estuary is partially controlled by the Troy Dam and other flood control and water supply reservoirs in

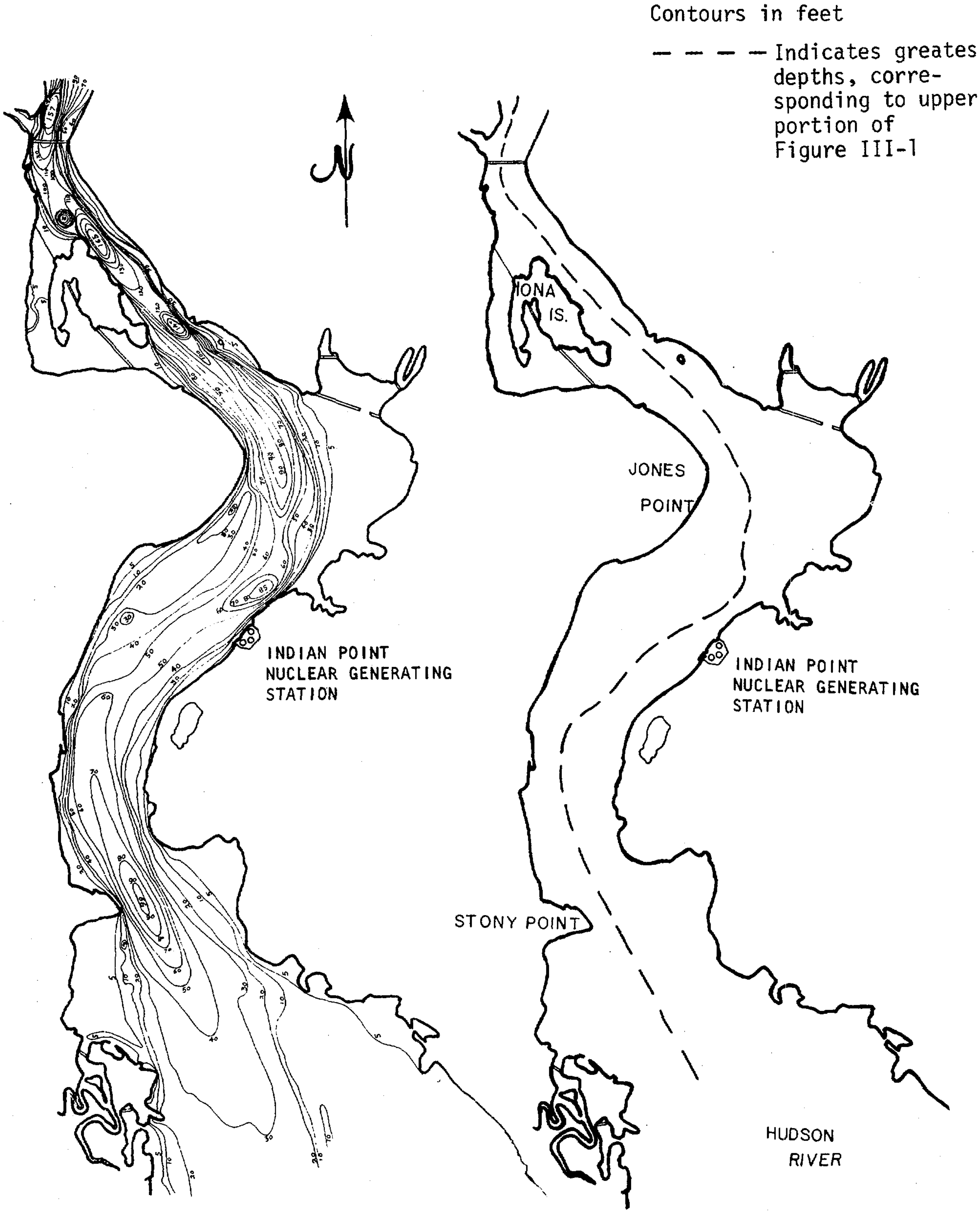


Figure III-2. Bottom-Contour Characteristics of Hudson River within Indian Point Region the Hudson drainage basin. At least 60% of the estuary's net flow is recorded at the Green Island gage above Troy Dam. The drainage basin below Troy, principally the tributaries in the southeastern Catskill Mountains, contributes the remainder. The average flow at Green Island is 373 m^3/sec; 90% of the time, flows from Troy Dam are >113 m^3/sec. These values are subject to considerable influence by releases from reservoirs in the watershed and could be modified by changes in the release schedules (Darmer, 1969). Extraordinarily high flows passing the Troy Dam are rapidly modified within 30 mi by tidal influence and the increasing cross-sectional area of the channel (Darmer, 1969).

The oscillating tidal flow of the Hudson is much greater than the freshwater flow: the usual tidal flow is 10 to 100 times the freshwater flow, ranging from about 5670 to 8500 m^3/sec; however exceptional tidal flows may be > 14,000 m^3/sec (Busby, 1966). As a consequence, the net flow of the Hudson drainage is completely masked by the tidal flows superimposed on it. In addition, unusual weather can suppress the estuary's very large tidal flow: strong wind from the north and south quadrants or changes in barometric pressure will push water into or out of the estuary, obscuring the true tidal regime. Tidal activity at any given time increases longitudinally in either direction from West Point (Figure III-3). This upstream concentration of tidal energy has also been demonstrated by Gross (1972) for both the Hudson and Potomac estuaries. In the Hudson, the mean total amplitude increases from 82 cm (2.7 ft) at West Point to approximately 137 cm (4.5 ft) at both Albany and Battery Park. This condition apparently results from a reflection of the tidal wave at the landward end of the progressively narrowing channel.

The same longitudinal pattern exists for amplitude extremes and tidal-current velocities (Figure III-4).

C. METHODS

1. Standard-Station Water Quality Studies

During 1972 and 1973, weekly water quality measurements were made near Indian Point at stations (Figure III-5) corresponding to standard trawl and seine locations (TI, 1973a, 1974a). These measurements of temperature, dissolved oxygen concentration, conductivity, pH, and turbidity were not concurrent with biological sampling. They were made at 3-m depth intervals (surface to bottom); if the last interval was within 1 m of the bottom, no readings were taken.

Until late August 1973, all physicochemical factors except turbidity were measured with a Martek Mark II water quality monitoring system; for the remainder of 1973, these factors were measured with a Hydrolab Surveyor Model 6D *in situ* water quality analyzer. Turbidity was determined with a Hydroproducts Model 210 transmissometer.

In 1974, the sampling program was modified in order to obtain a direct correlation between water quality data and biological data (TI, 1975a). Measurements of temperature, dissolved oxygen, conductivity, pH, and turbidity at each standard Indian Point trawl and beach-seine site (Figure III-6) were concurrent with fisheries collections. Physicochemical data collection concurrent with biological sampling at these stations continued through the 1975 study. All oxygen values determine *in situ* during 1974 and 1975 were corrected for salinity effects (Appendix F).

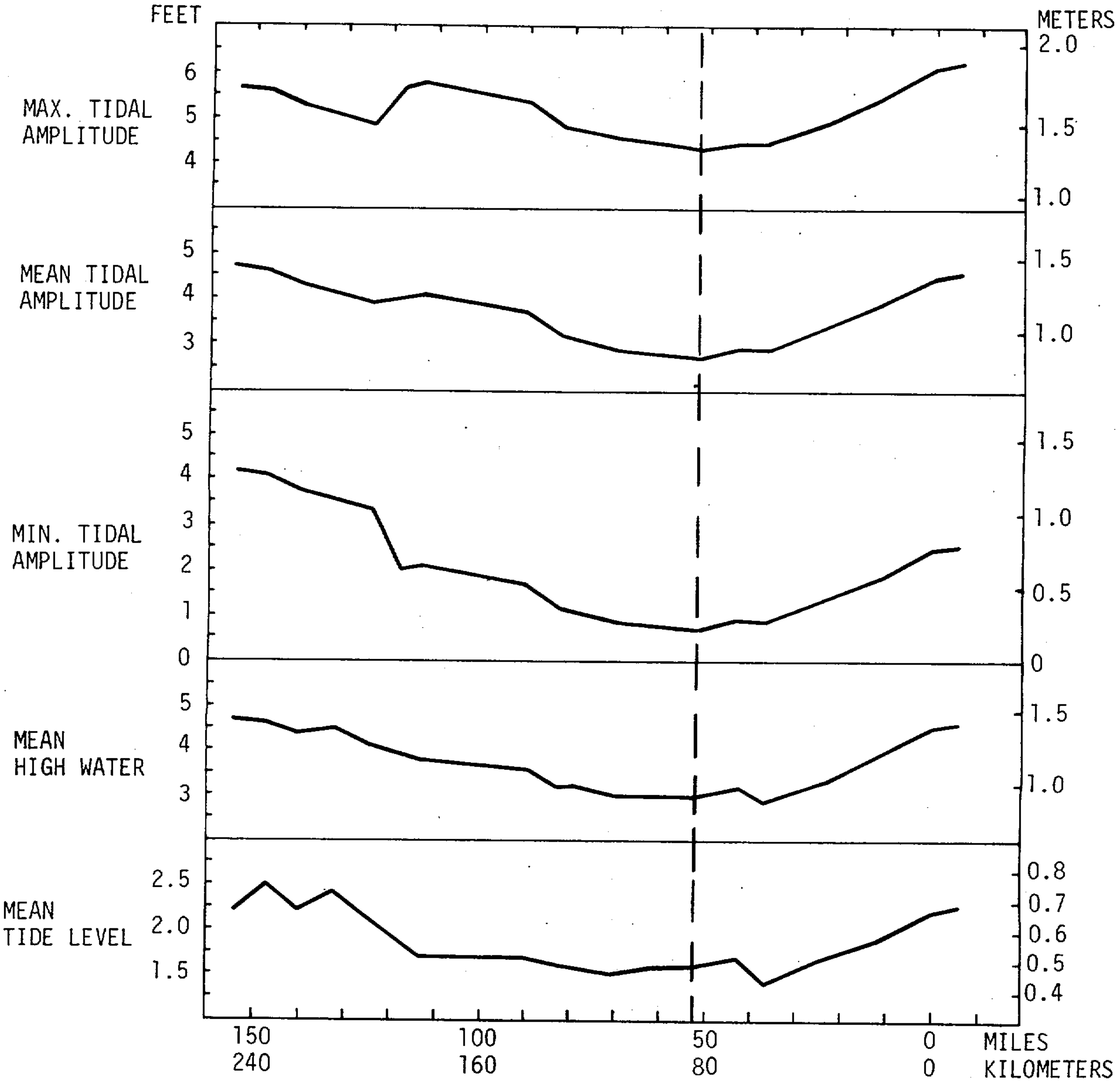


Figure III-3. Longitudinal Changes in Major Indices of Tidal Activity (referred to mean low water), Hudson River Estuary. (--- Denotes Location of West Point, N.Y.; Data from USCGS Hydrographic Charts)

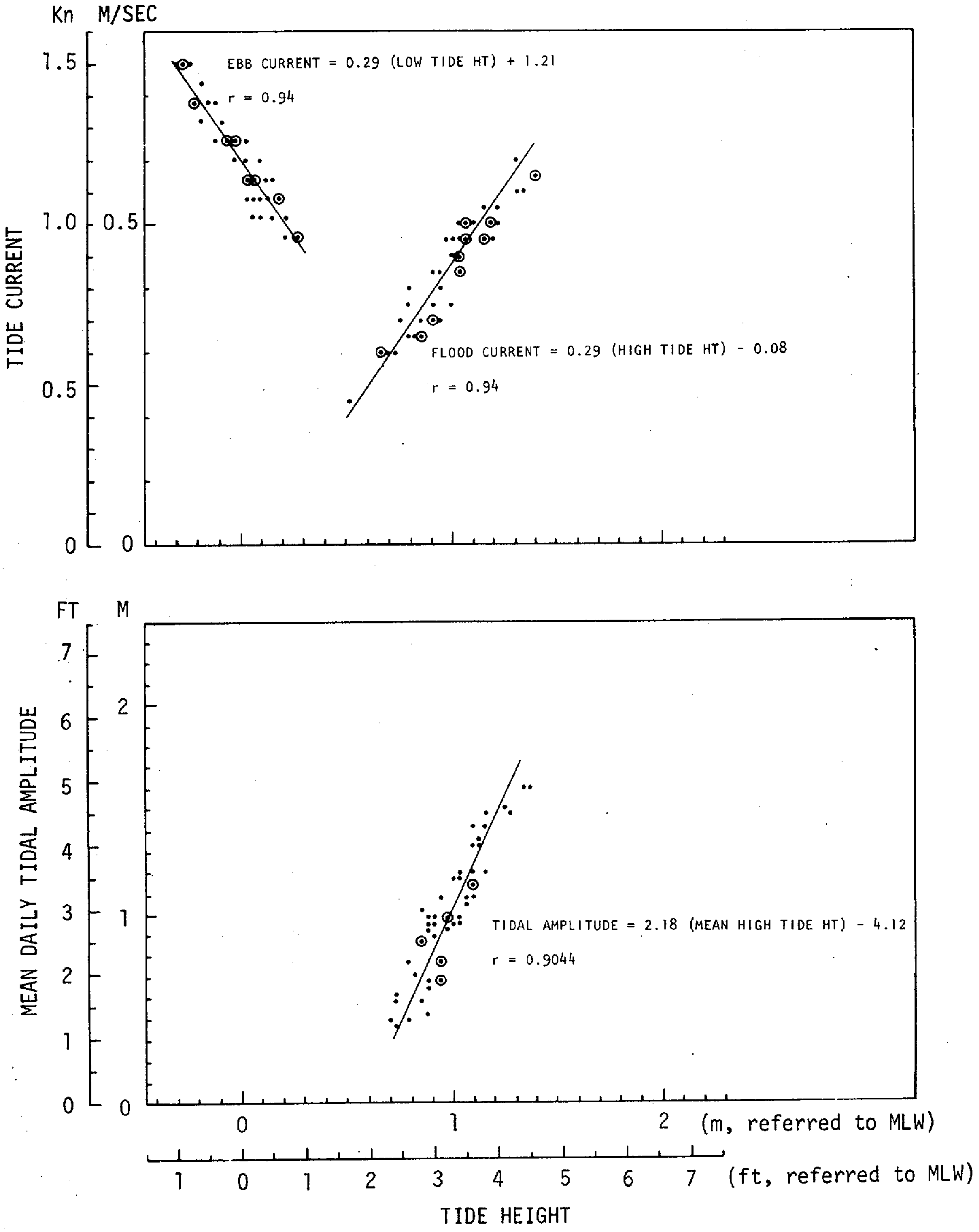


Figure III-4. Relationship among Tidal Elevations, Amplitudes, and Currents in Hudson River at Peekskill, New York, as Described by Regression Analysis. (Data from USGS prediction tables for 1973)

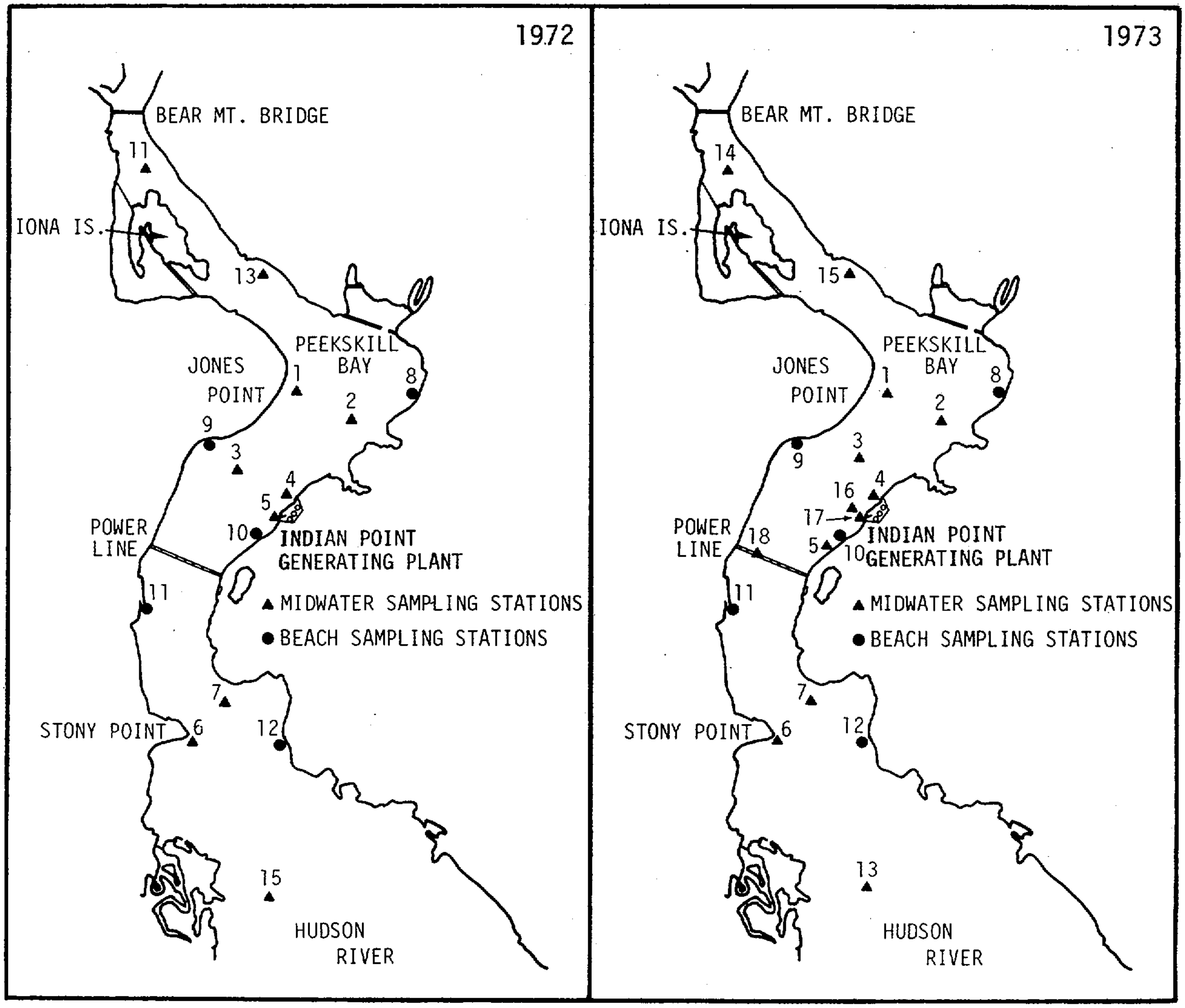


Figure III-5. Location of Water Quality Sampling Stations in Vicinity of Indian Point during 1972 and 1973

Specific methods employed for water quality data acquisition during standard-station trawl and beach-seine efforts are discussed in the following paragraphs.

a. Water Quality Data Acquisition Associated with Trawls

During the 1974 surface-trawl and bottom-trawl efforts, the Hydrolab system sensor unit was towed in front of the trawl to measure water quality factors. Measurements were taken when the trawl was set and continued until all readings had been completed.

Until September 1, sampling associated with bottom trawls was done at 3-m depth intervals (surface to bottom) as in 1973; beginning in September, measurements were taken only at the surface, middle, and bottom to prevent exceeding the tow duration. During surface-trawling efforts, water quality data were ususally collected only at the surface. A surface water sample was hand-collected at each sampling location and returned to the laboratory for measurement of turbidity with a Hach Model 2100A turbidimeter.

In 1975, variables were measured with the Hydrolab system following completion of the trawl. All other procedures were identical to those used at the end of 1974.

b. Water Quality Data Acquisition Associated with Beach Seines

The 1974 water quality sampling in association with standard-station beach-seine efforts usually involved measuring temperature *in situ* at each station with a mercury thermometer and hand-collecting a water sample for additional laboratory analyses.

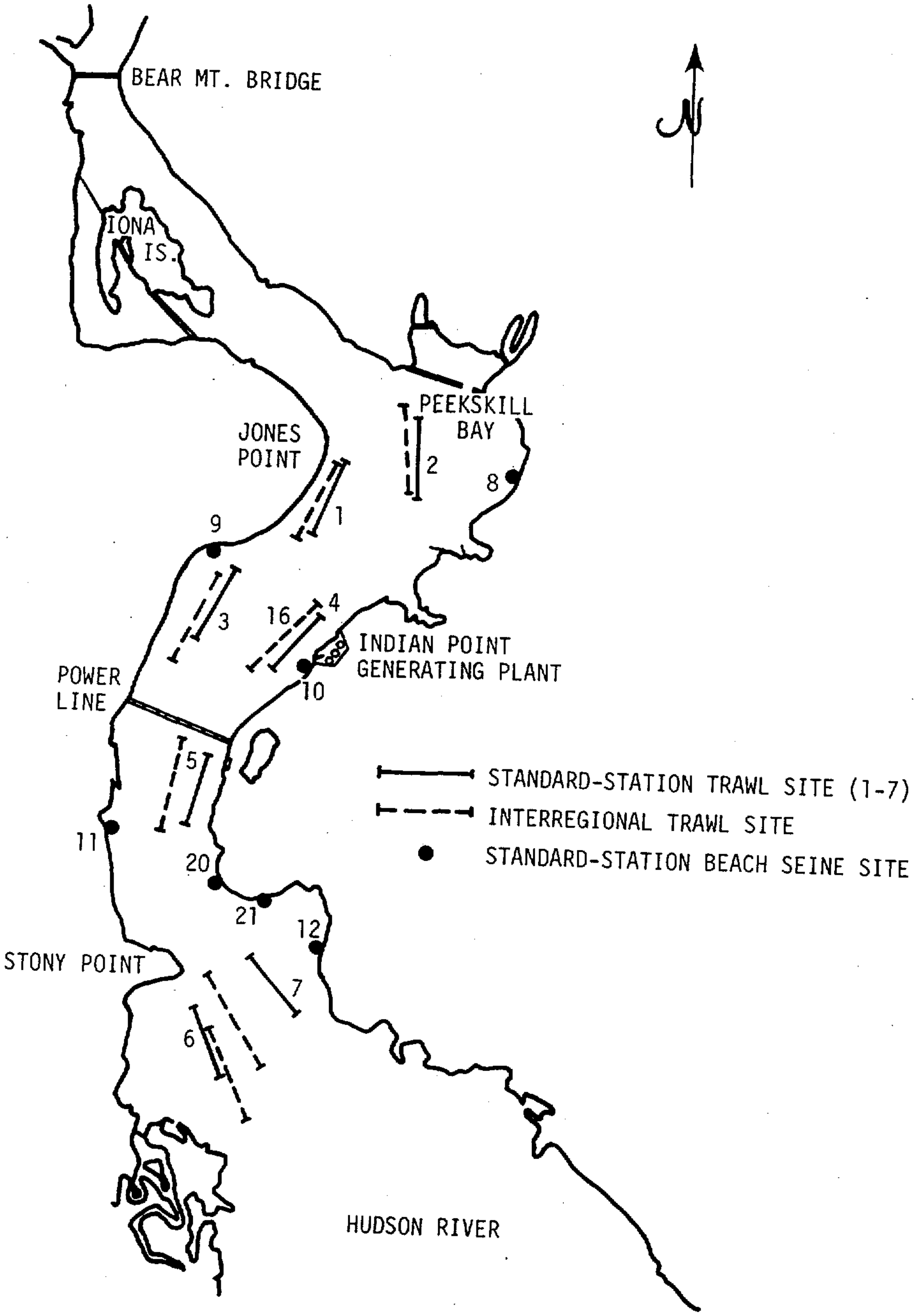


Figure III-6. Location of Water Quality Sampling Stations in Vicinity of Indian Point Associated with Standard-Station Beach-Seine and Trawl Efforts during 1974 and 1975. (Indicated are interregional trawl sites used as equivalents for standard-station trawl locations)

Some temperature measurements were made with thermistors. Sample analysis included conductivity determination with a YSI Model 31 conductivity bridge, pH determination with a Sargent-Welch Model PBL pH meter, and turbidity measurement with a Hach Model 2100A turbidimeter.

In 1975, a YSI Model 54 or Model 57 dissolved oxygen meter was used to measure temperature and dissolved oxygen content at each station. All other procedures remained identical to those followed in 1974.

2. Water Quality Studies at Indian Point Nuclear Generating Facility

Water quality data collected since 1973 in conjunction with an ongoing fish impingement study at the Indian Point nuclear plant (TI, 1974b; TI, 1975b) were used to describe further the environmental conditions in the Indian Point region. Temperature, dissolved oxygen concentration, and conductivity were measured daily in front of the Unit 2 intake with a YSI Model 54 dissolved oxygen meter and a YSI Model 33 SCT meter, respectively.

3. Freshwater Flow and Tide Data

U.S. Geological Survey (Albany, New York) estimates of daily freshwater release at Green Island, New York, were used as an index of freshwater input to the estuary for 1972-1975. Tide height predictions for each year were derived from the yearly tide tables published by the National Ocean Survey (NOS), National Oceanic and Atmospheric Administration, U.S. Department of Commerce. Tidal amplitude in the Indian Point area was calculated on a daily basis as the mean difference between high and low tide levels (derived from tide tables) in a 24-hr period.

4. Meteorological Data

Meteorological conditions in the Indian Point area were continuously monitored (1972-1975) at a site near the Verplanck laboratory primarily to support analyses and interpretations of estuarine physicochemical data. A Weathermeasure W123 recording wind system was used to measure wind direction and speed, and a Weathermeasure M701 meteorograph was employed to determine air temperature, relative humidity, and barometric pressure.

5. Salt Front Position

An index value of 300 μmho/cm at 25°C (approximately) 0.1 o/oo salinity) was used to indicate the extent of saltwater intrusion within the estuary. Daily estimates of the longitudinal position of the salt front were determined from collected conductivity data and by calculation using a previously developed equation (TI, 1975a) as follows:

$$R_s = -17.33\ (\log_e U_5) + 25.59/A_4 + 78.17$$

where

R_s = salt front's predicted location (in miles above Battery Park, indicated by location of 0.1 o/oo salinity isopleth at midchannel bottom depth)

U_5 = freshwater release (10^3 cfs) at Green Island 5 days before salt front location prediction date

A_4 = tidal amplitude (ft) at Indian Point 4 days before salt front location prediction date

6. Other Water Quality Data

Temperature, conductivity, dissolved oxygen, pH, and turbidity determinations conducted during 1974 and 1975 in association with an interregional trawl survey (TI, 1975c) were utilized in analyses to provide additional insight into the physicochemical conditions of the Indian Point region. Interregional trawl locations were used as equivalent sources of data for the standard-station trawl locations (Figure III-6). Observed salt front positions were determined from conductivity data collected in conjunction with various sampling efforts distributed over an extensive range of the estuary (TI, 1975c). Supplementary information was also derived from USGS (1972) water quality data for the Hudson River.

D. RESULTS

1. Conductivity/Salinity

Of the physicochemical parameters routinely monitored in the vicinity of Indian Point, conductivity is the most variable on a daily and seasonal basis. Salinity intrusion into this region is controlled primarily by interaction between freshwater flow and tidal mixing (TI, 1975a) and is aided in its movement northward by the river's bottom configuration. There is no major increase in bottom elevation between Battery Park and Albany - a condition conducive to gravity-induced influxes of sea water. Consequently, upstream salt migration is limited primarily by freshwater dilution. Tidal mixing accentuates the dilution process and, as a result, inhibits the progress of salinity intrusion.

River morphometry, by influencing mixing, affects salt front movement within the estuary. The series of sill structures in the Indian Point region maximizes the effects of tidal mixing by creating areas of high turbulence that increase the freshwater dilution process. Salt intrusion into the Indian Point area is delayed by these structures until tidal amplitudes have decreased to a level sufficient to allow the salt water to pass. Maximum upriver salt movements (and consequently peak conductivity values) at Indian Point have occurred when tidal mixing (indicated by daily tidal amplitude values) and freshwater flow were minimal (Figure III-7). When such conditions occurred, rates of upstream salt front migration were frequently as high as 5 mi/day. High freshwater flows, combined with large tidal amplitudes, were responsible for flushing saline water from the area.

The temporal distribution of conductivity/salinity near Indian Point follows a general seasonal pattern (Figure III-8). During the early months of the year (January through June), short-lived salt intrusions into the region occur regularly. This period is followed by a more extensive summer intrusion, when relatively high conductivity/salinity conditions predominate. Rarely have maximum salinity values exceeded 5 o/oo (9.0 mmho/cm at 25°C). This extended intrusion period terminates when freshwater release into the estuary increases above the minimal summer levels. During the latter part of the year,salt again surges into the region. There have been yearly variations in the seasonal distribution of conductivity/salinity in the Indian Point

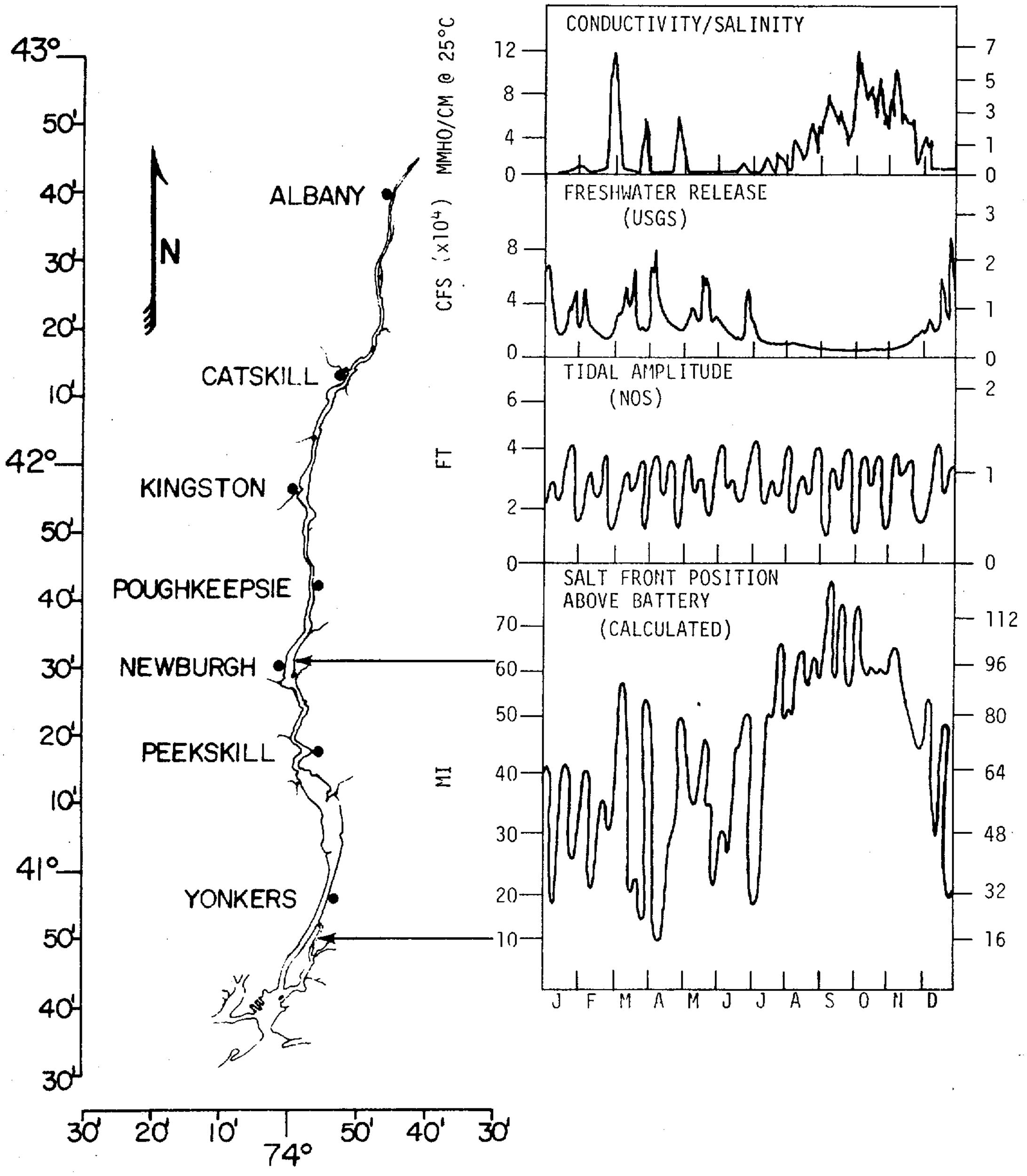


Figure III-7. Semidiagrammatic Representation of Variables Influencing Salinity Intrusion within Lower Hudson River Estuary and Conductivity/ Salinity at Indian Point. (Plot derived from 1973 data) region involving differences in the magnitude and duration of salt intrusions and directly related to the amount of fresh water released into the estuary. During 1975 the characteristic summer intrusion period began in late June but was abruptly terminated in mid-July by a large amount of local rainfall not reflected in freshwater flow data at Green Island (Figure III-9). As localized high flows dissipated, saline water rapidly reinvaded the area and a second extended intrusion period developed. This second period was unusual compared with that of recent years in that it lasted only until late September when heavy localized rainfall combined with high freshwater releases at Green Island to remove the saline water from the region.

Salinity/conductivity variations between sampling stations were related primarily to station locations (TI, 1974a), but differences rarely exceeded 3 o/oo (5.5 mmho/cm at 25°C). Generally, southern stations had higher conductivity values than did northern stations (Figure III-10). Morphometry (beach, channel, or shoal) also influenced a station's conductivity. Saline water, because of its higher density, tends to follow the deeper sections of the river and accumulate in these deeper areas as intrusion progresses; consequently, channel stations usually have higher conductivity values, and vertical stratification is most pronounced in the deeper portions of the estuary (Figure III-11). Beach areas appeared to be the last to flush whenever saline water left the region (TI, 1974a). Otherwise, beach and shoal areas generally were quite similar.

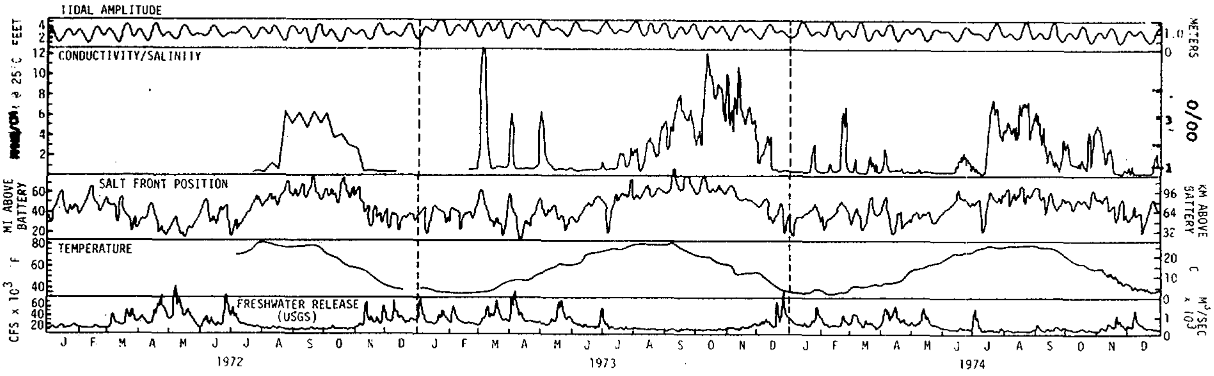


Figure III-8. Seasonal Variation of Tidal Amplitude, Conductivity/Salinity, and Temperature at Indian Point with Salt Front Positions and Freshwater Flow, Hudson River Estuary, 1972-1974

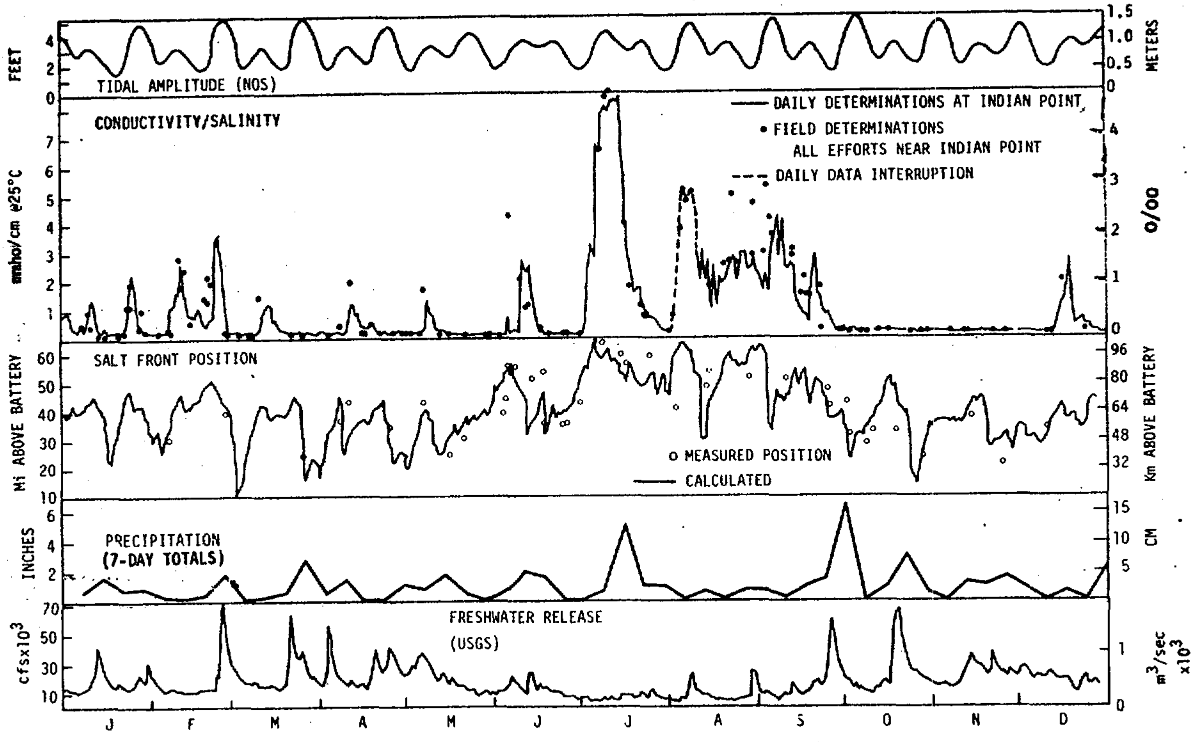


Figure III-9. Seasonal Variation of Tidal Amplitude, Conductivity/Salinity, and Precipitation at Indian Point with Salt Front Position and Freshwater Flow, Hudson River Estuary, 1975

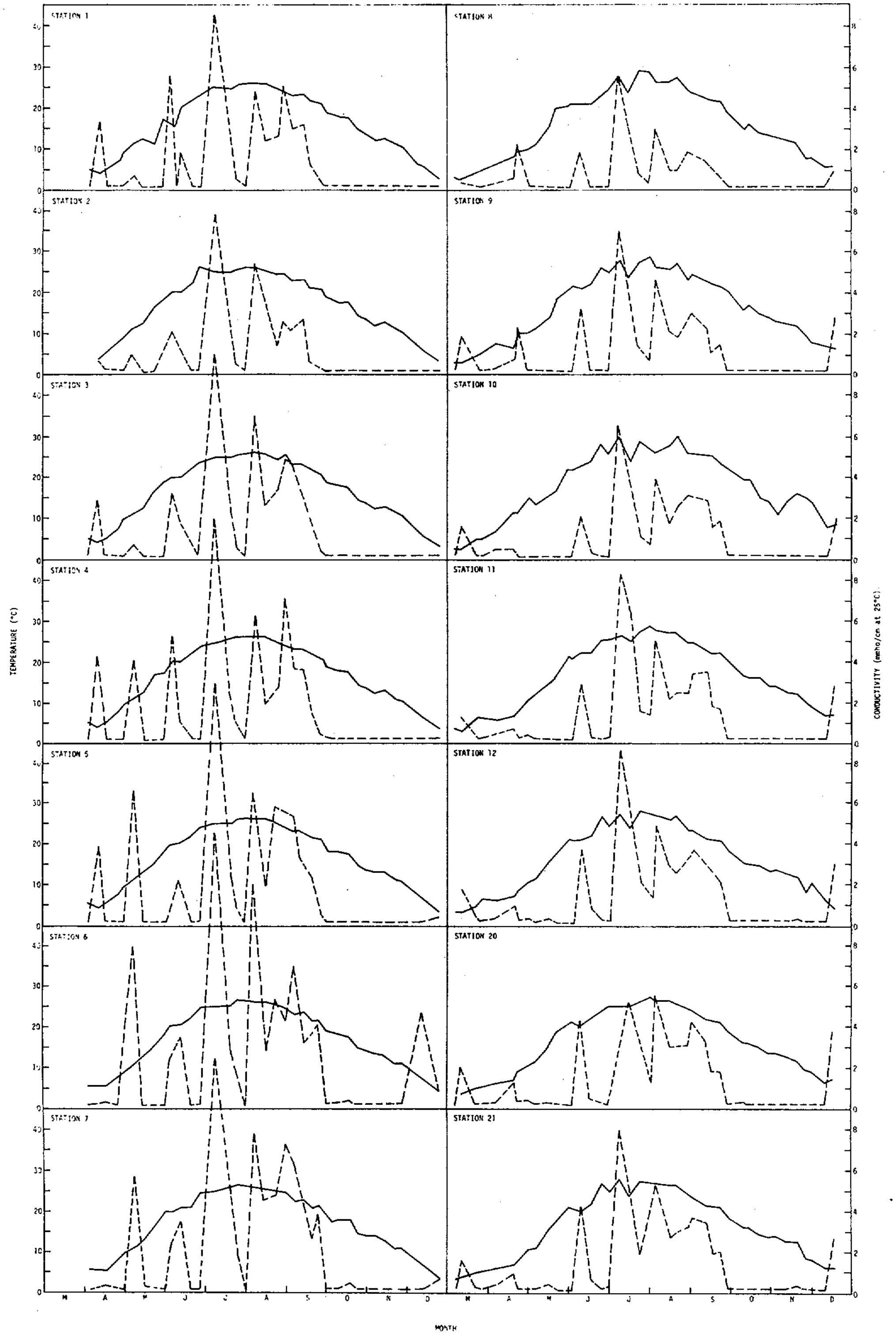


Figure III-10. Seasonal Variation of Water Temperature (——) and Conductivity (----) at Indian Point Standard Sampling Stations during 1975. (Bottom measurements used for stations 1 through 7)

2. Temperature and Dissolved Oxygen Concentration

Dissolved oxygen solubility in water is inversely correlated with temperature, a relationship which is evident near Indian Point (Figure III-12).

Biological activity (photosynthesis and respiration) also affects oxygen concentration. These effects are most pronounced in localized areas during the warmer months of the year.

Fluctuations in water temperature and dissolved oxygen reflected seasonal variations in air temperature (Figure III-12). After an early period of little temperature change (January through March), temperatures rapidly increased through June; from July through August, temperatures remained relatively constant; during the final months of the year, temperatures declined to less than 5° C. Dissolved oxygen levels declined to minimum summer values and gradually increased thereafter. During the year, temperatures generally ranged from near 0° C to 27° C and dissolved oxygen values from 5 to 14 ppm.

Variations in freshwater flow also seem to effect temporal changes in temperature and dissolved oxygen. Summer short-term temperature depressions occurred during periods of peak freshwater flow (Figure III-12); during spring, the rate of temperature increase was highest, but high freshwater flows apparently retarded or reversed this increase; during fall, temperatures decreased, with the rate of decrease apparently accelerated by peak releases of fresh water into the estuary. Increased freshwater flows were also associated with oxygen depletion within the estuary. These instances of oxygen depletion were probably

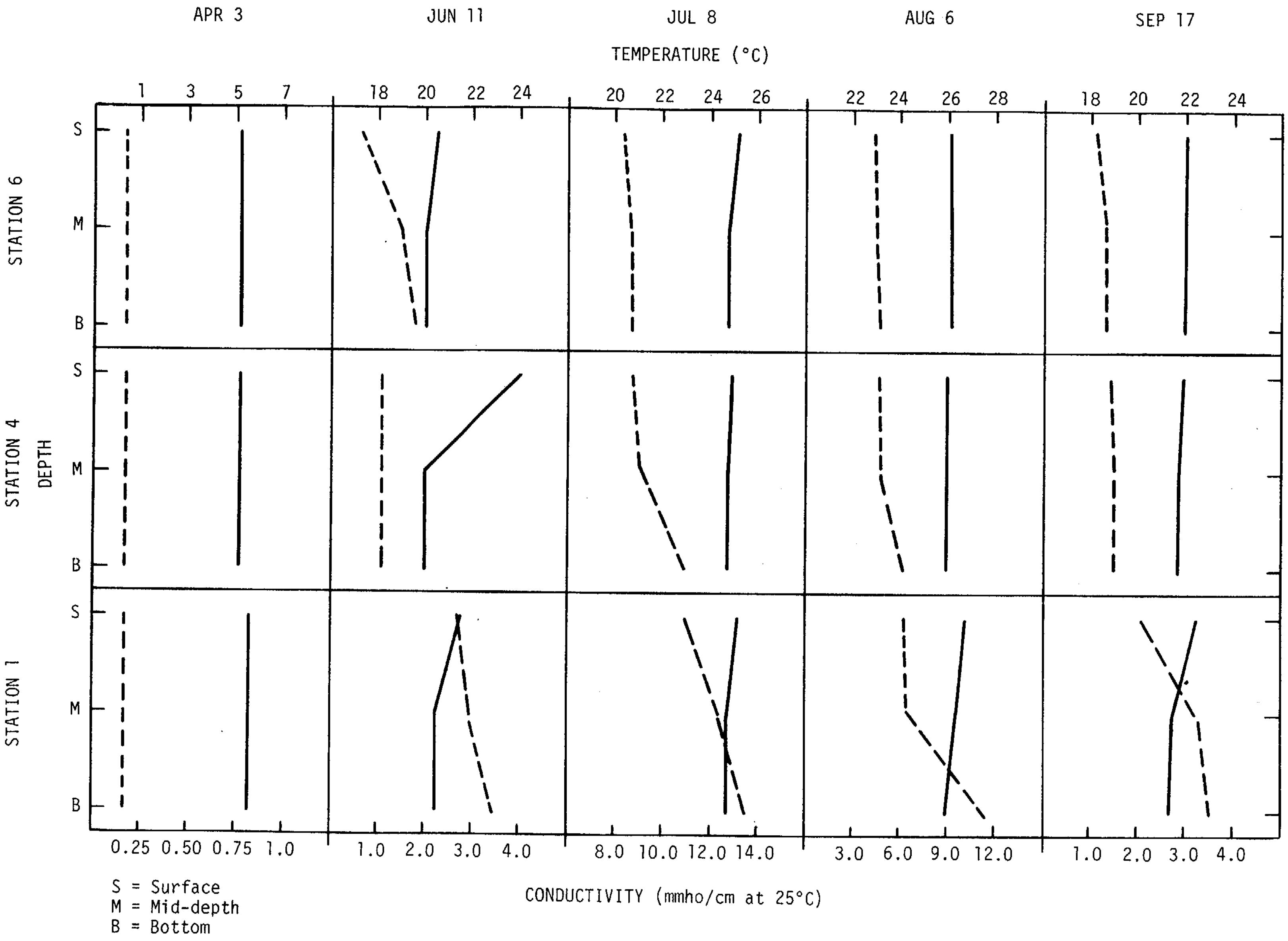


Figure III-11. Vertical Profiles of Temperature (——) and Conductivity (----) in Indian Point Region Determined from Surface, Middle, and Bottom Measurements at Standard Stations 1, 4, and 6 on Selected Days during 1975

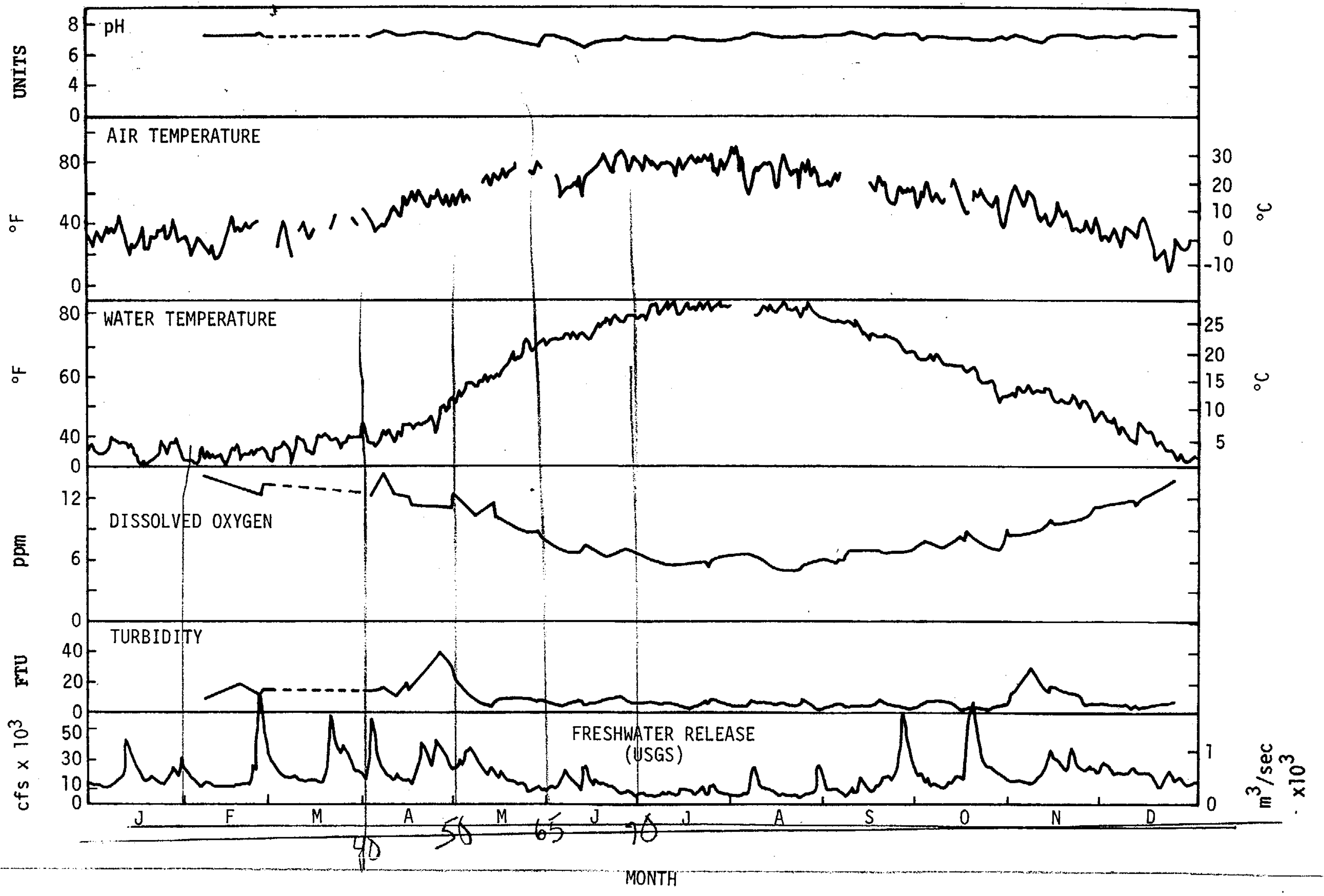


Figure III-12. Seasonal Variation of Water Temperature, pH, Dissolved Oxygen Concentration, Turbidity, and Air Temperature with Freshwater Flow in Hudson River at Indian Point. (Water temperatures from TI impingement study; pH and dissolved oxygen values [mid-depth] and turbidity values [surface] measured weekly at standard-station 4) caused by increased biological oxygen demand resulting from additional organic material carried into the estuary during high runoff periods (TI, 1974a).

Daily variations in temperature and dissolved oxygen generally were limited to shallow-water areas where ambient meteorological conditions are more likely to influence the effects of temperature and biological activity on oxygen concentration. During the summer, beach areas tended to be slightly warmer (2-3° C) than deep-water areas (Figure III-10). Usually, sampling stations 4 and 10 near the Indian Point power plant's discharge were somewhat warmer than those outside the thermal plume's influence (Figure III-10 and TI, 1974a). Vertical temperature stratification occurred only at standard-sampling station number 4 (Figure III-11); temperature measurements were quite similar at all depths sampled. When photosynthetic activity was high, shallow areas exhibited higher oxygen levels than did the deep-water areas; at other times, values at all stations were usually comparable. In deep-water areas, there have been localized occurrences of oxygen depletion, especially during warmer months (TI, 1975a); these reductions in oxygen concentration generally develop in areas subjected to high organic loading where mixing is limited. During the 1975 standard-station sampling survey in the Indian Point region, localized oxygen depletion was not recorded (Figure III-13).

3. Turbidity

Turbidity values within the Indian Point region generally ranged between 2 and 20 FTUs. Seasonal variations, similar at all stations (Figure III-13), appeared to be related to changes in freshwater flow: during periods of increased freshwater flow, turbidity values generally increased. The two major periods of increased turbidity in April and November 1975 followed peak periods of freshwater release at Green Island (Figure III-12). Beach areas generally were somewhat more turbid and showed greater variation than did trawl areas.

4. Hydrogen Ion Concentration (pH)

Measurements of pH in the Indian Point area have continued to indicate the strong buffering capacity of the estuary. Values have ranged between 6.5 and 7.5, with the majority approximately equalling 7.0 (Figures III-12 and III-13). Seasonal patterns have not been apparent. Beach-seine data have tended to be more variable than trawl data during warmer months.

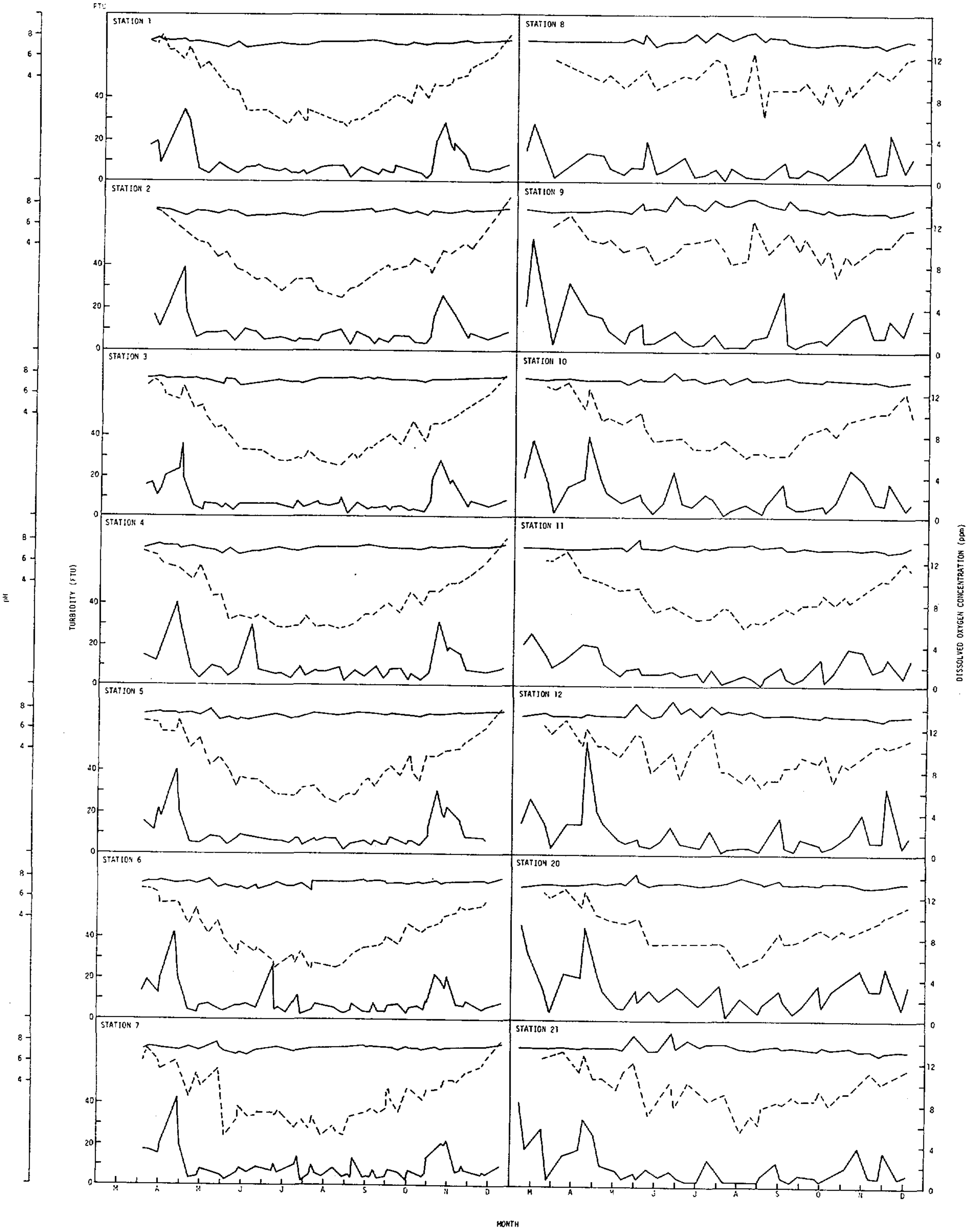


Figure III-13. Seasonal Variation of Dissolved Oxygen (----), pH (Upper Solid Line), and Turbidity (Lower Solid Line) at Indian Point Standard Sampling Stations during 1975. (Bottom measurements used for dissolved oxygen and pH for stations 1 through 7)

SECTION IV

STANDARD-STATION FISHERIES

A. INTRODUCTION

It is essential to develop "trend-through-time" data series if changes in fish community structure resulting from environmental stress are to be followed (Loftus, 1976). To establish such a data series for the Indian Point region (RM 39-47[KM 63.0-75.9]), Texas Instruments initiated a standard-station fisheries sampling program in 1972, complementing standard-station catch data with riverwide fisheries and physicochemical data. Standard-station catch data have been evaluated to characterize species composition and richness, relative abundance, and distribution of fishes in the Indian Point area. Changes or lack of changes in these community attributes have been noted.

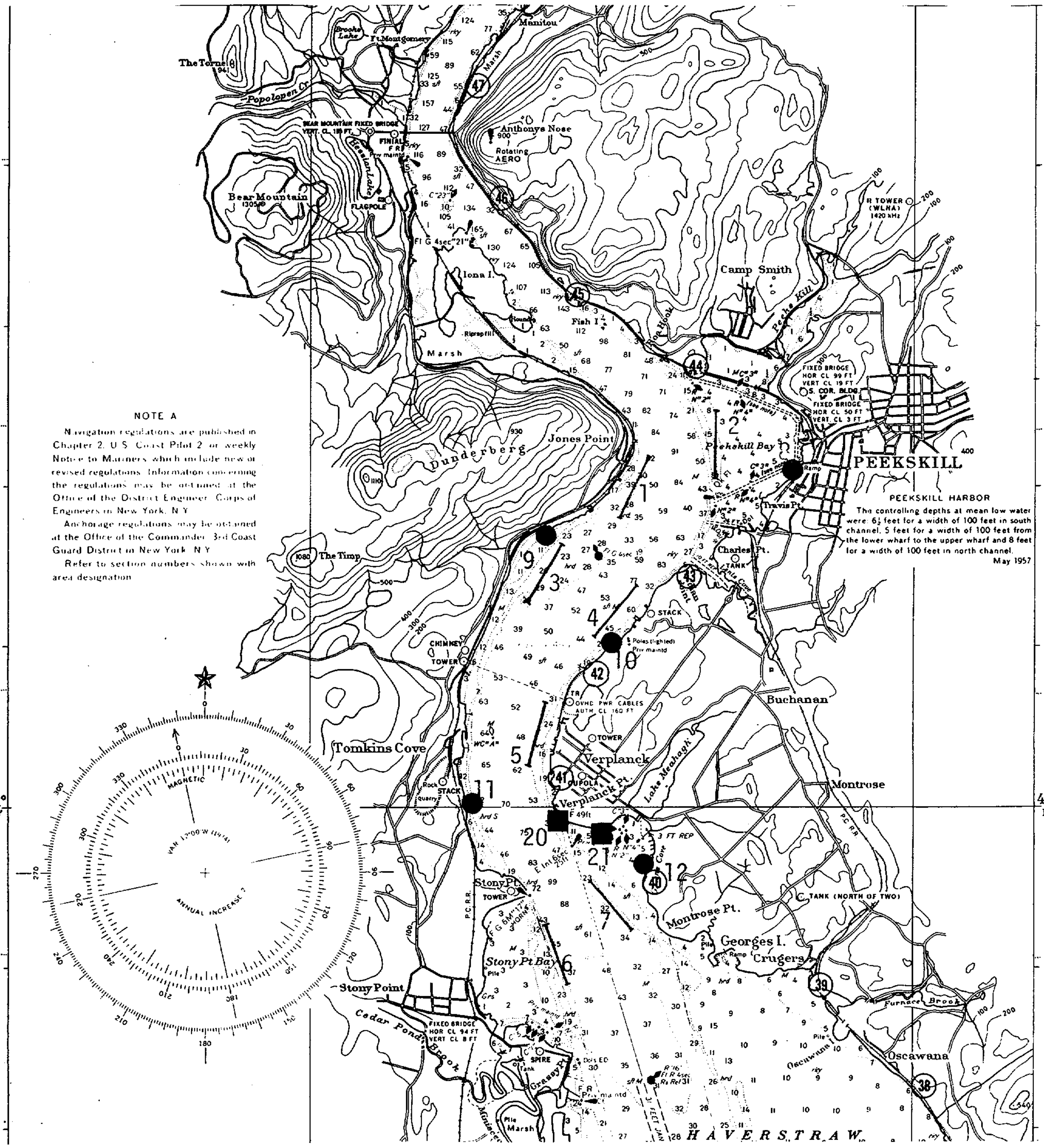
The following paragraphs review the methods, materials, and findings of the 4-year effort.

B. FIELD METHODS AND MATERIALS

1. Standard-Station Beach Seines

a. 1972

From late April through December 1972, five standard sites in the Indian Point region (Figure IV-1) were sampled weekly with beach seines (all on the same day if possible) during daylight, beginning approximately 2 hr before a mean low tide. Also, biweekly (once every 2 weeks) during late April and May and monthly from June through December,



○ BEACH-SEINE SITES, 1972-1975

■ BEACH-SEINE SITES, MAY-DECEMBER 1974

I BOTTOM-TRAWL AND SURFACE-TRAWL SITES

Figure IV-1. Standard-Station Beach-Seine, Bottom-Trawl, and Surface-Trawl Sites in Hudson River Estuary, RM 39-43 (KM 62-69), 1972-75 each of the five stations was sampled once every 6 hr during a 24-hr interval. These samples were taken approximately 2 hr before mean high or mean low tide during each period of tidal change.

A 100-ft (30.5-m) beach seine was used for all sampling (Table IV-1). Figure IV-2 shows how it was set and towed.

The standard beach-seine stations were located using shoreline landmarks. They and their locations are described in Table IV-3.

b. 1973

The same five stations were used for weekly collections from late March through December 1973*. In addition to daylight sampling, there was monthly sampling once every 6 hr during a 24-hr period.

c. 1974

From late March through December 1974, the same five beach-seine sites were sampled weekly during daylight hours only. Beginning in May and continuing through December, two additional stations were sampled (Figure IV-1 and Table IV-3).

d. 1975

From late March through December 1975, the seven sites used in 1974 were sampled during daylight.

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*In 1973 and 1975, occasional sampling was conducted during periods of mild weather in January, but the data were not included in this report since not all years and stations were represented.

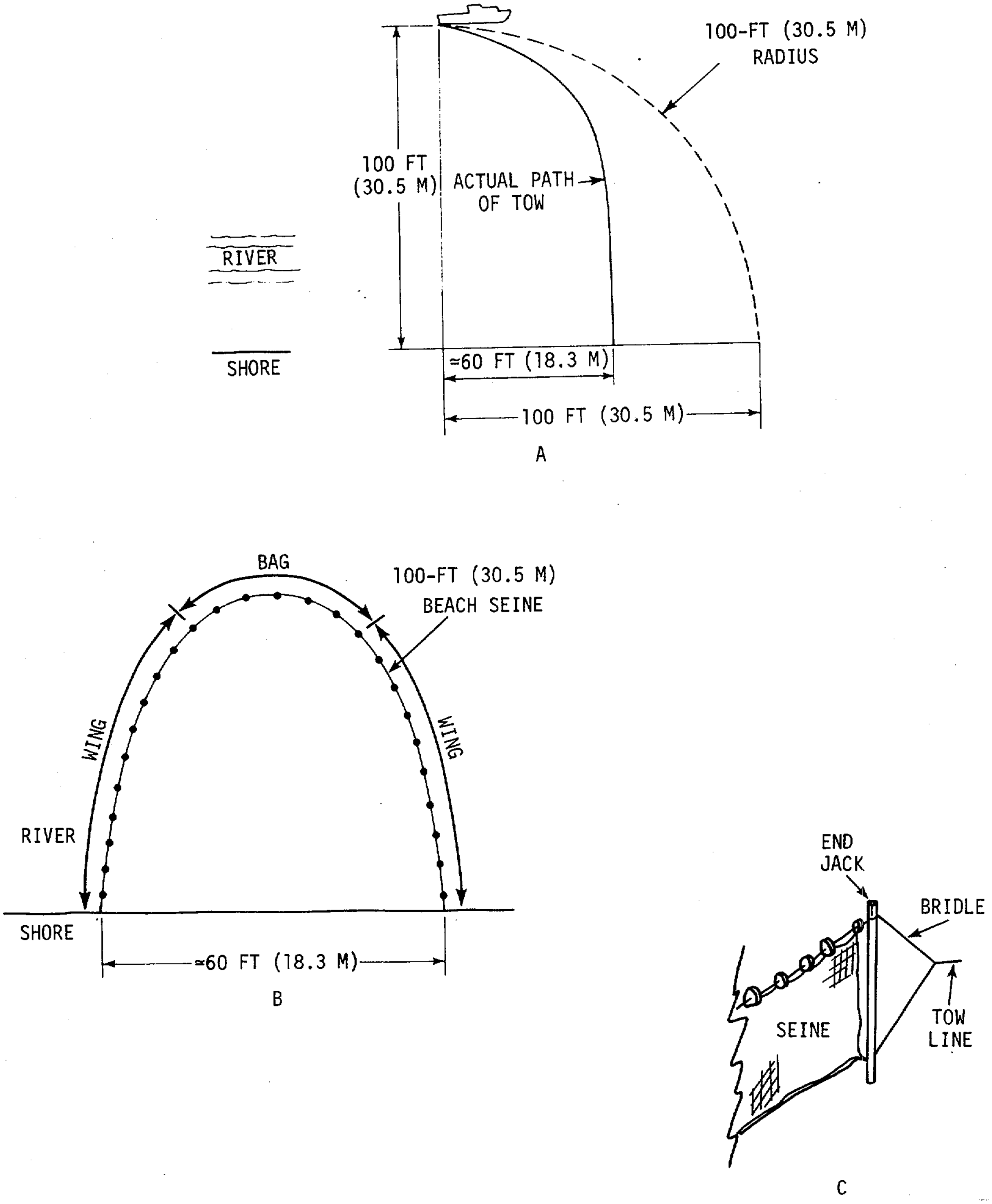

Figure IV-2. 100-ft (30.5-m) Beach-Seine Deployment. (A) With one end attached to 16-ft tow line (connected to boat) and other end held on shore, net is stretched perpendicular to shore, then towed clockwise around to shore, forming half a semicircle. (B) After completion of tow. (C) Jack and tow arrangement.

Table IV-1

Description of 100-ft (30.5-m) Beach Seine Used for Standard-Station Sampling, Indian Point Region, Hudson River Estuary, New York, 1972-75

Element	Dimensions	Mesh Size
Wings	40 ft x 8 ft (12.1 m x 2.4 m)	3/8-in (9mm) stretch
Bag	20 ft x 10 ft (6.1 m x 3 m)	3/16-in (4.5 mm) delta
End jacks	2 in x 4 in x 8 ft (5 cm x 10 cm x 1.3 m)	
Tow line	16 ft x 3/8 in (4.8 m x 1 cm)	

Table IV-2

Locations of Standard-Station Trawl Sites, Indian Point Region, Hudson River Estuary, New York 1972-75

Station	RM	Approx. Depth* (m)	Approx. Tow Course* (°)	Location**	
				Latitude	Longitude
1	43	9	031	41° 16'57"	73° 57'17"
2	43	5	350	41° 17'12"	73° 56'38"
3	42	5	031	41° 16'25"	73° 58'16"
4	42	16	043	41° 16'14"	73° 57'36"
5	41	12	024	41° 15'42"	73° 58'03"
6	39	12	336	41° 14'04"	73° 57'55"
7	40	5	304	41° 14'36"	73° 57'28"

*True course given is for upriver towing; tows are routinely made against the tide, so a tow course of 010° would be 190° during incoming tide.

**Refers to midpoint of tow.

Table IV-3

Descriptions of Standard-Station Beach-Seine Sites, Indian Point Region, Hudson River Estuary, New York, 1972-75

Station	Location	Description
8	In Peekskill Bay (RM 43, east side) immediately south of public launching ramp	Mud but beach covered with accumulation of glass; maximum depth, 1.5 m; covered with heavy aquatic vegetation during summer
9	South of Jones Point (RM 42, west side) and adjacent to former reserve fleet headquarters	Medium-sized rocks and mud changing to gravel farther out; maximum depth, 1.5 m; heavily vegetated during summer
10	Gas line 100 m south of Con Edison Indian Point discharge canal (RM 42, east side)	Sand and gravel changing to mud at greater depths; maximum depth, 2 m; small stream enters river immediately south of sampling site
11	35 m south of Trap Rock Corp. barge mooring area (RM 40, west side)	Sand; drops off steeply to depth of 2.5 m
12	South of Green's Cove (RM 40, east side) 100 m south of Cortlandt Yacht Club	Gravel and crushed brick; drops off to maximum depth of 2 m; very dense aquatic vegetation during summer
20*	Verplanck Point (RM 40, east side) 10 m south of pier	Sand; drops steeply to maximum depth of 2 m
21*	Verplanck Point (RM 40, east side) 50 m south of trailer park	Sand changing to mud; maximum depth, 2 m

*Two stations added in May 1974

2. Standard-Station Bottom Trawls

a. 1972

In April 1972, weekly daylight and biweekly nighttime sampling was initiated at seven fixed trawl stations (Figure IV-1 and Table IV-2). From April through June, samples were collected with an otter-type bottom trawl similar to the trawl used in 1969 and 1970 by Raytheon (1971). A fine mesh (0.6-cm) cod-end liner (Table IV-4 and Figure IV-3) was included. The same trawl, but without the cod-end liner, was used from July through December.

Stations were located using depth contours and shoreline landmarks (Figure IV-1). All bottom trawls were towed against the tide for 10 min at 1.0 m/sec maintaining a 3:1 cable-length:river-depth ratio.

b. 1973

The seven Indian Point bottom-trawl stations were sampled only during the day in 1973. Samples were collected from late March through December using the otter-type bottom trawl without a cod-end liner. In 1973 and thereafter a 4:1 cable-length:river-depth ratio was maintained.

c. 1974

From April through December 1974, the seven standard-station trawl sites were sampled biweekly during daylight hours using the trawl without the cod-end liner. Using the same trawl into which had been sewn a fine mesh (1.6-cm) cod-end liner, an additional set of samples was taken

Table IV-4

Description of Bottom Trawls Used for Standard-Station Sampling, Indian Point Region, Hudson River Estuary, New York, 1972-75

	Length		Stretch Mesh Size	
	ft	(m)	in	(cm)
Total	44.3	(13.5)		
Body	33	(10)		
Body mesh			1.5	(3.8)
Cod end	11.6	(3.5)		
Cod-end mesh			1.25	(3.1)
Head rope	25.7	(7.8)		
Foot rope	30.7	(9.3)		
Door	1.3 x 2.6	(0.4 x 0.8)		
Cod-end liner mesh			0.25 0.6	(0.6)* (1.6)†

* Used from April through June 1972.

† Used from July 1974 through December 1975 for repetitive samples. No liner used from July 1972 through June 1974.

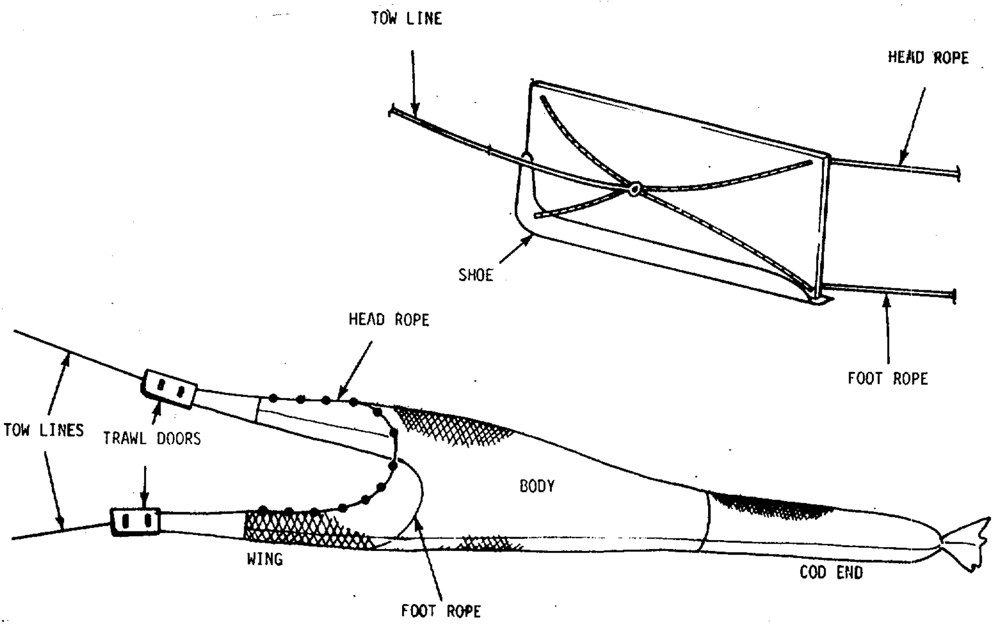

Figure IV-3. Bottom Trawl Used during Standard-Station Sampling, 1972-75. (A) Basic design. (B) Trawl doors.

(Table IV-4) on either the day preceding or the day after the collections with the unlined trawl. From June through December, new trawls constructed of knotless nylon of the same mesh size were used interchangeably with the older knotted nylon trawls.

d. 1975

The 1975 sampling was biweekly during the day from April through December. Unless equipment problems necessitated the use of older equipment, bottom trawls were of knotless nylon mesh.

3. Standard-Station Surface Trawls

a. 1972

From April through December 1972, fixed trawl stations (Figure IV-1, Table IV-2) between RM 39 and 43 (KM 62 and 69) were sampled weekly during the day and biweekly at night with a surface trawl modified from a midwater-trawl design (Table IV-5, Figure IV-4). The trawls were deployed as shown in Figure IV-4 and towed against the tide for 10 min at 1.0 m/sec.

b. 1973

During May-December 1973, the seven sites were sampled only during daylight. Collections were biweekly.

c. 1974-75

During July-December, 1974-75, the seven stations were sampled biweekly during daylight.

Table IV-5

Description of Surface Trawl Used for Standard-Station Sampling, Indian Point Region, Hudson River Estuary, New York, 1972-75

Element	Length ft	(m)	Stretch Size in.	(cm)
1st section	6.9	(2.1)	1.7	(4.3)
2nd section	10.9	(3.3)	1.4	(3.5)
3rd section	9.9	(3.0)	1.2	(3.0)
4th section	8.9	(2.7)	1.0	(2.5)
Cod end	9.6	(2.9)	0.16	(0.4)
Head rope	17.5	(5.3)	———	
Foot rope	17.5	(5.3)	———	
Spreader bars	10.8	(3.3)	———	
Total	49.5	(15.0)	———	

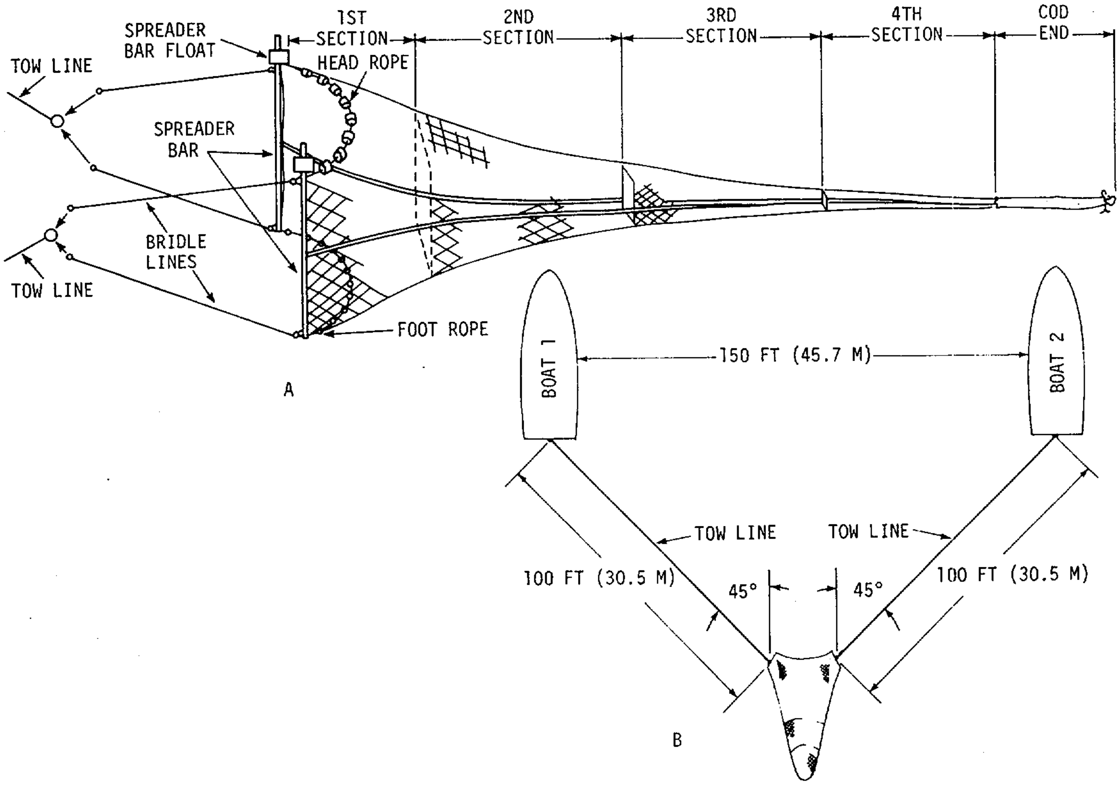

Figure IV-4. Surface Trawl Used during Standard-Stations Sampling, 1972-75. (A) Design (B) Deployment

C. LABORATORY PROCESSING

In 1972, samples were sorted by species and the total number of each species separated into the following four (total) length groups: 0-49 mm, 50-125 mm, 126-250 mm, and 251+ mm. Young-of-the-year were not differentiated from adults except for white perch and striped bass which were differentiated by scale analysis.

Based on results of the 1972 biological characteristics work on white perch and striped bass (TI, 1973), four new length classes were established for use from January through mid-July 1973: 0-100 mm, 101-150 mm, 151-250 mm, and 251+ mm. From mid-July through December 1973, the following were the length classes: 0-x mm, x + 1-150 mm, 151-250 mm, and 251+ mm. The x value denoted the upper total length limit for young-of-the-year and was updated periodically by species to adjust for growth of the young-of-the-year age class, i.e., to separate by length the young-of-the-year from yearling and older fish. During 1973, this procedure was applied only to white perch and striped bass.

The length classes from January through mid-July 1974 were: 0-100 mm, 101-150 mm, 151-250 mm, and 251+ mm. From mid-July through December 1974, the x variable was utilized as in 1973 to differentiate young-of-the-year from older fish except that it was applied to all species collected. The same length classes using the x variable employed after mid-July in 1973 and 1974 were utilized throughout 1975 for all species.

D. ANALYSIS

Species composition was evaluated by noting the occurrence of fish species captured in standard-station samples from 1972 through 1975. Comparison of species occurrence among the three sampling gears was also made. Species were categorized in terms of generalized life history and occurrence in the Hudson River estuary according to the Fisheries Survey of the Hudson River: March-December 1973 (TI, 1976).

The richness of the Indian Point fish community was analyzed by evaluating the numbers of species and families recorded from standard-station samples during each of the four years considered. Numbers of families and species captured in each type of sampling gear were also compared.

The relative abundance of species commonly occurring in the standard-station samples was assessed by interpreting the catch-per-unit-effort (CPUE) values for each gear* plotted against time on a yearly basis. Distribution among sampling sites for common species except striped bass, white perch, and Atlantic tomcod was analyzed in the same manner; distribution of the latter species was evaluated with the Friedman nonparametric 2-way analysis of variance and the multiple-comparisons approach to *a posteriori* comparisons of the Friedman test (Hollander and Wolfe, 1973). Biweekly intervals in which the total CPUE for the gear under consideration was 0 were not included in the test.

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* For bottom trawls, only CPUE values for unlined trawls were considered, since the employment and mesh size of cod-end liners was variable over the 1972-1975 period (see Table IV-4).

E. RESULTS

1. Species Composition and Richness

A summary of the numbers of families and species taken by each gear (Table IV-6) indicates that the greatest variety occurred in shore and bottom regions, with surface trawls accounting for the lowest numbers. This trend was noted in a previous report (TI, 1973). Throughout the 4-year period, numbers of families and species showed little variation in surface or bottom trawls. In beach-seine collections, the number of families remained nearly constant but the number of species increased, peaking in 1974.

Of the 60 species collected during 1972-75, seven were anadromous, one was catadromous, seven were estuarine, 28 were typically freshwater, and 17 were marine (Table IV-7). Most of the marine forms collected in the vicinity of Indian Point were juveniles utilizing the estuary as a summer nursery-feeding ground, a typical pattern observed in many coastal areas along the eastern seaboard (Gunter, 1957; Perlmutter et al, 1967; McErlean et al, 1973; Haedrich and Haedrich, 1974; Allen and Horne, 1975).

The fish community in stressed ecosystems often lacks the richness of those in undisturbed environments and may undergo changes in species composition (Cairnes and Kaesler, 1971; Hynes, 1972; Odum, 1971; Warren, 1971; McErlean et al, 1973; Hocutt et al, 1974). From 1972 to 1975, there were no apparent changes in species composition or richness in the vicinity of Indian Point, suggesting that the fish community was relatively stable during the 4-year period.

Table IV-6

Numbers of Families and Species Collected in Standard-Station Samples, Indian Point Region, Hudson River Estuary, New York, 1972-1975

	Year							
	1972		1973		1974		1975	
Gear	Family	Species	Family	Species	Family	Species	Family	Species
100-ft beach seine	19	35	22	39	22	47	21	40
Surface trawl	10	15	9	12	5	12	8	13
Small bottom trawl	15	23	14	21	14	23	14	20
All combined	21	38	23	40	22	49	23	43

2. Relative Abundance and Distribution of Common Species

In many natural communities, a few species are numerically dominant while a larger number of species occur less frequently (Odum, 1971; Hynes, 1972). Of the 60 species of fish recorded from standard-station collections during 1972-75, 13 occurred most commonly (Table IV-7). Their relative abundance and distribution are discussed in the following paragraphs.

a. Striped Bass (*Morone saxatilis*)

CPUE values for striped bass were significantly different ($p < 0.05$) among standard-station beach-seine sites for each of the 4 years considered (Figures IV-5 through IV-8 and Tables B-1 through B-4). Generally, CPUE values at stations 10 and 11 along open stretches of the river and nearest to deep water (Figure IV-1 and Table IV-3) were significantly higher ($p < 0.05$) than those at stations 8 and 12 which are located in heavily vegetated shoal areas; those at stations 9, 20, and 21 were intermediate.

Table IV-7

Fishes Collected in Standard-Station Samples, Yearly and by Gear, Indian Point Region, Hudson River Estuary, New York, 1972-75†

Species	Principal Usage of Estuary ‡	Beach Seine				Surface Trawl				Bottom Trawl			
		72	73	74	75	72	73	74	75	72	73	74	75
STURGEONS - ACIPENSERIDAE													
Shortnose sturgeon - *Acipenser brevirostrum*	M-F Life resident; spawning (Sp)	-	-	-	-	-	-	-	-	+	+	+	+
Atlantic sturgeon - *Acipenser oxyrhynchus*	M-F Resident during early years; larger adults anadromous; spawning (Sp)	-	-	-	-	-	-	-	-	-	-	+	-
FRESHWATER EELS - ANGUILLIDAE													
American eel - *Anguilla rostrata*	M-F Catadromous; nursery adult feeding	+	+	+	+	+	-	-	+	+	+	+	+
HERRINGS - CLUPEIDAE													
*Blueback herring - *Alosa aestivalis*	M-F Anadromous; spawning (Sp); nursery (Sp-F)	+	+	+	+	+	+	+	+	+	+	+	+
*Alewife - *Alosa pseudoharengus*	M-F Anadromous; spawning (Sp); nursery (S-F)	+	+	+	+	+	+	+	+	+	+	+	+
*American shad - *Alosa sapidissima*	M-F Anadromous; spawning (Sp); nursery (S-F)	+	+	+	+	+	+	+	+	+	+	+	+
Atlantic menhaden - *Brevoortia tyrannus*	M-F Nursery (Sp-S); adult feeding lower estuary	+	-	+	-	+	+	+	+	+	-	+	+
Gizzard shad - *Dorosoma cepedianum*	M-F Nursery (S-W)	+	-	+	+	-	-	-	+	-	-	+	+
ANCHOVIES - ENGRAULIDAE													
*Bay anchovy - *Anchoa mitchilli*	M-F Life resident; spawning (Sp-S)	+	+	+	+	+	+	+	+	+	+	+	+
TROUTS - SALMONIDAE													
Brown trout - *Salmo trutta*	F Life resident (tributary streams)	-	+	-	-	-	-	-	-	-	-	-	-
SMELTS - OSMERIDAE													
Rainbow smelt - *Osmerus mordax*	M-F Anadromous; spawning (Sp); nursery (S-F)	+	+	+	+	+	+	-	-	+	+	+	+
PIKES - ESOCIDAE													
Redfin pickerel - *Esox americanus*	F Life resident; spawning (W-Sp)	-	-	-	+	-	-	-	-	-	-	-	-
Chain pickerel - *Esox niger*	F Life resident; spawning (W-Sp)	+	-	+	-	-	-	-	-	-	-	-	-
Northern pike - *Esox lucius*	F Life resident (tributary streams)	-	-	+	-	-	-	-	-	-	-	-	-
MINNOWS & CARPS - CYPRINIDAE													
Goldfish - *Carassius auratus*	F Life Resident; spawning (Sp)	+	+	+	+	-	-	-	-	+	+	+	-
Carp - *Cyprinus carpio*	F Life resident; spawning (Sp-S)	+	+	+	+	-	-	-	-	-	-	-	-
Silvery minnow - *Hybognathus nuchalis*	F Life resident; spawning (Sp)	-	-	+	-	-	-	-	-	-	-	-	-
Golden shiner - *Notemigonus crysoleucas*	F Life resident; spawning (Sp-S)	+	+	+	+	+	-	-	-	-	-	-	-
Emerald shiner - *Notropis atherinoides*	F Life resident; spawning (Sp-S)	-	-	+	+	-	-	-	-	-	-	-	-
*Spottail shiner - *Notropis hudsonius*	F Life resident; spawning (Sp-S)	+	+	+	+	+	+	-	-	+	+	+	+
Spotfin shiner - *Notropis spilopterus*	F Life resident; (tributary streams)	-	-	+	-	-	-	-	-	-	-	-	-
Bridle shiner - *Notropis bifrenatus*	F Life resident; (Sp-S)	-	+	-	-	-	-	-	-	-	-	-	-
Common shiner - *Notropis cornutus*	F Life resident (tributary streams)	-	-	+	-	-	-	-	-	-	-	-	-
Redfin shiner - *Notropis umbratilis*	F (1)	-	-	+	-	-	-	-	-	-	-	-	-
Blacknose dace - *Rhinichthys atratulus*	F Life resident (tributary streams)	-	+	+	-	-	-	-	-	-	-	-	-
SUCKERS - CATOSTOMIDAE													
White sucker - *Catostomus commersoni*	F Life resident; spawning (Sp)	+	+	+	+	-	-	-	-	-	-	+	-
FRESHWATER CATFISHES - ICTALURIDAE													
White catfish - *Ictalurus catus*	F Life resident; spawning (Sp)	+	+	+	+	-	-	-	-	+	+	+	+
Brown bullhead - *Ictalurus nebulosus*	F Life resident; spawning (Sp-S)	+	+	+	+	+	-	-	-	+	+	+	+
CODS - GADIDAE													
*Atlantic tomcod - *Microgadus tomcod*	M-F Spawning (W); nursery (Sp-F); adult feeding	+	+	+	+	+	-	-	+	+	+	+	+
NEEDLEFISHES - BELONIDAE													
Atlantic needlefish - *Strongylura marina*	M-F Nursery (S); adult feeding (S)	-	-	+	+	-	-	-	-	-	-	-	-
KILLIFISHES - CYPRINODONTIDAE													
*Banded killifish - *Fundulus diaphanus*	F Life resident; spawning (Sp-S)	+	+	+	+	-	-	-	-	-	-	-	+
Mummichog - *Fundulus heteroclitus*	M-F Life resident; spawning (Sp-S)	+	+	+	+	-	-	-	-	-	-	-	-
SILVERSIDES - ATHERINIDAE													
Tidewater siverside - *Menidia beryllina*	M-F Life resident; spawning (Sp-S)	-	-	+	+	-	-	+	-	-	-	-	-
Atlantic silverside - *Menidia menidia*	M-F Life resident; spawning (Sp-S)	+	+	+	+	-	+	+	-	-	-	-	-
Rough silverside - *Membras martinica*	M Nursery (S-F)	-	-	-	+	-	-	-	+	-	-	-	-
STICKLEBACKS - GASTEROSTEIDAE													
Fourspine stickleback - *Apeltes quadracus*	M-F Life resident; spawning (Sp-S)	+	+	+	+	-	-	-	-	-	-	-	-
Brook stickleback - *Culaea inconstans*	F Life resident (tributary streams)	-	-	+	+	-	-	-	-	-	-	-	-
Threespine stickleback - *Gasterosteus aculeatus*	M-F Life resident; spawning (sp)	-	+	+	-	-	-	-	-	-	-	-	-
PIPEFISHES & SEAHORSES													
Northern pipefish - *Syngnathus fuscus*	M-F Nursery (S); adult feeding (S)	+	+	+	+	-	-	-	-	-	-	-	-
TEMPERATE BASSES - PERCICHTHYIDAE													
*White perch - *Morone americana*	M-F Anadromous; spawning (Sp-S) nursery (Sp-F); feeding (Sp-F)	+	+	+	+	+	+	+	+	+	+	+	+
*Striped Bass - *Morone saxatilis*	M-F Anadromous; spawning (Sp) nursery (S-F) feeding	+	+	+	+	+	+	+	+	+	+	+	+
SUNFISHES - CENTRARCHIDAE													
Rock bass - *Ambloplites rupestris*	F Life resident; spawning (S)	+	-	-	-	-	-	-	-	-	-	-	-
Red breast sunfish - *Lepomis auritus*	F Life resident; spawning (S)	+	+	+	+	-	-	-	-	-	-	-	-
*Pumpkinseed - *Lepomis gibbosus*	F Life resident; spawning (S)	+	+	+	+	-	-	+	-	+	+	+	-
Bluegill - *Lepomis macrochirus*	F Life resident; spawning (S)	+	+	+	+	+	-	+	+	+	+	-	-
Green sunfish - *Lepomis cyanellus*	F Life resident (tributary streams)	-	-	-	+	-	-	-	-	-	-	-	-
Largemouth bass - *Micropterus salmoides*	F Life resident; spawning (S)	+	+	+	+	-	-	-	-	-	-	-	-
Black crappie - *Pomoxis nigromaculatus*	F Life resident; spawning (S)	+	+	+	+	-	-	-	-	-	-	-	-
PERCHES - PERCIDAE													
*Tessellated darter - *Etheostoma olmstedi*	F Life resident; spawning (Sp)	+	+	+	+	-	-	-	-	+	+	+	+
Yellow perch - *Perca flavescens*	F Life resident; spawning (Sp)	+	+	+	+	-	-	-	-	+	+	-	-
BLUEFISHES - POMATOMIDAE													
*Bluefish - *Pomatomus saltatrix*	M-F Nursery (S); yearling feeding (S-F)	+	+	+	+	+	+	+	+	+	+	+	+
JACKS & POMPANOS - CARANGIDAE													
Crevalle jack - *Caranx hippos*	M-F Nursery (S)	+	+	+	+	-	-	-	-	-	-	-	-
DRUMS - SCIAENIDAE													
Weakfish - *Cynoscion regalis*	M-F Marine spawner; nursery (S)	-	+	+	-	-	+	-	-	+	+	+	+
Spot - *Leiostomus xanthurus*	M-F Nursery (S)	-	+	-	-	-	-	-	-	-	-	-	-
Atlantic croaker - *Micropogon undulatus*	M-F Nursery (F)	-	-	+	-	-	-	-	-	-	-	-	-
MULLETS - MUGILIDAE													
Striped mullet - *Mugil cephalus*	M Nursery (S-F)	-	+	-	-	-	-	-	-	-	-	-	-
White mullet - *Mugil curema*	M Nursery (S-F)	-	-	-	+	-	-	-	-	-	-	-	-
BUTTERFISHES - STROMATEIDAE													
Butterfish - *Peprilus triacanthus*	M Incidental	-	-	-	-	-	-	-	-	+	-	-	-
LEFTEYE FLOUNDERS - BOTHIDAE													
Summer flounder - *Paralichthys dentatus*	M Nursery (S-F)	-	+	-	-	-	-	-	-	-	-	-	-
SOLES - SOLEIDAE													
*Hogchoker - *Trinectes maculatus*	M-F Life resident; spawning (S)	+	+	+	+	-	-	-	-	+	+	+	+

† Adapted from Texas Instruments (1975b).

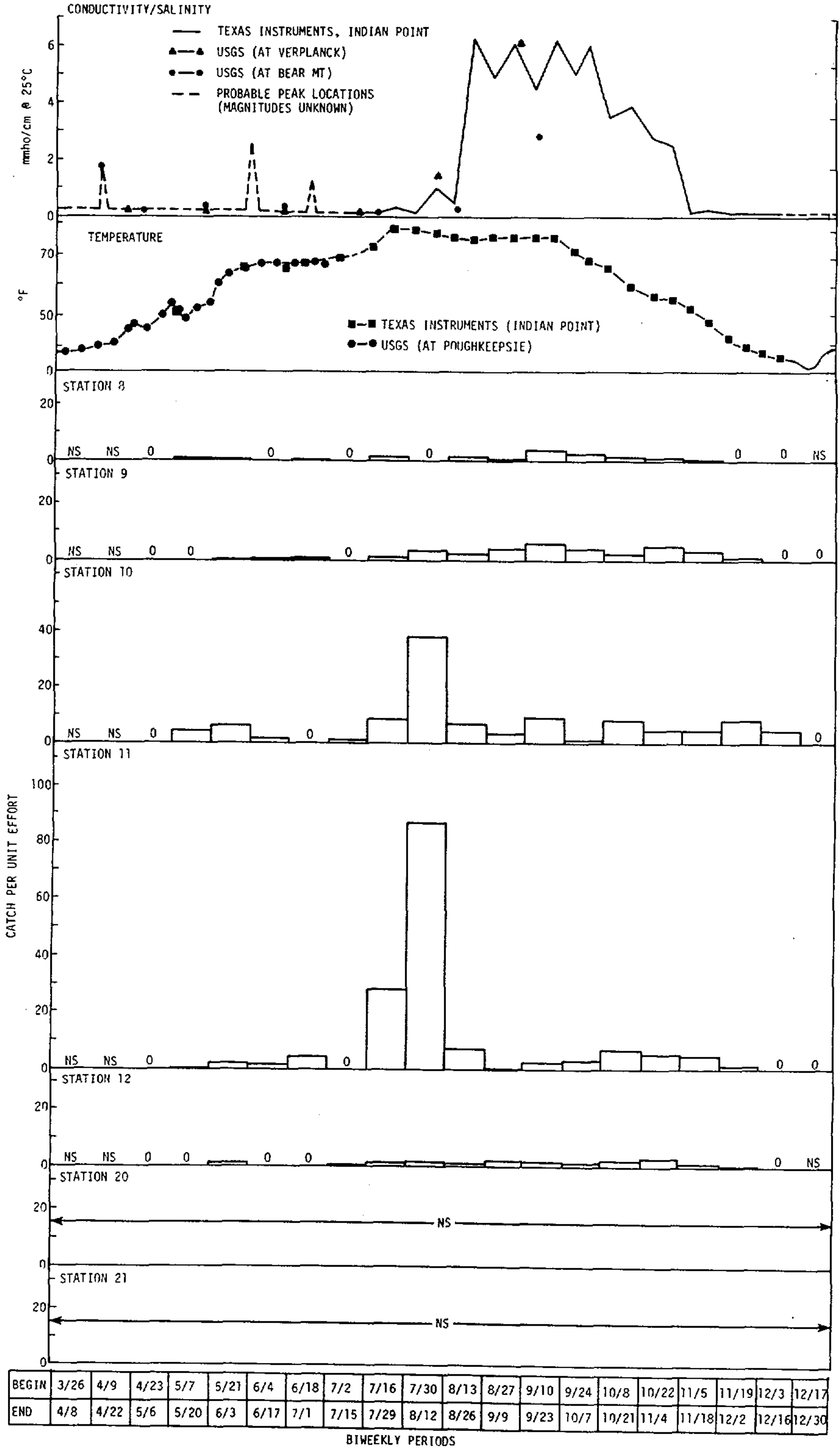
‡ General salinity distributions: F = limited to fresh or low-salinity waters; M = limited to marine or brackish waters; M-F = occurs in both marine and fresh waters (euryhaline); SP = Spring, S = Summer, F = Fall, W = Winter.

* Common Indian Point fish fauna.

\+ = present; - = absent; (1) = Probable misidentification.

Young-of-the-year striped bass first occur in shore zones of the Indian Point area in July. Beach seine CPUE values peak from July through September. Most striped bass spawning occurs north of the Indian Point area and young migrate shoreward and gradually downriver throughout the summer months (TI, 1976). Occurrence of young in the Indian Point area reflects this downstream migration. Relative abundance of young-of-the-year in beach-seine catches was greatest in 1973, lowest in 1972, and intermediate in 1974 and 1975 (Figures IV-5 through IV-8). CPUE values during the latter 2 years were similar. (The 1972-74 year classes of striped bass have been discussed in detail in an earlier report [TI, 1975c] .)

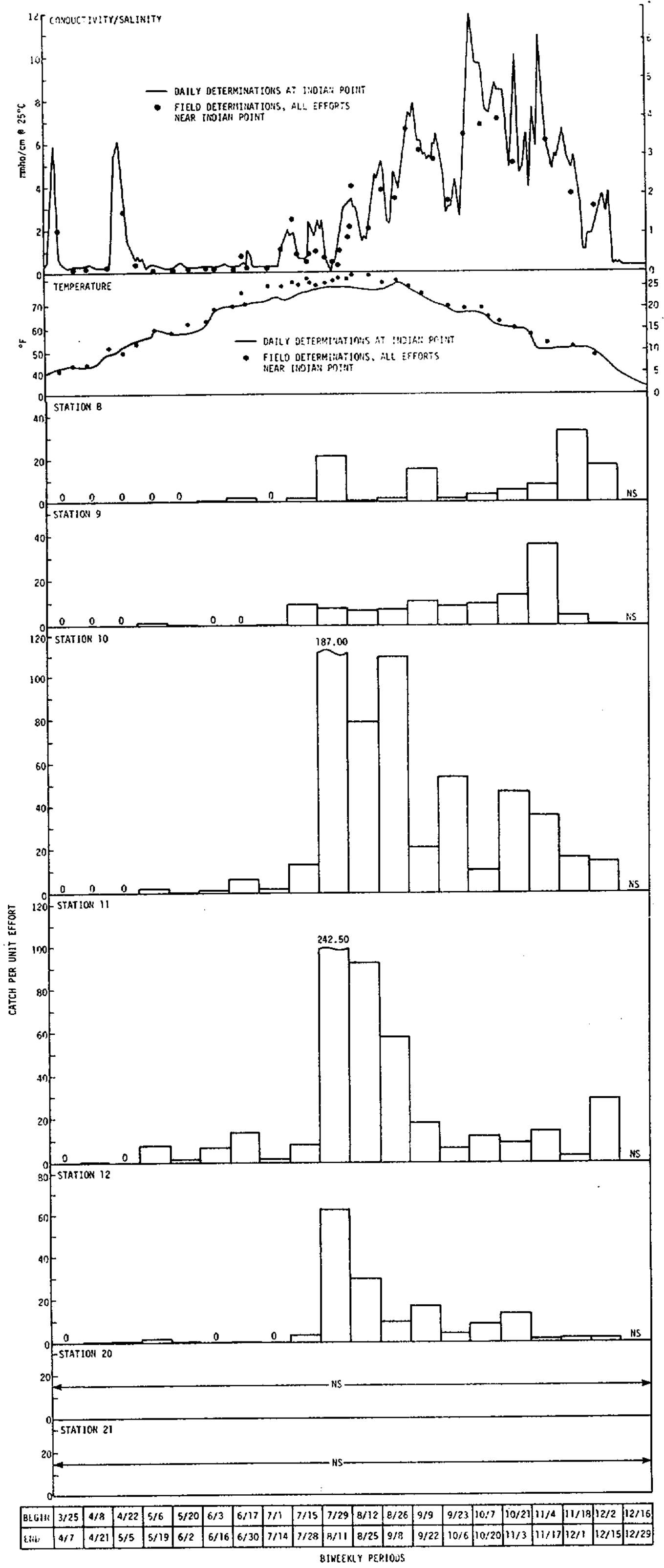
Subadult striped bass (ages I-III) were caught in standard-station beach seines from late March through mid-December, generally peaking in late May and June. Abundance levels were similar during all 4 years, and no long-term trends in nearfield abundance or distribution were discernible. Subadults apparently disperse from overwintering areas south of Indian Point throughout the Hudson River in the summer (TI, 1976). Limited catches occur throughout the summer and gradually decrease through the fall and early winter. Station 10 produced higher and more consistent catches of subadult striped bass than any other beach-seine site in 1974 and 1975 when subadults were differentiated from young-of-the-year. Since station 10 is adjacent to the effluent canal of the Indian Point power-generating facility, water temperatures there are generally warmer than at the other standard stations (TI, 1974a); during extended periods of no thermal discharge (e.g., summer 1973), however, catches at station 10 were still consistently high,



ADULTS, SUBADULTS AND YOUNG-OF-THE-YEAR NOT DIFFERENTIATED

NS = NO SAMPLE

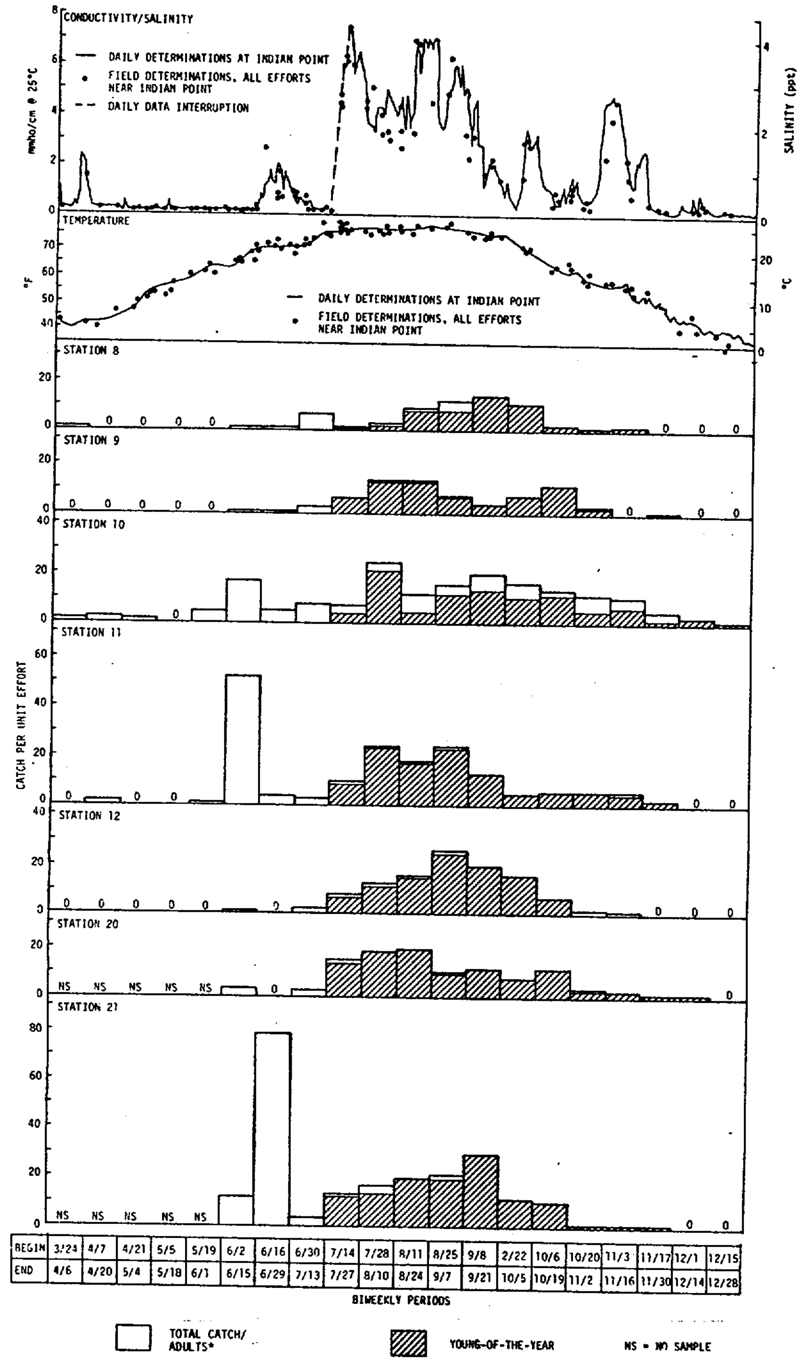
Figure IV-5. 1972 Beach-Seine Biweekly CPUE for Striped Bass, Indian Point Region, Hudson River Estuary, New York, Showing Water Temperature and Conductivity



ADULTS, SUBADULTS AND YOUNG-OF-THE-YEAR NOT DIFFERENTIATED

NS = NO SAMPLE

Figure IV-6. 1973 Beach-Seine Biweekly CPUE for Striped Bass, Indian Point Region, Hudson River Estuary, New York, Showing Water Temperature and Conductivity



*Adults not differentiated from young-of-the-year until mid-July

Figure IV-7. 1974 Beach-Seine Biweekly CPUE for Striped Bass, Indian Point Region, Hudson River Estuary, New York, Showing Water Temperature and Conductivity

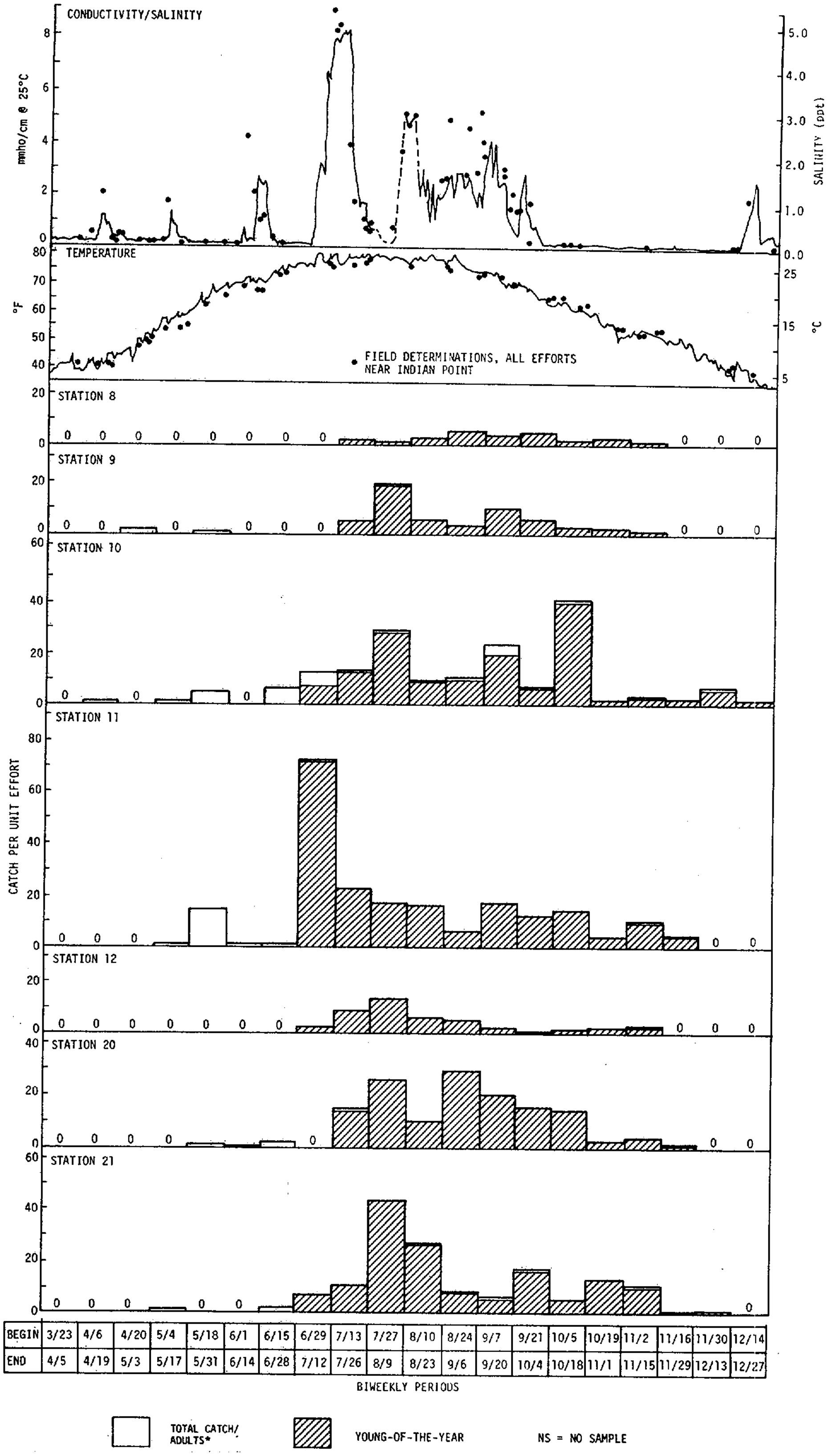


Figure IV-8. 1975 Beach-Seine Biweekly CPUE for Striped Bass, Indian Point Region, Hudson River Estuary, New York, Showing Water Temperature and Conductivity

suggesting that factors other than thermal preference influenced abundance at this site.

Subadults and young-of-the-year were also collected in bottom and surface trawls (Figures IV-9 through IV-12) but catches with these gears were low and infrequent.

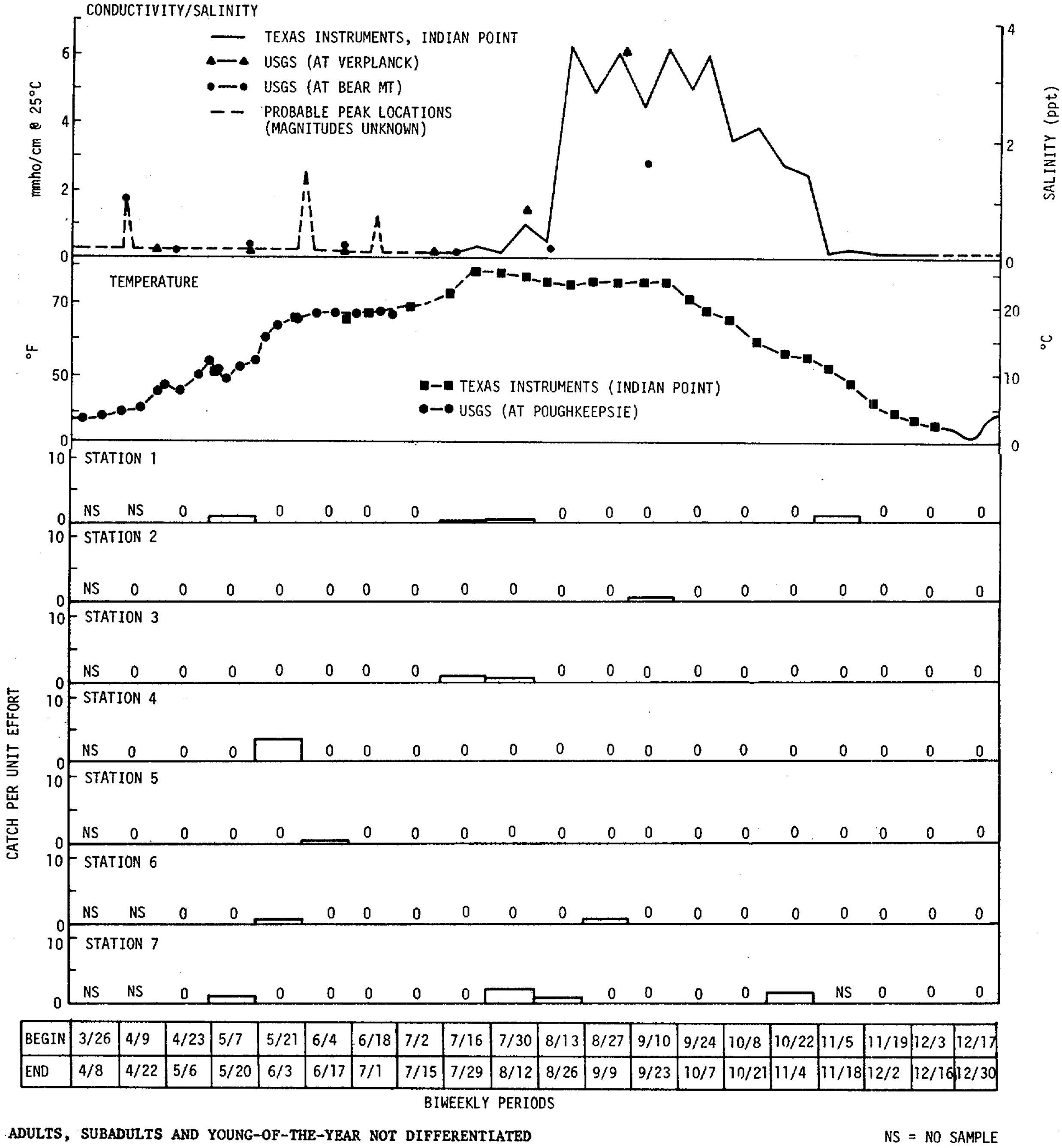
Adult striped bass (age IV and older), probably because of their ability to avoid small seines and trawls, were captured infrequently in standard-station sampling during 1972-75.

Following the onset of decreasing water temperatures in late September, beach-seine CPUE values diminished while those for bottom trawls increased. Catches in both gears then declined through the fall until mid-December when CPUE values approached 0. An offshore and downriver movement by young-of-the-year in the fall has been inferred (TI, 1975b). Bottom-trawl catches were insufficient for evaluation of distribution.

b. White Perch (*Morone americana*)

White perch abundance fluctuated in the Indian Point area during the 1972-75 period. The 1972-1974 abundance was discussed in previous reports (TI, 1976, 1975c). Abundance during 1975 was intermediate among those for the 1972-74 period. There were no indications of trends in relative abundance or distribution.

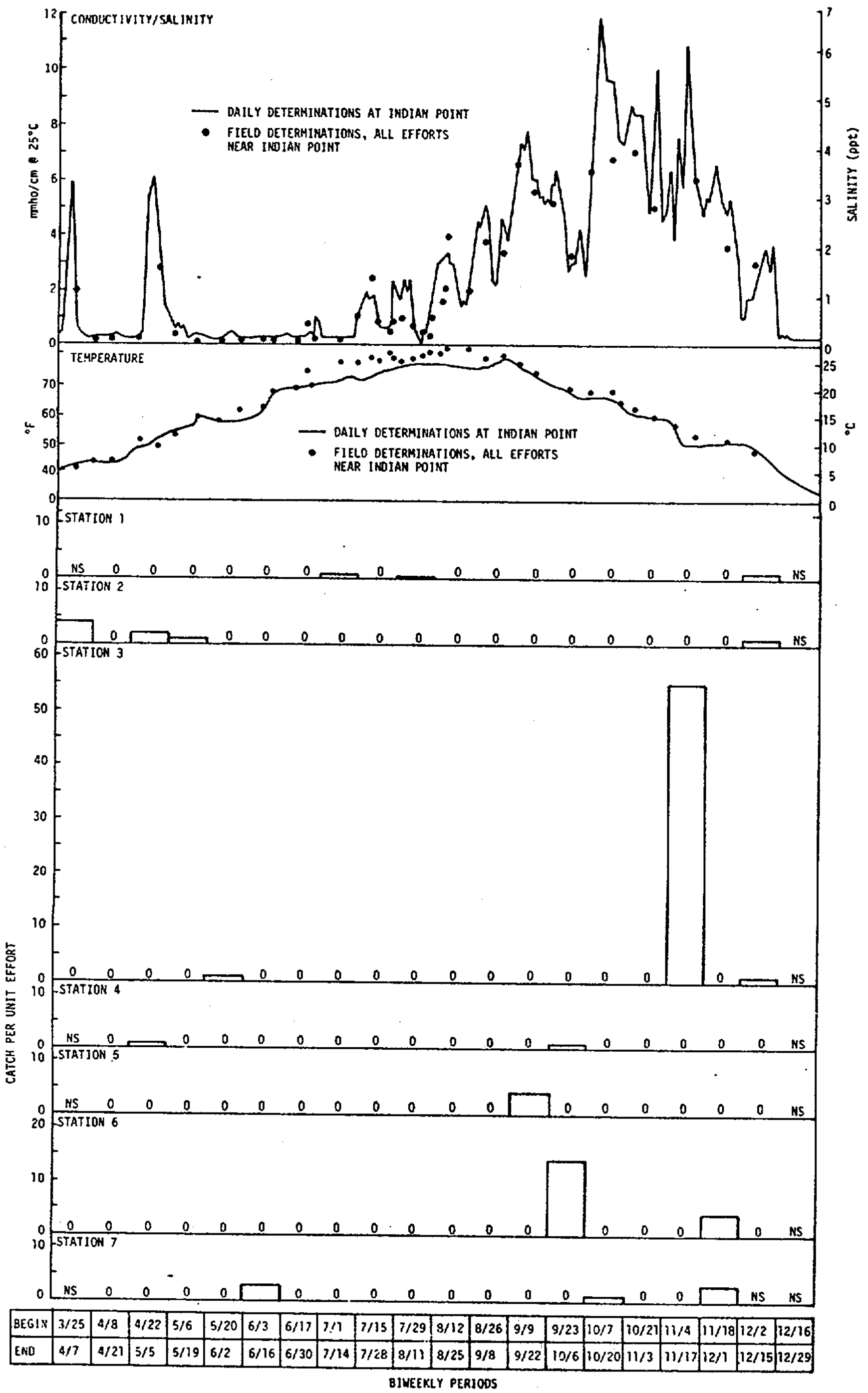
Adult and young-of-the-year white perch were taken regularly in standard-station beach seines (Figures IV-13 through IV-16 and Tables B-5 through B-10) and bottom trawls (Figures IV-17 through



ADULTS, SUBADULTS AND YOUNG-OF-THE-YEAR NOT DIFFERENTIATED

NS = NO SAMPLE

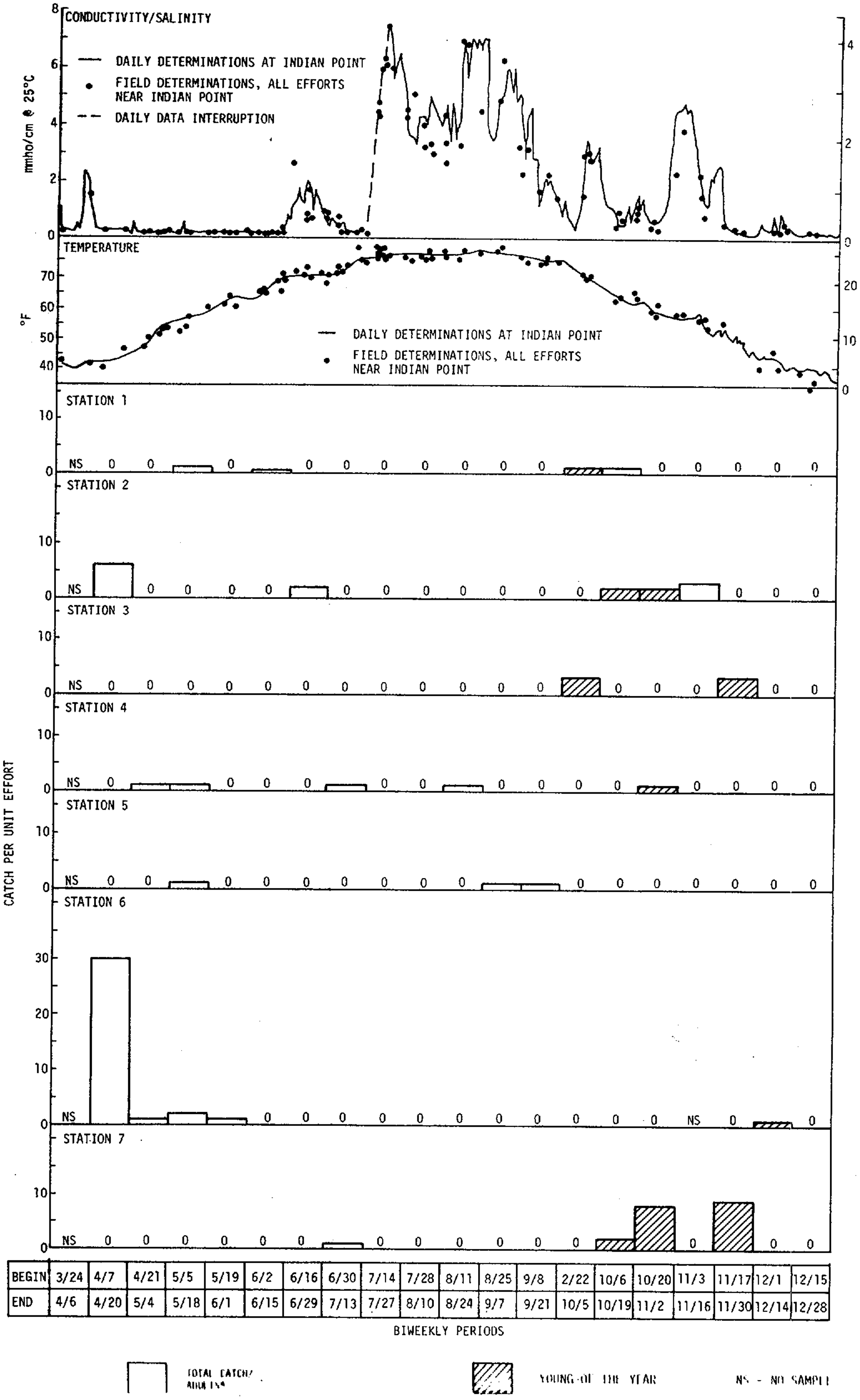
Figure IV-9. 1972 Bottom-Trawl Biweekly CPUE for Striped Bass, Indian Point Region, Hudson River Estuary, New York, Showing Water Temperature and Conductivity



ADULTS, SUBADULTS AND YOUNG-OF-THE-YEAR NOT DIFFERENTIATED

NS = NO SAMPLE

Figure IV-10. 1973 Bottom-Trawl Biweekly CPUE for Striped Bass, Indian Point Region, Hudson River Estuary, New York, Showing Water Temperature and Conductivity



*Adults not differentiated from young-of-the-year until mid-July

Figure IV-11. 1974 Bottom-Trawl Biweekly CPUE for Striped Bass, Indian Point Region, Hudson River Estuary, New York, Showing Water Temperature and Conductivity

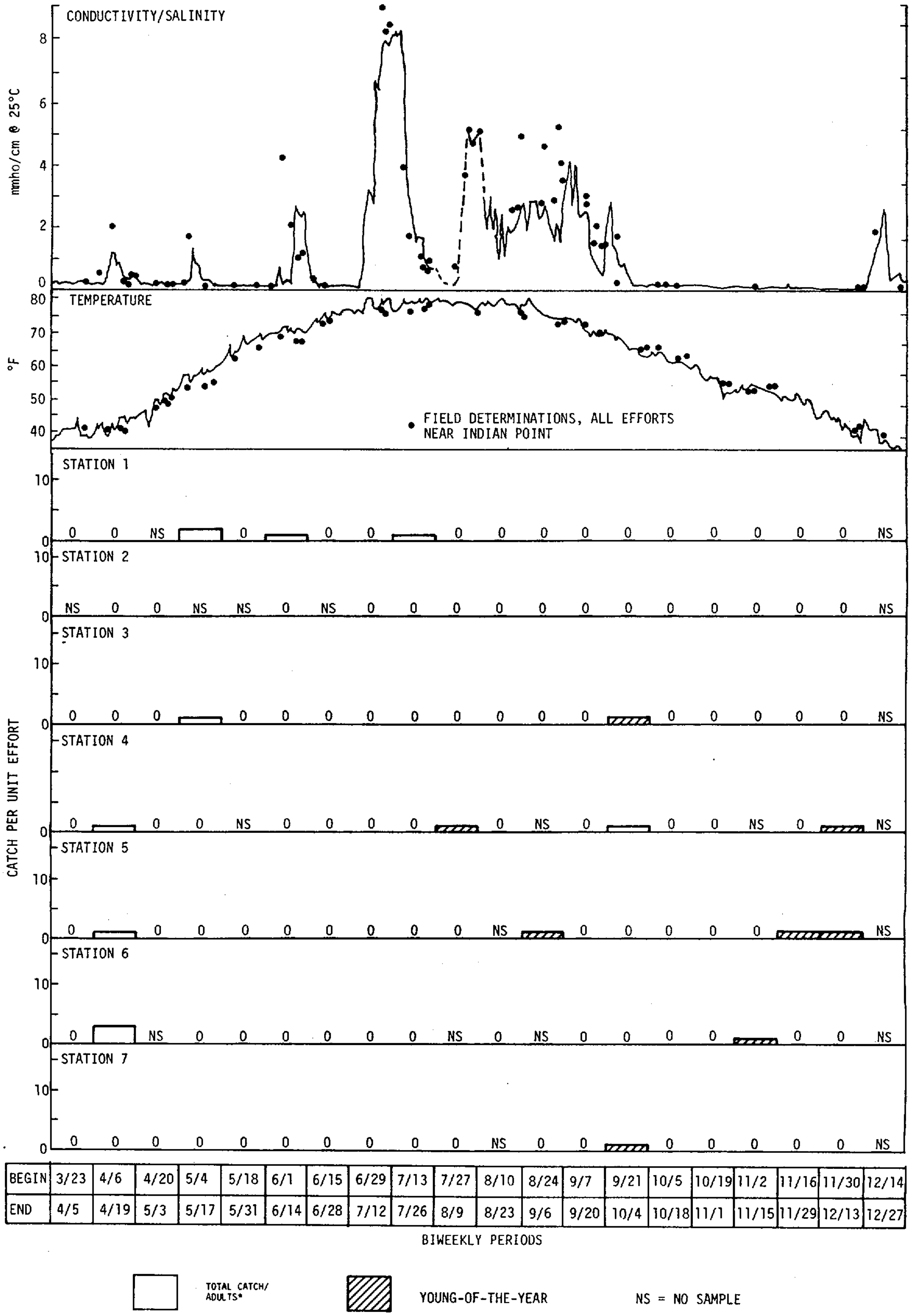
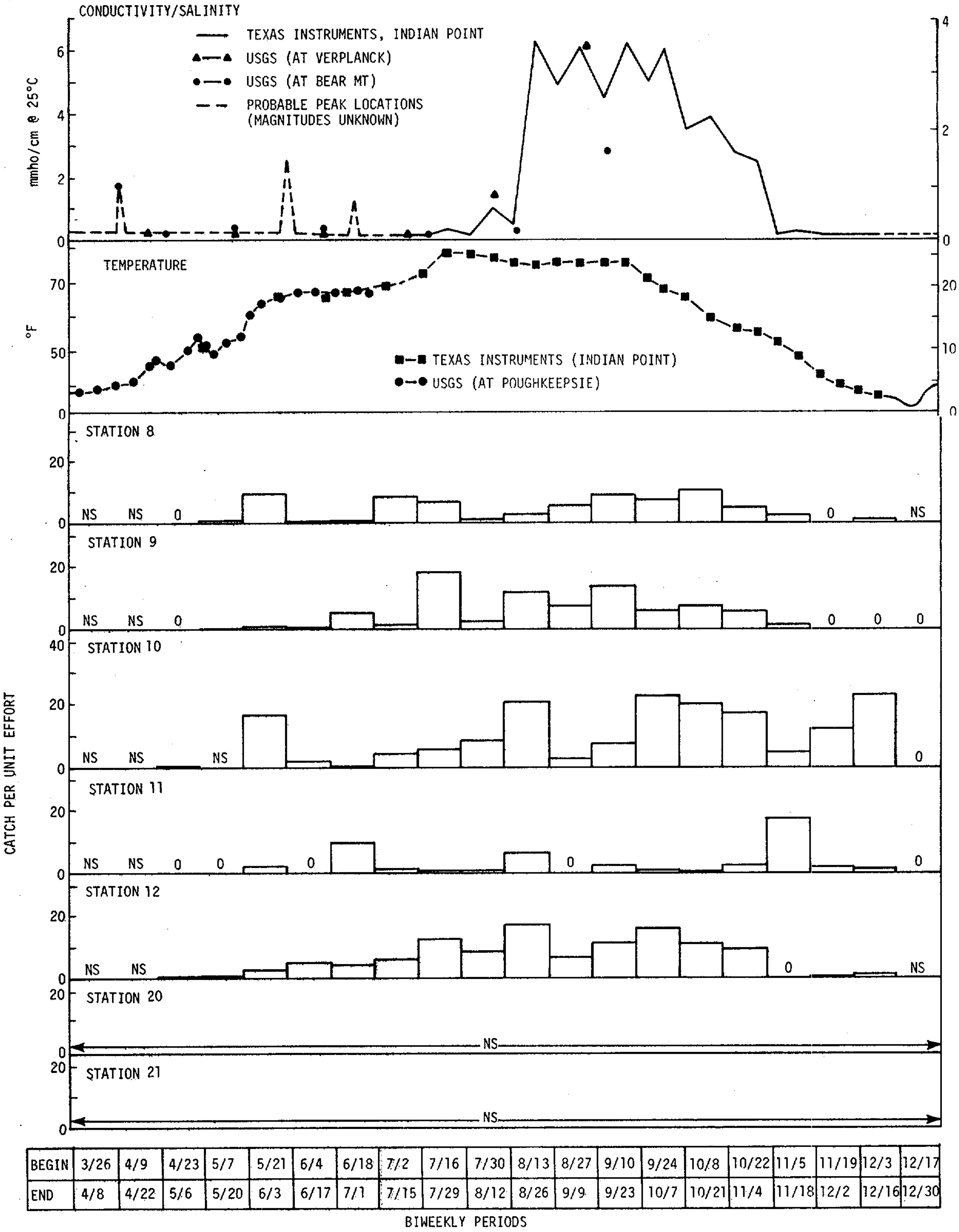


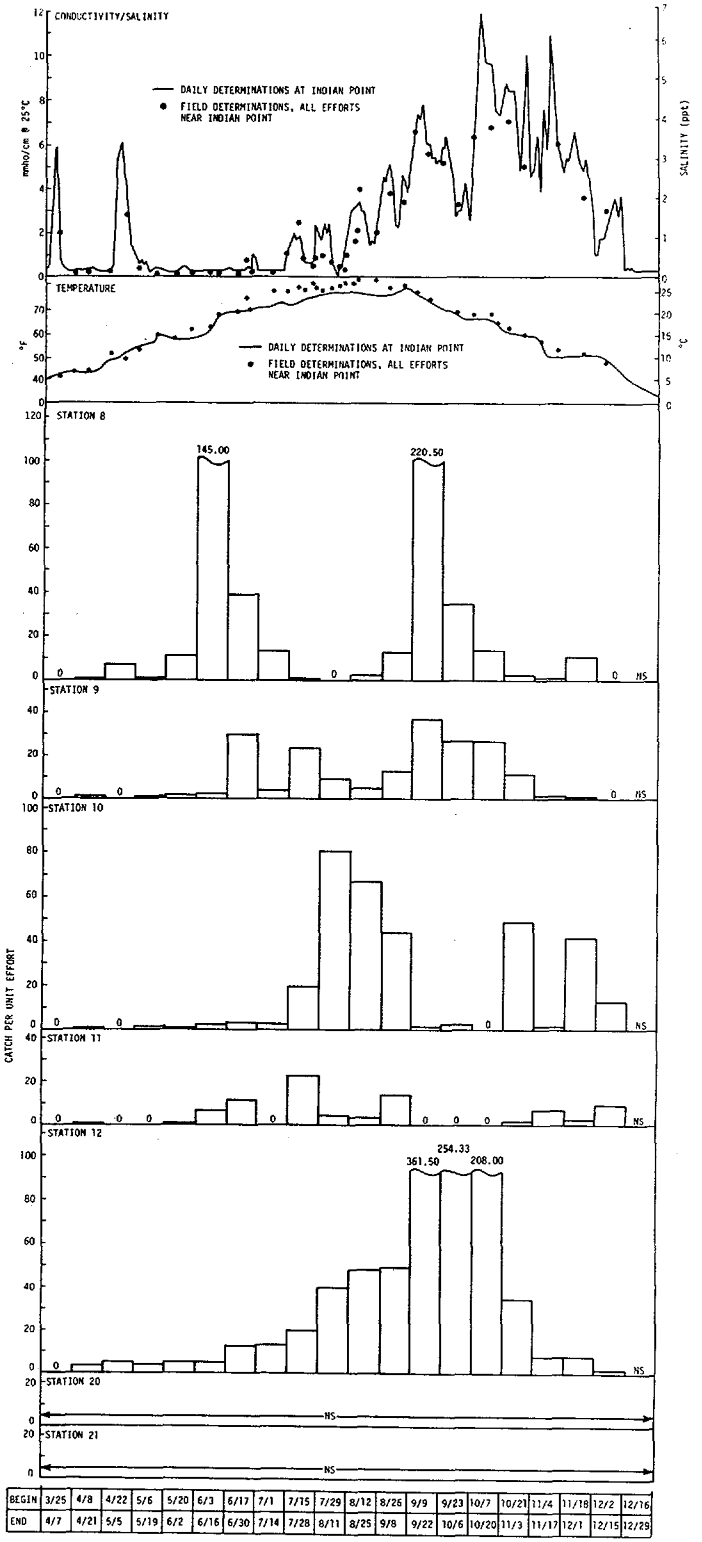
Figure IV-12. 1975 Bottom-Trawl Biweekly CPUE for Striped Bass, Indian Point Region, Hudson River Estuary, New York, Showing Water Temperature and Conductivity



ADULTS AND YOUNG-OF-THE-YEAR NOT DIFFERENTIATED

NS = NO SAMPLE

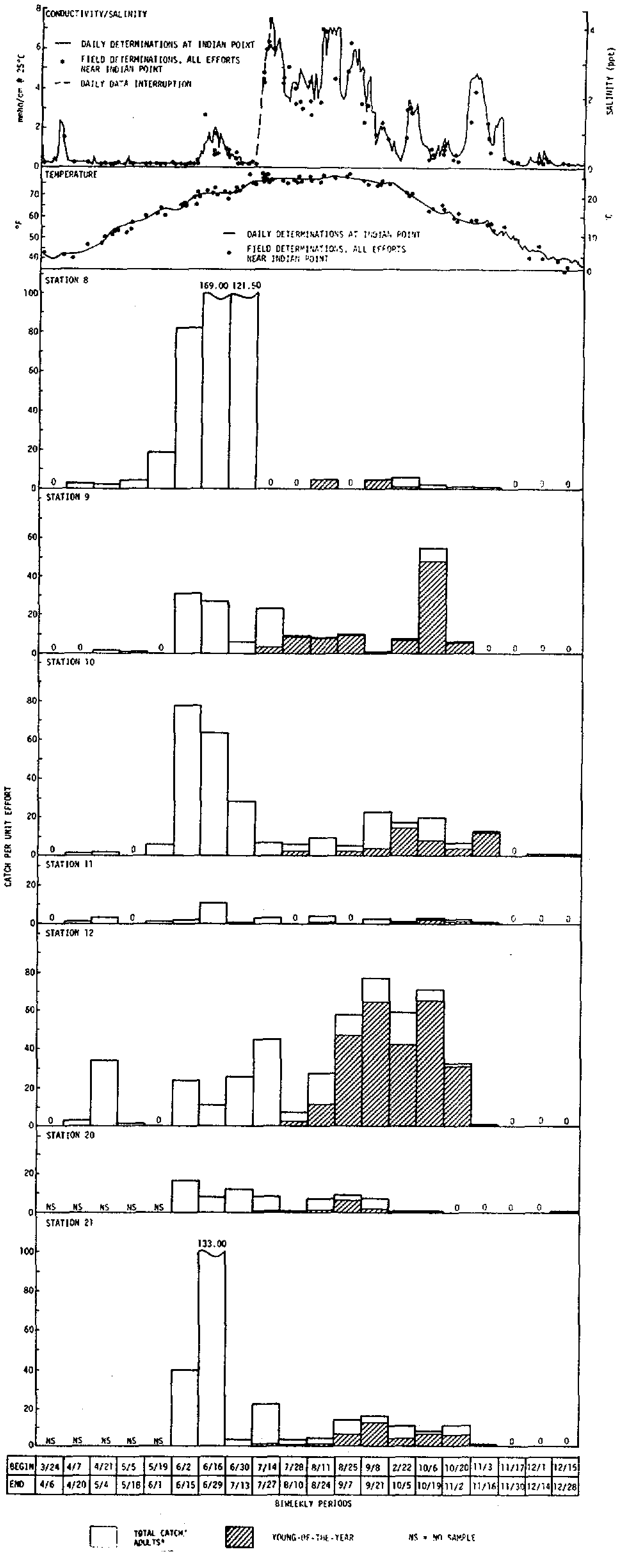
Figure IV-13. 1972 Beach-Seine Biweekly CPUE for White Perch, Indian Point Region, Hudson River Estuary, New York, Showing Water Temperature and Conductivity



ADULTS AND YOUNG-OF-THE-YEAR NOT DIFFERENTIATED

NS = NO SAMPLE

Figure IV-14. 1973 Beach-Seine Biweekly CPUE for White Perch, Indian Point Region, Hudson River Estuary, New York, Showing Water Temperature and Conductivity



*Adults not differentiated from young-of-the-year until mid-July

Figure IV-15. 1974 Beach-Seine Biweekly CPUE for White Perch, Indian Point Region, Hudson River Estuary, New York, Showing Water Temperature and Conductivity

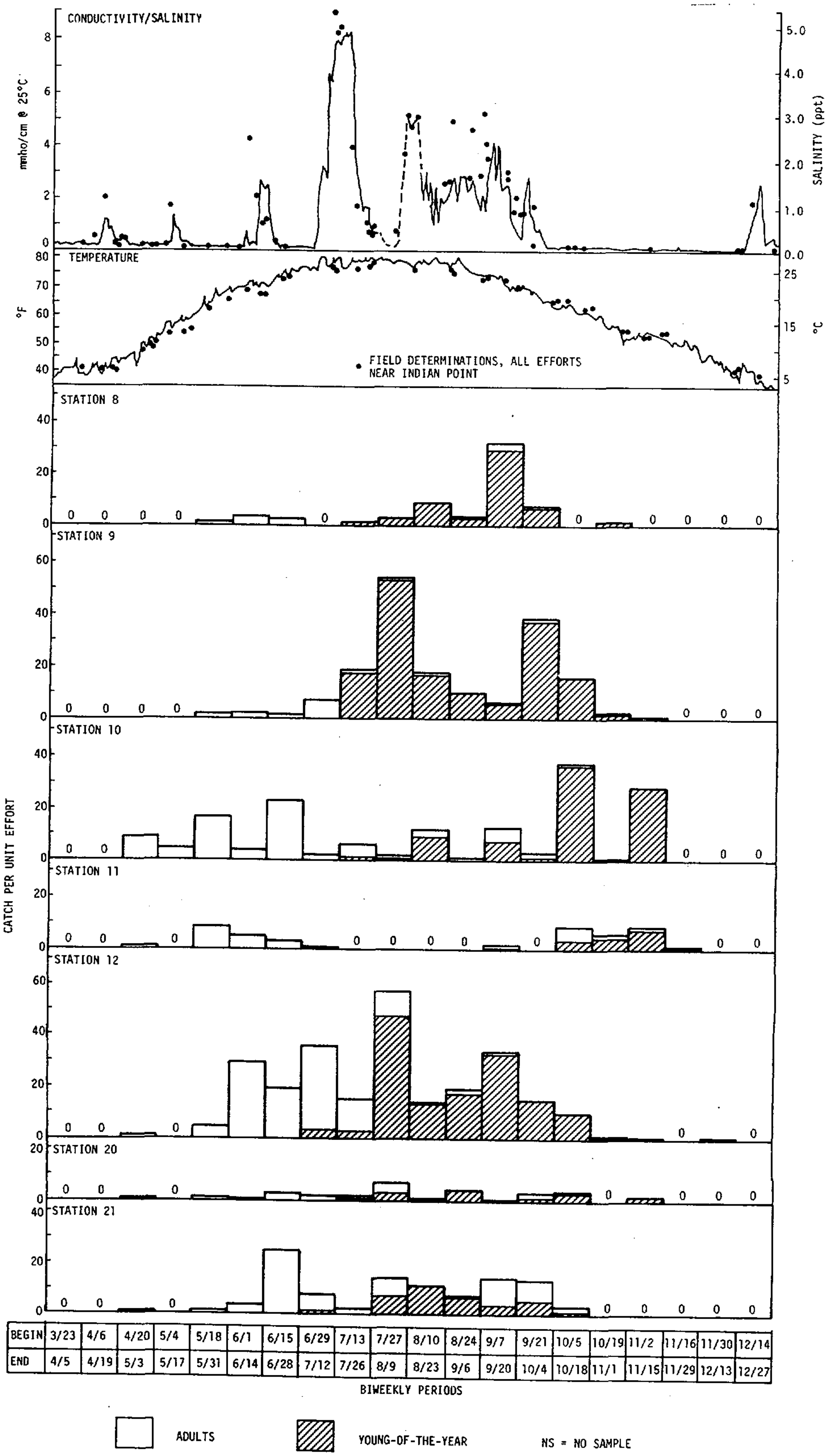


Figure IV-16. 1975 Beach-Seine Biweekly CPUE for White Perch, Indian Point Region, Hudson River Estuary, New York, Showing Water Temperature and Conductivity

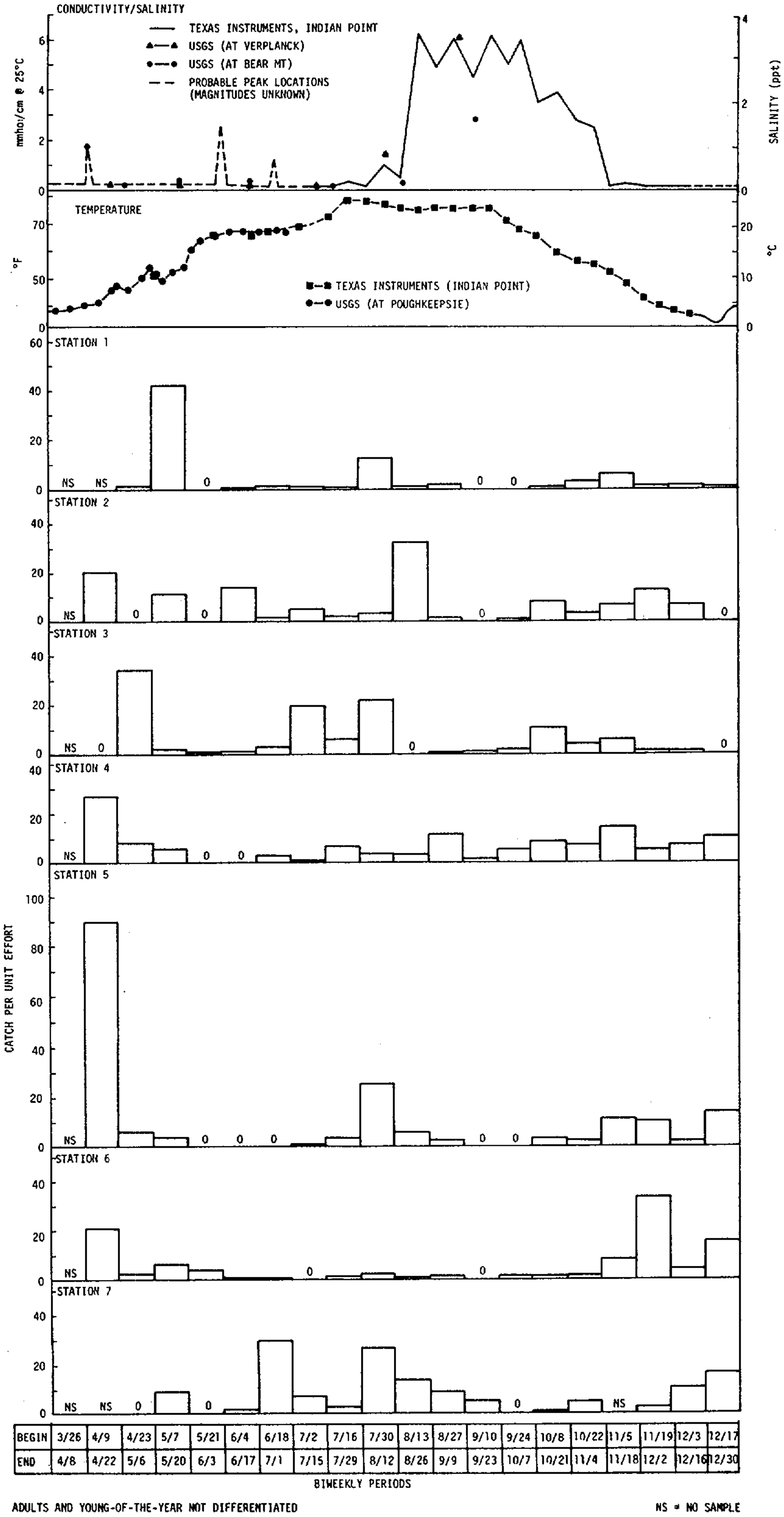


Figure IV-17. 1972 Bottom-Trawl Biweekly CPUE for White Perch, Indian Point Region, Hudson River Estuary, New York, Showing Water Temperature and Conductivity

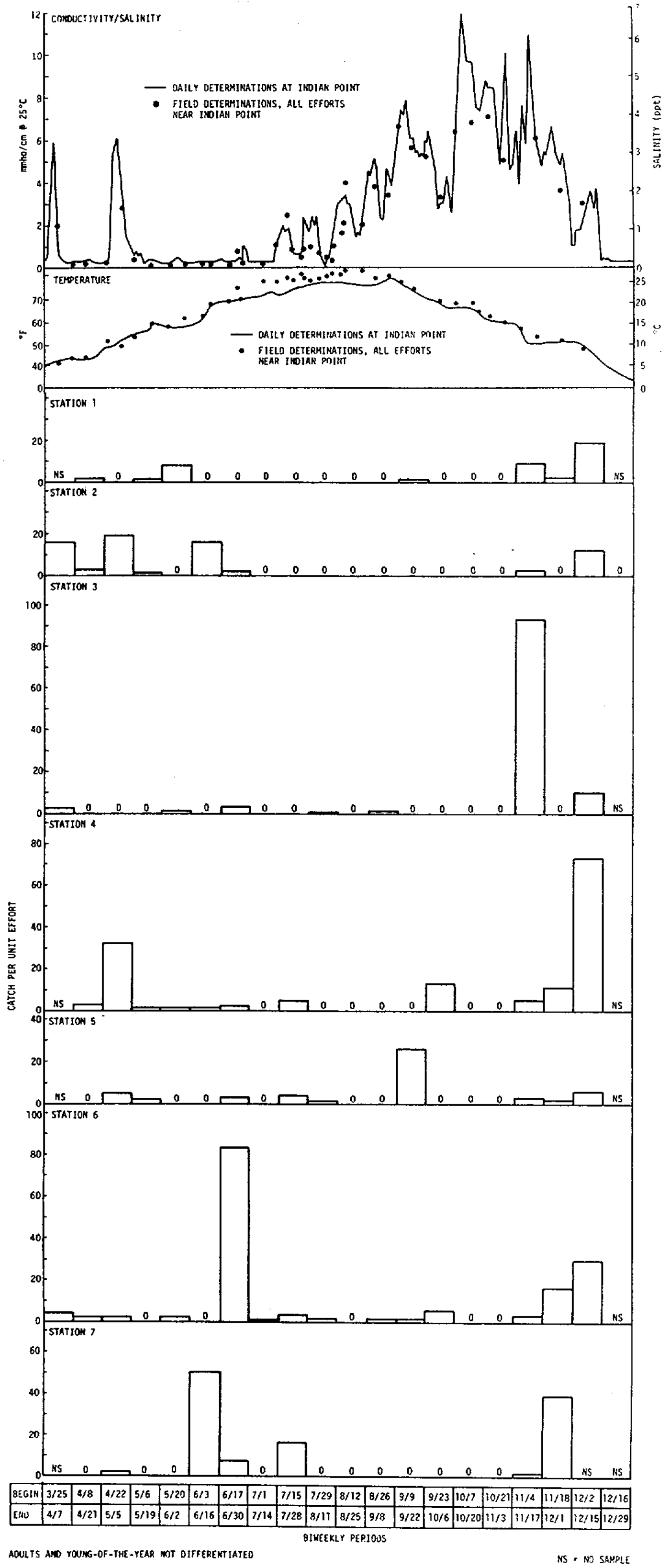


Figure IV-18. 1973 Bottom-Trawl Biweekly CPUE for White Perch, Indian Point Region, Hudson River Estuary, New York, Showing Water Temperature and Conductivity

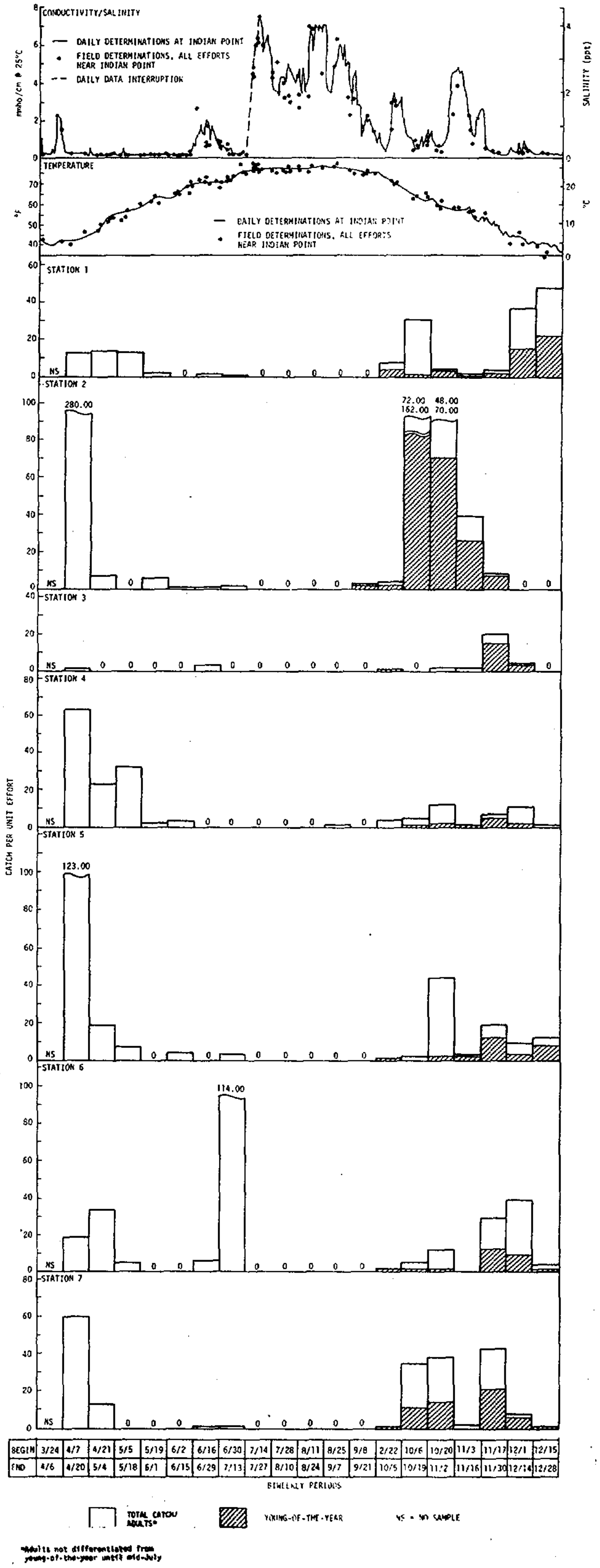


Figure IV-19. 1974 Bottom-Trawl Biweekly CPUE for White Perch, Indian Point Region, Hudson River Estuary, New York, Showing Water Temperature and Conductivity

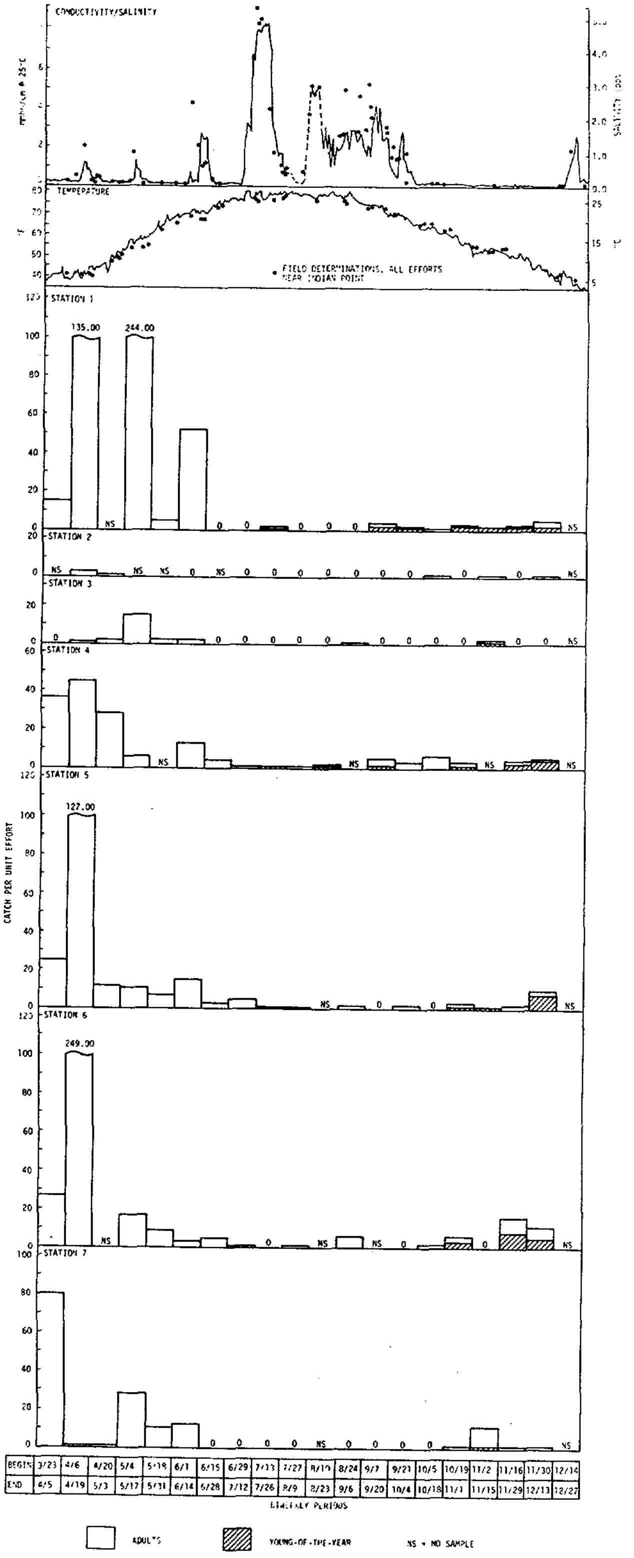


Figure IV-20. 1975 Bottom-Trawl Biweekly CPUE for White Perch, Indian Point Region, Hudson River Estuary, New York, Showing Water Temperature and Conductivity

IV-20 and Tables B-11 through B-16) during 1972-75. Distribution of catches between these gears was variable through time. Surface-trawl catches of white perch were negligible. Beach-seine CPUE values for adult and young-of-the-year white perch were significantly different ($p < 0.05$) among stations for each of the 4 years considered. These differences were expressed by low catches at sites located along open stretches of the river and higher catches at sheltered, weedy sites; the greatest differences were between station 11 (unsheltered) and station 12 (sheltered). Catch distribution among bottom-trawl stations was not significantly different ($\alpha = 0.05$) except in 1975 when catches at deeper stations were consistently greater than at shallow stations.

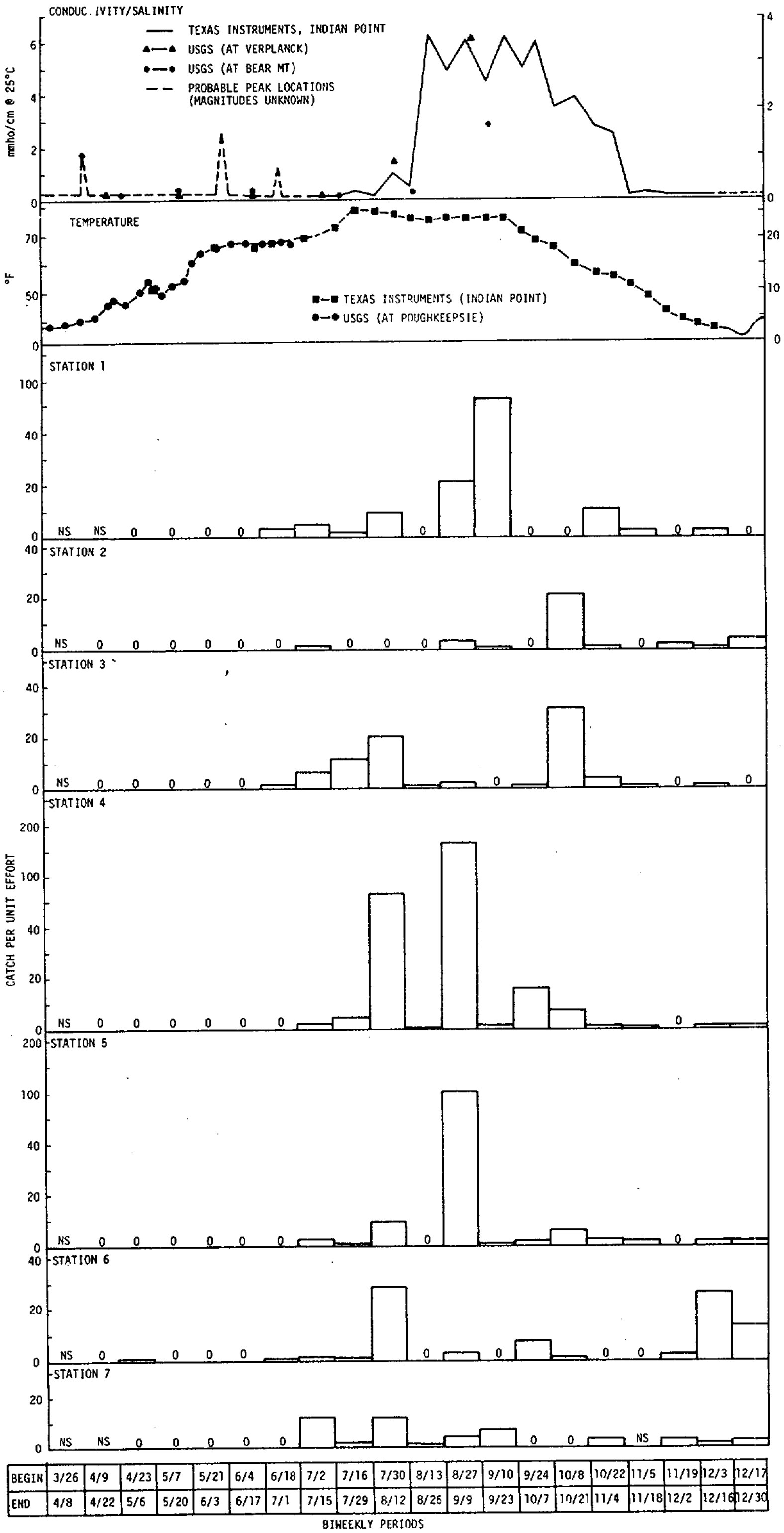
Adult white perch were taken in bottom trawls at the onset of standard-station sampling in late March and early April, with abundance peaking from early April to mid-May. Beach-seine catches began in mid-April to mid-May, peaking in June and July. This is consistent with annual spring upriver and shoreward spawning migrations reported previously (TI, 1976). Peak beach-seine catches generally coincide with water temperatures ranging from 18 to 25°C which have been associated with spawning activity (TI, 1976). After July, adult CPUE values in both bottom trawls and beach seines declined markedly, indicating movement away from the Indian Point area. Earlier reports indicated postspawning downriver migrations to regions south of Indian Point (TI, 1976).

Young-of-the-year first appeared in beach seines during July, with catches increasing until early September or late October. Increasing beach-seine catches in the Indian Point area during August probably reflected migration downriver from upstream spawning areas during summer months (TI, 1976). As beach-seine catches began to decline in the fall, young-of-the-year white perch began to appear in standard-station bottom trawls, representing an offshore movement, probably in response to declining water temperatures (TI, 1975a). Peak bottom-trawl catches of young-of-the-year occurred from mid-November to mid-December; during this period, concentrations of young white perch appeared to be closely associated with salt front (300 μmho/cm [0.1ppt]) location (TI, 1974a).

c. Atlantic Tomcod (*Microgadus tomcod*)

A previous report (TI, 1975c) extensively examined the abundance trends of Atlantic tomcod through 1974. The 1975 abundance levels of young-of-the-year were comparable to those of 1972-74. Local distribution showed no evidence of change during the 1972-75 period. Atlantic tomcod are reported to show a definite preference for deeper channel waters in the Hudson River (TI, 1976), but Tolderlund (1975) indicated that Atlantic tomcod exhibit no special depth preference in the Thames River of Connecticut. The 1972-75 standard-station bottom-trawl data (Figures IV-21 through IV-24 and Tables B-17 through B-20) indicated a tendency for higher catches at deeper sites, but this was not pronounced.

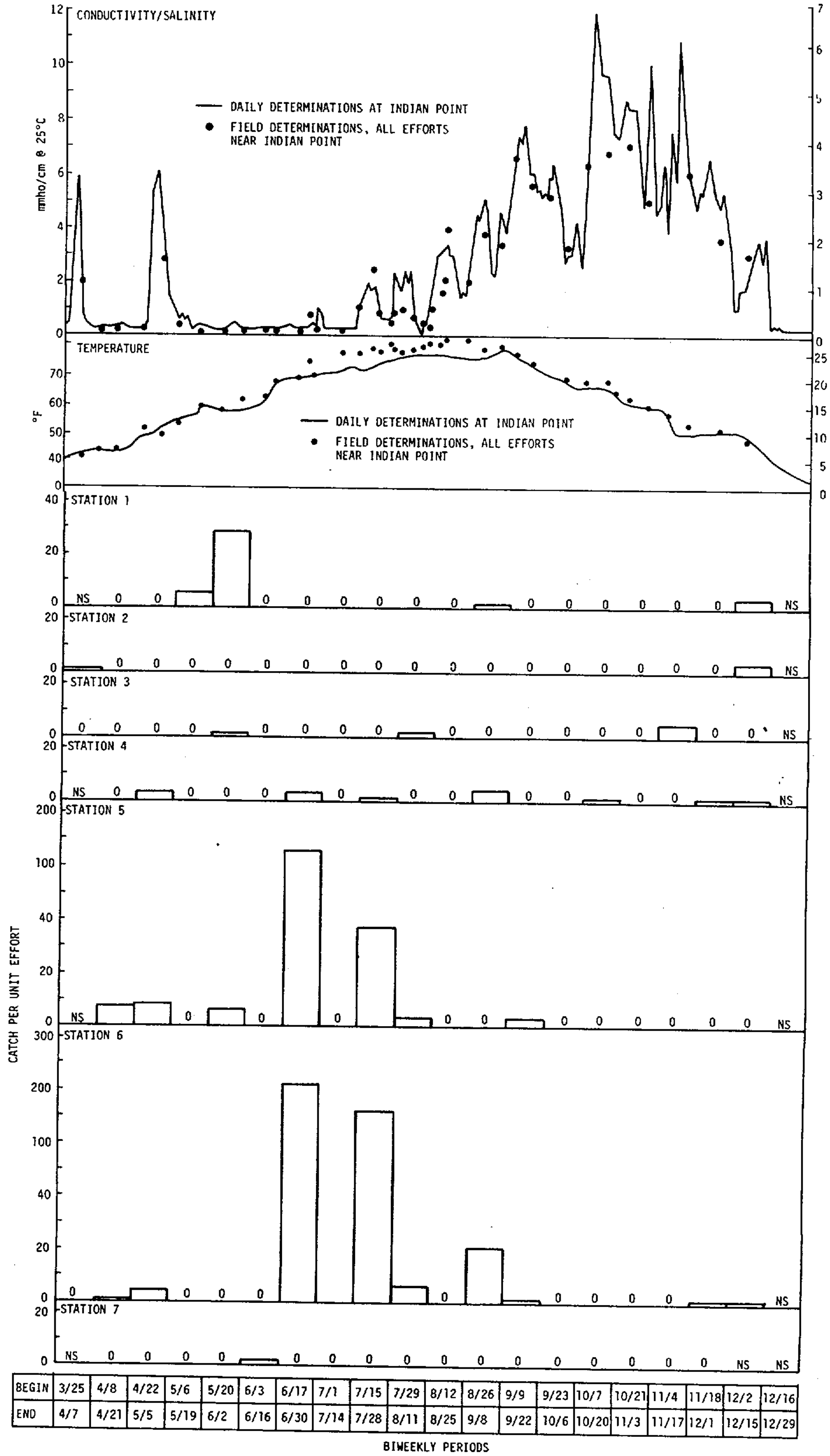
Although young-of-the-year Atlantic tomcod were collected in the Indian Point region with all three standard-station gears during 1972-75, surface-trawl and beach-seine catches were minimal and have



ADULTS AND YOUNG-OF-THE-YEAR NOT DIFFERENTIATED

NS = NO SAMPLE

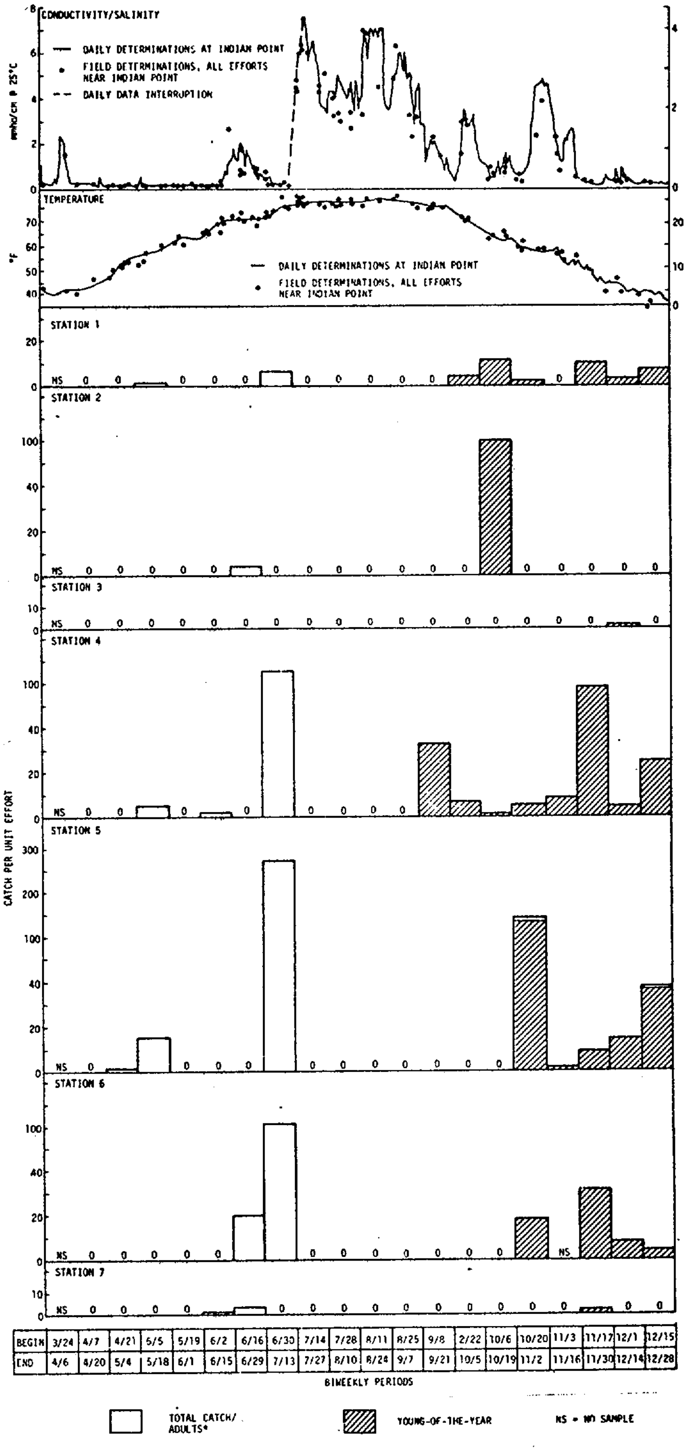
Figure IV-21. 1972 Bottom-Trawl Biweekly CPUE for Atlantic Tomcod, Indian Point Region, Hudson River Estuary, New York, Showing Water Temperature and Conductivity



ADULTS AND YOUNG-OF-THE-YEAR NOT DIFFERENTIATED

NS = NO SAMPLE

Figure IV-22. 1973 Bottom-Trawl Biweekly CPUE for Atlantic Tomcod, Indian Point Region, Hudson River Estuary, New York, Showing Water Temperature and Conductivity



*Adults not differentiated from young-of-the-year until mid-July

Figure IV-23. 1974 Bottom-Trawl Biweekly CPUE for Atlantic Tomcod, Indian Point Region, Hudson River Estuary, New York, Showing Water Temperature and Conductivity

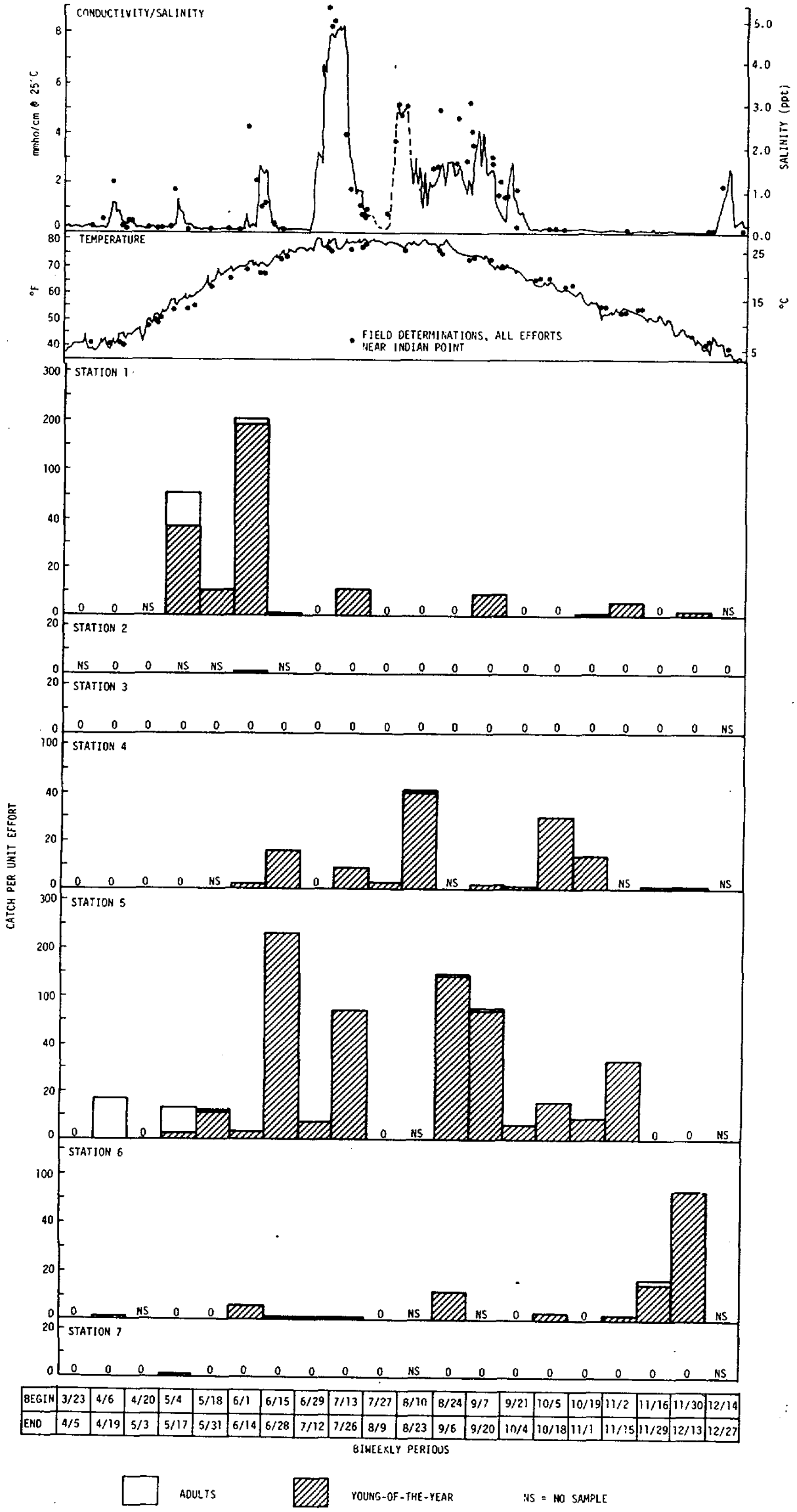


Figure IV-24. 1975 Bottom-Trawl Biweekly CPUE for Atlantic Tomcod, Indian Point Region, Hudson River Estuary, New York, Showing Water Temperature and Conductivity

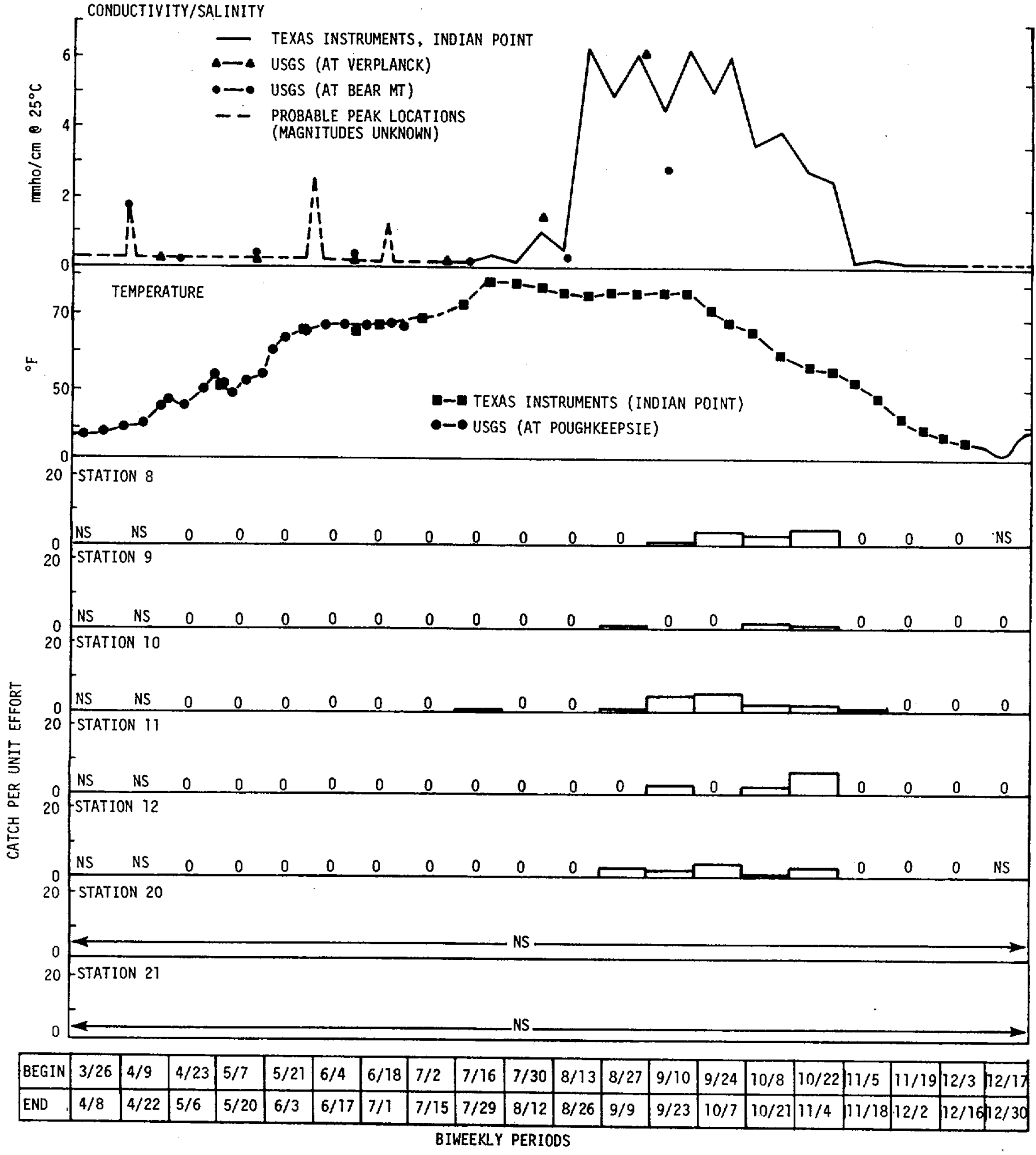
not been considered in this discussion. The predominance of bottom-trawl catches emphasized the essentially demersal nature of this species.

In some years, young-of-the-year Atlantic tomcod first appeared in bottom trawls in April; in other years, they were not present until May or June. Ichthyoplankton data have indicated early spring concentrations of young in the Yonkers and Tappan Zee areas (RM 12-33 [KM 19.5-53.1]), suggesting that occurrence in the Indian Point area follows upriver dispersal from those regions. CPUE values for young-of-the-year Atlantic tomcod oscillated for the remainder of the sampling season. These oscillations seem related to salt front position. Peak catches generally occurred when the salt front approached or traversed the Indian Point region. When the salt front was either north or south, local catches usually diminished.

Occurrence of adults in the Indian Point area was limited primarily to their midwinter spawning run (TI, 1976) when no standard-station samples were collected. Hence, adults were present only in very early and very late samples and in limited numbers.

d. American Shad (*Alosa sapidissima*)

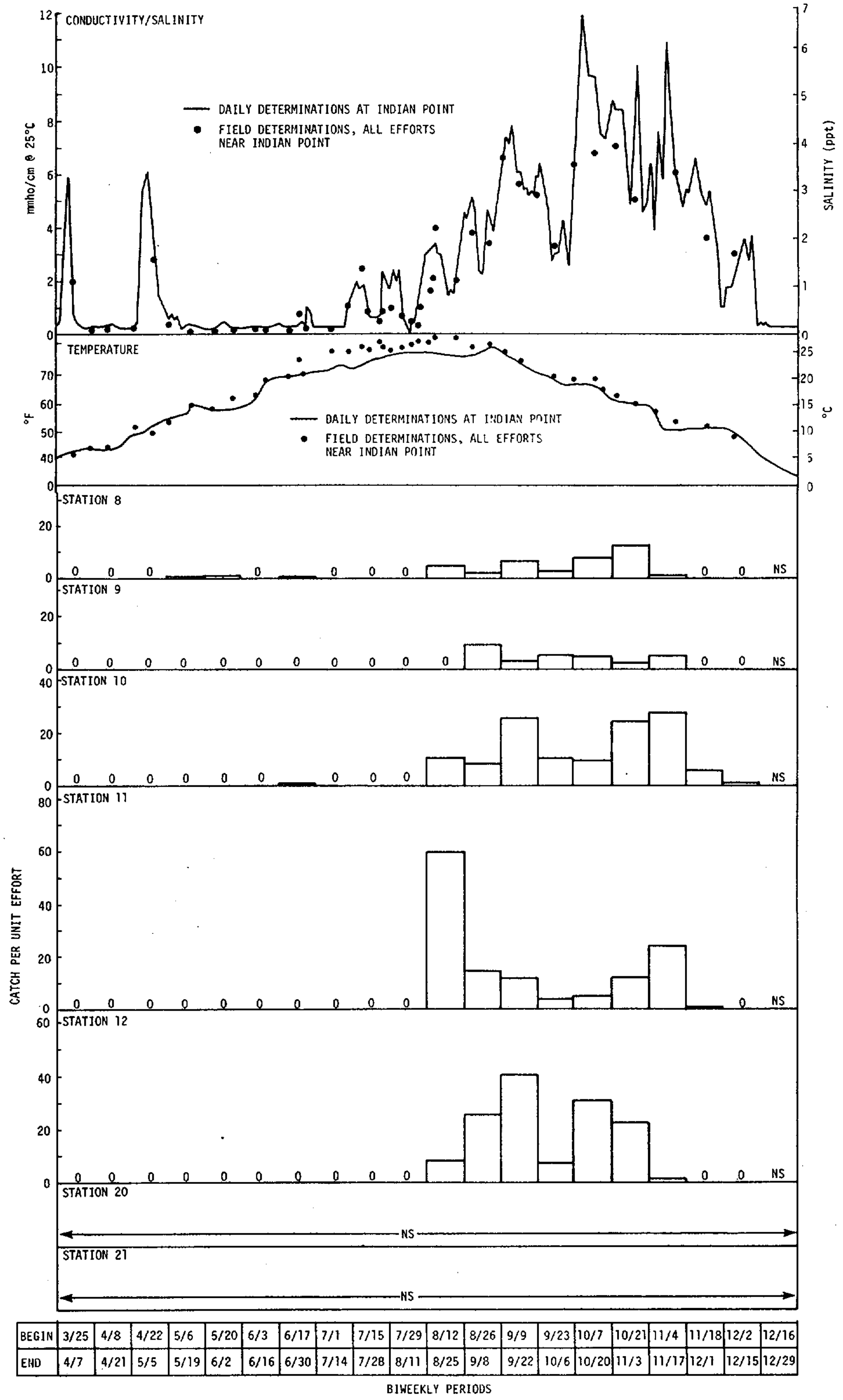
During 1972-75, young-of-the-year American shad were collected regularly in the Indian Point region with all three standard-station gears, but catch distribution among gears varied through each season. Adults were rarely collected, probably because of gear avoidance. The catch distribution of young-of-the-year was relatively homogeneous among all beach-seine stations, although CPUE values at station 8 tended to be lower than at other sites (Figures IV-25 through IV-28). There



ADULTS AND YOUNG-OF-THE-YEAR NOT DIFFERENTIATED

NS = NO SAMPLE

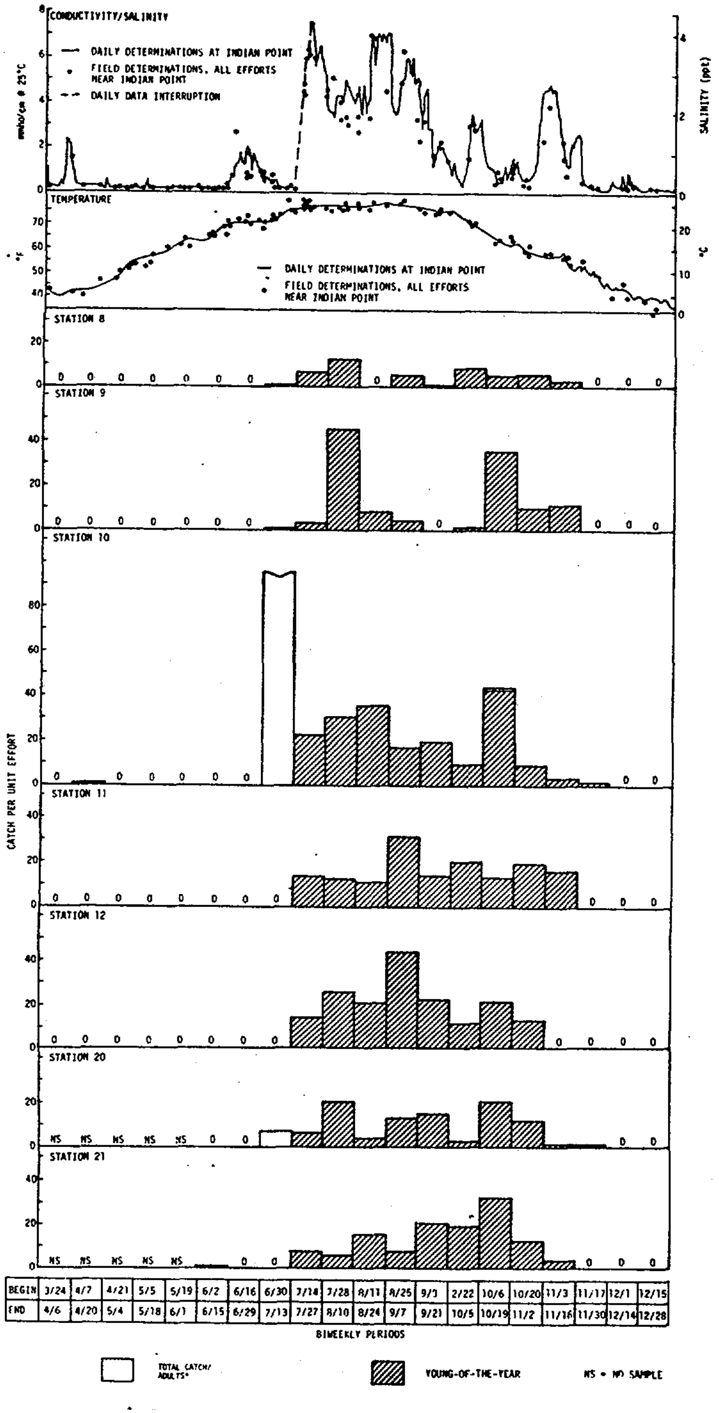
Figure IV-25. 1972 Beach-Seine Biweekly CPUE for American Shad, Indian Point Region, Hudson River Estuary, New York, Showing Water Temperature and Conductivity



ADULTS AND YOUNG-OF-THE-YEAR NOT DIFFERENTIATED

NS = NO SAMPLE

Figure IV-26. 1973 Beach-Seine Biweekly CPUE for American Shad, Indian Point Region, Hudson River Estuary, New York, Showing Water Temperature and Conductivity



*Adults not differentiated from young-of-the-year until mid-July

Figure IV-27. 1974 Beach-Seine Biweekly CPUE for American Shad, Indian Point Region, Hudson River Estuary, New York, Showing Water Temperature and Conductivity

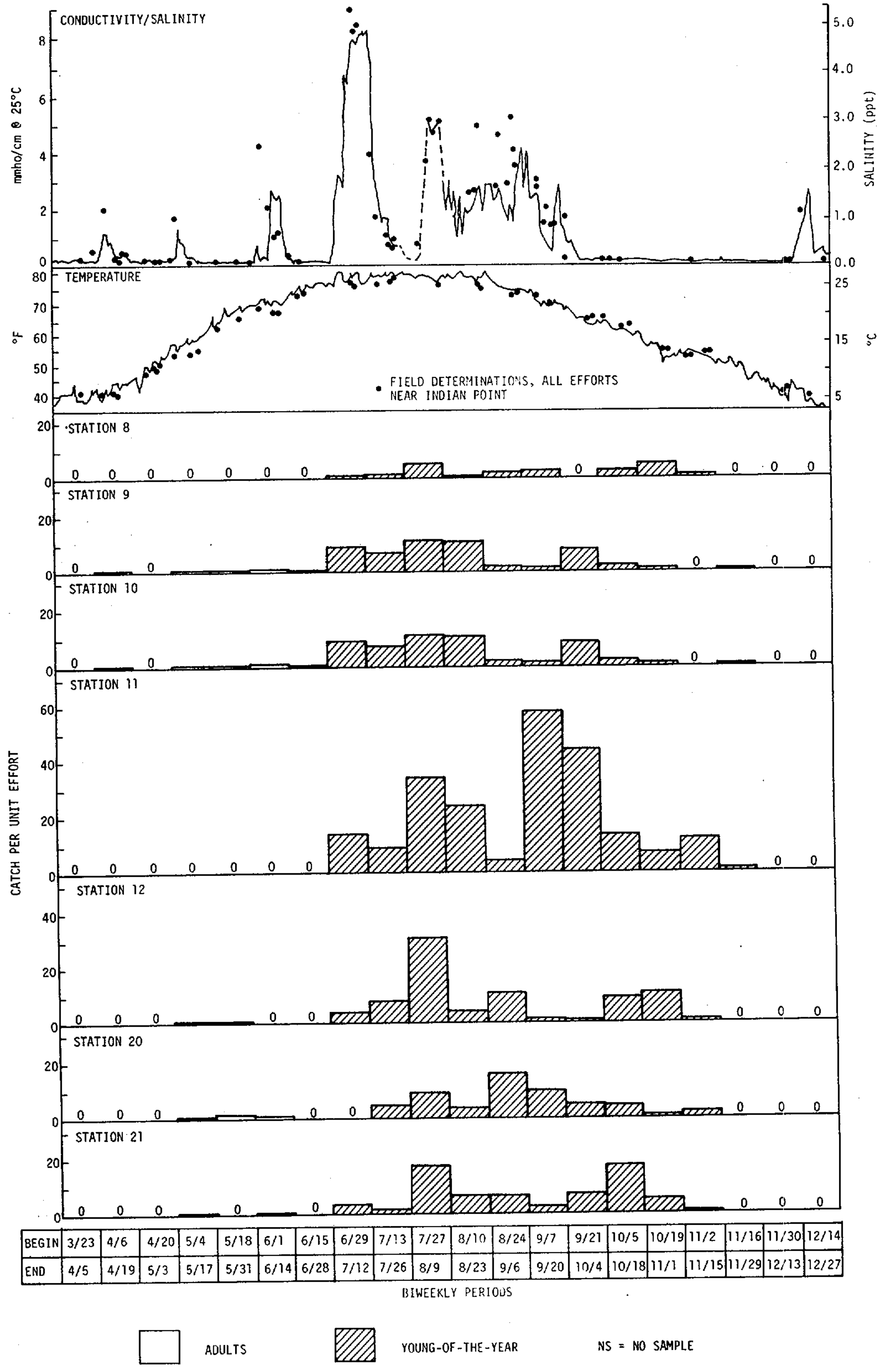


Figure IV-28. 1975 Beach-Seine Biweekly CPUE for American Shad, Indian Point Region, Hudson River Estuary, New York, Showing Water Temperature and Conductivity

were no consistent catch differences among trawl stations (Figures IV-28 through IV-36) and no indications of changes in local distribution.

Young-of-the-year American shad were generally found in the Indian Point area from July through December. Beach-seine catches fluctuated from July through November and exhibited no definite peaks. Surface-trawl CPUE values peaked in July and then diminished in late October and November. Bottom-trawl catches, which were low during the summer and early fall, increased sharply in late October and November. This was accompanied by a second peak in surface-trawl catches and declining beach-seine CPUE values. These changes probably reflected an offshore and seaward migration of young in response to cooler water temperatures (TI, 1975c). Although CPUE values for young-of-the-year were similar during 1973-75, they were much lower in 1972. American shad abundance through 1974 was discussed in detail in an earlier report (TI, 1975c).

c. Alewife (*Alosa pseudoharengus*)

Adult and young-of-the-year alewife were taken consistently in standard-station beach seines (Figures IV-37 through IV-40), bottom trawls (Figures IV-41 through IV-44), and surface trawls (Figures IV-45 through IV-48), indicating widespread occurrence within the Indian Point region. However, relative abundance among gear was variable through time. Among trawling stations, catch distribution of adults and young-of-the-year was not consistently different for either surface or bottom trawls. Among beach-seine stations, distribution of adults was relatively uniform; however, stations 9 and 12, both of which are in shoal areas and characterized by rock and/or mud substrates and dense summer

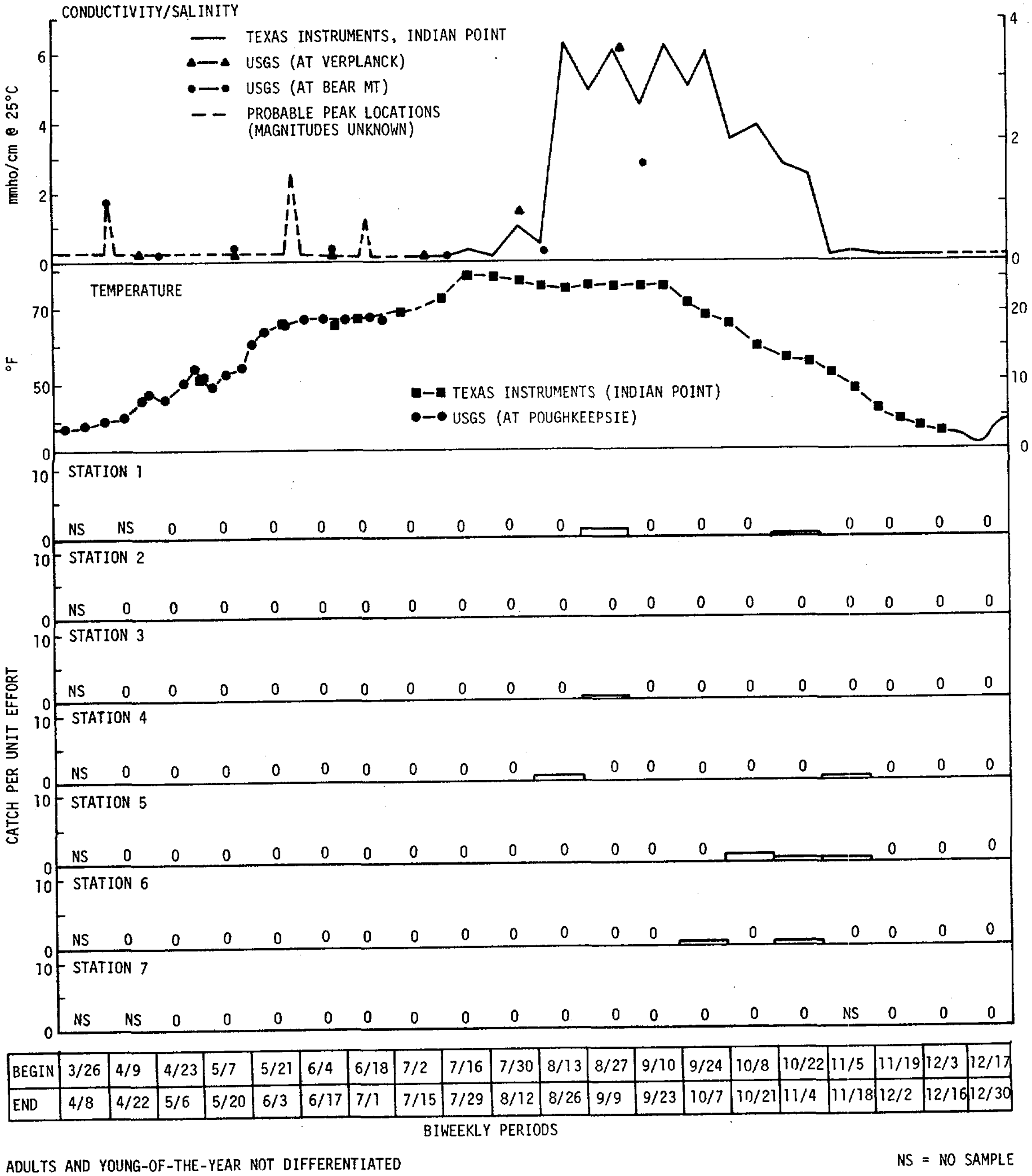
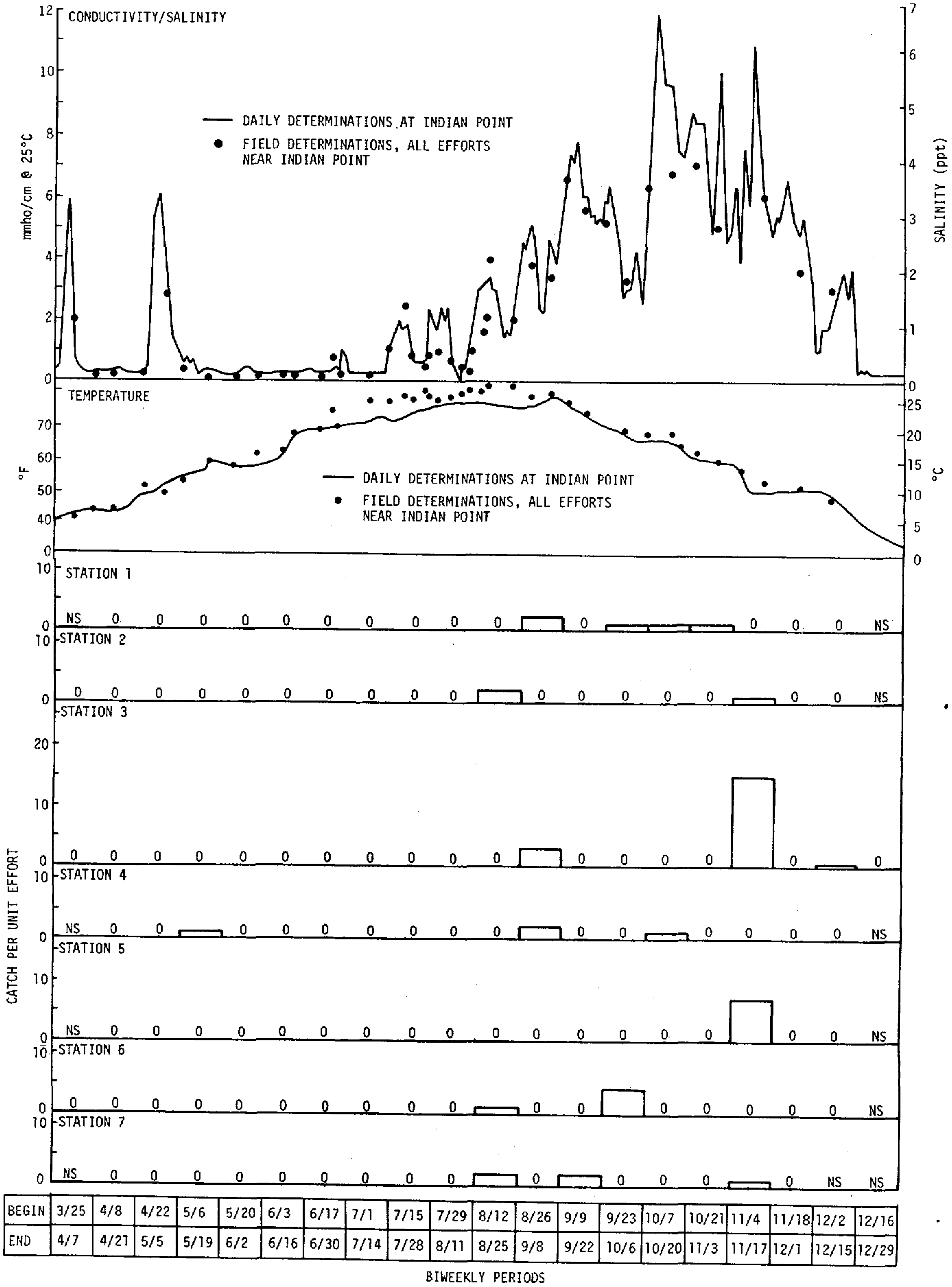


Figure IV-29. 1972 Bottom-Trawl Biweekly CPUE for American Shad, Indian Point Region, Hudson River Estuary, New York, Showing Water Temperature and Conductivity



ADULTS AND YOUNG-OF-THE-YEAR NOT DIFFERENTIATED

NS = NO SAMPLE

Figure IV-30. 1973 Bottom-Trawl Biweekly CPUE for American Shad, Indian Point Region, Hudson River Estuary, New York, Showing Water Temperature and Conductivity

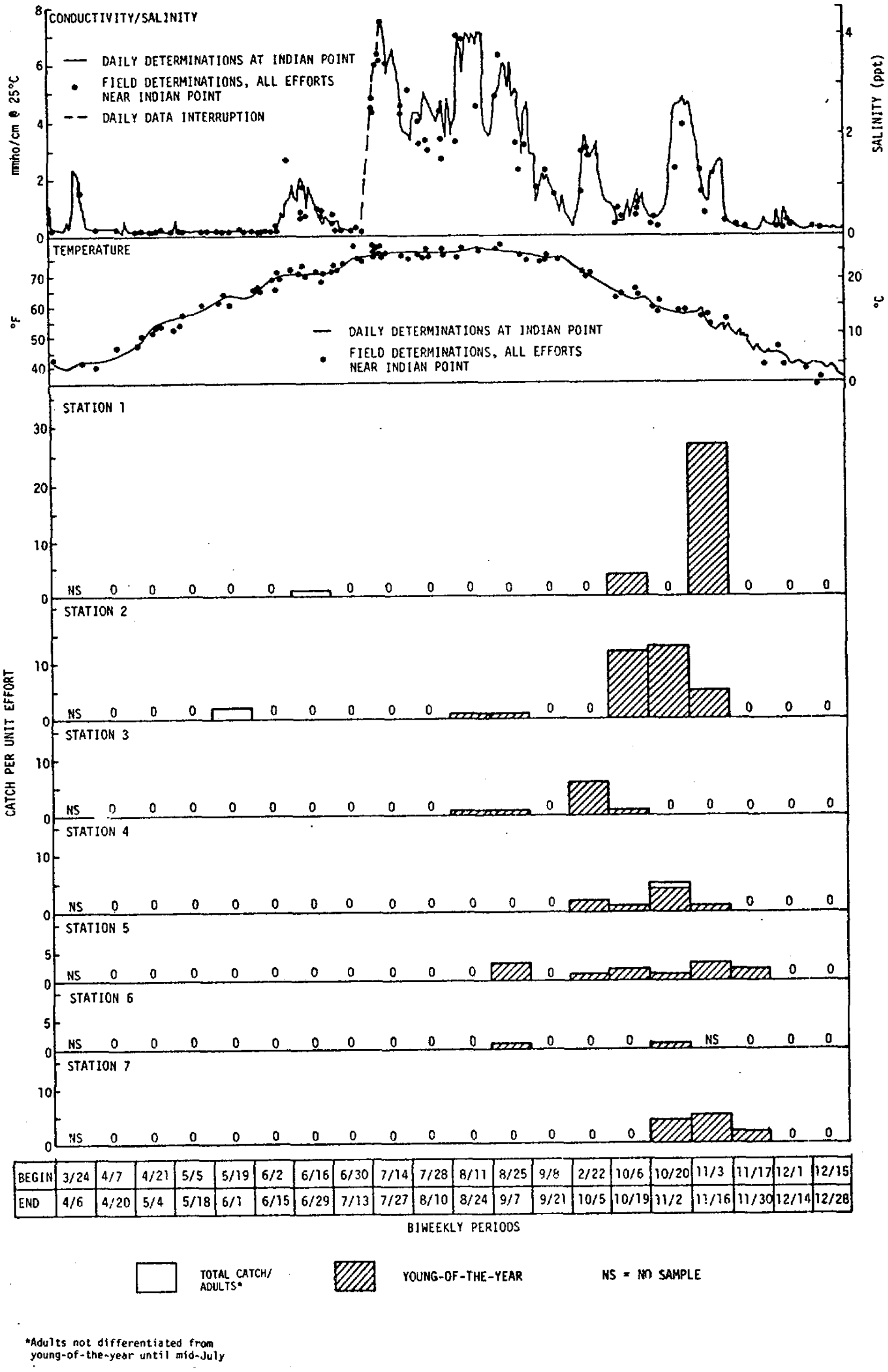


Figure IV-31. 1974 Bottom-Trawl Biweekly CPUE for American Shad, Indian Point Region, Hudson River Estuary, New York, Showing Water Temperature and Conductivity

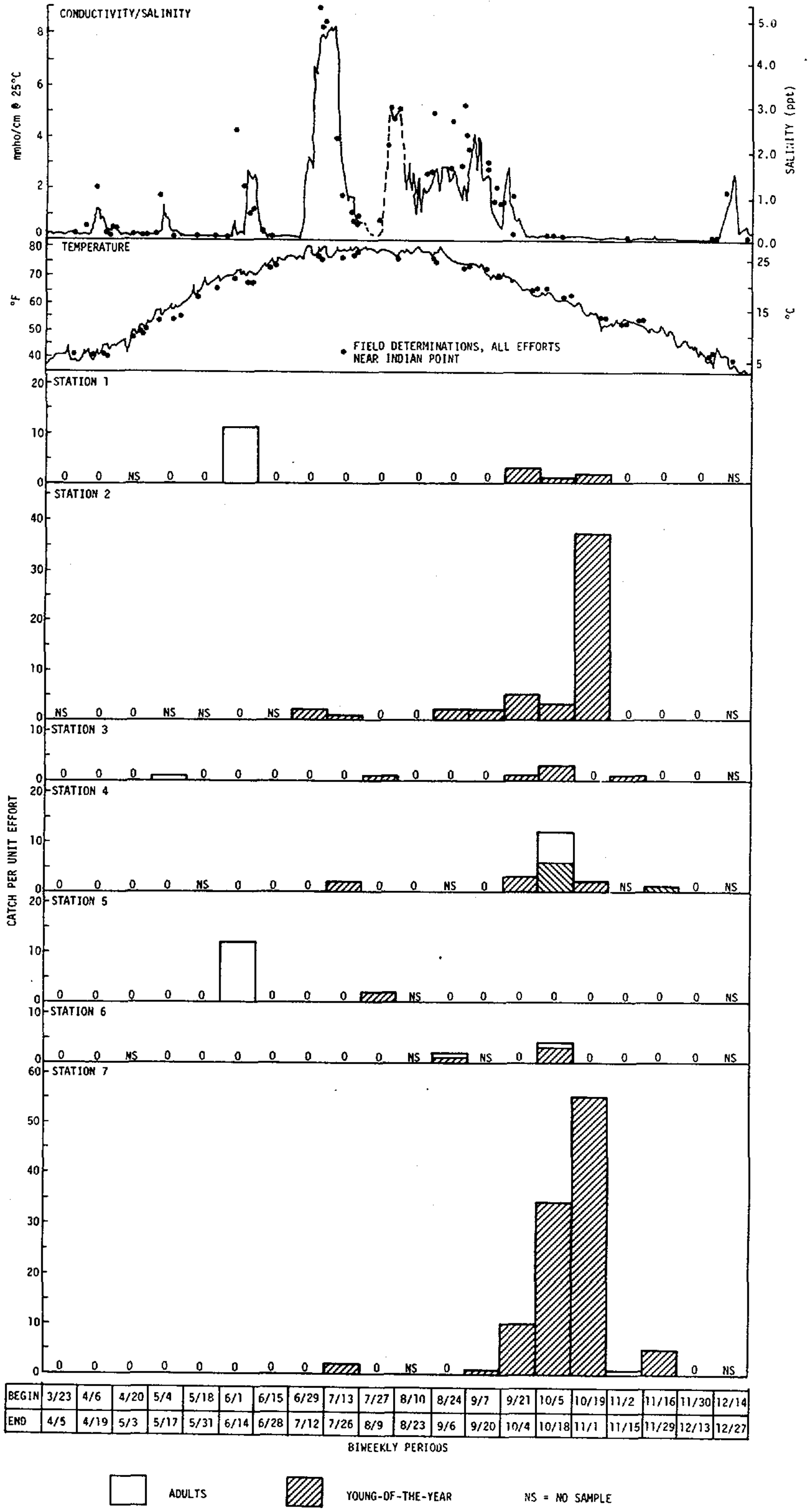
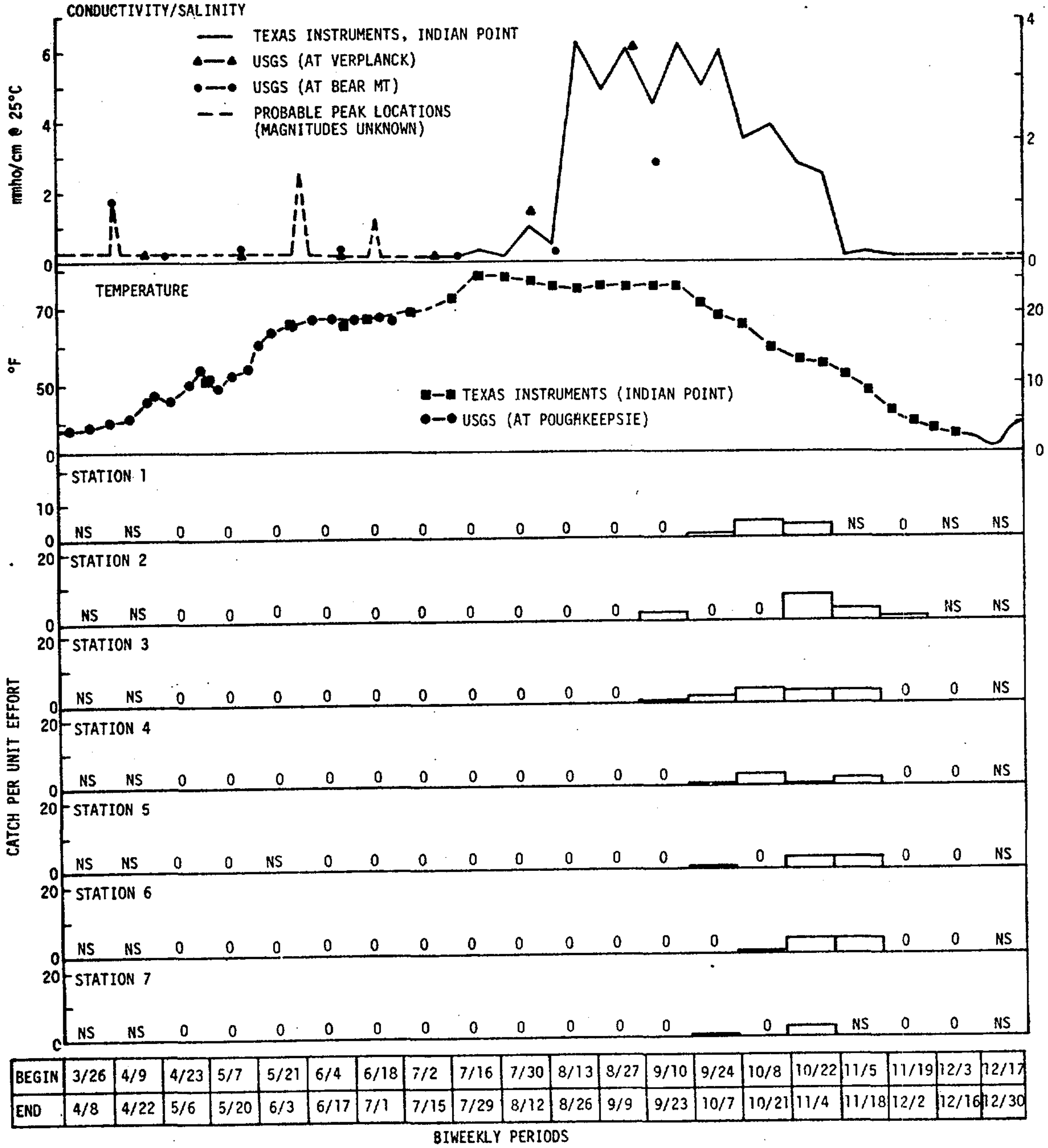


Figure IV-32. 1975 Bottom-Trawl Biweekly CPUE for American Shad, Indian Point Region, Hudson River Estuary, New York, Showing Water Temperature and Conductivity



ADULTS AND YOUNG-OF-THE-YEAR NOT DIFFERENTIATED

NS = NO SAMPLE

Figure IV-33. 1972 Surface-Trawl Biweekly CPUE for American Shad, Indian Point Region, Hudson River Estuary, New York, Showing Water Temperature and Conductivity

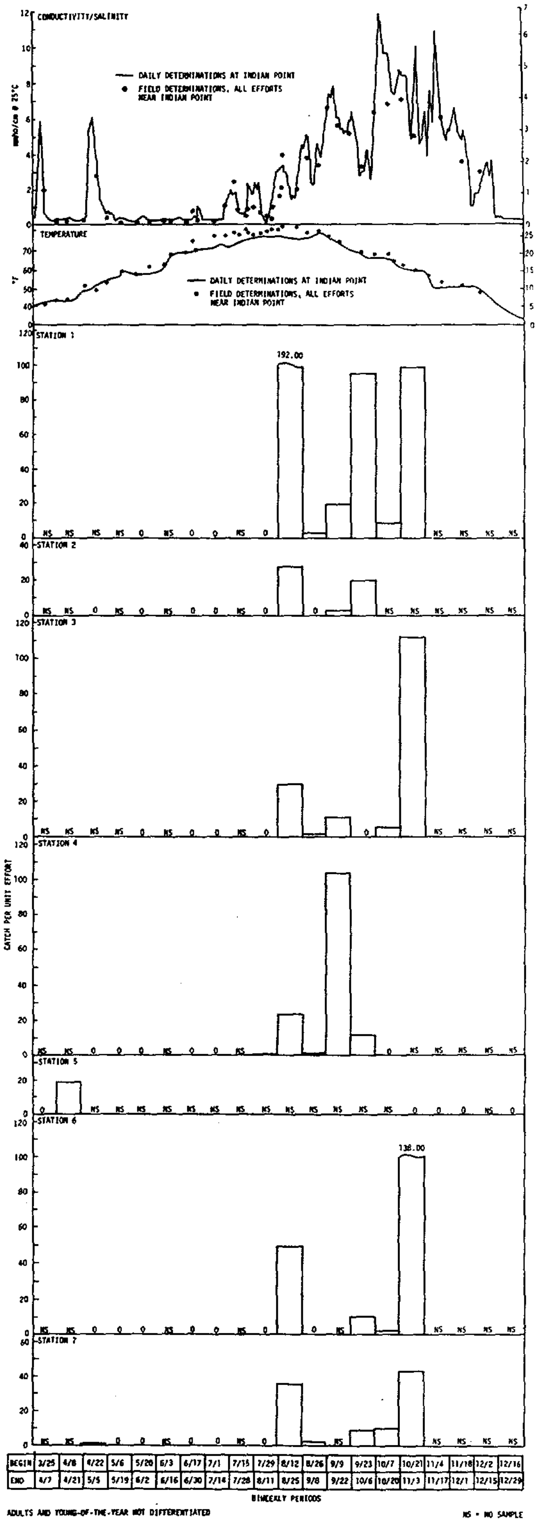


Figure IV-34. 1973 Surface-Trawl Biweekly CPUE for American Shad, Indian Point Region, Hudson River Estuary, New York, Showing Water Temperature and Conductivity

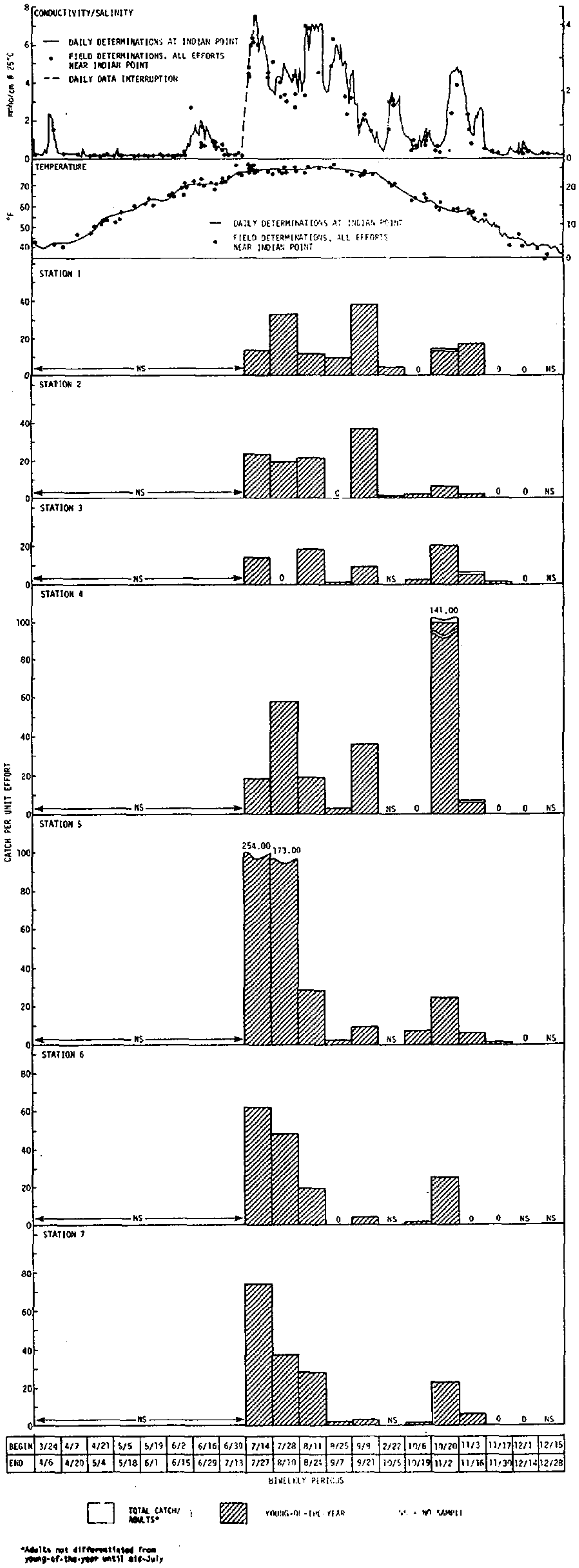


Figure IV-35. 1974 Surface-Trawl Biweekly CPUE for American Shad, Indian Point Region, Hudson River Estuary, New York, Showing Water Temperature and Conductivity

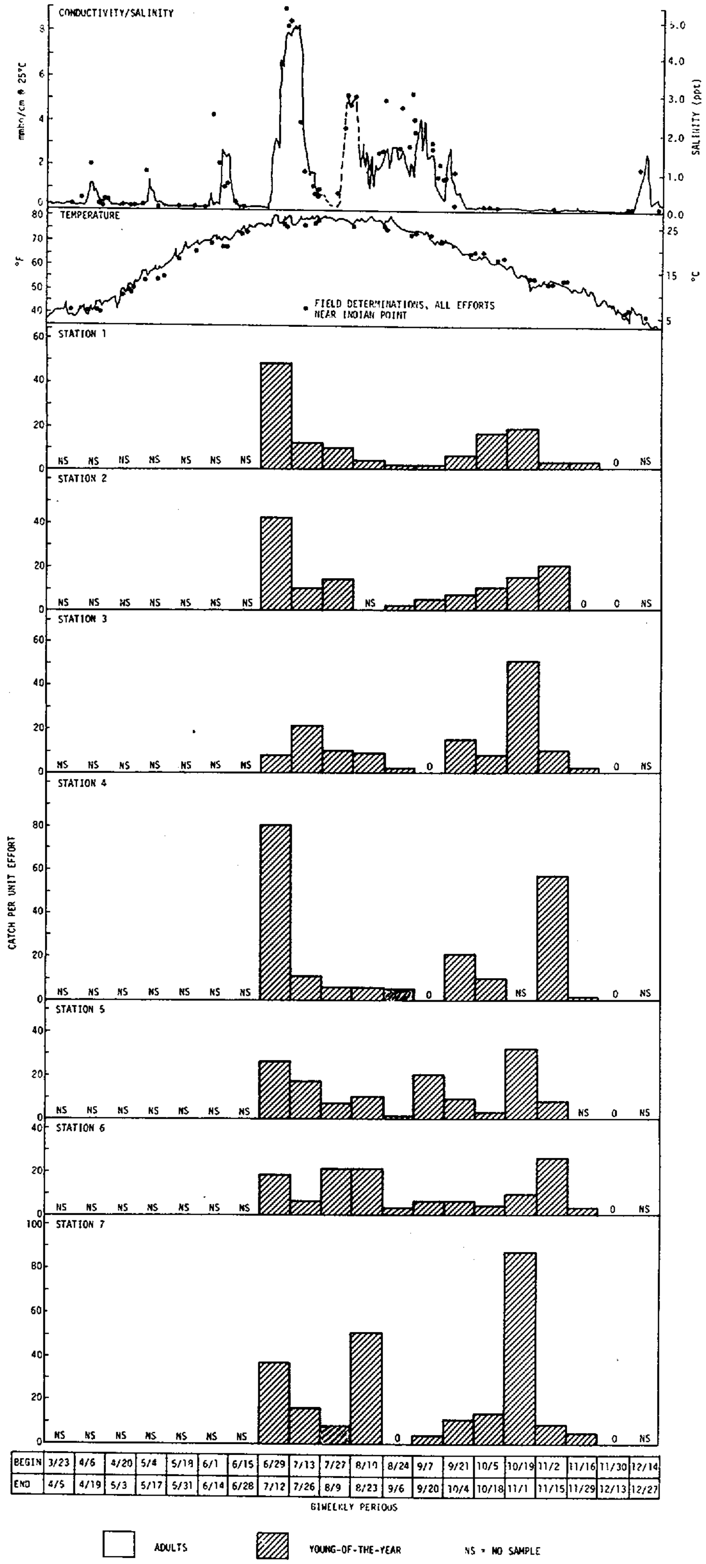
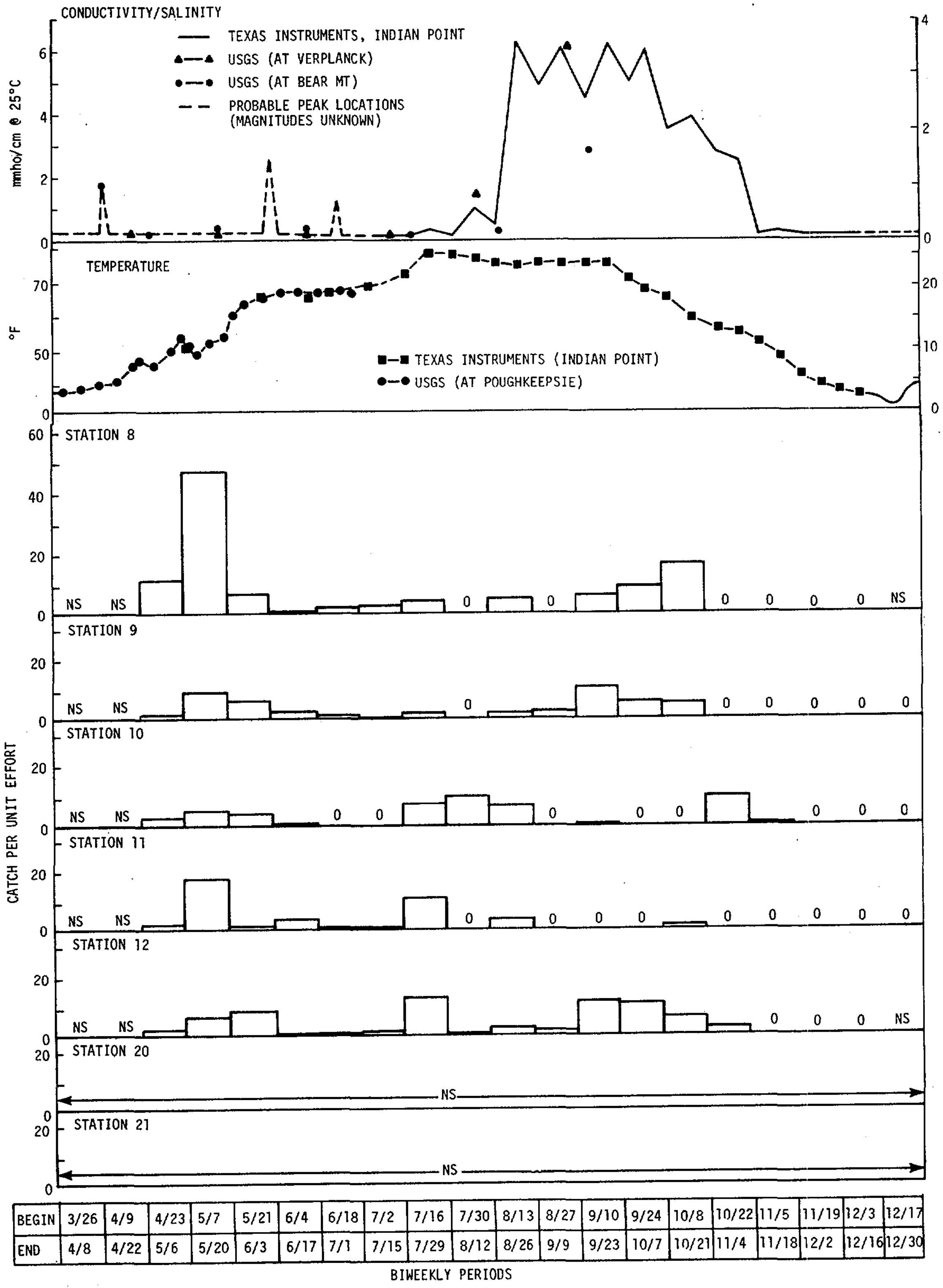


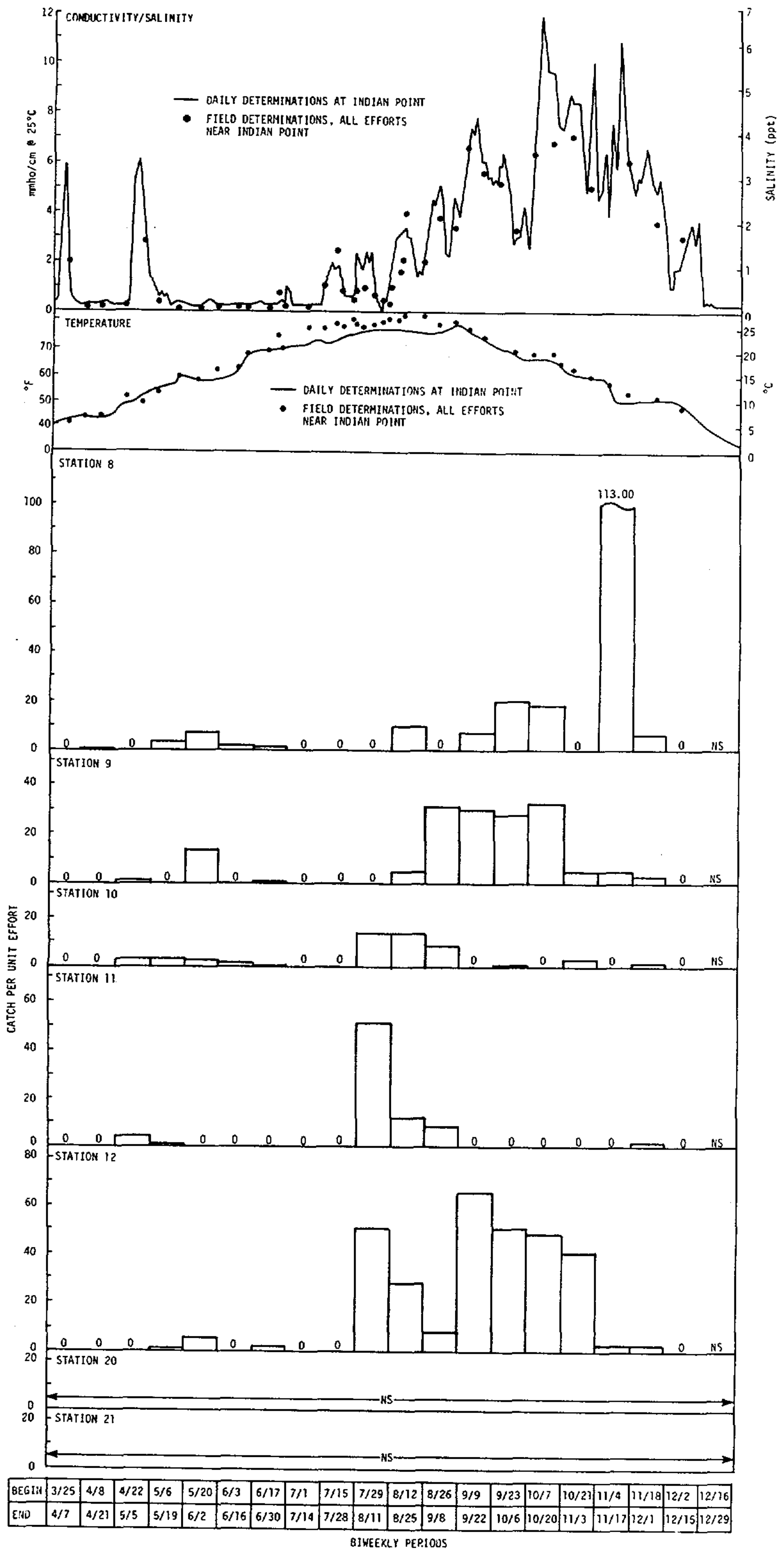
Figure IV-36. 1975 Surface-Trawl Biweekly CPUE for American Shad, Indian Point Region, Hudson River Estuary, New York, Showing Water Temperature and Conductivity



ADULTS AND YOUNG-OF-THE-YEAR NOT DIFFERENTIATED

NS = NO SAMPLE

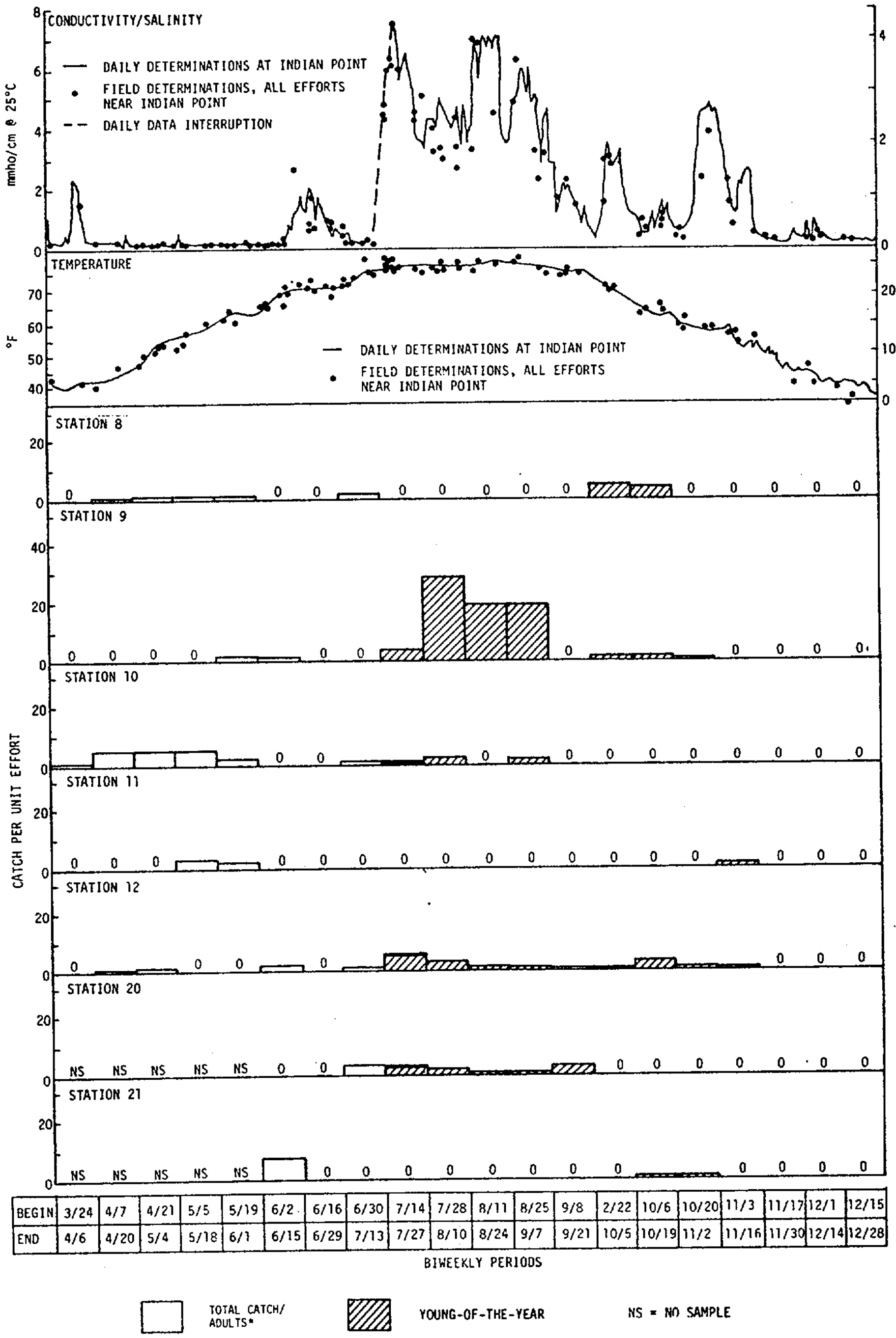
Figure IV-37. 1972 Beach-Seine Biweekly CPUE for Alewife, Indian Point Region, Hudson River Estuary, New York, Showing Water Temperature and Conductivity



ADULTS AND YOUNG-OF-THE-YEAR NOT DIFFERENTIATED

NS = NO SAMPLE

Figure IV-38. 1973 Beach-Seine Biweekly CPUE for Alewife, Indian Point Region, Hudson River Estuary, New York, Showing Water Temperature and Conductivity



*Adults not differentiated from young-of-the-year until mid-July

Figure IV-39. 1974 Beach-Seine Biweekly CPUE for Alewife, Indian Point Region, Hudson River Estuary, New York, Showing Water Temperature and Conductivity

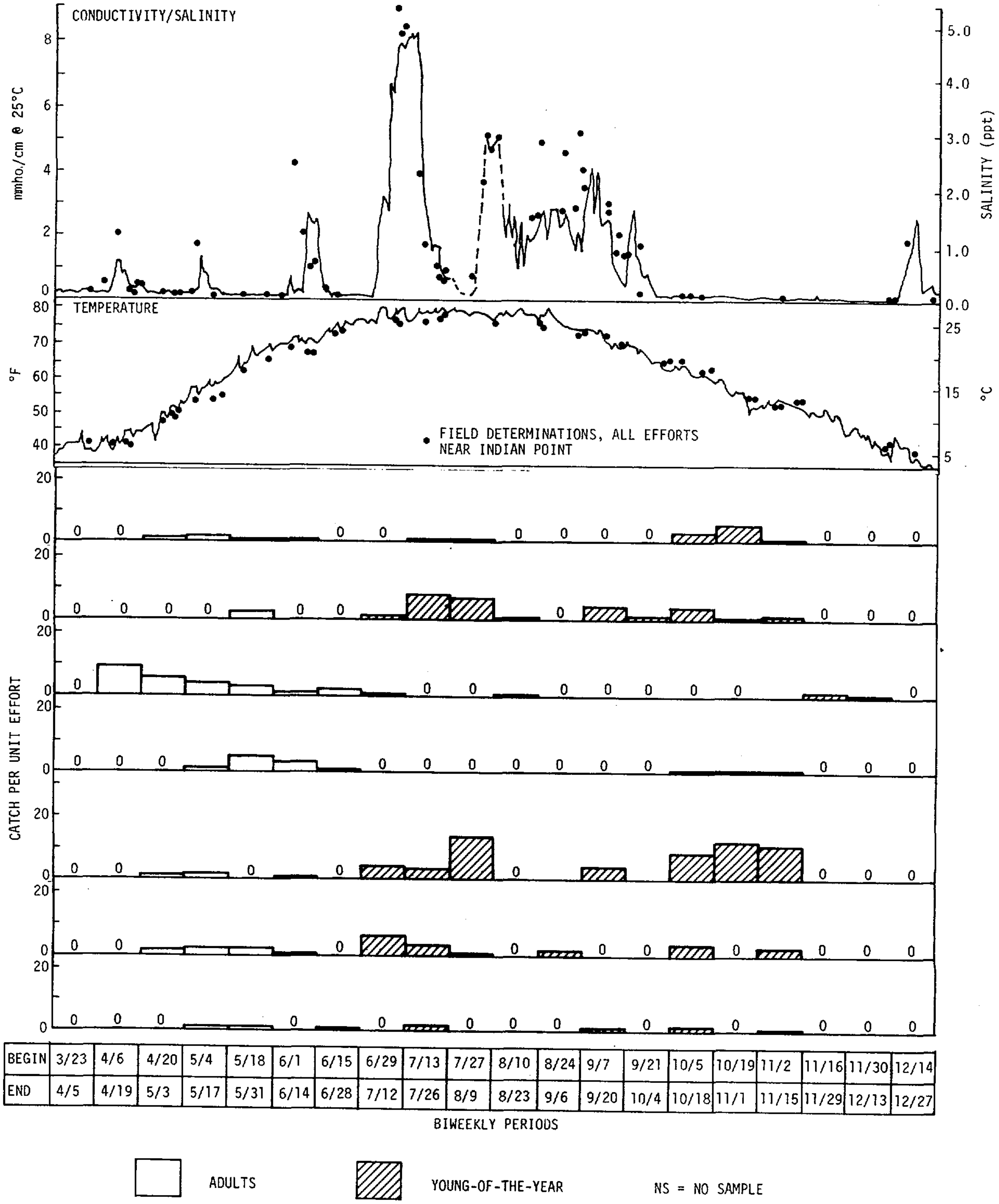
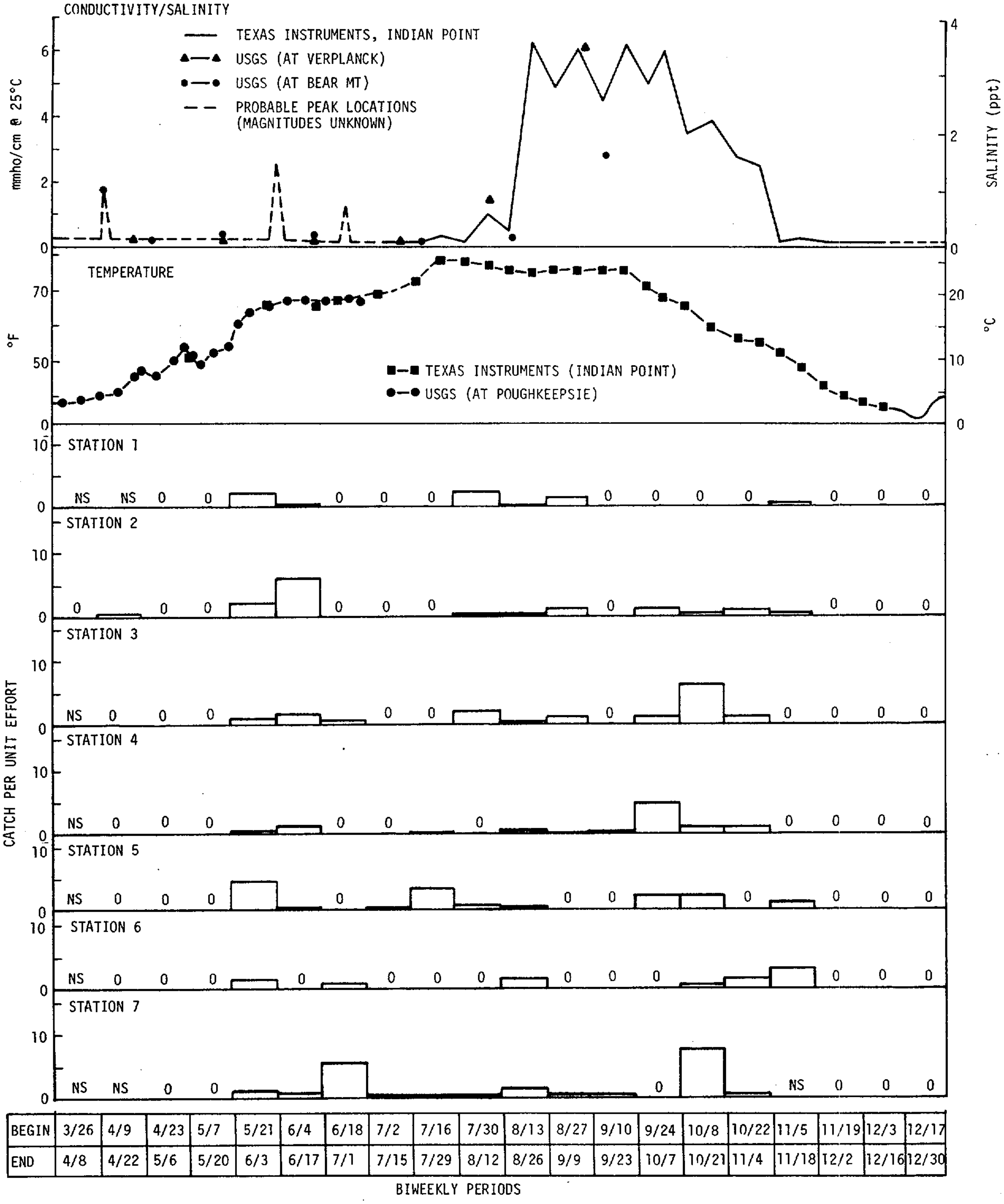


Figure IV-40. 1975 Beach-Seine Biweekly CPUE for Alewife, Indian Point Region, Hudson River Estuary, New York, Showing Water Temperature and Conductivity



ADULTS AND YOUNG-OF-THE-YEAR NOT DIFFERENTIATED

NS = NO SAMPLE

Figure IV-41. 1972 Bottom-Trawl Biweekly CPUE for Alewife, Indian Point Region, Hudson River Estuary, New York, Showing Water Temperature and Conductivity

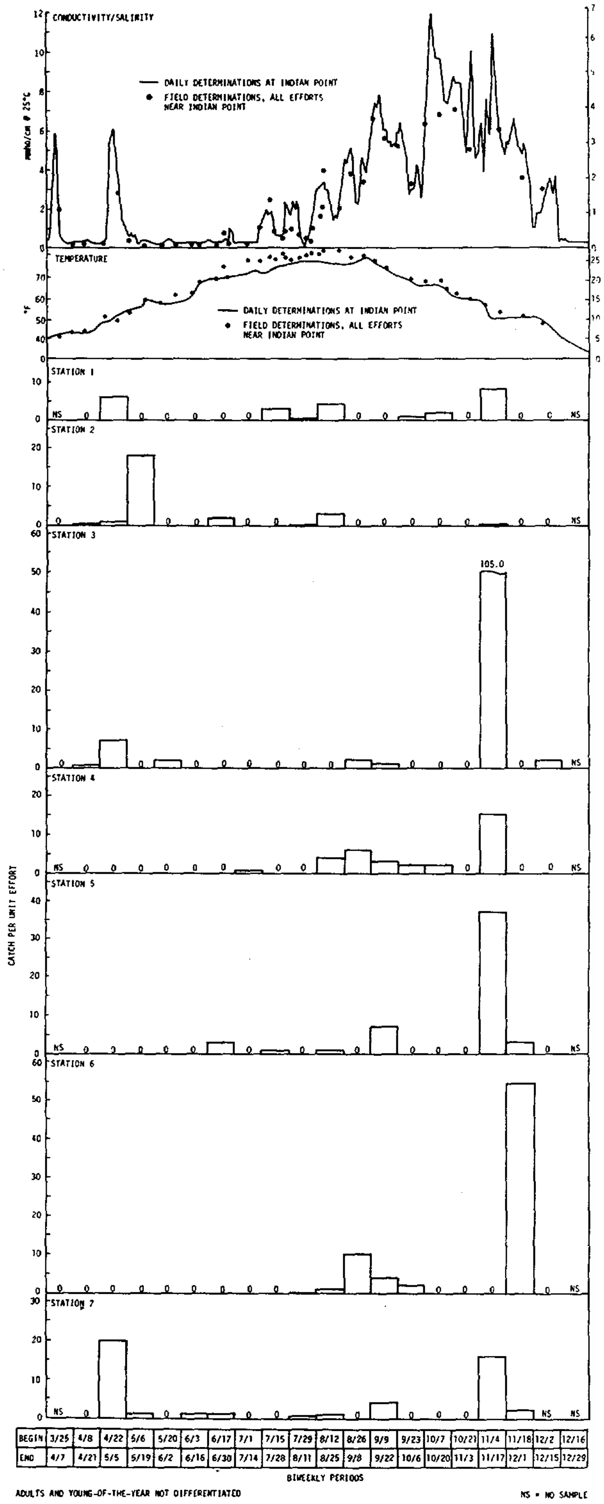
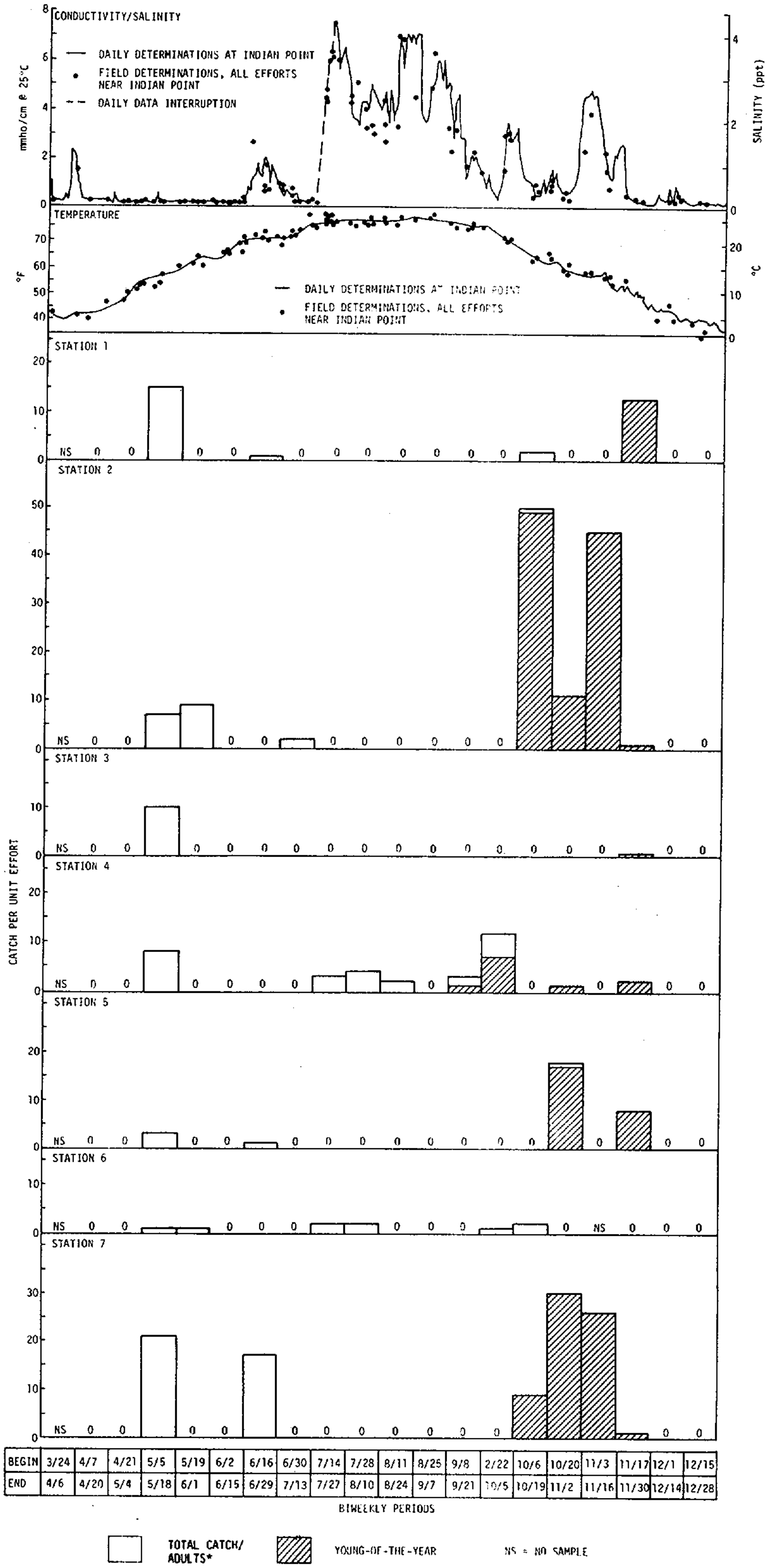


Figure IV-42. 1973 Bottom-Trawl Biweekly CPUE for Alewife, Indian Point Region, Hudson River Estuary, New York, Showing Water Temperature and Conductivity



*Adults not differentiated from young-of-the-year until mid-July

Figure IV-43. 1974 Bottom-Trawl Biweekly CPUE for Alewife, Indian Point Region, Hudson River Estuary, New York, Showing Water Temperature and Conductivity

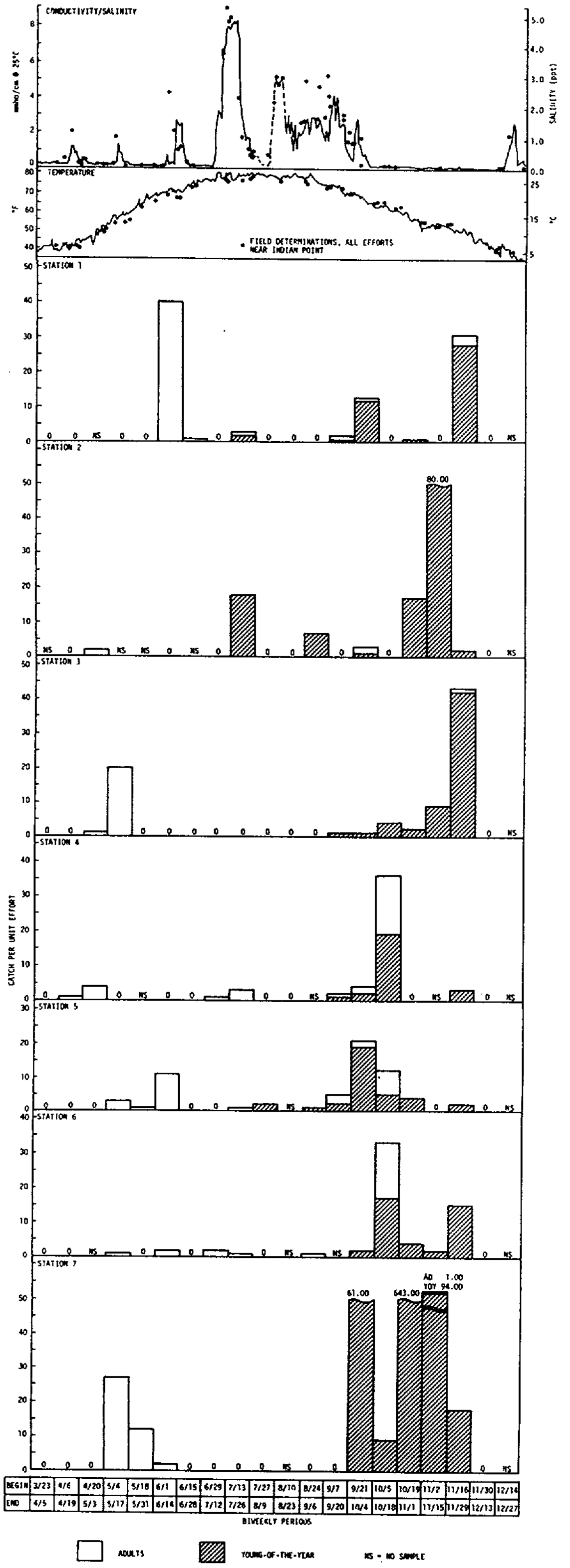
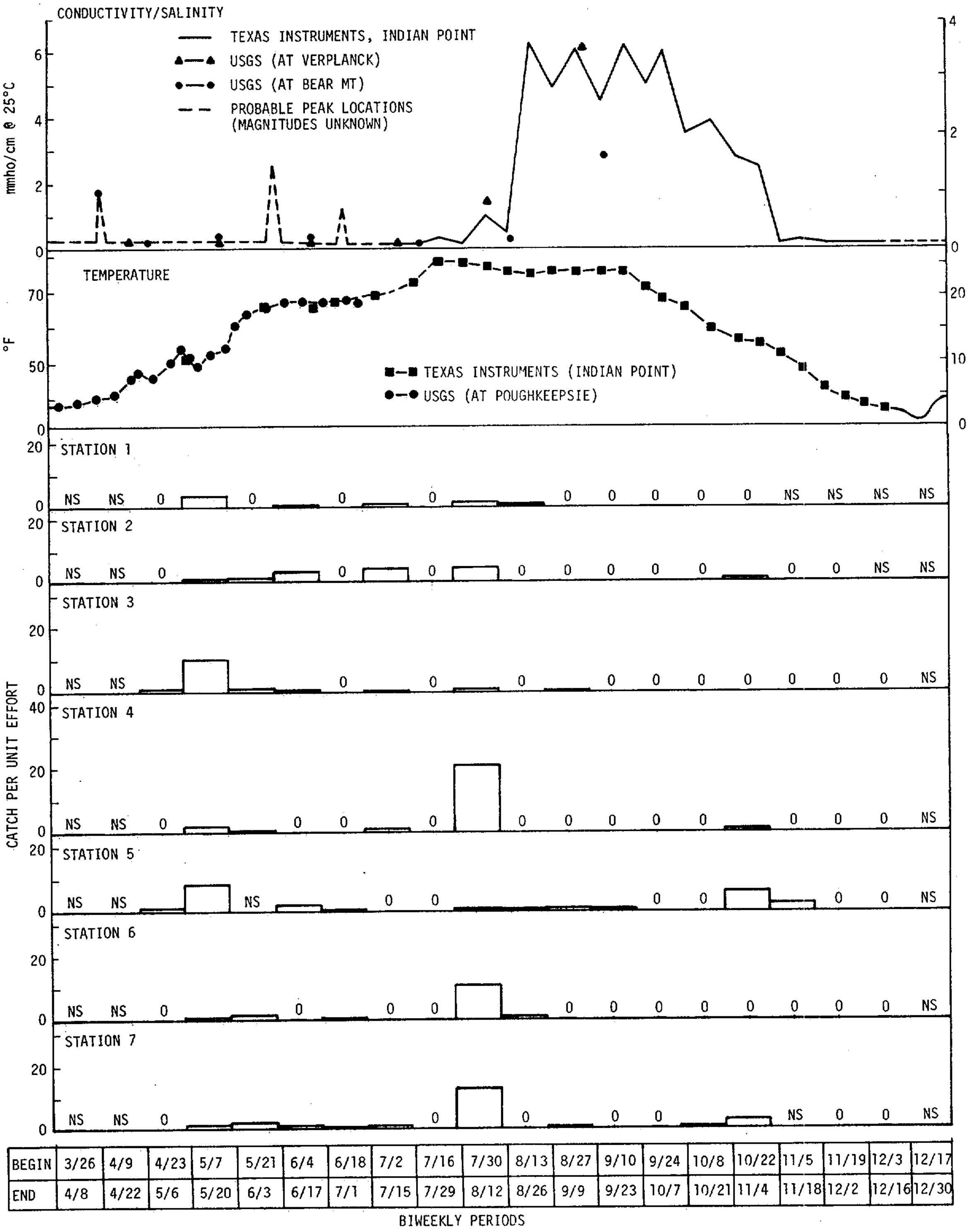


Figure IV-44. 1975 Bottom-Trawl Biweekly CPUE for Alewife, Indian Point Region, Hudson River Estuary, New York, Showing Water Temperature and Conductivity



ADULTS AND YOUNG-OF-THE-YEAR NOT DIFFERENTIATED

NS = NO SAMPLE

Figure IV-45. 1972 Surface-Trawl Biweekly CPUE for Alewife, Indian Point Region, Hudson River Estuary, New York, Showing Water Temperature and Conductivity

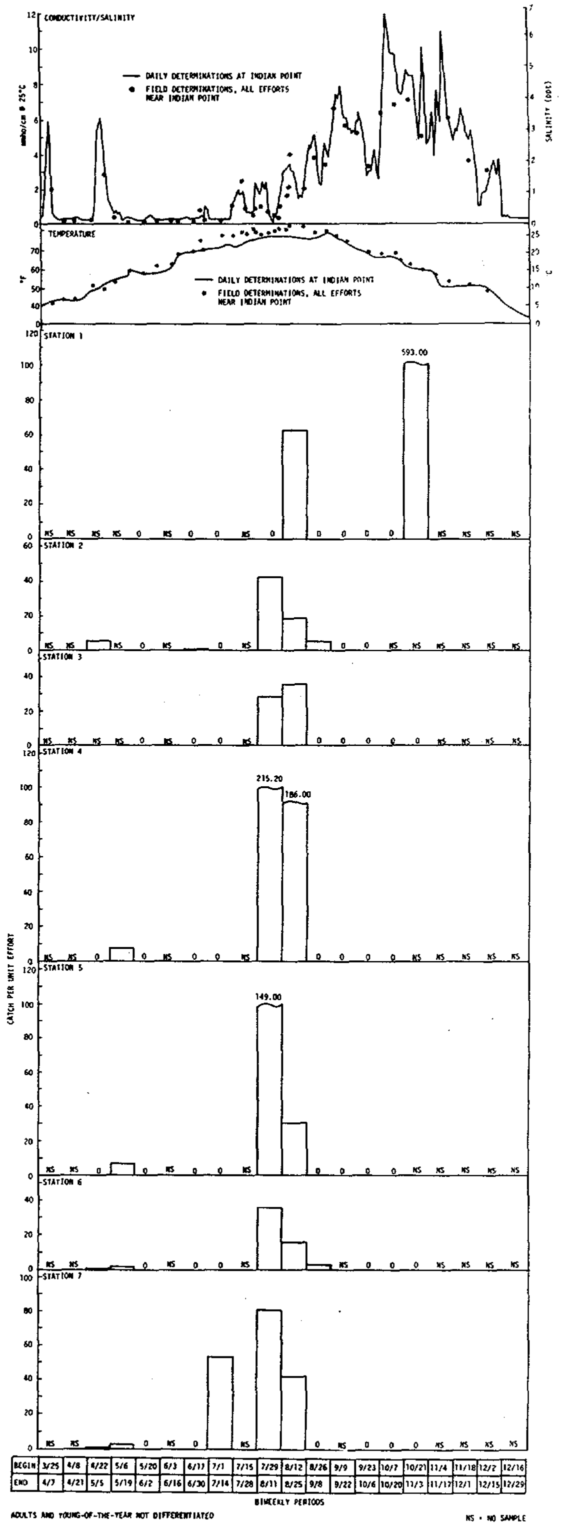
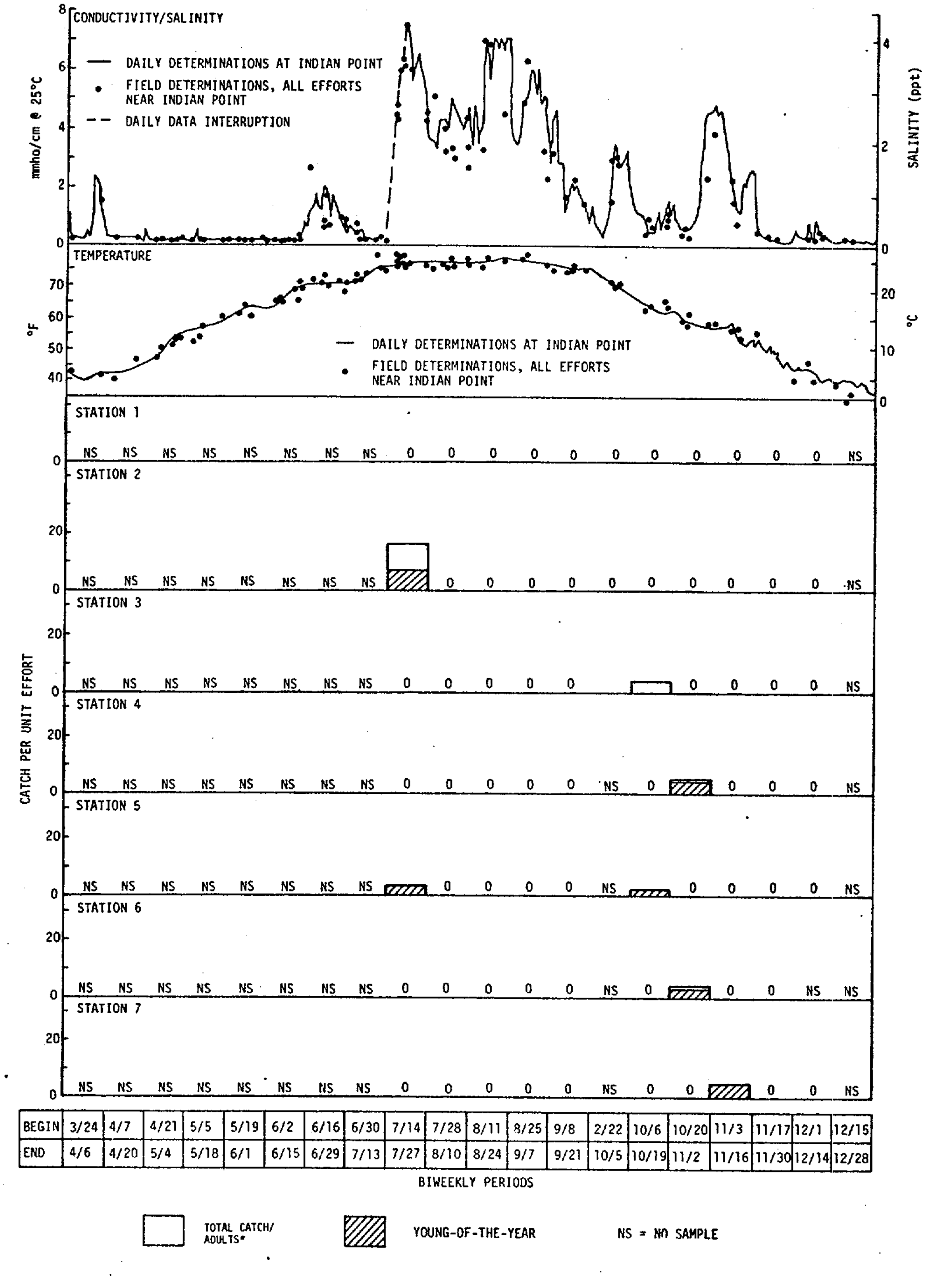


Figure IV-46. 1973 Surface-Trawl Biweekly CPUE for Alewife, Indian Point Region, Hudson River Estuary, New York, Showing Water Temperature and Conductivity



*Adults not differentiated from young-of-the-year until mid-July

Figure IV-47. 1974 Surface-Trawl Biweekly CPUE for Alewife, Indian Point Region, Hudson River Estuary, New York, Showing Water Temperature and Conductivity

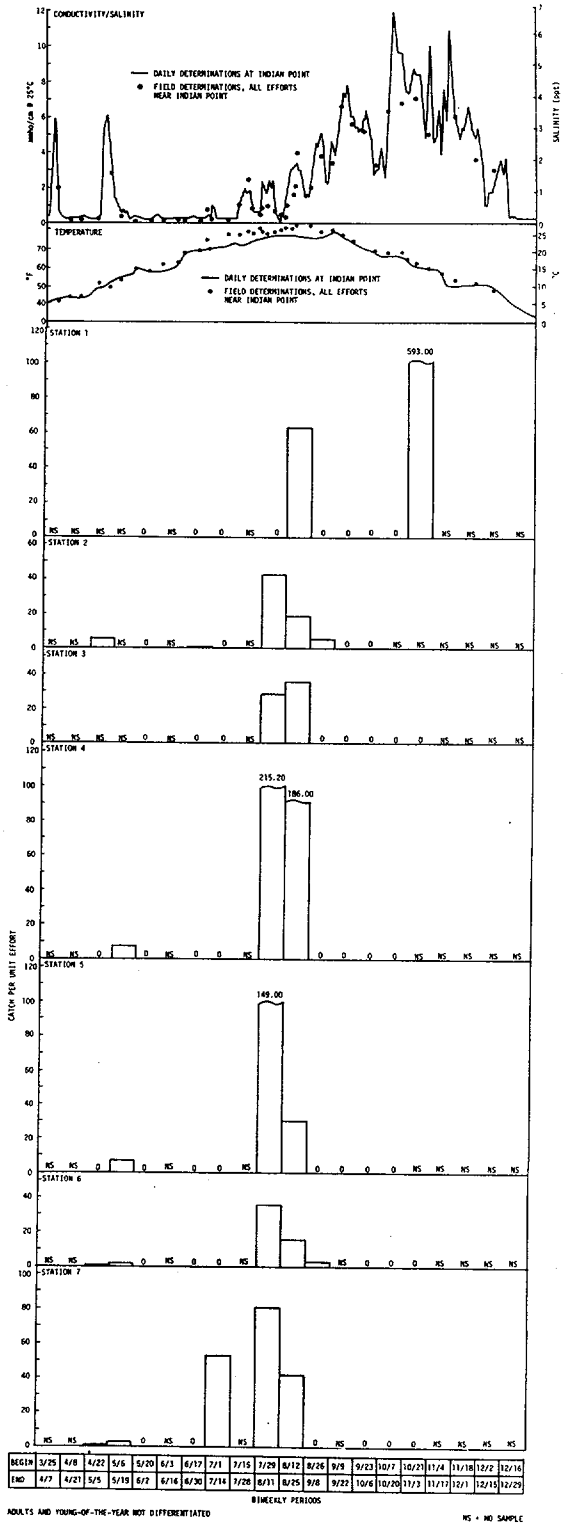
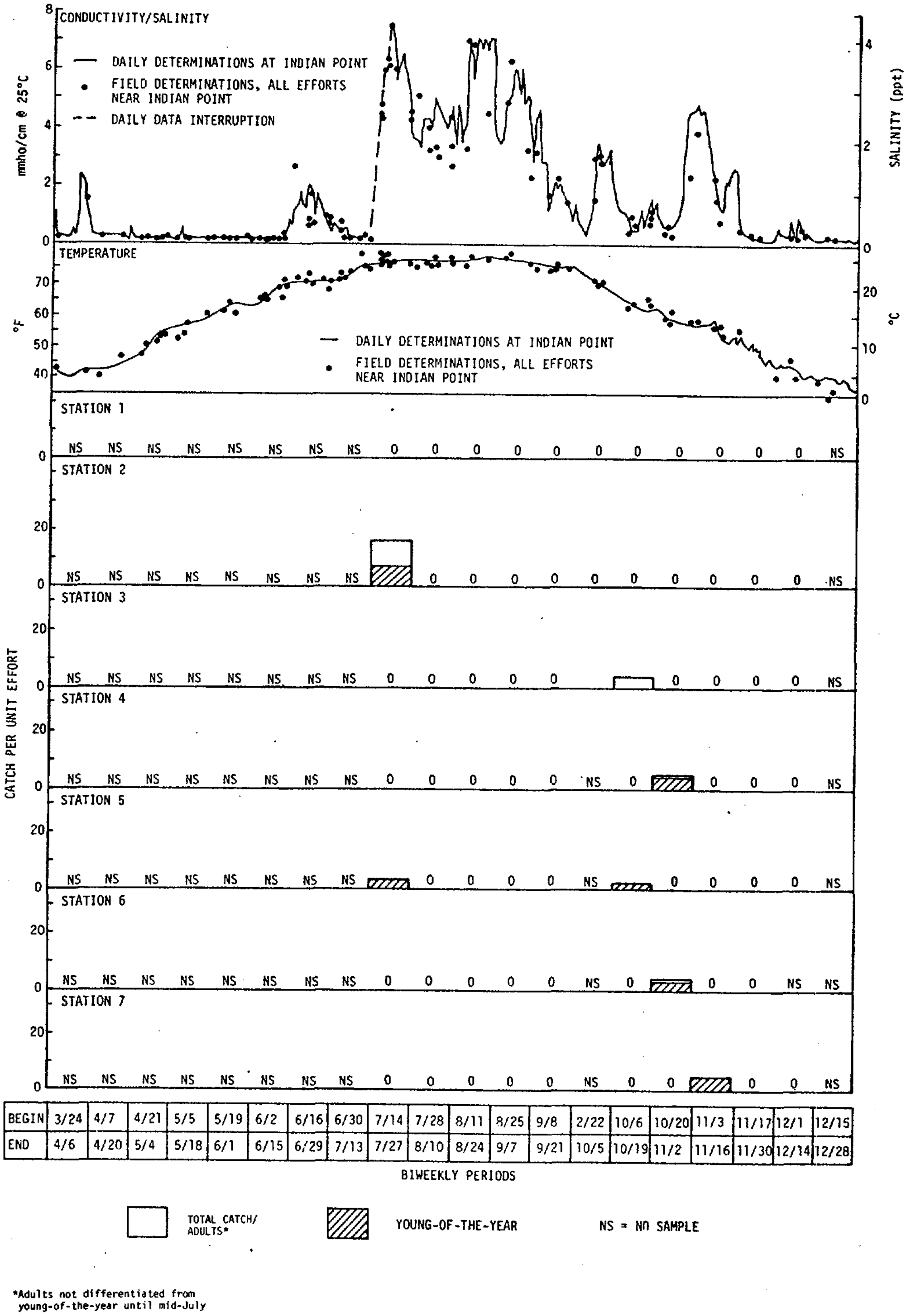


Figure IV-46. 1973 Surface-Trawl Biweekly CPUE for Alewife, Indian Point Region, Hudson River Estuary, New York, Showing Water Temperature and Conductivity



BEGIN	3/24	4/7	4/21	5/5	5/19	6/2	6/16	6/30	7/14	7/28	8/11	8/25	9/8	2/22	10/6	10/20	11/3	11/17	12/1	12/15
END	4/6	4/20	5/4	5/18	6/1	6/15	6/29	7/13	7/27	8/10	8/24	9/7	9/21	10/5	10/19	11/2	11/16	11/30	12/14	12/28

*Adults not differentiated from young-of-the-year until mid-July

Figure IV-47. 1974 Surface-Trawl Biweekly CPUE for Alewife, Indian Point Region, Hudson River Estuary, New York, Showing Water Temperature and Conductivity

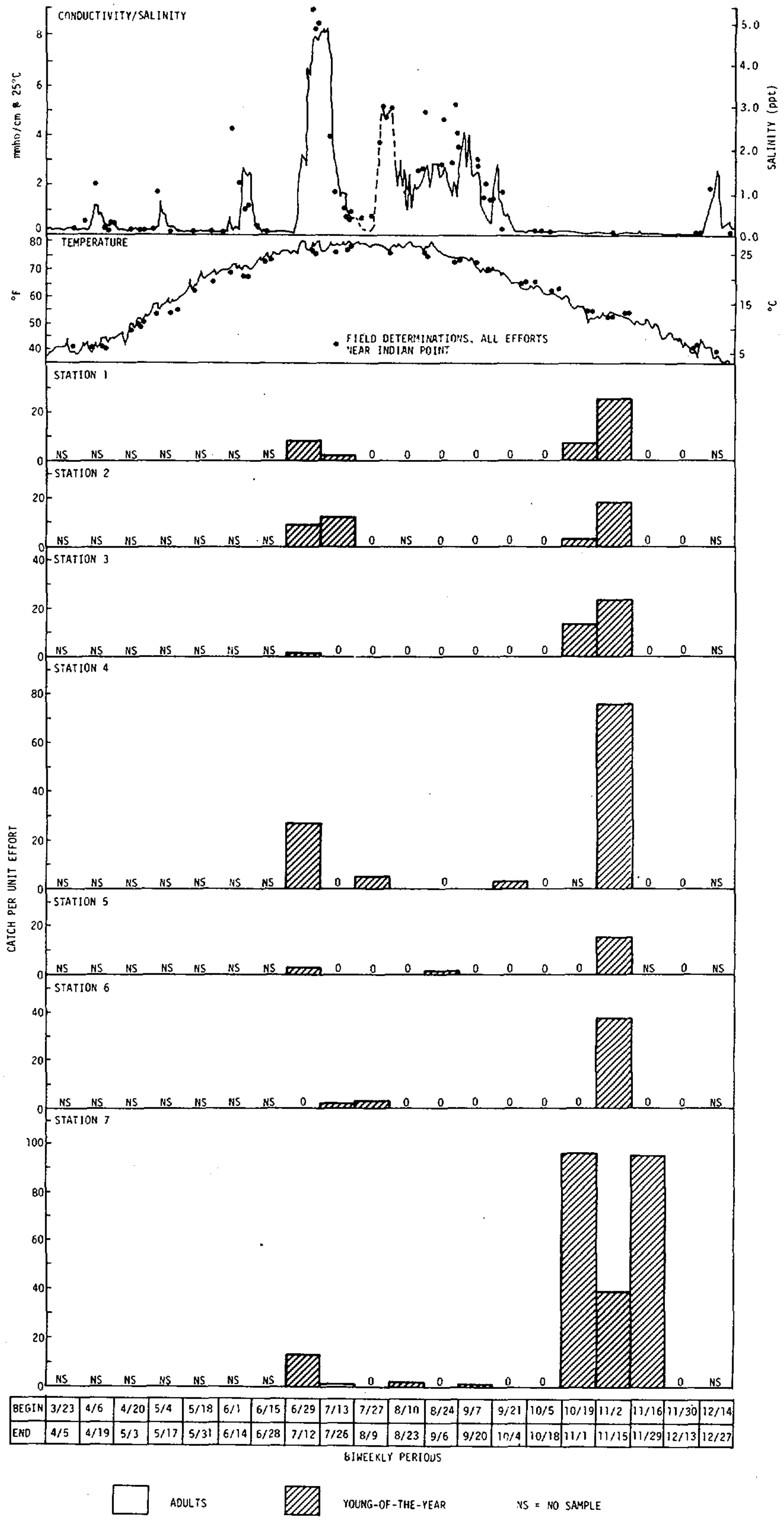


Figure IV-48. 1975 Surface-Trawl Biweekly CPUE for Alewife, Indian Point Region, Hudson River Estuary, New York, Showing Water Temperature and Conductivity

vegetation (Figure IV-1 and Table IV-3), produced consistently higher CPUE values for young-of-the-year. Abundance levels of adult alewife were basically similar in 1973, 1974, and 1975 but considerably higher in 1972. Young-of-the-year CPUE values were generally highest in 1973, intermediate in 1972, and lowest in 1974 and 1975.

In a generalized seasonal analysis, adults began to appear in all gear from late March to early April following the onset of their annual upriver spawning migration and they reached peak abundance in early May. Catches dropped off rapidly in late May and June and adults were essentially absent from the area by July.

Young-of-the-year first appeared in all gear during late June-early July; for the remainder of the summer and through September, bottom-trawl CPUE values were consistently low but surface-trawl catches tended to increase sharply from July through mid-August and to decline thereafter. Beach-seine CPUE values also rose during midsummer but did not peak as sharply as those for surface trawls and remained consistent at roughly the same levels until late fall. Upstream and shoreward movements of young-of-the-year alewife during midsummer have been suggested (TI, 1976) and may be reflected by decreasing CPUE values for surface trawls and relatively stable values for beach seines. Low bottom-trawl CPUE values during summer months indicated that young-of-the-year alewife were not generally abundant in deeper water during this period.

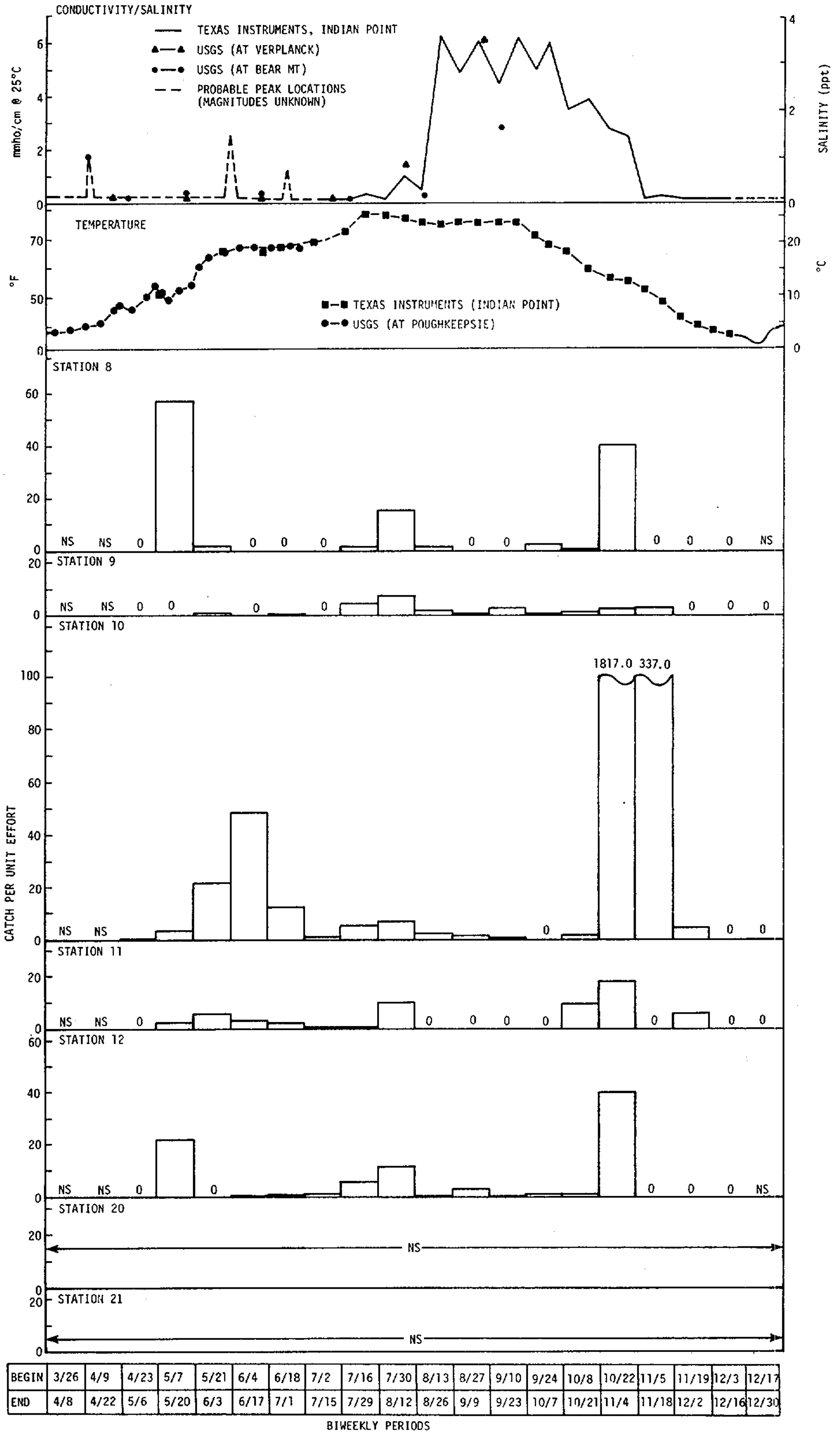
During late August to mid-October, surface-trawl CPUE values for young-of-the-year diminished to near 0, those for bottom trawls increased slowly, and beach-seine values remained relatively consistent with those during August. CPUE values for surface and bottom trawls peaked sharply in mid-October to early November but remained at previous levels for beach seines. These changes probably corresponded to the downstream migration of young alewife which is reported to occur in the fall (TI, 1976). During November, CPUE values decreased. By early December, CPUE values were essentially 0 for all gear.

No trends in nearfield distribution over the 4-year period were apparent, except that the relative abundance of young-of-the-year alewife at beach-seine station 8 (Peekskill Bay) appeared to have declined somewhat. This change may have reflected water quality conditions, but data are insufficient for definitive conclusions.

f. Blueback Herring (*Alosa aestivalis*)

All three standard-station gear collected adult and young-of-the-year blueback herring during 1972-75 (Figures IV-49 through IV-60), with adults being most frequently collected in beach seines and young-of-the-year sampled most effectively by surface trawls and beach seines. Highest beach-seine CPUE values for adult and young-of-the-year generally occurred at stations 10, 11, 20, and 21, which are relatively unprotected and drop off steeply to deep water (Figure IV-1 and Table IV-3). Among trawl stations, there were no apparent differences in catch distribution.

The first collections of adult blueback herring in the Indian Point area usually occurred in mid-April, primarily in beach seines. Abundance levels peaked in May or early June, then declined quickly as adults left the river (TI, 1976). Relative abundance of adults was similar for each of the 4 years considered.



ADULTS AND YOUNG-OF-THE-YEAR NOT DIFFERENTIATED

NS = NO SAMPLE

Figure IV-49. 1972 Beach-Seine Biweekly CPUE for Blueback Herring, Indian Point Region, Hudson River Estuary, New York, Showing Water Temperature and Conductivity

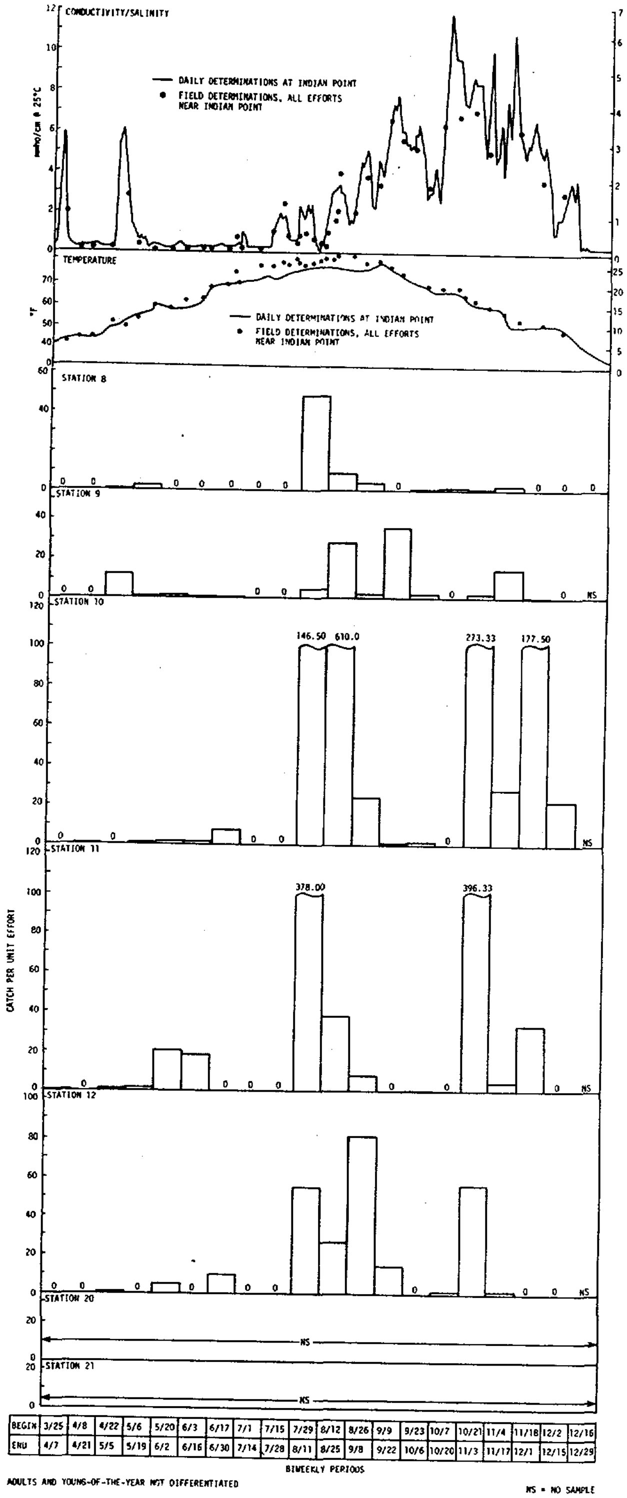
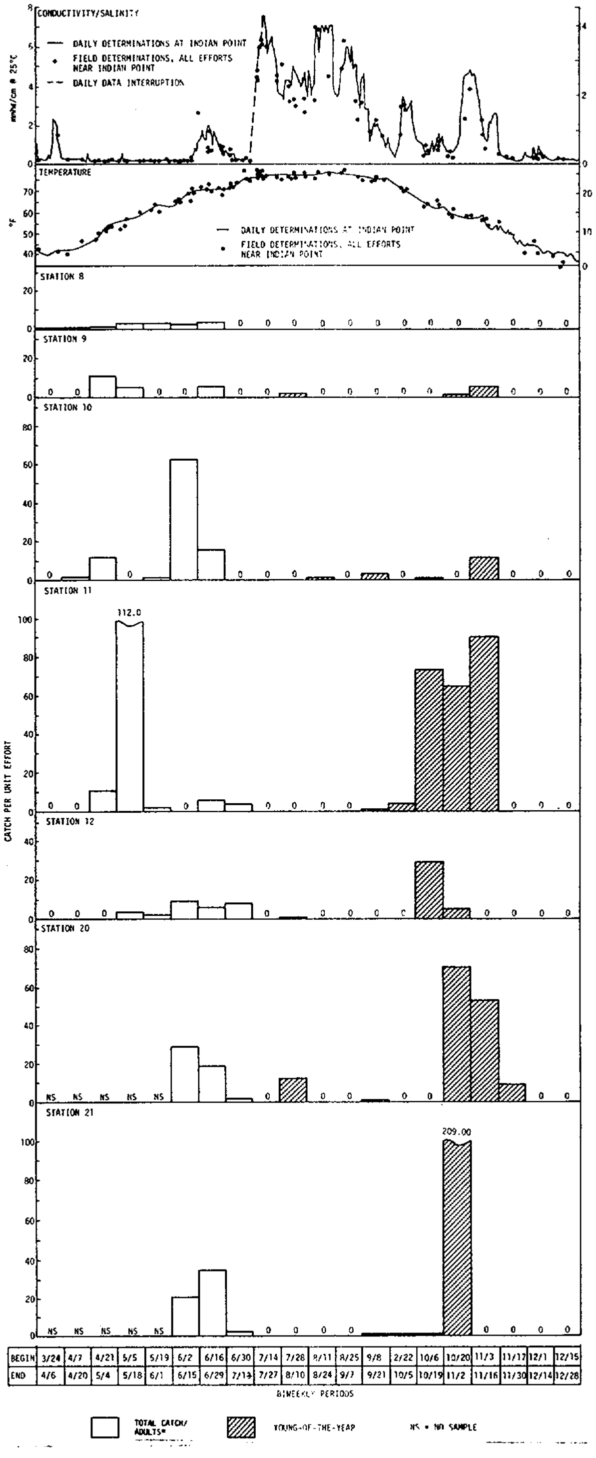


Figure IV-50. 1973 Beach-Seine Biweekly CPUE for Blueback Herring, Indian Point Region, Hudson River Estuary, New York, Showing Water Temperature and Conductivity



*Adults not differentiated from young-of-the-year until mid-July

Figure IV-51. 1974 Beach-Seine Biweekly CPUE for Blueback Herring, Indian Point Region, Hudson River Estuary, New York, Showing Water Temperature and Conductivity

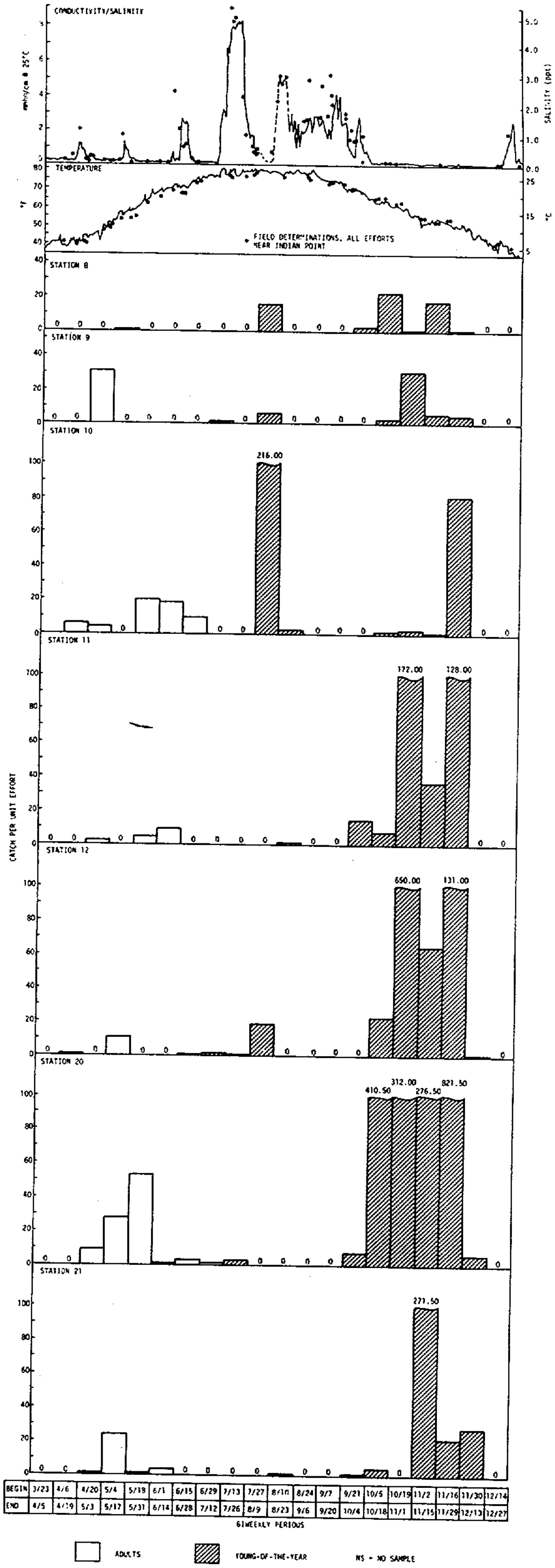
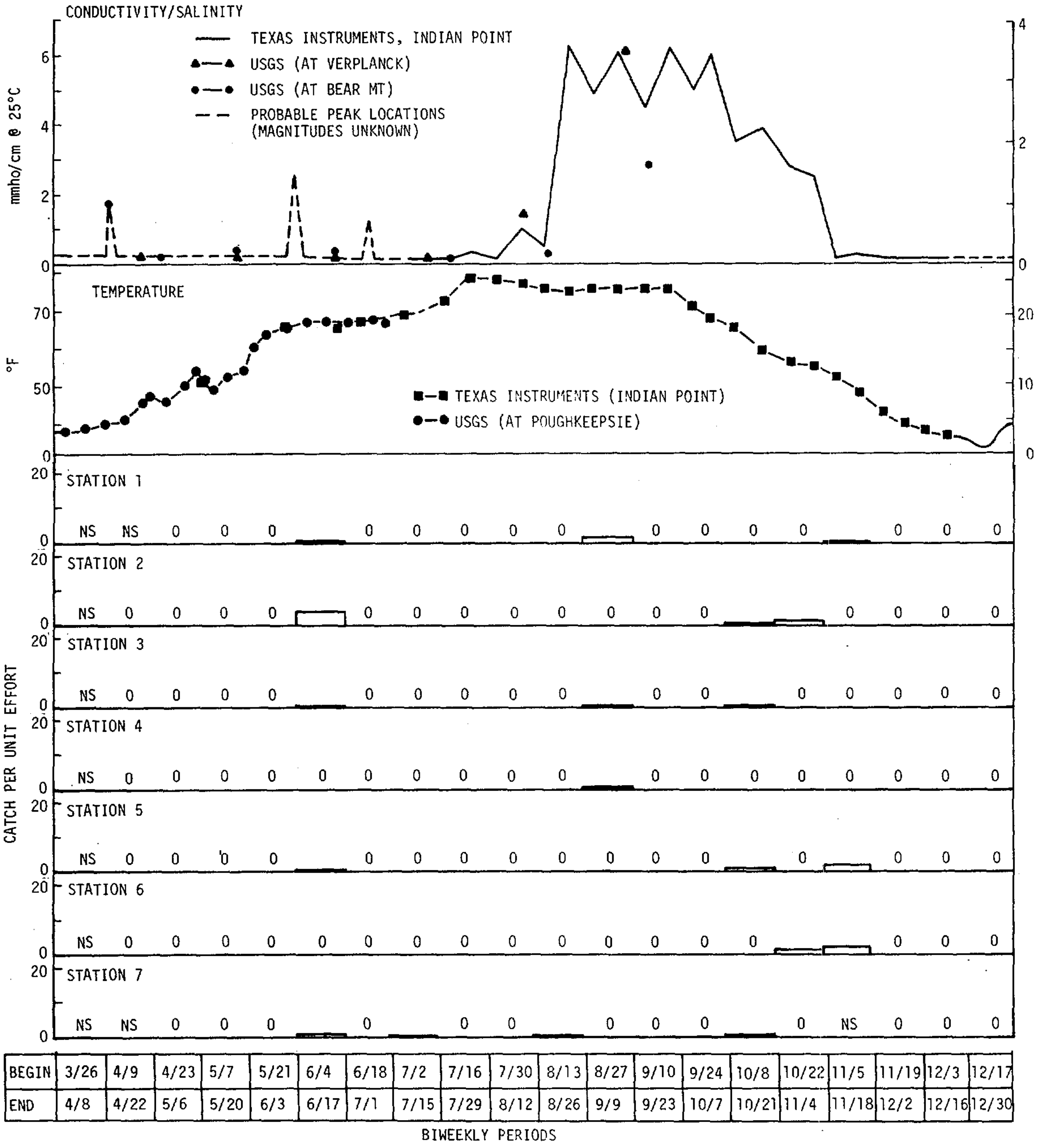


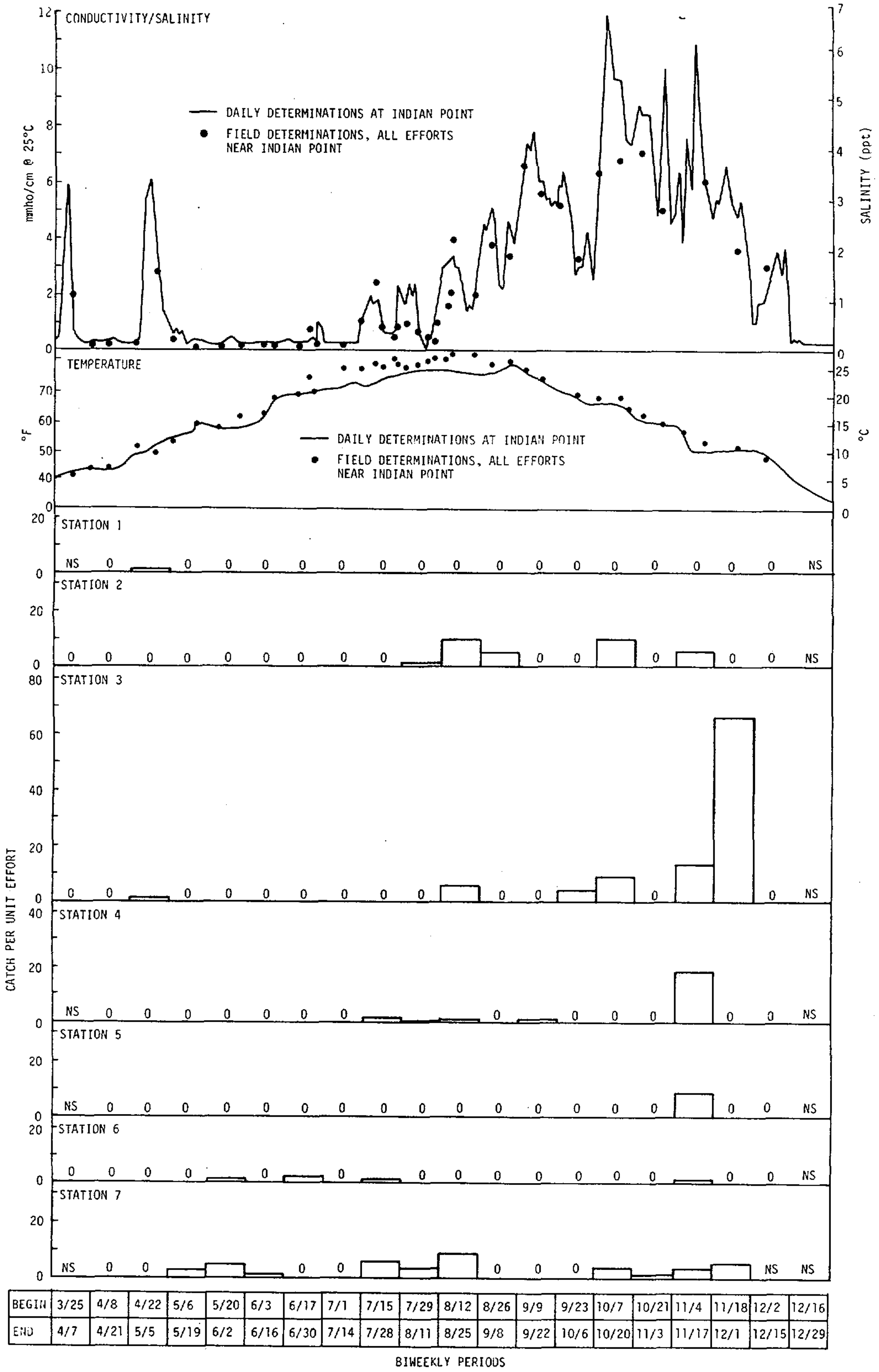
Figure IV-52. 1975 Beach-Seine Biweekly CPUE for Blueback Herring, Indian Point Region, Hudson River Estuary, New York, Showing Water Temperature and Conductivity



ADULTS AND YOUNG-OF-THE-YEAR NOT DIFFERENTIATED

NS = NO SAMPLE

Figure IV-53. 1972 Bottom-Trawl Biweekly CPUE for Blueback Herring, Indian Point Region, Hudson River Estuary, New York, Showing Water Temperature and Conductivity



ADULTS AND YOUNG-OF-THE-YEAR NOT DIFFERENTIATED

NS = NO SAMPLE

Figure IV-54. 1973 Bottom-Trawl Biweekly CPUE for Blueback Herring, Indian Point Region, Hudson River Estuary, New York, Showing Water Temperature and Conductivity

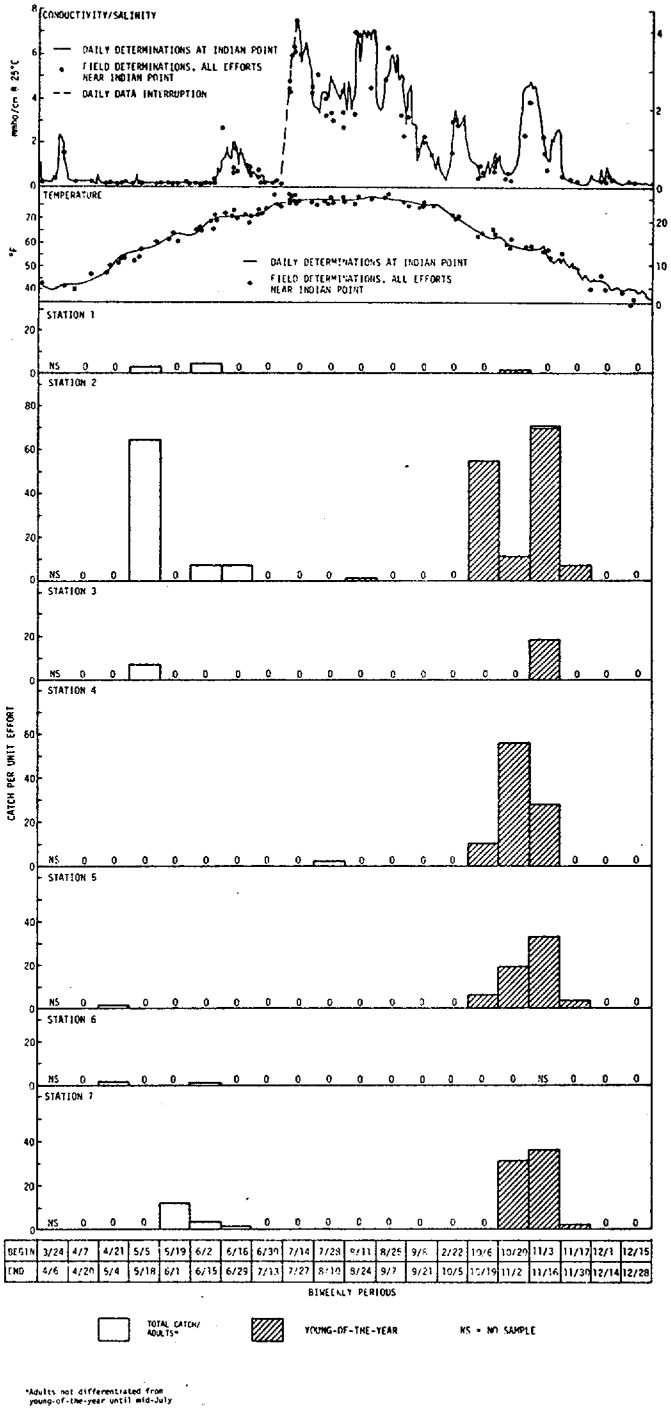


Figure IV-55. 1974 Bottom-Trawl Biweekly CPUE for Blueback Herring, Indian Point Region, Hudson River Estuary, New York, Showing Water Temperature and Conductivity

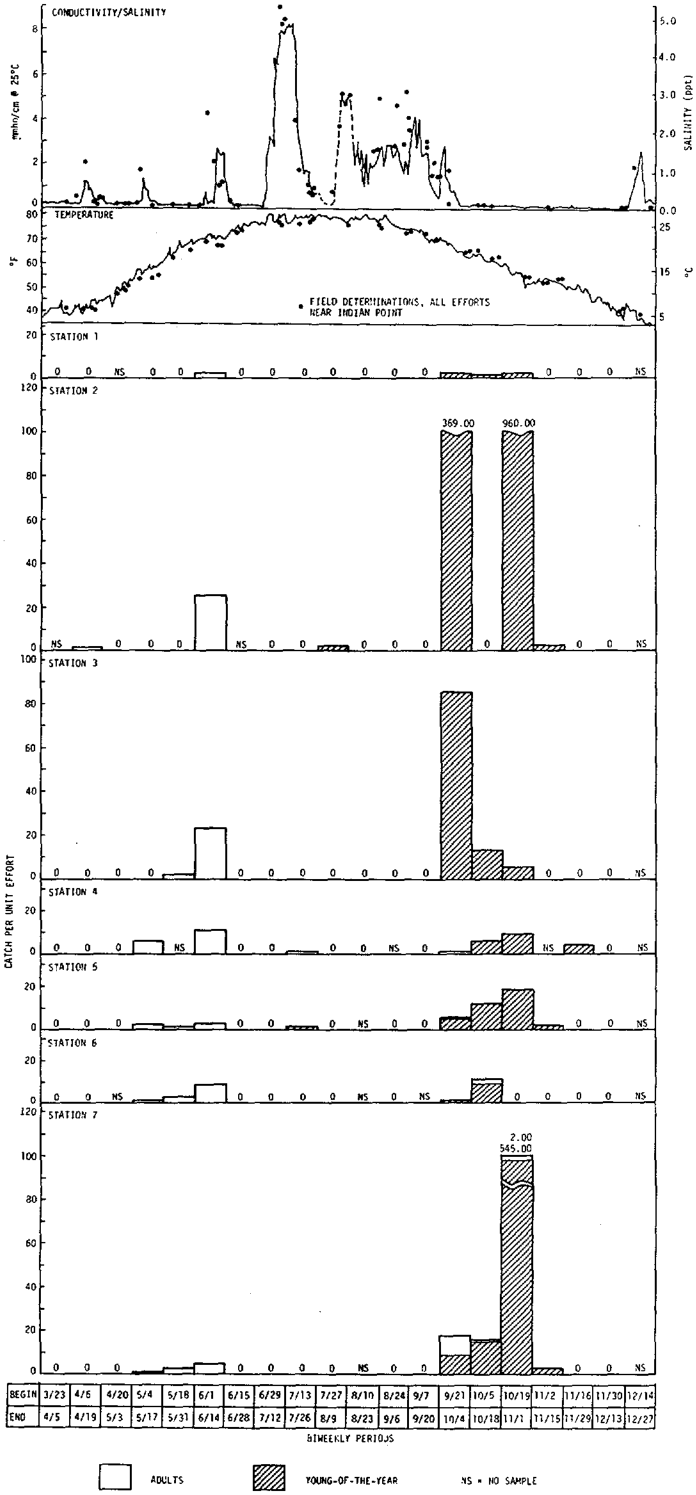
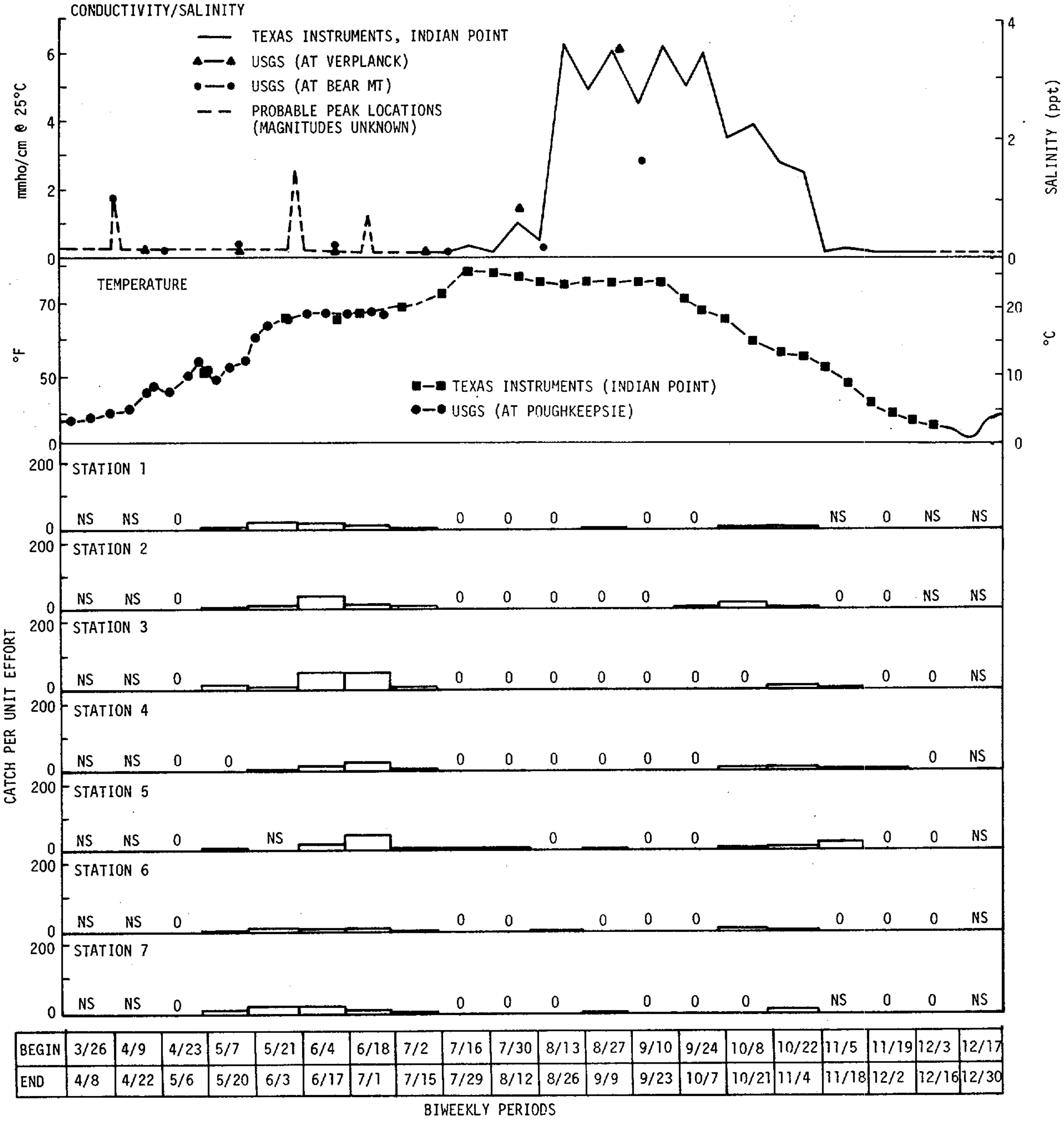


Figure IV-56. 1975 Bottom-Trawl Biweekly CPUE for Blueback Herring, Indian Point Region, Hudson River Estuary, New York, Showing Water Temperature and Conductivity



ADULTS AND YOUNG-OF-THE-YEAR NOT DIFFERENTIATED

NS = NO SAMPLE

Figure IV-57. 1972 Surface-Trawl Biweekly CPUE for Blueback Herring, Indian Point Region, Hudson River Estuary, New York, Showing Water Temperature and Conductivity

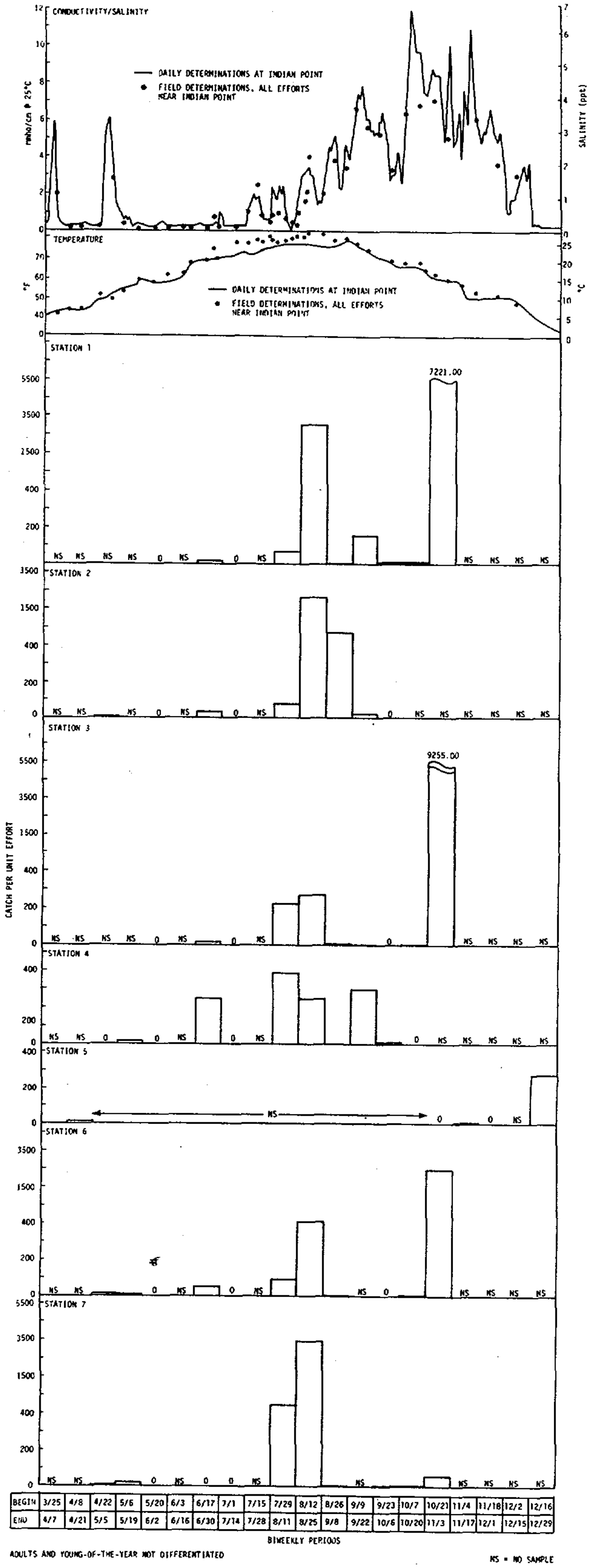


Figure IV-58. 1973 Surface-Trawl Biweekly CPUE for Blueback Herring, Indian Point Region, Hudson River Estuary, New York, Showing Water Temperature and Conductivity

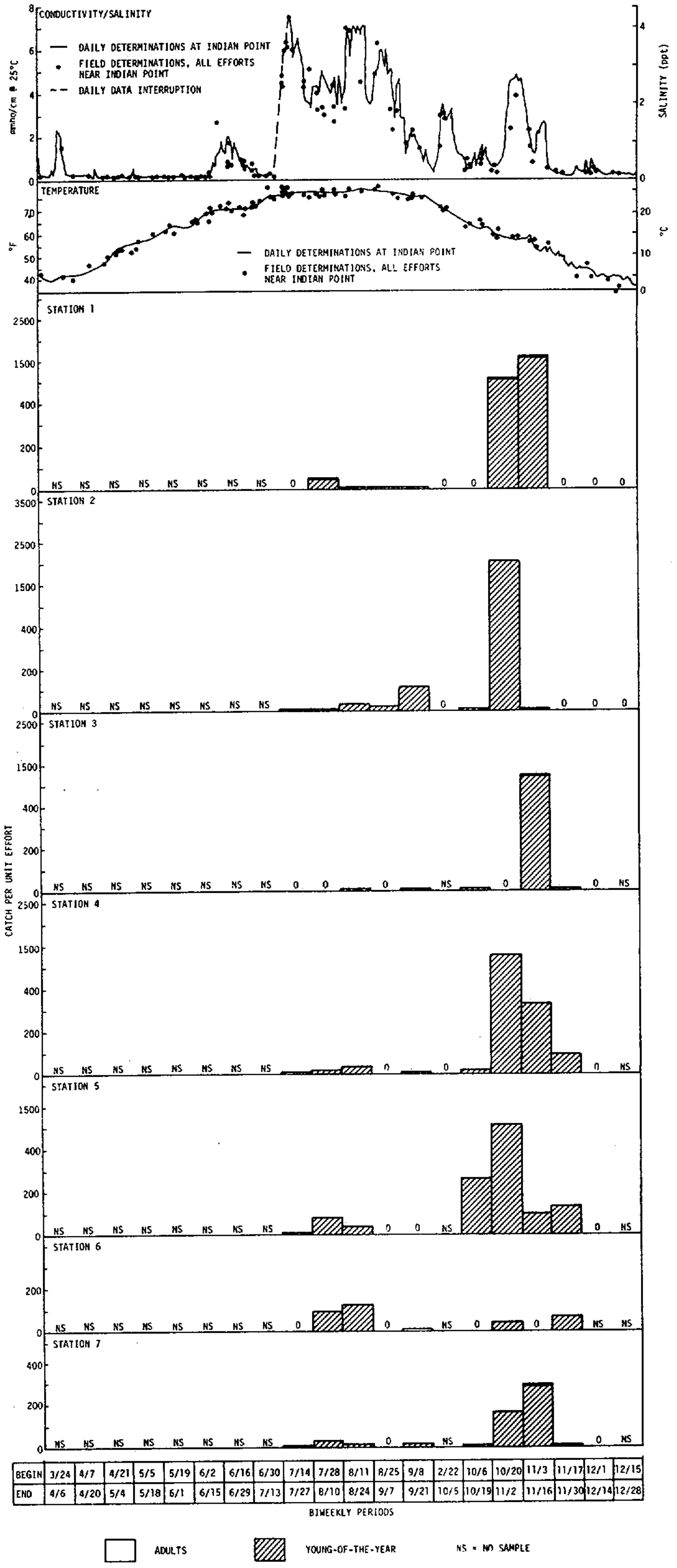


Figure IV-59. 1974 Surface-Trawl Biweekly CPUE for Blueback Herring, Indian Point Region, Hudson River Estuary, New York, Showing Water Temperature and Conductivity

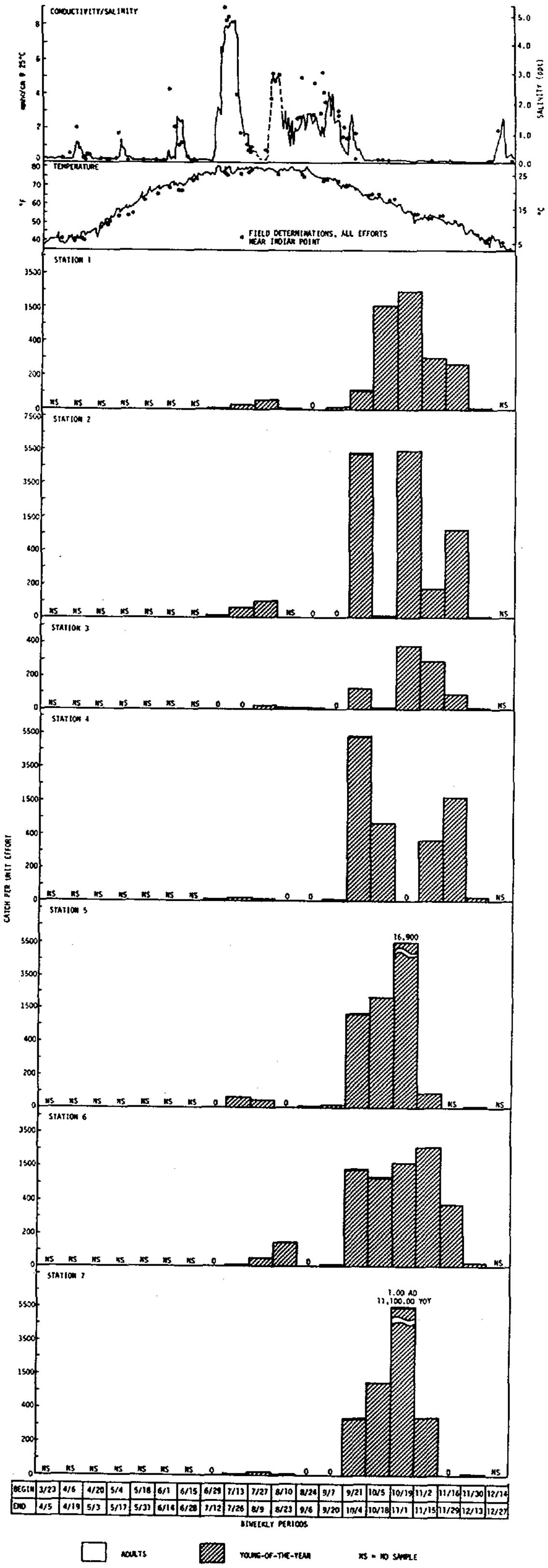


Figure IV-60. 1975 Surface-Trawl Biweekly CPUE for Blueback Herring, Indian Point Region, Hudson River Estuary, New York, Showing Water Temperature and Conductivity

Young-of-the-year first appeared in beach seines and surface trawls in August, but relative abundance at that time was highly variable from year to year. Through September, CPUE values for all gear were very low but rose sharply from October through mid-November, coinciding with seaward migrations (TI, 1976).

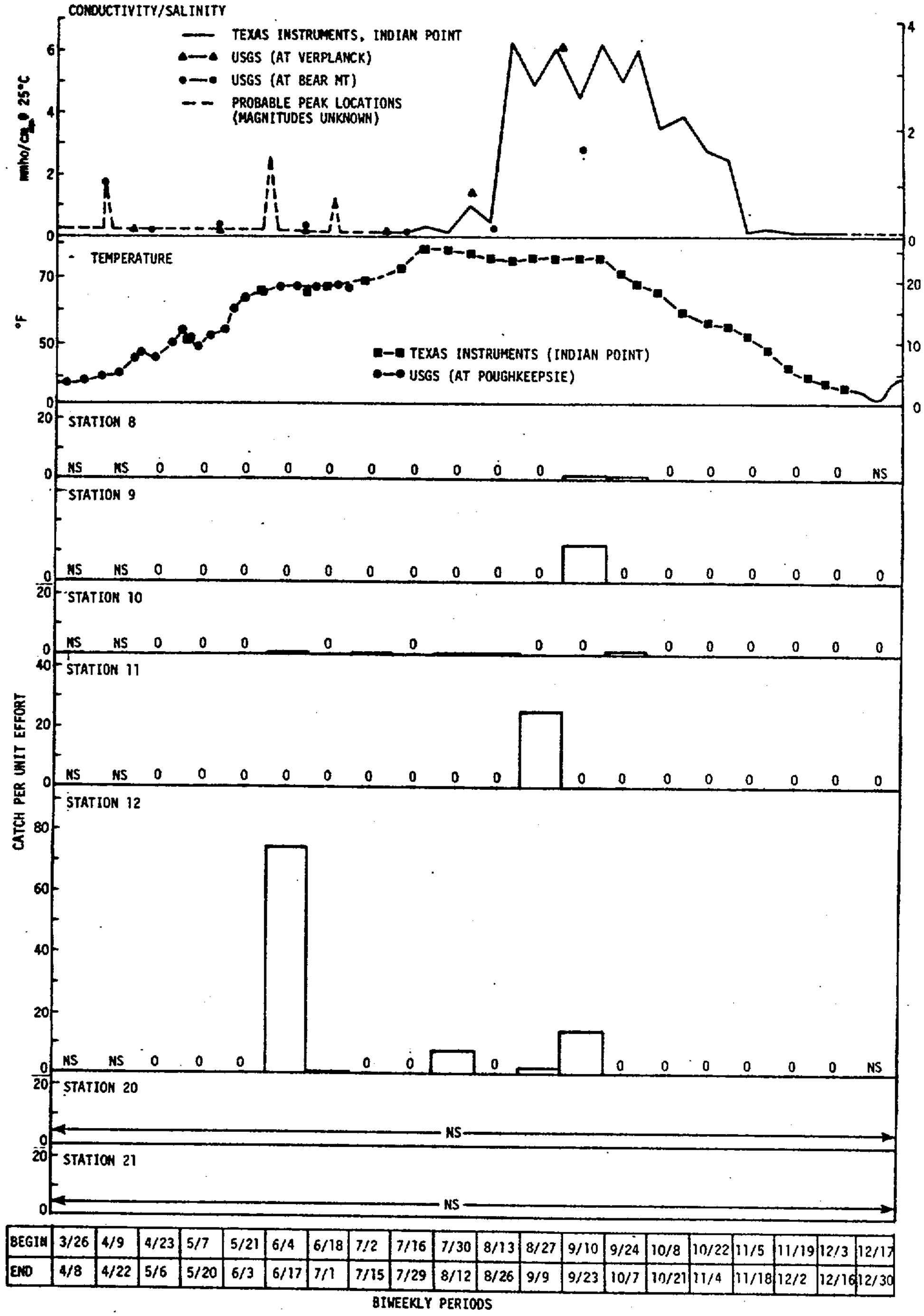
CPUE values for young-of-the-year were similar for 1973-75 but were lower in 1972. In 1973, August CPUE values rose sharply before declining in September; this was consistent with reported midsummer upriver movements of young-of-the-year (TI, 1976) but did not occur to nearly the same extent in 1972, 1974, or 1975.

No long-term trends for either relative abundance or distribution were apparent among sampling stations over the 4-year period.

g. Bay Anchovy (*Anchoa mitchilli*)

Each standard-station gear (beach seine, surface trawl, and bottom trawl) took large numbers of adult and young-of-the-year bay anchovy during 1972-75, but catch distribution among gear was variable seasonally and from year to year.

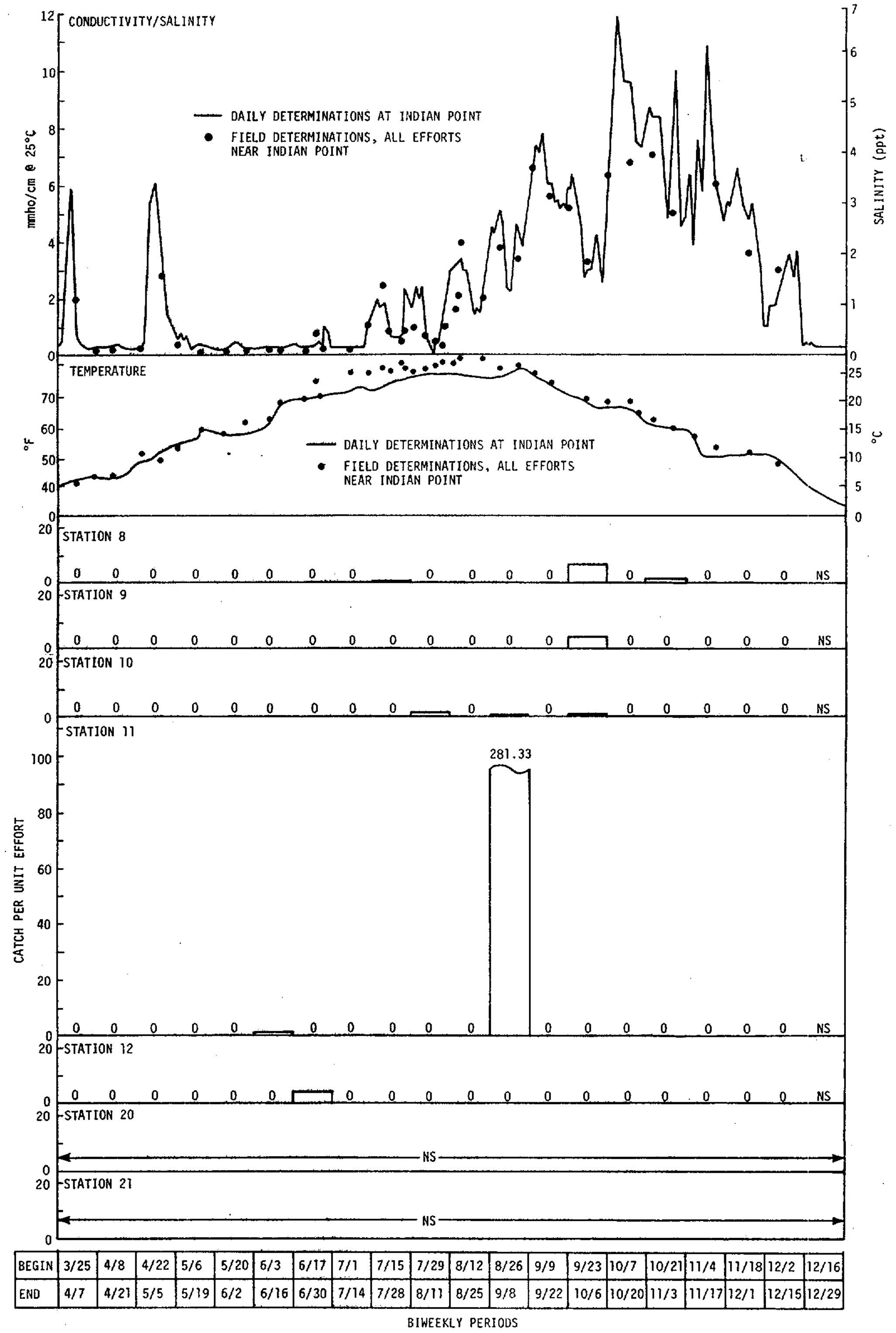
In a typical year, adult bay anchovy first appeared in May standard-station beach-seine catches (Figures IV-61 through IV-64). Beach seine CPUE values peaked in late spring and/or early summer and declined quickly in July when CPUE values for bottom and surface trawls increased (Figures IV-65 through IV-72), indicating an offshore movement. By August, catches in all gear had decreased; thereafter, catches of adults were sporadic and CPUE values low. Declining CPUE values in the



ADULTS AND YOUNG-OF-THE-YEAR NOT DIFFERENTIATED

NS = NO SAMPLE

Figure IV-61. 1972 Beach-Seine Biweekly CPUE for Bay Anchovy, Indian Point Region, Hudson River Estuary, New York, Showing Water Temperature and Conductivity



ADULTS AND YOUNG-OF-THE-YEAR NOT DIFFERENTIATED

NS = NO SAMPLE

Figure IV-62. 1973 Beach-Seine Biweekly CPUE for Bay Anchovy, Indian Point Region, Hudson River Estuary, New York, Showing Water Temperature and Conductivity

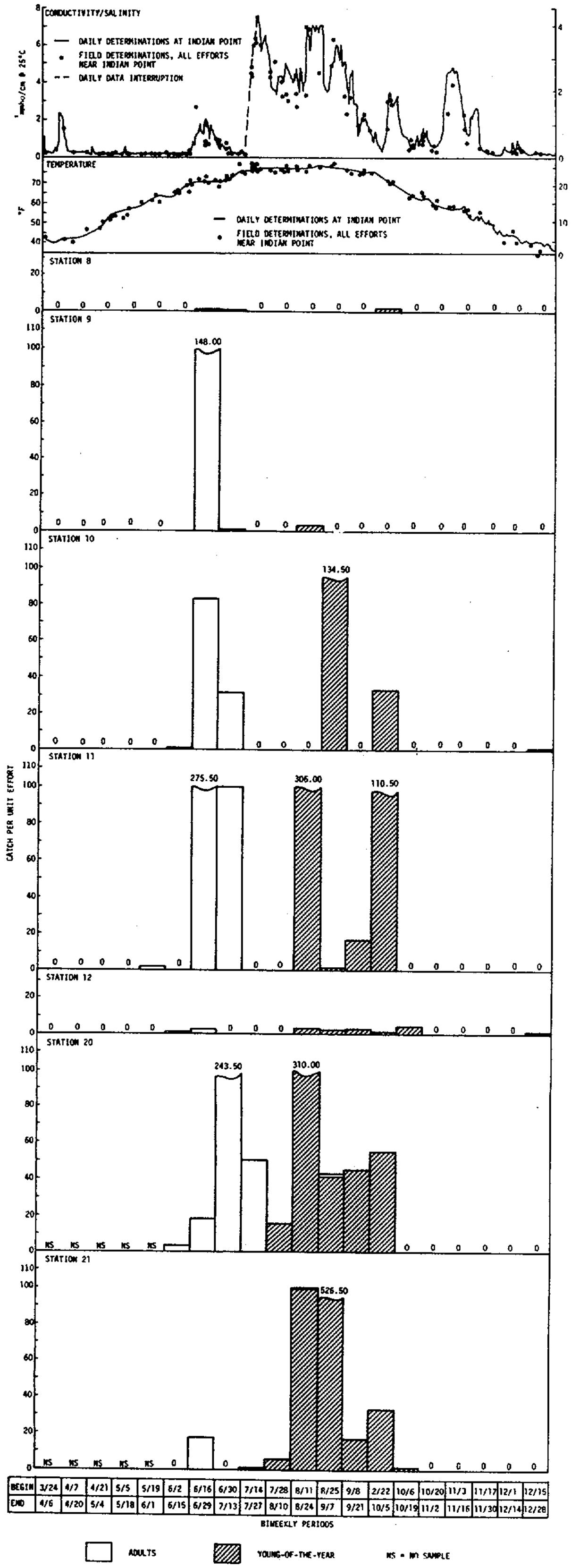


Figure IV-63. 1974 Beach-Seine Biweekly CPUE for Bay Anchovy, Indian Point Region, Hudson River Estuary, New York, Showing Water Temperature and Conductivity

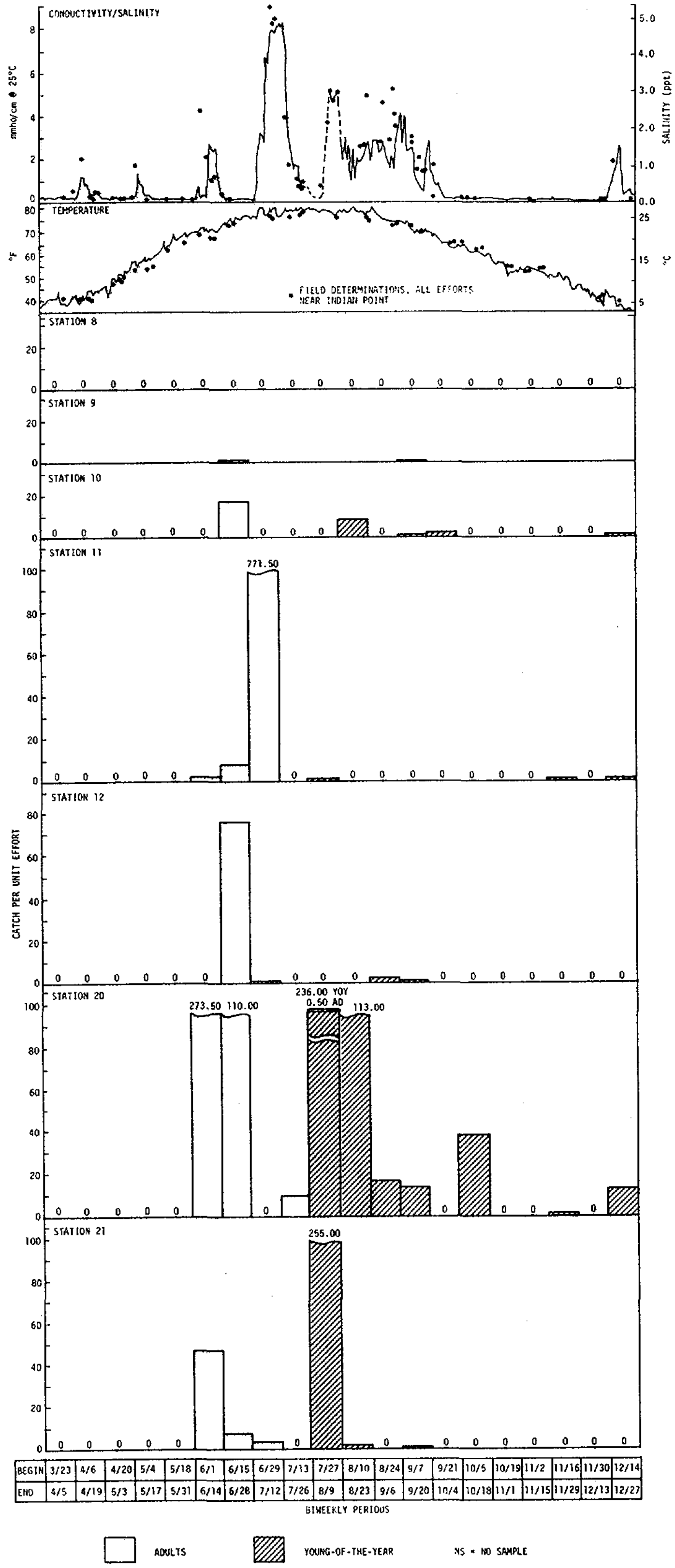
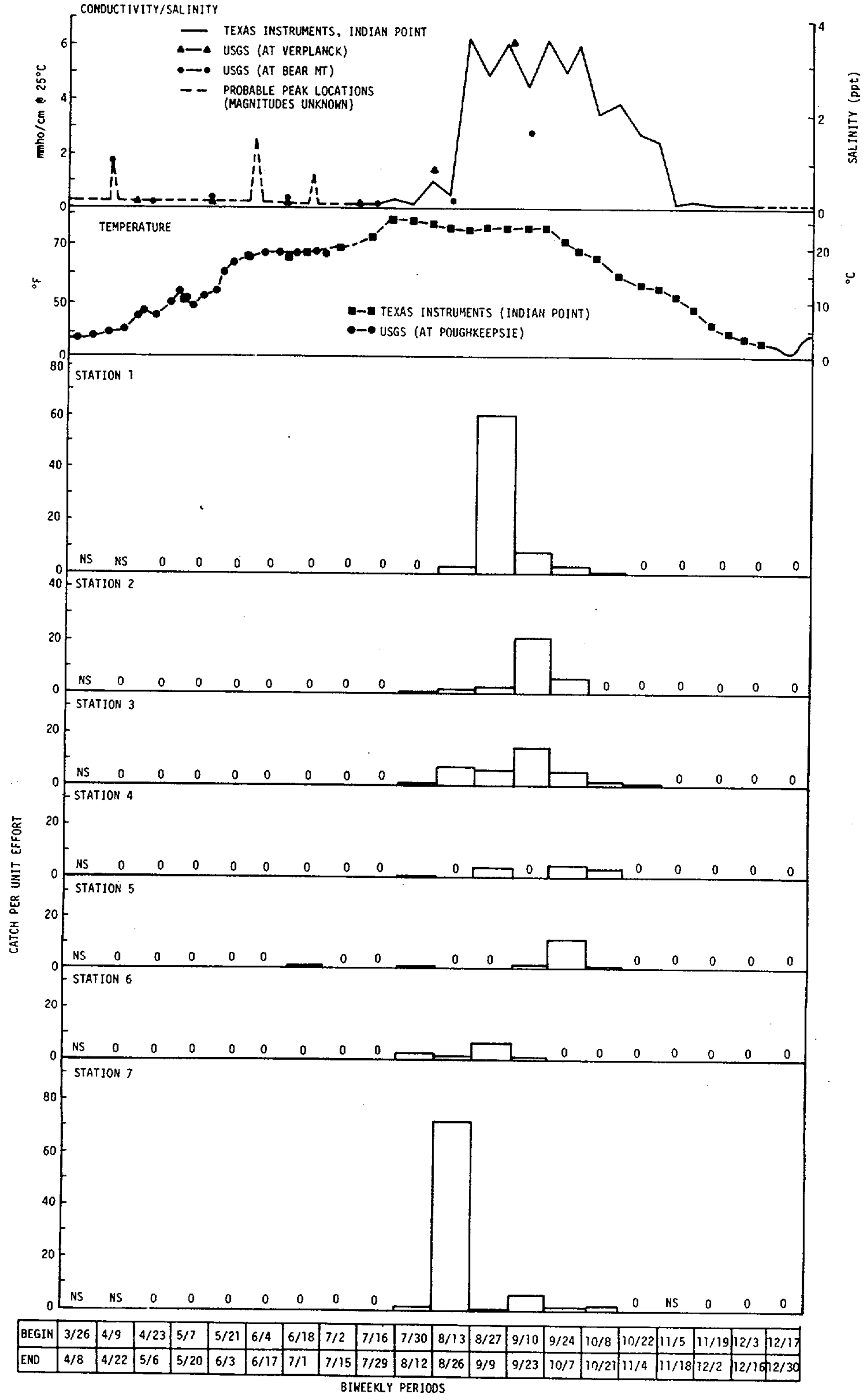


Figure IV-64. 1975 Beach-Seine Biweekly CPUE for Bay Anchovy, Indian Point Region, Hudson River Estuary, New York, Showing Water Temperature and Conductivity



ADULTS AND YOUNG-OF-THE-YEAR NOT DIFFERENTIATED

NS = NO SAMPLE

Figure IV-65. 1972 Bottom-Trawl Biweekly CPUE for Bay Anchovy, Indian Point Region, Hudson River Estuary, New York, Showing Water Temperature and Conductivity

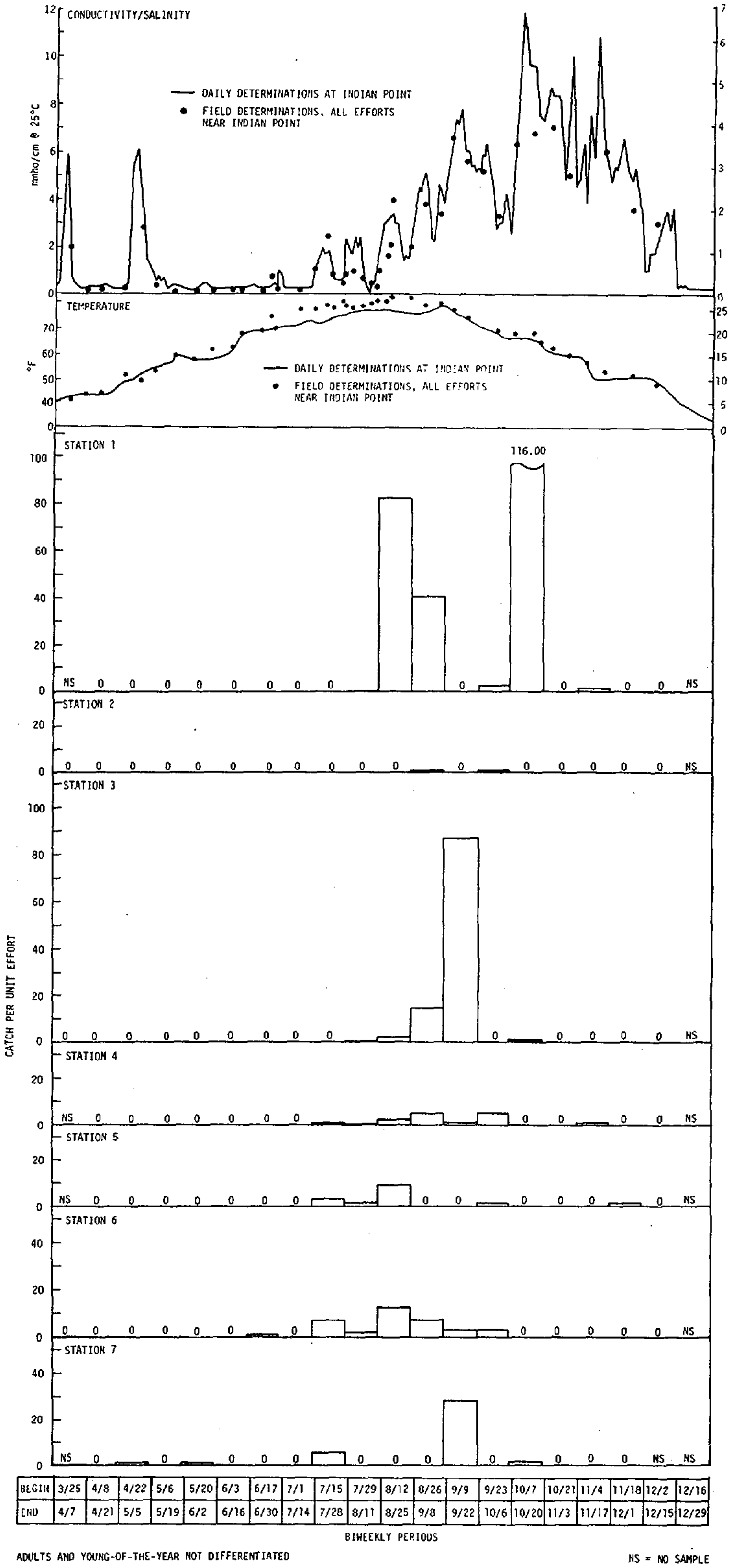
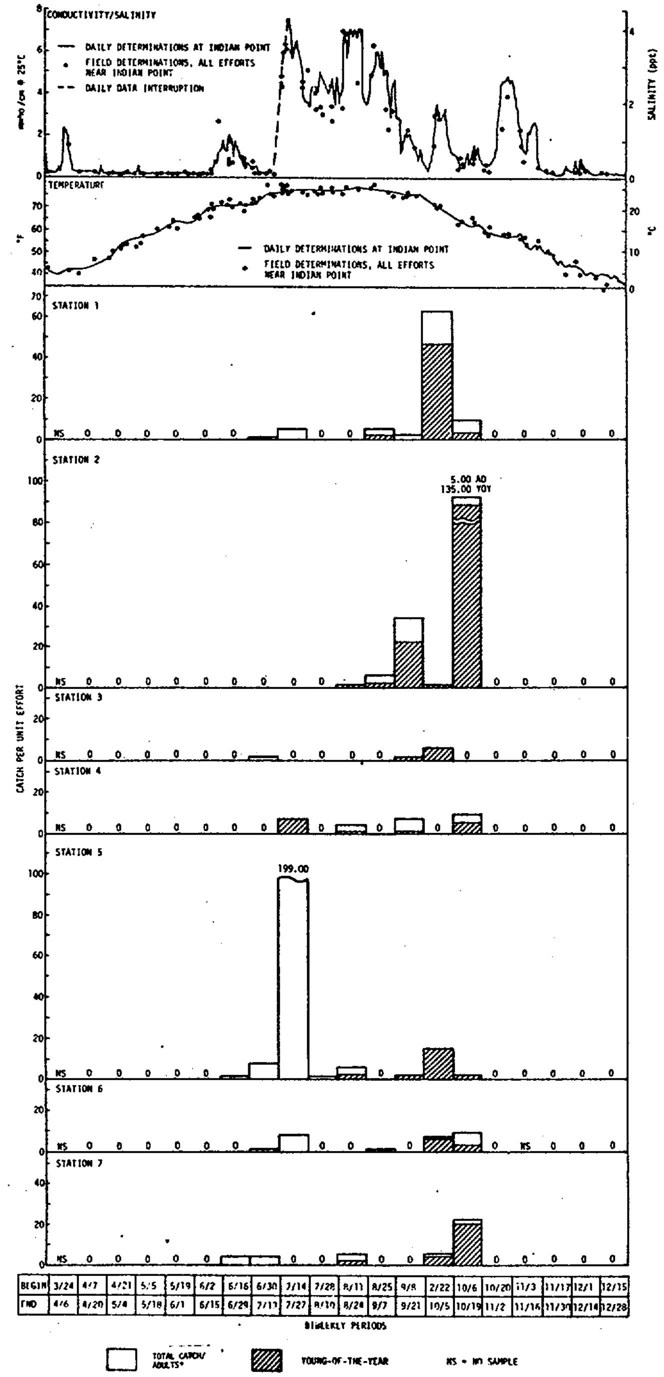


Figure IV-66. 1973 Bottom-Trawl Biweekly CPUE for Bay Anchovy, Indian Point Region, Hudson River Estuary, New York, Showing Water Temperature and Conductivity



*Adults not differentiated from young-of-the-year until mid-July

Figure IV-67. 1974 Bottom-Trawl Biweekly CPUE for Bay Anchovy, Indian Point Region, Hudson River Estuary, New York, Showing Water Temperature and Conductivity

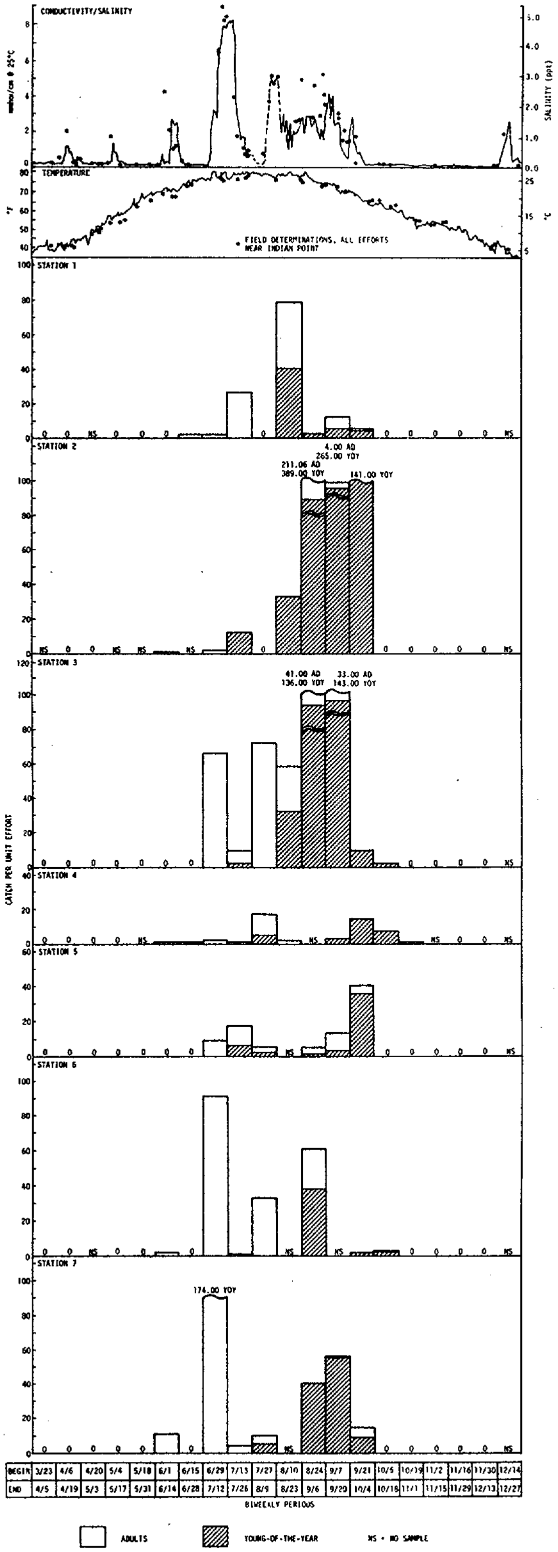
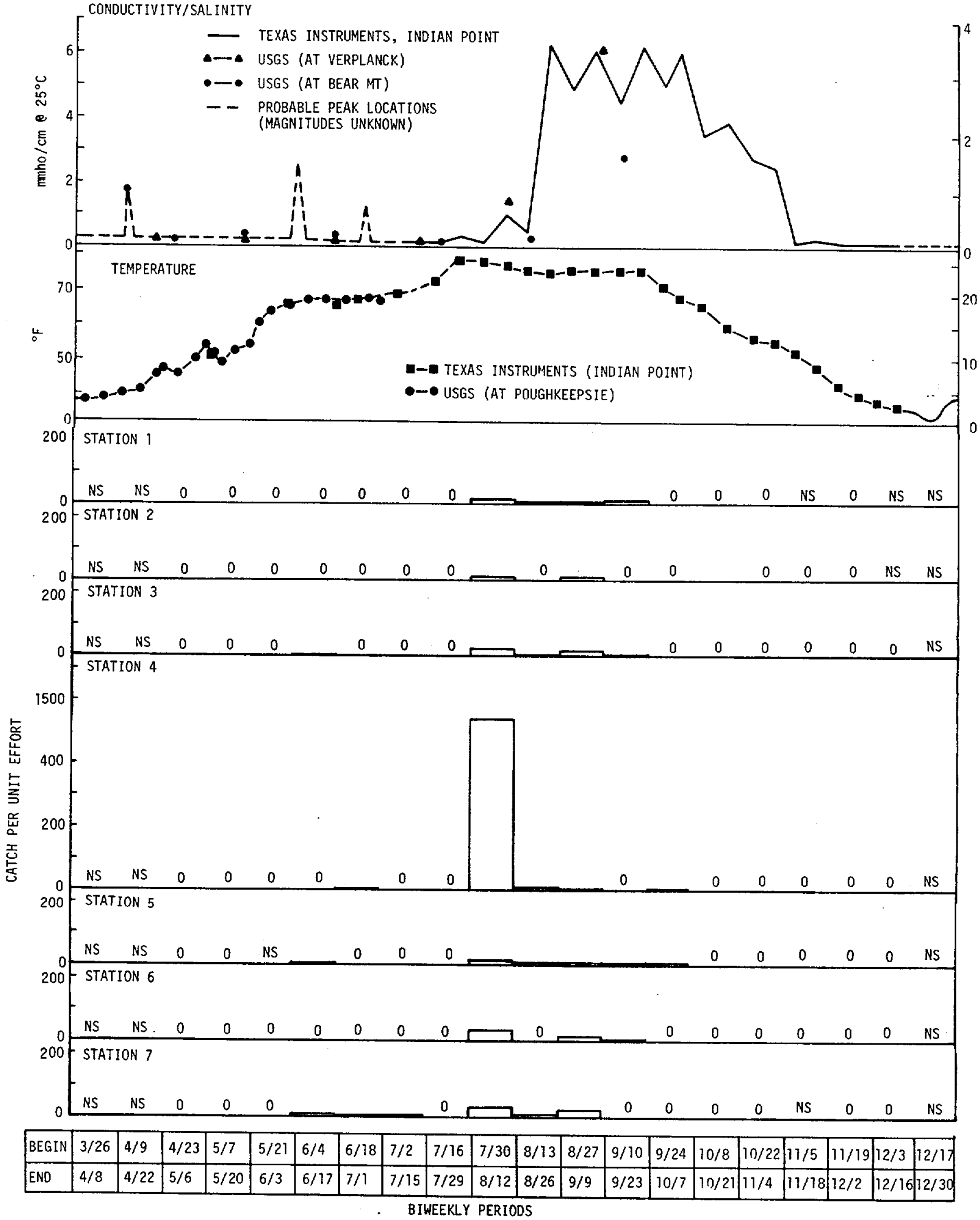


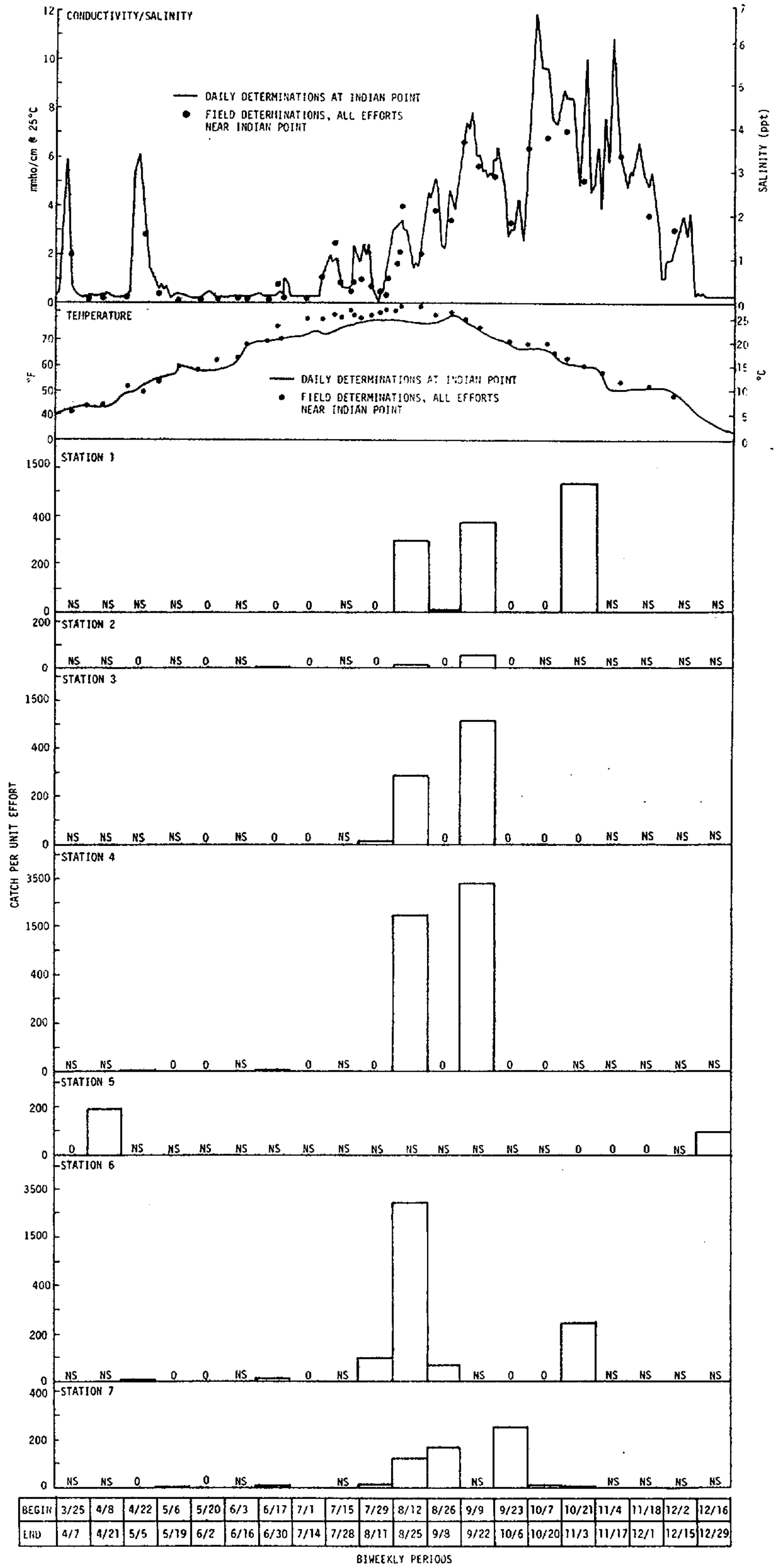
Figure IV-68. 1975 Bottom-Trawl Biweekly CPUE for Bay Anchovy, Indian Point Region, Hudson River Estuary, New York, Showing Water Temperature and Conductivity



ADULTS AND YOUNG-OF-THE-YEAR NOT DIFFERENTIATED

NS = NO SAMPLE

Figure IV-69. 1972 Surface-Trawl Biweekly CPUE for Bay Anchovy, Indian Point Region, Hudson River Estuary, New York, Showing Water Temperature and Conductivity



ADULTS AND YOUNG-OF-THE-YEAR NOT DIFFERENTIATED

NS = NO SAMPLE

Figure IV-70. 1973 Surface-Trawl Biweekly CPUE for Bay Anchovy, Indian Point Region, Hudson River Estuary, New York, Showing Water Temperature and Conductivity

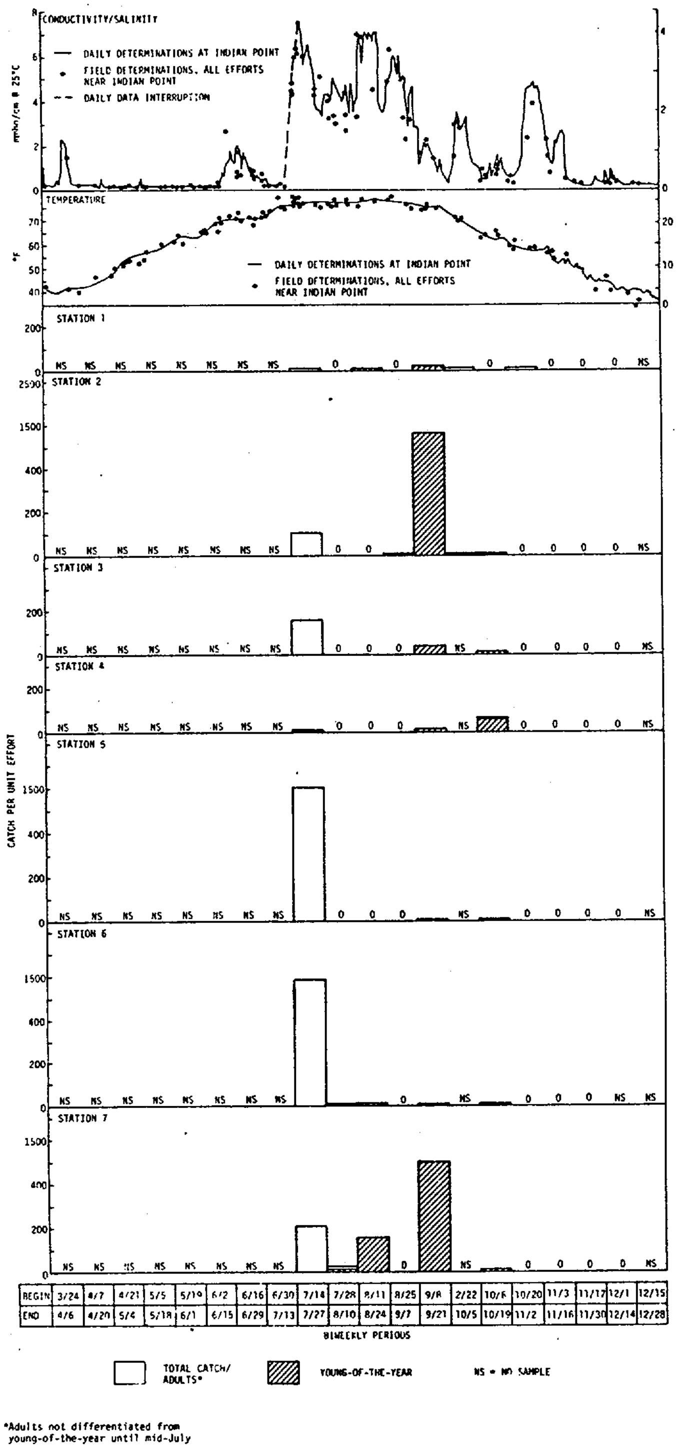


Figure IV-71. 1974 Surface-Trawl Biweekly CPUE for Bay Anchovy, Indian Point Region, Hudson River Estuary, New York, Showing Water Temperature and Conductivity

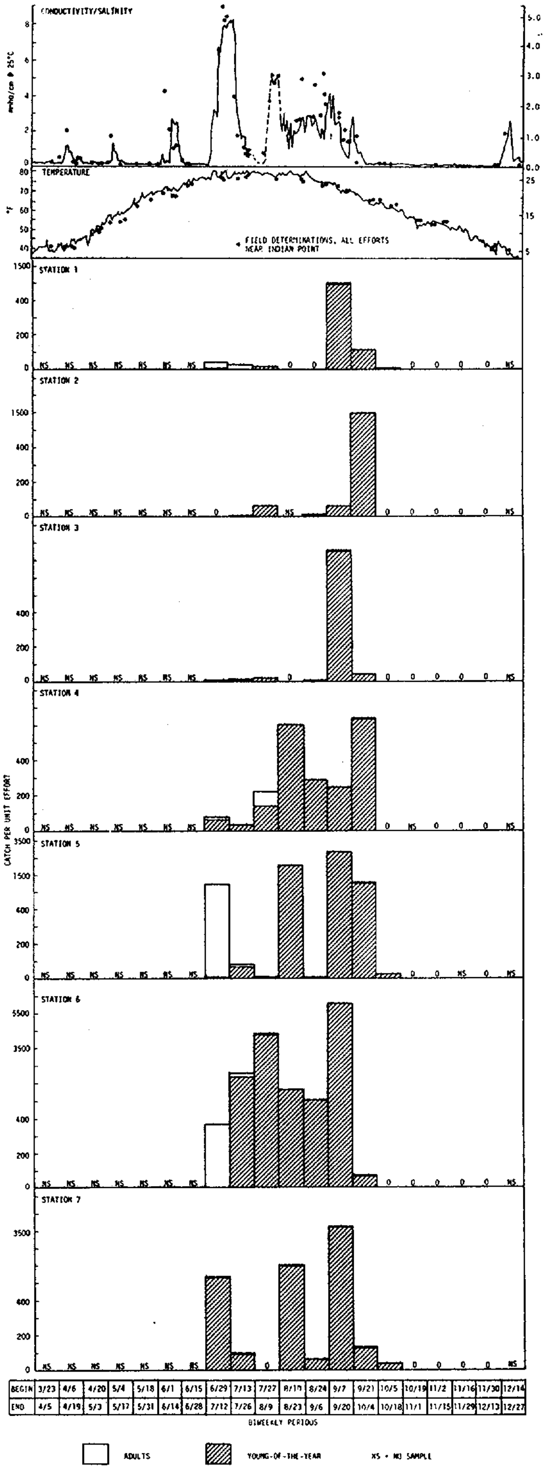


Figure IV-72. 1975 Surface-Trawl Biweekly CPUE for Bay Anchovy, Indian Point Region, Hudson River Estuary, New York, Showing Water Temperature and Conductivity

Indian Point region corresponded with increasing catches of adults and the occurrence of bay anchovy eggs in the Yonkers and Tappan Zee regions (RM 12-33 [KM 19.3-53.1]) (TI, 1976), suggesting a downriver movement of adults related to spawning activity.

Young-of-the-year bay anchovy were collected in all gear from July through October following upriver movement from spawning areas south of the Indian Point region (TI, 1976). Maximum CPUE values generally occurred from August through early October; in late October, catches declined abruptly as young-of-the-year moved downriver (TI, 1976).

Both young-of-the-year and adult bay anchovy occurred most commonly in areas of open water. Beach-seine CPUE values at stations 10, 11, 20, and 21, which are relatively unprotected, were consistently higher than those at stations 8, 9, and 12, which are located in weedy, shallow areas (Figure IV-1 and Table IV-3). Catch distribution among trawl stations was relatively uniform, although catches at the deepest station, 5, (Table IV-3), tended to be low.

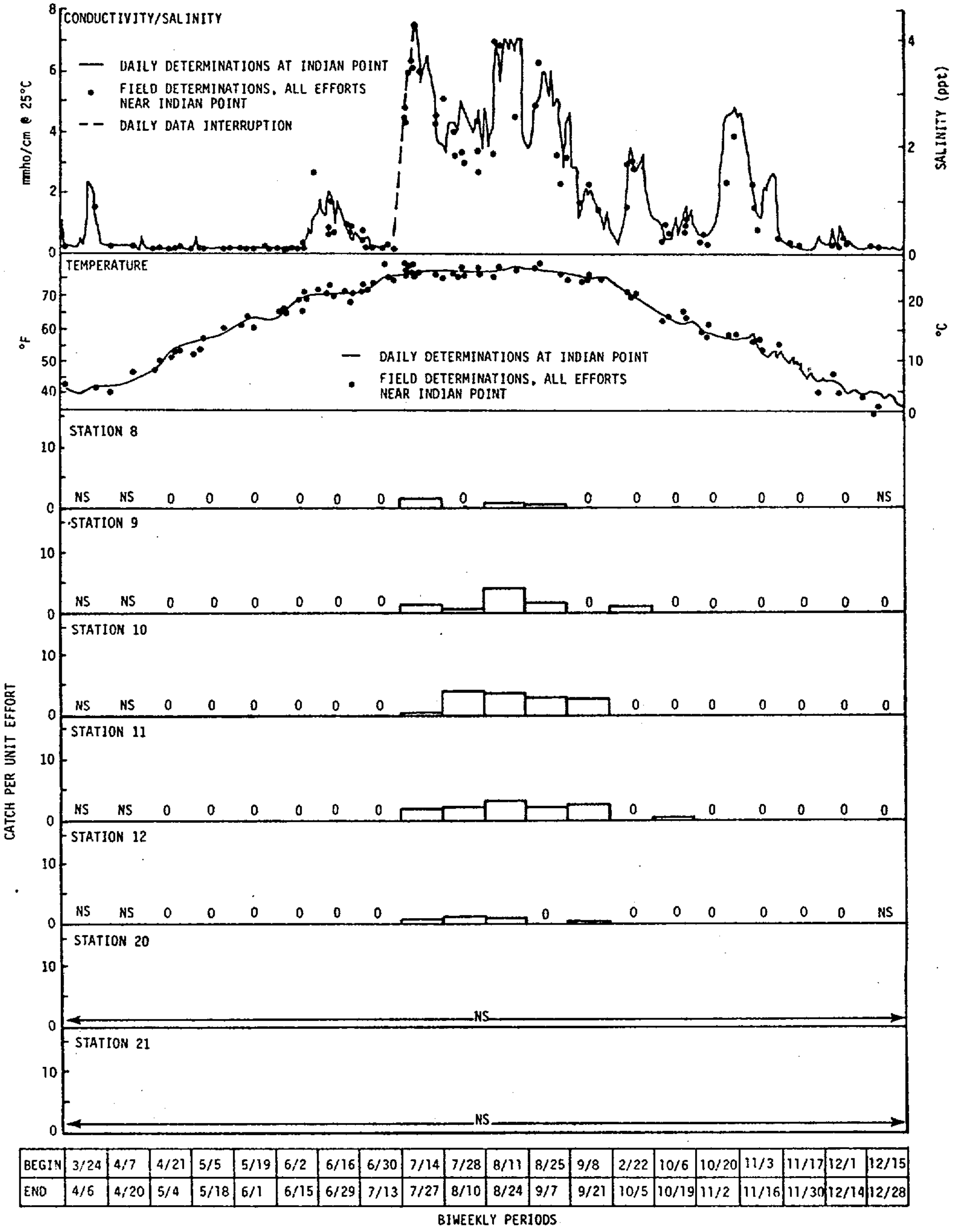
Abundance levels of adults and young-of-the-year were notably greater in 1974 and 1975 than in 1972 and 1973. This may have reflected fluctuations in riverwide distribution. Bay anchovy distribution tends to be influenced by salinity (Dovel, 1971); thus, yearly variability in salinity conditions could affect relative abundance in a given area.

h. Bluefish (*Pomatomus saltatrix*)

During 1972-75, young-of-the-year bluefish were commonly present in standard-station beach seines (Figures IV-73 through IV-76) and surface trawls (Figures IV-77 through IV-80) but occurred only occasionally in bottom trawls. Beach seines most frequently registered high CPUE values. During the 4 years considered, beach-seine station 11 and surface-trawl station 5 both located along unprotected sections of the river near deeper water (Figure IV-1 and Table IV-3)--usually accounted for higher CPUE values than did the other sites. Consistently lower catches were normally recorded at beach-seine station 8 and surface-trawl station 2 located respectively in and at the mouth of Peekskill Bay, a shallow, weedy cove (Figure IV-1 and Table IV-3). These distribution patterns suggest a preference for open areas with steeply sloped bottoms.

Bluefish rarely occur in water temperatures of < 58-60°F (14.4-15.6°C) except during overwintering periods in offshore marine waters (Bigelow and Schroeder, 1953). They are essentially a marine species and thus restricted to regions of relatively high salinity (TI, 1976); they are present in standard-station samples from June or early July through September or mid-October when temperature and salinity requirements are usually met. CPUE values are generally highest during July. Older individuals have never been captured in standard-station samples.

Relative abundance of bluefish in the Indian Point area increased from 1972 through 1974 but decreased slightly in 1975. No changes in nearfield distribution over the 4-year period were apparent.



BEGIN	3/24	4/7	4/21	5/5	5/19	6/2	6/16	6/30	7/14	7/28	8/11	8/25	9/8	2/22	10/6	10/20	11/3	11/17	12/1	12/15
END	4/6	4/20	5/4	5/18	6/1	6/15	6/29	7/13	7/27	8/10	8/24	9/7	9/21	10/5	10/19	11/2	11/16	11/30	12/14	12/28

ALL YOUNG-OF-THE-YEAR

NS = NO SAMPLE

Figure IV-73. 1972 Beach-Seine Biweekly CPUE for Bluefish, Indian Point Region, Hudson River Estuary, New York, Showing Water Temperature and Conductivity

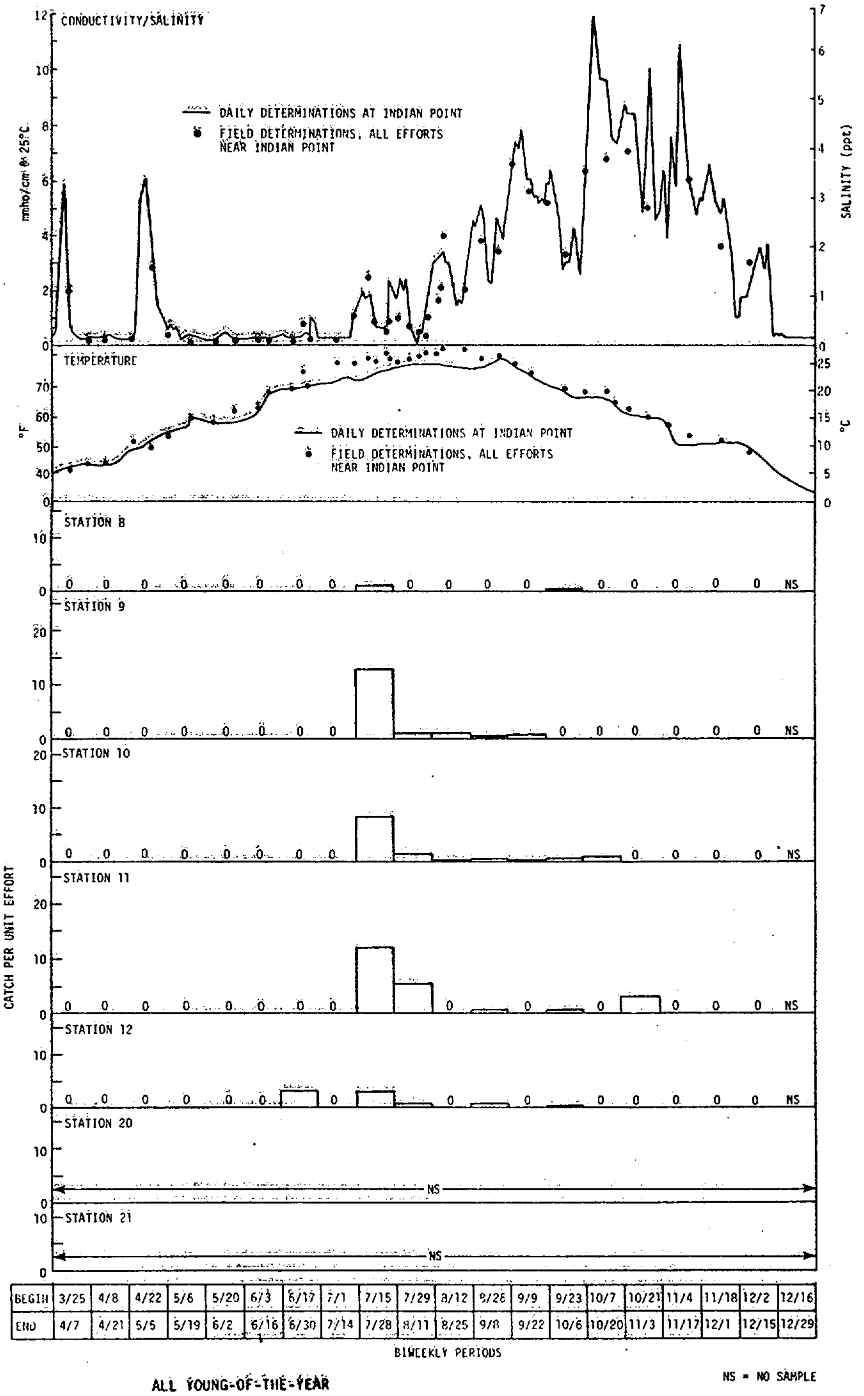


Figure IV-74. 1973 Beach-Seine Biweekly CPUE for Bluefish, Indian Point Region, Hudson River Estuary, New York, Showing Water Temperature and Conductivity

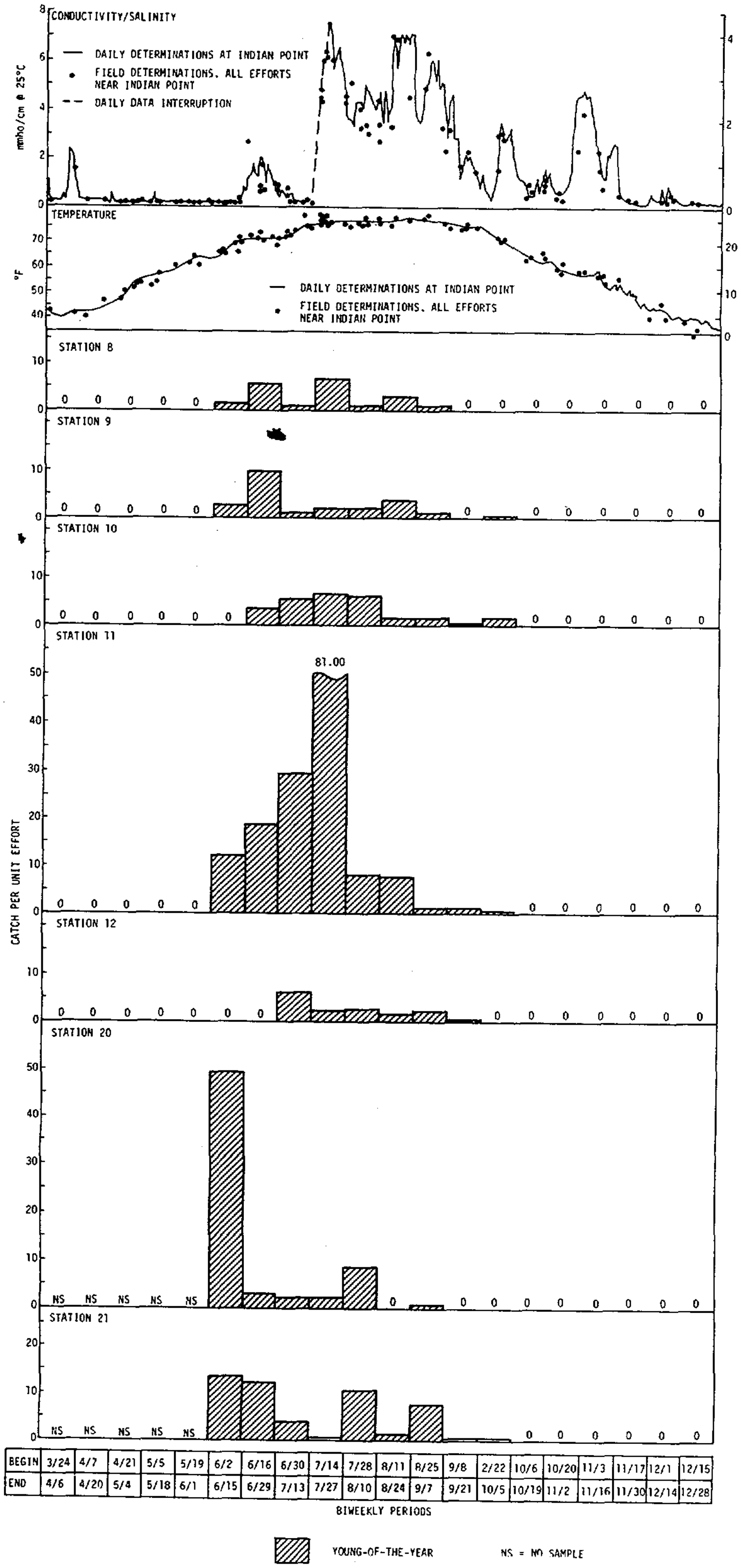


Figure IV-75. 1974 Beach-Seine Biweekly CPUE for Bluefish, Indian Point Region, Hudson River Estuary, New York, Showing Water Temperature and Conductivity

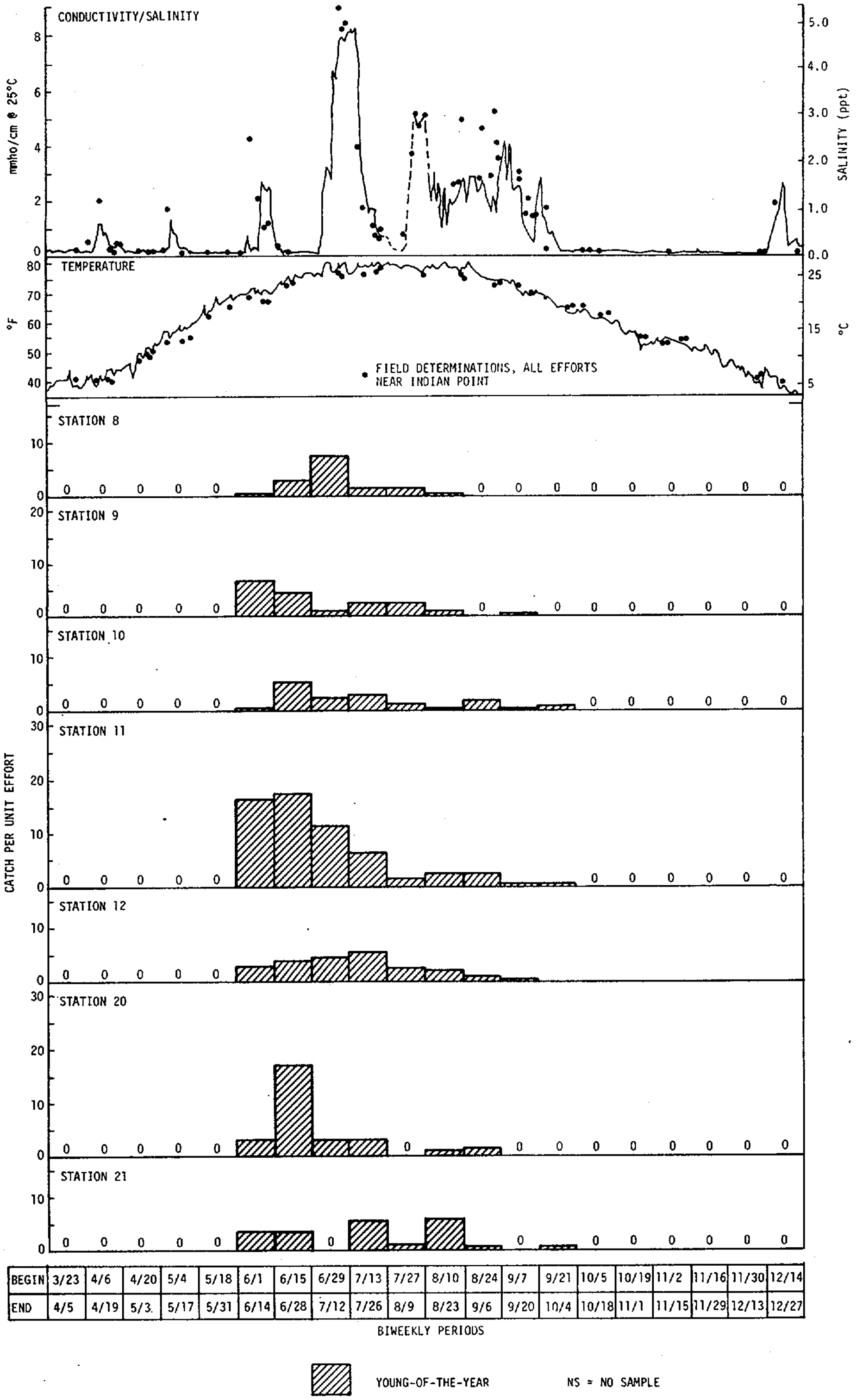


Figure IV-76. 1975 Beach-Seine Biweekly CPUE for Bluefish, Indian Point Region, Hudson River Estuary, New York, Showing Water Temperature and Conductivity

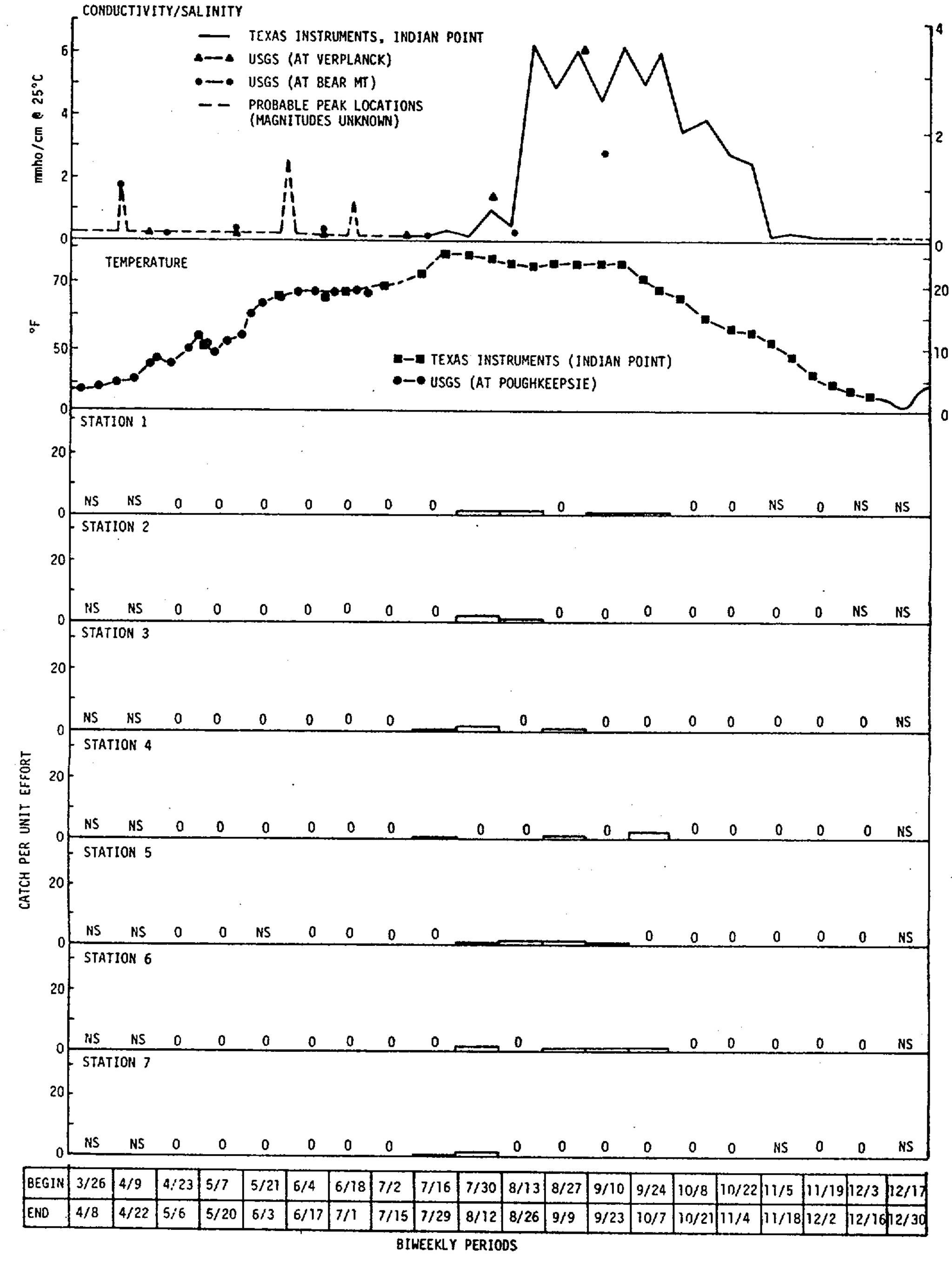
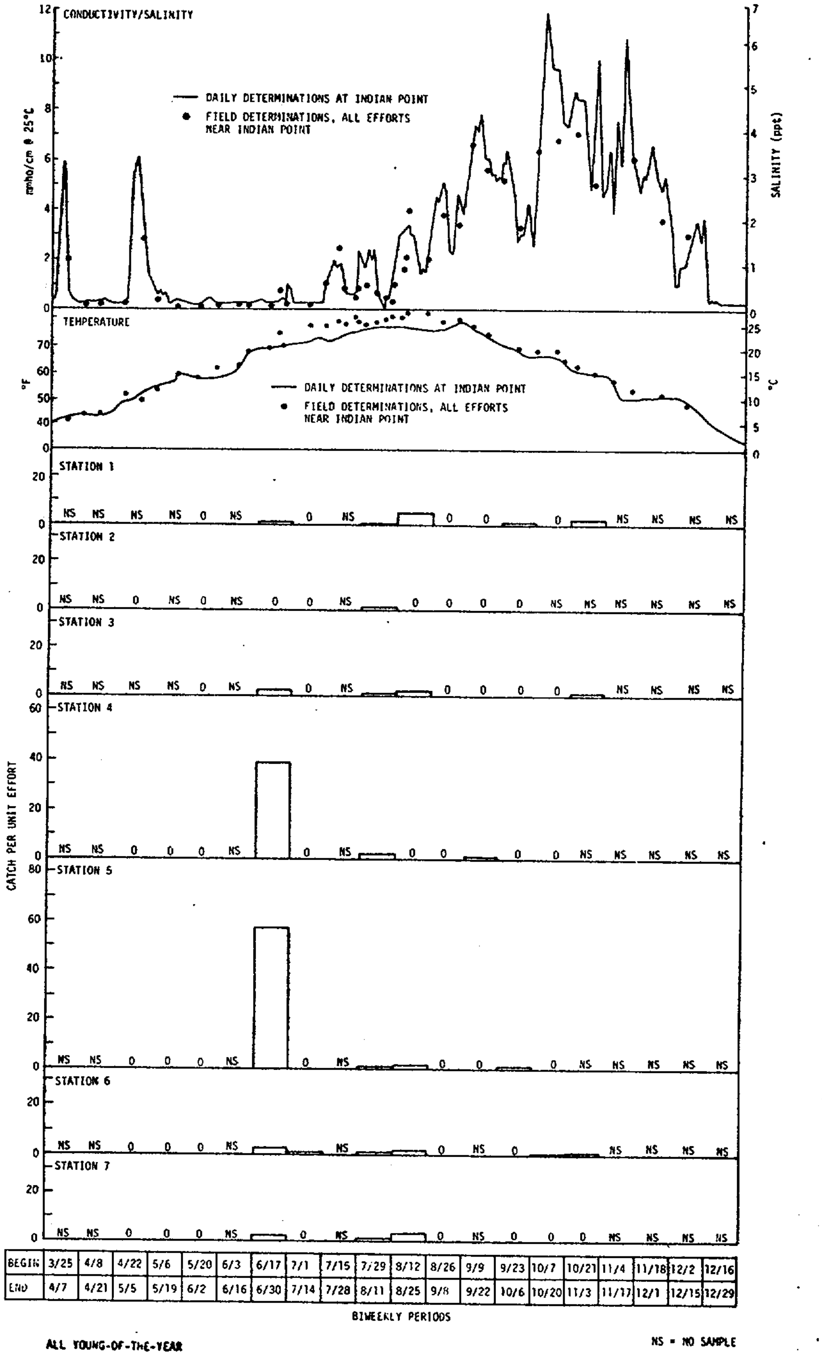


Figure IV-77. 1972 Surface-Trawl Biweekly CPUE for Bluefish, Indian Point Region, Hudson River Estuary, New York, Showing Water Temperature and Conductivity



ALL YOUNG-OF-THE-YEAR

NS = NO SAMPLE

Figure IV-78. 1973 Surface-Trawl Biweekly CPUE for Bluefish, Indian Point Region, Hudson River Estuary, New York, Showing Water Temperature and Conductivity

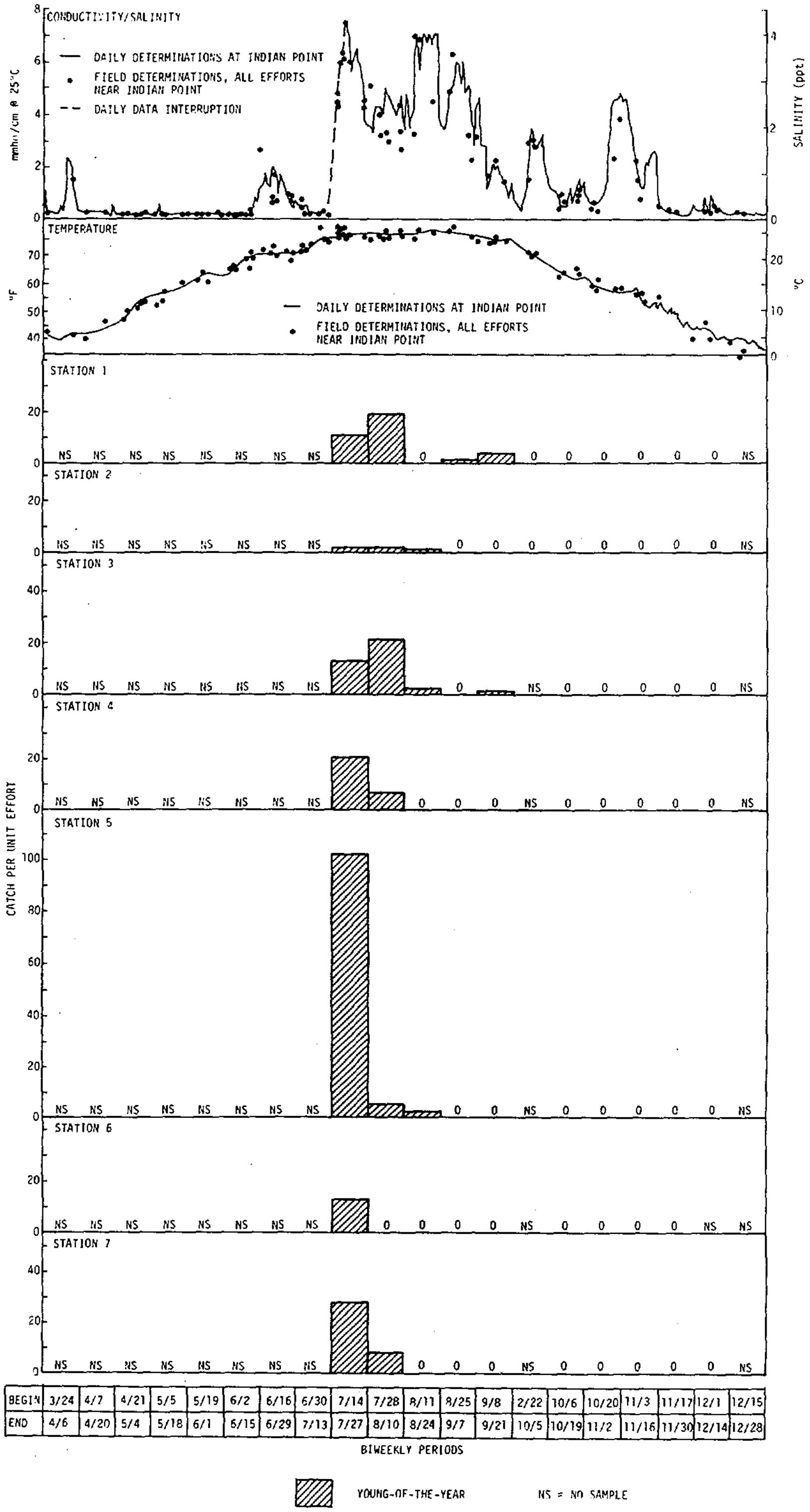


Figure IV-79. 1974 Surface-Trawl Biweekly CPUE for Bluefish, Indian Point Region, Hudson River Estuary, New York, Showing Water Temperature and Conductivity

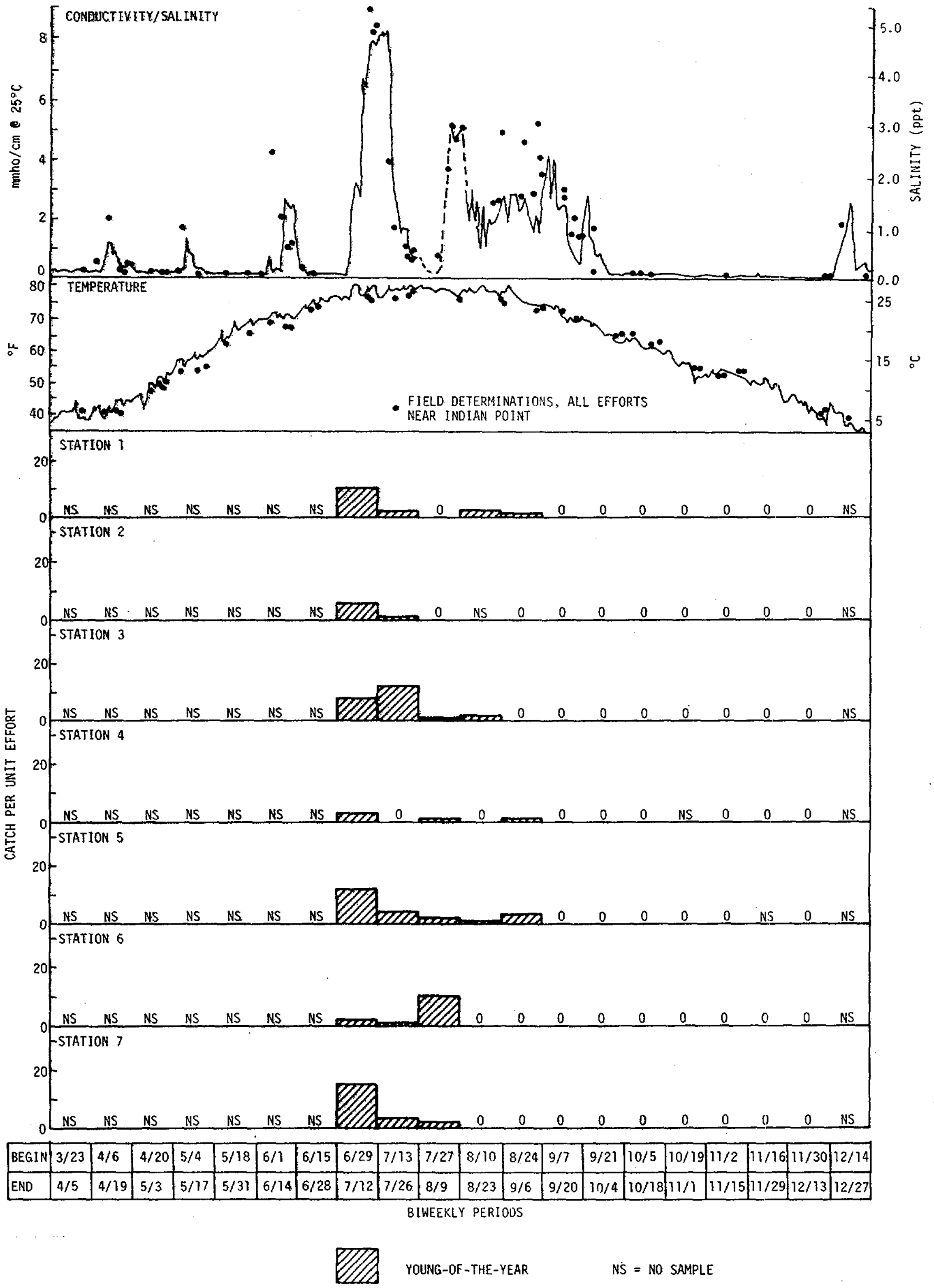
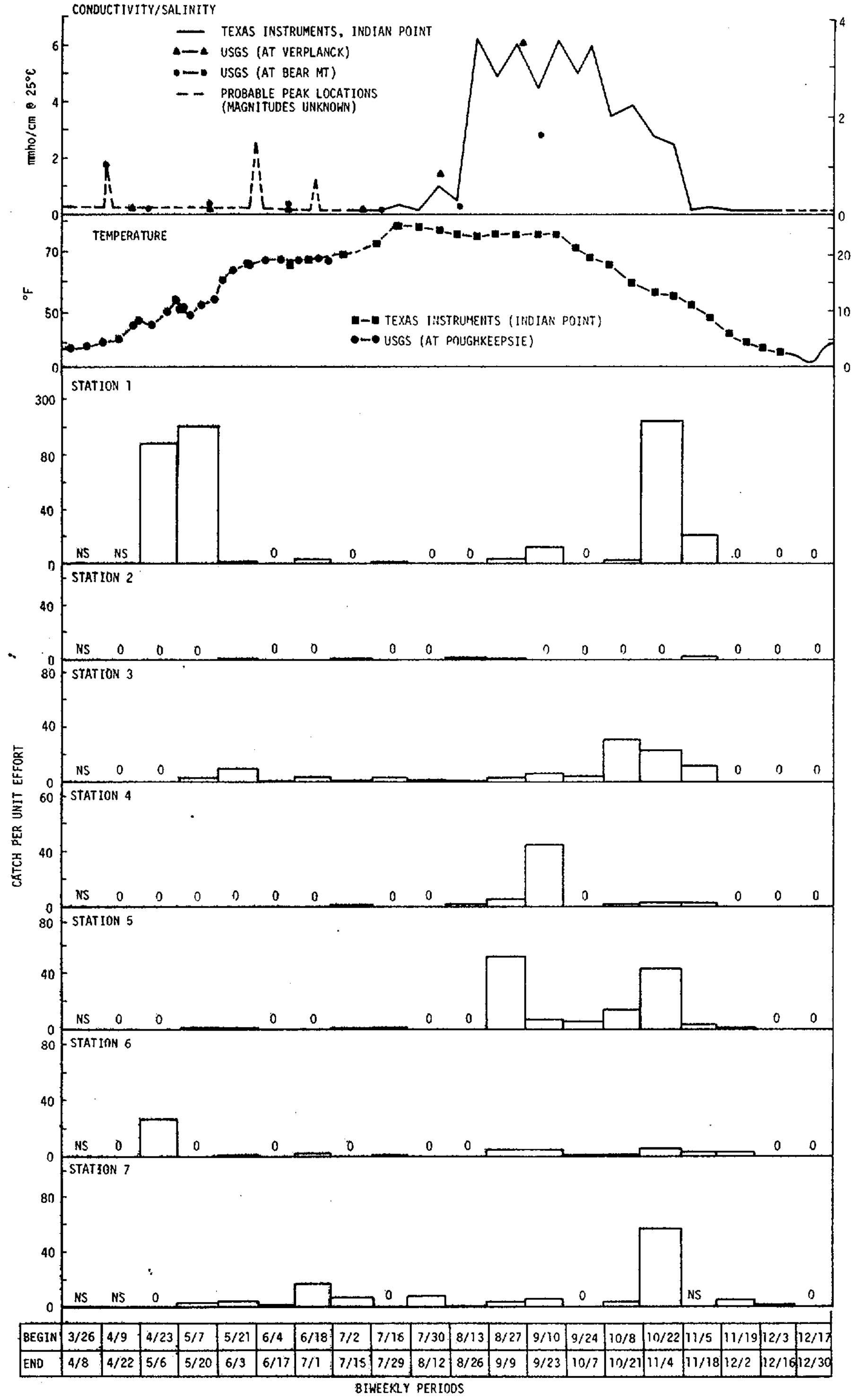


Figure IV-80. 1975 Surface-Trawl Biweekly CPUE for Bluefish, Indian Point Region, Hudson River Estuary, New York, Showing Water Temperature and Conductivity

i. Hogchoker (*Trinectes maculatus*)

During 1972-75, hogchoker were collected regularly and abundantly in the Indian Point area only by bottom trawls (Figures IV-81 through IV-84). Their exclusion from other gear reflected the species' strictly demersal distribution.

Adult hogchoker were collected at all seven standard-station bottom-trawl sites during 1972-75. In 1972, catch distribution among stations was relatively even; in 1973-75, CPUE values tended to be higher at deeper sites (Figures IV-81 to IV-84). The relative abundance of adults fluctuated and no long-term trends were discernible. They first appeared in April trawl catches and increased in abundance through May. CPUE values dropped sharply in June and remained near 0 through July. An earlier report (TI, 1976) similarly noted greatly reduced hogchoker catches in the Indian Point region during June and July 1973; the same report stated that hogchoker eggs were collected in mid-July only below the Yonkers region (RM 12-23 [KM 19.3-37.0]) and that post yolk-sac larvae were found during late July only in the Tappan Zee area (RM 24-33 [KM 38.6-53.1]). Hogchoker are known to spawn in estuarine and marine waters, usually in salinities greater than 9 ppt (Lippson and Moran, 1974). Disappearance of adults from the Indian Point area during June and July apparently is the result of a downriver spawning migration to regions of higher salinity. August CPUE values showed a large increase and levels remained relatively high through the end of December when standard-station sampling ceased.



ADULTS AND YOUNG-OF-THE-YEAR NOT DIFFERENTIATED

NS = NO SAMPLE

Figure IV-81. 1972 Bottom-Trawl Biweekly CPUE for Hogchoker, Indian Point Region, Hudson River Estuary, New York, Showing Water Temperature and Conductivity

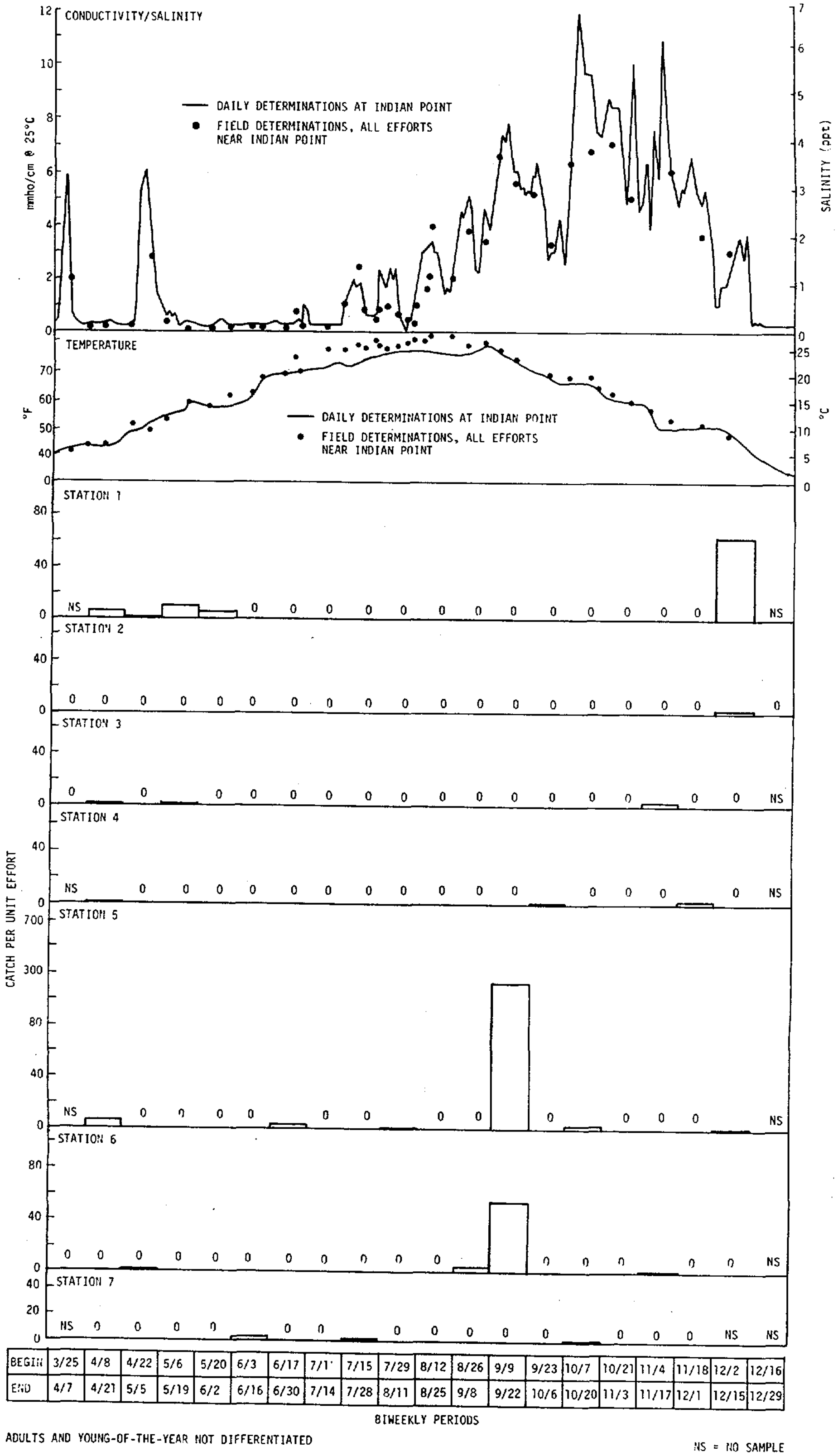
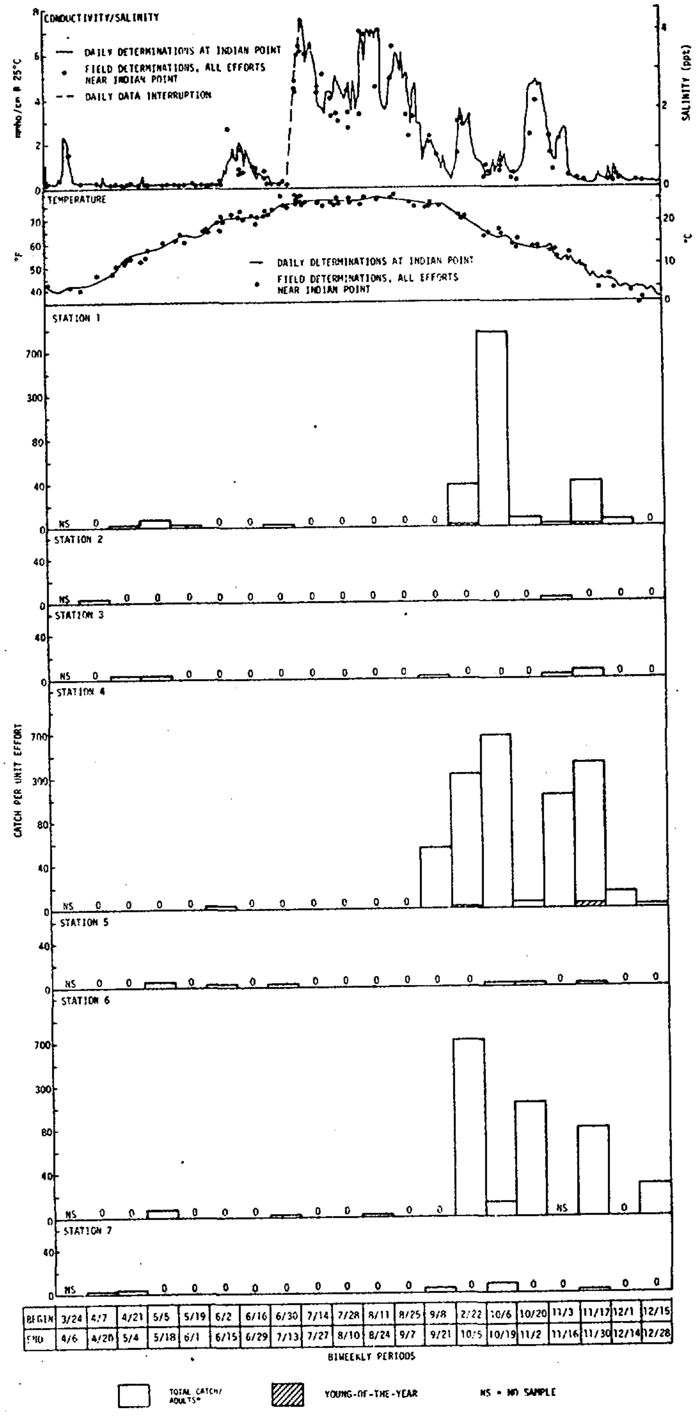


Figure IV-82. 1973 Bottom-Trawl Biweekly CPUE for Hogchoker, Indian Point Region, Hudson River Estuary, New York, Showing Water Temperature and Conductivity



*Adults not differentiated from young-of-the-year until mid-July

Figure IV-83. 1974 Bottom-Trawl Biweekly CPUE for Hogchoker, Indian Point Region, Hudson River Estuary, New York, Showing Water Temperature and Conductivity

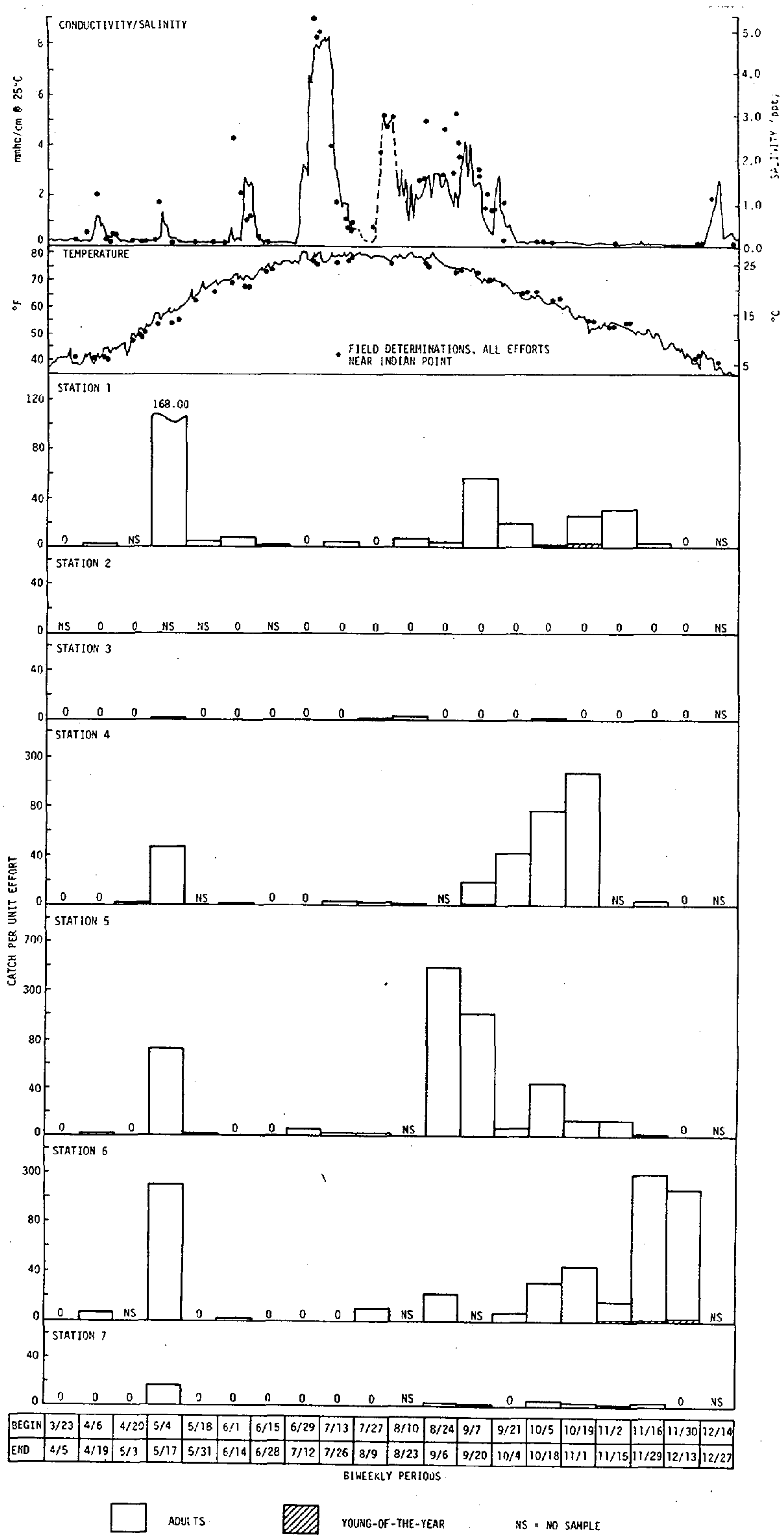


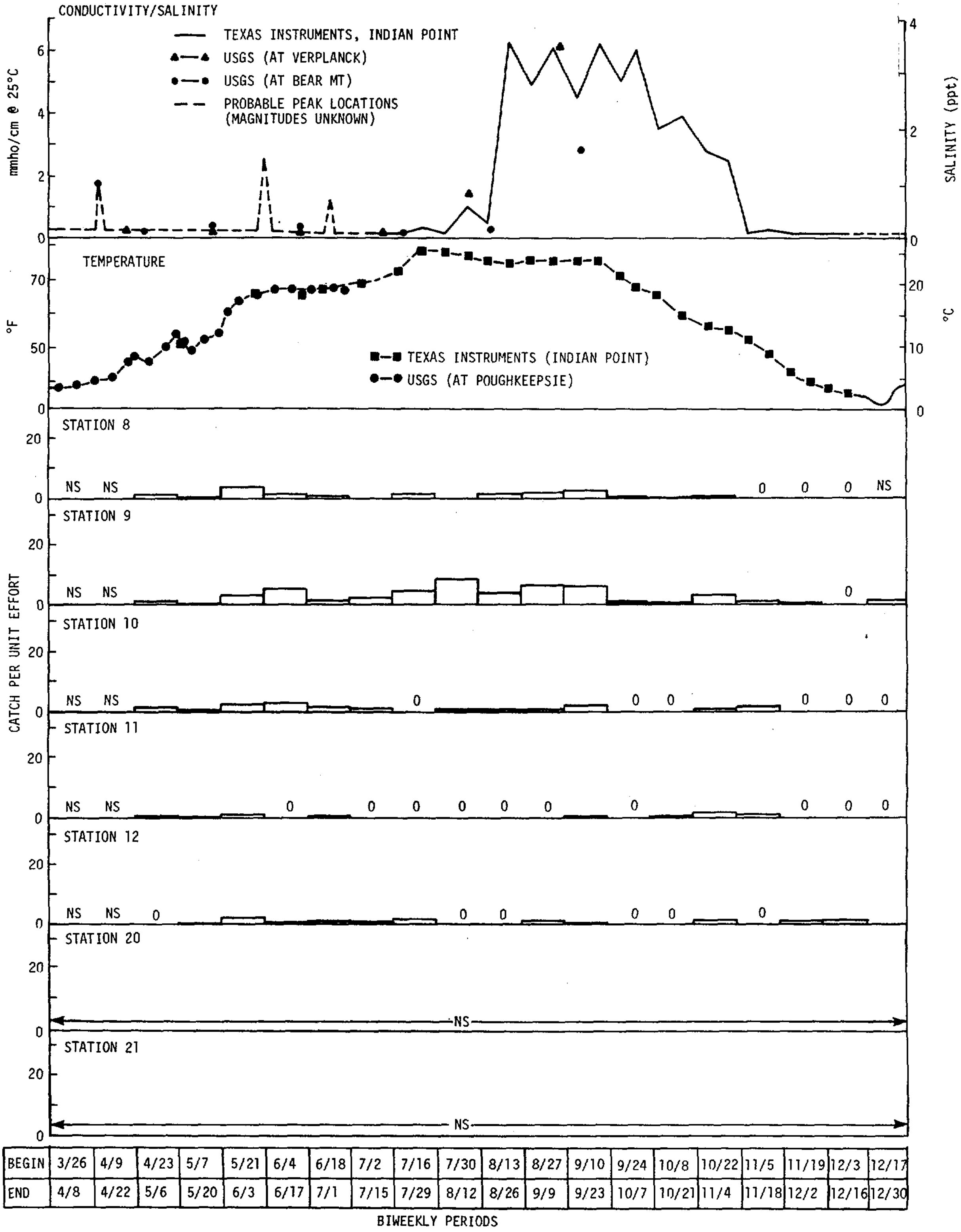
Figure IV-84. 1975 Bottom-Trawl Biweekly CPUE for Hogchoker, Indian Point Region, Hudson River Estuary, New York, Showing Water Temperature and Conductivity

CPUE values for young-of-the-year were similar from year to year. Young-of-the-year were first collected in September and appeared in samples through December--but never in abundance. Due to their small size, young-of-the-year may not be vulnerable to standard-station trawling gear. Additionally, spawning appears to take place about 20 mi (32 km) downriver, and young-of-the-year may not disperse to the Indian Point region in large numbers by year's end. The limited abundance precluded evaluating the distribution of young-of-the-year hogchoker.

j. Banded Killifish (*Fundulus diaphanus*)

Banded killifish, common shore-zone residents of the Indian Point area, were collected exclusively in standard-station beach-seine samples during 1972-75 (Figures IV-85 through IV-88). Lack of occurrence in trawls indicated strict littoral distribution.

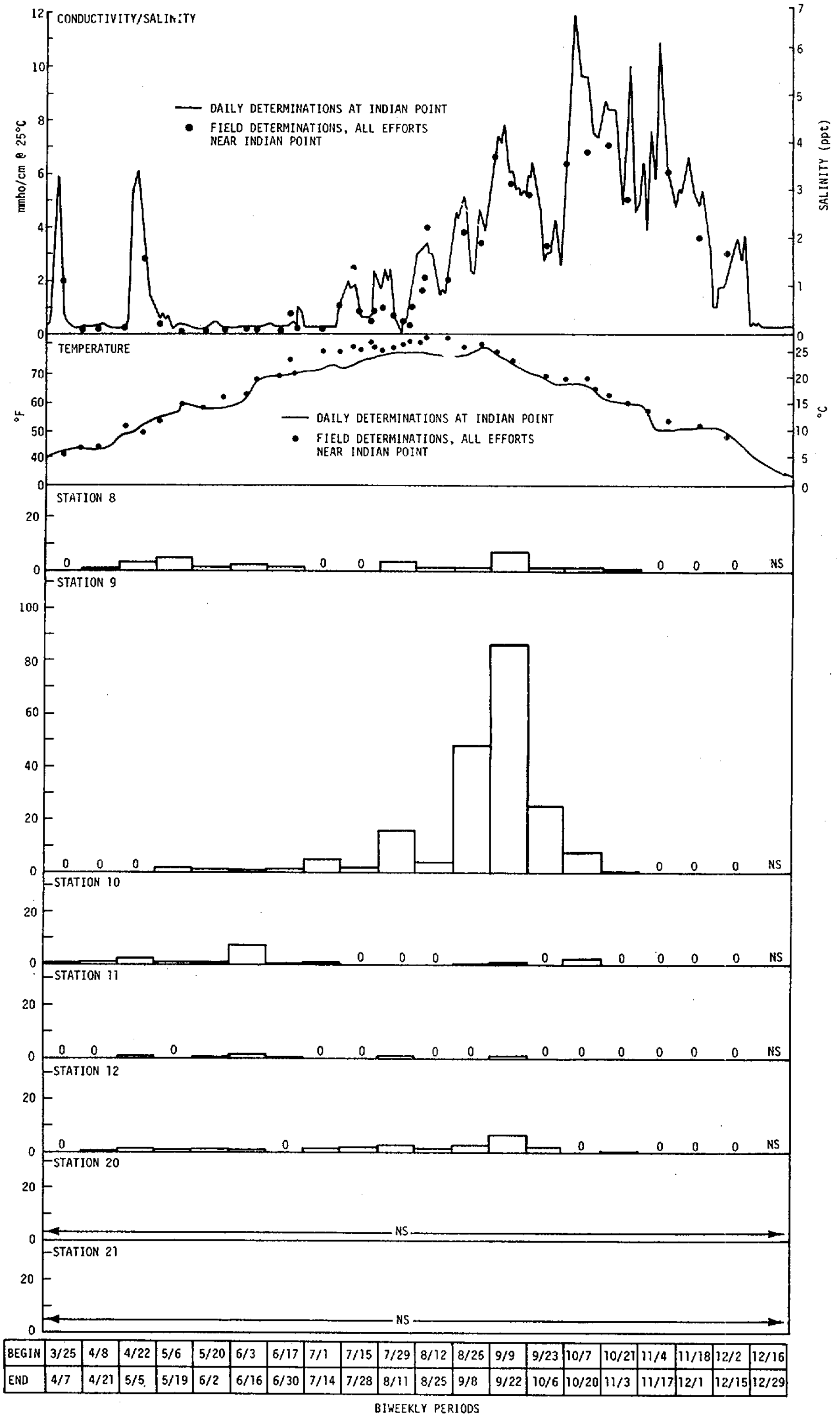
CPUE values for adults and young-of-the-year were highest at stations 8, 9, and 12, which are located in heavily vegetated shoal areas (Figure IV-1 and Table IV-3). Only occasional catches were recorded at other stations. Adults were typically present in beach-seine catches throughout the sampling season; CPUE values remained fairly consistent from late March through December but increased slightly between June and October when the water temperatures ranged between 21 and 27^{o} C. Young-of-the-year first occurred in July and reached peak abundance in early August; CPUE values remained high through the end of September, then declined during October and November. Declining catches in late fall throughout the estuary were previously reported (TI, 1976).



ADULTS AND YOUNG-OF-THE-YEAR NOT DIFFERENTIATED

NS = NO SAMPLE

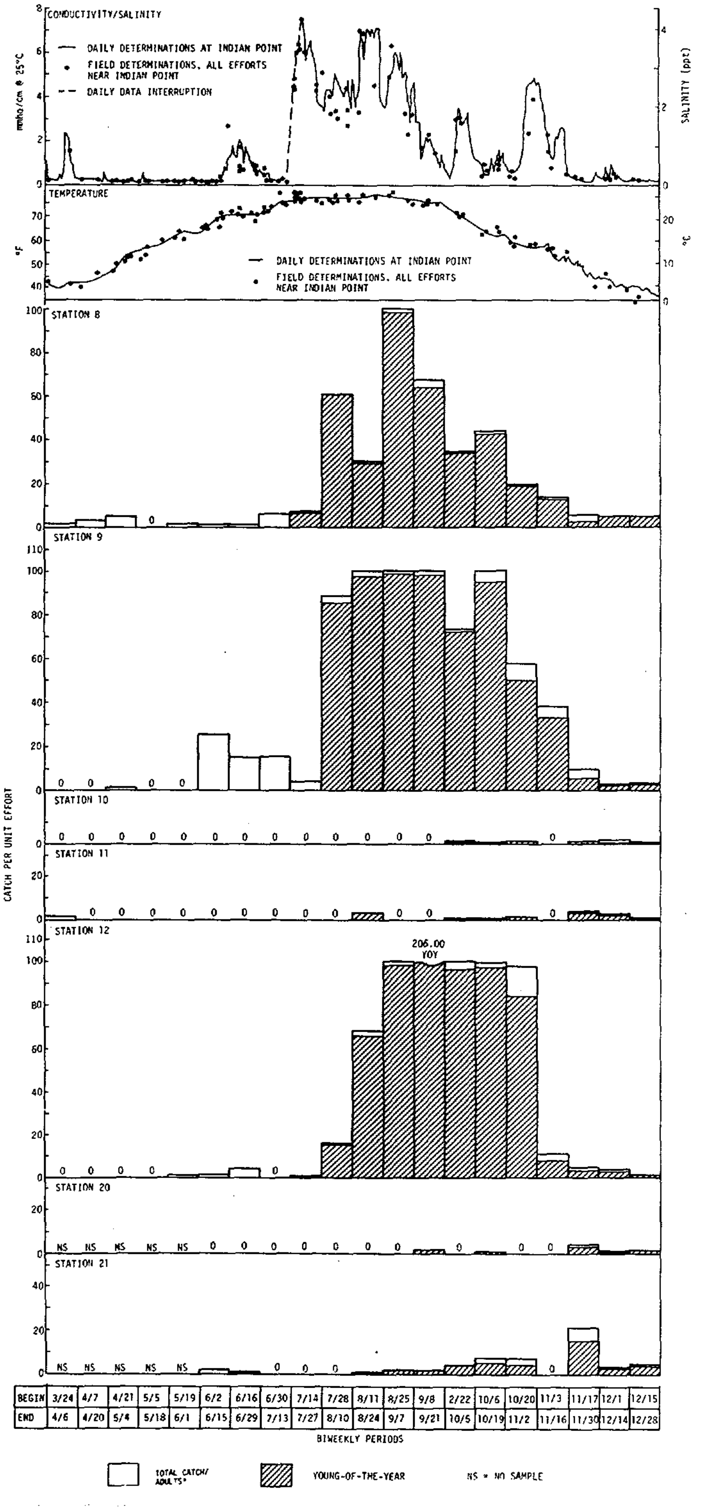
Figure IV-85. 1972 Beach-Seine Biweekly CPUE for Banded Killifish, Indian Point Region, Hudson River Estuary, New York, Showing Water Temperature and Conductivity



ADULTS AND YOUNG-OF-THE-YEAR NOT DIFFERENTIATED

NS = NO SAMPLE

Figure IV-86. 1973 Beach-Seine Biweekly CPUE for Banded Killifish, Indian Point Region, Hudson River Estuary, New York, Showing Water Temperature and Conductivity



*Adults not differentiated from young-of-the-year until mid-July

Figure IV-87. 1974 Beach-Seine Biweekly CPUE for Banded Killifish, Indian Point Region, Hudson River Estuary, New York, Showing Water Temperature and Conductivity

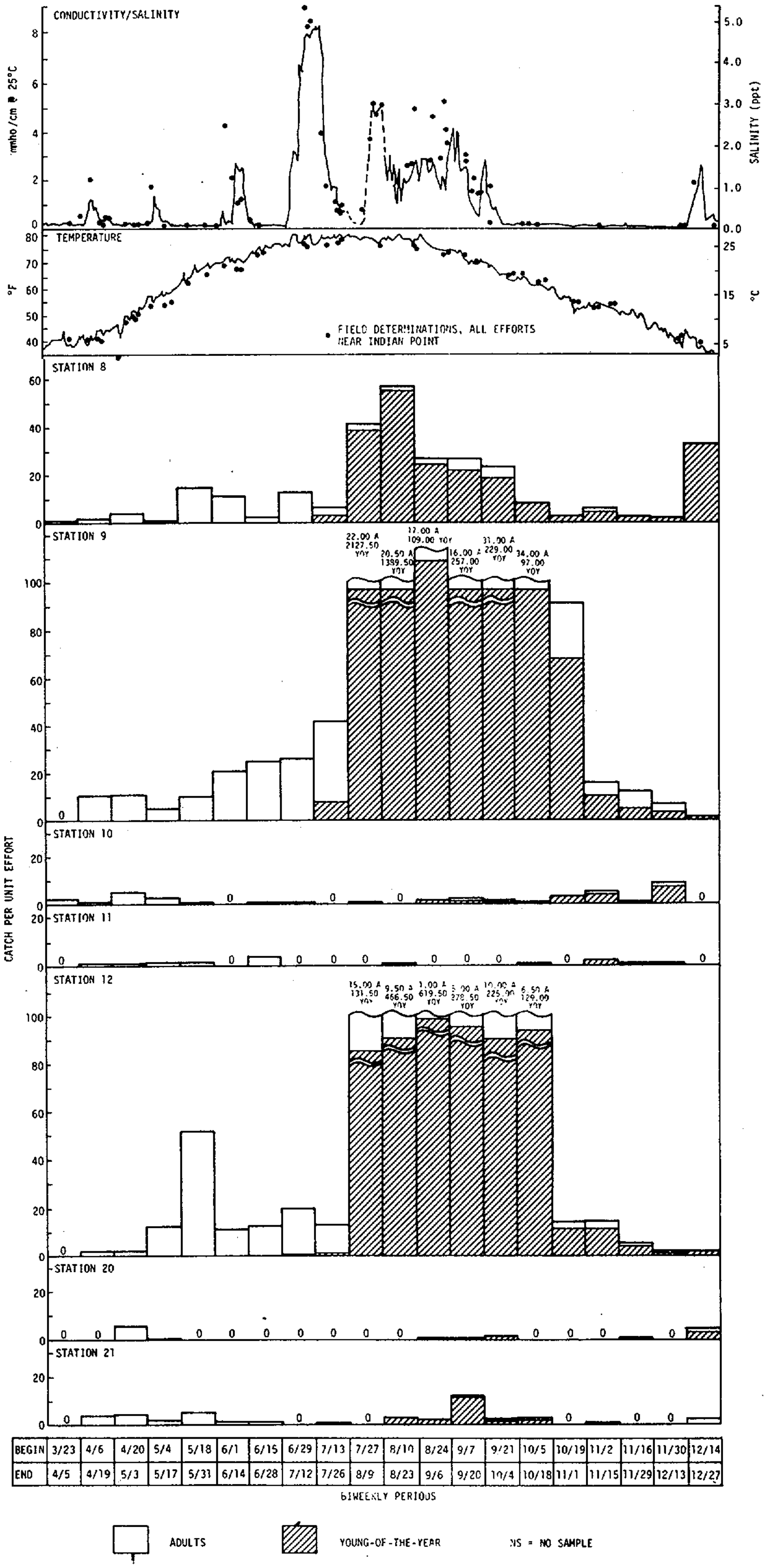


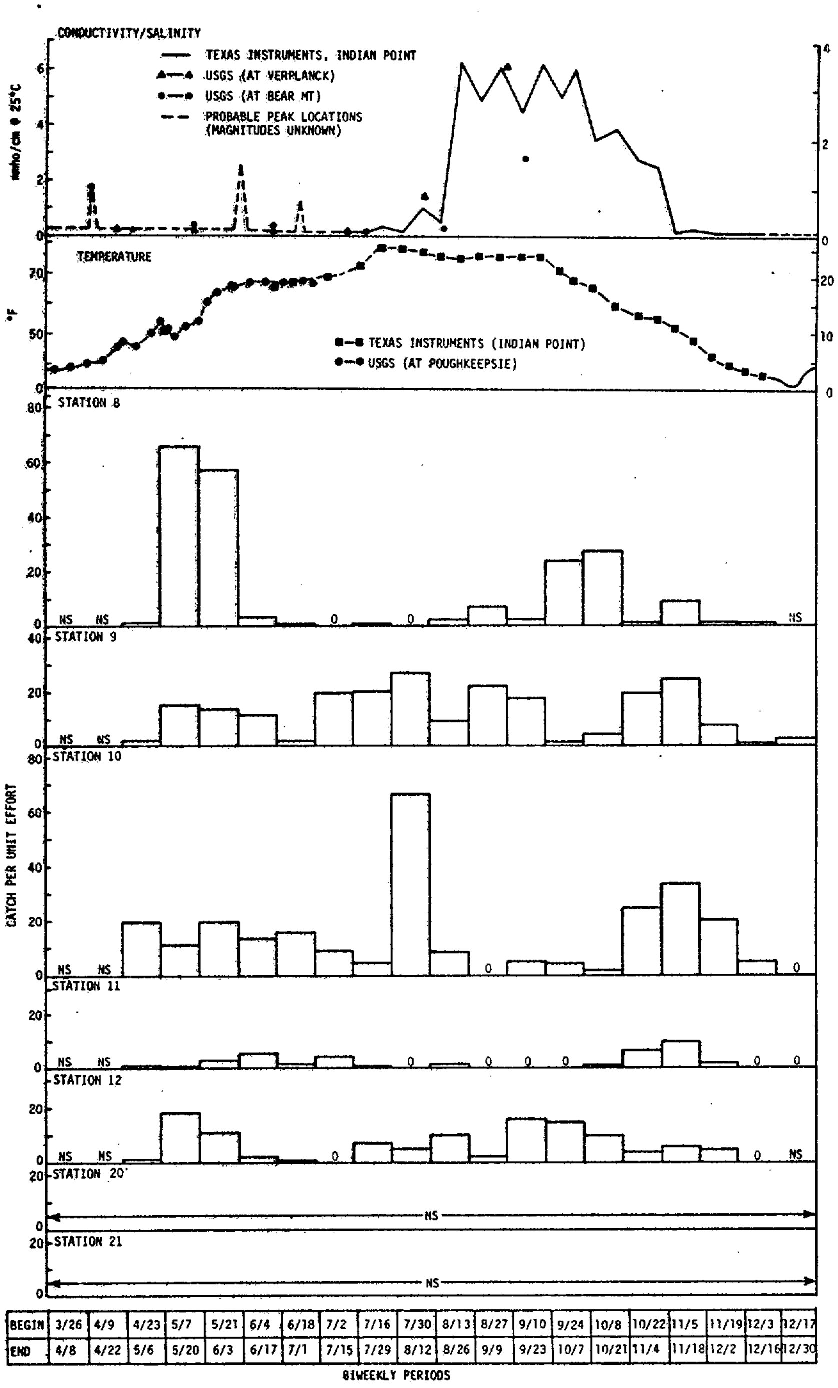
Figure IV-88. 1975 Beach-Seine Biweekly CPUE for Banded Killifish, Indian Point Region, Hudson River Estuary, New York, Showing Water Temperature and Conductivity

Relative abundance of adult and young-of-the-year banded killifish was similar during 1972 and 1973 but increased substantially during 1974 and still more in 1975. This may represent an increase in riverwide abundance or shifting riverwide distribution patterns. Distribution among Indian Point standard beach-seine stations has not changed over the 4-year period.

k. Spottail Shiner (*Notropis hudsonius*)

Spottail shiner were taken almost exclusively in standard-station beach seines during the 1972-75 study period (Figures IV-89 through IV-92), denoting a littoral habitat preference. Only rarely did individuals appear in surface trawls, and bottom-trawl catches were negligible except briefly during late fall. Adult and young-of-the-year spottail shiner were most abundant at beach-seine stations 8, 9, and 12, which are located in shallow, heavily vegetated areas (Figure IV-1 and Table IV-3). Highest late-fall bottom-trawl CPUE values were recorded at stations 2, 3, and 7, which are relatively shallow and adjacent to the beach-seine sites which had earlier produced highest CPUE values (Figure IV-1 and Table IV-3). Relative abundance and distribution were uniform during 1972-1975. CPUE values at beach-seine station 10 decreased from 1972-73 to 1974-75.

In a typical year, adult spottail shiner were present at all beach-seine stations when standard-station sampling began in late March. Peak CPUE values occurred from late April through May when water temperature ranged between 9 and 20° C; Mansueti and Hardy (1967) reported the optimum spawning temperature for spottail shiner to be 18.3° C, which generally occurs in the Indian Point area during late



ADULTS AND YOUNG-OF-THE-YEAR NOT DIFFERENTIATED

NS = NO SAMPLE

Figure IV-89. 1972 Beach-Seine Biweekly CPUE for Spottail Shiner, Indian Point Region, Hudson River Estuary, New York, Showing Water Temperature and Conductivity

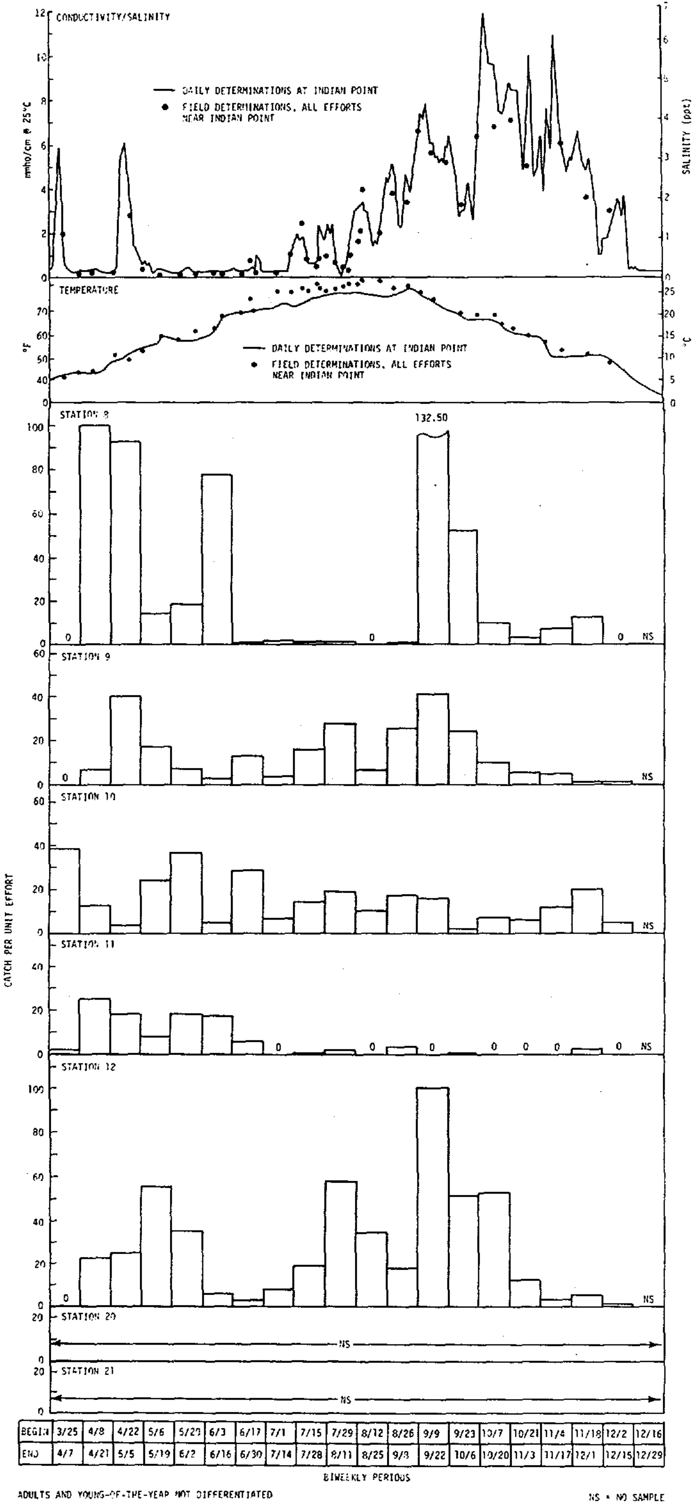
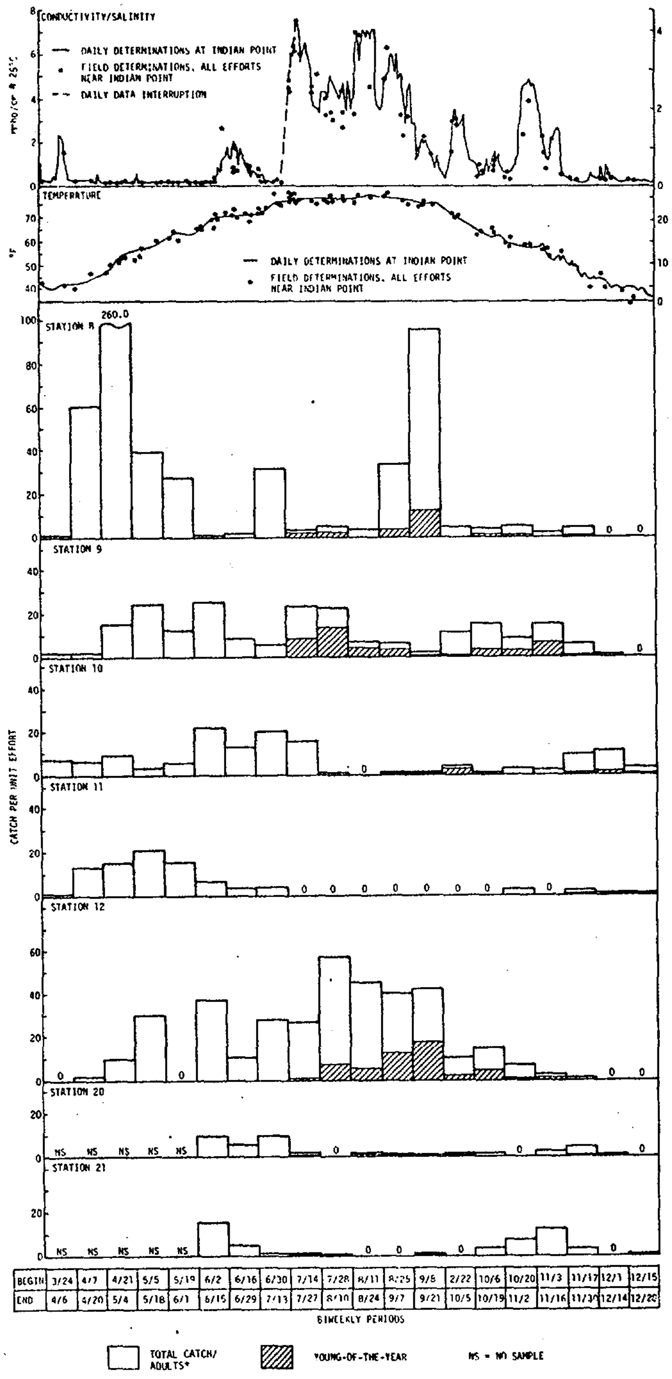


Figure IV-90. 1973 Beach-Seine Biweekly CPUE for Spottail Shiner, Indian Point Region, Hudson River Estuary, New York, Showing Water Temperature and Conductivity



*Adults not differentiated from young-of-the-year until mid-July

Figure IV-91. 1974 Beach-Seine Biweekly CPUE for Spottail Shiner, Indian Point Region, Hudson River Estuary, New York, Showing Water Temperature and Conductivity

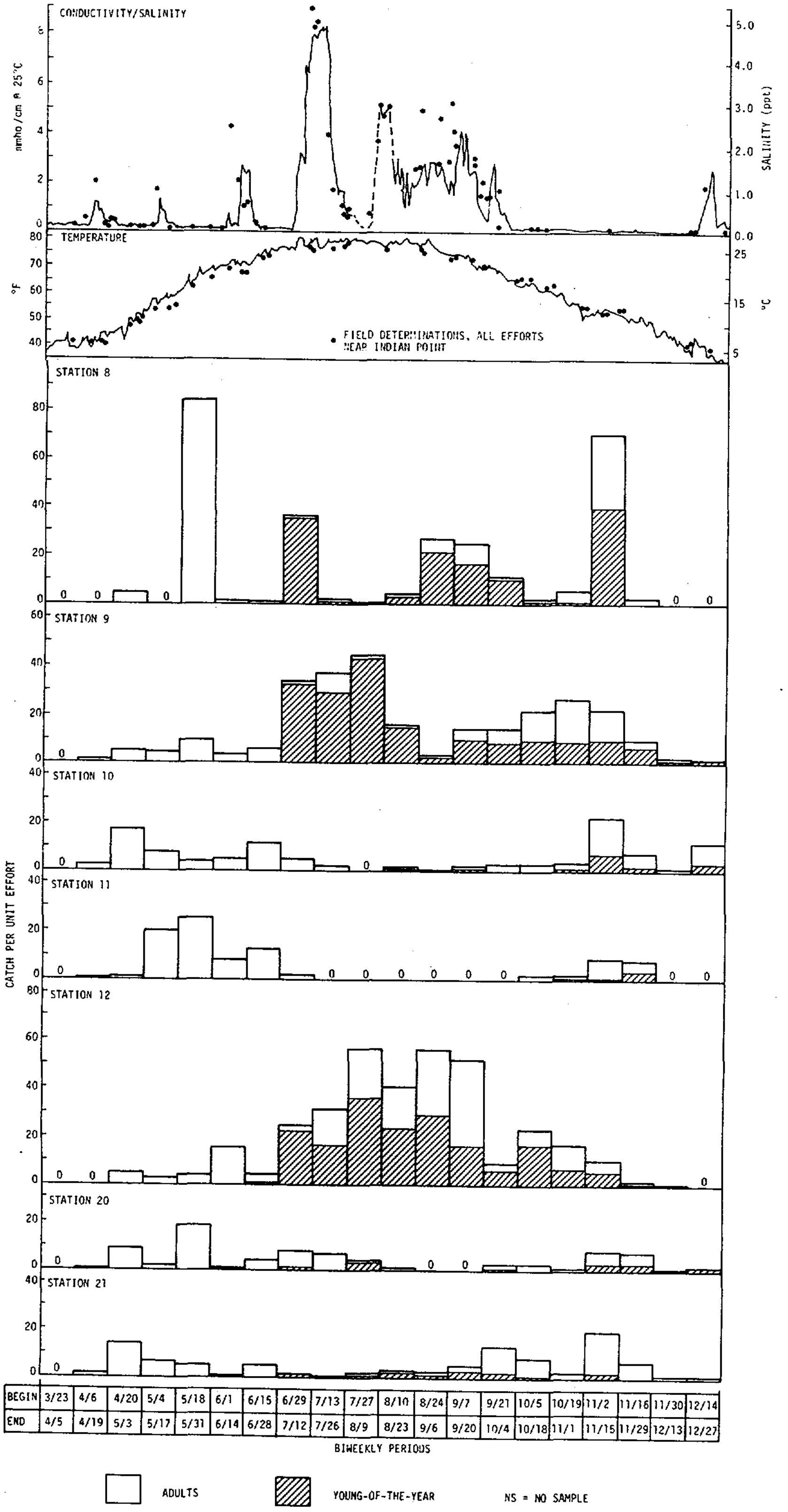


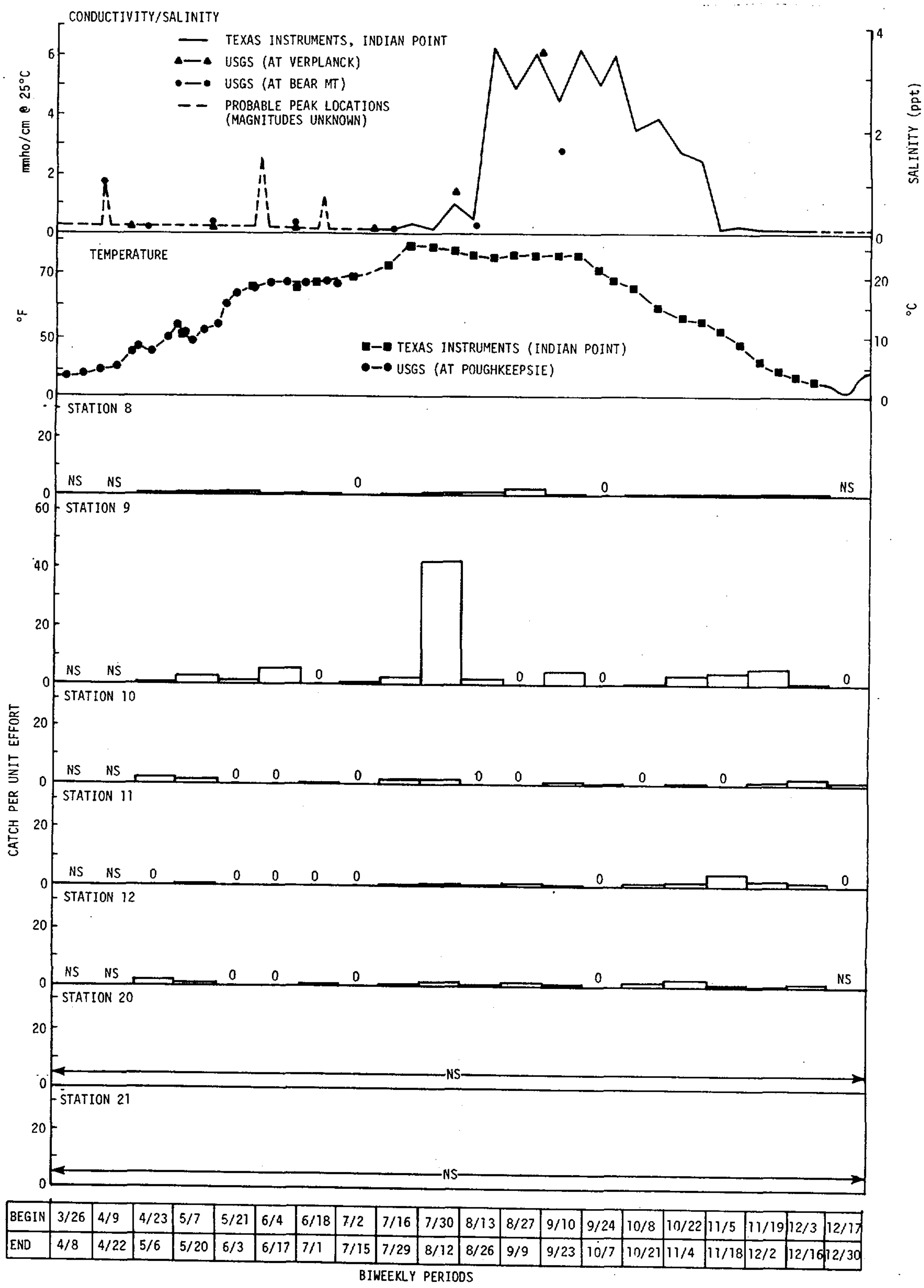
Figure IV-92. 1975 Beach-Seine Biweekly CPUE for Spottail Shiner, Indian Point Region, Hudson River Estuary, New York, Showing Water Temperature and Conductivity

May. CPUE values subsequently decreased sharply, and appreciable adult catches did not recur until August and September. Young-of-the-year were initially caught in July. Beach-seine catches of adults and young-of-the-year declined through October following an offshore movement in response to falling water temperatures (TI, 1976). In late fall, subsequent to the offshore movement, limited numbers appeared in bottom trawls.

1. Tessellated Darter (*Etheostoma olmstedi*)

Tessellated darter are common shore-zone residents in the Indian Point area. Occurrence in standard-station collections during 1972-75 was limited almost entirely to beach seines (Figures IV-93 through IV-96). Relative abundance of both adults and young-of-the-year increased during the period but exhibited no long-term trend. Both adults and young-of-the-year were most abundant at stations 8, 9, and 12, which are located in densely vegetated shoal areas (Figure IV-1 and Table IV-3), but this tendency was more pronounced for young-of-the-year than for adults.

Adults appeared in beach seines at the onset of standard-station sampling in late March. CPUE values increased through the spring, probably reflecting spawning activity. Estuarine spawning of tessellated darters has been reported to occur between April and June (Lippson and Moran, 1974). By June, CPUE values began to decline, and they remain relatively low throughout the summer. Young-of-the-year appeared in beach seines during July and increased in abundance through early August; then, CPUE values declined until early fall when they rose again, but to less than early August levels. Adult catches also increased



ADULTS AND YOUNG-OF-THE-YEAR NOT DIFFERENTIATED

NS = NO SAMPLE

Figure IV-93. 1972 Beach-Seine Biweekly CPUE for Tessellated Darter, Indian Point Region, Hudson River Estuary, New York, Showing Water Temperature and Conductivity

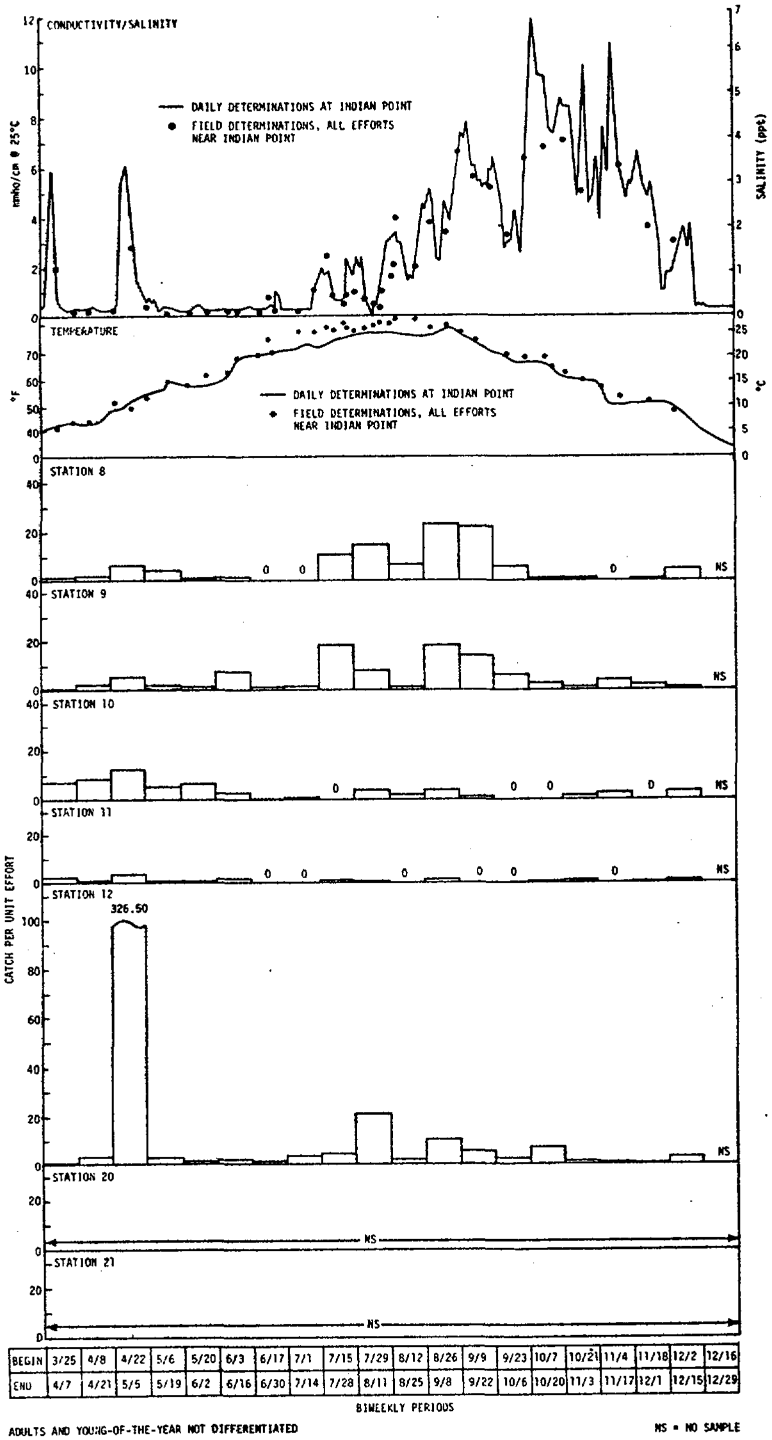
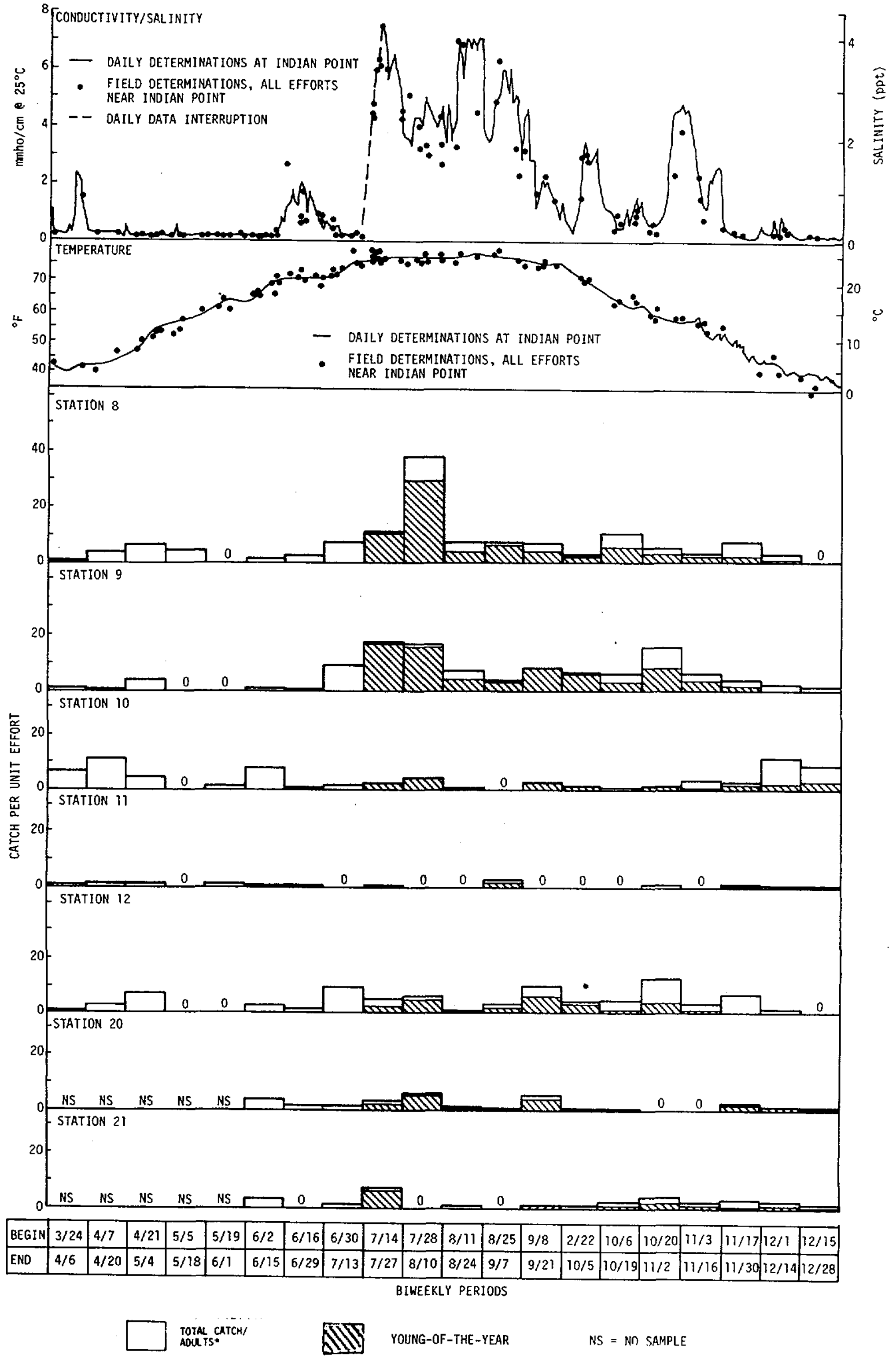


Figure IV-94. 1973 Beach-Seine Biweekly CPUE for Tessellated Darter, Indian Point Region, Hudson River Estuary, New York, Showing Water Temperature and Conductivity



*Adults not differentiated from young-of-the-year until mid-July

Figure IV-95. 1974 Beach-Seine Biweekly CPUE for Tessellated Darter, Indian Point Region, Hudson River Estuary, New York, Showing Water Temperature and Conductivity

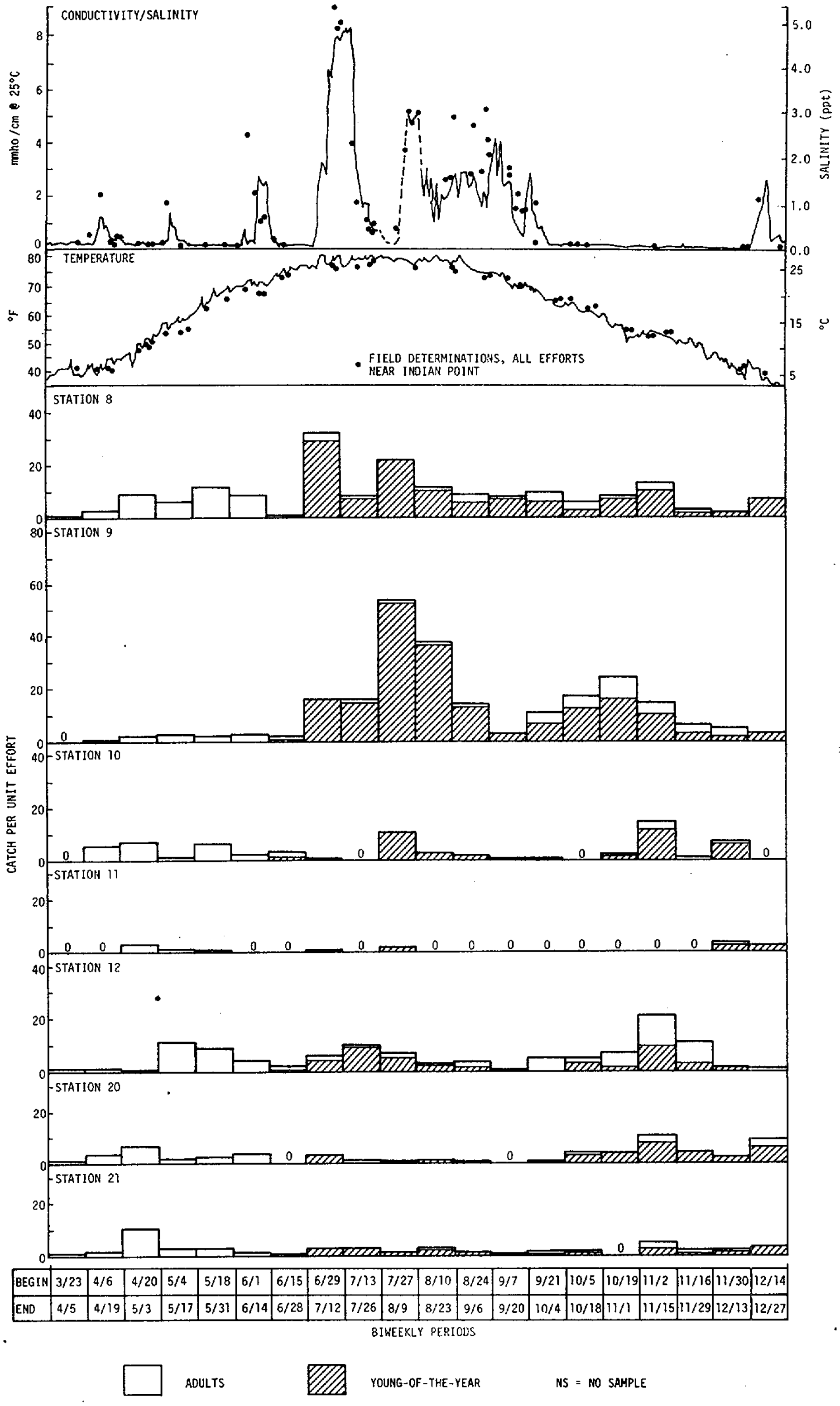


Figure IV-96. 1975 Beach-Seine Biweekly CPUE for Tessellated Darter, Indian Point Region, Hudson River Estuary, New York, Showing Water Temperature and Conductivity

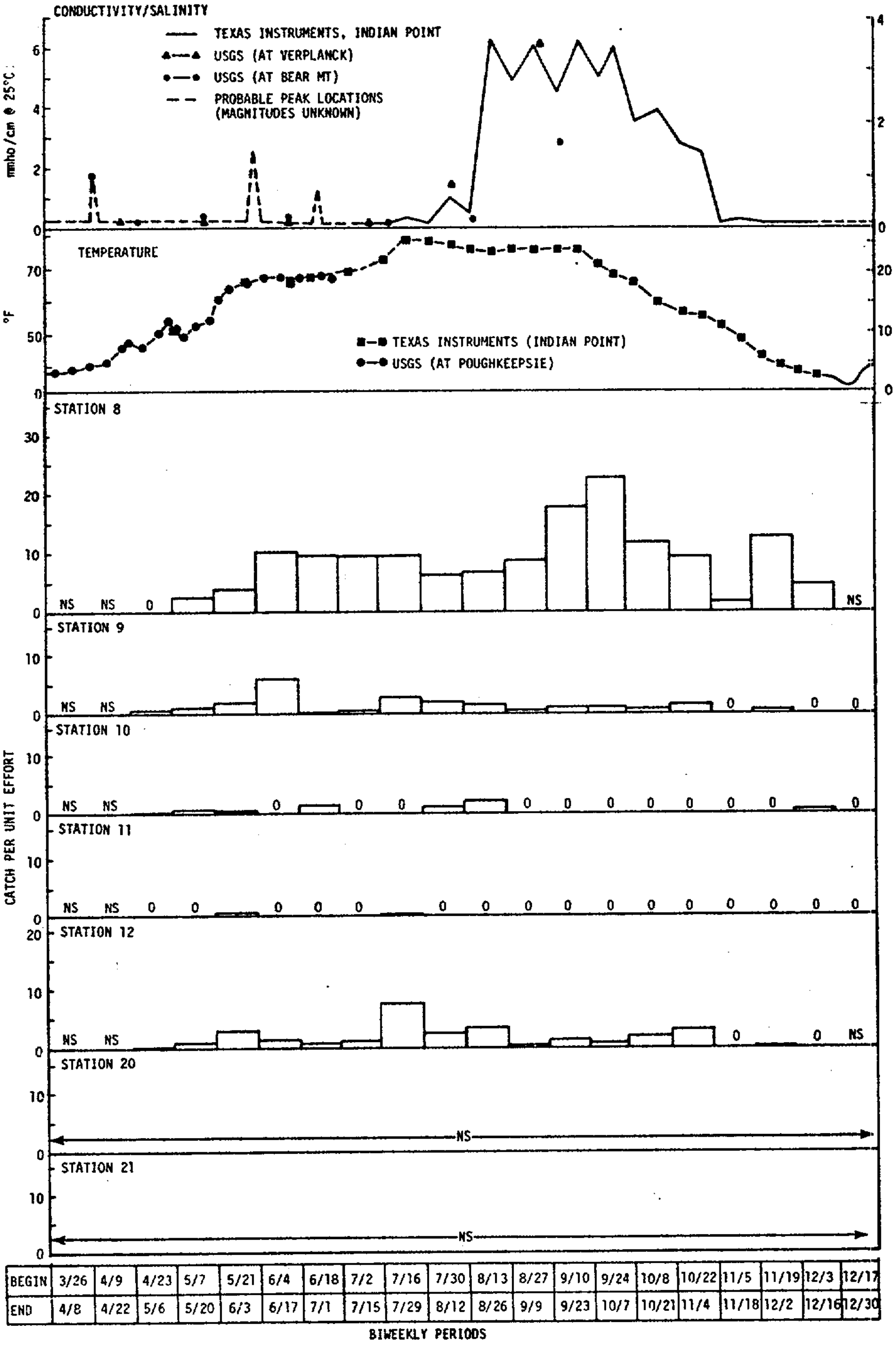
again during this period. Late fall CPUE values for both adults and young-of-the-year were again down. Smith (1971) reports that tessellated darters overwinter in deeper channel waters; but current studies indicated no increase in bottom trawl catches after beach seine CPUE values declined.

No changes in distribution among beach-seine stations were apparent during the 4-year study.

m. Pumpkinseed (*Lepomis gibbosus*)

Pumpkinseed were common in standard-station beach-seine samples during the 1972-75 study (Figures IV-97 through IV-100). Catches in surface and bottom trawls were rare, indicating a predominant shore-zone distribution. Stations 8 and 12, which are in weedy shoal areas (Figure IV-1 and Table IV-3), registered highest CPUE values for adults and young-of-the-year; stations 11 and 20, the lowest. The latter drop off more steeply, are relatively free of vegetation, and are along unprotected shorelines (Figure IV-1 and Table IV-3). Catch distribution among beach-seine stations remained relatively unchanged for adults and young-of-the-year, although CPUE values increased at station 12.

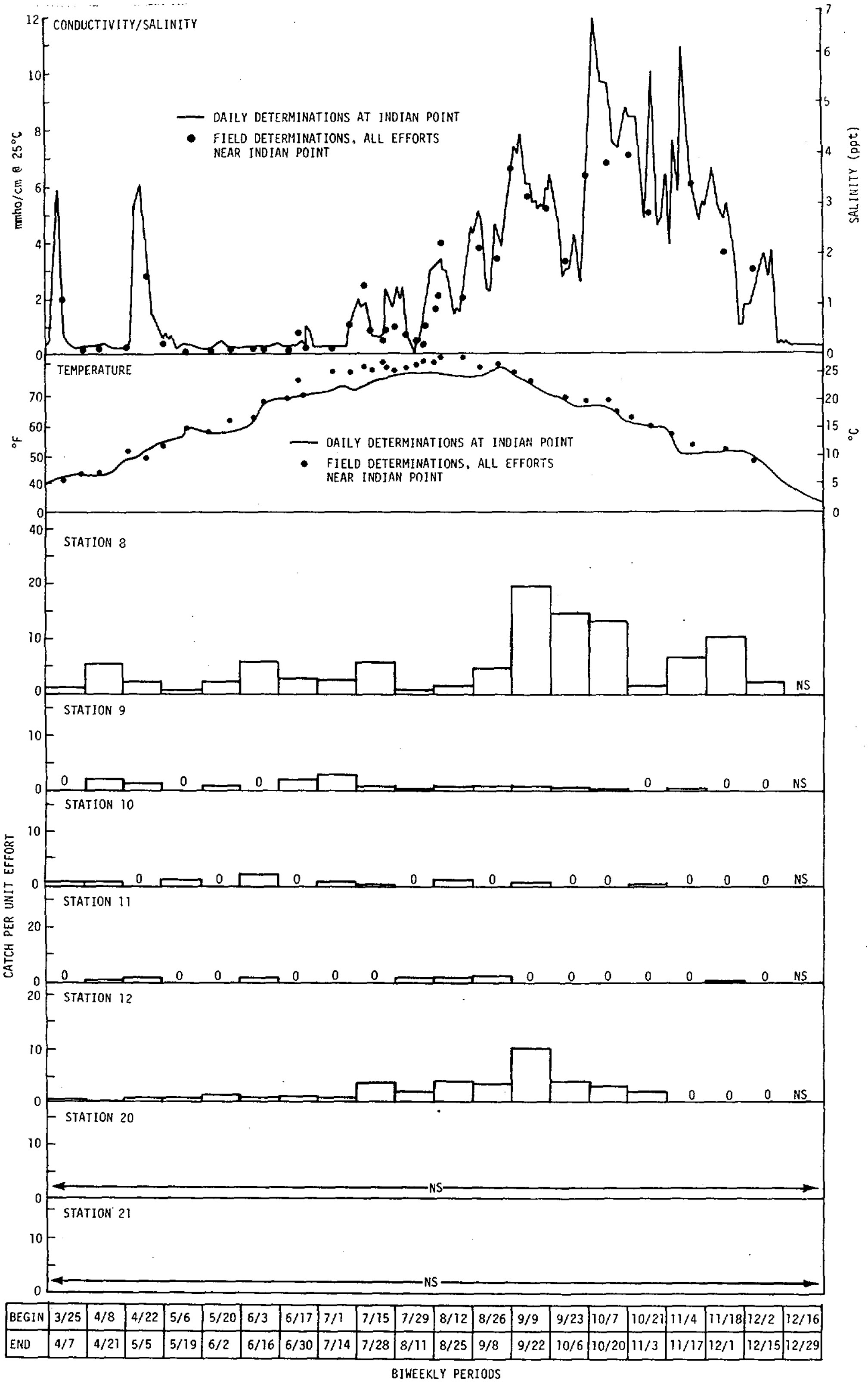
Relative abundance of pumpkinseed in the Indian Point area fluctuated over the 4-year period but exhibited no trends. Pumpkinseeds generally were present in standard-station collections throughout the sampling season. Abundance increased through April and May but remained stable throughout the summer and early fall. Young-of-the-year first appeared in late August and reached peak abundance in September and October. CPUE values for adults and young-of-the-year declined in November and December.



ADULTS AND YOUNG-OF-THE-YEAR NOT DIFFERENTIATED

NS = NO SAMPLE

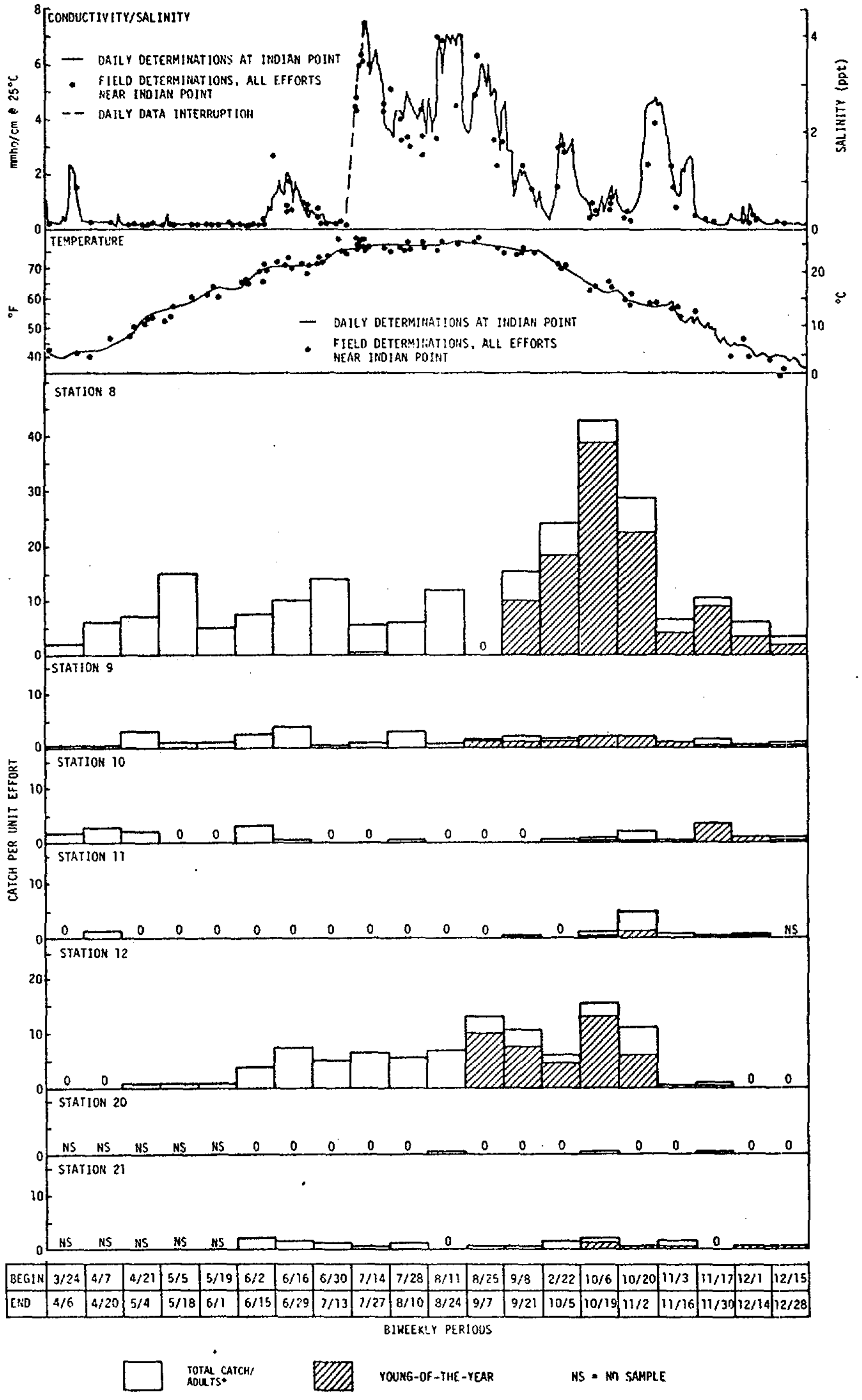
Figure IV-97. 1972 Beach-Seine Biweekly CPUE for Pumpkinseed, Indian Point Region, Hudson River Estuary, New York, Showing Water Temperature and Conductivity



ADULTS AND YOUNG-OF-THE-YEAR NOT DIFFERENTIATED

NS = NO SAMPLE

Figure IV-98. 1973 Beach-Seine Biweekly CPUE for Pumpkinseed, Indian Point Region, Hudson River Estuary, New York, Showing Water Temperature and Conductivity



*Adults not differentiated from young-of-the-year until mid-July

Figure IV-99. 1974 Beach-Seine Biweekly CPUE for Pumpkinseed, Indian Point Region, Hudson River Estuary, New York, Showing Water Temperature and Conductivity

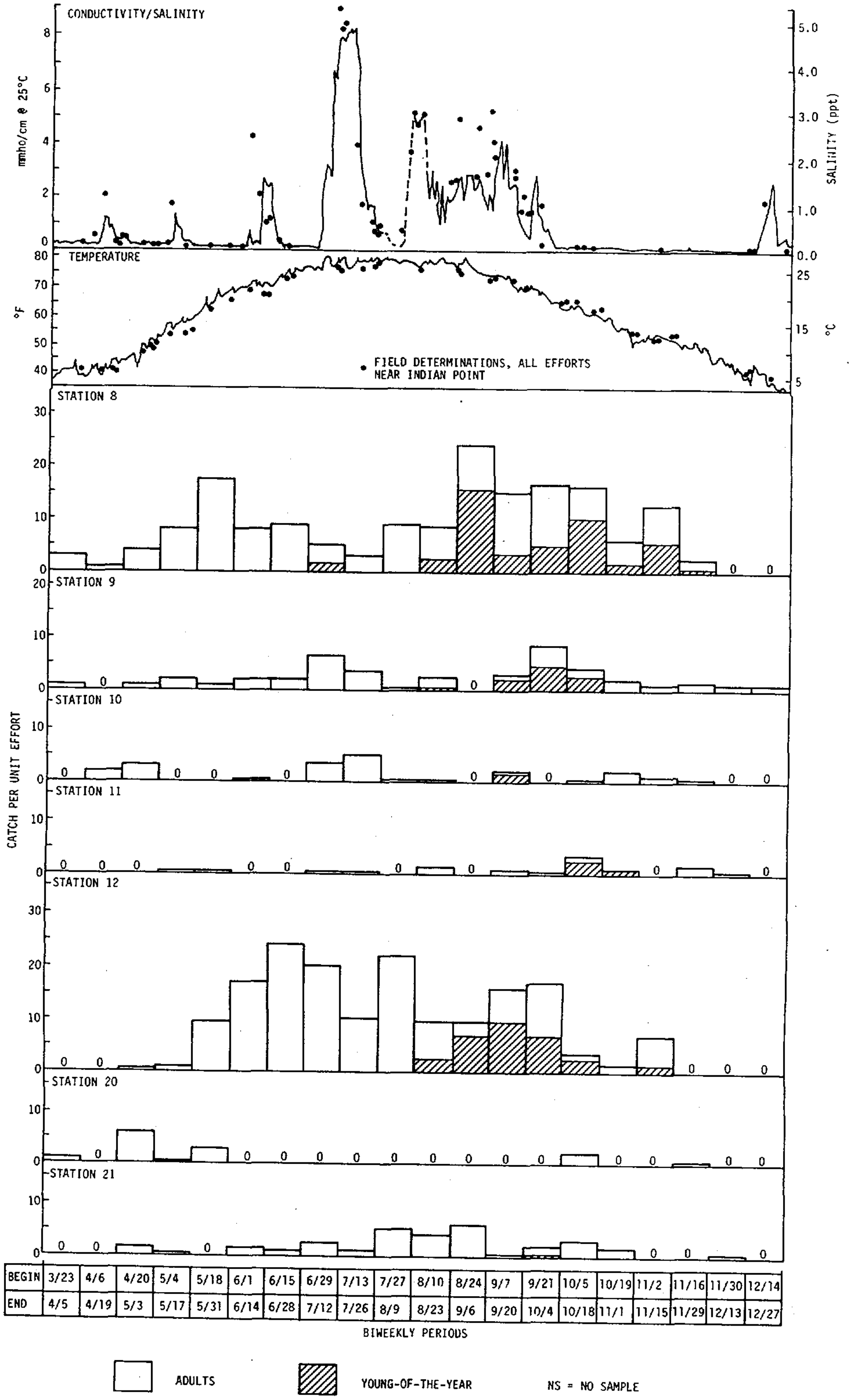


Figure IV-100. 1975 Beach-Seine Biweekly CPUE for Pumpkinseed, Indian Point Region, Hudson River Estuary, New York, Showing Water Temperature and Conductivity

F. CONCLUSIONS

For the years covered by this analysis, there was no indication of substantial change in the fish community in the Indian Point area:

- Species composition and numbers of species and families collected in standard-station samples remained essentially stable.
- Local distribution of selected species did not change appreciably.
- No long-term trends in relative abundance of common species were discernible.

Most of the species discussed exhibited seasonal abundance patterns (Figure IV-101):

- Spring samples were characterized by the presence of adult alewives and blueback herring moving up the Hudson River to spawn and by increasing catches of resident estuarine species.
- Summer samples were dominated by young-of-the-year, including marine forms such as bluefish.
- Fall samples reflected decreasing catches of resident species as well as downriver migrations by young-of-the-year of anadromous and estuarine species.

Water temperature and salinity influenced the seasonal occurrence of many species. Changes in water temperature are commonly a stimulus for processes such as spawning and migration (Nikolsky, 1963) and probably contributed to much of the seasonal variability noted in the fish community in the Indian Point area. Salinity is a critical factor in the distribution of estuarine organisms (Reid, 1961). This was particularly apparent for young-of-the-year Atlantic tomcod, white perch, and bay anchovy, which appeared to associate closely with the

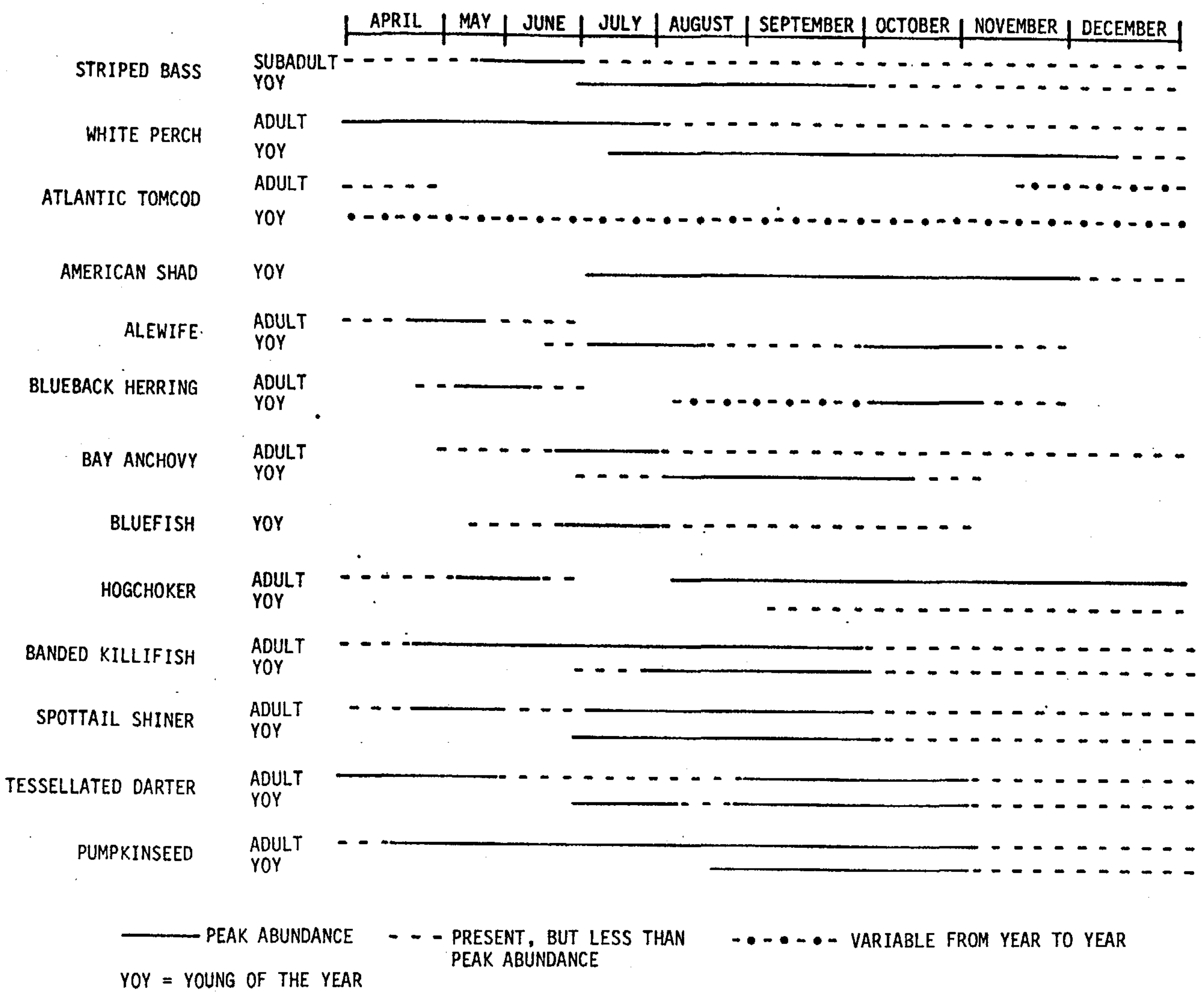


Figure IV-101. Generalized Seasonal Patterns of Abundance of Common Fish Species in Standard-Station Samples, Indian Point Region, Hudson River Estuary, New York salt front.

Among fishes commonly inhabiting shore-zone areas, there was a rather sharp dichotomy of habitat preference:

- Beach-seine stations 10, 11, 20, and 21, which are relatively unprotected, free of summer vegetation and nearest deep water (Figure IV-1 and Table IV-3), usually accounted for highest striped bass, blueback herring, bay anchovy, and bluefish CPUE values.
- Stations 8, 9, and 12, which are in shoal areas characterized by dense summer vegetation (Figure IV-1 and Table IV-3), were generally the sites of greatest white perch, alewife, banded killifish, spottail shiner, tessellated darter, and pumpkinseed abundance.
- Only young American shad demonstrated no clear preference of habitat type.

SECTION V

BIOLOGICAL CHARACTERISTICS

A. INTRODUCTION

This section represents a synthesis of data accumulated on age and length composition, age at maturity, condition, fecundity, food analysis, and growth for striped bass and white perch during 1972-75. Corresponding data for Atlantic tomcod are presented for 1973-75 (Table V-1).

B. SAMPLING AND LABORATORY METHODS

1. Sample Collection

Striped bass, white perch, and Atlantic tomcod were collected by beach seines, box traps, gill nets, otter and Tucker trawls, and epibenthic sleds. Additional striped bass used to determine age at maturity and fecundity were purchased from commercial fishermen. Also, sport fishermen provided additional specimens of Atlantic tomcod.

Yearly collections of striped bass and white perch began in 1972 (see Section IV). Those collected by standard-station sampling from 1972 through 1974 were preserved in 10% formalin and returned to the laboratory; a study conducted during 1974, however, indicated that preservation in formalin caused the condition of preserved fish to be significantly different from the condition of fresh fish. To overcome this problem, August-October 1974 weekly samples of fresh striped bass and white perch collected from box traps set within the Indian Point region (RM 39-46, KM 63-75) were used for length/weight analysis. All

Table V-1

Summary of Data Presented for Biological Characteristics Program, 1972-75

Characteristic	Species	Year 1972	1973	1974	1975
Age composition	Striped bass	X	X	X	X
	White perch	X	X	X	X
	Atlantic tomcod	-	X*	X	X
Length composition	Striped bass	X	X	X	X
	White perch	X	X	X	X
	Atlantic tomcod	-	X*	X	X
Age at maturity	Striped bass	-	X	X	†
	White perch	X	X	X	†
	Atlantic tomcod	-	X*	X	X
Condition	Striped bass	-	X**	X**	X**
	White perch	-	X	X	X
	Atlantic tomcod	-	-	X	X
Growth	Striped bass	X	X	X	X
	White perch	X	X	X	X
	Atlantic tomcod	-	-	X	X
Fecundity	Striped bass	-	X	X	†
	White perch	X	X	X	†
	Atlantic tomcod	-	X*	X	†
Food analysis	Striped bass	X	X	X	-
	White perch	X	X	X	-
	Atlantic tomcod	-	X*	X	-

X Sample presented
- No sample
* December 1973 only
**Spring season only (March 30 - June 5)
† Samples not processed

lengths and weights for 1975 standard-station sampling were recorded from fresh fish. Fresh lengths and weights were recorded for striped bass captured in gill nets and purchased from commercial fishermen during the 1972-75 striped bass spawning seasons.

Atlantic tomcod sampling began in December 1973 and continued through 1975. During winter (December-March), Atlantic tomcod were collected in box traps and, conditions permitting, with bottom trawl; during other times of the year, Atlantic tomcod were collected with bottom and Tucker trawls, epibenthic sleds, and occasionally from sport fishermen. Entire samples from the 1973-74 Atlantic tomcod spawning run were examined for length, weight, and sex. For the 1974-75 and 1975-76 spawning seasons, a stratified random subsampling scheme was used. On a weekly basis, entire trap catches of Atlantic tomcod from selected trap sites were returned to the lab for workup. May-December Atlantic tomcod samples generally were processed while fresh; however, all ichthyoplankton samples collected with Tucker trawl and epibenthic sled were preserved in 5% formalin at time of capture. During 1974, sampling was approximately weekly and entire catches (to a maximum of 150 tomcod) were randomly subsampled. The 1975 samples were acquired approximately biweekly, with maximum random subsamples of 80 Atlantic tomcod. The change in sample size was based on variances calculated from 1974 data.

2. Laboratory Procedures

Preliminary laboratory workup included measuring and recording total length and weight, determining sex, and removing and preserving stomachs and/or gonads. Catch information was recorded for each sample.

a. Age Determination

Scale samples were removed from striped bass and white perch in an area above the lateral line and below the separation between the first and second dorsal fins (as defined by Mansueti, 1960, and Merriman, 1941) and from Atlantic tomcod in the area between the middle dorsal fin and the lateral line. During 1975, otoliths rather than scales were used to determine the age of Atlantic tomcod.

Aging of scales was accomplished with the annulus method and a Trisimplex microprojector. Reflected light was used to examine otoliths. Striped bass and white perch scales were wet-mounted between two microscope slides. Atlantic tomcod scales, due to their small size, were initially mounted permanently under cover slips on microscope slides; when the mounting medium was found eventually to crack, subsequent samples (after September 1974) were heat-pressed into acetate cards (Koo, 1962).

b. Growth Determination

Striped bass and white perch from standard-station samples were subsampled weekly and their ages determined in order to calculate monthly mean total lengths and weights of young-of-the-year, yearling, and older fish. Monthly age and length frequencies were established from these data. Mean monthly total length and weight and monthly age and length frequencies for striped bass and white perch were determined from fish collected in standard-station samples. In 1972 and 1973, a subsample of 15 fish from each size class (see Section IV. C.) was used for this purpose; in 1974 and 1975, the subsample size was 20 fish. If there were fewer fish in a size class than the maximum subsample size, all fish in that size class were weighed and measured.

Atlantic tomcod length-frequency data for the 1973-74 spawning season were obtained from traps set at RM 41. Length frequencies for the 1974-75 spawning season and December 1975 period of the 1975-1976 spawning season were obtained from tomcod mark release data collected between RM 26 and RM 73. During the 1974-75 and 1975-76 spawning seasons, entire trap catches of tomcod were divided into the following eight length groups: 0-125 mm, 126-150 mm, 151-175 mm, 176-200 mm, 201-225 mm, 226-250 mm, 251-275 mm, and 276+ mm. A random subsample of 20 fish per length group was taken. These were measured fresh (total length to the nearest millimeter, weight to the nearest 0.1 g), and sexed. The total number of fish in each length group was recorded and, during the 1975-76 spawning season, the total number of males per length group was also recorded.

Atlantic tomcod growth was monitored during 1974 and 1975 by plotting mean lengths and weights through the year and by calculating instantaneous growth rates for the 2 years using the following formula:

$$G = \frac{\log_e W_f - \log_e W_i}{t}$$

where

G = instantaneous growth rate

W_f = final mean weight

W_i = initial mean weight

t = elapsed time (days)

Instantaneous growth rates for striped bass and white perch were calculated using monthly mean weights as the initial and final weights and 30 days as the elapsed time.

c. Determination of Fecundity and Age at Maturity

During May, June, and July, gonads were excised from striped bass and white perch collected in gill nets and standard-station samples and those purchased from commercial fishermen. The excised gonads were stored in 10% formalin for later workup. This same procedure was used for Atlantic tomcod collected during December 1973-February 1974, May-November 1974, and May-November 1975. Ovaries removed from Atlantic tomcod collected during the 1974-75 spawning run were stored in Simpson's modified version of Gilson's fluid (Bagenal, 1971) to avoid the need of manual separation of eggs from the ovarian tissue.

The state of sexual maturity was determined by visual examination, egg-diameter measurements, and manual expulsion of gametes. Scales were taken from fish used in the fecundity studies in order to determine the age of individual fish. These data were used to calculate percent mature by age.

Rate of Atlantic tomcod sexual maturation was determined by monitoring the percentage of total body weight due to gonad tissue. Gonads of the 1975 young-of-the-year tomcod were excised and stored in 10% formalin; later, they were dried on paper toweling for 30 min and then weighed to the nearest 0.01 g. Because this procedure was found to produce a more stable gonad weight, the same procedure was used to re-weigh the 1974 young-of-the-year gonads.

To determine striped bass and white perch fecundity, preserved ovaries were blotted dry and weighed to the nearest 0.1 g. An aliquot was then removed from the medial portion of the right ovary, weighed to the nearest 0.01 g, and the total number of mature eggs in the aliquot counted. For Atlantic tomcod collected during December 1973, the eggs were manually separated from the ovarian tissue, washed, drained, and weighed to the nearest 0.01 g. An aliquot of approximately 2 g was removed, weighed to the nearest 0.01 g, and counted. For all three species, the total number of eggs per fish was estimated using the equation:

$$\hat{E} = \frac{c}{w} W$$

where

$\hat{E}$ = estimated number of eggs in ovaries

c = number of eggs counted in aliquot

w = weight of aliquot

W = weight of ovaries

The log of the calculated fecundity estimates was regressed on the log of the total lengths for striped bass, white perch, and Atlantic tomcod and also on the log of the total weight for Atlantic tomcod. All data were rested for homogeneity of group variance with Levene's test (Brown and Forsythe, 1974) and for common lines with analysis of variance. Analysis of variance (ANOVA) was used to test for differences in mean fecundity estimates within an age group between years for striped bass and for white perch. Fecundity estimates for striped bass in age groups VIII, IX, and X from 1973 and 1974, and for white perch in age groups II through V from 1972-1974 were used in the ANOVA.

The average number of eggs per female Atlantic tomcod was determined using the equation

$$\overline{F} = \frac{a}{n} \sum_{i=1}^{n} L_i^{\,b}$$

where

$\overline{F}$ = estimated mean number of eggs per female

a = coefficient of length in length/fecundity relationship

b = exponent of length in length/fecundity relationship

n = number of individual female lengths determined during spawning period

L_i = individual female lengths

d. Analysis of Condition (Length/Weight Relationship)

Striped bass, white perch, and Atlantic tomcod specimens used to describe the length/weight relationship were collected by standard-station beach seines and trawls, traps, gill nets, and Tucker and otter trawls. Adult striped bass during the spring season were collected with gill nets or were purchased from commercial fishermen. As mentioned in subsection B.1, length and weight data from standard stations prior to 1975 were recorded from fish previously preserved in formalin; after July 1974, all length/weight data were obtained from fresh fish. All Atlantic tomcod data, unless otherwise noted, were from fresh fish.

The length/weight relationship for striped bass and white perch was calculated during the following seasons:

Spring	March 20-June 17
Summer	June 18-September 17
Fall	September 18-December 31

Length/weight data were analyzed using the least squares method of linear regression. The log-transformed data were grouped by sex, and regression lines were calculated for males and females. The straight-line equation used to describe this relationship was

$$Y = a + bX$$

where

Y = log weight

X = log length

a = Y intercept

b = slope

Levene's test for equality of group variance was made prior to testing pooled data (Brown and Forsythe, 1974), and analysis of variance was used to test for differences between sexes.

e. Food-Habit Analysis

Striped bass and white perch specimens captured in standard-station beach seines and bottom trawls were used for stomach analysis. Samples for the Atlantic tomcod food-habit study were collected from box traps and ichthyoplankton gear within RM 10-58 (KM 16-93).

Except young-of-the-year, the specimens were injected with 10% formalin through the mouth in the field and their stomachs later removed in the laboratory; young-of-the-year, because of their smaller size, could be preserved intact in 10% formalin and their stomachs removed at the time of examination. To remove the stomachs, they were severed at the esophagus and pyloric constriction.

The food items were placed in a petri dish, sorted using a dissecting microscope, identified to the lowest practical taxonomic level, and counted; food items encountered in the stomachs of striped bass and white perch also were measured volumetrically by water displacement to the nearest 0.1 mℓ. The number of identifiable dismembered organisms was estimated by counting the number of heads or bodies. If there were many small organisms, total-count estimates were made using two methods: for striped bass and white perch, a portion (approximately 10%) of the organisms was counted and this count then increased by a factor of 10; in the case of Atlantic tomcod, the organisms were distributed evenly throughout an area of a petri dish and an aliquot based on a gridded area counted and extrapolated to the total area. Items such as plants, unidentifiable animal remains, detritus, and filamentous algae were not assigned numerical values; rather, were noted as being present or absent.

Frequency of occurrence and percent frequency were calculated on a monthly basis for each species by using the following formulas:

$$\text{Frequency of occurrence of } i^{th} \text{ food item} = \frac{\text{No. containing food item } i}{\text{No. containing food}} \times 100$$

$$\text{\% frequency of } i^{th} \text{ food item} = \frac{\text{No. of item i}}{\text{No. of all food items}} \times 100$$

An additional index, percent volume, was calculated for striped bass and white perch and combined with frequency of occurrence and percent frequency to calculate an overall importance index. The formulas used were

$$\text{\% vol. of food item i} = \frac{\text{Total vol. of item i}}{\text{Total vol. of food items}} \times 100$$

$$\text{Importance index} = \frac{\text{\% vol.} + \text{\% freq.}}{2} \times \frac{\text{\% freq. of occurrence}}{100}$$

Food items were ranked according to this index and the top five food items considered for comparative purposes. For Atlantic tomcod, the percent frequency of food items was used to describe those food items which constituted the basis of the diet.

To demonstrate changes in feeding habits as a function of fish size, the following sampling length classes were established and used for striped bass prior to August 1973: 51-115, 116-200, and 201+ mm (TL) for striped bass; 51-75, 76-150, 151-200, and 201+ mm (TL) for white perch. To delimit young-of-the-year more effectively, this was modified in August 1973 to the following: 0-75, 76-115, 116-200, and 200+ mm for striped bass; 0-75, 76-150, 151-200, and 200+ mm for white perch.

C. RESULTS

1. Striped Bass

a. Growth

Yearly growth curves for young-of-the-year striped bass showed similar trends for 1973-75. Incremental growth was greatest during July (Table V-2 and Figure V-1); thereafter, size increased at a slower rate until September-October, at which time the growth curve approached an asymptote indicating termination of the growing season. This was indicated also by instantaneous growth rates (Table V-3 and Figure V-2). Lower growth rates were coincident with decreasing water temperatures (Figure V-2).

b. Age and Length Composition

Striped bass < 150 mm in total length (Appendix Figure C-1) typically were collected in standard-station beach seines and bottom trawls. Yearling fish dominated April, May, and June striped bass catches (Appendix Figure C-2). May beach-seining concomitant with the spawning run occasionally collected age III striped bass (> 300 mm in total length) (Appendix Figures C-3 and C-4). Young-of-the-year striped bass began appearing in July beach-seine catches and were the dominant age class (73-90%) thereafter. Young-of-the-year striped bass first occurred in bottom trawls during August and, as in beach seines, were the dominant age group of striped bass collected thereafter (Appendix Figures C-5 and C-6).

Table V-2

Monthly Mean Total Lengths of Young-of-the-Year Striped Bass Collected in Standard-Station Beach Seines and Bottom Trawls, July-December 1973-75

	Month																	
	July			August			September			October			November			December		
Year	$\bar{x}$	2 SE*	n†	$\bar{x}$	2 SE	n	$\bar{x}$	2 SE	n	$\bar{x}$	2 SE	n	$\bar{x}$	2 SE	n	$\bar{x}$	2 SE	n
1973	50.0	1.580	172	66.3	1.484	274	80.7	1.788	311	82.3	1.760	257	87.3	3.132	103	75.9	5.678	15
1974	44.5	1.470	222	66.3	1.370	339	75.4	1.228	395	82.3	2.392	191	91.1	5.620	59	83.9	6.788	13
1975	43.8	1.478	184	66.8	1.308	359	85.6	1.678	312	106.5	2.864	171	107.6	5.224	68	125.6	16.448	8

* Two times the standard error of the mean

†Sample size

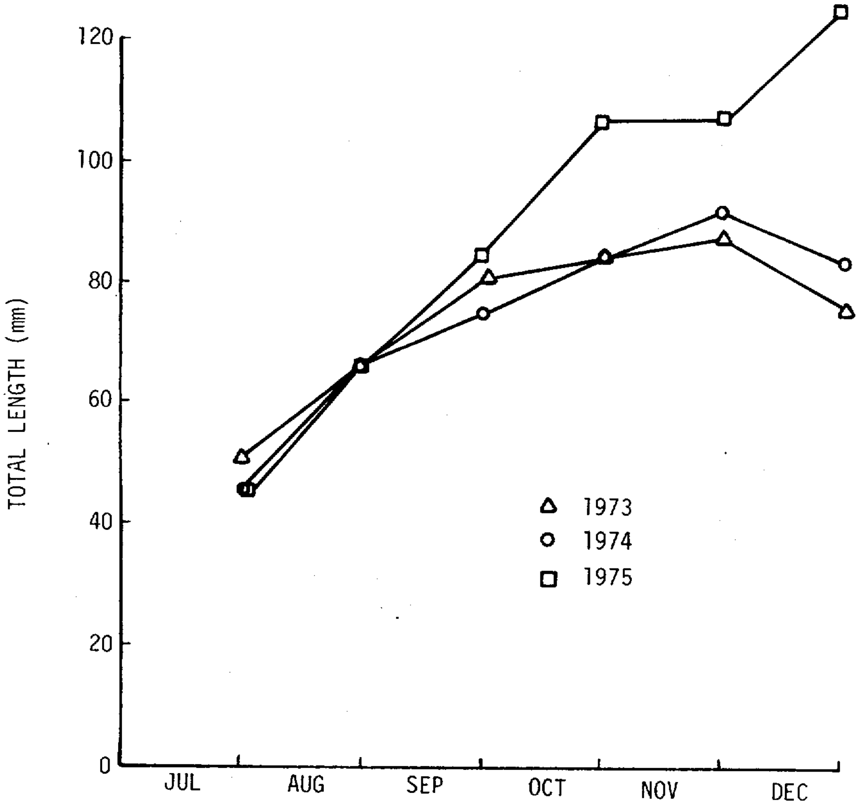


Figure V-1. Comparison of Monthly Mean Total Lengths of Young-of-the-Year Striped Bass Collected in Standard-Station Beach Seines and Bottom Trawls, July-December 1973-75

Table V-3

Instantaneous Growth Rates of Young-of-the-Year Striped Bass Collected in Standard-Station Beach Seines and Bottom Trawls, July-November 1973-75

Month	Year	Initial Mean Weight(w_i) (g)	Final Mean Weight (w_f) (g)	Time (days)	Instantaneous Growth Rate
Jul	1973	1.4	3.6	30	0.0311
	1974	1.2	3.6		0.0363
	1975	1.0	3.4		0.0407
Aug	1973	3.6	6.2	30	0.0180
	1974	3.6	4.9		0.0097
	1975	3.4	6.7		0.0229
Sep	1973	6.2	6.2	30	-0.0004
	1974	4.9	6.4		0.0089
	1975	6.7	12.4		0.0204
Oct	1973	6.2	7.7	30	0.0072
	1974	6.4	9.3		0.0127
	1975	12.4	12.6		0.0005
Nov	1973	7.7	4.9	30	-0.0151
	1974	9.3	7.0		-0.0093
	1975	12.6	19.5		0.0145

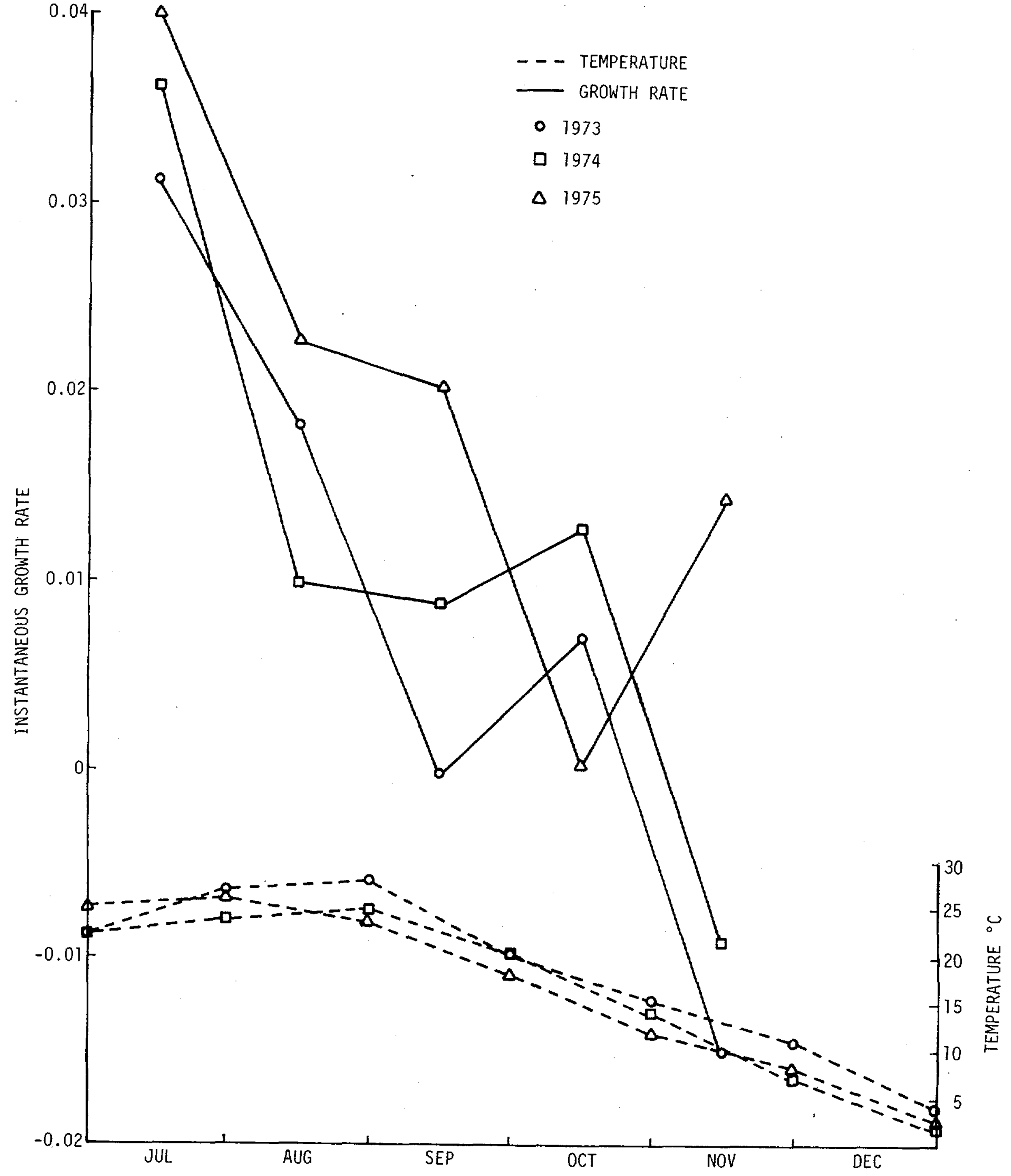


Figure V-2. Instantaneous Growth Rate and Temperature during the Growth Period for Young-of-the-Year Striped Bass Collected in Standard-Station Beach Seines and Bottom Trawls, July-December 1973-75

c. Food Analysis

1) 1972

During the first year of life, striped bass fed primarily on hapacticoid, calanoid, and cyclopoid copepods; *Gammarus*; and chironomid larvae (Appendix Table C-1). They initially preyed on copepods, gradually changing to larger amphipods, isopods, and chironomid larvae as their total lengths increased to 75 mm. Chironomid larvae were the most important dipteran remains in striped bass stomachs and often were among the top five food items in the various size classes.

The seasonal importance of *Gammarus* fluctuated in response to its density in the river and the seasonal addition of new food items into the ecosystem (TI, 1973). Other amphipod genera occurred occasionally, their numbers generally increasing as salinities increased.

2) 1973

A comparison of 1973 food-habit data by size class with similar data from 1972 reflected similar trends in striped bass feeding habits (Appendix Tables C-1 and C-2). As striped bass increased in total length, they progressed from copepods to chironomid larvae to *Gammarus* to fish. Spring samples revealed that calanoid copepods, *Gammarus*, chironomid larvae, *Neomysis*, and *Daphnia* were important in yearling striped bass diets. Striped bass approaching 200 mm in total length became increasingly piscivorous and preyed on white perch and clupeids; fish greater than this length were almost totally piscivorous. The analysis reflected the intrusion of the salt front into the area in

July: halophilic organisms such as *Crangon*, *Neomysis*, and *Callinectes* appeared more frequently from August to September.

3) 1974

Food-habit data by size class for striped bass reflected similar trends in 1972, 1973, and 1974. Striped bass food items increased in size as the fish increased in length: from copepods to chironomid larvae to *Gammarus* (and other Amphipoda) to fish.

Data breakdown by bottom trawl and beach seine revealed some differences in feeding habits: in bottom-trawl samples, *Gammarus* and chironomid larvae were the top items among yearling striped bass; in beach-seine samples, calanoid copepods and *Gammarus* proved to be of major importance.

As in 1973, samples reflected the July intrusion of the salt front. Young-of-the-year striped bass fed primarily on amphipods, calanoid copepods, and chironomid larvae while larger fish fed on these species as well as *Neomysis*, another salinity-dependent species. Striped bass > 75 mm preyed on bay anchovies; those > 116 mm preyed on clupeids, Atlantic tomcod, mummichogs, *Morone*, and banded killifish.

d. Condition

Summary data for the length/weight relationship of striped bass appear in Table V-4. Because of insufficient seasonal data, only the spring seasons of 1973 through 1975 were analyzed.

Table V-4

Length/Weight Relationship[1] of Striped Bass for Spring 1973-1975*

Sex	Year	Sample Size	Intercept a	Slope b	Correlation Coefficient r	r^2
Male	1973	45	-5.218	3.175	0.9966	0.9932
	1974	100	-5.750	3.265	0.9785	0.9575
	1975	51	-4.703	2.911	0.9954	0.9908
Female	1973	48	5.459	3.175	0.9894	0.9789
	1974	83	-6.180	3.424	0.9773	0.9552
	1975	48	-5.145	3.070	0.9941	0.9883

* March 30-June 5

[1] log weight = a + b (log length)

The 1973 data for males and females revealed unequal lines but a common slope ($\alpha = 0.05$), indicating a simple line shift. The 1975 data did not meet the homogeneity-of-variance assumption and could not be tested statistically. This effect was attributed to the extreme variability of spawning-condition (maturing, ripening, or partially spent) fish.

e. Fecundity

Regression analysis of log-transformed fecundity and length data revealed similar lines ($\alpha = 0.05$) for the 1973 and 1974 striped bass samples. According to analysis of variance mean fecundity for females ages VII, IX, and X did not differ between years ($\alpha = 0.05$); mean fecundity increased with age (Table V-5).

f. Age at Maturity

All female striped bass less than age V were immature; maturity began when they attained an age of V or VI and was complete for all of those age VII and older (Table V-5). Data from 1973 and 1974 were similar except for ages V and VI which exhibited differences because of small sample sizes and the respective times when the samples were taken. Maturity estimates for 1973 were established for fish taken during March, April, and to a lesser degree May; during that time, the gonads of maturing striped bass (ages V and VI) were small and the exact state of maturity difficult to determine. Based on this knowledge, fish collected during May and early June were used for the 1974 estimates; during that period, maturation was complete and differences between mature and immature gonads were readily discernible. For fish that had previously matured (age VII and older), state of maturity was obvious throughout the March-June period.

Fifty male striped bass age III and older were examined in 1973 for state of maturity and 59 age IV and older were examined in 1974. All of these males were mature.

2. White Perch

a. Growth

Yearly growth patterns of young-of-the-year white perch were similar to those of young-of-the-year striped bass: the exhibited maximum growth during July (Table V-6 and Figure V-3), increasing growth until September-October, and then a general slowdown indicating

Table V-5

Mean Fecundity and Age at Maturity for Female Striped Bass, 1973 and 1974

Age	Year	No. Examined	No. Mature	No. Immature	% Mature	Mean Fecundity	Standard Error	Sample* Size
III	1973	1	0	1	0			
	1974	-	-	-	-			
	Total	1	0	1	0			
IV	1973	7	0	7	0			
	1974	9	0	9	0			
	Total	16	0	16	0			
V	1973	9 †	0	9	0	-	-	
	1974	5	4	1	80	591,000	219,500	2
	Total	14	4	10	28	591,000	219,500	2
VI	1973	3 ‡	2	1	67	276,345	-	1
	1974	5	5	0	100	726,507	115,035	5
	Total	8	7	1	88	651,480	294,459	6
VII	1973	8	8	0	100	1,002,102	267,997	7
	1974	6	6	0	100	1,174,340	558,885	2
	Total	14	14	0	100	1,040,377	226,304	9
VIII	1973	15	15	0	100	1,487,084	136,448	11
	1974	16	16	0	100	1,210,577	82,228	14
	Total	31	31	0	100	1,332,240	79,050	25
IX	1973	9	9	0	100	1,610,329	198,853	7
	1974	18	18	0	100	1,497,703	120,367	17
	Total	27	27	0	100	1,530,552	101,299	24
X	1973	3	3	0	100	1,980,669	315,066	3
	1974	16	16	0	100	1,762,574	165,140	14
	Total	19	19	0	100	1,801,061	144,452	17
XI	1973	-	-	-	-	-	-	
	1974	7	7	0	100	1,818,524	452,376	4
	Total	7	7	0	100	1,818,524	452,376	4
XII	1973	1	1	0	100	1,994,789	-	1
	1974	-	-	-	-	-	-	
	Total	1	1	0	100	1,994,789	-	1
XIII	1973	-	-	-	-			
	1974	-	-	-	-			
	Total	-	-	-	-			
XIV	1973	1	1	0	100			1
	1974	-	-	-	-			
	Total	1	1	0	100			1

* Number of fish used to determine fecundity estimate

† Samples taken during March and April

‡ 2 from March, 1 from May

termination of the growing season. This was indicated also by instantaneous growth rates (Table V-7 and Figure V-4). Lower growth rates were coincident with decreasing water temperature (Figure III-8).

Young-of-the-year growth was greatest during the warmer years. Mean total lengths of young-of-the-year were 77.5 mm in November 1973, 76.1 mm in November 1975, and 71.2 mm in November 1974. Highest July-November water temperatures occurred in 1973, and lowest in 1974. Since peak spawning for the 3 years occurred at approximately the same time, the parallel between greatest temperature during the July-November period and mean length attained by November suggested that growth was greatest during the warmer years.

With minor variations, growth data for yearling and older white perch showed trends similar to those for young-of-the-year fish (Table V-6 and Figure V-5). Monthly mean lengths of yearling and age II white perch remained stable during April and May, with first incremental growth occurring during May and June. The inception of growth for yearling and age II white perch was again coincident with peak spawning and water temperatures approximating 13-15° C.

Growth of adult white perch exhibited a lag: the first period of incremental growth for white perch age III and older occurred during the July-August periods up to 2 months after inception of growth for young-of-the-year, yearling, and age II white perch (Table V-6 and Figure V-5). This dichotomy may have been due to the state of maturity for the different age classes. During May when temperatures conducive to growth were attained, young-of-the-year, yearling, and age II white

Table V-6

Monthly Mean Length by Age for White Perch (Ages 0-VIII) Collected by Standard-Station Beach Seines and Bottom Trawls, April-December 1973-75

			0			I			II			III			IV			V			VI			VII			VIII	
Month	Year	x̄	2 SE*	n†	x̄	2 SE	n	x̄	2 SE	n	x̄	2 SE	n	x̄	2 SE	n	x̄	2 SE	n	x̄	2 SE	n	x̄	2 SE	n	x̄	2 SE	n
Apr	1973	-	-	-	64.2	2.664	19	119.0	3.044	33	149.2	4.876	18	176.6	5.688	9	188.8	7.500	4	18.2	0	1	-	-	-	-	-	-
	1974	-	-	-	77.8	1.268	172	127.8	2.464	29	152.7	2.554	63	173.6	4.652	19	183.5	14.388	4	-	-	-	254.0	0	1	-	-	-
	1975	-	-	-	73.7	1.866	108	121.2	1.400	297	155.0	2.532	56	167.0	1.886	101	183.8	3.708	37	201.1	12.858	8	-	-	-	-	-	-
May	1973	-	-	-	64.9	1.932	62	119.2	2.514	40	159.1	3.596	39	175.8	4.526	17	189.7	8.104	9	183.9	11.586	4	-	-	-	-	-	-
	1974	-	-	-	79.6	1.724	84	127.5	9.460	14	154.6	4.284	14	173.4	7.98	9	184	26.0	2	-	-	-	225.0	-	1	-	-	-
	1975	-	-	-	70.2	1.402	145	119.9	2.33	98	153.1	3.146	22	170.8	2.402	63	186.5	2.72	33	197.8	12.366	4	-	-	-	-	-	-
Jun	1973	-	-	-	73.6	1.220	214	120.0	2.064	178	162.0	3.384	30	175.3	4.990	15	188.5	5.286	6	197.6	12.128	3	-	-	-	-	-	-
	1974	-	-	-	83.9	0.906	356	130.6	1.724	42	152.0	2.594	48	171.9	4.192	22	189.1	8.134	9	189.5	7.00	2	-	-	-	-	-	-
	1975	-	-	-	79.8	1.710	143	128.1	2.422	91	159.0	3.340	30	173.3	2.998	60	183.4	4.268	41	192.3	7.986	11	219.3	31.418	3	-	-	-
Jul	1973	39.9	1.64	111	91.2	1.396	129	130.0	3.428	67	160.5	3.256	16	178.1	10.010	8	194.5	1.000	2	190.0	8.000	2	-	-	-	-	-	-
	1974	33.0	2.056	25	94.2	1.276	221	136.0	3.834	16	157.0	4.964	33	174.3	13.776	3	186.3	5.766	6	203.0	0	1	215.0	0	1	-	-	-
	1975	34.1	1.762	55	94.4	2.006	87	133.1	2.188	46	164.0	2.892	13	174.4	3.272	8	190.4	3.174	7	191.8	14.810	5	-	-	-	271.0	0	1
Aug	1973	51.9	1.304	249	103.0	2.706	28	128.2	4.940	24	158.0	14.094	4	181.3	11.616	4	203.0	0	1	-	-	-	-	-	-	-	-	-
	1974	54.3	2.4	84	111.3	1.618	114	166.0	16.0	2	176.3	9.804	8	196.8	8.656	4	-	-	-	-	-	-	-	-	-	-	-	-
	1975	53.3	1.66	249	105.6	2.834	44	144.3	7.572	10	167.5	7.190	17	182.0	6.426	13	197.8	13.962	4	189.5	13.000	2	-	-	-	-	-	-
Sep	1973	63.4	0.978	314	113.0	2.732	33	139.7	3.598	30	164.4	5.068	9	193.5	23.0	2	-	-	-	-	-	-	-	-	-	-	-	-
	1974	66.0	1.25	232	118.4	1.354	139	145.5	4.538	11	165.8	6.012	13	179.8	8.808	4	19.03	7.860	3	-	-	-	-	-	-	-	-	-
	1975	69.9	1.244	285	123.0	2.20	67	150.4	3.104	49	169.0	2.864	27	182.4	5.244	16	196.3	9.358	4	-	-	-	-	-	-	-	-	-
Oct	1973	70.6	1.464	213	118.5	3.344	27	145.3	4.802	20	168.2	4.598	10	177.0	0	1	-	-	-	-	-	-	-	-	-	-	-	-
	1974	69.5	0.84	310	120.5	1.134	252	147.6	3.236	17	165.4	3.648	27	181.7	5.828	10	203.0	2.066	6	215.0	0	1	-	-	-	-	-	-
	1975	74.4	1.79	147	123.1	3.554	33	147.0	4.516	35	174.5	9.196	12	186.8	8.524	12	193.7	5.863	6	222.0	0	1	-	-	-	-	-	-
Nov	1973	77.5	1.24	129	124.8	3.264	24	149.0	2.876	37	166.7	5.086	10	192.2	13.220	6	197.0	0	1	-	-	-	-	-	-	-	-	-
	1974	71.2	1.182	177	119.8	1.946	119	160.0	5.804	10	165.2	15.596	4	178.5	5.0	2	212.0	0	1	-	-	-	-	-	-	-	-	-
	1975	76.1	2.026	95	129.4	5.616	14	150.6	3.040	32	167.3	8.602	9	177.3	10.372	7	200.3	8.110	3	-	-	-	-	-	-	-	-	-
Dec	1973	71.4	426.000	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	1974	70.2	1.322	149	122.4	1.870	149	160.9	9.566	7	173.0	6.782	11	200.0	12.166	3	-	-	-	209.0	0	1	-	-	-	-	-	-
	1975	80.3	1.73	122	125.4	2.004	55	150.6	4.098	32	171.0	5.034	3	194.0	0	1	-	-	-	223.0	0	1	-	-	-	-	-	-

* Two times the standard error of the mean

† Sample size
- No sample

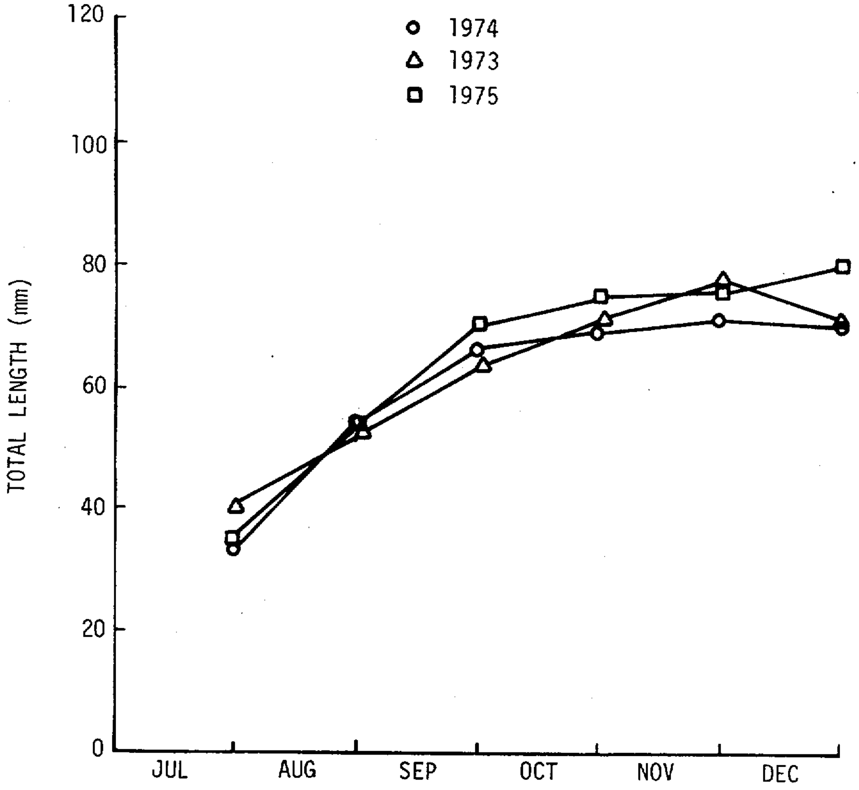


Figure V-3. Comparison of Monthly Mean Total Lengths of Young-of-the-Year White Perch Collected in Standard-Station Beach Seines and Bottom Trawls, July-December 1973-75

Table V-7

Instantaneous Growth Rates of Young-of-the-Year White Perch Collected in Standard-Station Beach Seines and Bottom Trawls, July-November 1973-75

Month	Year	Initial Mean Weight (W_i) (g)	Final Mean Weight (W_f) (g)	Time (days)	Instantaneous Growth Rate
Jul	1973	0.9	2.1		0.0276
	1974	0.5	2.5	30	0.0554
	1975	0.5	2.2		0.0468
Aug	1973	2.1	3.6		0.0178
	1974	2.5	4.0	30	0.0162
	1975	2.2	4.5		0.0233
Sep	1973	3.6	5.1		0.0116
	1974	4.0	4.4	30	0.0033
	1975	4.5	5.1		0.0044
Oct	1973	5.1	6.3		0.0074
	1974	4.4	4.8	30	0.0025
	1975	5.1	5.3		0.0016
Nov	1973	6.3	5.3		-0.0062
	1974	4.8	4.7	30	-0.0004
	1975	5.3	6.5		0.0068

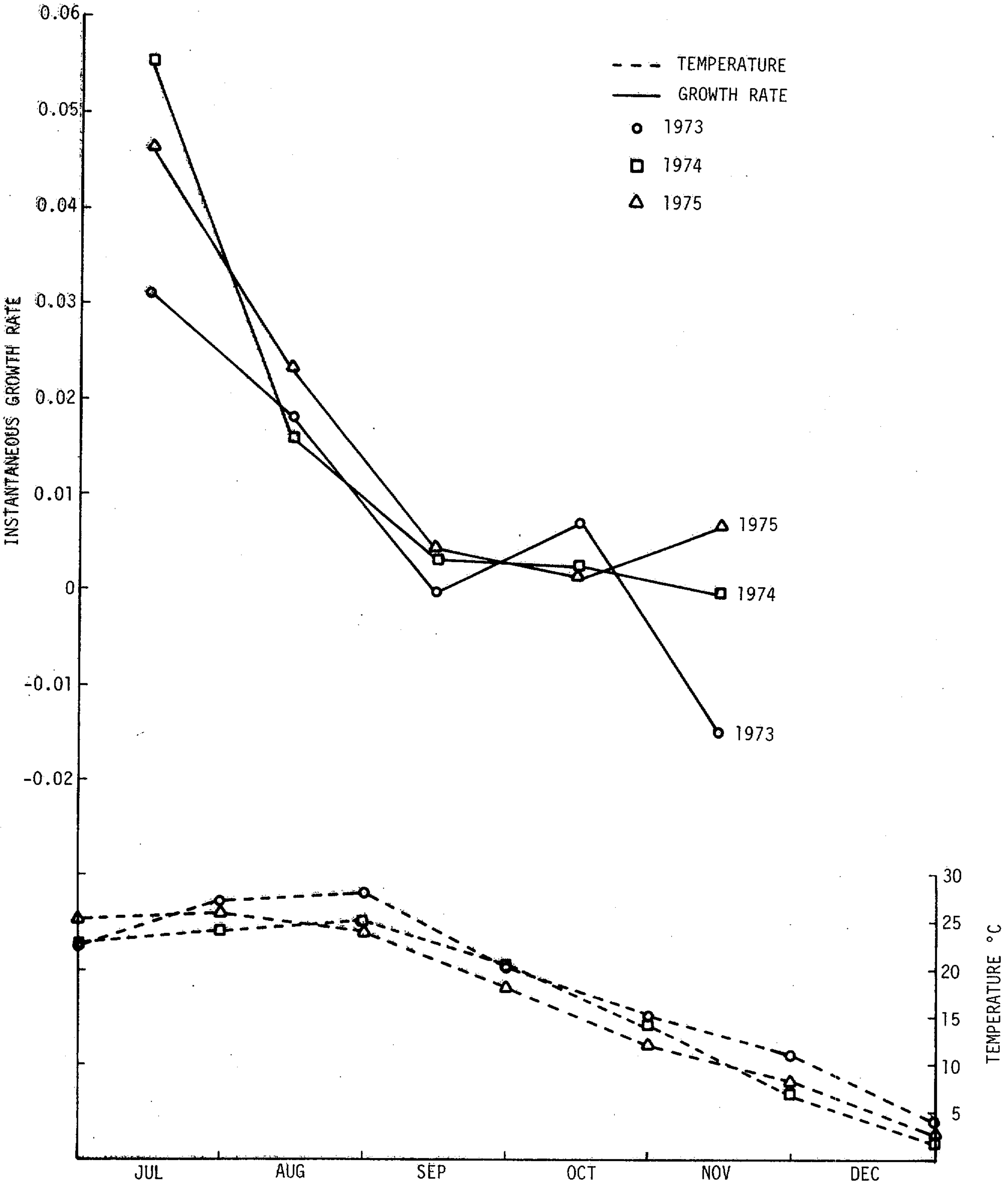


Figure V-4. Instantaneous Growth Rates and Temperature during the Growth Perio for Young-of-the-Year White Perch Collected in Standard-Station Beach Seines and Bottom Trawls, July-December 1973-75 perch showed signs of somatic growth. Conversely, age III and older white perch, whose gonads were ripening at this time, showed little or no somatic growth. The differences may have been due to the fact that at the time when young-of-the-year, yearling, and age II fish were expending energy toward somatic growth, this energy was being utilized by age III and older perch for gonad development. Once spawning was completed (by mid-June), energy was apparently expended towards growth in length, accounting for the 1- to 2-month lag.

Incidental data gathered from scale readings for white perch aging also indicated that fish > 150 mm (primarily age III and older) did not form scale annuli until July and August, whereas fish < 150 mm (age II and younger) formed annuli during May and early June.

b. Age and Length Composition

Most of the white perch caught in standard-station beach seines and bottom trawls were < 200 mm in total length (ages 0-IV) (Appendix Figures C-7 through C-12). This catch distribution remained characteristic of bottom-trawl samples throughout the interval between April and December and was typical of beach-seine catches from April through July; thereafter, beach seines mostly caught white perch < 150 mm in total length. This is because the young-of-the-year that were recruited during July generally exceeded 53% and often 90% of the catches from July-December. Beach-seine sample sizes during the November-December sampling period declined, whereas those for bottom trawls increased, apparently because of white perch movement from the shoals and shorelines into deeper water for overwintering.

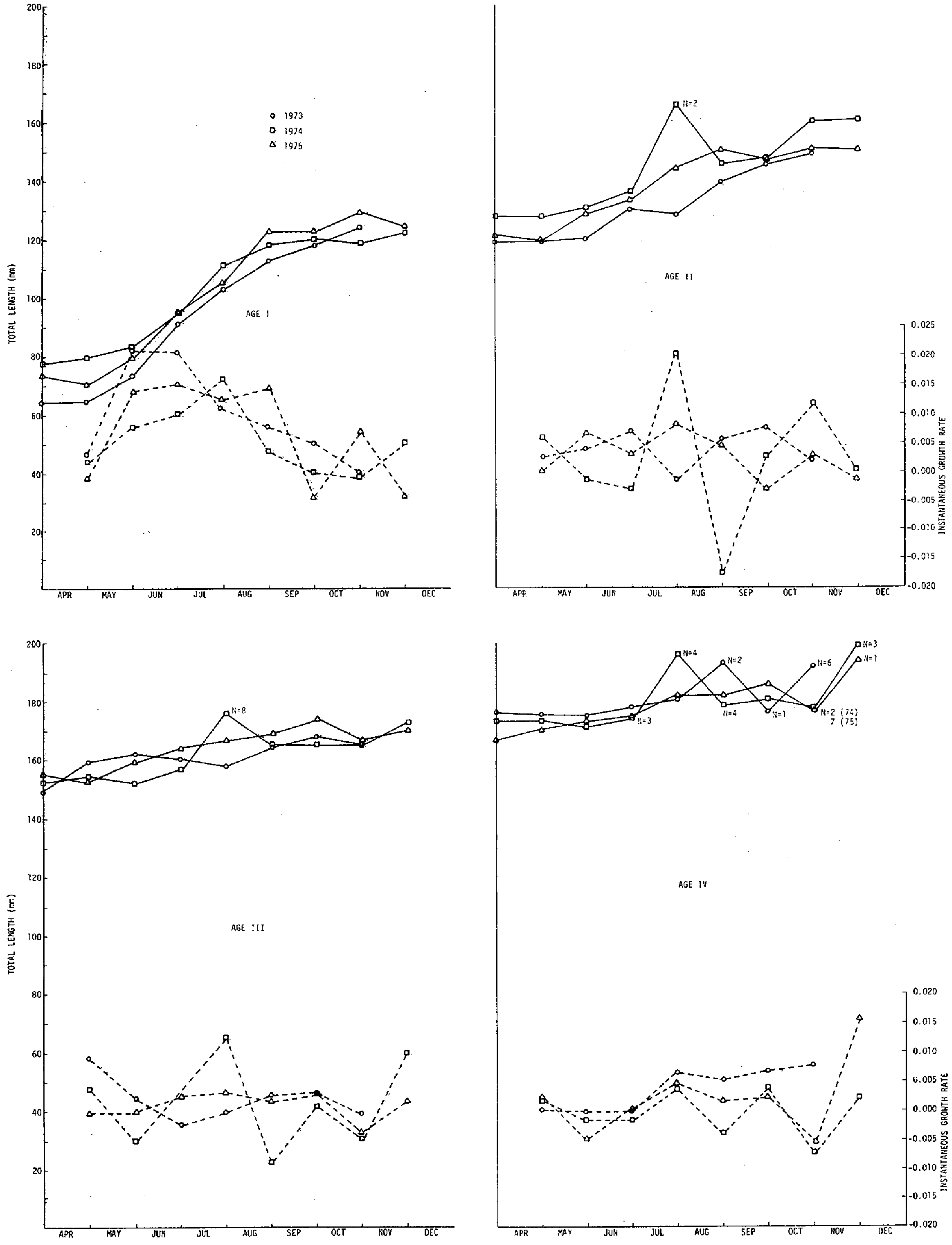


Figure V-5. Mean Total Length and Instantaneous Growth Rate for White Perch Ages I-IV, April-December 1973-75 based on Standard-Station Beach Seine and Bottom-Trawl Samples Combined

Year-class strength was indicated by these data. When the percent of young-of-the-year in 1973 was compared to yearlings in 1974 and age II fish in 1975 (thereby following the 1973 cohort), a strong 1973 class was indicated. Conversely, the percent of young-of-the-year in 1974 and yearlings in 1975 indicated a comparatively poor 1974 year class. These results are consistent with previous findings (TI, 1975c).

c. Food Analysis

1) 1972

During the first year of life, white perch fed primarily on harpacticoid, calanoid, and cyclopoid copepods, *Gammarus*, and chironomid larvae (Appendix Table C-3). They initially preyed on copepods, gradually changing to larger amphipods, isopods, and chironomid larvae as their total lengths increased to approximately 100 mm. Chironomid larvae were the most important dipteran remains in white perch stomachs and often were among the top five food items in the various size classes.

The seasonal importance of *Gammarus* fluctuated in response to its density in the river and the seasonal addition of new food items into the ecosystem (TI, 1973). Other amphipod genera occurred occasionally, their numbers and subsequent importance generally increasing as salinities increased.

Fish eggs were abundant in the stomachs of white perch in the spring. Occasionally, older white perch (> 100 mm) contained fish with some individuals containing young-of-the-year white perch and striped bass. However, the greatest predation of white perch on striped bass appeared to be the ingestion of eggs during the spawning season.

2) 1973

A comparison of 1973 food-habit data by size class with similar data from 1973 reflected similar trends in white perch feeding habits (Appendix Tables C-3 and C-4). Again, the main food items encountered were copepods (primarily calanoida), *Gammarus*, and chironomid larvae. Unlike 1972, there was no confirmation of white perch predation on striped bass eggs. The eggs that were consumed were identified as those of the family Clupeidae.

Samples taken in the Indian Point region in 1973 reflected the intrusion of the salt front into the area in July. From July to September, halophilic organisms such as harpacticoid copepods were abundant in the stomach contents of young-of-the-year white perch.

3) 1974

As in 1972 and 1973, copepods (primarily Calanoida), *Gammarus*, and chironomid larvae were the main food items encountered. Spring bottom-trawl samples indicated that *Gammarus*, polychaetes, and calanoid copepods were of major importance to yearling white perch; beach-seine samples revealed cladocera, dipterans, and calanoid copepods were the major food items. Among larger white perch, polychaetes, *Gammarus*, and chironomid larvae were the major food items. Summer samples yielded *Gammarus*, *Corophium*, *Leptocheirus*, chironomid larvae, and *Monoculodes* as the major dietary items.

As in 1973, Indian Point area samples reflected the July intrusion of the salt front. Among young-of-the-year white perch in September-November, harpacticoid copepods were of major importance, as well as calanoid copepods, amphipods, and chironomids. There was little evidence that white perch were piscivorous.

d. Condition

Spring and summer 1973-75 and fall 1972-75 length/weight relationships for white perch are summarized in Tables V-8, V-9, and V-10. Statistical analysis by season was not attempted due to problems attributable to data collection from preserved and fresh fish (see subsection B).

e. Fecundity

Mean fecundity estimates by age appear in Table V-11. Regression analysis of the log of length vs the log of fecundity for fish ages II through V collected during 1972-74 revealed dissimilar lines ($\alpha = 0.05$). Analysis of variance of mean fecundity by year for these same ages revealed equal means for age II fish and unequal means for ages III through V ($\alpha = 0.05$). These differences are currently interpreted as a problem of methodology rather than a biological phenomenon. During the spawning season, white perch egg diameters exhibited a wide range: eggs from < 0.1 to 0.8 mm in diameter frequently occurred within a single ovary. Consequently, it was necessary to determine which eggs should be included in egg counts. Based on 1972 data, 0.2 mm was established as the lower size limit for viable eggs. This lower limit was only used for 1973-74 data.

Table V-8

Total Length/Weight Relationship[1] of White Perch for Spring 1973-75*

Sex	Year	Sample Size	y Intercept a	Slope b	Correlation Coefficient r	r^2
Male	1972	No Sample				
	1973†	36	-5.014	3.084	0.9873	0.9747
	1974	No Sample				
	1975‡	54	-4.948	3.055	0.9831	0.9665
Female	1972	No Sample				
	1973†	43	-5.125	3.137	0.9894	0.9789
	1974	No Sample				
	1975‡	63	-5.501	3.311	0.9901	0.9803

*March 30-June 15

†Preserved samples

‡Fresh samples

[1] log weight = a + b (log length)

Table V-9

Total Length/Weight Relationship[1] of White Perch for Summer 1973-75*

Sex	Year	Sample Size	y Intercept a	Slope b	Correlation Coefficient r	r^2
Male	1972	No Sample				
	1973†	36	-5.274	3.212	0.9899	0.9800
	1974	No Sample				
	1975‡	35	-4.805	2.973	0.9925	0.9851
Female	1972	No Sample				
	1973†	42	-4.617	2.412	0.9904	0.9808
	1974	No Sample				
	1975‡	58	-4.846	3.000	0.9898	0.9798

*Jun 18-September 14

†Preserved samples

‡Fresh samples

[1] log weight = a + b (log length)

Table V-10

Total Length/Weight Relationship[1] of White Perch for Fall 1972-75*

Sex	Year	Sample Size	y Intercept a	Slope b	Correlation Coefficient r	r^2
Male	1972†	38	-3.912	2.575	0.9492	0.9009
	1973†	28	-4.090	2.660	0.9714	0.9436
	1974‡	8	-5.194	3.149	0.9879	0.9759
	1975‡	23	-6.247	3.636	0.9544	0.9108
Female	1972†	44	-4.563	2.888	0.9397	0.8831
	1973†	38	-5.301	3.221	0.9834	0.9671
	1974‡	9	-5.889	3.470	0.9956	0.9912
	1975‡	26	-5.105	3.125	0.9669	0.9348

*September 17-December 29

†Preserved sample

‡Fresh sample

[1] log weight = a + b (log length)

f. Age at Maturity

All female white perch < age II were immature, with maturity apparently beginning to develop between ages II and IV and being complete by age V (Table V-11). All female white perch age V and older were mature. Data from the 1972-74 samples indicated similar maturation ages.

Male white perch maturity first occurred at age II and was complete for all male white perch age IV and older (Table V-12).

3. Atlantic Tomcod

a. Growth, Age, and Length Composition

During 1974 and 1975, a summer slowdown in growth resulted in marks on Atlantic tomcod scales and otoliths that could be interpreted as annuli. A weaker mark occasionally formed on scales during the winter spawning season, but no winter mark was noted on otoliths.

Growth-rate profiles for 1974 and 1975 young-of-the-year tomcod are similar (Figure V-6): both curves exhibit a growth slowdown during mid-summer (previously recorded TI, 1974a for the 1974 year class).

Table V-11

Mean Fecundity and Age at Maturity for Female White Perch, 1972-74 *

Age	Year	Maturity				Fecundity		
		No. Examined	No. Mature	No. Immature	% Mature	Mean Fecundity	Standard Error	Sample Size
II	1972	19	0	19	0	--	--	--
	1973	17	4	13	24	20,445	8813	15
	1974	26	5	21	19	13,878	3392	6
	Comb.	62	9	53	15	18,568	6461	21
III	1972	8	6	2	75	38,834	6208	5
	1973	28	27	1	96	24,758	1728	68
	1974	18	17	1	95	17,366	3471	16
	Comb.	54	50	4	93	24,220	1562	89
IV	1972	18	18	0	100	58,188	4710	16
	1973	28	27	1	96	38,925	3436	30
	1974	18	17	1	95	22,410	3372	18
	Comb.	64	62	2	97	39,096	2211	64
V	1972	8	8	0	100	66,967	8797	12
	1973	15	15	0	100	49,445	4379	23
	1974	6	6	0	100	24,624	9420	5
	Comb.	29	29	0	100	51,599	3828	40
VI	1972	3	3	0	100	53,912	9070	7
	1973	1	1	0	100	62,418	-	1
	1974	-	-	-	-	-	-	-
	Comb.	4	4	0	100	54,475	7929	8

* 1972 Age at maturity samples obtained from RM 40-46. All fecundity samples are from May and June.

Table V-12

Percentages of Sexually Mature Male White Perch Ages II-VI Collected in Indian Point Region, 1972-74

Age	Year	No Examined	No. Mature	No. Immature	% Mature
II	1972	16	4	12	25
	1973	6	3	3	50
	1974	13	10	3	77
	Total	35	17	18	49
III	1972	2	2	0	100
	1973	3	2	1	67
	1974	13	12	1	92
	Total	18	16	2	89
IV	1972	8	8	0	100
	1973	5	5	0	100
	1974	5	5	0	100
	Total	18	18	0	100
V	1972	6	6	0	100
	1973	4	4	0	100
	1974	1	1	0	100
	Total	11	11	0	100
VI	1972	2	2	0	100
	1973	2	2	0	100
	1974	2	2	0	100
	Total	6	6	0	100

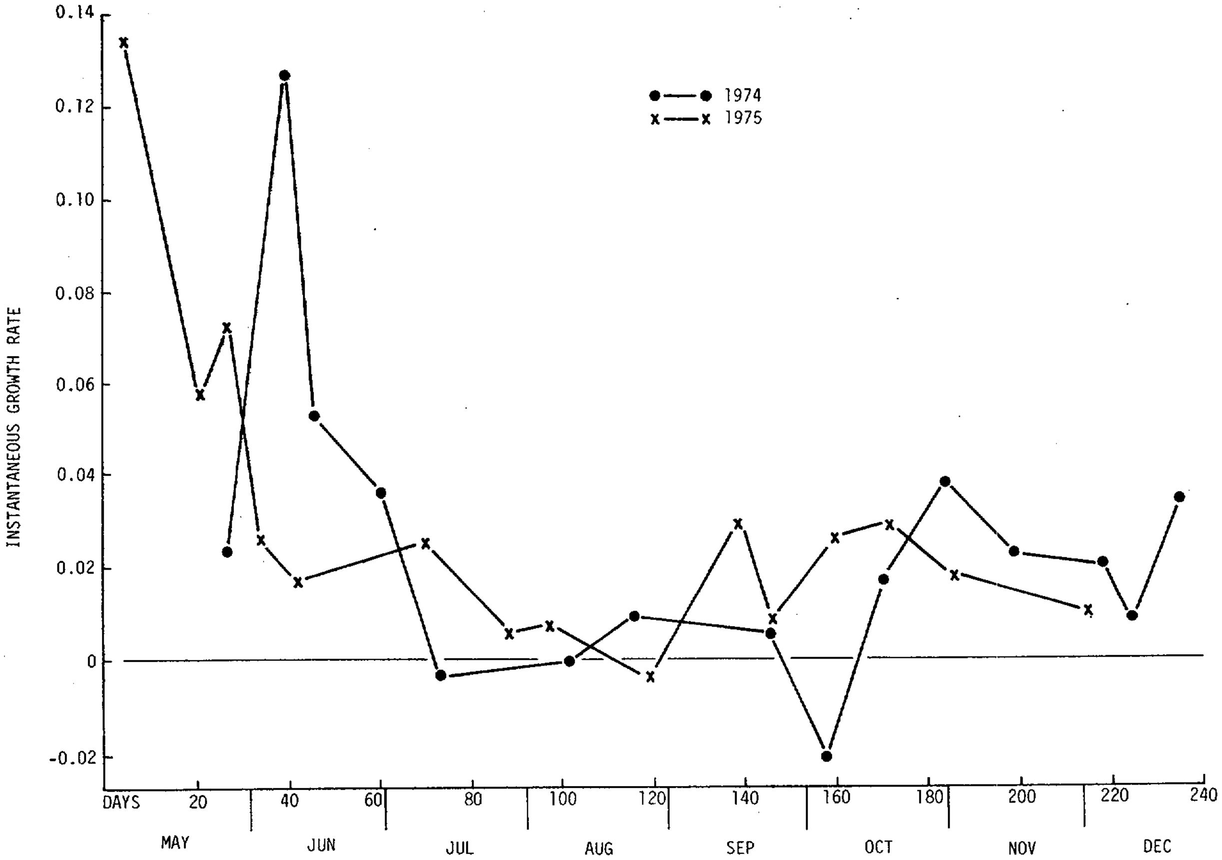


Figure V-6. Instantaneous Growth Rates for Young-of-the-Year Atlantic Tomcod in Hudson River, 1974 and 1975

Growth patterns of young-of-the-year tomcod were similar during 1974 and 1975 (Figure V-7) except that the 1975 year class continued to grow slightly during the mid-summer, resulting in a greater mean length in December 1975 than was observed during December 1974 (Table V-13). Length-frequency data indicated that the 1973 year class grew larger than either the 1974 or 1975 year classes.

Table V-13

Percent Length-Frequency Composition, Sample Size, and Mean Length of Atlantic Tomcod Caught in Traps during Spawning Season of 1973-74, 1947-75, and December 1975 of 1975-76 Spawning Seasons

Length Class (mm)	December			January		February	
	1973	1974	1975	1974	1975	1974	1975
91-100							0.3
101-110		0.7		0.2	1.1	0.7	1.0
111-120		4.1	0.3	1.4	6.9	1.0	6.9
121-130	1.2	14.1	3.0	4.2	17.3	4.7	24.5
131-140	2.8	21.3	12.3	8.7	20.6	10.8	23.6
141-150	5.2	20.2	21.8	14.6	18.3	15.2	19.2
151-160	9.2	17.1	23.8	13.6	14.3	18.9	13.0
161-170	12.9	11.2	18.4	13.1	10.9	10.8	7.0
171-180	10.0	5.6	10.5	10.8	6.1	13.5	3.4
181-190	16.1	2.8	4.5	9.3	2.9	8.5	0.9
191-200	11.2	1.4	1.9	6.1	1.1	7.8	0.1
201-210	10.8	0.6	1.2	6.7	0.4	2.7	
211-220	5.6	0.5	0.8	5.5	0.1	2.7	
221-230	7.6	0.1	0.4	2.4		1.7	
231-240	2.4	0.1	0.3	2.3		0.7	
241-250	2.0	0.1	0.2	0.8		0.3	
251-260	2.0		0.2	0.3			
261-270	0.0		0.1	0.1			
271-280	0.4			0.1			
281-290	0.4						
Sample size	249	6746	13711	7246	9635	467	770
Mean total length (mm)	189.2	147.7	158.4	171.6	145.1	162.9	139.9

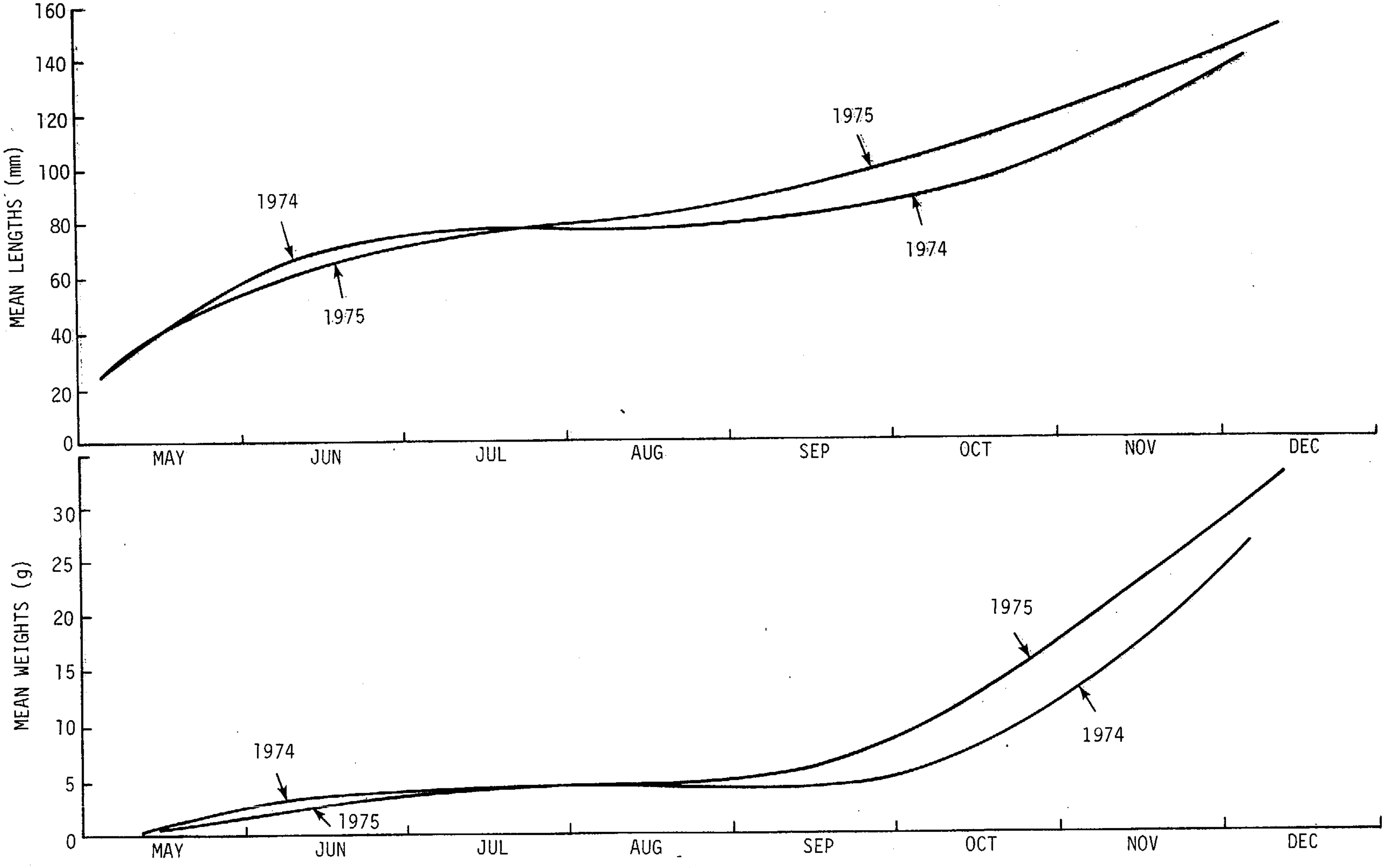


Figure V-7. Mean Lengths and Mean Weights of Young-of-the-Year Atlantic Tomcod during 1974 and 1975

b. Food Analysis

Invertebrates comprised the majority of food items utilized by the 46 mature (December) and 486 juvenile (May-October) Atlantic tomcod examined. The results of this study indicate that fish constitute a very minor portion of the Atlantic tomcod diet. The evidence does suggest that adults may be more piscivorous than juveniles.

Atlantic tomcod consumed 28 types of food items (excluding plants, unidentifiable animal remains, and detritus). Among the mature, or adults, the percent frequency was greatest for *Gammarus*, *Neomysis*, *Monoculodes*, *Crangon septemspinosus*, and *Chirodotea* respectively (Table V-14); fish, specifically Percichthyidae, were relatively unimportant although in 1973 the stomach of one adult contained three juvenile striped bass. Additionally, two unidentified *Morone*, one unidentified fish, and fish eggs were encountered in adult Atlantic tomcod stomachs. The 1974 Atlantic tomcod stomach data indicated that *Morone* eggs and larvae constituted only a minor portion of the diet of young-of-the-year.

In the area from RM 0-30 (KM 0-48), juvenile Atlantic tomcod consumed copepods, *Gammarus*, polychaetes, and *Monoculodes* in greatest frequencies (Table V-15). Only one white perch (*Morone americanus*) larva and one unidentified fish larva were found in stomach contents of the 205 young-of-the-year sampled from this region.

Juveniles taken between RM 31-60 (KM 50-96) most frequently consumed calanoid copepods and *Gammarus* (Table V-16); no fish, fish eggs or fish larvae were found in Atlantic tomcod stomachs from this region. Comparison of stomach data from RMs 0-30 with that from upriver indicated

Table V-14

Percent Frequency of Occurrence and Percent Frequency of Principal Food Items Found in Adult Atlantic Tomcod Captured in Trap Nets in Hudson River between RM 21 and 56 during December 1973

Food Item	% Frequency of Occurrence	% Frequency
Polychaeta	2.44	0.13
Cladocera	0.0	0.0
Calanoida	0.0	0.0
Cyclopoida	0.0	0.0
Harpacticoida	0.0	0.0
Chirodotea sp.	7.32	2.01
Cyathura polita	4.88	0.27
Neomysis sp.	36.59	11.52
Gammarus sp.	63.41	76.94
Monoculodes sp.	4.88	4.02
Leptocheirus sp.	0.0	0.0
Crangon septemspinosus	17.07	2.94
Chaoborus sp.	0.0	0.0
Chironomidae (larvae)	9.76	0.54
Chironomidae (pupae)	0.0	0.0
Morone saxatilus	2.44	0.40*
Morone sp.	4.88	0.27
Fish eggs	2.44	0.40
Fish (unidentified)	2.44	0.13
Other	7.32	0.40

* One Atlantic tomcod (TL, 208 mm) contained three striped bass

Table V-15

Percent Frequency of Occurrence and Percent Frequency of Principal Food Items Found in Young-of-the Year Atlantic Tomcod Captured from RM 0-30 of the Hudson River during 1974

	May, n = 133		June, n = 25		July, n = 47	
Food Item	% Frequency of Occurrence	% Frequency	% Frequency of Occurrence	% Frequency	% Frequency of Occurrence	% Frequency
Polychaeta	34.58	2.50	44.0	5.72	6.38	3.33
Cladocera	5.26	0.40	52.0	10.93	4.25	0.83
Calanoida	82.70	86.31	64.0	53.06	6.38	2.91
Cyclopoida	12.03	1.65	28.0	11.73	6.38	2.08
Harpacticoida	10.52	0.99	44.0	8.12	17.02	7.92
Chirodotea sp.	0.0	0.0	0.0	0.0	0.0	0.0
Cyathura polita	1.50	0.09	8.0	0.20	12.76	3.33
Neomysis sp.	15.78	2.45	0.0	0.0	21.27	7.92
Gammarus sp.	49.62	5.08	72.0	6.32	23.4	17.08
Monoculodes sp.	12.03	0.40	20.0	0.70	38.29	12.91
Leptocheirus sp.	0.0	0.0	8.0	0.40	0.0	0.0
Chaoborus sp.	0.0	0.0	4.0	0.10	14.89	20.83
Chironomidae(larvae)	0.0	0.0	32.0	1.80	10.63	2.91
Chironomidae(pupae)	2.25	0.07	8.0	0.20	10.63	2.91
Gastropoda	0.0	0.0	0.0	0.0	0.0	0.0
Other	0.75	0.02	24.0*	0.70**	38.29†	15.0‡

* Includes one white perch larvae.

** Includes percent frequency of 2.12 for *Crangon* sp.

† Includes one unidentified fish.

‡ Includes percent frequency of 4.00 for *Crangon* sp.

Table V-16

Percent Frequency of Occurrence and Percent Frequency of Principal Food Items Found in Young-of-the-Year Atlantic Tomcod Captured from RM 31-60 of the Hudson River during 1974

	May, n = 98		June, n = 50		August, n = 49		September, n = 48		October, n = 24	
Food Item	% Frequency of Occurrence	% Frequency	% Frequency of Occurrence	% Frequency	% Frequency of Occurrence	% Frequency	% Frequency of Occurrence	% Frequency	% Frequency of Occurrence	% Frequency
Polychaeta	14.28	0.47	62.0	8.75	0.0	0.0	2.08	0.76	4.16	0.57
Cladocera	1.02	0.04	2.0	0.11	2.04	2.27	0.0	0.0	0.0	0.0
Calanoida	90.82	83.76	60.0	64.74	14.25	2.96	2.08	0.25	0.0	0.0
Cyclopoida	14.28	2.20	16.0	2.66	2.04	0.27	0.0	0.0	0.0	0.0
Harpacticoida	40.82	2.63	2.0	0.77	20.4	5.39	2.08	0.76	0.0	0.0
Chirodotea sp.	0.0	0.0	4.0	0.22	6.12	0.80	2.08	0.76	0.0	0.0
Cyathura polita sp.	0.0	0.0	6.0	0.33	6.12	0.80	14.58	3.31	4.16	0.29
Neomysis sp.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.33	0.86
Gammarus sp.	79.59	10.16	86.0	21.95	89.79	70.35	81.25	55.10	100.0	89.94
Monoculodes sp.	5.10	0.12	0.0	0.0	24.48	5.66	52.08	35.71	25.0	7.18
Leptocheirus sp.	1.02	0.02	0.0	0.0	0.0	0.0	14.58	2.04	4.16	0.29
Chaoborus sp.	8.16	0.16	0.0	0.0	24.48	12.39	2.08	0.25	8.33	0.57
Chironomidae(larvae)	13.26	0.35	6.0	0.33	2.04	0.27	2.08	0.25	0.0	0.0
Chironomidae(pupae)	0.0	0.0	0.0	0.0	2.04	0.27	0.0	0.0	0.0	0.0
Gastropoda	3.06	0.06	0.0	0.0	0.0	0.0	4.16	0.76	0.0	0.0
Other	0.0	0.0	2.0	0.11	4.08	0.54	0.0	0.0	4.16	0.29*

* Includes percent frequency of 4.16 for *Crangon* sp.

some differences in food habits that could be related to differing salinity concentrations. The lower river region (RM 0-30) is typically a mesohaline zone (Howells, 1972) (200-2000 mg/ℓ chloride) while the upper river region is typically oligohaline (50-200 mg/ℓ chloride). The percent frequency of gammarids, which prefer low salinities (Williams et al, 1975), was highest in the upper region. Harpacticoid copepods, which inhabit wide salinity ranges (Green, 1968), occurred in diets in both regions but constituted a larger percent frequency in the lower river. Calanoid copepods were numerically important food items in both regions during May but rapidly decreased in importance in the lower river by July and in the upper river by August as salinities increased.

Observations made during work-up of adult Atlantic tomcod captured between December 1974-February 1975 and December 1975-February 1976 indicate that males and females preyed heavily on eggs considered to be from Atlantic tomcod. This additional source of mortality from cannibalism should be considered in studies of Atlantic tomcod population dynamics.

c. Fecundity

Linear relationships between the logs of the fecundity and of the total length were determined for both the 1973-74 and 1974-75 spawning seasons (Figure V-8). Levene's test for homogeneity of group variance was used, and the null hypothesis (no differences in variance between groups) was accepted. The equality of regression lines between years was tested with analysis of variance, and the hypothesis of no difference between years was rejected ($\alpha = 0.05$) (Table V-17). These

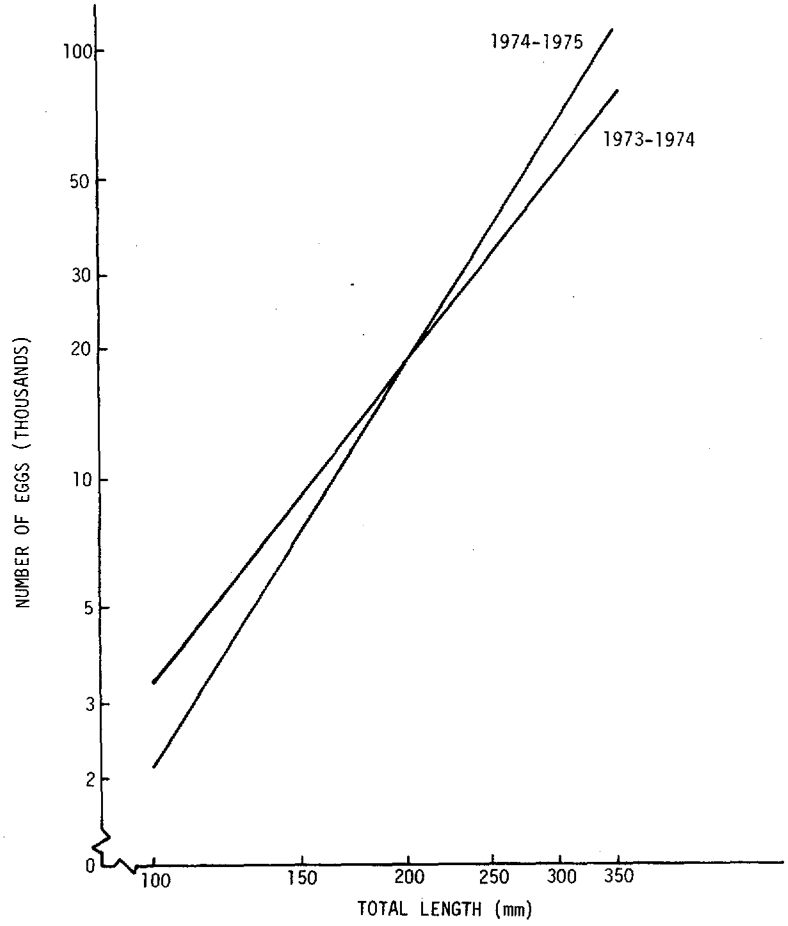


Figure V-8. Regression of Number of Eggs on Total Length for Atlantic Tomcod, Hudson River, 1973-74 and 1974-75 Spawning Seasons

Table V-17

Regression Results and F Values from Log-Transformed Length, Weight, and Egg Count Data from Tomcod Spawning Seasons of 1973-74 and 1974-75

	Spawning Season	Sample Size	y Intercept a	Slope b	Correlation Coefficient r	F Value	Attained Significance Level*
Length vs Fecundity	1973-74	83	-1.55905	2.53912	0.8514	213.42	p <0.001
	1974-75	116	-3.03484	3.18334	0.8640	335.72	p <0.001
	Common line					3.801	p <0.025
Weight vs Fecundity	1973-74	49	2.67731	0.85163	0.8990	198.07	p <0.001
	1974-75	115	2.34133	1.01361	0.9082	531.88	p <0.001
	Common line					2.427	p <0.092

* Probability of rejecting null hypothesis given that null hypothesis is true, with given set of data

length/fecundity relationships may be unequal to a common line because of differences in distribution of lengths used for the fecundity samples.

Similar treatments were applied to the logs of the 1973-74 fecundity and total-weight data. While the analysis-of-variance test for no difference between years was not rejected (α = 0.05 level), it was considered biased since a portion of the total weight was derived from the eggs, which resulted in the number of eggs being regressed on their own weight.

Average fecundities for December 1973 and December 1974 were estimated to be 20,260 eggs and 11,640 eggs respectively. Mean lengths for females during these time periods were estimated to be 199.0 mm and 157.1 mm respectively.

d. Age at Maturity

Maturity, monitored as gonad weight/body weight for young-of-the-year, followed the same trend for the 1974 and 1975 year classes (Figure V-9). Data from both years indicate that tomcod mature sexually at the age of 11-12 months, assuming 1 January to be the approximate date of spawning. Maturation commenced approximately 1 week earlier for the 1975 females and 2 weeks earlier for the 1975 males than for the 1974 year class. Gonad maturation rates were similar for both years: testes weight was maximum during the middle of November for both years, with values of about 16.0% of total body weight, declining 3-4% by the first week of December. This early peak in testes maturation and subsequent decrease in weight may be an artifact due to substantial loss of fluid and gametes during handling of ripe males. Neither loss of

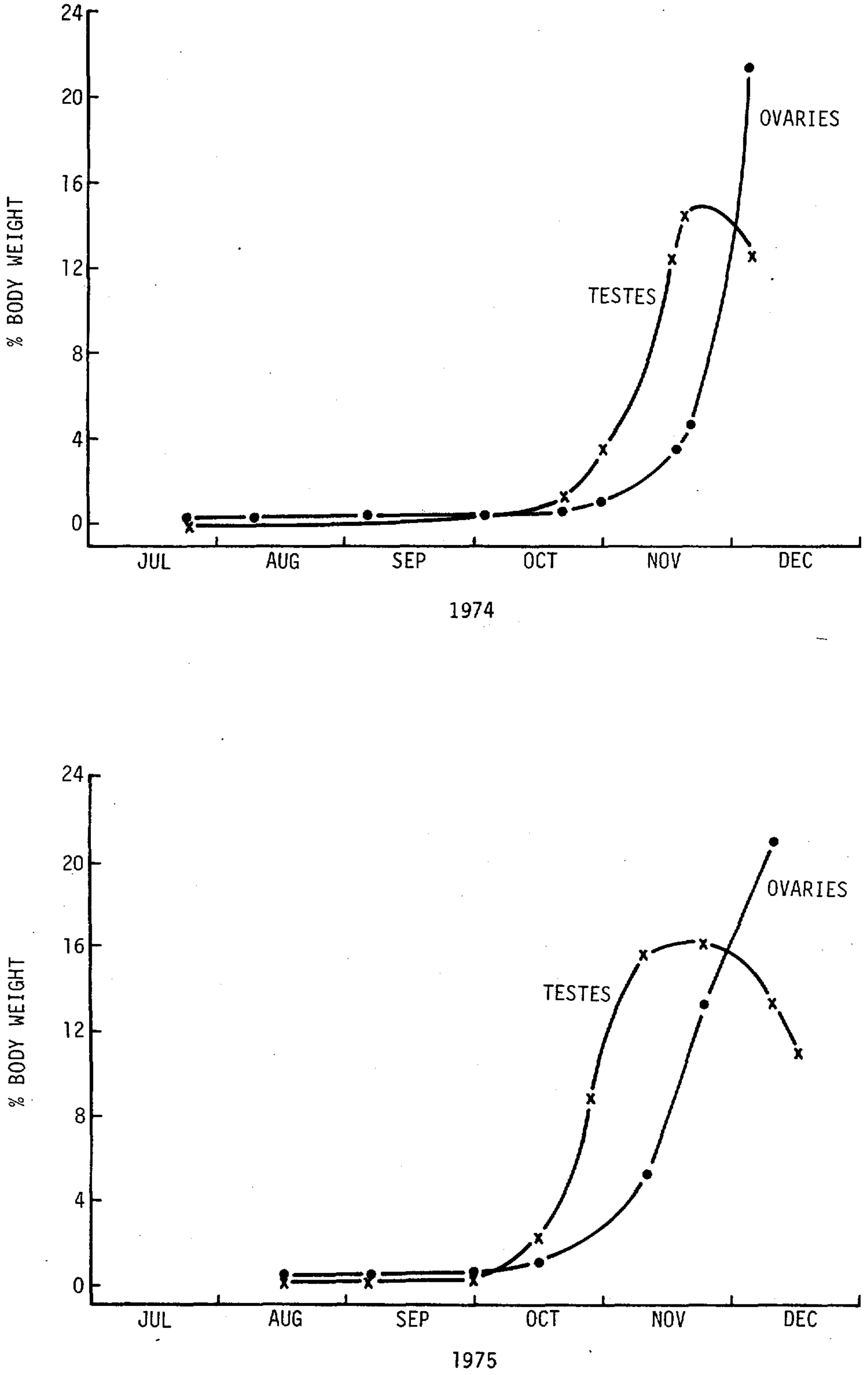


Figure V-9. Mean Gonad Weight Expressed as Percentage of Total Body Weight for Young-of-the-Year Atlantic Tomcod, Hudson River, 1974 and 1975 fluid or ova from females nor the presence of ova in sample containers was observed. All Atlantic tomcod caught from November through the remainder of the spawning season were mature.

e. Sex Ratio

Sex ratios of 1974 and 1975 young-of-the-year Atlantic tomcod were similar, averaging 40-42% females in June, increasing to 47-48% females in September (Table V-18). Sex ratios determined from trap data during the 1974-75 spawning season indicated that the percentage of females in early December was about 2-3%, increasing to about 60% in mid-January. By the end of January, this had decreased to 2-3%, a level at which it continued through February (Figure V-10). The change in sex ratio during the spawning season is presently considered to be a sex-behavior difference during this time of the year.

Table V-18

Percentage of Young-of-the-Year Male and Female Atlantic Tomcod in Hudson River by Month, 1974 and 1975

		June		July		August		September	
	Sex	%	n	%	n	%	n	%	n
1974	Male	59.7	368	54.6	654	54.0	462	52.9	220
	Female	40.3	248	45.4	544	46.0	393	47.1	196
	Total		616		1198		855		416
1975	Male	57.3	86	55.3	173	54.3	76	51.3	116
	Female	42.7	64	44.7	140	45.7	64	48.7	110
	Total		150		313		140		226

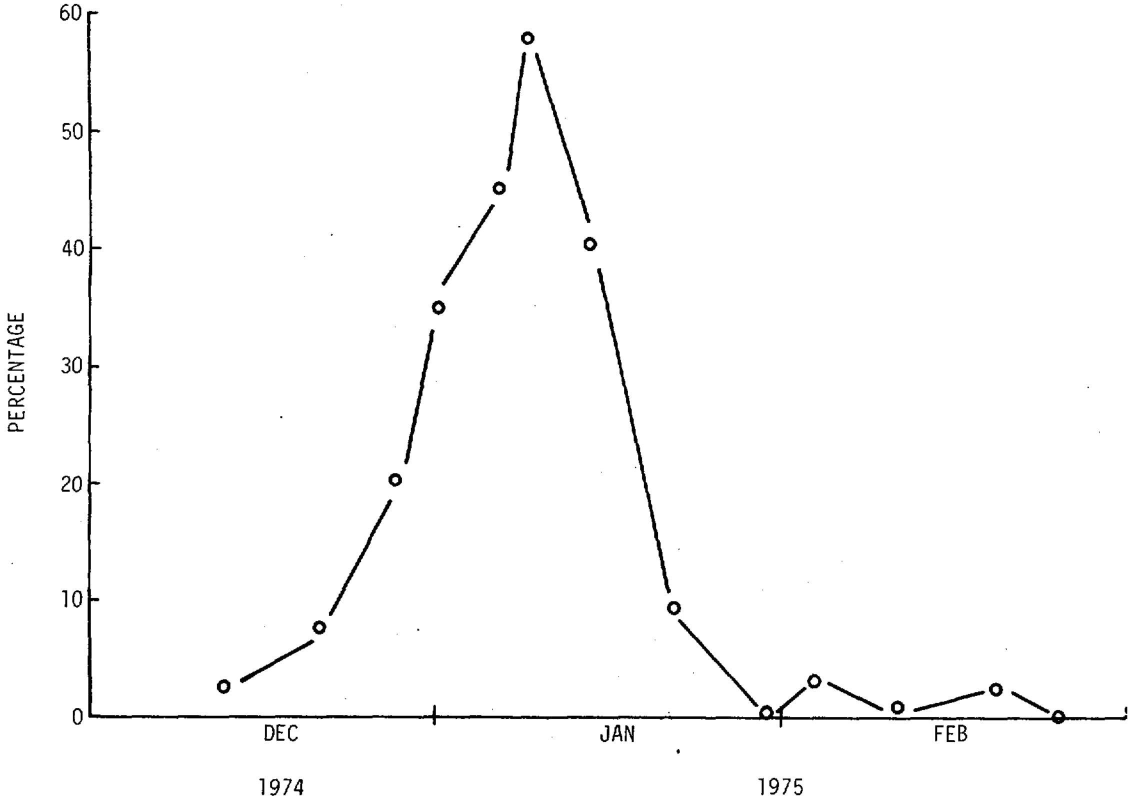


Figure V-10. Percentage of Female Atlantic Tomcod in Winter Trap Catches, RM 51, Hudson River

D. CONCLUSIONS

Young-of-the-year striped bass and white perch achieved greatest growth during July. During September-October, the growing season for both species terminated. Growth appeared to be temperature-oriented, with inception and abatement occurring at 13-15°C. White perch attained greatest lengths at the end of years in which July-November temperatures were highest. Initiation of the growing season for yearling and age II white perch began in May; age III and older white perch began growing during July-August. These differences in initiation of the growing season were attributed to varying states of maturity by age class and to development of gonads.

Standard-station beach seines and bottom trawls typically collect striped bass < 150 mm in total length (< age II) and white perch < 200 mm in total length (ages 0-IV). Yearlings dominated spring catches of striped bass, whereas white perch catches were comprised of fish ages I through IV. Young-of-the-year of both species first appeared in July catches and were the dominant age group thereafter. Typically, trawl catches of white perch increased during November-December, indicating movement into deeper water for overwintering. Age-composition data showed a strong 1973 year class and a weak 1974 year class of white perch.

During their first year of life, both striped bass and white perch fed primarily on harpacticoid, calanoid, and cyclopoid copepods; *Gammarus;* and chironomid larvae. Initially, both species preyed on copepods but gradually changed to larger amphipods, isopods, and chironomid larvae as their total lengths increased (to 75 mm for striped bass and to 100 mm for white perch). Striped bass > 150 mm in total length became piscivorous, whereas white perch of these lengths still fed largely on copepods, *Gammarus*, and chironomid larvae. Striped bass age II and older were highly piscivorous, preying mainly on members of the family Clupeidae and occasionally on white perch and juvenile striped bass. During the 1972 spawning season, white perch stomachs revealed ingestion of striped bass eggs. Occasionally, young-of-the-year striped bass and white perch were found in white perch stomachs. The feeding habits of both species reflected seasonal changes and intrusion of the salt wedge.

Regression analysis of 1973 and 1974 striped bass fecundity data revealed similar lines (α = 0.05). Analysis of variance of mean fecundities of striped bass ages VIII, IX, and X by year were equal (α = 0.05). Mean fecundity was found to increase with age. Regression analysis and analysis of mean fecundity for white perch ages II-IV from 1972-74 samples revealed significantly different results (α = 0.05), the exception being the mean fecundity for age II fish; these differences were interpreted to be methodological rather than biological. Mean fecundity of white perch increased with age.

Maturity of female striped bass first occurred at age V and was 100% at age VII and older. All of the male striped bass examined were mature at age III and older. Female white perch began to mature at age II and all were mature by age V. Males also began to mature at age II and all were mature at age IV, one year earlier than females.

Atlantic tomcod spawning occurred during midwinter. Growth occurred in spring and fall and little or no growth in summer. This summer slowdown resulted in marks on both otoliths and scales that were useful for aging. Lesser marks form on some scales during winter, but there was no evidence of marks on otoliths for this time of year. The hypothesis of a common line for the log of fecundity vs the log of total length for the 1973-74 and 1974-75 relationships was rejected (α = 0.05). Differences in regression lines may have resulted from differences in length distributions of fecundity samples. Gonad maturation of young-of-the-year Atlantic tomcod began in October, with testes weight peaking and prematurely declining in November which was thought to be an artifact caused by loss of testicular matter as a result of handling. Spawning population length-frequency data, gonad maturity schedules, and scale and otolith morphologies revealed that Hudson River Atlantic tomcod spawning populations are composed almost entirely of 11- to 13-month-old fish.

SECTION VI

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APPENDIX A

CPUE FOR COMMON SPECIES COLLECTED IN INDIAN POINT STANDARD-STATION BEACH SEINES, BOTTOM TRAWLS, AND SURFACE TRAWLS, 1972-1975

Table A-1

CPUE for Striped Bass Collected in Standard-Station Beach Seines by Site Indian Point Region, Hudson River Estuary, New York, 1972-1975

			Biweekly Period																			
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Station 8	1972		0 (0)*	0 (0)	0 (4)	0.50 (4)	0.40 (5)	0 (2)	0.33 (3)	0 (2)	1.25 (4)	0 (2)	1.25 (4)	0.50 (2)	3.50 (4)	2.50 (2)	1.67 (3)	1.00 (2)	0.50 (2)	0 (3)	0 (2)	0 (0)
	1973		0 (2)	0 (4)	0 (2)	0 (2)	0 (3)	0.50 (2)	1.67 (3)	0 (2)	1.33 (3)	21.00 (2)	0.50 (2)	1.33 (3)	15.00 (2)	1.33 (3)	3.00 (2)	5.00 (2)	7.50 (2)	32.33 (3)	17.00 (1)	0 (0)
	1974	Adults	1.00 (3)	0 (2)	0 (1)	0 (1)	0 (1)	1.00 (2)	1.00 (2)	6.50 (2)	0.50 (2)	0.50 (2)	1.00 (1)	4.00 (1)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)
		YOY									0.50	1.50	8.00	8.00	14.00	10.50	2.00	1.00	1.50	0	0	0
	1975	Adults**	0 (1)	0 (1)	0 (1)	0 (2)	0 (2)	0 (2)	0 (1)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (1)	0 (1)
		YOY	0	0	0	0	0	0	0	0	1.50	0.50	2.50	5.00	3.50	4.00	1.00	2.00	0.50	0	0	0
Station 9	1972		0 (0)	0 (0)	0 (4)	0 (4)	0.40 (5)	0.50 (2)	0.75 (4)	0 (2)	1.00 (4)	3.50 (2)	2.20 (5)	4.00 (2)	6.00 (4)	4.00 (2)	2.67 (3)	5.00 (2)	3.50 (2)	1.00 (3)	0 (2)	0 (1)
	1973		0 (2)	0 (4)	0 (2)	1.00 (2)	0.33 (3)	0 (2)	0 (3)	0.50 (2)	9.33 (3)	8.00 (2)	7.00 (2)	8.67 (3)	11.00 (2)	8.67 (3)	9.50 (2)	13.33 (3)	37.00 (2)	4.00 (2)	0.50 (2)	0 (0)
	1974	Adults	0 (2)	0 (2)	0 (1)	0 (1)	0 (1)	0.50 (2)	0.50 (2)	3.00 (2)	0 (2)	0.50 (2)	0.50 (2)	0.50 (2)	0 (2)	0 (2)	0 (2)	0.50 (2)	0 (2)	0 (2)	0 (2)	0 (2)
		YOY									6.50	13.50	13.50	7.50	4.50	8.00	12.00	3.00	0	0.50	0	0
	1975	Adults	0 (1)	0 (2)	1.00 (1)	0 (2)	0.50 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0.50 (2)	0 (2)	0 (1)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (1)
		YOY	0	0	0	0	0	0	0	0	5.00	15.00	5.00	3.00	9.00	5.50	2.50	1.50	0.50	0	0	0
Station 10	1972		0 (0)	0 (0)	0 (4)	4.50 (4)	6.00 (5)	1.50 (2)	0 (4)	1.00 (2)	8.00 (4)	38.50 (2)	6.75 (4)	3.00 (2)	8.75 (4)	1.00 (2)	8.00 (3)	4.00 (2)	4.00 (2)	8.00 (4)	4.00 (2)	0 (1)
	1973		0 (2)	0 (4)	0 (2)	2.50 (2)	0.33 (3)	1.50 (2)	6.67 (3)	2.00 (2)	13.00 (3)	187.00 (2)	79.00 (2)	109.67 (3)	21.00 (2)	53.67 (3)	10.50 (2)	46.67 (3)	36.00 (1)	16.50 (2)	14.33 (3)	0 (0)
	1974	Adults	1.00 (2)	2.00 (2)	1.00 (1)	0 (1)	4.00 (1)	16.50 (2)	4.00 (2)	7.00 (2)	3.50 (2)	3.00 (2)	7.50 (2)	4.50 (2)	6.50 (2)	4.00 (2)	2.00 (2)	6.50 (2)	4.00 (2)	3.00 (2)	0 (2)	0 (2)
		YOY									3.00	21.00	4.00	11.50	13.00	10.00	11.00	4.50	6.00	1.00	2.00	0.50
	1975	Adults	0 (1)	0.50 (2)	0 (1)	1.50 (2)	4.50 (2)	0 (2)	6.00 (2)	5.50 (2)	1.00 (1)	0.50 (2)	0.50 (2)	0.50 (2)	4.00 (2)	0.50 (2)	1.50 (2)	0 (2)	1.00 (2)	0 (2)	1.00 (2)	0 (1)
		YOY	0	0	0	0	0	0	0	7.00	12.00	28.00	8.50	10.00	19.00	6.00	39.00	1.50	2.00	2.00	5.00	1.00
Station 11	1972		0 (0)	0 (0)	0 (4)	0.40 (5)	1.67 (3)	1.50 (2)	4.25 (4)	0 (2)	28.50 (4)	87.00 (2)	7.50 (4)	0.50 (2)	2.50 (4)	3.00 (2)	7.00 (3)	5.50 (2)	5.00 (1)	1.33 (3)	0 (2)	0 (1)
	1973		0 (2)	0.60 (5)	0 (2)	8.00 (2)	1.67 (3)	7.00 (2)	14.00 (3)	2.00 (1)	8.33 (3)	242.50 (2)	93.00 (2)	58.33 (3)	18.50 (2)	6.67 (3)	12.00 (2)	9.33 (3)	14.00 (1)	2.75 (4)	29.00 (1)	0 (0)
	1974	Adults	0 (2)	1.50 (2)	0 (1)	0 (1)	1.00 (1)	52.50 (2)	3.50 (2)	3.00 (2)	1.00 (2)	0.50 (2)	0.50 (2)	1.00 (2)	0 (2)	0 (2)	0 (2)	0 (2)	1.50 (2)	0 (2)	0 (2)	0 (2)
		YOY									8.50	23.00	17.50	23.00	13.00	5.00	5.50	5.50	4.00	2.00	0	0
	1975	Adults	0 (1)	0 (2)	0 (1)	0.50 (2)	14.50 (2)	1.00 (2)	1.00 (2)	1.00 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0.50 (2)	0.50 (2)	0 (2)	0 (1)
		YOY	0	0	0	0	0	0	0	71.00	22.50	17.00	16.50	6.00	17.00	12.00	14.00	3.50	9.00	3.50	0	0
Station 12	1972		0 (0)	0 (0)	0 (4)	0 (5)	1.00 (4)	0 (2)	0 (4)	0.50 (2)	1.25 (4)	1.50 (2)	1.25 (4)	2.00 (2)	1.75 (4)	1.50 (2)	2.33 (3)	3.00 (2)	1.00 (1)	0.33 (3)	0 (1)	0 (0)
	1973		0 (2)	0.20 (5)	0.50 (2)	1.00 (2)	0.33 (3)	0 (2)	0.33 (3)	0 (2)	3.33 (3)	62.50 (2)	29.50 (2)	9.50 (2)	17.00 (2)	4.00 (3)	8.50 (2)	13.00 (3)	1.50 (2)	2.00 (3)	2.00 (1)	0 (0)
	1974	Adults	0 (2)	0 (2)	0 (1)	0 (1)	0 (1)	0.50 (2)	0 (2)	2.00 (2)	1.00 (2)	1.00 (2)	0.50 (2)	2.00 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (1)
		YOY									6.50	11.00	15.00	24.00	19.50	15.50	6.00	1.50	0.50	0	0	0
	1975	Adults	0 (1)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (1)	0 (2)	0 (2)	0.50 (2)	0 (2)	0 (2)	0 (1)
		YOY	0	0	0	0	0	0	0	2.50	9.00	13.50	6.00	5.50	2.50	1.00	1.50	2.00	2.00	0	0	0
Station 20	1972										No data taken in 1972											
	1973										No data taken in 1973											
	1974	Adults	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	3.00 (2)	0 (2)	2.50 (2)	1.50 (2)	0 (2)	0 (2)	0.50 (2)	0 (2)	0 (2)	0 (2)	0.50 (2)	0 (2)	0 (2)	0 (2)	0 (2)
		YOY									13.00	17.50	19.00	8.50	11.00	7.50	10.50	2.50	2.00	0.50	0.50	0
	1975	Adults	0 (1)	0 (2)	0 (2)	0 (2)	1.00 (2)	0.50 (2)	2.00 (1)	0 (1)	1.00 (1)	0 (2)	0 (1)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0.50 (2)	0 (2)	0 (1)
		YOY	0	0	0	0	0	0	0	0	14.00	26.00	10.00	29.50	20.50	15.50	14.50	2.50	3.50	1.00	0	0
Station 21	1972										No data taken in 1972											
	1973										No data taken in 1973											
	1974	Adults	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	11.50 (2)	78.00 (2)	3.00 (2)	0.50 (2)	3.00 (2)	0 (2)	2.00 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)
		YOY									12.50	13.00	19.50	18.50	29.00	10.50	10.00	0.50	0.50	0.50	0	0
	1975	Adults	0 (1)	0 (2)	0 (2)	0.50 (2)	0 (2)	0 (2)	1.50 (2)	0 (2)	0 (2)	0 (1)	0.50 (2)	0.50 (2)	0.50 (2)	0.50 (2)	0 (2)	0 (2)	0.50 (2)	0 (2)	0 (2)	0 (1)
		YOY	0	0	0	0	0	0	0	7.00	11.00	43.00	26.00	8.00	5.50	16.50	5.50	13.50	10.00	0.50	1.00	

Key to Biweekly Periods:

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1972	3/26-4/8	4/9-4/22	4/23-5/6	5/7-5/20	5/21-6/3	6/4-6/17	6/18-7/1	7/2-7/15	7/16-7/29	7/30-8/12	8/13-8/26	8/27-9/9	9/10-9/23	9/24-10/7	10/8-10/21	10/22-11/4	11/5-11/18	11/19-12/2	12/3-12/16	12/17-12/30
1973	3/25-4/7	4/8-4/21	4/22-5/5	5/6-5/19	5/20-6/2	6/3-6/16	6/17-6/30	7/1-7/14	7/15-7/28	7/24-8/11	8/12-8/25	8/26-9/8	9/9-9/22	9/23-10/6	10/7-10/20	10/21-11/3	11/4-11/17	11/18-12/1	12/2-12/15	12/16-12/29
1974	3/24-4/6	4/7-4/20	4/21-5/4	5/5-5/18	5/19-6/1	6/2-6/15	6/16-6/29	6/30-7/13	7/14-7/27	7/28-8/10	8/11-8/24	8/25-9/7	9/8-9/21	9/22-10/5	10/6-10/19	10/20-11/2	11/3-11/16	11/17-11/30	12/1-12/14	12/15-12/28
1975	3/23-4/5	4/6-4/19	4/20-5/3	5/4-5/17	5/18-5/31	6/1-6/14	6/15-6/28	6/29-7/12	7/13-7/26	7/27-8/9	8/10-8/23	8/24-9/6	9/7-9/20	9/21-10/4	10/5-10/18	10/19-11/1	11/2-11/15	11/16-11/29	11/30-12/13	12/14-12/27

*Number of tows in parentheses.
**During 1972 through June 1974 adults and young-of-the-year (YOY) were not differentiated.

Table A-2

CPUE for Striped Bass Collected in Standard-Station Bottom Trawls by Site Indian Point Region, Hudson River Estuary, New York, 1972-1975

	Biweekly Period																			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1972	0 (0)*	0 (0)	0 (2)	0.83 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0.22 (3)	0.33 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (3)	1.00 (2)	0 (1)	0 (2)	0 (2)
1973	0 (0)	0 (2)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0.67 (1)	0 (0)	0.20 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	1.00 (1)	0 (0)
1974 Adults**	0 (0)	0 (1)	0 (1)	1.00 (1)	0 (1)	0.50 (2)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	1.00 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)
YOY									0	0	0	0	0	1.00	0	0	0	0	0	0
1975 Adults	0 (1)	0 (1)	0 (0)	2.00 (1)	0 (1)	1.00 (1)	0 (1)	0 (1)	1.00 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (0)
YOY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1972	0 (0)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (1)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0.50 (2)	0 (2)	0 (2)	0 (3)	0 (2)	0 (1)	0 (2)	0 (1)
1973	4.00 (1)	0 (2)	2.00 (1)	1.00 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (2)	0 (1)	1.00 (1)	0 (0)
1974 Adults	0 (0)	6.00 (1)	0 (1)	0 (1)	0 (1)	0 (2)	2.00 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	1.00 (1)	0 (1)	0 (1)	0 (1)
YOY									0	0	0	0	0	0	2.00	2.00	2.00	0	0	0
1975 Adults	0 (0)	0 (1)	0 (1)	0 (0)	0 (0)	0 (1)	0 (0)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (0)
YOY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1972	0 (0)	0 (1)	0 (2)	0 (2)	0 (2)	0 (3)	0 (2)	0 (2)	0.83 (2)	0.33 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (1)	0 (2)	0 (1)
1973	0 (1)	0 (2)	0 (1)	0 (1)	1.00 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	55.00 (1)	0 (2)	1.00 (2)	0 (0)
1974 Adults	0 (0)	0 (1)	0 (1)	0 (1)	0 (1)	0 (2)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)
YOY									0	0	0	0	0	3.00	0	0	0	3.00	0	0
1975 Adults	0 (1)	0 (1)	0 (1)	1.00 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (0)
YOY				0	0	0	0	0	0	0	0	0	0	1.00	0	0	0	0	0	0
1972	0 (0)	0 (2)	0 (2)	0 (2)	3.67 (2)	0 (1)	0 (1)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (1)	0 (2)
1973	0 (0)	0 (2)	1.00 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	1.00 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (0)
1974 Adults	0 (0)	0 (1)	1.00 (1)	1.00 (1)	0 (1)	0 (2)	0 (1)	1.00 (1)	0 (1)	0 (1)	1.00 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)
YOY									0	0	0	0	0	0	0	1.00	0	0	0	0
1975 Adults	0 (1)	1.00 (1)	0 (1)	0 (1)	0 (0)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (0)	0 (1)	1.00 (1)	0 (1)	0 (1)	0 (0)	0 (1)	0 (1)	0 (0)
YOY	0	0	0	0	0	0	0	0	0	1.00	0	0	0	0	0	0	0	0	1.00	0
1972	0 (0)	0 (2)	0 (2)	0 (2)	0 (2)	0.33 (2)	0 (2)	0 (2)	0 (1)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)
1973	0 (0)	0 (2)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	4.00 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (0)
1974 Adults	0 (0)	0 (1)	0 (1)	1.00 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	1.00 (1)	1.00 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)
YOY									0	0	0	0	0	0	0	0	0	0	0	0
1975 Adults	0 (1)	1.00 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (0)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (0)
YOY	0	0	0	0	0	0	0	0	0	0	0	1.00	0	0	0	0	0	1.00	1.00	0
1972	0 (0)	0 (1)	0 (2)	0 (2)	0.50 (2)	0 (2)	0 (2)	0 (2)	0 (3)	0 (2)	0 (2)	0.50 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)
1973	0 (1)	0 (3)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	14.00 (1)	0 (1)	0 (1)	0 (1)	4.00 (1)	0 (1)	0 (0)
1974 Adults	0 (0)	30.00 (1)	1.00 (1)	2.00 (1)	1.00 (1)	0 (2)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (0)	0 (1)	0 (1)	0 (1)
YOY									0	0	0	0	0	0	0	0	0	0	1.00	0
1975 Adults	0 (1)	3.00 (1)	0 (0)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (0)	0 (1)	0 (0)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (0)
YOY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.00	0	0	0
1972	0 (1)	0 (0)	0 (1)	1.00 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	2.00 (2)	0.83 (2)	0 (2)	0 (2)	0 (2)	0 (2)	1.50 (2)	0 (0)	0 (2)	0 (2)	0 (2)
1973	0 (0)	0 (1)	0 (1)	0 (1)	0 (1)	3.00 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	1.00 (1)	0 (1)	0 (1)	3.00 (1)	0 (0)	0 (0)
1974 Adults	0 (0)	0 (1)	0 (1)	0 (1)	0 (1)	0 (2)	0 (1)	1.00 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)
YOY									0	0	0	0	0	0	2.00	8.00	0	9.00	0	0
1975 Adults	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (0)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (0)
YOY	0	0	0	0	0	0	0	0	0	0	0	0	0	1.00	0	0	0	0	0	0

Table A-3

CPUE for White Perch Collected in Standard-Station Beach Seines by Site Indian Point Region, Hudson River Estuary, New York, 1972-1975

		Biweekly Period																			
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Station 8	1972	0 (0)	0 (0)	0 (4)	0.75 (4)	9.20 (5)	0.50 (2)	0.67 (3)	8.50 (2)	6.50 (4)	1.00 (2)	3.00 (4)	5.50 (2)	8.75 (4)	7.50 (2)	11.33 (3)	5.00 (2)	2.50 (2)	0 (3)	1.50 (2)	0 (0)
	1973	0 (2)	0.25 (4)	7.50 (2)	0.50 (2)	11.33 (3)	145.00 (2)	39.00 (3)	13.50 (2)	0.67 (3)	0 (2)	2.50 (2)	12.67 (3)	220.50 (2)	34.67 (3)	13.50 (2)	2.00 (2)	1.50 (2)	10.67 (3)	0 (1)	0 (0)
	1974																				
	Adults	0 (3)	2.50 (2)	2.00 (1)	4.00 (1)	19.00 (1)	82.00 (2)	169.00 (2)	121.50 (2)	0 (2)	0 (2)	0 (1)	0 (1)	0 (2)	4.50 (2)	1.50 (2)	0.50 (2)	0.50 (2)	0 (2)	0 (2)	0 (2)
	YOY									0	0	5.00	0	5.00	1.00	0.50	0	0	0	0	0
	1975																				
	Adults	0 (1)	0 (1)	0 (1)	0 (2)	1.00 (2)	3.00 (2)	2.00 (1)	0 (2)	0 (2)	0 (2)	0 (2)	0.50 (2)	3.00 (2)	1.00 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (1)	0 (1)
	YOY	0	0	0	0	0	0	0	0	1.50	2.50	8.50	2.50	29.00	6.00	0	1.50	0	0	0	0
Station 9	1972	0 (0)	0 (0)	0 (4)	0.25 (4)	0.80 (5)	0.50 (2)	5.25 (4)	1.50 (2)	18.50 (4)	2.50 (2)	11.60 (5)	7.50 (2)	13.75 (4)	6.00 (2)	7.33 (3)	5.50 (2)	1.50 (2)	0 (3)	0 (2)	0 (1)
	1973	0 (2)	1.00 (4)	0 (2)	0.50 (2)	1.67 (3)	2.00 (2)	29.67 (3)	4.00 (2)	23.00 (3)	9.50 (2)	5.00 (2)	11.67 (3)	36.50 (2)	26.67 (3)	26.50 (2)	11.33 (3)	1.50 (2)	0.50 (2)	0 (2)	0 (0)
	1974																				
	Adults	0 (2)	0 (2)	2.00 (1)	1.00 (1)	0 (1)	31.50 (2)	27.00 (2)	6.00 (2)	20.00 (2)	1.50 (2)	0.50 (2)	0.50 (2)	0 (2)	1.00 (2)	7.50 (2)	0.50 (2)	0 (2)	0 (2)	0 (2)	0 (2)
	YOY									2.50	8.00	7.50	9.50	1.00	7.00	47.00	5.50	0	0	0	0
	1975																				
	Adults	0 (1)	0 (2)	0 (1)	0 (2)	2.00 (2)	2.50 (2)	1.50 (2)	7.50 (2)	1.50 (2)	1.00 (2)	1.00 (2)	0 (1)	0.50 (2)	1.50 (2)	0 (2)	0.50 (2)	0.50 (2)	0 (2)	0 (2)	0 (1)
	YOY	0	0	0	0	0	0	0	0	17.50	53.00	16.50	10.00	5.50	37.00	16.00	1.50	0	0	0	0
Station 10	1972	0 (0)	0 (0)	0.25 (4)	0.20 (5)	11.40 (5)	1.50 (2)	0.25 (4)	4.00 (2)	5.50 (4)	8.00 (2)	20.75 (4)	2.50 (2)	7.50 (4)	22.50 (2)	20.00 (3)	17.00 (2)	4.50 (2)	12.00 (4)	23.00 (2)	0 (1)
	1973	0 (2)	0.25 (4)	0 (2)	1.50 (2)	1.00 (3)	3.50 (2)	4.33 (3)	3.00 (2)	20.00 (3)	80.50 (2)	67.00 (2)	44.33 (3)	2.00 (2)	2.67 (3)	0 (2)	48.67 (3)	2.00 (1)	42.00 (2)	13.00 (3)	0 (0)
	1974																				
	Adults	0 (2)	1.50 (2)	2.00 (1)	0 (1)	6.00 (1)	78.00 (2)	63.50 (2)	28.50 (2)	7.00 (2)	4.00 (2)	9.00 (2)	3.00 (2)	19.00 (2)	3.00 (2)	11.50 (2)	3.00 (2)	1.00 (2)	0 (2)	0 (2)	0 (2)
	YOY									0	2.00	0	2.00	4.00	9.50	8.00	3.50	12.00	0	0.50	1.00
	1975																				
	Adults	0 (1)	0 (2)	9.00 (1)	4.50 (2)	16.50 (2)	3.50 (2)	23.00 (2)	2.00 (2)	5.00 (1)	1.50 (2)	3.00 (2)	1.00 (2)	5.50 (2)	2.00 (2)	1.00 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (1)
	YOY	0	0	0	0	0	0	0	0	1.00	0.50	9.00	0	7.50	0.50	36.50	0.50	28.50	0	0	0
Station 11	1972	0 (0)	0 (0)	0 (4)	0 (5)	2.00 (3)	0 (2)	9.25 (4)	1.00 (2)	0.50 (4)	0.50 (2)	6.00 (4)	0 (2)	2.00 (4)	0.50 (2)	0.33 (3)	2.00 (2)	17.00 (1)	1.33 (3)	1.00 (2)	0 (1)
	1973	0 (2)	0.20 (5)	0 (2)	0 (2)	0.67 (3)	7.00 (2)	11.67 (3)	0 (1)	23.00 (3)	4.50 (2)	3.50 (2)	14.00 (3)	0 (2)	0 (3)	0 (2)	1.33 (3)	7.00 (1)	2.50 (4)	9.00 (1)	0 (0)
	1974																				
	Adults	0 (2)	1.00 (2)	3.00 (1)	0 (1)	1.00 (1)	2.00 (2)	10.50 (2)	0.50 (2)	3.00 (2)	0 (2)	3.50 (2)	0 (2)	0 (2)	0.50 (2)	1.00 (2)	1.00 (2)	0 (2)	0 (2)	0 (2)	0 (2)
	YOY									0	0	0.50	0	2.50	0.50	1.50	1.00	0.50	0	0	0
	1975																				
	Adults	0 (1)	0 (2)	1.00 (1)	0 (2)	8.50 (2)	5.00 (2)	3.00 (2)	0.50 (2)	0 (2)	0 (2)	0 (2)	0 (2)	1.50 (2)	0 (2)	5.50 (2)	1.50 (2)	1.50 (2)	0.50 (2)	0 (2)	0 (1)
	YOY	0	0	0	0	0	0	0	0	0	0	0	0	0.50	0	3.50	4.50	7.50	0.50	0	0
Station 12	1972	0 (0)	0 (0)	0.25 (4)	0.20 (5)	3.00 (4)	5.00 (2)	4.75 (4)	6.00 (2)	12.50 (4)	8.50 (2)	17.00 (4)	7.00 (2)	11.50 (4)	16.00 (2)	11.00 (3)	9.50 (2)	0 (1)	0.67 (3)	1.00 (1)	0 (0)
	1973	0 (2)	3.40 (5)	5.00 (2)	4.00 (2)	5.00 (3)	5.00 (2)	13.00 (3)	13.50 (2)	20.33 (3)	40.00 (2)	48.00 (2)	49.00 (2)	361.50 (2)	254.33 (3)	208.00 (2)	35.33 (3)	8.00 (2)	8.33 (3)	2.00 (1)	0 (0)
	1974																				
	Adults	0 (2)	3.00 (2)	34.00 (1)	1.00 (1)	0 (1)	24.00 (2)	11.00 (2)	21.84 (2)	45.50 (2)	5.50 (2)	16.00 (2)	10.50 (2)	12.50 (2)	16.50 (2)	6.00 (2)	1.50 (2)	0 (2)	0 (2)	0 (2)	0 (1)
	YOY								4.16	0	2.00	11.50	47.00	64.50	42.50	65.00	31.00	0.50	0	0	0
	1975																				
	Adults	0 (1)	0 (2)	1.00 (2)	0 (2)	4.50 (2)	29.00 (2)	19.00 (2)	32.50 (2)	12.50 (2)	10.50 (2)	0.50 (2)	2.00 (2)	1.00 (2)	0 (1)	0 (2)	0.50 (2)	0.50 (2)	0 (2)	0.50 (2)	0 (1)
	YOY	0	0	0	0	0	0	0	3.00	2.50	47.00	13.50	17.00	32.50	15.00	10.00	0.50	0	0	0	0
Station 20	1972										No data taken during 1972										
	1973										No data taken during 1973										
	1974																				
	Adults	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	16.50 (2)	8.00 (2)	12.00 (2)	8.00 (2)	0 (2)	6.00 (2)	2.50 (2)	5.50 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)
	YOY								0	0.50	0.50	1.00	6.50	2.00	0.50	0.50	0	0	0	0	0.50
	1975																				
	Adults	0 (1)	0 (2)	0.50 (2)	0 (2)	1.50 (2)	0.50 (2)	3.00 (1)	2.00 (1)	1.00 (1)	3.00 (2)	0 (1)	0 (2)	0 (2)	2.00 (2)	0.50 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (1)
	YOY	0	0	0	0	0	0	0	0	1.00	4.50	1.00	4.50	0.50	1.50	3.50	0	2.00	0	0	0
Station 21	1972										No data taken during 1972										
	1973										No data taken during 1973										
	1974																				
	Adults	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	40.00 (2)	133.00 (2)	3.04 (2)	22.00 (2)	3.00 (2)	3.50 (2)	7.50 (2)	3.50 (2)	7.00 (2)	1.50 (2)	5.50 (2)	0 (2)	0 (2)	0 (2)	0 (2)
	YOY								0.46	0.50	0.50	1.00	6.50	12.50	4.00	6.50	6.00	0.50	0	0	0
	1975																				
	Adults	0 (1)	0 (2)	0.50 (2)	0 (2)	1.00 (2)	3.50 (2)	24.50 (2)	6.50 (2)	2.00 (2)	7.00 (1)	0 (2)	0.50 (2)	10.50 (2)	8.00 (2)	2.50 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (1)
	YOY	0	0	0	0	0	0	0	1.00	0	7.00	11.00	6.50	3.50	5.00	1.00	0	0	0	0	0

Key to Biweekly Periods:

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1972	3/26-4/8	4/9-4/22	4/23-5/6	5/7-5/20	5/21-6/3	6/4-6/17	6/18-7/1	7/2-7/15	7/16-7/29	7/30-8/12	8/13-8/26	8/27-9/9	9/10-9/23	9/24-10/7	10/8-10/21	10/22-11/4	11/5-11/18	11/19-12/2	12/3-12/16	12/17-12/30
1973	3/25-4/7	4/8-4/21	4/22-5/5	5/6-5/19	5/20-6/2	6/3-6/16	6/17-6/30	7/1-7/14	7/15-7/28	7/29-8/11	8/12-8/25	8/26-9/8	9/9-9/22	9/23-10/6	10/7-10/20	10/21-11/3	11/4-11/17	11/18-12/1	12/2-12/15	12/16-12/29
1974	3/24-4/6	4/7-4/20	4/21-5/4	5/5-5/18	5/19-6/1	6/2-6/15	6/16-6/29	6/30-7/13	7/14-7/27	7/28-8/10	8/10-8/24	8/25-9/7	9/8-9/21	9/22-10/5	10/6-10/19	10/20-11/2	11/3-11/16	11/17-11/30	12/1-12/14	12/15-12/28
1975	3/23-4/5	4/6-6/19	4/20-5/3	5/4-5/17	5/18-5/31	6/1-6/14	6/15-6/28	6/29-7/12	7/13-7/26	7/27-8/9	8/10-8/23	8/24-9/6	9/7-9/20	9/21-10/4	10/5-10/18	10/19-11/2	11/2-11/15	11/16-11/29	11/30-12/13	12/14-12/27

*Number of tows in parentheses

**During 1972 through June 1974 adults and young-of-the-year (YOY) were not differentiated.

Table A-4

CPUE for White Perch Collected in Standard-Station Bottom Trawls by Site Indian Point Region, Hudson River Estuary, New York, 1972-1975

		Biweekly Period																			
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Station 1	1972	0 (0)*	0 (0)	1.00 (2)	42.17 (2)	0 (2)	0.33 (2)	1.00 (2)	0.96 (2)	0.56 (3)	12.33 (2)	0.83 (2)	1.50 (2)	0 (2)	0 (2)	0.50 (2)	3.00 (3)	5.50 (2)	1.00 (1)	1.50 (2)	0.50 (2)
	1973	0 (0)	1.50 (2)	0 (1)	1.00 (1)	8.00 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	1.00 (1)	0 (1)	0 (1)	0 (1)	9.00 (1)	2.00 (1)	19.00 (1)	0 (0)
	1974																				
	Adults	0 (0)	13.00 (1)	14.00 (1)	13.00 (1)	2.00 (1)	0 (2)	2.00 (1)	1.00 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	4.00 (1)	30.00 (1)	1.00 (1)	1.00 (1)	2.00 (1)	22.00 (1)	26.00 (1)
	YOY									0	0	0	0	0	4.00	1.00	3.00	1.00	2.00	15.00	22.00
	1975																				
	Adults**	15.00 (1)	135.00 (1)	0 (0)	244.00 (1)	5.00 (1)	52.00 (1)	0 (1)	0 (1)	1.00 (1)	0 (1)	0 (1)	0 (1)	2.00 (1)	1.00 (1)	1.00 (1)	1.00 (1)	0 (1)	1.00 (1)	3.00 (1)	0 (0)
	YOY	0	0	0	0	0	0	0	0	1.00	0	0	0	2.00	1.00	0	2.00	2.00	2.00	2.00	0
Station 2	1972	0 (0)	20.50 (2)	0 (2)	11.50 (2)	0 (2)	14.33 (2)	1.33 (1)	5.00 (2)	2.00 (2)	3.33 (2)	32.17 (2)	1.00 (2)	0 (2)	0.50 (2)	8.14 (2)	3.28 (3)	7.00 (2)	13.00 (1)	7.00 (2)	0 (1)
	1973	16.00 (1)	3.00 (2)	19.00 (1)	1.00 (1)	0 (1)	16.00 (1)	2.00 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	2.50 (2)	0 (1)	12.00 (1)	0 (0)
	1974																				
	Adults	0 (0)	28.00 (1)	7.00 (1)	0 (1)	6.00 (1)	1.00 (2)	1.00 (1)	2.00 (1)	0 (1)	0 (1)	0 (1)	0 (1)	1.00 (1)	2.00 (1)	72.00 (1)	48.00 (1)	13.00 (1)	1.00 (1)	0 (1)	0 (1)
	YOY									0	0	0	0	2.00	2.00	162.00	70.00	26.00	7.00	0	0
	1975																				
	Adults	0 (0)	3.00 (1)	1.00 (1)	0 (0)	0 (0)	0 (1)	0 (0)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	1.00 (1)	0 (1)	1.00 (1)	0 (1)	1.00 (1)	0 (0)
	YOY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Station 3	1972	0 (0)	0 (1)	34.50 (2)	1.67 (2)	0.67 (2)	0.89 (3)	3.00 (2)	5.99 (2)	6.00 (2)	22.00 (2)	0 (2)	0.33 (2)	0.50 (2)	1.50 (2)	10.50 (2)	4.00 (2)	5.50 (2)	1.00 (1)	1.00 (2)	0 (1)
	1973	2.67 (1)	0 (2)	0 (1)	0 (1)	1.00 (1)	0 (1)	3.00 (1)	0 (1)	0 (1)	0.40 (1)	0 (1)	1.00 (1)	0 (1)	0 (1)	0 (1)	0 (1)	93.00 (1)	0 (2)	10.00 (2)	0 (0)
	1974																				
	Adults	0 (0)	1.00 (1)	0 (1)	0 (1)	0 (1)	0 (2)	3.00 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	2.00 (1)	2.00 (1)	5.00 (1)	1.00 (1)	0 (1)
	YOY									0	0	0	0	0	1.00	0	0	0	15.00	3.00	0
	1975																				
	Adults	0 (1)	1.00 (1)	2.00 (1)	15.00 (1)	2.00 (1)	2.00 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	1.00 (1)	0 (1)	0 (1)	0 (1)	0 (1)	1.00 (1)	0 (1)	0 (1)	0 (0)
	YOY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.00	0	0	0
Station 4	1972	0 (0)	27.00 (2)	8.50 (2)	5.67 (2)	0 (2)	0 (1)	2.67 (1)	0.33 (2)	6.17 (2)	3.67 (2)	3.46 (2)	11.96 (2)	1.00 (2)	5.00 (2)	8.50 (2)	7.00 (2)	14.50 (2)	5.00 (2)	7.00 (1)	10.50 (2)
	1973	0 (0)	3.00 (2)	32.00 (1)	1.00 (1)	1.00 (1)	1.00 (1)	2.00 (1)	0 (1)	5.00 (1)	0 (1)	0 (1)	0 (1)	0 (1)	13.00 (1)	0 (1)	0 (1)	5.00 (1)	11.00 (1)	73.00 (1)	0 (0)
	1974																				
	Adults	0 (0)	63.00 (1)	23.00 (1)	32.00 (1)	2.00 (1)	3.50 (2)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	1.00 (1)	0 (1)	4.00 (1)	4.00 (1)	10.00 (1)	0 (1)	2.00 (1)	9.00 (1)	1.00 (1)
	YOY									0	0	0	0	0	0	1.00	2.00	1.00	5.00	2.00	0
	1975																				
	Adults	36.00 (1)	45.00 (1)	28.00 (1)	6.00 (1)	0 (0)	13.00 (1)	4.00 (1)	1.00 (1)	0 (1)	1.00 (1)	1.00 (1)	0 (0)	4.00 (1)	3.00 (1)	6.00 (1)	2.00 (1)	0 (0)	2.00 (1)	1.00 (1)	0 (0)
	YOY	0	0	0	0	0	0	0	0	1.00	0	1.00	0	1.00	0	0	1.00	0	2.00	4.00	0
Station 5	1972	0 (0)	89.86 (2)	5.67 (2)	3.67 (2)	0 (2)	0 (2)	0 (2)	0.33 (2)	3.33 (1)	25.33 (2)	5.83 (2)	2.33 (2)	0 (2)	0 (2)	3.00 (2)	2.00 (2)	11.50 (2)	10.00 (2)	2.00 (2)	14.00 (2)
	1973	0 (0)	0 (2)	5.00 (1)	2.00 (1)	0 (1)	0 (1)	3.00 (1)	0 (1)	4.00 (1)	1.00 (1)	0 (1)	0 (1)	26.00 (1)	0 (1)	0 (1)	0 (1)	3.00 (1)	2.00 (1)	6.00 (1)	0 (0)
	1974																				
	Adults	0 (0)	123.00 (1)	19.00 (1)	7.00 (1)	0 (1)	4.00 (1)	0 (1)	3.00 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	2.00 (1)	42.00 (1)	1.00 (1)	7.00 (1)	6.00 (1)	4.00 (1)
	YOY									0	0	0	0	0	1.00	0	2.00	2.00	12.00	3.00	8.00
	1975																				
	Adults	25.00 (1)	127.00 (1)	12.00 (1)	11.00 (1)	7.00 (1)	15.00 (1)	3.00 (1)	5.00 (1)	0 (1)	1.00 (1)	0 (0)	2.00 (1)	0 (1)	2.00 (1)	0 (1)	2.00 (1)	0 (1)	2.00 (1)	2.00 (1)	0 (0)
	YOY	0	0	0	0	0	0	0	0	1.00	0	0	0	0	0	0	1.00	1.00	0	7.00	0
Station 6	1972	0 (0)	21.00 (1)	2.50 (2)	6.33 (2)	4.00 (2)	0.33 (2)	0.33 (2)	0 (2)	1.00 (3)	2.67 (2)	0.50 (2)	1.00 (2)	0 (2)	1.50 (2)	1.00 (2)	1.50 (2)	8.50 (2)	33.50 (2)	4.00 (2)	15.50 (2)
	1973	4.00 (1)	2.00 (3)	2.00 (1)	0 (1)	2.00 (1)	0 (1)	83.00 (1)	0.67 (1)	3.00 (1)	1.00 (1)	0 (1)	1.00 (1)	1.00 (1)	5.00 (1)	0 (1)	0 (1)	3.00 (1)	16.00 (1)	29.00 (1)	0 (0)
	1974																				
	Adults	0 (0)	19.00 (1)	34.00 (1)	5.00 (1)	0 (1)	0 (2)	6.00 (1)	114.00 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	4.00 (1)	11.00 (1)	0 (0)	17.00 (1)	30.00 (1)	3.00 (1)
	YOY									0	0	0	0	0	1.00	1.00	1.00	0	12.00	9.00	1.00
	1975																				
	Adults	27.00 (1)	249.00 (1)	0 (0)	17.00 (1)	9.00 (1)	3.00 (1)	5.00 (1)	1.00 (1)	0 (1)	1.00 (1)	0 (0)	6.00 (1)	0 (0)	0 (1)	2.00 (1)	3.00 (1)	0 (1)	8.00 (1)	6.00 (1)	0 (0)
	YOY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3.00	0	8.00	5.00	0
Station 7	1972	0 (0)	0 (0)	0 (1)	9.00 (2)	0 (2)	1.33 (2)	29.83 (2)	7.00 (2)	2.83 (2)	26.33 (2)	13.67 (2)	8.83 (2)	5.00 (2)	0 (2)	0.50 (2)	5.00 (2)	0 (0)	2.50 (2)	10.50 (2)	16.50 (2)
	1973	0 (0)	0 (1)	2.00 (1)	0 (1)	0 (1)	50.00 (1)	7.00 (1)	0 (1)	16.00 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	1.00 (1)	39.00 (1)	0 (0)	0 (0)
	1974																				
	Adults	0 (0)	60.00 (1)	13.00 (1)	0 (1)	0 (1)	0 (2)	1.00 (1)	1.00 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	24.00 (1)	24.00 (1)	2.00 (1)	22.00 (1)	2.00 (1)	0 (1)
	YOY									0	0	0	0	0	1.00	11.00	14.00	0	21.00	6.00	1.00
	1975																				
	Adults	80.00 (1)	1.00 (1)	1.00 (1)	28.00 (1)	10.00 (1)	12.00 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	1.00 (1)	10.00 (1)	1.00 (1)	1.00 (1)	0 (0)
	YOY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.00	0	0	0

Table A-5

CPUE for Atlantic Tomcod Collected in Standard-Station Bottom Trawls by Site Indian Point Region, Hudson River Estuary, New York, 1972-1975

		Biweekly Period																			
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Station 1	1972	0 (0)*	0 (0)	0 (2)	0 (2)	0 (2)	0 (2)	3.33 (2)	4.92 (2)	1.22 (3)	9.33 (2)	0 (2)	21.17 (2)	64.17 (2)	0 (2)	0 (2)	10.33 (3)	2.50 (2)	0 (1)	2.50 (2)	0 (2)
	1973	0 (0)	0 (2)	0 (1)	5.00 (1)	28.00 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	1.00 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	3.00 (1)	0 (0)
	1974 Adults**	0 (0)	0 (1)	0 (1)	1.00 (1)	0 (1)	0 (2)	0 (1)	6.00 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)
	YOY									0	0	0	0	0	4.00	11.00	2.00	0	10.00	3.00	7.00
	1975 Adults	0 (1)	0 (1)	0 (0)	17.00 (1)	0 (1)	7.00 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (0)
	YOY	0	0	0	37.00	10.00	193.00	1.00	0	11.00	0	0	0	9.00	0	0	1.00	6.00	0	2.00	0
Station 2	1972	0 (0)	0 (2)	0 (2)	0 (2)	0 (2)	0 (1)	0 (1)	1.67 (2)	0 (2)	0 (2)	0 (2)	3.00 (2)	0.50 (2)	0 (2)	21.43 (2)	1.00 (3)	0 (2)	2.00 (1)	0.50 (2)	4.00 (1)
	1973	1.00 (1)	0 (2)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (2)	0 (1)	3.00 (1)	0 (0)
	1974 Adults	0 (0)	0 (1)	0 (1)	0 (1)	0 (1)	0 (2)	4.00 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)
	YOY									0	0	0	0	0	0	97.02	0	0	0	0	0
	1975 Adults	0 (0)	0 (1)	0 (1)	0 (0)	0 (0)	0 (1)	0 (0)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)
	YOY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Station 3	1972	0 (0)	0 (1)	0 (2)	0 (2)	0 (2)	0 (3)	1.00 (2)	6.33 (2)	10.67 (2)	19.67 (2)	0.50 (2)	1.67 (2)	0 (2)	0.50 (2)	31.00 (2)	3.50 (2)	0.50 (2)	0 (1)	0.50 (2)	0 (1)
	1973	0 (1)	0 (2)	0 (1)	0 (1)	1.00 (1)	0 (1)	0 (1)	0 (1)	0 (1)	1.60 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	5.00 (1)	0 (2)	0 (2)	0 (0)
	1974 Adults	0 (0)	0 (1)	0 (1)	0 (1)	0 (1)	0 (2)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)
	YOY									0	0	0	0	0	0	0	0	0	0	1.00	0
	1975 Adults	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)
	YOY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Station 4	1972	0 (0)	0 (2)	0 (2)	0 (2)	0 (2)	0 (1)	0 (1)	2.00 (2)	4.50 (2)	62.67 (2)	0.33 (2)	167.21 (2)	1.50 (2)	15.50 (2)	7.50 (2)	1.00 (2)	0.50 (2)	0 (2)	1.00 (1)	1.00 (2)
	1973	0 (1)	0 (2)	3.00 (1)	0 (1)	0 (1)	0 (1)	3.00 (1)	0 (1)	1.00 (1)	0 (1)	0 (1)	4.00 (1)	0 (1)	0 (1)	1.00 (1)	0 (1)	0 (1)	1.00 (1)	1.00 (1)	0 (0)
	1974 Adults	0 (0)	0 (1)	0 (1)	5.00 (1)	0 (1)	2.00 (2)	0 (1)	125.00 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)
	YOY									0	0	0	0	32.00	6.00	1.00	5.00	8.00	87.00	4.00	24.00
	1975 Adults	0 (1)	0 (1)	0 (1)	0 (1)	0 (0)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	1.00 (1)	0 (0)	0 (1)	0 (1)	0 (1)	0 (1)	0 (0)	0 (1)	0 (1)	0 (0)
	YOY	0	0	0	0	0	2.00	16.00	0	9.00	3.00	40.00	0	2.00	1.00	30.00	14.00	0	1.00	1.00	0
Station 5	1972	0 (0)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	2.67 (2)	0.67 (1)	9.67 (2)	0 (2)	101.00 (2)	0.50 (2)	2.00 (2)	6.00 (2)	2.50 (2)	2.00 (2)	0 (2)	2.00 (2)	2.00 (2)
	1973	0 (0)	7.50 (2)	8.00 (1)	0 (1)	6.00 (1)	0 (1)	128.00 (1)	0 (1)	37.00 (1)	3.40 (1)	0 (1)	0 (1)	3.00 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (0)
	1974 Adults	0 (0)	0 (1)	1.00 (1)	15.00 (1)	0 (1)	0 (1)	0 (1)	270.00 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	5.00 (1)	0 (1)	0 (1)	0 (1)	1.00 (1)
	YOY									0	0	0	0	0	0	0	132.00	1.00	8.00	14.00	36.00
	1975 Adults	0 (1)	17.00 (1)	0 (1)	11.00 (1)	1.00 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (0)	3.00 (1)	1.00 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (0)
	YOY	0	0	0	2.00	11.00	3.00	231.00	7.00	69.00	0	0	142.00	68.00	6.00	15.00	9.00	33.00	0	0	0
Station 6	1972	0 (0)	0 (1)	0.50 (2)	0 (2)	0 (2)	0 (2)	0.50 (2)	1.50 (2)	0.67 (3)	28.67 (2)	0 (2)	3.00 (2)	0 (2)	7.50 (2)	1.00 (2)	0 (2)	0 (2)	2.00 (2)	26.00 (2)	13.50 (2)
	1973	0 (1)	0.67 (3)	4.00 (1)	0 (1)	0 (1)	0 (1)	209.00 (1)	0 (1)	159.00 (1)	6.20 (1)	0 (1)	21.00 (1)	1.00 (1)	0 (1)	0 (1)	0 (1)	0 (1)	1.00 (1)	1.00 (1)	0 (0)
	1974 Adults	0 (0)	0 (1)	0 (1)	0 (1)	0 (1)	0 (2)	20.00 (1)	105.00 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (0)	0 (1)	0 (1)	0 (1)
	YOY									0	0	0	0	0	0	0	18.00	0	31.00	8.00	4.00
	1975 Adults	0 (1)	1.00 (1)	0 (0)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (0)	0 (1)	0 (0)	0 (1)	0 (1)	0 (1)	0 (1)	2.00 (1)	0 (1)	0 (0)
	YOY	0	0	0	0	0	6.00	1.00	1.00	1.00	0	0	12.00	0	0	3.00	0	2.00	25.00	66.00	0
Station 7	1972	0 (0)	0 (0)	0 (1)	0 (2)	0 (2)	0 (2)	0 (2)	12.33 (2)	1.67 (2)	12.00 (2)	1.33 (2)	4.17 (2)	7.00 (2)	0 (2)	0 (2)	3.50 (2)	0 (0)	3.50 (2)	1.50 (2)	3.00 (2)
	1973	0 (0)	0 (1)	0 (1)	0 (1)	0 (1)	2.00 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (0)	0 (0)
	1974 Adults	0 (0)	0 (1)	0 (1)	0 (1)	0 (1)	0.50 (2)	3.00 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)
	YOY									0	0	0	0	0	0	0	0	0	2.00	0	0
	1975 Adults	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (0)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (0)
	YOY	0	0	0	1.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table A-6

CPUE for American Shad Collected in Standard-Station Beach Seines by Site Indian Point Region, Hudson River Estuary, New York, 1972-1975

		Biweekly Period																			
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Station 8	1972	0 (0)*	0 (0)	0 (4)	0 (4)	0 (5)	0 (2)	0 (3)	0 (2)	0 (4)	0 (2)	0 (4)	0 (2)	0.50 (4)	3.50 (2)	2.33 (3)	4.50 (2)	0 (2)	0 (3)	0 (2)	0 (0)
	1973	0 (2)	0 (4)	0 (2)	0.50 (2)	0.67 (3)	0 (2)	0.33 (3)	0 (2)	0 (3)	0 (2)	4.50 (2)	1.67 (3)	6.50 (2)	2.67 (3)	7.50 (2)	12.50 (2)	0.50 (2)	0 (3)	0 (1)	0 (0)
	1974 Adults**	0 (3)	0 (2)	0 (1)	0 (1)	0 (1)	0 (2)	0 (2)	0.50 (2)	0 (2)	0 (2)	0 (1)	0 (1)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)
	YOY									6.00	12.00	0	5.00	0.50	8.00	5.00	5.50	2.50	0	0	0
	1975 Adults	0 (1)	0 (2)	0 (1)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (1)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (1)
	YOY	0	0	0	0	0	0	0	1.00	1.50	5.00	0.50	2.00	2.50	0	2.50	5.00	1.00	0	0	0
Station 9	1972	0 (0)	0 (0)	0 (4)	0 (4)	0 (5)	0 (2)	0 (4)	0 (2)	0 (4)	0 (2)	0 (5)	0.50 (2)	0 (4)	0 (2)	1.67 (3)	0.50 (2)	0 (2)	0 (3)	0 (2)	0 (1)
	1973	0 (2)	0 (4)	0 (2)	0 (2)	0 (3)	0 (2)	0 (3)	0 (2)	0 (3)	0 (2)	0 (2)	9.00 (3)	3.00 (2)	5.00 (3)	4.50 (2)	2.33 (3)	5.00 (2)	0 (2)	0 (2)	0 (0)
	1974 Adults	0 (2)	0 (2)	0 (1)	0 (1)	0 (1)	0 (2)	0 (2)	0.50 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)
	YOY									3.50	45.00	8.50	4.50	0	1.50	35.50	10.00	11.50	0	0	0
	1975 Adults	0 (1)	0.50 (2)	0 (1)	0.50 (2)	0.50 (2)	1.00 (2)	0.50 (2)	0 (2)	0 (1)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (1)
	YOY	0	0	0	0	0	0	0	9.00	7.00	11.50	11.00	2.00	1.50	8.50	2.50	1.00	0	0.50	0	0
Station 10	1972	0 (0)	0 (0)	0 (4)	0 (4)	0 (5)	0 (2)	0 (4)	0 (2)	0.25 (4)	0 (2)	0 (4)	0.50 (2)	4.25 (4)	4.50 (2)	1.67 (3)	1.50 (2)	0.50 (2)	0 (4)	0 (2)	0 (1)
	1973	0 (2)	0 (4)	0 (2)	0 (2)	0 (3)	0 (2)	0.33 (3)	0 (2)	0 (3)	0 (2)	10.50 (2)	8.33 (3)	25.50 (2)	10.00 (3)	9.50 (2)	24.33 (3)	27.00 (1)	5.50 (2)	1.00 (3)	0 (0)
	1974 Adults	0 (2)	1.00 (2)	0 (1)	0 (1)	0 (1)	0 (2)	0 (2)	323.5 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0.50 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)
	YOY									22.0	30.5	35.5	16.50	19.50	9.50	42.50	9.50	3.00	1.50	0	0
	1975 Adults	0 (1)	0.50 (2)	0 (1)	0.50 (2)	0.50 (2)	1.00 (2)	0.50 (2)	0 (2)	0 (1)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (1)
	YOY	0	0	0	0	0	0	0	9.00	7.00	11.50	11.00	2.00	1.50	8.50	2.50	1.00	0	0.50	0	0
Station 11	1972	0 (0)	0 (0)	0 (4)	0 (5)	0 (3)	0 (2)	0 (4)	0 (2)	0 (4)	0 (2)	0 (4)	0 (2)	2.50 (4)	0 (2)	2.00 (3)	6.00 (2)	0 (1)	0 (3)	0 (2)	0 (1)
	1973	0 (2)	0 (5)	0 (2)	0 (2)	0 (3)	0 (2)	0 (3)	0 (1)	0 (3)	0 (2)	59.00 (2)	14.00 (3)	11.50 (2)	3.67 (3)	4.50 (2)	11.33 (3)	23.00 (1)	0.25 (4)	0 (1)	0 (0)
	1974 Adults	0 (2)	0 (2)	0 (1)	0 (1)	0 (1)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)
	YOY									13.50	12.00	11.00	31.00	14.00	20.00	13.00	19.50	16.00	0	0	0
	1975 Adults	0 (1)	0 (2)	0 (1)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (1)
	YOY	0	0	0	0	0	0	0	14.00	9.00	34.00	24.00	4.50	58.00	44.50	13.50	7.00	12.50	1.50	0	0
Station 12	1972	0 (0)	0 (0)	0 (4)	0 (5)	0 (4)	0 (2)	0 (4)	0 (2)	0 (4)	0 (2)	0 (4)	2.50 (2)	1.50 (4)	3.50 (2)	0.33 (3)	2.50 (2)	0 (1)	0 (3)	0 (1)	0 (0)
	1973	0 (2)	0 (5)	0 (2)	0 (2)	0 (3)	0 (2)	0 (3)	0 (2)	0 (3)	0 (2)	8.00 (2)	25.00 (2)	40.00 (2)	7.00 (3)	30.50 (2)	22.00 (3)	1.00 (2)	0 (3)	0 (1)	0 (0)
	1974 Adults	0 (2)	0 (2)	0 (1)	0 (1)	0 (1)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)
	YOY									14.00	25.00	20.50	43.00	22.00	11.00	21.00	7.50	0	0	0	0
	1975 Adults	0 (1)	0 (2)	0 (2)	0.50 (2)	0.50 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (1)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)
	YOY	0	0	0	0	0	0	0	4.00	8.00	31.00	4.50	11.50	1.50	1.00	9.50	11.50	1.00	0	0	0
Station 20	1972										No Data Taken in 1972										
	1973										No Data Taken in 1973										
	1974 Adults	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (2)	0 (2)	7.00 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)
	YOY									6.50	20.00	4.00	12.50	14.50	2.50	20.00	11.50	1.00	1.00	0	0
	1975 Adults	0 (1)	0 (2)	0 (2)	0.50 (2)	1.50 (2)	1.00 (2)	0 (1)	0 (1)	0 (1)	0 (2)	0 (1)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)
	YOY	0	0	0	0	0	0	0	0	5.00	9.50	4.00	16.00	10.00	5.50	5.00	1.00	2.50	0	0	0
Station 21	1972										No Data Taken in 1972										
	1973										No Data Taken in 1973										
	1974 Adults	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0.50 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)
	YOY									7.50	5.50	15.00	7.00	20.00	19.00	32.00	12.50	3.50	0	0	0
	1975 Adults	0 (1)	0 (2)	0 (2)	0.50 (2)	0 (2)	0.50 (2)	0 (2)	0 (2)	0 (2)	0 (1)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)
	YOY	0	0	0	0	0	0	0	3.50	1.50	17.00	6.50	6.50	2.50	7.00	17.00	5.00	0.50	0	0	0

Table A-7

CPUE for American Shad Collected in Standard-Station Bottom Trawls by Site Indian Point Region, Hudson River Estuary, New York, 1972-1975

Biweekly Period

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1972	0 (0)*	0 (0)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (3)	0 (2)	0 (2)	1.00 (2)	0 (2)	0 (2)	0 (2)	0.33 (3)	0 (2)	0 (1)	0 (2)	0 (2)
1973	0 (0)	0 (2)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	2.00 (1)	0 (1)	1.00 (1)	1.00 (1)	1.00 (1)	0 (1)	0 (1)	0 (1)	0 (0)
1974 Adults**	0 (0)	0 (1)	0 (1)	0 (1)	0 (1)	0 (2)	1.00 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)
YOY									0	0	0	0	0	0	4.00	0	27.00	0	0	0
1975 Adults	0 (1)	0 (1)	0 (0)	0 (1)	0 (1)	11.00 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (0)
YOY	0	0	0	0	0	0	0	0	0	0	0	0	0	3.00	1.00	2.50	0	0	0	0
1972	0 (0)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (1)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (3)	0 (2)	0 (1)	0 (2)	0 (1)
1973	0 (1)	0 (2)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	2.00 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	1.00 (2)	0 (1)	0 (1)	0 (0)
1974 Adults	0 (0)	0 (1)	0 (1)	0 (1)	2.00 (1)	0 (2)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)
YOY									0 (1)	0 (1)	1.00 (1)	1.00	0	0	12.00	13.00	5.00	0	0	0
1975 Adults	0 (0)	0 (1)	0 (1)	0 (0)	0 (0)	0 (1)	0 (0)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (0)
YOY	0	0	0	0	0	0	0	2.00	1.00	0	0	2.00	2.00	5.00	3.00	37.00	0	0	0	0
1972	0 (0)	0 (1)	0 (2)	0 (2)	0 (2)	0 (3)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0.50 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (1)	0 (2)	0 (1)
1973	0 (1)	0 (2)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	3.00 (1)	0 (1)	0 (1)	0 (1)	0 (1)	15.00 (1)	0 (2)	0.50 (2)	0 (0)
1974 Adults	0 (0)	0 (1)	0 (1)	0 (1)	0 (1)	0 (2)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)
YOY									0 (1)	0 (1)	1.00 (1)	1.00	0	6.00	1.00	0	0	0	0	0
1975 Adults	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (0)
YOY	0	0	0	0	0	0	0	0	0	1.00	0	0	0	1.00	3.00	0	1.00	0	0	0
1972	0 (0)	0 (2)	0 (2)	0 (2)	0 (2)	0 (1)	0 (1)	0 (2)	0 (2)	0 (2)	0.63 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0.50 (2)	0 (2)	0 (1)	0 (2)
1973	0 (0)	0 (2)	0 (1)	1.00 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	2.00 (1)	0 (1)	0 (1)	1.00 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (0)
1974 Adults	0 (0)	0 (1)	0 (1)	0 (1)	0 (1)	0 (2)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	1.00 (1)	0 (1)	0 (1)	0 (1)	0 (1)
YOY									0 (1)	0 (1)	0 (1)	0	0	2.00	1.00	4.00	1.00	0	0	0
1975 Adults	0 (1)	0 (1)	0 (1)	0 (1)	0 (0)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (0)	0 (1)	0 (1)	6.00 (1)	0 (1)	0 (0)	0 (1)	0 (1)	0 (0)
YOY	0	0	0	0	0	0	0	0	2.00	0	0	0	0	3.00	6.00	2.00	0	1.00	0	0
1972	0 (0)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (1)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	1.00 (2)	0.50 (2)	0.50 (2)	0 (2)	0 (2)	0 (2)
1973	0 (0)	0 (2)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	7.00 (1)	0 (1)	0 (1)	0 (0)
1974 Adults	0 (0)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)
YOY									0 (1)	0 (1)	0 (1)	3.00	0	1.00	2.00	1.00	3.00	2.00	0	0
1975 Adults	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	12.00 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (0)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (0)
YOY	0	0	0	0	0	0	0	0	0	2.00	0	0	0	0	2.00	1.00	0	0	0	0
1972	0 (0)	0 (1)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0.50 (2)	0 (2)	0.50 (2)	0 (2)	0 (2)	0 (2)	0 (2)
1973	0 (1)	0 (3)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	1.00 (1)	0 (1)	0 (1)	4.00 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (0)
1974 Adults	0 (0)	0 (1)	0 (1)	0 (1)	0 (1)	0 (2)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)
YOY									0 (1)	0 (1)	0 (1)	1.00	0	0	0	1.00	0	0	0	0
1975 Adults	0 (1)	0 (1)	0 (0)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (0)	1.00 (1)	0 (0)	0 (1)	1.00 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (0)
YOY	0	0	0	0	0	0	0	0	0	0	0	1.00	0	0	3.00	0	0	0	0	0
1972	0 (0)	0 (0)	0 (1)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (0)	0 (2)	0 (2)	0 (2)
1973	0 (0)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	2.00 (1)	0 (1)	2.00 (1)	0 (1)	0 (1)	0 (1)	1.00 (1)	0 (1)	0 (0)	0 (0)
1974 Adults	0 (0)	0 (1)	0 (1)	0 (1)	0 (1)	0 (2)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)
YOY									0 (1)	0 (1)	0 (1)	0	0	0	0	4.00	5.00	2.00	0	0
1975 Adults	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (0)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	1.00 (1)	0 (1)	0 (1)	0 (0)
YOY	0	0	0	0	0	0	0	0	2.00	0	0	0	1.00	10.00	34.00	55.00	0	5.00	0	0

Table A-8

CPUE for American Shad Collected in Standard-Station Surface Trawls by Site Indian Point Region, Hudson River Estuary, New York, 1972-1975

		Biweekly Period																			
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Station 1	1972	0 (0)*	0 (0)	0 (1)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0.50 (2)	4.50 (2)	3.50 (2)	0 (0)	0 (2)	0 (0)	0 (0)
	1973	0 (0)	0 (0)	0 (0)	0 (0)	0 (1)	0 (0)	0 (1)	0 (1)	0 (0)	0 (1)	192.00 (1)	3.00 (1)	20.00 (1)	96.00 (1)	9.00 (1)	99.00 (1)	0 (0)	0 (0)	0 (0)	0 (0)
	1974 Adults**	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	1.00 (1)	0 (1)	0 (1)	0 (1)	0 (0)
	YOY									13.00	33.00	11.00	9.00	38.00	4.00	0	13.00	17.00	0	0	0
	1975 Adults	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (0)
	YOY	0	0	0	0	0	0	0	48.00	12.00	9.00	4.00	2.00	2.00	6.00	16.00	18.00	3.00	3.00	0	0
Station 2	1972	0 (0)	0 (0)	0 (1)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	2.00 (2)	0 (2)	0 (2)	7.00 (2)	3.00 (1)	1.00 (1)	0 (0)	0 (0)
	1973	0 (0)	0 (0)	0 (1)	0 (0)	0 (1)	0 (0)	0 (1)	0 (1)	0 (0)	0 (1)	28.00 (1)	0 (1)	3.00 (1)	20.00 (1)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
	1974 Adults	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (0)
	YOY									23.00	19.00	21.00	0	36.00	1.00	2.00	6.00	2.00	0	0	0
	1975 Adults	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (1)	0 (1)	0 (1)	0 (0)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (0)
	YOY	0	0	0	0	0	0	0	42.00	10.00	14.00	0	2.00	5.00	7.00	10.00	15.00	20.00	0	0	0
Station 3	1972	0 (0)	0 (0)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0.50 (2)	1.50 (2)	3.50 (2)	3.00 (2)	3.00 (1)	0 (1)	0 (1)	0 (0)
	1973	0 (0)	0 (0)	0 (0)	0 (0)	0 (1)	0 (0)	0 (1)	0 (1)	0 (0)	0 (1)	30.00 (1)	2.00 (1)	11.00 (1)	0 (1)	6.00 (1)	113.00 (1)	0 (0)	0 (0)	0 (0)	0 (0)
	1974 Adults	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (0)	0 (1)	0 (1)	1.00 (1)	0 (1)	0 (1)	0 (0)
	YOY									14.00	0	18.00	1.00	9.00	0	2.00	20.00	5.00	1.00	0	0
	1975 Adults	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (0)
	YOY	0	0	0	0	0	0	0	8.00	21.00	10.00	9.00	2.00	0	15.00	8.00	51.00	10.00	2.00	0	0
Station 4	1972	0 (0)	0 (0)	0 (1)	0 (2)	0 (3)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0.50 (2)	3.00 (2)	0.50 (2)	2.00 (1)	0 (2)	0 (1)	0 (0)
	1973	0 (0)	0 (0)	0 (1)	0 (1)	0 (1)	0 (0)	0 (1)	0 (1)	0 (0)	0.20 (1)	24.00 (1)	1.00 (1)	104.00 (1)	12.00 (1)	0 (1)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
	1974 Adults	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (0)	0 (1)	3.00 (1)	1.00 (1)	0 (1)	0 (1)	0 (0)
	YOY									18.00	58.00	19.00	3.00	36.00	0	0	141.00	7.00	0	0	0
	1975 Adults	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (0)	0 (1)	0 (1)	0 (1)	0 (0)
	YOY	0	0	0	0	0	0	0	80.00	11.00	6.00	6.00	5.00	0	21.00	10.00	0	57.00	1.00	0	0
Station 5	1972	0 (0)	0 (0)	0 (1)	0 (2)	0 (0)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0.50 (2)	0 (2)	3.00 (2)	3.00 (1)	0 (2)	0 (1)	0 (0)
	1973	0 (1)	19.00 (1)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (1)	0 (1)	0 (1)	0 (0)	0 (1)
	1974 Adults	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (0)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (0)
	YOY									254.00	173.00	28.00	2.00	9.00	0	7.00	24.00	6.00	1.00	0	0
	1975 Adults	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (0)	0 (1)	0 (0)
	YOY	0	0	0	0	0	0	0	26.00	17.00	7.00	10.00	1.00	20.00	9.00	3.00	32.00	8.00	0	0	0
Station 6	1972	0 (0)	0 (0)	0 (1)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0.50 (2)	4.00 (2)	4.00 (1)	0 (1)	0 (1)	0 (0)
	1973	0 (0)	0 (0)	0 (1)	0 (1)	0 (1)	0 (0)	0 (1)	0 (1)	0 (0)	0 (1)	49.00 (1)	0 (1)	0 (0)	10.00 (1)	2.31 (1)	138.00 (1)	0 (0)	0 (0)	0 (0)	0 (0)
	1974 Adults	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	2.00 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (0)	0 (1)	0 (1)	0 (1)	0 (1)	0 (0)	0 (0)
	YOY									60.00	48.00	19.00	0	4.00	0	1.00	25.00	0	0	0	0
	1975 Adults	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)
	YOY	0	0	0	0	0	0	0	18.00	6.00	21.00	21.00	3.00	6.00	6.00	4.00	9.00	26.00	3.00	0	0
Station 7	1972	0 (0)	0 (0)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0.50 (2)	0 (2)	3.00 (2)	0 (0)	0 (1)	0 (1)	0 (0)
	1973	0 (0)	0 (0)	1.00 (1)	0 (1)	0 (1)	0 (2)	0 (1)	0 (2)	0 (0)	0 (1)	35.00 (1)	2.00 (1)	0 (0)	9.00 (1)	10.00 (1)	43.00 (1)	0 (0)	0 (0)	0 (0)	0 (0)
	1974 Adults	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (0)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (0)
	YOY									74.00	37.00	28.00	2.00	3.00	0	1.00	23.00	6.00	0	0	0
	1975 Adults	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (0)
	YOY	0	0	0	0	0	0	0	37.00	16.00	8.00	51.00	0	4.00	11.00	14.00	87.00	9.00	5.00	0	0

Table A-9

CPUE for Alewife Collected in Standard-Station Beach Seines by Site Indian Point Region, Hudson River Estuary, New York, 1972-1975

			Biweekly Period																			
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Station 8	1972		0 (0)	0 (0)	10.50 (4)	46.50 (5)	5.80 (5)	0.50 (2)	1.67 (3)	2.00 (2)	3.75 (4)	0 (2)	4.00 (4)	0 (2)	5.25 (4)	8.00 (2)	15.33 (3)	0 (2)	0 (2)	0 (3)	0 (2)	0 (0)
	1973		0 (2)	0.25 (4)	0 (2)	3.00 (2)	7.33 (3)	1.00 (2)	0.67 (3)	0 (2)	0 (3)	0 (2)	9.50 (2)	0 (3)	7.50 (2)	20.00 (3)	18.50 (2)	0 (2)	113.00 (2)	6.00 (3)	0 (1)	0 (0)
	1974	Adults	0 (3)	0.50 (2)	1.00 ( )	1.00 (1)	1.00 (1)	0 (2)	0 (2)	1.50 (2)	0 (2)	0 (2)	0 (1)	0 (1)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)
		YOY									0	0	0	0	0	4.00	3.50	0	0	0	0	0
	1975	Adults	0 (1)	0 (1)	1.00 (1)	1.50 (2)	0.50 (2)	0.50 (2)	0 (1)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (1)	0 (1)
		YOY	0	0	0	0	0	0	0	0	0.50	0.50	0	0	0	0	3.50	6.00	0.50	0	0	0
Station 9	1972		0 (1)	0 (1)	1.25 (4)	8.25 (4)	5.40 (5)	2.00 (2)	1.00 (4)	0.50 (2)	1.75 (4)	0 (2)	1.60 (5)	1.00 (2)	10.00 (4)	5.00 (2)	4.67 (3)	0 (2)	0 (2)	0 (3)	0 (2)	0 (1)
	1973		0 (2)	0 (4)	0.50 (2)	0 (2)	8.00 (3)	0 (2)	0.33 (3)	0 (2)	0 (3)	0 (2)	4.00 (2)	31.00 (3)	29.50 (2)	28.00 (3)	32.00 (2)	4.00 (3)	4.00 (2)	2.50 (2)	0 (2)	0 (0)
	1974	Adults	0 (2)	0 (2)	0 (1)	0 (1)	2.00 (1)	1.50 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)
		YOY									3.50	28.50	19.00	19.00	0	1.50	1.50	0.50	0	0	0	0
	1975	Adults	0 (1)	0 (2)	0 (1)	0 (2)	2.50 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (1)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (1)
		YOY	0	0	0	0	0	0	0	1.50	8.00	7.00	0.50	0	4.50	1.50	4.00	0.50	1.00	0	0	0
Station 10	1972		0 (0)	0 (0)	2.25 (4)	4.75 (4)	3.60 (5)	0.50 (2)	0 (4)	0 (2)	6.75 (4)	7.50 (2)	6.00 (4)	0 (2)	0.25 (4)	0 (2)	0 (3)	7.50 (2)	0.50 (2)	0 (4)	0 (2)	0 (1)
	1973		0 (2)	0 (4)	3.00 (2)	3.00 (2)	2.33 (2)	1.00 (2)	0.33 (3)	0 (2)	0 (3)	13.00 (2)	13.00 (2)	7.67 (3)	0 (2)	0.67 (3)	0 (2)	2.67 (3)	0 (1)	1.00 (2)	0 (3)	0 (0)
	1974	Adults	0.50 (2)	5.00 (2)	5.00 (1)	5.00 (1)	2.00 (1)	0 (2)	0 (2)	1.00 (2)	0.50 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)
		YOY									0.50 (2)	2.50 (2)	0 (2)	2.00	0	0	0	0	0	0	0	0
	1975	Adults	0 (1)	9.50 (2)	6.00 (1)	4.50 (2)	3.00 (2)	1.00 (2)	2.00 (2)	0 (2)	0 (1)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (1)
		YOY	0	0	0	0	0	0	0	0.50	0	0	0.50	0	0	0	0	0	0	1.00	0.50	0
Station 11	1972		0 (0)	0 (0)	1.50 (4)	16.80 (5)	1.33 (3)	3.00 (2)	0.50 (4)	0.50 (2)	9.75 (4)	0 (2)	3.00 (4)	0 (2)	0 (4)	0 (2)	1.00 (3)	0 (2)	0 (1)	0 (3)	0 (2)	0 (1)
	1973		0 (2)	0 (5)	4.00 (2)	1.00 (2)	0 (3)	0 (2)	0 (3)	0 (1)	0 (3)	51.00 (2)	12.50 (2)	8.33 (3)	0 (2)	0 (3)	0 (2)	0 (3)	0 (1)	1.25 (4)	0 (1)	0 (0)
	1974	Adults	0 (2)	0 (2)	0 (1)	3.00 (1)	2.00 (1)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)
		YOY									0	0	0	0	0	0	0	0	1.00	0	0	0
	1975	Adults	0 (1)	0 (2)	0 (1)	1.50 (2)	5.00 (2)	3.50 (2)	0.50 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (1)
		YOY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.50	0.50	0.50	0	0	0
Station 12	1972		0 (0)	0 (0)	2.00 (4)	6.00 (5)	8.00 (4)	0.50 (2)	0.25 (4)	1.00 (2)	12.00 (4)	0.50 (2)	2.25 (4)	1.50 (2)	11.00 (4)	10.00 (2)	5.67 (3)	2.50 (2)	0 (1)	0 (3)	0 (1)	0 (0)
	1973		0 (2)	0 (5)	0 (2)	0.50 (2)	5.00 (3)	0 (2)	1.67 (3)	0 (2)	0 (3)	50.00 (2)	27.50 (2)	7.50 (2)	65.00 (2)	50.00 (3)	47.50 (2)	40.00 (3)	2.00 (2)	2.33 (3)	0 (1)	0 (0)
	1974	Adults	0 (2)	0.50 (2)	1.00 (1)	0 (1)	0 (1)	2.00 (2)	0 (2)	1.00 (2)	0.50 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (1)
		YOY									5.00	3.00	1.50	1.00	0.50	0.50	3.00	1.00	0.50	0	0	0
	1975	Adults	0 (1)	0 (2)	1.00 (2)	1.50 (2)	0 (2)	0.50 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (1)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (1)
		YOY	0	0	0	0	0	0	0	4.00	3.50	13.50	0	0	4.00	0	8.50	12.00	11.00	0	0	0
Station 20	1972											No Data Taken in 1972										
	1973											No Data Taken ih 1973										
	1974	Adults	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (2)	0 (2)	3.50 (2)	0.50 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)
		YOY									2.50	2.50	0.50	0.50	3.00	0	0	0	0	0	0	0
	1975	Adults	0 (1)	0 (2)	1.50 (2)	2.00 (2)	2.00 (2)	0.50 (2)	0 (1)	0 (1)	0 (1)	0 (2)	0 (1)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)
		YOY	0	0	0	0	0	0	0	6.00	3.00	0.50	0	1.50	0	0	3.50	0	2.50	0	0	0
Station 21	1972											No Data Taken in 1972										
	1973											No Data Taken in 1973										
	1974	Adults	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	7.50 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)
		YOY									0	0	0	0	0	0	0.50	0.50	0	0	0	0
	1975	Adults	0 (1)	0 (2)	0 (2)	1.00 (2)	1.00 (2)	0 (2)	0.50 (2)	0 (2)	0 (2)	0 (1)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (1)
		YOY	0	0	0	0	0	0	0	0	1.50	0	0	0	1.00	0	1.50	0	0.50	0	0	0

Table A-10

CPUE for Alewife Collected in Standard-Station Bottom Trawls by Site Indian Point Region, Hudson River Estuary, New York, 1972-1975

		Biweekly Period																			
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Station 1	1972	0 (0)*	0 (0)	0 (2)	0 (2)	2.33 (2)	0.48 (2)	0 (2)	0 (2)	0 (3)	2.33 (2)	0.33 (2)	1.50 (2)	0 (2)	0 (2)	0 (2)	0 (3)	0.50 (2)	0 (1)	0 (2)	0 (2)
	1973	0 (0)	0 (2)	6.00 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	3.00 (1)	0.60 (1)	4.00 (1)	0 (1)	0 (1)	1.00 (1)	2.00 (1)	0 (1)	8.00 (1)	0 (1)	0 (1)	0 (0)
	1974																				
	Adults**	0 (0)	0 (1)	0 (1)	15.00 (1)	0 (1)	0 (2)	1.00 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	2.00 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)
	YOY									0 (1)	0 (1)	0 (1)	0	0	0	0	0	0	13.00	0	0
	1975																				
	Adults	0 (1)	0 (1)	0 (0)	0 (1)	0 (1)	40.00 (1)	1.00 (1)	0 (1)	1.00 (1)	0 (1)	0 (1)	0 (1)	1.00 (1)	1.00 (1)	0 (1)	0 (1)	0 (1)	3.00 (1)	0 (1)	0 (0)
	YOY	0	0	0	0	0	0	0	0	2.00	0	0	0	1.00	12.00	0	1.00	0	28.00	0	0
Station 2	1972	0 (0)	0.50 (2)	0 (2)	0 (2)	2.33 (2)	6.00 (2)	0 (1)	0 (2)	0 (2)	0.33 (2)	0.33 (2)	1.00 (2)	0 (2)	1.00 (2)	0.50 (2)	0.94 (3)	0.50 (2)	0 (1)	0 (2)	0 (1)
	1973	0 (1)	0.50 (2)	1.00 (1)	18.00 (1)	0 (1)	0 (1)	2.00 (1)	0 (1)	0 (1)	0.20 (1)	3.00 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0.50 (2)	0 (1)	0 (1)	0 (0)
	1974																				
	Adults	0 (0)	0 (1)	0 (1)	7.00 (1)	9.00 (1)	0 (2)	0 (1)	2.00 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	1.00 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)
	YOY									0 (1)	0 (1)	0 (1)	0	0	0	86.00	11.00	45.00	1.00	0	0
	1975																				
	Adults	0 (0)	0 (1)	2.00 (1)	0 (0)	0 (0)	0 (1)	0 (0)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	2.00 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (0)
	YOY	0	0	0	0	0	0	0	0	18.00	0	0	7.00	0	1.00	0	17.00	80.00	2.00	0	0
Station 3	1972	0 (0)	0 (1)	0 (2)	0 (2)	1.00 (2)	1.48 (3)	0.50 (2)	0 (2)	0 (2)	2.00 (2)	0.33 (3)	1.00 (2)	0 (2)	1.00 (2)	6.00 (2)	1.00 (2)	0 (2)	0 (1)	0 (2)	0 (1)
	1973	0 (1)	0.50 (2)	7.00 (1)	0 (1)	2.00 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	2.00 (1)	1.00 (1)	0 (1)	0 (1)	0 (1)	105.00 (1)	0 (2)	2.00 (2)	0 (0)
	1974																				
	Adults	0 (0)	0 (1)	0 (1)	10.00 (1)	0 (1)	0 (2)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)
	YOY									0 (1)	0 (1)	0 (1)	0	0	0	0	0	0	1.00	0	0
	1975																				
	Adults	0 (1)	0 (1)	1.00 (1)	20.00 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	1.00 (1)	0 (1)	0 (0)
	YOY	0	0	0	0	0	0	0	0	0	0	0	0	1.00	1.00	4.00	2.00	9.00	42.00	0	0
Station 4	1972	0 (0)	0 (2)	0 (2)	0 (2)	0.67 (2)	1.33 (1)	0 (1)	0 (2)	0.33 (2)	0 (2)	0.33 (2)	0.33 (2)	0.50 (2)	4.50 (2)	1.00 (2)	1.00 (2)	0 (2)	0 (2)	0 (1)	0 (2)
	1973	0 (0)	0 (2)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0.67 (1)	0 (1)	0 (1)	4.00 (1)	6.00 (1)	3.00 (1)	2.00 (1)	2.00 (1)	0 (1)	15.00 (1)	0 (1)	0 (1)	0 (0)
	1974																				
	Adults	0 (0)	0 (1)	0 (1)	8.00 (1)	0 (1)	0 (2)	0 (1)	0 (1)	3.00 (1)	4.00 (1)	2.00 (1)	0 (1)	2.00 (1)	5.00 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)
	YOY									0 (1)	0 (1)	0 (1)	0	1.00	7.00	0	1.00	0	2.00	0	0
	1975																				
	Adults	0 (1)	1.00 (1)	4.00 (1)	0 (1)	0 (0)	0 (1)	0 (1)	1.00 (1)	3.00 (1)	0 (1)	0 (1)	0 (0)	1.00 (1)	2.00 (1)	17.00 (1)	0 (1)	0 (0)	0 (1)	0 (1)	0 (0)
	YOY	0	0	0	0	0	0	0	0	0	0	0	0	1.00	2.00	19.00	0	0	3.00	0	0
Station 5	1972	0 (0)	0 (2)	0 (2)	0 (2)	4.50 (2)	0.33 (2)	0 (2)	0.33 (2)	3.33 (1)	0.33 (2)	0.33 (2)	0 (2)	0 (2)	2.00 (2)	2.00 (2)	0 (2)	1.00 (2)	0 (2)	0 (2)	0 (2)
	1973	0 (0)	0 (2)	0 (1)	0 (1)	0 (1)	0 (1)	3.00 (1)	0 (1)	1.00 (1)	0 (1)	1.00 (1)	0 (1)	7.00 (1)	0 (1)	0 (1)	0 (1)	37.00 (1)	3.00 (1)	0 (1)	0 (0)
	1974																				
	Adults	0 (0)	0 (1)	0 (1)	3.00 (1)	0 (1)	0 (1)	1.00 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	1.00 (1)	0 (1)	0 (1)	0 (1)	0 (1)
	YOY									0 (1)	0 (1)	0 (1)	0	0	0	0	17.00	0	8.00	0	0
	1975																				
	Adults	0 (1)	0 (1)	0 (1)	3.00 (1)	1.00 (1)	11.00 (1)	0 (1)	0 (1)	1.00 (1)	0 (1)	0 (0)	0 (1)	3.00 (1)	2.00 (1)	7.00 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (0)
	YOY	0	0	0	0	0	0	0	0	0	2.00	0	1.00	2.00	19.00	5.00	4.00	0	2.00	0	0
Station 6	1972	0 (0)	0 (1)	0 (2)	0 (2)	1.50 (2)	0 (2)	0.83 (2)	0 (2)	0 (3)	0 (2)	1.50 (2)	0 (2)	0 (2)	0 (2)	0.50 (2)	1.50 (2)	3.00 (2)	0 (2)	0 (2)	0 (2)
	1973	0 (1)	0 (3)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0.20 (1)	1.00 (1)	10.00 (1)	4.00 (1)	2.00 (1)	0 (1)	0 (1)	0 (1)	54.00 (1)	0 (1)	0 (0)
	1974																				
	Adults	0 (0)	0 (1)	0 (1)	1.00 (1)	1.00 (1)	0 (2)	0 (1)	0 (1)	2.00 (1)	2.00 (1)	0 (1)	0 (1)	0 (1)	1.00 (1)	2.00 (1)	0 (1)	0 (0)	0 (1)	0 (1)	0 (1)
	YOY									0 (1)	0 (1)	0 (1)	0	0	0	0	0	0	0	0	0
	1975																				
	Adults	0 (1)	0 (1)	0 (0)	1.00 (1)	0 (1)	2.00 (1)	0 (1)	2.00 (1)	1.00 (1)	0 (1)	0 (0)	1.00 (1)	0 (0)	0 (1)	16.00 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (0)
	YOY	0	0	0	0	0	0	0	0	0	0	0	0	0	2.00	17.00	4.00	2.00	15.00	0	0
Station 7	1972	0 (0)	0 (0)	0 (1)	0 (2)	1.25 (2)	0.67 (2)	5.50 (2)	0.33 (2)	0.33 (2)	0.33 (2)	1.50 (2)	0.50 (2)	0.50 (2)	0 (2)	7.50 (2)	0.50 (2)	0 (0)	0 (2)	0 (2)	0 (2)
	1973	0 (0)	0 (1)	20.00 (1)	1.00 (1)	0 (1)	1.00 (1)	1.00 (1)	0 (1)	0 (1)	0.60 (1)	1.00 (1)	0 (1)	4.00 (1)	0 (1)	0 (1)	0 (1)	16.00 (1)	2.00 (1)	0 (0)	0 (0)
	1974																				
	Adults	0 (0)	0 (1)	0 (1)	21.00 (1)	0 (1)	0 (2)	17.00 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)
	YOY									0 (1)	0 (1)	0 (1)	0	0	0	9.00	30.00	26.00	1.00	0	0
	1975																				
	Adults	0 (1)	0 (1)	0 (1)	27.00 (1)	12.00 (1)	2.00 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (0)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	1.00 (1)	0 (1)	0 (1)	0 (0)
	YOY	0	0	0	0	0	0	0	0	0	0	0	0	0	61.00	9.00	643.00	94.00	18.00	0	0

Table A-11

CPUE for Alewife Collected in Standard-Station Surface Trawls by Site Indian Point Region, Hudson River Estuary, New York, 1972-1975

	Biweekly Period																			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1972	0 (0)	0 (0)	0 (1)	3.00 (2)	0 (2)	1.50 (2)	0 (2)	0.67 (2)	0 (2)	1.00 (2)	0.50 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (0)	0 (0)
1973	0 (0)	0 (0)	0 (0)	0 (0)	0 (1)	0 (0)	0 (1)	0 (1)	0 (0)	0 (1)	62.00 (1)	0 (1)	0 (1)	0 (1)	0 (1)	593.00 (1)	0 (0)	0 (0)	0 (0)	0 (0)
1974																				
Adults	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (0)
YOY																				
1975																				
Adults	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (0)
YOY	0	0	0	0	0	0	0	8.00	2.00	0	0	0	0	0	0	7.00	25.00	0	0	0
1972	0 (0)	0 (0)	0 (1)	1.67 (2)	1.83 (2)	3.00 (2)	0 (2)	4.33 (2)	0 (2)	4.50 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	1.00 (2)	0 (1)	0 (1)	0 (0)	0 (0)
1973	0 (0)	0 (0)	6.00 (1)	0 (0)	0 (1)	0 (0)	1.00 (1)	0 (1)	0 (0)	42.20 (1)	18.00 (1)	5.00 (1)	0 (1)	0 (1)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
1974																				
Adults	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	9.00 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (0)
YOY									7.00	0	0	0	0	0	0	0	0	0	0	0
1975																				
Adults	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (1)	0 (1)	0 (1)	0 (0)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (0)
YOY	0	0	0	0	0	0	0	9.00	12.00	0	0	0	0	0	0	3.00	18.00	0	0	0
1972	0 (0)	0 (0)	1.50 (2)	10.00 (2)	1.50 (2)	0.50 (2)	0 (2)	0.33 (2)	0 (2)	1.00 (2)	0 (2)	0.50 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (1)	0 (1)	0 (1)	0 (0)
1973	0 (0)	0 (0)	0 (0)	0 (0)	0 (1)	0 (0)	0 (1)	0 (1)	0 (0)	27.80 (1)	35.00 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (0)	0 (0)	0 (0)	0 (0)
1974																				
Adults	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (0)
YOY									0	0	0	0	0	0	4.00	0	0	0	0	0
1975																				
Adults	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (0)
YOY	0	0	0	0	0	0	0	1.00	0	0	0	0	0	0	0	13.00	23.00	0	0	0
1972	0 (0)	0 (0)	0 (1)	1.67 (2)	0.50 (3)	0 (2)	0 (2)	1.00 (2)	0 (2)	20.50 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	1.00 (2)	0 (1)	0 (2)	0 (1)	0 (0)
1973	0 (0)	0 (0)	0 (1)	8.00 (1)	0 (1)	0 (0)	0 (1)	0 (1)	0 (0)	215.20 (1)	186.00 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
1974																				
Adults	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (0)	0 (1)	1.00 (1)	0 (1)	0 (1)	0 (1)	0 (0)
YOY									0	0	0	0	0	0	0	4.00	0	0	0	0
1975																				
Adults	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (0)	0 (1)	0 (1)	0 (1)	0 (0)
YOY	0	0	0	0	0	0	0	27.00	0	5.00	0	0	0	3.00	0	0	75.00	0	0	0
1972	0 (0)	0 (0)	1.00 (1)	8.33 (2)	0 (0)	1.50 (2)	0.33 (2)	0 (2)	0 (2)	0.50 (2)	0.50 (2)	1.00 (2)	0.50 (2)	0 (2)	0 (2)	6.00 (2)	2.00 (1)	0 (2)	0 (1)	0 (0)
1973	0 (0)	0 (0)	0 (1)	7.00 (1)	0 (1)	0 (0)	0 (1)	0 (1)	0 (0)	149.00 (1)	30.00 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
1974																				
Adults	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (0)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (0)
YOY									3.00	0	0	0	0	0	2.00	0	0	0	0	0
1975																				
Adults	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (1)	0 (1)	0 (1)	0 (1)	1.00 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (0)	0 (1)	0 (0)
YOY	0	0	0	0	0	0	0	3.00	0	0	0	0	0	0	0	0	15.00	0	0	0
1972	0 (0)	0 (0)	0 (1)	1.33 (2)	1.50 (2)	0 (2)	0.50 (2)	0 (2)	0 (2)	10.50 (2)	1.00 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (1)	0 (1)	0 (1)	0 (0)
1973	0 (0)	0 (0)	1.00 (1)	2.00 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (0)	35.40 (1)	15.00 (1)	2.00 (1)	0 (0)	0 (1)	0 (1)	0 (1)	0 (0)	0 (0)	0 (0)	0 (0)
1974																				
Adults	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (0)	0 (1)	1.00 (1)	0 (1)	0 (1)	0 (0)	0 (0)
YOY									0	0	0	0	0	0	0	3.00	0	0	0	0
1975																				
Adults	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (0)
YOY	0	0	0	0	0	0	0	0	2.00	3.00	0	0	0	0	0	0	37.00	0	0	0
1972	0 (0)	0 (0)	0 (2)	1.75 (2)	2.17 (2)	1.00 (2)	0.50 (2)	0.67 (2)	0 (2)	12.50 (2)	0 (2)	0.50 (2)	0 (2)	0 (2)	0.50 (2)	3.00 (2)	0 (0)	0 (1)	0 (1)	0 (0)
1973	0 (0)	0 (0)	1.00 (1)	3.00 (1)	0 (1)	0 (0)	0 (1)	52.33 (2)	0 (0)	80.22 (1)	42.00 (1)	0 (1)	0 (0)	0 (1)	0 (1)	0 (1)	0 (0)	0 (0)	0 (0)	0 (0)
1974																				
Adults	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (0)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (0)
YOY									0	0	0	0	0	0	0	0	5.00	0	0	0
1975																				
Adults	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (0)
YOY	0	0	0	0	0	0	0	13.00	1.00	0	2.00	0	1.00	0	0	96.00	39.00	95.00	0	0

Table A-12

CPUE for Blueback Herring Collected in Standard-Station Beach Seines by Site Indian Point Region, Hudson River Estuary, New York, 1972-1975

	Biweekly Period																			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1972	0 (0)*	0 (0)	0 (4)	57.25 (4)	1.60 (5)	0 (2)	0 (3)	0 (2)	1.25 (4)	15.00 (2)	1.25 (4)	0 (2)	0 (4)	2.00 (2)	0.67 (2)	40.50 (2)	0 (2)	0 (3)	0 (2)	0 (0)
1973	0 (2)	0 (4)	0.50 (2)	2.00 (2)	0 (3)	0 (2)	0 (3)	0 (2)	0 (3)	47.50 (2)	8.50 (2)	3.67 (3)	0 (2)	0.67 (3)	1.00 (2)	0.50 (2)	2.00 (2)	0 (3)	0 (1)	0 (0)
1974																				
Adults**	0.33 (3)	0.50 (2)	1.00 (1)	3.00 (1)	3.00 (1)	2.50 (2)	3.50 (2)	0 (2)	0 (2)	0 (1)	0 (1)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)
YOY								0	0	0	0	0	0	0	0	0	0	0	0	0
1975																				
Adults	0 (1)	0 (1)	0 (1)	0.50 (2)	0 (2)	0 (2)	0 (1)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (1)	0 (1)
YOY	0	0	0	0	0	0	0	0	0	15.50	0	0	0	2.00	22.00	0.50	17.50	0.50	0	0
1972	0 (0)	0 (0)	0 (4)	0 (4)	0.80 (5)	0 (2)	0.25 (4)	0 (2)	4.50 (4)	7.00 (2)	1.80 (5)	0.50 (2)	2.75 (4)	0.50 (2)	0.67 (3)	2.00 (2)	2.50 (2)	0 (3)	0 (2)	0 (1)
1973	0 (2)	0 (4)	12.00 (2)	1.00 (2)	1.33 (3)	0.50 (2)	0.33 (3)	0 (2)	0 (3)	4.50 (2)	27.50 (2)	2.33 (3)	35.50 (2)	2.33 (3)	0 (2)	2.33 (3)	14.50 (2)	0.50 (2)	0 (2)	0 (0)
1974																				
Adults	0 (2)	0 (2)	11.00 (1)	5.00 (1)	0 (1)	0 (2)	5.50 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)
YOY									0	2.00	0	0	0	0	0	1.00	5.50	0	0	0
1975																				
Adults	0 (1)	0 (2)	31.00 (1)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (1)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (1)
YOY	0	0	0	0	0	0	0	1.00	0	6.00	0	0	0	0	2.50	30.50	5.00	4.00	0	0
1972	0 (0)	0 (0)	0.25 (4)	3.25 (4)	21.60 (5)	49.00 (2)	12.50 (4)	1.00 (2)	5.25 (4)	7.00 (2)	2.25 (4)	1.50 (2)	0.25 (4)	0 (2)	1.67 (3)	1817.00 (2)	337.00 (2)	4.25 (4)	0 (2)	0 (1)
1973	0 (2)	0.25 (4)	0 (2)	0.50 (2)	0.67 (3)	1.00 (2)	7.33 (3)	0 (2)	0 (3)	146.50 (2)	610.00 (2)	24.00 (3)	0.50 (2)	1.00 (3)	0 (2)	273.33 (3)	28.00 (1)	177.50 (2)	22.33 (3)	0 (0)
1974																				
Adults	0 (2)	1.50 (2)	12.00 (1)	0 (1)	1.00 (1)	62.50 (2)	15.50 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)
YOY									0	0	1.00	0	3.00	0	0.50	0	11.50	0	0	0
1975																				
Adults	0 (1)	6.00 (2)	4.00 (1)	0 (0)	20.50 (2)	18.00 (2)	9.50 (2)	0 (2)	0 (1)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (1)
YOY	0	0	0	0	0	0	0	0	0	216.00	2.00	0	0	0	1.00	2.00	0.50	80.50	0	0
1972	0 (0)	0 (0)	0 (4)	2.40 (5)	6.00 (3)	3.00 (2)	2.00 (4)	0.50 (2)	0.50 (4)	10.00 (2)	0 (4)	0 (2)	0 (4)	0 (2)	9.67 (3)	17.50 (2)	0 (1)	5.67 (3)	0 (2)	0 (1)
1973	0.50 (2)	0 (5)	1.00 (2)	1.50 (2)	20.33 (3)	18.50 (2)	0 (3)	0 (1)	0 (3)	378.00 (2)	37.50 (2)	8.00 (3)	0 (2)	0.33 (3)	0 (2)	396.33 (3)	4.00 (1)	33.00 (4)	0 (1)	0 (0)
1974																				
Adults	0 (2)	0 (2)	11.00 (1)	112.00 (1)	2.00 (1)	0 (2)	6.00 (2)	4.00 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)
YOY									0	0	0	0	0.50	4.00	73.50	64.50	90.00	0	0	0
1975																				
Adults	0 (1)	0 (2)	2.00 (1)	0 (2)	4.50 (2)	9.00 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (1)
YOY	0	0	0	0	0	0	0	0	0	0	1.00	0	0	14.50	7.00	172.00	36.50	128.00	0	0
1972	0 (0)	0 (0)	0 (4)	21.60 (5)	0 (4)	0.50 (2)	0.75 (4)	1.00 (2)	6.00 (4)	11.50 (2)	0.25 (4)	3.00 (2)	0.25 (4)	1.00 (2)	1.00 (3)	41.00 (2)	0 (1)	0 (3)	0 (1)	0 (0)
1973	0 (2)	0 (5)	1.00 (2)	0 (2)	5.00 (3)	0 (2)	11.67 (3)	0 (2)	0 (3)	54.50 (2)	27.50 (2)	81.50 (2)	14.00 (2)	0 (3)	1.50 (2)	55.67 (3)	1.50 (2)	0 (3)	0 (1)	0 (0)
1974																				
Adults	0 (2)	0 (2)	0 (1)	3.00 (1)	2.00 (1)	9.50 (2)	6.00 (2)	8.00 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (1)
YOY									0	0.50	0	0	0	0	29.00	5.00	0	0	0	0
1975																				
Adults	0 (1)	0.50 (2)	0 (2)	10.50 (2)	0 (2)	0 (2)	0.50 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (1)
YOY	0	0	0	0	0	0	0	1.50	0.50	18.00	0	0	0	0	22.50	650.00	64.00	131.00	0.50	0
1972										No Data Taken in 1972										
1973										No Data Taken in 1973										
1974																				
Adults	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	29.50 (2)	18.00 (2)	1.50 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)
YOY									0	13.00	0	0	0.50	0	0	71.00	53.50	9.50	0	0
1975																				
Adults	0 (1)	0 (2)	9.00 (2)	28.00 (2)	53.00 (2)	0.50 (2)	3.00 (1)	1.00 (1)	0 (1)	0 (2)	0 (1)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (1)
YOY	0	0	0	0	0	0	0	0	3.00	0	0	0	0	7.50	410.50	312.00	276.50	821.50	6.00	0
1972										No Data Taken in 1972										
1973										No Data Taken in 1973										
1974																				
Adults	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	21.00 (2)	34.50 (2)	2.50 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)
YOY									0	0	0	0	0.50	0.50	5.00	209.00	0	0	0	0
1975																				
Adults	0 (1)	0 (2)	1.00 (2)	24.00 (2)	1.80 (2)	3.50 (2)	0 (2)	0 (2)	0 (2)	0 (1)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)
YOY	0	0	0	0	0	0	0	0	0	0	1.00	0	0	1.00	4.50	0	271.50	20.50	28.50	0

Table A-13

CPUE for Blueback Herring Collected in Standard-Station Bottom Trawls by Site Indian Point Region, Hudson River Estuary, New York, 1972-1975

Biweekly Period

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1972	0 (0)*	0 (0)	0 (2)	0 (2)	0 (2)	0.33 (2)	0 (2)	0 (2)	0 (3)	0 (2)	0 (2)	1.33 (2)	0 (2)	0 (2)	0 (2)	0 (3)	0.50 (2)	0 (1)	0 (2)	0 (2)
1973	0 (0)	0 (2)	1.00 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (0)
1974																				
Adults**	0 (0)	0 (1)	0 (1)	3.00 (1)	0 (1)	4.00 (2)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)
YOY									0	0	0	0	0	0	0	1.00	0	0	0	0
1975																				
Adults	0 (1)	0 (1)	0 (0)	0 (1)	0 (1)	2.00 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (0)
YOY	0	0	0	0	0	0	0	0	0	0	0	0	0	2.00	1.00	2.00	0	0	0	0
1972	0 (0)	0 (2)	0 (2)	0 (2)	0 (2)	4.00 (2)	0 (1)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0.50 (2)	1.00 (3)	0 (2)	0 (1)	0 (2)	0 (1)
1973	0 (1)	0 (2)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	1.20 (1)	10.00 (1)	5.00 (1)	0 (1)	0 (1)	10.00 (1)	0 (1)	5.50 (2)	0 (1)	0 (1)	0 (0)
1974																				
Adults	0 (0)	0 (1)	0 (1)	64.00 (1)	0 (1)	7.00 (2)	7.00 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	1.00 (1)	0 (1)	0 (1)	0 (1)
YOY									0	0	1.00	0	0	0	54.00	11.00	69.00	7.00	0	0
1975																				
Adults	0 (0)	1.00 (1)	0 (1)	0 (0)	0 (0)	25.00 (1)	0 (0)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (0)
YOY	0	0	0	0	0	0	0	0	0	2.00	0	0	0	369.00	0	960.00	2.00	0	0	0
1972	0 (0)	0 (1)	0 (2)	0 (2)	0 (2)	0.30 (3)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0.50 (2)	0 (2)	0 (2)	0.50 (2)	0 (2)	0 (2)	0 (1)	0 (2)	0 (1)
1973	0 (1)	0 (2)	1.00 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	6.00 (1)	0 (1)	0 (1)	4.00 (1)	9.00 (1)	0 (1)	14.00 (1)	67.00 (2)	0 (2)	0 (0)
1974																				
Adults	0 (0)	0 (1)	0 (1)	7.00 (1)	0 (1)	0 (2)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)
YOY									0	0	0	0	0	0	0	0	18.00	0	0	0
1975																				
Adults	0 (1)	0 (1)	0 (1)	0 (1)	2.00 (1)	23.00 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (0)
YOY	0	0	0	0	0	0	0	0	0	0	0	0	0	85.00	13.00	5.00	0	0	0	0
1972	0 (0)	0 (2)	0 (2)	0 (2)	0 (2)	0 (1)	0 (1)	0 (2)	0 (2)	0 (2)	0 (2)	0.63 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (1)	0 (2)
1973	0 (0)	0 (2)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	2.00 (1)	0.60 (1)	1.00 (1)	0 (1)	1.00 (1)	0 (1)	0 (1)	0 (1)	19.00 (1)	0 (1)	0 (1)	0 (0)
1974																				
Adults	0 (0)	0 (1)	0 (1)	0 (1)	0 (1)	0 (2)	0 (1)	0 (1)	0 (1)	2.00 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)
YOY									0	0	0	0	0	0	10.00	56.00	28.00	0	0	0
1975																				
Adults	0 (1)	0 (1)	0 (1)	6.00 (1)	0 (0)	11.00 (1)	0 (1)	0 (1)	1.00 (1)	0 (1)	0 (1)	0 (0)	0 (1)	1.00 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (0)
YOY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6.00	9.00	0	4.00	0	0
1972	0 (0)	0 (2)	0 (2)	0 (2)	0 (2)	0.33 (2)	0 (2)	0 (2)	0 (1)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0.50 (2)	0 (2)	2.00 (2)	0 (2)	0 (2)	0 (2)
1973	0 (0)	0 (2)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	9.00 (1)	0 (1)	0 (1)	0 (0)
1974																				
Adults	0 (0)	0 (1)	1.00 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)
YOY									0	0	0	0	0	0	6.00	19.00	33.00	3.00	0	0
1975																				
Adults	0 (1)	0 (1)	0 (1)	2.00 (1)	1.00 (1)	3.00 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (0)	0 (1)	0 (1)	1.00 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (0)
YOY	0	0	0	0	0	0	0	0	1.00	0	0	0	0	5.00	12.00	18.00	2.00	0	0	0
1972	0 (0)	0 (1)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (3)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	1.50 (2)	2.00 (2)	0 (2)	0 (2)	0 (2)
1973	0 (1)	0 (3)	0 (1)	0 (1)	1.00 (1)	0 (1)	2.00 (1)	0 (1)	1.00 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	1.00 (1)	0 (1)	0 (1)	0 (1)
1974																				
Adults	0 (0)	0 (1)	1.00 (1)	0 (1)	0 (1)	0.50 (2)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (0)	0 (1)	0 (1)	0 (1)
YOY									0	0	0	0	0	0	0	0	0	0	0	0
1975																				
Adults	0 (1)	0 (1)	0 (0)	1.00 (1)	3.00 (1)	9.00 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (0)	0 (1)	0 (0)	0 (1)	2.00 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (0)
YOY	0	0	0	0	0	0	0	0	0	0	0	0	0	1.00	9.00	0	0	0	0	0
1972	0 (0)	0 (0)	0 (1)	0 (2)	0 (2)	0.67 (2)	0 (2)	0.33 (2)	0 (2)	0 (2)	0.33 (2)	0 (2)	0 (2)	0 (2)	0.50 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)
1973	0 (0)	0 (1)	0 (1)	3.00 (1)	5.00 (1)	1.00 (1)	0 (1)	0 (1)	6.00 (1)	3.80 (1)	9.00 (1)	0 (1)	0 (1)	0 (1)	4.00 (1)	1.00 (1)	4.00 (1)	6.00 (1)	0 (0)	0 (0)
1974																				
Adults	0 (0)	0 (1)	0 (1)	0 (1)	12.00 (1)	3.50 (2)	1.00 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)
YOY									0	0	0	0	0	0	0	31.00	36.00	2.00	0	0
1975																				
Adults	0 (1)	0 (1)	0 (1)	1.00 (1)	3.00 (3)	5.00 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (0)	0 (1)	0 (1)	9.00 (1)	1.00 (1)	2.00 (1)	0 (1)	0 (1)	0 (1)	0 (0)
YOY	0	0	0	0	0	0	0	0	0	0	0	0	0	9.00	15.00	545.00	3.00	2.00	0	0

Table A-14

CPUE for Blueback Herring Collected in Standard-Station Surface Trawls by Site Indian Point Region, Hudson River Estuary, New York, 1972-1975

		Biweekly Period																			
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Station 1	1972	0 (0)*	0 (0)	0 (1)	1.00 (2)	19.33 (2)	16.50 (2)	14.67 (2)	0.67 (2)	0 (2)	0 (2)	0 (2)	0.50 (2)	0 (2)	0 (2)	0.50 (2)	2.50 (2)	0 (0)	0 (2)	0 (0)	0 (0)
	1973	0 (0)	0 (0)	0 (0)	0 (0)	0 (1)	0 (0)	13.00 (1)	0 (1)	0 (0)	63.20 (1)	3074.00 (1)	2.00 (1)	152.00 (1)	16.00 (1)	10.00 (1)	17221.00 (1)	0 (0)	0 (0)	0 (0)	0 (0)
	1974																				
	Adults**	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (1)	1.00 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	1.00 (1)	3.00 (1)	0 (1)	0 (1)	0 (0)
	YOY									0	49.00	7.00	1.00	1.00	0	0	632.00	1684.00	0	0	0
	1975																				
	Adults	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	1.00 (1)	4.00 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (0)
	YOY	0	0	0	0	0	0	0	3.00	31.00	59.00	1.00	0	2.00	112.00	1643.00	2481.00	319.00	274.00	4.00	0
Station 2	1972	0 (0)	0 (0)	0 (1)	1.67 (2)	12.50 (2)	41.83 (2)	14.33 (2)	8.33 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	4.50 (2)	20.50 (2)	5.00 (1)	0 (1)	0 (0)	0 (0)
	1973	0 (0)	0 (0)	1.00 (1)	0 (0)	0 (1)	0 (0)	36.00 (1)	0 (1)	0 (0)	77.40 (1)	2131.00 (1)	474.00 (1)	21.00 (1)	0 (1)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
	1974																				
	Adults	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	2.00 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (0)
	YOY									1.00	4.00	31.00	26.00	115.00	0	5.00	2598.00	7.00	0	0	0
	1975																				
	Adults	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	3.00 (1)	0 (1)	0 (1)	0 (0)	0 (1)	0 (1)	5.00 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (0)
	YOY	0	0	0	0	0	0	0	2.00	59.00	105.00	0	0	0	6269.00	6.00	6508.00	176.00	783.00	4.00	0
Station 3	1972	0 (0)	0 (0)	0 (2)	12.00 (2)	5.33 (2)	40.17 (2)	48.17 (2)	0.42 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	10.00 (2)	1.00 (1)	0 (1)	0 (1)	0 (0)
	1973	0 (0)	0 (0)	0 (0)	0 (0)	0 (1)	0 (0)	12.00 (1)	0 (1)	0 (0)	222.80 (1)	272.00 (1)	7.00 (1)	3.00 (1)	0 (1)	3.00 (1)	9255.00 (1)	0 (0)	0 (0)	0 (0)	0 (0)
	1974																				
	Adults	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (0)	0 (1)	0 (1)	2.00 (1)	0 (1)	0 (1)	0 (0)
	YOY									0	0	7.00	0	1.00	0	3.00	0	936.00	4.00	0	0
	1975																				
	Adults	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (0)
	YOY	0	0	0	0	0	0	0	0	0	23.00	5.00	6.00	0	135.00	4.00	388.00	299.00	102.00	1.00	0
Station 4	1972	0 (0)	0 (0)	0 (1)	0 (2)	1.33 (3)	12.33 (2)	23.33 (2)	1.00 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	4.50 (2)	8.00 (2)	2.00 (1)	0.50 (2)	0 (1)	0 (0)
	1973	0 (0)	0 (0)	0 (1)	14.00 (1)	0 (1)	0 (0)	245.00 (1)	0 (1)	0 (0)	386.00 (1)	245.00 (1)	0 (1)	295.00 (1)	3.00 (1)	0 (1)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
	1974																				
	Adults	0 (1)	0 (1)	0 (1)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	1.00 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (0)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (0)
	YOY									0	18.00	38.00	0	9.00	0	14.00	1077.00	326.00	90.00	0	0
	1975																				
	Adults	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	1.00 (1)	0 (1)	0 (0)	0 (1)	0 (1)	0 (1)	0 (0)
	YOY	0	0	0	0	0	0	0	1.00	10.00	3.00	0	0	3.00	5294.00	465.00	0	367.00	1750.00	24.00	0
Station 5	1972	0 (0)	0 (0)	0 (1)	1.33 (2)	0 (0)	16.50 (2)	46.83 (2)	2.00 (2)	0.50 (2)	0.50 (2)	0 (2)	1.50 (2)	0 (2)	0 (2)	0.50 (2)	10.00 (2)	24.00 (1)	0 (2)	0 (1)	0 (0)
	1973	0 (1)	14.00 (1)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (1)	8.00 (1)	0 (1)	0 (0)	276.00 (1)
	1974																				
	Adults	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	6.00 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (0)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (0)
	YOY									0	79.00	39.00	0	0	0	262.00	567.00	96.00	127.00	0	0
	1975																				
	Adults	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	1.00 (1)	0 (1)	0 (1)	0 (1)	0 (0)	0 (1)	0 (0)
	YOY	0	0	0	0	0	0	0	0	63.00	47.00	0	1.00	13.00	1189.00	2172.00	16900.00	98.00	0	2.00	0
Station 6	1972	0 (0)	0 (0)	0 (1)	2.33 (2)	15.00 (2)	7.50 (2)	8.33 (2)	0.33 (2)	0 (2)	0 (2)	0.50 (2)	0 (2)	0 (2)	0 (2)	4.50 (2)	2.00 (2)	0 (1)	0 (1)	0 (1)	0 (0)
	1973	0 (0)	0 (0)	9.00 (1)	2.00 (1)	0 (1)	0 (0)	53.00 (1)	0 (1)	0 (0)	90.60 (1)	400.00 (1)	2.00 (1)	0 (0)	0 (1)	1.54 (1)	2454.00 (1)	0 (0)	0 (0)	0 (0)	0 (0)
	1974																				
	Adults	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (0)	0 (1)	0 (1)	0 (1)	0 (1)	0 (0)	0 (0)
	YOY									0	95.00	125.00	0	2.00	0	0	42.00	0	69.00	0	0
	1975																				
	Adults	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	1.00 (1)	2.00 (1)	1.00 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (0)
	YOY	0	0	0	0	0	0	0	0	1.00	46.00	146.00	0	4.00	1295.00	801.00	1674.00	2602.00	377.00	23.00	0
Station 7	1972	0 (0)	0 (0)	0 (2)	6.00 (2)	17.67 (2)	17.67 (2)	2.00 (2)	1.00 (2)	0 (2)	0 (2)	0 (2)	1.00 (2)	0 (2)	0 (2)	0 (2)	9.00 (2)	0 (0)	0 (1)	0 (1)	0 (0)
	1973	0 (0)	0 (0)	4.00 (1)	20.00 (1)	0 (1)	0 (0)	0 (1)	0 (2)	0 (0)	448.40 (1)	3428.00 (1)	1.00 (1)	0 (0)	1.00 (1)	2.00 (1)	61.00 (1)	0 (0)	0 (0)	0 (0)	0 (0)
	1974																				
	Adults	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	2.00 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (0)	0 (1)	0 (1)	1.00 (1)	0 (1)	0 (1)	0 (0)
	YOY									0	32.00	13.00	0	16.00	0	2.00	162.00	292.00	3.00	0	0
	1975																				
	Adults	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (1)	0 (1)	0 (1)	2.00 (1)	0 (1)	0 (1)	1.00 (1)	0 (1)	1.00 (1)	0 (1)	0 (1)	0 (1)	0 (0)
	YOY	0	0	0	0	0	0	0	0	2.00	18.00	0	0	0	340.00	1002.00	11100.00	341.00	0	10.00	0

Table A-15

CPUE for Bay Anchovy Collected in Standard-Station Beach Seines by Site Indian Point Region, Hudson River Estuary, New York, 1972-1975

		Biweekly Period																			
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Station 8	1972	0 (0)*	0 (0)	0 (4)	0 (4)	0 (5)	0 (2)	0 (3)	0 (2)	0 (4)	0 (2)	0 (4)	0 (2)	1.25 (4)	1.00 (2)	0 (3)	0 (2)	0 (2)	0 (3)	0 (2)	0 (0)
	1973	0 (2)	0 (4)	0 (2)	0 (2)	0 (3)	0 (2)	0 (3)	0 (2)	0.33 (3)	0 (2)	0 (2)	0 (3)	0 (2)	6.33 (3)	0 (2)	0.50 (2)	0 (2)	0 (3)	0 (1)	0 (0)
	1974																				
	Adults**	0 (3)	0 (2)	0 (1)	0 (1)	0 (1)	0 (2)	1.00 (2)	0.50 (2)	0 (2)	0 (2)	0 (1)	0 (1)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)
	YOY									0	0	0	0	0	1.50	0	0	0	0	0	0
	1975																				
	Adults	0 (1)	0 (1)	0 (1)	0 (2)	0 (2)	0 (2)	0 (1)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (1)	0 (1)
	YOY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Station 9	1972	0 (0)	0 (0)	0 (4)	0 (4)	0 (5)	0 (2)	0 (4)	0 (2)	0 (4)	0 (2)	0 (5)	0 (2)	12.50 (4)	0 (2)	0 (3)	0 (2)	0 (2)	0 (3)	0 (2)	0 (1)
	1973	0 (2)	0 (4)	0 (2)	0 (2)	0 (3)	0 (2)	0 (3)	0 (2)	0 (3)	0 (2)	0 (2)	0 (3)	0 (2)	4.00 (3)	0 (2)	0 (3)	0 (2)	0 (2)	0 (2)	0 (0)
	1974																				
	Adults	0 (2)	0 (2)	0 (1)	0 (1)	0 (1)	0 (2)	148.00 (2)	0.50 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)
	YOY									0	0	3.00	0	0	0	0	0	0	0	0	0
	1975																				
	Adults	0 (1)	0 (2)	0 (1)	0 (2)	0 (2)	0 (2)	0.50 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (1)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (1)
	YOY	0	0	0	0	0	0	0	0	0	0	0	0	0.50	0	0	0	0	0	0	0
Station 10	1972	0 (0)	0 (0)	0 (4)	0 (4)	0 (5)	0.50 (2)	0 (4)	0.50 (2)	0 (4)	0.50 (2)	0.50 (4)	0 (2)	0 (4)	1.00 (2)	0 (3)	0 (2)	0 (2)	0 (4)	0 (2)	0 (1)
	1973	0 (2)	0 (4)	0 (2)	0 (2)	0 (3)	0 (2)	0 (3)	0 (2)	0 (3)	0.50 (2)	0 (2)	0.33 (3)	0 (2)	0.33 (3)	0 (2)	0 (3)	0 (1)	0 (2)	0 (3)	0 (0)
	1974																				
	Adults	0 (2)	0 (2)	0 (1)	0 (1)	0 (1)	0.50 (2)	82.50 (2)	31.50 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)
	YOY									0	0	0	134.50	0	33.00	0	0	0	0	0	0.50
	1975																				
	Adults	0 (1)	0 (2)	0 (1)	0 (2)	0 (2)	0 (2)	17.00 (2)	0 (2)	0 (1)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (1)
	YOY	0	0	0	0	0	0	0	0	0	0	8.00	0	0.50	2.00	0	0	0	0	0	1.00
Station 11	1972	0 (0)	0 (0)	0 (4)	0 (5)	0 (3)	0 (2)	0 (4)	0 (2)	0 (4)	0 (2)	0 (4)	25.00 (2)	0 (4)	0 (2)	0 (3)	0 (2)	0 (1)	0 (3)	0 (2)	0 (1)
	1973	0 (2)	0 (5)	0 (2)	0 (2)	0 (3)	0.50 (2)	0 (3)	0 (1)	0 (3)	0 (2)	0 (2)	281.33 (3)	0 (2)	0 (3)	0 (2)	0 (3)	0 (1)	0 (4)	0 (1)	0 (0)
	1974																				
	Adults	0 (2)	0 (2)	0 (1)	0 (1)	2.00 (1)	0 (2)	275.50 (2)	100.0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)
	YOY									0	0	306.00	1.00	16.50	110.50	0	0	0	0	0	0
	1975																				
	Adults	0 (1)	0 (2)	0 (1)	0 (2)	0 (2)	2.00 (2)	7.50 (2)	771.50 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (1)
	YOY	0	0	0	0	0	0	0	0	0	1.00	0	0	0	0	0	0	0	0.50	0	1.00
Station 12	1972	0 (0)	0 (0)	0 (4)	0 (5)	0 (4)	74.50 (2)	0.25 (4)	0 (2)	0 (4)	7.00 (2)	0 (4)	2.00 (2)	14.00 (4)	0 (2)	0 (3)	0 (2)	0 (1)	0 (3)	0 (1)	0 (0)
	1973	0 (2)	0 (5)	0 (2)	0 (2)	0 (3)	0 (2)	3.67 (3)	0 (2)	0 (3)	0 (2)	0 (2)	0 (2)	0 (2)	0 (3)	0 (2)	0 (3)	0 (2)	0 (3)	0 (1)	0 (0)
	1974																				
	Adults	0 (2)	0 (2)	0 (1)	0 (1)	0 (1)	0.50 (2)	2.00 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (1)
	YOY									0	0	3.00	2.00	2.50	1.00	4.00	0	0	0	0	1.00
	1975																				
	Adults	0 (1)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	75.50 (2)	0.50 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (1)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (1)
	YOY	0	0	0	0	0	0	0	0	0	0	0	2.00	0.50	0	0	0	0	0	0	0
Station 20	1972										No Data Taken in 1972										
	1973										No Data Taken in 1973										
	1974																				
	Adults	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	3.50 (2)	18.50 (2)	243.50 (2)	50.00 (2)	0 (2)	0 (2)	1.50 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)
	YOY	0	0	0	0	0	0	0	0	0	15.50	310.00	40.50	44.50	54.50	0	0	0	0	0	0
	1975																				
	Adults	0 (1)	0 (2)	0 (2)	0 (2)	0 (2)	273.50 (2)	110.00 (1)	0 (1)	9.00 (1)	0.50 (2)	0 (1)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (1)
	YOY	0	0	0	0	0	0	0	0	0	236.00	113.00	16.00	13.00	0	37.50	0	0	0.50	0	12.00
Station 21	1972										No Data Taken in 1972										
	1973										No Data Taken in 1973										
	1974																				
	Adults	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (2)	17.50 (2)	0 (2)	0 (2)	0 (2)	0.50 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)
	YOY									0.50	5.50	461.50	526.50	16.50	33.00	1.00	0	0	0	0	0
	1975																				
	Adults	0 (1)	0 (2)	0 (2)	0 (2)	0 (2)	46.50 (2)	7.00 (2)	3.00 (2)	0 (2)	0 (1)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (1)
	YOY	0	0	0	0	0	0	0	0	0	255.00	1.50	0	0.50	0	0	0	0	0	0	0

Table A-16

CPUE for Bay Anchovy Collected in Standard-Station Bottom Trawls by Site Indian Point Region, Hudson River Estuary, New York, 1972-1975

	Biweekly Period																			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1972	0 (0)*	0 (0)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (3)	0 (2)	2.33 (2)	60.83(2)	7.33 (2)	2.50 (2)	0.50 (2)	0 (3)	0 (2)	0 (1)	0 (2)	0 (2)
1973	0 (0)	0 (2)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0.20 (1)	82.00 (1)	41.00 (1)	0 (1)	3.00 (1)	116.00 (1)	0 (1)	2.00 (1)	0 (1)	0 (1)	0 (0)
1974																				
Adults**	0 (0)	0 (1)	0 (1)	0 (1)	0 (1)	0 (2)	0 (1)	1.00 (1)	5.00 (1)	0 (1)	0 (1)	3.00 (1)	2.00 (1)	16.00 (1)	5.00 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)
YOY									0	0	0	2.00	0	46.00	3.00	0	0	0	0	0
1975																				
Adults	0 (1)	0 (1)	0 (0)	0 (1)	0 (1)	0 (1)	2.00 (1)	2.00 (1)	26.00 (1)	0 (1)	38.00 (1)	0 (1)	7.00 (1)	1.00 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (0)
YOY	0	0	0	0	0	0	0	0	0	0	0	2.00	5.00	4.00	0	0	0	0	0	0
1972	0 (0)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (1)	0 (2)	0 (2)	0.33 (2)	1.50 (2)	2.00 (2)	21.00 (2)	5.00 (2)	0 (2)	0 (3)	0 (2)	0 (1)	0 (2)	0 (1)
1973	0 (1)	0 (2)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	1.00 (1)	0 (1)	1.00 (1)	0 (1)	0 (1)	0 (2)	0 (1)	0 (1)	0 (0)
1974																				
Adults	0 (0)	0 (1)	0 (1)	0 (1)	0 (1)	0 (2)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	4.00 (1)	12.00 (1)	0 (1)	5.00 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)
YOY									0	0	1.00	2.00	22.00	1.00	135.00	0	0	0	0	0
1975																				
Adults	0 (0)	0 (1)	0 (1)	0 (0)	0 (0)	1.00 (1)	0 (0)	2.00 (1)	0 (1)	0 (1)	0 (1)	211.00 (1)	4.00 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (0)
YOY	0	0	0	0	0	0	0	0	12.00	0	33.00	389.00	265.00	141.00	0	0	0	0	0	0
1972	0 (0)	0 (1)	0 (2)	0 (2)	0 (2)	0 (3)	0 (2)	0 (2)	0 (2)	0.67 (2)	6.67 (2)	5.67 (2)	14.50 (2)	5.00 (2)	1.00 (2)	0.60 (2)	0 (2)	0 (1)	0 (2)	0 (1)
1973	0 (1)	0 (2)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0.20 (1)	2.00 (1)	14.00 (1)	87.00 (1)	0 (1)	1.00 (1)	0 (1)	0 (1)	0 (2)	0 (2)	0 (0)
1974																				
Adults	0 (0)	0 (1)	0 (1)	0 (1)	0 (1)	0 (2)	0 (1)	2.00 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)
YOY									0	0	0	0	2.00	6.00	0	0	0	0	0	0
1975																				
Adults	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	66.00 (1)	7.00 (1)	72.00 (1)	26.00 (1)	41.00 (1)	33.00 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (0)
YOY	0	0	0	0	0	0	0	0	2.00	0	32.00	136.00	143.00	9.00	2.00	0	0	0	0	0
1972	0 (0)	0 (2)	0 (2)	0 (2)	0 (2)	0 (1)	0 (1)	0 (2)	0 (2)	0.33 (2)	0 (2)	3.46 (2)	0 (2)	4.50 (2)	3.00 (2)	0 (2)	0 (2)	0 (2)	0 (1)	0 (2)
1973	0 (0)	0 (2)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	1.00 (1)	0.20 (1)	2.00 (1)	5.00 (1)	1.00 (1)	5.00 (1)	0 (1)	0 (1)	1.00 (1)	0 (1)	0 (1)	0 (0)
1974																				
Adults	0 (0)	0 (1)	0 (1)	0 (1)	0 (1)	0 (2)	0 (1)	0 (1)	7.00 (1)	0 (1)	3.00 (1)	0 (1)	6.00 (1)	0 (1)	4.00 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)
YOY									0	0	1.00	0	1.00	0	5.00	0	0	0	0	0
1975																				
Adults	0 (1)	0 (1)	0 (1)	0 (1)	0 (0)	1.00 (1)	1.00 (1)	2.00 (1)	1.00 (1)	12.00 (1)	2.00 (1)	0 (0)	0 (1)	0 (1)	0 (1)	0 (1)	0 (0)	0 (1)	0 (1)	0 (0)
YOY	0	0	0	0	0	0	0	0	0	5.00	0	0	3.00	14.00	7.00	1.00	0	0	0	0
1972	0 (0)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0.50 (2)	0 (2)	0 (1)	0.33 (2)	0 (2)	0 (2)	1.00 (2)	11.00 (2)	0.50 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)
1973	0 (0)	0 (2)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	3.00 (1)	1.40 (1)	9.00 (1)	0 (1)	0 (1)	1.00 (1)	0 (1)	0 (1)	0 (1)	1.00 (1)	0 (1)	0 (0)
1974																				
Adults	0 (0)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	1.00 (1)	8.00 (1)	199.00 (1)	1.00 (1)	4.00 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)
YOY									0	0	2.00	0	2.00	15.00	2.00	0	0	0	0	0
1975																				
Adults	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	9.00 (1)	11.00 (1)	3.00 (1)	0 (0)	4.00 (1)	10.00 (1)	5.00 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (0)
YOY	0	0	0	0	0	0	0	0	6.00	2.00	0	1.00	3.00	35.00	0	0	0	0	0	0
1972	0 (0)	0 (1)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (3)	2.00 (2)	1.50 (2)	6.00 (2)	1.50 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)
1973	0 (1)	0 (3)	0 (1)	0 (1)	0 (1)	0 (1)	1.00 (1)	0 (1)	7.00 (1)	2.00 (1)	13.00 (1)	8.00 (1)	3.00 (1)	3.00 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (0)
1974																				
Adults	0 (0)	0 (1)	0 (1)	0 (1)	0 (1)	0 (2)	0 (1)	1.00 (1)	8.00 (1)	0 (1)	0 (1)	0 (1)	0 (1)	1.00 (1)	6.00 (1)	0 (1)	0 (0)	0 (1)	0 (1)	0 (1)
YOY									0	0	0	1.00	0	6.00	3.00	0	0	0	0	0
1975																				
Adults	0 (1)	0 (1)	0 (0)	0 (1)	0 (1)	2.00 (1)	0 (1)	91.00 (1)	1.00 (1)	33.00 (1)	0 (0)	23.00 (1)	0 (0)	0 (1)	1.00 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (0)
YOY	0	0	0	0	0	0	0	0	0	0	0	38.00	0	2.00	2.00	0	0	0	0	0
1972	0 (0)	0 (0)	0 (1)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	1.00 (2)	71.17 (2)	0.67 (2)	5.50 (2)	1.00 (2)	1.50 (2)	0 (2)	0 (0)	0 (2)	0 (2)	0 (2)
1973	0 (0)	0 (1)	1.00 (1)	0 (1)	1.00 (1)	0 (1)	0 (1)	0 (1)	6.00 (1)	0 (1)	0 (1)	0 (1)	28.00 (1)	0 (1)	2.00 (1)	0 (1)	0 (1)	0 (1)	0 (0)	0 (0)
1974																				
Adults	0 (0)	0 (1)	0 (1)	0 (1)	0 (1)	0 (2)	4.00 (1)	4.00 (1)	0 (1)	0 (1)	3.00 (1)	0 (1)	0 (1)	1.00 (1)	2.00 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)
YOY									0	0	2.00	0	0	4.00	20.00	0	0	0	0	0
1975																				
Adults	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	11.00 (1)	0 (1)	174.00 (1)	4.00 (1)	5.00 (1)	0 (0)	0 (1)	1.00 (1)	5.00 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (0)
YOY	0	0	0	0	0	0	0	0	0	5.00	0	40.-0	55.00	9.00	0	0	0	0	0	0

Table A-17

CPUE for Bay Anchovy Collected in Standard-Station Surface Trawls by Site Indian Point Region, Hudson River Estuary, New York, 1972-1975

		Biweekly Period																			
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Station 1	1972	0 (0)*	0 (0)	0 (1)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	7.50 (2)	1.00 (2)	1.00 (2)	2.50 (2)	0 (2)	0 (2)	0 (2)	0 (0)	0 (2)	0 (0)	0 (0)
	1973	0 (0)	0 (0)	0 (0)	0 (0)	0 (1)	0 (0)	0 (1)	0 (1)	0 (0)	0 (1)	297.00 (1)	1.00 (1)	368.00 (1)	0 (1)	0 (1)	750.00 (1)	0 (0)	0 (0)	0 (0)	0 (0)
	1974																				
	Adults**	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	7.00 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (0)
	YOY									0	0	1.00	0	19.00	1.00	0	3.00	0	0	0	0
	1975																				
	Adults	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	36.00 (1)	26.00 (1)	0 (1)	0 (1)	0 (1)	1.00 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (0)
	YOY							0	3.00	0	17.00	0	0	489.00	112.00	3.00	0	0	0	0	0
Station 2	1972	0 (0)	0 (0)	0 (1)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	8.00 (2)	0 (2)	2.00 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (1)	0 (1)	0 (0)	0 (0)
	1973	0 (0)	0 (0)	0 (1)	0 (0)	0 (1)	0 (0)	1.00 (1)	0 (1)	0 (0)	0 (1)	11.00 (1)	0 (1)	57.00 (1)	0 (1)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
	1974																				
	Adults	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	102.00 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (0)
	YOY									0	0	0	1.00	1137.00	5.00	5.00	0	0	0	0	0
	1975																				
	Adults	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (1)	0 (1)	0 (1)	0 (0)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (0)
	YOY	0	0	0	0	0	0	0	0	1.00	65.00	0	12.00	62.00	1425.00	0	0	0	0	0	0
Station 3	1972	0 (0)	0 (0)	0 (2)	0 (2)	0 (2)	0.33 (2)	0 (2)	0 (2)	0 (2)	21.00 (2)	1.00 (2)	5.50 (2)	1.00 (2)	0 (2)	0 (2)	0 (2)	0 (1)	0 (1)	0 (1)	0 (0)
	1973	0 (0)	0 (0)	0 (0)	0 (0)	0 (1)	0 (0)	0 (1)	0 (1)	0 (0)	15.00 (1)	286.00 (1)	0 (1)	670.00 (1)	0 (1)	0 (1)	0 (1)	0 (0)	0 (0)	0 (0)	0 (0)
	1974																				
	Adults	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	156.00 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (0)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (0)
	YOY									0	0	0	38.00	0	15.00	0	0	0	0	0	
	1975																				
	Adults	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	5.00 (1)	8.00 (1)	0 (1)	0 (1)	0 (1)	41.00 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (0)
	YOY	0	0	0	0	0	0	0	0	5.00	19.00	0	5.00	2973.00	46.00	0	0	0	0	0	0
Station 4	1972	0 (0)	0 (0)	0 (1)	0 (2)	0 (3)	0 (2)	0.50 (2)	0 (2)	0 (2)	886.00 (2)	1.50 (2)	6.50 (2)	0 (2)	0.50 (2)	0 (2)	0 (2)	0 (1)	0 (2)	0 (1)	0 (0)
	1973	0 (0)	0 (0)	1.00 (1)	0 (1)	0 (1)	0 (0)	5.00 (1)	0 (1)	0 (0)	0 (1)	2042.00 (1)	0 (1)	3386.00 (1)	0 (1)	0 (1)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
	1974																				
	Adults	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	3.00 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (0)	2.00 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (0)
	YOY									1.00	0	0	0	13.00	0	60.00	0	0	0	0	0
	1975																				
	Adults	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	17.00 (1)	0 (1)	83.00 (1)	0 (1)	0 (1)	0 (1)	8.00 (1)	0 (1)	0 (0)	0 (1)	0 (1)	0 (1)	0 (0)
	YOY	0	0	0	0	0	0	0	62.00	32.00	139.00	1540.00	287.00	247.00	1808.00	0	0	0	0	0	0
Station 5	1972	0 (0)	0 (0)	0 (1)	0 (2)	0 (0)	0.50 (2)	0 (2)	0 (2)	0 (2)	7.00 (2)	1.00 (2)	1.00 (2)	1.00 (2)	1.00 (2)	0 (2)	0 (2)	0 (1)	0 (2)	0 (1)	0 (0)
	1973	0 (1)	191.00 (1)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (1)	0 (1)	0 (1)	0 (0)	106.00 (1)
	1974																				
	Adults	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	1516.00 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (0)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (0)
	YOY									0	0	0	0	2.00	0	5.00	0	0	0	0	0
	1975																				
	Adults	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	899.00 (1)	15.00 (1)	2.00 (1)	0 (1)	0 (1)	0 (1)	4.00 (1)	0 (1)	0 (1)	0 (1)	0 (0)	0 (1)	0 (0)
	YOY	0	0	0	0	0	0	0	2.00	64.00	0	2082.00	1.00	2806.00	1080.00	19.00	0	0	0	0	0
Station 6	1972	0 (0)	0 (0)	0 (1)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	21.00 (2)	0 (2)	11.00 (2)	1.50 (2)	0 (2)	0 (2)	0 (2)	0 (1)	0 (1)	0 (1)	0 (0)
	1973	0 (0)	0 (0)	4.00 (1)	0 (1)	0 (1)	0 (0)	17.00 (1)	0 (1)	0 (0)	99.60 (1)	2907.00 (1)	70.00 (1)	0 (0)	0 (1)	0 (1)	243.00 (1)	0 (0)	0 (0)	0 (0)	0 (0)
	1974																				
	Adults	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	1344.00 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (0)	0 (1)	0 (1)	0 (1)	0 (1)	0 (0)	0 (0)
	YOY									1.00	1.00	2.00	0	5.00	0	9.00	0	0	0	0	0
	1975																				
	Adults	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	366.00 (1)	204.00 (1)	6.00 (1)	0 (1)	0 (1)	0 (1)	2.00 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (0)
	YOY	0	0	0	0	0	0	0	0	1824.00	4304.00	1123.00	560.00	6092.00	72.00	0	0	0	0	0	0
Station 7	1972	0 (0)	0 (0)	0 (2)	0 (2)	0 (2)	1.50 (2)	0.33 (2)	0.33 (2)	0 (2)	28.50 (2)	1.00 (2)	15.50 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (0)	0 (1)	0 (1)	0 (0)
	1973	0 (0)	0 (0)	0 (1)	1.00 (1)	0 (1)	0 (0)	3.00 (1)	0 (2)	0 (0)	6.00 (1)	127.00 (1)	168.00 (1)	0 (0)	252.00 (1)	5.00 (1)	1.00 (1)	0 (0)	0 (0)	0 (0)	0 (0)
	1974																				
	Adults	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	210.00 (1)	12.00 (1)	0 (1)	0 (1)	0 (1)	0 (0)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (0)
	YOY									0	12.00	158.00	546.00	0	1.00	0	0	0	0	0	0
	1975																				
	Adults	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	884.00 (1)	5.00 (1)	0 (1)	2.00 (1)	0 (1)	0 (1)	7.00 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (0)
	YOY	0	0	0	0	0	0	0	1.00	88.00	0	1532.00	64.00	3767.00	123.00	35.00	0	0	0	0	0

Table A-18

CPUE for Bluefish Collected in Standard-Station Beach Seines by Site Indian Point Region, Hudson River Estuary, New York, 1972-1975

		Biweekly																			
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Station 8	1972	0 (0)*	0 (0)	0 (4)	0 (4)	0 (5)	0 (2)	0 (3)	0 (2)	1.50 (4)	0 (2)	0.75 (4)	0.50 (2)	0 (4)	0 (2)	0 (3)	0 (2)	0 (2)	0 (3)	0 (2)	0 (0)
	1973	0 (2)	0 (4)	0 (2)	0 (2)	0 (3)	0 (2)	0 (3)	0 (2)	1.00 (3)	0 (2)	0 (2)	0 (3)	0 (2)	0.33 (3)	0 (2)	0 (2)	0 (2)	0 (3)	0 (1)	0 (0)
	1974																				
	Adults**	0 (3)	0 (2)	0 (1)	0 (1)	0 (1)	1.50 (2)	5.50 (2)	1.00 (2)	2.00 (2)	1.00 (2)	3.00 (1)	1.00 (1)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)
	YOY									4.50	0	0	0	0	0	0	0	0	0	0	0
	1975																				
	Adults	0 (1)	0 (1)	0 (1)	0 (2)	0 (2)	0 (2)	0 (1)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (1)	0 (1)
	YOY	0	0	0	0	0	0.50	3.00	7.50	1.50	1.50	0.50	0	0	0	0	0	0	0	0	0
Station 9	1972	0 (0)	0 (0)	0 (4)	0 (4)	0 (5)	0 (2)	0 (4)	0 (0)	1.25 (4)	0.50 (2)	4.00 (5)	1.50 (2)	0 (4)	1.00 (2)	0 (3)	0 (2)	0 (2)	0 (3)	0 (2)	0 (1)
	1973	0 (2)	0 (4)	0 (2)	0 (2)	0 (3)	0 (2)	0 (3)	0 (2)	12.67 (3)	1.00 (2)	1.00 (2)	0.33 (3)	0.50 (2)	0 (3)	0 (2)	0 (3)	0 (2)	0 (2)	0 (2)	0 (0)
	1974																				
	Adults	0 (2)	0 (2)	0 (1)	0 (1)	0 (1)	2.50 (2)	9.50 (2)	1.00 (2)	1.00 (2)	1.50 (2)	3.50 (2)	1.00 (2)	0 (2)	0.50 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)
	YOY									1.00	0.50	0	0	0	0	0	0	0	0	0	0
	1975																				
	Adults	0 (1)	0 (2)	0 (1)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (1)	0. (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (1)
	YOY	0	0	0	0	0	7.00	4.50	1.00	2.50	2.50	1.00	0	0.50	0	0	0	0	0	0	0
Station 10	1972	0 (0)	0 (0)	0 (4)	0 (4)	0 (5)	0 (2)	0 (4)	0 (2)	0.25 (4)	4.00 (2)	3.75 (4)	3.00 (2)	2.75 (4)	0 (2)	0 (3)	0 (2)	0 (2)	0 (4)	0 (2)	0 (1)
	1973	0 (2)	0 (4)	0 (2)	0 (2)	0 (3)	0 (2)	0 (3)	0 (2)	8.33 (3)	1.50 (2)	0.50 (2)	0.67 (3)	0.50 (2)	0.67 (3)	1.00 (2)	0 (3)	0 (1)	0 (2)	0 (3)	0 (0)
	1974																				
	Adults	0 (2)	0 (2)	0 (1)	0 (1)	0 (1)	0 (2)	3.50 (2)	5.50 (2)	2.00 (2)	6.00 (2)	1.50 (2)	1.50 (2)	0.50 (2)	1.50 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)
	YOY									4.50	0	0	0	0	0	0	0	0	0	0	0
	1975																				
	Adults	0 (1)	0 (2)	0 (1)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (1)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (1)
	YOY	0	0	0	0	0	0.50	5.50	2.50	3.00	1.50	0.50	2.00	0.50	1.00	0	0	0	0	0	0
Station 11	1972	0 (0)	0 (0)	0 (4)	0 (5)	0 (3)	0 (2)	0 (4)	0 (2)	1.75 (4)	2.00 (2)	2.75 (4)	2.00 (2)	2.25 (4)	0 (2)	0.33 (3)	0 (2)	0 (1)	0 (3)	0 (2)	0 (1)
	1973	0 (2)	0 (5)	0 (2)	0 (2)	0 (3)	0 (2)	0 (3)	0 (1)	12.00 (3)	5.50 (2)	0 (2)	0.67 (3)	0 (2)	0.67 (3)	0 (2)	3.00 (3)	0 (1)	0 (4)	0 (1)	0 (0)
	1974																				
	Adults	0 (2)	0 (2)	0 (1)	0 (1)	0 (1)	12.00 (2)	18.50 (2)	2950 (2)	52.50 (2)	8.00 (2)	7.50 (2)	1.00 (2)	1.00 (2)	0.50 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)
	YOY									28.50	0	0	0	0	0	0	0	0	0	0	0
	1975																				
	Adults	0 (1)	0 (2)	0 (1)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)		0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (1)
	YOY	0	0	0	0	0	16.50	17.50	11.50	6.50	1.50	2.50	2.50	0.50	0.50	0	0	0	0	0	0
Station 12	1972	0 (0)	0 (0)	0 (4)	0 (5)	0 (4)	0 (2)	0 (4)	0 (2)	0.50 (4)	1.00 (2)		0 (2)	0.25 (4)	0 (2)	0 (3)	0 (2)	0 (1)	0 (3)	0 (1)	0 (0)
	1973	0 (2)	0 (5)	0 (2)	0 (2)	0 (3)	0 (2)	3.00 (3)	0 (2)	2.33 (3)	0.50 (2)		0.50 (2)	0 (2)	0.33 (3)	0 (2)	0 (3)	0 (2)	0 (3)	0 (1)	0 (0)
	1974																				
	Adults	0 (2)	0 (2)	0 (1)	0 (1)	0 (1)	0 (2)	0 (2)	6.00 (2)	1.50 (2)	2.50 (2)	1.50 (2)	2.00 (2)	0.50 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (1)
	YOY									0.50	0	0	0	0	0	0	0	0	0	0	0
	1975																				
	Adults	0 (1)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (1)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (1)
	YOY	0	0	0	0	0	3.00	4.00	4.50	5.50	2.50		1.00	0.50	0	0	0	0	0	0	0
Station 20	1972										No Data Taken in 1972										
	1973										No Data Taken in 1973										
	1974																				
	Adults	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	49.00 (2)	3.00 (2)	2.00 (2)	0.50 (2)	8.50 (2)	0 (2)	1.00 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)
	YOY									0.50	0	0	0	0	0	0	0	0	0	0	0
	1975																				
	Adults	0 (1)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (1)	0 (1)	0 (1)	0 (2)	0 (1)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (1)
	YOY	0	0	0	0	0	3.00	17.00	3.00	3.00	0	1.00	1.50	0	0	0	0	0	0	0	0
Station 21	1972										No Data Taken in 1972										
	1973										No Data Taken in 1973										
	1974																				
	Adults	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	13.50 (2)	12.00 (2)	4.00 (2)	0.50 (2)	10.50 (2)	1.50 (2)	7.50 (2)	0.50 (2)	0.50 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)
	YOY									0	0	0	0	0	0	0	0	0	0	0	0
	1975																				
	Adults	0 (1)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (1)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (1)
	YOY	0	0	0	0	0	3.50	3.50	0	5.50	1.00	6.00	0.50	0	0.50	0	0	0	0	0	0

CPUE for Bluefish Collected in Standard-Station Surface Trawls by Site Indian Point Region, Hudson River Estuary, New York, 1972-1975

		Biweekly Period																			
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Station 1	1972	0 (0)*	0 (0)	0 (1)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	1.00 (2)	1.00 (2)	0 (2)	0.50 (2)	0.50 (2)	0 (2)	0 (2)	0 (0)	0 (2)	0 (0)	0 (0)
	1973	0 (0)	0 (0)	0 (0)	0 (0)	0 (1)	0 (0)	1.00 (1)	0 (1)	0 (0)	0.60 (1)	5.00 (1)	0 (1)	0 (1)	1.00 (1)	0 (1)	2.00 (1)	0 (0)	0 (0)	0 (0)	0 (0)
	1974																				
	Adults**	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	9.00 (1)	19.00 (1)	0 (1)	1.00 (1)	4.00 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (0)
	YOY									2.00	0	0	0	0	0	0	0	0	0	0	0
	1975																				
	Adults	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (0)
	YOY	0	0	0	0	0	0	0	10.00	2.00	0	2.00	1.00	0	0	0	0	0	0	0	0
Station 2	1972	0 (0)	0 (0)	0 (1)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	1.50 (2)	0.50 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (1)	0 (1)	0 (0)	0 (0)
	1973	0 (0)	0 (0)	0 (1)	0 (0)	0 (1)	0 (0)	0 (1)	0 (1)	0 (0)	1.00 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
	1974																				
	Adults	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	1.00 (1)	2.00 (1)	1.00 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (0)
	YOY									1.00	0	0	0	0	0	0	0	0	0	0	0
	1975																				
	Adults	0 (0)	0 (0)	0 (1)	0 (0)	0 (0)	0 (0)	0 (0)	0 (1)	0 (1)	0 (1)	0 (0)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (0)
	YOY	0	0	0	0	0	0	0	6.00	1.00	0	0	0	0	0	0	0	0	0	0	0
Station 3	1972	0 (0)	0 (0)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0.33 (2)	1.00 (2)	0 (2)	0.50 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (1)	0 (1)	0 (0)	
	1973	0 (0)	0 (0)	0 (0)	0 (0)	0 (1)	0 (0)	2.00 (1)	0 (1)	0 (0)	0.80 (1)	2.00 (1)	0 (1)	0 (1)	0 (1)	0 (1)	1.00 (1)	0 (0)	0 (0)	0 (0)	0 (0)
	1974																				
	Adults	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	11.00 (1)	21.00 (1)	2.00 (1)	0 (1)	1.00 (1)	0 (0)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (0)
	YOY									2.00	0	0	0	0	0	0	0	0	0	0	0
	1975																				
	Adults	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (0)
	YOY	0	0	0	0	0	0	0	8.00	12.00	1.00	2.00	0	0	0	0	0	0	0	0	0
Station 4	1972	0 (0)	0 (0)	0 (1)	0 (2)	0 (3)	0 (2)	0 (2)	0 (2)	0.33 (2)	0 (2)	0 (2)	0.50 (2)	0 (2)	2.00 (2)	0 (2)	0 (2)	0 (1)	0 (2)	0 (1)	0 (0)
	1973	0 (0)	0 (0)	0 (1)	0 (1)	0 (1)	0 (0)	39.00 (1)	0 (1)	0 (0)	2.40 (1)	0 (1)	0 (1)	1.00 (1)	0 (1)	0 (1)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
	1974																				
	Adults	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	18.00 (1)	6.00 (1)	0 (1)	0 (1)	0 (1)	0 (0)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (0)
	YOY									2.00	0	0	0	0	0	0	0	0	0	0	0
	1974																				
	Adults	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (0)	0 (1)	0 (1)	0 (1)	0 (0)
	YOY	0	0	0	0	0	0	0	3.00	0	1.00	0	1.00	0	0	0	0	0	0	0	0
Station 5	1972	0 (0)	0 (0)	0 (1)	0 (2)	0 (0)	0 (2)	0 (2)	0 (2)	0 (2)	0.50 (2)	1.00 (2)	1.00 (2)	0.50 (2)	0 (2)	0 (2)	0 (2)	0 (1)	0 (2)	0 (1)	0 (0)
	1973	0 (0)	0 (0)	0 (1)	0 (1)	0 (1)	0 (0)	57.00 (1)	0 (1)	0 (0)	0.80 (1)	2.00 (1)	0 (1)	0 (1)	1.00 (1)	0 (1)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
	1974																				
	Adults	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	92.00 (1)	5.00 (1)	2.00 (1)	0 (1)	0 (1)	0 (0)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (0)
	YOY									10.00	0	0	0	0	0	0	0	0	0	0	0
	1975																				
	Adults	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (0)	0 (1)	0 (0)
	YOY	0	0	0	0	0	0	0	12.00	4.00	2.00	1.00	3.00	0	0	0	0	0	0	0	0
Station 6	1972	0 (0)	0 (0)	0 (1)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	1.00 (2)	0 (2)	0.50 (2)	0.50 (2)	0.50 (2)	0 (2)	0 (2)	0 (1)	0 (1)	0 (1)	0 (0)
	1973	0 (0)	0 (0)	0 (1)	0 (1)	0 (1)	0 (1)	3.00 (1)	1.33 (1)	0 (0)	1.40 (1)	2.00 (1)	0 (1)	0 (0)	0 (1)	0.77 (1)	1.00 (1)	0 (0)	0 (0)	0 (0)	0 (0)
	1974																				
	Adults	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	9.00 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (0)	0 (1)	0 (1)	0 (1)	0 (1)	0 (0)	0 (0)
	YOY									4.00	0	0	0	0	0	0	0	0	0	0	0
	1975																				
	Adults	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (0)
	YOY	0	0	0	0	0	0	0	2.00	1.00	10.00	0	0	0	0	0	0	0	0	0	0
Station 7	1972	0 (0)	0 (0)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0.33 (2)	1.00 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (0)	0 (1)	0 (1)	0 (0)
	1973	0 (0)	0 (0)	0 (1)	0 (1)	0 (1)	0 (0)	2.00 (1)	0 (2)	0 (0)	1.00 (1)	3.00 (1)	0 (1)	0 (0)	0 (1)	0 (1)	0 (1)	0 (0)	0 (0)	0 (0)	0 (0)
	1974																				
	Adults	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	25.00 (1)	8.00 (1)	0 (1)	0 (1)	0 (1)	0 (0)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (0)
	YOY									3.00	0	0	0	0	0	0	0	0	0	0	0
	1975																				
	Adults	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (0)
	YOY	0	0	0	0	0	0	0	15.00	3.00	2.00	0	0	0	0	0	0	0	0	0	0

Table A-20

CPUE for Hogchokers Collected in Standard-Station Bottom Trawls by Site Indian Point Region, Hudson River Estuary, New York, 1972-1975

			Biweekly Period																			
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Station 1	1972		0 (0)*	0 (0)	88.00 (2)	102.83 (2)	0.50 (2)	0 (2)	1.50 (2)	0 (2)	0.33 (3)	0 (2)	0 (2)	2.17 (2)	10.50 (2)	0 (2)	1.50 (2)	103.67 (3)	18.50 (2)	0 (1)	0 (2)	0 (2)
	1973		0 (0)	6.00 (2)	1.00 (1)	10.0 (1)	5.00 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	64.00 (1)	0 (0)
	1974	Adults**	0 (0)	0 (1)	1.00 (1)	5.00 (1)	1.00 (1)	0 (2)	0 (1)	1.00 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	37.00 (1)	848.00 (1)	6.00 (1)	1.00 (1)	39.00 (1)	4.00 (1)	0 (1)
		YOY									0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	1.00 (1)	0 (1)	0 (1)	0 (1)	1.00 (1)	0 (1)	0 (1)
	1975	Adults	0 (1)	2.00 (1)	0 (0)	168.00 (1)	5.00 (1)	8.00 (1)	1.00 (1)	0 (1)	4.00 (1)	0 (1)	7.00 (1)	4.00 (1)	57.00 (1)	19.00 (1)	1.00 (1)	24.00 (1)	31.00 (1)	2.00 (1)	0 (1)	0 (0)
		YOY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2.00	0	0	0	0
Station 2	1972		0 (0)	0 (2)	0 (2)	0 (2)	0.33 (2)	0 (2)	0 (1)	0.33 (2)	0 (2)	0 (2)	0.67 (2)	0.50 (2)	0 (2)	0 (2)	0 (2)	0 (3)	1.00 (2)	0 (1)	0 (2)	0 (1)
	1973		0 (1)	0 (2)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (2)	0 (1)	2.00 (1)	0 (0)
	1974	Adults	0 (0)	2.00 (1)	0 (1)	0 (1)	0 (1)	0 (2)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	1.00 (1)	0 (1)	0 (1)	0 (1)
		YOY									0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)
	1975	Adults	0 (0)	0 (1)	0 (1)	0 (0)	0 (0)	0 (0)	0 (0)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (0)
		YOY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Station 3	1972		0 (0)	0 (1)	0 (2)	3.00 (2)	9.75 (2)	0.44 (3)	1.50 (2)	0.67 (2)	2.50 (2)	1.00 (2)	0.50 (2)	1.50 (2)	5.00 (2)	4.00 (2)	36.50 (2)	22.50 (2)	12.00 (2)	0 (1)	0 (2)	0 (1)
	1973		0 (1)	1.00 (2)	0 (1)	1.00 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	2.00 (1)	0 (2)	0 (2)	0 (0)
	1974	Adults	0 (0)	0 (1)	2.00 (1)	2.00 (1)	0 (1)	0 (2)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	1.00 (1)	0 (1)	0 (1)	0 (1)	2.00 (1)	7.00 (1)	0 (1)	0 (1)
		YOY										0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)
	1975	Adults	0 (1)	0 (1)	0 (1)	1.00 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	1.00 (1)	3.00 (1)	0 (1)	0 (1)	0 (1)	1.00 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (0)
		YOY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Station 4	1972		0 (0)	0 (2)	0 (2)	0 (2)	0 (2)	0 (1)	0 (1)	0.33 (2)	0 (2)	0 (2)	1.25 (2)	4.17 (2)	44.00 (2)	0 (2)	1.00 (2)	1.50 (2)	0.50 (2)	0 (2)	0 (1)	0 (2)
	1973		0 (0)	1.00 (2)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	1.00 (1)	0 (1)	0 (1)	0 (1)	2.00 (1)	0 (1)	0 (0)
	1974	Adults	0 (0)	0 (1)	0 (1)	0 (1)	0 (1)	1.50 (2)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	55.00 (1)	324.00 (1)	672.00 (1)	5.00 (1)	125.00 (1)	419.00 (1)	14.00 (1)	2.00 (1)
		YOY									0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	1.00 (1)	0 (1)	0 (1)	0 (1)	4.00 (1)	0 (1)	0 (1)
	1975	Adults	0 (1)	0 (1)	1.00 (1)	47.00 (1)	0 (0)	1.00 (1)	0 (1)	0 (1)	3.00 (1)	2.00 (1)	1.00 (1)	0 (0)	18.00 (1)	42.00 (1)	76.00 (1)	178.00 (1)	0 (0)	4.00 (1)	0 (1)	0 (0)
		YOY	0	0	0	0	0	0	0	0	0	0	0	0	1.00	0	0	0	0	0	0	0
Station 5	1972		0 (0)	0 (2)	0 (2)	0.67 (2)	0.50 (2)	0 (2)	0 (2)	0.33 (2)	0.67 (1)	0 (2)	0 (2)	52.17 (2)	6.50 (2)	5.00 (2)	13.50 (2)	23.50 (2)	2.50 (2)	0.50 (2)	0 (2)	0 (2)
	1973		0 (0)	6.50 (2)	0 (1)	0 (1)	0 (1)	0 (1)	2.00 (1)	0 (1)	0 (1)	0.20 (1)	0 (1)	0 (1)	228.00 (1)	0 (1)	2.00 (1)	0 (1)	0 (1)	0 (1)	1.00 (1)	0 (0)
	1974	Adults	0 (0)	0 (1)	0 (1)	4.00 (1)	0 (1)	2.00 (1)	0 (1)	2.00 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	2.00 (1)	2.00 (1)	0 (1)	1.00 (1)	0 (1)	0 (1)
		YOY									0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)
	1975	Adults	0 (1)	2.00 (1)	0 (1)	72.00 (1)	1.00 (1)	0 (1)	0 (1)	5.00 (1)	2.00 (1)	2.00 (1)	0 (0)	490.00 (1)	101.00 (1)	7.00 (1)	44.00 (1)	13.00 (1)	13.00 (1)	1.00 (1)	0 (1)	0 (0)
		YOY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Station 6	1972		0 (0)	0 (1)	27.00 (2)	0 (2)	0.50 (2)	0 (2)	1.00 (2)	0 (2)	0.56 (3)	0 (2)	0 (2)	4.00 (2)	4.00 (2)	0.50 (2)	0.50 (2)	4.50 (2)	2.50 (2)	2.50 (2)	0 (2)	0 (2)
	1973		0 (1)	0 (3)	1.00 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	3.00 (1)	54.00 (1)	0 (1)	0 (1)	0 (1)	1.00 (1)	0 (1)	0 (1)	0 (0)
	1974	Adults	0 (0)	0 (1)	0 (1)	7.00 (1)	0 (1)	0 (2)	0 (1)	1.00 (1)	0 (1)	0 (1)	1.00 (1)	0 (1)	0 (1)	712.00 (1)	12.00 (1)	142.00 (1)	0 (0)	80.00 (1)	0 (1)	28.00 (1)
		YOY									0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (0)	0 (1)	0 (1)	0 (1)
	1975	Adults	0 (1)	7.00 (1)	0 (0)	195.00 (1)	0 (1)	2.00 (1)	0 (1)	0 (1)	0 (1)	10.00 (1)	0 (0)	22.00 (1)	0 (0)	7.00 (1)	31.00 (1)	44.00 (1)	15.00 (1)	283.00 (1)	155.00 (1)	0 (0)
		YOY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.00	1.00	2.00	0
Station 7	1972		0 (0)	0 (0)	0 (1)	3.00 (2)	3.50 (2)	1.00 (2)	16.00 (2)	6.00 (2)	0 (2)	6.67 (2)	0.83 (2)	2.33 (2)	2.50 (2)	0 (2)	1.50 (2)	56.50 (2)	0 (0)	4.00 (2)	1.00 (2)	0 (2)
	1973		0 (0)	0 (1)	0 (1)	0 (1)	0 (1)	2.00 (1)	0 (1)	0 (1)	1.00 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	1.00 (1)	0 (1)	0 (1)	0 (1)	0 (0)	0 (0)
	1974	Adults	0 (0)	1.00 (1)	2.00 (1)	0 (1)	0 (1)	0 (2)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	3.00 (1)	0 (1)	8.00 (1)	0 (1)	0 (1)	1.00 (1)	0 (1)	0 (1)
		YOY									0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)
	1975	Adults	0 (1)	0 (1)	0 (1)	16.00 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (1)	0 (0)	2.00 (1)	1.00 (1)	0 (1)	4.00 (1)	3.00 (1)	1.00 (1)	3.00 (1)	0 (1)	0 (0)
		YOY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table A-21

CPUE for Banded Killifish Collected in Standard-Station Beach Seines by Site Indian Point Region, Hudson River Estuary, New York, 1972-1975

		Biweekly Period																			
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Station 8	1972	0 (0)*	0 (0)	1.00 (4)	0.50 (4)	3.20 (5)	1.00 (2)	0.67 (3)	0 (2)	1.25 (4)	0 (2)	1.25 (4)	1.50 (2)	2.00 (4)	0.50 (2)	0.33 (3)	0.50 (2)	0 (2)	0 (3)	0 (2)	0 (0)
	1973	0 (2)	0.50 (4)	3.00 (2)	4.50 (2)	1.33 (3)	2.50 (2)	1.67 (3)	0 (2)	0 (3)	3.50 (2)	1.50 (2)	1.33 (3)	7.50 (2)	1.33 (3)	1.50 (2)	0.50 (2)	0 (2)	0 (3)	0 (1)	0 (0)
	1974																				
	Adults**	1.67 (3)	3.50 (2)	5.00 (1)	0 (1)	2.00 (1)	1.50 (2)	1.50 (2)	6.50 (2)	0.50 (2)	0 (2)	1.00 (1)	2.00 (1)	3.50 (2)	0.50 (2)	1.50 (2)	0.50 (2)	1.00 (2)	3.00 (2)	0 (2)	0 (2)
	YOY									6.50	60.50	29.00	109.00	63.50	33.40	42.00	18.50	12.50	2.50	5.00	5.00
	1975																				
	Adults	1.00 (1)	2.00 (1)	4.00 (1)	0.50 (2)	14.50 (2)	11.00 (2)	2.00 (1)	12.50 (2)	3.50 (2)	3.00 (2)	1.50 (2)	2.50 (2)	4.00 (2)	4.50 (2)	0 (2)	0 (2)	1.50 (2)	0 (2)	0 (1)	0 (1)
	YOY	0	0	0	0	0	0	0	0	3.00	38.50	55.50	49.00	22.50	19.00	8.00	2.50	4.50	2.50	2.00	33.00
Station 9	1972	0 (0)	0 (0)	1.00 (4)	0.25 (4)	3.40 (5)	5.00 (2)	1.50 (4)	2.50 (2)	4.50 (4)	8.50 (2)	3.80 (5)	6.00 (2)	5.75 (4)	0.50 (2)	0.33 (3)	3.00 (2)	1.00 (2)	0.33 (3)	0 (2)	1.00 (1)
	1973	0 (2)	0 (4)	0 (2)	2.00 (2)	1.33 (3)	1.00 (2)	1.67 (3)	5.00 (2)	2.00 (3)	16.00 (2)	4.00 (2)	48.33 (3)	86.50 (2)	25.67 (3)	8.00 (2)	0.33 (3)	0 (2)	0 (2)	0 (2)	0 (0)
	1974																				
	Adults	0 (2)	0 (2)	1.00 (1)	0 (1)	0 (1)	25.50 (2)	15.00 (2)	15.50 (2)	4.00 (2)	3.50 (2)	2.50 (2)	1.50 (2)	2.50 (2)	1.00 (2)	5.50 (2)	7.50 (2)	5.00 (2)	4.00 (2)	0.50 (2)	0.50 (2)
	YOY									0	85.00	423.50	148.00	214.00	72.00	174.00	50.00	33.00	5.50	2.00	2.50
	1975																				
	Adults	0 (1)	10.50 (2)	11.00 (1)	5.00 (2)	10.00 (2)	20.50 (2)	24.50 (2)	26.00 (2)	34.00 (2)	22.00 (2)	20.50 (2)	17.00 (1)	16.00 (2)	31.00 (2)	34.00 (2)	23.00 (2)	5.50 (2)	7.50 (2)	3.50 (2)	0 (1)
	YOY	0	0	0	0	0	0	0	0	7.50	2127.50	1389.50	109.00	257.00	229.50	97.00	68.00	10.00	4.50	3.00	1.00
Station 10	1972	0 (0)	0 (0)	1.25 (4)	0.50 (4)	1.60 (5)	2.50 (2)	1.50 (4)	1.00 (2)	0 (4)	0.50 (2)	0.50 (4)	0.50 (2)	1.50 (4)	0 (2)	0 (3)	0.50 (2)	1.50 (2)	0 (4)	0 (2)	0 (1)
	1973	1.00 (2)	1.25 (4)	2.50 (2)	1.00 (2)	0.67 (3)	7.00 (2)	0.33 (3)	0.50 (2)	0 (3)	0 (2)	0 (2)	0.33 (3)	0.50 (2)	0 (3)	2.50 (2)	0 (3)	0 (1)	0 (2)	0 (3)	0 (0)
	1974																				
	Adults	0 (2)	0 (2)	0 (1)	0 (1)	0 (1)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0.50 (2)	0.50 (2)	0 (2)	0 (2)	0 (2)	1.00 (2)	0 (2)
	YOY									0	0	0	0	0	0.50	0	1.00	0	1.00	0.50	0.50
	1975																				
	Adults	2.00 (1)	0.50 (2)	5.00 (1)	2.50 (2)	0.50 (2)	0 (2)	0.50 (2)	0.50 (2)	0 (1)	0.50 (2)	0 (2)	0 (2)	0.50 (2)	0.50 (2)	0.50 (2)	0 (2)	1.00 (2)	0 (2)	1.50 (2)	0 (1)
	YOY	0	0	0	0	0	0	0	0	0	0	0	1.00	1.50	0.50	0	2.50	3.50	0.50	7.00	0
Station 11	1972	0 (0)	0 (0)	0.25 (4)	0.20 (5)	0.67 (3)	0 (2)	0.25 (4)	0 (2)	0 (4)	0 (2)	0 (4)	0 (2)	0.25 (4)	0 (2)	0.33 (3)	1.50 (2)	1.00 (1)	0 (3)	0 (2)	0 (1)
	1973	0 (2)	0 (5)	0.50 (2)	0 (2)	0.33 (3)	1.50 (2)	0.33 (3)	0 (1)	0 (3)	0.50 (2)	0 (2)	0 (3)	0.50 (2)	0 (3)	0 (2)	0 (3)	0 (1)	0 (4)	0 (1)	0 (0)
	1974																				
	Adults	1.00 (2)	0 (2)	0 (1)	0 (1)	0 (1)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0.50 (2)	0.50 (2)	0 (2)
	YOY									0	0	2.50	0	0	0.50	0.50	1.00	0	2.50	1.50	0.50
	1975																				
	Adults	0 (1)	1.00 (2)	1.00 (1)	1.50 (2)	1.50 (2)	0 (2)	3.50 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0.50 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (1)
	YOY	0	0	0	0	0	0	0	0	0	0	0.50	0	0	0	0	0	2.00	0.50	0.50	0
Station 12	1972	0 (0)	0 (0)	0 (4)	0.20 (5)	2.00 (4)	0.50 (2)	0.75 (4)	0.50 (2)	1.25 (4)	0 (2)	0 (4)	0.50 (2)	0.25 (4)	0 (2)	0 (3)	1.00 (2)	0 (1)	0.67 (3)	1.00 (1)	0 (0)
	1973	0 (2)	0.40 (5)	1.50 (2)	1.00 (2)	1.33 (3)	1.00 (2)	0 (3)	1.50 (2)	1.67 (3)	2.50 (2)	1.50 (2)	2.50 (2)	7.00 (2)	1.67 (3)	0 (2)	0.33 (3)	0 (2)	0 (3)	0 (1)	0 (0)
	1974																				
	Adults	0 (2)	0 (2)	0 (1)	0 (1)	1.00 (1)	1.50 (2)	4.00 (2)	0 (2)	0.50 (2)	0.50 (2)	2.50 (2)	1.50 (2)	0 (2)	3.50 (2)	2.50 (2)	13.50 (2)	2.50 (2)	1.50 (2)	1.00 (2)	0 (1)
	YOY									0 (2)	15.00 (2)	65.50 (2)	115.50 (2)	206.00 (2)	113.00 (2)	97.00 (2)	84.00 (2)	8.50 (2)	3.00 (2)	2.50 (2)	1.00 (1)
	1975																				
	Adults	0 (1)	2.50 (2)	2.50 (2)	12.50 (2)	51.50 (2)	11.00 (2)	12.50 (2)	19.00 (2)	12.00 (2)	15.00 (2)	9.50 (2)	1.00 (2)	5.00 (2)	10.00 (1)	6.50 (2)	2.50 (2)	3.00 (2)	1.00 (2)	1.00 (2)	0 (1)
	YOY	0	0	0	0	0	0	0	0.50	1.00	131.50	466.50	619.50	278.50	225.00	129.00	11.50	11.00	4.00	1.00	2.00
Station 20	1972										No Data Taken in 1972										
	1973										No Data Taken in 1973										
	1974																				
	Adults	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	1.00 (2)	0.50 (2)	0 (2)
	YOY	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	1.50 (2)	0 (2)	0.50 (2)	0 (2)	0 (2)	3.00 (2)	0.50 (2)	1.50 (2)
	1975																				
	Adults	0 (1)	0 (2)	6.00 (2)	0.50 (2)	0 (2)	0 (2)	0 (1)	0 (1)	0 (1)	0 (2)	0 (1)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	1.00 (1)
	YOY	0	0	0	0	0	0	0	0	0	0	0	0.50	0.50	1.00	0	0	0	0.50	0	3.00
Station 21	1972										No Data Taken in 1972										
	1973										No Data Taken in 1973										
	1974																				
	Adults	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	1.50 (2)	0.50 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	2.50 (2)	2.50 (2)	0 (2)	6.00 (2)	0.50 (2)	0.50 (2)
	YOY									0 (2)	0 (2)	0.50 (2)	1.50 (2)	1.00 (2)	4.00 (2)	5.00 (2)	4.50 (2)	0 (2)	15.00 (2)	2.00 (2)	3.00 (2)
	1975																				
	Adults	0 (1)	4.00 (2)	4.50 (2)	1.50 (2)	5.56 (2)	1.00 (2)	1.00 (2)	0 (2)	0.50 (2)	0 (1)	0 (2)	0 (2)	0.50 (2)	0.50 (2)	1.00 (2)	0 (2)	0 (2)	0 (2)	0 (2)	2.00 (1)
	YOY	0	0	0	0	0	0	0	0	0	0	2.50	2.00	1.50	1.50	1.50	0	0.50	0	0	0

Table A-22

CPUE for Spottail Shiners Collected in Standard-Station Beach Seines by Site Indian Point Region, Hudson River Estuary, New York, 1972-1975

		Biweekly Period																			
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Station 8	1972	0 (0)*	0 (0)	1.25 (4)	65.75 (4)	57.00 (5)	3.00 (2)	0.67 (3)	0 (2)	0.25 (4)	0 (2)	2.25 (4)	7.00 (2)	2.25 (4)	24.00 (2)	27.67 (3)	1.00 (2)	9.00 (2)	1.33 (3)	1.00 (2)	0 (0)
	1973	0 (2)	99.75 (4)	92.50 (2)	14.50 (2)	19.00 (3)	77.50 (2)	0.33 (3)	2.00 (2)	1.00 (3)	1.00 (2)		0.33 (3)	132.50 (2)	52.33 (3)	10.00 (2)	3.50 (2)	7.50 (2)	13.00 (3)	0 (1)	0 (0)
	1974																				
	Adults**	0.67 (3)	60.50 (2)	260.00 (1)	39.00 (1)	27.00 (1)	0.50 (2)	1.00 (2)	31.00 (2)	1.00 (2)	2.50 (2)	3.00 (1)	29.00 (1)	82.50 (2)	4.50 (2)	2.00 (2)	4.00 (2)	1.50 (2)	4.00 (2)	0 (2)	0 (2)
	YOY									2.00 (2)	2.50 (2)		4.00 (1)	12.50 (2)	0 (2)	1.50 (2)	1.00 (2)	0 (2)	0.50 (2)	0 (2)	0 (2)
	1975																				
	Adults	0 (1)	0 (1)	5.00 (1)	0 (2)	84.00 (2)	1.50 (2)	1.00 (1)	0.50 (2)	1.50 (2)	0 (2)	1.00 (2)	5.50 (2)	8.00 (2)	1.00 (2)	0.50 (2)	5.00 (2)	30.50 (2)	2.00 (2)	0 (1)	0 (1)
	YOY	0	0	0	0	0	0	0	35.00	0.50	0.50	3.00	21.00	16.50	10.00	0.50	0.50	39.00	0	0	0
Station 9	1972	0 (0)	0 (0)	2.25 (4)	15.50 (4)	13.80 (5)	11.50 (2)	1.50 (4)	20.00 (2)	20.75 (4)	27.50 (2)	9.40 (5)	22.50 (2)	18.00 (4)	1.00 (2)	4.67 (3)	19.50 (2)	25.00 (2)	8.00 (3)	0.50 (2)	3.00 (1)
	1973	0 (2)	6.75 (4)	40.00 (2)	17.50 (2)	7.00 (3)	3.00 (2)	12.67 (3)	4.00 (2)	15.67 (3)	28.00 (2)	7.00 (2)	25.33 (3)	41.00 (2)	24.00 (3)	10.00 (2)	5.67 (3)	5.00 (2)	1.00 (2)	0.50 (2)	0 (0)
	1974																				
	Adults	1.50 (2)	1.00 (2)	15.00 (1)	24.00 (1)	12.00 (1)	25.00 (2)	8.00 (2)	5.50 (2)	14.50 (2)	8.50 (2)	2.50 (2)	2.50 (2)	1.00 (2)	10.00 (2)	11.50 (2)	5.00 (2)	8.00 (2)	5.00 (2)	0.50 (2)	0 (2)
	YOY									8.50 (2)	13.50 (2)	4.00 (2)	3.50 (2)	0.50 (2)	1.00 (2)	3.50 (2)	3.00 (2)	6.50 (2)	0.50 (2)	0 (2)	0 (2)
	1975																				
	Adults	0 (1)	1.00 (2)	5.00 (1)	4.50 (2)	9.50 (2)	3.50 (2)	6.00 (2)	1.00 (2)	8.00 (2)	1.00 (2)	0.50 (2)	1.00 (1)	4.50 (2)	6.00 (2)	12.50 (2)	17.50 (2)	12.50 (2)	3.50 (2)	1.50 (2)	0 (1)
	YOY	0	0	0	0	0	0	0	32.50	29.00	43.00	15.00	2.00	10.00	8.50	9.50	9.00	9.50	6.00	0.50	1.00
Station 10	1972	0 (0)	0 (0)	19.25 (4)	11.25 (4)	19.80 (5)	13.50 (2)	15.75 (4)	9.00 (2)	4.75 (4)	66.50 (2)	8.50 (4)	0 (2)	5.00 (4)	4.50 (2)	2.00 (3)	24.50 (2)	33.50 (2)	24.00 (4)	5.00 (2)	0 (1)
	1973	38.50 (2)	12.50 (4)	3.50 (2)	24.00 (2)	36.33 (3)	5.00 (2)	28.33 (3)	7.00 (2)	14.33 (3)	19.00 (2)	10.50 (2)	17.33 (3)	16.00 (2)	2.00 (3)	7.50 (2)	6.33 (3)	12.00 (1)	20.50 (2)	5.00 (3)	0 (0)
	1974																				
	Adults	7.00 (2)	6.50 (2)	9.00 (1)	3.00 (1)	5.00 (1)	22.00 (2)	12.50 (2)	20.00 (2)	15.50 (2)	0.50 (2)	0 (2)	0.50 (2)	0.50 (2)	1.00 (2)	0.50 (2)	2.50 (2)	1.50 (2)	8.00 (2)	9.00 (2)	2.50 (2)
	YOY									0	0	0	0.50	0.50	2.50	0	0	0	1.00	1.50	0.50
	1975																				
	Adults	0 (1)	2.50 (2)	17.00 (1)	7.50 (2)	3.50 (2)	4.50 (2)	11.00 (2)	4.50 (2)	2.00 (1)	0 (2)	0.50 (2)	0.50 (2)	0.50 (2)	2.50 (2)	2.50 (2)	2.50 (2)	15.50 (2)	5.50 (2)	0.50 (2)	9.00 (1)
	YOY	0	0	0	0	0	0	0	0	0	0	0.50	0	1.00	0	0	0.50	6.50	1.50	0	3.00
Station 11	1972	0 (0)	0 (0)	0.50 (4)	0.40 (5)	3.00 (3)	5.50 (2)	1.25 (4)	4.50 (2)	0.25 (4)	0 (2)	1.50 (4)	0 (2)	0 (4)	0 (2)	0.67 (3)	6.50 (2)	10.00 (1)	1.67 (3)	0 (2)	0 (1)
	1973	2.00 (2)	25.20 (5)	18.00 (2)	8.00 (2)	18.00 (3)	17.50 (2)	5.67 (3)	0 (1)	0.33 (3)	2.00 (2)	0 (2)	3.33 (3)	0 (2)	0.33 (3)	0 (2)	0 (3)	0 (1)	2.50 (4)	0 (1)	0 (0)
	1974																				
	Adults	0.50 (2)	13.00 (2)	15.00 (1)	21.00 (1)	15.00 (1)	6.50 (2)	3.50 (2)	4.00 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	2.50 (2)	0 (2)	1.50 (2)	0.50 (2)	0.50 (2)
	YOY									0	0	0	0	0	0	0	0	0	0.50	0	0
	1975																				
	Adults	0 (1)	0.50 (2)	1.00 (1)	20.00 (2)	25.00 (2)	8.00 (2)	12.50 (2)	2.00 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	2.00 (2)	1.50 (2)	8.00 (2)	4.50 (2)	0 (2)	0 (1)
	YOY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.50	0.50	3.50	0	0
Station 12	1972	0 (0)	0 (0)	0.75 (4)	18.40 (5)	10.75 (4)	1.50 (2)	0.25 (4)	0 (2)	7.25 (4)	5.00 (2)	11.50 (4)	3.00 (2)	16.25 (4)	15.00 (2)	10.33 (3)	4.00 (2)	6.00 (1)	5.33 (3)	0 (1)	0 (0)
	1973	0 (2)	22.20 (5)	24.50 (2)	55.50 (2)	35.00 (3)	5.50 (2)	2.67 (3)	7.50 (2)	18.33 (3)	57.50 (2)	34.00 (2)	17.50 (2)	100.00 (2)	51.00 (3)	52.50 (2)	12.00 (3)	3.00 (2)	5.33 (3)	1.00 (1)	0 (1)
	1974																				
	Adults	0 (2)	2.00 (2)	10.00 (1)	30.00 (1)	0 (1)	37.00 (2)	10.50 (2)	28.00 (2)	25.50 (2)	49.50 (2)	39.50 (2)	27.50 (2)	24.50 (2)	8.00 (2)	9.50 (2)	5.50 (2)	1.00 (2)	0.50 (2)	0 (2)	0 (1)
	YOY									1.00	7.50	5.50	12.50	17.50	2.50	5.00	1.00	1.50	0	0	0
	1975																				
	Adults	0 (1)	0 (2)	5.00 (2)	3.00 (2)	4.00 (2)	15.00 (2)	3.50 (2)	2.50 (2)	15.00 (2)	20.50 (2)	17.00 (2)	27.00 (2)	35.50 (2)	3.00 (1)	6.50 (2)	10.00 (2)	4.50 (2)	0.50 (2)	0.50 (0)	0 (1)
	YOY	0	0	0	0	0	0	0.50	22.00	16.00	35.50	23.00	28.50	16.00	6.00	16.50	6.50	5.50	0.50	0	0
Station 20	1972	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
	1973	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
	1974																				
	Adults	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	9.50 (2)	5.50 (2)	9.50 (2)	1.00 (2)	0 (2)	0.50 (2)	0.50 (2)	0.50 (2)	0.50 (2)	1.00 (2)	0 (2)	2.00 (2)	4.00 (2)	0 (2)	0 (2)
	YOY									0.50	0	1.00	0.50	0	0.50	0	0	0	0.50	0.50	0
	1975																				
	Adults	0 (1)	0.50 (2)	9.00 (2)	2.00 (2)	18.50 (2)	0.50 (2)	4.00 (1)	7.00 (1)	7.00 (1)	0.50 (2)	1.00 (1)	0 (2)	0 (2)	2.00 (2)	2.50 (2)	0.50 (2)	5.50 (2)	5.00 (2)	0.50 (2)	0 (1)
	YOY	0	0	0	0	0	0	0	1.00	0	3.00	0	0	0	0.50	0	0	2.50	2.50	0	1.00
Station 21	1972	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
	1973	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
	1974																				
	Adults	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	15.50 (2)	5.00 (2)	1.00 (2)	0.50 (2)	0.50 (2)	0 (2)	0 (2)	0.50 (2)	0 (2)	3.50 (2)	7.00 (2)	12.00 (2)	3.50 (2)	0 (2)	0.50 (2)
	YOY									0.50	0	0	0	0.50	0	0	0	0	0	0	0
	1975																				
	Adults	0 (1)	1.50 (2)	14.00 (2)	6.50 (2)	5.00 (2)	0.50 (2)	5.00 (2)	0 (2)	0.50 (2)	1.00 (1)	0.50 (2)	1.50 (2)	2.00 (2)	10.50 (2)	8.00 (2)	2.50 (2)	17.00 (2)	6.50 (2)	1.00 (2)	1.00 (1)
	YOY	0	0	0	0	0	0	0	1.50	0	1.00	2.50	1.00	3.00	2.50	0.50	0	2.00	0	0	0

Table A-23

CPUE for Tessellated Darters Collected in Standard-Station Beach Seines by Site Indian Point Region, Hudson River Estuary, New York, 1972-1975

		Biweekly Period																			
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Station 8	1972	0 (0)*	0 (0)	0.25 (4)	0.50 (4)	1.20 (5)	0.50 (2)	0.33 (3)	0 (2)	0.75 (4)	1.50 (2)	1.50 (4)	2.50.(2)	0.75 (4)	0 (2)	0.33 (3)	0.50 (2)	1.00 (2)	1.00 (3)	1.50 (2)	0 (0)
	1973	1.50 (2)	2.50 (4)	6.50 (2)	4.50 (2)	1.67 (3)	1.00 (2)	0 (3)	0 (2)	10.00 (3)	14.00 (2)	6.00 (2)	23.33 (3)	22.00 (2)	5.00 (3)	1.00 (2)	1.00 (2)	0 (2)	0.67 (3)	4.00 (1)	0 (0)
	1974 Adults**	0.67 (3)	4.00 (2)	12.00 (1)	5.00 (1)	0 (1)	1.50 (2)	2.50 (2)	7.00 (2)	0.50 (2)	8.50 (2)	3.00 (1)	1.00 (1)	2.50 (2)	1.00 (2)	4.50 (2)	2.50 (2)	2.00 (2)	4.50 (2)	2.00 (2)	0 (2)
	YOY									10.00	29.00	4.00	6.00	4.00	2.00	5.50	3.00	1.50	2.50	1.00	0
	1975 Adults	1.00 (1)	3.00 (1)	9.00 (1)	6.00 (2)	11.50 (2)	8.50 (2)	1.00 (1)	3.00 (2)	0.50 (2)	0 (2)	1.50 (2)	3.00 (2)	0.50 (2)	3.50 (2)	2.00 (2)	1.00 (2)	2.00 (2)	1.00 (2)	0 (1)	0 (1)
	YOY	0	0	0	0	0	0	0	29.00	7.00	21.50	10.00	5.50	7.00	6.00	2.50	7.00	10.50	1.50	2.00	7.00
Station 9	1972	0 (0)	0 (0)	0.25 (4)	2.50 (4)	1.20 (5)	5.00 (2)	0 (4)	0.50 (2)	2.75 (4)	42.50 (2)	2.00 (5)	0 (2)	4.25 (4)	0 (2)	0.33 (3)	3.00 (2)	4.00 (2)	5.67 (3)	0.50 (2)	0 (1)
	1973	0.50 (2)	2.75 (4)	5.50 (2)	1.50 (2)	1.33 (3)	7.50 (2)	1.33 (3)	1.50 (2)	18.67 (3)	8.50 (2)	1.00 (2)	18.00 (3)	14.00 (2)	6.33 (3)	3.00 (2)	1.67 (3)	4.50 (2)	2.50 (2)	1.00 (2)	0 (0)
	1974 Adults	1.00 (2)	0.50 (2)	4.00 (1)	0 (1)	0 (1)	1.00 (2)	0.50 (2)	9.00 (2)	0.50 (2)	1.00 (2)	3.00 (2)	0.50 (2)	0 (2)	0.50 (2)	3.00 (2)	7.50 (2)	2.50 (2)	2.00 (2)	2.00 (2)	1.50 (2)
	YOY									17.00	15.50	4.00	3.00	8.00	6.00	3.00	8.00	3.50	1.50	0	0
	1975 Adults	0 (1)	0.50 (2)	2.00 (1)	2.50 (2)	2.00 (2)	2.50 (2)	1.50 (2)	0 (2)	1.00 (2)	0.50 (2)	1.00 (2)	1.00 (1)	0 (2)	4.00 (2)	4.00 (2)	8.50 (2)	4.50 (2)	3.00 (2)	3.00 (2)	0 (1)
	YOY	0	0	0	0	0	0	0.50	15.50	14.50	52.50	36.00	13.00	2.50	6.50	12.50	15.50	10.00	3.00	1.50	3.00
Station 10	1972	0 (0)	0 (0)	2.00 (4)	1.25 (4)	0 (5)	0 (2)	0.50 (4)	0 (2)	1.50 (4)	1.50 (2)	0 (4)	0 (2)	1.00 (4)	0.50 (2)	0 (3)	0.50 (2)	0 (2)	1.00 (4)	2.00 (2)	1.00 (1)
	1973	7.00 (2)	8.50 (4)	12.00 (2)	5.50 (2)	6.67 (3)	2.50 (2)	0.33 (3)	0.50 (2)	0 (3)	3.50 (2)	1.50 (2)	3.33 (3)	1.00 (2)	0 (3)	0 (2)	1.33 (3)	2.00 (1)	0 (2)	2.67 (3)	0 (0)
	1974 Adults	6.00 (2)	11.00 (2)	4.00 (1)	0 (1)	1.00 (1)	7.50 (2)	0.50 (2)	1.50 (2)	0 (2)	0 (2)	0.50 (2)	0 (2)	0 (2)	0 (2)	0.50 (2)	0 (2)	2.50 (2)	1.00 (2)	9.50 (2)	5.50 (2)
	YOY									2.00	2.00	0	0	2.50	1.00	0	1.00	0.50	1.50	1.50	2.50
	1975	0 (1)	5.50 (2)	7.00 (1)	1.00 (2)	6.00 (2)	2.00 (2)	2.00 (2)	0 (2)	0 (1)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0.50 (2)	2.50 (2)	0.50 (2)	0.50 (2)	0 (1)
	YOY	0	0	0	0	0	0	1.00	0.50	0	10.50	2.50	1.50	0.50	0.50	0	1.00	11.50	0	6.50	0
Station 11	1972	0 (0)	0 (0)	0 (4)	0.20 (5)	0 (3)	0 (2)	0 (4)	0 (2)	0.25 (4)	0.50 (2)	0.25 (4)	1.00 (2)	0.50 (4)	0 (2)	1.33 (3)	1.50 (2)	4.00 (1)	2.00 (3)	1.50 (2)	0 (1)
	1973	2.00 (2)	1.80 (5)	4.00 (2)	0.50 (2)	0.67 (3)	1.50 (2)	0 (3)	0 (1)	1.00 (3)	0.50 (2)	0 (2)	1.67 (3)	0 (2)	0 (3)	0.50 (2)	0.67 (3)	0 (1)	0.25 (4)	1.00 (1)	0 (0)
	1974 Adults	0.50 (2)	1.00 (2)	1.00 (1)	0 (1)	1.00 (1)	0.50 (2)	0.50 (2)	0 (2)	0 (2)	0 (2)	0 (2)	1.00 (2)	0 (2)	0 (2)	0 (2)	1.00 (2)	0 (2)	0.50 (2)	0.50 (2)	0 (2)
	YOY									0.50	0	0	1.50	0	0	0	0	0	0.50	0	0.50
	1975 Adults	0 (1)	0 (2)	3.00 (1)	1.00 (2)	0.50 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	9 (2)	0 (2)	0 (2)	0 (2)	0.50 (2)	0 (1)
	YOY	0	0	0	0	0	0	0	0.50	0	1.50	0	0	0	0	0	0	0	0	2.50	2.00
Station 12	1972	0 (0)	0 (0)	1.75 (4)	1.00 (5)	0 (4)	0 (2)	0.50 (4)	0 (2)	0.50 (4)	1.50 (2)	0.50 (4)	1.00 (2)	0.75 (4)	0 (2)	1.00 (3)	2.00 (2)	1.00 (1)	0.67 (3)	1.00 (1)	0 (0)
	1973	0.50 (2)	3.00 (5)	326.50 (2)	2.50 (2)	1.33 (3)	2.00 (2)	0.67 (3)	3.50 (2)	4.00 (3)	21.00 (2)	2.00 (2)	10.50 (2)	5.50 (2)	2.33 (3)	7.00 (2)	1.67 (3)	0.50 (2)	0.33 (3)	3.00 (1)	0 (0)
	1974 Adults	0.50 (2)	2.50 (2)	7.00 (1)	0 (1)	0 (1)	2.50 (2)	1.50 (2)	9.00 (2)	2.50 (2)	1.50 (2)	0 (2)	1.50 (2)	3.00 (2)	1.00 (2)	3.50 (2)	9.00 (2)	2.00 (2)	6.50 (2)	1.00 (2)	0 (1)
	YOY									2.00	4.50	0.50	1.50	6.50	2.50	1.00	3.50	1.00	0	0	0
	1975 Adults	1.00 (1)	1.00 (2)	0.50 (2)	11.00 (2)	8.50 (2)	4.00 (2)	1.00 (2)	1.50 (2)	0.50 (2)	1.50 (2)	0.50 (2)	1.50 (2)	0 (2)	5.00 (1)	2.00 (2)	5.50 (2)	11.50 (2)	8.00 (2)	0 (2)	1.00 (1)
	YOY	0	0	0	0	0	0	0.50	4.00	9.00	5.00	2.90	1.50	0.50	0	3.00	1.50	9.50	3.00	1.50	0
Station 20	1972										No Data Taken in 1972										
	1973										No Data Taken in 1973										
	1974 Adults	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	3.50 (2)	1.50 (2)	1.50 (2)	1.00 (2)	0.50 (2)	0.50 (2)	0 (2)	2.00 (2)	0 (2)	0.50 (2)	0 (2)	0 (2)	0.50 (2)	0 (2)	0.50 (2)
	YOY									2.00	5.00	0.50	0.50	3.50	0.50	0	0	0	2.00	1.00	0.50
	1975 Adults	1.00 (1)	2.50 (2)	6.50 (2)	1.50 (2)	2.00 (2)	3.50 (2)	0 (1)	0 (1)	1.00 (1)	0 (2)	0 (1)	0 (2)	0 (2)	0 (2)	1.00 (2)	0 (2)	3.00 (2)	0 (2)	0 (2)	3.00 (1)
	YOY	0	0	0	0	0	0	0	3.00	0	0.50	1.00	0.50	0	0.50	3.00	4.00	7.50	4.00	2.50	6.00
Station 21	1972	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
	1973	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (C)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
	1974 Adults	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	3.00 (2)	0 (2)	1.00 (2)	1.00 (2)	0 (2)	0.50 (2)	0 (2)	0 (2)	1.00 (2)	1.50 (2)	2.50 (2)	1.00 (2)	2.50 (2)	1.50 (2)	1.00 (2)
	YOY									5.50	0	0	0	1.00	0	1.00	2.00	1.00	0.50	1.00	0.50
	1975 Adults	1.00 (1)	1.50 (2)	10.50 (2)	3.00 (2)	3.00 (2)	1.00 (2)	0.50 (2)	0 (2)	0 (2)	0 (1)	0.50 (2)	0 (2)	0 (2)	1.00 (2)	0.50 (2)	0 (2)	2.00 (2)	1.50 (2)	0.50 (2)	0 (1)
	YOY	0	0	0	0	0	0	0	2.50	2.50	1.00	2.00	1.00	0.50	0.50	1.00	0	2.50	0.50	1.00	3.00

Table A-24

CPUE for Pumpkinseeds Collected in Standard-Station Beach Seines by Site
Indian Point Region, Hudson River Estuary, New York, 1972-1975

		Biweekly Period																			
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Station 8	1972	0 (0)*	0 (0)	0 (4)	3.25 (4)	4.20 (5)	10.00 (2)	9.67 (3)	9.50 (2)	9.50 (4)	6.50 (2)	6.75 (4)	8.50 (2)	17.25 (4)	22.50 (2)	11.33 (3)	9.00 (2)	1.50 (2)	12.33 (3)	4.50 (2)	0 (0)
	1973	1.00 (2)	5.25 (4)	2.00 (2)	0.50 (2)	2.00 (3)	5.50 (2)	2.67 (3)	2.50 (2)	5.67 (3)	0.50 (2)	1.50 (2)	4.67 (3)	19.50 (2)	14.67 (3)	13.00 (2)	1.50 (2)	6.50 (2)	10.33 (3)	2.00 (1)	0 (0)
	1974																				
	Adults**	2.00 (3)	6.00 (2)	7.00 (1)	15.00 (1)	5.00 (1)	7.50 (2)	10.00 (2)	14.00 (2)	5.00 (2)	6.00 (2)	12.00 (1)	0 (1)	5.50 (2)	5.50 (2)	4.00 (2)	6.00 (2)	2.50 (2)	1.50 (2)	2.50 (2)	1.50 (2)
	YOY									0.50	0	0	0	10.00	18.00	38.50	22.50	4.00	9.00	3.50	2.00
	1975																				
	Adults	3.00 (1)	1.00 (1)	4.00 (1)	8.00 (2)	17.50 (2)	8.00 (2)	9.00 (1)	3.50 (2)	3.00 (2)	9.00 (2)	6.00 (2)	8.50 (2)	11.50 (2)	11.50 (2)	6.00 (2)	4.50 (2)	7.00 (2)	2.00 (2)	0 (1)	0 (1)
	YOY	0	0	0	0	0	0	0	1.50	0	0	2.50	15.50	3.50	5.00	10.00	1.50	5.50	0.50	0	0
Station 9	1972	0 (0)	0 (0)	0.75 (4)	1.00 (4)	2.00 (5)	6.00 (2)	0.25 (4)	0.50 (2)	2.75 (4)	2.00 (2)	1.60 (5)	0.50 (2)	1.00 (4)	1.00 (2)	0.67 (3)	1.50 (2)	0 (2)	0.67 (3)	0 (2)	0 (1)
	1973	0 (2)	2.00 (4)	1.50 (2)	0 (2)	1.33 (3)	0 (2)	2.00 (3)	3.00 (2)	1.00 (3)	0.50 (2)	1.00 (2)	1.00 (3)	1.00 (2)	0.67 (3)	0.50 (2)	0 (3)	0.50 (2)	0 (2)	0 (2)	0 (0)
	1974																				
	Adults	0.50 (2)	0.50 (2)	3.00 (1)	1.00 (1)	1.00 (1)	2.50 (2)	4.00 (2)	0.50 (2)	1.00 (2)	3.00 (2)	1.00 (2)	0.50 (2)	1.00 (2)	1.00 (2)	0 (2)	0 (2)	0 (2)	1.00 (2)	0 (2)	0.50 (2)
	YOY									0	0	0	1.00	1.00	0.50	2.-0	2.00	1.00	0.50	0.50	0.50
	1975																				
	Adults	1.00 (1)	0 (2)	1.00 (1)	2.00 (2)	1.00 (2)	2.00 (2)	2.00 (2)	6.50 (2)	3.50 (2)	0.50 (2)	2.00 (2)	0 (1)	1.00 (2)	4.00 (2)	1.50 (2)	2.00 (2)	1.00 (2)	1.50 (2)	1.00 (2)	1.00 (1)
	YOY	0	0	0	0	0	0	0	0	0	0	0.50	0	2.00	4.50	2.50	0	0	0	0	0
Station 10	1972	0 (0)	0 (0)	0.25 (4)	0.50 (4)	0.40 (5)	0 (2)	1.25 (4)	0 (2)	0 (4)	1.00 (2)	2.00 (4)	0 (2)	0 (4)	0 (2)	0 (3)	0 (2)	0 (2)	0 (4)	0.50 (2)	0 (1)
	1973	0.50 (2)	0.50 (4)	0 (2)	1.00 (2)	0 (3)	2.00 (2)	0 (3)	0.50 (2)	0.33 (3)	0 (2)	1.00 (2)	0 (3)	0.50 (2)	0 (3)	0 (2)	0.33 (3)	0 (1)	0 (2)	0 (3)	0 (0)
	1974																				
	Adults	1.50 (2)	2.50 (2)	2.00 (1)	0 (1)	0 (1)	3.00 (2)	0.50 (2)	0 (2)	0 (2)	0.50 (2)	0 (2)	0 (2)	0 (2)	0.50 (2)	0.50 (2)	1.50 (2)	0 (2)	0 (2)	1.00 (2)	0.50 (2)
	YOY									0	0	0	0	0	0	0.50	0.50	0.50	3.50	0	0.50
	1975																				
	Adults	0 (1)	2.00 (2)	3.00 (1)	0 (2)	0 (2)	0.50 (2)	0 (2)	3.50 (2)	5.00 (1)	0.50 (2)	0.50 (2)	0 (2)	0.50 (2)	0 (2)	0.50 (2)	2.00 (2)	1.00 (2)	0.50 (2)	0 (2)	0 (1)
	YOY	0	0	0	0	0	0	0	0	0	0	0	0	1.50	0	0	0	0	0	0	0
Station 11	1972	0 (0)	0 (0)	0 (4)	0 (5)	0.67 (3)	0 (2)	0 (4)	0 (2)	0.25 (4)	0 (2)	0 (4)	0 (2)	0 (4)	0 (2)	0 (3)	0 (2)	0 (1)	0 (3)	0 (2)	0 (1)
	1973	0 (2)	0.40 (5)	0.50 (2)	0 (2)	0 (3)	0.50 (2)	0 (3)	0 (1)	0 (3)	0.50 (2)	0.50 (2)	0.67 (3)	0 (2)	0 (3)	0 (2)	0 (3)	0 (1)	0.25 (4)	0 (1)	0 (0)
	1974																				
	Adults	0 (2)	1.50 (2)	0 (1)	0 (1)	0 (1)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0.50 (2)	0 (2)	1.00 (2)	3.50 (2)	1.00 (2)	0.50 (2)	0.50 (2)	0 (2)
	YOY									0	0	0	0	0	0	0.50	1.50	0	0	0.50	0
	1975																				
	Adults	0 (1)	0 (2)	0 (1)	0.50 (2)	0.50 (2)	0 (2)	0 (2)	0.50 (2)	0.50 (2)	0 (2)	1.50 (2)	0 (2)	1.00 (2)	0.50 (2)	1.00 (2)	0 (2)	0 (2)	1.50 (2)	0.50 (2)	0 (1)
	YOY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20.50	1.00	0	0	0	0
Station 12	1972	0 (0)	0 (0)	0.25 (4)	1.00 (5)	2.75 (4)	1.50 (2)	0.75 (4)	1.00 (2)	7.50 (4)	2.50 (2)	3.50 (4)	0.50 (2)	2.50 (4)	1.00 (2)	2.00 (3)	3.00 (2)	0 (1)	0.33 (3)	0 (1)	0 (1)
	1973	0.50 (2)	0.20 (5)	1.00 (2)	1.00 (2)	1.33 (3)	1.00 (2)	1.33 (3)	1.00 (2)	3.67 (3)	2.00 (2)	4.00 (2)	3.50 (2)	10.00 (2)	4.00 (3)	3.00 (2)	2.00 (3)	0 (2)	0 (3)	0 (1)	0 (0)
	1974																				
	Adults	0 (2)	0 (2)	1.00 (1)	1.00 (1)	1.00 (1)	4.00 (2)	7.50 (2)	5.00 (2)	6.50 (2)	5.50 (2)	7.00 (2)	3.00 (2)	3.00 (2)	1.50 (2)	2.50 (2)	5.00 (2)	0.50 (2)	0.50 (2)	0 (0)	0 (1)
	YOY									0 (2)	0 (2)	0 (2)	10.00 (2)	7.50 (2)	4.50 (2)	13.00 (2)	6.00 (2)	0 (2)	0.50 (2)	0 (2)	0 (1)
	1975																				
	Adults	0 (1)	0 (2)	0.50 (2)	1.00 (2)	9.50 (2)	17.00 (2)	24.00 (2)	20.00 (2)	10.00 (2)	22.00 (2)	7.00 (2)	2.50 (2)	6.50 (2)	10.00 (1)	1.00 (2)	1.50 (2)	5.50 (2)	0 (2)	0 (2)	0 (1)
	YOY	0	0	0	0	0	0	0	0	0	0	2.50	7.00	9.50	7.00	2.50	0	1.50	0	0	0
Station 20	1972										No Data Taken in 1972										
	1973										No Data Taken in 1973										
	1974																				
	Adults	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0.50 (2)	0 (2)	0 (2)	0 (2)	0.50 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)
	YOY									0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0.50 (2)	0 (2)	0 (2)
	1975																				
	Adults	1.00 (1)	0 (2)	6.00 (2)	0.50 (2)	3.00 (2)	0 (2)	0 (1)	0 (1)	0 (1)	0 (2)	0 (1)	0 (2)	0 (2)	0 (2)	2.00 (2)	0 (2)	0 (2)	0.50 (0)	0 (2)	0 (1)
	YOY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Station 21	1972										No Data Taken in 1972										
	1973										No Data Taken in 1973										
	1974																				
	Adults	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	2.00 (2)	1.50 (2)	1.00 (2)	0.50 (2)	1.00 (2)	0 (2)	0.50 (2)	0.50 (2)	1.50 (2)	1.00 (2)	0 (2)	1.00 (2)	0 (2)	0 (2)	0 (2)
	YOY									0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (2)	1.00 (2)	0.50 (2)	0.50 (2)	0 (2)	0.50 (2)	0.50 (2)
	1975																				
	Adults	0 (1)	0 (2)	1.50 (2)	0.50 (2)	0 (2)	1.50 (2)	1.00 (2)	2.50 (2)	1.00 (2)	5.00 (1)	4.00 (2)	6.00 (2)	0.50 (2)	1.50 (2)	3.00 (2)	1.50 (2)	0 (2)	0 (2)	0.50 (2)	0 (1)
	YOY	0	0	0	0	0	0	0	0	0	0	0	0	0	0.50	0	0	0	0	0	0

APPENDIX B

NONPARAMETRIC ANOVA TABLES FOR STRIPED BASS,WHITE PERCH, AND ATLANTIC TOMCOD DISTRIBUTION AMONG INDIAN POINT STANDARD-STATION SITES, 1972-1975

Table B-1

Ranked CPUE Data, Summed Ranks, χ^2 Value and Degrees of Freedom for Friedman Nonparametric Two-Way ANOVA, Striped Bass, 1972 Standard-Station Beach-Seine Samples

			Station		
Sampling Period	8	9	10	11	12
May 7 - 20	2	4.5	1	3	4.5
May 21 - Jun 3	4.5	4.5	1	2	3
Jun 4 - 17	4.5	3	1.5	1.5	4.5
Jun 18 - Jul 1	3	2	4.5	1	4.5
Jul 2 - 15	4	4	1	4	2
Jul 16 - 29	3.5	5	2	1	3.5
Jul 30 - Aug 12	5	3	2	1	4
Aug 13 - 26	4.5	3	2	1	4.5
Aug 27 - Sep 9	4.5	1	2	4.5	3
Sep 10 - 23	3	2	1	4	5
Sep 24 - Oct 7	3	1	5	2	4
Oct 8 - 21	5	3	1	2	4
Oct 22 - Nov 4	5	2	3	1	4
Nov 5 - 18	5	3	2	1	4
Nov 19 - Dec 2	5	3	1	2	4
Dec 3 - 16	3.5	3.5	1	3.5	3.5
Totals	65.0	47.5	31.0	34.5	62.0

$\chi^2 = 23.9$ df = 4 Significant difference ($p < 0.05$)

Multiple comparisons by station:

10 11 9 12 8

Underlining denotes no significant difference ($p < 0.05$).

Table B-2

Ranked CPUE Data, Summed Ranks, χ^2 Value and Degrees of Freedom for Friedman Nonparametric Two-Way ANOVA, Striped Bass, 1973 Standard-Station Beach-Seine Samples

	Station				
Sampling Period	8	9	10	11	12
Apr 8 - 21	4	4	4	1	2
Apr 22 - May 5	3.5	3.5	3.5	3.5	1
May 6 - 19	5	3.5	2	1	3.5
May 20 - Jun 2	5	3	3	1	3
Jun 3 - 16	3	4.5	2	1	4.5
Jun 17 - 30	3	5	2	1	4
July 1 - 14	4.5	3	1.5	1.5	4.5
Jul 15 - 28	5	2	1	3	4
Jul 29 - Aug 11	4	5	2	1	3
Aug 12 - 25	5	4	2	1	3
Aug 26 - Sep 8	5	3	1	2	4
Sep 9 - 22	4	5	1	2	3
Sep 23 - Oct 6	5	2	1	3	4
Oct 7 - 20	5	3	2	1	4
Oct 21 - Nov 3	5	2	1	4	3
Nov 4 - 17	4	1	2	3	5
Nov 18 - Dec 1	1	3	2	4	5
Dec 2 - 15	2	5	3	1	4
Totals	73.0	61.5	36.0	35.0	64.5

$\chi^2 = 26.0$ df = 4 Significant difference ($p < 0.05$)

Multiple comparisons by station:

11 10 9 12 8

Underlining denotes no significant difference ($p < 0.05$)

Table B-3

Ranked CPUE Data, Summed Ranks, χ^2 Value and Degrees of Freedom for Friedman Nonparametric Two-Way ANOVA, Striped Bass, 1974 Standard-Station Beach-Seine Samples

	Station						
Sampling Period	8	9	10	11	12	20	21
Jun 2 - 15	5	6.5	2	1	6.5	4	3
Jun 16 - 29	4	5	2	3	6.5	6.5	1
Jun 30 - Jul 13	2	4	1	4	7	6	4
Jul 14 - 27	7	5.5	5.5	3	4	1	2
Jul 28 - Aug 10	7	5	1	2	6	3	4
Aug 11 - 24	7	5	6	3	4	2	1
Aug 25 - Sep 7	5	7	4	2	1	6	3
Sep 8 - 21	4	7	2.5	5	2.5	6	1
Sep 22 - Oct 5	3.5	5	2	7	1	6	3.5
Oct 6 - 19	7	2	1	6	5	3	4
Oct 20 - Nov 2	6	3	1	2	5	4	7
Nov 3 - 16	4	7	1	2	5.5	3	5.5
Nov 17 - 30	6.5	4	1	2	6.5	4	4
Dec 1 - 4	5	5	1	5	5	2	5
Totals	73.0	71.0	31.0	47.0	65.5	56.5	48.0

$\chi^2 = 21$ df = 6 Significant difference ($p < 0.05$)

Multiple comparisons by station:

10 11 21 20 12 9 8

Underlining denotes no significant difference ($p < 0.05$)

Table B-4

Ranked CPUE Data, Summed Ranks, χ^2 Value and Degrees of Freedom for Friedman Nonparametric Two-Way ANOVA, Striped Bass, 1975 Standard-Station Beach-Seine Samples

	Station						
Sampling Period	8	9	10	11	12	20	21
Apr 20 - May 3	4.5	1	4.5	4.5	4.5	4.5	4.5
May 4 - May 17	5.5	5.5	1	2.5	5.5	5.5	5.5
May 18 - May 31	6	4	2	1	6	3	6
Jun 1 - Jun 14	4.5	4.5	4.5	1	4.5	4.5	4.5
Jun 15 - Jun 28	6	6	1	4	6	4.5	3
Jun 29 - Jul 12	6	6	2	1	4	2	3
Jul 13 - Jul 26	7	6	3	1	5	6	4
Jul 27 - Aug 9	7	4	2	5	6	2	1
Aug 10 - Aug 23	7	6	4	2	5	3	1
Aug 24 - Sep 6	6	7	2	4	5	3	3
Sep 7 - Sep 20	6	4	1	3	7	1	5
Sep 21 - Oct 4	6	5	4	3	7	2	1
Oct 5 - Oct 18	7	5	1	3	6	2	4
Oct 19 - Nov 1	4.5	6.5	6.5	2	4.5	2	1
Nov 2 - Nov 15	6.5	6.5	4	2	5	3	1
Nov 16 - Nov 29	6	6	2	1	6	3	4
Nov 30 - Dec 13	5	5	1	5	5	3	2
Dec 14 - Dec 27	4.5	4.5	1	4.5	4.5	5	4.5
Totals	105.0	92.5	46.5	49.5	96.5	59.0	55.0

χ^2 = 44.33 df = 6 Significant ($p < 0.05$)

Multiple Comparisons by Station:

10 11 21 20 9 12 8

Underlining denotes no significant difference ($p < 0.05$)

Table B-5

Ranked CPUE Data, Summed Ranks, χ^2 Value and Degrees of Freedom for Friedman Nonparametric Two-Way ANOVA, White Perch, 1972 Standard-Station Beach-Seine Samples

Sampling Period	Station 8	9	10	11	12
May 21 - Jun 3	2	5	1	4	3
Jun 4 - Jun 17	3.5	3.5	2	5	1
Jun 18 - Jul 1	4	2	5	1	3
Jul 2 - Jul 15	1	4	3	5	2
Jul 16 - Jul 29	3	1	4	5	2
Jul 30 - Aug 12	4	3	2	5	1
Aug 13 - Aug 26	5	3	1	4	2
Aug 27 - Sep 9	3	1	4	5	2
Sep 10 - Sep 23	3	1	4	5	2
Sep 24 - Oct 7	3	4	1	5	2
Oct 8 - Oct 21	2	4	1	5	3
Oct 22 - Nov 4	4	3	1	5	2
Nov 5 - Nov 18	3	4	2	1	5
Dec 3 - Dec 16	2	5	1	3.5	3.5
Totals	42.5	43.5	32.0	58.5	33.5

$\chi^2 = 12.77$ df = 4 Significant ($p < 0.05$)

Multiple Comparisons by Station:

10 12 8 9 11

Underlining denotes no significant difference ($p < 0.05$)

Table B-6

Ranked CPUE Data, Summed Ranks, χ^2 Value and Degrees of Freedom for Friedman Nonparametric Two-Way ANOVA, White Perch, 1973 Standard-Station Beach-Seine Samples

	Station				
Sampling Period	8	9	10	11	12
Apr 8 - apr 21	3.5	2	3.5	5	1
May 6 - May 19	3.5	3.5	2	5	1
May 20 - Jun 2	1	3	4	5	5
Jun 3 - Jun 16	1	5	4	2	3
Jun 17 - Jun 30	1	2	5	4	3
Jul 1 - Jul 14	1.5	3	4	5	1.5
Jul 15 - Jul 28	5	1.5	4	1.5	3
Jul 29 - Aug 11	5	3	1	4	2
Aug 12 - Aug 25	5	3	1	4	2
Aug 26 - Sep 8	4	5	2	3	1
Sep 9 - Sep 22	2	3	4	5	1
Sep 23 - Oct 6	2	3	4	5	1
Oct 7 - Oct 20	3	2	4.5	4.5	1
Oct 21 - Nov 3	4	3	1	5	2
Nov 4 - Nov 17	4.5	4.5	3	2	1
Nov 18 - Dec 1	2	5	1	4	3
Dec 2 - Dec 15	4.5	4.5	1	2	3
Totals	52.5	56.0	49.0	66.0	31.5

$\chi^2 = 21$ df = 4 Significant ($p < 0.05$)

Multiple Comparisons by Station:

12 10 8 9 11

Underlining denotes no significant difference ($p < 0.05$)

Table B-7

Ranked CPUE Data, Summed Ranks, χ^2 Value and Degrees of Freedom for Friedman Nonparametric Two-Way ANOVA, White Perch (Adults), 1974 Standard-Station Beach-Seine Samples

	Station						
Sampling Period	8	9	10	11	12	20	21
Apr 21 - May 4	4	4	4	2	1	6.5	6.5
Jun 2 - Jun 15	1	4	2	7	5	6	3
Jun 16 - Jun 29	1	4	3	6	5	7	2
Jul 1 - Jul 13	1	5	2	7	3	4	6
Jul 14 - Jul 27	7	3	5	6	1	4	2
Aug 11 - Aug 24	7	6	2	4.5	1	3	4.5
Aug 25 - Sep 7	6.5	5	3	6.5	1	4	2
Sep 22 - Oct 5	3	5	4	6	1	7	2
Oct 6 - Oct 19	4.5	2	1	6	3	7	4.5
Oct 20 - Nov 2	5.5	5.5	2	4	3	7	1
Totals	40.5	43.5	28	55	24	55.5	33.5

$\chi^2 = 19.71$ df = 6 Significant ($p < 0.05$)

Multiple Comparisons by Station:

10 11 21 20 12 9 8

Underlining denotes no significant difference ($p< 0.05$)

Table B-8

Ranked CPUE Data, Summed Ranks, χ^2 Value and Degrees of Freedom for Friedman Nonparametric Two-Way ANOVA, White Perch (Yoy), 1974 Standard-Station Beach-Seine Samples

	Station						
Sampling Period	8	9	10	11	12	20	21
Jul 28 - Aug 10	6.5	1	2.5	6.5	2.5	4.5	4.5
Aug 11 - Aug 24	3	2	7	6	1	4.5	4.5
Aug 25 - Sep 7	6.5	2	5	6.5	1	3.5	3.5
Sep 8 - Sep 21	3	7	4	5	1	6	2
Sep 22 - Oct 5	5	3	2	6.5	1	6.5	4
Oct 6 - Oct 19	6.5	2	3	5	1	6.5	4
Oct 20 - Nov 16	6.5	3	4	5	1	6.5	2
Totals	37.0	20.0	27.5	40.5	8.5	38.0	24.5

$\chi^2 = 24.30$ df = 6 Significant difference ($p < 0.05$)

Multiple Comparisons by Station:

12 9 21 10 8 20 11

Underlining denotes no significant difference
($p < 0.047$)

Table B-9

Ranked CPUE Data, Summed Ranks, χ^2 Value and Degrees of Freedom for Friedman Nonparametric Two-Way Anova, White Perch (Adults), 1975 Standard-Station Beach-Seine Samples

	Station						
Sampling Period	8	9	10	11	12	20	21
Apr 20 - May 3	6.5	6.5	1	2.5	2.5	4.5	4.5
May 18 - May 31	6.5	4	1	2	3	5	6.5
Jun 1 - Jun 14	5	6	3.5	2	1	7	3.5
Jun 15 - Jun 28	6	7	2	4.5	3	4.5	1
Jun 29 - Jul 12	7	2	4.5	6	1	4.5	3
Jul 13 - Jul 26	6.5	4	2	6.5	1	5	3
Jul 27 - Aug 9	6.5	5	4	6.5	1	3	2
Aug 24 - Sep 6	3.5	6	2	6	1	6	3.5
Sep 7 - Sep 20	3	6	2	4	5	7	1
Sep 21 - Oct 4	5	4	2.5	6.5	6.5	2.5	1
Oct 5 - Oct 18	6	6	3	1	6	4	2
Totals	61.5	56.5	27.5	47.5	31.0	53.0	31.0

$\chi^2 = 22.71$ df = 6 Significant ($p < 0.05$)

Multiple Comparisons by Station:

10 12 21 11 20 9 8

Underlining denotes No significant Difference ($p = 0.049$)

Table B-10

Ranked CPUE Data, Summed Ranks, χ^2 Value and Degrees of Freedom for Friedman Nonparametric Two-Way ANOVA, White Perch (Yoy), 1975 Standard-Station Beach-Seine Samples

	Station						
Sampling Period	8	9	10	11	12	20	21
Jul 13 - Jul 26	3	1	4.5	6.5	2	4.5	6.5
Jul 27 - Aug 9	5	1	6	7	2	4	3
Aug 10 - Aug 23	5	1	4	7	2	6	3
Aug 24 - Sep 6	5	2	6.5	6.5	1	4	3
Sep 7 - Sep 20	2	4	3	6.5	1	6.5	5
Sep 21 - Oct 4	3	1	6	7	2	5	4
Oct 5 - Oct 18	7	2	1	4.5	3	4.5	6
Oct 19 - Nov 1	2.5	2.5	4.5	1	4.5	6.5	6.5
Totals	32.5	14.5	35.5	46.0	17.5	41.0	37.0

$\chi^2 = 22.25$ df = 6 Significant ($p < 0.05$)

Multiple Comparisons by Station:

9 12 8 10 21 20 11

Underlining denotes no significant difference
($p = 0.041$)

Table B-11

Ranked CPUE Data, Summed Ranks, χ^2 Value and Degrees of Freedom for Friedman Nonparametric Two-Way ANOVA, White Perch, 1972 Standard-Station Beach-Seine Samples

	Station						
ampling Period	1	2	3	4	5	6	7
pr 9 - Apr 22	6	4	6.0	2	1	3	6.0
pr 23 - May 6	5	6.5	1	2	3	4	6.5
ay 7 - May 20	1	2	7	5	6	4	3
un 4 - Jun 17	4.5	1	3	6.5	6.5	4.5	2
un 18 - Jul 1	5	4	2	3	7	6	1
ul 2 - Jul 15	4	3	2	5.5	5.5	7	1
ul 16 - Jul 29	7	5	2	1	3	6	4
ul 30 - Aug 12	4	6	3	7	2	5	1
ug 13 - Aug 26	5	1	7	4	3	6	2
ug 27 - Sep 9	4	5.5	7	1	3	5.5	2
ep 10 - Sep 23	5.5	5.5	3	2	5.5	5.5	1
ep 24 - Oct 7	6	4	2.5	1	6	2.5	6
ct 8 - Oct 21	6.5	3	1	2	4	5	6.5
ct 22 - Nov 4	5	4	3	1	6	7	2
ov 5 - Nov 18	5.5	4	5.5	1	2	3	7
ov 19 - Dec 2	6.5	2	6.5	4	3	1	5
ec 3 - Dec 16	6	2.5	7	2.5	5	4	1
ec 17 - Dec 30	5	6.5	6.5	4	3	2	1
Totals	91.5	69.5	75.0	54.5	74.5	81.0	58.0

^{2} = 11.54 df = 6 No Significant difference (p = 0.05)

Table B-12

Ranked CPUE Data, Summed Ranks, χ^2 Value and Degrees of Freedom for Friedman Nonparametric Two-Way ANOVA, White Perch, 1973 Standard-Station Beach-Seine Samples

	Station						
Sampling Period	1	2	3	4	5	6	7
Mar 25 - Apr 7	5.5	1	3	515	515	2	5.5
Apr 8 - Apr 21	4	1.5	6	1.5	6	3	6
Apr 22 - May 5	6.5	2	6.5	1	3	4.5	4.5
May 6 - May 19	3	3	6	3	1	6	6
May 20 - Jun 2	1	6	3.5	3.5	6	2	6
Jun 3 - Jun 16	5.5	2	5.5	3	5.5	5.5	1
Jun 17 - Jun 30	7	5.5	3.5	5.5	3.5	1	2
Jul 15 - Jul 28	6	6	6	2	3	4	1
Aug 9 - Aug 22	2.5	5.5	5.5	5.5	1	2.5	5.5
Aug 23 - Sep 6	5	5	5	1	5	2	5
Nov 4 - Nov 17	2	6	1	3	4.5	4.5	7
Nov 18 - Dec 1	4.5	6.5	6.5	3	4.5	2	1
Dec 2 - Dec 15	3	4	5	1	6	2	7
Totals	55.5	54.0	63.0	38.5	54.5	41	57.5

$\chi^2 = 7.79$ df = 6 No significant difference ($p = 0.05$)

Table B-13

Ranked CPUE Data, Summed Ranks, χ^2 Value and Degrees of Freedom for Friedman Nonparametric Two-Way ANOVA, White Perch (Yearling and Older), 1974 Standard-Station Beach-Seine Samples

	Station						
Sampling Period	1	2	3	4	5	6	7
Apr 7 - Apr 20	6	1	7	4	2	5	3
Apr 21 - May 4	4	6	7	2	3	1	5
May 5 - May 18	2	6	6	1	3	4	6
May 19 - Jun 1	2.5	1	5.5	2.5	5.5	5.5	5.5
Jun 2 - Jun 15	5.5	3	5.5	2	1	5.5	5.5
Jun 16 - Jun 29	3	4.5	2	6.5	6.5	1	4.5
Jun 30 - Jul 13	4.5	3	6.5	6.5	2	1	4.5
Sep 6 - Sep 19	2	1	7	4.5	6	4.5	3
Oct 20 - Nov 2	7	1	6	5	2	4	3
Nov 3 - Nov 16	4.5	1	2.5	6.5	4.5	6.5	2.5
Nov 17 - Nov 30	5.5	7	4	5.5	3	2	1
Dec 1 - Dec 14	2	7	6	3	4	1	5
Dec 15 - Dec 28	1	6	6	4	2	3	6
Totals	49.5	47.5	71	53.0	44.5	44.0	54.5

$\chi^2 = 8.42$ df = 6 No significant difference ($p = 0.05$)

Table B-14

Ranked CPUE Data, Summed Ranks, χ^2 Value and Degrees of Freedom for Friedman Nonparametric Two-Way ANOVA, White Perch (Yoy), 1974 Standard-Station Beach-Seine Samples

			Station				
Sampling Period	1	2	3	4	5	6	7
Sep 22 - Oct 5	1	2	4.5	7	4.5	4.5	4.5
Oct 6 - Oct 19	4	1	6.5	4	6.5	4	2
Oct 20 - Nov 2	3	1	7	4.5	4.5	6	2
Nov 3 - Nov 16	3.5	1	6	3.5	2	6	6
Nov 17 - Nov 30	7	5	2	6	3.5	3.5	1
Dec 1 - Dec 14	1	7	4.5	6	4.5	2	3
Dec 15 - Dec 28	1	6	6	6	2	3.5	3.5
Totals	20.5	23.0	36.5	37.0	27.5	29.5	22.0

$\chi^2 = 8.34$ df = 6 No significant difference ($p = 0.05$)

Table B-15

Ranked CPUE Data, Summed Ranks, χ^2 Value and Degrees of Freedom for Friedman Nonparametric Two-Way ANOVA, White Perch (Yearling and Older), 1974 Standard-Station Beach-Seine Samples

Sampling Period	Station 1	2	3	4	5	6	7
Mar 23 - Apr 5	5	6.5	6.5	2	4	3	1
Apr 6 - Apr 19	2	5	6.5	4	3	1	6.5
Apr 20 - May 3	6.5	4.5	3	1	2	6.5	4.5
May 4 - May 17	1	7	4	6	5	3	2
May 18 - May 31	4	6.5	5	6.5	3	2	1
Jun 1 - Jun 14	1	7	6	3	2	5	4
Jun 15 - Jun 28	5.5	5.5	5.5	2	3	1	5.5
Jun 29 - Jul 12	5.5	5.5	5.5	2.5	1	2.5	5.5
ug 12 - Sep 6	5.5	5.5	3	5.5	2	1	5.5
ep 21 - Oct 4	3	5.5	5.5	1	2	5.5	5.5
ct 5 - Oct 18	3.5	3.5	6	1	6	2	6
ct 19 - Nov 1	4.5	6.5	6.5	2.5	2.5	1	4.5
ov 2 - Nov 15	5.5	2.5	2.5	5.5	5.5	5.5	1
ov 16 - Nov 29	4.5	6.5	6.5	2.5	2.5	1	4.5
ov 30 - Dec 13	2	5.5	7	5.5	3	1	5.5
Totals	59.0	83.0	79.0	50.5	46.5	41.0	62.5

2 = 24.28 df = 6 Significant ($p < 0.05$)

Multiple Comparisons by Station:

```
6      5      4      1      7      3      2
___________________________
       ___________________________
       ________________________________
```

Underlining denotes no significant difference ($p < 0.05$)

Table B-16

Ranked CPUE Data, Summed Ranks, χ^2 Value and Degrees of Freedom for Friedman Nonparametric Two-Way ANOVA, White Perch (Yoy), 1975 Standard-Station Beach-Seine Samples

	Station						
Sampling Period	1	2	3	4	5	6	7
Oct 19 - Nov 1	2	6	6	3.5	3.5	1	6
Nov 2 - Nov 15	1	6	3	6	3	6	3
Nov 16 - Nov 29	2.5	5.5	5.5	2.5	5.5	1	5.5
Nov 30 - Dec 13	4	6	6	3	1	2	6
Totals	9.5	23.5	20.5	15.0	13.0	10.0	20.5

$\chi^2 = 9.90$ df = 6 No significant difference ($p = 0.05$)

Table B-17

Ranked CPUE Data, Summed Ranks, χ^2 Value and Degrees of Freedom for Friedman Nonparametric Two-Way ANOVA, Atlantic Tomcod, 1972 Standard-Station Beach-Seine Samples

	Station						
Sampling Period	1	2	3	4	5	6	7
Jun 18 - Jul 1	1	5.5	2	5.5	5.5	2	5.5
Jul 2 - Jul 15	3	6	2	5	4	7	1
Jul 16 - Jul 29	4	7	1	2	5.5	5.5	3
Jul 30 - Aug 12	6	7	3	1	5	2	4
Aug 13 - Aug 26	5.5	5.5	2	3	5.5	5.5	1
Aug 27 - Sep 9	3	5.5	7	1	2	5.5	4
Sep 10 - Sep 23	1	4.5	6.5	3	4.5	6.5	2
Sep 24 - Oct 7	6	6	4	1	3	2	6
Oct 8 - Oct 21	6.5	2	1	3	4	5	6.5
Oct 22 - Nov 4	1	5.5	2.5	5.5	4	7	2.5
Nov 5 - Nov 18	1	6	3.5	3.5	2	6	6
Nov 19 - Dec 2	5.5	2.5	5.5	6.5	5.5	2.5	1
Dec 3 - Dec 16	2	6.5	6.5	5	3	1	4
Dec 17 - Dec 30	6.5	2	6.5	5.	4	1	3
Totals	52	71.5	53	49	57.5	59.5	49.5

$\chi^2 = 5.68$ df = 6 Not significant ($p = 0.05$)

Table B-18

Ranked CPUE Data, Summed Ranks, X^2 Value and Degrees of Freedom for Friedman Nonparametric Two-Way ANOVA, Atlantic Tomcod, 1973 Standard-Station Beach-Seine Samples

	Station						
Sampling Period	1	2	3	4	5	6	7
Apr 22 - May 5	5.5	5.5	5.5	3	1	2	5.5
May 20 - Jun 2	1	5.5	3	5.5	2	5.5	5.5
Jun 17 - Jun 30	5.5	5.5	5.5	3	2	1	5.5
Jul 15 - Jul 28	5.5	5.5	5.5	3	2	1	5.5
Jul 29 - Aug 11	5.5	5.5	3	5.5	2	1	5.5
Aug 26 - Sep 8	3	5.5	5.5	2	5.5	1	5.5
Dec 2 - Dec 15	1.5	1.5	6	3.5	6	3.5	6
Totals	27.5	34.5	34.0	25.5	20.5	15.0	39.0

$\chi 2 = 13.1$ df = 6 Significant ($p < 0.05$)

Multiple Comparisons by Station:

6 5 4 1 3 2 7

Underlining denotes no significant difference
($p = 0.047$)

Table B-19

Ranked CPUE Data, Summed Ranks, X^2 Value and Degrees of Freedom for Friedman Nonparametric Two-Way ANOVA, Atlantic Tomcod, 1974 Standard-Station Beach-Seine Samples

	Station						
Sampling Period	1	2	3	4	5	6	7
May 5 - May 18	3	5.5	5.5	2	1	5.5	5.5
Jun 16 - Jun 29	5.5	2	5.5	5.5	5.5	1	3
Jul 1 - Jul 13	4	6	6	2	1	3	6
Oct 6 - Oct 19	2	1	5.5	3	5.5	5.5	5.5
Oct 20 - Nov 2	4	6	6	3	1	2	6
Nov 17 - Nov 30	3	6.5	6.5	1	4	2	5
Dec 1 - Dec 14	4	6.5	5	3	1	2	6.5
Dec 15 - Dec 28	3	6	6	2	1	4	6
Totals	28.5	39.5	46.0	21.5	20.0	25.0	43.5

χ^2 = 18.75 df = 6 Significant ($p < 0.05$)

Multiple Comparisons by Station:

$\underline{5 \quad \underline{4 \quad 6 \quad 1 \quad 2 \quad 7 \quad 3}}$

Underlining denotes no significant difference
(p = 0.041)

Table B-20

Ranked CPUE Data, Summed Ranks, χ^2 Value and Degrees of Freedom for Friedman Nonparametric Two-Way ANOVA, Atlantic Tomcod, 1975 Standard-Station Beach-Seine Samples

	Station						
Sampling Period	1	2	3	4	5	6	7
Jun 1 - Jun 14	6	4	6	3	2	1	6
Jun 29 - Jul 12	3	6	6	1	2	4	6
Aug 24 - Sep 6	3	5.5	5.5	5.5	1	2	5.5
Sep 7 - Sep 20	3	5.5	5.5	2	1	5.5	5.5
Oct 5 - Oct 18	1	6	6	4	2	3	6
Nov 2 - Nov 15	5.5	5.5	5.5	2	1	3	5.5
Nov 16 - Nov 29	3	5.5	5.5	1	5.5	2	5.5
Dec 1 - Dec 13	3	5.5	5.5	2	5.5	1	5.5
Totals	27.5	43.5	45.5	20.5	20.0	21.5	45.5

$\chi^2 = 24.2$ df = 6 Significant ($p < 0.05$)

Multiple Comparisons by Station

5 4 6 1 2 3 7

Underlining denotes no significant difference ($p < 0.05$)

APPENDIX C

BIOLOGICAL CHARACTERISTICS DATA

Table C-1

Comparison of Major Food Items of Striped Bass by Index of Importance, April-December 1972-74

	1972			1973				1974		1974, Beach Seine	
Month	Length (mm)	Food Item	Index of Importance	Length (mm)	Food Item	Index of Importance	Length (mm)	Food Item	Index of Importance	Food Item	Index of Importance
Apr	0-75	No Sample		51-115	Calanoida *Gammarus* *Neomysis* *Daphnia* Chironomidae n=9	27.9 7.4 4.9 2.2 1.0	0-75	Chironomid (L) n=1	100.0	Calanoida *Gammarus* Chironomid (L) Cladocera (unid) n=2	30.6 6.5 6.5 6.4
	76-100	No Sample					76-115	*Gammarus* Cladocera (unid) Copepod (unid) n=6	43.3 3.6 2.3	Calanoida *Gammarus* Chironomid (L) *Monocolodes* *Cassidina* *Chiridotea* n=8	19.1 17.4 1.6 0.5 0.5 0.5
	101-125	No Sample		116-200	n=0		116-200	*Gammarus* n=1	100.0	n=0	
	126-150	No Sample									
	151-200	No Sample									
	201-300	No Sample		201 +	White perch Alewife Atlantic tomcod n=7	47.8 3.0 0.7	201 +	n=0		n=0	
	301-500	No Sample									
	501 +	No Sample									
May	0-75	n=0		51-115	*Gammarus* Calanoida Clupeidae eggs Chironomidae (L) n=12	40.5 3.6 0.5 0.3	0-75				
	76-100	*Daphnia* *Gammarus* n=1	74.3 25.7				76-115	*Gammarus* Leptocheirus n=3	85.3 4.9	*Gammarus* n=5	60.0
	101-125	*Gammarus* Chironomidae (P) Chironomidae (L) Fish (unid) Ceratopogonidae (L) n=36	27.8 1.5 0.8 0.3 0.1	116-200	*Gammarus* Tessellated darter *Cyathura* Unid fish n=3	29.5 15.7 1.4 1.4	116-200	*Gammarus* n=1	100.0	n=0	
	126-150	*Gammarus* *Cyathura* n=9	91.2 0.4								
	151-200	*Gammarus* Chironomidae (P) n=6	30.8 1.6								
	201-300	*Gammarus* n=1	83.2	201 +	White perch Alewife *Gammarus* n=6	20.0 16.7 1.7	201 +	n=0		n=0	
	301-500	n=0									
	501 +	n=0									
Jun	0-75	n=0		0-75			0-75	n=0		*Gammarus* Calanoida Harpacticoida Chironomid (L) n=3	39.9 14.2 3.1 2.8
	76-100	*Gammarus* Calanoida Harpacticoida Cyclopoida Fish (unid) n=20	11.3 4.7 2.6 0.9 0.5	76-115			76-115	Calanoida Chironomid (P) Chironomid (L) Chrysalis (unid) n=2	30.5 6.7 6.4 6.4	Calanoida *Gammarus* *Leptocheirus* Cladocera (unid) Chironomid (L) n=41	4.6 4.5 4.2 0.5 0.2
	101-125	Calanoida Cyclopoida *Gammarus* Fish (unid) Chironomidae (L) n=23	4.5 3.0 1.7 1.3 1.0	116-200			116-200	*Gammarus* *Corophium* *Leptocheirus* n=1	33.3 33.3 33.3	Atlantic tomcod *Gammarus* Animal remains *Chiridotea* *Leptocheirus* n=29	23.0 9.3 0.1 0.1 0.2
	126-150	Chironomidae (P) Cyclopoida Harpacticoida	7.4 7.4 3.9								
	151-200	*Gammarus* Chironomidae (L) Chironomidae (P) Fish (unid) n=4	11.3 3.8 3.8 1.9								

Table C-1 (Contd)

	1972			1973			1974			1974, Beach Seine	
Month	Length (mm)	Food Item	Index of Importance	Length (mm)	Food Item	Index of Importance	Length (mm)	Food Item	Index of Importance	Food Item	Index Importance
Jun	201-300	*Gammarus*	3.3	201 +			201 +				
		Atlantic tomcod	3.3								
		Alewife	1.5								
		Mummichog	1.4								
		Bay anchovy	1.2								
		n=8						n=0		n=0	
	301-500	Clupeidae	22.3								
		Mummichog	7.0								
		Bay anchovy	3.8								
		Fish eggs	0.2								
		n=3									
	501+										
Jul	0-75	Calanoida	26.2	0-75			0-75				
		Cyclopoida	7.3								
		Daphnia	5.4								
		Chironomidae (L)	2.3								
		Latona	0.5								
		n=67									
	76-100	*Gammarus*	24.6	76-115			76-115	*Leptocheirus*	29.7	*Gammarus*	19.1
		Chironomidae (L)	7.1					Chironomid	2.8	Chironomid (L)	14.1
		Fish (unid)	3.8					*Gammarus*	14.4	*Cyathura*	10.9
		Cyathura	0.7					*Cyathura*	2.8	Harpacticoida	1.0
		Ceratopogonidae (L)	0.7					Chironomid	0.9	Chironomid (P)	0.8
		n=8						n=12		n=17	
	101-125	*Gammarus*	7.2	116-200			116-200	Minnow (unid)	6.6	Polychaeta	21.8
		Tessellated darter	4.4					*Cyathura*	5.8	*Cyathura*	10.5
		Cyathura	1.3					Chironomid	5.5	Chironomid (L)	0.8
		n=6						*Cassidina*	3.4	*Gammarus*	0.5
								Leptocheirus	2.8	*Crangon*	0.4
								n=4		n=16	
	126-150	*Cyathura*	69.0								
		Gammarus	15.5								
		n=2									
	151-200	Fish (unid)	14.5								
		Gammarus	6.6								
		Cyathura	3.5								
		n=4									
	201-300	n=0		201 +			201 +	n=0		n=0	
	301-500	n=0									
	501 +	Cluepidae	29.2								
		Fish (unid)	20.8								
		n=2									
Aug	0-75	Calanoida	16.2	0-75	Calanoida	17.2	0-75				
		Gammarus	8.2		*Gammarus*	4.4					
		Cyclopoida	2.3		Chironomid (P)	3.9					
		Harpacticoida	2.0		Chironomid (L)	1.0					
		Chironomidae (L)	2.0		Harpacticoida	0.9					
		n=26			n=26					n=0	
	76-100	*Gammarus*	21.5	76-115	*Gammarus*	33.0	76-115			*Gammarus*	39.5
		Calanoida	9.9		Calanoida	10.8				*Corophium*	7.8
		Cyathura	6.8		Harpacticoida	0.6				Chironomid (L)	4.4
		White perch	2.2		Chironomid (P)	0.2				Banded killifish	1.1
		Fish (unid)	1.9		White perch	0.1					
		n=13			n=21					n=19	
	101-125	*Gammarus*	100.0	116-200	*Crangon*	25.0	116-200			Fish remains	7.0
		n=1			Unid fish	14.0				*Gammarus*	5.3
					Esocid	1.5				*Rithropanopeus*	4.4
	126-150	Tessellated darter	100.0		White perch	1.3				Atlantic tomcod	3.3
		n=1								*Corophium*	1.3
					n=5					n=19	
	151-200	n=0									
	201-300	Clupeidae	100.0	201 +			201 +			Fish remains	100.0
		n=1								n=1	
	301-500	Alewife	100.0								
		n=2									
	501 +	n=0									
Sep	0-75	Chironomidae (L)	26.6	0-75			0-75	*Leptocheirus*	8.7	*Gammarus*	35.4
		Gammarus	14.4					*Gammarus*	8.2	*Leptocheirus*	2.5
		Chironomidae (P)	1.9					*Monoculodes*	7.3	Chironomid (L)	1.2
		Chironomidae (A)	0.3					Calanoida	4.2	*Corophium*	0.9
		Muscidae (L)	0.2					Bay anchovy	2.8	*Cyathura*	0.8
		n=26						n=5		n=29	
	76-100	*Gammarus*	17.4	76-115			76-115	*Corophium*	31.4	*Gammarus*	25.5
		Chironomidae (L)	3.5					*Monoculodes*	6.5	Chironomid (L)	1.4
		Muscidae (L)	1.0					*Gammarus*	6.1	*Crangon*	1.0
		Crangon	0.8					Polychaeta	2.0	*Corophium*	1.0
		Psychodidae (L)	0.4					Bay anchovy	1.3	Banded killifish	0.8
		n=21						n=5		n=31	

Table C-1 (Contd)

1972					1973			1974		1974, Beach Seine	
Month	Length (mm)	Food Item	Index of Importance	Length (mm)	Food Item	Index of Importance	Length (mm)	Food Item	Index of Importance	Food Item	Index of Importance
Sep	101-125	*Gammarus*	54.8	116-200			116-200	*Gammarus*	11.6	*Gammarus*	7.8
		Fish (unid)	22.6					Mummichog	5.7	Bay anchovy	2.7
		n=2						Bay anchovy	2.0	Atlantic tomcod	2.3
	126-150	Striped bass	34.4							Diptera (L)	2.1
		Fish (unid)	14.0							Clupeid (unid)	1.1
		n=2						n=5		n=13	
	151-200	n=0									
	201-300			201 +			201 +	Fish remains	0.0	Atlantic tomcod	26.2
										Gammarus	3.6
										Cyathura	3.6
		n=0						n=1		n=3	
	301-500	n=0									
	501 +	n=0									
Oct	0-75	*Gammarus*	54.2	0-75			0-75	*Leptocheirus*	34.9	*Gammarus*	29.5
		Chironomidae (L)	3.8					Chironomid (L)	9.9	*Corophium*	4.2
		Cyathura	1.5					*Gammarus*	7.6	*Monoculodes*	1.9
		Chironomidae (P)	1.0					*Monoculodes*	6.4	*Cyathura*	1.3
		Neomysis	0.3					*Corophium*	2.8	Chironomid (L)	1.3
		n=21						n=4		n=27	
	76-100	*Gammarus*	56.8	76-115			76-115	*Gammarus*	12.5	*Gammarus*	47.1
		Cyathura	1.0					Polychaeta	11.7	Chironomid (P)	1.1
		Crangon —	0.7					*Leptocheirus*	5.2	Fish remains	1.1
		Fish (unid)	0.4					*Neomysis*	4.3	*Cyathura*	0.9
		Chiridotea	0.1					*Chaoborus (L)*	1.6	Calanoida	0.4
		n=21						n=5		n=32	
	101-125	*Gammarus*	26.8	116-200			116-200			Banded killifish	3.4
		Fish (unid)	6.1							*Gammarus*	3.4
		White perch	1.3							*Rithropanopeus*	1.9
		Crangon	0.5							Striped bass	1.0
		Rithropanopeus	0.1							Clupeid (unid)	1.0
		n=15								n=15	
	126-150	White perch	27.1								
		Fish (unid)	22.9								
		n=3									
	151-200	Blueback herring	57.6								
		Fish (unid)	4.6								
	201-300	Fish (unid)	100.0	201 +			201 +			Clupeid (unid)	46.7
		n=1								Fish remains	9.5
										n=8	
	301-500	n=0									
	501 +	n=0									
Nov	0-75	*Gammarus*	25.0	0-75	*Gammarus*	31.0	0-75	*Gammarus*	17.0	Calanoida	48.0
		Calanoida	10.2		Chironomid (L)	4.1		Calanoida	11.6	Cyclopoida	5.5
		Daphnia	3.3		Calanoida	2.2		*Monoculodes*	10.7	*Gammarus*	5.3
		Monoculodes	2.9		Animal (unid)	1.3		*Leptocheirus*	4.4	*Cassidina*	0.6
		Bosmina	1.1					Polychaeta	0.9	*Cyathura*	0.6
		n=24			n=14			n=6		n=7	
	76-100	*Gammarus*	34.6	76-115	*Gammarus*	27.2	76-115	*Gammarus*	24.7	Calanoida	19.7
		Calanoida	5.0		Calanoida	8.2		*Leptocheirus*	11.6	*Gammarus*	14.0
		Daphnia	1.5		*Neomysis*	5.1		*Cyathura*	9.8	Cyclopoida	1.2
		Monoculodes	1.5		Animal (unid)	1.4		Polychaeta	3.0		
		Chiridotea	0.6		Chironomid (L)	0.2		Banded killifish	2.5		
		n=22			n=36			n=6		n=15	
	101-125	*Gammarus*	61.7	116-200	Blueback herring	21.8	116-200	*Gammarus*	86.3	*Neomysis*	6.7
		Monoculodes	4.1		*Crangon*	5.7		*Corophium*	6.9	Mummichog	5.3
		Chiridotea	0.5		Clupeid (unid)	1.3				*Gammarus*	4.5
		Corophium	0.5		*Callineetes*	1.2				*Crangon*	2.2
		Chaoborus (L)	0.5		Oligochaeta	1.2				Blueback herring	1.0
		n=5			n=7			n=2		n=10	
	126-150	White perch	25.1								
		Gammarus	14.5								
		Fish (unid)	0.5								
		Monoculodes	0.2								
		Chiridotea	0.1								
		n=7									

Table C-1 (Contd)

1972					1973			1974		1974, Beach Seine	
Month	Length (mm)	Food Item	Index of Importance	Length (mm)	Food Item	Index of Importance	Length (mm)	Food Item	Index of Importance	Food Item	Index of Importance
Nov	151-200	Fish (unid)	33.8								
		Blueback herring	16.4								
		n=3									
	201-300	n=0		201 +			201 +			*Crangon*	18.5
										Clupeid (unid)	17.4
										Morone (unid)	14.1
								n=0		n=2	
	301-500	n=0									
	501 +	n=0									
Dec	0-75	Calanoida	38.9	0-75	No Sample		0-75	No Sample			
		Gammarus	8.3								
		Daphnia	7.7								
		Cyathura	2.0								
		Cyclopoida	1.9								
		n=3									
	76-100	*Gammarus*	43.8	76-115			76-115				
		Chiridotea	12.6								
		Calanoida	2.1								
		Daphnia	1.8								
		Chironomidae (P)	1.0								
		n=5									
	101-125	n=0		116-200			116-200				
	126-150	n=0									
	151-200	n=0									
	201-300	n=0		201 +			201 +				
	301-500	n=0									
	501 +	n=0			No Sample			No Sample			

Table C-2

Comparison of Major Food Items of Young-of-the-year Striped Bass, July-November, 1973

July		August		September		October		November	
Food Item	Importance Index	Food Item	Importance Index	Food Item	Importance Index	Food Item	Importance Index	Food Item	Importance Index
Calanoida	43.8	Calanoida	15.5	*Gammarus*	61.0	*Gammarus*	55.2	*Gammarus*	16.0
Gammarus	3.86	*Gammarus*	12.1	Chironomid (L)	2.2	Chironomid (L)	1.1	*Neomysis*	16.6
Chironamid (L)	1.5	Chironomid (P)	1.8	Unid. Fish	0.1	*Cyathura*	0.5	Calanoida	3.6
Chironomid (P)	0.7	Harpacticoida	0.7	Calanoida	0.1	Calanoida	0.4	Chironomid (L)	0.9
Harpacticoida	0.5	Chironomid (L)	0.7	Chironomid (L)	0.1	*Neomysis*	0.1	*Corophium*	0.3
n = 50		n = 46		n = 22		n = 54		n = 33	
L = Larvae; P = Pupae									

Table C-3

Comparison of Major Food Items of White Perch by Index of Importance, April-December 1972-1974

		1972			1973			1974		1974, Beach Seine	
Month	Length (mm)	Food Item	Index of Importance	Length (mm)	Food Item	Index of Importance	Length (mm)	Food Item	Index of Importance	Food Item	Index of Importance
Apr	0-75	No Sample		0-75	Calanoida	42.5	0-75	*Gammarus*	47.5	Cladocera	19.1
					Gammarus	9.8		*Monoculodes*	2.7	Diptera	9.7
					Chironomidae (L)	8.0		Chironomidae	1.6	*Gammarus*	8.1
					Bosmina	3.6		Calanoida	0.6	Chironomid (L)	6.6
					Harpacticoida	2.9		*Leptochenus*	0.4	Chironomid	6.6
					n=9			n=37		n=2	
	76-100			76-150	*Gammarus*	31.6	76-150	*Gammarus*	37.5	Chironomid	62.2
					Calanoida	7.4		Polychaeta	13.2	*Gammarus*	14.6
	101-125				Chironomidae (L)	5.0		Chironomid (L)	3.3	Cladocera	0.6
					Chiridotea	0.8		*Monoculodes*	2.9		
					Harpacticoida	0.1		Fish Eggs (Unid)	0.5		
	126-150				n=46			n=43		n=4	
	151-200			151-200	*Gammarus*	17.0	151-200	Polychaeta	29.9	*Gammarus*	67.5
					Calanoida	9.3		*Gammarus*	27.5	Chironomid (L)	3.4
					Chironomid (L)	1.9		Chironomid (L)	5.1	Diptera (L)	2.4
					Chiridotea	0.7		*Monoculodes*	4.1	*Cyathura*	1.6
					Cyathura	0.2		*Leptocheirus*	1.5	*Chiridotea*	0.8
					n=22			n=25		n=8	
	≥201	No Sample		≥201	Spottail shiner	69.6	≥201	*Gammarus*	91.1	*Gammarus*	50.6
					Gammarus	30.4		Polychaeta	2.6	Chironomid (L)	12.8
								Chirodatea	2.3	Diptera (L)	1.5
								Monoculodes	2.3	*Cyathura*	0.7
								Chironomid (L)	1.7	*Chiridotea*	0.3
					n=1			n=1		n=14	
May	0-75	*Gammarus*	46.9	0-75	Cyclopoida	45.5	0-75	Calanoida	17.9	Calanoid	34.1
		Corophium	1.8		Chironomid (L)	5.8		*Gammarus*	8.5	Chironomid (L)	8.0
		Bosmina	1.1		Calanoida	4.0		Cyclopoida	5.8	*Gammarus*	4.9
		Chironomidae (L)	1.0		Ostracoda	2.4		Chironomid (L)	2.6	Cyclopoida	4.8
		Fish eggs	0.6		*Gammarus*	2.1		Harpacticoida	5.2	Harpacticoida	4.5
		n=27			n=48			n=10		n=8	
	76-100	*Gammarus*	37.0	76-150	Chironomid (L)	39.9	76-150	*Gammarus*	20.4	Chironomid (L)	10.5
		Chironomidae (L)	5.3		Calanoida	26.7		Polychaeta	19.3	Calanoida	9.6
		Calanoida	2.1		*Gammarus*	1.8		Chironomid (L)	4.5	*Gammarus*	7.7
		Cyclopoida	0.8		*Leptocheirus*	0.4		Calanoida	2.0	Chironomid (P)	3.6
		Harpacticoida	0.6		Chironomid (P)	0.3		Chironomid (P)	1.1	Cyclopoida	1.8
		n=45			n=8			n=15		n=22	
	101-125	*Gammarus*	65.8								
		Cyathura	2.4								
		Bosmina	2.0								
		Chironomidae (L)	0.9								
		Muscidae (L)	0.7								
		n=8									
	126-150	*Gammarus*	55.3								
		Chironomidae (L)	12.7								
		Chiridotea	1.9								
		Cyathura	0.8								
		Copepoda	0.2								
		n=26									
	151-200	*Gammarus*	23.9	151-200	Calanoida	13.4	151-200	*Gammarus*	50.10	*Gammarus*	31.5
		Chironomidae (L)	19.1		*Gammarus*	12.1		Polychaeta	23.7	Polychaeta	18.7
		Cyathura	8.1		Chironomid (L)	0.7		Chironomid (L)	5.4	Chironomid (L)	11.2
		Chiridotea	1.3		*Cyathura*	0.4		*Monoculodes*	1.2	Chironomid (P)	0.4
		Annelida	0.2		*Neomysis*	0.2		*Chirodotea*	1.0	Oligochaeta	0.1
		n=43			n=6			n=9		n=8	
	≥201	Chironomidae (L)	23.9	≥201	Calanoida	22.0	≥201	*Gammarus*	25.7	*Gammarus*	100.0
		Gammarus	22.1		*Gammarus*	14.7		Polychaeta	10.4		
		Cyathura	4.9		Chironomid (L)	2.3		Calanoida	5.5		
		Chiridotea	0.4		*Leptocheirus*	1.5		Chironomid (L)	3.7		
					Harpacticoida	0.3		Chironomid (P)	0.9		
		n=8			n=16			n=34		n=1	
Jun	0-75	Calanoida	24.5	0-75			0-75	Calanoida	37.6	Calanoida	37.9
		Cyclopoida	5.2					Harpacticoida	6.2	Harpacticoida	4.5
		Harpacticoida	1.3					Chironomid (L)	6.2	Chironomid (L)	2.9
		Gammarus	1.2							*Leptocheirus*	1.3
		Chironomidae (L)	0.9							Cladocera (unid)	0.5
		n=35						n=2		n=33	
	76-100	Cyclopoida	11.0				76-150	Chironomid (L)	42.5	Calanoida	25.1
		Chironomidae (L)	7.6					Fish eggs unid	3.0	Chironomid (L)	9.1
		Gammarus	6.1					Gastropoda	1.6	Chironomid (P)	2.2
		Calanoida	5.0					*Cyathura*	1.6	Cladocera (unid)	0.8
		Harpacticoida	3.5					*Leptocheirus*	1.6	Harpacticoida	0.7
		n=38						Harpacticoida	1.6		
								n=5		n=100	
	101-125	Fish eggs	32.1								
		Chironomidae (L)	3.2								
		Cyathura	1.4								
		Chironomidae (P)	0.9								
		Gammarus	0.2								
		n=40									
	126-150	Fish eggs	15.5								
		Gammarus	10.0								
		Chironomidae (L)	5.0								
		Cyathura	0.9								
		Chironomidae (P)	0.1								
		n=25									

Table C-3 (Contd)

1972				1973				1974		1974, Beach Seine	
Month	Length (mm)	Food Item	Index of Importance	Length (mm)	Food Item	Index of Importance	Length (mm)	Food Item	Index of Importance	Food Item	Index of Importance
Jun	151-200	Fish eggs	12.3	151-200			151-200	Polychaeta	24.8	Calanoida	9.6
		Gammarus	5.9					Chironomid (L)	11.9	Chironomid (L)	6.2
		Cyathura	0.8					*Cyathura*	1.2	*Cyathura*	2.4
		Chironomidae (L)	0.5					*Carophium*	0.5	*Leptocheirus*	0.6
		Calanoida	0.2					*Gammarus*	0.1	Chironomid (P)	0.3
		n=22						n=13		n=13	
	≥201	*Gammarus*	52.2	≥ 201			≥201	Adult insect remains	50.0		
		Fish	0.9					Polychaeta	50.0		
		Cyathura	0.8								
		Fish eggs	0.2								
		Chironomidae (L)	0.2								
		n=24						n=1		n=0	
Jul	0-75			0-75	No Sample		0-75			Harpacticoida	12.8
										Chironomid (L)	8.8
										Fish eggs (unid)	6.1
										Calanoida	6.1
										Chironomid (P)	3.8
		n=0								n=4	
	76-100	*Gammarus*	19.0	76-150			76-150			Chironomid (L)	22.3
		Fish eggs	13.8							Cladocera (unid)	5.7
		Chironomidae (L)	2.8							*Gammarus*	4.3
		n=6								Chironomid (P)	3.1
	101-125	*Daphnia*	19.5							*Leptocheirus*	2.8
		Chironomidae (L)	12.3							n=103	
		Fish eggs	6.5								
		Chironomidae (P)	0.7								
		Gammarus	0.5								
		n=22									
	126-150	Fish eggs	30.0								
		Gammarus	14.8								
		Chironomidae (L)	5.0								
		Daphnia	0.6								
		Calanoida	0.6								
		n=37									
	151-200	*Gammarus*	27.6	151-200			151-200			Chironomid (L)	61.9
		Fish eggs	14.4							*Leptocheirus*	8.3
		Chironomidae (L)	1.9							Chironomid (P)	5.4
		Cyathura	0.9							*Cyathura*	5.4
		Chironomidae (P)	0.3								
		n=48								n=2	
	≥201	*Gammarus*	7.8	≥201			≥201				
		Calanoida	6.5								
		Fish	3.0								
		Daphnia	2.6								
		Chironomidae (L)	0.6		No Sample						
		n=10								n=0	
Aug	0-75	Calanoida	29.3	0-75	Calanoida	14.7	0-75				
		Harpacticoida	21.2		Harpacticoida	10.4					
		Gammarus	7.0		*Gammarus*	7.1					
		Chironomidae (L)	4.4		Chiromid (L)	5.3					
		Ostracoda	0.6		*Sida*	0.9					
		n=25			n=69			n=0		n=0	
	76-100	*Gammarus*	68.2	76-150	Chironomid (L)	29.4	76-150			*Gammarus*	25.3
		Cyathura	1.7		*Gammarus*	16.36				Chironomid (L)	12.8
		Chironomidae (L)	1.1		Chironomid (P)	2.2				*Leptocheirus*	12.7
		Corophium	0.2		*Cyathura*	1.0				*Corophium*	4.8
		Harpacticoida	0.2		*Leptocheirus*	0.5				*Cyathura*	1.5
		n=19			n=47			n=0		n=54	
	101-125	*Gammarus*	59.6								
		Chironomidae (L)	8.4								
		Chironomidae (P)	0.6								
		Cyathura	0.5								
		Monoculodes	0.5								
		n=47									
	126-150	*Gammarus*	46.0								
		Chironomidae (L)	8.6								
		Chironomidae (P)	0.2								
		Fish	0.1								
		Cyathura	0.1								
		n=15									
	151-200	*Gammarus*	50.4	151-200	*Gammarus*	78.7	151-200	*Monoculodes*	14.9	*Leptocheirus*	39.4
		Chironomidae (L)	2.9		*Cyathura*	1.5		*Cyathura*	7.1	Chironomid (L)	18.8
		Cyathura	0.6		Chironomid (L)	0.4		*Corophium*	6.3	*Cyathura*	12.1
		Chironomidae (P)	0.2		*Sida*	0.3		*Chaoborus* (L)	2.7	Polychaeta	3.2
		Neomysis	0.1		*Monoculodes*	0.2		Chironomid (L)	1.8	*Corophium*	3.2
		n=40			n=14			n=14		n=2	
	≥201	*Gammarus*	89.4	≥201	*Gammarus*	100.0	≥201	Chironomid (L)	22.0		
		Cyathura	3.7					Polychaeta	14.5		
		Chironomidae (L)	3.6					*Cyathura*	13.6		
		Mollusca	2.0					Chaoborus (L)	10.2		
								Crangon	9.5		
		n=1			n=1			n=2		n=0	

Table C-3 (Contd)

1972				1973			1974			1974, Beach Seine	
Month	Length (mm)	Food Item	Index of Importance	Length (mm)	Food Item	Index of Importance	Length (mm)	Food Item	Index of Importance	Food Item	Index of Importance
Sep	0-75	Harpacticoida	23.2	0-75	No Sample		0-75	Harpacticoida	12.7	Harpacticoida	23.1
		Chironomidae (L)	14.9					*Gammarus*	10.5	*Leptocheirus*	0.4
		Gammarus	6.4					*Leptocheirus*	6.5	*Monoculodes*	3.7
		Calanoida	1.8					*Monoculodes*	4.5	Chironomid (L)	3.3
		Monoculodes	1.7					Calanoida	3.1	*Gammarus*	2.7
		n=29						n=12		n=33	
	76-100	Chironomidae (L)	30.2	76-150			76-150	*Gammarus*	70.3	*Gammarus*	24.7
		Gammarus	26.6					Chironomid (L)	0.7	Chironomid (L)	5.6
		Harpacticoida	3.2					*Monoculodes*	0.6	*Rithropanopeus*	3.5
		Chironomidae (P)	1.9					*Leptocheirus*	0.3	*Leptocheirus*	1.7
		Cyathura	0.6					*Corophium*	0.2	*Corophium*	0.1
		n=6						n=14		n=42	
	101-125	*Gammarus*	30.8								
		Chironomidae (L)	14.6								
		Cyathura	5.0								
		Monoculodes	0.8								
		Chironomidae (P)	0.1								
	126-150	*Gammarus*	27.1								
		Chironomidae (L)	9.0								
		Cyathura	3.2								
		Corophium	1.6								
		Crangon	1.4								
		n=19									
	151-200	*Gammarus*	49.2	151-200			151-200	*Gammarus*	23.4	*Leptocheirus*	22.6
		Neomysis	2.4					*Rithropanopeus*	8.2	*Cyathura*	10.6
		Chironomidae (L)	1.6					Polychaeta	1.9	*Corophium*	3.5
		Crangon	1.4					*Chaoborus* (L)	0.4	*Gammarus*	3.3
		Monoculodes	1.0					*Cyathura*	0.2	Chironomid (L)	0.8
		n=26						n=6		n=6	
	≥ 201	*Gammarus*	98.5	≥ 201			≥ 201				
		Monoculodes	0.9								
		Cyathura	0.3								
		Neomysis	0.3								
		n=4			No Sample			n=0		n=0	
Oct	0-75	Harpacticoida	28.3	0-75	No Sample		0-75	Harpacticoida	25.0	Harpacticoida	17.9
		Gammarus	10.8					*Gammarus*	12.5	*Gammarus*	11.2
		Chironomidae (L)	4.0					*Monoculodes*	9.8	Chironomid (L)	4.6
		Calanoida	2.6					Chironomid (L)	4.9	Calanoida	1.9
		Neomysis	0.7					Calanoida	4.4	*Leptocheirus*	1.3
		n=37						n=19		n=26	
	76-100	*Gammarus*	16.0	76-150			76-150	*Gammarus*	23.3	*Gammarus*	9.3
		Harpacticoida	9.7					Chironomid (L)	6.4	Calanoida	7.1
		Chironomidae (L)	4.4					*Monoculodes*	5.7	Chironomid (L)	1.9
		Enallagma (N)	0.7					*Corophium*	1.6	*Corophium*	1.2
		Ostracoda	0.6					Calanoida	1.2	*Leptocheirus*	0.1
		n=9						n=20		n=30	
	101-125	*Gammarus*	25.9								
		Chironomidae (L)	13.5								
		Cyathura	0.9								
		Monoculodes	0.9								
		Neomysis	0.7								
		n=25									
	126-150	*Gammarus*	38.1								
		Chironomidae (L)	3.8								
		Neomysis	1.6								
		Crangon	1.0								
		Monoculodes	0.3								
		n=22									
	151-200	*Gammarus*	36.4	151-200			151-200	*Gammarus*	17.2	*Gammarus*	49.6
		Chironomidae (L)	3.1					Polychaeta	1.7	*Corophium*	5.8
		Crangon	2.6					Chironomid (L)	0.4	Chironomid (L)	1.4
		Fish	0.6					*Cyathura*	0.4	Chrysalis (unid)	1.4
		Cyathura	0.6							*Cyathura*	1.4
		n=25						n=9		n=3	
	≥ 201	*Gammarus*	21.7	≥ 201			≥ 201	*Crangon*	29.4		
		Fish	12.4					*Gammarus*	11.1		
		Crangon	0.7					*Rithropanopeus*	5.9		
		Enallagma (N)	0.2					*Cyathura*	2.7		
		n=7			No Sample			n=2		n=0	

Table C-3 (Contd)

1972				1973			1974			1974, Beach Seine	
Month	Length (mm)	Food Item	Index of Importance	Length (mm)	Food Item	Index Importance	Length (mm)	Food Item	Index of Importance	Food Item	Index of Importance
Nov	0-75	Calanoida	14.9	0-75	Calanoida	22.8	0-75	*Gammarus*	18.9	Calanoida	60.6
		Gammarus	14.2		Harpacticoida	16.2		Calanoida	0.13	Harpacticoida	17.2
		Harpacticoida	13.0		Chironomid (L)	7.8		Harpacticoida	11.7	Chironomid (L)	2.9
		Bosmina	3.0		*Gammarus*	1.7		*Monoculodes*	3.7	*Corophium*	0.7
		Cyclopoida	1.7		*Monoculodes*	1.0		Chironomid (L)	2.8	*Gammarus*	0.7
										Monoculodes	0.7
		n=22			n=29			n=26		n=5	
	76-100	*Gammarus*	25.0	76-150	Calanoida	15.2	76-150	*Gammarus*	37.2	Calanoida	63.3
		Calanoida	27.0		Chironomid (L)	11.1		Calanoida	10.1	Harpacticoida	7.4
		Harpacticoida	0.6		*Gammarus*	9.6		Chironomid	2.4	*Gammarus*	6.6
		Alona	0.5		Harpacticoida	4.5		*Monoculodes*	1.6	*Monoculodes*	2.9
		Chironomidae (L)	0.1		*Monoculodes*	2.2		*Leptocheirus*	8.0	Chironomid (L)	0.8
		n=13			n=56			n=25		n=4	
	101-125	Chironomidae (L)	20.5								
		Gammarus	17.5								
		Fish	1.5								
		Monoculodes	0.4								
		Corophium	0.1								
		n=15									
	126-150	*Gammarus*	39.6								
		Monoculodes	4.6								
		Daphnia	2.0								
		Chironomidae (L)	1.6								
		Chiridotea	0.7								
		n=17									
	151-200	*Gammarus*	53.9	151-200	*Gammarus*	9.0	151-200	*Gammarus*	34.2		
		Fish	5.1		*Corophium*	7.1		*Monoculodes*	4.7		
		Neomysis	0.5		Blueback Herring	1.3		*Cyathura*	0.1		
		Monoculodes	0.4		Unid. Fish	1.0		*Neomysis*	0.7		
		Chironomidae (L)	0.3		*Monoculodes*	1.0		*Leptocheirus*	0.3		
		n=16			n=15			n=13		n=0	
	≥ 201	*Gammarus*	61.4	≥ 201	Unid Fish	19.8	≥ 201	*Crangon*	51.8		
		Crangon	38.6		*Crangon*	11.2		Polychaeta	34.1		
					Unid Clupeid	3.9		*Monoculodes*	14.1		
		n=1			n=4			n=1		n=0	
Dec	0-75	Calanoida	33.6	0-75	No Sample		0-75				
		Gammarus	11.1								
		Cyclopoida	2.1								
		Ostracoda	1.3								
		Harpacticoida	1.0								
		n=25						n=0		n=0	
	76-100	*Gammarus*	74.2	76-150			76-150				
		Daphnia	25.8								
		n=2									
	101-125	*Gammarus*	84.9								
		Chridotea	1.8								
		Daphnia	0.4								
		Calanoida	0.2								
		Monoculodes	0.1								
		n=16									
	126-150	*Gammarus*	87.0								
		Chiridotea	3.4								
		Daphnia	0.2								
		n=12									
	151-200	*Gammarus*	93.4	151-200			151-200				
		Chiridotea	0.9								
		n=7									
	≥ 201	n=0		≥ 201	No Sample		≥ 201	n=0			

Table C-4

Food Analysis of Young-of-the-year White Perch Collected by Standard-Station Beach Seines and Bottom Trawls, July-November, 1973

July		August		September		October		November	
Food Item	Importance Index	Food Item	Importance Index	Food Item	Importance Index	Food Item	Importance Index	Food Item	Importance Index
Harpacticoida	46.0	Calanoida	14.7	Chironomid (L)	22.7	Chironomid (L)	17.7	Calanoida	23.1
Calanoida	8.4	Harpactiocoida	10.4	*Gammarus*	13.9	Harpacticoida	16.6	Harpacticoida	11.9
Choronomid (L)	2.9	*Gammarus*	7.1	Harpacticoida	8.3	*Gammarus*	11.6	Chironomid (L)	8.1
Gammarus	2.7	Chironomid (L)	5.3	Chironomid (P)	1.5	Calanoida	4.1	*Gammarus*	2.6
Daphnia	1.2	*Sida*	0.9	*Daphnia*	0.4	Corophium	0.3	*Monoculodes*	2.5
n = 31		n = 69		n = 49		n = 45		n = 50	

L = Larvae; P = Pupae

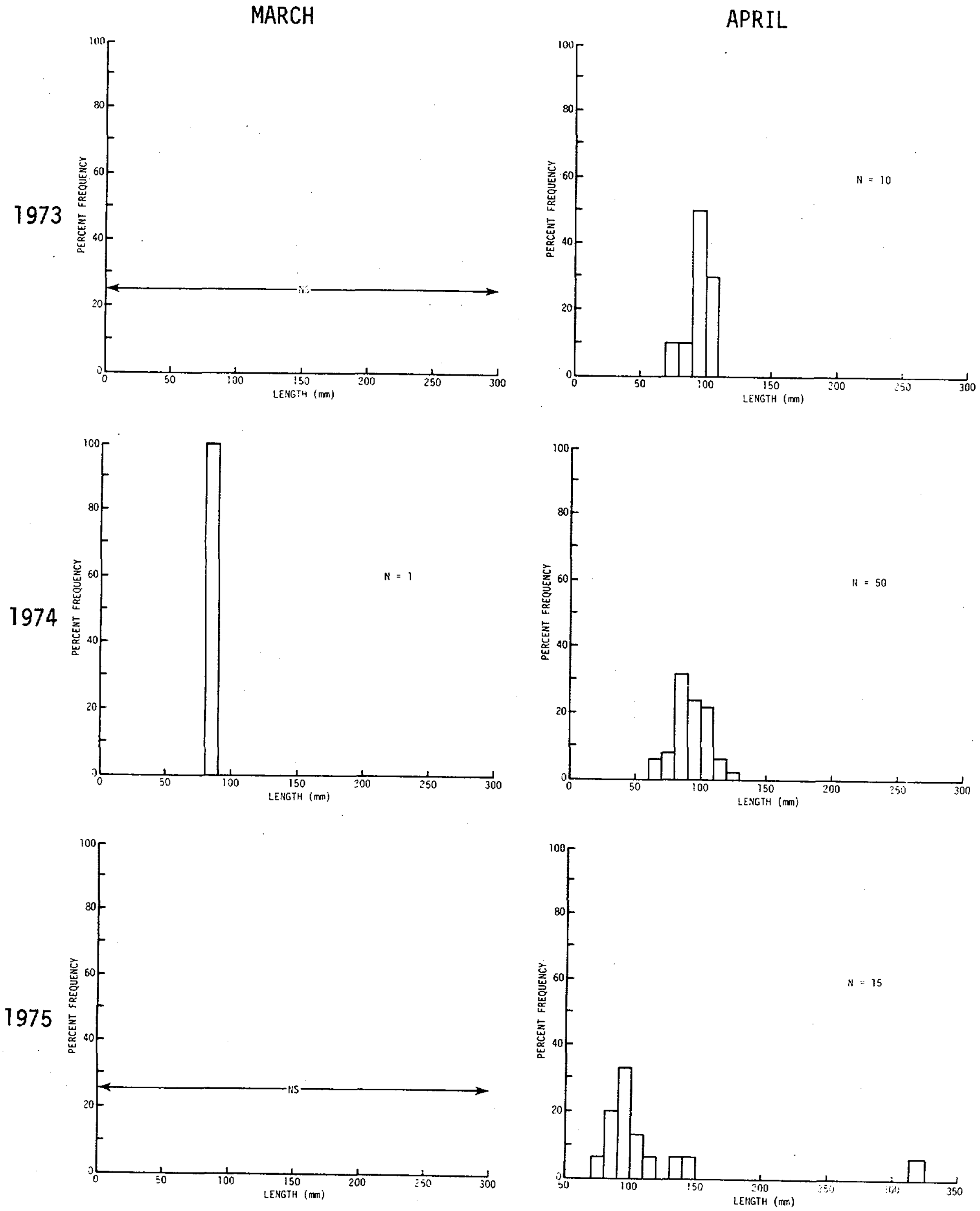


Figure C-1. Length-Frequency Distribution of Striped Bass Collected by Standard-Station Beach Seines and Bottom Trawls, March-December, 1973-1975

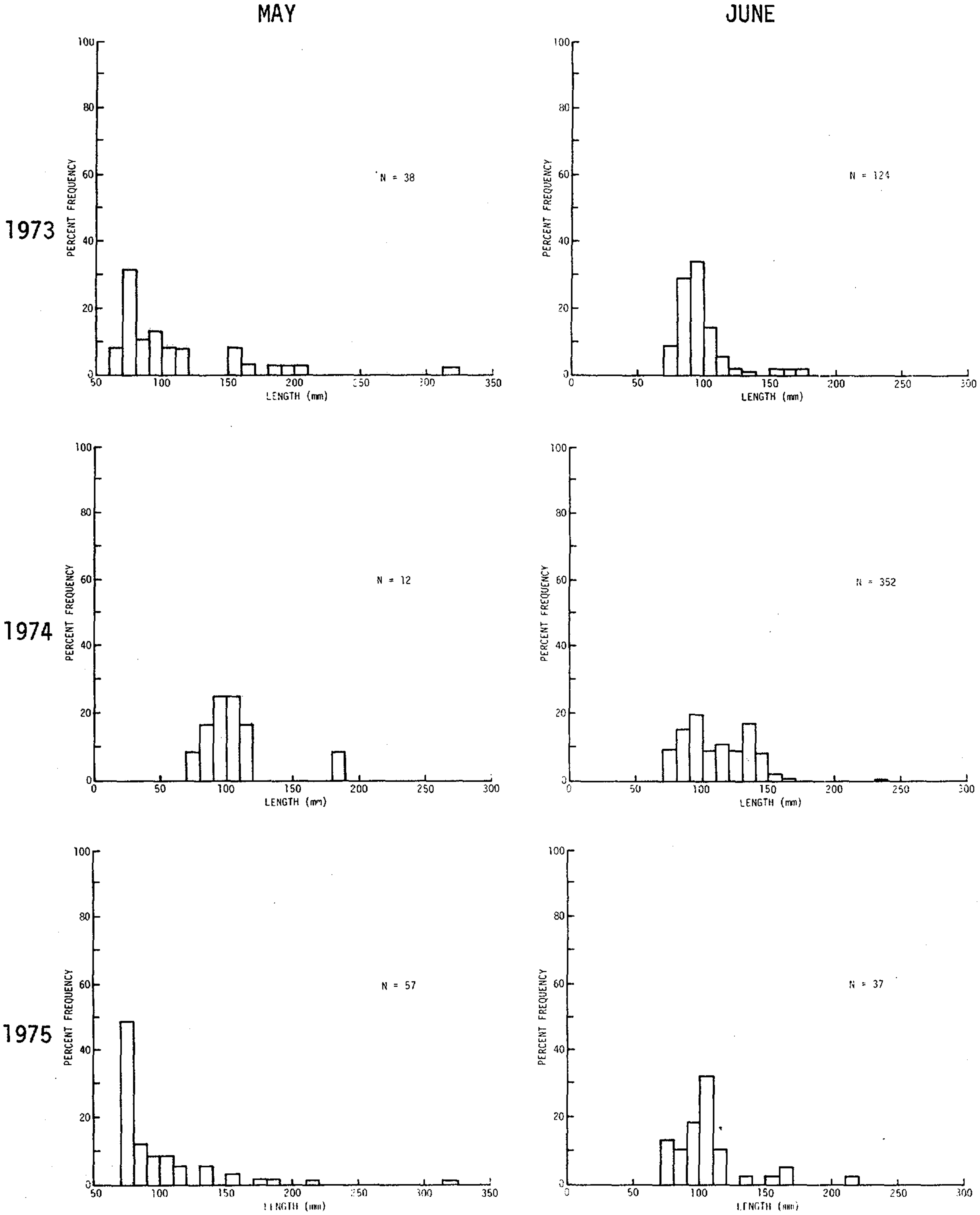


Figure C-1. (Contd)

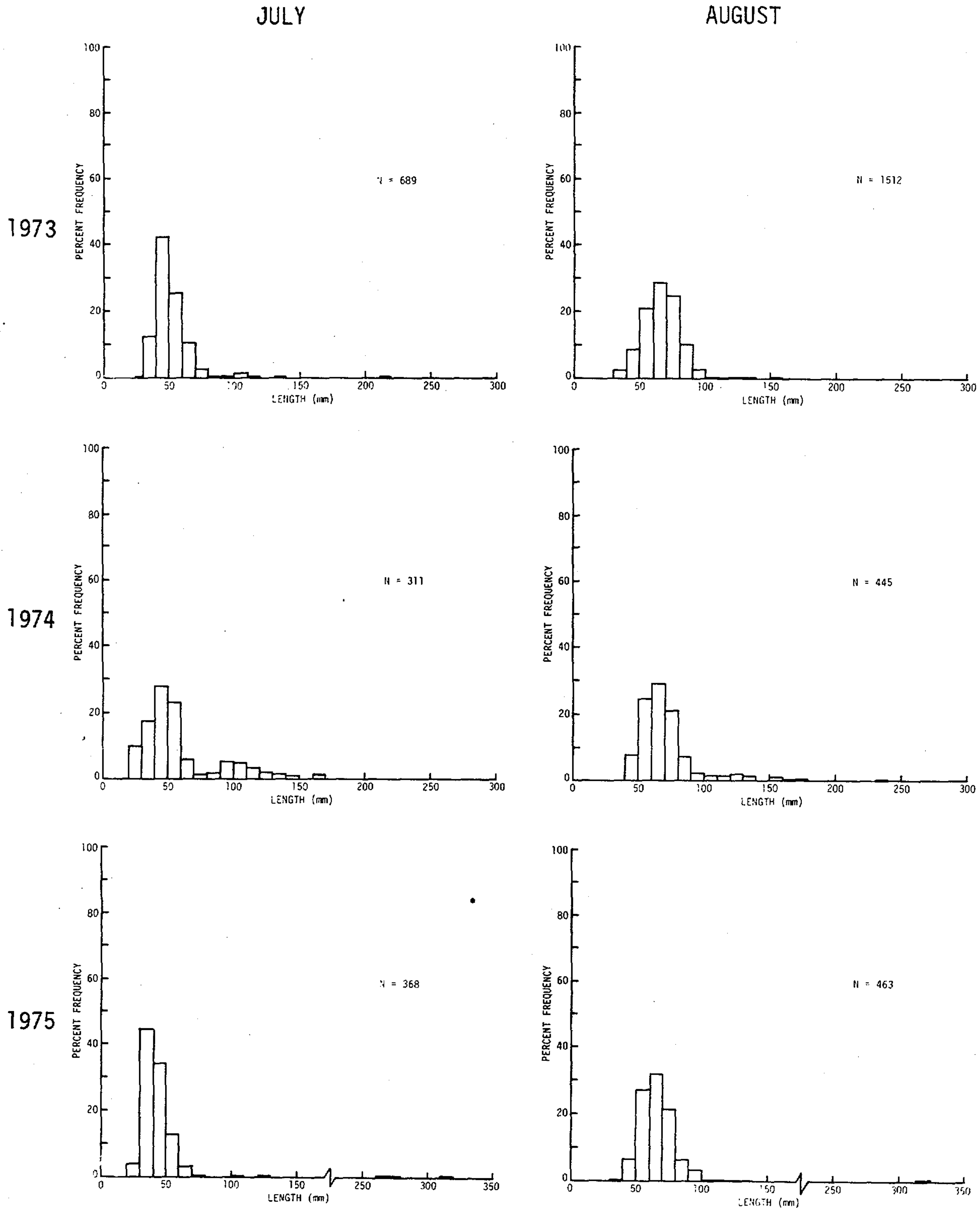


Figure C-1. (Contd)

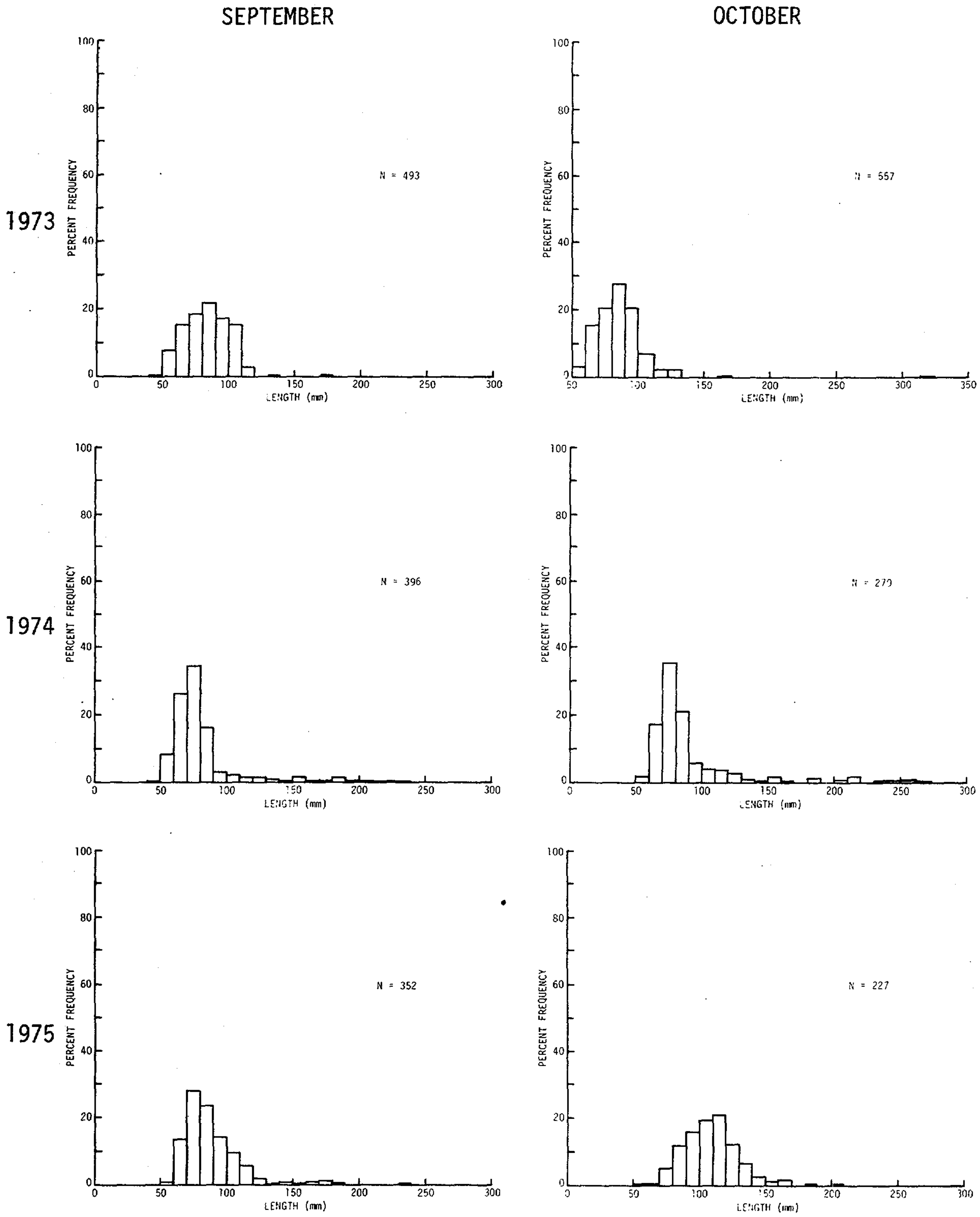


Figure C-1. (Contd)

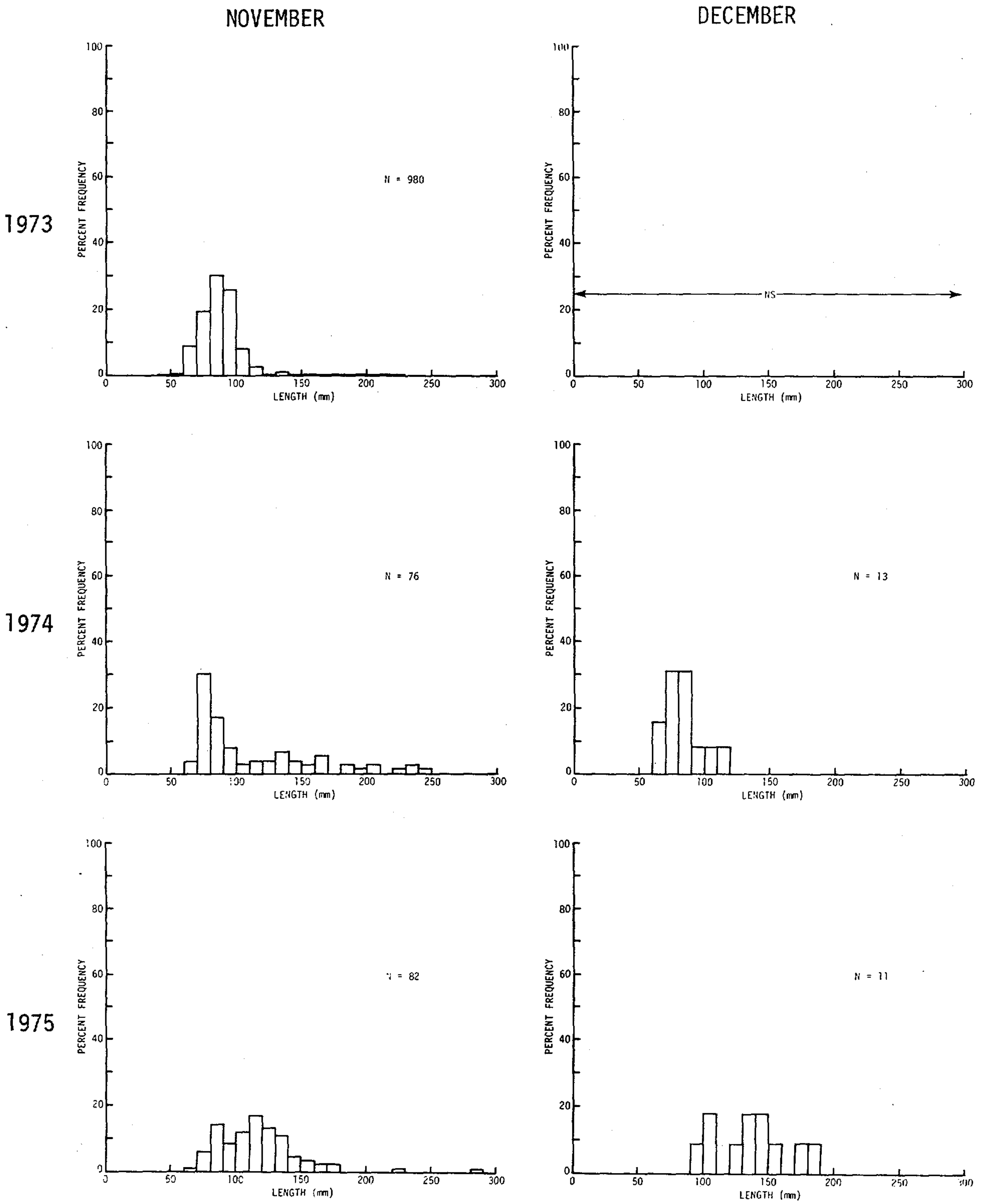


Figure C-1. (Contd)

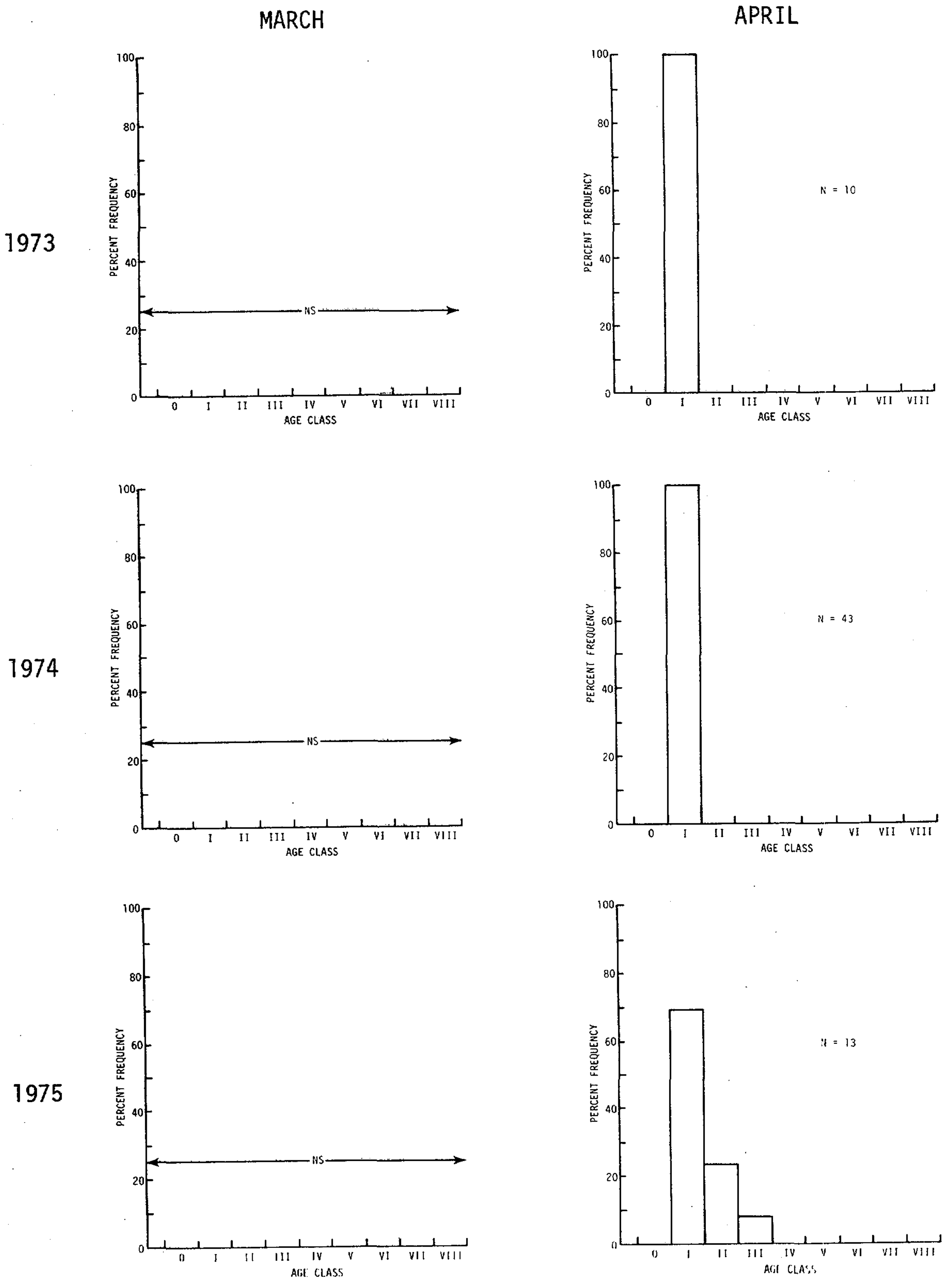


Figure C-2. Age Composition of Striped Bass Collected in Standard-Station Beach Seines and Bottom Trawls, March-December, 1973-1975

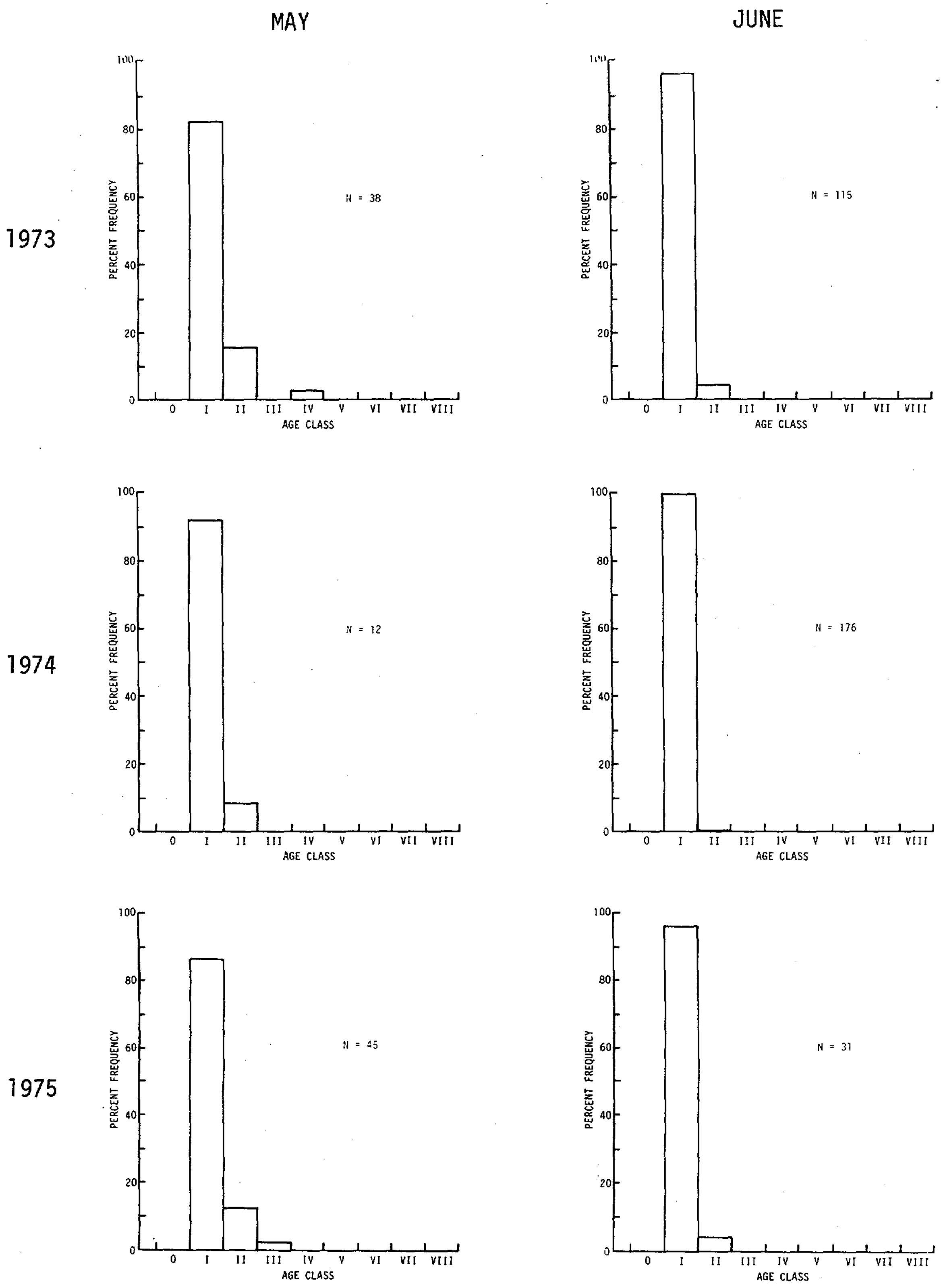


Figure C-2. (Contd)

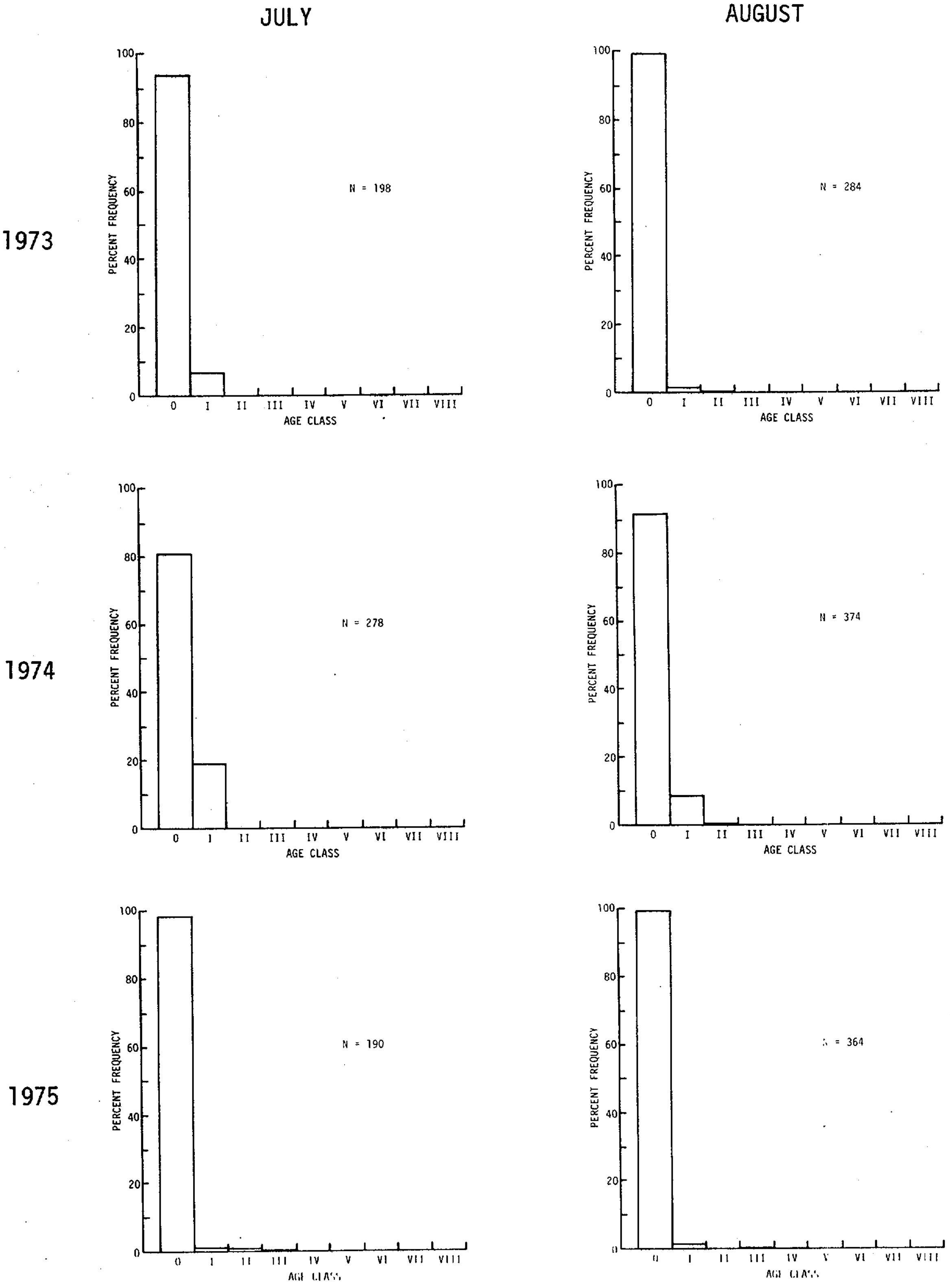


Figure C-2. (Contd)

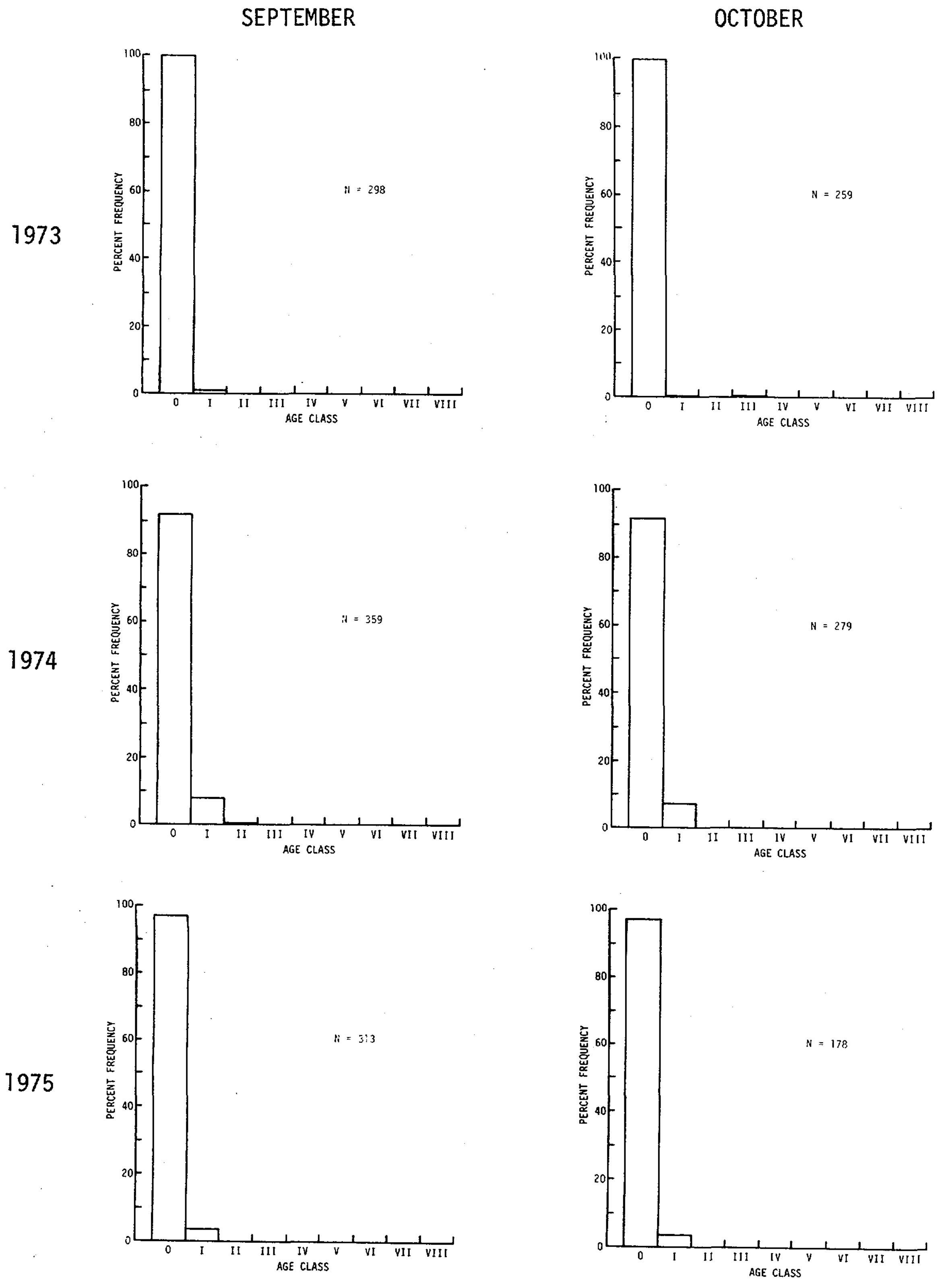


Figure C-2. (Contd)

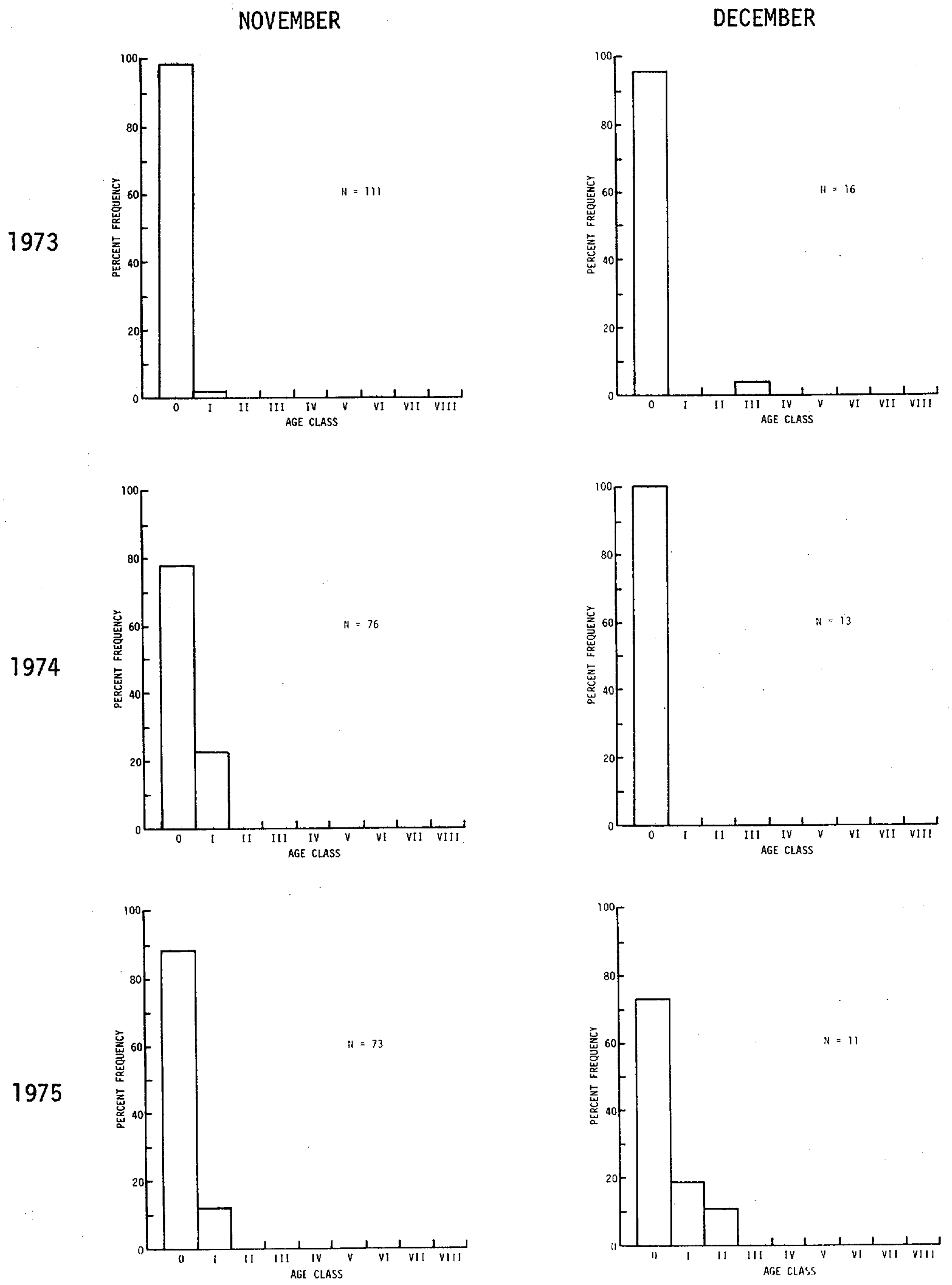


Figure C-2. (Contd)

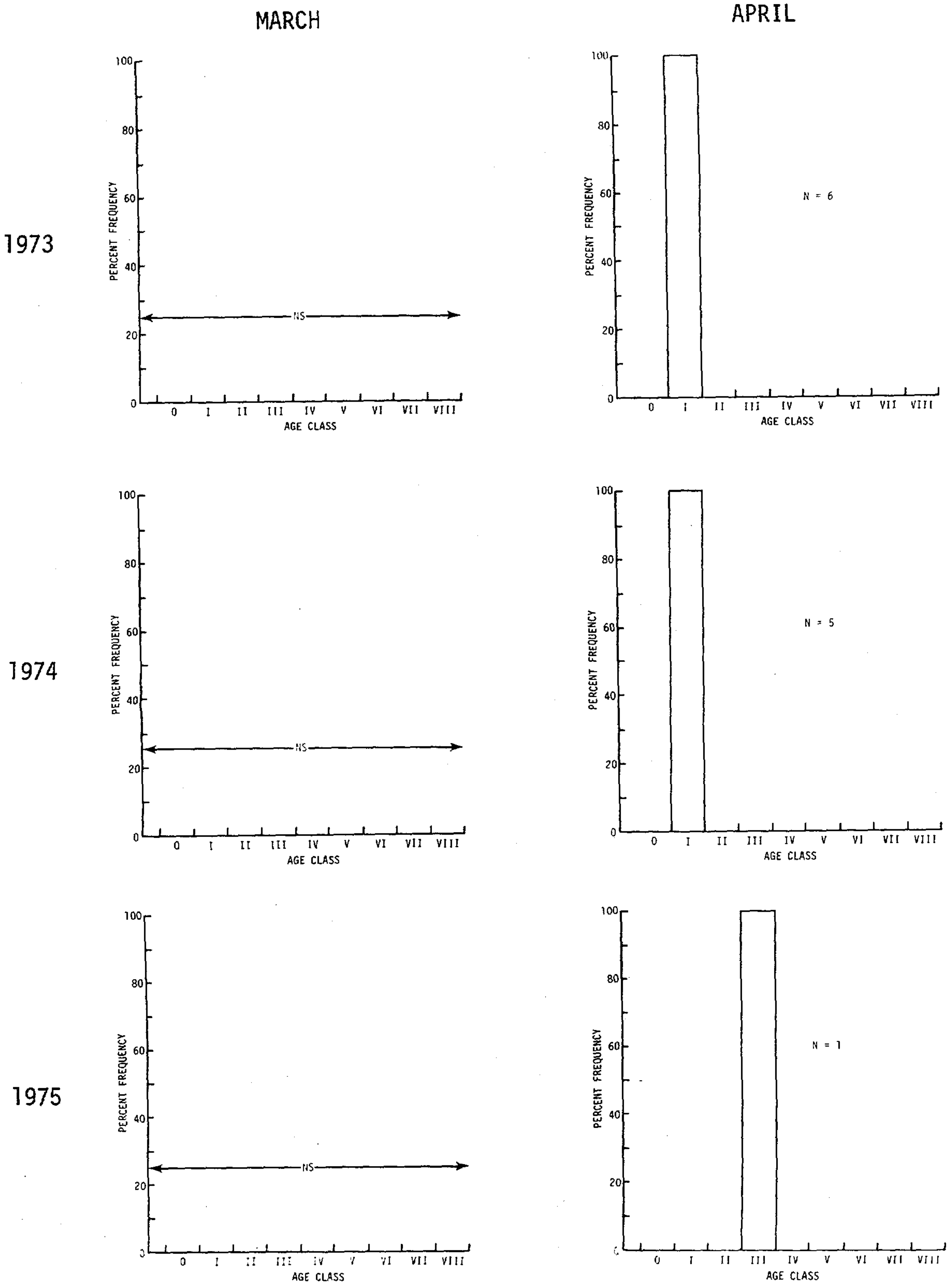


Figure C-3. Age Composition of Striped Bass Collected in Standard-Station Beach Seines, March-December, 1973-1975

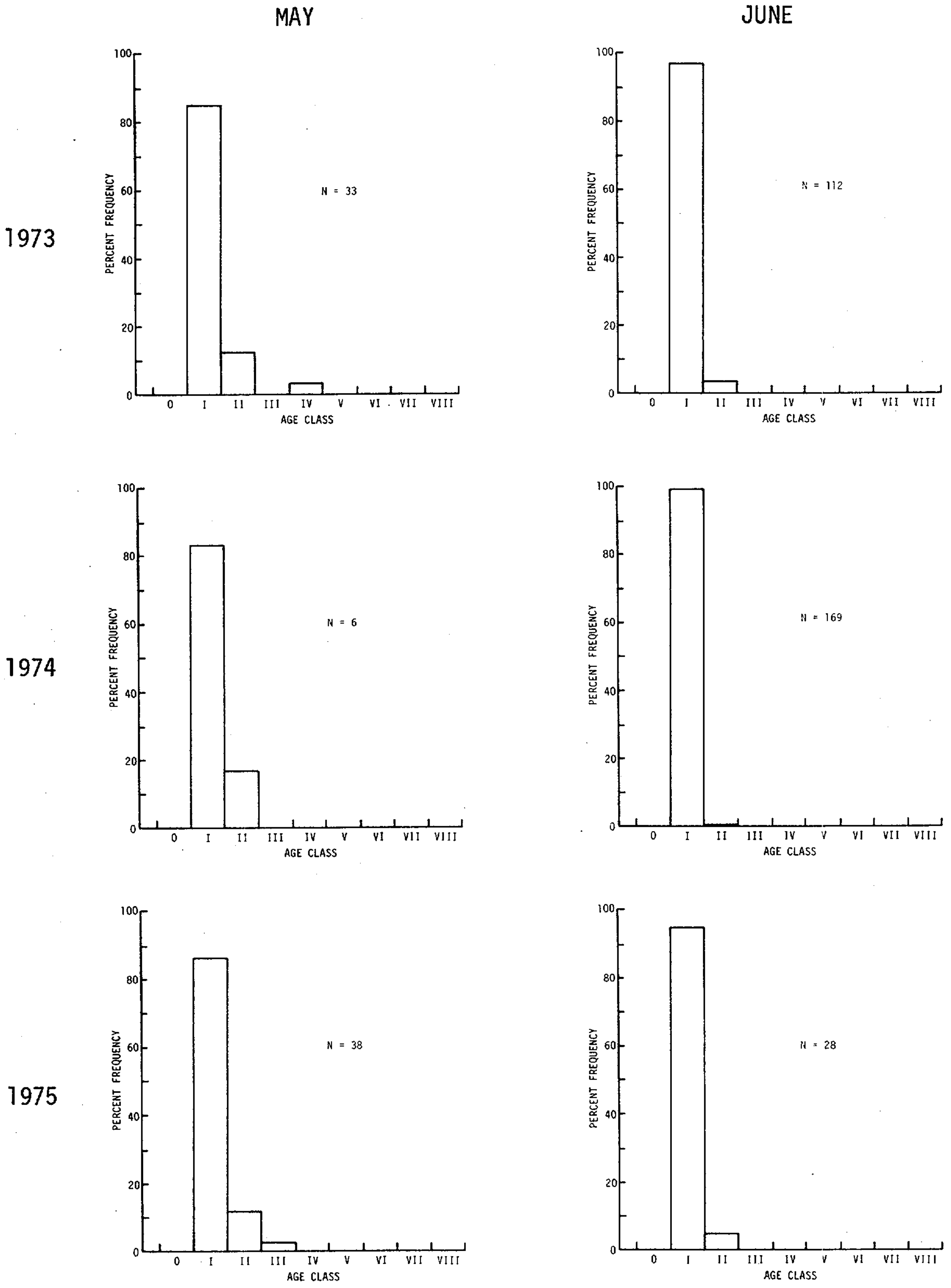


Figure C-3. (Contd)

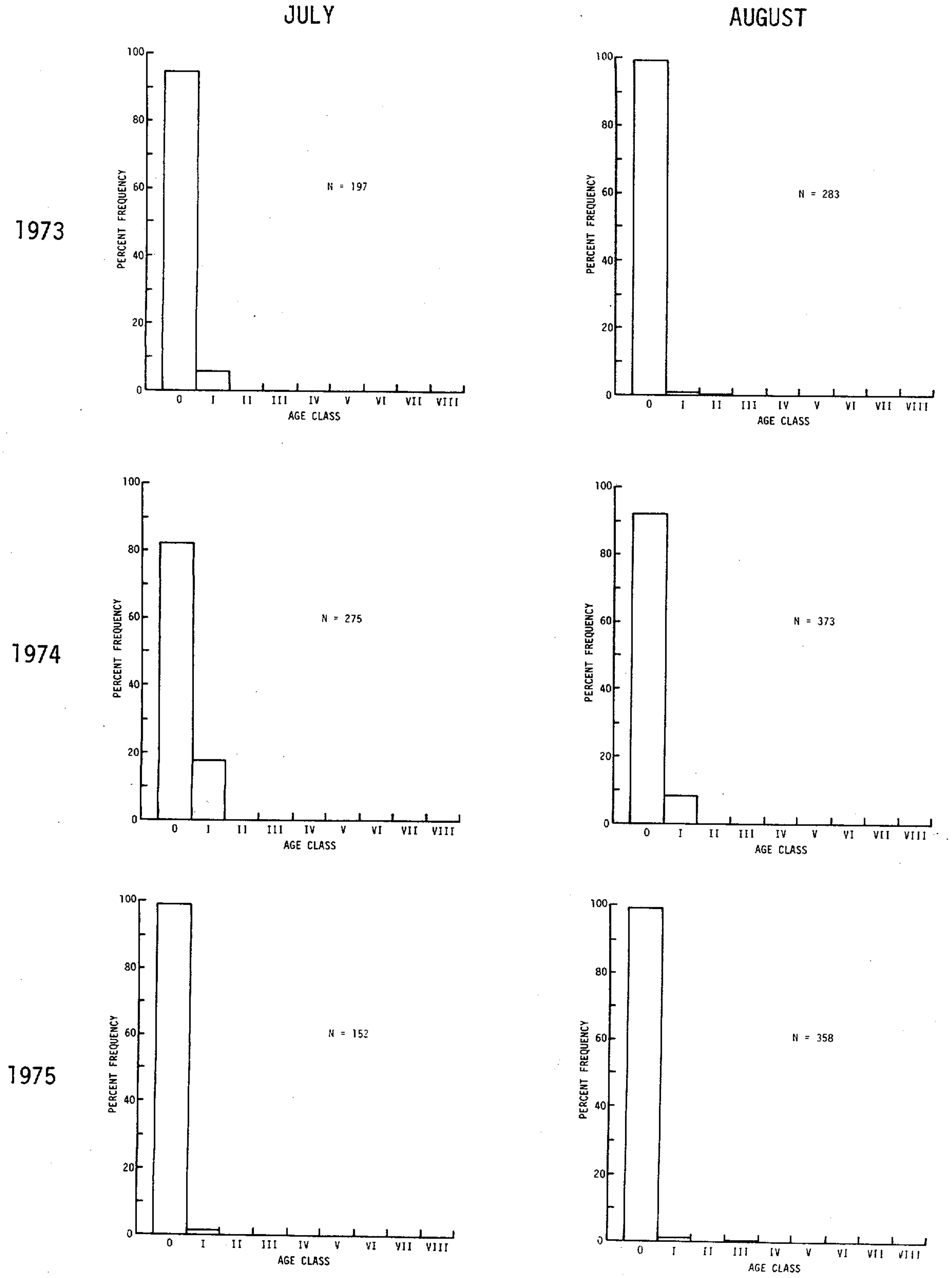


Figure C-3. (Contd)

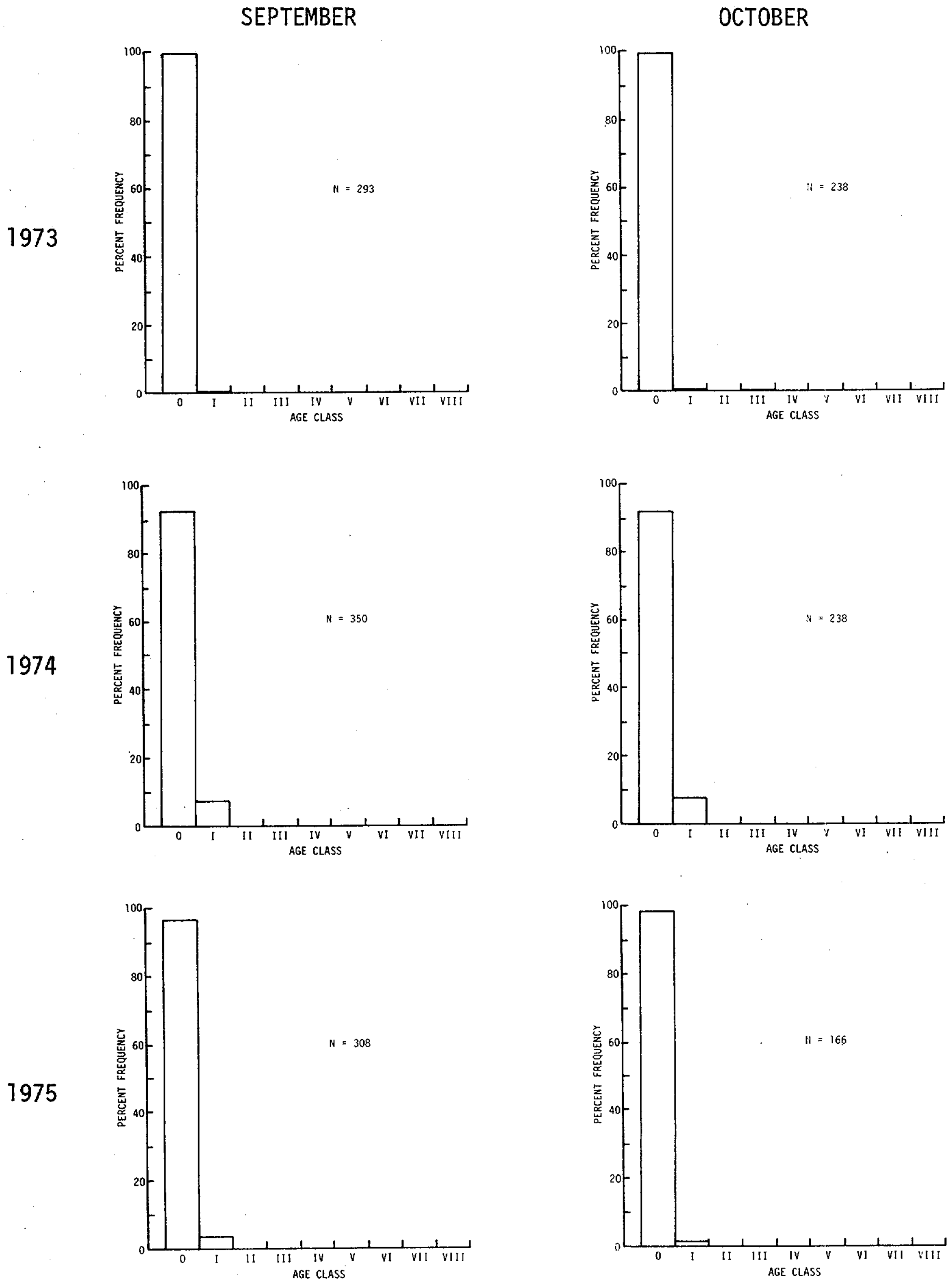


Figure C-3. (Contd)

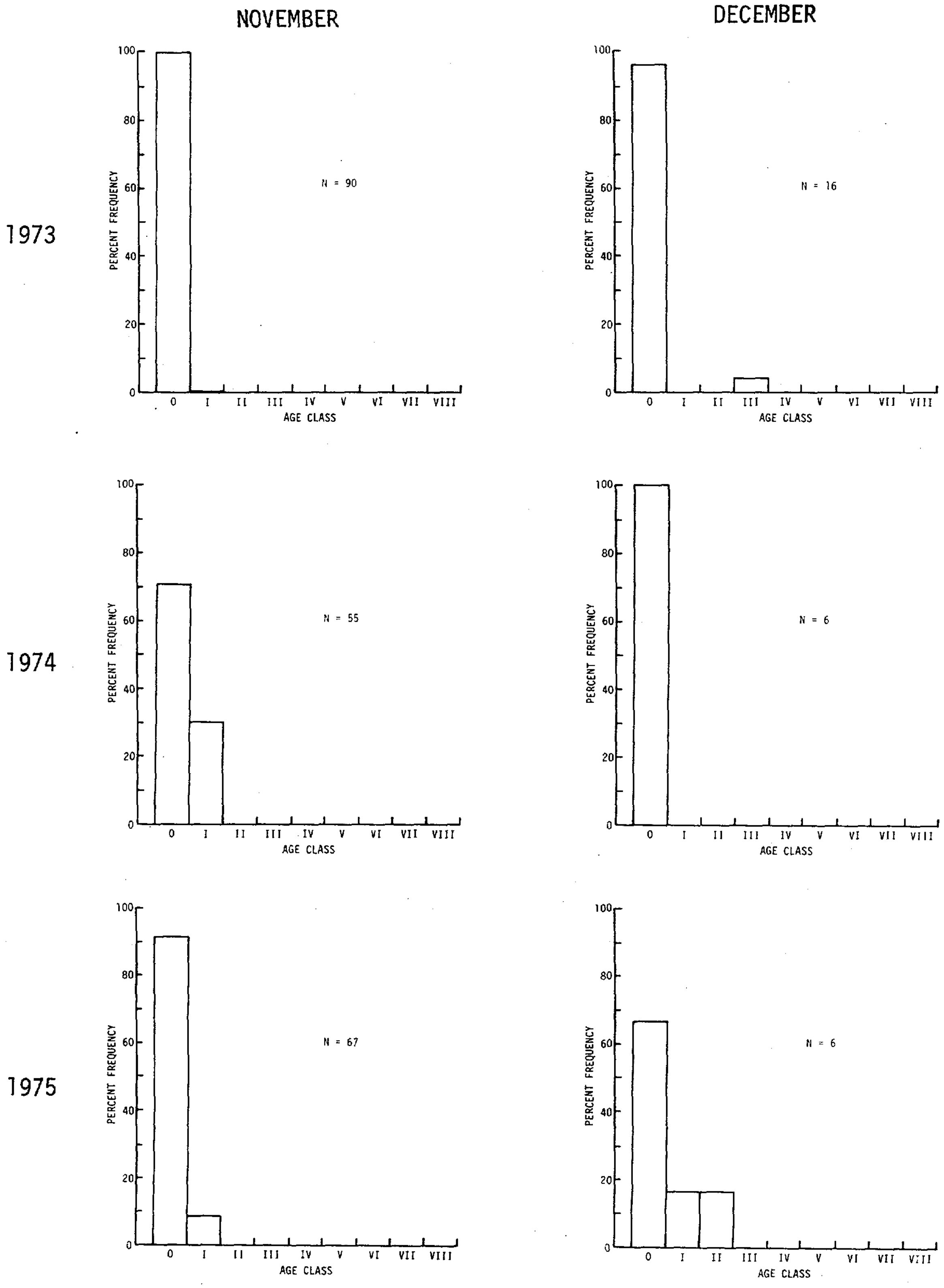


Figure C-3. (Contd)

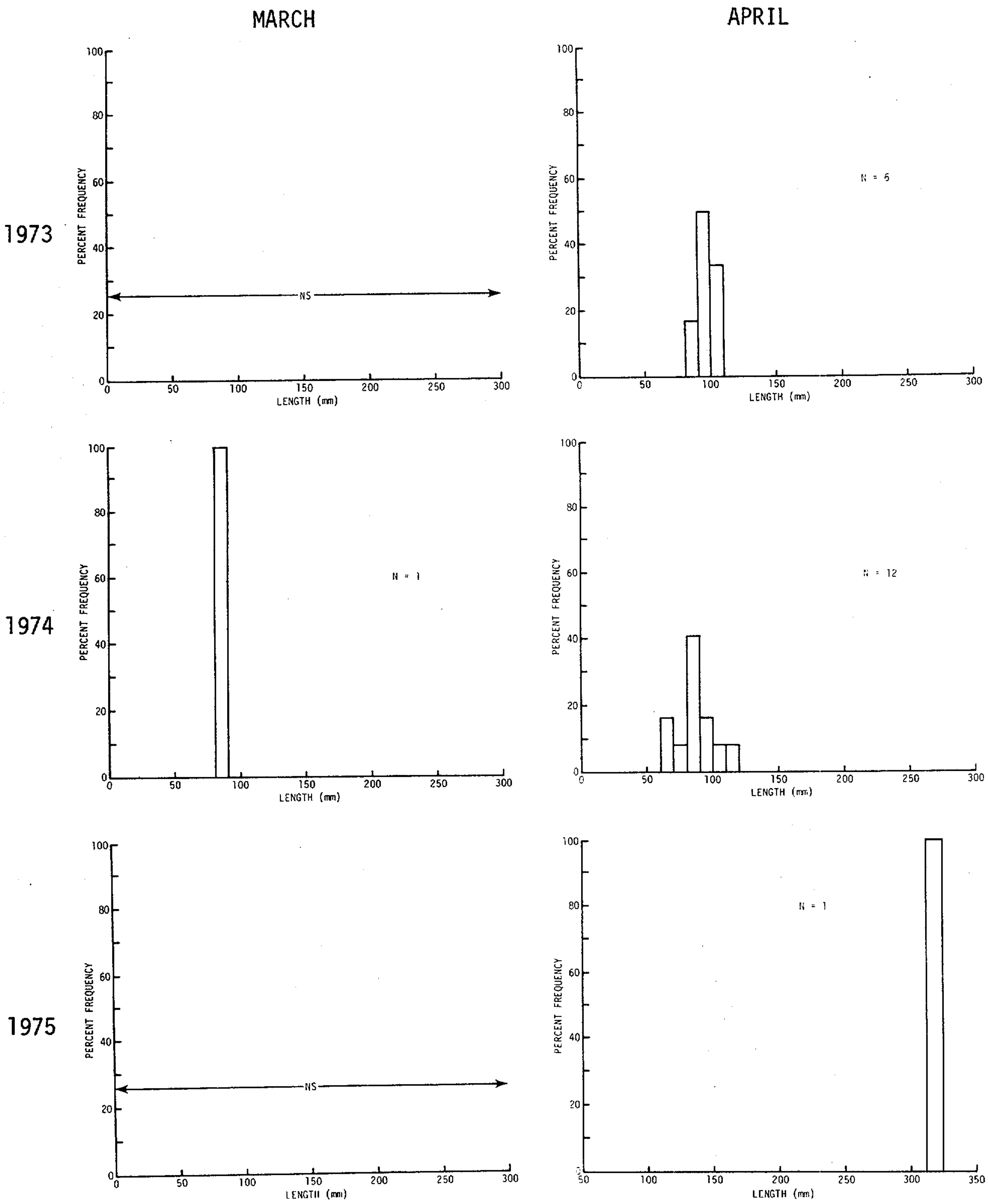


Figure C-4. Length-Frequency Distribution of Striped Bass Collected in Standard-Station Beach Seines, March-December, 1973-1975

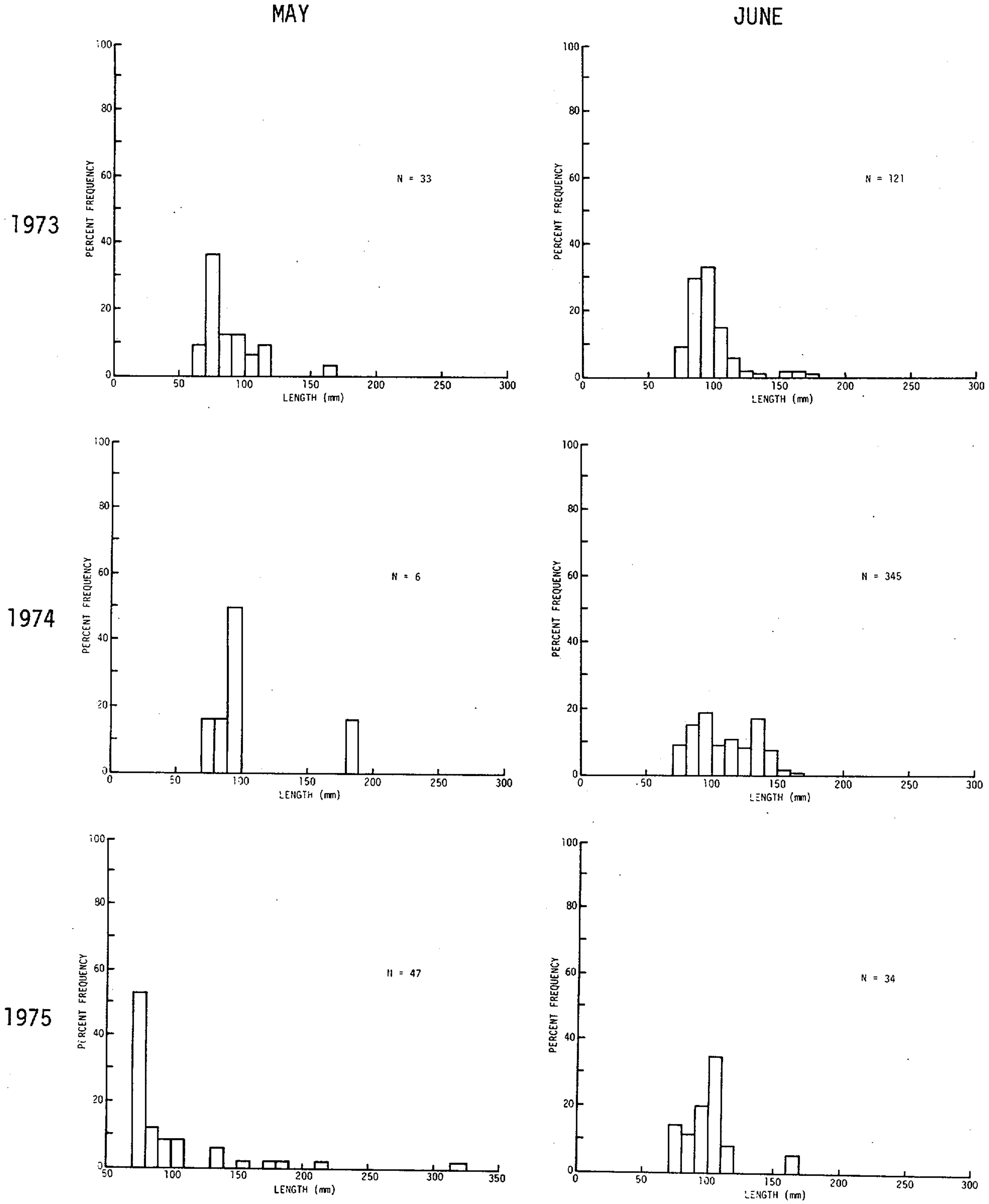


Figure C-4. (Contd)

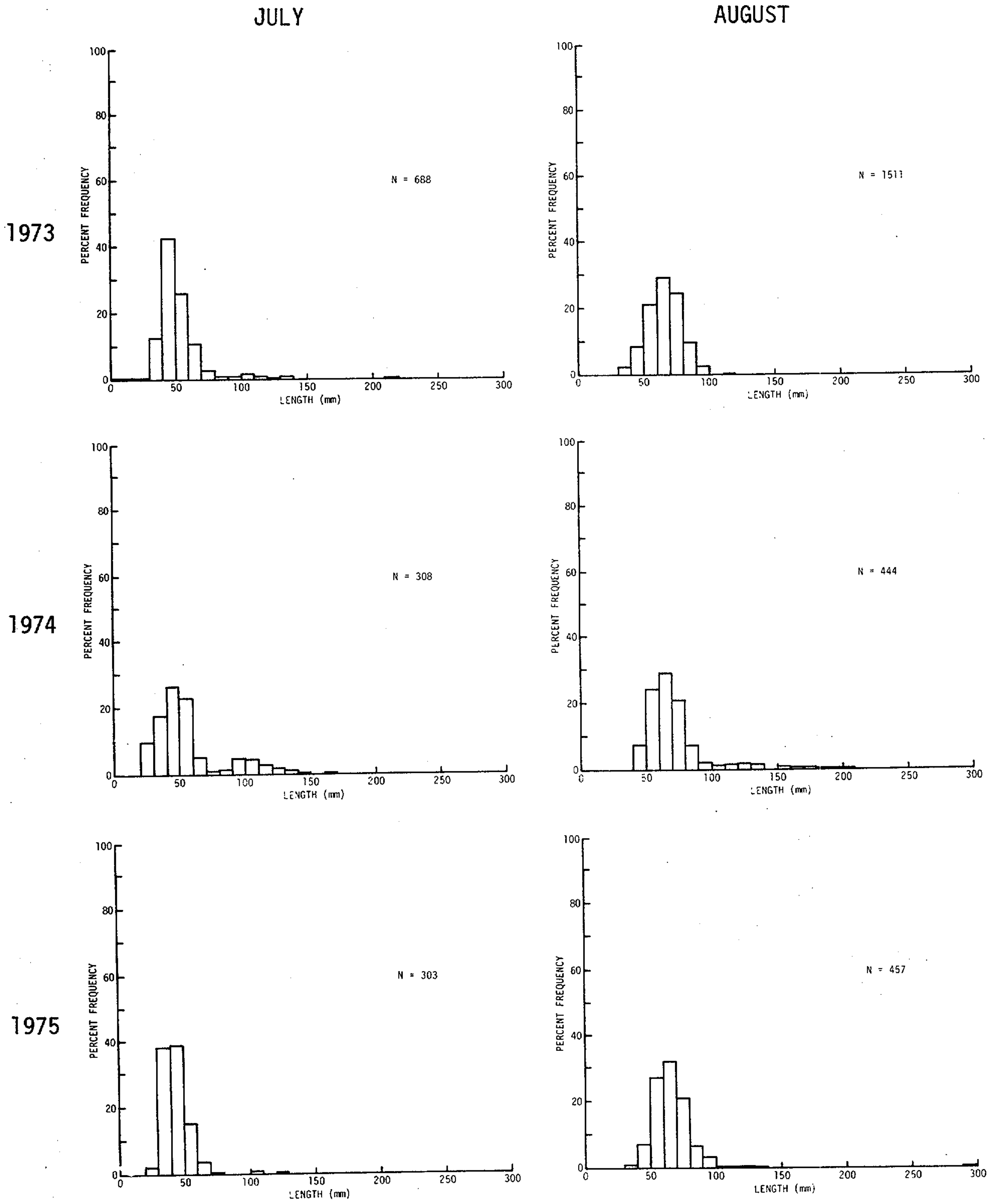


Figure C-4. (Contd)

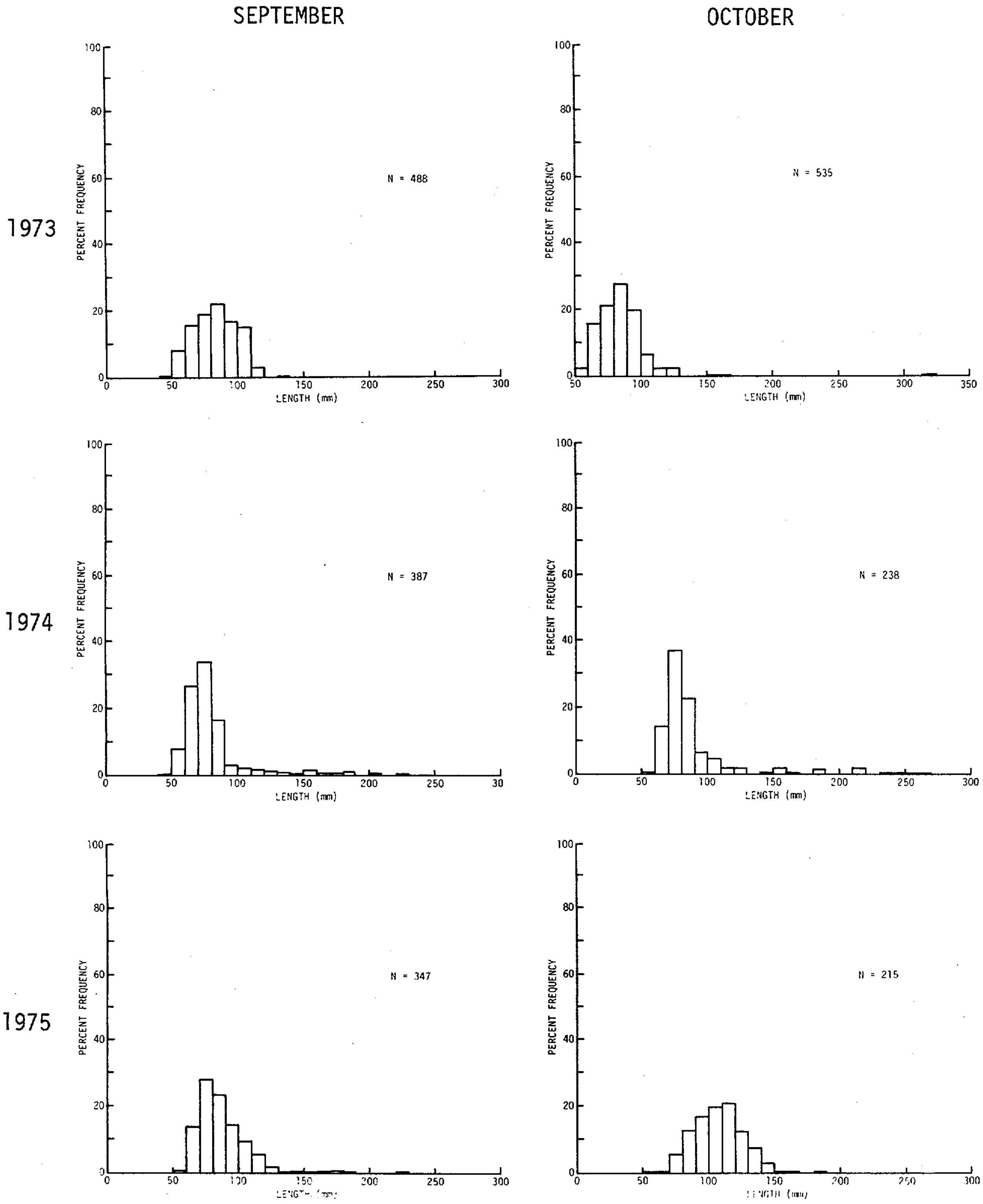


Figure C-4. (Contd)

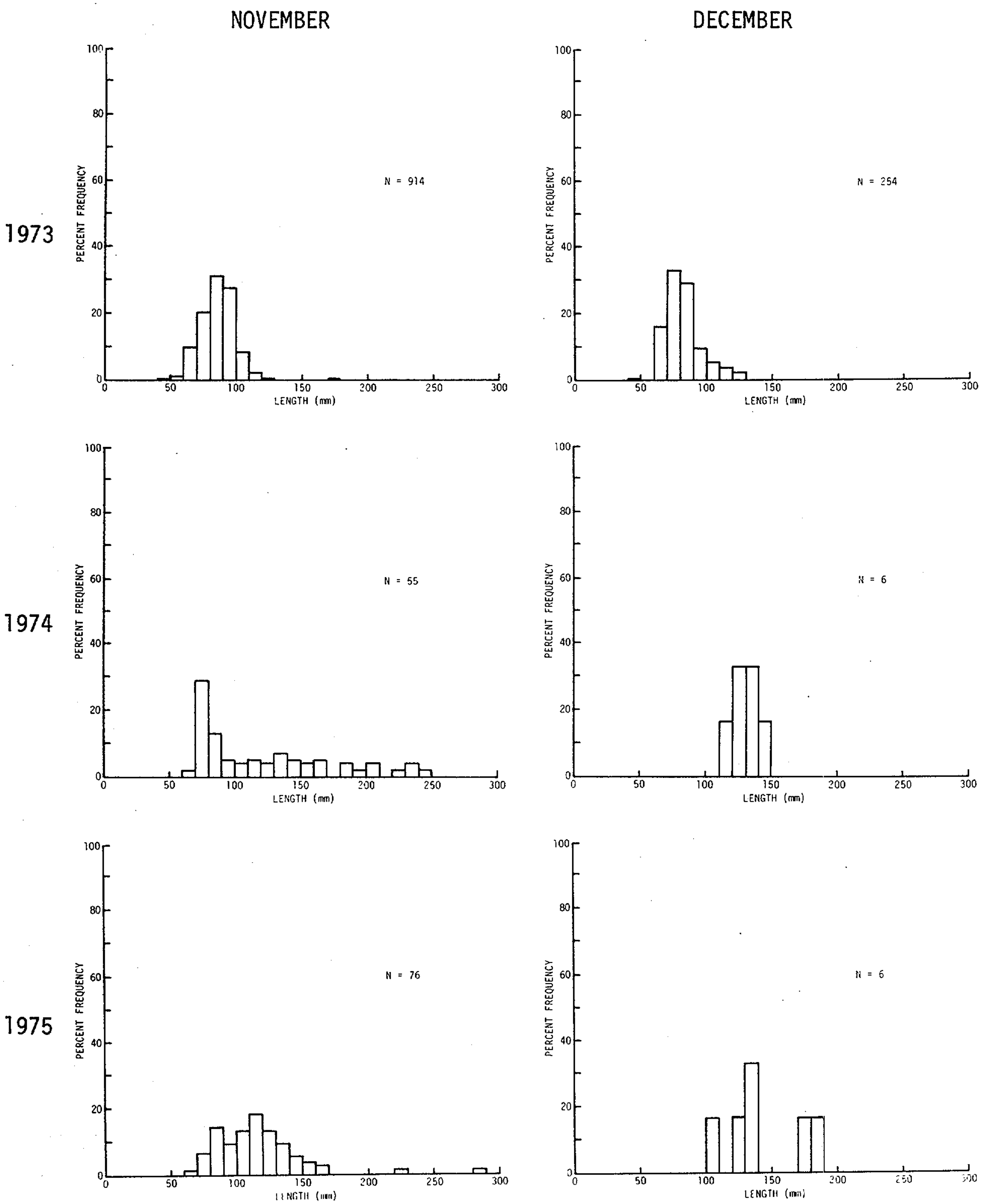


Figure C-4. (Contd)

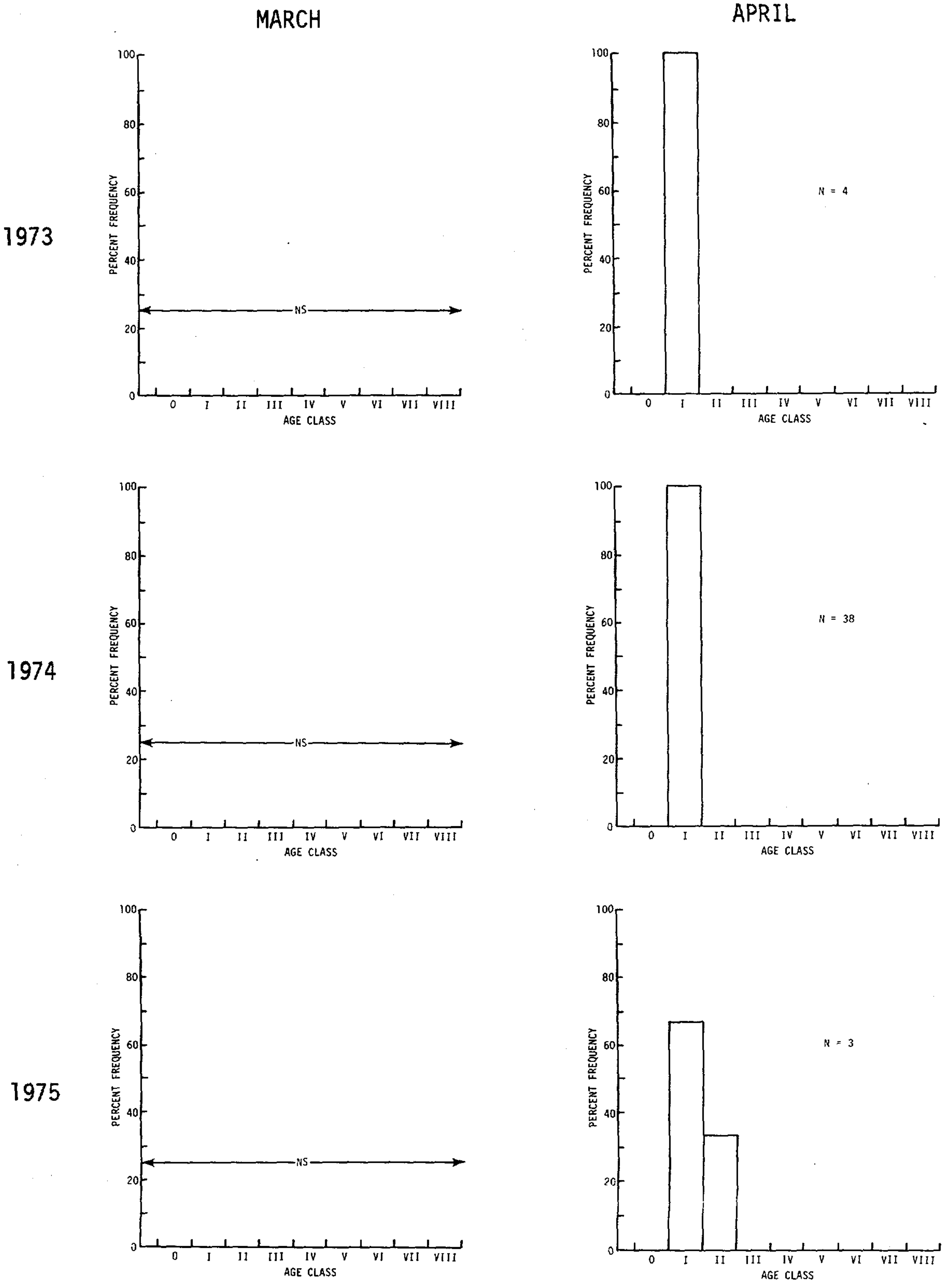


Figure C-5. Age Composition of Striped Bass Collected in Standard-Station Bottom Trawls, March-December, 1973-1975

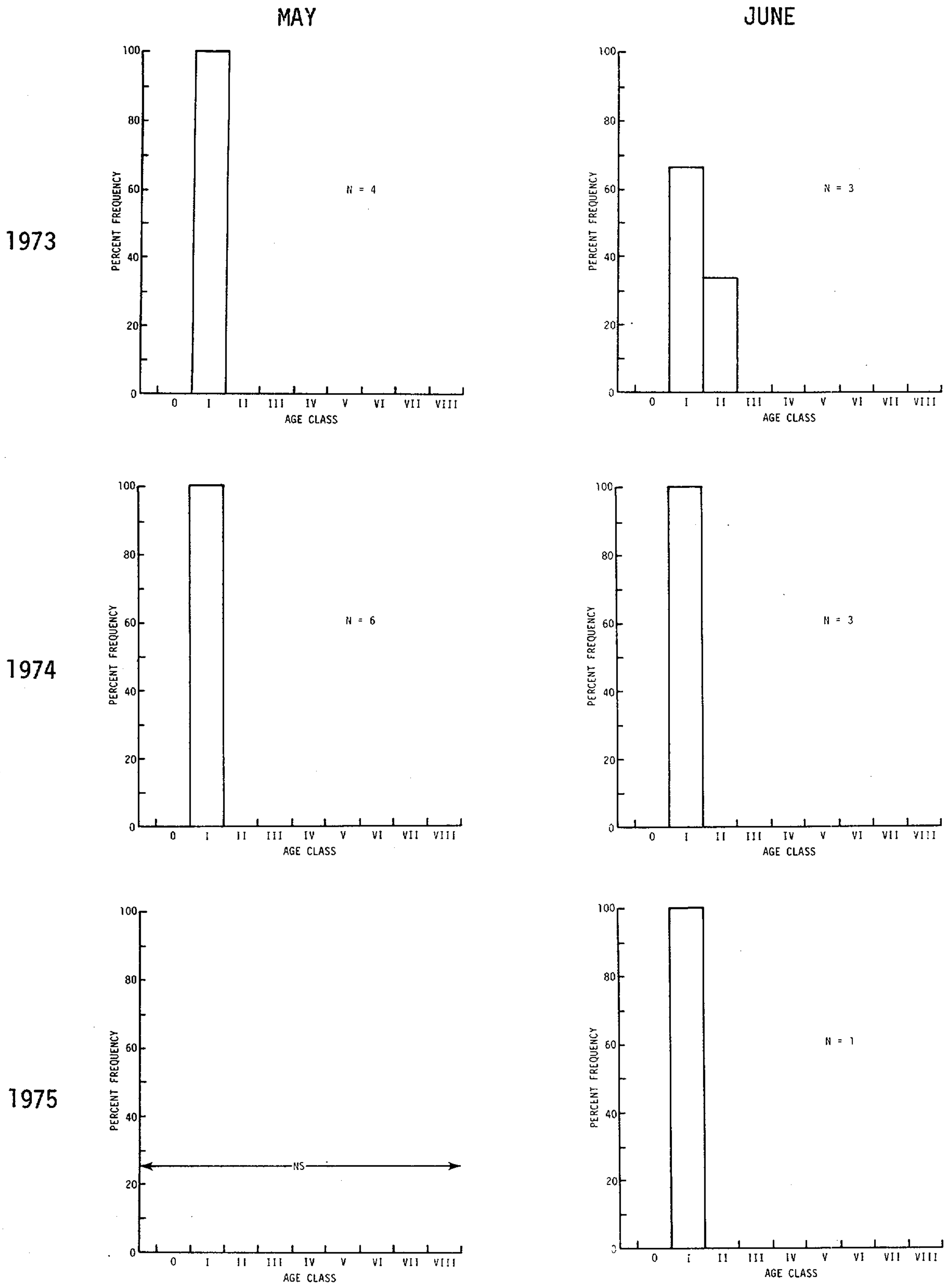


Figure C-5. (Contd)

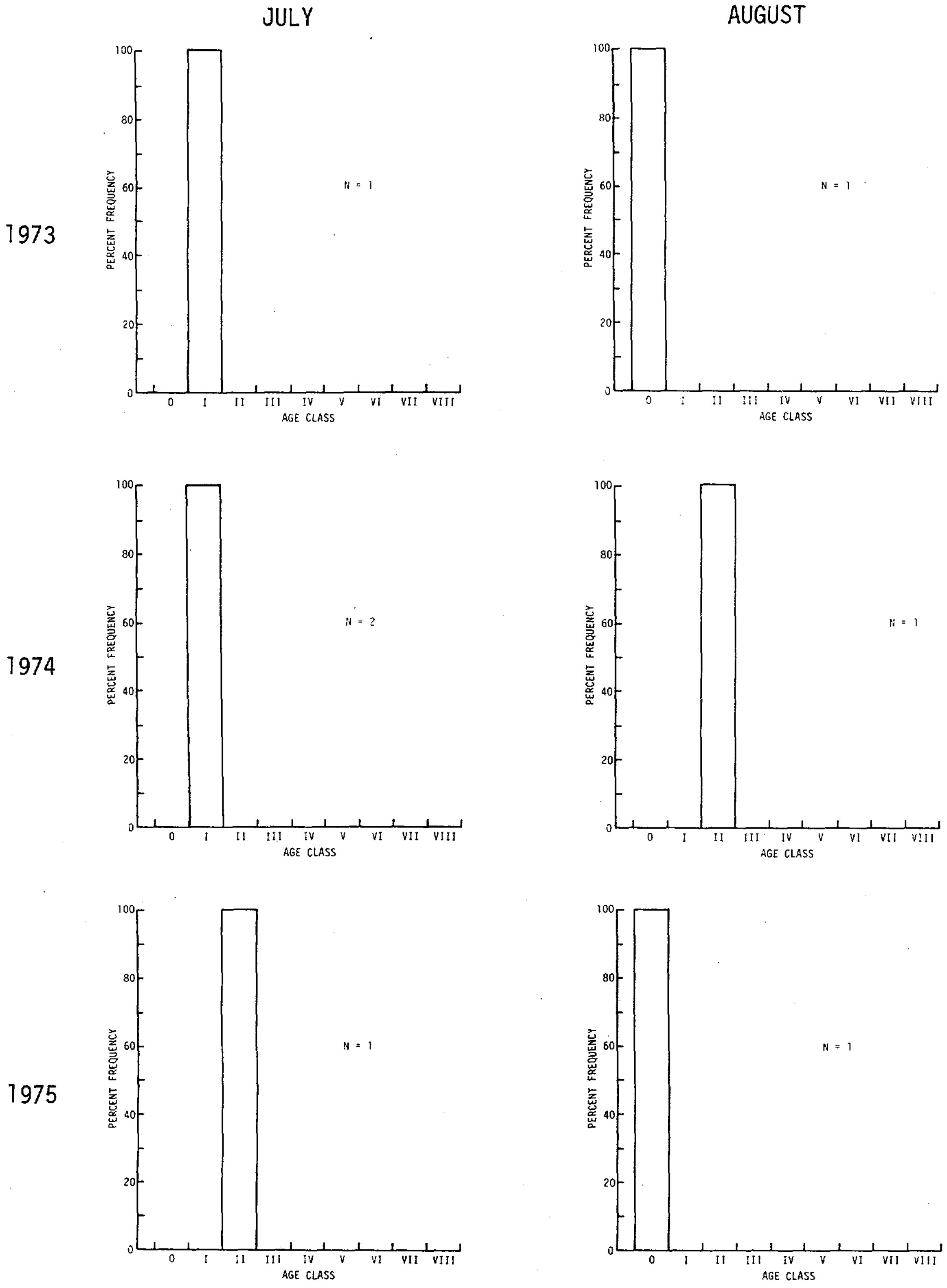


Figure C-5. (Contd)

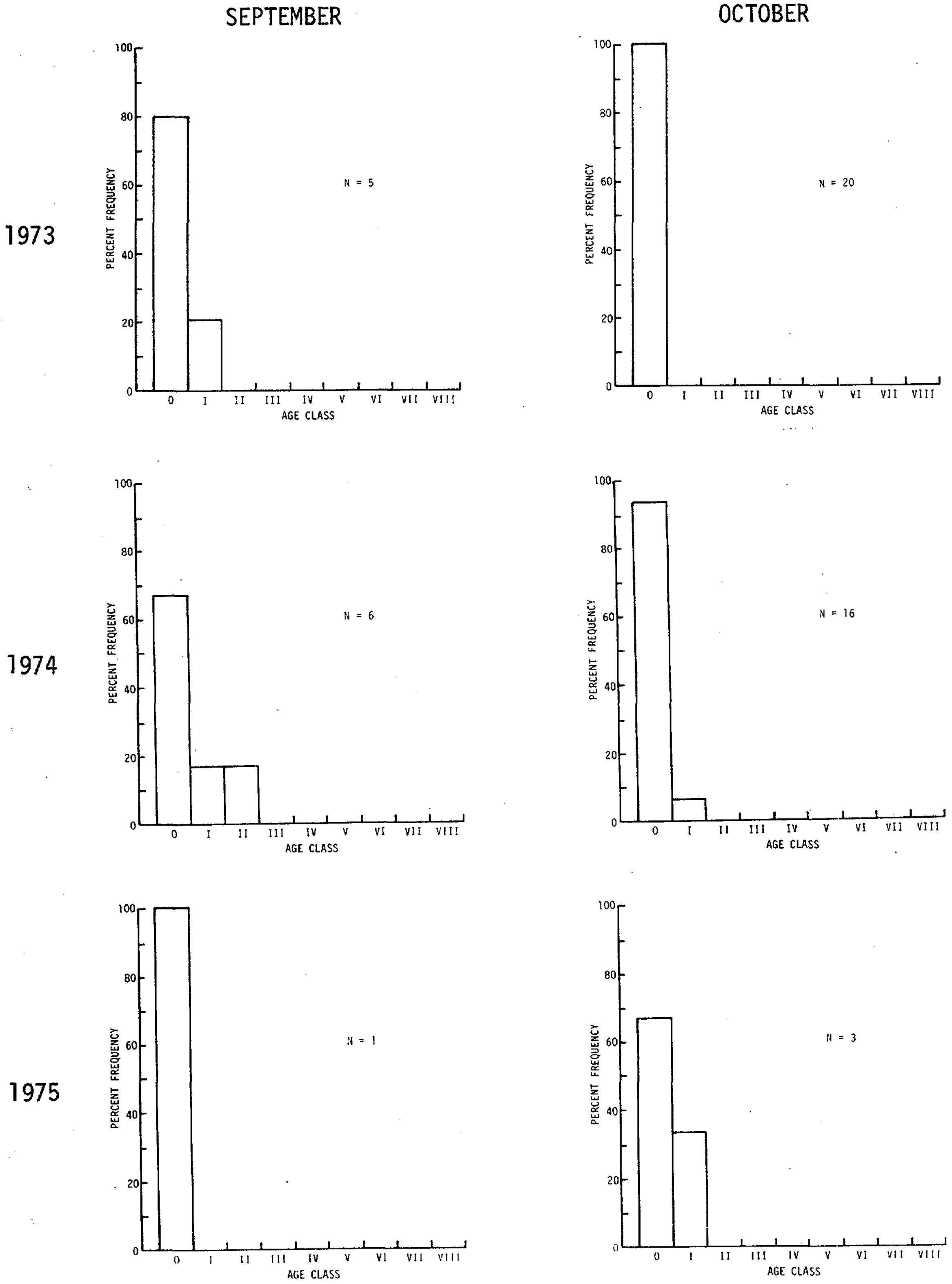
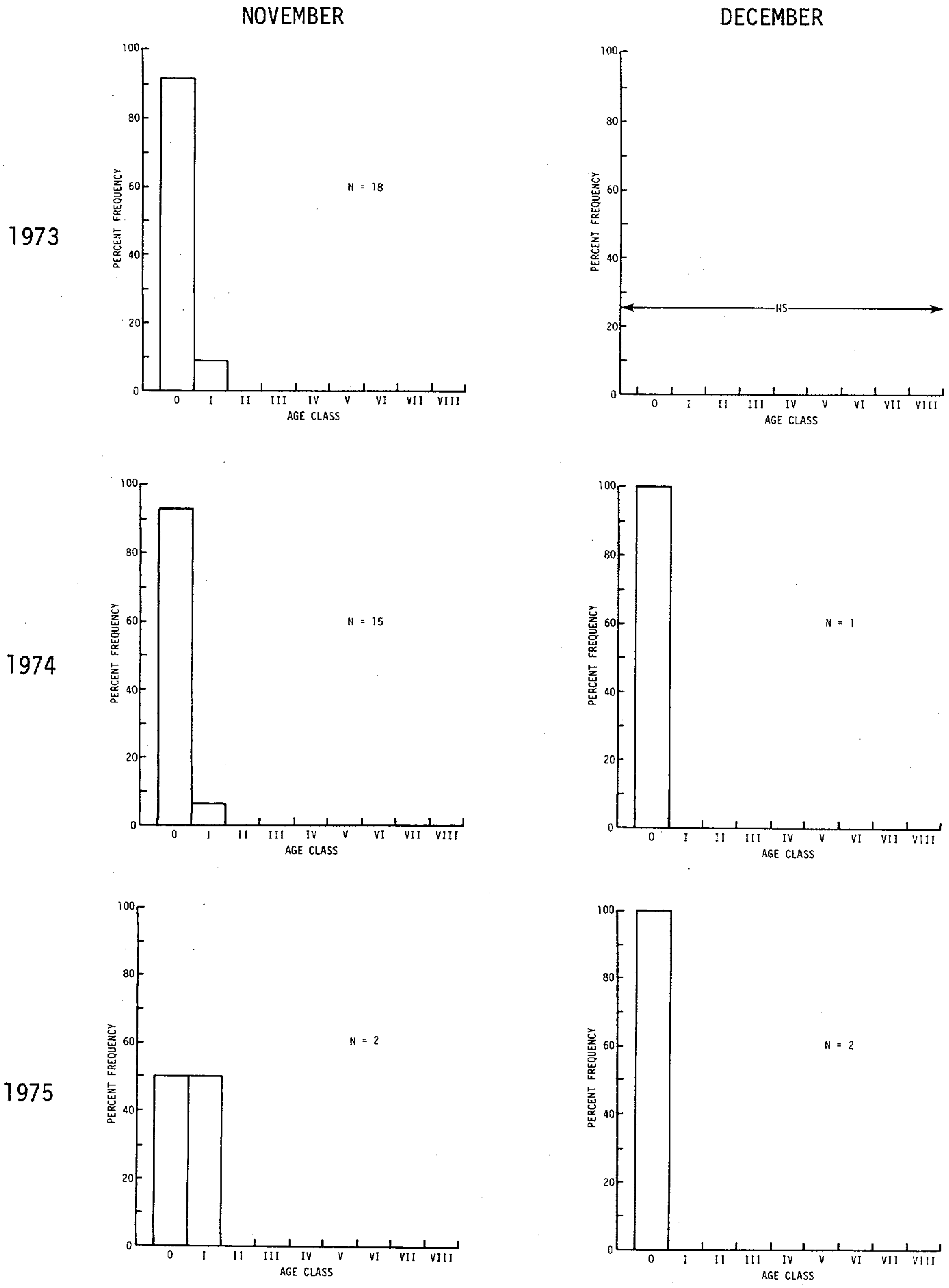


Figure C-5. (Contd)



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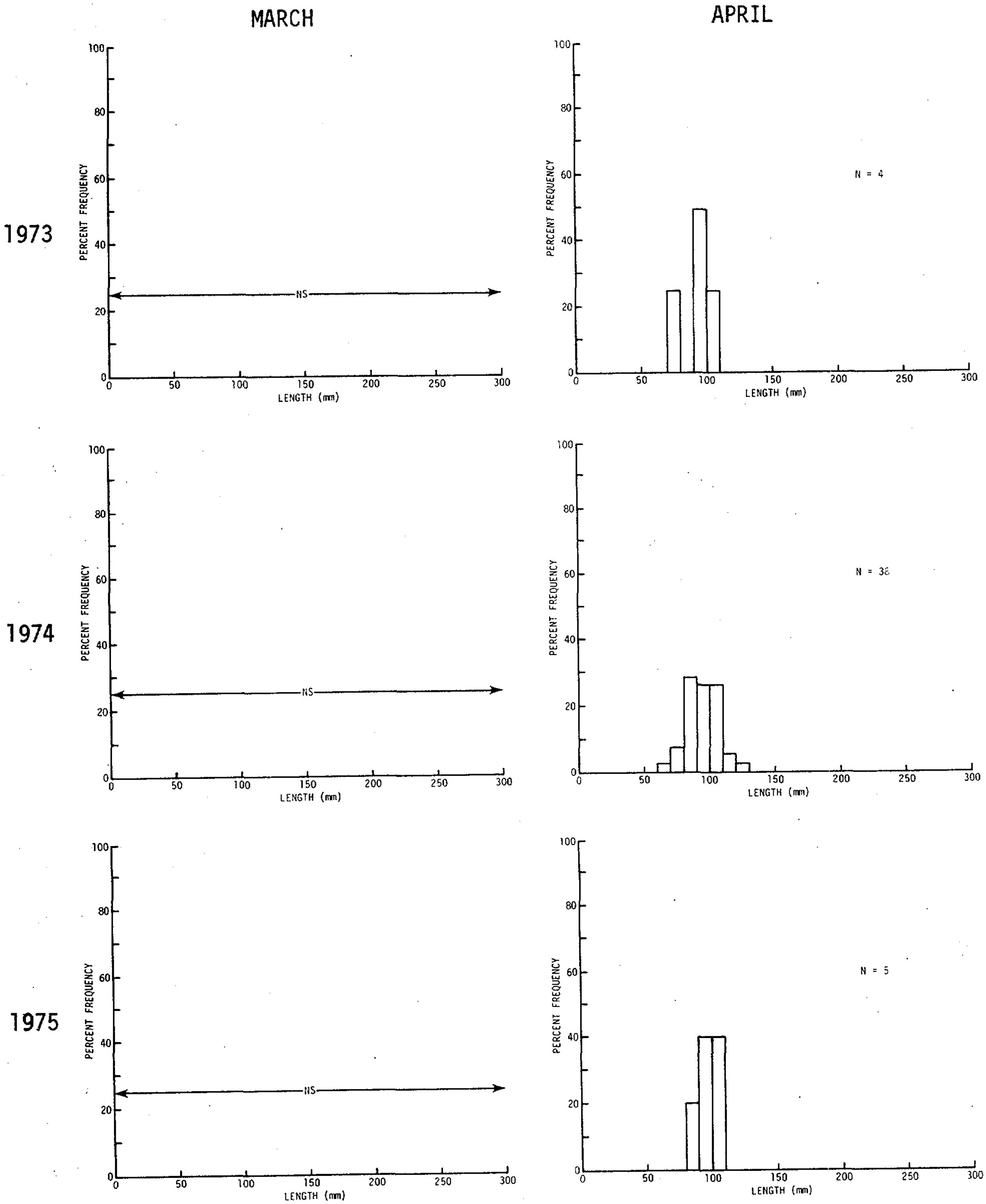


Figure C-6. Length-Frequency Distribution of Striped Bass Collected in Standard-Station Bottom Trawls, March-December, 1973-1975

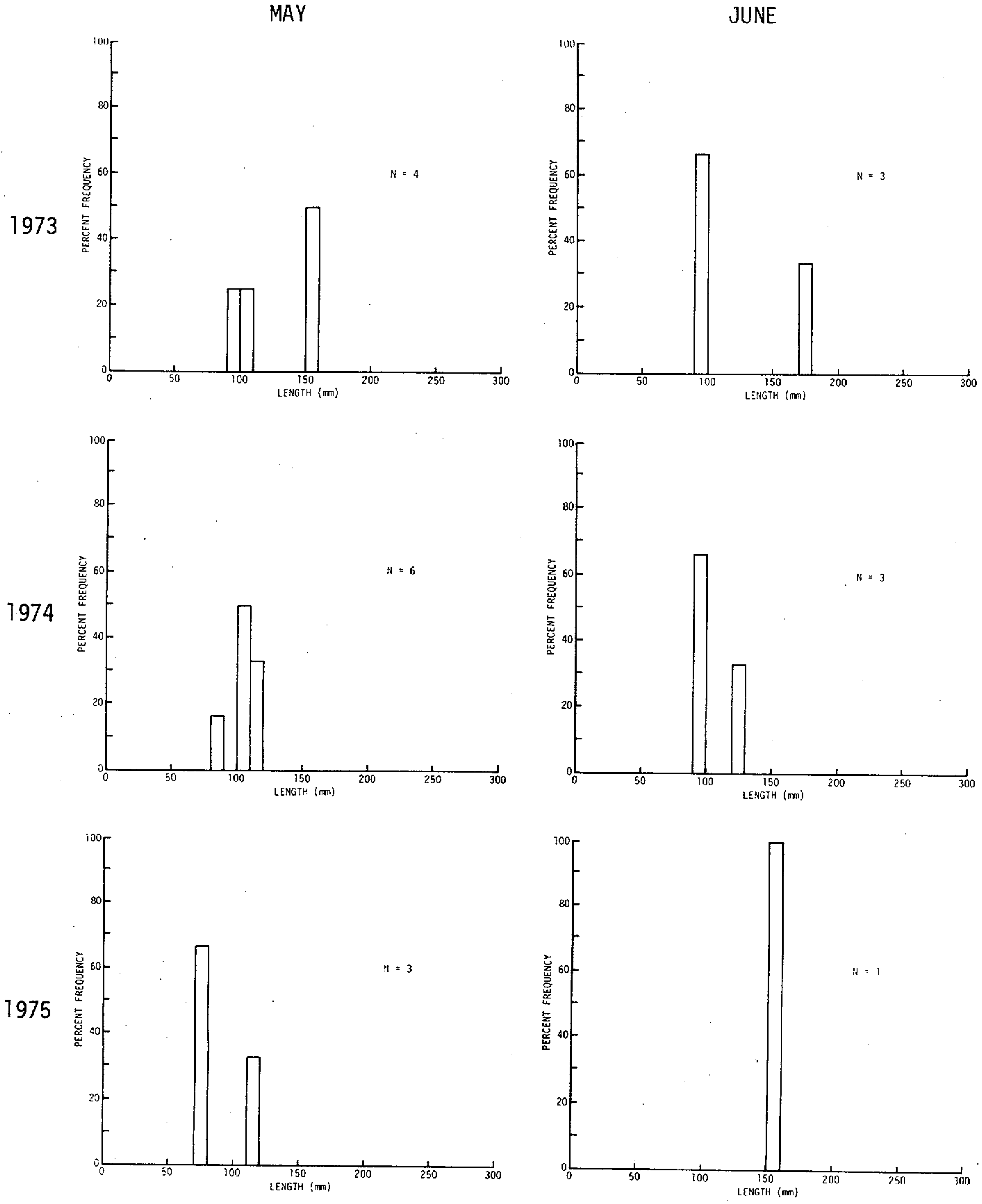


Figure C-6. (Contd)

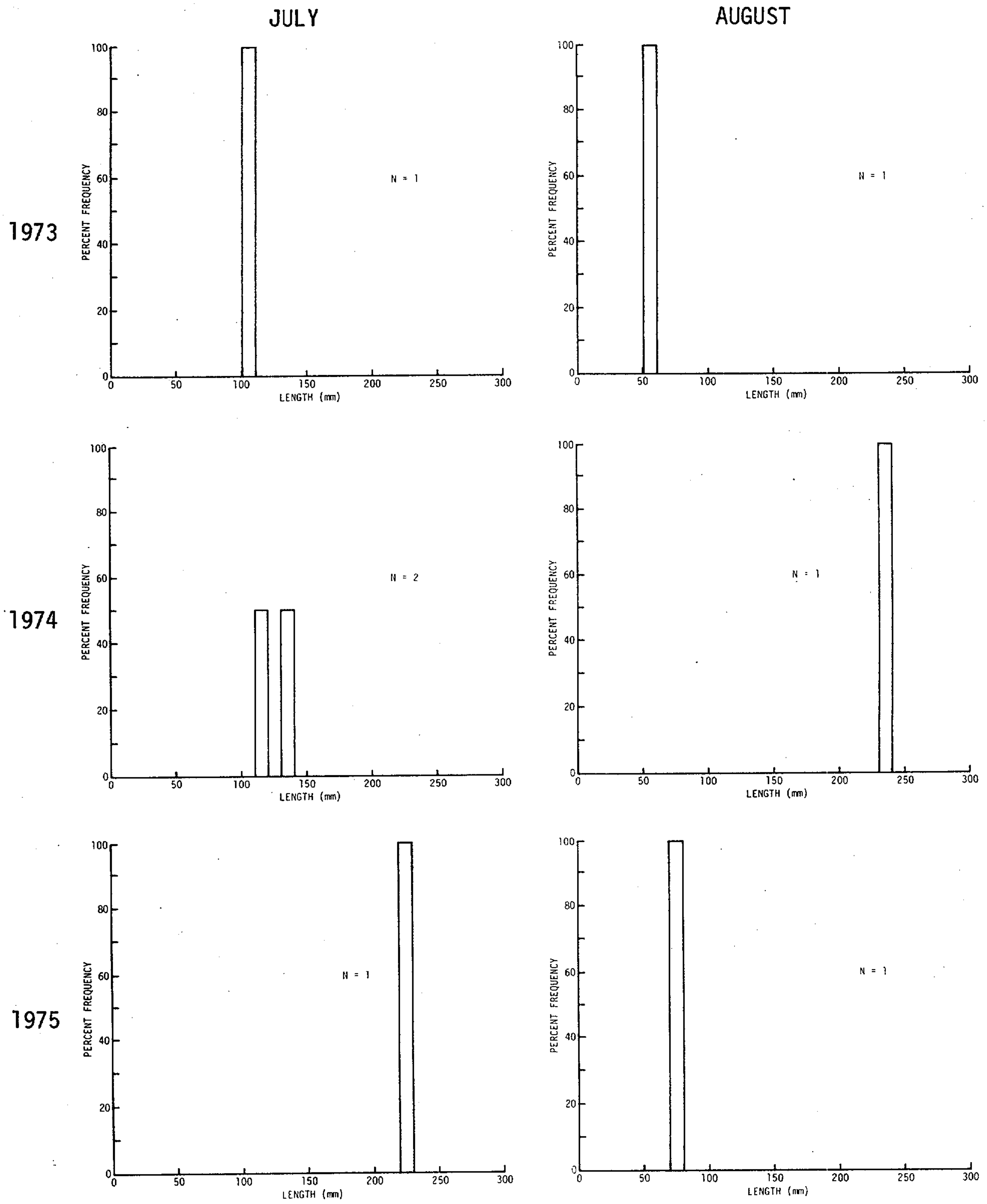


Figure C-6. (Contd)

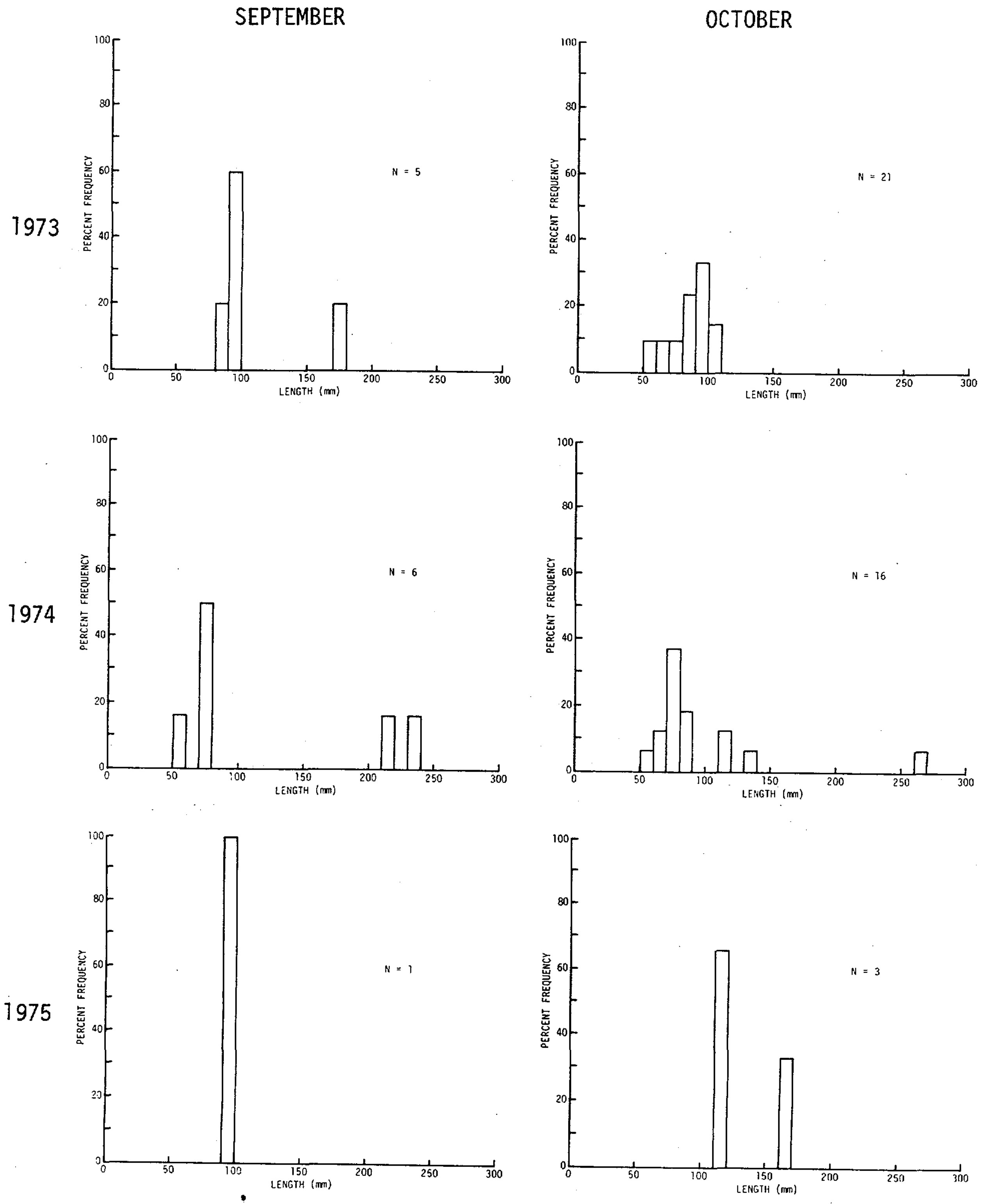


Figure C-6. (Contd)

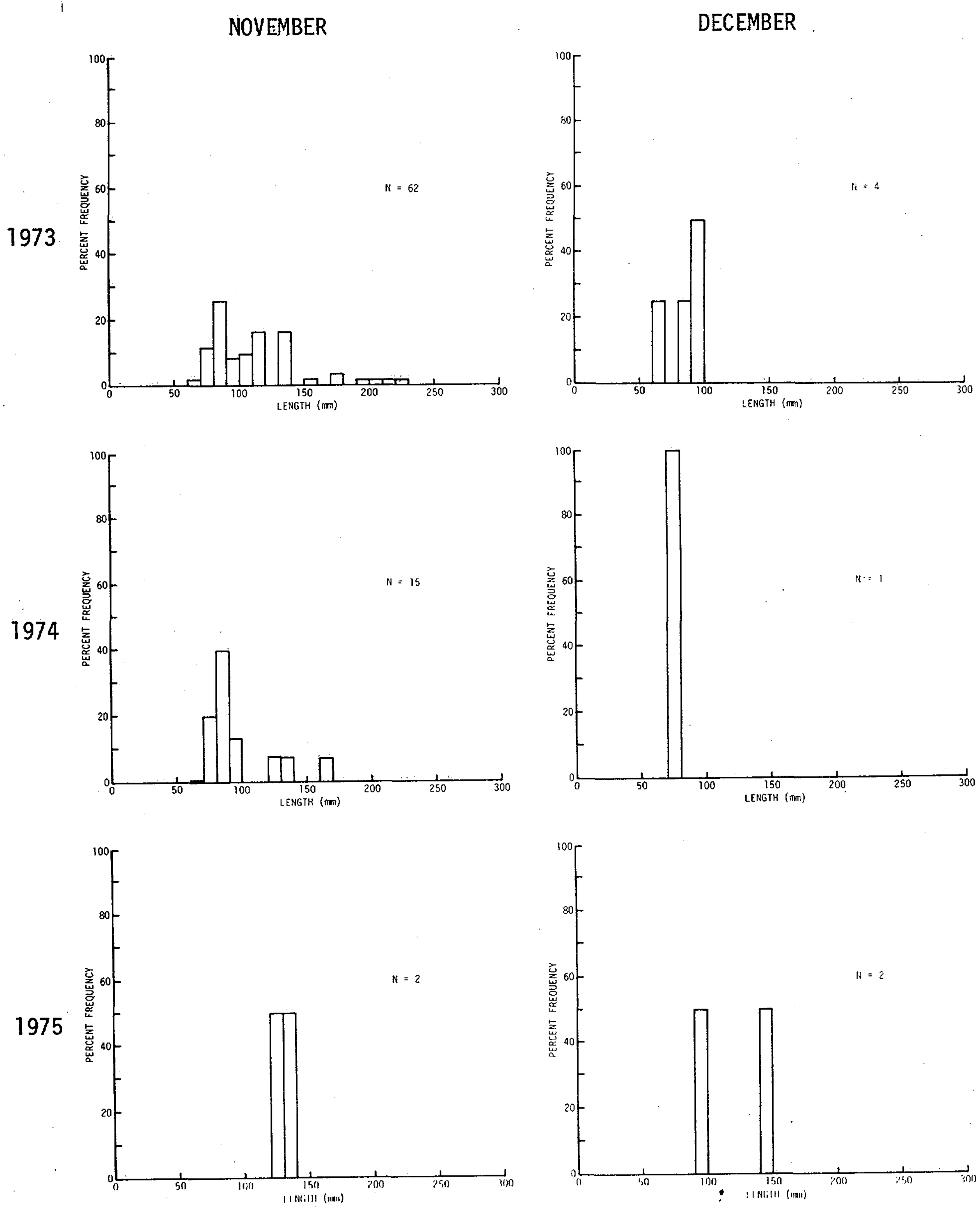


Figure C-6. (Contd)

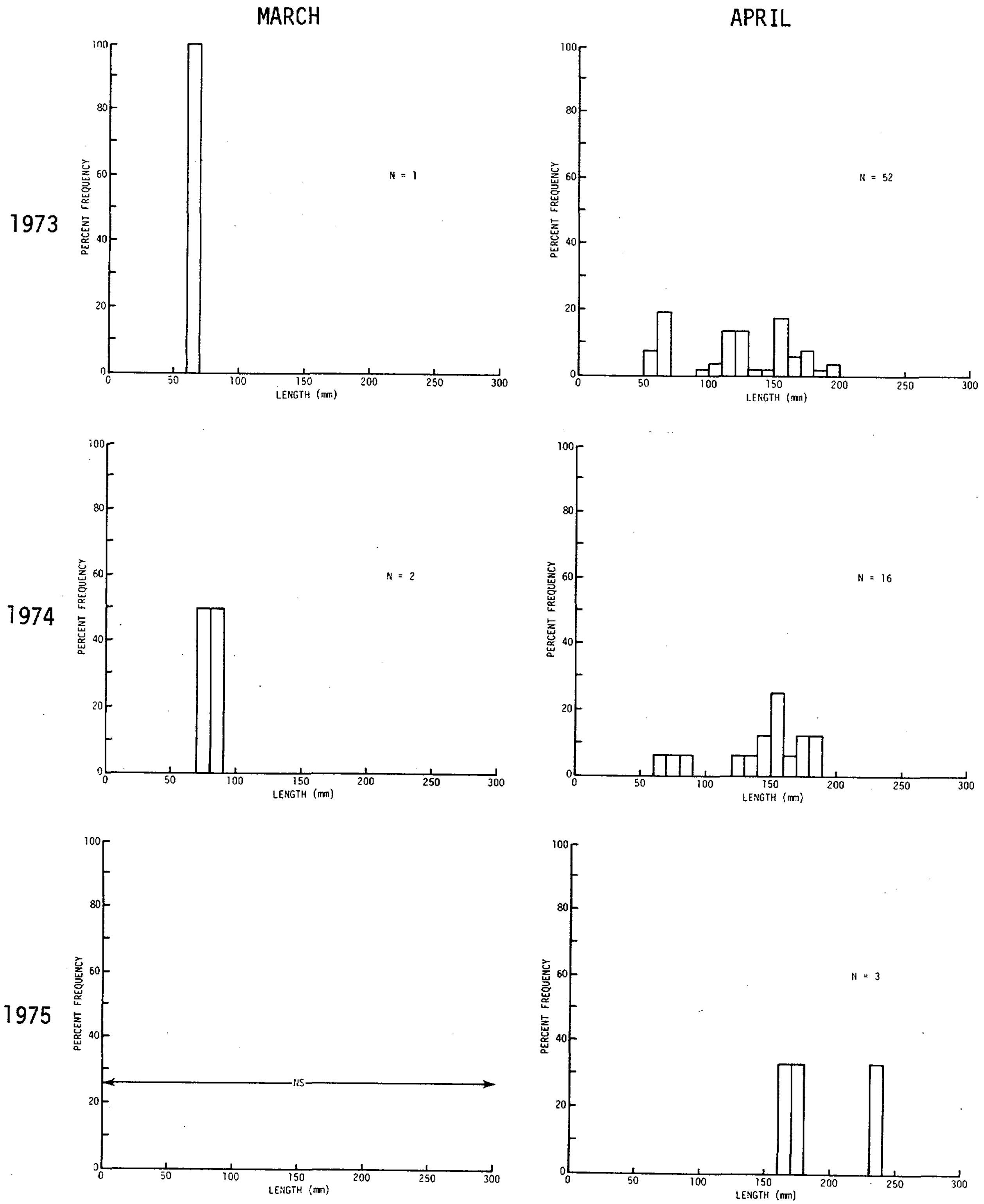


Figure C-7. Length-Frequency Distribution of White Perch Collected in Standard-Station Beach Seines, March-December, 1973-1975

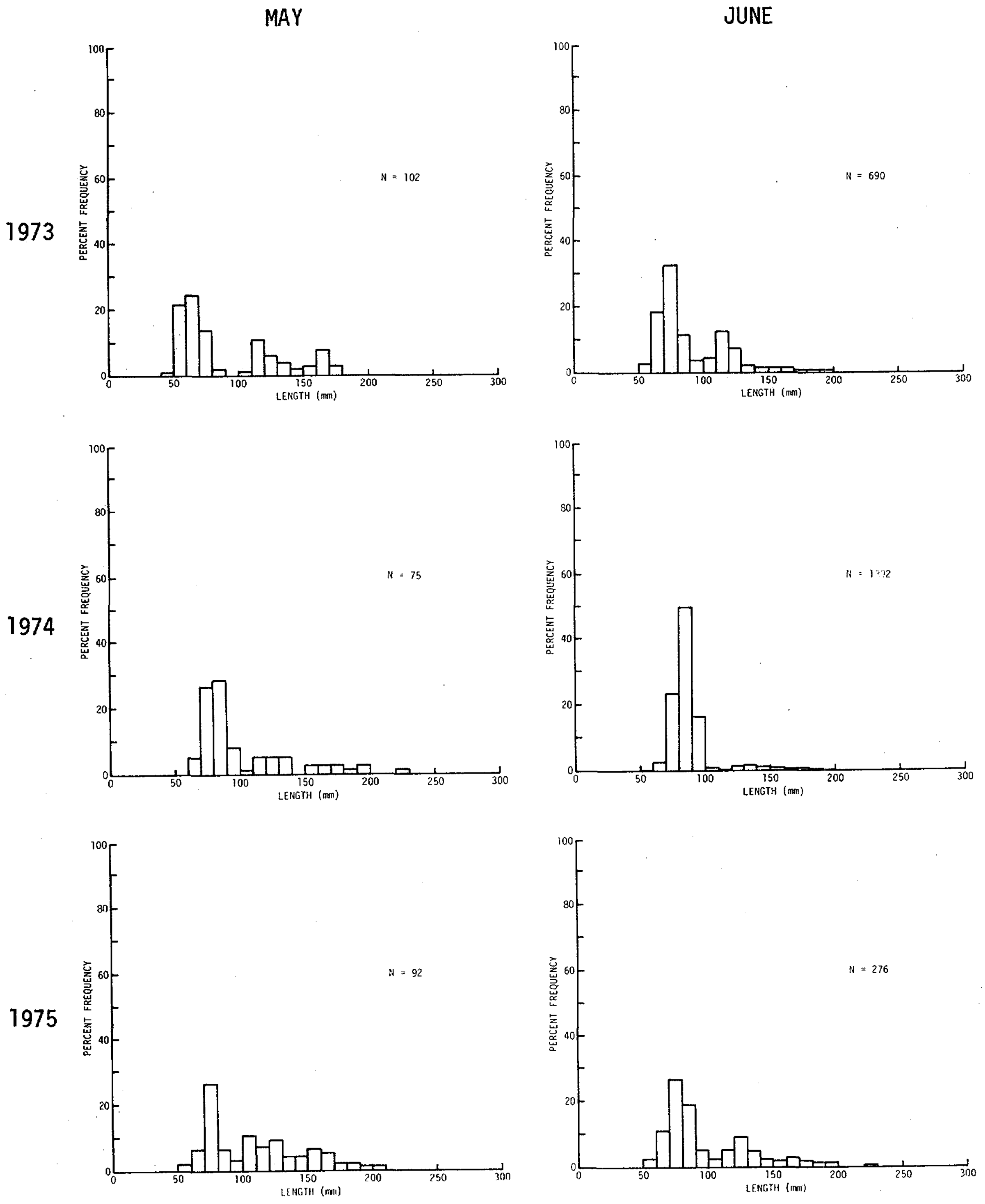


Figure C-7. (Contd)

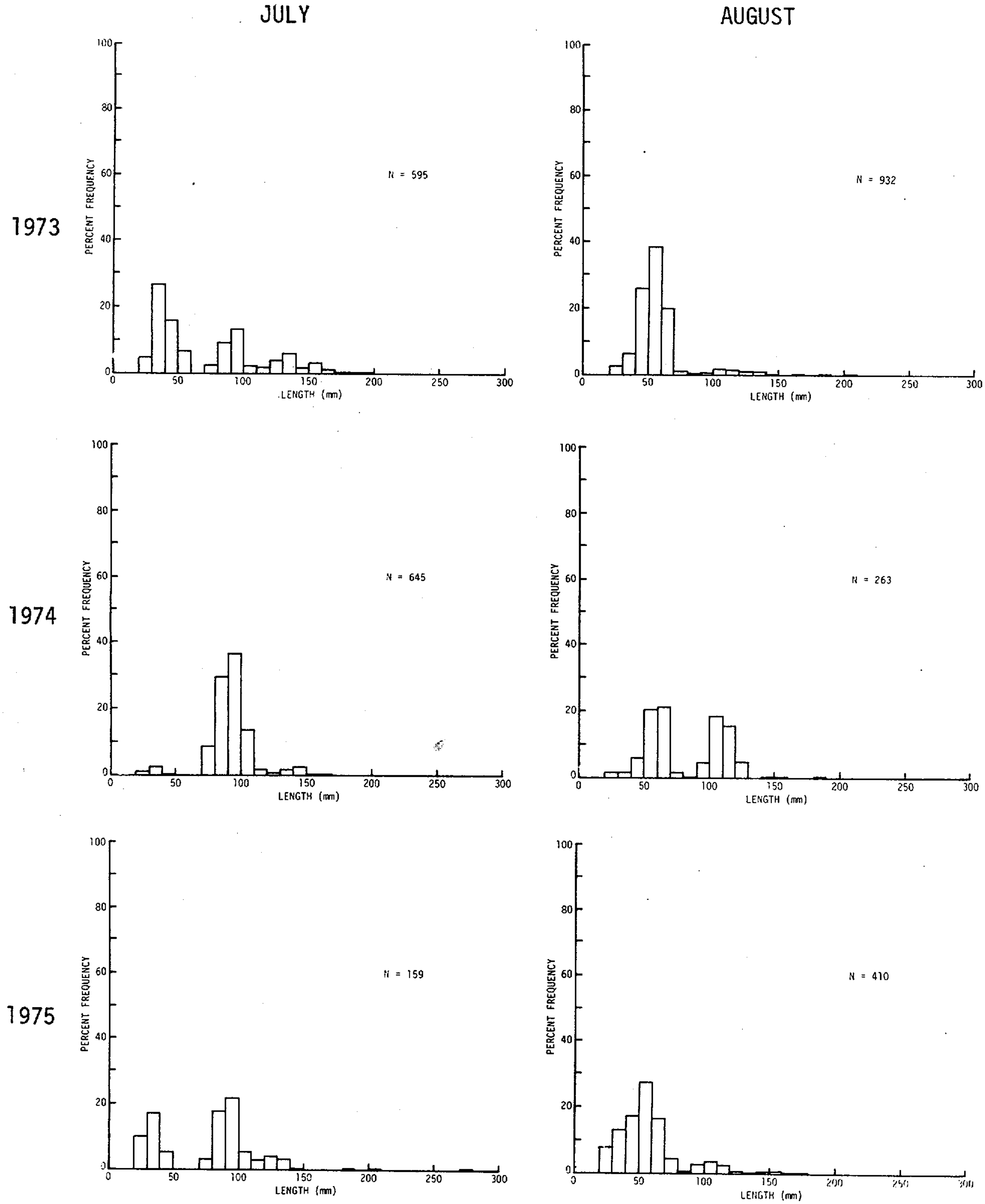


Figure C-7. (Contd)

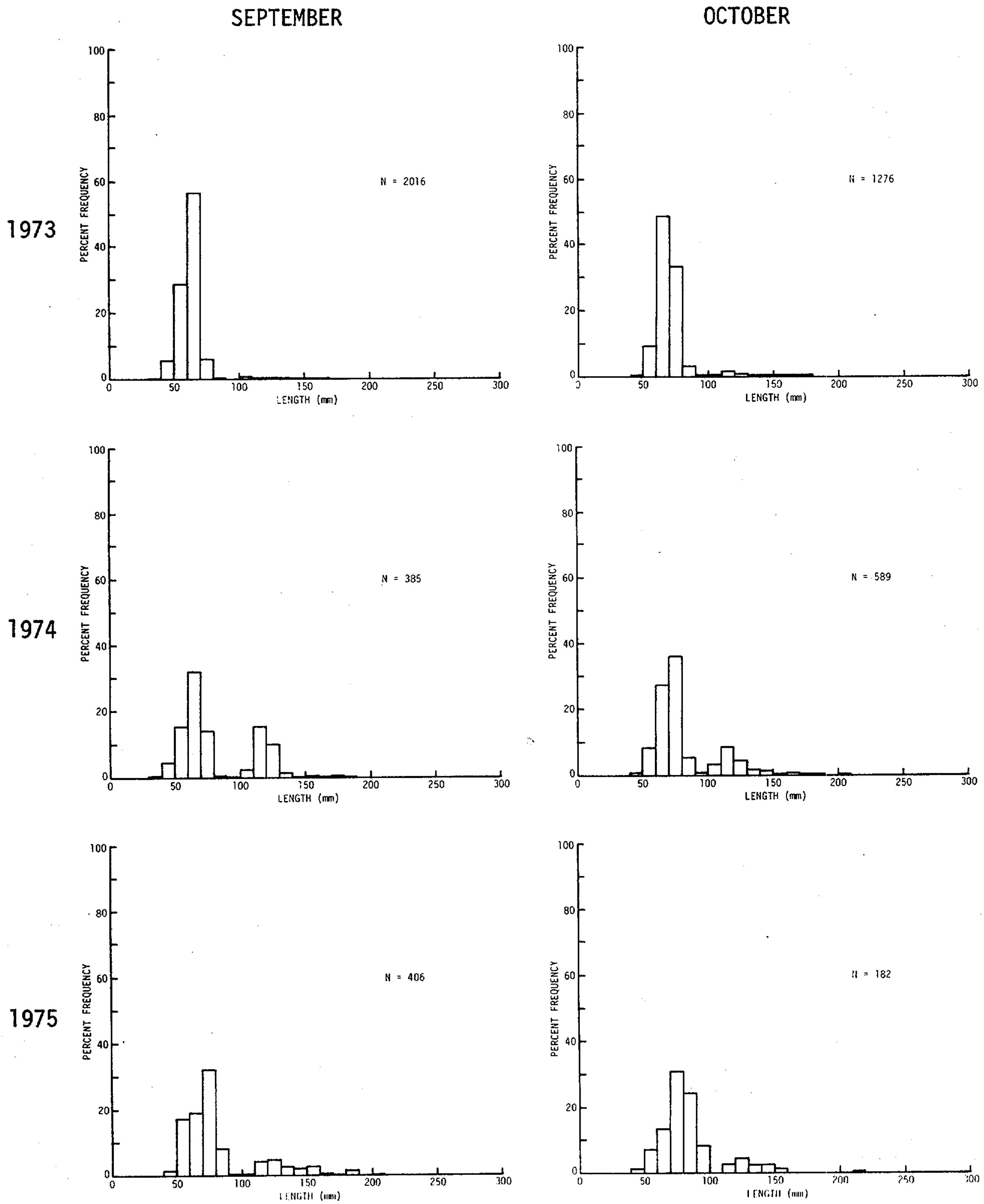
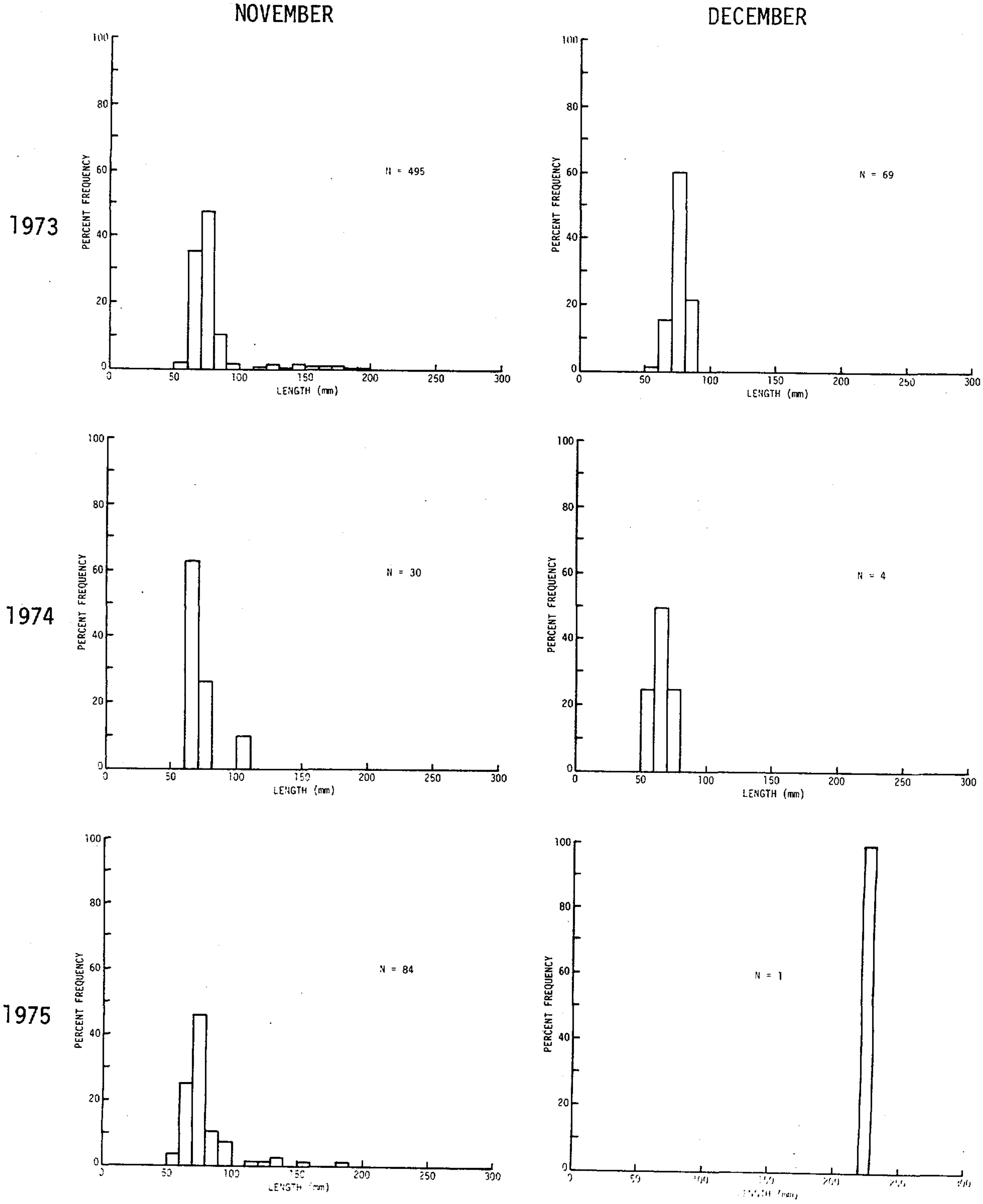


Figure C-7. (Contd)



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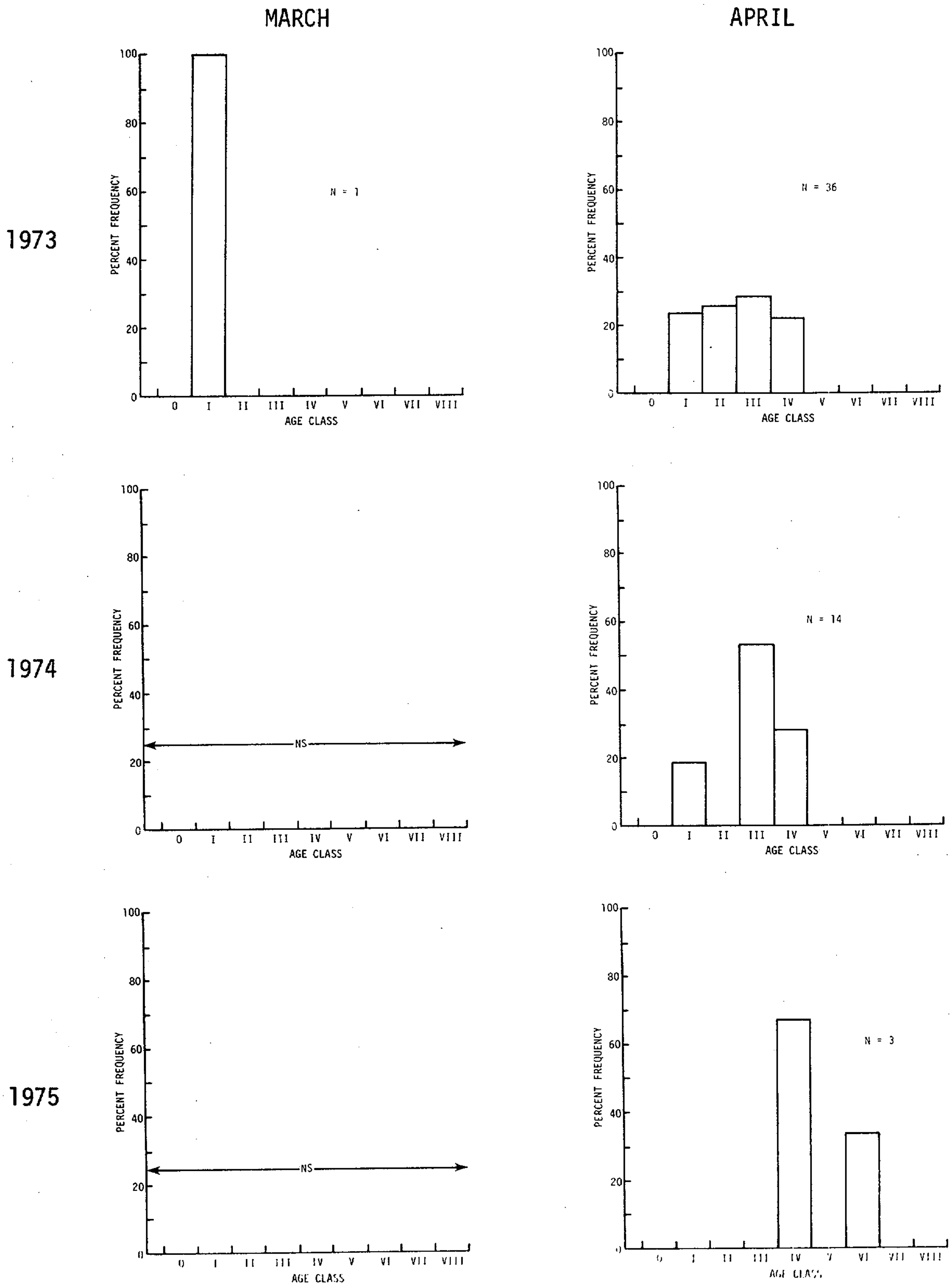
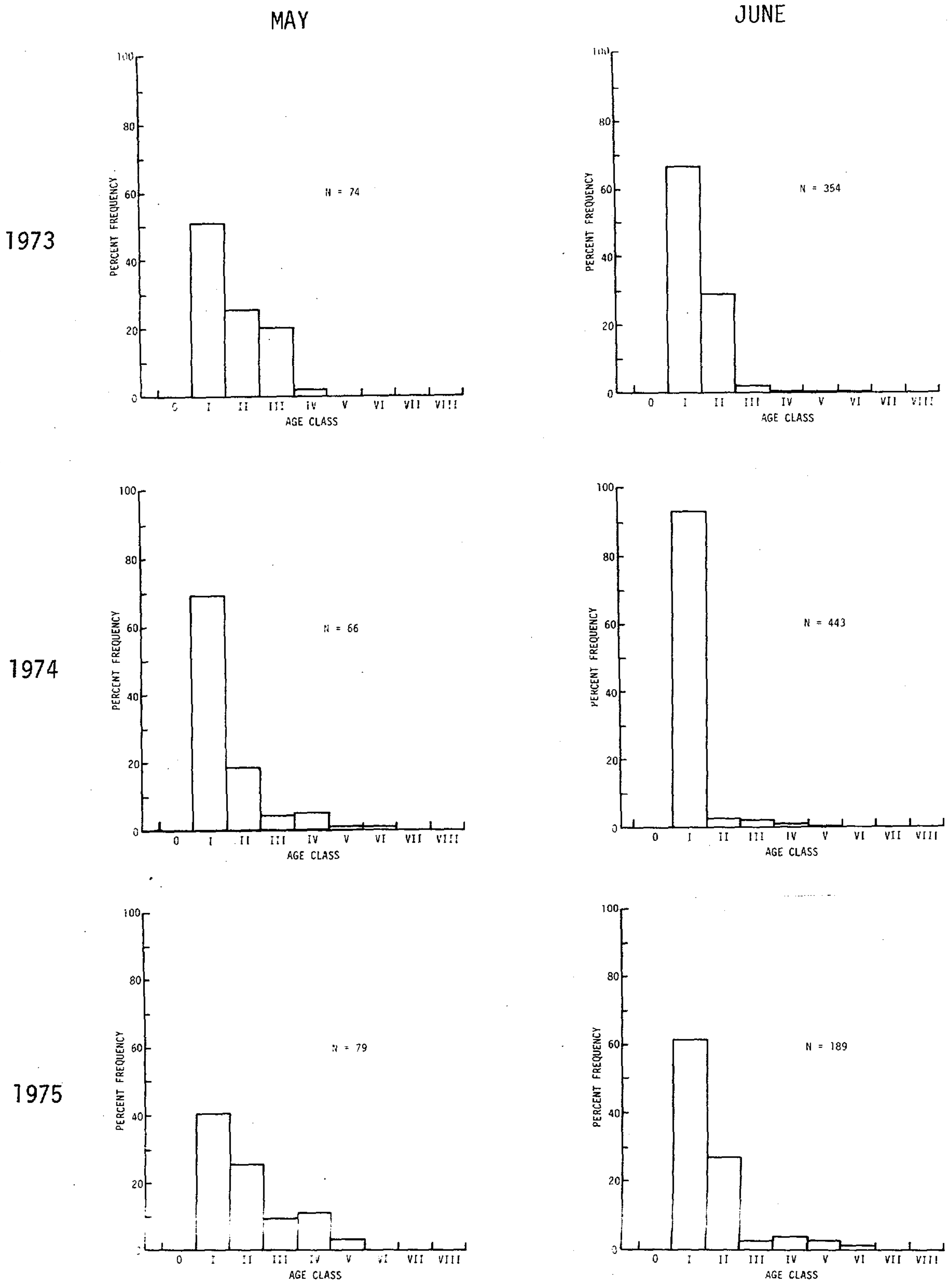


Figure C-8. Age Composition of White Perch Collected in Standard-Station Beach Seines, March-December, 1973-1975



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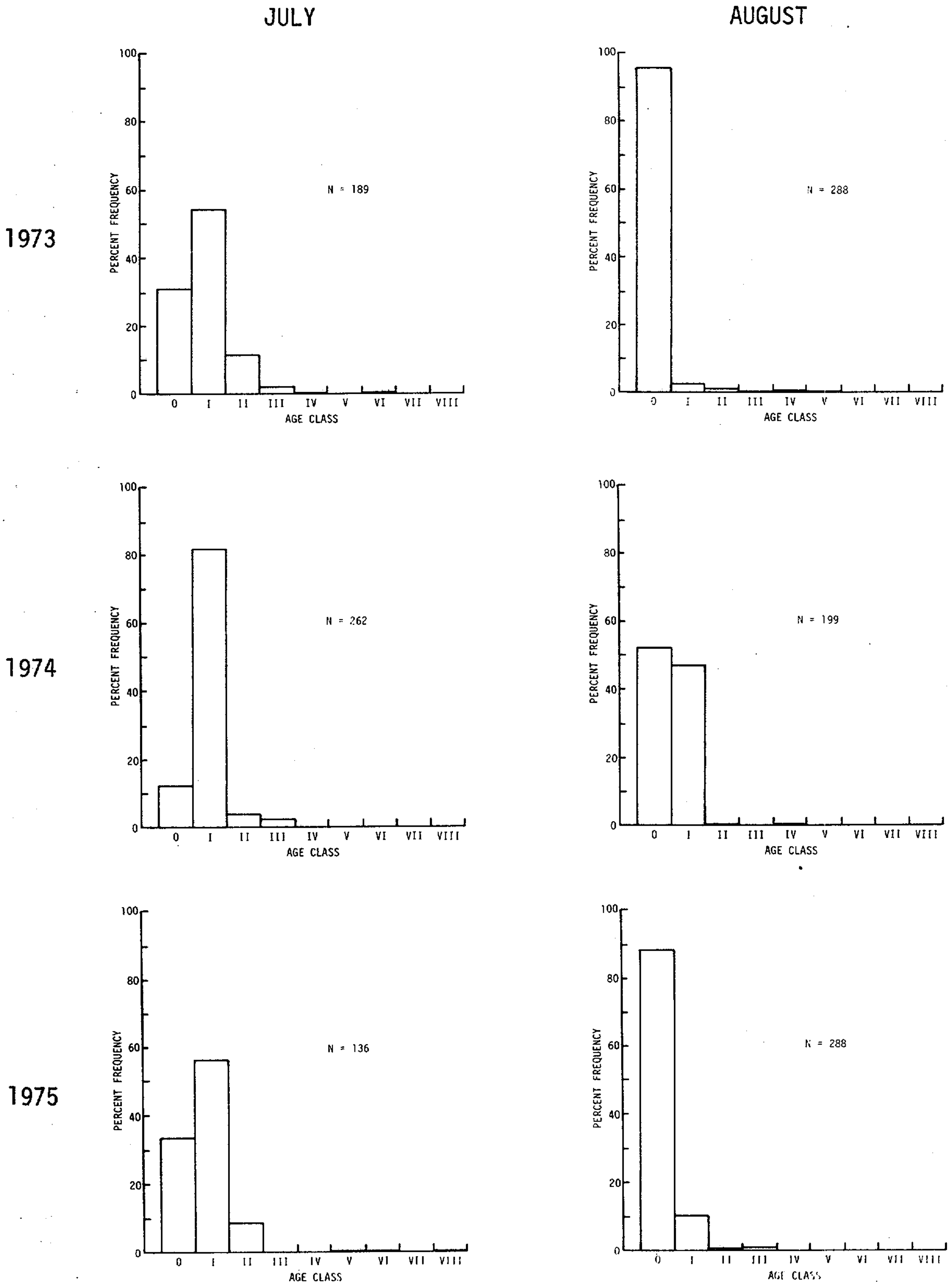

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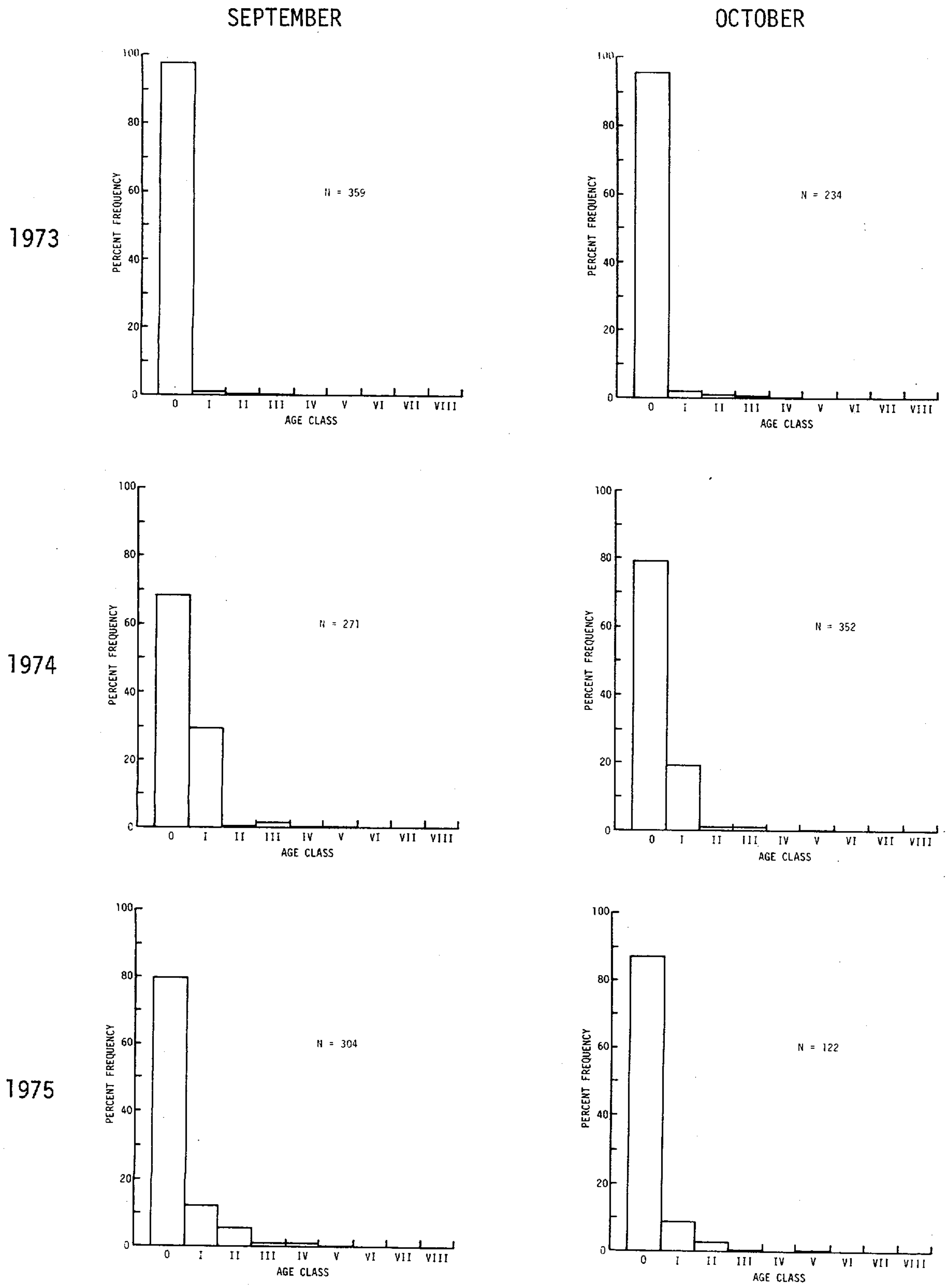

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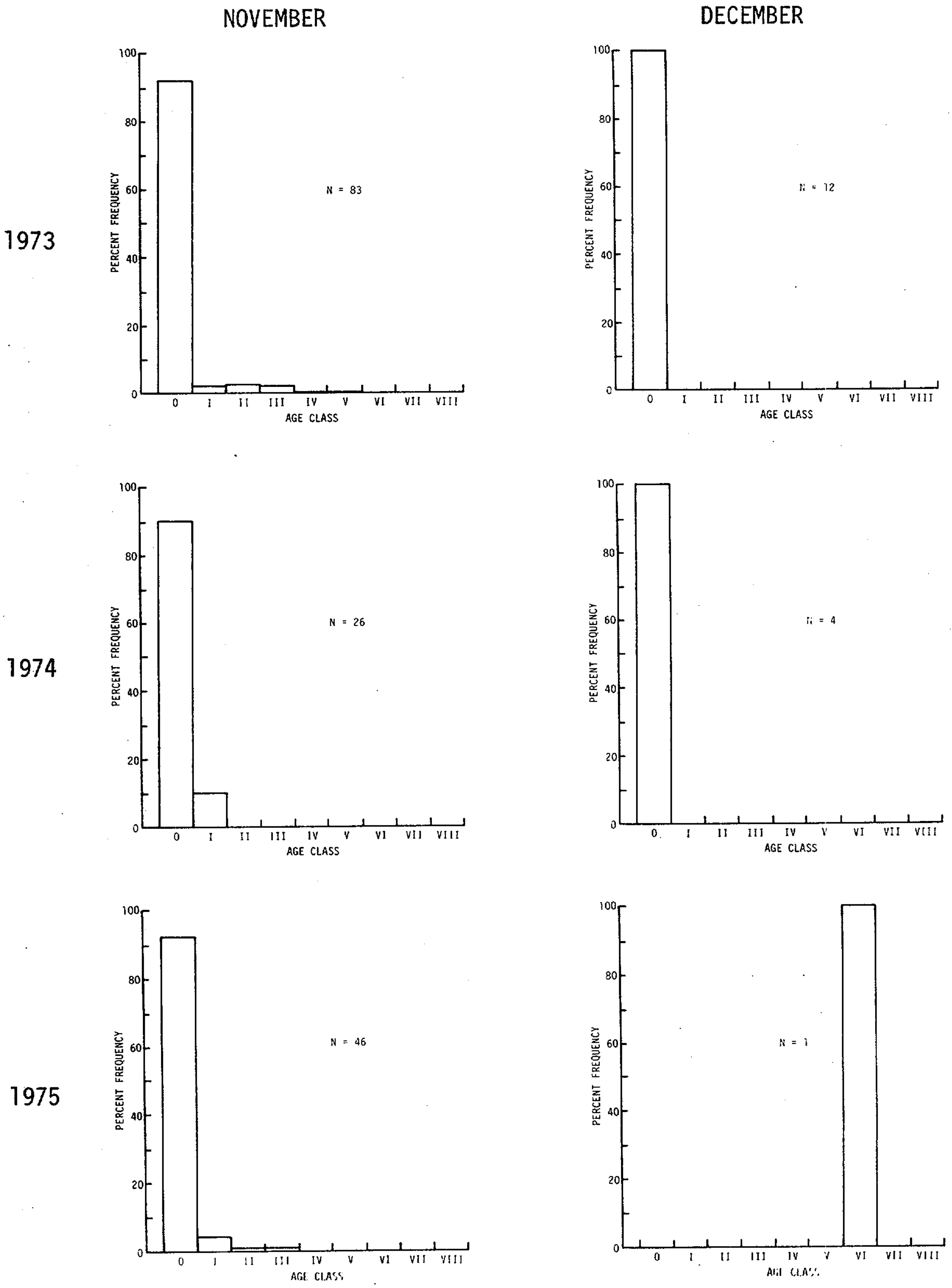

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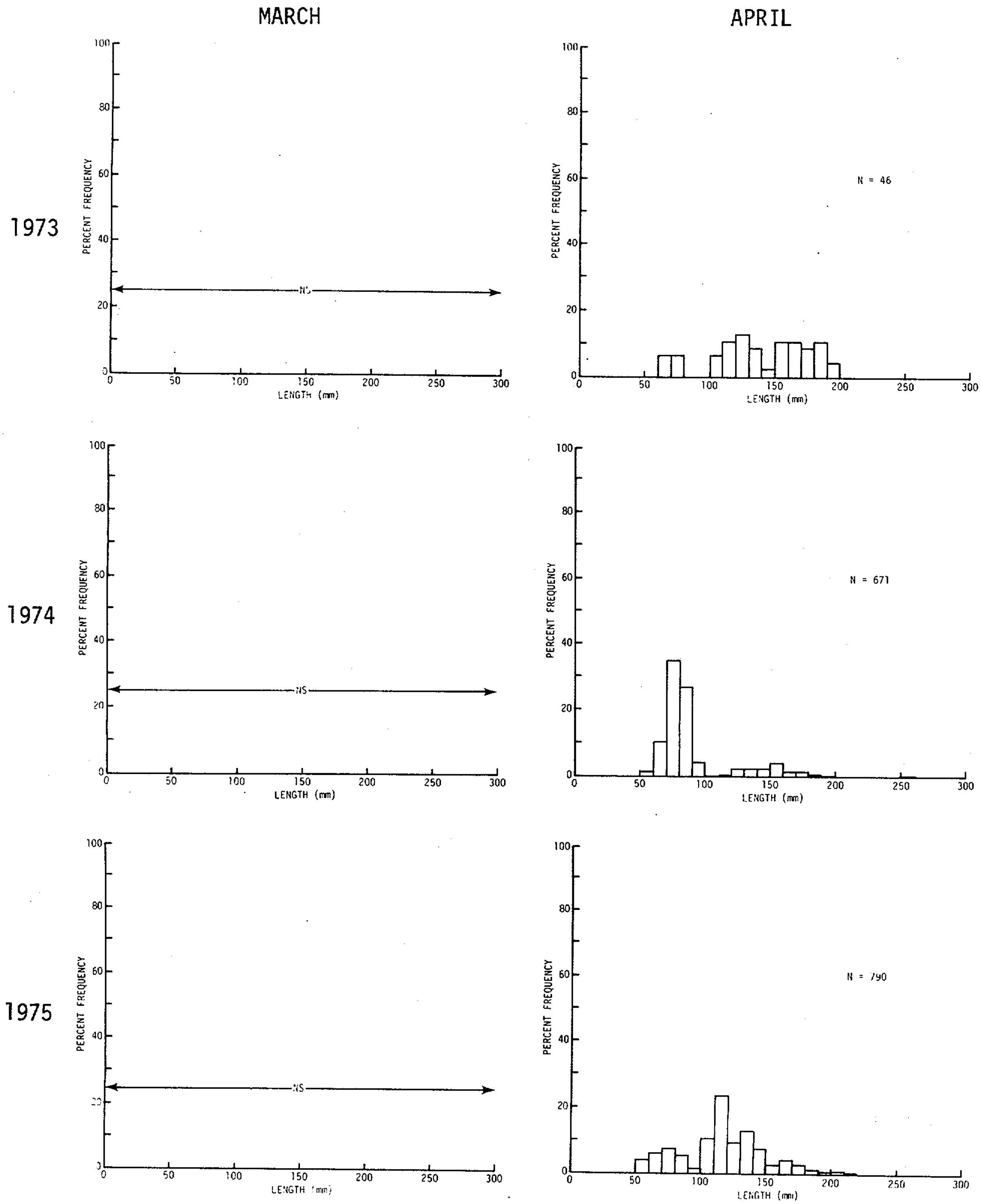
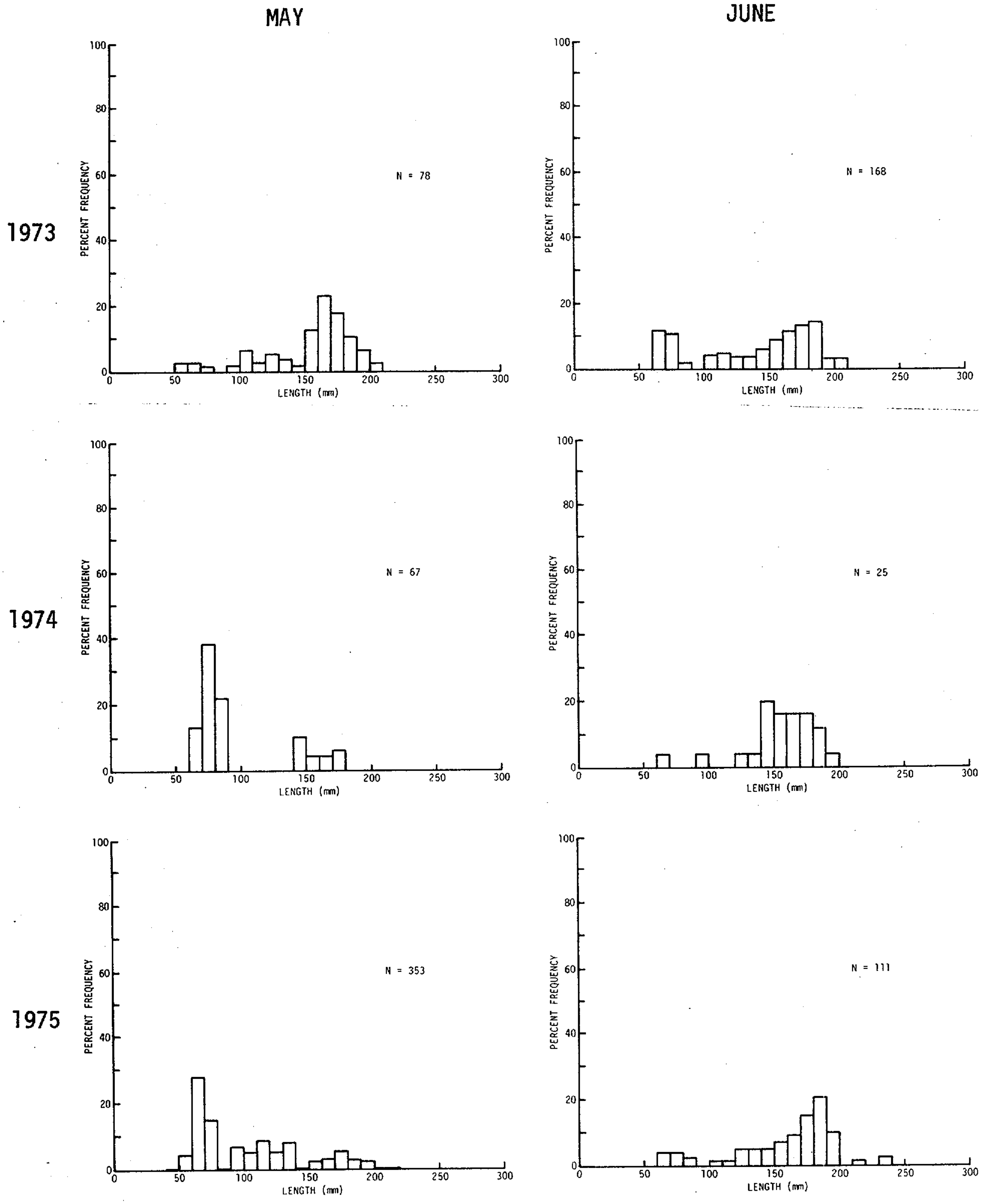


Figure C-9. Length-Frequency Distribution of White Perch Collected in Standard-Station Bottom Trawls, March-December, 1973-1975



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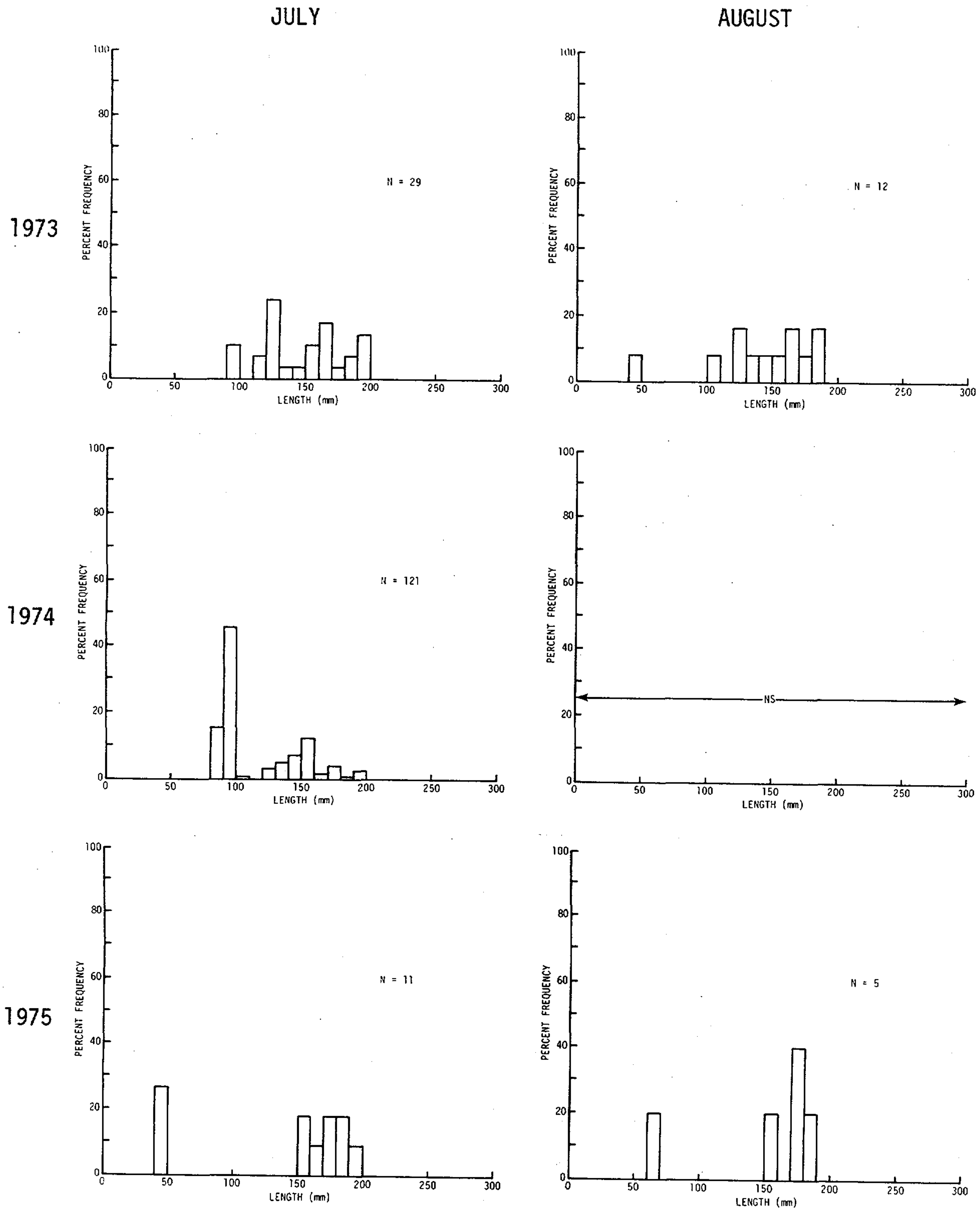

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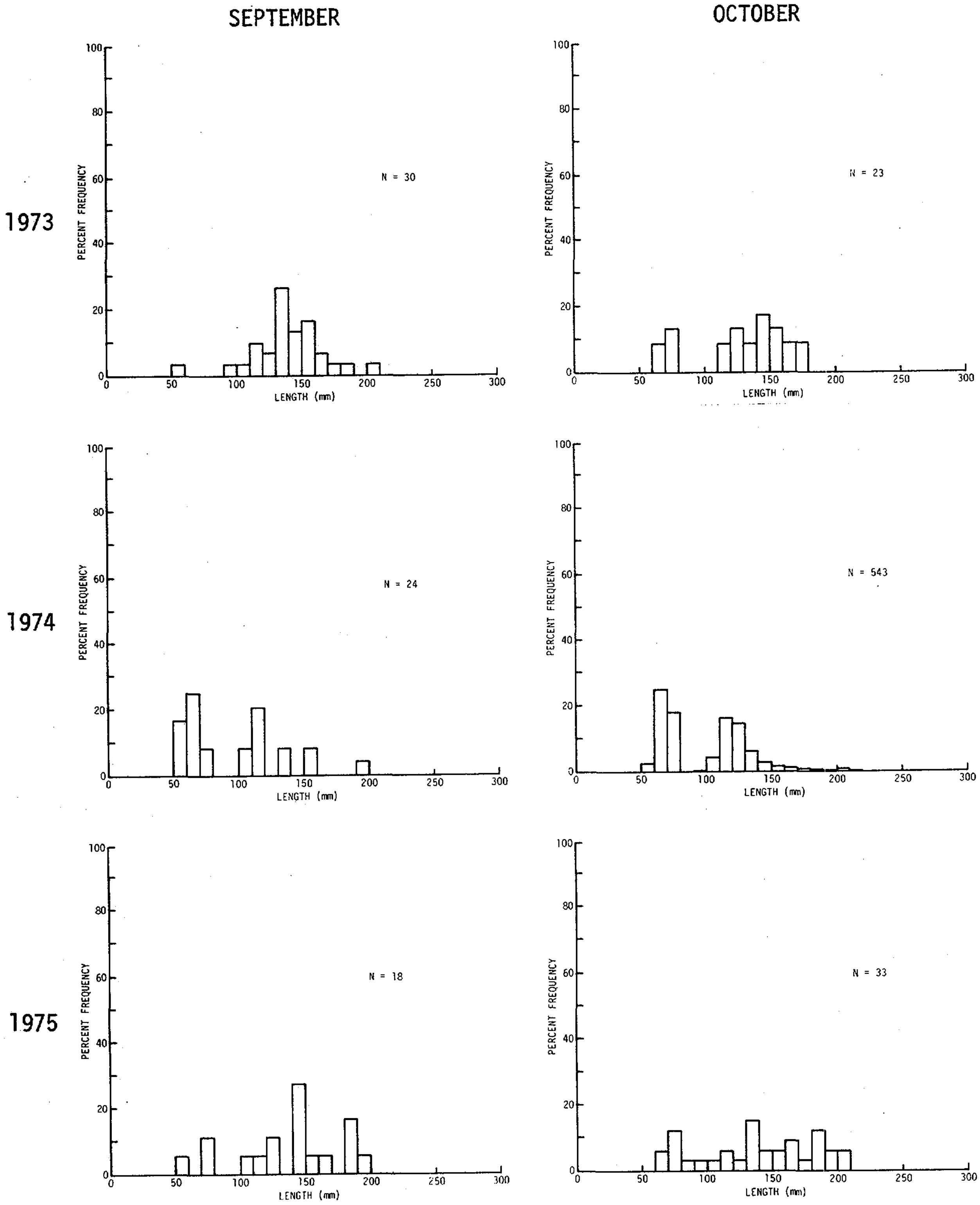
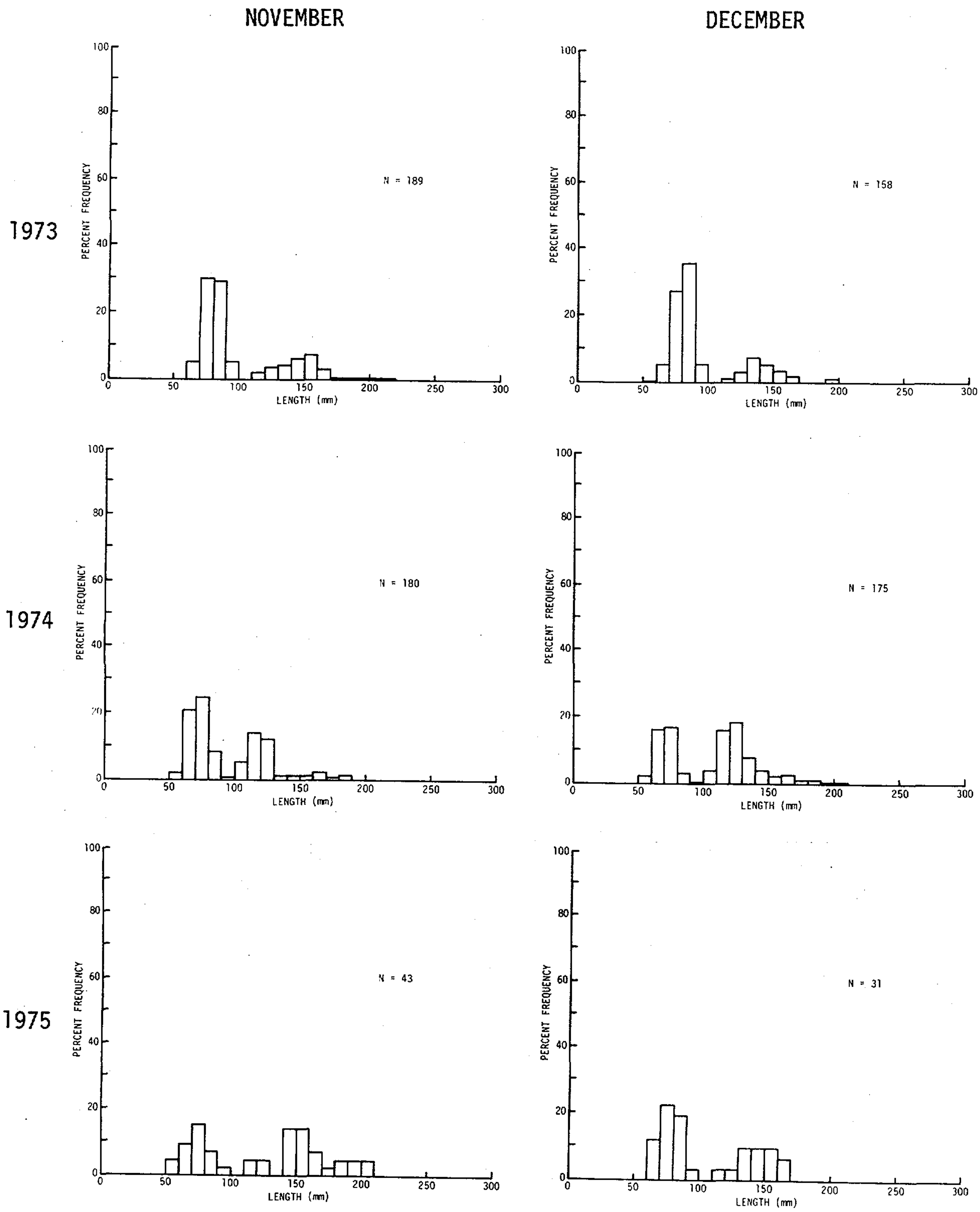


Figure C-9. (Contd)



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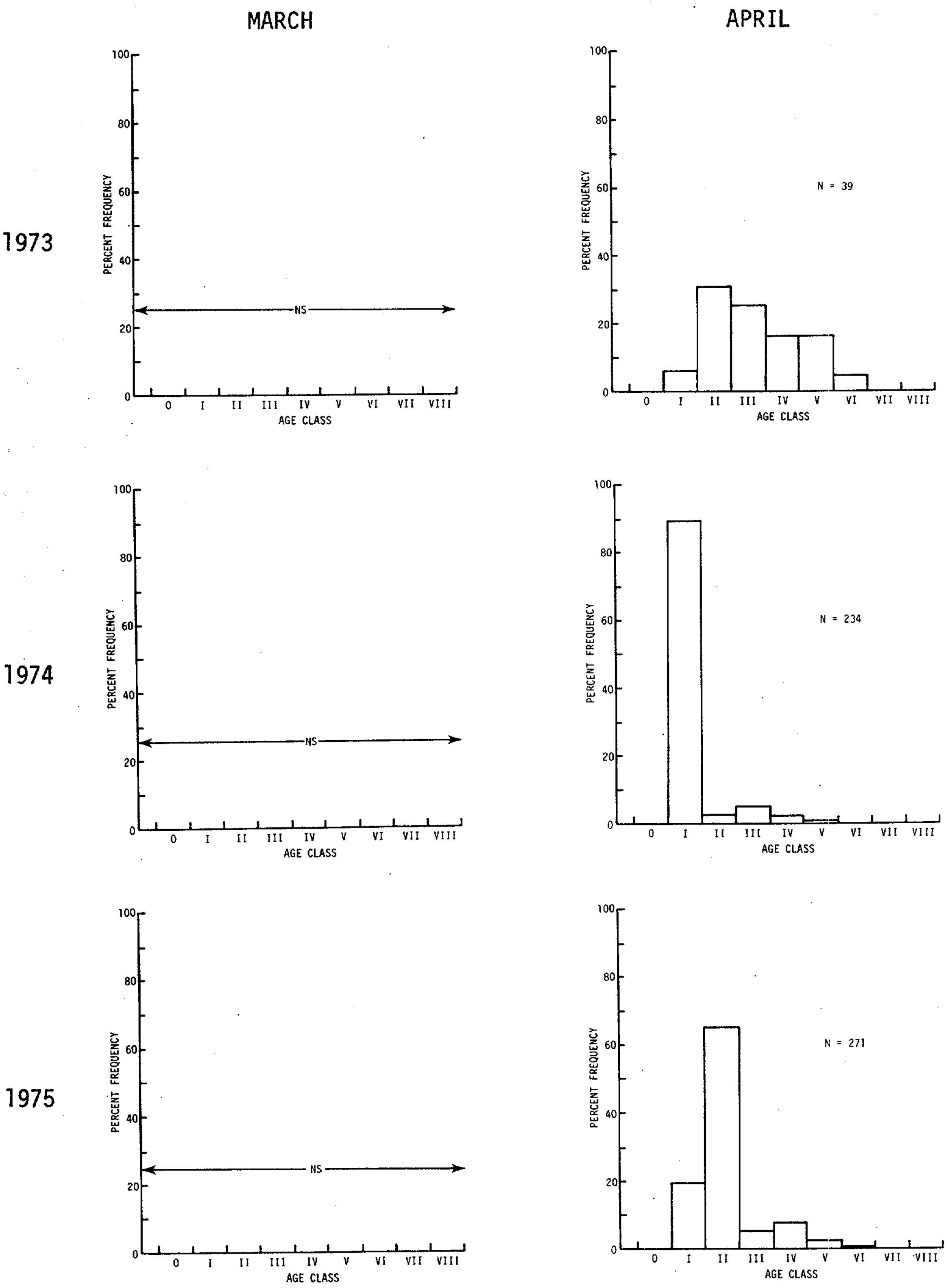
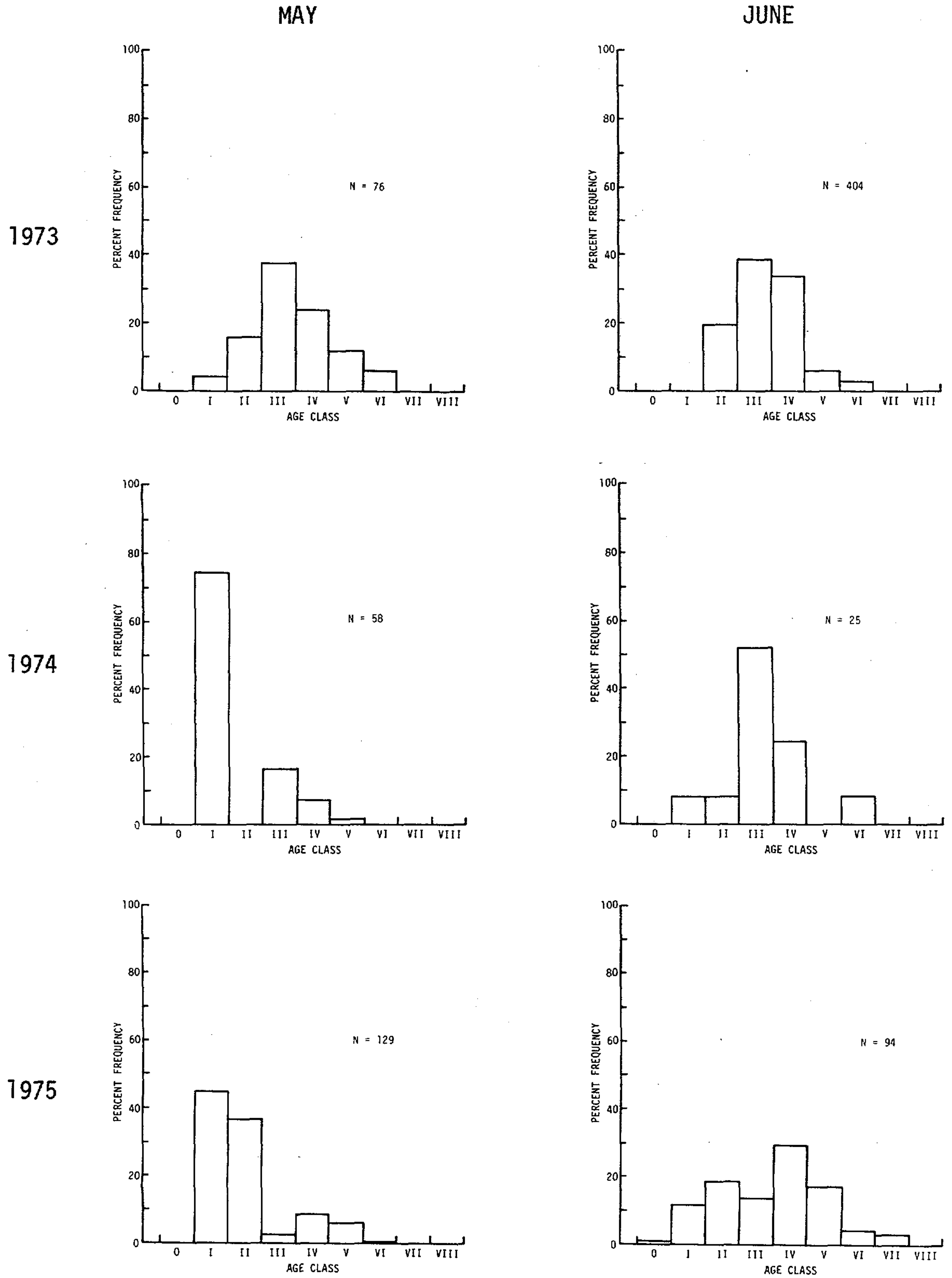


Figure C-10. Age Composition of White Perch Collected in Standard-Station Bottom Trawls, March-December, 1973-1975



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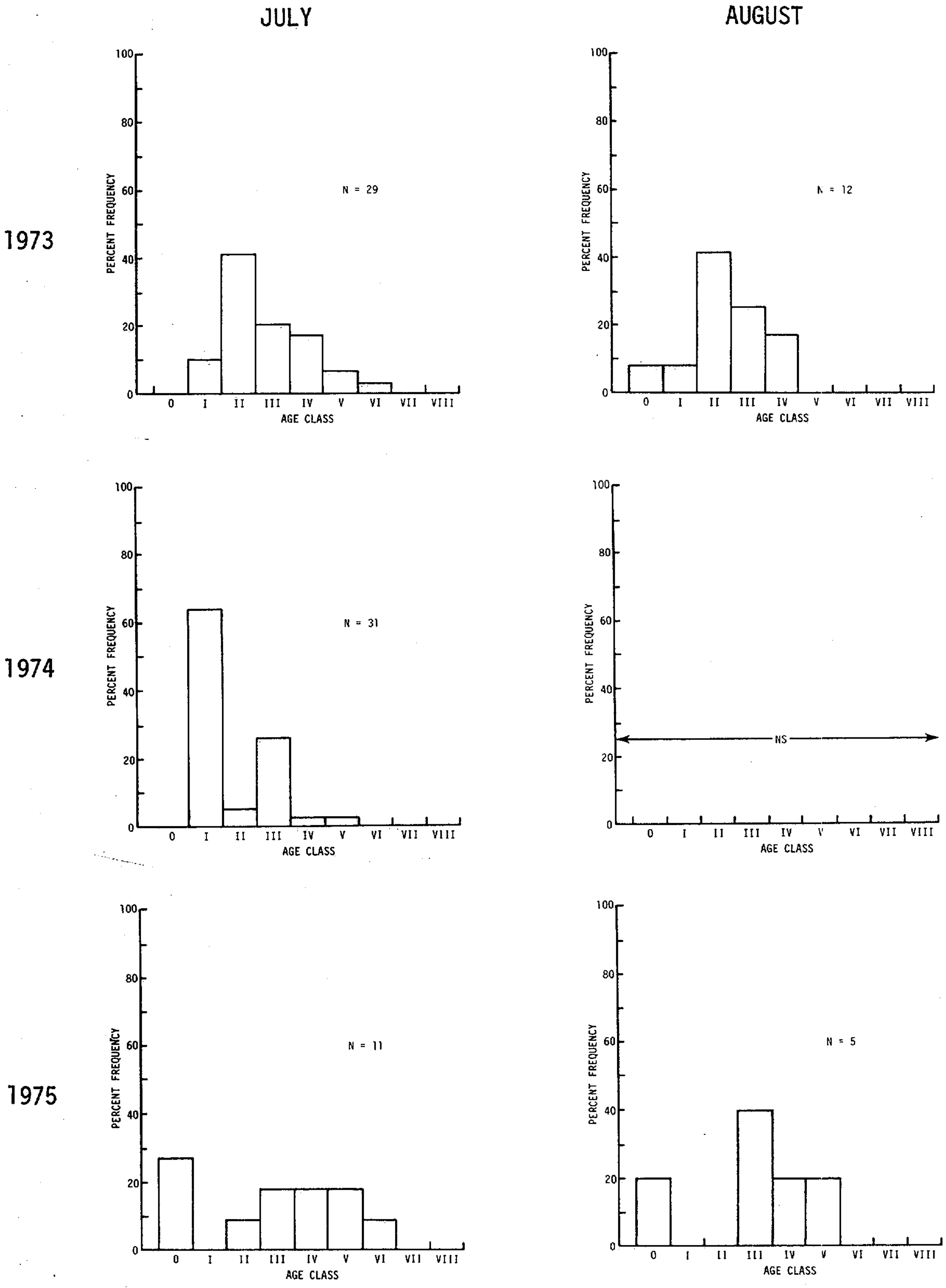

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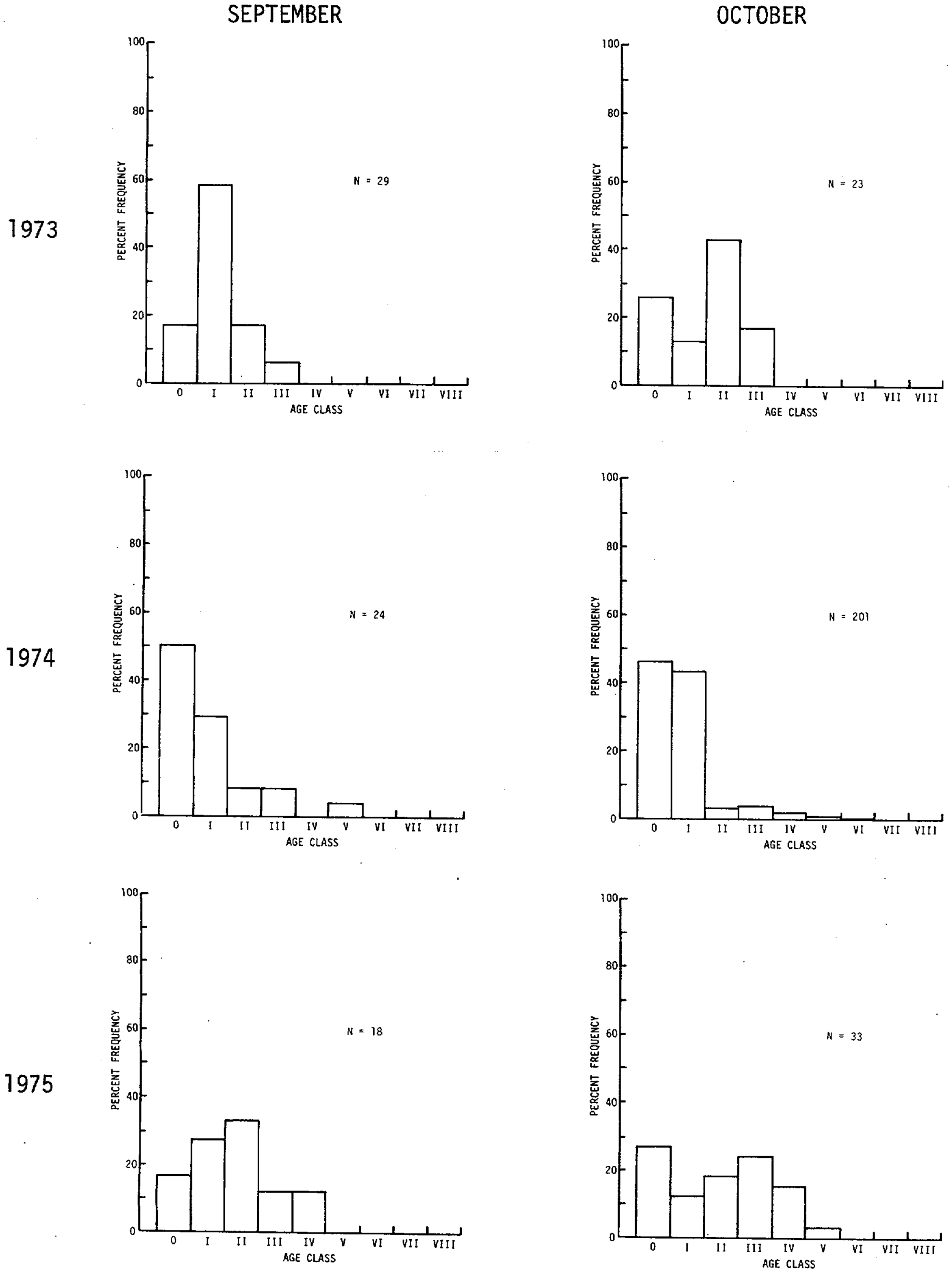

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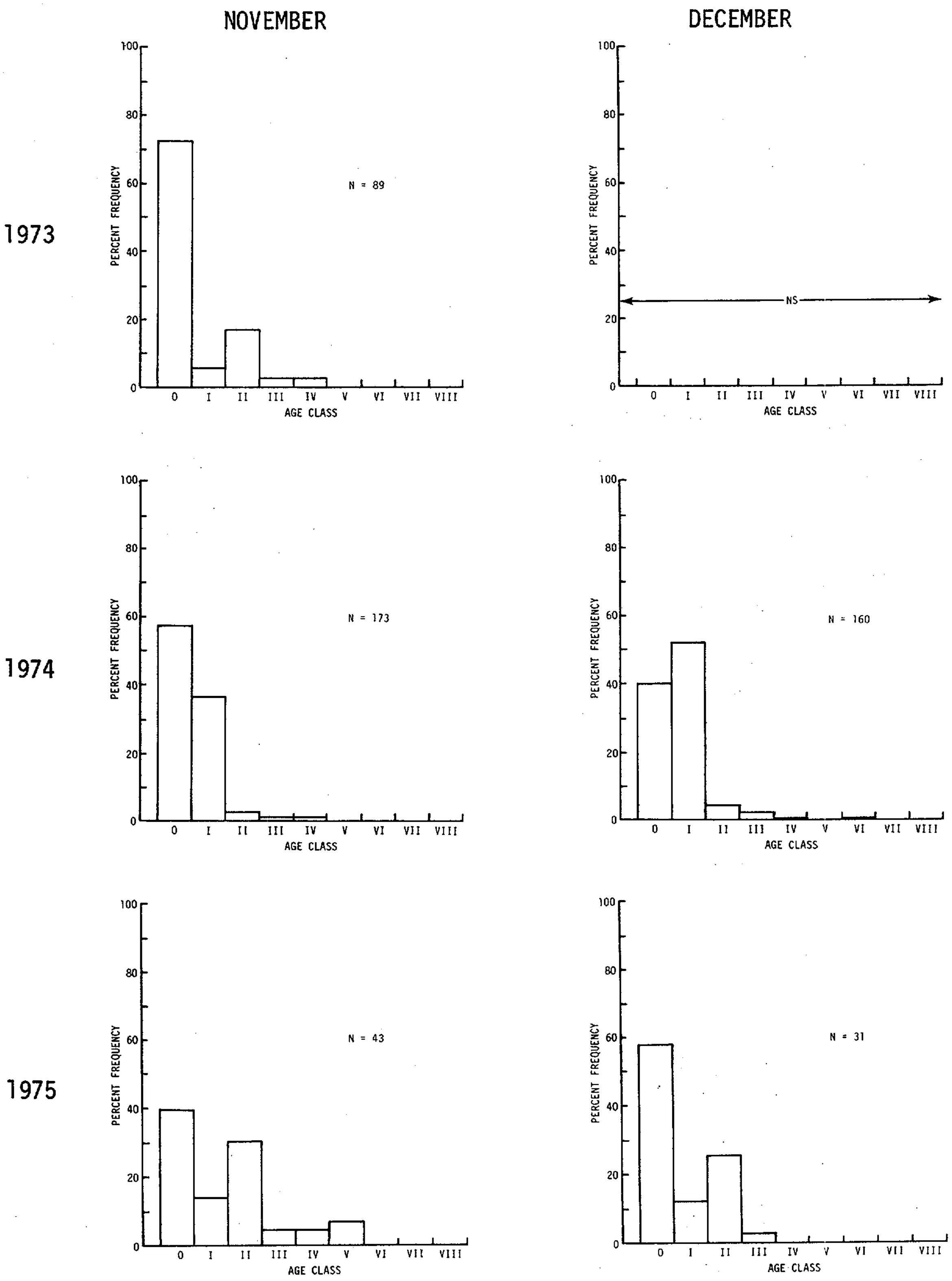

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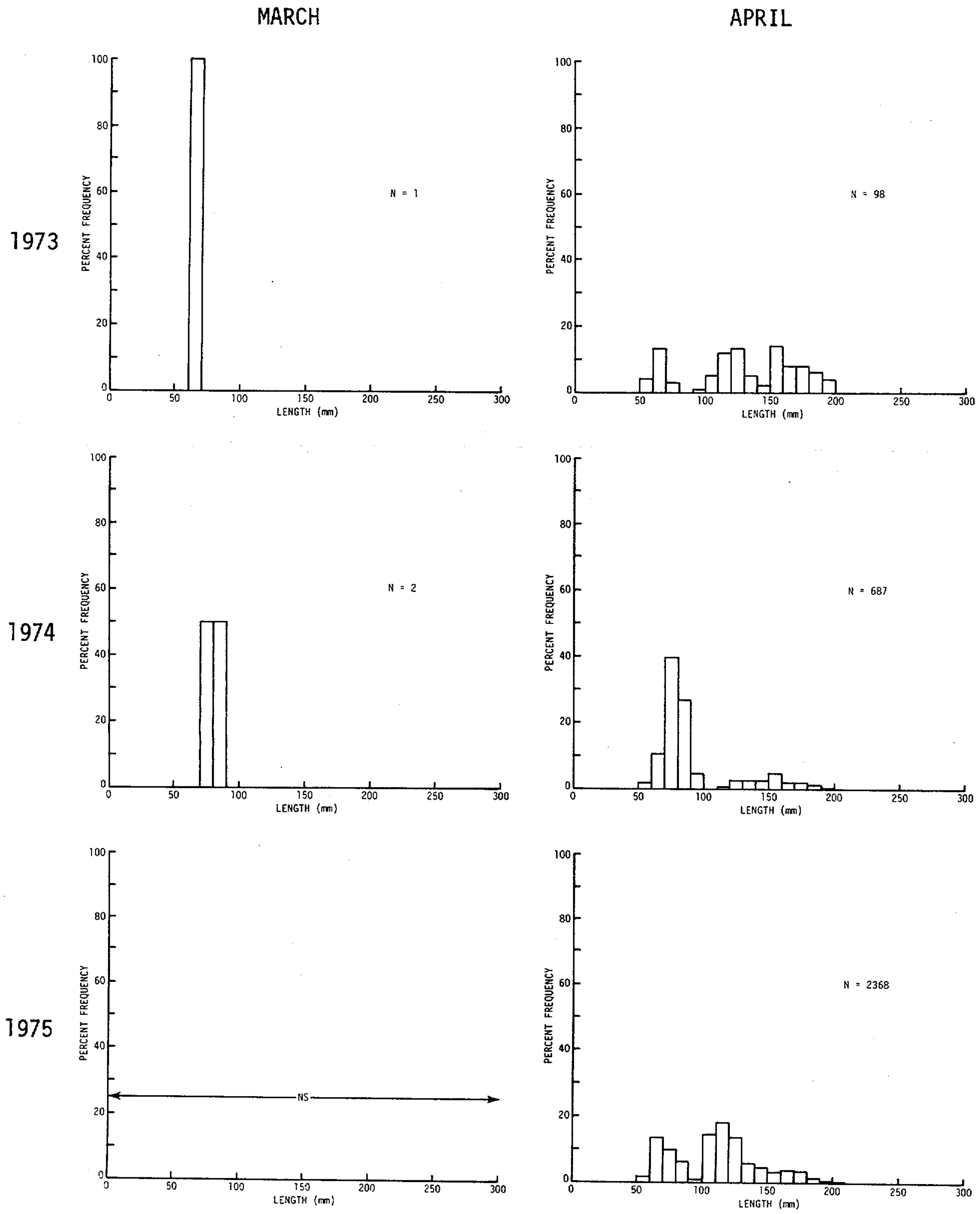
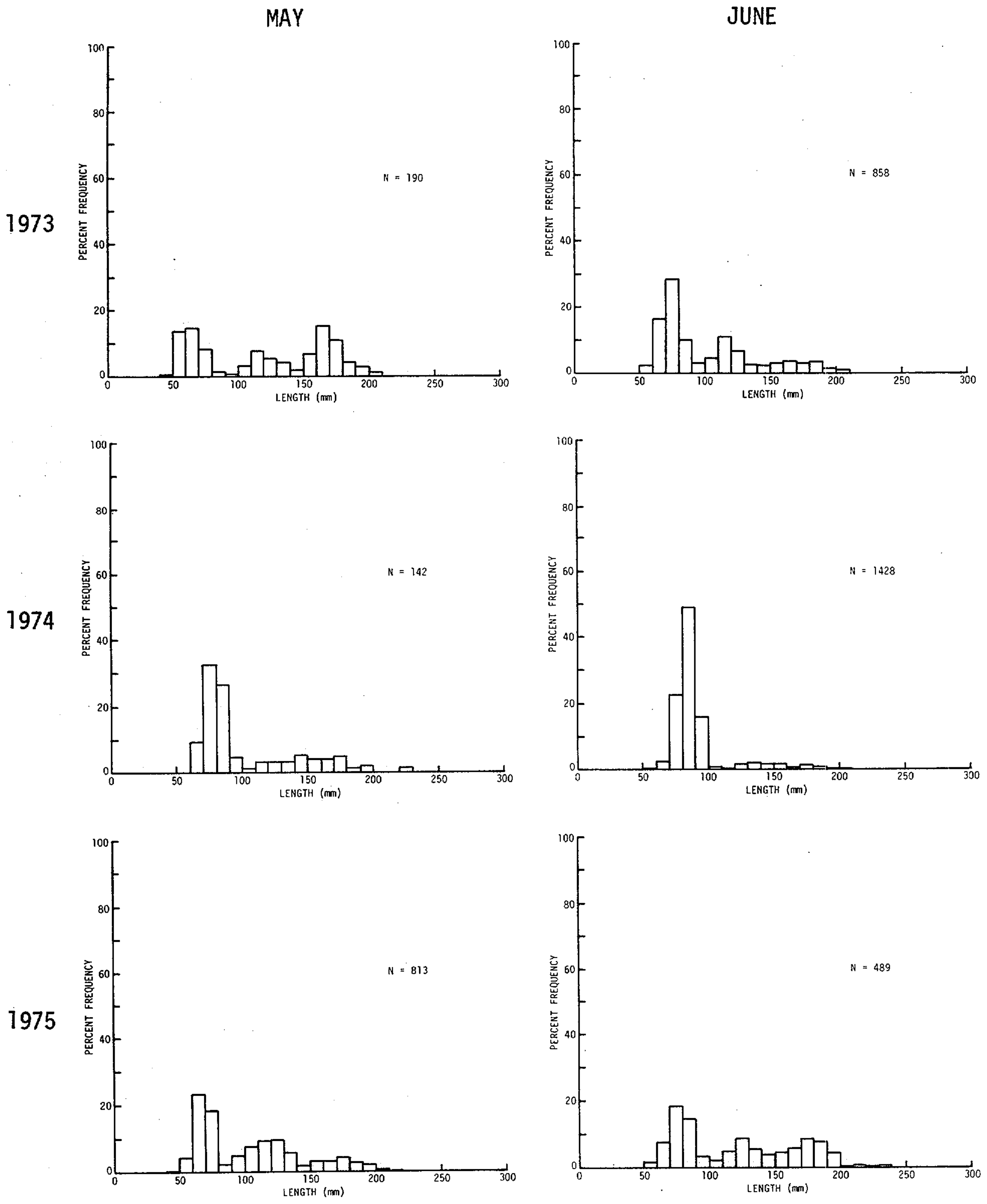


Figure C-11. Length-Frequency Distribution of White Perch Collected in Standard-Station Beach Seines and Bottom Trawls, March-December, 1973-1975



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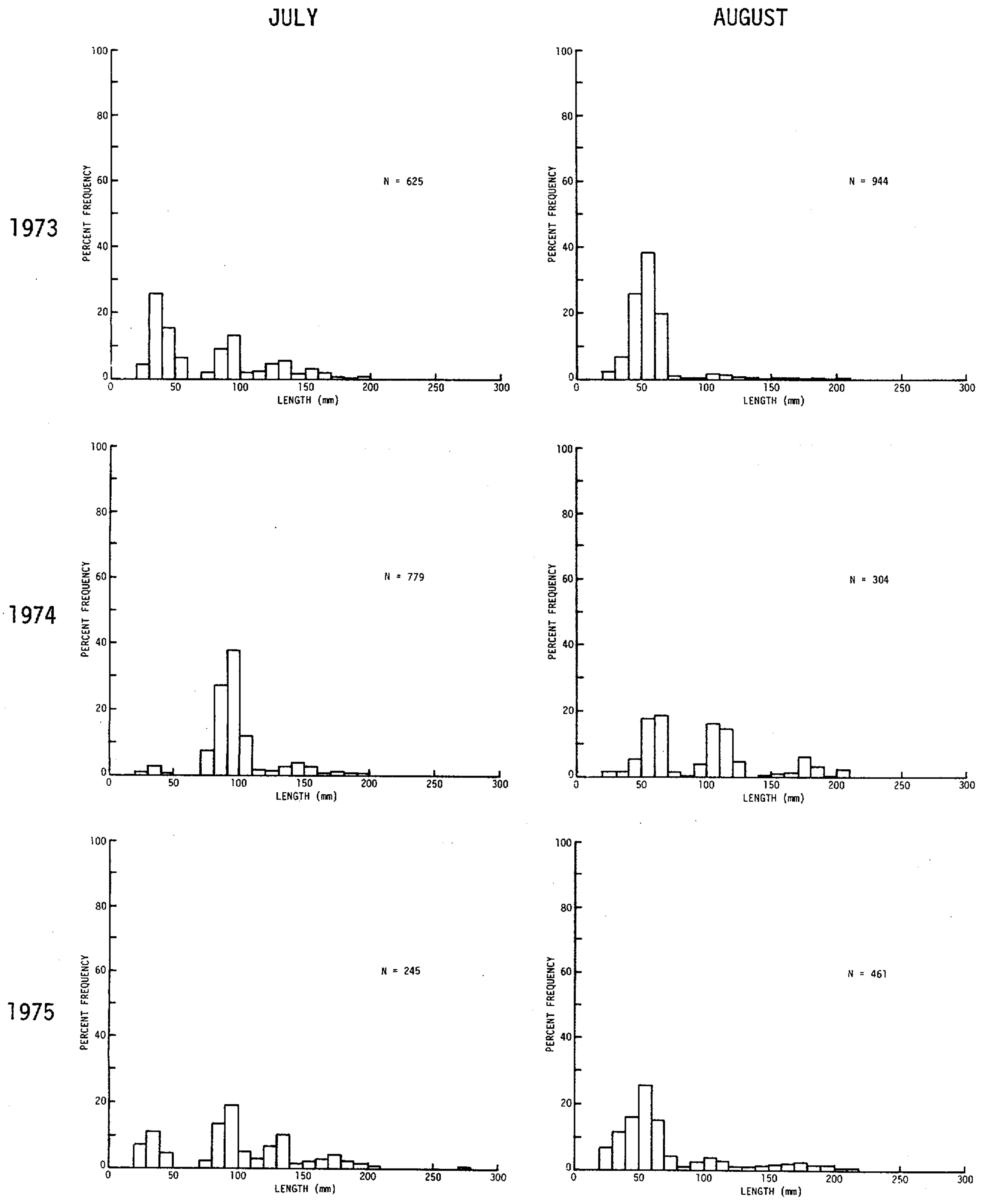

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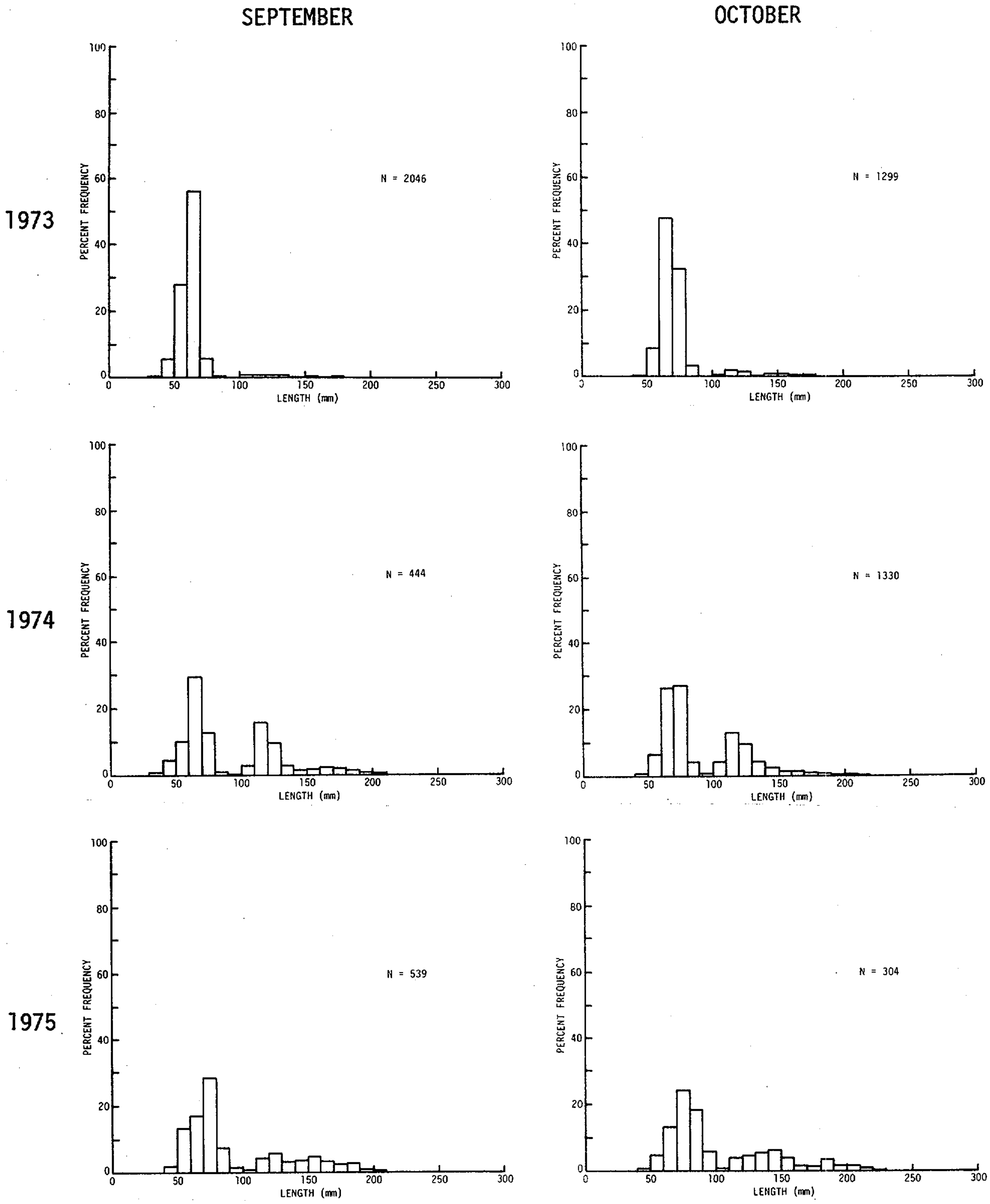

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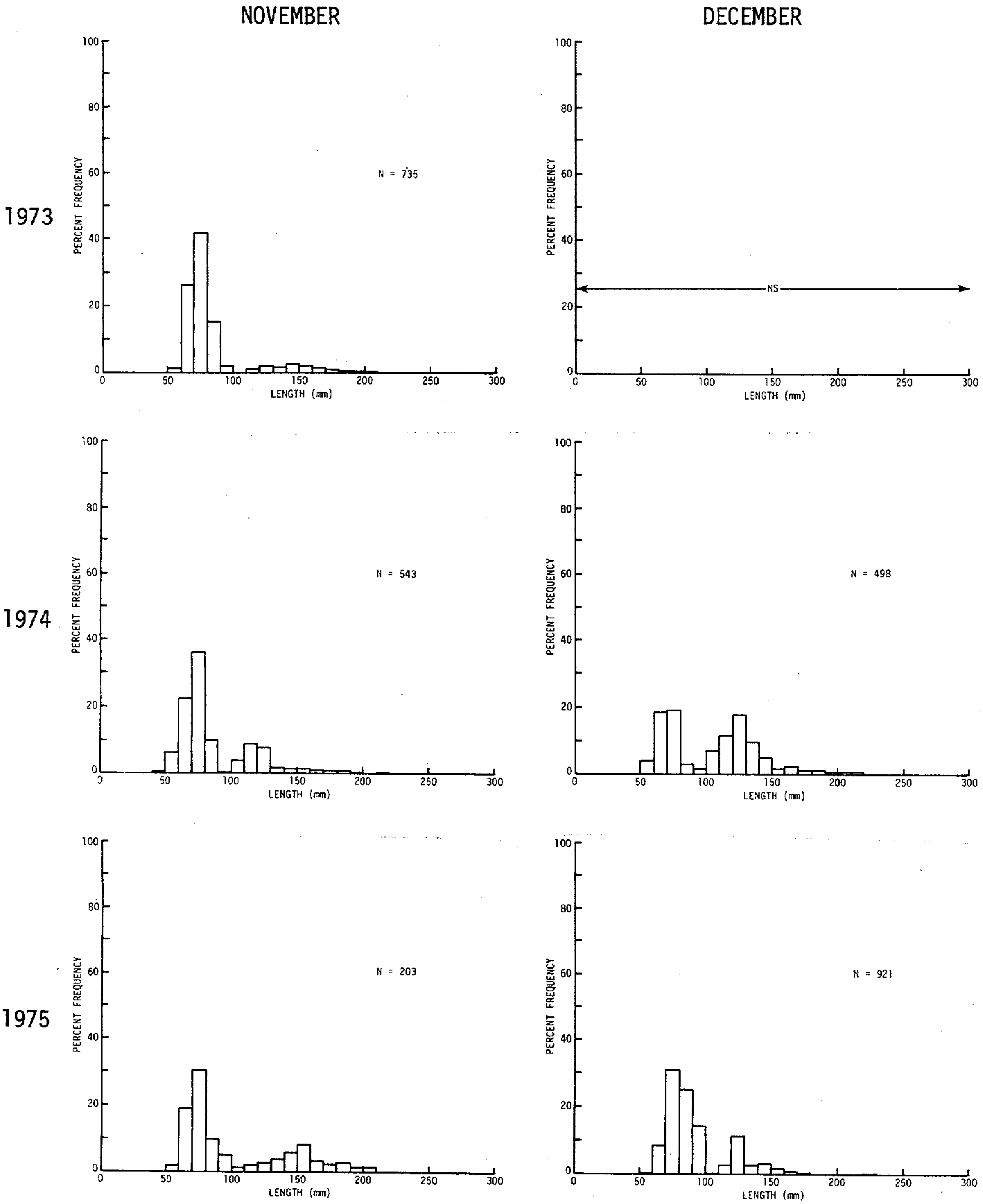

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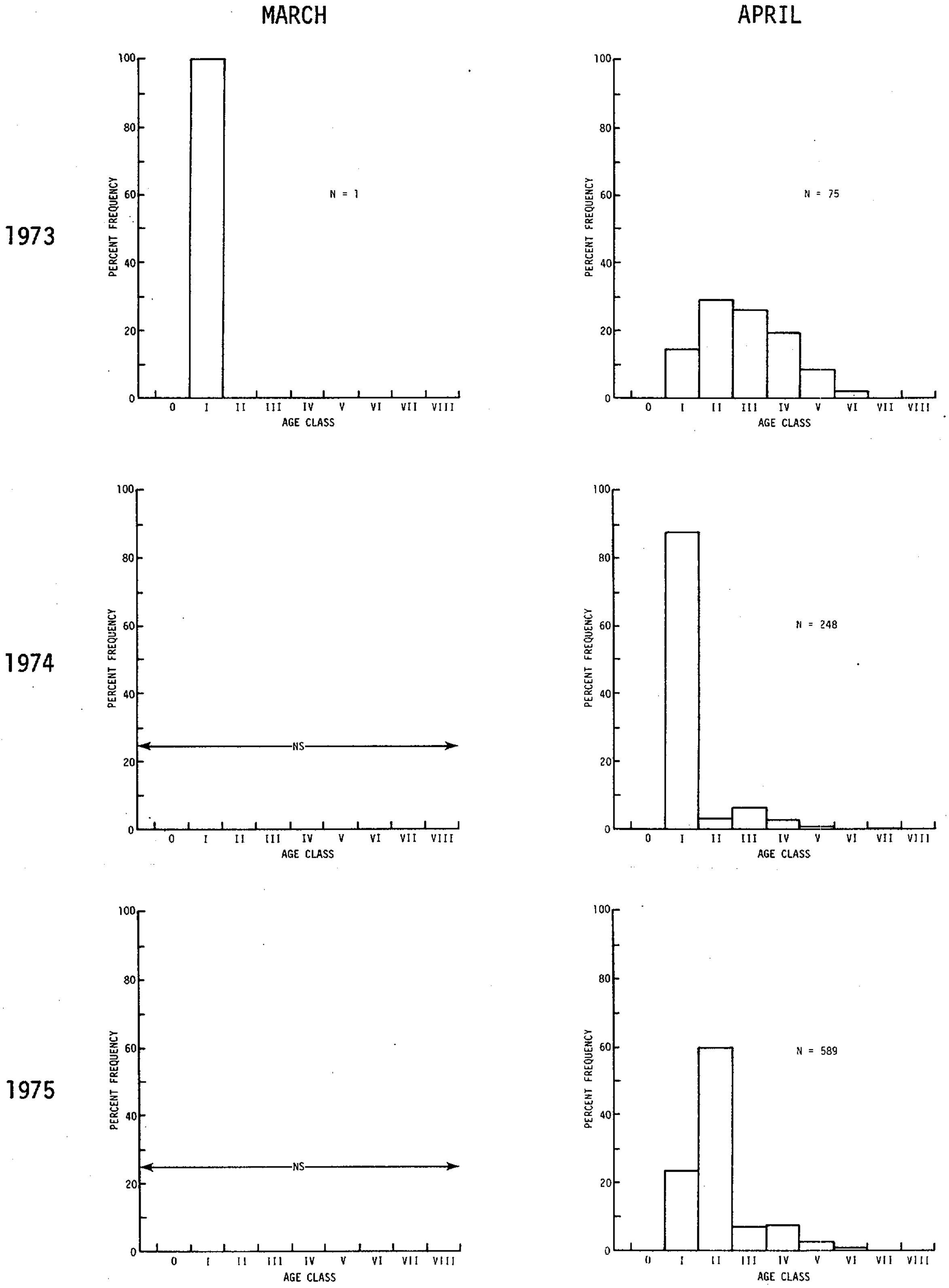

Figure C-12. Age Composition of White Perch Collected in Standard-Station Beach Seines and Bottom Trawls, March-December, 1973-1975

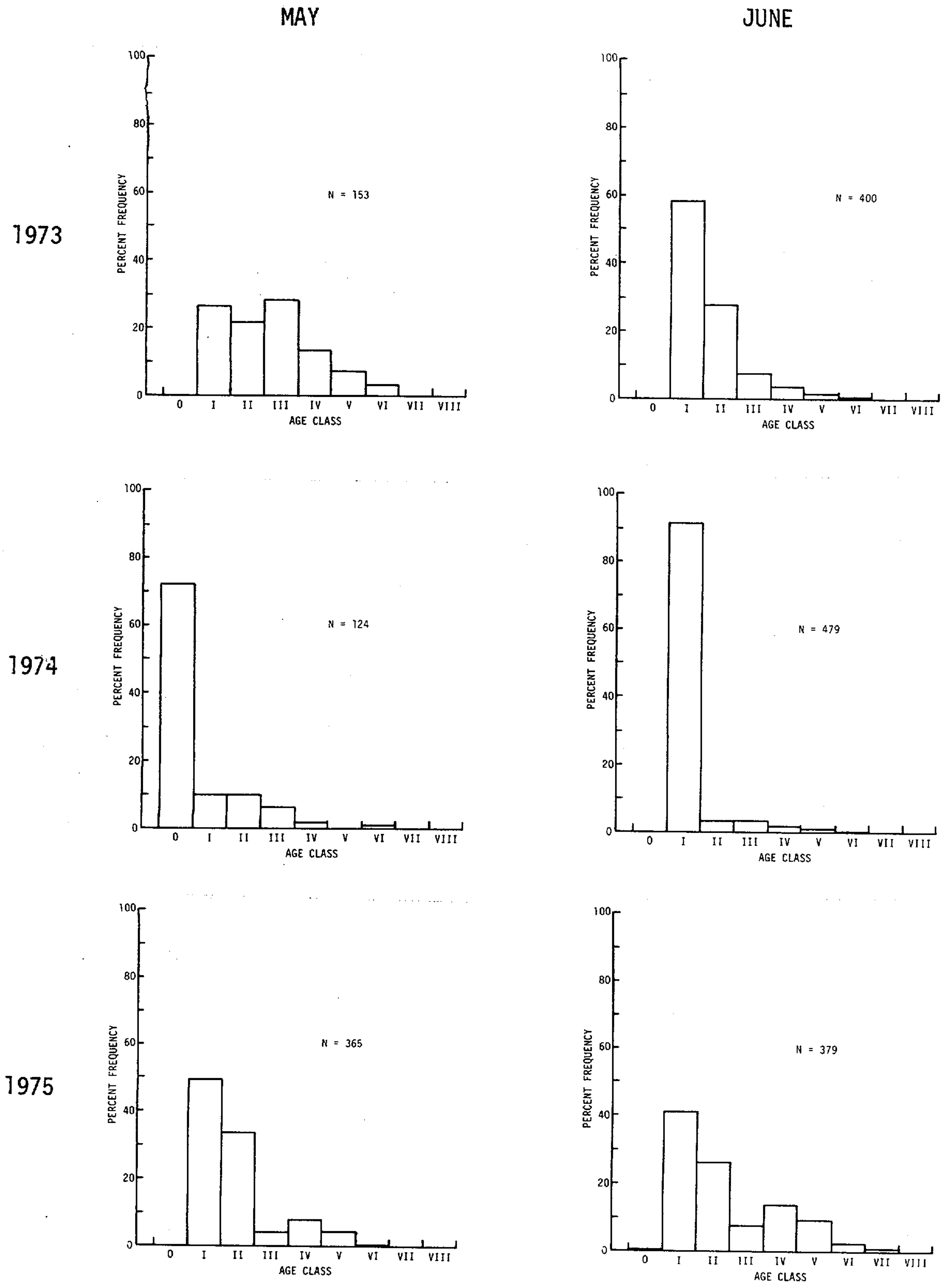

Figure C-12. (Contd)

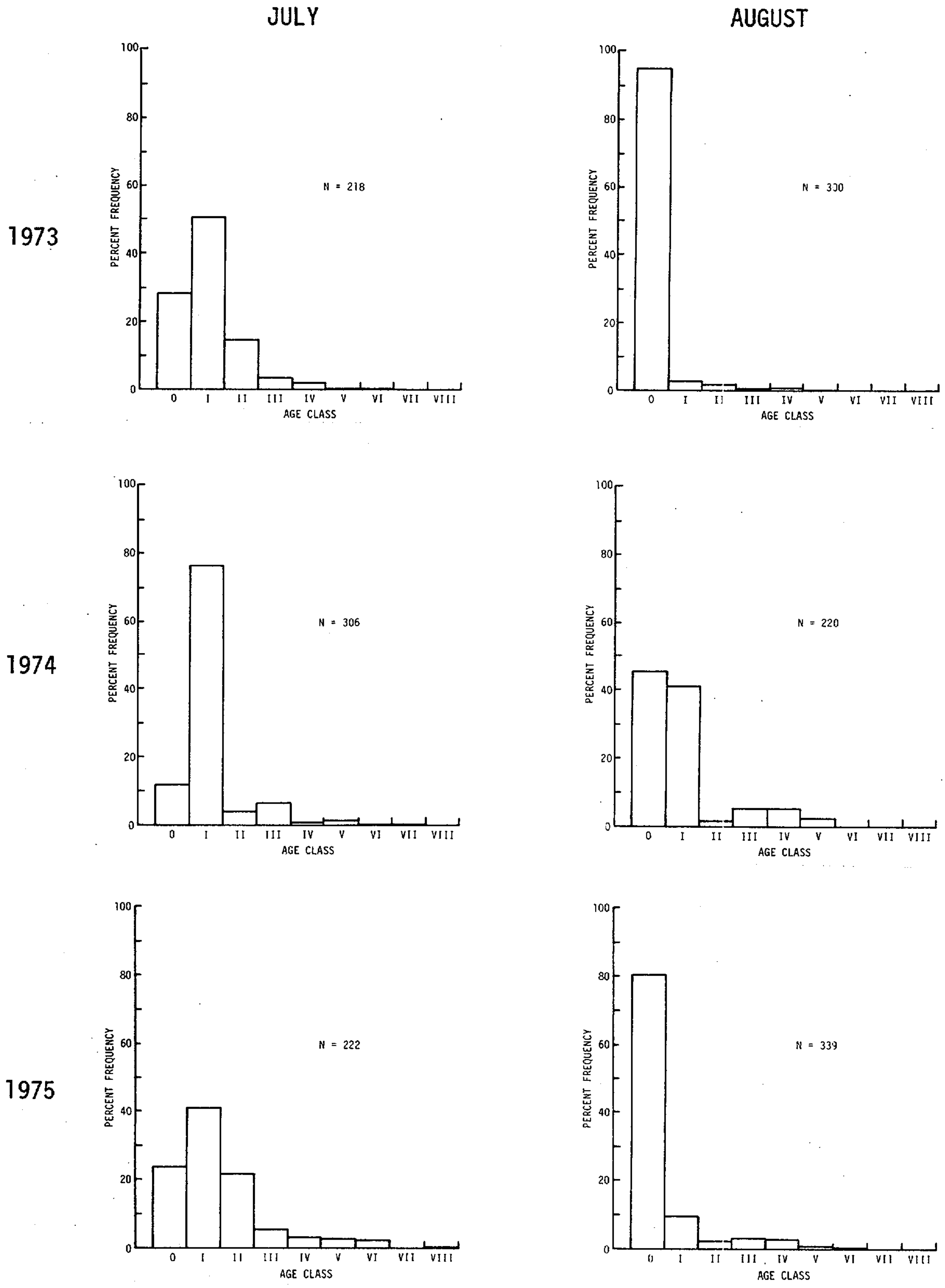

Figure C-12. (Contd)

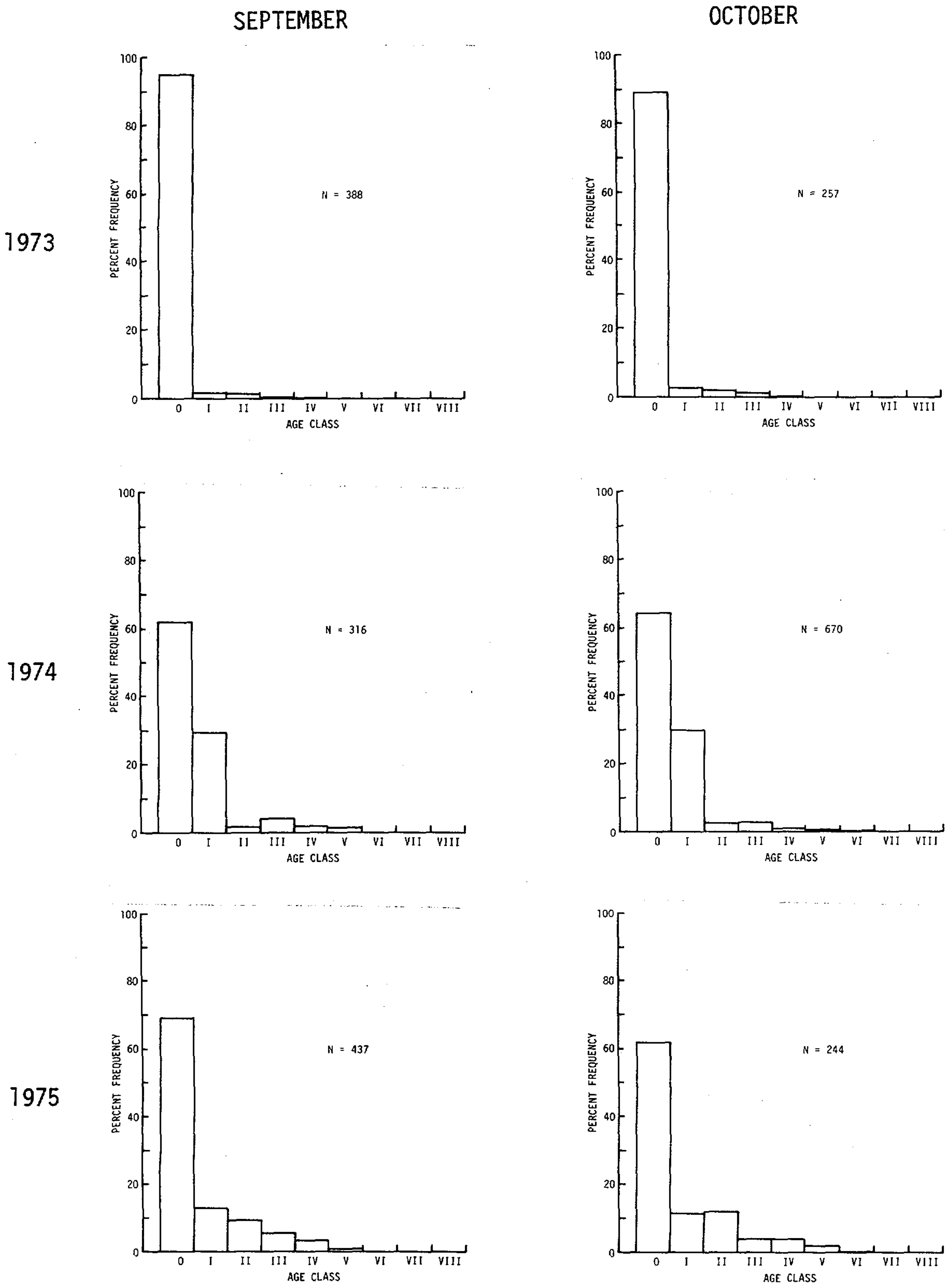

Figure C-12. (Contd)

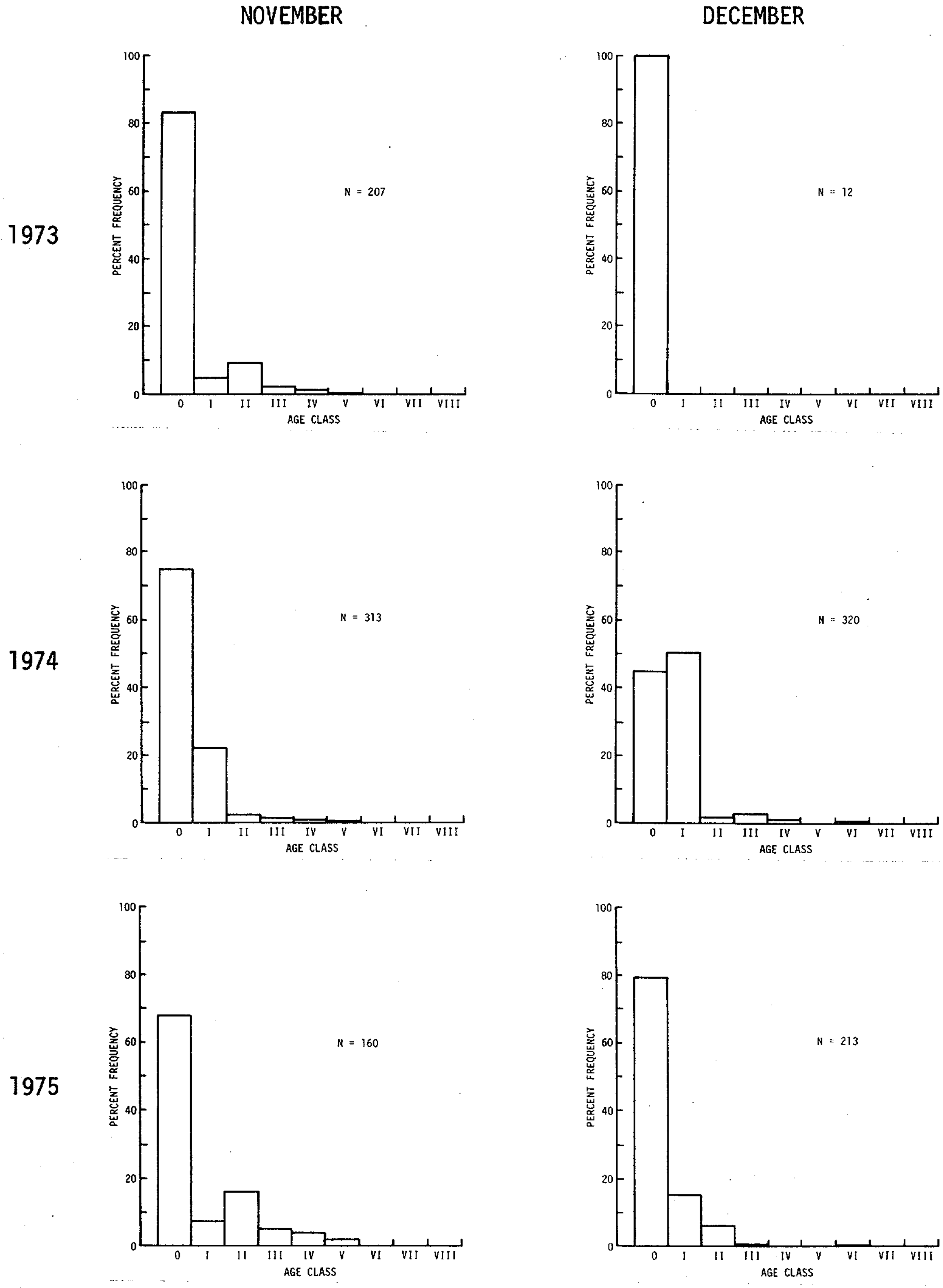

Figure C-12. (Contd)

APPENDIX D

CORRECTION EQUATION FOR EFFECT OF DISSOLVED SALTS ON DISSOLVED OXYGEN MEASUREMENTS

APPENDIX D

CORRECTION EQUATION FOR EFFECT OF DISSOLVED SALTS ON DISSOLVED OXYGEN MEASUREMENTS

Oxygen readings determined with polarographic oxygen probes were adjusted to correct for ambient dissolved-salt concentrations. In a sample, an increase in dissolved salt above the concentration used for meter calibrations (air-saturated distilled water) causes an apparent increase in dissolved oxygen and must be corrected. The change is nonlinear and temperature-dependent.

The equation used for the correction is as follows (Pijanowski, 1973):

$$D_c = D_m \quad 0.9987e^{-\left[\left(\frac{S}{1.255 + 145.5}\right)\right]} \qquad \text{(D-1)}$$

where

S = salinity (o/oo)

T = temperature (^{o}C)

D_c = dissolved-oxygen concentration corrected for increased salinity

D_m = observed dissolved-oxygen value at salinity S and temperature T

The dissolved-oxygen correction can be adapted for conductivity measurements by substituting the following equation for S in Equation D-1:

$$S = -100 \ \ell n \left[1 - \frac{C_T(-0.0585)[\ell n(T + 3)]^2 + 1.9488)}{178500} \right] \qquad \text{(D-2)}$$

where

C_T = conductivity (μmhos/cm) at temperature T (^{o}C)