1990 YEAR CLASS REPORT FOR THE HUDSON RIVER ESTUARY MONITORING PROGRAM

Prepared for

CONSOLIDATED EDISON COMPANY OF NEW YORK, INC

New York, New York

January 1992

Prepared by

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Jointly Funded by
Central Hudson Gas & Electric Corporation
Consolidated Edison Company of New York, Inc.
New York Power Authority
Niagara Mohawk Power Corporation
Orange and Rockland Utilities, Inc.

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EXECUTIVE SUMMARY

In 1990, the Hudson River Utilities continued the biological monitoring program that began in the early 1970s. During the 1970s, these sampling programs provided information about the distribution and abundance of important fish species, their life history characteristics, and environmental conditions within the Hudson River estuary. This information was also used to calculate entrainment and impingement impact estimates. These data and analyses have typically been presented in a series of annual Year Class reports.

The studies conducted in 1990 were similar in scope and intensity to the field programs conducted since the signing of the Settlement Agreement which became effective in 1981. These studies have been somewhat reduced in extent from pre-Settlement programs, but still provide the same level of information on the early life stages for the most critical time periods of the year. The basic study elements were:

1. Ichthyoplankton Survey--A survey of egg, larval, and early juvenile stages of key fish species. This survey collected approximately 200 samples per week from mid-April to mid-July and approximately 100 samples per week every other week thereafter through mid-August. Sampling was conducted with fine mesh nets near the bottom and in open water from the southern tip of Manhattan to Albany. Approximately 59 percent of the samples collected in the field were processed in the laboratory.

2. Fall Juvenile Survey--A continuation of the Ichthyoplankton Survey for juvenile and older fish in bottom and open water areas. The nets have larger mesh and are towed faster than in the ichthyoplankton survey to reduce gear avoidance. Sampling was conducted every other week from early July through mid-October.Approximately 210 samples were collected between the George Washington Bridge and Albany in each week of sampling.

3. Beach Seine Survey--A survey of juvenile and older fish in the shore zone. The Beach Seine Survey was conducted every other week, alternating with the Fall Juvenile Survey, from mid-June through late October. Approximately 100 samples were collected with a seine between the George Washington Bridge and Albany in each week of sampling.

Water temperature, dissolved oxygen concentration, and salinity were measured concurrently with each of these three surveys.

In addition to the results of these three surveys and related measurements, the analyses for this report incorporated results of previous surveys, and related data sets of environmental conditions from the Poughkeepsie Water Works (temperature) and the U.S. Geological Survey gauging station at Green Island, New York (freshwater inflow).

The major objectives and results of the 1990 Year Class Report were:

1. *Describe the patterns and variability of environmental parameters that may have affected fish distribution and abundance in 1990.*

   Year class success of temperate estuarine fish can be strongly influenced by environmental conditions during the early life stages. Factors such as freshwater inflow, water temperature, salinity, and dissolved oxygen can affect eggs and larvae directly by causing lethal conditions, or indirectly by affecting food supply, feeding ability, or metabolic rates. Knowledge of how environmental factors vary both within and across years is essential to understanding the dynamics of fish populations and how they might respond to additional sources of mortality such as power plant operation.

   In 1990, freshwater inflow as measured at the Green Island Dam was among the highest recorded since the biological monitoring programs began in 1974. This was particularly evident in late winter through spring and in the fall. As flows were close to the average in the summer, salinity observed during the study was similar to previous years. Temperature and dissolved oxygen values were generally within the range reported for previous years.

2. *Describe the distribution and abundance of selected fish species in the Hudson River estuary in 1990.*

   The spatial and temporal distribution of fish within the Hudson River estuary are important in determining the potential vulnerability of each species to entrainment and impingement at any of the existing power plants. These distribution patterns are in turn influenced by various abiotic factors such as freshwater flow or temperature. In 1990, a total of 85 fish species were collected. Similar numbers of marine and freshwater taxon to previous years were recorded.

   The spatial and temporal distributions for 13 selected species were described on a regional basis for each week based on catches from each of the three fisheries surveys. Rainbow smelt were added as the thirteenth species for study this year. In addition, a more detailed analysis of the spatial distribution pattern for the early life stages of striped bass, white perch, and American shad was also conducted. The results of these analyses indicate that the general distribution of the 12 selected fish species studied in past Year Class Reports was similar to that observed in previous years with the following exceptions.

   Densities of striped bass eggs tended to be higher in collections this year which may be the result of increased catchability due to dislodgement from normally unsamplable areas by the above normal flows observed throughout May and June. Also, the geographical distribution of the striped bass egg catch was shifted upstream from the historic trend. Except for a shift in distribution to the upper estuary for the young of year life stage, the geographic distribution of the subsequent larval stages of striped bass paralleled historic patterns. Temporal distribution of striped bass eggs, and post yolk-sac larvae occurred three and two weeks later than the historic trend, whereas, peak yolk-sac abundance occurred two weeks earlier; no difference from the historic trend was noted for young of year striped bass. Analysis of the microdistribution pattern for eggs revealed that highest densities were found at River Mile (RM) 51-53, Constitution Marsh is adjacent to the river at this location, and at RM 63, the river is bordered by vegetated shallow areas. Peak abundance of larval striped bass occurred in approximately the same areas.

The long-term trend in the white perch young of year temporal distribution indicates two spawning peaks separated by about three weeks; the first peak is much smaller in comparison to the later peak and occurs typically in week 22 (late May) whereas the second and larger peak abundance occurs in late June/early July. The long-term temporal trends for white perch eggs, post yolk-sac and yolk-sac larvae stages indicates no such distinct bimodal pattern. In 1990, two distinct spawning events are apparent not only in the young of year temporal distribution but also in the distributions for yolk-sac and post-yolk sac larvae. In 1990, the first spawning event appeared to occur later in the season and was thus also detected in the larval indices. From one to three spawning peaks have been observed for the Hudson River (TI, 1980). Spatial distribution fors white perch eggs, larvae, and young of year were similar to the long-term trends from the Ichthyoplankton Survey. Young of year white perch were distributed more in the West Point, Hyde Park, and Kingston regions than previously and relatively few were from the lower estuary. Analysis of the microdistribution patterns revealed a general downriver shift in the peak abundance areas from the egg through young of year stages. Eggs and larvae were most abundant in the extensive shallow areas of upriver regions.

The spatial and temporal distribution of American shad eggs, larvae and young of year were similar to previous years. Analysis of microdistribution patterns for American shad revealed that eggs and yolk-sac larvae were most abundant in the northern most areas of the Hudson River estuary. Post yolk-sac larvae and young of year were most abundant further south.

No rainbow smelt eggs were detected in the Ichthyoplankton Survey. Both yolk-sac and post yolk-sac larvae and young of year were collected. Yolk-sac larvae were collected primarily during the second week of sampling in the Ichthyoplankton Survey in the upper estuary, i.e. Peekskill through Catskill regions. Downriver movement of post yolk-sac larvae during the spring was apparent from spatial and temporal distributions. Only a few young of year rainbow smelt were collected in shore areas most were taken in the deeper, higher salinity waters of the lower estuary, Battery through Cornwall. By mid-October young of year rainbow smelt were no longer collected. No adult rainbow smelt were collected in the beach seines and just a few were collected on two occasions in the Fall Juvenile Survey.

3. *Determine patterns and trends in year class strength for striped bass, white perch, and American shad in the Hudson River estuary in 1990.*

The abundance of fish populations varies from year to year in response to changes in natural mortality, egg deposition, fishing harvest, and other anthropogenic sources of mortality. Detection of these changes is often difficult because it is impossible to precisely measure fish abundance in large estuarine systems such as the Hudson River estuary. Adult anadromous species, such as striped bass and American shad, may be available within the Hudson River estuary for only a limited time, and the wide range of sizes and ages encountered makes it difficult to obtain truly representative samples.

To avoid the problems inherent in sampling adults, population trends for selected species in the Hudson River estuary and elsewhere are monitored by sampling young of year fish near the end of their first growing season. Young of year are available for capture for a longer period of time than adults; they are more similar in size so the effects of size-related gear efficiency are reduced; and, they inhabit areas that are more accessible to sampling than do the adults. In addition, it is commonly believed that mortality after this stage is relatively constant from year to year such that trends in abundance of the young of year can be used as an indicator of trends in subsequent recruitment to the adult stock.

The focus of this objective was to estimate young of year abundance indices for striped bass, white perch, and American shad using four different methodologies and to compare these indices estimated for 1990 to indices calculated for previous years. For striped bass the young of year indices all suggest that the 1990 year class abundance was near the long-term average for the studies extending back to 1974. The abundance indices for young of year white perch suggest that 1990 is possibly the smallest year class since 1985. Although abundance in Fall Juvenile Survey catches declined from the high levels observed in 1979, a similar declining trend has not been exhibited in the Beach Seine Survey catches. This suggests reasons other than declining population for the trend observed in the offshore collections. The relatively low abundance of this species in offshore waters in 1990 continued a trend which extends back to 1982. A recent analysis of white perch young of year and adult indices for the Hudson River indicates that although young of year indices are indicating lower abundance, other white perch indices are indicating either no difference or significantly increasing trends. A decrease in catchability of young of year over the past few years due to increased unsamplable habitats (i.e., expansion of water chestnut beds observed since cessation of an eradication program in 1975) may account for the apparent decline in young of year abundance. The abundance indices for young of year American shad suggest that the 1990 year class abundance was close to the average. Overall, these analyses indicate that the abundance for striped bass and American shad was typical of previous years with no evidence of any long-term trends, either higher or lower.

4. *Describe the patterns in first year growth for striped bass, white perch, and American shad in the Hudson River estuary in 1990.*

Growth during the first year of life is studied because fish growth is a highly variable process which can be greatly influenced by numerous biotic and abiotic environmental factors. Due to its relative sensitivity to these environmental factors, an assessment of fish growth can provide important insights into the effects that environmental variability can have on early life stage survival and subsequent year class strength. The purpose of the analysis for this objective was to describe the seasonal growth patterns for the early life stages of striped bass, white perch, American shad, alewife, and blueback herring and to estimate size-specific growth rates for the first three species.

The seasonal growth pattern and length at the end of the first year for striped bass, white perch, and American shad were within the range reported for previous years. The results for alewife and blueback herring were similar to those reported for 1988 and 1989, the earliest years for which estimates from the Hudson River estuary are available. Estimates of size-specific growth rates for the larval and young of year for the three selected species were all within the range reported for previous years.

CHAPTER 1
INTRODUCTION

Since 1973, an annual Year Class Report has been prepared for five utilities: Central Hudson Gas and Electric Corporation; Consolidated Edison Company of New York, Inc.; New York Power Authority; Niagara Mohawk Power Corporation; and Orange and Rockland Utilities, Inc. The main purpose of the reports has been to present and analyze data on the distribution and abundance of early life stages of selected fish species based on surveys conducted throughout the Hudson River estuary.

The first report, First Multiplant Report (TI 1975), summarized estuary-wide data collected to estimate the impact of five electric generating stations on striped bass, white perch, and Atlantic tomcod. The multiplant effort was refined and renamed the Year Class Report for the 1974 data (TI 1977). Patterns of abundance and distribution of early life stages were examined in greater detail in the 1975 report, but impacts of station operations were not estimated (TI 1978a). The 1976 report (TI 1979a) expanded the focus to include ecological relationships of selected fish populations. In the 1977 and 1978 reports (TI 1980a,b), the life histories and distributional information on nine additional fish species were included. Data analysis of the 1979 report (TI 1981) was also extended to include predictions of environmental impact based on fish population age structure and age-specific survival. Further statistical analyses of biocharacteristics data available from 1973 to 1979 were included for the three initial key species.

The Hudson River Settlement Agreement among the Utilities, the U.S. Environmental Protection Agency, and other interested parties was announced in 1980 and became effective in May 1981 (Sandler and Schoenhard 1981). The 1980-1981 Year Class Report (Battelle 1983), the first one prepared after execution of the Settlement Agreement, continued the presentation of life history and population dynamics studies of selected Hudson River estuary fish species. The 1981 study program was also the first in which the length of the sampling season was reduced to focus on the period when most Hudson River fish were maturing from the larval to juvenile stage. The 1982 Year Class Report (NAI 1985a) was similar in content to the 1980-1981 report, but the estimation of year class strength was extended to include a fall index. In addition to the basic survey results, the 1983 report (NAI 1985b) included data on the first recaptures of fish released from a striped bass hatchery that began operation in 1983. This report also examined the relationship between environmental variables and the early life histories of striped bass, white perch, and American shad. The 1984 Year Class Report (MMES 1986) contained the types of information presented in 1982 and 1983 reports, but placed additional emphasis on the indices of year class strength and their interpretation.

The 1985 Year Class Report (Versar 1987) described the results from the 1985 Longitudinal River Ichthyoplankton, Fall Juvenile, and Beach Seine surveys. This report focused on: (1) the spatiotemporal distributions for 12 fish species with respect to life history and prevailing environmental factors; (2) year class strength indices, including development of a new index of year class strength for white perch, striped bass, American shad, and bay anchovy; and (3) factors that may influence year class strength for these four species.

The 1986 and 1987 Year Class Report (LMS 1989) described the results from the 1986 and 1987 Longitudinal River Ichthyoplankton, Fall Juvenile, and Beach Seine surveys. This report continued the description of the spatiotemporal distribution for 12 selected species, as well as an assessment of trends in year class abundance and growth for a limited number of species as in the previous year class reports. In addition, this report described the historical patterns of variability in selected physical/chemical parameters which may influence fish distribution and abundance, estimated the influence of inclusion of previously unsampled regions on abundance and standing crop estimates, and described changes in the fish community of the Hudson River estuary over time.

The 1988 and 1989 Year Class Reports (EA 1990, 1991) describe the results of the 1988 and 1989 Longitudinal River Ichthyoplankton, Fall Juvenile, and Beach Seine surveys. These reports focused on physical/chemical parameter patterns and spatiotemporal distribution for 12 selected species, as well as assessments of trends in year class abundance and growth for a limited number of species following the pattern established in previous year class reports.

The present report adds to the historical database by describing the results of the Longitudinal River Ichthyoplankton, Fall Juvenile, and Beach Seine surveys for 1990. The 1990 Year Class Report presents basic abundance and distribution data with the following objectives:

1. Describe the patterns and variability of environmental parameters that may have affected fish distribution and abundance in the Hudson River estuary in 1990.

2. Describe the distribution and abundance of 13 selected species of fish (Table 1-1) in the Hudson River estuary in 1990.

3. Determine whether trends in recruitment (i.e., year class strength) are evident for American shad, striped bass, and white perch populations in the Hudson River estuary.

4. Describe patterns in growth and size for larval and young-of-year striped bass, white perch, American shad, blueback herring, and alewife in the Hudson River estuary in 1990.

TABLE 1-1 FISH SPECIES SELECTED FOR PRESENTATION IN THE 1990 YEAR CLASS REPORT

Common Name	Scientific Name[a]	Life Stages[b]
Representative and Important Species		
Striped bass	*Morone saxatilis*	Egg, YSL, PYSL, YOY, YRL
White perch	*Morone americana*	Egg, YSL, PYSL, YOY, YRL
Atlantic tomcod	*Microgadus tomcod*	YSL, PYSL, YOY, YRL
Alewife	*Alosa pseudoharengus*	YOY, YRL[c]
Bay anchovy	*Anchoa mitchilli*	Egg, YSL, PYSL, YOY, YRL
Weakfish	*Cynoscion regalis*	YOY, YRL
White catfish	*Ictalurus catus*	YOY, YRL
Spottail shiner	*Notropis hudsonius*	YOY, YRL
Atlantic sturgeon	*Acipenser oxyrhynchus*	YOY, YRL
Shortnose sturgeon	*Acipenser brevirostrum*	YOY, YRL
Ecologically and/or Commercially Important Species		
American shad	*Alosa sapidissima*	Egg, YSL, PYSL, YOY, YRL
Blueback herring	*Alosa aestivalis*	YOY, YRL[c]
Rainbow smelt	*Osmerus mordax*	Egg, YSL, PYSL, YOY, YRL

a. Names recognized by American Fisheries Society (Robins et al. 1980).
b. YSL = yolk-sac larvae; PYSL = post yolk-sac larvae; YOY = young of year; YRL = yearling and older.
c. Egg, YSL, and PYSL of *Alosa* spp. were examined.

This report is organized into six chapters with supporting appendixes. Data collection and analysis methods are described in Chapter 2. Each of the remaining four chapters is devoted to addressing one of the four objectives previously described. Detailed data tables supporting report analyses are contained within the appendix section as follows: Appendix A - Quality Assurance Program and Data Quality Control Review; Appendix B - Physical/ Chemical Parameters; Appendix C - Density and Standing Crop Estimates; Appendix D - Abundance Indices; and Appendix E - Length-Frequency Distribution.

CHAPTER 2
MATERIALS AND METHODS

2.1 SAMPLING DESIGN

Several fishery techniques were employed in three separate sampling programs to obtain comprehensive information on the abundance and distribution of selected larval, young-of-year, and adult fish species in the Hudson River estuary. Temporally, the programs covered spring through fall, the period of greatest biological activity in north temperate waters. Program-specific techniques were employed to adequately sample all habitats and permit the determination of spatial distribution patterns. The three programs followed the same general design and employed gear similar to that of previous Hudson River sampling programs.

The three sampling programs that made up the overall program and their objectives were:

Longitudinal River Ichthyoplankton Survey (LRS). The entire length of the Hudson River estuary was sampled to provide ichthyoplankton data that would allow calculations of standing crop, mortality, and growth rates for selected Hudson River fish species. The primary species were Atlantic tomcod (*Microgadus tomcod*), American shad (*Alosa sapidissima*), striped bass (*Morone saxatilis*), and white perch (*M. americana*). LRS sampling was concentrated during the spring and summer when eggs and larvae of the primary species were usually abundant.

Fall Juvenile Survey (FJS). Samples were collected every other week from the George Washington Bridge to the Troy Dam in midsummer and fall. The objective was to provide data on young-of-year fish that would allow calculation of standing crop estimates and conditional mortality rates for selected Hudson River fish species. The target species were Atlantic tomcod, American shad, striped bass, and white perch.

Beach Seine Survey (BSS). Beach seine samples were collected in alternate weeks with the FJS at stations from the George Washington Bridge to the Troy Dam. The objective was to obtain information on young-of-year American shad, Atlantic tomcod, striped bass, and white perch while they were concentrated primarily in the shallow, near-shore region. The survey was conducted from mid-June through October, when young-of-year of these species were utilizing the shore zone nursery.

Sampling for all programs was conducted according to a stratified random design in which the Hudson River estuary from the George Washington Bridge (River Mile [RM] 12) to the Federal Dam at Troy (RM 152) was divided into 12 regions (Figure 2-1). For LRS, an additional region from the Battery (RM 1) to the George Washington Bridge was sampled

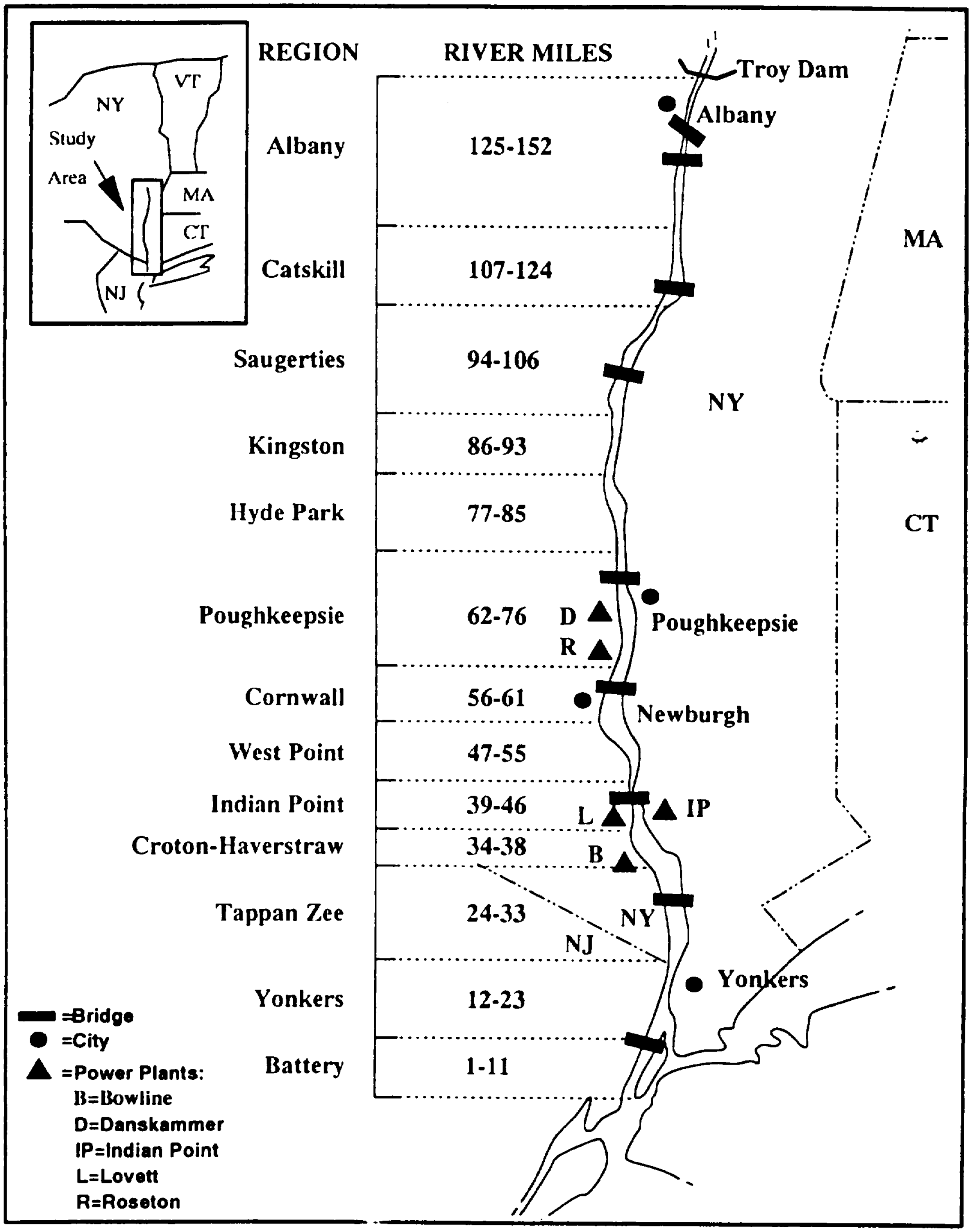


Figure 2-1. Location of 13 geographic regions (with river mile boundaries) sampled during 1990 field sampling programs in the Hudson River estuary.

in 1990. Each region was further divided into "strata" on the basis of river depth. The strata based on river depth are graphically presented in Figure 2-2 and defined below:

- Shore - that portion of the Hudson River estuary extending from the shore to a depth of 10 ft (the stratum defined only for BSS).
- Shoal - that portion of the Hudson River estuary extending from the shore to a depth of 20 ft at mean low tide.
- Bottom - that portion of the Hudson River estuary extending from the bottom to 10 ft above the bottom where river depth is greater than 20 ft at mean low tide.
- Channel - that portion of the Hudson River estuary not considered bottom where river depth is greater than 20 ft at mean low tide.

The proportional relationships of the shoal, bottom, and channel strata vary over the length of the Hudson River estuary. Presented in Figure 2-2 are three types of cross-sectional views. The low relief sectional is characteristic of the Tappan Zee and Croton-Haverstraw regions, the high relief sectional is exemplified by the Yonkers and Poughkeepsie regions, and the fjord relief sectional represents the West Point region.

A minimum of two samples were assigned to each stratum in most regions for the LRS. However, no samples were scheduled in the Battery region during the first half of the LRS or in the Hyde Park through Albany regions during the final four weeks of the LRS. A minimum of three samples were assigned to each stratum in each region for the FJS and a minimum of three samples were also taken in each region for the BSS. The strata actually sampled in each region during the 1990 survey period are given in Table 2-1. Shoal strata samples were not assigned in upriver regions nor were shoal or shore strata samples assigned in the Battery region.

A general summary of the three sampling programs for the annual study is presented in Table 2-2. The field and laboratory methods used for each survey are described in detail in the following sections.

2.2 LONGITUDINAL RIVER ICHTHYOPLANKTON SURVEY

2.2.1 Field Methods

Two gear types were used to sample the shoal, channel, and bottom strata in the LRS: a 1.0-m^2 Tucker trawl (Figure 2-3) to sample the channel strata, an epibenthic sled-mounted 1.0-m^2 net similar in design to the Tucker trawl (Figure 2-4) to sample the bottom strata, and both gear types to sample the shoal strata. Table 2-3 presents design specifications for the sampling gear.

Both gear types were towed against the prevailing current for 5 minutes. The tow started with the remote opening of the net and terminated with its remote closing. If the river depth was

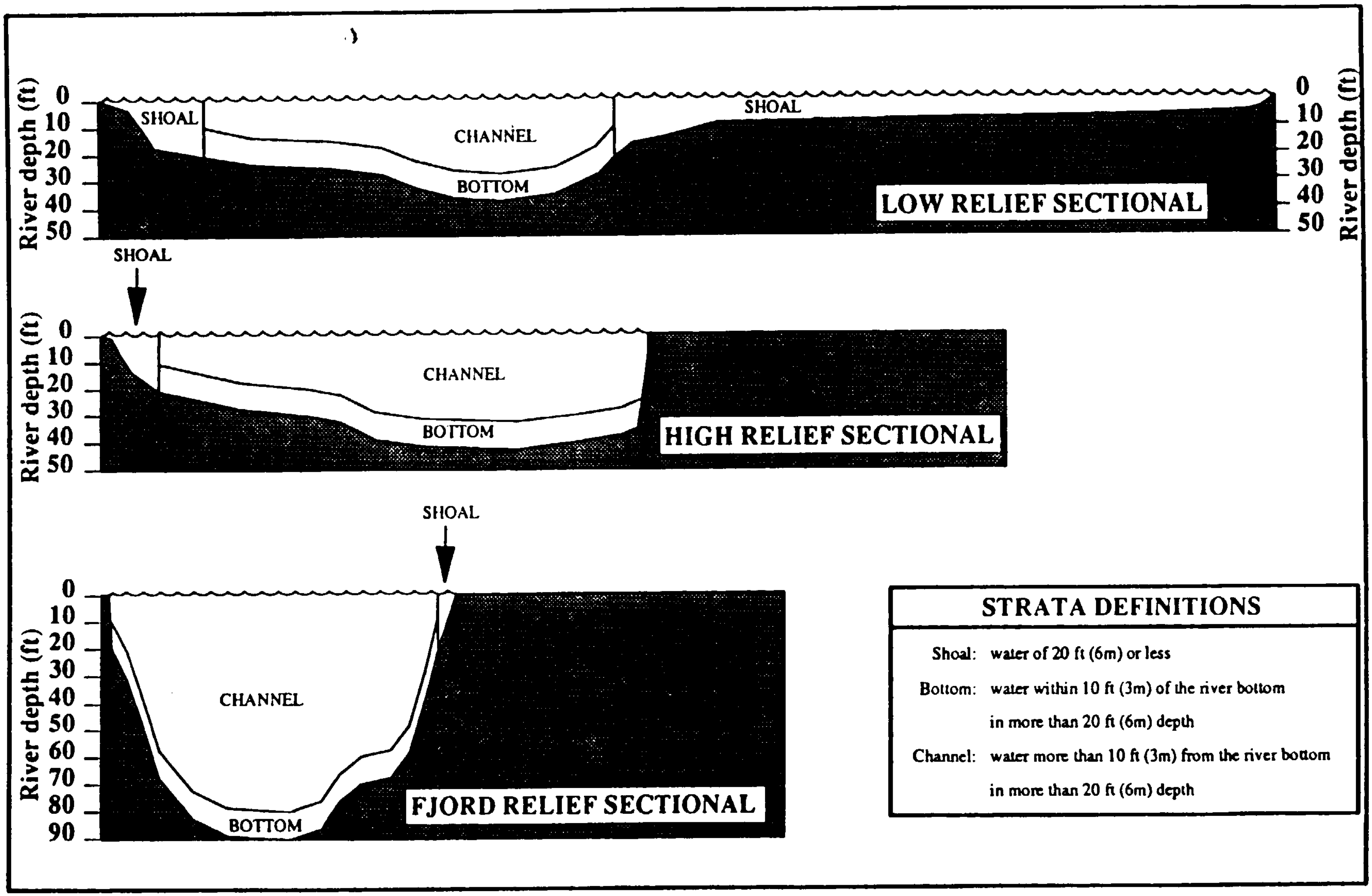


Figure 2-2. Cross sections of the Hudson River estuary showing locations and typical proportional relationships of the shoal, bottom, and channel strata.

TABLE 2-1 STRATA SAMPLED WITHIN THE 13 GEOGRAPHIC REGIONS OF THE HUDSON RIVER ESTUARY DURING 1990

Region	Abbreviation	River Miles	River Kilometers	1990 Survey Shore	1990 Survey Shoal	1990 Survey Channel	1990 Survey Bottom
Battery	BT	1-11	1-19	--	--	X	X
Yonkers	YK	12-23	19-39	X	X	X	X
Tappan Zee	TZ	24-33	39-55	X	X	X	X
Croton-Haverstraw	CH	34-38	55-63	X	X	X	X
Indian Point	IP	39-46	63-76	X	X	X	X
West Point	WP	47-55	76-90	X	--	X	X
Cornwall	CW	56-61	90-100	X	X	X	X
Poughkeepsie	PK	62-76	100-124	X	--	X	X
Hyde Park	HP	77-85	124-138	X	--	X	X
Kingston	KG	86-93	138-151	X	--	X	X
Saugerties	SG	94-106	151-172	X	--	X	X
Catskill	CS	107-124	172-201	X	--	X	X
Albany	AL	125-152	201-246	X	--	X	X

NOTE: Dashes (--) indicate no sampling scheduled.

TABLE 2-2 SUMMARY OF 1990 HUDSON RIVER SURVEYS

Program Phase	Sampling Schedule Start Date	Sampling Schedule End Date	Number of River Runs	Sampling Frequency	Strata Sampled	Sample Number: Collection Projected	Sample Number: Collection Actual	Sample Number: Lab Analysis	Sampling Gear
Longitudinal River Ichthyoplankton Survey	19 APR	16 AUG	15	Weekly/ Biweekly	Shoal	355	325	284	1.0-m^2 net on epibenthic sled or 1.0-m^2 Tucker trawl
					Channel	1,478*	1,445	635	1.0-m^2 Tucker trawl
					Bottom	964	914	642	1.0-m^2 net on epibenthic sled
Fall Juvenile Survey	09 JUL	17 OCT	8	Biweekly	Shoal	512	513		3.0-m beam trawl
					Channel	440	439		1.0-m^2 Tucker trawl
					Bottom	728	728		3.0-m beam trawl
Beach Seine Survey	18 JUN	24 OCT	0	Biweekly	Shore	1,000	1,000		30.5-m beach seine

* Includes 141 samples collected for striped bass otolith analysis.

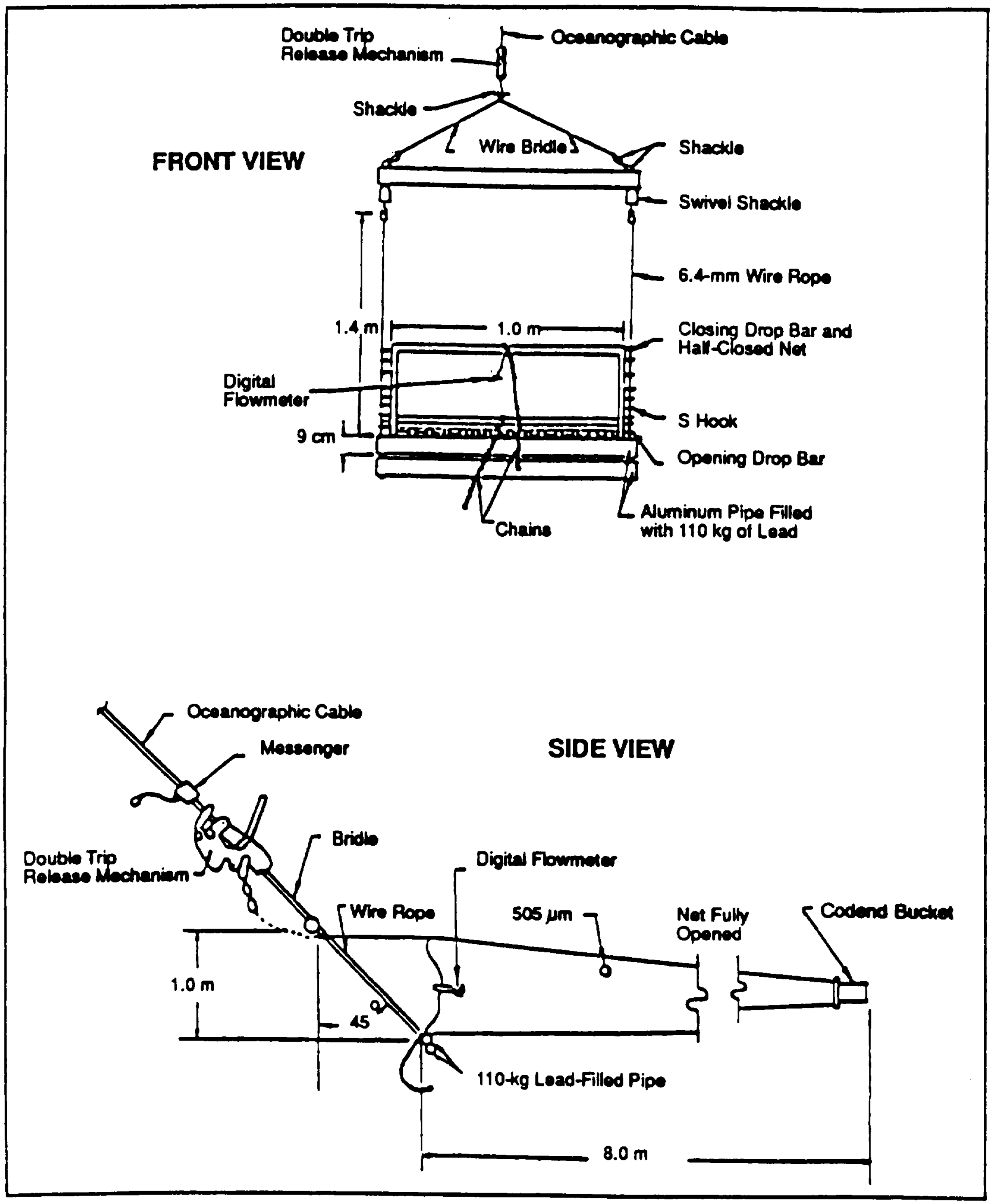


Figure 2-3. Design and dimensions of 1.0-m^2 Tucker trawl.

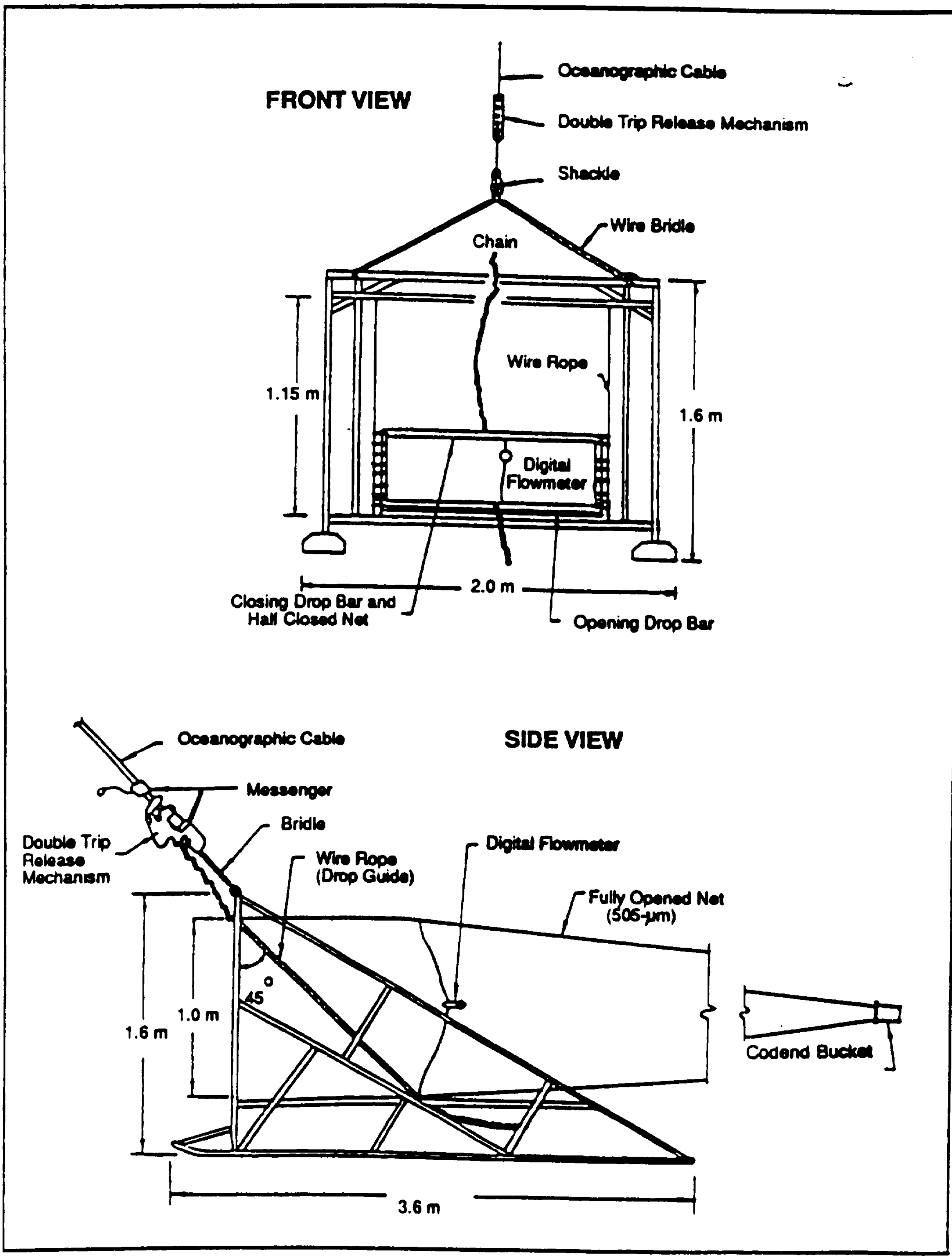


Figure 2-4. Design and dimensions of 1.0-m^2 Tucker trawl mounted on an epibenthic sled.

TABLE 2-3 SPECIFICATIONS OF SAMPLING GEAR USED DURING THE 1990 LONGITUDINAL RIVER ICHTHYOPLANKTON SURVEY

1.0-m^2 Tucker Trawl

Length	8.0 m
Mouth (width)	1.0 m
Mouth (height)	1.4 m
Mesh size	500 μm
Net material	Nytex (monofilament nylon)
Collection cup	30 cm
Length	30 cm
Length with net-retaining ring	37 cm
Mesh size	500 μm
Net material	Nytex (monofilament nylon)

1.0-m^2 Net Mounted on Epibenthic Sled

Length	8.0 m
Mouth (width)	1.0 m
Mouth (height)	1.4 m
Mesh size	505 μm
Net material	Nytex (monofilament nylon)
Collection cup	
Length	30 cm
Length with net-retaining ring	37 cm
Mesh size	500 μm
Net material	Nytex (monofilament nylon)

20 ft or less, an open set and retrieval of the net was allowed. The tow speed for the trawl was approximately 0.9 m/second; for the epibenthic sled-mounted net, approximately 1.0 m/second. An electronic flowmeter mounted along the side of the research vessel and equipped with an on-deck readout display was used to establish and maintain tow speed. A calibrated digital flowmeter mounted in the center of the net mouth was used to calculate the volume of water filtered for each sample.

The 1990 LRS covered 18 weeks from 9 April to 16 August (Table 2-2 and Figure 2-5) with all sampling conducted at night. Sampling was conducted weekly for the first 8 weeks between RM 12 and RM 152. For the next 4 consecutive weeks, sampling encompassed RM 1 - RM 152. Beginning the week of 16 July and ending the week of 16 August, sampling was conducted biweekly between RM 0 and 76. A special nocturnal 7-week sampling program that incorporated an additional 20 trawl (channel strata) samples; approximately 20 (per week) was conducted between 28 May and 22 July 1990. The samples collected during this survey were scheduled for a special aging study of striped bass larvae using daily otolith rings.

The allocation of sampling effort among river regions and strata was temporally adjusted in response to the projected presence and distribution of target species and life stages. The 1990 LRS sampling program was scheduled as five separate multiweek efforts. The first, which covered the last 2 weeks of April, was directed toward the collection of American shad eggs. The second effort covered the first 3 weeks of May and was designed to collect eggs of *Morone* spp. and American shad. The third effort encompassed the next 3 weeks from the end of May through the beginning of June and targeted *Morone* spp. and American shad yolk-sac larvae. The fourth effort consisted of 4 weeks extending from the middle of June through the first week in July. This sampling effort was designed to collect *Morone* spp. and American shad post yolk-sac larvae. The LRS sampling program concluded with a 6-week period, sampled biweekly, from the middle of July to the middle of August. The final sampling effort was designed to collect all life stages of bay anchovy.

The allocation of sampling effort among regions and strata is given in Table 2-4. During 1990, 2,797 ichthyoplankton samples (including 141 striped bass otolith aging samples) were scheduled for collection; 2,684 samples were collected, accounting for 95.96 percent of the scheduled total.

Following net washing and sample concentration in the codend bucket, the regularly scheduled LRS samples were examined for yearling and adult fish. All of these fish were identified, enumerated, and returned to the Hudson River estuary. Special care was taken for sturgeon and for marked and tagged fish. After yearling and adult fish were removed, the ichthyoplankton sample was placed in a container(s) and filled with 10 percent formalin.

In situ measurements of water temperature (°C), dissolved oxygen (mg/liter), and specific conductance (microsieman/cm at 25 °C) were taken with calibrated meters at fixed river mile and strata stations in conjunction with field sampling. Physical/chemical sampling locations, by river mile and strata, are presented in Table 2-5 for the 1990 LRS. Physical/chemical measurements were recorded from surface, middepth, and bottom water depth at channel stations and from the surface and bottom water depth at shoal stations. During the

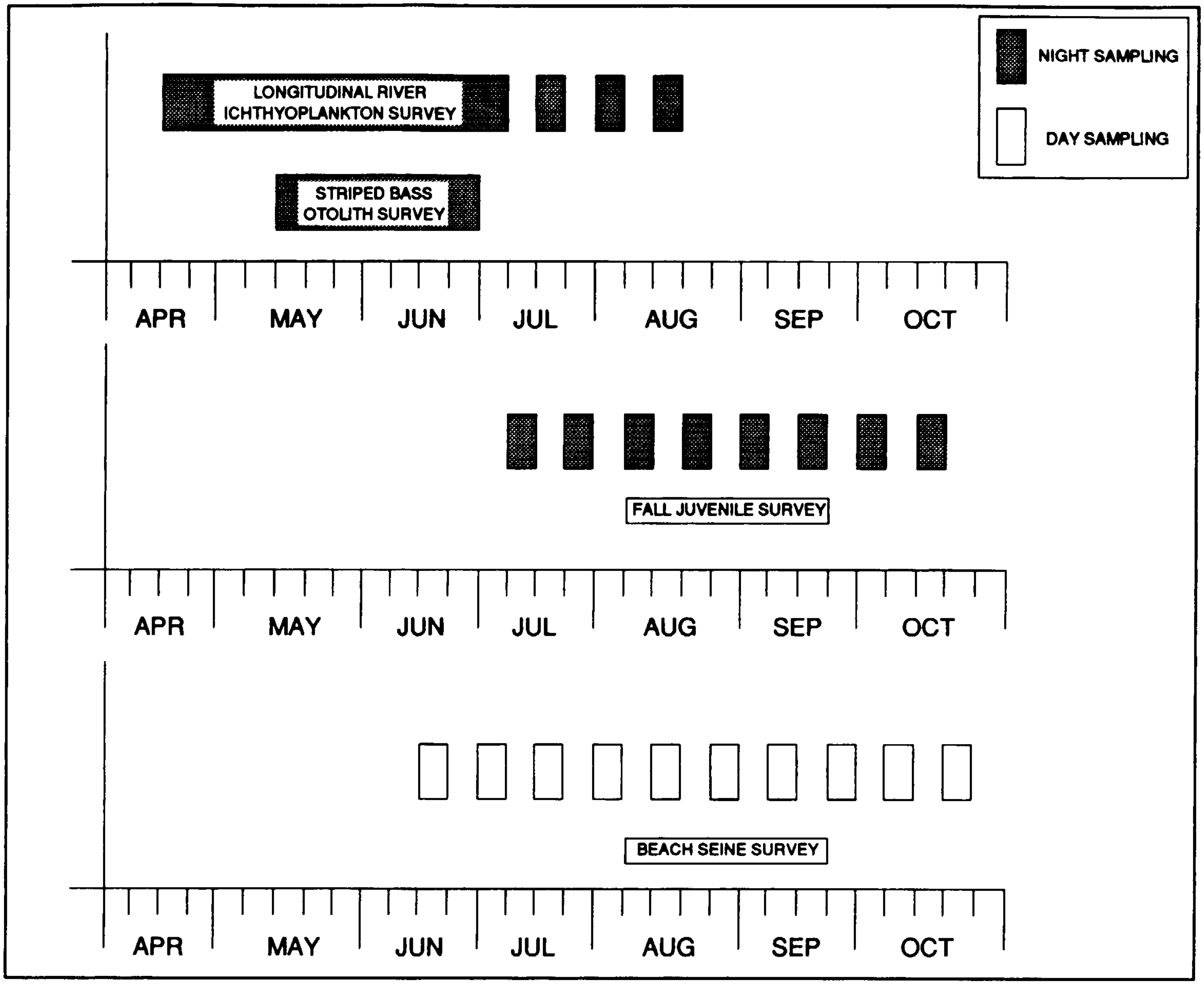


Figure 2-5. Sampling schedule for 1990

TABLE 2-4 SUMMARY OF 1990 SAMPLE COLLECTION INFORMATION BY RIVER REGION AND STRATUM FOR THE LONGITUDINAL RIVER ICHTHYOPLANKTON SURVEY

	2-Week Period From 16 APR To 29 APR					3-Week Period From 30 APR To 20 MAY					3-Week Period From 21 MAY To 10 JUN				
	Shoal		Channel	Bottom		Shoal		Channel	Bottom		Shoal		Channel	Bottom	
Region	Sled	Trawl	Trawl	Sled	Total	Sled	Trawl	Trawl	Sled	Total	Sled	Trawl	Trawl	Sled	Total
Battery	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Yonkers	2	2	6	6	16	6	3	9	9	27	6	3	9	9	27
Tappan Zee	4	3	8	8	23	6	3	9	12	30	6	3	12	12	33
Croton-Haverstraw	6	4	8	8	26	12	6	18	9	45	9	6	14	12	41
Indian Point	2	2	5	5	14	9	3	75	21	108	6	3	48	18	75
West Point	--	--	6	5	11	--	--	93	12	105	--	--	78	21	99
Cornwall	3	2	6	5	16	9	6	15	36	66	9	6	20	27	62
Poughkeepsie	--	--	3	6	9	--	--	30	30	60	--	--	76	48	124
Hyde Park	--	--	7	3	10	--	--	33	27	60	--	--	42	21	63
Kingston	--	--	9	12	21	--	--	21	18	39	--	--	18	12	30
Saugerties	--	--	6	10	16	--	--	9	9	18	--	--	9	15	24
Catskill	--	--	14	27	41	--	--	8	9	17	--	--	9	9	18
Albany	--	--	23	47	70	--	--	16	15	31	--	--	9	9	18
Total	17	13	101	142	273	42	21	336	207	606	36	21	344	213	614

	4-Week Period From 11 JUN To 8 JUL					6-Week Period From 9 JUL To 19 AUG				
	Shoal		Channel	Bottom		Shoal		Channel	Bottom	
Region	Sled	Trawl	Trawl	Sled	Total	Sled	Trawl	Trawl	Sled	Total
Battery	--	--	16	8	24	--	--	24	9	33
Yonkers	8	8	28	24	68	6	6	21	9	42
Tappan Zee	8	8	26	20	62	12	9	14	9	44
Croton-Haverstraw	12	8	32	24	76	18	12	14	9	53
Indian Point	12	8	80	20	120	6	6	13	9	34
West Point	--	--	119	32	151	--	--	14	9	23
Cornwall	8	8	65	48	129	6	6	12	9	33
Poughkeepsie	--	--	72	28	100	--	--	12	9	21
Hyde Park	--	--	44	20	64	--	--	2	--	2
Kingston	--	--	24	16	40	--	--	--	--	--
Saugerties	--	--	8	16	24	--	--	--	--	--
Catskill	--	--	12	12	24	--	--	--	--	--
Albany	--	--	12	12	24	--	--	--	--	--
Total	48	40	538	280	906	48	39	126	72	285

TABLE 2-5 WATER QUALITY SAMPLING LOCATIONS DURING THE 1990 LONGITUDINAL RIVER ICHTHYOPLANKTON SURVEY

River Region	Sampling Locations (RM) Shoals*	Sampling Locations (RM) Channel	Number of Samples Scheduled Per Region Per Run
Yonkers	19	14, 17, 19, 22	16
Tappan Zee	29	25, 27, 29, 32	16
Croton-Haverstraw	36	35, 36, 37, 38	16
Indian Point	43	40, 42, 43, 46	16
West Point	--	49, 51, 53, 55	12
Cornwall	59	56, 57, 59, 61	16
Poughkeepsie	--	63, 67, 71, 75	12
Hyde Park	--	78, 80, 82, 84	12
Kingston	--	87, 89, 91, 93	12
Saugerties	--	96, 99, 102, 105	12
Catskill	--	109, 114, 118, 122	12
Albany	--	126, 131, 135, 138, 142	15
Total			167

* Sample collected from east and west shoals at designated river mile.

NOTE: Dashes (--) indicate no sampling scheduled.

15 collection weeks of the 1990 LRS, 2,505 samples were scheduled, with 2,420 samples actually collected.

Ichthyoplankton samples collected for striped bass otolith aging were handled in the same manner as regularly scheduled LRS samples except that the preservative was 5 percent buffered formalin. Within 48 hours, the samples were curated in 70 percent ethylalcohol (ETOH).

2.2.2 Laboratory Methods

In 1990, approximately 60 percent of the regular LRS samples were scheduled for analysis. Selection of samples for laboratory analysis began with the grouping of all samples according to river run, region, and strata. Based on these groupings, samples were selected based on one of the following criteria:

1. If there were less than 6 samples in the group, then all were selected for analysis.

2. If there were between 6 and 12 samples in the group, then 50 percent of the samples were randomly selected for analysis.

3. If there were more than 12 samples in the group, then 20 percent of the samples were randomly selected for analysis.

The allocation of samples for laboratory analysis among regions, strata, and gear types based on these criteria is listed in Table 2-6. The total number of analyzed samples was 1,561, comprising 58.77 percent of the collected regular samples.

In 1990 as in the previous year, splitting (or subsampling) was permitted. A trained technician first determined if the sample needed splitting. This was done by visual inspection. Any sample containing large numbers of eggs may have been split so that eggs were only sorted from one or more splits containing a total of at least 250 eggs (all species combined).

There were two different sets of criteria for subsampling larvae, depending on the river run. Beginning with the river run in which striped bass post yolk-sac larvae first appeared, and for the next eight river runs (a total of nine consecutive river runs), a minimum of 500 *Morone* larvae (i.e., the combined total of yolk-sac larvae, post yolk-sac larvae, and juveniles of striped bass, white perch, and unidentified *Morone*) were sorted from the entire sample and a minimum of 500 non-*Morone* larvae must be sorted. Because some of the more difficult distinctions between species (e.g., striped bass vs. white perch) or between life stages could not be made reliably during sorting, samples from these nine river runs were usually sorted in their entirety for larvae (i.e., yolk-sac larvae, post yolk-sac larvae, and young of year combined) of all species combined. An exception to this may have been made, at the discretion of the laboratory supervisor, under the following circumstances: when extremely large numbers of non-*Morone* larvae occurred in the sample and a qualified identifier has verified that sufficient numbers of both *Morone* larvae and non-*Morone* larvae are sorted to meet their respective

TABLE 2-6 SUMMARY OF 1990 SAMPLE ANALYSIS INFORMATION BY RIVER REGION AND STRATUM FOR THE LONGITUDINAL RIVER ICHTHYOPLANKTON SURVEY

	2-Week Period From 19 APR To 26 APR					3-Week Period From 30 APR To 17 MAY					3-Week Period From 21 MAY To 7 JUN				
	Shoal		Bottom	Channel		Shoal		Bottom	Channel		Shoal		Bottom	Channel	
Region	Sled	Trawl	Sled	Trawl	Total	Sled	Trawl	Sled	Trawl	Total	Sled	Trawl	Sled	Trawl	Total
Battery	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Yonkers	2	2	6	6	16	6	3	9	9	27	6	3	9	9	27
Tappan Zee	3	1	8	8	20	6	3	12	9	30	6	3	12	12	33
Croton--Haverstraw	2	3	8	8	21	6	3	9	9	27	9	6	12	12	39
Indian Point	2	2	5	5	14	9	3	12	15	39	6	3	9	9	27
West Point	--	--	5	6	11	--	--	12	18	30	--	--	12	15	27
Cornwall	3	2	5	6	16	9	6	18	15	48	9	6	15	15	45
Poughkeepsie	--	--	6	3	9	--	--	15	15	30	--	--	9	12	21
Hyde Park	--	--	3	4	7	--	--	15	18	33	--	--	12	18	30
Kingston	--	--	8	6	14	--	--	9	12	21	--	--	12	9	21
Saugerties	--	--	5	3	8	--	--	9	9	18	--	--	15	9	24
Catskill	--	--	11	9	20	--	--	9	8	17	--	--	9	9	18
Albany	--	--	22	11	33	--	--	14	16	30	--	--	8	9	17
Total	12	10	92	75	189	36	18	143	153	350	36	21	134	138	329

	4-Week Period From 11 JUN To 6 JUL					5-Week Period From 16 JUL To 16 AUG				
	Shoal		Bottom	Channel		Shoal		Bottom	Channel	
Region	Sled	Trawl	Sled	Trawl	Total	Sled	Trawl	Sled	Trawl	Total
Battery	--	--	8	16	24	--	--	9	12	21
Yonkers	8	8	12	16	44	6	6	8	12	32
Tappan Zee	8	8	20	20	56	7	5	9	12	33
Croton-Haverstraw	12	8	12	12	44	10	5	9	12	36
Indian Point	12	8	20	12	52	6	6	9	9	30
West Point	--	--	16	20	36	--	--	8	9	17
Cornwall	8	8	24	12	52	6	6	8	9	29
Poughkeepsie	--	--	16	13	29	--	--	9	9	18
Hyde Park	--	--	20	20	40	--	--	--	--	--
Kingston	--	--	16	12	28	--	--	--	--	--
Saugerties	--	--	16	8	24	--	--	--	--	--
Catskill	--	--	12	12	24	--	--	--	--	--
Albany	--	--	12	12	24	--	--	--	--	--
Total	48	40	204	185	477	35	28	69	84	216

NOTE: Dashes (--) indicate no sampling scheduled.

subsampling quotas. The purpose of this exception was to allow splitting before sorting of taxa such as clupeids which could readily be distinguished from *Morone* by sorters.

The second set of criteria for subsampling larvae applied to the six other river runs not covered in the previous paragraph (before and after the period of striped bass abundance). Any sample from these river runs may have been subsampled so that larvae were sorted from one or more splits containing at least 100 larvae (i.e., yolk-sac larvae, post yolk-sac larvae, and young of year combined) of all species combined.

To eliminate any chance of bias, some steps in the splitting procedure were performed by an assistant so that the sorter had no prior knowledge of which splits were to be used for the analysis. This procedure is explained in Figure 2-6.

Randomness of the splitting procedure was monitored and controlled by testing selected samples to determine whether splits from the same sample differed by more than random variation. Samples were selected to test for randomness by a continuous sampling plan, shown in Figure 2-7 (CSP-V from MIL-STD-1235B, AQL = 10 percent).

For each split sample evaluated, three fractions of the same size were sorted and compared by the chi-square test according to the following procedure. The counts of the three splits (including any quality control [QC] finds) were averaged to obtain the expected value for the sample. Chi-square was calculated as:

$$\text{chi-square} = \frac{(O_1 - E)^2}{E} + \frac{(O_2 - E)^2}{E} + \frac{(O_3 - E)^2}{E}$$

where

O_1, O_2, and O_3 = observed counts for splits 1, 2, and 3
E = expected value for the sample (average of O_1, O_2, and O_3).

If the calculated value for chi-square was less than 5.99, then the splits of that sample were considered random, and the sample passed the split QC (5.99 was the critical value of chi-square with two degrees of freedom at an alpha level of 0.05). If a sample was split for both eggs and larvae, then both stages were tested separately. The sample passed the split QC only if chi-square was below the critical value for both life stages.

Eggs and larvae were separated from detrital material, sorted by major taxonomic group and life stage, counted, and placed in vials containing 5 percent formalin or in alcohol. Sorted samples were evaluated by a trained technician under magnification and all organisms were identified and enumerated. The following life stage designations were used in identification:

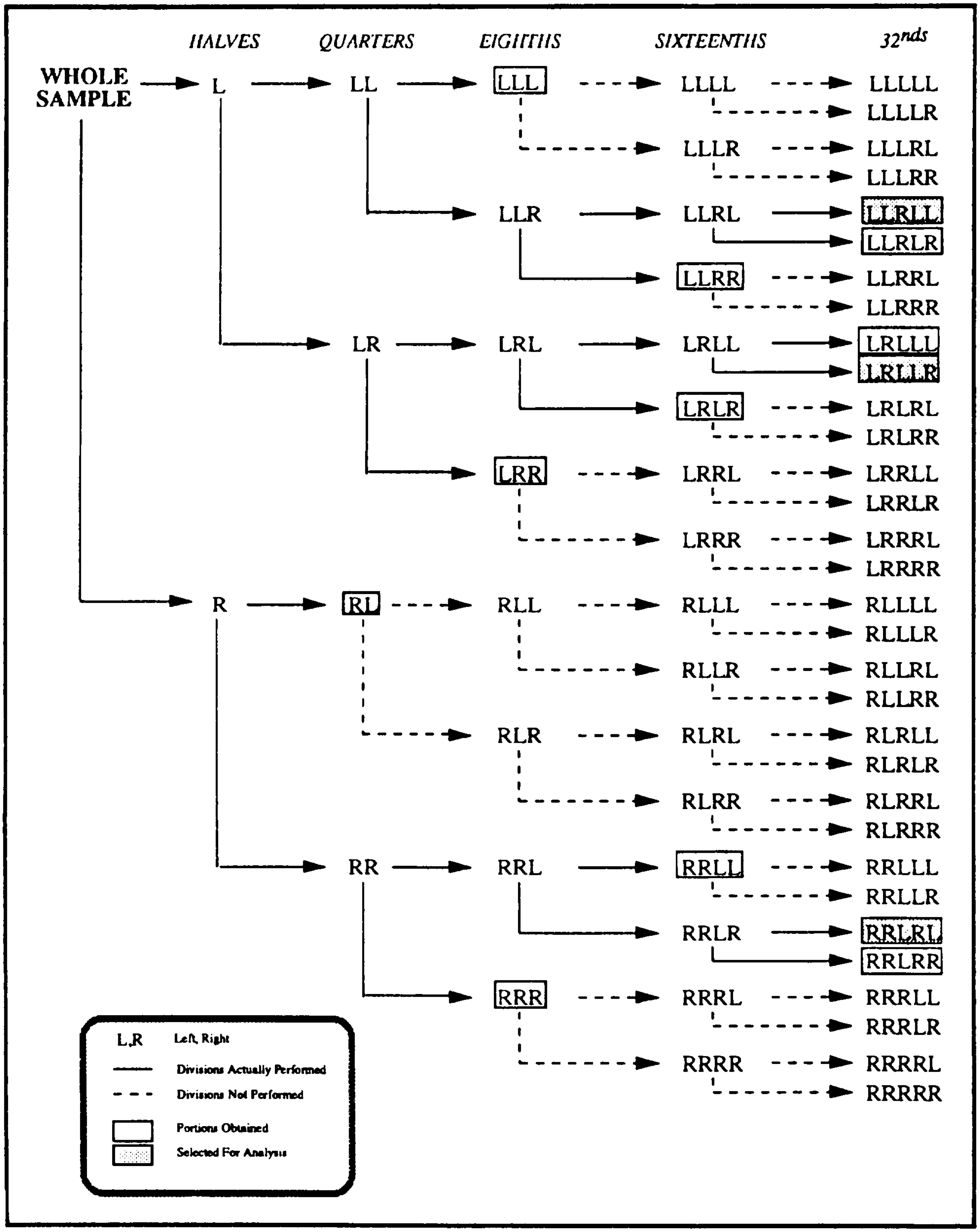


Figure 2-6. Conceptual diagram of the splitting process.

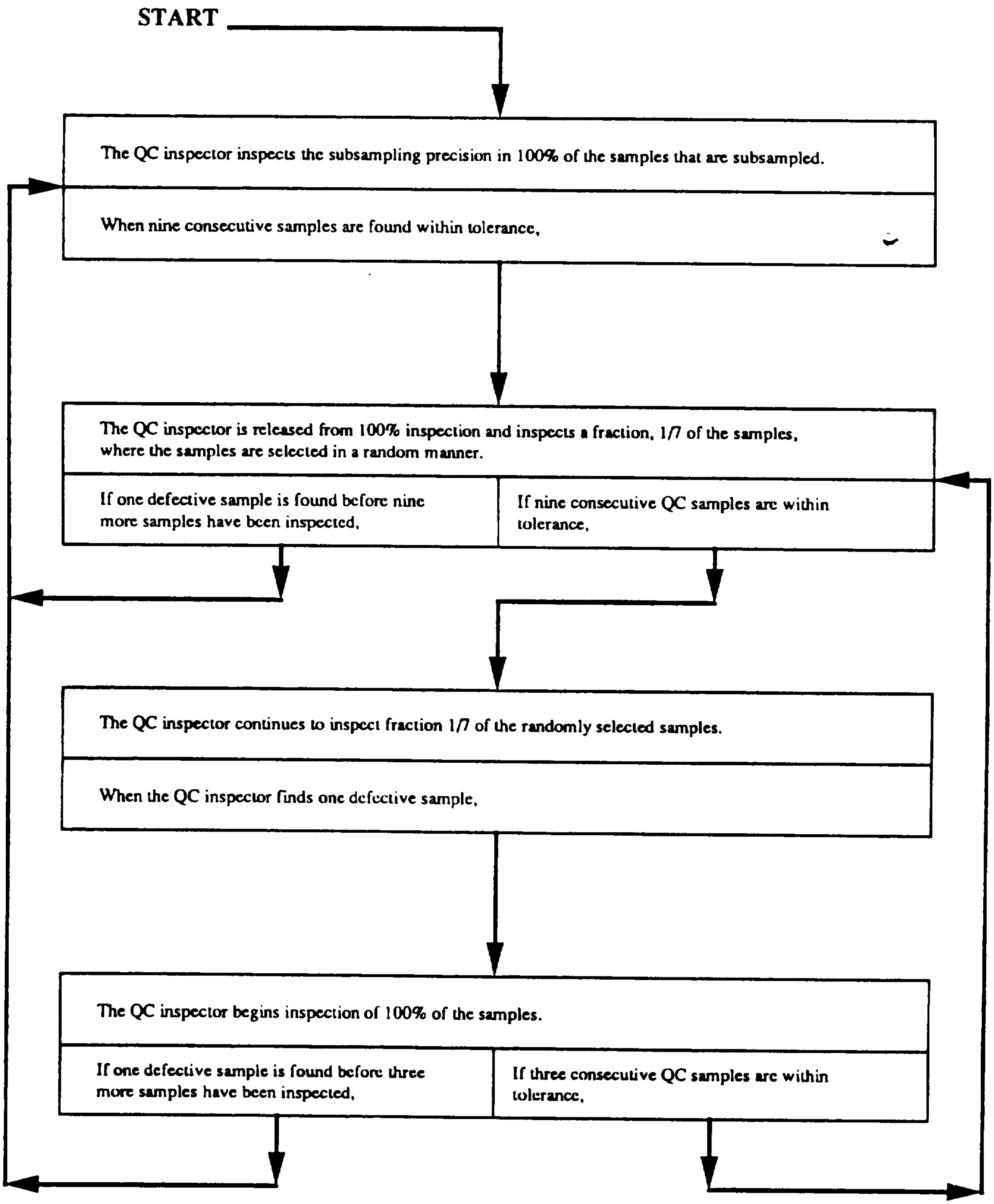


Figure 2-7. Inspection plan for evaluation of splitting precision.

Life Stage	Description
Egg	Embryonic stage from spawning to hatching
Yolk-Sac Larvae	From hatching to development of a complete and functional digestive system
Post Yolk-Sac Larvae	From development of a complete digestive system to acquisition of a full complement of adult fin rays
Young of Year	From acquisition of a full complement of adult fin rays to 31 December of the year spawned

Whenever possible, a maximum of 30 striped bass, 30 white perch, and 30 American shad per sample were measured. Organisms were chosen at random from all specimens regardless of life stage until the required number were obtained; life stages to be included were yolk-sac larvae, post yolk-sac larvae, and young of year. In addition 30 striped bass eggs were measured and an aggregate dry weight taken from each of the five samples with the greatest number of striped bass eggs. Eggs (diameter) and yolk-sac larvae and post yolk-sac larvae (total length) were measured to the nearest 0.1 mm and young of year to the nearest 1 mm. Measurements were recorded on the laboratory data sheet. Selection of specimens for measuring was randomized by spreading them uniformly in a gridded container, selecting a starting point in the grid by means of a random number table, and then measuring the first 30 measurable specimens encountered in a predetermined pattern commencing at the starting point. Every grid space had an equal probability of being selected as the starting point, so every specimen had an equal probability of being included in the subsample.

Continuous sampling inspection was employed during the sort and identification procedures to ensure an average outgoing quality of <0.1. Two sampling modes were required in the continuous sampling plan (CSP-1):

> Mode 1: The first eight samples sorted or analyzed for larval identification by an individual are subject to 100 percent QC reanalysis. If all eight pass the reanalysis, i.e., if ≤10 percent of the ichthyoplankton are missed or misidentified per sample, the individual is placed in CSP Mode 2. If any sample fails during Mode 1, then Mode 1 is continued until eight consecutive samples pass. For example, if a sample with QC No. 7 fails, then samples with QC Nos. 8 through 15 are subject to QC resorting.

> Mode 2: Lots of seven consecutive samples per individual are assigned. One sample from each lot is randomly chosen for QC analysis. If a sample fails (>10 percent of organisms missed or misidentified) during Mode 2, that individual is placed back into Mode 1. For example, if a sample with QC No. 6 fails in a lot of seven samples, then samples with QC Nos. 7 through 14 are subject to QC reanalysis. If samples 7 through 14 pass, the individual is again placed in Mode 2.

Results of the 1990 CSP-1 QA/QC Program are contained in Appendix A.1.

2.3 FALL JUVENILE SURVEY

2.3.1 Field Methods

A 1.0-m^2 Tucker trawl and a 3.0-m beam trawl were used to collect young-of-year fish in the FJS. The Tucker trawl with 3.0-mm mesh was used to collect samples in the channel strata, while the beam trawl (Figure 2-8) was used to sample the shoal and bottom strata. The latter gear was first used in this capacity in the 1985 FJS; prior to 1985 an epibenthic sled-mounted Tucker trawl was used (see Table 2-7 for design specifications for both trawl types).

Both gear types were towed against the prevailing current for approximately 5 minutes. For the Tucker trawl vessel speed is adjusted as necessary to achieve and maintain a 45° wire angle; the resultant tow speed is recorded. The beam trawl is towed speed of approximately 1.5 m/second. Tow speed was established and maintained by use of an electronic flowmeter mounted along the side of the research vessel and equipped with an ondeck readout display. A calibrated digital flowmeter mounted in the center of the net mouth was used to calculate the volume of water filtered for each sample.

The 1990 FJS biweekly sampling program covered 15 weeks from 9 July to 17 October (Figure 2-5), with all samples collected at night. Table 2-8 presents the distribution of the sampling effort among the 12 river regions by stratum for the 1990 FJS. In 1990, 1,680 samples were scheduled for collection; 1,680 samples, or 100.0 percent of the scheduled number were actually collected.

Calibrated meters were used to measure water temperature (°C), dissolved oxygen (mg/liter), and specific conductance (microsieman/cm at 25°C) at fixed river mile and strata stations in conjunction with field sampling. Sampling locations were the same as those used for the 1990 LRS sampling program (Table 2-5). Measurements of physical/chemical parameters were recorded during each biweekly FJS sampling period from surface, mid, and bottom water depths at channel stations and from surface and bottom water depths at shoal stations. During the 8 collection weeks of the 1990 FJS, 1,336 samples were scheduled and 1,149 samples were actually collected.

Samples collected during the first two sampling periods (River Runs 1 and 2) for the 1990 FJS program were preserved with 10 percent formalin at the time of collection and returned to the laboratory for analysis. Before preservation, samples were examined for sturgeon determined to be yearling or older, based on length categorization; live fish were returned to the river. Samples from the first two river runs were returned to the laboratory for analysis because of the difficulty in differentiating some species, especially young-of-year *Morone* (striped bass, white perch) and *Alosa* (alewife, blueback herring).

Samples collected following the second biweekly sampling period were evaluated in the field; only fish required to fill length measurement quotas were returned to the laboratory. The quota was to be 20 specimens of a selected species from each river region per run; because of

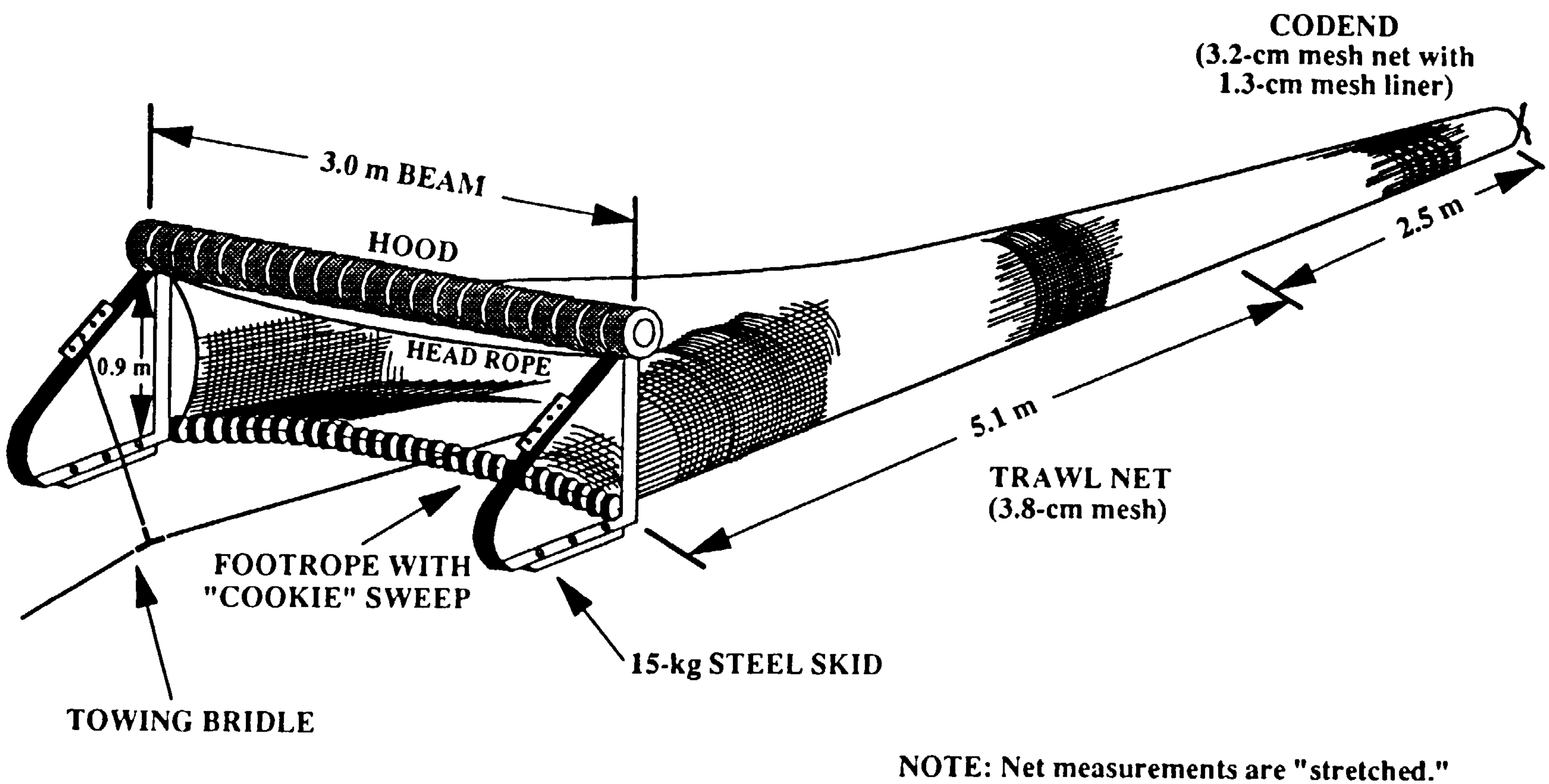


Figure 2-8. Design and dimensions of the 3.0-m beam trawl used in the 1990 Fall Juvenile Survey.

TABLE 2-7 SPECIFICATIONS OF SAMPLING GEAR USED DURING THE 1990 FALL JUVENILE SURVEY

1.0-m^2 Tucker Trawl

Length	8.0 m
Mouth (width)	1.0 m
Mesh size	3.0 mm
Collection cage (codend)	
Length	81 cm
Diameter	41 cm
Mesh size	3.0 mm

3.0-m Beam Trawl

Length	7.6 m
Beam width	3.0 m
Net body	3.8-cm mesh (stretch)
Codend	3.2-cm mesh (stretch) net with 1.3-cm mesh (stretch) liner
Hood	3.8-cm mesh (stretch)
Footrope	Equipped with 5.1-cm rollers
Headrope	Equipped with three floats
Mouth area	2.7 m^2

TABLE 2-8 NUMBER OF BIWEEKLY SAMPLES COLLECTED DURING THE 1990 FALL JUVENILE SURVEY

9 July - 17 October

Region	Shoal (Beam Trawl)	Channel (Tucker Trawl)	Bottom (Beam Trawl)	Total
	Strata			
Yonkers	57	40	40	137
Tappan Zee	240	64	64	368
Croton-Haverstraw	128	24	64	216
Indian Point	48	24	40	112
West Point	--	24	40	64
Cornwall	40	24	40	104
Poughkeepsie	--	24	40	64
Hyde Park	--	32	48	80
Kingston	--	48	72	120
Saugerties	--	48	96	144
Catskill	--	48	120	168
Albany	--	39	64	103
Total	513	439	728	1,680*

* All samples collected at night.

NOTE: Dashes (--) indicate no sampling scheduled.

the necessity of returning fish to the river alive, the first 20 specimens of a selected species were brought to the laboratory for length measurements. In 1990, the Hyde Park through Albany regions were considered one region for the purpose of filling length measurement quotas during the entire FJS and during River Runs 4 through 11 of the BSS. Also for the BSS during River Runs 1 through 3, the Yonkers through West Point regions were considered as one region for the same purpose. In river regions where fewer than 10 samples were collected per survey, no more than 10 specimens of each selected species from an individual sample were used to fill the length measurement quota. This criterion was used in the following surveys by river region:

Sampling Program	Region
BSS	YK, IP, WP, CW, PK
FJS	WP, PK

In all other regions, when the sample schedule resulted in 10 or more samples per survey, no more than five specimens per species in a sample were used to fill the length measurement quotas. If more specimens of a species were collected than needed, the individuals used to fill the quotas were randomly selected.

All fish not returned to the laboratory were identified and enumerated into length classes as described in the following section.

2.3.2 Laboratory Methods

Fish from the FJS identified and enumerated in both the field and laboratory were separated into the following length classes:

Length Class 1 - Less than or equal to the young-of-year length limit ("Division 1"), which was obtained from the Indian Point impingement contractor on a weekly basis for each species.

Length Class 2 - Greater than Division 1 and less than or equal to the yearling length limit ("Division 2"); set at 150 mm for most species, also obtained weekly from the impingement contractor. From 1 January through 31 May, Division 2 represents the upper length limit for yearling fish for all species. From 1 June through 31 December, Division 2 is assigned a static value of 150 mm TL for all species except alewife, American shad, blueback herring, striped bass, Atlantic tomcod, and white perch. For these species, Division 2 is maintained as a dynamic upper length limit for yearling fish throughout the year.

Length Class 3 - Greater than Division 2 and less than or equal to 250 mm.

Length Class 4 - Greater than 250 mm.

Twenty specimens of the following selected species collected in each river region were measured for total length (nearest millimeter) in the laboratory:

- Alewife
- American shad
- Atlantic sturgeon
- Atlantic tomcod
- Bay anchovy
- Blueback herring
- Shortnose sturgeon
- Spottail shiner
- Striped bass
- Weakfish
- White catfish
- White perch

2.4 BEACH SEINE SURVEY

2.4.1 Field Methods

The BSS utilized a 30.5-m bag beach seine to collect young-of-year fish in the shore zone of each region. Table 2-9 presents specifications for the beach seine. One end of the net was held on shore and the other end was towed perpendicularly away from the shore by boat. The seine was then hauled, clockwise if possible, in a semicircular path toward shore. The complete tow swept an area of approximately 450 m^2 (TI 1981). All BSS samples were collected on a diurnal schedule during alternate weeks of the FJS.

The 1990 BSS biweekly sampling program was conducted from 18 June through 24 October (Figure 2-5). Ten of the 19 weeks in this time period were collection weeks. Allocation of the proposed 100 beach seine samples per river run by river region and the total number of samples collected for the 1990 BSS are presented in Table 2-10. All of the scheduled 1,000 samples projected for collection in 1990 were collected.

Measurements of water temperature (°C), dissolved oxygen (mg/liter), and specific conductance (microsieman/cm at 25°C) were taken with each beach seine sample. Physical/chemical measurements were taken 1 ft below the water surface and approximately 50 ft from the shoreline. During the 10 collection weeks of the 1990 BSS, 1,000 samples were scheduled and 1,000 samples were actually collected.

Young-of-year fishes collected during the first four beach seine river runs in 1990 were processed in the laboratory because of the difficulty in distinguishing species at the young-of-year life stage, adults were processed in the field. All samples collected following River Run 4 were field processed; 20 specimens of the selected species from each region per run were collected (as described in Section 2.3.1) for length determination in the laboratory. Samples maintained for laboratory analysis were preserved using 10 percent formalin.

All sturgeon collected during both the FJS and BSS in 1990 were measured to the nearest 1 mm and weighed to the nearest 1 g. Fish that remained alive were returned to the Hudson River estuary; dead fish were frozen and held for the New York State Department of Environmental Conservation (NYSDEC).

TABLE 2-9 SPECIFICATIONS OF SAMPLING GEAR USED DURING THE 1990 BEACH SEINE SURVEY

30.5-m Beach Seine

Number of wings	2
Length of wings	12.0 m
Depth of wings	2.4 m
Wing mesh (bar)	1.0 cm
Length of bag	6.1 m
Depth of bag	3.0 m
Bag mesh (bar)	0.5 cm
Sample area	450 m^2

TABLE 2-10 NUMBER OF BIWEEKLY SAMPLES COLLECTED DURING THE 1990 BEACH SEINE SURVEY

18 June - 24 October

Region	Number of Beaches Sampled
Yonkers	44
Tappan Zee	200
Croton-Haverstraw	120
Indian Point	44
West Point	44
Cornwall	51
Poughkeepsie	59
Hyde Park	59
Kingston	59
Saugerties	108
Catskill	126
Albany	86
Total	1,000

2.4.2 Laboratory Methods

All fish returned to the laboratory were measured for total length to the nearest 1.0 mm. Laboratory analysis was conducted in the same manner as described for samples collected during the FJS.

2.5 ANALYTICAL METHODS

2.5.1 Physical/Chemical Parameters

To display the spatial and temporal patterns of temperature, salinity, and dissolved oxygen, a mean of each parameter for each sampling location and sampling week, weighted by stratum volume, was calculated. Equation 1 was used to compute these means for the standard physical/chemical stations sampled in conjunction with the LRS and FJS. Equation 2 was used for data taken in conjunction with the BSS. Salinity data were computed from conductivity data (microsieman/cm at 25°C) using Equation 3 (TI 1976). This equation differs from that used in some of the previous Year Class Reports in that pressure data is not required. The maximum deviation between this equation and the previous equation is 0.1 percent (TI 1976).

$$W_{lw} = \sum_{k=1}^{n_{lw}} P_{kr} \left[\frac{1}{n_{klw}} \sum_{d=1}^{n_{klw}} \left(\frac{1}{n_{dklw}} \sum_{i=1}^{n_{dklw}} W_{idklw} \right) \right] \quad (1)$$

where

W_{lw} = Weighted mean of a physical/chemical parameter at sampling location l during week w of the LRS and FJS

W_{idklw} = Physical/chemical measurement for location i at depth d in stratum k at sampling location l during week w

P_{kr} = Proportion of the river volume of region r containing sampling location l that is contained by stratum k (bottom and channel strata were combined for water quality analysis)

n_{dklw} = Number of sites at which measurements were made at depth d in stratum k at sampling location l during week w

n_{klw} = Number of depths sampled in stratum k at sampling location l during week w

n_{lw} = Number of strata sampled at sampling location l during week w.

$$W_{rw} = \frac{1}{n_{rw}} \sum_{i=1}^{n_{rw}} W_{irw} \qquad (2)$$

where

W_{rw} = Mean of a physical/chemical parameter at river mile r during biweek w of the BSS

W_{irw} = Physical/chemical measurement for location i at river mile r during biweek w

n_{rw} = Number of physical/chemical measurements taken at river mile r during biweek w.

$$\text{Salinity} = -100 \, ln \left(1 - \frac{C_{25}}{178.5} \right) \qquad (3)$$

where

C_{25} = Conductivity (millisieman/cm at 25 C).

2.5.2 Spatiotemporal Distribution Indices

2.5.2.1 Density and Catch-Per-Unit-Effort (CPUE) Estimates

Estimates of population densities were made for the LRS and FJS. For these two surveys the number of fish (by species and life stage) in individual samples was first converted to density (no./m^3 of water sampled) using Equation 4. The mean density and the standard error of the mean were calculated for each stratum, region, and sampling week using Equations 5 and 6. To obtain a mean density and standard error for each region during each sampling week, the stratum densities were weighted by the proportion of the regional river volume found in the stratum (Equations 7 and 8). If a stratum was not sampled, its volume was added to the volume of an adjacent stratum that was sampled. Stratum volume adjustments were made according to the following rules:

If This Stratum Was Not Sampled	Its Volume Was Added To This Stratum
Shoal	Bottom
Bottom	Channel

$$D_{ikrw} = \frac{C_{ikrw}}{V_{ikrw}} \tag{4}$$

where

D_{ikrw} = Density (for a life stage and species)/m^3 for sample i in stratum k in region r during week w

C_{ikrw} = Number of fish caught in sample i in stratum k in region r during week w

V_{krw} = Volume sampled (m^3) by sample i in stratum k in region r during week w.

$$D_{krw} = \frac{1}{n_{krw}} \sum_{i=1}^{n_{krw}} D_{ikrw} \tag{5}$$

where

D_{krw} = Average density in stratum k in region r during week w

D_{ikrw} = Sample density calculated in Equation 4

n_{krw} = Number of samples taken in stratum k in region r during week w.

$$SE(D_{krw}) = \sqrt{\frac{\sum_{i=1}^{n_{krw}} (D_{ikrw} - D_{krw})^2}{(n_{krw})(n_{krw}-1)}} \tag{6}$$

where

$SE(D_{krw})$ = Standard error of the average density in stratum k in region r during week w

D_{ikrw} = Sample density calculated in Equation 4

D_{krw} = Average stratum density calculated in Equation 5.

$$D_{rw} = \sum_{K=1}^{n_{rw}} (D_{krw})(P_k) \tag{7}$$

where

D_{rw} = Average density in region r during week w

D_{krw} = Average stratum density calculated in Equation 5

P_k^* = Proportion of the regional river volume found in stratum k (Table 2-11)

n_{rw} = Number of strata sampled in region r during week w.

$$SE(D_{rw}) = \sqrt{\sum_{k=1}^{n_{rw}} [\, SE(D_{krw})^2 \, (P_k)^2 \,]} \tag{8}$$

where

$SE(D_{rw})$ = Standard error of average density in region r during week w

$SE(D_{krw})$ = Standard error of the average stratum density calculated in Equation 6.

Catches from the BSS were reported as number caught per seine haul (CPUE) by life stage and species. The average CPUE for a region and its standard error were calculated using Equations 9 and 10:

$$C_{rw} = \frac{1}{n_{rw}} \sum_{i=1}^{n_{rw}} C_{irw} \tag{9}$$

where

C_{rw} = Average CPUE in region r during week w

C_{irw} = CPUE for sample i in region r during week w

n_{rw} = Number of samples taken in region r during week w.

*When a stratum is missing, P_k for the sampled stratum is equal to the sum of the P_k for the sampled stratum and the P_k for the unsampled stratum.

$$SE(C_{rw}) = \frac{\sum_{i=1}^{n_{rw}} (C_{irw} - C_{rw})^2}{n_{rw}(n_{rw} - 1)} \tag{10}$$

where

$SE(C_{rw})$ = Standard error of average CPUE in region r during week w

C_{rw} = Average regional CPUE calculated in Equation 9.

2.5.2.2 Standing Crop Estimates

Standing crop (the number of fish in an area at a particular time) was estimated by life stage and species for each of the three surveys. Standing crop estimates and the associated standard errors were calculated for each stratum in a region by taking the product of the average stratum density (or the standard error) and the volume of water contained in that stratum (Equations 11 and 12 for the LRS and FJS) (Table 2-11). The regional standing crop was then estimated as the sum of the stratum standing crops (Equations 13 and 14). Similarly, an estimate of the standing crop for the Hudson River estuary for each week was calculated by summing the standing crops for the 12 (13 for the LRS) river regions (Equations 15 and 16).

$$SC_{krw} = (V_{kr})(D_{krw}) \tag{11}$$

where

SC_{krw} = Standing crop estimate for stratum k in region r during week w

V_{kr} = River volume contained by stratum k in region r

D_{krw} = Average stratum density calculated in Equation 5.

$$SE(SC_{krw}) = (V_{kr})[SE(D_{krw})] \tag{12}$$

where

$SE(SC_{krw})$ = Standard error of the standing crop estimate for stratum k in region r during week w

$SE(D_{krw})$ = Standard error of average stratum density calculated in Equation 6.

TABLE 2-11 STRATUM AND REGION VOLUMES (m^3) AND SURFACE AREAS (m^2) USED IN ANALYSIS OF 1990 HUDSON RIVER ESTUARY DATA

Geographic Region	Channel Volume	Bottom Volume	Shoal Volume	Region Volume	Shorezone Surface Area
Battery*	141,809,822	48,455,129	18,747,833	209,012,784	*
Yonkers	143,452,543	59,312,978	26,654,767	229,420,288	3,389,000
Tappan Zee	138,000,768	62,125,705	121,684,992	321,811,465	20,446,000
Croton-Haverstraw	61,309,016	32,517,633	53,910,105	147,736,754	12,101,000
Indian Point	162,269,471	33,418,632	12,648,163	208,336,266	4,147,000
West Point	178,830,022	25,977,862	2,647,885	207,455,769	1,186,000
Cornwall	94,882,267	36,768,629	8,140,123	139,791,019	4,793,000
Poughkeepsie	228,975,052	63,168,132	5,990,260	298,133,444	3,193,000
Hyde Park	131,165,041	32,012,000	2,307,625	165,484,666	558,000
Kingston	93,657,021	35,479,990	12,332,868	141,469,879	3,874,000
Saugerties	113,143,296	42,845,077	20,307,338	176,295,711	7,900,000
Catskill	83,924,081	42,281,206	34,526,456	160,731,743	8,854,000
Albany	32,025,080	13,517,183	25,606,842	71,149,105	6,114,000
Total	1,603,443,480	527,880,156	345,505,257	2,476,828,893	76,555,000

* Shorezone surface area is unknown and not used in data analysis as no beach seine sampling is performed in the Battery region. Estimation of strata volumes for the Battery Region is described in the 1989 year class report (EA 1990).

$$SC_{rw}^{**} = \sum_{k=1}^{3} SC_{krw} \tag{13}$$

where

SC_{rw} = Standing crop estimate for region r during week w

SC_{krw} = Stratum standing crop estimate calculated in Equation 11.

$$SE(SC_{rw})^{**} = \sqrt{\sum_{k=1}^{3} [SE(SC_{krw})]^2} \tag{14}$$

where

$SE(SC_{rw})$ = Standard error of standing crop estimate for region r during week w

$SE(SC_{krw})$ = Standard error of stratum standing crop estimate calculated in Equation 12.

$$SC_w = \sum_{r=1^{**}}^{12} SC_{rw} \tag{15}$$

where

SC_w = Standing crop estimate for week w

SC_{rw} = Regional standing crop estimate calculated in Equation 13 or 17.

$$SE(SC_w) = \sqrt{\sum_{r=1^{***}}^{12} [SE(SC_{rw})]^2} \tag{16}$$

[**]Volumes of unsampled strata were added to the volumes of an adjacent stratum according to the rules for stratum volumes in Section 2.5.2.

[***]For the LRS, r=0

where

$SE(SC_w)$ = Standard error of standing crop estimate for week w

$SE(SC_{rw})$ = Standard error of regional standing crop estimate calculated in Equation 14 or 18.

An estimate of regional standing crop (and standard error) for the BSS was obtained by multiplying CPUE and the surface area of the shore zone and dividing by the empirically derived estimate of the area sampled by the 30.5-m beach seine (Equations 17 and 18). The weekly estimate of standing crop for the shore zone was calculated as the sum of the 12 regional standing crops (Equations 15 and 16).

$$SC_{rw} = (C_{rw} A_r) / A \qquad (17)$$

where

SC_{rw} = Standing crop estimate for the shore zone in region r during week w

C_{rw} = Average regional CPUE calculated in Equation 9

A_r = Surface area (m^2) of the shore zone in region r

A = Surface area (m^2) sampled by the beach seine (450 m^2) (TI 1981).

$$SE(C_{rw}) = [SE(SC_{rw})](A_r) \qquad (18)$$

where

$SE(SC_{rw})$ = Standard error of standing crop estimate for the shore zone in region r during week w

$SE(C_{rw})$ = Standard error of average regional CPUE calculated in Equation 10.

2.5.2.3 Temporal and Geographic Distribution Indices

Distribution indices were computed to facilitate presentation of changes in distribution of selected species and life stages through time and space. A geographic index that collapses data over weeks was calculated for LRS and BSS data as the relative density in each region. To allow comparisons of 1990 data with historical data, only data from samples collected from Weeks 18-27 (where Week 1 begins with the first Monday in January) and north of RM 12 were used for LRS; data from Weeks 33-40 were used for the BSS. In all cases, data were used only when Regions 1-12 were sampled. This geographic index was calculated as follows:

$$G_{ry} = \frac{\sum_{w=1}^{n_y} D_{rwy}}{\sum_{r=1}^{12} \sum_{w=1}^{n_y} D_{rwy}} \qquad (19)$$

where

G_{ry} = Geographic index for region r in year y

D_{rwy} = Regional density for week w in year y calculated in Equation 7 (or regional CPUE calculations in Equation 9 for BSS)

n_y = Number of weeks sampled in year y.

A temporal index that collapses data for the entire Hudson River estuary was computed for early life stages from LRS standing crops (Equation 20):

$$T_{wy} = \frac{SC_{wy}}{\sum_{w=1}^{n_y} SC_{wy}} \qquad (20)$$

where

T_{wy} = Temporal index for week w in year y

SC_{wy} = Weekly standing crop estimate in year y calculated in Equation 15

n_y = Number of weeks sampled in year y.

2.5.3 Annual Young-of-Year Abundance Indices

2.5.3.1 Beach Seine Abundance Index

Weekly average CPUE for the Beach Seine component of the index was calculated as the weighted mean of average regional CPUE values. The weighting factor used was the percentage of the 284 sample beaches occurring in a region (Table 2-12). The formula for the calculations of weekly beach seine abundance is presented in Equation 21:

TABLE 2-12 REVISED VOLUME (m^3) ESTIMATES USED FOR WEIGHTING STRATA MEANS* AND NUMBER OF BEACHES USED FOR WEIGHTING REGIONAL MEANS OF ABUNDANCE FOR THE ANNUAL ABUNDANCE INDICES

Region	Bottom Volume	Shoal Volume	Number of Beaches
Yonkers	0	5,784,084	15
Tappan Zee	20,377,231	26,405,643	25
Croton-Haverstraw	10,665,784	11,698,493	25
Indian Point	10,961,311	2,744,651	22
West Point	8,520,739	0	9
Cornwall	12,060,110	1,766,407	15
Poughkeepsie	20,719,147	0	30
Hyde Park	10,499,936	0	17
Kingston	11,637,437	0	11
Saugerties	14,953,185	0	20
Catskill	13,868,236	0	41
Albany	4,433,636	0	54
Total	---	---	284

* For bottom and shoal strata.

$$BS_w = \frac{\sum_{r=1}^{12} (B_r)(C_{rw})}{\sum_{r=1}^{12} B_r} \tag{21}$$

where

BS_w = Beach seine average CPUE in week w

B_r = Number of sampleable beaches in region r

C_{rw} = Average regional CPUE (as calculated in Equation 9).

The overall Beach Seine abundance index for 1990 was calculated as the mean of the weekly average CPUE for Weeks 33 through 40 (sampling from 13 August through 26 September).

2.5.3.2 Fall Juvenile Abundance Index

Weekly density for this index was calculated by first computing weekly strata densities for each stratum of the Hudson River estuary using Equation 22:

$$D_{wrk_r} = \frac{\sum_{i=1}^{n_{k_r}} C_{wrk_r i}}{\sum_{i=1}^{n_{k_r}} V_{wrk_r i}} \tag{22}$$

where

D_{wrk_r} = Estimated density in stratum k_r of region r during week w
n_{k_r} = Number of samples taken in stratum k_r of region r
$C_{wrk_r i}$ = Number of fish caught in sample i in stratum k_r of region r during week w
$V_{wrk_r i}$ = Volume of sample i in stratum k_r of region r during week w.

Offshore data were adjusted for the relative gear efficiency of the beam trawl versus the epibenthic sled. The adjustment factors correspond to modified bottom and shoal strata volume estimates used to correct offshore density estimates for comparison with epibenthic sled data collected in previous years. Those factors were calculated from data presented in NAI 1986 and are presented in Table 2-13. Density estimates were divided by the adjustment factors.

TABLE 2-13 ADJUSTMENT FACTORS FOR THE BEAM TRAWL TO STANDARDIZE VALUES WITH THOSE OF THE EPIBENTHIC SLED

Species	Adjustment Factor
Striped bass	4
White perch	10
American shad	0.1
Bay anchovy	0.02

These strata density estimates were then combined to form a weekly offshore average density estimate (Equation 23). Percent volumes contained in each stratum were used to weight strata density estimates. The volumes used in calculating these weekly average density estimates were less than the total strata volume and only included the portion of the strata actually sampled by each gear (Table 2-12). In the bottom strata, actual sampling was limited to the portion of that strata within 3.3 ft of the bottom. Consequently, the bottom volume used for the calculation of this index was proportionately reduced from the total strata volume. Similarly, shoal strata volumes were adjusted to reflect the volume within 3.3 ft of the bottom with areas of the Hudson River estuary between 6.6 and 20 ft deep (MLW):

$$D_w = \frac{\sum_{r=r_s}^{r_e} \sum_{k_r=k_{rs}}^{k_{re}} (V_{rk_r})(D_{wrk_r})}{\sum_{r=r_s}^{r_e} \sum_{k_r=k_{rs}}^{k_{re}} V_{rk_r}} \qquad (23)$$

where

D_w = Average offshore density estimate for week w

D_{wrk_r} = Estimated stratum density calculated in Equation 22

V_{rk_r} = Volume weighting factor for stratum k_r in region r

r_s = First region included in the index

r_e = Last region included in the index

k_{rs} = First stratum included from region r in the index

k_{re} = Last stratum included from region r in the index.

The overall Fall Juvenile abundance index for 1990 was calculated as the mean of the average offshore density estimates for Weeks 33 through 40 (sampling from 20 August through 6 October).

2.5.3.3 Combined Standing Crop Estimates

The weekly combined standing crop method has been used to estimate the abundance of white perch and striped bass young of year for each week of sampling in the Hudson River estuary between RM 12 and RM 152.

The weekly combined standing crop estimates for 1990 were computed in six steps that combined data from the FJS and BSS:

1. Adjust the standing crop estimate of the shoal stratum for area sampled in the shore zone.

2. Sum the stratum standing crop estimates within a region for each survey.

3. Adjust regional standing crop estimates from each survey for gear efficiency.

4. Sum the regional standing crop estimates for each week for each survey.

5. Predict standing crop estimates for unsampled weeks of each survey.

6. Combine weekly standing crop estimates from the two surveys.

The standing crop estimate of the shoal stratum, as calculated by Equation 11, was reduced by 25 percent prior to summation of the three strata standing crop estimates for each region. This adjustment was made in order to eliminate overlap between the shoal stratum (0-3.3 ft) sampled in the FJS and the shore zone (0-3.3 ft) sampled in the BSS. It was based on the assumption that the bottom slopes uniformly from 0 to 6.6 ft.

After summing the stratum standing crop estimates in each region for each survey, the regional standing crop estimates were adjusted for gear efficiency. For the FJS, gear efficiency for the epibenthic sled (for years prior to 1985) and the Tucker trawl was assumed to be 50 percent. The BSS catch efficiencies were estimated (TI 1978b; 1979b) as 0.255 for young-of-year striped bass and 0.182 for young-of-year white perch. Since FJS sampling takes place at night and BSS sampling takes place during the day, species-specific gear efficiency adjustments (designed to account for night/day differences between the two fall surveys) were applied to standing crop estimates from the BSS. TI (1978b; 1979b) estimated night/day ratios of 2.136 and 1.685 for young-of-year striped bass and white perch, respectively.

In 1985, the epibenthic sled that had been used historically since 1974 was replaced with a beam trawl. Studies conducted by NAI (1986) in which the two types of gear were sampled in the same region found statistically significant, species-specific differences in catch between the two sampling devices. Adjustment factors, based on these relative catches, were developed in this report to estimate beam trawl gear efficiency (based on the assumed gear efficiency for epibenthic sled) so that data collected in 1990 could be compared to data collected prior to 1985 (Table 2-13). When an adjustment resulted in a revised gear efficiency greater than 100 percent, gear efficiency was assumed to be 100 percent.

After the FJS and BSS regional standing crop estimates were adjusted, the regional values were summed to estimate the adjusted standing crop for each week sampled. These steps are summarized for the BSS and FJS in Equations 24 and 25, respectively:

$$SC_{w,B} = \sum_{r=r_s}^{r_e} (SC_{rw,B})\ (R/C) \tag{24}$$

where

$SC_{w,B}$ = Adjusted standing crop estimate for week w of the BSS

$SC_{rw,B}$ = Standing crop estimate (as calculated in Equation 17)

R = Ratio of night/day beach seine catches.

C = Catch efficiency of beach seine during the day

r_s = First region included in the index

r_e = Last region included in the index.

$$SC_{w,F} = \sum_{r=r_s}^{r_e} \left[1/E_F\ [\ (0.75)\ (SC_{k=1,r,w}) + \sum_{k=2}^{3} SC_{krw}\ ]\right] \tag{25}$$

where

$SC_{w,F}$ = Adjusted standing crop estimate for week w of the FJS

E_F = Gear efficiency adjustment for the FJS

SC_{krw} = Standing crop estimate (as calculated in Equation 11)

k = 1 = shoal stratum; 2 = bottom stratum; 3 = channel stratum.

The final step in the calculation of weekly combined standing crop was to add the BSS and FJS adjusted weekly standing crop estimates to obtain a weekly estimate incorporating data from both surveys. In most years, FJS and BSS sampling was conducted in alternate weeks. Therefore, in weeks when no FJS sampling was conducted, the weekly FJS standing crop estimate was set equal to the mean of the FJS standing crop estimates for the two adjacent weeks. In weeks when no BSS sampling was conducted, the BSS standing crop estimate was set equal to the BSS estimate of the previous week. Standard error estimates were calculated as described in Versar 1987.

2.5.3.4 Coordinate Pair Index

The coordinate pair index provides a methodology for combining information from both the BSS and the FJS to describe relative young-of-year abundance (Versar 1987). The coordinate pair approach uses a ranking procedure to assign a value to each axis for each year. In order to ensure temporal consistency across all years, the calculation of the coordinate pair index was restricted to the period sampled in all years which extended from Week 33 to Week 40. A weighted CPUE is first calculated for each week of each year from the BSS (Equation 21); then all weeks in all years are ranked and a mean rank for each year is calculated based on beach seine sampling. A similar procedure using weighted mean densities (Equation 22) was used to calculate the annual mean ranking based on the FJS. The resulting paired mean ranks for each year were plotted against each other as an index of overall abundance.

2.5.4 Growth

Estimates of population growth rates for larval and young-of-year Hudson River estuary fishes were made from mean length data collected during the 1990 Hudson River surveys. Two methods were used, one based on successive exponential segments (a log-linear growth model) and another using the logistic growth model. For the log-linear model, size-selection bias is minimized by limiting the analysis to the period of presumably full recruitment that occurs after young-of-year fish become vulnerable to sampling gear. This has the disadvantage of estimating growth rates from a limited number of observations; it may also be influenced to some degree by size selectivity in the initial observations. The logistic growth model is estimated from a larger number of observations; however, it may also be influenced to some degree by size selectivity in the initial observations.

2.5.4.1 Log-Linear Growth Model

The log-linear growth model assumes exponential or log-linear growth: (1) from hatching to full recruitment to the beach seine, and (2) from full recruitment to 60 mm. Previous year class reports have defined full recruitment size for striped bass and white perch as 30 and 25 mm, respectively (TI 1980a,b). Based on 1984 data, the recruitment size of American shad is 30 mm (MMES 1986).

The dates on which the population mean length reached recruitment size and 60 mm were determined from the following relationship:

$$\ln (L_t) = \ln (L_0) + \beta(t) \tag{26}$$

where

L_t = Mean length at time t

L_0 = Predicted mean length at time 0

β = Instantaneous growth rate

t = Number of days since 1 May.

The coefficients L_0 and β were estimated using ordinary least-squares regression analysis on log transformed BSS length measurement data. After solving for L_0 and β, the equation was rearranged to solve for the dates on which full recruitment and 60 mm TL were reached.

Generally, only the weekly mean lengths from the first sampling period in July to the first week when the mean total length exceeded 60 mm TL were used in the regression analyses. In some cases, however, this criterion left only one to three observations. In order to increase the number of observations in these cases, the mean yolk-sac larvae length from the midweek of peak yolk-sac larvae abundance was included as an additional observation.

The growth rates from hatching to recruitment size were calculated using Equation 27; the growth rates from recruitment size to 60 mm were calculated using Equation 28:

$$G_L = \frac{L_r - L_0}{T_r - T_0} \qquad (27)$$

where

G_L = Growth rate of larvae and early young of year between hatching and recruitment size

L_r = TL (mm) for full recruitment to the BSS (30 mm for striped bass and American shad; 25 mm for white perch)

L_0 = Mean length of yolk-sac larvae (or length at hatching for striped bass)

T_r = Number of days since 1 May when length L_r was reached (estimated using Equation 26)

T_0 = Number of days since 1 May to the midpoint of the week of peak yolk-sac larvae (or peak egg for striped bass) standing crop.

$$G_J = \frac{60 - L_r}{T_{60} - T_r} \qquad (28)$$

where

G_J = Growth rate of young of year between recruitment and 60 mm TL

T_{60} = Number of days since 1 May when 60 mm was reached (estimated using Equation 26).

To determine the growth rate from hatching to recruitment to BSS (G_L), the date of hatching for striped bass was defined as the midpoint of the week of peak egg abundance and the mean length at hatching was assumed to be 4.0 mm. This length selection is based on reports by Westin and Rogers (1978) that mean hatching lengths were between 3.25 and 4.71 mm when hatching was completed at 18 C. The peaks in white perch and American shad egg abundance exhibited by the LRS samples may not accurately reflect peak abundance in the Hudson River estuary because of the demersal nature of the eggs of these species. Therefore, the midpoint of the week of peak yolk-sac larvae abundance, rather than peak egg abundance, was used in larval growth rate estimates. The larval abundance peaks were determined from the standing crop estimates from the LRS.

2.5.4.2 Logistic Growth Model

Weekly mean lengths (L_t) from the LRS, FJS, and BSS length data and the midpoint of the sampling weeks (t) were used to fit the logistic function (Equation 29):

$$L_t = \frac{K}{1 + e^{(A - Rt)}} \qquad (29)$$

The coefficients K, R, and A were derived from the least-squares fit of Equation 29. Equation 29 was rearranged to solve for the dates when the population was fully recruited to the BSS (30 mm for striped bass or American shad or 25 mm for white perch) and 60 mm were reached.

Using these estimated dates when the population mean lengths reached specified values, growth rates from hatching to recruitment size were calculated using Equation 27 and growth rates from recruitment to 60 mm were calculated using Equation 28.

CHAPTER 3
PHYSICAL/CHEMICAL PARAMETERS

Major influencing factors on the physical/chemical parameters of the Hudson River estuary are the volume of fresh water moving downstream, the degree of tidal activity and mixing, and the river morphometry (TI 1976). This chapter relates the parameters of temperature, salinity, and dissolved oxygen as measured during the 1990 surveys to these influencing factors. Although parameters were measured with the BSS, emphasis will be placed on data from the LRS/FJS as these surveys encompassed the entire fish sampling period. In addition, freshwater flow data obtained from the U.S. Geological Survey (USGS) gauging station at the Green Island Dam near Troy, New York, and daily water temperature data from the Poughkeepsie Water Works (PWW) are discussed. Tables of the aforementioned physical/chemical parameters are presented in Appendix B.

3.1 GREEN ISLAND DAM FLOWS

3.1.1 Introduction

A major factor affecting the physical/chemical parameters of the Hudson River estuary is the amount of freshwater flow from the various tributary streams and rivers. Approximately 60 percent of the total freshwater flow enters the Hudson River estuary from the Green Island Dam; the remaining 40 percent is contributed from tributaries along the course of the Hudson River estuary (TI 1976). Variability in the amount of fresh water entering the Hudson River estuary can have significant effects on other physical/chemical parameters. For example, large inputs of fresh water from Green Island Dam contribute to decreased salinity in the lower Hudson River estuary by effectively pushing back the saltfront. Sudden and sustained decreases in temperature may be related to high discharges of cooler fresh water. Dissolved oxygen concentrations may also be influenced by increased runoff containing high levels of oxygen-consuming materials.

3.1.2 Seasonal Pattern

Typically, freshwater flow from Green Island Dam is highest in April and lowest during August, with a secondary peak usually occurring in late December (TI 1976); the overall 1990 seasonal pattern of freshwater flow fits this typical pattern (Figure 3-1). In 1990, peak daily flow averages ranged from approximately 500 to 2,300 m^3/sec/day in March through May and again in mid-October and November, while periods of low daily flow averages of <200 m^3/sec/day occurred from July through early October (Figure 3-1) (Appendix Table B-1). However, several significant digressions from the average (1947-1989) flow rate were evident in 1990 previous to, and during, the sampling period (Figure 3-2). Above average flow occurred from March through May; the early, high discharge in March peaked at 2,101 m^3/sec/day on 18 March. Discharge peaked at 1,909 m^3/sec/day on 4 April, 1,628 m^3/sec/day on 12 April, and 1,560, 1,886, and 2,129 m^3/sec/day, on 14, 18, and 22 May, respectively. Another significant digression from the long-term average occurred in the fall of 1990, when

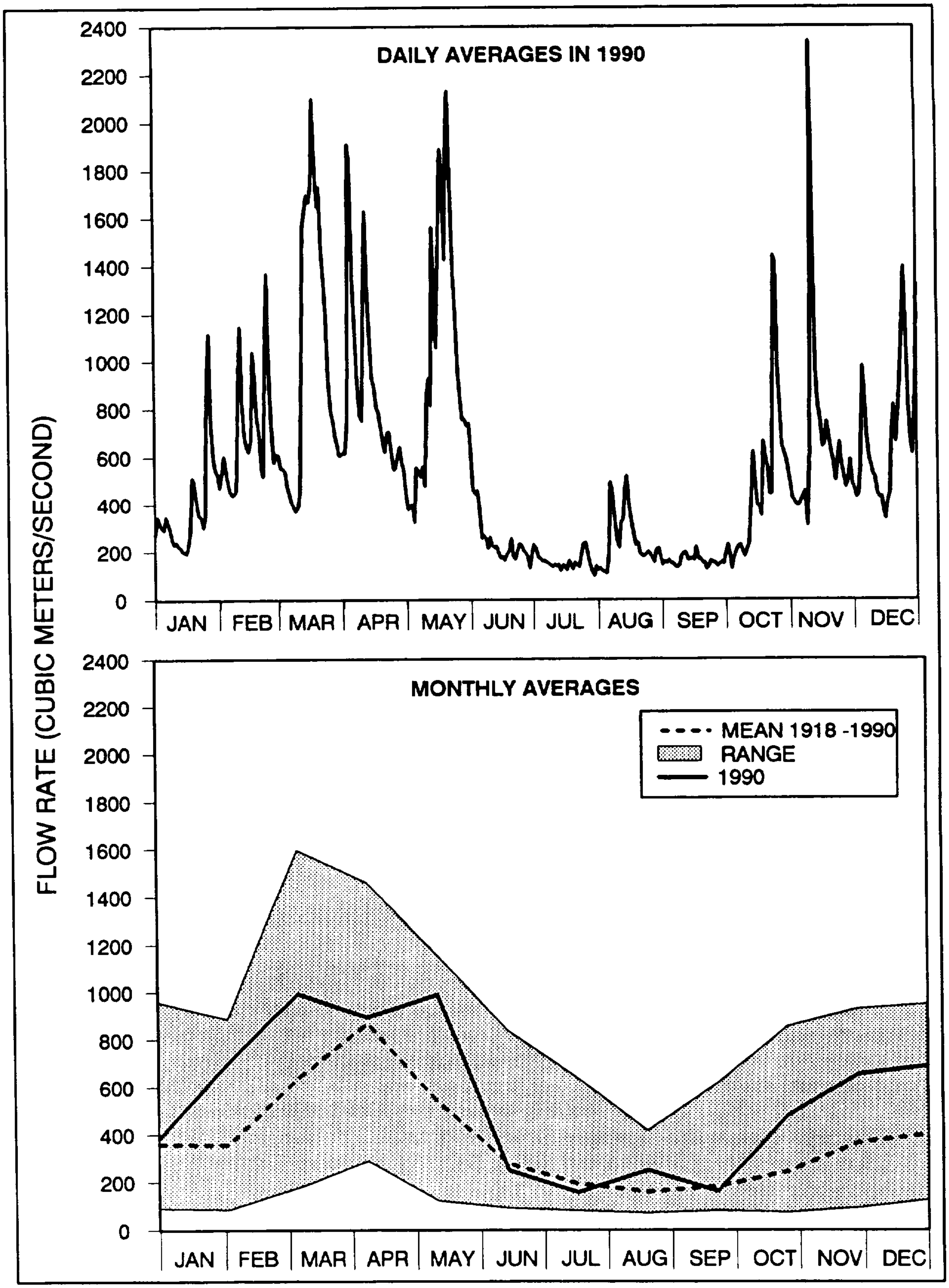


Figure 3-1. Hudson River daily average flow rates in 1990 and monthly average flow rates from 1918 to 1990, Green Island Dam, Troy, New York.

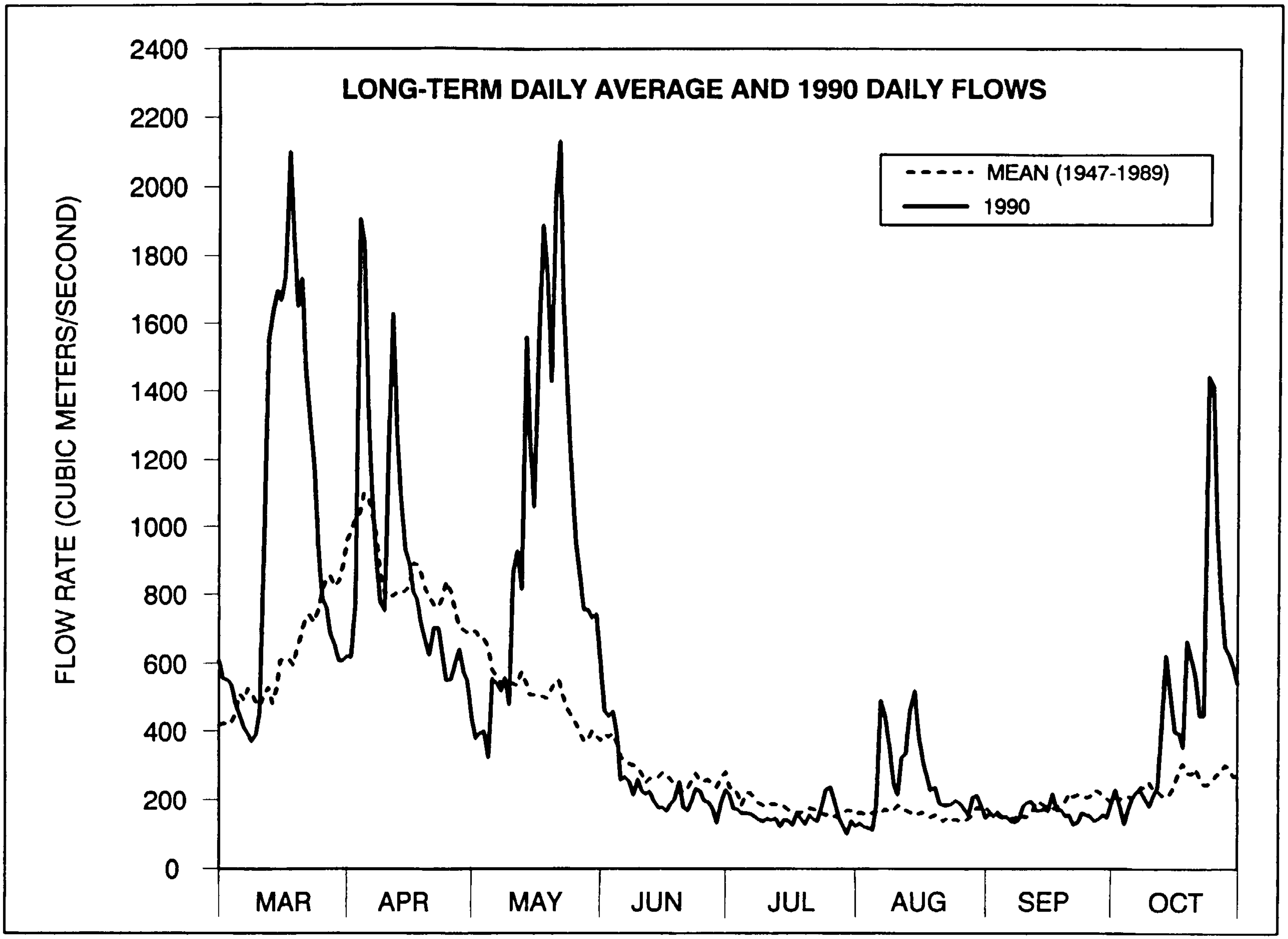


Figure 3-2. Hudson River long-term daily flow average and 1990 daily flows.

flows peaked to 1,441 m^3/sec/day on 24 October and to 2,336 m^3/sec/day on marked 11 November.

In addition, spring discharge peaks were generally associated with marked increases in water temperature, while the fall peaks were generally associated with notable decreases in water temperature. These digressions are significant because substantial above-average increases in flow during the critical spring and fall seasons may affect the distribution and density of important life stages of the fish species targeted for analysis.

3.1.3 Comparison to Long-Term Record

Flow data have been recorded at Green Island Dam since 1918. The long-term (1918-1990) monthly averages ranged from a low of 158 m^3/sec/month in August to a high of 868 m^3/sec/month in April (Figure 3-1 and Table B-2). Values in 1990 ranged from a low of 157 m^3/sec/month in July to a high of 994 m^3/sec/month in March (Figure 3-1 and Table B-2). In nine out of the 12 months (January, February, March, April, May, August, October, November, and December), the 1990 mean monthly flow was greater than (103 to 195%) the corresponding monthly long-term average but was within the range of long-term maximum values.

In comparison to recent years (1974-1989) discharges in 1975, 1976, 1977, and 1990 were the highest recorded (Table B-3). The 1990 average discharge (549 m^3/sec/year) was second only to the average recorded in 1976 (603 m^3/sec/year). Annual mean flows range from 301 m^3/sec/year in 1990 to 603 m^3/sec/year in 1976.

3.2 POUGHKEEPSIE WATER WORKS TEMPERATURES

3.2.1 Introduction

Long-term (1951-1990) daily temperature records were available from the Poughkeepsie Water Works (PWW), located just north of the City of Poughkeepsie, New York, at RM 76. Although temperatures were recorded daily for most of this period, beginning in June 1982 they were not recorded on weekends or major holidays. To fill in the missing values, the temperature from the nearest preceding day was substituted for the missing points. The data at PWW provide an extensive seasonal pattern of temperature at a single location on the Hudson River estuary to which the riverwide LRS/FJS temperature data can be compared.

3.2.2 Seasonal Pattern

Historically, water temperatures at PWW cycle on an annual basis, with the low (averaging approximately 1.0°C) occurring in January and February and the high (averaging approximately 25°C) in August (Table B-4). The lowest recorded temperature in 1990 was 0.8°C on 1 and 16 January. Water temperatures in 1990 remained relatively low (<2.5°C) through early March. Water temperature began increasing in early March and was characterized by two periods where temperature increased abruptly (temperature rose 1 to 2° a day from 15 March through 19 March and 2 May through 4 May) followed by an equally abrupt temperature decrease. Water temperature reached a high of 26.6°C on 4 August. Temperatures started to decline after late August. Temperature started to drop rapidly (approximately 14°C in five weeks) in late October. This rapid decline in water temperature can probably be attributed to large inputs of cooler fresh water on several dates in October and November (see Figure 3-1).

3.2.3 Comparison to Long-Term Record

The 1990 mean water temperature profile generally resembled the long-term pattern (Figure 3-3), but several significant digressions, where the 1990 mean approached either the long-term minimum or maximum, occurred. During a period from February through early March, 1990 mean water temperatures approached and occasionally exceeded the long-term maximum on several dates. The 1990 mean water temperature exceed the long-term maximum by 0.6 to 2.1°C from 16 to 26 March and approached and exceeded the long-term maximum by 0.1°C on 8 May. On 24 May, the 1990 mean water temperature declined to 12.9°C, only 0.1 degree greater than the long-term minimum temperature recorded for the date.

3.3 LONGITUDINAL RIVER ICHTHYOPLANKTON/FALL JUVENILE SURVEYS

3.3.1 Spatiotemporal Pattern in Temperature

Two primary factors controlling temporal changes in water temperature within the Hudson River estuary are the regular seasonal changes in incident solar radiation and short-term fluctuations in freshwater flow (TI 1976). Water temperatures increase or decrease concurrently with air temperatures as a result of changes in solar radiation. The effect of high discharges of fresh water is decreased downstream temperature. During the spring and summer this effect slows the warming of water temperatures, but during the fall increased freshwater flow speeds the cooling of water temperatures (TI 1976).

Mean weekly water temperature measured during the LRS/FJS increased from the beginning of sampling in April to early August, and then decreased steadily until the end of the sampling program in October (Figure 3-3). This temporal pattern, observed throughout the Hudson River estuary, closely exemplified the temporal changes in temperature recorded at PWW. Weekly mean temperatures measured during the LRS/FJS were in general agreement with concurrent PWW temperatures. Peak river temperatures occurred during the week beginning 30 July, as with PWW, when the riverwide mean was 26.6°C and regional mean values were between 26.3 and 28.2°C (Table B-5). Lowest values occurred during the first week of sampling when the mean riverwide temperature was 8.7°C (PWW daily temperatures were 7.6-8.6°C) and regional mean temperatures ranged from 7.0 to 10.2°C.

The cooling influence of a high discharge of freshwater flow was observed in the spring. When flow increased from 816 m^3/sec/day on 13 May to 2,129 m^3/sec/day on 22 May, the

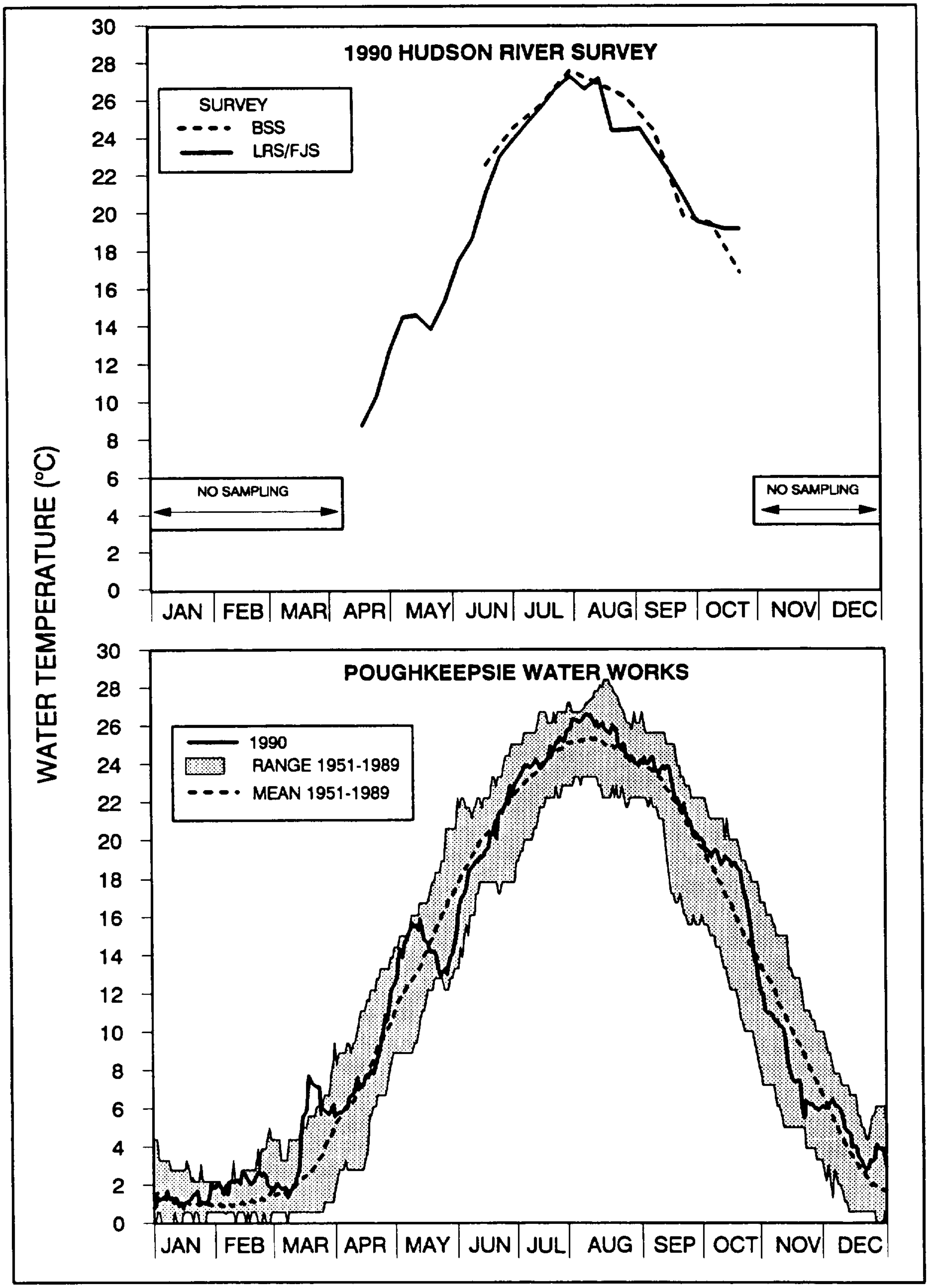


Figure 3-3. Seasonal variations in water temperature from 1990 Hudson River surveys and 1951-1990 Poughkeepsie Water Works.

mean water temperature during the sampling week beginning 14 May decreased several degrees.

A comparison of 1990 temperatures with those of previous years (Versar 1987; LMS 1989; EA 1990) indicates that temperature patterns and values were analogous. Mean regional temperatures during the first sampling week, the week of maximum temperatures, and the last survey week in 1990, were comparable to temperatures in equivalent weeks of previous years.

Mean weekly water temperatures were similar between regions during sampling weeks prior to 7 May. From 7 to 14 May, water temperatures in upper reaches (i.e., above Kingston) declined several degrees, probably as a result of the large increase in flow during this period. After this initial delay in the water temperature warming trend, upriver water temperature warmed rapidly. Containing some of the lowest regional water volumes (between 3 and 8 percent of the total volume of the Hudson River estuary), the upper regions respond more quickly to the warming effect of solar radiation during the spring. Influx of cool ocean waters maintains mean temperatures in the Yonkers region lower than most other regions during warmer periods. During the summer months of 1990, Croton-Haverstraw and Indian Point were the warmest regions, owing to their proximity to broad, shallow areas of the Hudson River estuary where decreased water movement and increased surface area for solar radiation contribute to higher temperatures. In the fall, the upriver regions, especially Albany, cool more quickly than other regions due to the increased flow of cooler fresh water and the smaller regional water volumes. Generally, the upper Hudson River estuary is warmer than downriver areas during the early spring and several degrees colder in the fall (LMS 1989; EA 1990). While the early spring data did not follow this pattern, upriver water temperatures in the fall were generally lower than those recorded downstream.

Temporal patterns in the BSS temperature data are generally in agreement with LRS/FJS measurements (Figure 3-3). Mean weekly regional temperatures increased during the spring and summer to a peak temperature of 29.8°C in the Cornwall region during the 13 August sampling week (Table B-6). The shallowness of the shore zone resulted in slightly higher temperatures measured during BSS than on corresponding weeks during LRS/FJS in the spring and summer (Figure 3-3). BSS mean temperatures decreased steadily through the end of the summer and the fall, generally on par with LRS/FJS temperatures. A minimum mean temperature of 13.0°C was recorded from the Albany region during the last week of sampling which began on 22 October. The shore zone areas of the lower Hudson River estuary were generally warmer than upriver areas throughout the BSS with the Indian Point and the Croton-Haverstraw regions most often exhibiting the highest temperatures. The Saugerties and Albany regions, in particular, and the upper Hudson River estuary, in general, contained most of the low temperatures recorded during the BSS; probably as a result of discharges of cooler fresh water and increased water movement in the narrower sections of the Hudson River estuary.

3.3.2 Spatiotemporal Pattern in Salinity

Factors of primary importance affecting the distribution of seawater and its associated measure (salinity) are volume of freshwater flow, tidal amplitude, and mixing caused by changes in river morphometry (TI 1976). Increasing volumes of freshwater flow downstream provide increasing resistance to upstream movement of seawater. As tidal amplitude increases, effective mixing of fresh water and seawater is increased, reducing the distance intruded by the saltfront as dilution occurs near the interface. Denser, more saline water follows deeper areas of the channel into the Hudson River estuary during intrusion. However, irregularities, like sills, in river bottom topography promote mixing of fresh and salt water. The reduced circulation and delay in mixing in shallow areas of the Hudson River estuary result in generally lower salinity.

Seasonal variations in salinity in 1990 resemble the pattern observed in previous years of the Hudson River surveys: decreased values in spring in response to increased freshwater flows, increasing summer levels as freshwater input slows, and finally, decreased salinity in the fall as freshwater discharges increase again. The lowest salinity encountered riverwide occurred during the week of 14 May when the water was fresh in all regions from Tappan Zee through Albany and mean salinity was less than 1 part per thousand (ppt) in the Yonkers region (Figure 3-4 and Table B-7). Salinity remained at low levels in May and June in regions above Tappan Zee due to the greater than average freshwater flows (Table B-2).

Salinity in the lower river regions quickly increased after flow declined and remained high through mid-October. Salinity values generally increase during the summer months, because freshwater flows are often at their lowest point during this time. Relatively good summer flows kept the salt front below previous years' extent. The salt front (1 ppt) reached ~~Croton-Haverstraw~~ only once during the summer of 1990, during the week of 30 July. During the week of 13 August, the salt front retreated abruptly from West Point back to Indian Point; the retreat correlated to a period of relatively high flows from 7 to 16 August (Table B-2).

Spatial patterns of salinity measured in the Hudson River estuary are dictated by the degree of intrusion of seawater. Proximity of the Yonkers region to the ocean leads to the highest mean regional salinity values. Salinity over 8 ppt reached lower portions of the Tappan Zee region throughout the summer (Figure 3-4). Salinity declined steadily with distance upriver; however, levels of 1.0 ppt extended into the lower sections of the ~~Croton-Haverstraw~~ region.

The spatiotemporal pattern of salinity observed during the BSS resembles that observed in the LRS/FJS. Mean weekly regional salinity was highest in the Yonkers region and decreased upstream (Table B-8). Mean salinity exceeded 0.2 ppt only once in regions north of Poughkeepsie. Peak salinity measurements (0.2 - 9.5 ppt from Croton-Haverstraw to Yonkers) were recorded during the week of 8 October and lowest values (0.1-2.8 ppt from West Point to Yonkers) were observed during the final week of sampling beginning on 22 October. Actual salinity encountered during the BSS was lower than during the LRS/FJS

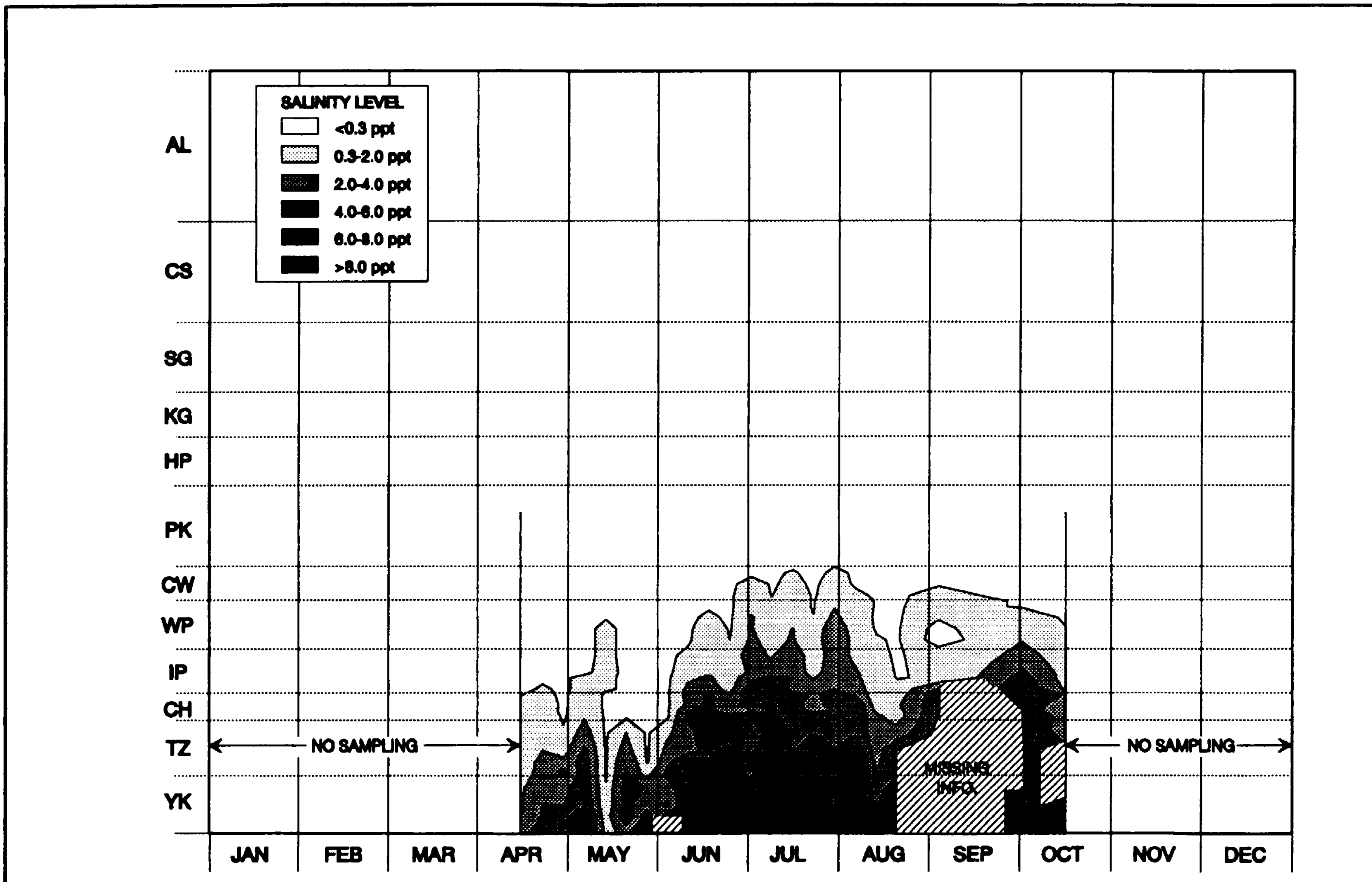


Figure 3-4. Seasonal variations in salinity based on the 1990 Longitudinal River Ichthyoplankton and Fall Juvenile surveys.

because of the tendency for the denser, saline water to follow the deeper channel rather than the shore zone area.

3.3.3 Spatiotemporal Pattern in Dissolved Oxygen

Dissolved oxygen (DO) concentrations in the Hudson River estuary are influenced by temperature, salinity, turbulence, photosynthesis, and respiration (TI 1976). DO changes inversely with changes in temperature, salinity, and respiration; however, changes in turbulence and photosynthesis cause similar directional changes in DO.

Temperature was a primary influence on DO concentrations during the 1990 surveys through its effects on saturation levels and biological consumption rates. As temperatures rose in the spring and summer, DO, as recorded in the LRS/FJS, declined from peak mean weekly regional values of 9.2-13.2 mg/liter on 16 April to minimum mean levels of 5.3-8.7 mg/liter on 6 August when temperature was elevated (Figure 3-5 and Table B-9). DO concentrations increased in the fall, responding to declining temperatures.

The seasonal pattern of high DO concentrations in the spring, declining to minimum values in the summer and increasing again in the fall, is typical of that observed in all previous years (LMS 1989; EA 1990). The lowest mean DO values measured in 1990 were still well above levels that might be detrimental to aquatic life. The highest mean DO values from 1990 are comparable to peak values from other years.

Percent oxygen saturation compares the theoretical limit of oxygen saturation, based on temperature and salinity, to the observed DO concentrations. Mean weekly regional percent saturation was usually above 90 percent during the spring (Figure 3-5 and Table B-11). Percent saturation declined slightly in the summer but still generally averaged above 70 percent. Individual mean weekly regional values never dropped below 59.5 percent, the minimum recorded during the week of 20 August from the Cornwall region. The higher metabolic activity and associated increased BOD that accompany temperature increases were probably responsible for declines in oxygen saturation observed during the summer (MMES 1986).

In other studies, few regular trends have been observable in the longitudinal distribution of DO (TI 1976). Overall, few regular longitudinal trends existed in the 1990 LRS/FJS DO data (Table B-9). However, during the warmer months, there was a subtle trend with mean weekly regional DO values being slightly higher in the upper Hudson River estuary. Within this trend, existed a cluster of low DO values (e.g., 4.9-6.0) in July and August in the West Point, Cornwall, and Poughkeepsie regions.

Similarly, there was a very subtle longitudinal trend in the BSS DO data; at time DO values were slightly higher at the upper Hudson River sites. Lack of a distinct longitudinal pattern is consistent with observations made in previous years (Versar 1978; LMS 1989). In the BSS regional mean DO data, there was a less distinct temporal difference in DO then what was observed in the LRS/FJS. Overall, DO values recorded in the BSS remained above levels considered to be detrimental to aquatic life.

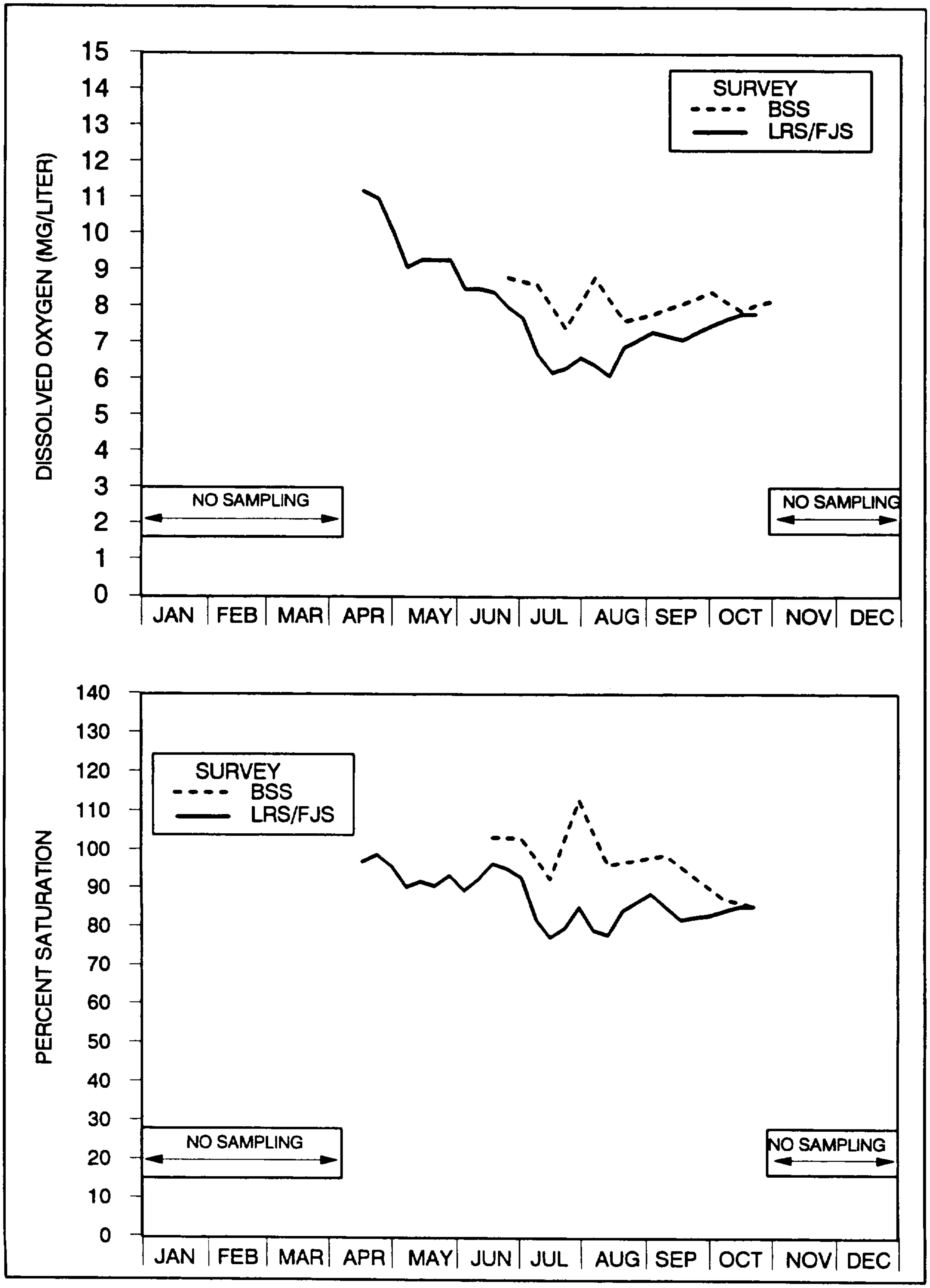


Figure 3-5. Seasonal variations in dissolved oxygen and percent saturation from 1990 Hudson River surveys.

A peak in DO values in the BSS was recorded during the 18 June and 30 July sampling periods when mean regional DO concentrations ranged from 6.8 to 11.3 mg/liter and from 6.4 to 11.4 mg/liter, respectively (Table B-10). Saturated and supersaturated conditions existed during these and other periods (Table B-12). Previous reports have also noted supersaturation in the shore zone even in the summer months (MMES 1986; EA 1990, 91). Turbulence from wave action and oxygen released as a by-product of photosynthesis could be two causes of this supersaturation.

3.4 GENERAL SUMMARY OF PHYSICAL/CHEMICAL CONDITIONS

The temporal and spatial patterns of the water parameters, temperature, salinity, and DO, measured in conjunction with the LRS/FJS and BSS generally replicate patterns observed in previous years of study. Water temperatures increase or decrease in response to changes in incident solar radiation and freshwater flow. The 1990 temperature pattern was average when compared to previous Hudson River survey years. Freshwater flow, tidal amplitude, and river morphometry affect the salinity pattern in the Hudson River estuary. Aside from when areas of high salinity (e.g., >6 ppt) retreated dramatically from the lower Hudson River estuary on one occasion during the summer of 1990, the pattern of salinity distribution and extent was typical of what had been recorded in previous years. Concentrations of DO, as recorded in both the LRS/FJS and BSS, remained above levels considered detrimental to aquatic life.

CHAPTER 4
SPATIOTEMPORAL DISTRIBUTION OF SELECTED SPECIES OF HUDSON RIVER ESTUARY FISHES

4.1 SPECIES COMPOSITION

During the 17 years of the Hudson River fisheries surveys conducted since 1974, 139 fish species have been recorded (Table 4-1). The yearly mean of 80 species collected reflects resident cold, cool, and warm freshwater species; resident estuarine species; and migratory marine fishes captured in the various regions of the Hudson River estuary. The species composition represents a variety of life history groups, although most of the fish species are present only as adults.

During the 1990 surveys, 85 fish species were recorded (Table 4-1). Three species not collected during previous Hudson River surveys - longear sunfish, sharptail goby, and spanish mackerel - were collected for the first time in 1990. Sea horse collected in 1990, were found only once previously, in 1988. Almost all species - freshwater, marine, estuarine, anadromous, and catadromous - collected in 1990 were found in previous years' samples. Rock bass, however, which were collected in all previous years of the study, were not found in the 1990 sample.

The 1990 species composition represents a variety of taxa. Twenty-six out of the 85 species were collected in all three sampling surveys, while 33 species were collected in only one of the surveys (Table 4-2). Aside from catches of freshwater and "undetermined" fish, nearly equivalent numbers of the taxa were collected in all three surveys.

4.2 STRIPED BASS

The striped bass, *Morone saxatilis* (Walbaum), is an anadromous species with an Atlantic Coast distribution from the St. Lawrence River south to northern Florida and with a separate distinct population in the northern Gulf of Mexico. Striped bass were introduced inland and to the Pacific Coast and are now prevalent from Canada to Mexico in the Pacific Ocean and occur in many freshwater reservoirs (Bailey 1975).

Adult striped bass enter the Hudson River estuary in late winter through early spring and spawn in May and June. Spawning generally occurs upstream of the saltfront between the Croton-Haverstraw and Poughkeepsie regions, but may extend throughout the Hudson River estuary. Spawning usually occurs within 25 miles of the saltfront in tidal river systems (Tresselt 1952) and at temperatures of 10-25°C (Richkus 1987). Most adults return to the ocean after spawning, although some remain in the Hudson River estuary for a time. The distance that striped bass travel from the mouth of the Hudson River estuary is related to size, with smaller fish moving shorter distances (Waldman 1988). A majority of the striped

TABLE 4-1 SPECIES COMPOSITION OF FISH COLLECTED DURING HUDSON RIVER STUDIES FROM 1974 TO 1990

Common Name	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
Fresh Water																	
Banded killifish	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Black bullhead				X				X			X	X					
Black crappie	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Blacknose dace	X	X	X	X	X	X	X					X		X	X		
Bluegill	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Bluntnose minnow	X	X	X	X	X	X	X										
Bridle shiner	X		X						X								
Brook stickleback	X	X	X	X				X								X	
Brook trout				X	X												
Brown bullhead	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Brown trout			X	X	X	X	X	X				X					X
Carp	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Central mudminnow			X				X							X			
Chain pickerel	X	X	X	X	X	X	X	X	X		X					X	
Channel catfish	X							X					X	X	X	X	X
Comely shiner	X						X										
Common shiner	X	X	X	X	X	X	X	X		X					X		X
Creek chub		X	X	X	X	X	X			X		X					
Cutlips minnow	X	X	X	X	X	X									X	X	
Eastern mudminnow		X					X										
Emerald shiner	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Fallfish	X	X	X	X	X	X	X	X	X				X				
Fathead minnow	X	X	X	X	X	X	X					X	X			X	
Freshwater drum																X	
Gizzard shad	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X
Golden shiner	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Goldfish	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Grass pickerel	X				X												X
Green sunfish		X		X			X								X		
Largemouth bass	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Logperch	X		X	X		X	X			X					X	X	
Longear sunfish																	X
Longnose dace		X	X	X	X				X			X					
Margined madtom														X			
Mimic shiner	X																
Northern hog sucker	X		X	X	X		X	X			X			X	X		X
Northern pike	X	X	X	X	X	X	X		X				X	X	X	X	X
Pumpkinseed	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Rainbow trout						X											
Redbreast sunfish	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Redfin pickerel	X	X	X	X	X	X	X	X	X		X				X		
Rock bass	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
Rosyface shiner	X																
Satinfin shiner	X	X	X	X	X	X	X				X	X	X		X		X
Shield darter							X										
Silvery minnow	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Smallmouth bass	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Spotfin shiner	X	X	X	X	X	X	X	X			X	X	X	X	X		
Spottail shiner	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Tessellated darter	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Trout perch	X	X	X	X	X	X					X						
Walleye			X	X	X	X				X	X			X		X	
White bass				X													
White catfish	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
White crappie	X	X	X	X	X	X	X	X			X		X	X	X		X
White sucker	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Yellow bullhead		X						X								X	
Yellow perch	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Total	42	39	42	44	40	38	40	32	25	24	29	28	27	29	32	30	29

TABLE 4-1 (Cont.)

Common Name	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
Marine																	
American sandlance													X	X	X	X	X
Ammodytes sp.		X	X	X	X	X	X	X				X					
Atlantic cod							X							X	X		
Atlantic croaker			X	X		X						X	X	X		X	X
Atlantic herring		X	X		X	X			X				X	X	X	X	X
Atlantic mackerel															X		
Atlantic menhaden	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Atlantic needlefish	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Atlantic silverside	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Bay anchovy	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Black seabass					X							X			X		
Bluefish	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Butterfish	X	X	X	X			X	X	X	X	X	X	X	X	X	X	X
Conger eel						X		X	X	X	X	X	X	X	X	X	X
Crevalle jack	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Cunner									X	X	X	X	X		X	X	X
Fourbeard rockling						X	X								X	X	X
Fourspot flounder	X						X	X			X	X	X		X	X	X
Gray snapper							X					X	X	X			
Grubby													X		X	X	X
Hickory shad		X			X	X				X			X				
Inshore lizardfish	X					X	X	X			X	X			X	X	
Longhorn sculpin	X	X								X						X	
Lookdown	X	X	X	X		X	X	X				X	X	X	X	X	X
Moonfish			X										X	X		X	
Naked goby	X		X								X	X	X	X	X	X	X
Northern kingfish	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X
Northern pipefish	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Northern puffer		X		X		X	X	X	X	X	X	X	X	X	X	X	X
Northern searobin			X		X		X	X	X		X		X	X	X	X	X
Northern stargazer	X						X		X	X	X	X			X		X
Orangespotted filefish													X				
Pollack		X															
Red hake	X		X			X	X	X			X	X			X	X	X
Rock gunnel			X	X											X	X	X
Rough silverside		X	X	X	X	X	X	X	X		X	X	X	X	X	X	X
Scup	X																
Seahorse															X		X
Sea raven							X										
Searobin		X	X		X		X	X							X		X
Seaboard goby		X	X				X								X		
Sharptail goby																	X
Sheepshead								X									
Silver hake	X	X		X									X		X	X	X
Silver perch	X					X					X	X	X		X		
Smallmouth flounder						X	X		X		X	X			X		X
Spanish mackerel																	X
Speckled worm eel					X		X				X			X	X		
Spot	X	X	X	X			X		X	X		X	X	X	X		X
Spotfin butterflyfish									X			X					
Spotfin mojarra									X								
Spotted hake							X			X	X	X	X	X	X	X	X
Striped anchovy		X				X			X			X					
Striped cuskeel							X					X	X	X	X	X	
Striped killifish			X														
Striped mullet	X		X	X		X	X	X	X	X	X	X	X	X	X		
Striped burrfish													X				
Striped searobin		X			X	X	X	X	X	X	X	X	X	X	X	X	X
Summer flounder	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X
Tautog		X				X	X	X	X	X	X	X	X	X	X	X	X

TABLE 4-1 (Cont.)

Common Name	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
Marine (Cont.)																	
Weakfish	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
White mullet	X	X	X	X	X	X	X		X	X	X	X	X			X	X
Windowpane	X	X		X		X	X	X		X	X	X	X	X	X	X	X
Winter flounder	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Yellowtail flounder	X																
Total	28	30	29	24	22	31	38	28	29	25	32	39	40	32	45 46	37	40
Estuarine																	
Fat sleeper													X				
Fourspine stickleback	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Hogchoker	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Inland silverside	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Mummichog	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Shortnose sturgeon	X		X	X		X	X	X	X	X	X	X	X	X	X	X	X
Threespine stickleback	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
White perch	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Total	7	6	7	7	6	7	7	7	7	7	7	7	8	7	7	7	7
Catadromous																	
American eel	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Total	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Anadromous																	
Alewife	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
American shad	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Atlantic sturgeon	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Atlantic tomcod	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Blueback herring	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Rainbow smelt	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Sea lamprey	X	X				X	X	X			X				X		X
Striped bass	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Total	8	8	7	7	7	8	8	8	7	7	8	7	7	7	8	7	8
All Categories																	
Total	85	83	85	82	75	84	93	75	68	63	76	81	82	75	93	82	85

TABLE 4-2 SPECIES COMPOSITION OF FISH COLLECTED IN EACH OF THE HUDSON RIVER SURVEYS DURING 1990

Common Name	BSS	FJS	LRS
Anadromous			
Alewife	X	X	X
American shad	X	X	X
Atlantic sturgeon		X	X
Atlantic tomcod	X	X	X
Blueback herring	X	X	X
Rainbow smelt	X	X	X
Sea lamprey		X	
Striped bass	X	X	X
Total	6	8	7
Catadromous			
American eel	X	X	X
Total	1	1	1
Estuarine			
Fourspine stickleback	X		X
Hogchoker	X	X	X
Inland silverside	X	X	
Mummichog	X	X	
Shortnose sturgeon		X	X
Threespine stickleback	X		X
White perch	X	X	X
Total	6	5	5
Freshwater			
Banded killifish	X		X
Black crappie	X		
Bluegill	X		

TABLE 4-2 SPECIES COMPOSITION OF FISH COLLECTED IN EACH OF THE HUDSON RIVER SURVEYS DURING 1990

Common Name	BSS	FJS	LRS
Freshwater (Cont.)			
Brown bullhead	X	X	X
Brown trout			X
Carp	X	X	
Channel catfish	X	X	
Common shiner			X
Emerald shiner	X		
Fathead minnow			X
Gizzard shad	X	X	X
Golden shiner	X		X
Goldfish	X		
Grass pickerel	X		
Largemouth bass	X		
Longear sunfish	X		
Northern hog sucker	X		
Northern pike	X		
Pumpkinseed	X	X	
Redbreast sunfish	X		
Satinfin shiner	X	X	
Silvery minnow	X		
Smallmouth bass	X	X	X
Spottail shiner	X	X	X
Tesselated darter	X	X	X
White catfish	X	X	X
White crappie	X		
White sucker	X		X
Yellow perch	X		X
Total	26	10	13

TABLE 4-2 SPECIES COMPOSITION OF FISH COLLECTED IN EACH OF THE HUDSON RIVER SURVEYS DURING 1990

Common Name	BSS	FJS	LRS
Marine			
American sand lance			X
Atlantic croaker	X	X	
Atlantic herring			X
Atlantic menhaden	X	X	X
Atlantic needlefish	X	X	X
Atlantic silverside	X	X	X
Bay anchovy	X	X	X
Bluefish	X	X	X
Butterfish	X	X	X
Conger eel			X
Crevalle jack	X	X	
Cunner		X	
Fourbeard rockling			X
Fourspot flounder		X	
Grubby			X
Lookdown	X		
Naked goby	X	X	X
Northern kingfish	X	X	
Northern pipefish	X	X	X
Northern puffer			X
Northern searobin		X	X
Northern stargazer		X	
Red hake		X	X
Rock gunnel			X
Rough silverside	X		
Sea horse			X
Searobin			X
Silver hake	X	X	
Smallmouth flounder			X
Spot	X		X

TABLE 4-2 SPECIES COMPOSITION OF FISH COLLECTED IN EACH OF THE HUDSON RIVER SURVEYS DURING 1990

Common Name	BSS	FJS	LRS
Marine (Cont.)			
Spotted hake	X		X
Striped searobin		X	
Summer flounder	X	X	X
Sharptail goby			X
Spanish mackerel		X	
Tautog	X	X	
Weakfish	X	X	X
White mullet	X		
Windowpane		X	X
Winter flounder	X	X	X
Total	21	24	27
Undetermined			
Acipenseridae			X
Centrarchidae	X		X
Clupeidae	X	X	X
Cyprinidae			X
Fundulus sp.			X
Gobiidae			X
Menidia SP.			X
Morone sp.		X	X
To be identified			X
Unidentifiable			X
Total	2	2	10

bass that move out of the Hudson River estuary generally remain within an area ranging from Sandy Hook, New Jersey, to both shores of Long Island and the Connecticut and Rhode Island coastlines (Waldman 1988).

Striped bass young of year generally move downriver during the summer to feed in nursery areas located in the higher salinity waters (McFadden et al. 1978). With decreasing fall water temperatures, the young of year move either to the lower Hudson River estuary or into adjacent bays and sounds to overwinter. Hudson River striped bass constitute roughly 10-50 percent of Atlantic Coastal stocks, depending on the year (Van Winkle and Kumar 1982).

Female striped bass, which mature between the ages of four and nine years, spawn their eggs near the surface in generally turbid areas of moderately high current or tidal flow (Rogers et al. 1982). Incubation time is usually two to three days, depending on water temperature (Rogers et al. 1977). Nursery grounds are typically characterized by sand or gravel substrates with low currents (Wang and Kernehan 1979). Currents move the newly hatched larvae downstream as they have limited swimming abilities (Mansueti 1958). After approximately one week, they have absorbed their yolk supplies and feed actively on small zooplankton. At the young of year stage, reached after somewhat less than 30 days in the Hudson River estuary (McFadden et al. 1978), they are described by Boynton et al. (1981) as being nonselective feeders traveling in schools along the river shores where stronger currents are located.

Historically, striped bass comprised an important commercial fishery in the Hudson River estuary, but high polychlorinated biphenyl (PCB) levels resulted in closing of the fishery in 1976. Adult striped bass weighing 22 lb or more still attract an active recreational fishery.

4.2.1 Egg Distribution

Striped bass eggs were first collected in early May during the 1990 LRS (Figure 4-1). While the greatest number had been collected by mid-June, moderate densities of striped bass eggs were recorded into late June. No eggs were found in any region after late June. The greatest egg density was recorded in early June, with the greatest single peak abundance (1,932/1,000 m^3) recorded in the Hyde Park region also in early June. The mean water temperature in the Hyde Park region during the period of peak egg abundance was 17.4°C. In previous years of this monitoring study, peak weekly regional densities for striped bass exceeded 500 eggs/1,000 m^3 only three times (830, 2,266, and 5,130 eggs/1,000 m^3 were recorded in 1974, 1983, and 1989, respectively). Weekly regional densities exceeded 500 eggs/1000 m^3 for striped bass five times in 1990 (Table C-1). Overall, weekly regional densities tended to be higher than observed in previous years.

Striped bass eggs were found in every region except the Battery and Yonkers, although no sampling was conducted in the Battery region during the first eight weeks of sampling, which included the period of peak egg abundance in other regions. Regional density estimates were greatest in the Croton-Haverstraw through West Point regions. Overall, few eggs were found in the lower saline portion of the Hudson River estuary. Aside from an

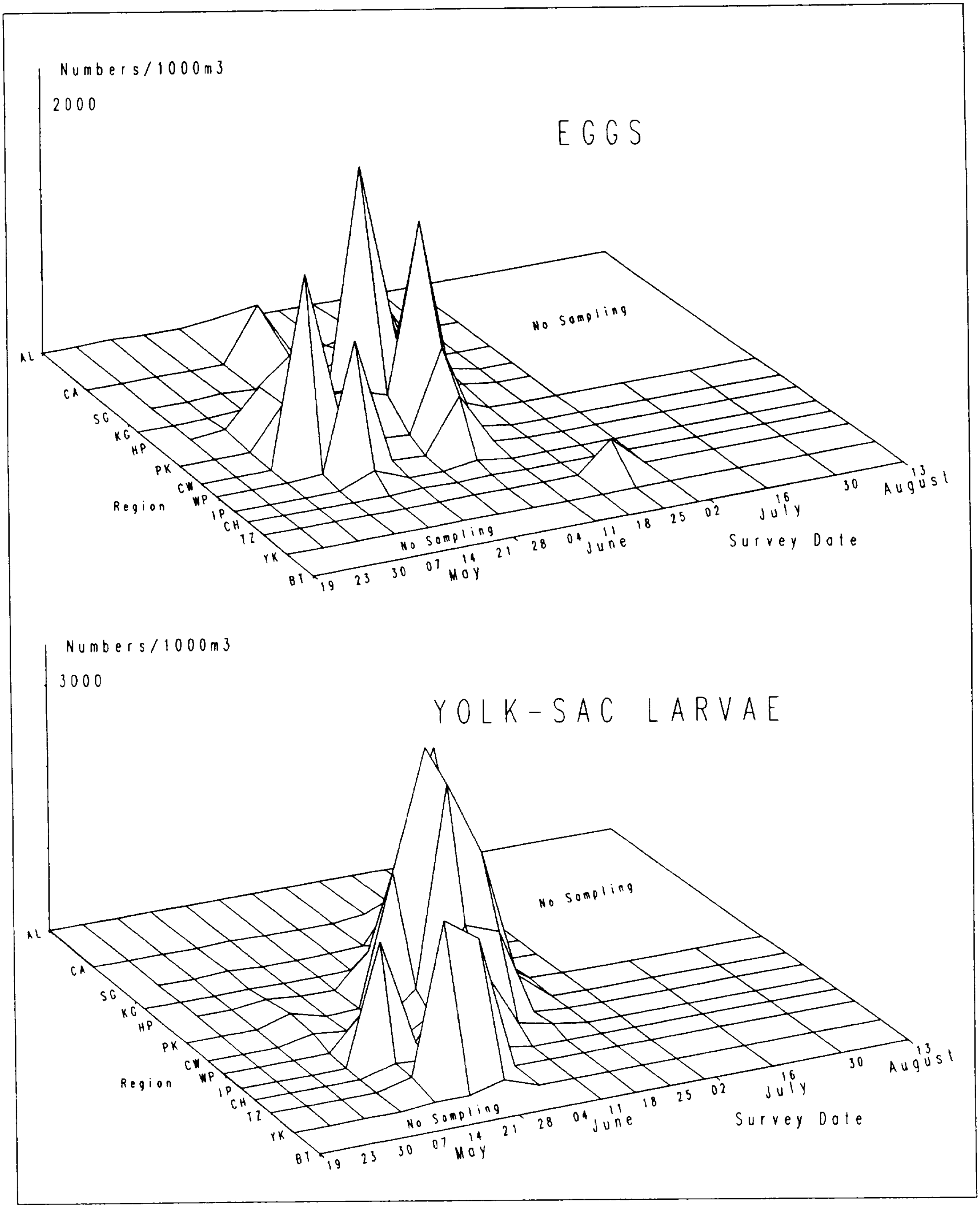


Figure 4–1. Spatiotemporal distribution of egg and yolk–sac stages of striped bass in the Hudson River estuary based on the 1990 Long River Ichthyoplankton Survey.

egg density of 235/1,000 m^3 in late June in the Tappen Zee region, egg density in regions south of and including the Croton-Haverstraw region did not exceed 10/1,000 m^3 during any sampling period. Also, relatively few eggs were collected in the Albany region.

4.2.2 Yolk-Sac Larval Distribution

Striped bass yolk-sac larvae were collected from late April/early June through mid-July (Figure 4-1). Relatively high densities were collected from late May through mid-June, with the peak densities occurring in early June. The highest regional density (3,269/1,000 m^3) was recorded in the Poughkeepsie region in early June.

Peak yolk-sac larval densities extended from Tappan Zee to Saugerties. Yolk-sac larvae were collected only once (in mid-June) south of Yonkers, although no sampling was conducted in the Battery region during the period of peak yolk-sac larvae abundance in other regions. Density estimates during previous years have usually been highest in the middle Hudson River regions (Indian Point through Hyde Park). In 1990, however, relatively high yolk-sac densities were recorded as far south as the Tappen Zee region. In most sampling periods, yolk-sac larval densities were also relatively low in the regions north of Saugerties.

4.2.3 Post Yolk-Sac Larval Distribution

Striped bass post yolk-sac larvae were first collected during mid-May, with the highest densities found from late May to late June (Figure 4-2). The peak in post yolk-sac larval abundance followed the peak larval yolk-sac abundance by one to two weeks, the approximate developmental time from the yolk-sac to post yolk-sac stage (Setzler et al. 1980). Peak post yolk-sac larvae abundance lasted three to four weeks and peak regional density estimates exceeded 6,000/1,000 m^3 in mid-June in the Cornwall and Poughkeepsie regions. In all regions the post yolk-sac larvae density declined to less than 7/1,000 m^3 by late July.

Post yolk-sac larvae were collected throughout the Hudson River estuary in 1990, with the greatest number occurring from Croton-Haverstraw through Kingston. Similar spatial distributions have been reported in previous years.

4.2.4 Young of Year Distribution

Young of year striped bass were first collected in the LRS in late June, but were not collected in quantity until early July (Figure 4-2). The greatest densities were recorded in early and mid-July. Young of year were collected in every sampling period during the FJS and in all sampling periods, excluding the first (week of 18 June), in the BSS (Figure 4-3). In the FJS temporal distribution peaked in the first several weeks of collection (10/1,000 m^3) and declined steadily through September; a small peak (5.7/1,000 m^3) was observed in Croton-Haverstraw in October. In the BSS the temporal peak in the young of the year density occurred in mid- and late July. After the period of peak abundance in the BSS,

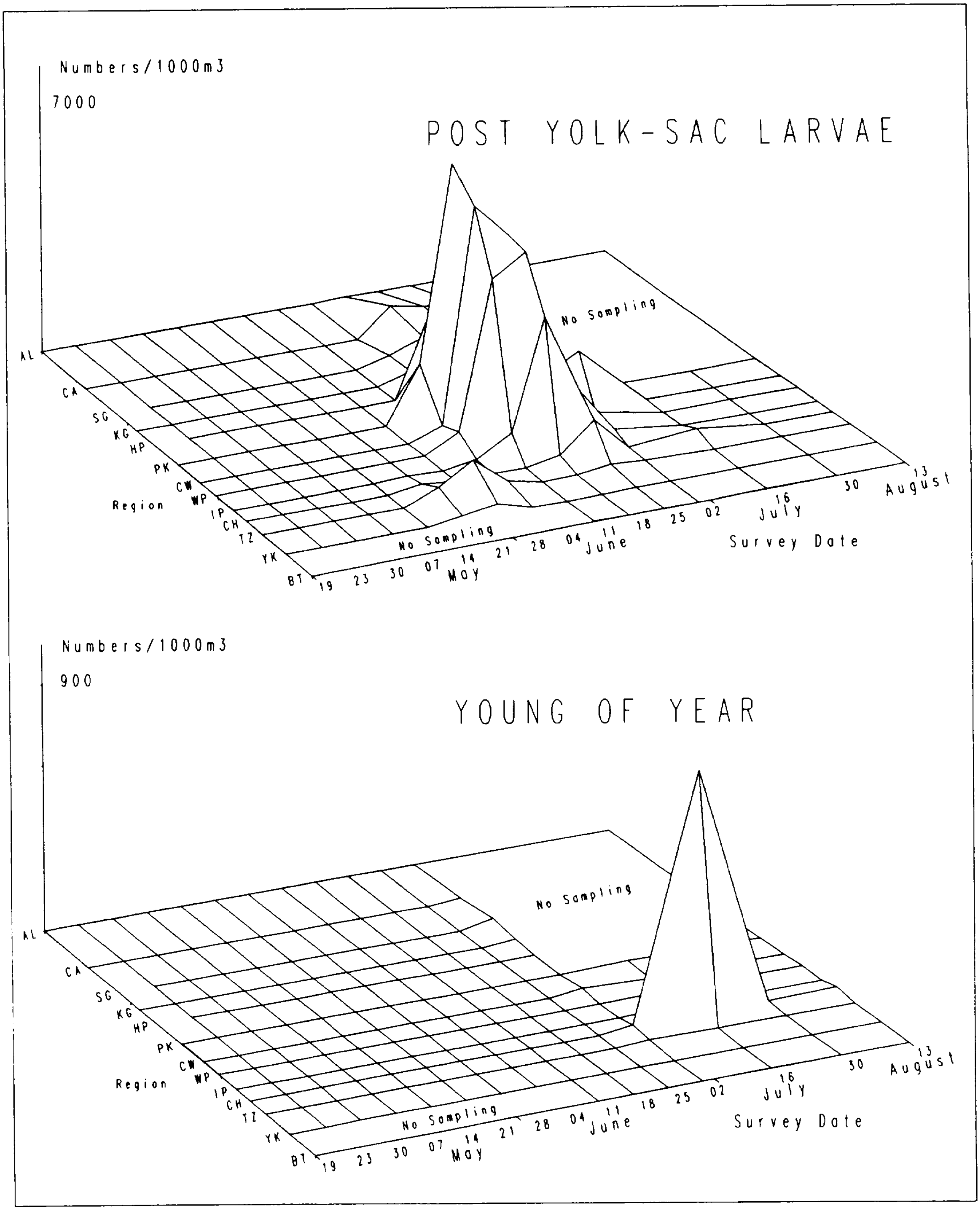


Figure 4-2. Spatiotemporal distribution of post yolk-sac and young-of-year stages of striped bass in the Hudson River estuary based on the 1990 Long River Ichthyoplankton Survey.

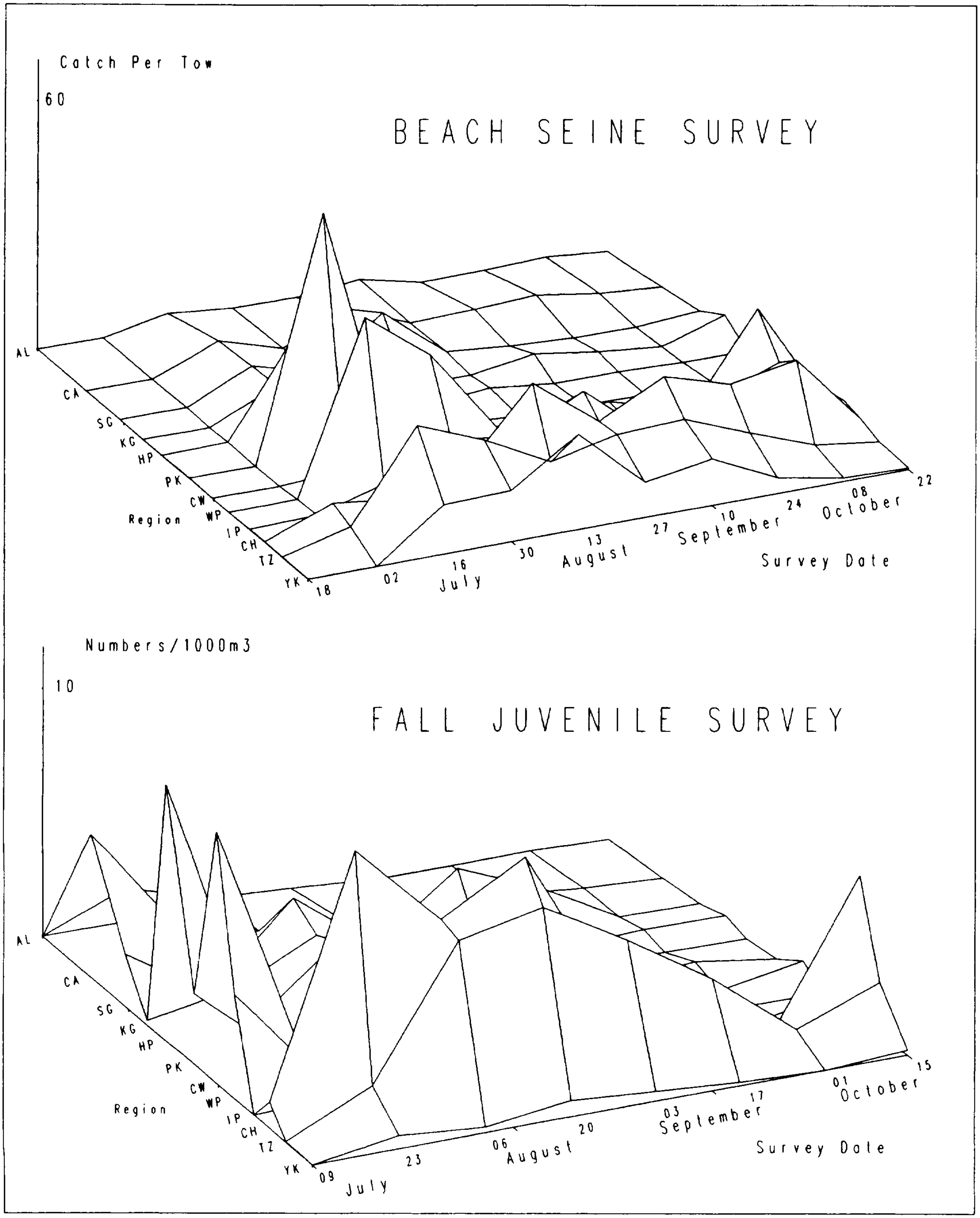


Figure 4-3. Spatiotemporal distribution of young-of-year striped bass in the Hudson River estuary based on the 1990 Fall Juvenile and Beach Seine River Ichthyoplankton Surveys.

young of year densities were comparable within a region between sampling periods through mid-October.

Striped bass young of year were collected from every region of the Hudson River estuary in 1990. In the LRS, high young of year densities (i.e., 876/1,000 m^3) were recorded only in the Croton-Haverstraw region; young of year densities in all other regions sampled during the LRS did not exceed 25/1,000 m^3. Collections of young of year striped bass in the LRS were made as far north as Albany. In the FJS, young of year were collected in greatest numbers during the early weeks of the FJS, as far north as the Catskill region. By the end of sampling (mid-October) young of year were collected primarily in the lower region of the estuary. In the BSS, highest densities of young of year were collected in the mid- and lower portion of the estuary. By mid-October young of year were primarily collected in the lower estuary.

Striped bass generally move shoreward and downstream of the spawning area to shallow-water nursery areas in the lower portion of the Hudson River estuary in the summer and fall (McFadden et al. 1978). From the data collected, a trend in young of year distribution toward the lower estuary was evident in both the BSS and FJS. The migration of young of year downriver to overwintering grounds during the fall has been reported in previous years (TI 1981; NAI 1985a; LMS 1989; EA 1990,91).

4.2.5 Yearling and Older Fish Distribution

Yearling and older striped bass were collected during all sampling periods in both the 1990 FJS and BSS (Figure 4-4); densities never exceeded 1/1,000 m^3 in the FJS or 1/tow in the BSS. In the FJS, the yearling and older striped bass estimated standing crop (Table C-14) was highest in August and early September. In the BSS, the yearling and older striped bass estimated standing crop (Table C-16) was highest in the first week of sampling (week of 18 June).

During the FJS, most yearling or older striped bass taken were collected in the lower Hudson River estuary. Regionally, yearling and older striped bass were collected more widely in the BSS, found in upper, middle, and lower estuary reaches throughout the sampling period.

4.2.6 Comparison to Previous Years

Comparing 1990 to the historical temporal trend, the peak distribution of eggs and yolk-sac larvae occurred three and two weeks later, respectively, in 1990 than the long-term trend (Figure 4-5). In contrast, post yolk-sac larvae peak distribution in 1990 occurred several weeks before the historical period of peak distribution. As in past years, young of year began appearing in collections during the first week of July (week 27).

Striped bass eggs in the 1990 LRS were collected primarily in the Cornwall, Poughkeepsie, and Hyde Park regions (Figure 4-6). These regions are north of the region of long-term geographical peak distribution. The 1990 geographic distribution of yolk-sac larvae closely

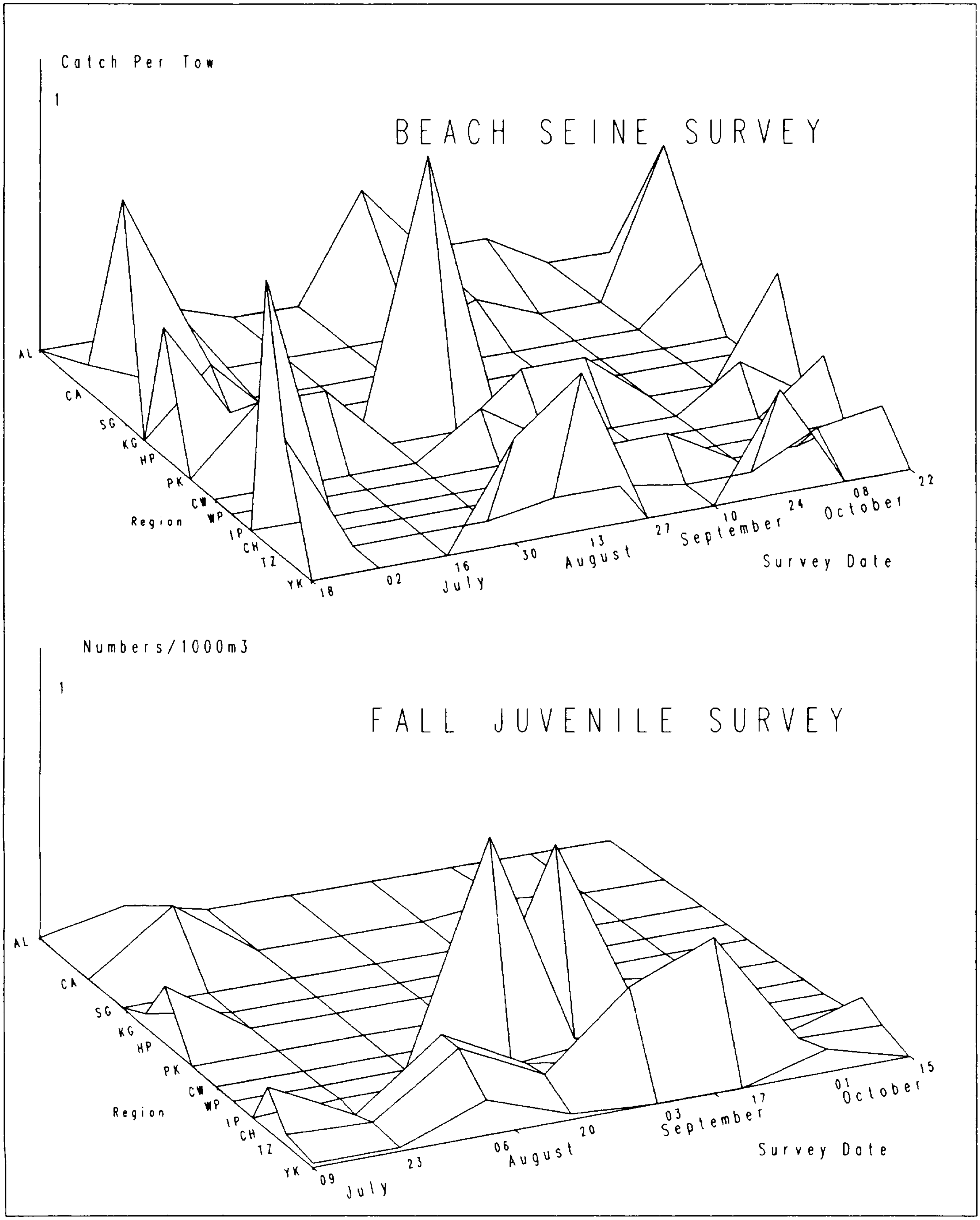


Figure 4-4. Spatiotemporal distribution of yearling and older striped bass in the Hudson River estuary based on the 1990 Fall Juvenile and Beach Seine River Ichthyoplankton Surveys.

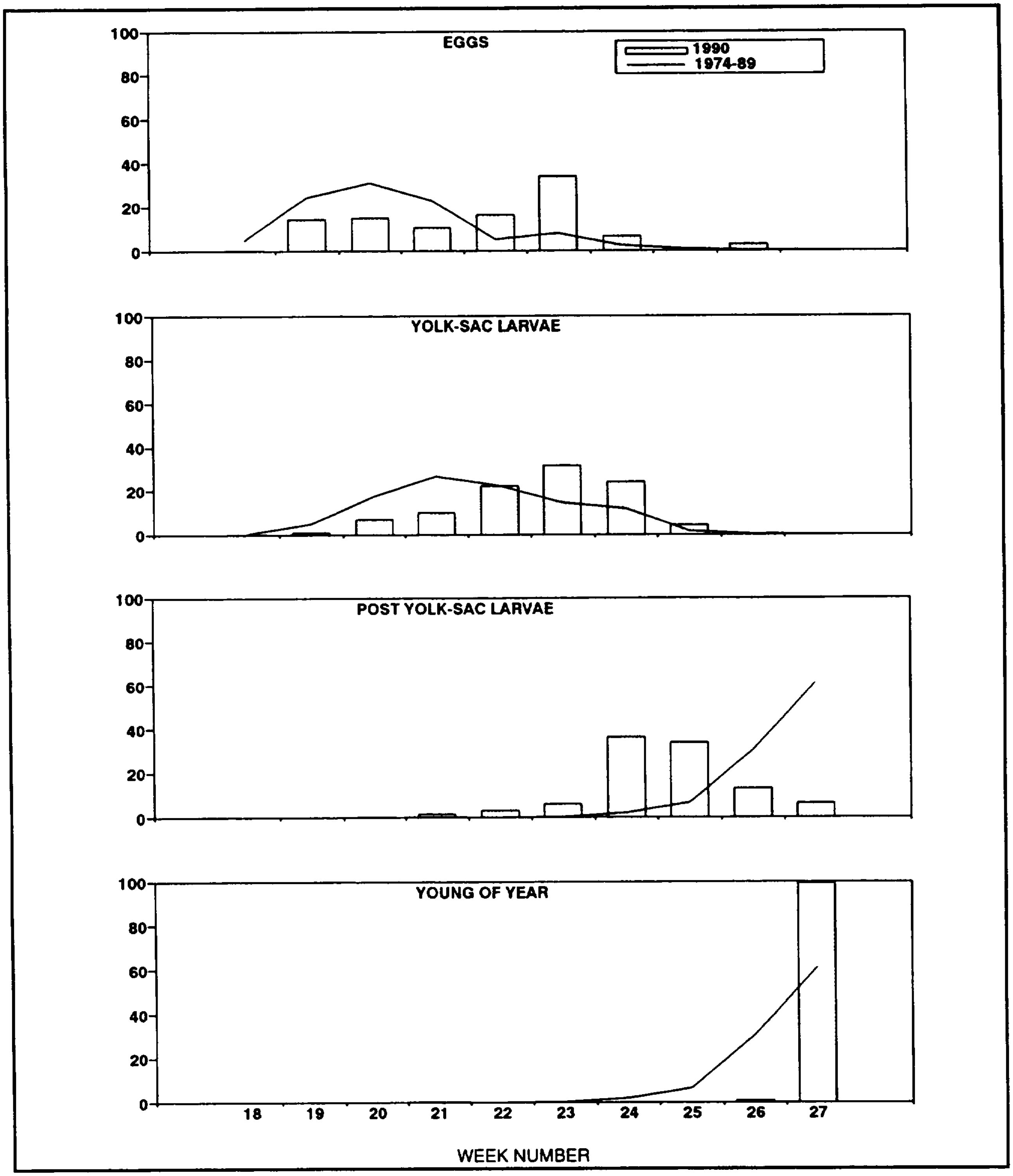


Figure 4-5. Temporal distribution indices for the early life stages of striped bass collected during Longitudinal River Ichthyoplankton surveys of the Hudson River Estuary, 1974-1990.

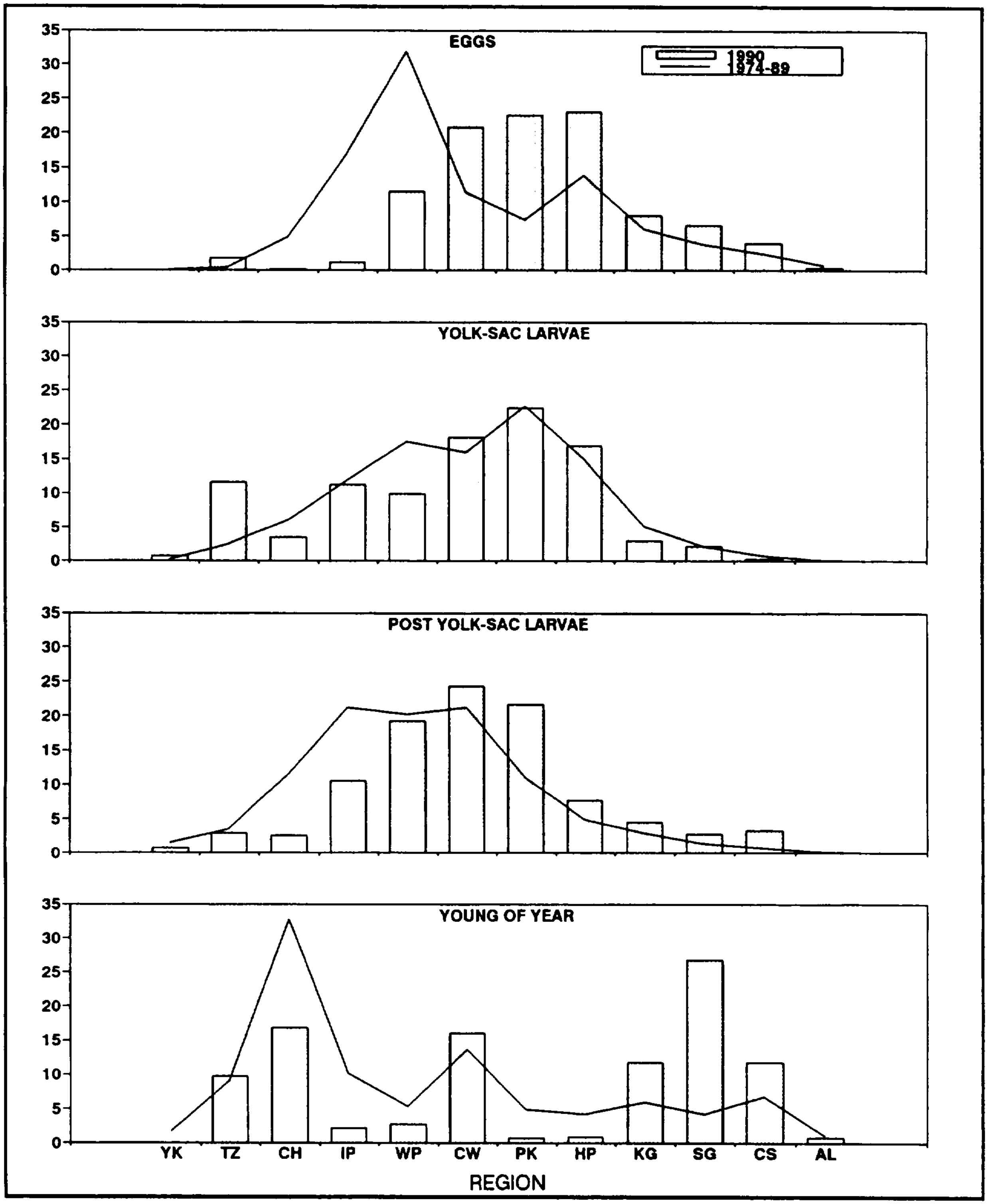


Figure 4-6. Geographic distribution indices for the early life stages of striped bass collected during Longitudinal River Ichthyoplankton Surveys of the Hudson River estuary, 1974-1990.

followed the historic trend. The 1990 post yolk-sac larvae distribution was shifted upriver slightly from the historical trend. The 1990 region of peak abundance of young of year, Saugerties, was well upriver of Croton-Haverstraw, the region where peak distribution has been recorded over the long-term. The 1990 geographic index is based primarily on one week of data. Except for a few young of year collected in Cornwall region in week 26, no young of year were collected until week 27; the LRS geographic index uses only weeks 18 to 27. Peak densities are observed in the Croton-Haverstraw region during week 28, which is not included in the 1990 index.

The 1990 BSS young-of-year geographical index was similar to the historical trend (Figure 4-7). Young of year historically and in 1990 were found primarily in the lower estuary.

4.2.7 Microdistribution Patterns

To ascertain any pattern in the spatial distribution of the early life stages of striped bass collected in the 1990 LRS, mean densities by river mile for the period of peak abundance for each life stage were calculated. During the period of peak abundance of striped bass eggs (7 May to 7 June), the greatest striped bass egg density was recorded at RM 53 (Figure 4-8); abundant numbers of eggs were also collected at RM 51 and 52. The river bends around a prominent point (West Point) at RM 53; the river channel is very deep along the western shore, but an extensive zone of shallow water with vegetation (i.e., Constitution Marsh; RM 52-55) exists on the eastern shore. The second greatest density of striped bass eggs was collected at RM 63; abundant numbers of eggs were also collected in areas just above and below (RM 60-65) this peak. The main channel of the river at RM 63 is bordered on both shores by vegetated shallow-water areas. A third area of abundant egg distribution occurred from RM 81 to 84. The river is relatively narrow and deep in this section with a only a small area of vegetated shallow water on the eastern shore at RM 83 and 84. The peak occurrence of striped bass eggs in previous years has consistently been observed between RM 53 and 63 and occasionally at RM 81-82 and RM 101 (LMS 1989; EA 1990, 91).

In 1990 the peak abundance of striped bass yolk-sac larvae was recorded from 29 May to 14 June and the greatest densities during this period were collected at RM 63 and 85 (Figure 4-8). A band of abundant yolk-sac larvae were also recorded from RM 55 to 57. Yolk-sac larvae distribution during peak abundance was similar to that of the egg distribution. The outfall of Wappingers Creek is located several miles north of RM 63. The river channel at RM 85 is relatively narrow; RM 85 is located on the southern end of a broad area of shallow water, several miles south of the outfall of Roundout Creek. Mouths of tributary creeks have in the past been linked to areas of yolk-sac larval abundance (EA 1990).

From 11 to 21 June striped bass post yolk-sac larvae were most abundant at RM 69; a secondary peak occurred at RM 51 (Figure 4-8). The river channel at RM 69 is deep and little shallow-water habitat exists along the eastern and western shorelines. The secondary peak in post yolk-sac larval abundance recorded at RM 51 is similar to the location of peaks in post yolk-sac larval abundance recorded in previous years: RM 41-51 in 1986, RM 48-63 in 1987 (LMS 1989), and RM 46-50 in 1988 (EA 1990). The river in the vicinity of RM 52

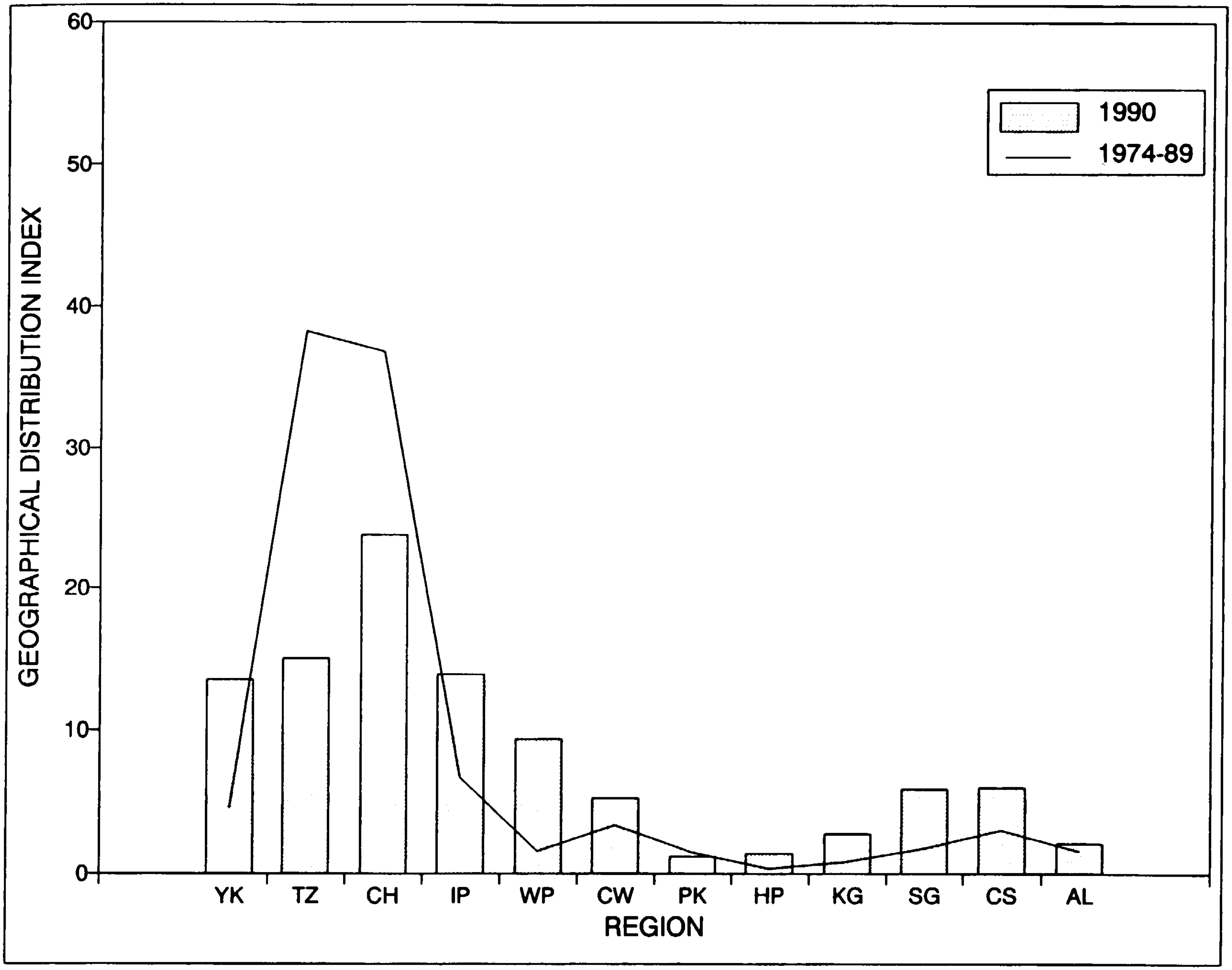


Figure 4-7. Geographic distribution indices for young of year striped bass collected during Beach Seine surveys of the Hudson River estuary, 1974-1990.

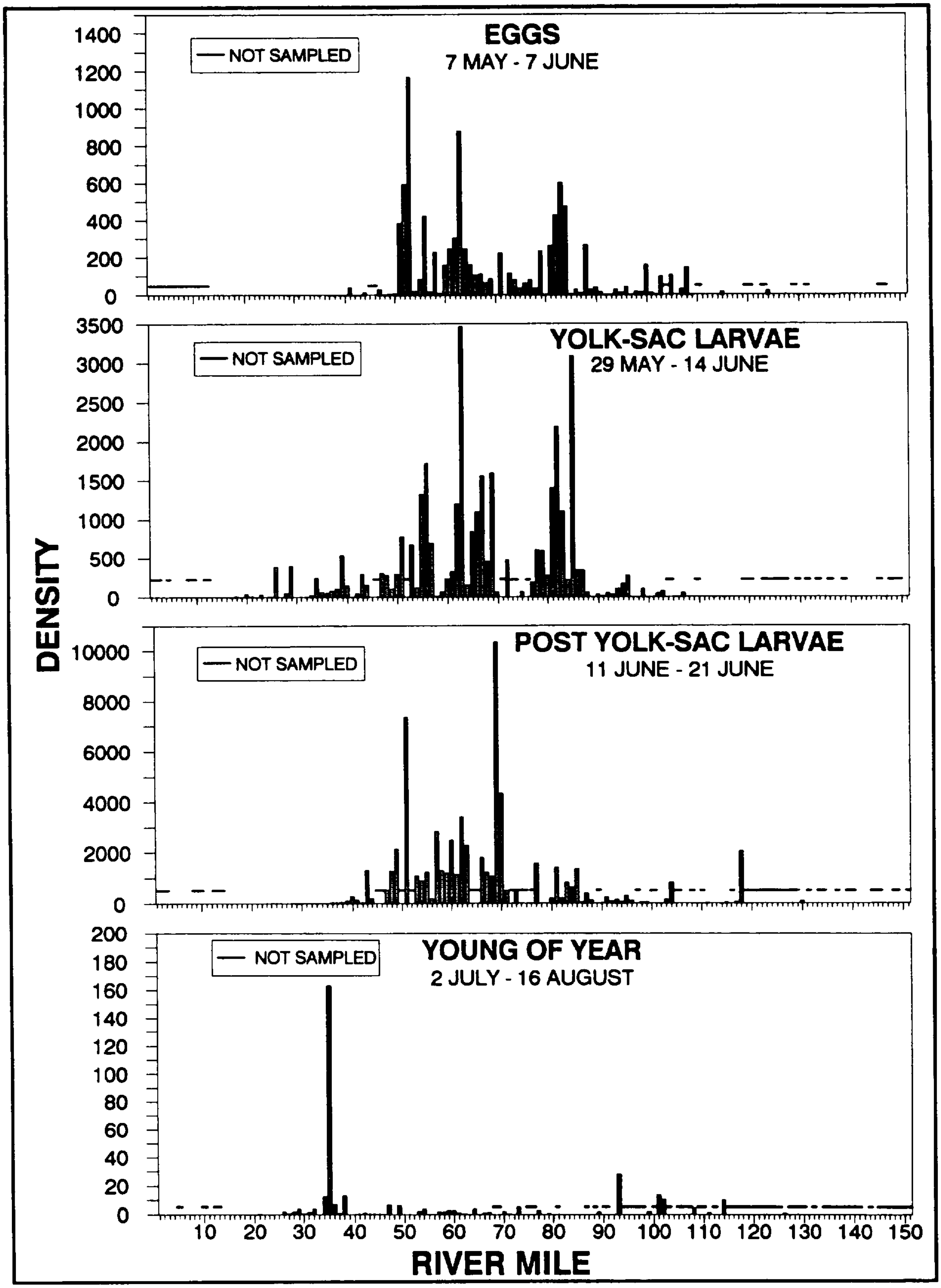


Figure 4-8. Microdistribution (mean density by river mile) of striped bass in the Hudson River estuary based on the 1990 Longitudinal River Ichthyoplankton Survey.

is similar to the river at RM 69; the channel at RM 52 is deep, and aquatic vegetation exists in only a thin fringe along the eastern shoreline.

During the period of peak abundance of young of year striped bass (2 July to 16 August), the highest young of year densities were collected at RM 35 (Figure 4-8). A large zone of shallow water exists in the vicinity of RM 35, which is in the southern end of Croton-Haverstraw Bay. Croton-Haverstraw Bay has been an area of peak striped bass young of year abundance in past years (EA 1990).

4.3 WHITE PERCH

White perch, *Morone americana* (Gmelin), are endemic to the coastal rivers and estuaries of North America, occurring from Nova Scotia to South Carolina (Scott and Crossman 1973). They have invaded the lower Great Lakes and have been introduced into many inland reservoirs (Woolcott 1962; Scott and Christie 1963). Except for landlocked, freshwater populations, this euryhaline species is considered semianadromous as it exhibits seasonal spawning migrations, but it is limited to estuary regions in its overall distribution. White perch are found in the Hudson River estuary from the Battery at Manhattan to the Troy Dam at Albany (TI 1981). They are most common in brackish waters but may be found in areas with salinity concentrations ranging from 0 to 30 ppt (NAI 1985b).

White perch are prolific spawners that deposit demersal adhesive eggs over shoals and in estuary tributaries (Bath and O'Connor 1982). Holsapple and Foster (1975) reported that the relationship of Hudson River white perch length to egg production was curvilinear; the number of ova produced ranged from 33,000 to 185,000 for three- to eight-year-old females. Spawning usually occurs upriver in areas of fresh water, but may occur in areas of salinity up to 5 ppt (Hardy 1978). During the fall, the adults move downriver to overwintering grounds (LMS 1987). Offshore movement to deep-water overwintering areas from Yonkers to Indian Point is reported for the Hudson River estuary (TI 1981).

Larval and young of year white perch feed on cladocerans, copepods, and amphipods (Marcy 1976; Elrod et al. 1981). Adults are predatory, relying on invertebrates such as *Gammarus*, annelids, bryozoans, and various crustaceans (de Sylva et al. 1962; Moore et al. 1975) and increasing amounts of fish and fish eggs (Elrod et al. 1981). No major fishery exists for white perch in the Hudson River estuary even though it is the most abundant predatory fish within the Hudson River estuary. The Chesapeake and Delaware bays, however, support an important commercial fishery of white perch (IA 1984).

4.3.1 Egg Distribution

White perch eggs were collected during the first LRS sampling period (19-23 April) and, aside from mid-July, were collected through early August (Figure 4-9). The greatest regional density (12,086/1,000 m^3) was recorded in the Peekskill region during 29 May - 2 June when mean weekly water temperatures ranged from 14.3 to 16.9°C (Table B-5). Regional densities >1,000 eggs/1,000 m^3 occurred from early May to mid-June when mean

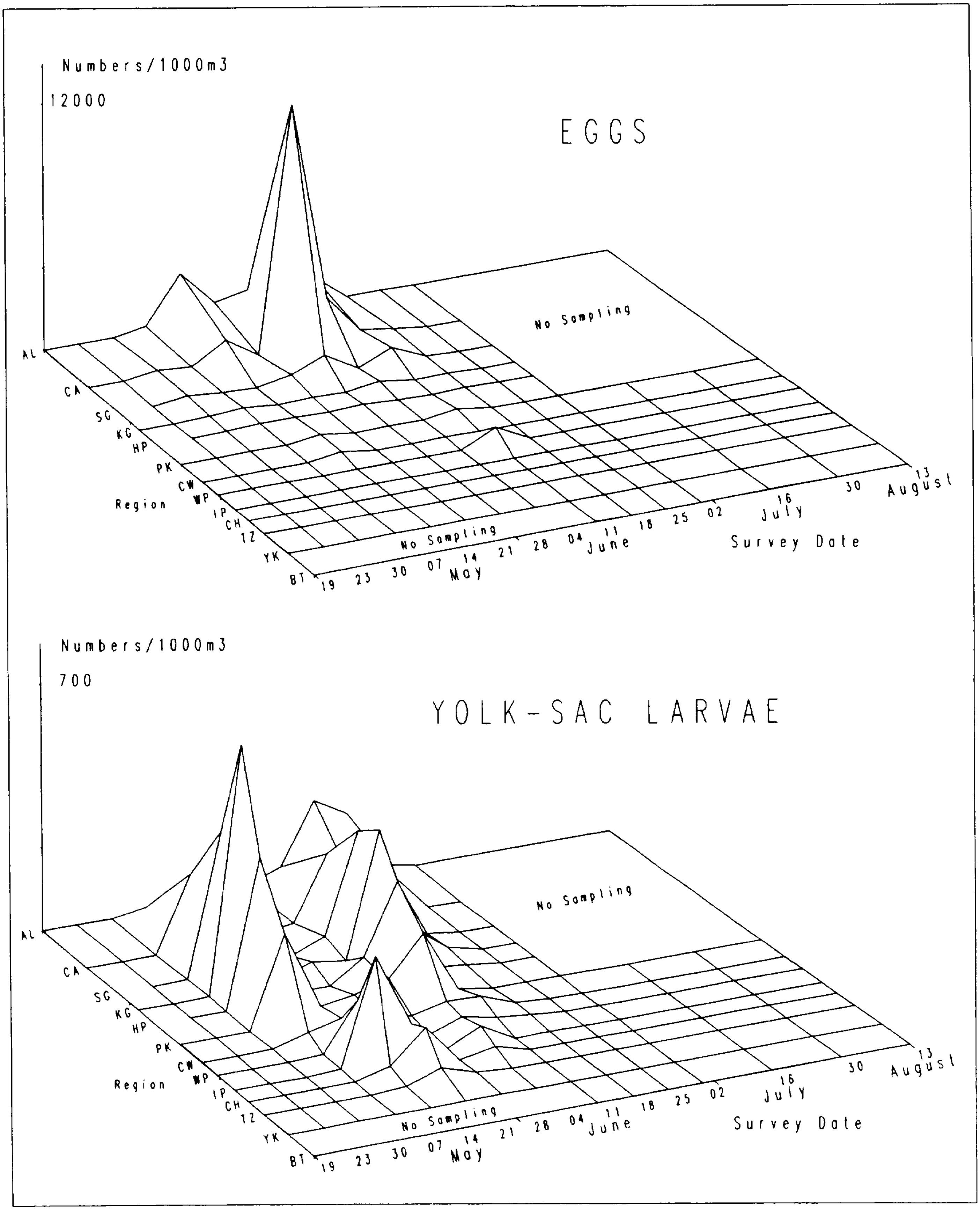


Figure 4-9. Spatiotemporal distribution of egg and yolk-sac stages of white perch in the Hudson River estuary based on the 1990 Long River Ichthyoplankton Survey.

weekly water temperatures ranged from 11.0 to 22.2°C (Table B-5). In the Hudson River estuary, peak egg deposition occurs at 16-20°C (Klauda et al. 1988a).

The greatest densities of white perch eggs were found in upriver regions from Saugerties to Albany, with the Albany and Catskill regions containing the highest densities. Aside from a small isolated peak of 801/1,000 m^3 in the West Point region in mid-June, mean weekly egg density estimates were <300/1,000 m^3 in the mid-Hudson River estuary and <20/1,000 m^3 in the lower estuary. White perch eggs were not found in regions south of and including Croton-Haverstraw.

4.3.2 <u>Yolk-Sac Larval Distribution</u>

White perch yolk-sac larvae were collected in the Hudson River estuary from early May through early July (Figure 4-9); no yolk-sac larvae were collected during the first two sampling weeks of the LRS. The greatest yolk-sac larval abundance was recorded in early May (7-10 May), with a secondary peak in abundance in early June. Few yolk-sac larvae were collected after late June.

White perch yolk-sac larvae were collected from all regions except the Battery during the 1990 LRS. The Battery region was not sampled during the period when yolk-sac larvae were abundant in other regions. A peak abundance of 685/1,000 m^3 yolk-sac larvae was recorded in early May in the Kingston region. White perch yolk-sac larvae were generally abundant in regions north of and including Croton-Haverstraw.

4.3.3 <u>Post Yolk-Sac Larval Distribution</u>

White perch post yolk-sac larvae were first collected in the 1990 LRS during the week of 30 April - 3 May (Figure 4-10). The peak regional post yolk-sac density was 5,330/1,000 m^3 in the Albany region during 18-21 June. White perch post yolk-sac larvae were collected in all river regions. In mid-May they were most prevalent between Poughkeepsie and Yonkers and later in the season were most abundant upriver of Indian Point. Fluctuations in white perch larval densities between weeks and regions may be related to their spawning habits. Early development can occur in tributaries and bays along the Hudson River estuary; thus, the larvae may not be captured by the sampling gear. Changes in freshwater flow from the tributaries may increase availability of larvae to capture.

4.3.4 <u>Young of Year Distribution</u>

Young of year white perch were collected in the first 1990 LRS sampling period but were not consistently found in samples until late June (Figure 4-10). The greatest density of young of year white perch in the LRS was recorded in mid-July. The peak regional young of year density of 81/1,000 m^3 was recorded in the Croton-Haverstraw region, also in mid-July; no sampling was conducted in the Hyde Park through Albany regions in July. Except for the first sampling week of 18 June, young of year white perch were taken during all weeks of the BSS and were collected during all weeks of the FJS (Figure 4-11). In the FJS,

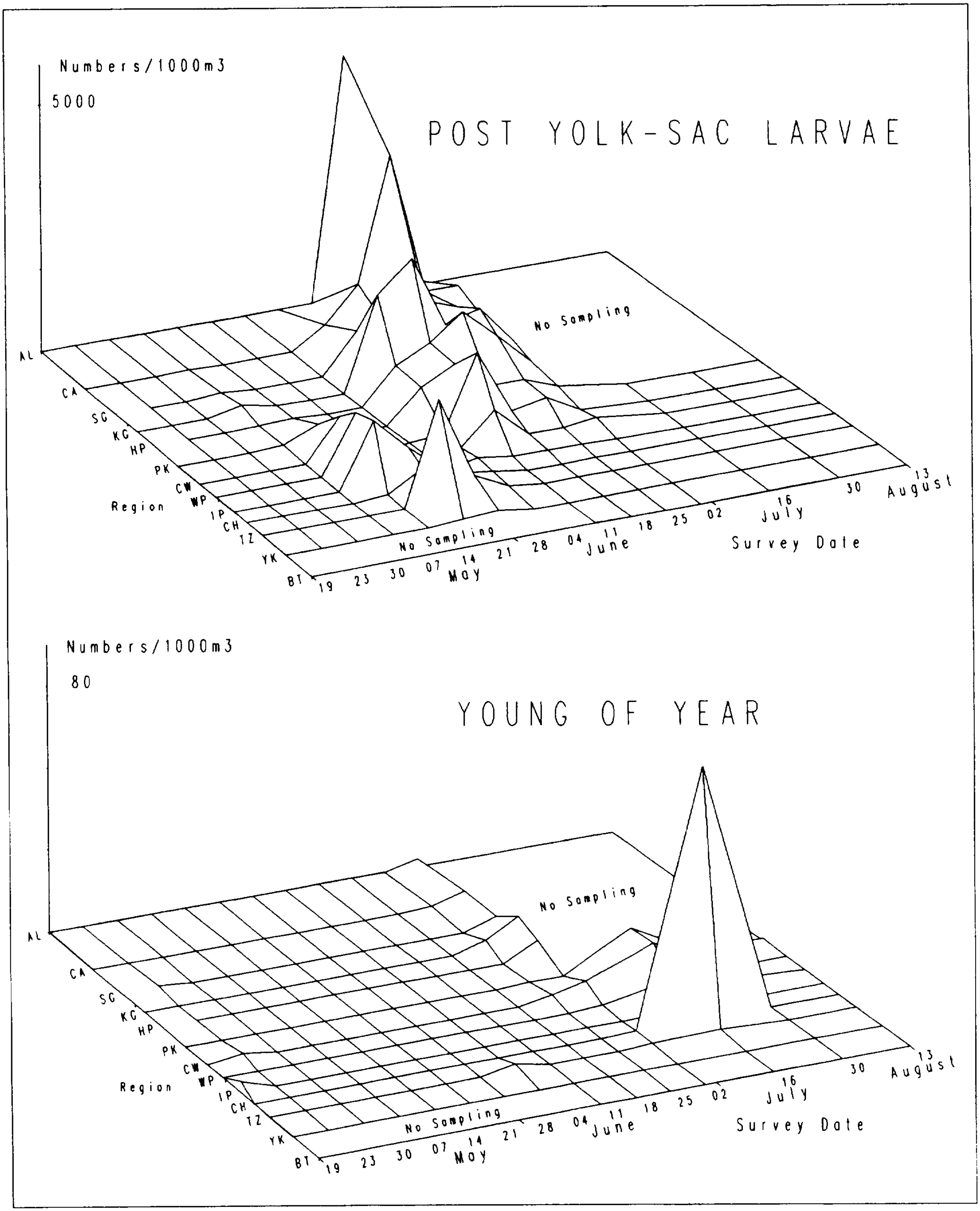


Figure 4–10. Spatiotemporal distribution of post yolk–sac and young–of–year stages of white perch in the Hudson River estuary based on the 1990 Long River Ichthyoplankton Survey.

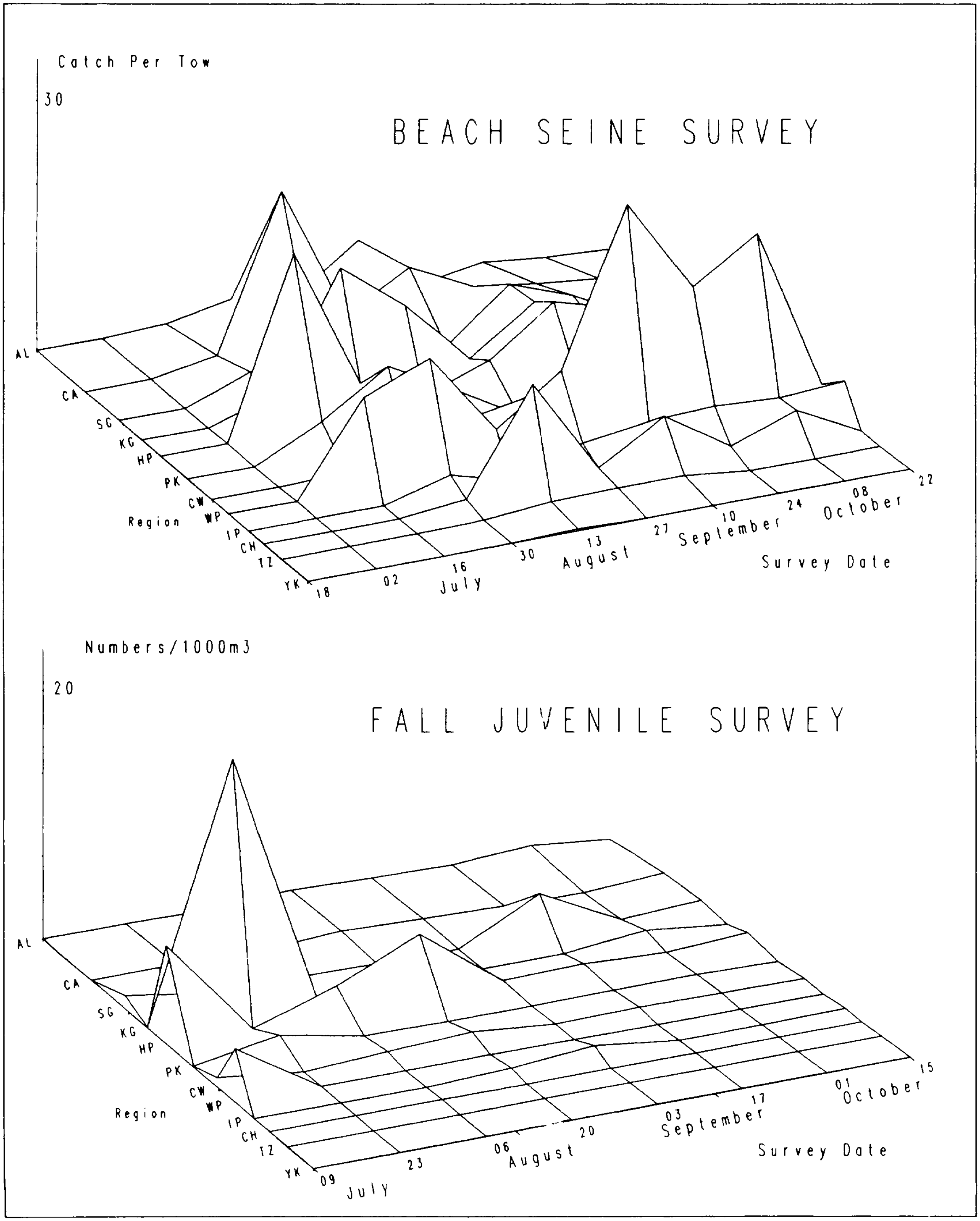


Figure 4-11. Spatiotemporal distribution of young-of-year white perch in the Hudson River estuary based on the 1990 Fall Juvenile and Beach Seine River Ichthyoplankton Surveys.

young of year densities were highest during the summer months and declined through October. In the BSS, young of year white perch remained relatively equally abundant from late July through October. Peak abundance (28/tow) in the BSS was recorded in the week of 10 September in the West Point region.

In the LRS young of year white perch were collected primarily in reaches north of Croton-Haverstraw. The regional extent of the young of year white perch distribution is impossible to distinguish as no samples were taken in the upper estuary during the end of the sampling period. In the BSS, young of year were taken from every region; however, few were collected in the higher salinity water of the Tappan Zee and Yonkers regions. Distribution patterns of abundance observed during the BSS indicated a general shift in peak young of year density from upriver regions (Albany to Hyde Park) during July and August to downriver regions (i.e., West Point) from mid-September through mid-October. This possibly indicates that young of year white perch migrated from upper to lower Hudson River regions in the fall. No young of year were taken in regions below and including Croton-Haverstraw in the FJS. In the FJS, the greatest regional density (24/1,000 m^3) was recorded in the Kingston region; most regional peak densities of white perch young of year were generally found north of Indian Point and south of Catskill.

4.3.5 Yearling and Older Fish Distribution

Yearling and older white perch were collected during all sampling periods in both the 1990 FJS and BSS (Figure 4-12). Yearling and older abundance in the FJS peaked (12/1,000 m^3) during the week of 15 October; no clear temporal distributional pattern of yearling and older white perch in the FJS was evident. In the BSS, the highest density of yearling and older white perch was collected during the weeks of 18 June in the Hyde Park region (35/1,000 m^3) and 2 July in the Kingston region (38/1,000 m^3). Aside from a lesser peak in abundance in mid-September, the estimated standing crop (Table C-32) of yearling and older white perch in the BSS generally decreased through the summer and fall.

Yearling and older white perch were collected in all of the Hudson River regions sampled in both the BSS and FJS (Yonkers through Albany). No regional pattern of abundance was noted in the FJS. Peak regional densities in the early sampling periods of the BSS were recorded in the Albany, Kingston through Cornwall, and Indian Point through Tappen Zee regions. In the mid- and late sampling periods of the BSS, regional densities of yearling and older white perch were greatest in the Saugerties and Catskill regions and regions below Cornwall; a similar bimodal geographic distribution has been observed in previous years (EA 1991).

4.3.6 Comparison to Previous Years

In 1990, only the temporal distribution of young of year resembled the historical trend (Figure 4-13). A major peak in egg distribution in week 22 (28 May) in 1990 digressed significantly from the historic trend of a broad band occurring from week 18 through 24 (late April through mid-June). Also, the peak in yolk-sac distribution, which historically occurred in weeks 20 and

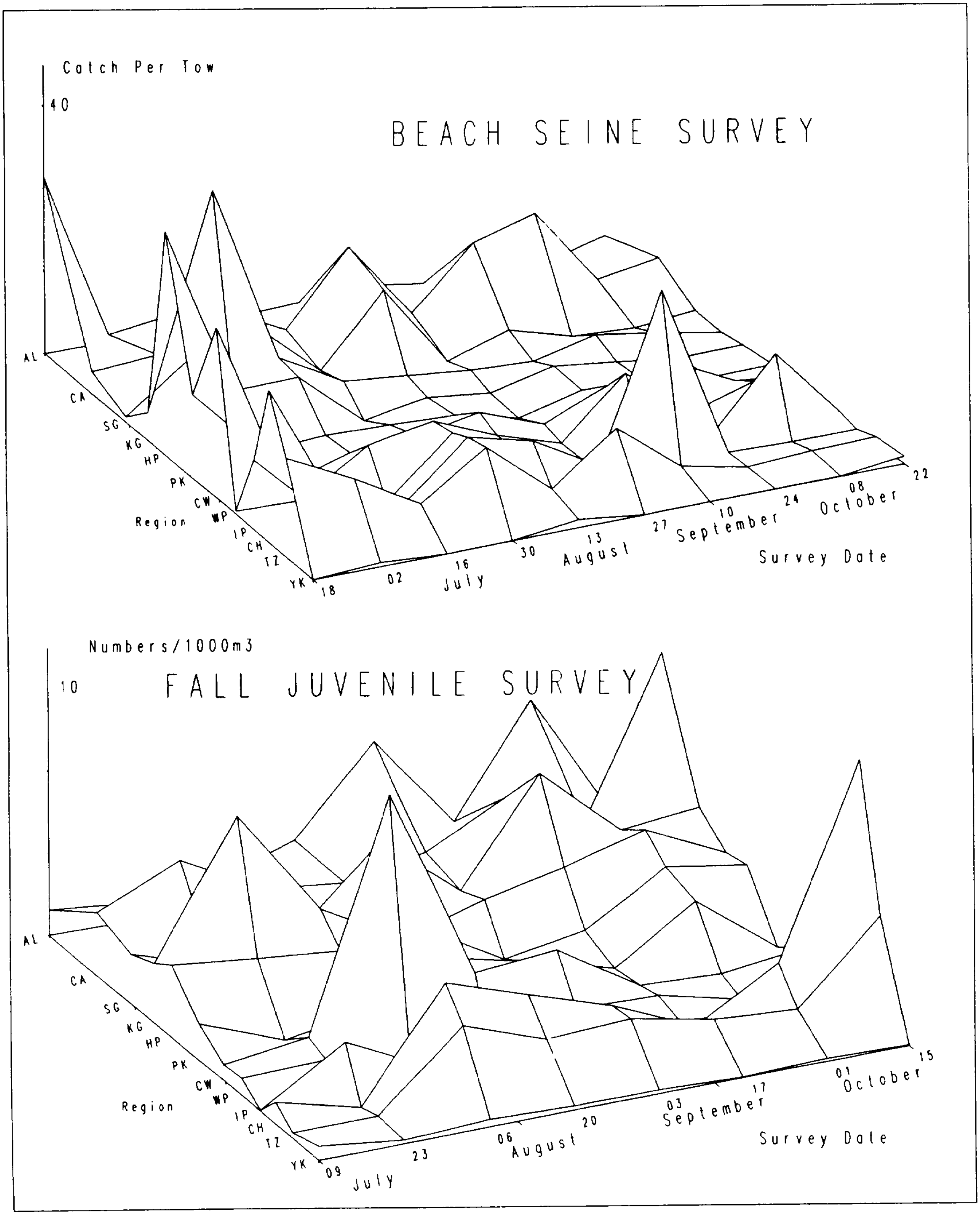


Figure 4-12. Spatiotemporal distribution of yearling and older white perch in the Hudson River estuary based on the 1990 Fall Juvenile and Beach Seine River Ichthyoplankton Surveys.

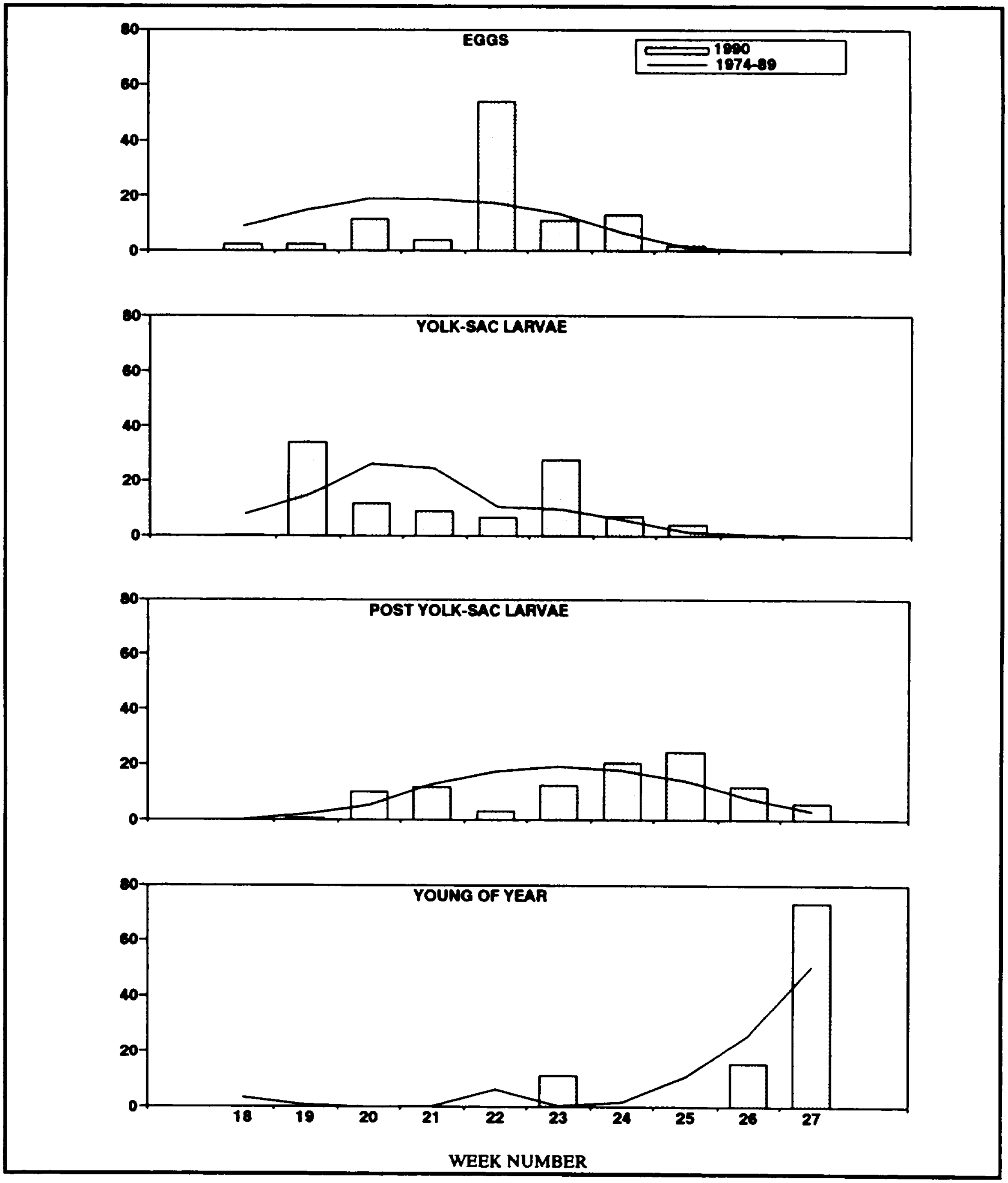


Figure 4-13. Temporal indices for the early life stages of white perch collected during Longitudinal River Ichthyoplankton surveys of the Hudson River estuary, 1974-1990.

21 (mid-May), occurred in weeks 19 and 23 in 1990, appearing as a temporal bimodal distribution in abundance. Also, the post yolk-sac larvae temporal index was bimodal.

The geographic distributions for eggs, yolk-sac larvae, post yolk-sac larvae, and young of year white perch as recorded in the 1990 LRS were generally consistent with the long-term trends (Figure 4-14). There was a slight upriver shift in young of year distribution, with a peak occurring in Saugerties rather than Croton-Haverstraw.

The 1990 BSS geographic index values for young of year white perch did not fit the long-term trend (Figure 4-15). The long-term indicates a bimodal pattern, with most of the catch occurring in the Tappan Zee and Croton-Haverstraw regions and a smaller peak from Saugerties to Catskill. Major differences from the long-term pattern include a shift in peak distribution from the Tappan Zee and Croton-Haverstraw regions upriver, with the largest proportion of the catch occurring at West Point. In addition, the smaller peak for young of year white perch was distributed from Hyde Park trhough the Catskill region.

4.3.7 Microdistribution Patterns

Peak abundance of white perch eggs, which occurred from 29 May to 2 June, was recorded at RM 111 (Figure 4-16). In the vicinity of RM 111, the main channel of the Hudson River is narrow and vegetated shallow water zones exist along both shorelines. Catskill Creek enters the Hudson River between RM 100 and 113. The lesser peaks in abundance which occur at RM 108 and 109, are located in Inbocht Bay, a large vegetated shallow water area located on the western shore of the river between RM 108 and 109. In previous years, high densities of white perch eggs were associated with shallow shoals and tributaries containing aquatic vegetation at RM 54 to 65, 101 to 110, and 123 to 129 (LMS 1989; EA 1990).

During the period of peak white perch yolk-sac larval abundance (7-17 May), the greatest numbers of white perch yolk-sac larvae were found at RM 67, but relatively high numbers were also recorded at a number of locations (Figure 4-16). The outfall of Wappingers Creek is located in the vicinity of RM 67. Other locations (RM 84, RM 106, and RM 111) that had a high density of yolk-sac larvae in 1990 also contained shallow vegetated areas and were in the vicinity of a tributary outfall. However, RM 81, an area of secondary abundance, lacks shoreline shallow water areas; the river in the vicinity of RM 81 is broad and wide. These attributes (i.e., broad river areas and shallow vegetated zones in the vicinity of a tributary outfall) are the attributes of the location (RM 80-85) containing the peak occurrence of white perch yolk-sac larvae during the last four years (LMS 1989; EA 1990).

From 4 to 28 June, peak abundance for white perch post yolk-sac larvae occurred at RM 118 (Figure 4-16). The river is relatively wide at RM 118, due to the presence of a large island in the middle of the river channel. Just north and south of RM 118, are areas having extensive shallow water vegetated zones on both shorelines. The shallow water zone in the vicinity of RM 118 exists in a relatively small fringe along the western shoreline. The other area of relatively high abundance (RM 130) is located in the vicinity of the outfall of Schodack Creek and is also a location that has little shallow water shoreline area.

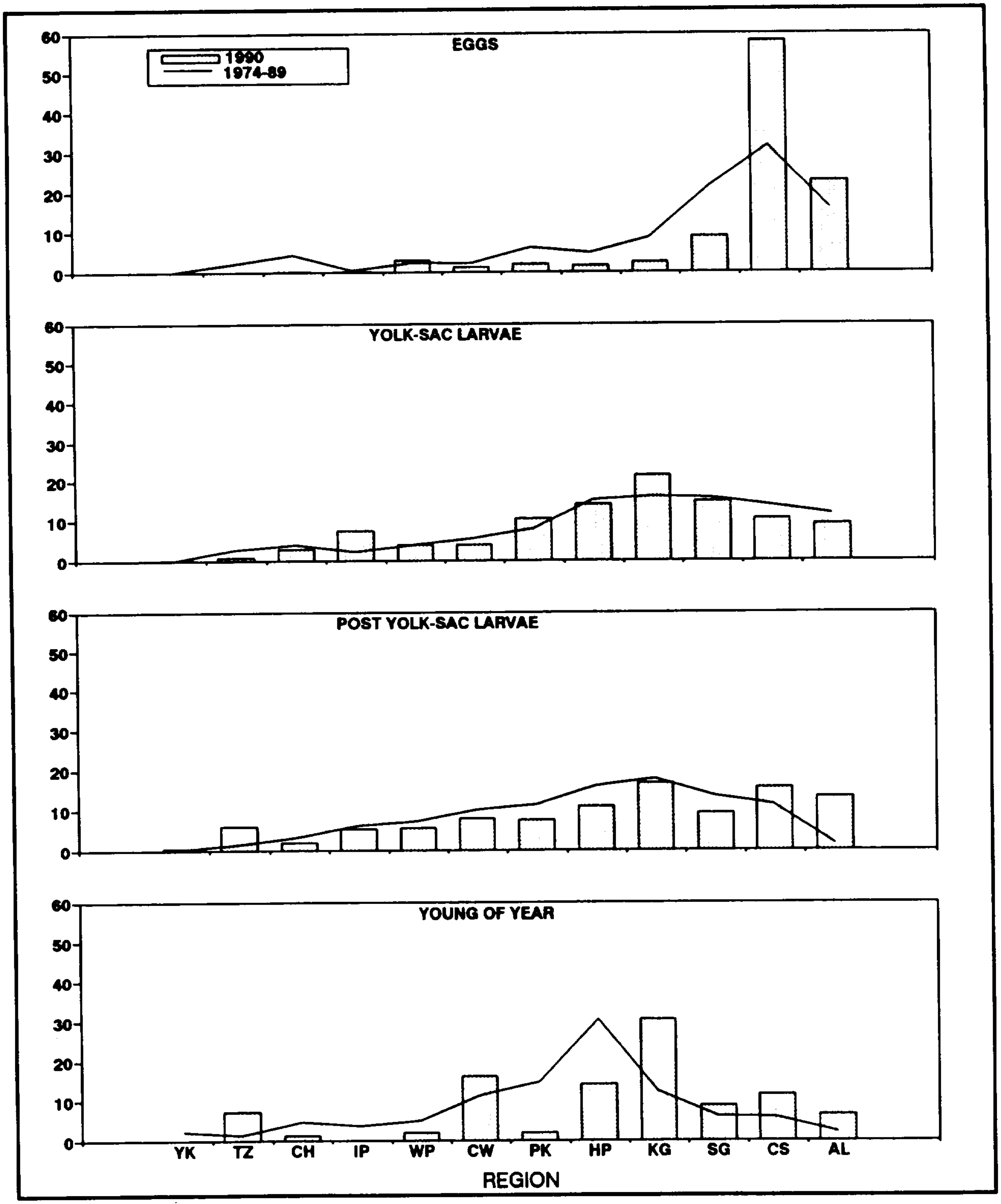


Figure 4-14. Geographic distribution indices for the early life stages of white perch collected during Longitudinal River Ichthyoplankton surveys of the Hudson River estuary, 1974-1990.

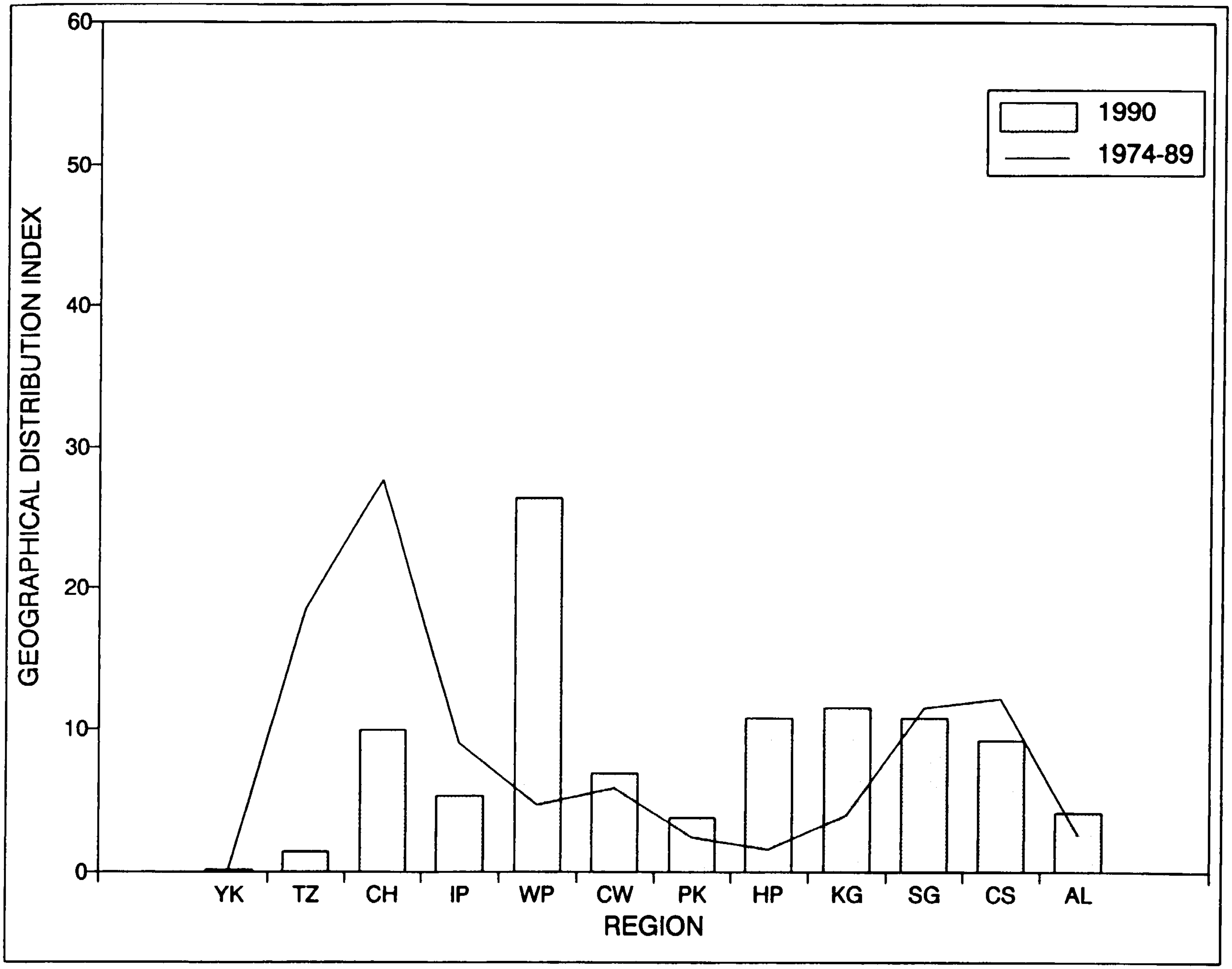


Figure 4-15. Geographic distribution indices for young of year white perch collected during Beach Seine surveys of the Hudson River estuary, 1974-1990.

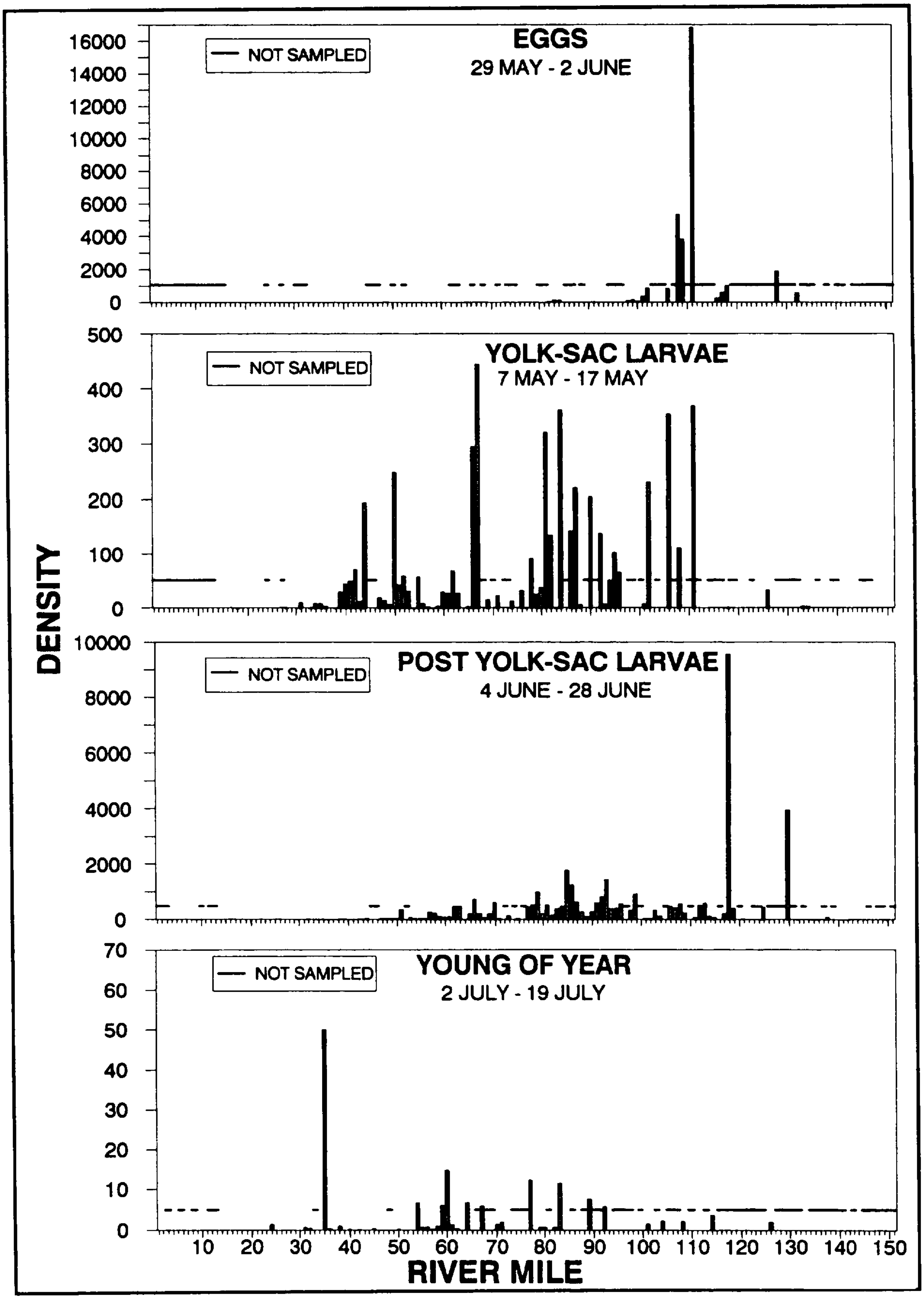


Figure 4-16. Microdistribution (mean density by river mile) of white perch in the Hudson River estuary based on the 1990 Longitudinal River Ichthyoplankton Survey.

Peak white perch young of year abundance occurred from 2 to 19 July and during this period, the greatest young of year densities were recorded at RM 35 (Figure 4-16). River mile 35 is located on the southern edge of Croton-Haverstraw Bay, an area which contains extensive zones of shallow water.

4.4 ATLANTIC TOMCOD

The Atlantic tomcod, *Microgadus tomcod* (Walbaum), an anadromous euryhaline species of the family Gadidae, inhabits the Atlantic Coast from Canada to Virginia (Peterson et al. 1980). In the Hudson River estuary, they occur as far upriver as the Saugerties Region, but are uncommon above the Kingston Region. Adult tomcod enter the Hudson River estuary in November to spawn over sand or gravel bottoms in fresh water; fertilization is limited to salinities of less than 2 ppt (Booth 1967). The eggs are demersal and nonadhesive, are deposited between December and February, and have an incubation time of about 24 days at 6°C. At 2.5-3.5°C hatching takes 34-61 days (Watson 1987). Upon hatching, the larvae drift downstream to waters with higher salinity where larval development occurs (Peterson et al. 1980). Yolk-sac absorption occurs in four-five days. During the summer, young of year tomcod are principally caught in water depths of 20 ft or greater within the Hudson River estuary (Klauda et al. 1988b). As salinity decreases in the Hudson River mid-estuary toward fall, young of year tomcod move downriver to the lower Hudson River estuary and adjacent coastal areas.

4.4.1 Egg Distribution

Atlantic tomcod eggs were not collected during the 1990 LRS (Figure 4-17). This is not surprising as tomcod spawn in the winter (December-February) and hatching is usually completed by the beginning of March. The LRS did not begin until 19 April.

4.4.2 Yolk-Sac Larval Distribution

No Atlantic tomcod yolk-sac larvae were present in the 1990 sampling program (Figure 4-17). The LRS sampling began 19 April. In previous years, when the LRS started in March, yolk-sac larvae were collected through early April (Battelle 1983).

4.4.3 Post Yolk-Sac Larval Distribution

In 1990, Atlantic tomcod post yolk-sac larvae were collected in quantity during the first several sampling weeks (19 April - 10 May) of the LRS and were collected in low numbers on several occasions through 14 June (Figure 4-18). As in previous years, maximum abundance occurred in early to mid-April. Peak density (3,504/1,000 m^3) was recorded in the Tappan Zee region. Few Atlantic tomcod post yolk-sac larvae were collected north of Indian Point. Atlantic tomcod post yolk-sac larvae were found mainly from the Yonkers to Indian Point region, although samples were not taken in the Battery region during the period of peak abundance in other regions.

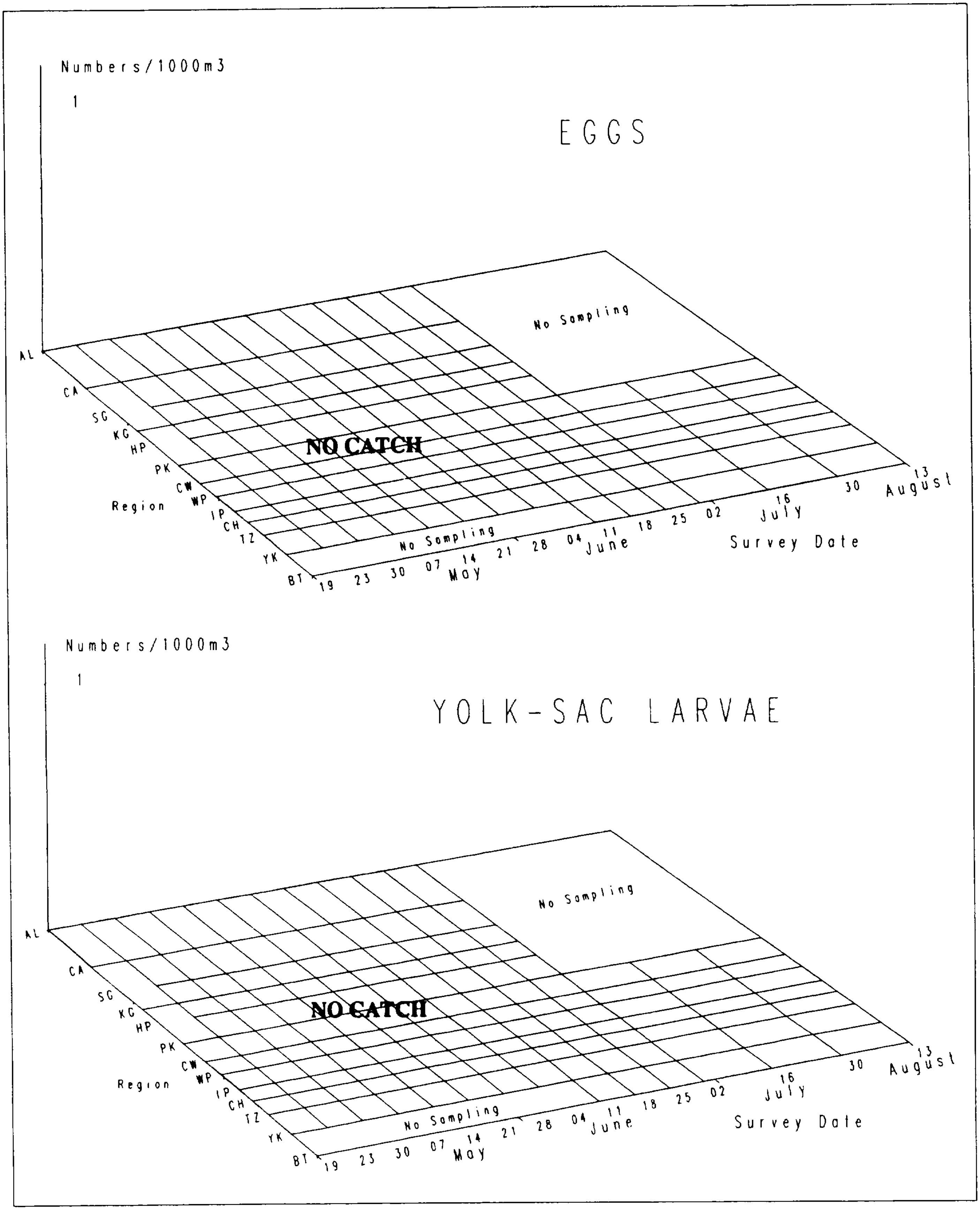


Figure 4-17. Spatiotemporal distribution of egg and yolk-sac stages of Atlantic tomcod in the Hudson River estuary based on the 1990 Long River Ichthyoplankton Survey.

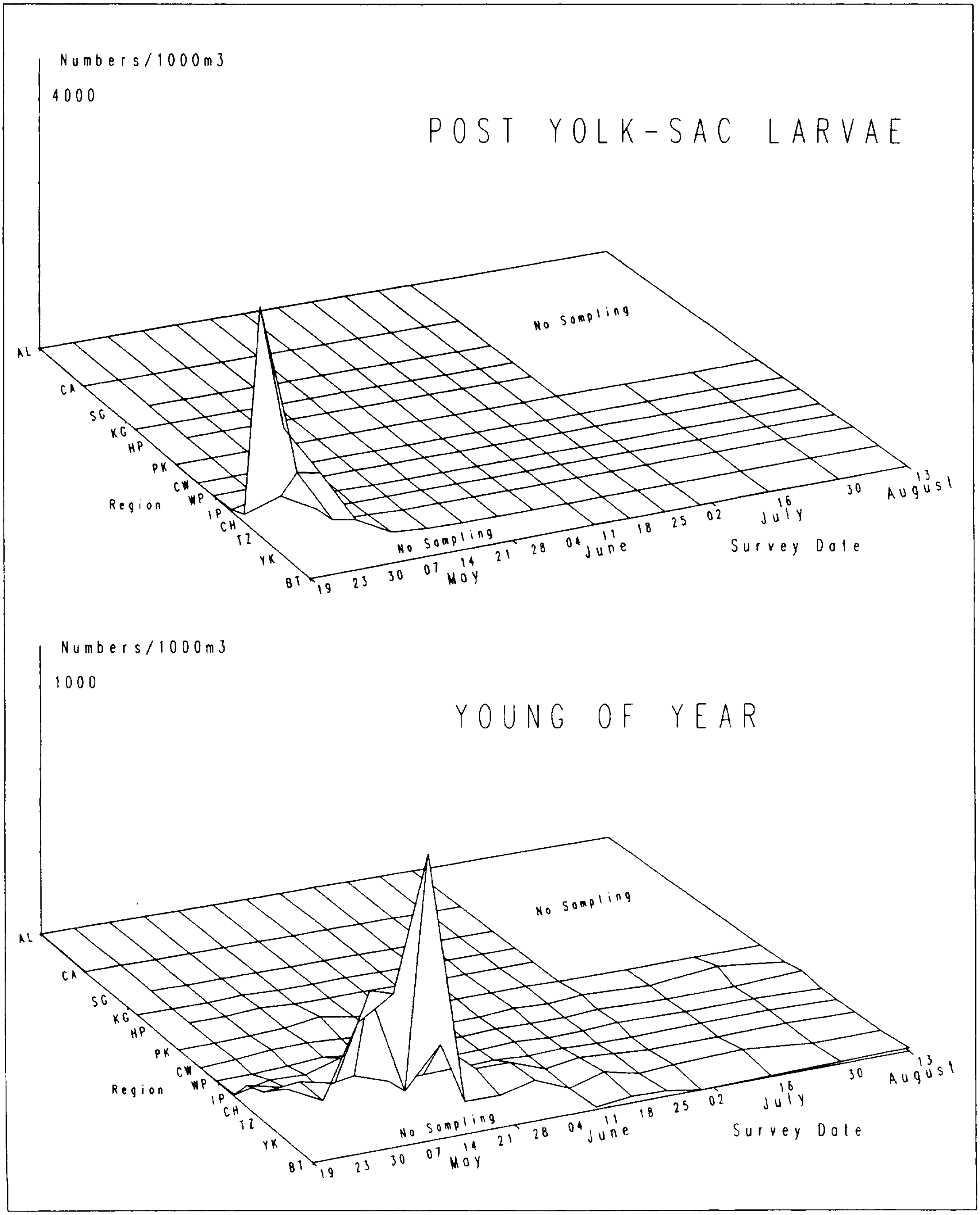


Figure 4–18. Spatiotemporal distribution of post yolk–sac and young–of–year stages of Atlantic tomcod in the Hudson River estuary based on the 1990 Long River Ichthyoplankton Survey.

4.4.4 Young of Year Distribution

Young of year Atlantic tomcod were taken during all periods of the 1990 LRS, but were most abundant in the April and May collections (Figure 4-18). Young of year Atlantic tomcod were also taken during all sampling periods in the FJS and in a majority of weeks sampled during the BSS (Figure 4-19). In the BSS a peak density of 13/tow was recorded during the week of 18 June, and in the FJS a peak of 24/1,000 m^3 was recorded in late July, with a secondary peak (10/1,000 m^3) in late August. A small secondary peak was recorded in September in the BSS and in October in the FJS as water temperature declined.

In all three surveys, young of the year Atlantic tomcod were found at highest densities in the mid- to lower Hudson River estuary. In the LRS the majority of young of year Atlantic tomcod were collected in regions south of and including Indian Point. In the FJS most young of year were collected south of Hyde Park and in the BSS, south of Indian Point. Atlantic tomcod prefer cooler, deeper water and thus were not found in great abundance in the higher temperatures existent in the shore zone area.

4.4.5 Yearling and Older Fish Distribution

No yearling and older Atlantic tomcod were collected in the 1990 BSS (Figure 4-20). In the FJS peak densities of yearling and older Atlantic tomcod were recorded in mid- to late August. As revealed in the FJS, similar to the young of year distribution, the regional densities of yearling and older Atlantic tomcod were greatest in the lower river regions (i.e., south of Indian Point).

4.4.6 Comparison to Previous Years

The geographic distribution of Atlantic tomcod young of year from the 1990 BSS was similar to the long-term (1974-1988) average distribution (Figure 4-21). Peak occurrence was in the Tappan Zee region. The only BSS substantive digression from the long-term trend was that a sizeable proportion of the catch was from West Point, where historically very few have been collected.

4.5 AMERICAN SHAD

The range of the American shad, *Alosa sapidissima* (Wilson), an anadromous fish belonging to the herring family Clupeidae, extends from Newfoundland to Florida. Spawning occurs in the spring in freshwater tributaries of coastal rivers. American shad are found throughout the Hudson River estuary. Their upriver migration is limited to areas south of the Federal Dam at Troy, New York (Sheppard 1976).

American shad generally spawn in flat, shallow areas or in river channels where sand and/or gravel substrates are present. Water depths are usually 3-30 ft, with currents from >1 to <3 fps (Walburg and Nichols 1967). Spawning was observed by Chittenden (1969) in waters as shallow as 6-12 in. Smith (1907) concluded that although flats are the typical spawning location, egg deposition could also occur elsewhere. Spawning in the Hudson River estuary

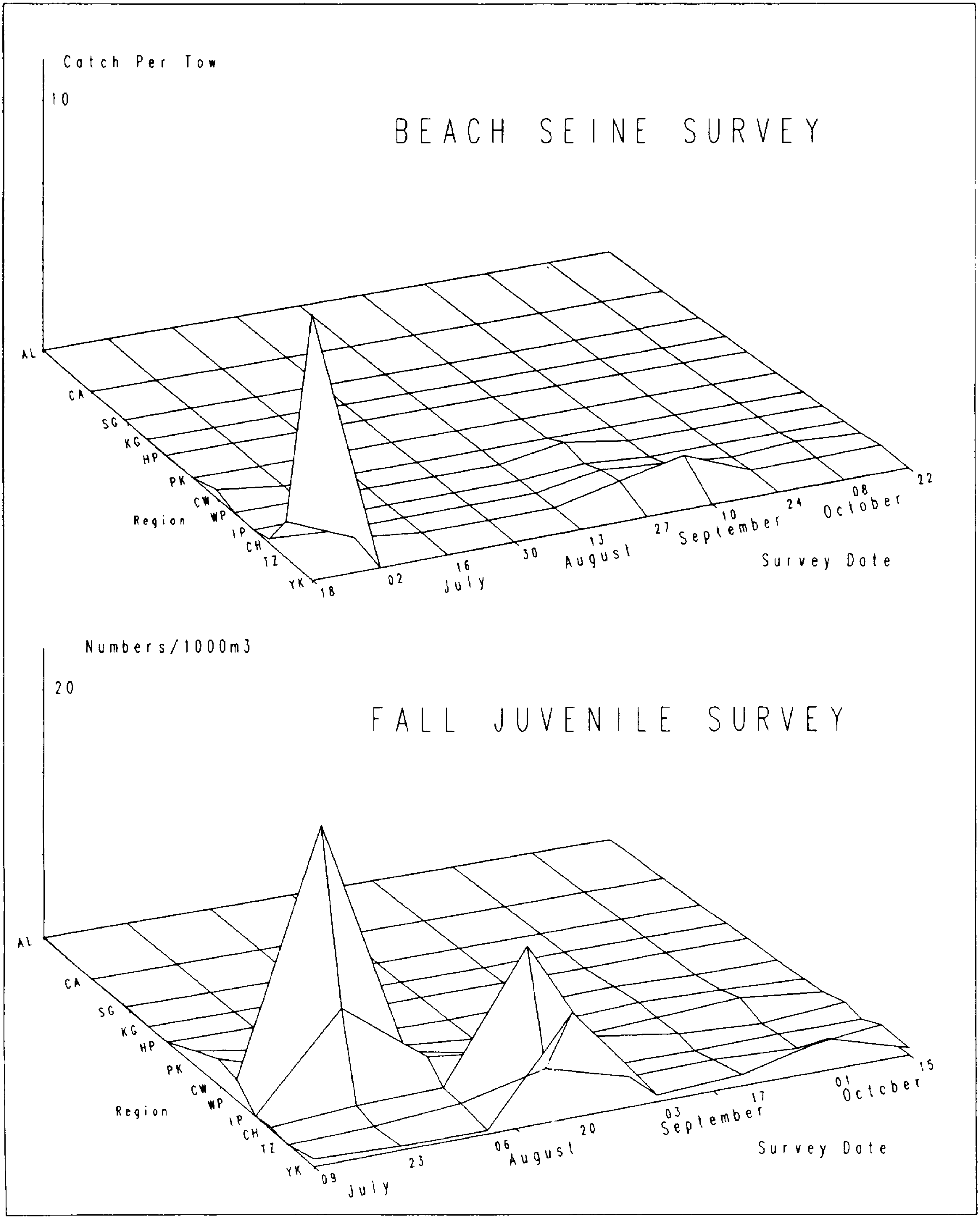


Figure 4 – 19. Spatiotemporal distribution of young – of – year Atlantic tomcod in the Hudson River estuary based on the 1990 Fall Juvenile and Beach Seine River Ichthyoplankton Surveys.

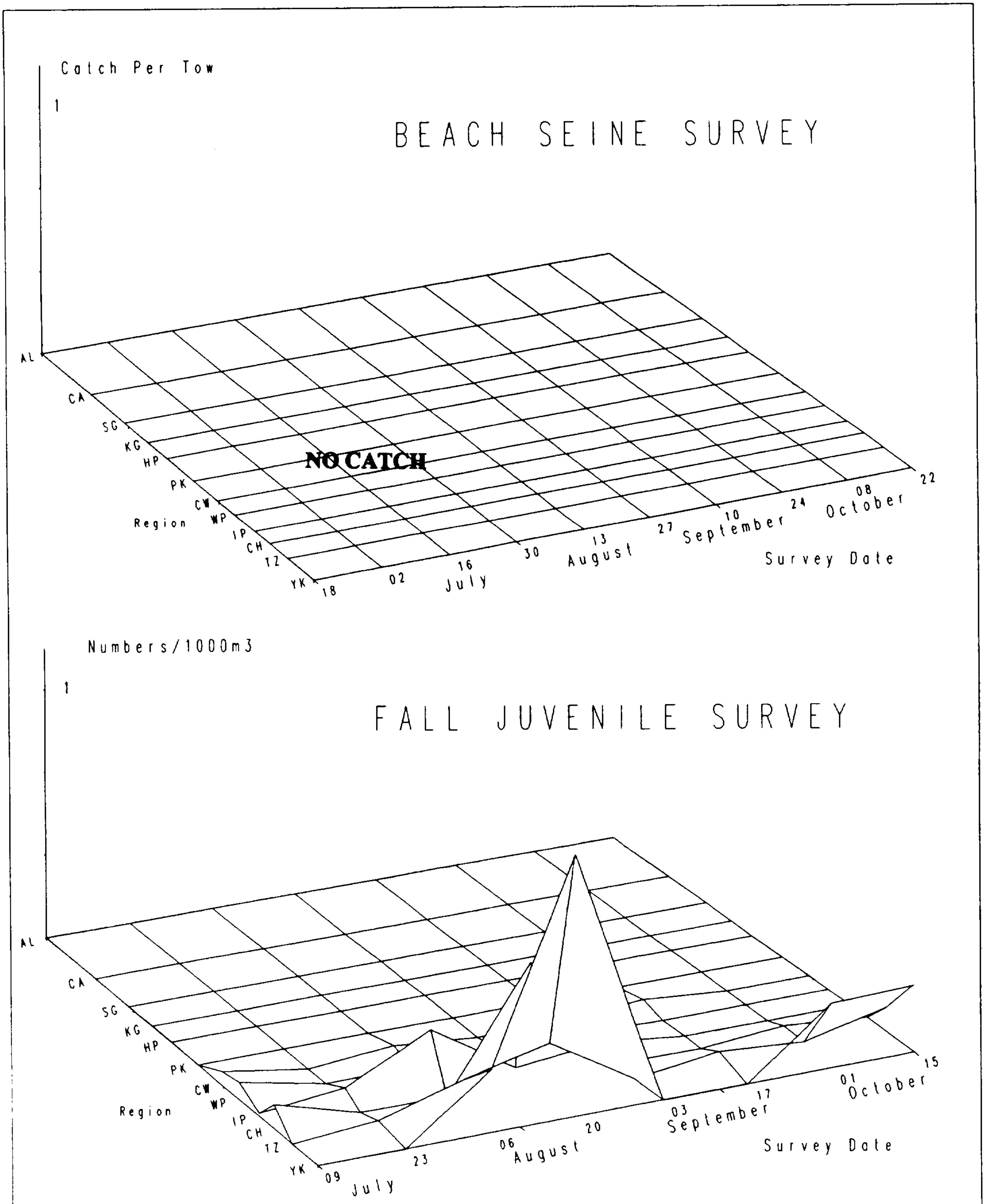


Figure 4–20. Spatiotemporal distribution of yearling and older Atlantic tomcod in the Hudson River estuary based on the 1990 Fall Juvenile and Beach Seine River Ichthyoplankton Surveys.

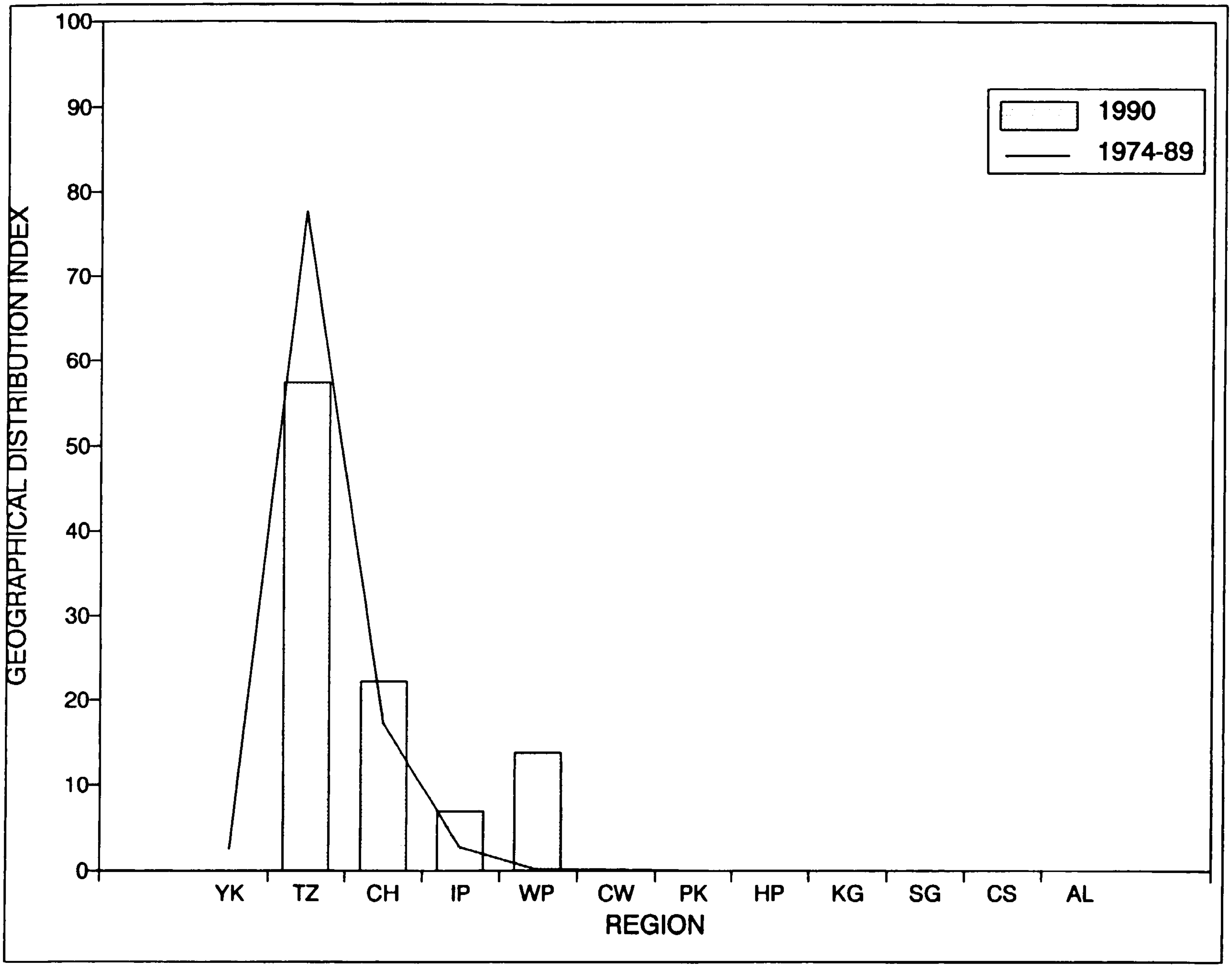


Figure 4-21. Geographic distribution indices for young of year Atlantic tomcod collected during Beach Seine surveys of the Hudson River estuary, 1974-1990.

occurs in tributaries as well as in river flats, primarily from the Hyde Park to Catskill regions when water temperatures are from 7 to 14°C (TI 1981). Walburg and Nichols (1967) reported that American shad can spawn at water temperatures from 8 to 26°C, but that most spawning occurs from 12 to 21°C. Mansueti and Kolb (1953) noted that at suitable water temperatures American shad will spawn wherever they are in the river.

The eggs of American shad are demersal and nonadhesive, with each female typically spawning over 50,000 eggs (Leggett 1969). After spawning, those adult shad that survive return to the ocean to spend summers in the Gulf of Maine (Scott and Crossman 1973). In many rivers north of Chesapeake Bay adults may return to spawn as many as five times, with spawning occurring first at age three or four (Leggett and Carscadden 1978). Mansueti and Hardy (1967) reported incubation time from two days at 27°C to 17 days at 12°C. Larvae are no longer dependent on their yolk-sac after 5 days at 17°C (Mansueti and Hardy 1967) and feed throughout the summer on copepods, terrestrial insects, and certain cladocerans (Domermuth and Reed 1980). As river temperatures decline during fall the young of year shad migrate out of the Hudson River estuary and remain in the ocean until mature (approximately three-five years). Adult shad are commercially harvested each spring, primarily from the lower Hudson River estuary through RM 144 (Kahnle and Brandt 1984). Sport harvest has not been assessed in the Hudson River estuary.

4.5.1 Egg Distribution

American shad eggs were collected from the beginning of the sampling period (19 April) through late June (Figure 4-22). Most eggs were collected in mid-May, although a substantial number were also collected in the Battery region the week of 18 June. Previous studies have also reported peak egg density for American shad in early to mid-May in the Hudson River estuary.

The majority of American shad eggs were collected in regions north of Hyde Park, with greatest densities occurring in the Catskill and Albany regions. The peak egg density of 2,756/1,000 m^3 was recorded in the Albany region. The peak in abundance recorded in mid-June in the Battery region (2,071/1,000 m^3) was nearly as high.

4.5.2 Yolk-Sac Larval Distribution

American shad yolk-sac larvae were collected from early May (7 May) through late June (28 June) in the 1990 LRS (Figure 4-22). The greatest abundance of yolk-sac larvae was recorded in mid- to late May, just slightly after the peak egg abundance. No similar distribution of yolk-sac larvae was noted for the peak eggs density that occurred in mid-June in the Battery region. American shad yolk-sac larvae occurred in very low densities ($<50/1,000$ m^3) after mid-June. Greatest densities of yolk-sac larvae were found in the Albany through Poughkeepsie regions, while moderate yolk-sac larvae densities extended through the Cornwall region.

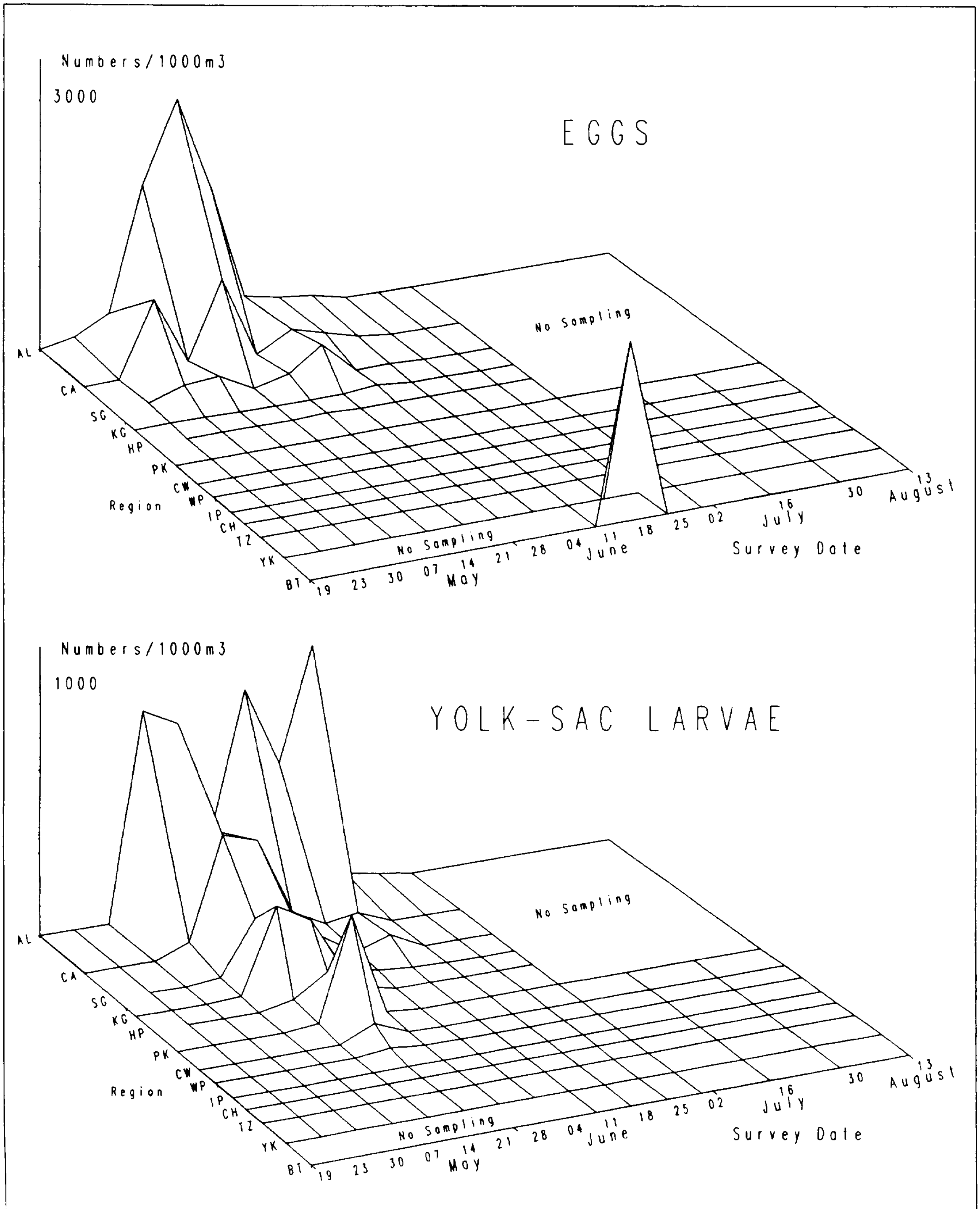


Figure 4-22. Spatiotemporal distribution of egg and yolk-sac stages of American shad in the Hudson River estuary based on the 1990 Long River Ichthyoplankton Survey.

4.5.3 Post Yolk-Sac Larval Distribution

American shad post yolk-sac larvae were present in the 1990 LRS beginning in early May and were collected through 19 July (Figure 4-23). Peak abundance was recorded the week of 11 June. As upper estuary regions were not sampled from late July through August and post yolk-sac larvae were present in relatively high densities in this region up to the last sample in the region, the temporal and spatial distribution of post yolk-sac larvae in the Hudson River in 1990 cannot be fully determined.

Greatest post yolk-sac larval densities were found from Kingston to Albany with lesser downriver peaks recorded in the Cornwall and Poughkeepsie regions. The peak post yolk-sac larval density of 1,789/1,000 m^3 occurred in the Albany region the week of 11 June. Few American shad post yolk-sac larvae were collected south of the Indian Point region. Thus no secondary peak reflecting that observed for egg density was noted in 1990. Similar spatial distribution was reported in previous years, except during 1984 when secondary peaks were noted in downriver regions (MMES 1986).

4.5.4 Young of Year Distribution

American shad young of year were first collected in quantity in the LRS during the week of 25 June (Figure 4-23) and were present in every subsequent week of the LRS and every biweekly sample of the FJS and BSS (Figure 4-24). In both the LRS and FJS higest densities were recorded in late June and early July, respectively; in the BSS, peak abundance was recorded the week of 17 July. Densities of young of year American shad decreased from peak levels through October in the BSS and FJS, but remained in moderate abundance in these surveys through the fall.

American shad young of year were absent from the lower Hudson River regions (i.e., Yonkers and the Battery) in the LRS, but were found in all regions in both the BSS and FJS. In the LRS, the greatest regional density (193/1,000 m^3) was recorded in the Catskill region the week of 25 June. In the FJS, two peak densities were recorded, one in the Saugerties (46/1,000 m^3) and one in the Catskill (42/1,000 m^3) region. In the BSS, the peak regional density (371/1,000 m^3) was recorded in the West Point region the week of 17 July. Except for the peak abunance in West Point region in July in the BSS, young of year were present in the shore zone areas of the upper half of the Hudson River estuary during the summer and early fall in moderate numbers. In the fall no clear pattern of movement from upstream to downriver areas was evident from the data collected.

4.5.5 Yearling and Older Fish Distribution

A few ($<$0.05/1,000 m^3) yearling and older American shad were collected in the FJS in the Tappan Zee region the week of 6 August and in the Croton-Haverstraw region the week of 20 August (Figure 4-25). A few ($\leq$1/tow) were also collected in the BSS in the Croton-Haverstraw and Hyde Park regions the weeks of 2 July and 14 August, respectively (Figure 4-25).

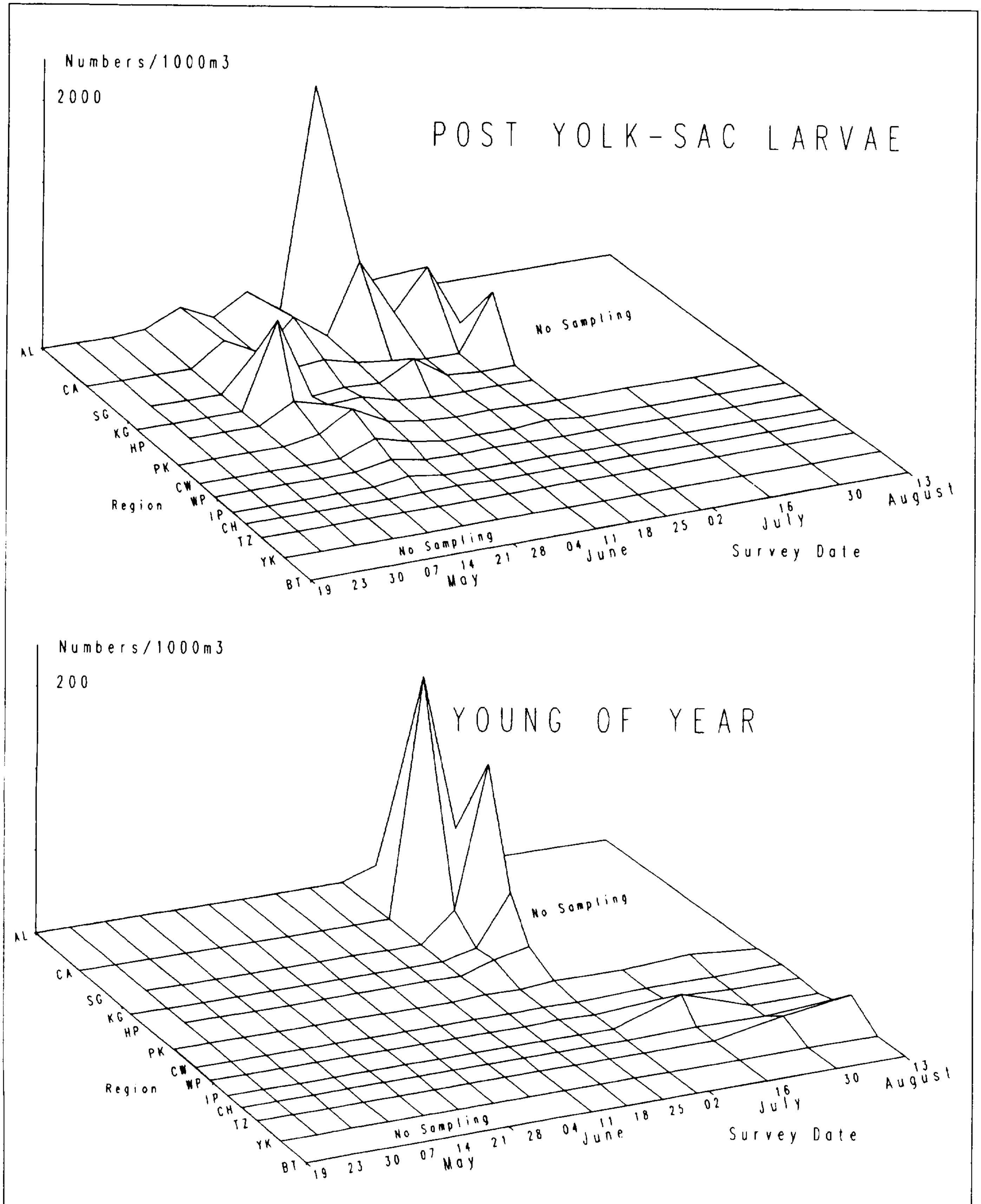


Figure 4–23. Spatiotemporal distribution of post yolk–sac and young–of–year stages of American shad in the Hudson River estuary based on the 1990 Long River Ichthyoplankton Survey.

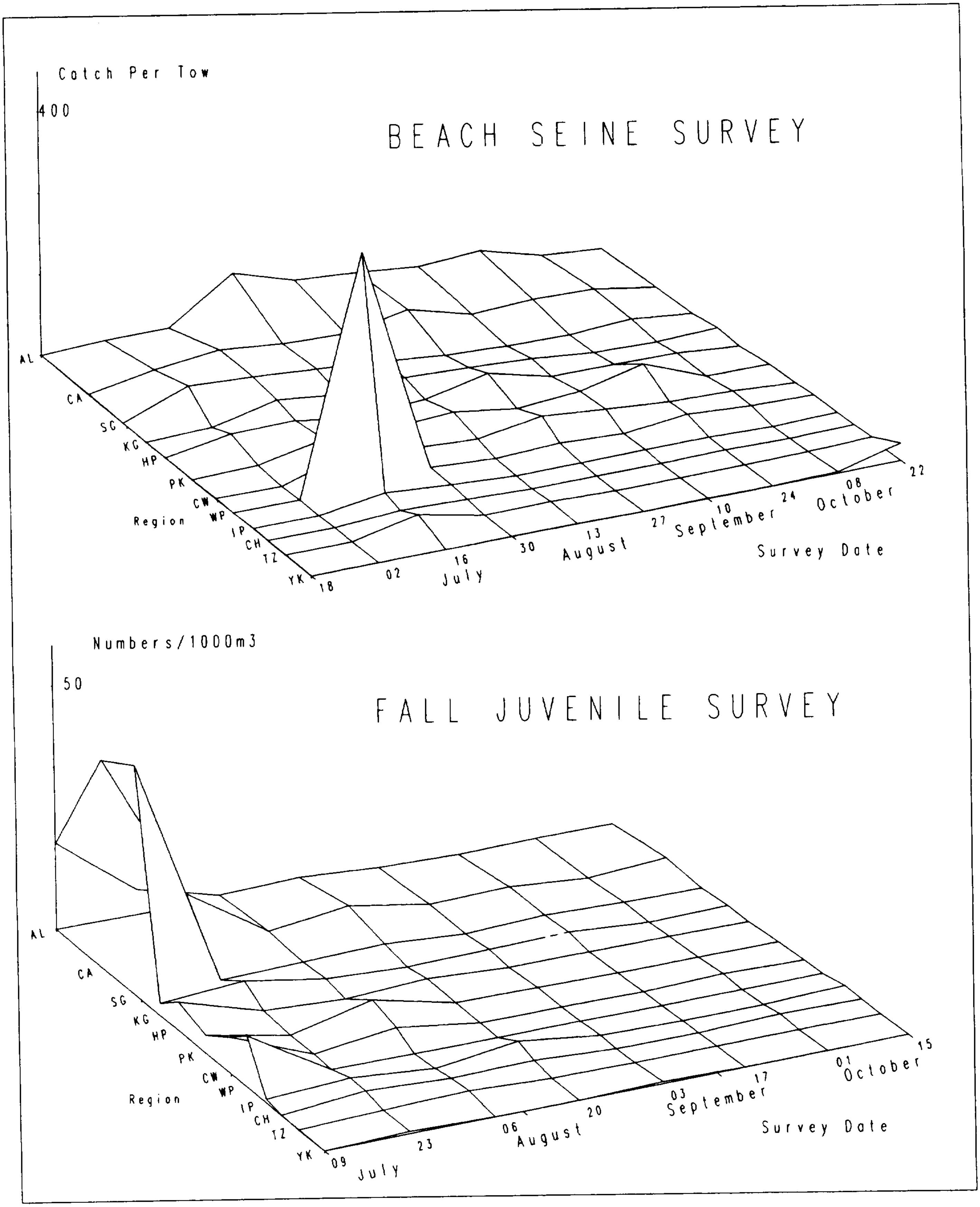


Figure 4–24. Spatiotemporal distribution of young–of–year American shad in the Hudson River estuary based on the 1990 Fall Juvenile and Beach Seine River Ichthyoplankton Surveys.

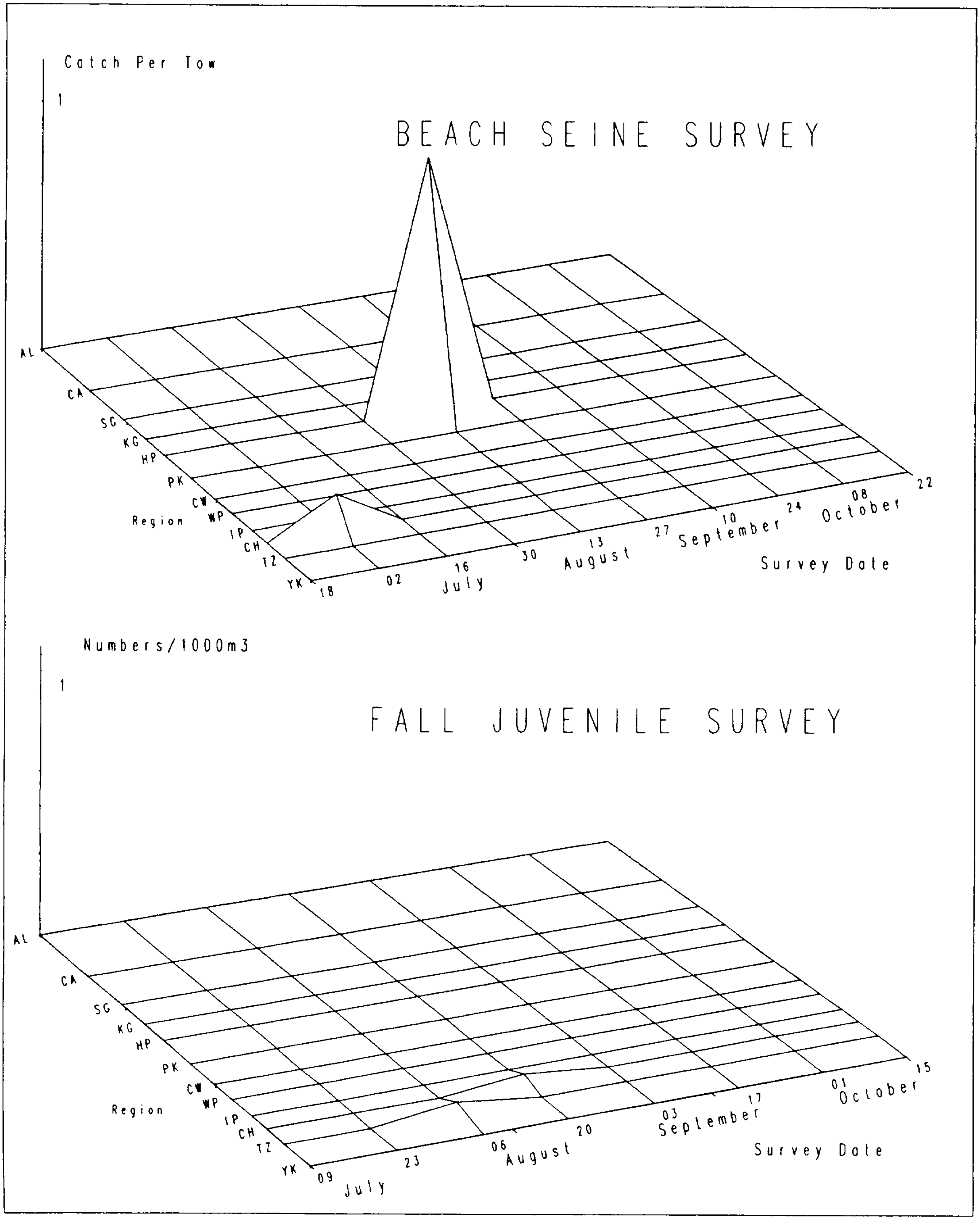


Figure 4–25. Spatiotemporal distribution of yearling and older American shad in the Hudson River estuary based on the 1990 Fall Juvenile and Beach Seine River Ichthyoplankton Surveys.

4.5.6 Comparison to Previous Years

The 1974-1990 long-term pattern for BSS geographic distribution of young of year is trimodal, with greatest abundance in the Tappan Zee and Croton-Haverstraw regions in the lower estuary, the Cornwall and Peakskill regions in the middle estuary, and the Saugerties, Catskill, and Albany in the upper estuary (Figure 4-26). In 1990, a bimodal distribution pattern was noted; most young of year were found in the middle and upper estuary and very few in the lower estuary.

4.5.7 Microdistribution Patterns

Peak abundance of American shad eggs was recorded from 30 April to 2 June, with highest densities at RM 127 and a secondary peak recorded at RM 137 (Figure 4-27). At RM 127 and 137, the main channel of the Hudson River is narrow, with a vegetated shallow-water zone existing in only a thin fringe immediately along the shoreline. Abundant egg collections were made in similar locations in previous years: RM 125-129 in 1986 (LMS 1989); RM 131 in 1987 (LMS 1989); RM 134 in 1988 (EA 1990); and RM 139 in 1989 (EA 1990).

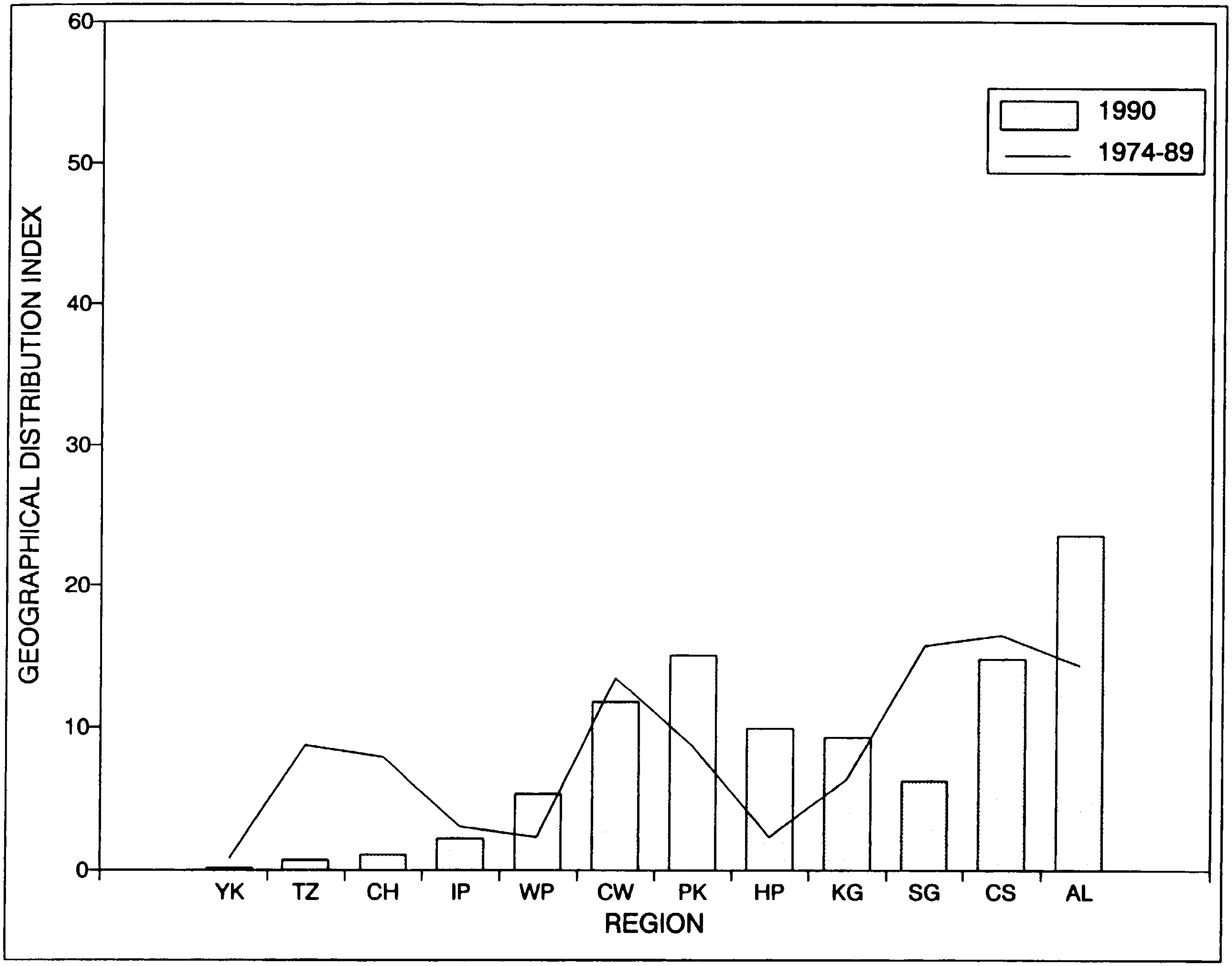
American shad yolk-sac larvae, collected in greatest densities from 7 May to 2 June, were most abundant at RM 127 and 132 (Figure 4-27). As noted above, the main channel of the Hudson River in the vicinity of RM 127 is narrow, with a vegetated shallow-water zone existing in only a thin fringe immediately along the shoreline. The physical characteristics of RM 132 are similar. Peak occurrence in the past three years has been observed at RM 124-126 (EA 1990).

The greatest densities of American shad post yolk-sac larvae were collected from 29 May to 21 June. Peak post yolk-sac larval abundance occurred at RM 132 (a narrow channel having a thin fringe of shallow water on the western shoreline) and RM 111-113 and 106-108 (locations that contain shallow-water vegetated areas) (Figure 4-27). Presence of post yolk-sac larvae near the vegetated shallows may be related to their feeding preferences, which include copepods, terrestrial insects, and cladocerans. In previous years, peak post yolk-sac larval distribution was found in areas containing shallow vegetated flats (LMS 1989; EA 1990).

During the period of peak abundance of American shad young of year (25 June to 6 July), the highest density was collected at RM 104 (Figure 4-27), a location having an extensive shallow-water area. A secondary peak in density was recorded at RM 113, also an area containing an extensive shallow-water vegetated area. In past years, peak post yolk-sac larval abundance has been recorded in Hudson River reaches containing shallow-water vegetated areas (EA 1990). Like post yolk-sac larvae, the presence of young of year American shad in shallow-water vegetated areas is probably related to their food preferences.

4.6 RIVER HERRINGS, *Alosa* spp.

Two species of river herrings, the blueback herring (*Alosa aestivalis*) and the alewife (*Alosa pseudoharengus*), are anadromous clupeids of the Hudson River estuary that are difficult to distinguish before they reach a young of year total length of 35-40 mm (TI 1981). For this reason, early life stages of these two species are collectively identified as *Alosa* spp. in all of



4-26. Geographic distribution indices for young of year American shad collected during Beach Seine surveys of the Hudson River estuary, 1974-1990.

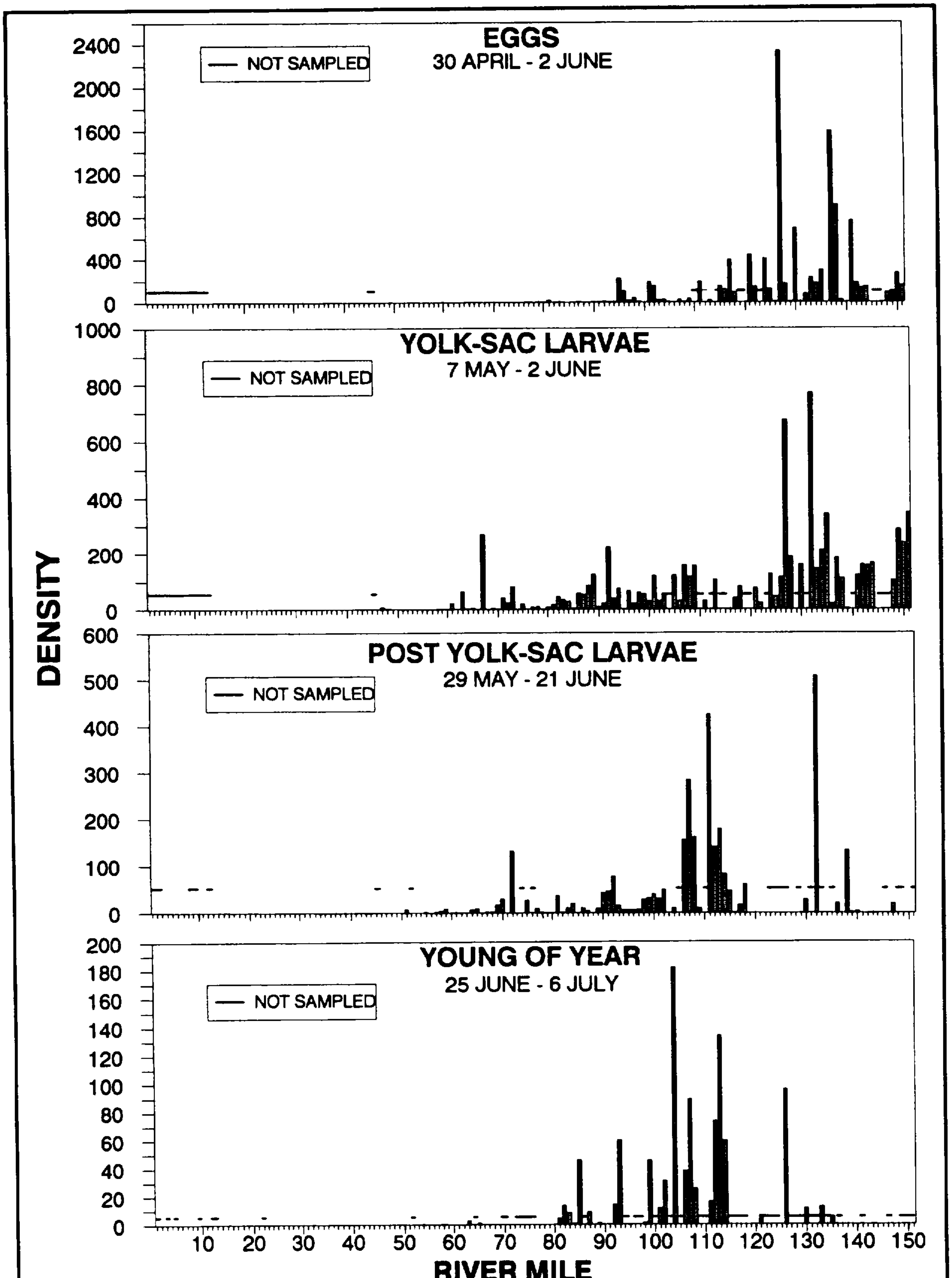


Figure 4-27. Microdistribution (mean density by river mile) of American shad in the Hudson River estuary based on the 1990 Longitudinal River Ichthyoplankton Survey.

the Hudson River surveys. A third anadromous clupeid, American shad (*Alosa sapidissima*), abundant in the Hudson River estuary, can be easily distinguished from other river herring early life stages and is discussed separately in Section 4.5.

Both blueback herring and alewife enter rivers and estuaries along the Atlantic Coast in spring to spawn in brackish or freshwater areas. Both species spawn in the tributaries of the Hudson River estuary (Schmidt et al. 1988). Alewife prefer ponds and slow-moving streams; blueback herring spawn in deeper, faster waters. Alewife spawning occurs first at temperatures near 13°C (Tyus 1974); blueback herring may not spawn until temperatures exceed 20°C (Loesch and Lund 1977). In the Hudson River estuary, alewife and blueback herring spawning runs overlap to some extent; both species are repeat spawners. Adults return to the sea following spawning and young of year usually migrate out of the Hudson River estuary as water temperatures decrease in the fall. Alewife and blueback herring eggs, yolk-sac larvae, and post yolk-sac larvae are presented and discussed together. Young of year (≥40 mm) and yearling and older stages are presented separately by river herring species in subsequent sections.

4.6.1 Egg Distribution

In 1990 *Alosa* spp. peak egg abundance occurred during the weeks of 14 May and 28 May in the Albany and Catskill regions, respectively (Figure 4-28), when water temperatures were about 11 and 15°C (Table B-5), respectively; egg densities declined significantly after early June. A biomodal pattern has been observed in previous years and, in conjunction with preferred spawning temperatures of the two species, water temperatures of 13 and 19°C approximate the spawning temperatures favored by the alewife (Tyus 1974) and blueback herring (Loesch and Lund 1977), respectively, suggesting sequential spawning peaks in those years (EA 1991). Temperatures in 1990 are not as supportive of separate spawning periods as in previous years.

Peak river herring egg densities were 157,684/1,000 m^3 in the Albany region and 33,326/1,000 m^3 in the Catskill region during the week of 14 May and 60,413/1,000 m^3 in the Catskill region during the week of 29 May. Regional densities south of Kingston generally did not exceed 19/1,000 m^3 during the LRS. This distribution pattern is typical of that reported for previous years.

4.6.2 Yolk-Sac Larval Distribution

River herring yolk-sac larvae were collected from late April (the first sampling week [19 April] of the LRS) through June in 1990, with peak abundance occurring in early June (Figure 4-28). Several smaller peaks in the yolk-sac larval density were recorded in early and late May. The late May and early June peaks occurred approximately two weeks after the recorded peaks in egg density. Previous studies have recorded yolk-sac larvae peaks one week after the egg abundance peak in the Hudson River estuary.

Yolk-sac larvae were collected in most river regions, but densities recorded in regions below West Point were substantially lower than those observed in the upper estuary. During late May, yolk-sac larval densities ranged only up to 15/1,000 m^3 in regions downriver of West

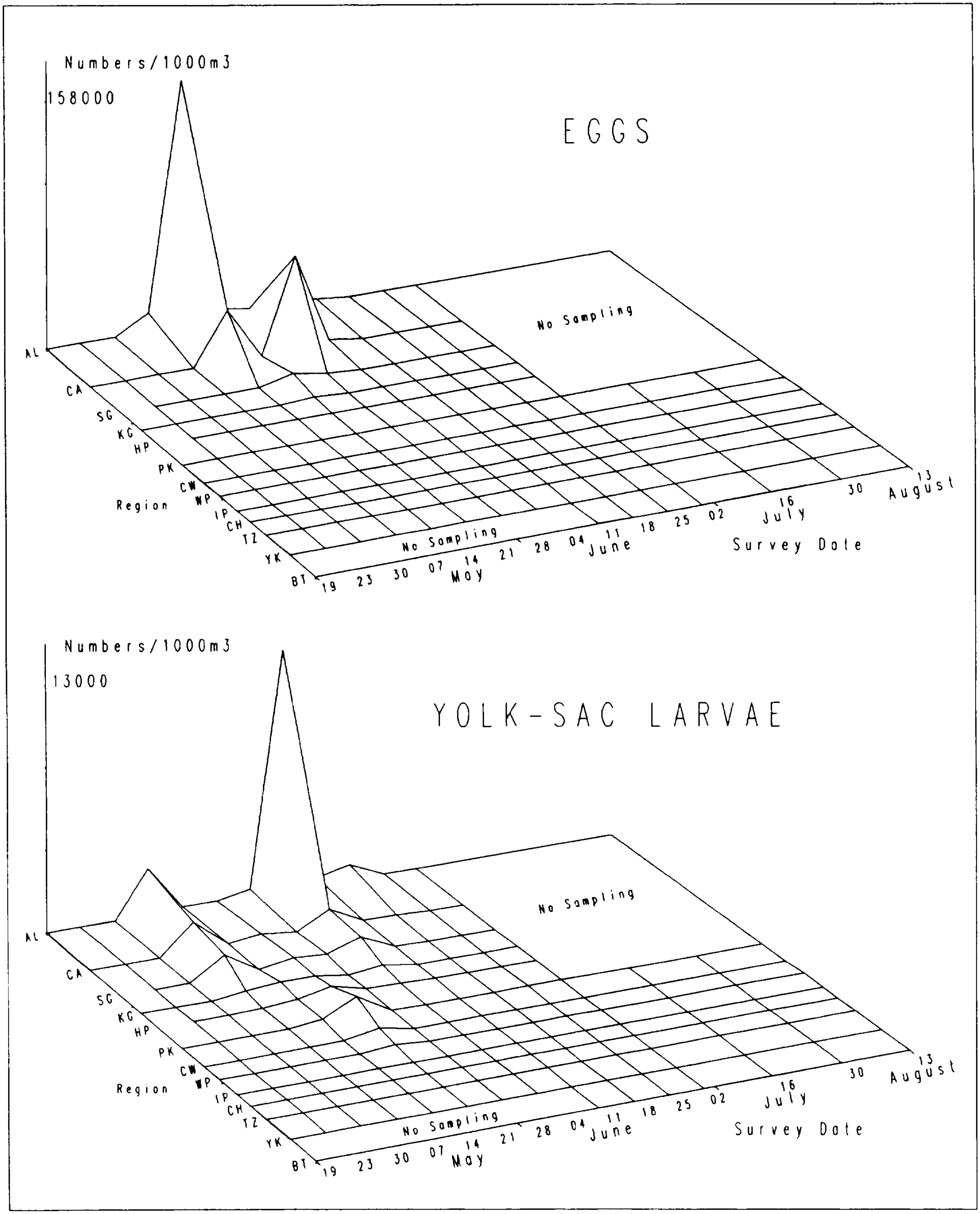


Figure 4–28. Spatiotemporal distribution of egg and yolk–sac stages of Alosa spp. in the Hudson River estuary based on the 1990 Long River Ichthyoplankton Survey.

Point. As in previous years, in 1990 most river herring yolk-sac larvae were collected in the Albany region, and in 1990 the peak density of 12,835/1,000 m^3 was recorded from this region.

4.6.3 Post Yolk-Sac Larval Distribution

River herring post yolk-sac larvae were identified in 1990 LRS collections from late April through early July (Figure 4-29). Peak abundance occurred from mid- to late June and most post yolk-sac larvae were collected from mid-May to late June.

In May, the greatest river herring post yolk-sac larval densities were found between the Kingston and Tappen Zee regions, and in June and July, between the West Point and Albany regions. The peak post yolk-sac larvae density of 3,456/1,000 m^3 in May was recorded in the Poughkeepsie region, while the peak post yolk-sac larvae density of 9,442/1,000 m^3 occurred during the week of 18 June in the Catskill region. In June and July, densities exceeding 2,000/1,000 m^3 were recorded in the upper estuary.

4.6.4 Early Young of Year Distribution

River herring young of year (<40 mm TL) were collected almost exclusively in early July in the 1990 LRS (Figure 4-29). The greatest abundance of unidentified river herring young of year occurred in the Kingston, Saugerties, and Catskill regions in early July, with a peak density estimate of 556/1,000 m^3 recorded in Kingston. The spatial and temporal distribution of young of the year extends into the areas and periods that were not sampled in light of the sharply increasing densities of young of year in the upper estuary towards the end of the LRS sampling period in these areas.

4.7 BLUEBACK HERRING

Blueback herring (*Alosa aestivalis*) is an anadromous clupeid, occurring from Nova Scotia to Florida (NOAA 1987). As noted previously, blueback herring spawning takes place in the spring, following that of the alewife. In the Hudson River estuary most spent adults return to sea during the period from mid-June to mid-August (TI 1981). Blueback herring eggs are demersal and somewhat adhesive, hatching in three-four days at 20-21°C (Jones et al. 1978). Young of year begin to leave the Hudson River estuary in mid-October as water temperatures rapidly decrease (TI 1981).

4.7.1 Young of Year Distribution

Identifiable blueback herring young of year (35-40 mm) were first collected in quantity during early July in the LRS, BSS, and FJS (Figures 4-30 and 4-31). Catches of young of year blueback herring in both the BSS and FJS continued through October. Greatest densities were recorded in mid-July and mid-August (last week of sampling) in the LRS, in early to late August in the FJS, and in early August through early September in the BSS. Densities decreased towards fall and probably reflect mortality and migration from the river in fall.

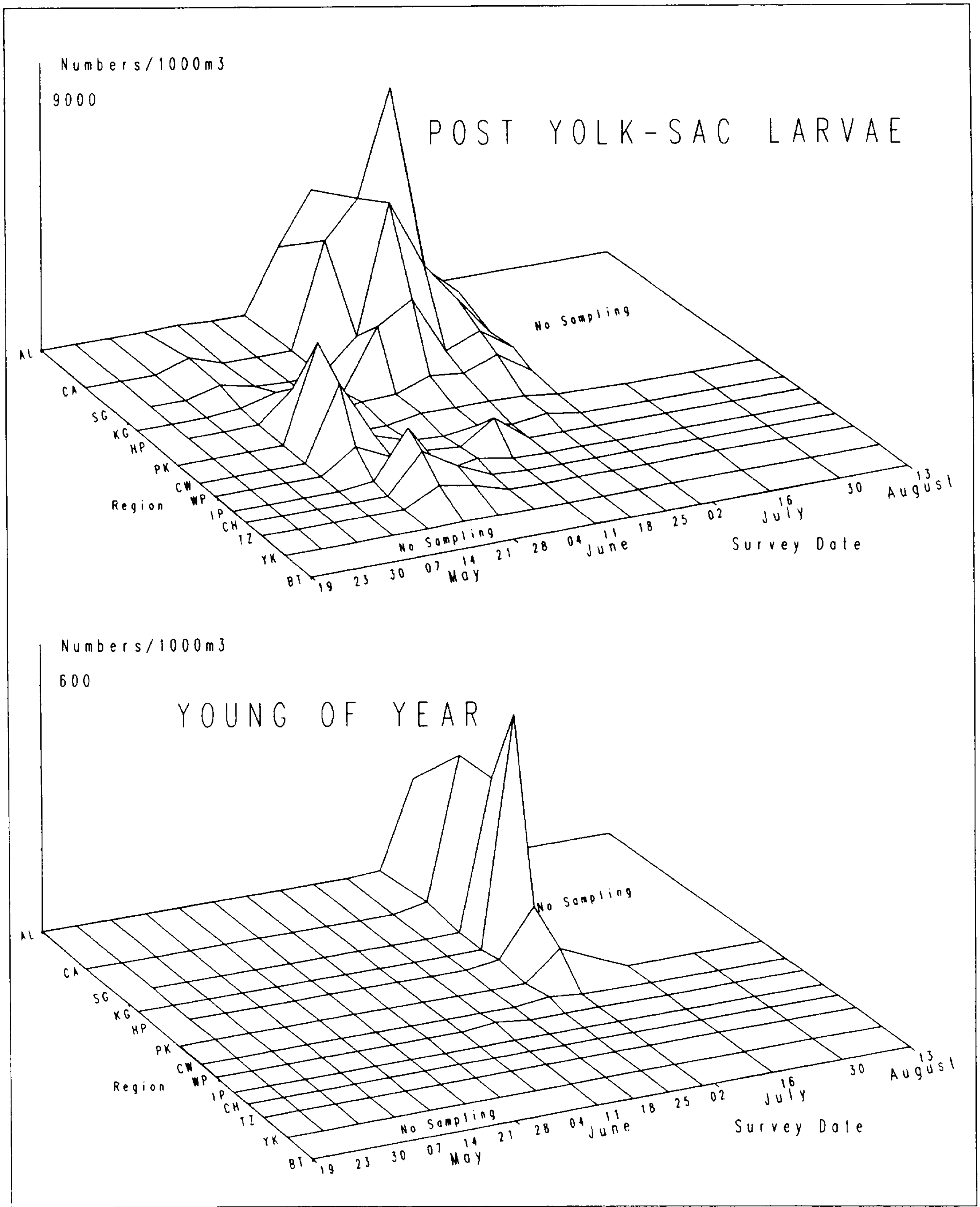


Figure 4–29. Spatiotemporal distribution of post yolk–sac and young–of–year stages of Alosa spp. in the Hudson River estuary based on the 1990 Long River Ichthyoplankton Survey.

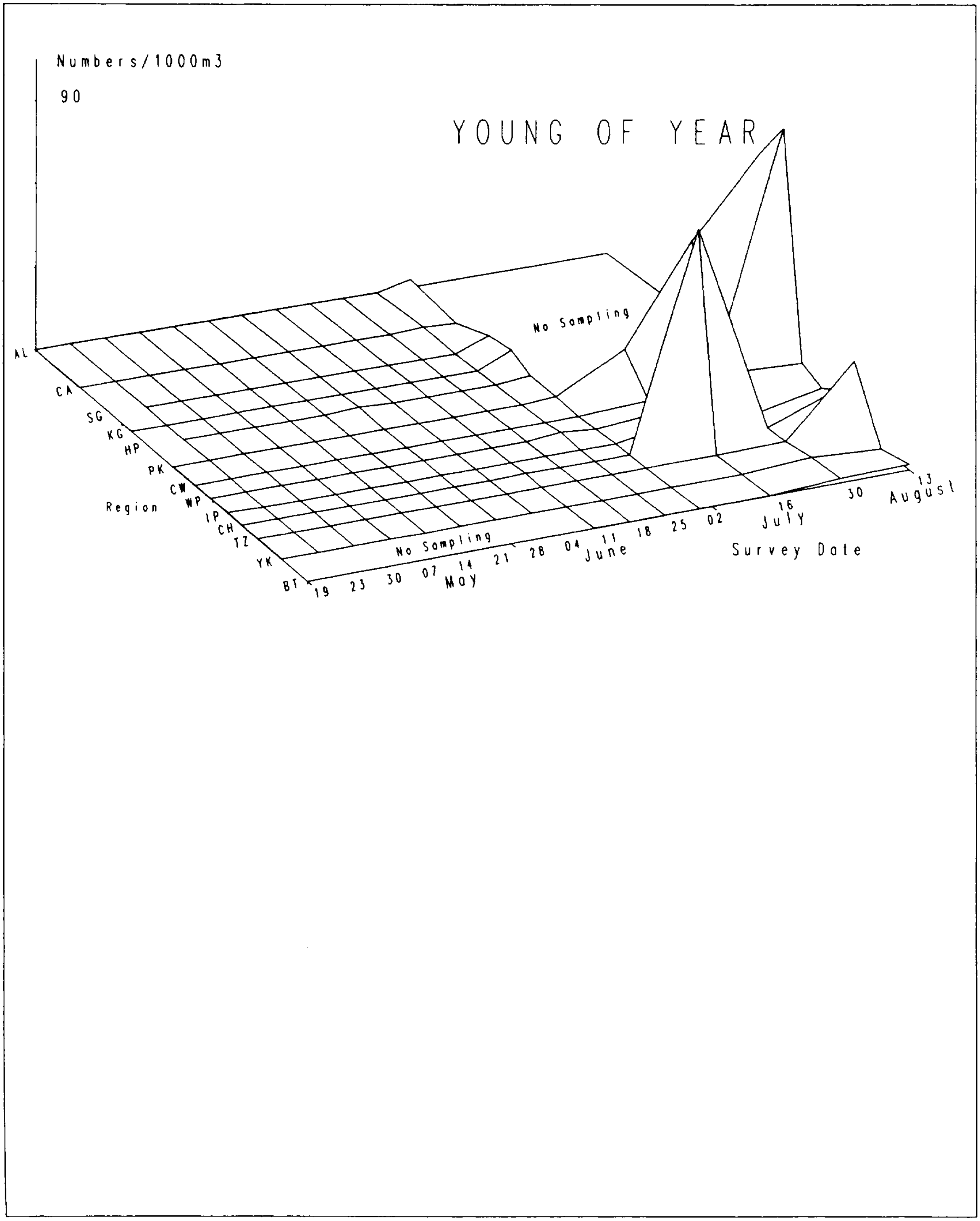


Figure 4–30. Spatiotemporal distribution of young–of–year stage of blueback herring in the Hudson River estuary based on the 1990 Long River Ichthyoplankton Survey.

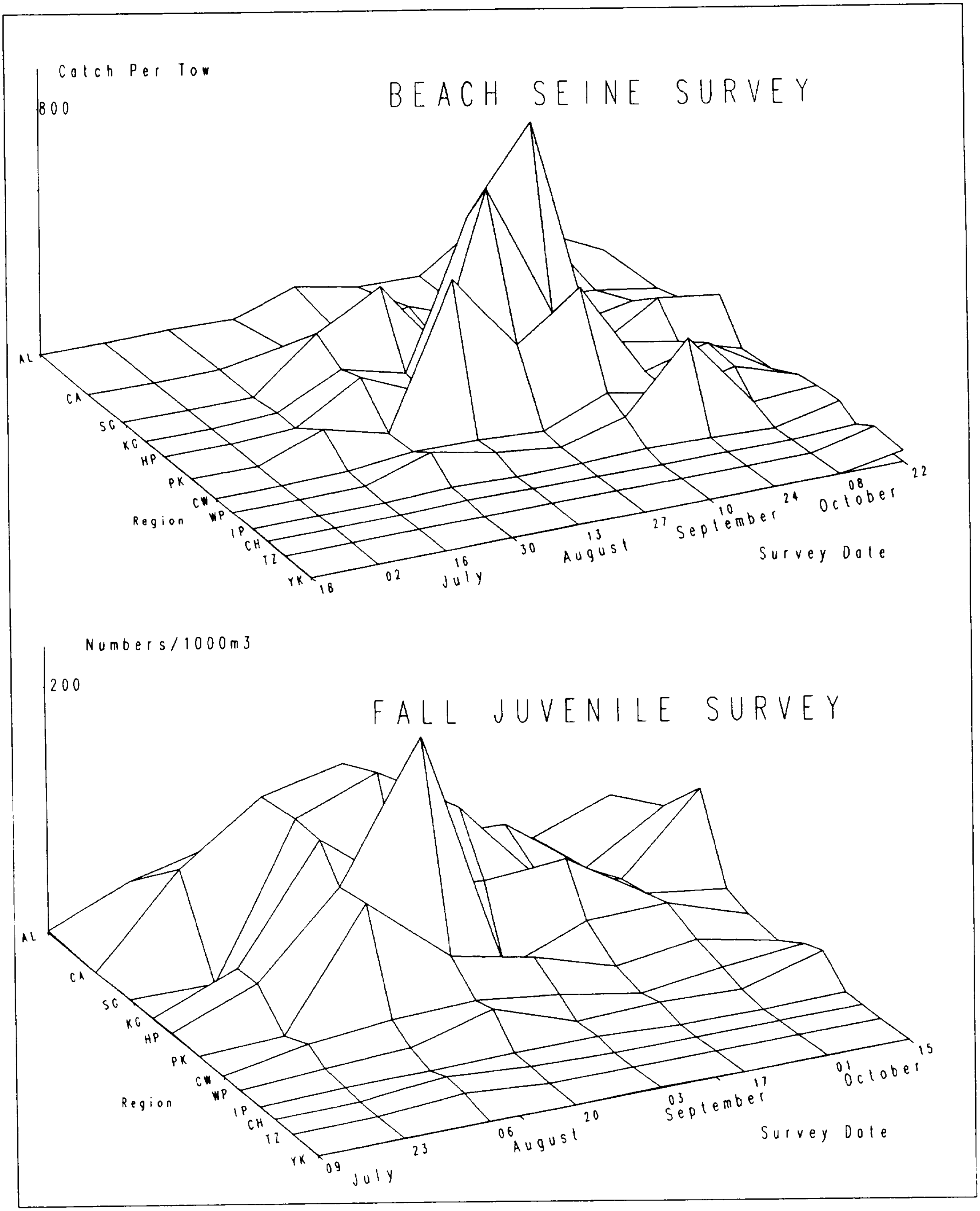


Figure 4–31. Spatiotemporal distribution of young–of–year blueback herring in the Hudson River estuary based on the 1990 Fall Juvenile and Beach Seine River Ichthyoplankton Surveys.

In the LRS, high densities were observed in the Poughkeepsie and Tappan Zee regions; however, because no sampling was conducted in areas north of Poughkeepsie during this time the spatial extent cannot be determined from the LRS. High densities in the BSS were recorded in the mid- and upper Hudson River regions (from West Point through Albany) and in regions north of Indian Point in the FJS. These regions upstream of the saltfront constituted the area of greatest density for blueback herring young of year as measured during the FJS and BSS.

4.7.2 Yearling and Older Fish Distribution

Yearling and older blueback herring were caught sporadically and in very low numbers in both the 1990 BSS and FJS; in both surveys there was no trend to their pattern of distribution (Figure 4-32).

4.8 ALEWIFE

The alewife (*Alosa pseudoharengus*) is an anadromous fish that inhabits coastal waters from Newfoundland to South Carolina (Winters et al. 1973). Spawning occurs during the spring, with adults apparently emigrating from the Hudson River estuary by mid-June (TI 1981). The demersal and semiadhesive alewife eggs have a six-day incubation period at 15°C (Mansueti and Hardy (1967). Young of year begin moving out of the Hudson River estuary in the summer and are nearly absent by fall (Bigelow and Schroeder 1953).

4.8.1 Young of Year Distribution

Identifiable alewife young of year (35-44 mm and greater) were first collected in the 14 May sampling week of the LRS (Figure 4-33) and were collected in every sampling week of both the FJS and BSS (Figure 4-34). The extent of the trend in abundance of young of year alewife in the LRS cannot be determined as the upper estuary was not sampled in mid-July through August. In the BSS, peak abundance (14/tow) occurred the week of 16 July and in the week of 23 July (5/1,000 m^3) in the FJS. Standing crop estimates for both the FJS (Table C-84) and BSS (Table C-86) decrease in October.

In the FJS, the greatest densities of young of year alewife were recorded primarily in the Poughkeepsie to Catskill regions. In the BSS relatively large collections were made in many (excluding Albany and Yonkers) estuary regions. The fall migration of young of year alewife from upper to lower estuary reaches does not appear in the BSS and FSS pattern of spatial distribution.

4.8.2 Yearling and Older Fish Distribution

Aside from trace collections in the Tappen Zee region in mid-July and in the Cornwall region in early October, yearling and older alewife were essentially absent from the FJS (Figure 4-35). In the BSS yearling and older alewife were found only once, in the Indian Point region in mid-July.

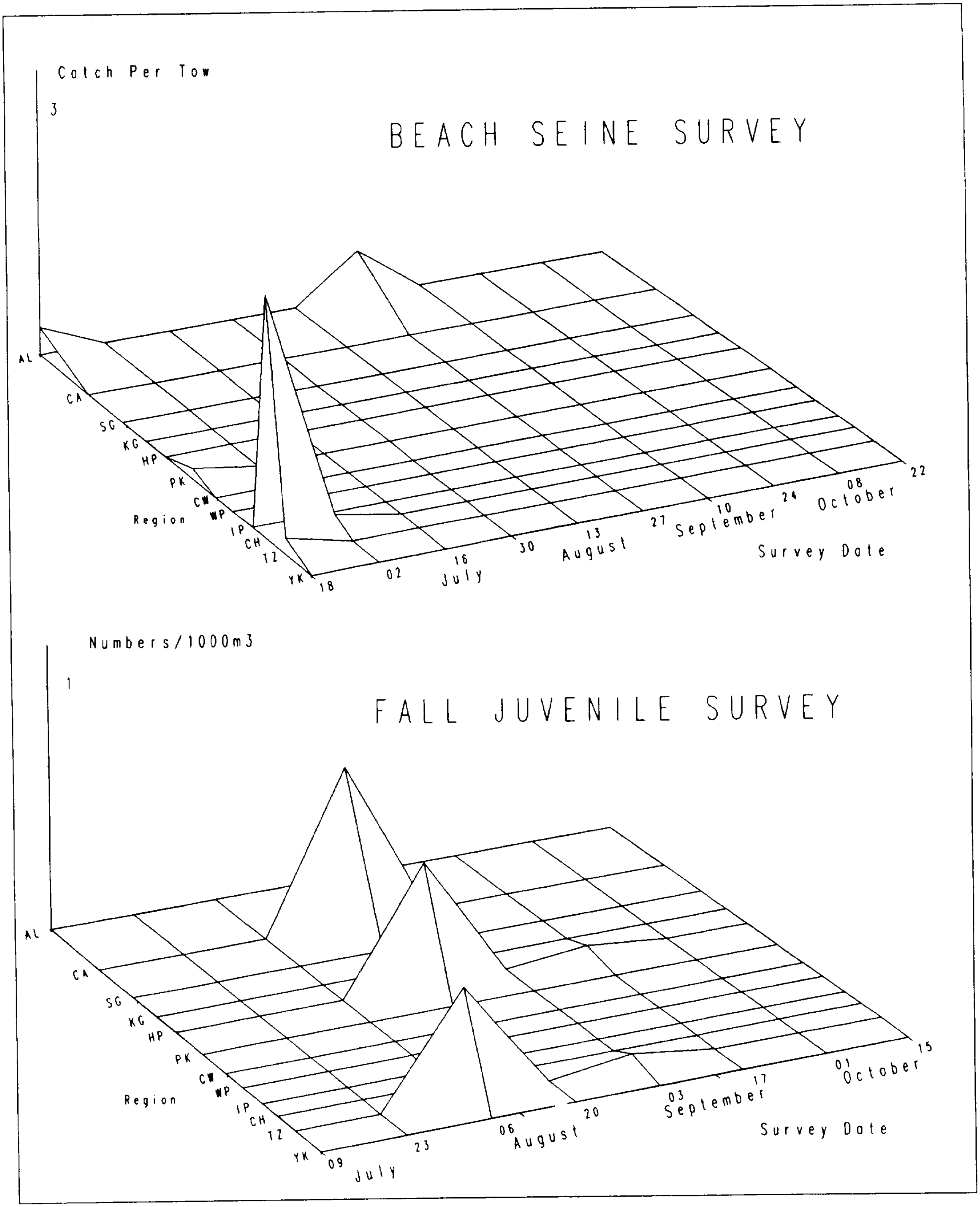


Figure 4–32. Spatiotemporal distribution of yearling and older blueback herring in the Hudson River estuary based on the 1990 Fall Juvenile and Beach Seine River Ichthyoplankton Surveys.

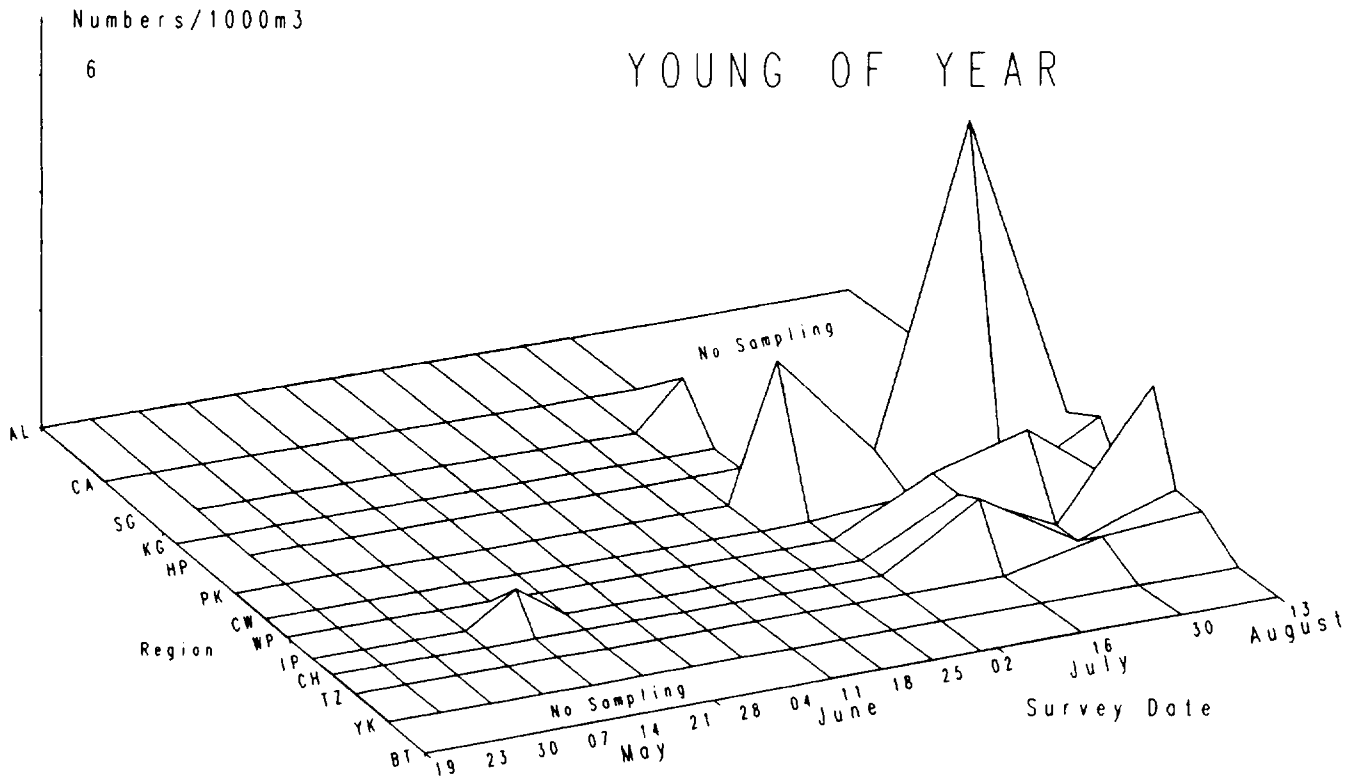


Figure 4−33. Spatiotemporal distribution of young−of−year stage of alewife in the Hudson River estuary based on the 1990 Long River Ichthyoplankton Survey.

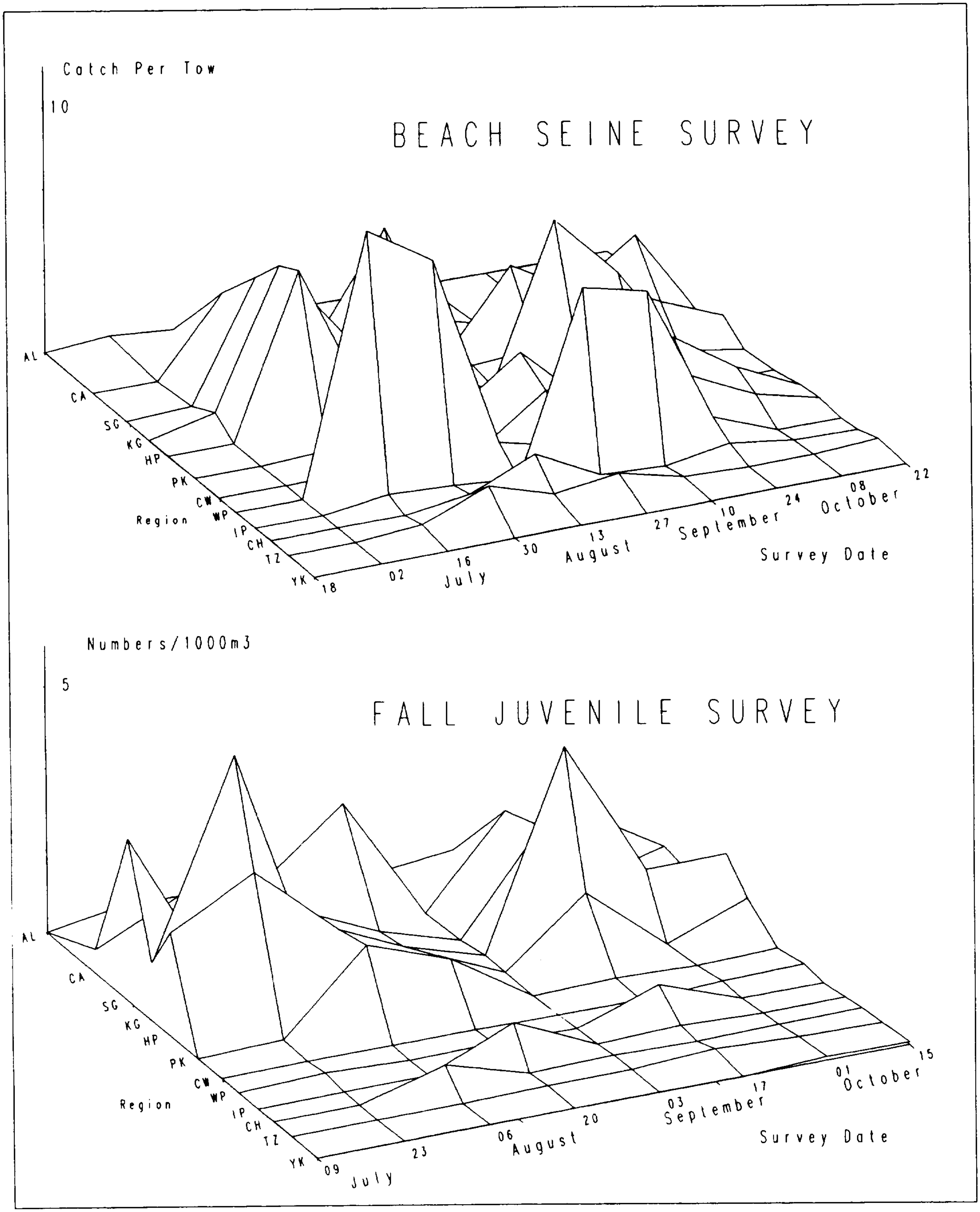


Figure 4-34. Spatiotemporal distribution of young-of-year alewife in the Hudson River estuary based on the 1990 Fall Juvenile and Beach Seine River Ichthyoplankton Surveys.

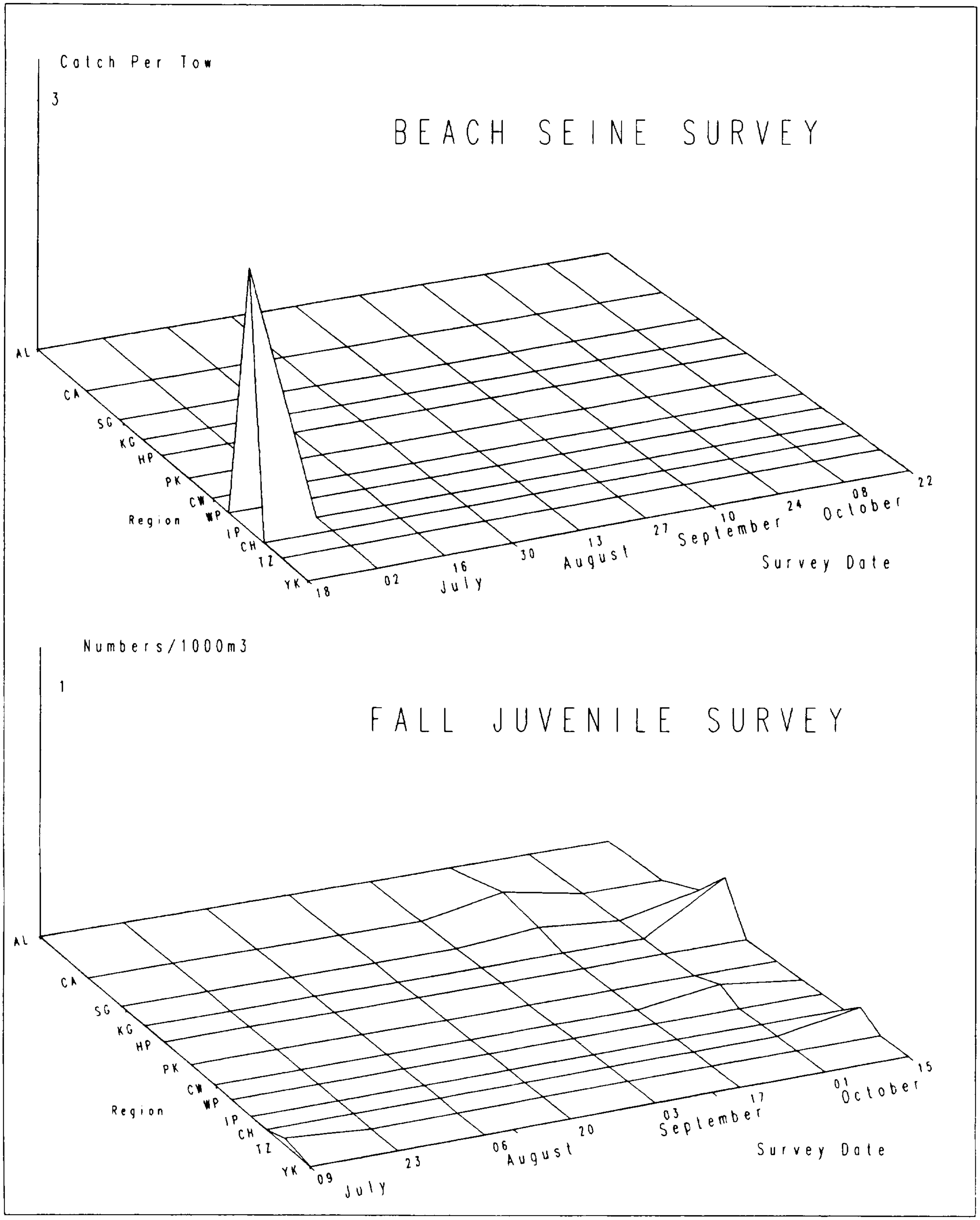


Figure 4 – 35. Spatiotemporal distribution of yearling and older alewife in the Hudson River estuary based on the 1990 Fall Juvenile and Beach Seine River Ichthyoplankton Surveys.

4.9 BAY ANCHOVY

The bay anchovy, *Anchoa mitchilli* (Valenciennes), is found primarily in Atlantic Coast estuaries from Maine south to the Yucatan Peninsula of Mexico. This species moves between brackish water and saltwater, apparently related to spawning and maturation. Many important estuarine fish such as striped bass, bluefish, weakfish, and white perch rely on bay anchovy as forage (Robinette 1983).

Spawning typically occurs over an extended period from May to September when water temperatures are from 15 to 30°C (Wang and Kernehan 1979). In the Hudson River estuary spawning is generally believed to be greatest from the Tappan Zee Region south to the Narrows, particularly in the Yonkers Region (Dovel 1981; TI 1981). Peak spawning occurs in July at salinities greater than 10 ppt. The newly spawned eggs are pelagic and buoyant, but apparently become demersal with advanced development. Hatching occurs in about one day at 27-28°C (Mansueti and Hardy 1967). The larval fish sink to the denser saline waters and are moved upstream by tidal transport to areas of lower salinity. The larvae remain between the Tappan Zee and Indian Point regions to feed (Dovel 1981). Young of year move downstream out of the nursery area in early fall to overwinter at higher salinities. Mature fish return to low-salinity waters as far north as Poughkeepsie to feed before moving to the higher salinity spawning areas.

4.9.1 Egg Distribution

Bay anchovy eggs were collected during the 1990 LRS from the 29 May sampling week through the end of the program (Figure 4-36). Peak egg density of 63,587/1,000 m^3 was recorded in the 2 July week in the Tappen Zee region. Based on egg densities, spawning activities were almost entirely limited to the Hudson River estuary below and including Indian Point, where mean salinities ranged from 2.1 to 10.6 ppt during July (Table B-7). Greatest egg densities were recorded south of Croton-Haverstraw, but eggs were collected as far north as Albany.

4.9.2 Yolk-Sac Larval Distribution

Bay anchovy yolk-sac larvae were first collected during the 1990 LRS from the 2 July sampling week (Figure 4-36). The greatest peak in density (14/1,000 m^3) was recorded in that week in the Croton-Haverstraw region. Most collections of yolk-sac larvae were made south of West Point, although a small collection (0.23/1,000 m^3) was made in the Cornwall region during early July.

4.9.3 Post Yolk-Sac Larval Distribution

Bay anchovy post yolk-sac larvae first appeared in the 1990 LRS during the week of 25 June (Figure 4-37). High post yolk-sac larval densities (approximately 1,200-1,800/1,000 m^3) were recorded from mid-July through the end of the sampling program. Peak density (5,007/1,000 m^3) was recorded the week of 16 July in the Croton-Haverstraw region. Post yolk-sac larvae

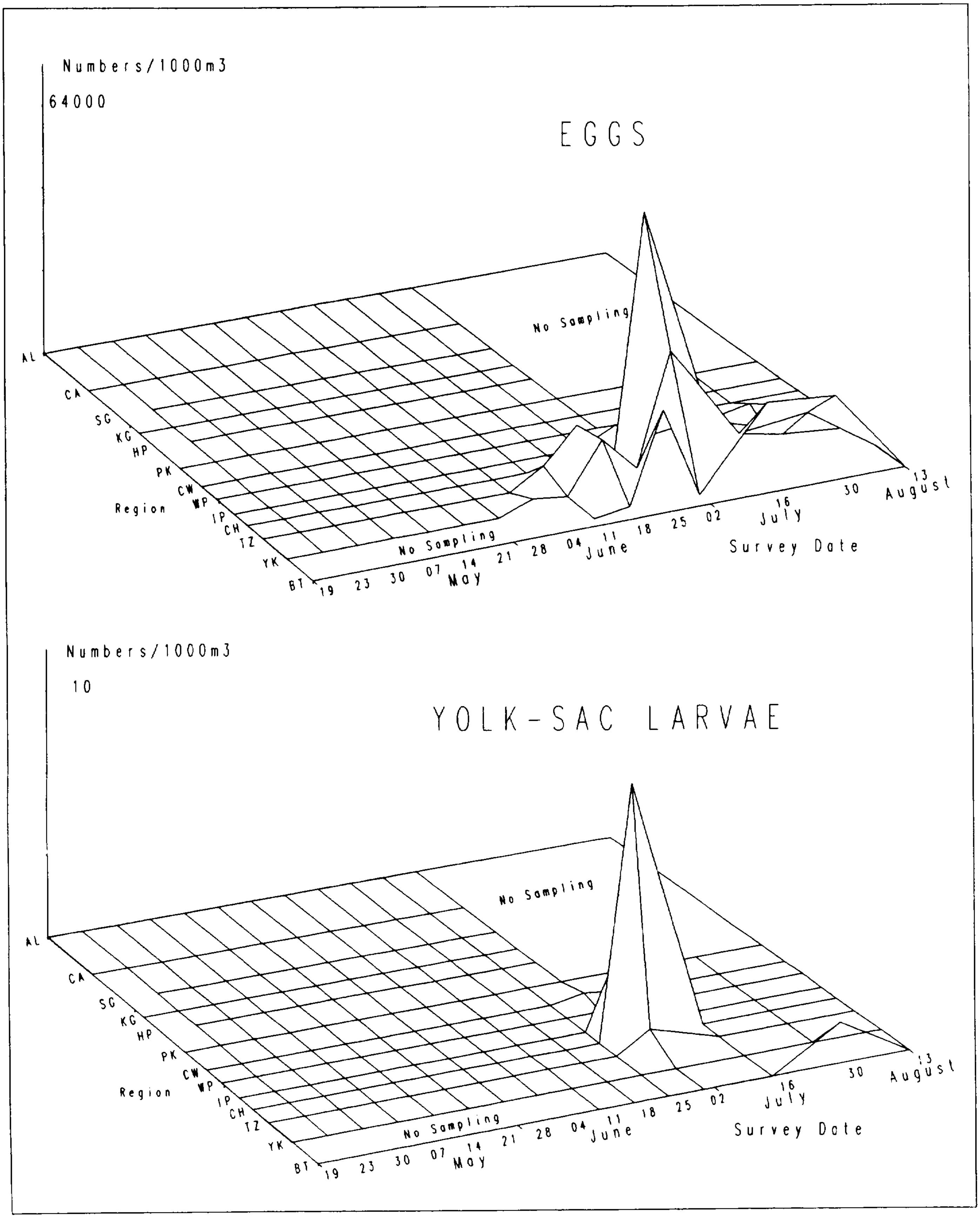


Figure 4-36. Spatiotemporal distribution of egg and yolk-sac stages of bay anchovy in the Hudson River estuary based on the 1990 Long River Ichthyoplankton Survey.

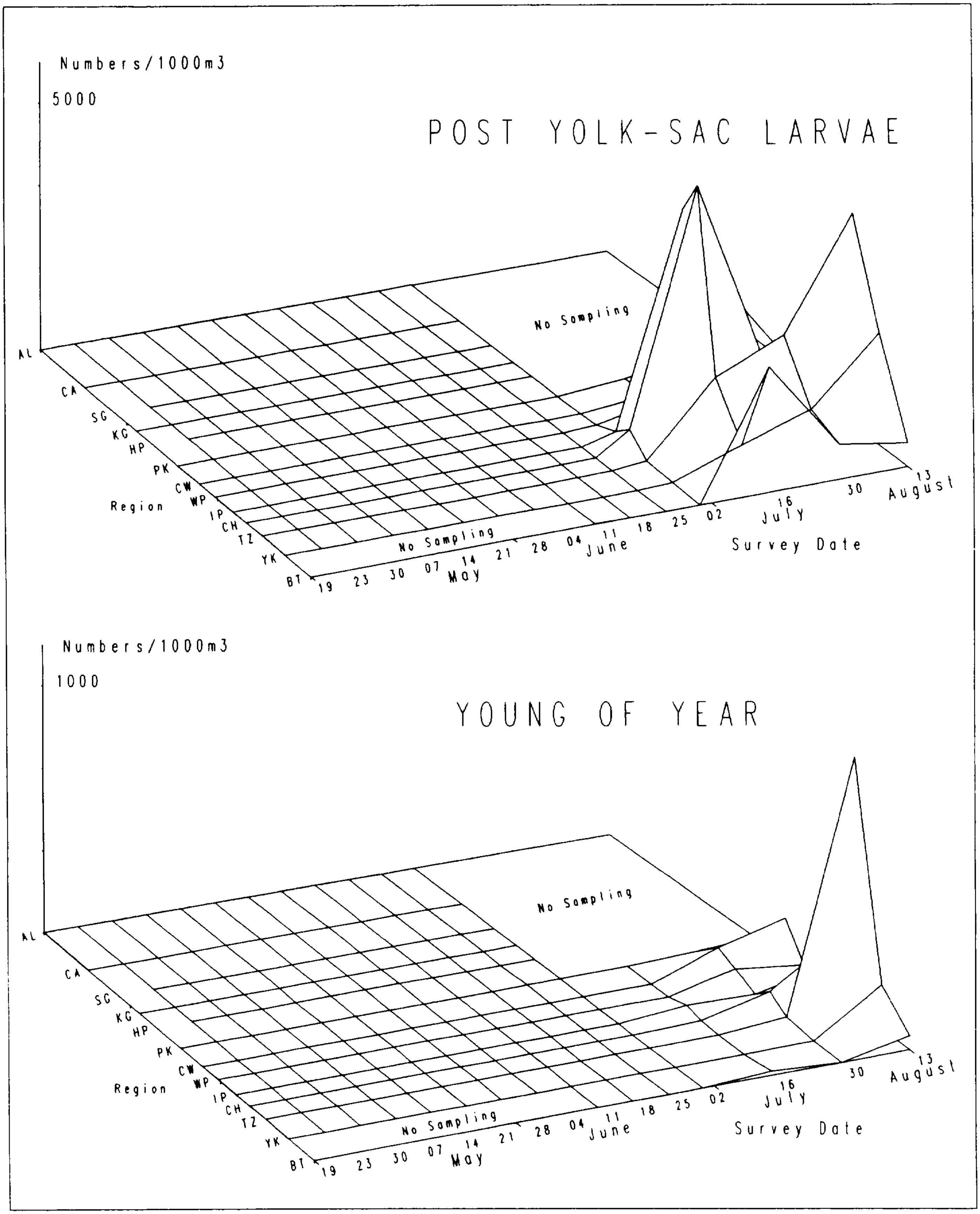


Figure 4–37. Spatiotemporal distribution of post yolk–sac and young–of–year stages of bay anchovy in the Hudson River estuary based on the 1990 Long River Ichthyoplankton Survey.

were found as far north as Albany, but densities were highest between the Battery and Cornwall regions.

4.9.4 Young of Year Distribution

Young of year bay anchovy were first taken in the week of 29 May in the 1990 LRS (Figure 4-37); high densities were not collected, however, until late July. Young of year were present during every sampling week of the FJS and all but the first three weeks of the BSS (Figure 4-38). In the BSS, peak density (57/tow) occurred the last week of the survey (23 October) in the Yonkers region; young of year were not found in regions north of and including Poughkeepsie in the BSS. From early July through August regions north of Poughkeepsie were not sampled in the LRS; during this time young of year bay anchovy were collected from Poughkeepsie to the Battery, with greatest densities occurring below the Poughkeepsie region. A peak density of 1,048/1,000 m^3 was recorded in the last week (13 August) of LRS sampling in the Tappan Zee region. Young of year bay anchovy were found in all regions of the Hudson River estuary in the FJS. The greatest abundance (123 to 203/1000 m^3) was recorded the last week (15 October) of the FJS in the lower estuary (Yonkers through Indian Point). Peak spatial and temporal patterns for the FJS and BSS indicate a slight downriver migration from the upper and middle estuary to the lower estuary in mid-fall. Temperatures were 17.1 to 20°C in the middle and upper estuary and 20.1 to 20.5°C in the lower estuary (Table B-5).

4.9.5 Yearling and Older Fish Distribution

Yearling and older bay anchovy were collected during the first sampling period of both the BSS and FJS (Figure 4-39). Yearling and older bay anchovy were collected throughout the FJS, while in the BSS collections of yearling and older bay anchovy declined to trace levels (i.e., $\leq$0.03/1,000 m^3) by the end of July. The peak collection periods for both the BSS and FJS occurred in the first weeks of sampling (mid-June to early July).

In the FJS, greatest abundance of yearling and older bay anchovy occurred between the Yonkers and West Point regions, with trace numbers recorded as far upriver as Hyde Park. In the BSS, most were collected in the Yonkers region. Trace numbers were taken in the Hudson River mid-estuary when the saltfront remained upriver in September and October. Decreasing salinities and temperatures through October may have caused yearling and older bay anchovy to migrate to the sea.

4.9.6 Comparison to Previous Years

In 1990, as for the long-term trend, most young of year bay anchovy were distributed in the Yonkers and Tappan Zee regions; however, unlike the long-term trend, a higher proportion of the catch was also collected in the Indian Point and West Point regions during the weeks (33-40) for the index. Temperatures were still relatively high (19.5-26.9°C) during this time (Table B-5).

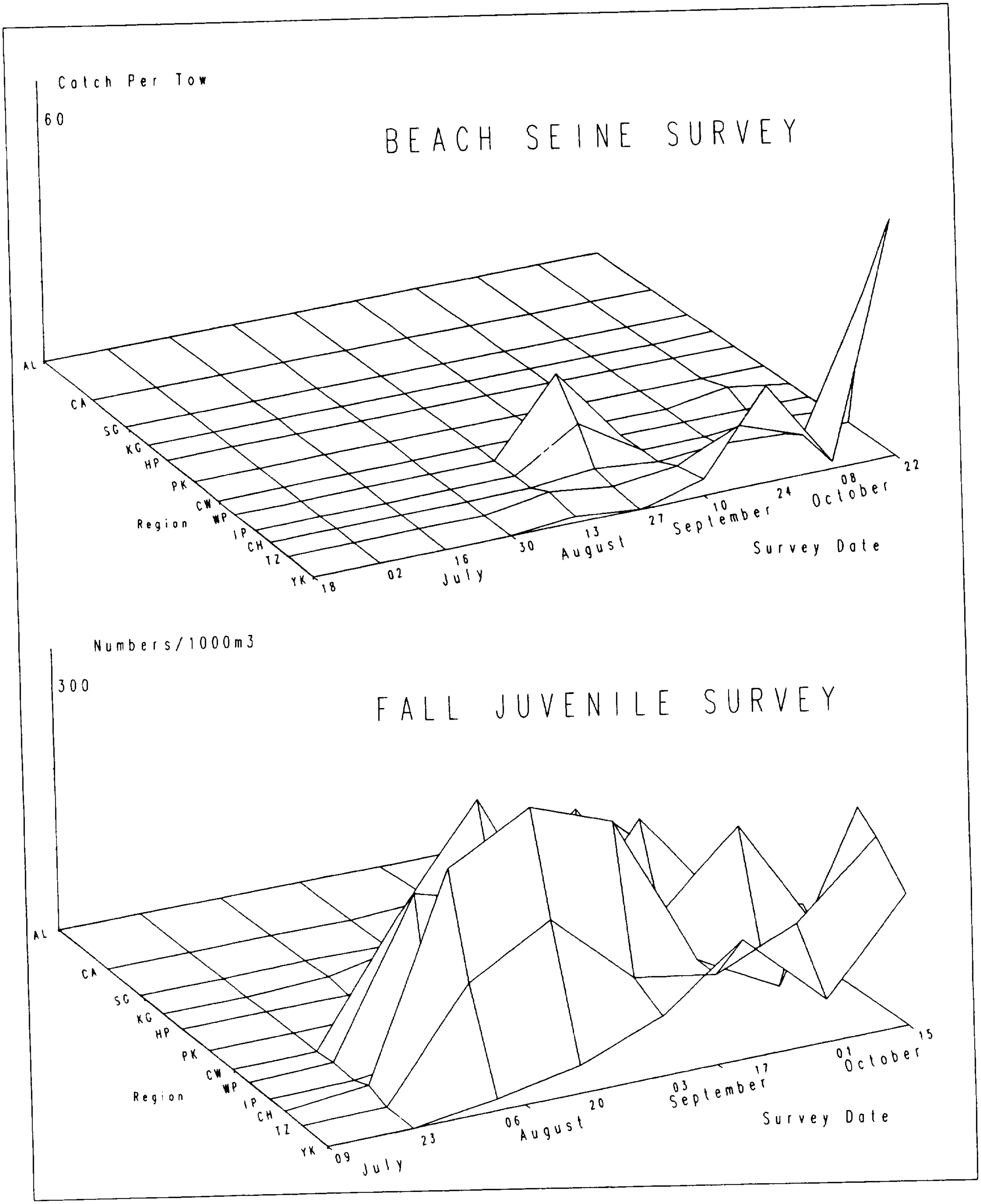


Figure 4-38. Spatiotemporal distribution of young-of-year bay anchovy in the Hudson River estuary based on the 1990 Fall Juvenile and Beach Seine River Ichthyoplankton Surveys.

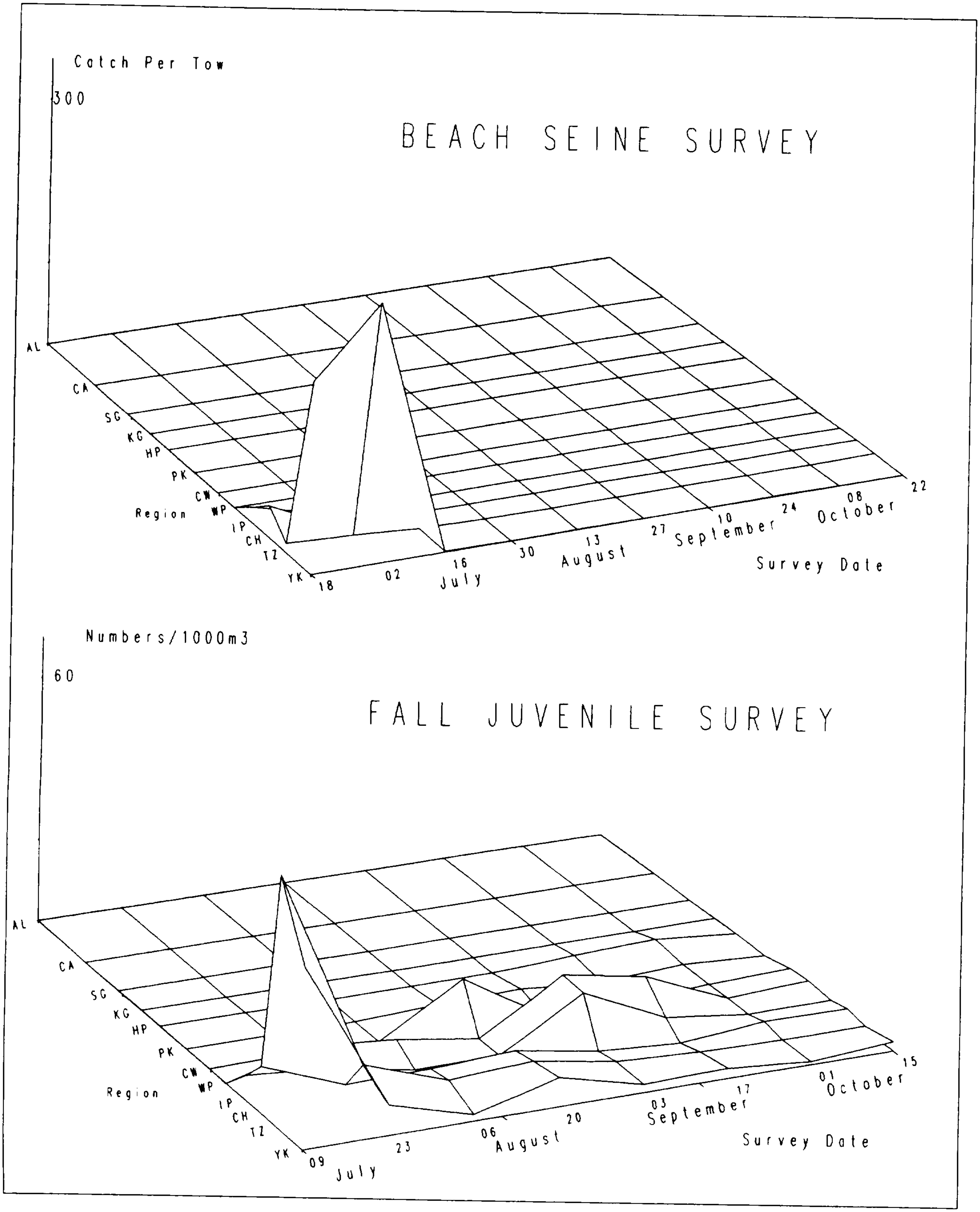


Figure 4 – 39. Spatiotemporal distribution of yearling and older bay anchovy in the Hudson River estuary based on the 1990 Fall Juvenile and Beach Seine River Ichthyoplankton Surveys.

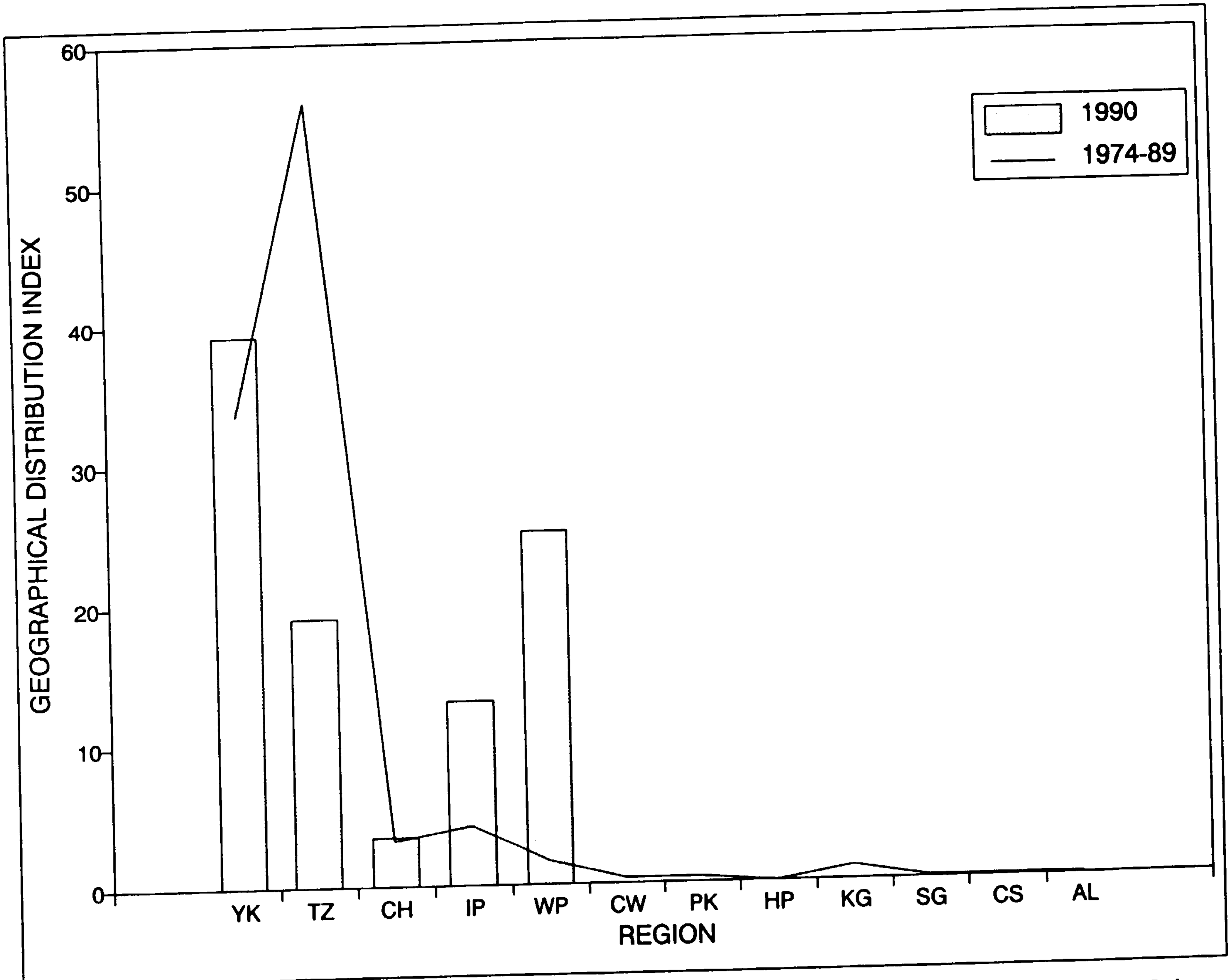


Figure 4-40. Geographic distribution indices for young of year bay anchovy collected during Beach Seine surveys of the Hudson River estuary, 1974-1990.

4.10 WEAKFISH

The weakfish, *Cynoscion regalis* (Bloch and Schneider), is a euryhaline species important both commercially and recreationally. Its coastal range is from Nova Scotia to Florida, with greatest concentrations from Long Island Sound to Chesapeake Bay (Colton et al. 1979). In the Hudson River estuary weakfish are found upriver to Hyde Park, with greatest abundances in the lower reaches of the Hudson River estuary.

Spawning occurs in coastal waters and estuaries from April to August when water temperatures are from 15 to 21°C and salinities range from 28 to 31 ppt (Lippson and Moran 1974). The Hudson River estuary appears to be near the northern limit of their spawning range (Colton et al. 1979). After spawning, adult weakfish move off the Virginia-Carolina coast to overwinter (Yetman et al. 1985).

Weakfish eggs are pelagic and buoyant (Lippson and Moran 1974), but when hatched, the larvae sink to the bottom and are carried upstream by denser bottom currents (Thomas 1971). Young of year fish remain in the brackish environment of the deeper shoals and channel waters until cooler fall temperatures cause them to leave the estuaries. The young of year weakfish then move south to join the adults in the overwintering areas.

4.10.1 <u>Young of Year Distribution</u>

Weakfish young of year were caught in the LRS, FJS, and BSS in 1990, with the earliest collections occurring the week of 16 July in the LRS (Figure 4-41), the week of 23 July in FJS, and 18 June in the BSS (Figure 4-42). Peak young of year densities (26/1,000 m^3) occurred in late July in the LRS and in late August in both the FJS and BSS (>2/1000 m^3 and 1/tow, respectively).

The peak occurrence of young of year weakfish was recorded in the Croton-Haverstraw region in both the LRS and BSS and south of and including Indian Point in the FJS. Young of year were caught as far upriver as the Cornwall region in both the LRS and FJS. Catches of young of year weakfish in the BSS did not extend north of the Croton-Haverstraw region.

4.10.2 <u>Yearling and Older Fish Distribution</u>

No yearling or older weakfish were collected during the 1990 BSS and few were collected in the FJS (Figure 4-43). In the FJS a peak density of 3.1/1,000 m^3 was recorded in late August. All collections in the FJS were made in the Yonkers region, reflecting the high salinity requirements of yearling and older weakfish.

4.11 WHITE CATFISH

The white catfish, *Ictalurus catus*, is a resident freshwater species found in coastal rivers along most of the East Coast of the United States (Trautman 1957). Although adult white catfish will tolerate brackish waters with salinity up to 14 ppt (Kendall and Schwartz 1968), spawning is restricted to water with salinity less than 2 ppt (Perry and Avault 1968).

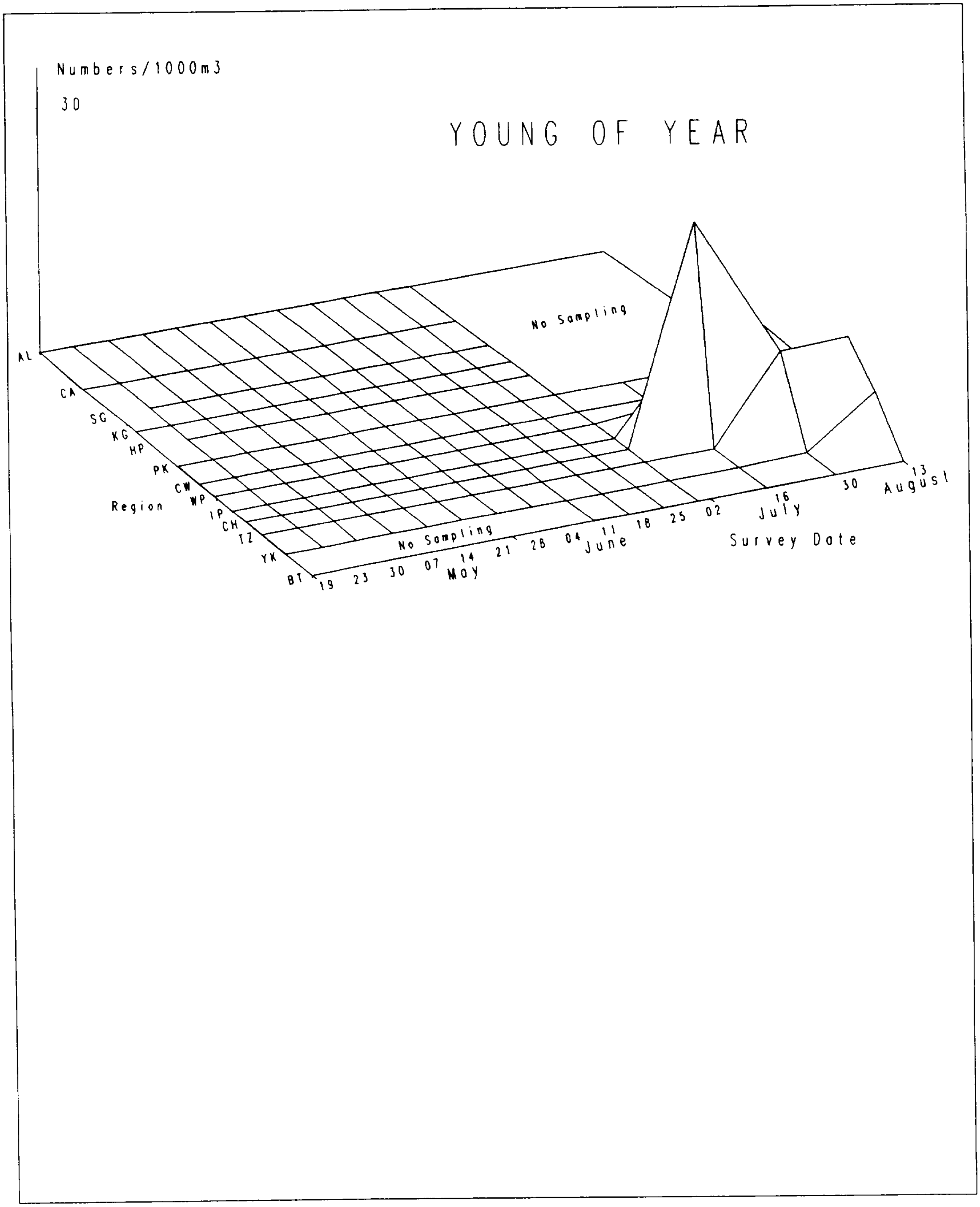


Figure 4-41. Spatiotemporal distribution of young-of-year stage of weakfish in the Hudson River estuary based on the 1990 Long River Ichthyoplankton Survey.

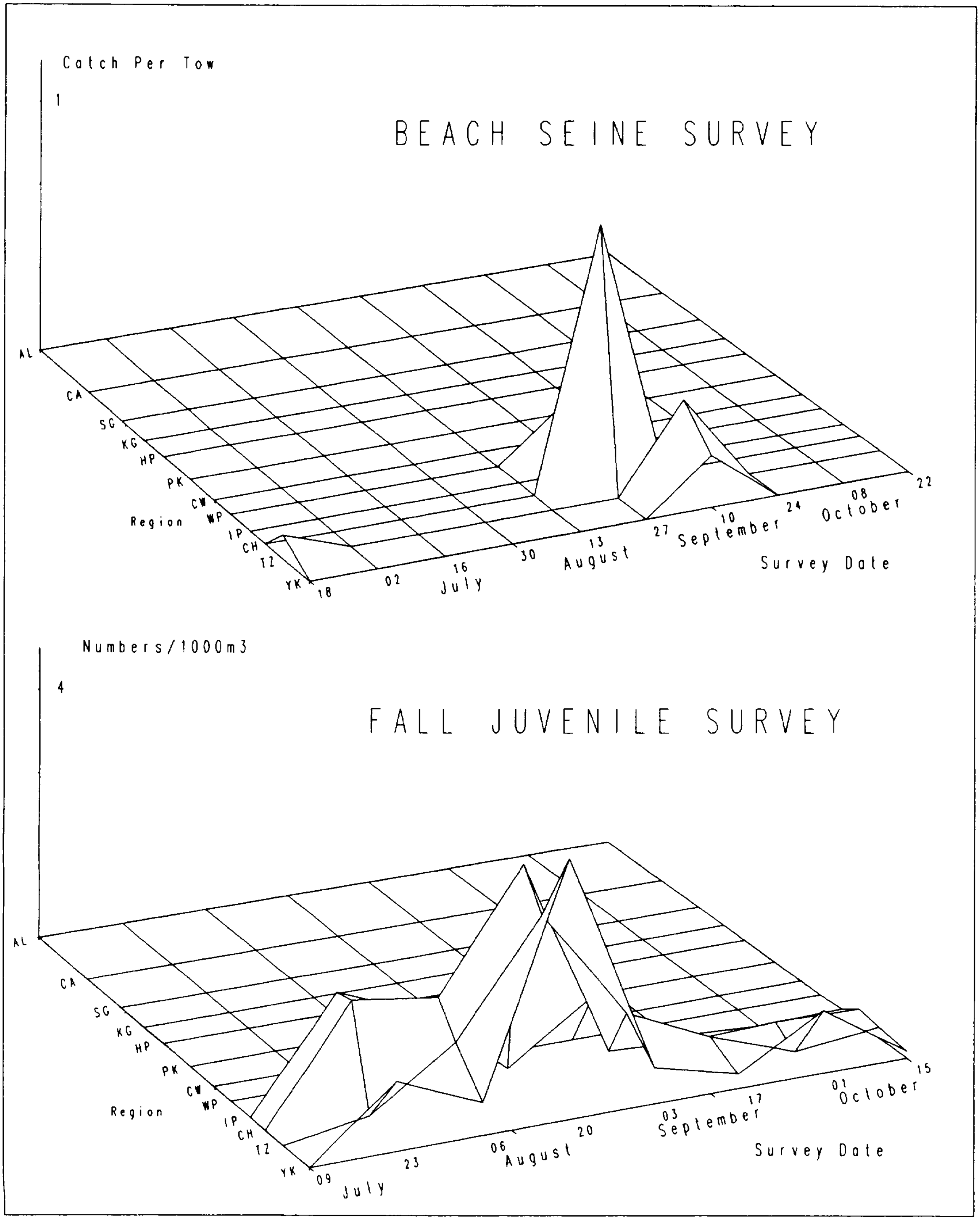


Figure 4 – 42. Spatiotemporal distribution of young – of – year weakfish in the Hudson River estuary based on the 1990 Fall Juvenile and Beach Seine River Ichthyoplankton Surveys.

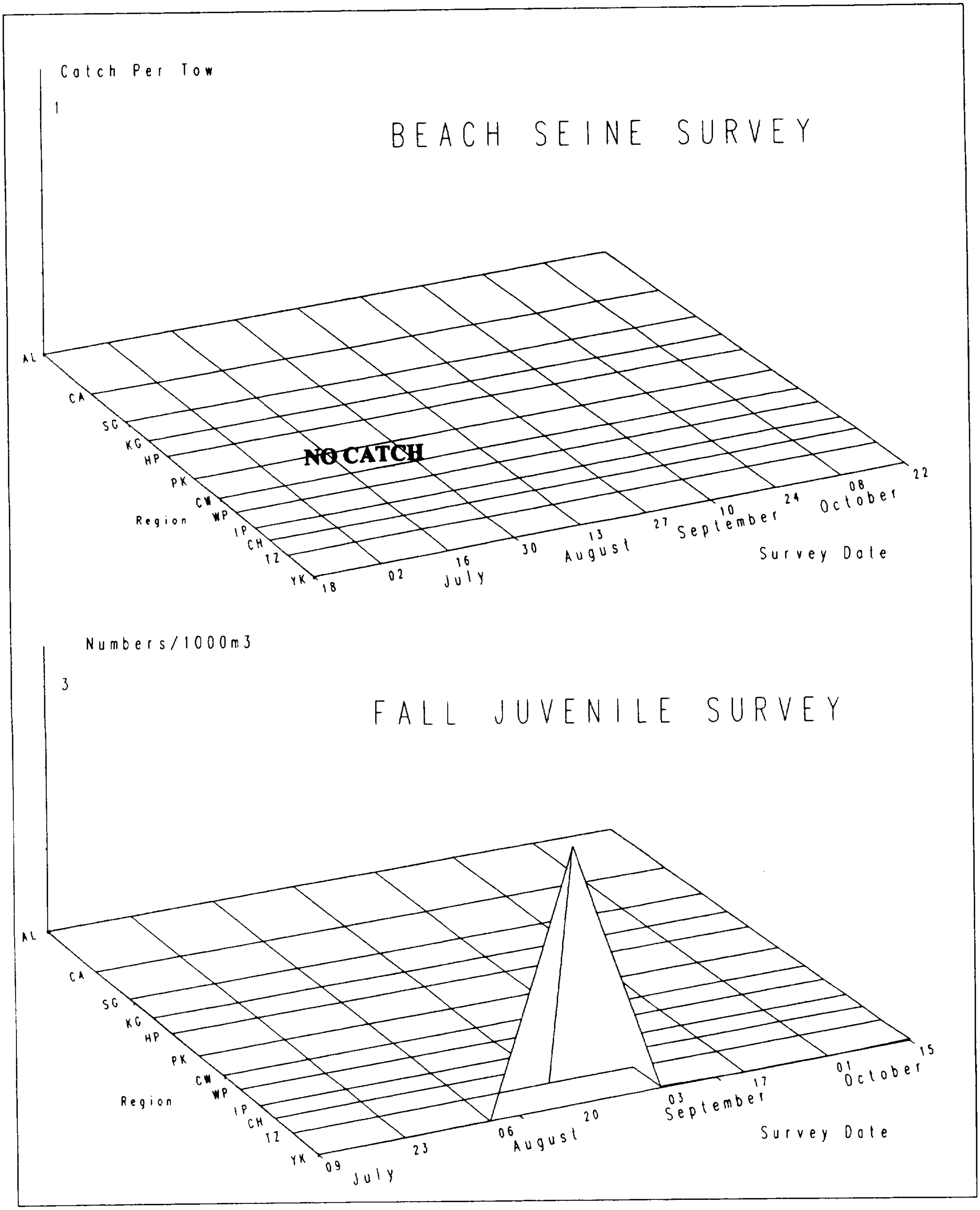


Figure 4–43. Spatiotemporal distribution of yearling and older weakfish in the Hudson River estuary based on the 1990 Fall Juvenile and Beach Seine River Ichthyoplankton Surveys.

Spawning occurs in late spring or early summer, with large shore and shoal catches of adults in June and July, possibly related to spawning activities (TI 1981). Generally found in deep-water areas, the adult white catfish lays adhesive eggs in prepared nests found in the shallower shoal and shore zones, remaining there to provide parental care. No spatiotemporal distribution information is available for the early stages of white catfish because of the invulnerability of eggs and larvae to LRS sampling gear. Because of high downriver salinities, it is probable that spawning occurs only in the middle and upper regions of the Hudson River estuary or in the tributaries.

In the Hudson River estuary young of year white catfish are typically found from the Poughkeepsie region north to the upper limit of the Hudson River estuary at the Troy Dam from late July through early August. After moving into deeper river strata during September and October, the yearling and older catfish migrate downstream to overwintering grounds when upper Hudson River estuary temperatures drop to 14-15°C (NAI 1985b). Mansueti (1950) and Schmidt (1971) reported similar fall movements to deeper waters with changing water temperatures. White catfish are bottom dwellers, feeding on vegetation and benthic invertebrates as well as small vertebrates.

4.11.1 <u>Young of Year Distribution</u>

In the LRS, white catfish young of year were collected during the week of 18 June in the Indian Point region and during the week of 25 June in the Cornwall region (see Appendix C). Young of year white catfish were absent from BSS collections (Figure 4-44), which is an indication of their preference for deep-water habitat. White catfish young of year were, however, collected during all but the first sampling period of the FJS. Peak young of year densities in the FJS were recorded in late August and a smaller peak occurred in early October. All young of year white catfish were collected north of and including the Cornwall region, and most were collected in regions north of Saugerties. The capture of young of year white catfish in the Cornwall region in early August may be correlated to the retreat of the saltfront during this period (see Figure 3-4).

4.11.2 <u>Yearling and Older Fish Distribution</u>

Yearling and older white catfish were collected in only low densities in both the BSS and FJS (Figure 4-45). Aside from a trace occurrence in late August in the BSS, yearling and older white catfish were collected during all weeks of both the FJS and BSS (see Appendix C). Peak temporal distribution was recorded in early August in the FJS and in early June during the BSS. In the BSS yearling and older white catfish were found as far south as the Tappen Zee region and as far north as the Kingston region. Yearling and older white catfish were found in all regions in the FJS.

4.12 SPOTTAIL SHINER

Spottail shiner, *Notropis hudsonius* (Clinton), occur in freshwater rivers and lakes from Canada south to Georgia on the East Coast of the United States, with a range extension west to Iowa and Missouri (Scott and Crossman 1973). A small, mid-water schooling fish, the spottail shiner

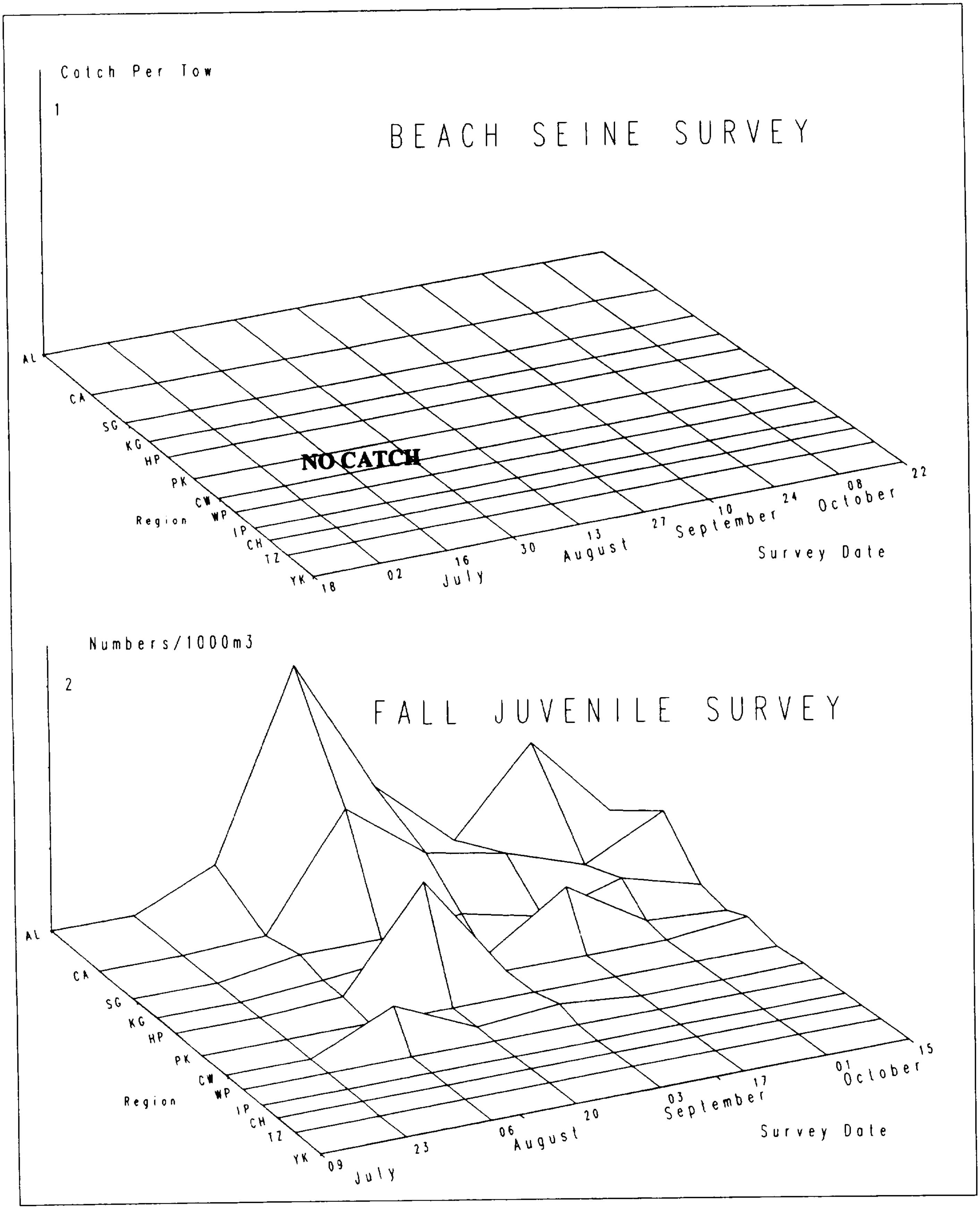


Figure 4-44. Spatiotemporal distribution of young-of-year white catfish in the Hudson River estuary based on the 1990 Fall Juvenile and Beach Seine River Ichthyoplankton Surveys.

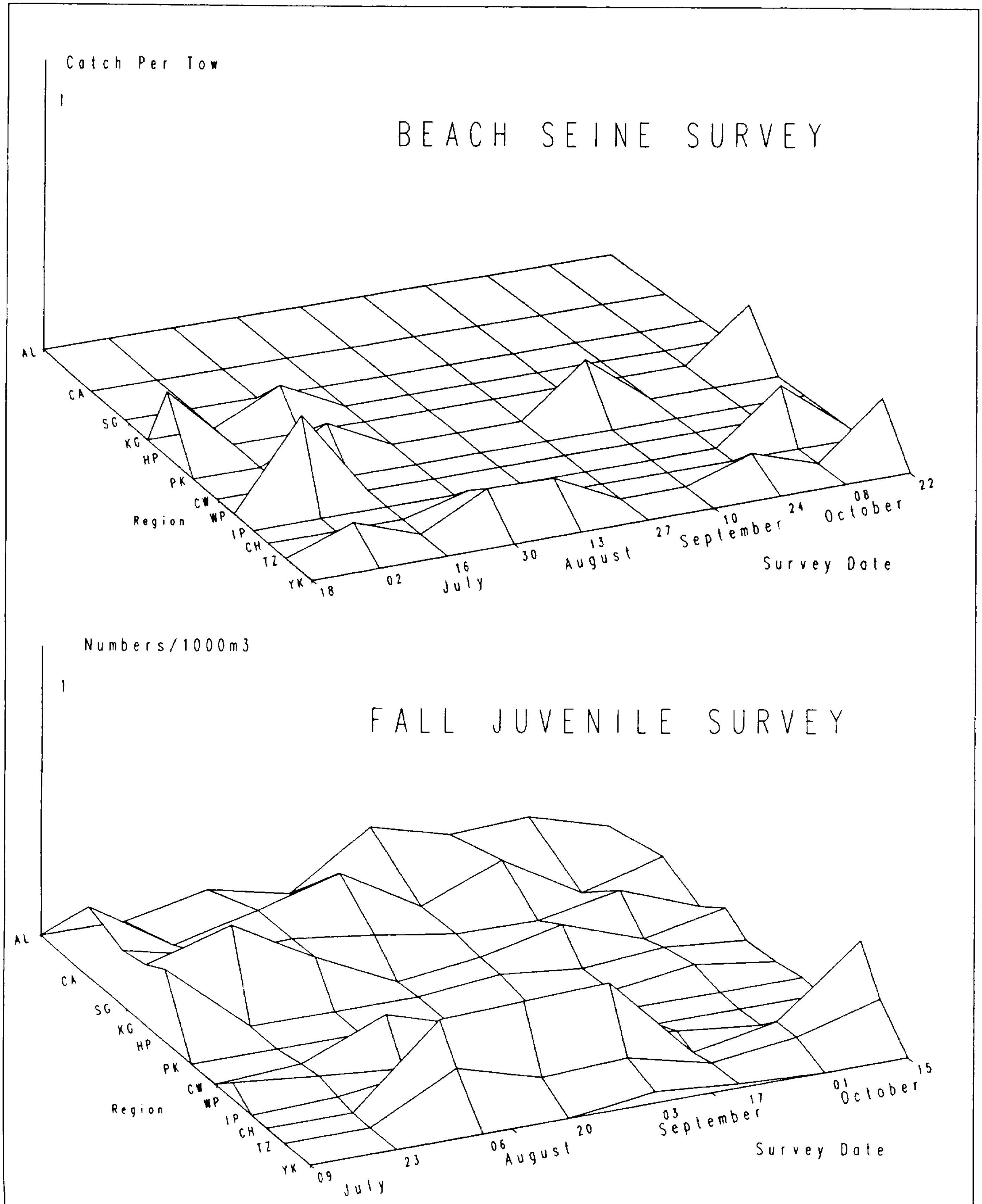


Figure 4–45. Spatiotemporal distribution of yearling and older white catfish in the Hudson River estuary based on the 1990 Fall Juvenile and Beach Seine River Ichthyoplankton Surveys.

is omnivorous, feeding on algae, insects, small crustaceans, water mites, eggs, and small fish larvae. They are an important forage source for the many piscivorous fish found throughout their range.

In the Hudson River estuary, the spottail shiner is restricted to the upriver regions, preferring areas of low turbidity away from strong currents (Pflieger 1975). Adults move from the overwintering shoal and bottom strata of the middle and upper Hudson River estuary to shore zone areas of the upper Hudson River estuary to spawn during June and July (Werner 1980), typically preferring habitats with sand or gravel substrates. Spawning takes place over sandy bottoms and at the mouth of tributaries where the fish assemble in large aggregations (Smith 1985a). After spawning, the adults return to offshore areas, with young of year following in September to overwinter.

4.12.1 <u>Young of Year Distribution</u>

Young of year spottail shiner were collected in only one week (16 July) of the LRS, in the Cornwall region (see Appendix C). Spottail shiner young of year were found in every sampling period of the BSS and FJS (Figure 4-46). Peak abundance in the FJS occurred in early September, while high densities were recorded in the BSS from July through the end of sampling in mid-October. Most young of year spottail shiner were collected north of Indian Point in the BSS and north of Saugerties in the FJS. In the BSS density was relatively comparable between mid- and upper estuary regions.

4.12.2 <u>Yearling and Older Fish Distribution</u>

Overall, catches of yearling and older spottail shiner in the FJS were limited, with the greatest density ($>0.2/1,000\ m^3$) collected in the upper estuary regions. Aside from an isolated catch in early August in the Cornwall region, no individuals were collected in the FJS in reaches south of Catskill. The preference of yearling and older spottail shiner for inshore areas is evident from the results of the BSS, as they were collected during all BSS sampling periods (Figure 4-47). No temporal trend was apparent in any of the three surveys.

Yearling and older spottail shiner were collected as far south as the Tappen Zee region in early June, but during most BSS sampling periods yearling and older spottail shiner were not found south of the Croton-Haverstraw region. Greatest regional densities were noted in the shore zones of the Poughkeepsie and Hyde Park regions sampled during the BSS.

4.13 ATLANTIC STURGEON

The Atlantic sturgeon, *Acipenser oxyrhynchus* (Mitchell), is an anadromous species inhabiting estuarine and offshore waters from Labrador to eastern Florida. In the Hudson River estuary Atlantic sturgeon have been found from the Croton-Haverstraw region through the Catskill Region. Adults generally reside in or near their natal estuaries, although they are occasionally collected off shore (Murawski and Pacheco 1977).

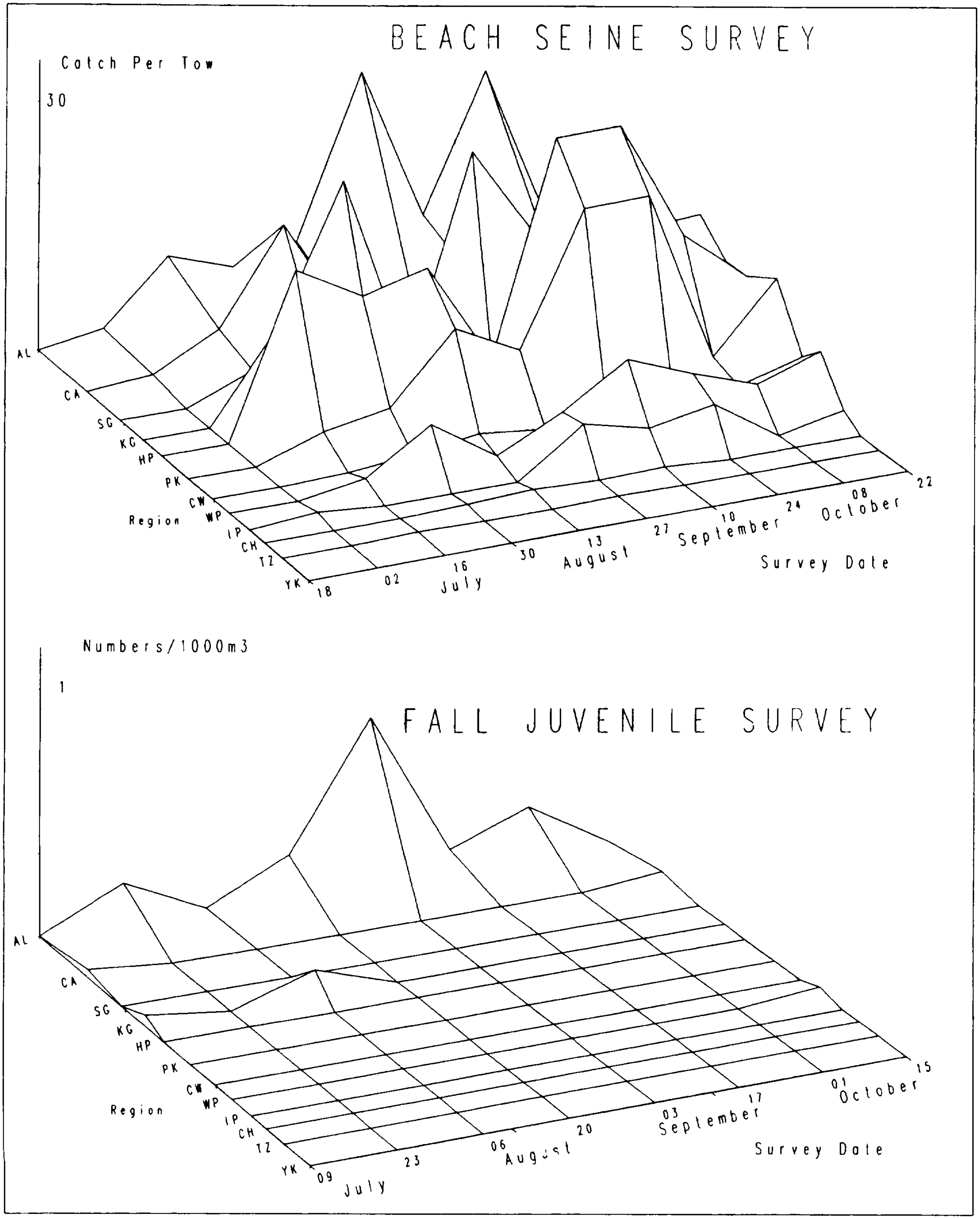


Figure 4 – 46. Spatiotemporal distribution of young – of – year spottail shiner in the Hudson River estuary based on the 1990 Fall Juvenile and Beach Seine River Ichthyoplankton Surveys.

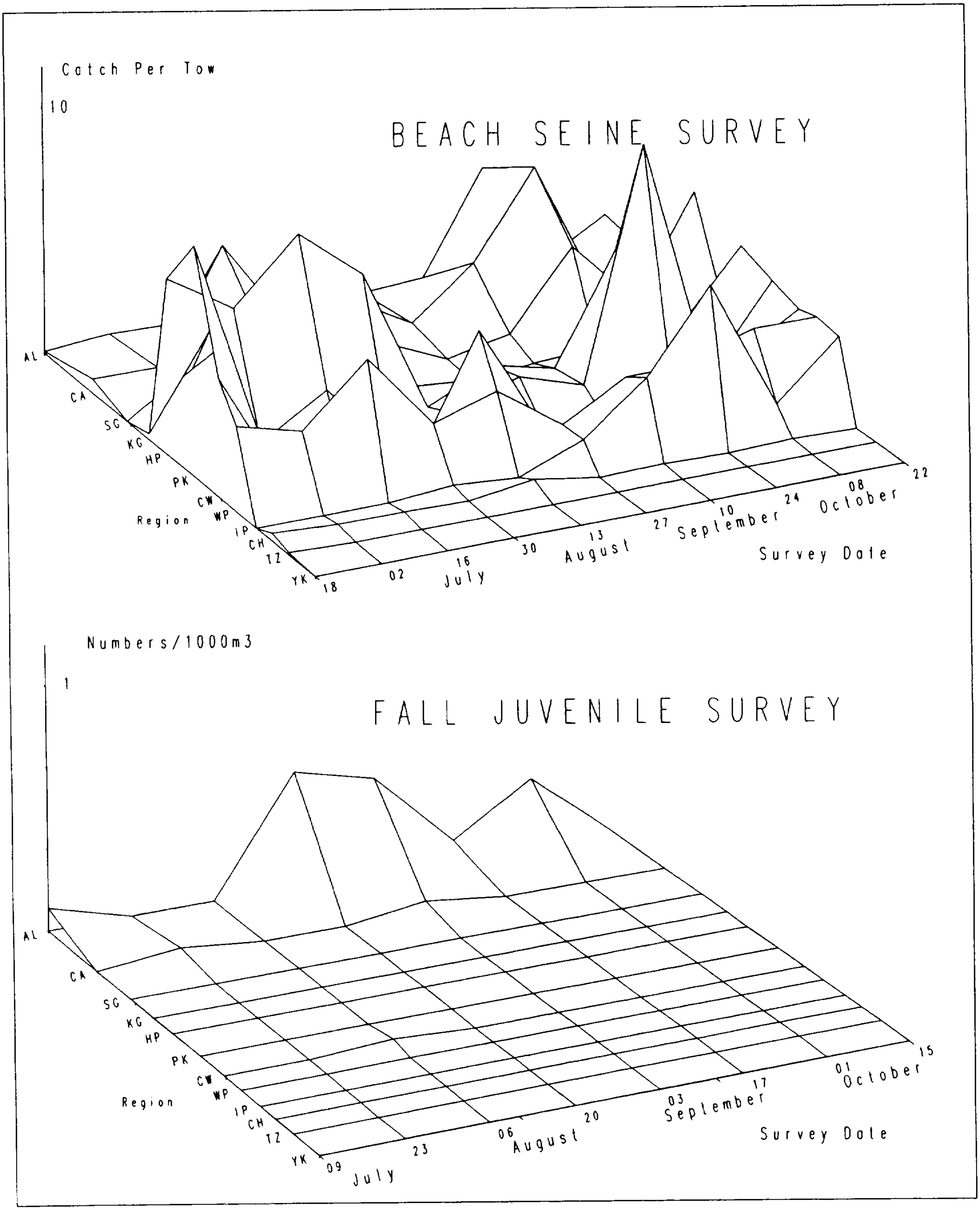


Figure 4-47. Spatiotemporal distribution of yearling and older spottail shiner in the Hudson River estuary based on the 1990 Fall Juvenile and Beach Seine River Ichthyoplankton Surveys.

Spawning occurs in the spring in fresh water, near the saltfront, when temperatures reach 13-18°C (Borodin 1925). Adult Atlantic sturgeon move out of the Hudson River estuary following spawning; the young remain in fresh water for three-five years before migrating out of the Hudson River estuary (Hoff 1975). While in the Hudson River estuary, young of year are demersal, feeding on insect larvae, zooplankton, and plant material (TI 1981). In the Hudson River estuary, maturity is reached beginning at about age 20, with spawning occurring at three- to five-year intervals (Smith 1985b).

4.13.1 Young-of-Year Distribution

No young of year or earlier life stages of Atlantic sturgeon were collected in any of the 1990 sampling programs (Figure 4-48).

4.13.2 Yearling and Older Fish Distribution

Only 12 yearling and older Atlantic sturgeon were collected in 1990 (Table 4-3 and Figure 4-49); all were yearling or older and were released alive after sample processing. Six were collected in the FJS and six in the LRS. Atlantic sturgeon were collected sporadically from Croton-Haverstraw to Albany and from early April to mid-September. The largest catch occurred in the Albany region during the 20 April sampling week.

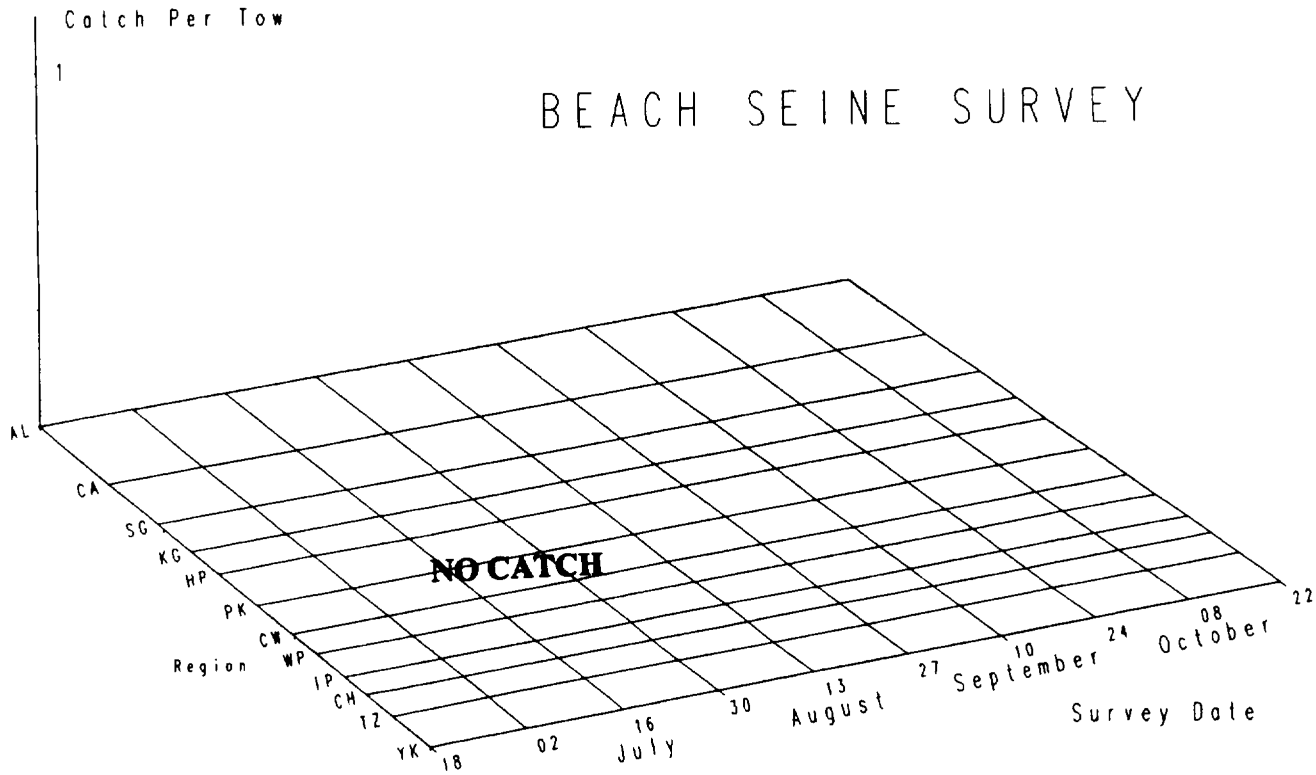
4.14 SHORTNOSE STURGEON

The shortnose sturgeon, *Acipenser brevirostrum*, is an anadromous species first listed as endangered by the Endangered Species Act of 1973. Since 1979, however, population studies of the Atlantic Coast shortnose sturgeon have indicated that the species is more common than had been observed and the status of the species has been upgraded from "endangered" to "threatened" (Williams et al. 1989). These fish inhabit estuaries and nearshore waters from Canada to Florida and tend to remain within estuaries for most of their lives. They have been reported to move up to 20 km/day within an estuary (McCleave et al. 1977; Buckley and Kynard 1985). In the Hudson River estuary, shortnose sturgeon are thought to overwinter in the mid-estuary, moving upriver to spawn.

Spawning occurs in the uppermost areas of the Hudson River estuary, between Coxsackie and Troy, in late April and early May when water temperatures range from 6 to 17°C (TI 1981). The eggs and larvae are demersal. The larvae appear to disperse downriver throughout the summer, utilizing the region from Haverstraw Bay to Coeymans as a nursery area (Hoff et al. 1988). Adult shortnose sturgeon spawn periodically, with the first spawn occurring between age eight-17 years and as many as 20 years between spawns (Taubert 1980).

4.14.1 Young of Year Distribution

No young of year or earlier life stages of shortnose sturgeon were collected in any of the 1990 sampling programs (see Appendix C).



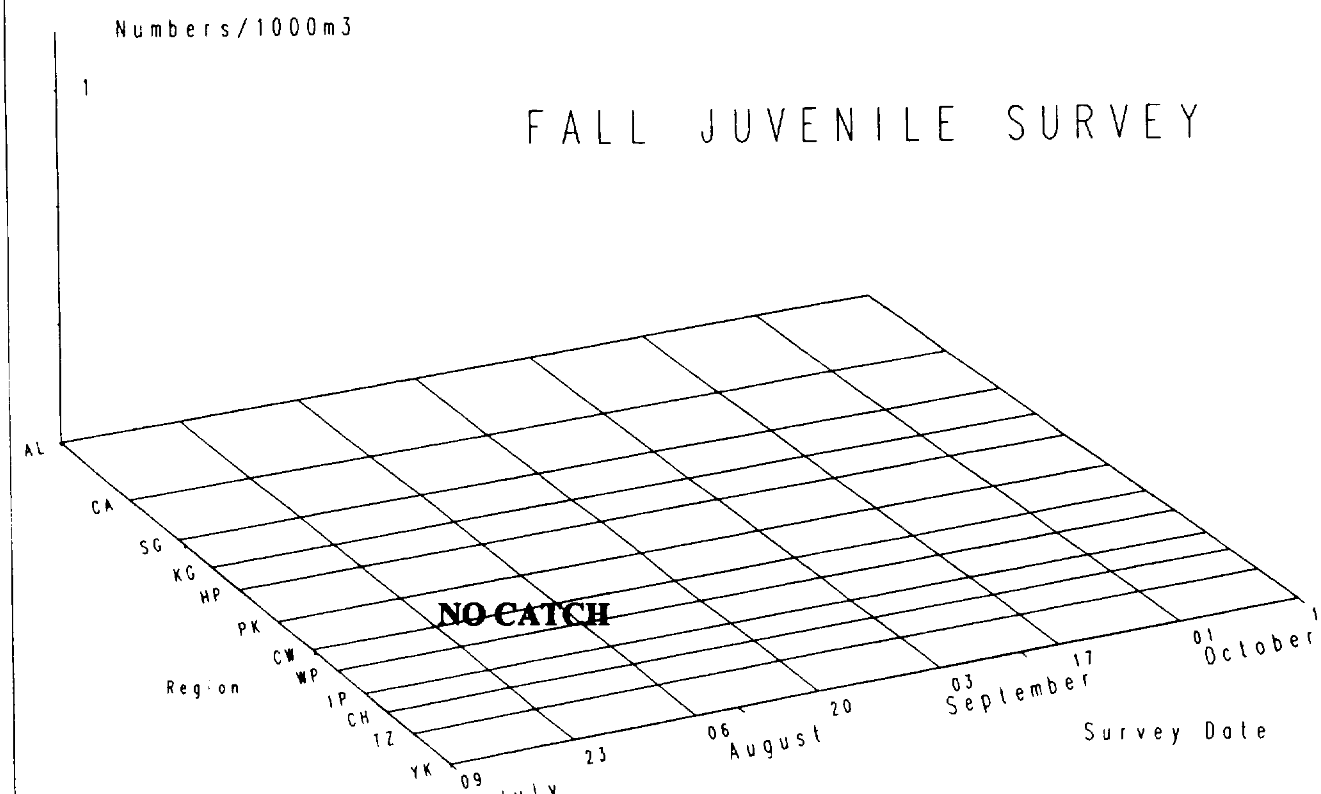
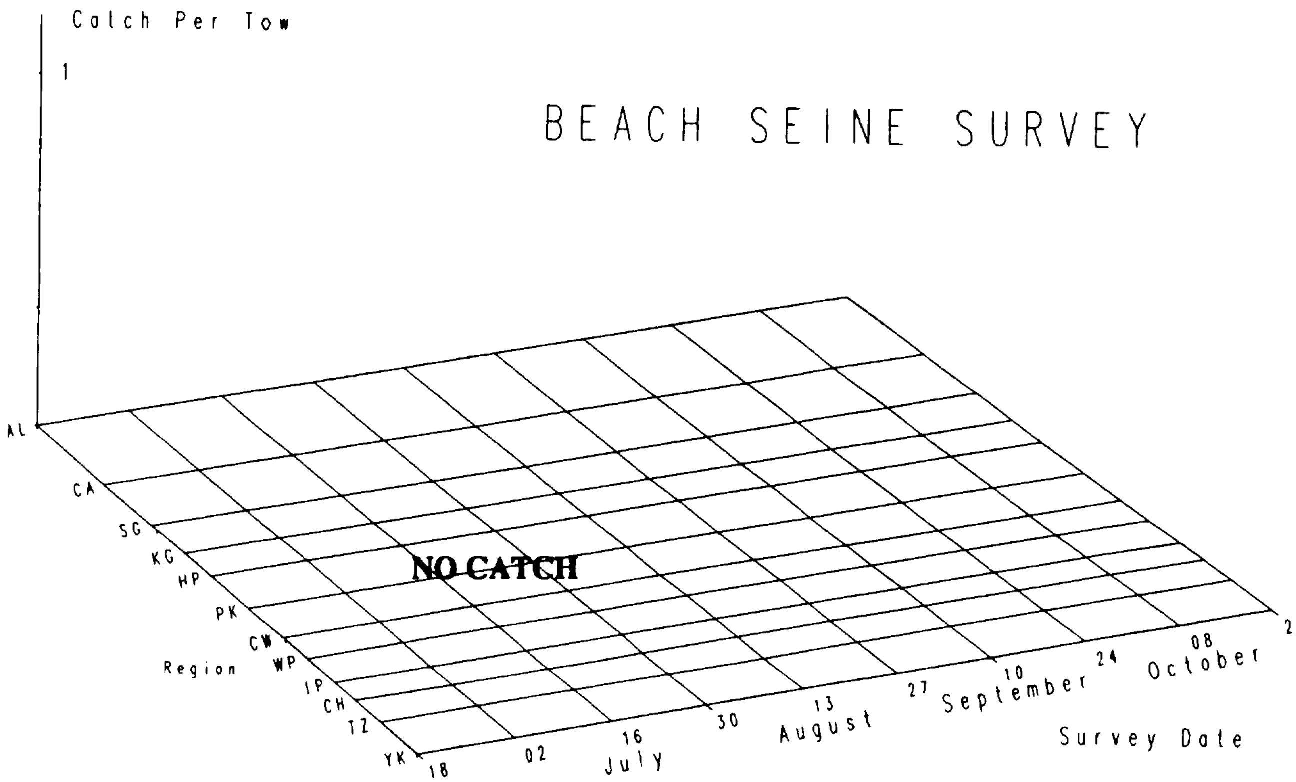


Figure 4 – 48. Spatiotemporal distribution of young – of – year Atlantic sturgeon in the Hudson River estuary based on the 1990 Fall Juvenile and Beach Seine River Ichthyoplankton Surveys.

TABLE 4-3 COLLECTIONS OF ATLANTIC STURGEON DURING THE 1990 HUDSON RIVER SURVEYS

DATE	SURVEY	REGION	STRATA	NUMBER COLLECTED
20 April	LRS	Albany	Bottom	2
21 April	LRS	Albany	Bottom	1
23 April	LRS	Albany	Bottom	1
1 May	LRS	Catskill	Bottom	1
24 May	LRS	Catskill	Bottom	1
12 July	FJS	Saugerties	Bottom	1
8 August	FJS	Cornwall	Bottom	1
22 August	FJS	Saugerties	Bottom	1
23 August	FJS	Croton-Haverstraw	Bottom	1
5 Sept	FJS	Saugerties	Bottom	1
18 Sept	FJS	Saugerties	Bottom	1



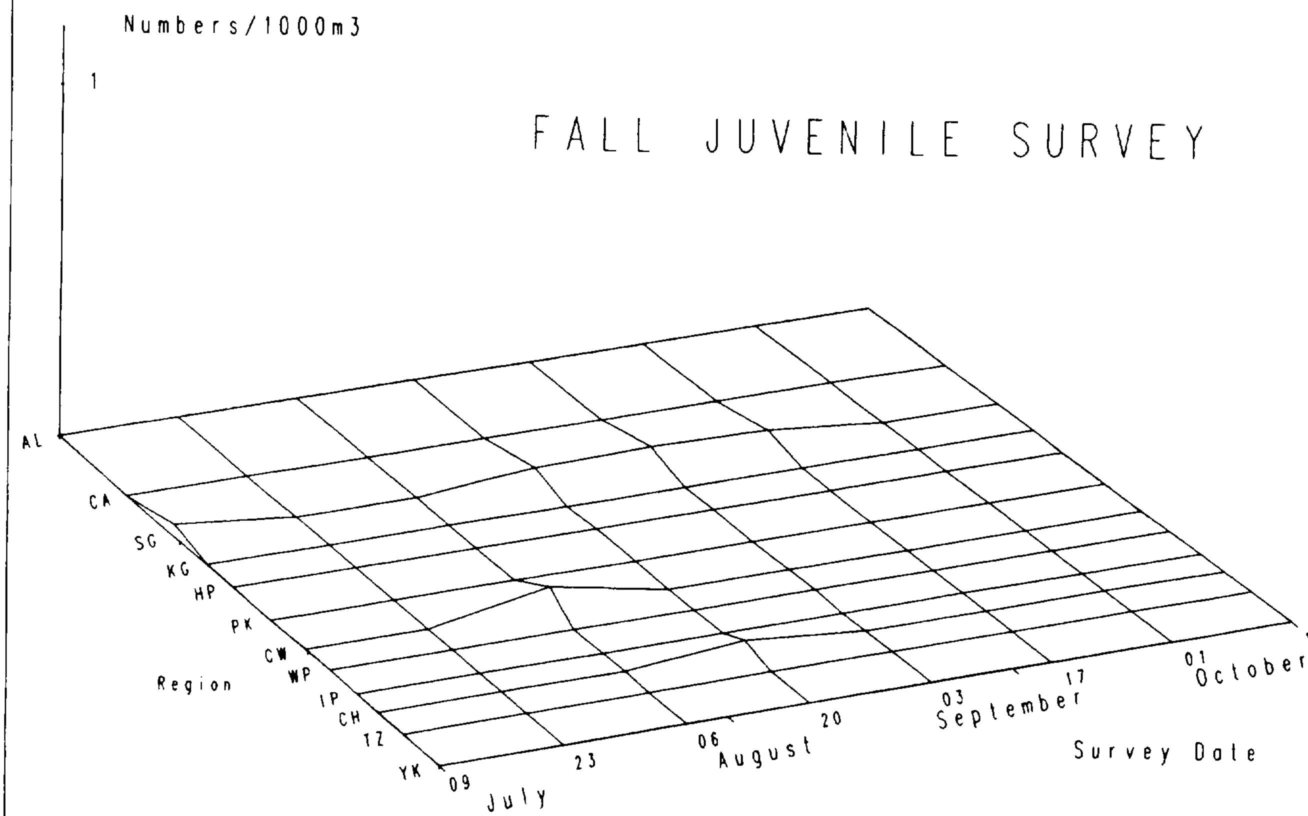


Figure 4-49. Spatiotemporal distribution of yearling and older Atlantic sturgeon in the Hudson River estuary based on the 1990 Fall Juvenile and Beach Seine River Ichthyoplankton Surveys.

4.14.2 Yearling and Older Fish Distribution

Only 14 shortnose sturgeon were captured during 1990; all were yearling or older (Table 4-4 and Figure 4-50) and were released alive after sample processing. Two were collected in the FJS and two in the LRS. Shortnose sturgeon were collected in the Tappan Zee, Poughkeepsie, and Hyde Park regions, and in May, June, July, and September. No shortnose sturgeon were collected in the BSS.

4.15 RAINBOW SMELT

The rainbow smelt, *Osmerus mordax*, is a circumpolar species which in North America, inhabits boreal and northern temperate regions (Scott and Crossman 1979). The Delaware and Hudson Rivers represent the southern limit of its distribution in the eastern United States (Smith 1985).

Most rainbow smelt sexually mature between the ages of two and three. They are anadromous, spawning in March-May (Rupp 1959) in the Hudson River's freshwater reaches. Spawning takes place at night (Scott and Crossman 1973) over gravel substrate. Lake bound populations of rainbow smelt will shoal spawn if suitable stream habitat is not accessible. Rainbow smelt are broadcast spawners; their eggs are adhesive (Rosthchild 1961) and attach to the substrate after release. Cooper (1978) found that eggs hatch in eight days at a mean water temperature of 15° C and in 29 days at 6-7° C (McKenzie 1964). Young disperse rapidly after hatching (Tin and Jude 1983; Dunstall 1984). Highest larval densities occur in protected shoreline areas such as bays and harbors (O'Gorman 1983). As they grow, young of year rainbow smelt move offshore to deeper water and by late fall may be found interspersed with adults (Ferguson 1965). Adults are characterized as a schooling pelagic fish that inhabit inshore coastal zones as well as midwater areas in lakes. The rainbow smelt is carnivorous, feeding on fish (including other smelt), amphipods, aquatic insects, larvae, and worms (Scott and Crossman 1973; Smith 1985a).

4.15.1 Egg Distribution

Rainbow smelt eggs were not collected during the 1990 LRS (Figure 4-51).

4.15.2 Yolk-Sac Larvae Distribution

Rainbow smelt yolk-sac larvae were collected only in three weeks of the LRS (23 April, 7 May, and 14 May) with peak abundance occurring during the week of 23 April (Figure 4-51). Yolk-sac larvae were found primarily in middle and upper estuary reaches, although collections were made as far south as Croton-Haverstraw. Peak densities (17/1,000 m^3) were recorded in the Saugerties region in late April.

4.15.3 Post Yolk-Sac Larvae Distribution

Post yolk-sac rainbow smelt larvae were collected during the first week (19 April) of the 1990 LRS through mid-July (Figure 4-52). The greatest densities were recorded between early May

TABLE 4-4 COLLECTIONS OF SHORTNOSE STURGEON DURING THE 1990 HUDSON RIVER SURVEYS

DATE	SURVEY	REGION	STRATA	NUMBER COLLECTED
9 May	LRS	Poughkeepsie	Bottom	1
12 June	LRS	Tappan Zee	Channel	1
13 July	FJS	Hyde Park	Bottom	1
18 September	FJS	Tappan Zee	Shoals	1

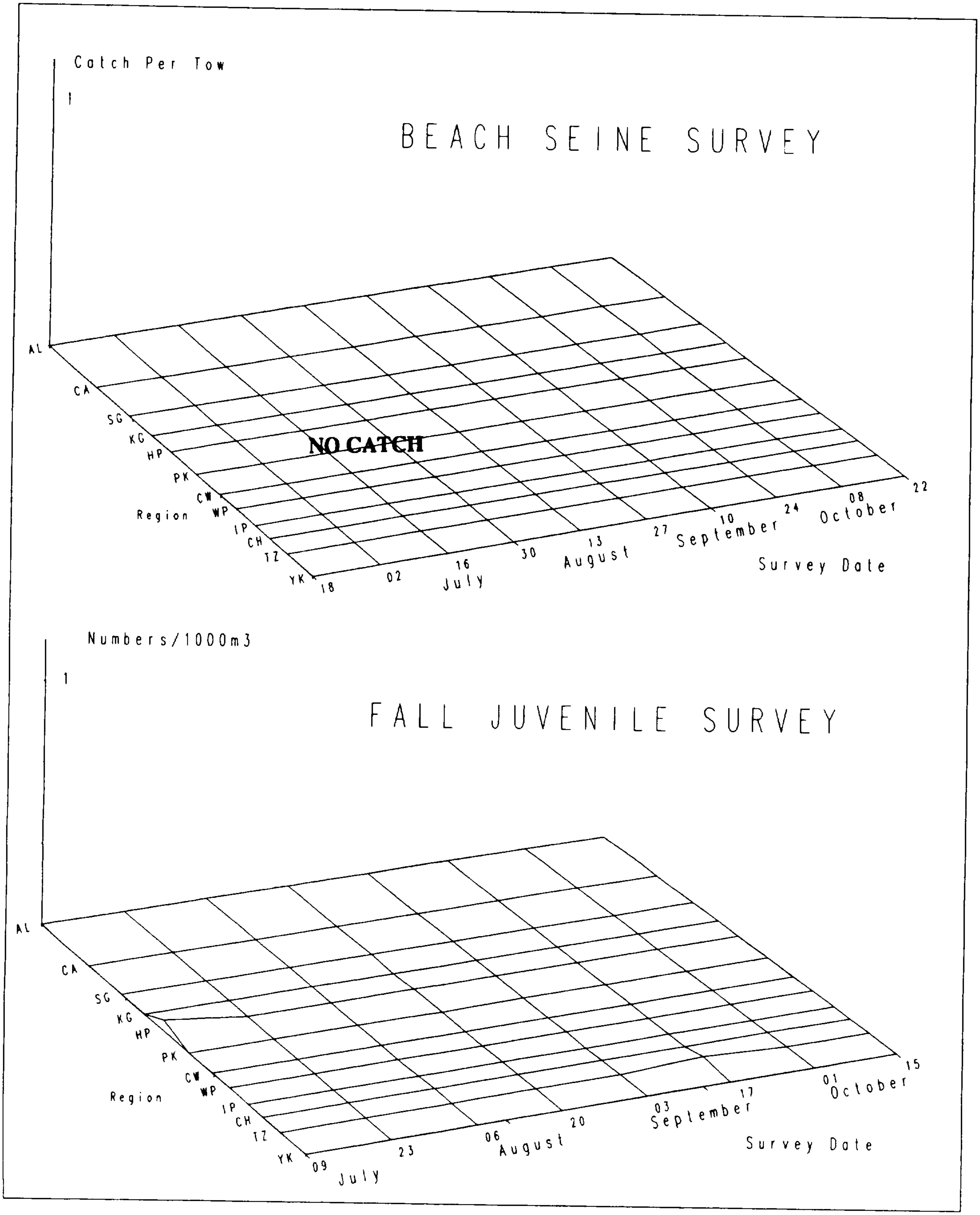


Figure 4–50. Spatiotemporal distribution of yearling and older shortnose sturgeon in the Hudson River estuary based on the 1990 Fall Juvenile and Beach Seine River Ichthyoplankton Surveys.

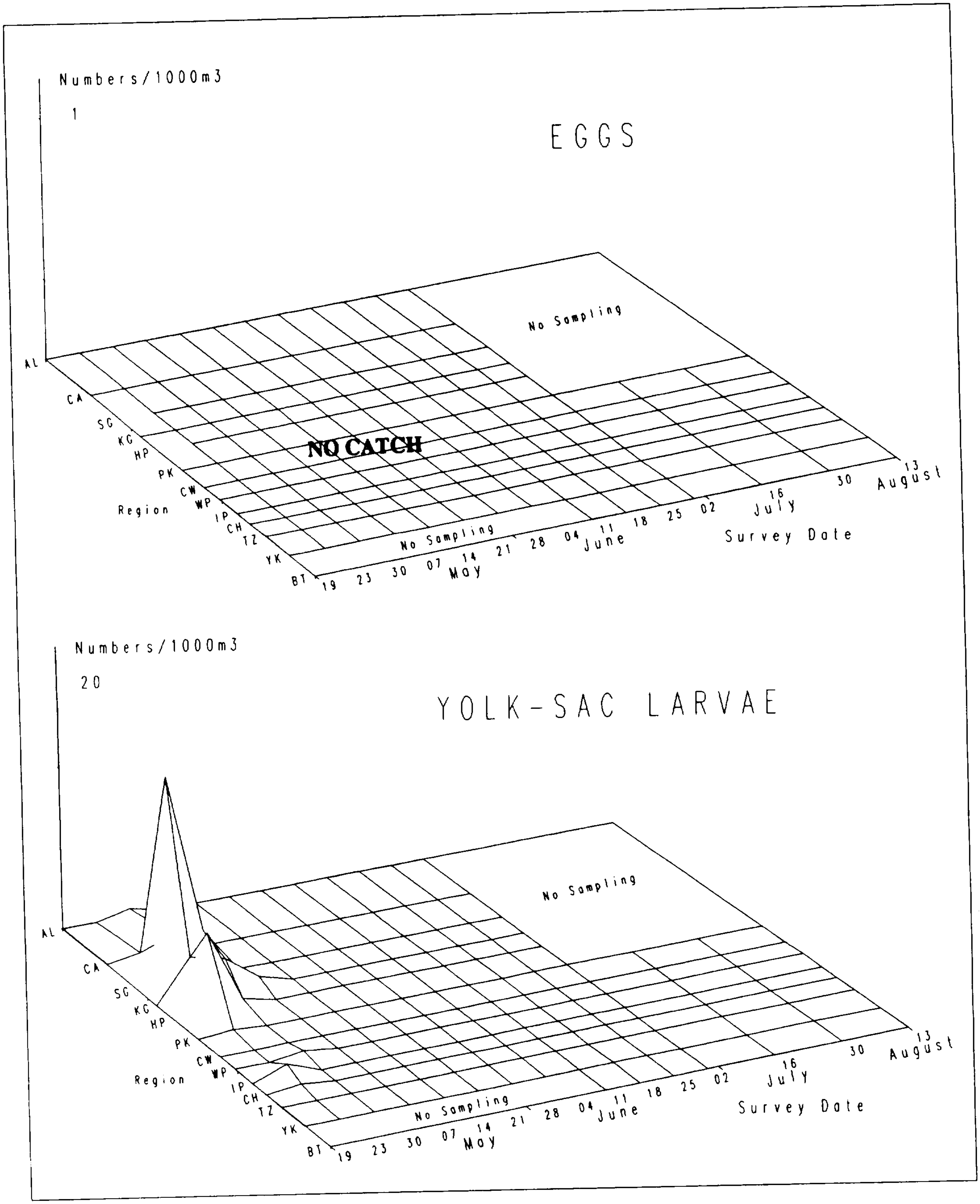


Figure 4–51. Spatiotemporal distribution of egg and yolk–sac stages of rainbow smelt in the Hudson River estuary based on the 1990 Long River Ichthyoplankton Survey.

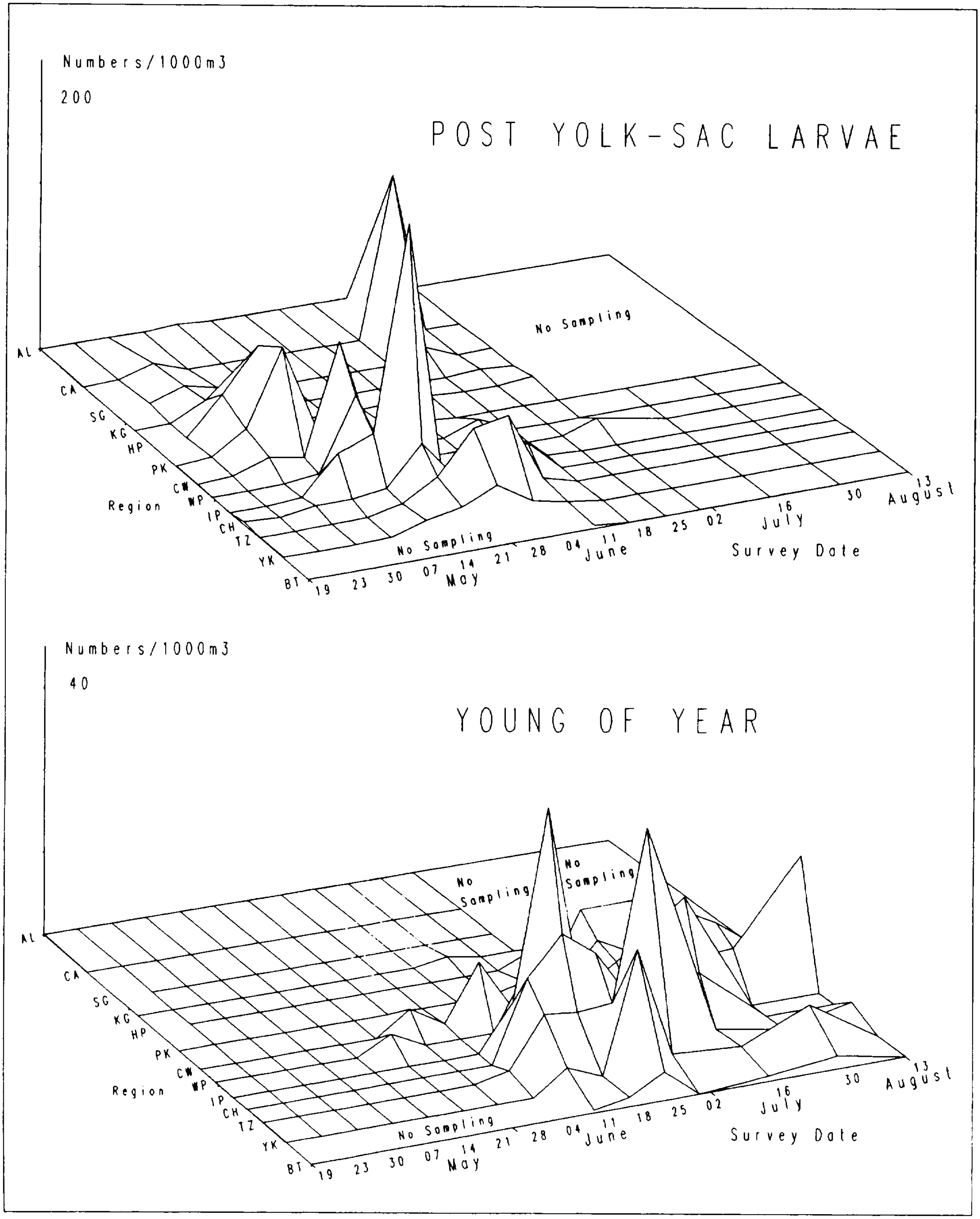


Figure 4-52. Spatiotemporal distribution of post yolk-sac and young-of-year stages of rainbow smelt in the Hudson River estuary based on the 1990 Long River Ichthyoplankton Survey.

and mid-June, with peak density occurring during sample week 21 May. Post yolk-sac larvae were collected in all of the regions sampled. In early and mid-May greatest densities were found from Croton-Haverstraw through Catskill. A secondary peak of 129/1,000 m^3 was recorded during the week of 18 July in the Saugerties region. Except for this peak the general distributional trend shifted to lower river regions, as from mid-May through mid-June post yolk-sac larval rainbow smelt were collected primarily from the Cornwall to Battery regions.

4.15.4 Young of Year Distribution

In the LRS rainbow smelt young of year were collected in quantity from mid-June through August, with peak abundance occurring in mid-July (Figure 4-52). In the LRS the majority of young of year rainbow smelt were distributed south of the Poughkeepsie region during the period of greatest abundance. Comparable peak young of year densities in the LRS occurred in the Indian Point region (37/1,000 m^3) during the week of 18 June and in the Tappen Zee region (35/1,000 m^3) during the week of 2 July. A similar temporal and spatial pattern of distribution was recorded in the FJS, where peak abundance (34/1,000 m^3) occurred during the week of 23 July and most young of year were collected south of Poughkeepsie (Appendix C). Rainbow smelt were rare in FJS collections made in October. Young of year rainbow smelt were collected during only one week (10 September) of the 1990 BSS in the Tappan Zee Region (Appendix C).

4.15.5 Yearling and Older Distribution

No yearling and older rainbow smelt were collected in the 1990 BSS (Appendix C). Yearling and older rainbow smelt were collected in only two weeks of the 1990 FJS. A few were collected in Cornwall during the week of 6 August and Indian Point during the week of 17 September (Appendix C).

CHAPTER 5
YOUNG OF YEAR ABUNDANCE INDICES

An understanding of the magnitude and variability of recruitment to the adult stock is important for the successful management of fish populations. For highly fecund species, such as many estuarine inhabitants, this recruitment can be quite variable, resulting from relatively small changes in early life stage mortality due to a variety of biotic or abiotic factors. To assess recruitment dynamics, sampling programs are often established to monitor the relative abundance of a particular life stage or age of fish at a point after the period of variable egg and larval mortality, but before actual recruitment to the adult stock. This relative abundance measure is then used as an index of adult recruitment and can be used to begin an investigation into factors contributing to the observed variability.

An important objective of the Hudson River studies has been the monitoring of young of year abundance for selected fish species during the late summer and early fall of their first year of life. Because year class strength is believed to be established prior to this time, the young-of-year abundance indices resulting from this monitoring have been used as an index of subsequent recruitment to the adult stock. These young of year indices can then be used to assess potential long-term trends, such as water quality or habitat degradation, commercial and recreational fishing pressure, or power plant operation, that could be related to man's activities.

The purpose of this chapter is to present young of year abundance indices for 1990 for striped bass, white perch, and American shad based on data from the BSS and FJS. These indices are then compared to similar indices from previous years extending back to 1974 for striped bass and white perch and to 1979 for American shad. While a variety of abundance estimation techniques have been utilized over the years (Versar 1987), the effort for this report focused on the following four techniques:

- Beach Seine abundance index
- Fall Juvenile abundance index
- Combined standing crop estimate
- Coordinate pair index

With the exception of the combined standing crop estimates for American shad, all four indices are available for each of the three species. Actual values for each of these four indices are presented in Appendix D.

Since the beginning of the Hudson River studies, the sampling schedule for both the BSS and the FJS has varied from year to year (Figure 5-1). To ensure temporal consistency across all years, the calculation of the two abundance indices and the resulting coordinate pair index were restricted to the period sampled in all years that extended from Week 33 through Week 40 (late August - early October). In addition to temporal variability, there have been differences in the spatial extent of sampling for the FJS surveys (Figure 5-2). To ensure spatial consistency in the Fall Juvenile index and the resulting coordinate pair index, only samples collected in the shoal strata from the Yonkers through Indian Point regions and samples collected in the bottom strata from the Tappan Zee through Poughkeepsie regions were included for the striped bass and white perch indices. For the American shad index, all strata were included in the calculations. Beach seine sampling has always included all regions; consequently, no further data subsetting was required. The analytical methodology used for each of these indices is described in Section 2.5.3.

5.1 STRIPED BASS

The Beach Seine abundance index for striped bass young of year in the late summer and early fall of 1990 was 6.4 within the range reported for previous years (Figure 5-3). However, it is considerably less than the highest index of 13.0 reported for 1987. The Fall Juvenile abundance index for 1990 of 0.9 is also within the range previously reported. The relative abundance between shore zone and offshore abundance for young of year striped bass was similar to all years since 1978, with the exception of 1988.

The weekly combined standing crop estimates for young of year striped bass in 1990 ranged from 4 to 26 million (Figure 5-4). Beginning in early July, the combined standing crop increased, most likely a result of increasing vulnerability to the sampling program. The combined standing crop estimate was highest in mid-July and gradually declined over the summer and early fall to approximately 15% of the peak level due to the combined effects of mortality and emigration from the study area. The peak combined standing crop of 26 million young-of-year striped bass for 1990 is within the range reported for previous years and is the same as reported for 1989 (EA 1991) but is considerably less than the highest peak combined standing crop of 56 million reported for 1987 (LMS 1989).

The coordinate pair index, combining data from both onshore and offshore areas, suggests that 1990 had a moderate abundance of young of year striped bass, comparable to previous years (Figure 5-5). Across the 17 years of study, one (1977) was a year of high abundance for striped bass young of year in both surveys, and two (1985 and 1986) were years of low abundance in both surveys. The remaining 14 years, including 1990, did not appear to differ substantially.

The pattern exhibited by these four indices suggests that young of year striped bass abundance during 1990 in the Hudson River estuary was similar to the typical numbers observed in the previous 16 years. While unusually strong or weak year classes can be readily identified, differentiation among most years is not possible as it depends upon the relative weighting factors used for the strata sampled. These weighting factors are, in turn, dependent upon assumptions of relative gear efficiency and volume of the segment

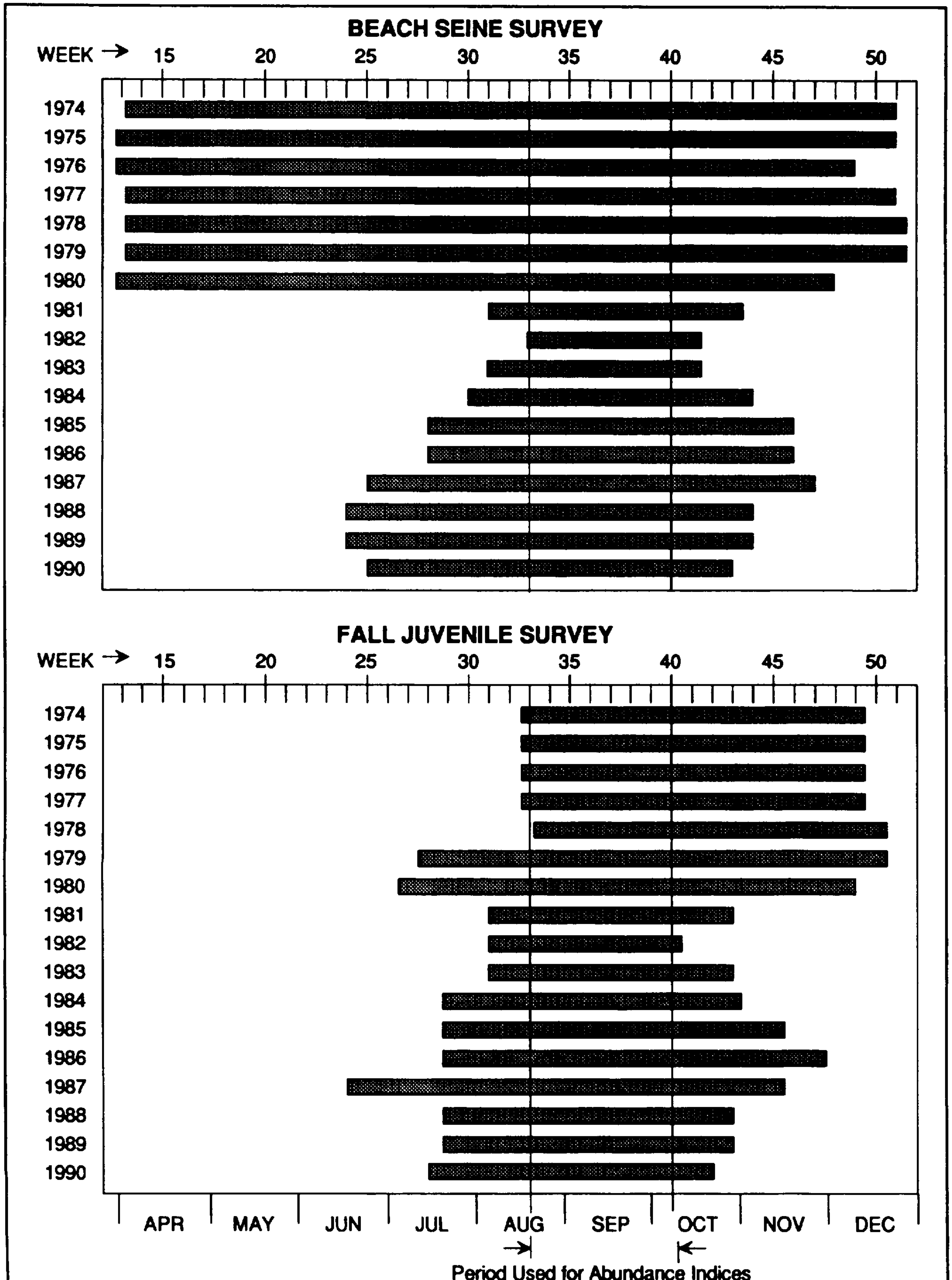


Figure 5-1. Sampling schedule for Beach Seine and Fall Juvenile surveys in the Hudson River Estuary, 1974-1990.

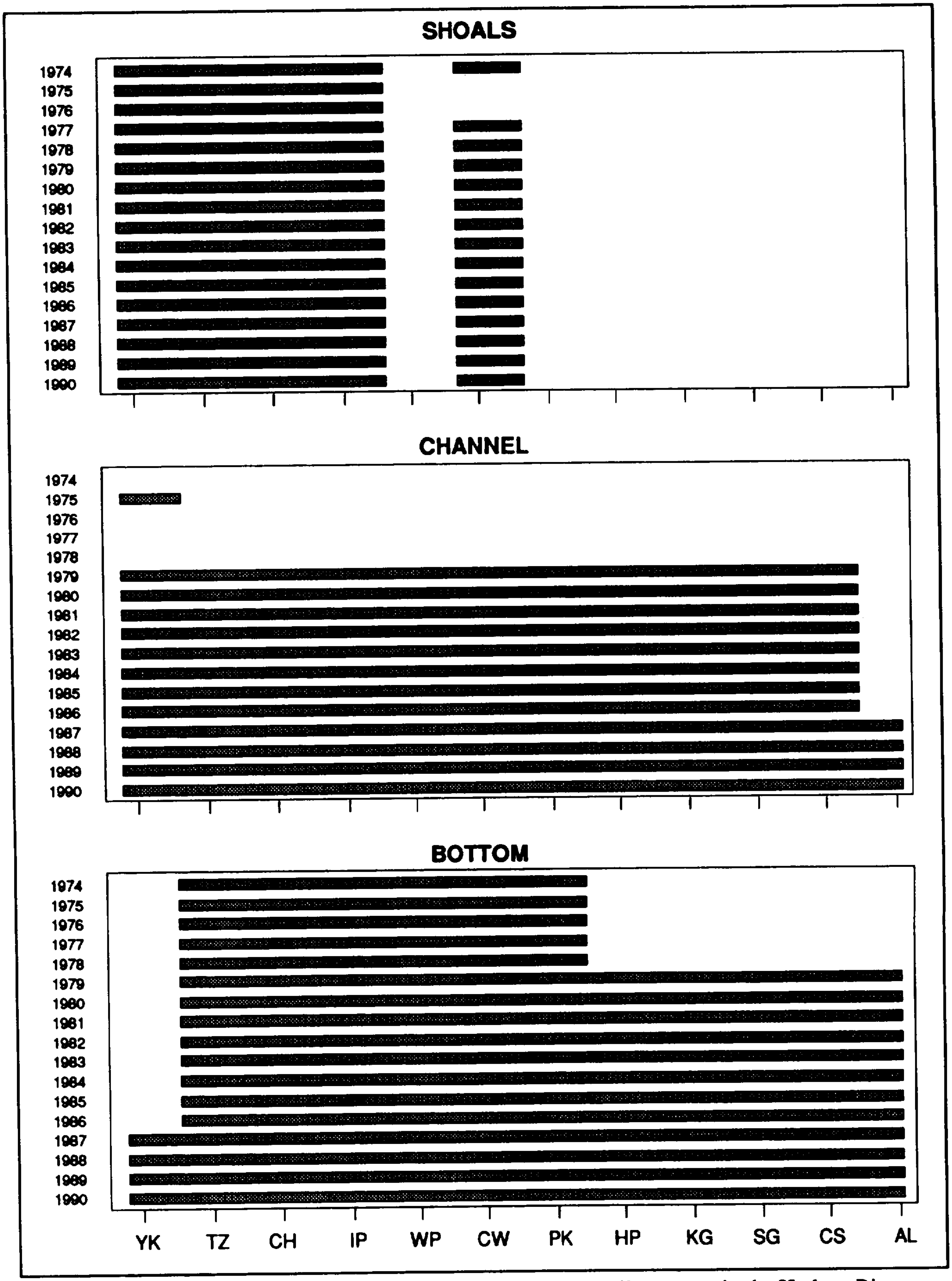


Figure 5-2. Spatial distribution of sampling for the Fall Juvenile surveys in the Hudson River Estuary, 1974-1990.

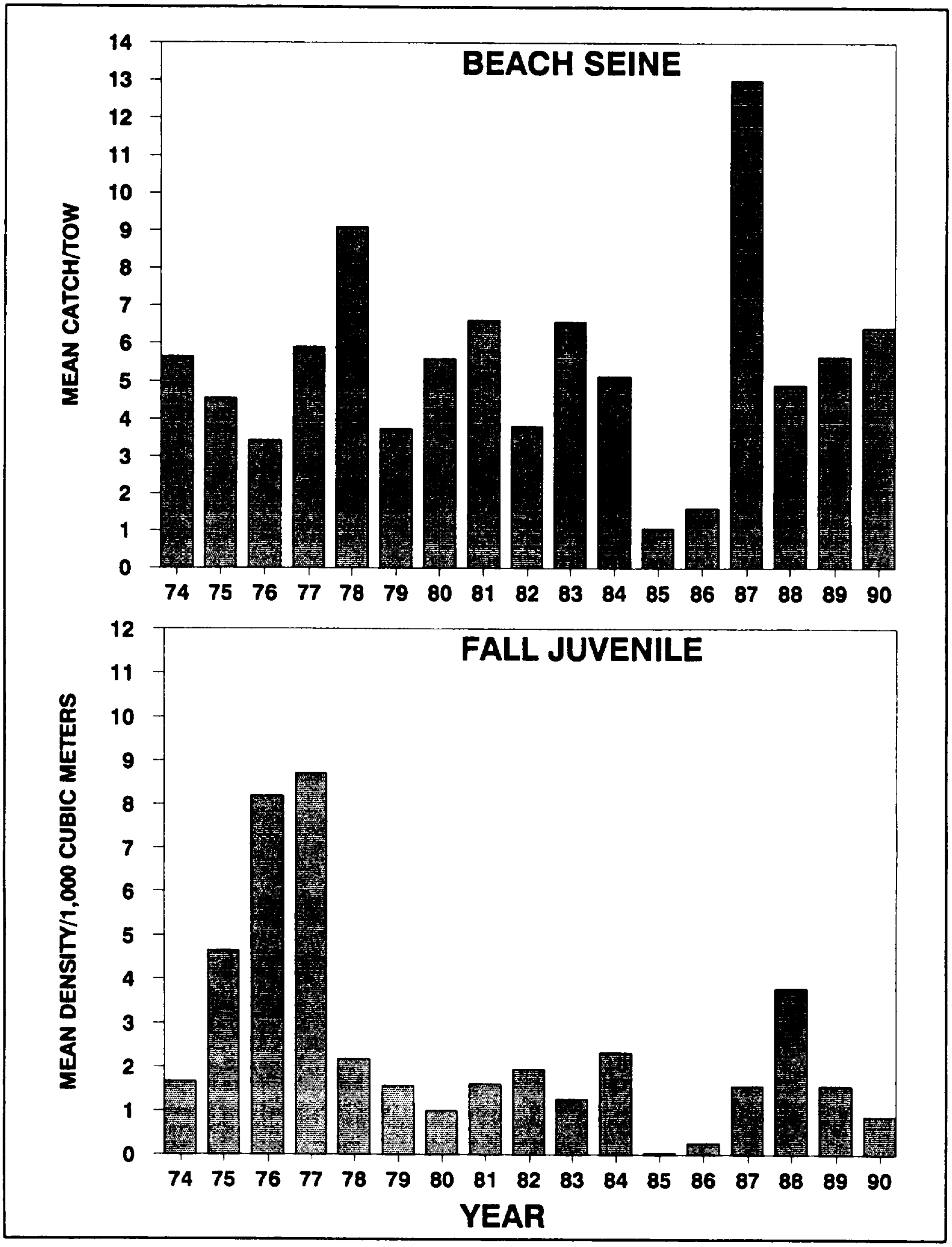


Figure 5-3 Beach Seine and Fall Juvenile abundance indices for young-of-year striped bass in the Hudson River estuary, late August - early October.

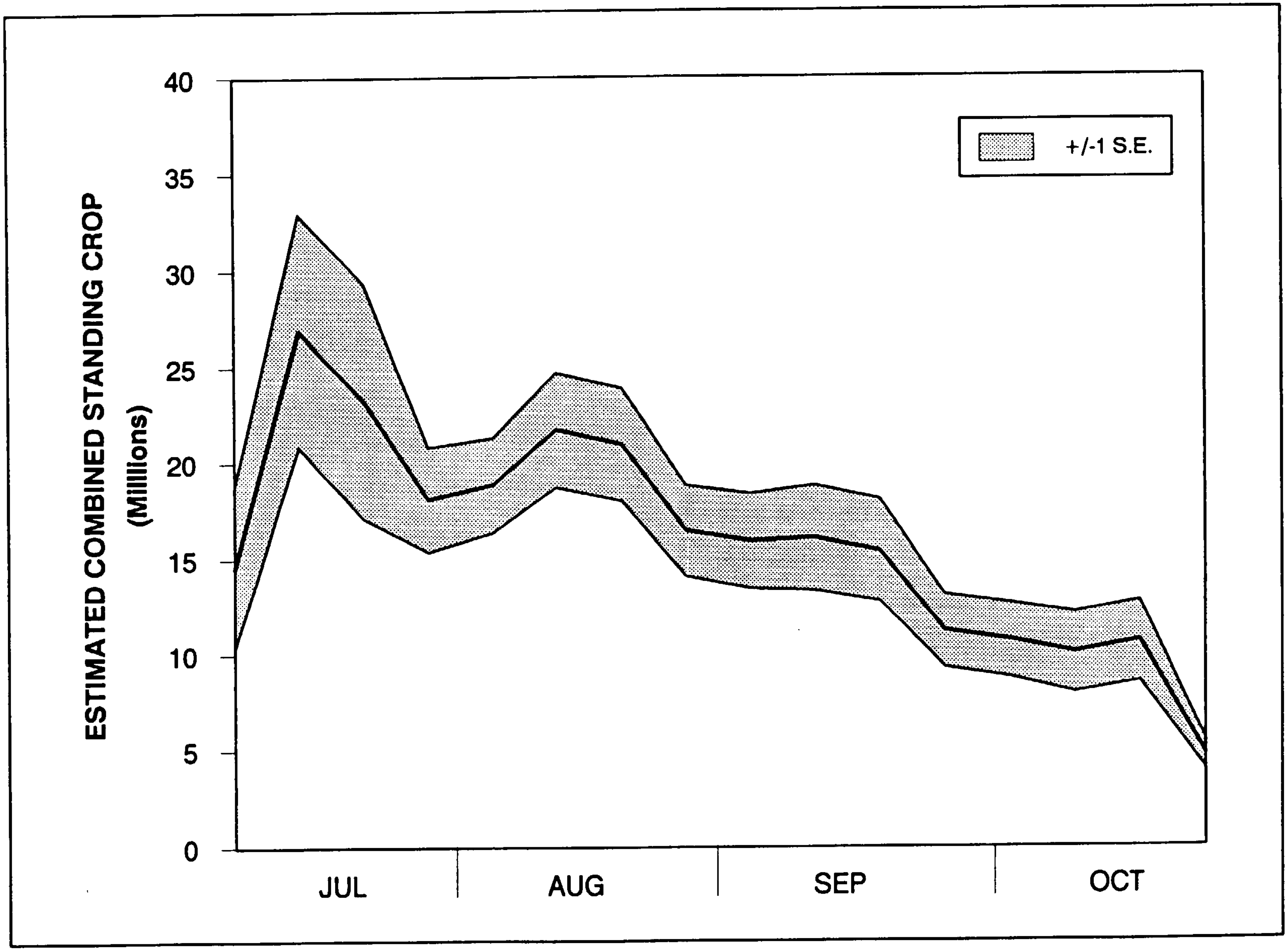


Figure 5-4 Estimated weekly combined standing crop for young-of-year striped bass in the Hudson River estuary, mid-July - October 1989.

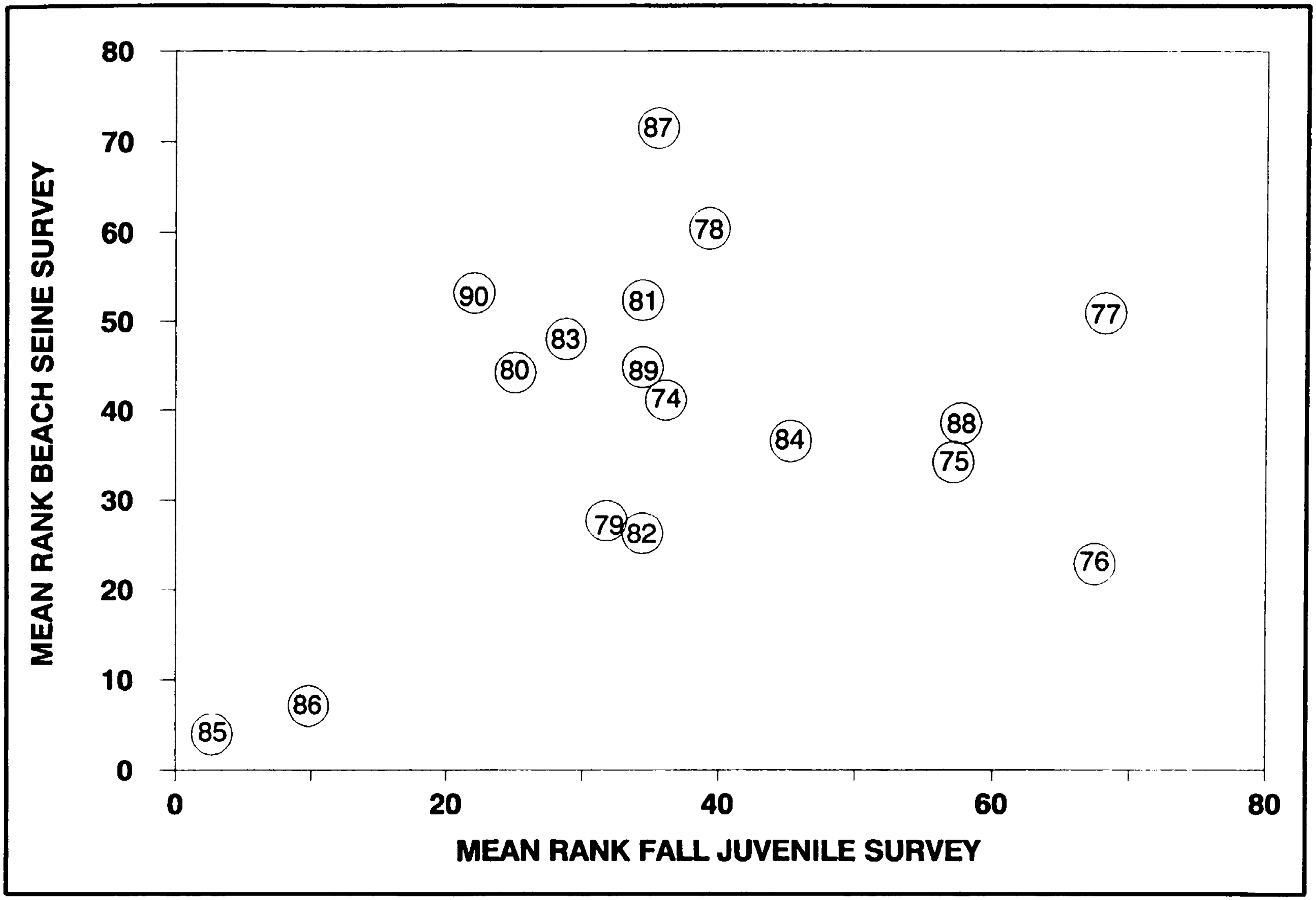


Figure 5-5 Coordinate pair indices for young-of-year striped bass in the Hudson River estuary, late August - early October.

inhabited by the young of year; factors which, to date, have been difficult to accurately estimate. There is, however, no evidence of a long-term trend in young of year striped bass abundance within the Hudson River estuary over the period 1974-1990.

5.2 WHITE PERCH

The Beach Seine abundance index for white perch young of year in the late summer and early fall of 1990 was 3.9, the lowest recorded in the 17 years of the study; however, it is very close to values recorded in the past (4.1, 4.2, and 4.3 in 1974, 1984, and 1985, respectively) (Figure 5-6). Since 1984 the white perch Beach Seine abundance indices have been generally lower than reported for the previous six-year period (1978-1983), but similar to earlier years (1974-1977). The Fall Juvenile abundance index for 1990 was 0.02, the lowest recorded for white perch. This continues a period of lower offshore abundance extending back to 1982.

The weekly combined standing crop estimates for young of year white perch in 1990 ranged from 2.8 to 11 million (Figure 5-7). Beginning in early July the combined standing crop estimate increased, reaching peak abundance the last week of July. The increase is most likely a result of recruitment of the young of year to the sampling gear. The combined standing crop estimates declined gradually over the summer and early fall, with a pattern of varying higher and lower young of year white perch estimated combined standing crops. This pattern is typical of previous years, reflecting the combined effects of recruitment to the sampling gear, movements in and out of unsampled areas such as tributaries and backwaters, and young of year mortality. The peak combined standing crop of 11 million young of year white perch is lower than the range of approximately 20-58 million reported for previous years (NAI 1985a, 1985b; MMES 1986; LMS 1989; EA 1990, 1991).

The coordinate pair index, combining data from both onshore and offshore areas, suggests that 1990 had the lowest abundance compared to previous years; this appears to continue the pattern of relatively low abundance for young of year white perch that has been evident since 1984 (Figure 5-8). Based on this index, these seven year classes of white perch, together with 1974 and 1977, appear relatively weak when compared with the other year classes. However, as with striped bass, differences among most of the years depend upon assumed relative strata weightings.

The patterns exhibited by these four indices suggest that young of year white perch abundance during 1990 continued the pattern of relatively low abundance that began in 1984. Overall, it appears that young of year white perch abundance was relatively high in the Hudson River estuary from 1975 through 1983 when compared to the other years. Wells, Matousek, and Hutchison (in press) evaluated white perch abundance trends in the Hudson River estuary using 20 separate indices of annual abundance, including the New York State Department of Environmental Conservation's (NYSDEC) Beach Seine Survey and the Hudson River Utilities' LRS, FSS, BSS, and White Perch Stock Assessment Program (WPSAP). The results indicated that although young of year indices were showing declines through 1980s, the numbers of white perch eggs, yolk-sac, and post-yolk sac larvae, and adults have increased over time. They suggest that a decline in catchability of young of

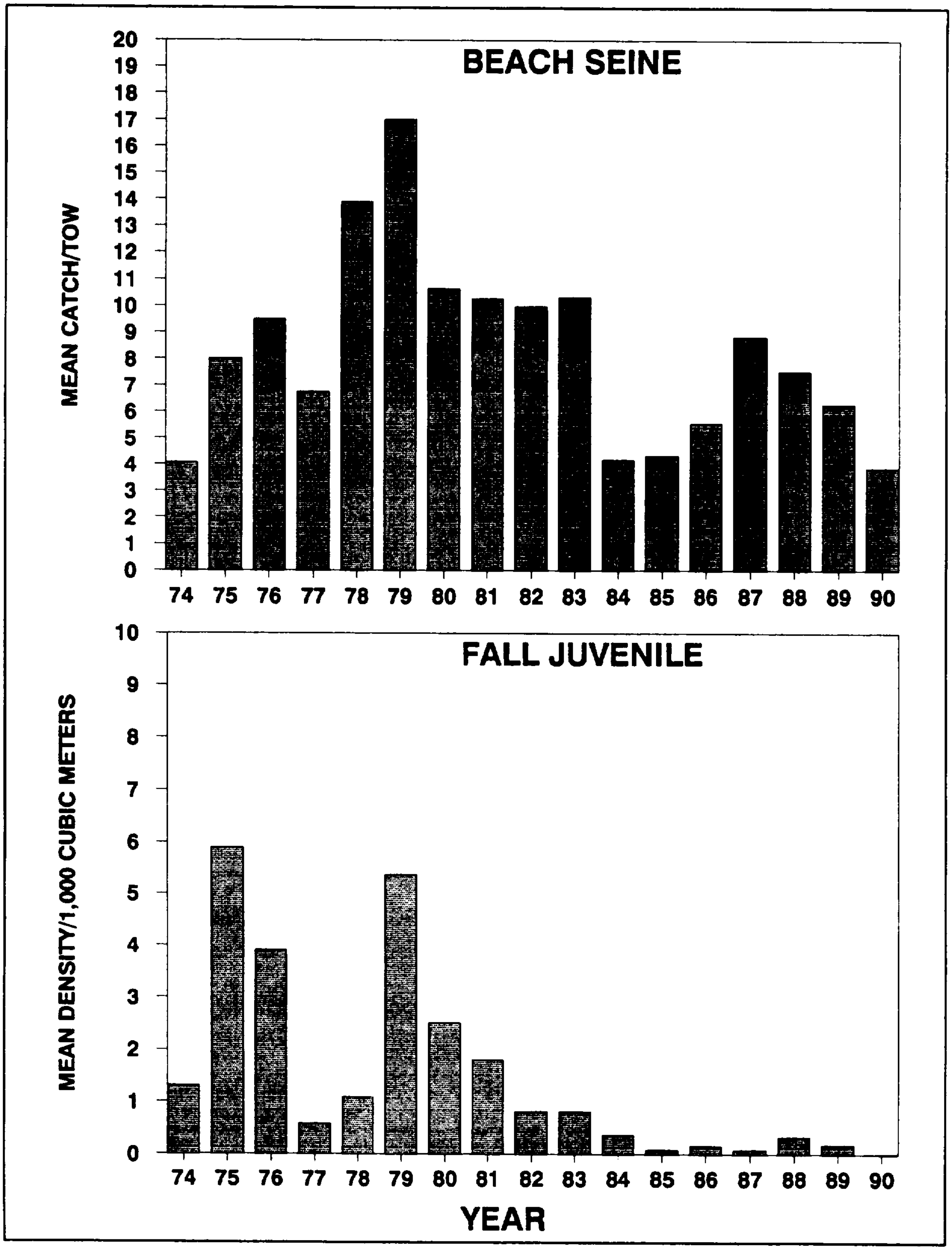


Figure 5-6 Beach Seine and Fall Juvenile abundance indices for young-of-year white perch in the Hudson River estuary, late August - early October.

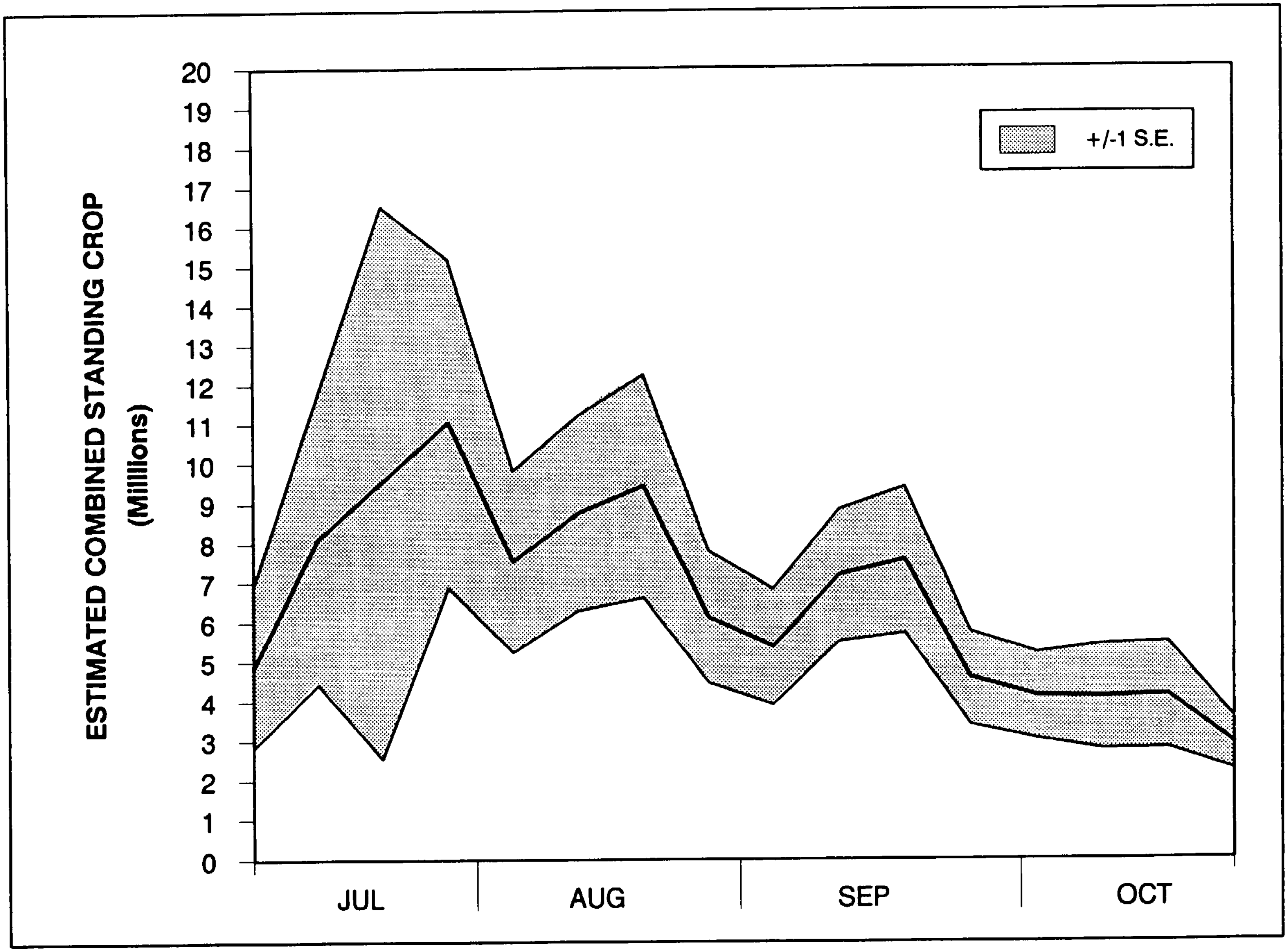


Figure 5-7 Estimated weekly combined standing crop for young-of-year white perch in the Hudson River estuary, mid-July - October 1989.

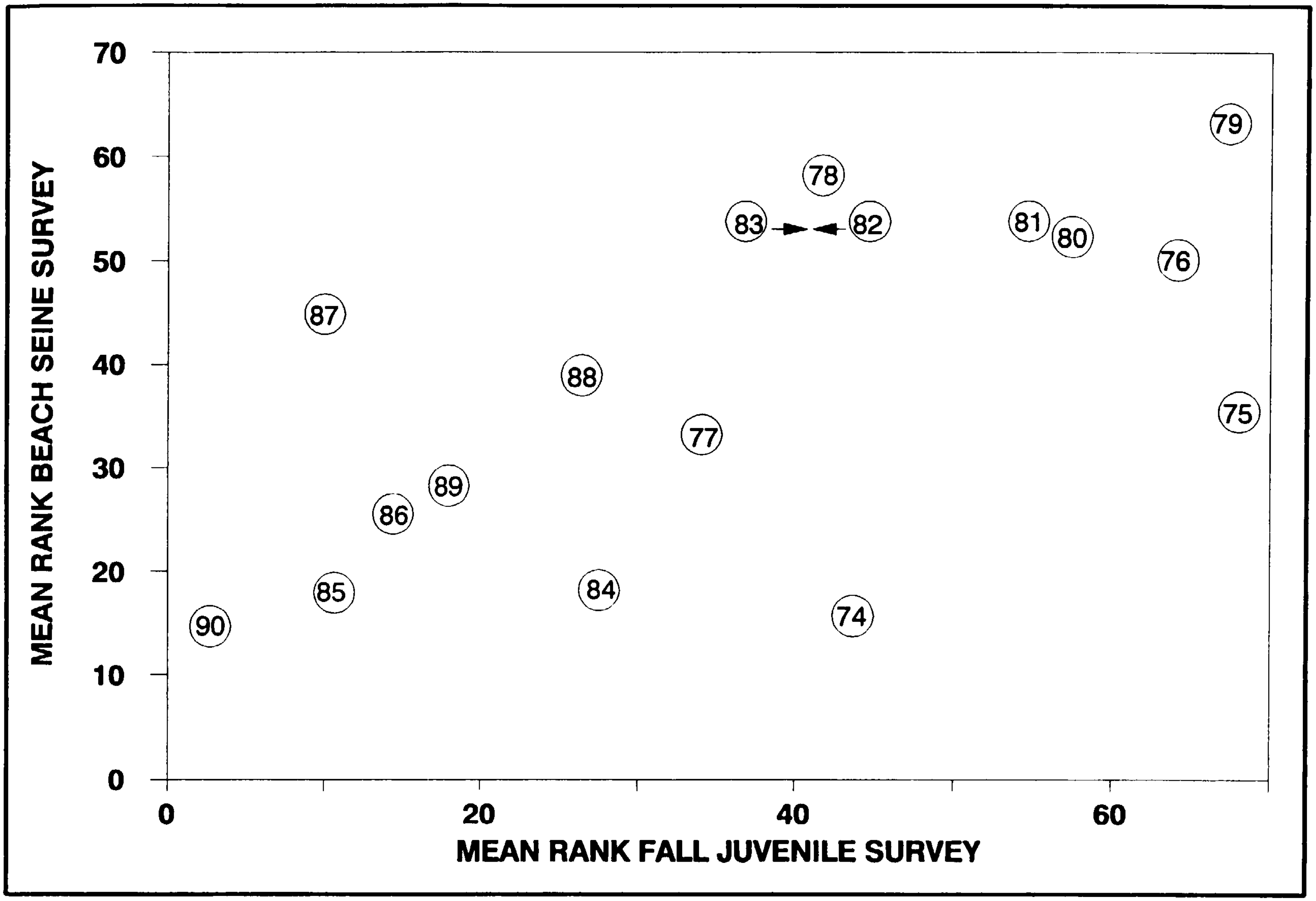


Figure 5-8 Coordinate pair indices for young-of-year white perch in the Hudson River estuary, late August - early October.

year white perch due to an increase in unsamplable habitats, such as the expansion of water chestnut beds observed since cessation of an eradication program in 1975, may explain in part the decline observed in young of year indices.

5.3 AMERICAN SHAD

The Beach Seine abundance index for American shad young of year in the late summer and early fall 1990 was 18.75, within the range reported for previous years (Figure 5-9). Except for 1984, 1985, and 1988, when abundance was low, the 1990 Beach Seine index is similar to other years. The Fall Juvenile abundance index for 1990 was 0.82, well within the range reported for previous years (Figure 5-10).

The coordinate pair index, combining data from both onshore and offshore areas, suggests that 1990 had a moderate abundance of young of year American shad (Figure 5-10). In the 12 years of study, two year classes (1986 and 1989) were the only two substantially different from the others. The other 10 year classes appeared to be generally similar in abundance.

The patterns exhibited by these three indices suggest that young of year American shad abundance during 1990 is similar to previous years. No weak year classes were clearly evident for this species in the Hudson River estuary. There was no evidence of a long-term trend or pattern across the period sampled, 1979-1990.

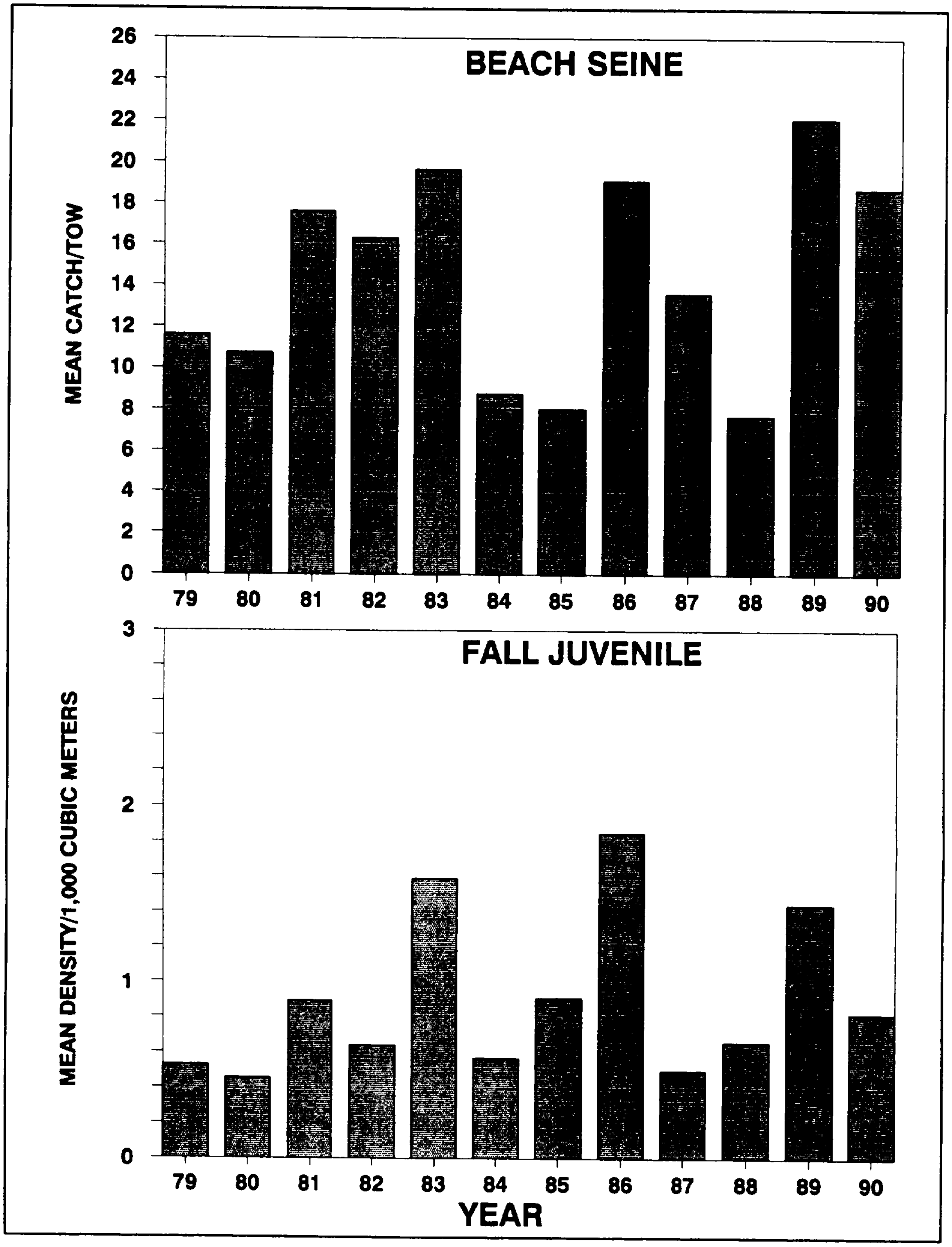


Figure 5-9 Beach Seine and Fall Juvenile abundance indices for young-of-year American shad in the Hudson River estuary, late August - early October.

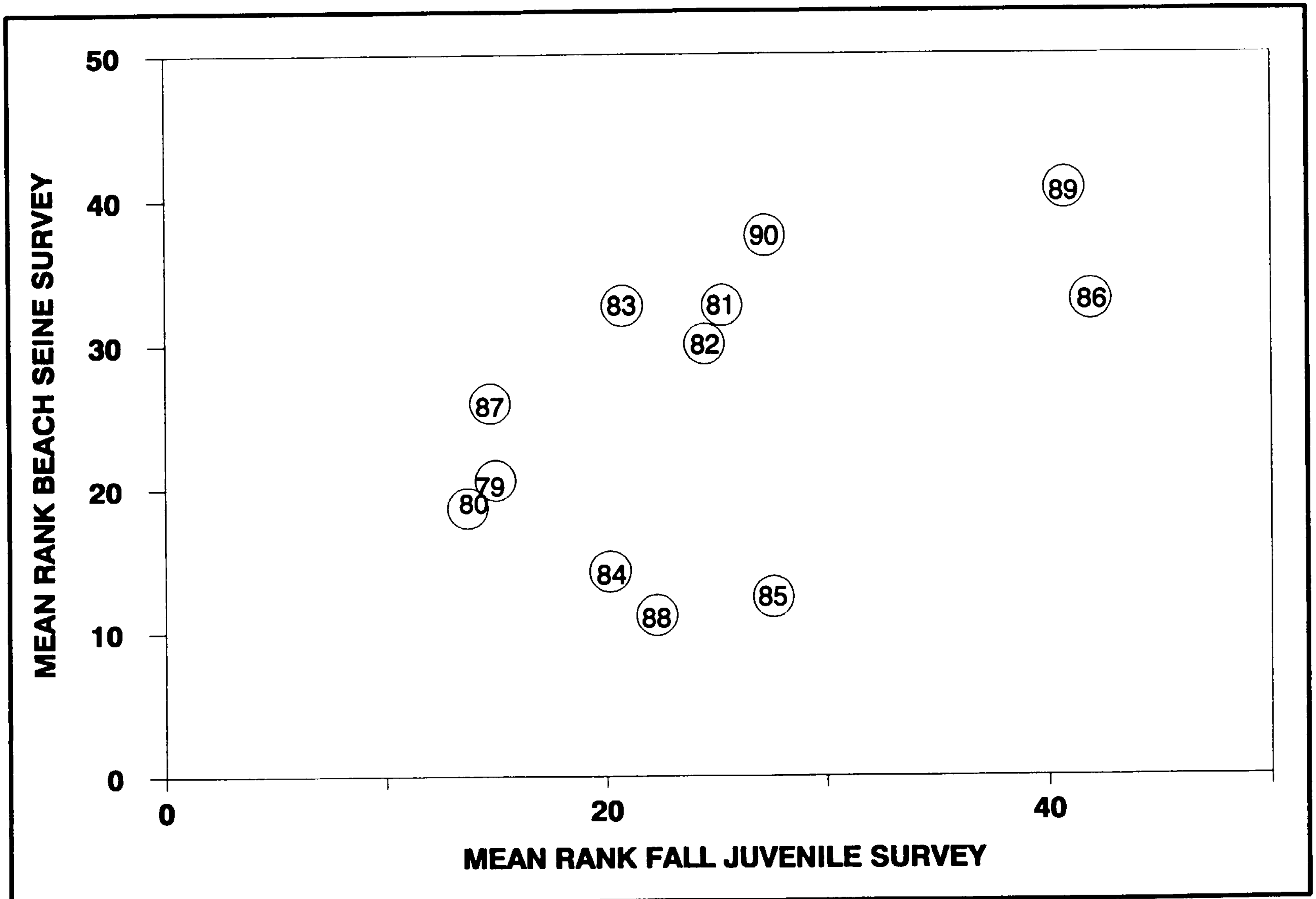


Figure 5-10. Coordinate pair indices for young of year American shad in the Hudson River estuary, late August-early October.

CHAPTER 6
GROWTH

Most fish species have the capacity for sustained growth over their entire life cycle (Lagler et al. 1962). Fish from temperate waters typically exhibit seasonal patterns in growth as rates reach their maximum values when temperatures are at or near optimal and decline when temperatures are above or below this value. The greatest percentage of total growth usually occurs during the first year of life and diminishes with increasing age (Crowder et al. 1987; Miller et al. 1988). Within this first year, most temperate species, such as those in the Hudson River estuary, exhibit exponential growth rates beginning in the larval stages and extending through mid-summer. Thereafter, growth slows as temperatures decline in the fall, with little growth occurring during winter.

Growth in fish is an extremely labile process which can be affected by a variety of abiotic and biotic factors. Some of these, such as water temperature and salinity, are density-independent, while others, such as competition and crowding stress, are density-dependent. Consequently, an analysis of growth, particularly during the earlier ages, can provide important insights into the effects various environmental parameters could have on survival and subsequent recruitment to the adult stock.

The purpose of this chapter is to describe the patterns in growth for larval and young of year striped bass, white perch, American shad, alewife, and blueback herring in the Hudson River estuary during 1990. Based on these data, growth rates for specific length ranges were estimated and compared to similar estimates available for previous years. Length-frequency distributions for each of these selected taxa in 1990 are presented in Appendix E.

6.1 STRIPED BASS

The median length of larval and young-of-year striped bass increased from 2.8 mm in late April/early May to 90 mm in mid-October 1990 (Figure 6-1). The small median length is based on only two measured individuals. Median length for the end of the growing season was in the typical range of 77-90 mm. The smallest individual reported was 1.2 mm while the largest was 124 mm. The 25th and 75th percentiles for the young of year lengths were generally within 10-12 mm of the median value in each week. This general uniformity in length at any point in time suggests that growth rates among individuals within the 1990 year class are relatively constant.

The seasonal pattern of growth for larval and young-of-year striped bass during 1990 was typical of that for previous years. Median lengths appeared to increase exponentially through late July when growth rates reached their peak. This period of maximum growth occurred just prior to the period of highest water temperatures (Section 3.3). Optimal temperature for growth of larval striped bass has been reported as 15-22°C (Davies 1973) and 18-24°C (Rogers et al. 1977). The water temperature at which maximum growth occurs

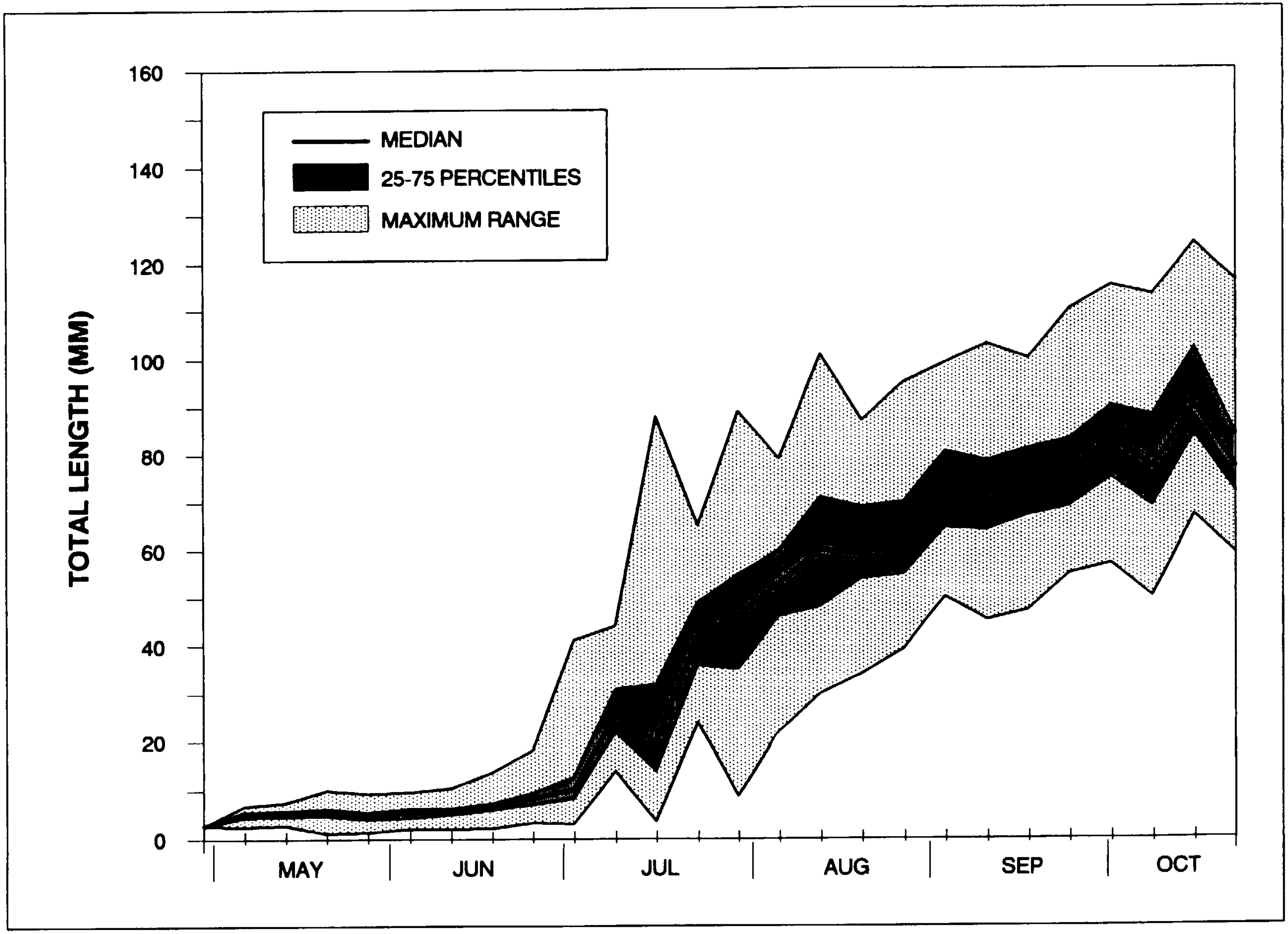


Figure 6-1. Weekly length statistics for striped bass larvae and young of year in the Hudson River estuary, 1990.

for young of year striped bass has been reported to be 29.6° C (EA 1978) which is higher than temperatures reported for 1990.

Beginning in early August, the rate of increase in median lengths slowed, suggesting a declining of the individual growth rates; however, the potential influence of size-related emigration or gear avoidance on length and resulting growth rate estimates cannot be totally discounted. By early to mid-October, growth appears to have ceased as water temperatures generally declined to 18-19°C. Mean lengths during October ranged from 79 to 93 mm, values which were within the range reported for previous years (TI 1981; MMES 1986; Versar 1987; LMS 1989; EA 1990).

A logistic model was fit to the weekly mean lengths calculated for larval and young of year striped bass collected in all surveys to estimate size-specific growth rates in 1990 (Figure 6-2). Based on the resulting equation ($K = 83.370$; $A = 5.1854$; $R = 0.0505$), the young of year striped bass population was estimated to have reached mean lengths of 30 and 60 mm (TL) on 19 July and 18 August, respectively (Table 6-1). Mean hatch date (6 June) was set to the midpoint of the week of peak egg abundance which was also the peak for yolk-sac larval abundance. Based on these end points, larval growth (4-30 mm) was estimated to be 0.6 mm/day while young of year growth (30-60 mm) was estimated to be 1.0 mm/day. The larval and young of year growth rates estimated using the logistic model were within ranges previously reported.

Beginning in late August and continuing through the second to last sampling period in late October, weekly mean lengths alternated from higher to lower with mean lengths from the FJS weeks being consistently higher than those measured in the BSS weeks, which is consistent with patterns observed in previous years for striped bass (LMS 1989; EA 1991). This pattern supports with the hypothesis that the larger individuals move off shore earlier, a process possibly related to emigration from the study area.

Using only the BSS data, a log-linear model was fit to the 1990 weekly estimated mean lengths when mean lengths were between 30 and 60 mm to estimate size-specific growth rates in a manner consistent with previous years (Figure 6-2). Based on the resulting equation ($\ln Y = 2.351 + 0.0162[t]$), the young of year population was estimated to have reached 30 and 60 mm (TL) on 6 July and 18 August, respectively. Based on these two points and the assumed mean hatch date (time of peak egg abundance--6 June), larval growth rate was estimated to be 0.9 mm/day while young of year growth rate was estimated to be 0.6 mm/day (Table 6-1). The larval growth rate estimated using the log-linear model was within the range reported for previous years but the larval rate was the second highest rate recorded.

Prior to peak abundance during the week of June 6 there was an earlier but much smaller peak in egg abundance during the week of 7 May. The 0.9 mm larval growth rate and 0.6 mm young of year rate likely reflect the mix of individuals from both egg abundance peaks. Using the midpoint between these peaks (23 May) as mean hatch date, the larval growth rate was estimated as 0.6 mm/day.

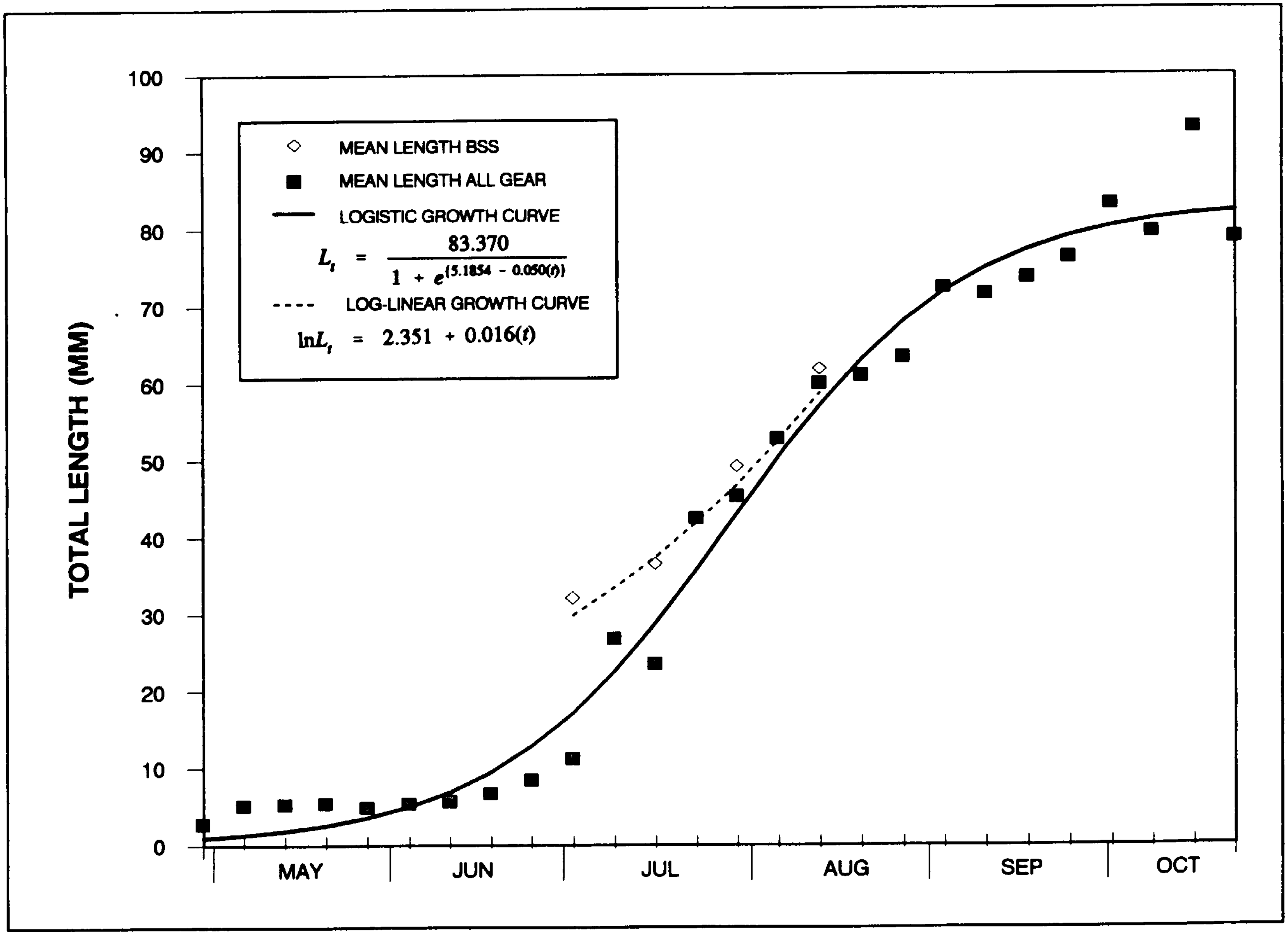


Figure 6-2. Weekly mean lengths and estimated logistic and log-linear growth curves for larval and young of year striped bass in the Hudson River estuary, 1990.

TABLE 6-1 ESTIMATES OF LARVAL AND EARLY YOUNG-OF-YEAR (4-30 mm TL) AND YOUNG-OF-YEAR (30-60 mm TL) GROWTH RATES OF STRIPED BASS COLLECTED FROM THE HUDSON RIVER ESTUARY SINCE 1973[a]

Year	Larvae and Early Young of Year		Young of Year	
	Time Period	Rate (mm/day)	Time Period	Rate (mm/day)
1973	16 MAY - 09 JUL	0.5	09 JUL - 05 AUG	1.1
1974	16 MAY - 06 JUL	0.5	16 JUL - 09 AUG	0.9
1975	21 MAY - 28 JUN	0.7	28 JUN - 30 JUL	0.9
1976	08 JUN - 10 JUL	0.8	10 JUL - 12 AUG	0.9
1977	18 MAY - 06 JUL	0.5	06 JUL - 05 AUG	1.0
1978	24 MAY - 03 JUL	0.7	03 JUL - 02 AUG	1.0
1979	09 MAY - 27 JUN	0.5	27 JUN - 01 AUG	0.9
1982[b]	04 JUN - 26 JUL	0.5	26 JUL - 10 AUG	2.0
1983[b]	02 JUN - 28 JUL	0.5	28 JUL - 17 AUG	1.5
1984	07 JUN - 12 JUL	0.7	12 JUL - 17 AUG	0.8
1984[c]	07 JUN - 21 JUL	0.6	21 JUL - 18 AUG	1.1
1985	08 MAY - 06 JUL	0.4	06 JUL - 25 JUL	1.6
1985[c]	08 MAY - 08 JUL	0.4	08 JUL - 05 AUG	1.1
1986	28 MAY - 05 JUL	0.5	05 JUL - 21 JUL	1.8
1986[c]	28 MAY - 08 JUL	0.5	08 JUL - 31 JUL	1.3
1987	13 MAY - 30 JUN	0.5	30 JUN - 08 AUG	0.8
1987[c]	13 MAY - 09 JUL	0.5	09 JUL - 09 AUG	1.0
1988	08 JUN - 24 JUN	1.6	24 JUN - 09 AUG	0.7
1988[c]	08 JUN - 13 JUL	0.7	13 JUL - 09 AUG	1.1
1989	24 MAY - 02 JUL	0.7	02 JUL - 14 AUG	0.7
1989[c]	24 MAY - 20 JUL	0.5	20 JUL - 17 AUG	1.1
1990	06 JUN - 06 JUL	0.9	06 JUL - 18 AUG	0.6
1990[c]	06 JUN - 19 JUL	0.6	19 JUL - 18 AUG	1.0

a. Growth rates were not available from 1980 or 1981.
b. Methods used were different from those described in Section 2.6.5 (NAI 1985a,b).
c. Growth rates using the logistic growth model.

6.2 WHITE PERCH

The median length of larval and young of year white perch increased from 3.9 mm (higher than the typical hatching length for white perch; prolarvae average 2.6 mm TL at hatching, with a range of 1.7-3.0 mm [Mansueti 1967]) in late April/early May to 76 mm in late October 1990 (Figure 6-3). The smallest individual reported was 1.9 mm while the largest was 96 mm. The 25th and 75th percentiles for the young of year lengths were generally within 10 mm of the median value in each week.

The seasonal pattern of growth for larval and young of year white perch during 1990 was typical of previous years. As with striped bass, median lengths appeared to increase exponentially through late July when growth rates were at their peak. This period of maximum growth occurred just prior to the period of highest water temperatures (Section 3.3). The water temperatures at which maximum growth occurs for young of year white perch has been reported to be 29.7°C (EA 1978) which was greater than temperatures reported in 1990.

By early October, growth appears to be slowing as water temperatures decline to 18-19°C. Mean lengths during October ranged from 73 to 80 mm, values which were within the range reported for previous years (TI 1981; MMES 1986; Versar 1987; LMS 1989; EA 1990).

A logistic model was fit to the weekly mean lengths calculated for larval and young of year white perch collected in all surveys to estimate size-specific growth rates in 1990 (Figure 6-4). Based on the resulting equation ($K = 77.3052$; $A = 5.9898$; $R = 0.055$), the young of year white perch population was estimated to have reached mean lengths of 25 and 60 mm (TL) on 23 July and 28 August, respectively (Table 6-2). Mean hatch date (9 May) was assumed to be the midpoint of the week of peak yolk-sac larval abundance. Based on these end points, larval growth rate (3-25 mm) was estimated to be 0.3 mm/day, while young of year growth rate (25-60 mm) was estimated to be 1.0 mm/day. Both the larval and the young of year growth rates estimated using the logistic model were within the range previously reported (EA 1990). Differences in mean length during the early fall between the BSS and the FJS, observed for striped bass, were not evident for white perch.

Using only the BSS data, a log-linear model was fit to the weekly estimated mean lengths when mean lengths were between 25 and 60 mm to estimate size-specific growth rates during 1990 in a manner consistent with previous years (Figure 6-4). Based on the resulting equation ($\ln Y = 2.0982 + 0.0168[t]$), the young of year population was estimated to have reached 25 and 60 mm (TL) on 6 July and 26 August, respectively. Based on these two points and the assumed mean hatch date (9 May), the larval growth rate was estimated to be 0.4 mm/day, while the young of year growth rate was estimated to be 0.7 mm/day (Table 6-2); the same as observed in 1989 (EA 1991). As with the logistic model, the estimated larval and young of year growth rates were within the reported ranges for previous years (EA 1990).

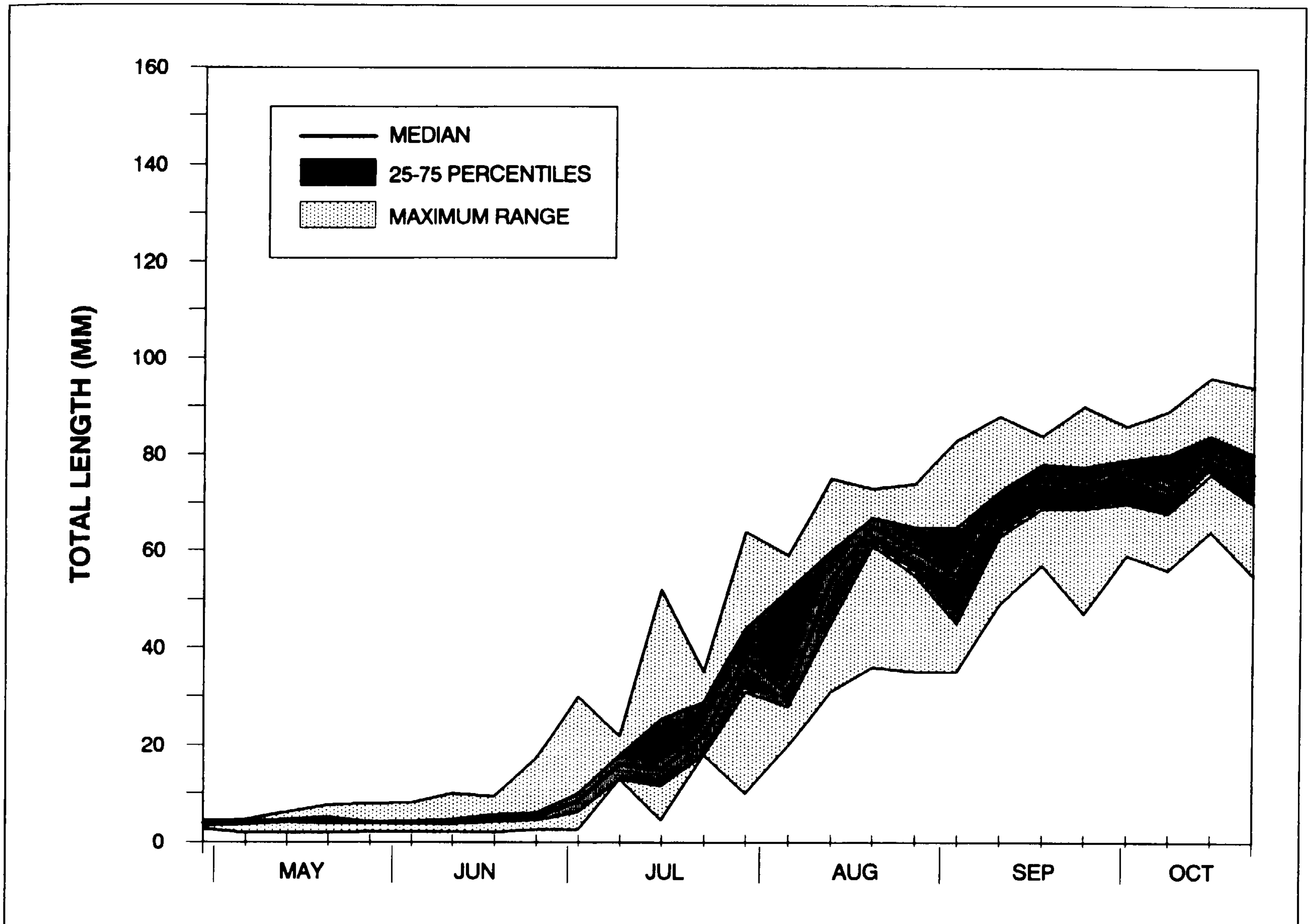


Figure 6-3. Weekly length statistics for white perch larvae and young of year in the Hudson River estuary, 1990.

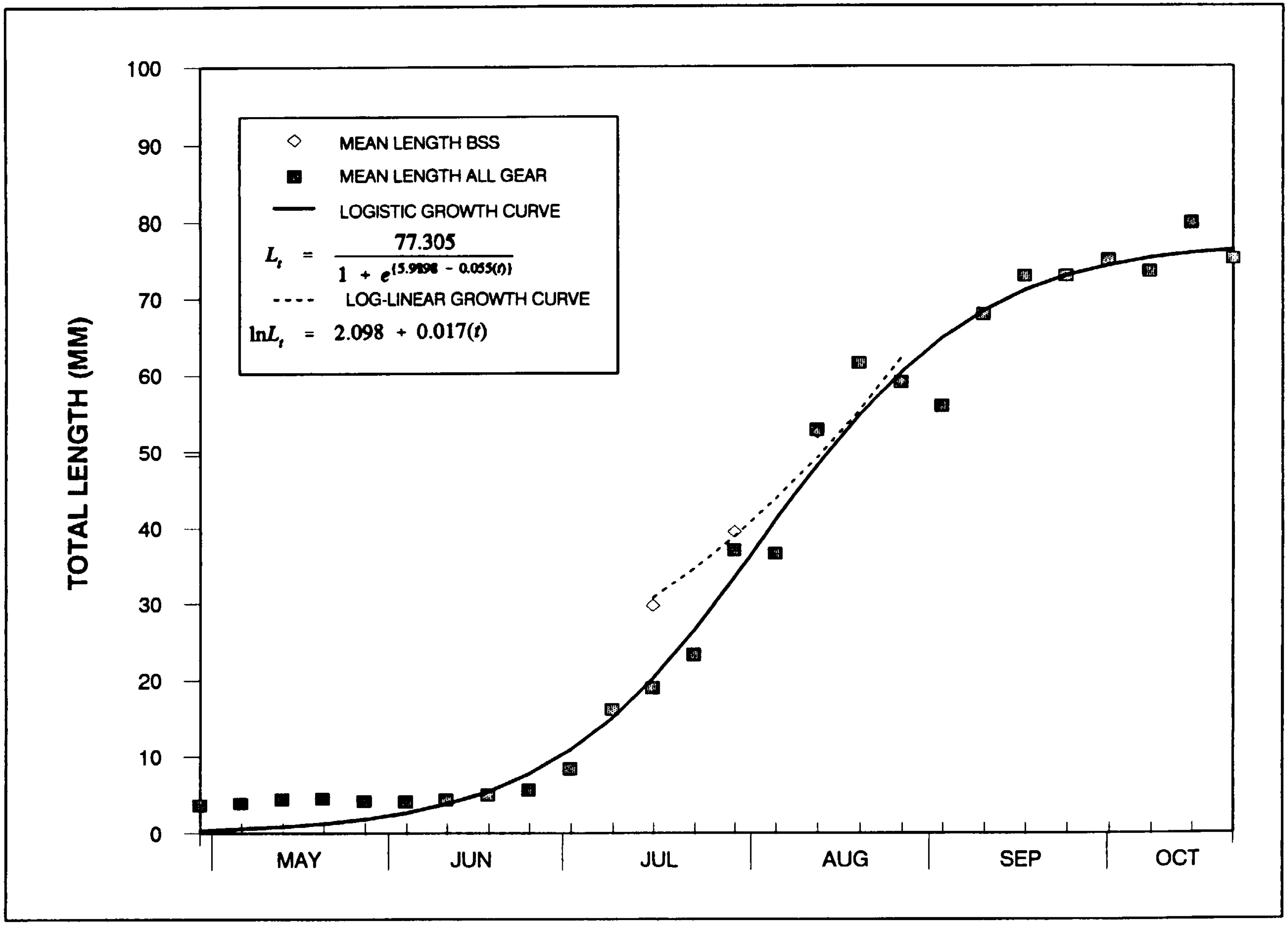


Figure 6-4. Weekly mean lengths and estimated logistic and log-linear growth curves for larval and young of year white perch in the Hudson River estuary, 1990.

TABLE 6-2 ESTIMATES OF LARVAL AND EARLY YOUNG-OF-YEAR (3-25 mm TL) AND YOUNG-OF-YEAR (25-60 mm TL) GROWTH RATES OF WHITE PERCH COLLECTED FROM THE HUDSON RIVER ESTUARY SINCE 1973[a]

	Larvae and Early Young of Year		Young of Year	
Year	Time Period	Rate (mm/day)	Time Period	Rate (mm/day)
1973	13 JUN - 10 JUL	0.8	10 JUL - 24 AUG	0.8
1974	22 MAY - 10 JUL	0.5	10 JUL - 27 AUG	0.7
1975	24 MAY - 26 JUN	0.7	26 JUN - 17 AUG	0.7
1976	12 JUN - 08 JUL	0.8	08 JUL - 02 SEP	0.6
1977	24 MAY - 01 JUL	0.6	01 JUL - 23 AUG	0.7
1978	31 MAY - 28 JUN	0.8	28 JUN - 22 AUG	0.6
1979	16 MAY - 28 JUN	0.5	28 JUN - 30 AUG	0.6
1982[b]	19 MAY - 25 JUL	0.3	25 JUL - 08 SEP	0.8
1983[b]	25 MAY - 27 JUL	0.4	27 JUL - 01 SEP	1.0
1984	14 JUN - 05 JUL	1.0	05 JUL - 06 SEP	0.6
1984[c]	14 JUN - 25 JUL	1.0	25 JUL - 08 SEP	0.8
1985	08 MAY - 18 JUN	0.5	18 JUN - 20 AUG	0.6
1985[c]	08 MAY - 14 JUL	0.4	14 JUL - 19 AUG	1.0
1986	08 MAY - 01 JUN	0.9	01 JUN - 18 AUG	0.4
1986[c]	08 MAY - 10 JUL	0.4	10 JUL - 18 AUG	0.9
1987	14 MAY - 23 JUL	0.3	23 JUL - 18 SEP	0.6
1987[c]	14 MAY - 09 JUL	0.3	09 JUL - 13 AUG	1.0
1988	18 MAY - 01 JUL	0.7	01 JUL - 17 AUG	0.8
1988[c]	18 MAY - 15 JUL	0.4	15 JUL - 19 AUG	1.0
1989	24 MAY - 12 JUL	0.4	12 JUL - 31 AUG	0.7
1989[c]	24 MAY - 26 JUL	0.3	26 JUL - 09 SEP	0.8
1990	9 MAY - 06 JUL	0.4	06 JUL - 26 AUG	0.7
1990[c]	9 MAY - 23 JUL	0.3	23 JUL - 28 AUG	1.0

a. Growth rates were not available from 1980 or 1981.
b. Methods used were different from those described in Section 2.6.5 (NAI 1985a,b).
c. Growth rates using the logistic growth model.

6.3 AMERICAN SHAD

The median length of larval and young of year American shad increased from 10.4 mm in late April/early May to 92 mm in early October 1990 (Figure 6-5). The smallest individual reported was 5 mm; the largest was 116 mm. The 25th and 75th percentiles for the young of year lengths were generally within 10 mm of the median value in each week. As with the previous two species, this general uniformity in length at any point in time suggests growth rates among individuals within the 1990 year class were relatively constant.

The seasonal pattern of growth for larval and young of year American shad during 1990 was typical of previous years. Median lengths appeared to increase exponentially through mid-July when growth rates were at their peak. This period of maximum growth occurred several weeks prior to the period of highest water temperatures (Section 3.3).

Beginning in late August, the rate of increase in median lengths slowed, suggesting a lowering of the individual growth rates; however, the potential influence of size-related emigration or gear avoidance on length and resulting growth rate estimates cannot be totally discounted. Growth appears to start ceasing in late October as water temperatures decline to 17-18°C. Mean lengths during October ranged from 82 to 92 mm, values which were within the range reported for previous years, although slightly less than for 1988 (MMES 1986; Versar 1987; LMS 1989; EA 1990).

A logistic model was fit to the weekly mean lengths calculated for larval and young of year American shad collected in all surveys to estimate size-specific growth rates in 1990 (Figure 6-6). Based on the resulting equation (K = 86.7166; A = 3.5562; R = 0.0040), the young of year American shad population was estimated to have reached mean lengths of 30 and 60 mm (TL) on 1 July and 6 August, respectively (Table 6-3). Mean hatch date (23 May) was set to the midpoint of the week of peak yolk-sac larval abundance. Based on these end points, larval growth (8-30 mm) was estimated to be 0.6 mm/day; young of year growth (30-60 mm) was estimated to be 0.7 mm/day. Both the larval and the young of year growth rates estimated using the logistic model were within the range previously reported.

The patterns in mean lengths for late June and early July suggest that these estimated values underrepresent true population lengths (Figure 6-6). During this period, mean lengths remained lower than expected assuming an exponential growth pattern. This pattern could be the result of avoidance of the LRS sampling gear by the larger individuals coupled with a tendency of the larger individuals to move inshore into areas which are not sampled by the LRS and an extended spawning period. Yolk-sac larvae were abundant from 7 May through 11 June. Beginning in September and becoming even more evident through October, weekly mean lengths alternated higher and lower with mean lengths from the FJS being consistently higher than those measured in the BSS which is consistent with observations in previous years. This pattern is similar to that observed for striped bass and is consistent with the hypothesis that the larger individuals move off shore earlier; a process possibly related to emigration from the study area.

Using only the BSS data, a log-linear model was fit to the weekly estimated mean lengths when mean lengths were between 30 and 60 mm to estimate size-specific growth rates

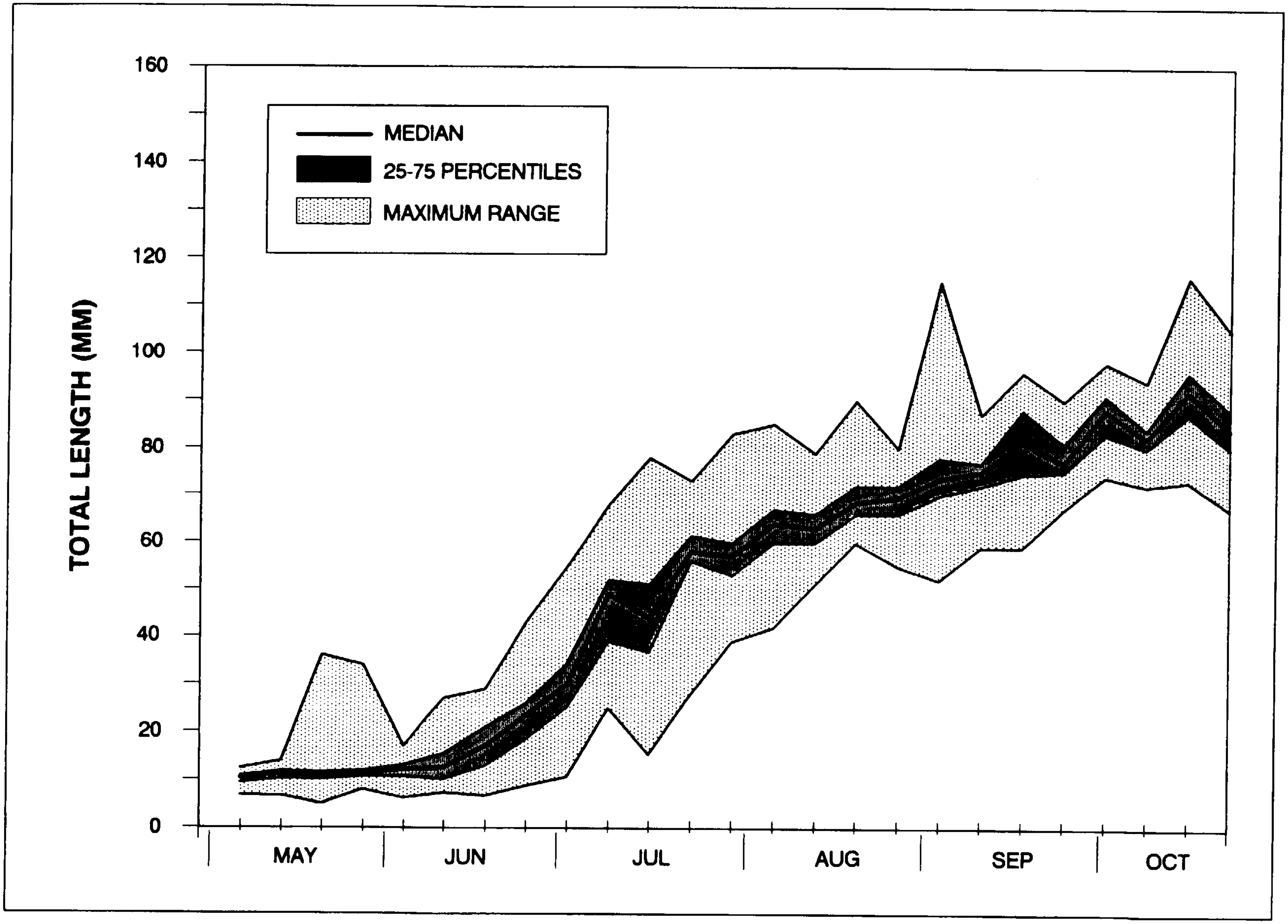


Figure 6-5. Weekly length statistics for American shad larvae and young of year in the Hudson River estuary, 1990.

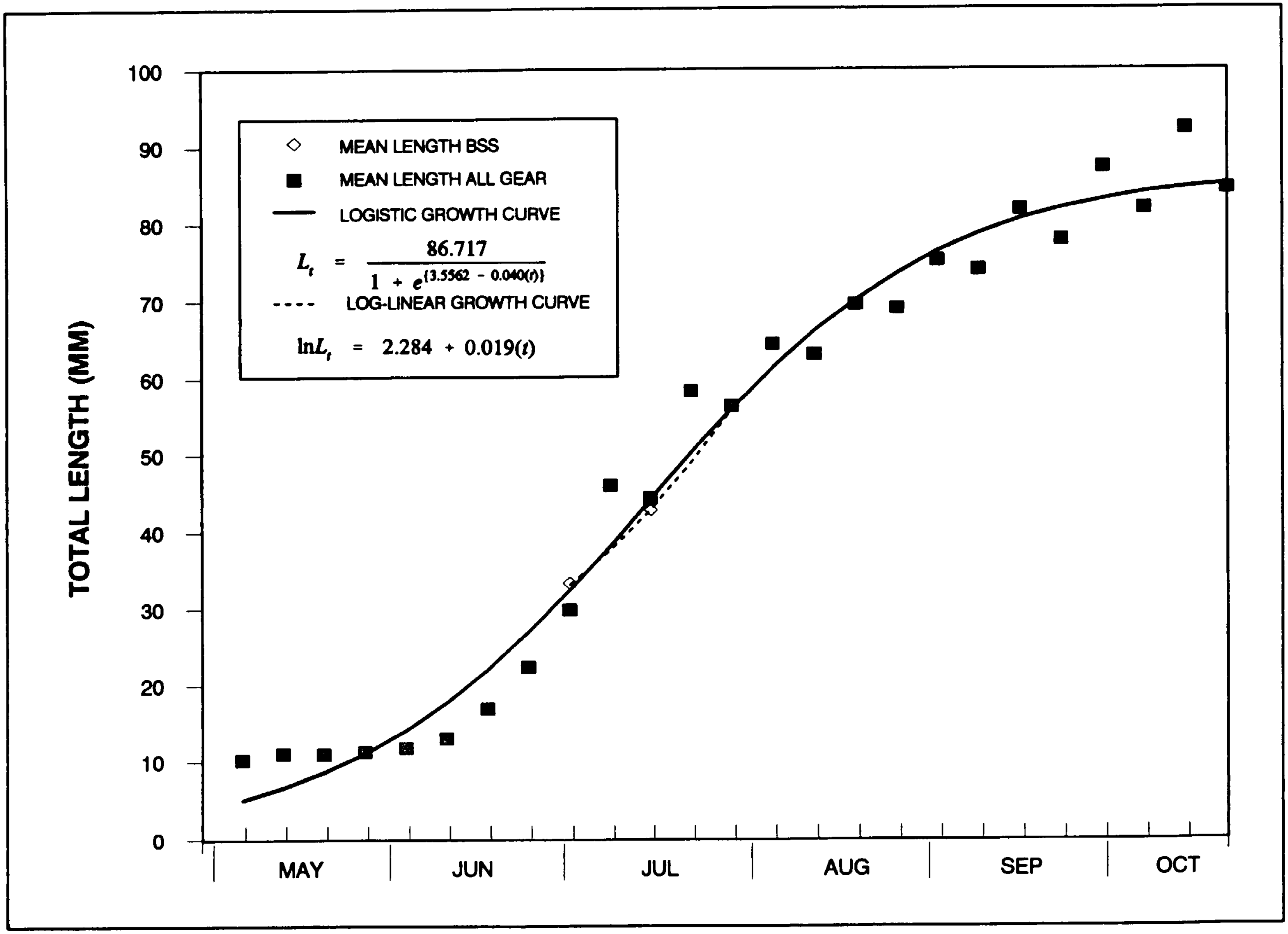


Figure 6-6. Weekly mean lengths and estimated logistic and log-linear growth curves for larval and young of year American shad in the Hudson River estuary, 1990.

TABLE 6-3 ESTIMATES OF LARVAL AND EARLY YOUNG-OF-YEAR (8-30 mm TL) AND YOUNG-OF-YEAR (30-60 mm TL) GROWTH RATES OF AMERICAN SHAD COLLECTED FROM THE HUDSON RIVER ESTUARY SINCE 1984

	Larvae and Early Young of Year		Young of Year	
Year	Time Period	Rate (mm/day)	Time Period	Rate (mm/day)
1984[a]	09 MAY - 01 JUL	0.4	01 JUL - 30 JUL	1.0
1984[b]	09 MAY - 01 JUL	0.5	01 JUL - 01 AUG	1.0
1985[a]	08 MAY - 12 JUL	0.3	12 JUL - 27 AUG	0.7
1985[b]	08 MAY - 17 JUN	0.5	17 JUN - 24 JUL	0.8
1986[a]	07 MAY - 20 JUN	0.4	20 JUN - 20 JUL	1.0
1986[b]	07 MAY - 20 JUN	0.5	20 JUN - 28 JUL	0.8
1987[a]	06 MAY - 09 JUL	0.3	09 JUL - 24 AUG	0.7
1987[b]	05 MAY - 20 JUL	0.5	20 JUL - 24 AUG	0.8
1988[a]	18 MAY - 21 JUN	0.7	21 JUN - 26 JUL	0.9
1988[b]	18 MAY - 22 JUN	0.6	22 JUN - 28 JUL	0.8
1989[a]	17 MAY - 23 JUN	0.6	23 JUN - 01 AUG	0.8
1989[b]	17 MAY - 29 JUN	0.5	29 JUN - 05 AUG	0.8
1990[a]	23 MAY - 29 JUN	0.6	29 JUN - 04 AUG	0.8
1990[b]	23 MAY - 01 JUL	0.6	01 JUL - 06 AUG	0.7

a. Growth rates using log-linear model.
b. Growth rates using the logistic model.

during 1990 in a manner consistent with previous years (Figure 6-6). Based on the resulting equation ($\ln Y = 2.2845 + 0.0187[t]$), the young of year population was estimated to have reached 30 and 60 mm (TL) on 29 June and 4 August, respectively. Based on these two points and the assumed mean hatch date (23 May), larval growth rate was estimated to be 0.6 mm/day; young of year growth rate was estimated to be 0.8 mm/day (Table 6-3). As with the logistic growth curve, both the larval and young of year growth rates estimated using the log-linear model were within the range reported for previous years.

6.4 ALEWIFE

Alewife and blueback herring are not uniquely identifiable until they are approximately 40 mm in length (Section 4.6). Consequently, length measurements for alewife were restricted to young of year collected after June 1990. When first collected, the median length of young of year alewife was 41 mm and increased to 97 mm in mid-October (Figure 6-7). Length measurements during the first half of July were undoubtedly overestimates of the true population mean length due to the inherent size selectivity of the sampling and identification process. The smallest alewife identified and measured was 36 mm while the largest was 113 mm. As with American shad, the 25th and 75th percentiles for young of year lengths were generally within 10 mm of the median value for each week, suggesting a consistency in individual growth rates.

The seasonal pattern of young of year growth suggested by these median length values indicate that by the time alewife were uniquely identifiable, growth rates were beginning to decline from their summer peak. As with American shad, it appears that peak growth rates occurred several weeks prior to the highest water temperatures. The water temperature at which maximum growth occurs has been reported to be 26.4°C (EA 1978) which is warmer than the maximum temperatures reported for 1990 (Section 3.3).

The rate of increase in median length slowed into the fall, suggesting individual growth rates were slowing down. However, as with the other anadromous species, the potential influence of size-related emigration or gear avoidance on lengths and resulting growth rate estimates cannot be totally discounted. During October, mean length estimates for young of year alewife ranged from 77 to 97 mm. These values are similar to those of American shad, a species which spawns at the same time (Schmidt et al. 1988), suggesting that first year growth rates for these two congeneric species are similar.

6.5 BLUEBACK HERRING

As previously noted, blueback herring and alewife are not uniquely identifiable until they are approximately 40 mm in length (Section 4.6). Consequently, length measurements for blueback herring were restricted to young of year collected after early July 1990. When first collected, the median length of young of year blueback herring was 45 mm (based on a single individual) and increased to 69 mm in mid-October (Figure 6-8). Length measurements prior to the beginning of August were undoubtedly overestimates of the true population mean length due to the inherent size selectivity of the sampling and identification process. The smallest blueback herring identified and measured was 27 mm; the largest was 91 mm. The 25th and 75th percentiles for young of year lengths were

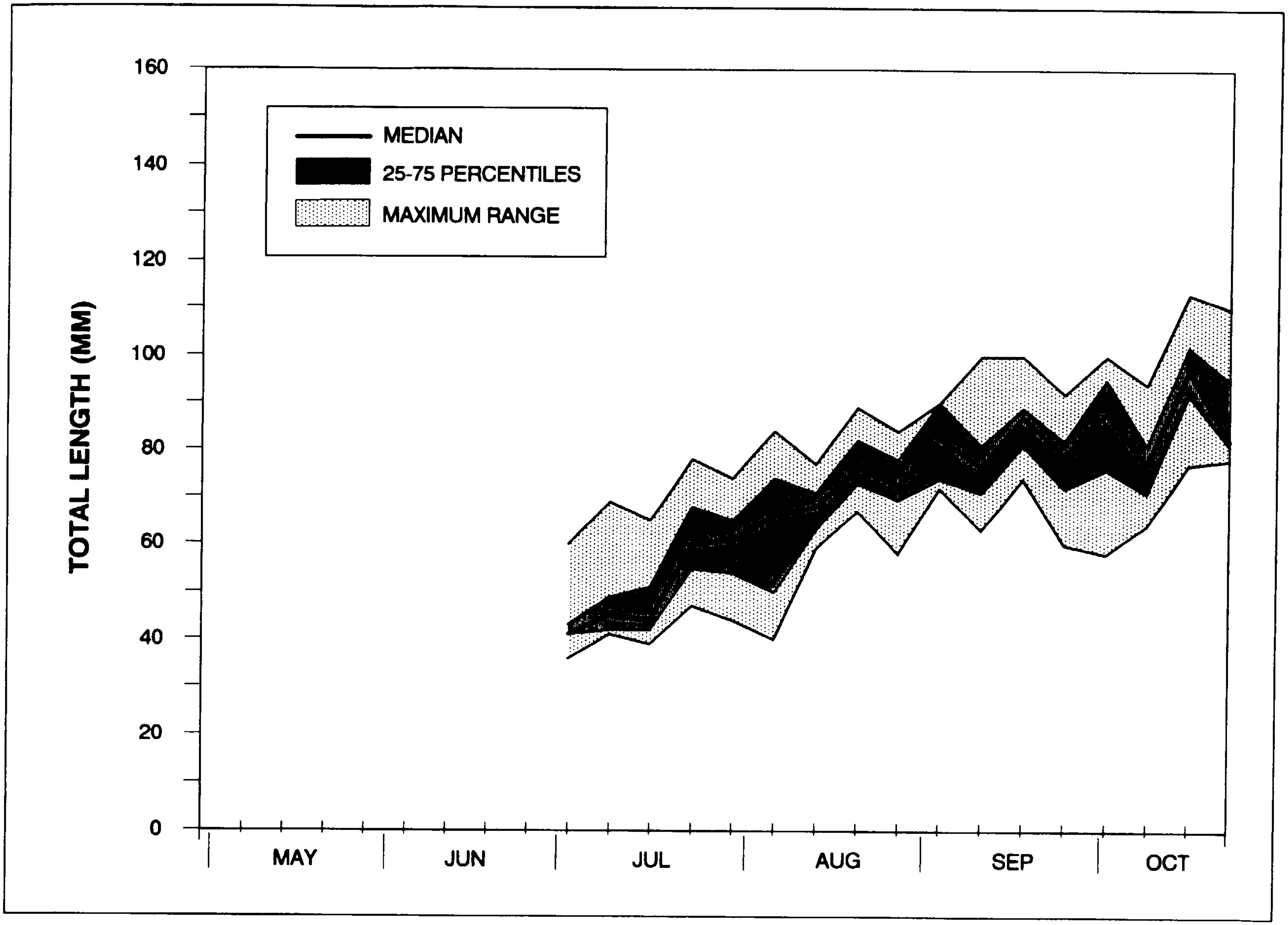


Figure 6-7. Weekly length statistics for alewife young of year in the Hudson River estuary, 1990.

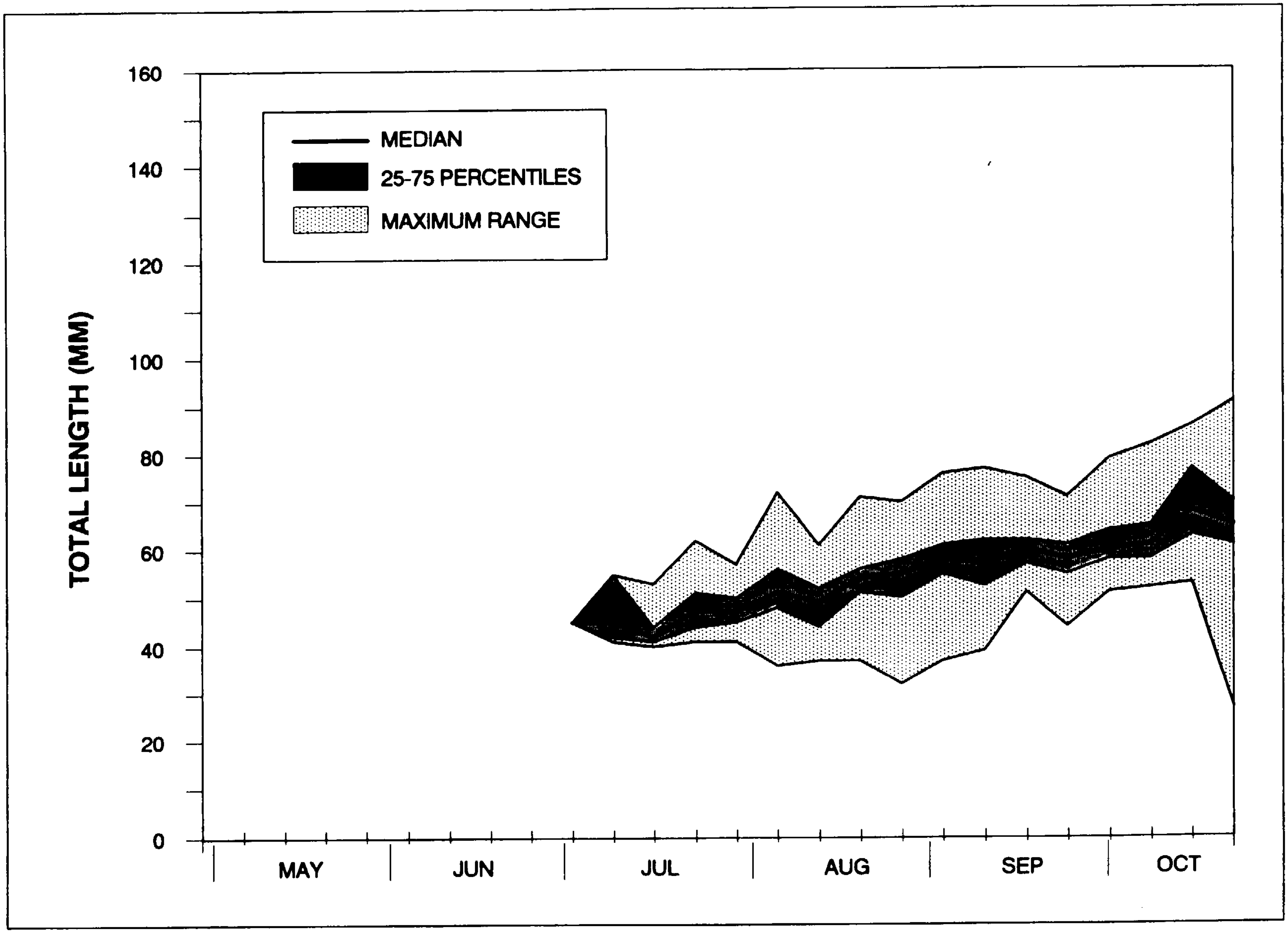


Figure 6-8. Weekly length statistics for blueback herring young of year in the Hudson River estuary, 1990.

generally within 5 mm of the median value for each week, suggesting a consistency in individual growth rates.

The seasonal pattern of young of year growth suggested by these median length values indicates that by the time blueback herring were uniquely identifiable, growth rates had declined from their summer peak. As with the other two *Alosa* species, it appears that peak growth rates occurred several weeks prior to the highest water temperatures. The rate of increase in median length was very low and with little change through the sampling period. During October, mean length estimates for young of year blueback herring ranged from 62 to 70 mm. These values are less than for either of the other two *Alosa* species, American shad and alewife. These other two species both spawn earlier than blueback herring in the Hudson River estuary (Schmidt et al. 1988). Consequently, the differences between the total first year growth rates of blueback herring and the other two congeneric species may simply reflect differences in spawning times and not differences in age-specific growth rates.

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APPENDIX A

QUALITY ASSURANCE PROGRAM
AND DATA QUALITY CONTROL REVIEW

APPENDIX A.1

CONTINUOUS SAMPLING PLAN (CSP-1)
QUALITY ASSURANCE/QUALITY CONTROL PROGRAM
FOR THE 1990 HUDSON RIVER
ICHTHYOPLANKTON LABORATORY PROGRAM

FINAL

QUALITY ASSURANCE REPORT FOR THE 1990 HUDSON RIVER ICHTHYOPLANKTON LABORATORY PROGRAM AND 1990 FALL JUVENILE SURVEY

Prepared for

Consolidated Edison Company of New York, Inc.
New York, New York

Prepared by

EA Engineering, Science, and Technology
Northeast Regional Operations

EA Report Nos. 11592.01 and 11507.01
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Prepared for

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QUALITY ASSURANCE PROGRAM REPORT FOR THE 1990 HUDSON RIVER ICHTHYOPLANKTON LABORATORY PROGRAM AND 1990 FALL JUVENILE SURVEY

1. INTRODUCTION

In recognition of Consolidation Edison Company of New York, Inc.'s (Con Edison) requirements for valid and reliable data on the 1990 Hudson River Ichthyoplankton Laboratory Program and the 1990 Fall Juvenile Survey, EA implemented a Quality Assurance Plan that provides a 10 percent Average Outgoing Quality Limit (AOQL) for all measurement parameters collected. The Quality Assurance Plan consists of two systems: a quality control (QC) system and a quality assurance (QA) system. The QC system is managed by the program manager and conducted by operational personnel. Its function is to continually monitor and document the reliability and validity (accuracy, precision, and completeness) of daily operations. The specific features of the QC system are determined by the Northeast Regional QA Officer to ensure that all procedures conform to Con Edison's data requirements. The QA system is managed by the QA Officer and utilizes project independent personnel familiar with the work or activities under evaluation to conduct performance and system audits. These audits are designed to provide objective evidence that the QC program and technical requirements, methods, and procedures as outlined in the program standard operating procedures are being implemented. The outcome of the QA system activities are:

- Verification of the effectiveness of the QC system.
- Assignment of corrective actions to resolve nonconforming procedures or data deficiencies.
- Communication of audit results to project and staff managers for followup.
- Objective validation or improvement of project operations.

This report provides a compilation of QC system data verifying the results of the 1990 Hudson River Ichthyoplankton Laboratory Program and the 1990 Fall Juvenile Survey activities. Determinations of the fraction inspected, process average (percent nonconforming), average outgoing quality of laboratory measurements, and a summary of organisms (by species and life stage) found during sorting QC are documented for the 1990 Hudson River Ichthyoplankton Program. For the 1990 Fall Juvenile Survey, consisting of the Fall Shoals Survey and the Beach Seine Survey, the average fraction inspected and average outgoing quality of laboratory young-of-year identifications and length measurements are documented. Young-of-year fishes were identified in the laboratory for the first three fall shoals river runs and the first four beach seine river runs. Young-of-year fishes were identified in the field starting with fall shoals River Run 4 and beach seine survey River Run 5. All length measurements of young-of-year fishes occurred in the laboratory.

2. QUALITY CONTROL/QUALITY ASSURANCE METHODS

2.1 Laboratory Quality Control Program

For sorting and identification of biological samples from the 1990 Hudson River Ichthyoplankton Laboratory Program, EA used a continuous sampling plan designed to achieve a 10 percent or better AOQL (U.S. DOD 1981). A flow diagram of how the sampling plan was applied is presented in Figure 1. A summary of the sampling plan, tolerances, and sample definitions utilized for each measurement parameter is presented in Table 1. QC inspection was applied on a laboratory-wide basis for the sorting task and to each individual processor for the identification task. QC samples were selected in a random manner utilizing random number tables. As determined from the sampling plan outlined in Table 1, a given number of samples selected for QC were reprocessed by QC inspectors with expertise in the task being inspected. In cases where a sample was subdivided and counted, counts for all subdivisions were combined before calculating percent error for that sample. If the difference between the QC value and the original value exceeded acceptable tolerances (Table 1), a third measurement was obtained to verify one of the measurements. If a sample was found to have exceeded acceptable tolerances, all subsequent samples processed by the laboratory for sort or that technician for identification were subjected to 100 percent QC until an appropriate number of consecutive samples (i) were found within tolerance as determined by the continuous sampling plan (Table 1 and Figure 2).

The QC of the sorting process was conducted under the direct supervision of the Sorting Supervisor. The majority of the sorting QC was provided by the Sorting Supervisor. Only individuals with a documented sorting QC record of superior performance provided the additional sort QC. Regarding identification QC, only the Identification Supervisor and Laboratory QC Supervisor (each of whom have over 12 years of identification experience) performed the QC on ichthyoplankton identification.

For the 1990 Fall Juvenile Survey, a continuous sampling plan was used to provide a 10 percent or better AOQL (U.S. DOD 1981) for the tasks of identifying and measuring young-of-year fishes in the laboratory (Figure 2). A summary of the sampling plan, tolerances, and sample definitions is presented in Table 2. QC inspection was applied to each individual processor for the identification and length measurement tasks. Samples for QC analysis were randomly selected using a random number generator. Based on the parameters in Table 2, a given number of QC samples were reprocessed by QC inspectors. If the difference between the QC value and the original value exceeded the acceptable tolerances, a third measurement was obtained to verify one of the measurements. All QC data were recorded in a log. The QC procedures used for the field identification of young-of-year fishes during fall shoals River Runs 3 through 8 and beach seine River Runs 5 through 11 were identical to those used in the laboratory.

2.2 Quality Control Reporting Methods

For each weekly sampling event (river run), the Laboratory Supervisor/Project Manager reviewed copies of the 1990 Hudson River Ichthyoplankton Laboratory Program Sort and Identification Quality Control Logs and the 1990 Fall Juvenile Survey Identification and Length Measurements Quality Control Log. From these data, fraction inspected, process average (percent nonconforming), and percent measurement error (precision) were determined for each river run and for the entire study.

2.2.1 Fraction Inspected

$$\text{Fraction Inspected} = \frac{\text{Number of Samples Inspected}}{\text{Total Number of Samples}} \times 100 \qquad \text{(Equation 1)}$$

River Run: Fraction inspected for a river run (Equation 1) was 100 times the number of samples inspected divided by the total number of samples analyzed for that river run.

Entire Study: Fraction inspected for the entire study was 100 times the number of samples inspected divided by the total number of samples analyzed during the study.

2.2.2 Process Average (Percent Nonconforming)

$$\text{Process Average (\% Nonconforming)} = \frac{\text{No. Nonconforming Samples Inspected}}{\text{No. of Samples Inspected}} \times 100 \qquad \text{(Equation 2)}$$

River Run: Process average for a river run (Equation 2) was 100 times the number of nonconforming QC samples found for that river run divided by the total number of QC samples analyzed for that river run.

Entire Study: Process average for the entire study was 100 times the total number of nonconforming QC samples for the study divided by the total number of QC samples analyzed for the study. The results of this analysis was a determination of the actual incoming quality level of each measurement parameter. (Note that because samples checked by QC found to be defective were rectified during QC, the average outgoing quality of the final data set differed from the percent nonconforming.)

2.2.3 Percent Measurement Error

2.2.3.1 Sorting Task

$$\text{Sorting Percent Measurement Error} = \frac{\text{QC Value}}{(\text{Original Value} + \text{QC Value})} \times 100 \qquad \text{(Equation 3A)}$$

Sample: Percent measurement error for a sorted sample (Equation 3A) was 100 times the QC value divided by the sum of the original value and the QC value.

River Run: Mean percent measurement error for sorted samples for a river run was the sum of the absolute values of the percent measurement error for each sample inspected during the river run divided by the total number of samples inspected for the river run.

Entire Study: Mean percent measurement error for sorted samples for the entire study was the sum of the absolute values of the percent measurement error for each sample inspected during the study divided by the total number of samples inspected for the study. (NOTE: This method of averaging gives equal weight to each sample, regardless of the number of organisms present.)

2.2.3.2 Identification Task

$$\text{Life Stage Percent Measurement Error} = \frac{(\text{Original Value - QC Value})}{\text{QC Value}} \times 100 \qquad \text{(Equation 3B)}$$

Life Stage: Percent measurement error for a life stage (Equation 3B) was 100 times the difference between the original value and the QC value divided by the QC value. For life stages where the QC value was 20 or less, if the original and QC values differed by less than or equal to two organisms, the percent measurement was considered zero. For life stages where the QC value was 20 or less and the original and QC values differed by greater than two organisms, the percent measurement error was calculated utilizing Equation 3B. In the latter case, if either the QC value or original value was zero, the percent measurement error was calculated by multiplying the difference between the original and QC values times 100. This results in percent measurement error values which are at times extremely large (e.g., several hundred percent for a life stage of a taxon in a sample) and not truly indicative of the actual proportion of specimens misidentified, mis-staged, or miscounted in a sample (see Section 2.2.5).

Taxon: Percent measurement error for an identified taxa was the sum of the absolute values of percent measurement error for each life stage within the taxon. Refer to Figure 3 for an example of taxon percent measurement error calculations.

River Run: Mean percent measurement error for identified taxa for a river run was the sum of the absolute values of the percent measurement error for each taxon inspected during the river run divided by the total number of taxa inspected for the river run. This statistic was computed by averaging taxa rather than identified samples because a QC sample for identification tasks was defined as one taxon even though complete samples were inspected and reworked when a taxon exceeded the 10 percent tolerance.

Entire Study: Mean percent measurement error for identified taxa for the entire study was the sum of the absolute values of the percent measurement error for each taxon inspected during the study divided by the total number of taxa inspected for the study.

2.2.4 Average Outgoing Quality

At the completion of this study, the QA Department calculated the Average Outgoing Quality (AOQ) for each measurement parameter inspected. A continuous sampling plan was used for laboratory tasks. Continuous sampling plans are devised for processes involving a continuous or nearly continuous flow of products or other entities. For these types of processes, it is extremely difficult to organize units into discrete groups commonly referred to as lots. As a result, inspection must be performed on individual units drawn from a continuous flow of products and a decision made concerning the quality of units produced based on the inspection results. Rectification is performed on any nonconforming unit found during inspection, followed by 100 percent screening of a number of subsequent units depending on the sampling plan. AOQ for each laboratory task was calculated as a function of the process average (percent nonconforming) and the fraction of total units inspected (Stephens 1979). This calculation applies to continuous sampling plans when nonconforming units found are rectified:

$$AOQ = \frac{p'(1-f)q^i}{f+(1-f)q^i} \times 100 \qquad \text{(Equation 4A)}$$

where

p' = Process average (percent nonconforming).
f = Fraction of units inspected. This is a parameter of the sampling plan.
q = $1-p'$ = process fraction conforming.
i = Clearing interval. This is a parameter of the sampling plan.

Example:

p' = 0.0689
f = 1/7 = 0.1429
q = 1-0.0689 = 0.9311
i = 8.

$$AOQ = \frac{0.0689\,(1-0.1429)(0.9311)^8}{0.1429 + (1-0.1429)(0.9311)^8} \times 100 = 5.32\%$$

2.2.5 Cumulative Error Rates

Due to the non-independence of identification errors across taxa and life stages, and to the cumulation of errors within taxa, a relatively high fraction of samples may fail QC inspection even though only a small fraction of organisms are incorrectly identified or counted. In order to present the actual error frequencies for particular taxa-life stages, two additional statistics were developed for the identification/counting process:

$$\text{Absolute Error Rate} = \Sigma \left| IC_i - QC_i \right| / \Sigma QC_i$$

$$\text{Net Error Rate} = \Sigma \left(IC_i - QC_i \right) / \Sigma QC_i$$

where

IC_i = initial count for taxon-life stage in sample i
QC_i = QC count for taxon-life stage in sample i.

The absolute error rate is the approximate fraction of the taxon-life stage that was originally identified or counted incorrectly. This is an estimate of the fraction of erroneous countable items in the uninspected samples.

Net error rate is the approximate relative error in the total counts for the taxon-life stage. For this index, positive (original count too high) and negative (original count too low) errors cancel each other so that the index reflects the relative net bias to the taxon-life stage abundance.

3. RESULTS

3.1 Hudson River Ichthyoplankton Laboratory Program

The AOQ for the sorting and identification tasks of the 1990 Hudson River Ichthyoplankton Laboratory Program was < 1.0 and 6.7 percent, respectively. This AOQ represents the actual or achieved quality for measurement parameters and exceeded the 10 percent AOQL requirement of Con Edison. The Average Fraction Inspected for sorting was 16.85 and 24.56 percent for identification (Table 3).

Sorting and identification tasks were also evaluated on a sampling-week basis representing River Runs (sampling weeks) 1 through 16. Sorted samples were inspected at a rate of 11.82-53.66 percent for individual river runs (Table 4). River run nonconformities among the inspected samples ranged from 0 to 11.11 percent, and was 1.18 percent overall (Table 5). Measurement error was between 0.07 and 4.49 percent and averaged 1.94 percent for the study (Table 6). For the task of sample identification, 13.45-53.52 percent of all samples were inspected from individual river runs (Table 7). The process average ranged among river runs from 0 to 73.33 percent (Table 8) and measurement error from 0 to 611.78 percent (Table 9). Process average (Table 8) and measurement error (Table 9) for the study were 32.44 and 118.52 percent, respectively.

Measurement error results are skewed towards high values as a result of the method of computation at the life stage level. In addition, measurement errors are summed over life stages within each taxon, which then amplifies the already skewed life stage values. These data are not indicative of actual measurement error and should only be compared to other measurement error results that are calculated using exactly the same methods.

Additional organisms found during the sort QC were identified independently to determine the frequency of species and life stages missed during the initial sort. Four taxa accounted for 94.8 percent of the additional organisms found during sort QC: striped bass, white perch, clupeids, and bay anchovy (Table 10). *Morone* spp. and weakfish accounted for an additional 1.5 and 1.2 percent, respectively. The dominant life stage for all species combined found during the sort QC was post yolk-sac larvae at 62 percent. Of the remaining life stages for all species combined, 16.9 percent were eggs, 20.6 percent were yolk-sac larvae, 0.6 percent could not be staged, and < 1 percent were young of year. The most abundant taxa/life stage combinations found in the sort QC were post yolk-sac larvae of white perch, striped bass, and *Morone* spp. (Table 11).

Absolute error rates of the identification process ranged from 0 to 0.3889, but most taxa-life stages had rates less than 0.1 (Table 12). If absolute error rates were near or above 0.1, generally a taxon had relatively high error rate for both yolk-sac and post yolk-sac larvae, suggesting misidentification of life stage by the initial identifier. This type of error was common for striped bass, white perch, American shad, and unidentified clupeids.

A second type of mistake contributing to the absolute error rates is misidentification of closely related taxa, for example, white perch and striped bass, American shad and clupeid. The switching from genus to species level identification was relatively common for clupeid to American shad.

Net error rates were generally substantially lower than absolute error rates, indicating cancellation of errors. With few exceptions, net error rates were less than $\pm$0.05. The only common taxon with net error rate above $\pm$0.05 was American shad. The net error rates of +0.1588 for yolk-sac larvae and +0.2670 for post yolk-sac larvae indicated that identifiers may have been too willing to identify clupeids to the species level. Striped bass and white perch had net error rates of $\pm$3 percent or less for both yolk-sac and post yolk-sac larvae. The negative net error for striped bass post yolk-sac larvae (-0.0175) suggests a slight tendency to misclassify them, probably as either yolk-sac larvae (+0.0212) or as white perch yolk-sac or post yolk-sac larvae (+0.0310 and +0.0150).

Although clupeid, American shad, striped bass, and naked goby young of the year all had relatively high net error rates (greater than $\pm$31 percent), the rates are based on a small sample size (25 or less for all except clupeid) since the juvenile life stage occurred infrequently in the samples.

3.2 Fall Juvenile Survey

Results of the laboratory QC program for the 1990 Fall Juvenile Survey were derived based upon calculations of average fraction inspection, process average (p'), and AOQ as presented for the 1990 Hudson River Ichthyoplankton Laboratory Program (Section 2.2). It should be noted that the CSP-V Plan (Table 2) criteria for the identification task required consideration of individual taxa as the defined QC sample unit. However, in the event that nonconforming taxa were encountered, the entire sample was reworked for subsequent QC inspection.

3.2.1 Identification Task

A total of 1,139 and 1,044 young-of-year (Division 1) taxa entries were recorded in the laboratory for the fall shoals and beach seine surveys, respectively. Based upon Equation 1 (Section 2.2.1), the fraction inspected for the entire study was calculated as follows:

$$\text{Fraction Inspected} = \frac{\text{No. Taxa Inspected (163)}}{\text{Total Taxa Entries (1,139+1,044)}} \times 100 = 7.46 \text{ percent (entire study)}$$

(NOTE: Process average was calculated from Equation 2 [Section 2.2.2.])

where

$$p' = \frac{\text{No. Nonconforming Taxa Inspected (3)}}{\text{No. of Taxa Inspected (163)}} \times 100$$

p' = 1.8 percent or 0.018.

Calculation of the AOQ for the combined fall shoals and beach seine survey program was based upon Equation 4A (Section 2.2.4) as follows:

$$AOQ = \frac{p'(1-f)q^i}{f+(1-f)q^i} \times 100$$

where

p' = 0.018 (percent taxa nonconforming)
f = 1/15 = 0.066 (fraction of taxa inspected, CSP criteria)
q = $1-p'$ = 0.982 (process fraction conforming)
i = 7 (clearing interval, CSP criteria).

$$\text{Hence, } AOQ = \frac{(0.018)(0.934)(0.982)^7}{0.066 + (0.934)(0.982)^7} \times 100 = 1.67 \text{ percent}$$

Resultant calculations for the 1990 Fall Juvenile Survey laboratory identification task are summarized as:

Fraction Inspected - 7.46 percent

AOQ - 1.67 percent.

3.2.2 Measurement Task

A total of 4,060 and 5,081 young-of-year (Division 1) fish length measurement records were made in the laboratory on selected taxa from the fall shoals and beach seine surveys, respectively.
As indicated in Table 2 (Section 2.2), the CSP-V QC Plan defines a QC sample unit as an individual fish specimen with nonconformity decision criteria shown as "tolerance."

Based upon Equation 1 (Section 2.2.1), the fraction inspected for the entire study (combined fall shoal and beach seine surveys) was calculated as follows:

$$\text{Fraction Inspected} = \frac{\text{No. Specimens Inspected (325)}}{\text{Total No. Specimens Recorded (9,141)}} \times 100 = 3.5 \text{ percent (entire study)}$$

Process average was calculated from Equation 2 (Section 2.2.2) where:

$$p' = \frac{\text{No. Nonconforming Specimens Inspected}}{\text{Total No. Specimens Inspected (325)}} \times 100$$

p' = 31 percent or 0.003.

Calculation of the AOQ for the laboratory length measurement task (entire survey) was based upon Equation 4A (Section 2.2.4) and applied as follows:

$$AOQ = \frac{p'\,(1-f)q^i}{f+(1-f)q^i} \times 100$$

where

p' = 0.003 (percent nonconforming observations)
f = 1/50 = 0.02 (fraction inspected, CSP criteria)
q = $1-p'$ = 0.997 (process fraction conforming)
i = 10.

$$\text{Hence, } AOQ = \frac{(0.003)(0.98)(0.997)}{0.02 + (0.98)(0.997)} \times 100 = 0.29 \text{ percent}$$

Resultant calculations for the 1990 Fall Juvenile Survey laboratory length task are summarized as:

Fraction Inspected - 3.5 percent

AOQ - 0.29 percent.

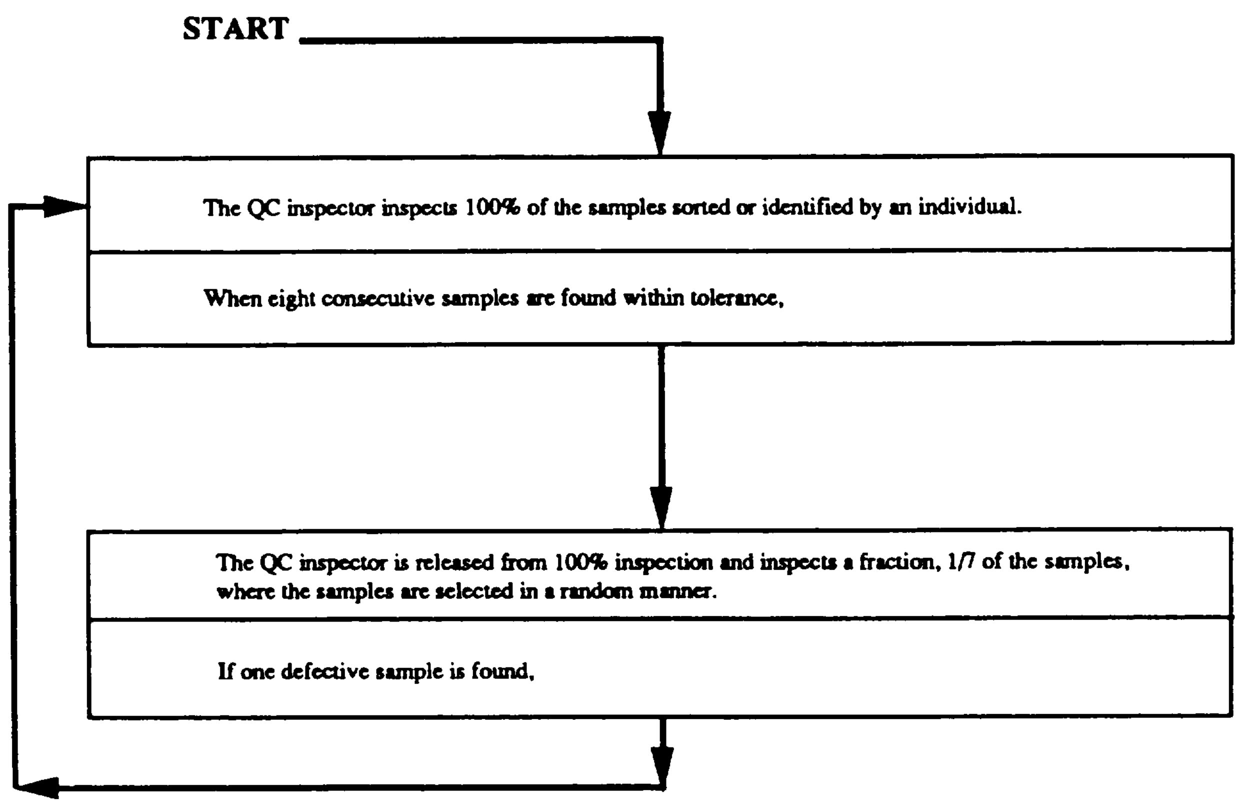

Figure 1. Quality control inspection plan for sorting and identification tasks.

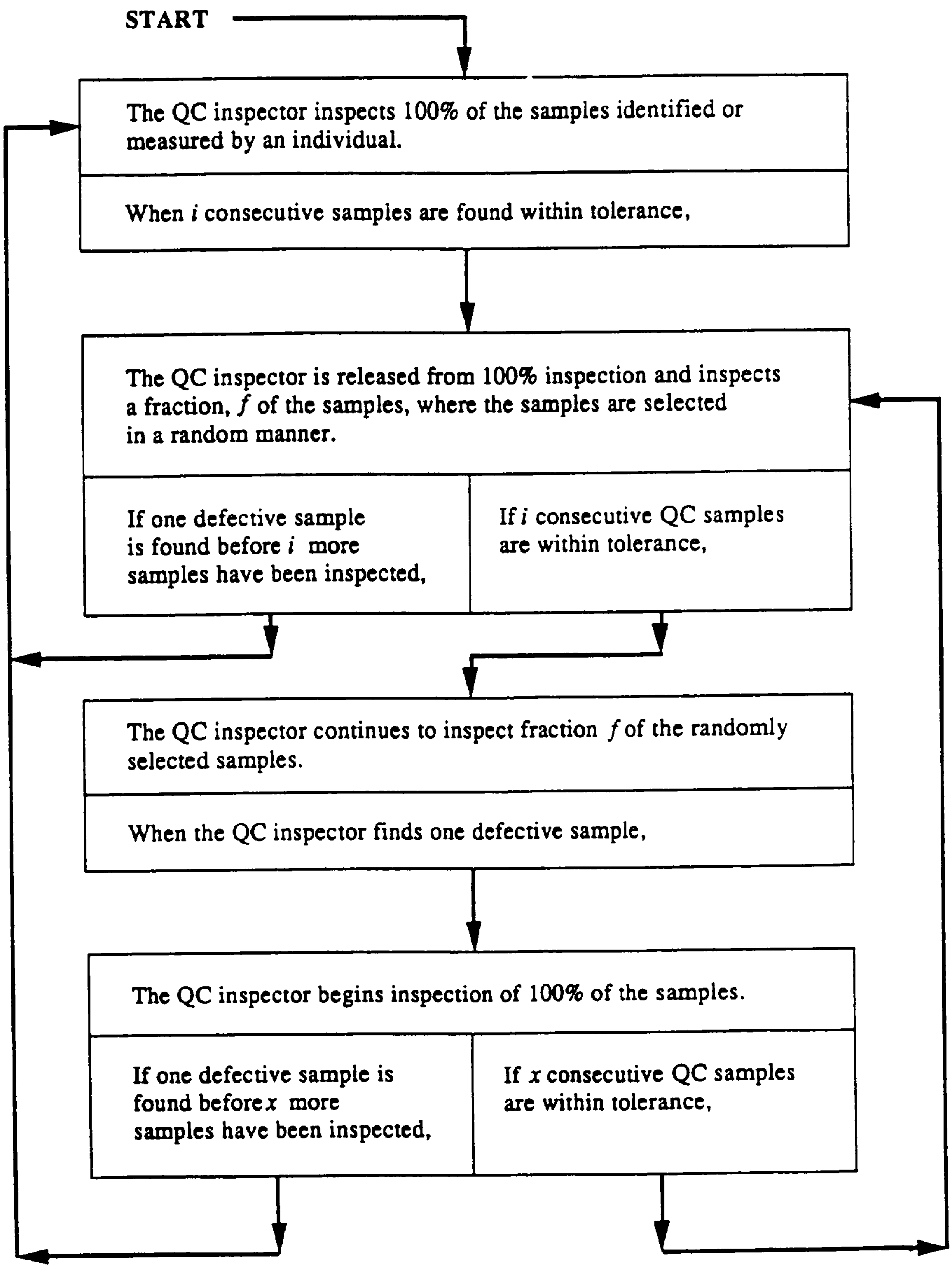

Figure 2. Procedure for continuous sampling plan (MIL-STD-1235B) for laboratory identification and length measurement of young-of-year fishes.

	Eggs	Post Yolk-Sac Larvae	Undetermined	Total
Taxon 1				
Original Value	103	176	25	
QC Value	100	194	26	
% Measurement Error Life Stage	3.0	-9.3	-3.8	16.1
Taxon 2				
Original Value		2		
QC Value		1		
% Measurement Error Life Stage		0		0
Taxon 3				
Original Value		8		
QC Value		2		
% Measurement Error Life Stage		300		300

Figure 3. Example of percent measurement error calculations for identified samples.

TABLE 1 CONTINUOUS SAMPLING PLAN TO PROVIDE A 10 PERCENT AOQL

Laboratory Task	CSP-1 AOQL-10%		Sample Tolerance	QC Sample Definition
	i	f		
Sorting	8	1/7	$\pm$2 if $\leq$20 organisms $\pm$10% if >20 organisms	One sample
Identification	8	1/7	$\pm$2 if $\leq$20 $\pm$10% if >20 (in identifying, assigning a life stage, or counting any species, errors are cumulative by life stage within a taxon)	One taxon

TABLE 2 TASK-SPECIFIC APPLICATIONS OF CONTINUOUS SAMPLING PLANS FOR THE 1990 FALL JUVENILE SURVEY

Task	QC Plan	AOQL	i	f	x	Tolerance	QC Sample Definition
Identification	CSP-V	7%	21	1/15	7	±10% of total count or ±2 individuals when <25 fish	One taxon
Length	CSP-V	7%	30	1/50	10	±1 mm when <34 mm TL ±3% when >34 mm TL	One fish

TABLE 3 FRACTION INSPECTED, PROCESS AVERAGE, MEAN PERCENT MEASUREMENT ERROR, AND AVERAGE OUTGOING QUALITY OF TASKS PERFORMED BY EA FOR THE 1990 HUDSON RIVER ICHTHYOPLANKTON LABORATORY PROGRAM

Task	Fraction Inspected (%)	Process Average (%)	Mean Percent Measurement Error (%)	AOQ (%)
Laboratory				
Sorting	16.85	1.18	1.94	0.997
Identification	24.56	32.44	118.52	6.7

TABLE 4 HUDSON RIVER ICHTHYOPLANKTON LABORATORY PROGRAM SAMPLE SORTING FRACTION INSPECTION RESULTS, 1990

River Run	Total Number of Samples Inspected	Total Number of Samples Identified	Fraction Inspected (%)
1	44	82	53.66
2	16	107	14.95
3	15	117	12.82
4	15	117	12.82
5	16	116	13.79
6	19	109	17.43
7	13	110	11.82
8	16	110	14.55
9	18	119	15.13
10	16	119	13.45
11	17	119	14.29
12	18	120	15.00
13	11	72	15.28
14	9	73	12.33
15	11	71	15.49
Total	254	1,561	16.85

TABLE 5 HUDSON RIVER ICHTHYOPLANKTON LABORATORY PROGRAM
SAMPLE SORTING PROCESS AVERAGE RESULTS, 1990

River Run	Number of Nonconformities	Total Number of Samples Inspected	Process Average	Cumulative Process Average
1	0	44	0.00	0.00
2	0	16	0.00	0.00
3	0	15	0.00	0.00
4	0	15	0.00	0.00
5	0	16	0.00	0.00
6	0	19	0.00	0.00
7	0	13	0.00	0.00
8	0	16	0.00	0.00
9	2	18	11.11	1.16
10	1	16	6.25	1.60
11	0	17	0.00	1.46
12	0	18	0.00	1.35
13	0	11	0.00	1.28
14	0	9	0.00	1.23
15	0	11	0.00	1.18
Total	3	254		1.18

TABLE 6 HUDSON RIVER ICHTHYOPLANKTON LABORATORY PROGRAM SAMPLE SORTING MEAN PERCENT MEASUREMENT ERROR RESULTS, 1990

River Run	Total Number of Samples Inspected	Mean Percent Measurement Error
1	44	0.07
2	16	0.09
3	15	1.26
4	15	2.17
5	16	1.51
6	19	2.42
7	13	3.50
8	16	1.84
9	18	3.06
10	16	4.49
11	17	2.87
12	18	2.84
13	11	1.41
14	9	1.95
15	11	2.81
Total	254	1.94

TABLE 7 HUDSON RIVER ICHTHYOPLANKTON LABORATORY PROGRAM SAMPLE IDENTIFICATION FRACTION INSPECTION RESULTS, 1990

River Run	Total Number of Samples Inspected	Total Number of Samples Identified	Fraction Inspected (%)
1	16	82	19.51
2	24	107	22.43
3	22	117	18.80
4	25	117	21.37
5	26	116	22.41
6	19	109	17.43
7	44	110	40.00
8	20	110	18.18
9	27	119	22.69
10	16	119	13.45
11	19	119	15.97
12	46	120	38.33
13	21	72	29.17
14	11	73	15.07
15	38	71	53.52
Total	374	1,561	24.56

TABLE 8 HUDSON RIVER ICHTHYOPLANKTON LABORATORY PROGRAM SAMPLE IDENTIFICATION PROCESS AVERAGE RESULTS, 1990

River Run	Number of Nonconformities	Total Number of Samples Inspected	Process Average	Cumulative Process Average
1	0	16	0.00	0.00
2	0	24	0.00	0.00
3	0	22	0.00	0.00
4	4	25	16.00	4.60
5	9	26	34.62	11.50
6	12	19	63.16	18.94
7	17	44	38.64	23.86
8	7	20	35.00	25.00
9	15	27	55.56	28.70
10	4	16	25.00	28.45
11	7	19	36.84	29.07
12	33	45	73.33	35.64
13	5	21	23.81	34.88
14	1	11	9.09	34.03
15	7	38	18.42	32.44
Total	121	373		32.44

TABLE 9 HUDSON RIVER ICHTHYOPLANKTON LABORATORY PROGRAM SAMPLE IDENTIFICATION MEAN PERCENT MEASUREMENT ERROR RESULTS, 1990

River Run	Total Number of Samples Inspected	Mean Percent Measurement Error
1	16	0.00
2	24	0.21
3	22	0.30
4	25	1.95
5	26	58.36
6	19	202.19
7	44	54.35
8	20	17.69
9	27	18.75
10	16	3.80
11	19	8.58
12	45	611.78
13	21	32.02
14	11	2.07
15	38	5.52
Total	373	118.52

TABLE 10 RANKING OF SPECIES MISSED DURING INITIAL SORT AND FOUND DURING QC

Taxon	Number of Organisms Found in Sort QC	Percent
Striped bass	799	34.5
White perch	740	32.0
Clupeidae unidentified	385	16.6
Bay anchovy	271	11.7
Morone unidentified	34	1.5
Weakfish	28	1.2
American shad	9	0.4
Atlantic tomcod	7	0.3
Rainbow smelt	8	0.3
To be identified	6	0.3
Unidentifiable	8	0.3
Cyprinidae unidentified	5	0.2
Atlantic menhaden	2	0.1
Gobiidae-gobies	3	0.1
Menidia sp.	3	0.1
Tessellated darter	2	0.1
Grubby	1	0.0
Windowpane	1	0.0
Winter flounder	1	0.0
Total	2,313	100.0

TABLE 11 SUMMARY BY LIFE STAGE OF THE SIX HIGHEST RANKED SPECIES MISSED DURING ORIGINAL SORT AND FOUND DURING SORT QC COMPARED TO TOTAL COUNT

Taxon Code	Life Stage	Number	Percent in Each Stage	Percent of Total Found	Total Organisms Found*
Bay anchovy	EGG	152	56.1	0.2	66,893
	YSL	0	0	0	66
	PYSL	119	43.9	0.4	30,643
	YOY	0	0	0	2,129
	UNI	0	0	0	0
	ALL	271	100.0	0.3	99,731
Striped bass	EGG	57	7.1	0.3	22,337
	YSL	365	45.7	0.8	46,108
	PYSL	377	47.2	0.4	87,517
	YOY	0	0	0	615
	UNI	0	0	0	0
	ALL	799	100.0	0.5	156,577
White perch	EGG	100	13.5	0.8	12,600
	YSL	43	5.8	0.5	8,889
	PYSL	597	80.7	1.1	56,203
	YOY	0	0	0	220
	UNI	0	0	0	0
	ALL	740	100.0	0.9	77,912
Weakfish	EGG	28	100.0	0.2	11,682
	YSL	0	0	0	1
	PYSL	0	0	0	155
	YOY	0	0	0	53
	UNI	0	0	0	0
	ALL	28	100.0	0.2	11,891
Clupeid unidentified	EGG	40	10.4	0.2	20,878
	YSL	56	14.5	0.4	12,504
	PYSL	289	75.1	0.8	36,342
	YOY	0	0	0	809
	UNI	0	0	0	4
	ALL	385	100.0	0.5	70,537
Morone unidentified	EGG	0	0	0	0
	YSL	0	0	0	52
	PYSL	22	64.7	4.4	503
	YOY	0	0	0	0
	UNI	12	35.3	4.6	263
	ALL	34	100.0	4.2	818

* Includes both original count and additional organisms found during sort QC.

NOTE: EGG = eggs; YSL = yolk-sac larvae; PYSL = post yolk-sac larvae; YOY = young of year; UNI = unidentified.

TABLE 12 CUMULATIVE NET AND ABSOLUTE ERROR RATES FOR COMMONLY ENCOUNTERED TAXA IN SAMPLES SELECTED FOR QC INSPECTION OF IDENTIFICATION AND COUNTING PROCESS

Taxon	Stage	Total Count[a]	Net Error	Absolute Error	N[b]
Bay anchovy	Eggs	11,871	-0.0057	0.0275	36
	PYSL	9,366	-0.0113	0.0282	72
	YOY	847	-0.0212	0.0756	25
Clupeid unid.	Eggs	4,645	-0.0022	0.0189	29
	YSL	2,518	-0.0286	0.1247	44
	PYSL	6,913	0.0386	0.1112	100
	YOY	84	-0.3690	0.3690	3
	Unidentified	1	0	0	1
American shad	Eggs	287	-0.0732	0.0941	5
	YSL	1,278	0.1588	0.2214	27
	PYSL	884	0.2670	0.3190	26
	YOY	18	-0.3889	0.3889	4
Blueback herring	YOY	159	0.0629	0.0629	9
Atlantic menhaden	PYSL	13	0	0	9
	YOY	5	0	0	1
Hogchoker	Eggs	251	0.0080	0.0637	6
Tessellated darter	YSL	173	0.0347	0.0347	14
	PYSL	17	0	0	5
Rainbow smelt	YSL	3	0	0	2
	PYSL	159	-0.0566	0.0566	33
	YOY	12	0	0	5
Weakfish	Eggs	2,379	-0.0008	0.0227	18
	PYSL	4	0	0	2
	YOY	2	0	0	2
Striped bass	Eggs	2,718	-0.0015	0.0309	31
	YSL	7,703	0.0212	0.0692	68
	PYSL	15,619	-0.0175	0.0868	85
	YOY	22	-0.3182	0.3182	6
White perch	Eggs	1,752	-0.0103	0.0228	23
	YSL	1,581	0.0310	0.0626	42
	PYSL	11,044	0.0150	0.1076	110
	YOY	18	0	0	5
Atlantic tomcod	PYSL	1,618	0.0049	0.0062	37
	YOY	1,183	-0.0076	0.0110	48
Naked goby	YOY	25	0.4800	0.4800	3
Gobiidae	PYSL	682	-0.0088	0.0411	23

a. Total verified count of taxon-life stage in inspected samples.
b. Total number of inspected samples containing taxon-life stage.

REFERENCES

Stephens, K.S. 1979. Volume 2: How to Perform Continuous Sampling. American Society for Quality Control. 70 pp.

U.S. Department of Defense (U.S. DOD). 1981. Military Standard. Single- and Multi-Level Continuous Sampling Procedures and Table for Inspection by Attributes. MIL-STD-1235B.

APPENDIX A.2

DATA REVIEW QUALITY CONTROL REPORT

APPENDIX A.2

LIST OF FIGURES

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APPENDIX A.2

DATA REVIEW QUALITY CONTROL REPORT

As part of the Quality Assurance Plan for Consolidated Edison Company of New York, Inc.'s (Con Edison) 1990 Year Class Report, LMS performed quality assurance audits of the data received. LMS audited Con Edison's 1990 Beach Seine Survey (BSS), Fall Juvenile Survey (FJS), and Longitudinal River Ichthyoplankton Survey (LRS) SAS files against microfilm of the original data sheets. Based on a random inspection of 5 percent of the data sheets from each sampling effort, the error rate associated with each data set has been calculated. In addition, LMS performed a 100 percent audit on calculated variables in selected files. This report presents the results of the auditing effort in compliance with Subtasks 2.1 and 2.2 of the 1990 Year Class Report. Computer databases were updated when errors were discovered.

A.1 SUBTASK 2.1 - 100 PERCENT AUDIT OF 5 PERCENT SAMPLES

To check the accuracy of the data collected in the field and analyzed in the laboratory, 5 percent of the 1990 BSS, FJS, and LRS samples were selected by means of a random numbers program. The program then generated a computer listing of the data for each parameter,* by data set. Data on the microfilmed copies of original data sheets were compared with the data in the computer listing to determine the accuracy of the data entered into the computer.

A.1.1 Beach Seine Survey - 1990

BSSLV3

Fifty samples were checked for the following parameters for data set BSSLV3:

YEAR	DATE	WAVE_HT	GEAR
TASK-CD	TIME	BTM_TYP	
SAMPLE	RIV_MILE	USE_CODE	
SITE	BEACH	TIDE_STG	

A total of 650 data fields were reviewed and no errors were found.

BSSLV5

Fifty samples with 249 observations were checked for the following parameters from data set BSSLV5:

SAMPLE	DIV_1	CT_LC1	CT_LC3
TAXON	DIV_2	CT_LC2	CT_LC4

A total of 1,992 data fields were reviewed and no errors were found.

* Full parameter names can be found in the Con Edison data dictionary.

BSSLV6

Fifty samples with 298 observations were checked for the following parameters from data set BSSLV6:

SAMPLE	LIFE_STG
TAXON	LENGTH
FISH_ID	PM

A total of 1,788 data fields were reviewed and no errors were found.

Overall, 50 samples containing 4,430 fields were checked for accuracy and no errors were found.

A.1.2 Fall Juvenile Survey - 1990

ICHFSLV3 and ICHFSLV4

Eighty-six samples were checked for the following parameters from data sets ICHFSLV3 and ICHFSLV4:

YEAR	TIME	VESL_CD	FLO_STRT
TASK_CD	RIV_MILE	TOW_SPD	FLO_END
SAMPLE	RIV_DPTH	TOW_DIR	FLO_DIF
SITE	USE_CODE	GEAR	DURATION
DATE	WAVE_HT	FLO_N	SAM_DPTH

A total of 1,720 data fields were reviewed:

- Sample 8, SAM_DPTH appeared as 19 ft (5.8 m) on the data sheet and 14 ft (4.4 m) on the computer listing.

There was one error giving an accuracy rate of 99.94 percent.

ICHFSLV5

Eighty-six samples with 309 observations were checked for the following parameters for data set ICHFSLV5:

SAMPLE	DIV_1	CT_LC1	CT_LC3
TAXON	DIV_2	CT_LC2	CT_LC4

A total of 2,472 data fields were reviewed and no errors were found.

ICHFSLV6

Eighty-six samples with 282 observations were checked for the following parameters from data set ICHFSLV6:

SAMPLE	LENGTH
TAXON	PM
FISH_ID	LIFE_STG

A total of 1,692 data fields were reviewed:

- Sample 885, Taxon 2, one fish LENGTH 42, LIFE_STG 4 was missing from the computer listing.

- Sample 2134, Taxon 35, one fish length 68 LIFE_STG 4 was missing from the computer listing.

There were two errors, giving an accuracy rate of 99.88 percent.

Overall, 86 samples containing 5,884 fields were checked for accuracy there were no major or unresolved errors.

A.1.3 Longitudinal River Ichthyoplankton Survey - 1990

ICHLRLV3 and ICHLRLV4, Catch Code 1 and 2

Seventy-eight samples with a catch code of 1 or 2 were checked for the following parameters from data sets ICHLRLV3 and ICHLRLV4:

YEAR	DATE	WAVE_HT	FLO_STRT
TASK_CD	TIME	VESL_CD	FLO_END
SAMPLE	RIV_MILE	TOW_SPD	FLO_DIF
GEAR	RIV_DPTH	TOW_DIR	DURATION
SITE	USE_CODE	FLO_N	SAM_DPTH

A total of 1,560 data fields were reviewed and no errors were found.

Note: Sample 1868 has DATE of 6/1/91 in the computer listing and was observed to be incorrect from a SAS program producing a frequency table of number of samples per week by river run; DATE should be 6/14/91.

ICHLRL5S, Catch Code 1 and 2

Seventy-eight samples with 186 observations were checked for the following parameters from data set ICHLRL5S:

SAMPLE	DIV_1	CT_LC1	CT_LC3
TAXON	DIV_2	CT_LC2	CT_LC4

A total of 1,488 data fields were reviewed and no errors were found.

Seventy-eight samples with 529 observations were checked for the following parameters from data set ICHLRL5S:

SAMPLE	SPL_FACT	CT_PYSL
CATCH_CD	TAXON	CT_YOY
SPLIT_ID	CT_EGGS	CT_UNID
N_SPLITS	CT_YSL	QC_FINDS

A total of 6,348 data fields were reviewed.

- Sample 795, a Taxon 30 observation appeared on the computer listing but was not on any of the data sheets.

- Sample 2636, Taxon appeared as 9 on the data sheet and as 59 on the computer listing.

There were 2 errors, giving an accuracy rate of 99.97 percent.

ICHLRLV6

Seventy-eight samples with 2,247 observations were checked for the following parameters from data set ICHLRLV6:

SAMPLE	LIF_STG
TAXON	LENGTH

A total of 8,988 data fields were reviewed.

- Sample 2708, LIFE_STG appeared as 4 on the laboratory sheet for a Taxon 35 fish of length 13.8 mm but appears as 3 on the computer listing.

There was one error, giving an accuracy rate of 99.99 percent.

ICHLRLV3 and ICHLRLV4, Catch Code 3

Sixty samples with a catch code of 3 were checked for the following parameters from data sets ICHLRLV3 and ICHLRLV4:

YEAR	DATE	WAVE_HT	FLO_STRT
TASK_CD	TIME	VESL_CD	FLO_END
SAMPLE	RIV_MILE	TOW_SPD	FLO_DIF
GEAR	RIV_DPTH	TOW_DIR	DURATION
SITE	USE_CODE	FLO_N	SAM_DPTH

A total of 1,200 data fields were reviewed.

- Sample 1608, RIV_DPTH appeared as 88 ft (26_8224 m) on the data sheet and 83 ft (25.2984 m) on the computer listing.

There was one error, giving an accuracy rate of 99.92 percent.

ICHLRL5S, Catch Code 3

Sixty samples with a catch code of 3 were checked for the following parameters from data set ICHLRL5S:

SAMPLE	DIV_1	CT_LC1	CT_LC3
TAXON	DIV_2	CT_LC2	CT_LC4

This was a total of 480 data fields.

- Sample 1139, Taxon 32, DIV_1 and DIV_2 was missing on the computer listing and was 100 and 225, respectively, on the data sheet.
- Sample 1139, Taxon 35 DIV_2 was missing on the computer listing and was 105 on the data sheet.
- Sample 1272, Taxon 32 CT_LC1 was repeated.

There was three errors, giving an accuracy rate of 99.38 percent.

Overall, 138 samples with 20,064 data fields were checked for accuracy. There were no major or unresolved errors. Corrections made in ICHLRL5S were also made to data set ICHLRLV5.

A.1.4 Total 1990 Samples

The total number of samples checked was 274 and the total number of data fields was 30,378. With 10 errors, there is an overall accuracy rate of 99.95 percent.

A.2 SUBTASK 2.2 - 100 PERCENT QC OF FIVE FIELDS

Five designated fields were checked by means of SAS computer programs. These programs generated graphs comparing values of variables and printouts with messages about nonconforming data.

The five fields that were checked are:

For BSS (data set BSSLV3):

BEACH	RIV_RUN
RIV_MILE	

For FJS (data sets ICHFSLV3 and ICHFSLV4):

VOLUME
STRATA
RIV_MILE
RIV_RUN

For LRS (data sets ICHLRLV3 and ICHLRLV4):

VOLUME
STRATA
RIV_MILE
RIV_RUN

VOLUME

In order to check the volume, a new volume was calculated as follows:

VOL_CAL = (FLO_DIF - A x DURATION x 60)/(100 x B) where A and B are calibrated factors from the file, FLOW.

If data in field GEAR equal 18, then the VOL_CAL field was multiplied by 2.743066. The new VOL_CAL was subtracted from the original VOLUME. If the difference was >0.2, an error was noted. Two errors one in the 1990 FJS data and one in the 1990 LRS were found. Figures A.2-1 and A.2-2 graph VOLUME vs. FLO_DIF for FJS and LRS data, respectively.

- FJS Sample 581, FLO_STRT and FLO_DIF appeared as 382932 and 9970, respectively on the data sheet and 982932 and 409970, respectively, on the computerlisting.

- LRS Sample 103, VOLUME appeared on 345.2 on the computer listing; the correct VOLUME is 360.7 using a duration of 5 min (345.2 is for 0.5 min).

STRATA

A program was run to check STRATA as follows:

If STRATA = 1 (shoals), then RIV_DPTH ≤6.1 m (20 ft)

If STRATA = 2 (bottom), then RIV_DPTH >6.1 m (20 ft)
and (RIV_DPTH - SAM_DPTH) ≤3.1 m (10 ft)

If STRATA = 3 (channel), then RIV_DPTH >6.1 m (20 ft)
and (RIV_DPTH - SAM_DPTH) >3.1 m (10 ft)

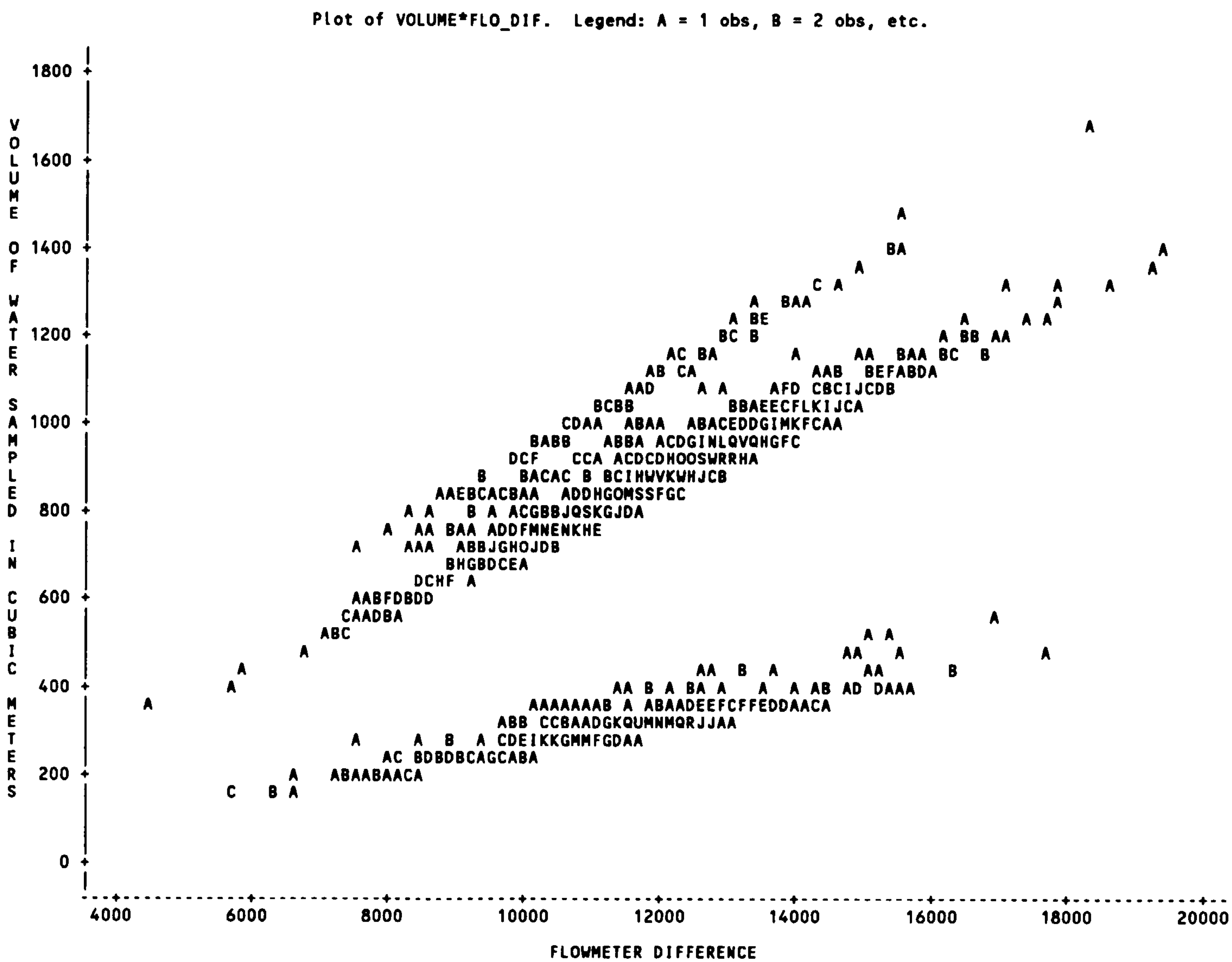
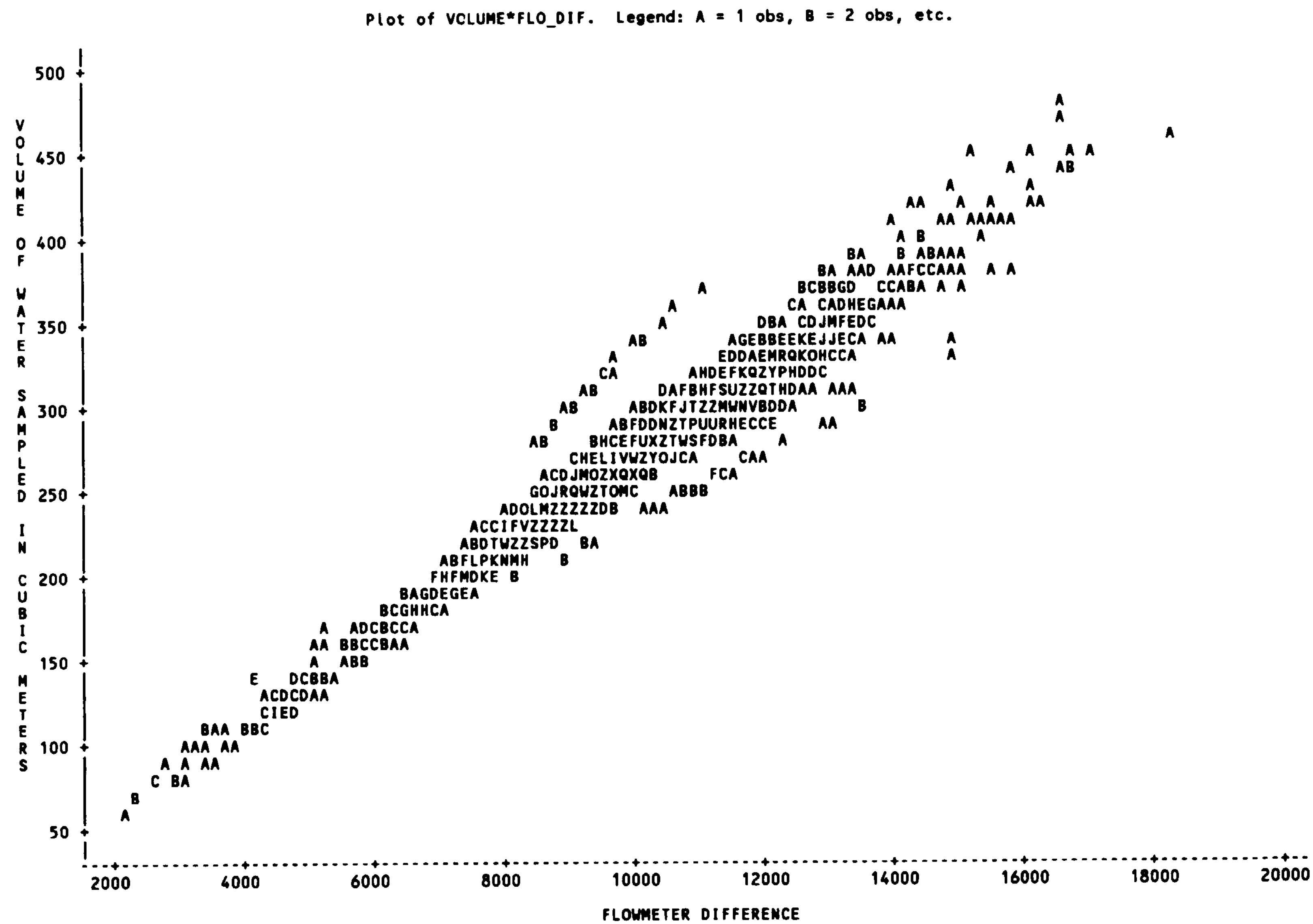


Figure A.2-1. Variable Check for Subtask 2.2 VOLUME vs FLO_DIF from the 1990 Fall Juvenile Survey.



NOTE: 111 obs hidden.

Figure A.2-2. Variable Check for Subtask 2.2 VOLUME vs FLO_DIF from the 1990 Longitudinal River Ichthyoplankton Survey.

Table A.2-1 shows nonconforming observations for FJS and LRS data. The variable, DPTH_DIF, represents RIV_DPTH minus SAM_DPTH.

Changes were not made to the two nonconforming strata observations:

- FJS Sample 8, the STRATA 3 (channel) designation was indicated to be incorrect; the difference between river depth and sample depth was 1.8 m, a tucker trawl was used for sampling. Although this difference is <3.1 m the channel designation was kept.

- LRS sample 782, the STRATA 2 (bottom) designation was indicated to be incorrect; the RIV_DPTH was 6.1 m which is the break point for strata designations.

<u>BEACH, RIV_MILE, RIV_RUN</u>

Table A.2-2 (Con Edison's 1990 Standard Operating Procedures Table III-3) was used as the basis of a SAS program that was run to verify that BEACH and RIV_MILE matched each other and were in the correct region. No problems were found.

RIV_RUN values were checked to make sure that all samples had a valid RIV_RUN number that designated the appropriate week.

For FJS and LRS data, the range for RIV_MILE was checked and all were correct.

TABLE A.2-1 VARIABLE CHECK FOR SUBTASK 2.2, SAMPLES WITH WRONG DEPTH FOR STRATA FROM THE 1990 FALL JUVENILE AND TTHE LONGITUDINAL RIVER ICHTHYOPLANKTON SURVEYS

Fall Juvenile Survey

OBS	TASK CD	SAMPLE	YEAR	RIV RUN	DATE	TIME	USE CODE	GEAR	RIV MILE	STRATA	RIV DPTH	SAM DPTH	DPTH DIF
1	98	8	90	1	10 Jul 90	21:16	1	65	15	3	7.6	5.8	1.8

Long River Ichthyoplankton Survey

OBS	TASK CD	SAMPLE	YEAR	RIV RUN	DATE	TIME	USE CODE	GEAR	RIV MILE	STRATA	RIV DPTH	SAM DPTH	DPTH DIF
1	88	782	90	4	5/7/90	20:35	1	64	151	2	6.1	6.1	0.0

TABLE A.2-2

DESIGNATION OF 1989 BEACH SEINE SURVEY SITES WITHIN SUBREGIONS

REGION I	(RM 12-23)
12-14	268, 267, 266, 265
15-17	264, 263, 262
18-20	261, 260, 259, 258
21-23	257, 256, 255, 254
REGION II	(RM 24-33)
24-26	253, 252, 251, 250, 249, 248, 247, 246, 270, 271, 283, 284
27-29	245, 244, 243, 242, 272
30-33	241, 240, 239, 238, 237, 236, 269, 285
REGION III	(RM 34-38)
34-35	235, 234, 233, 232, 231, 230, 229, 274, 275, 277
36-38	228, 227, 226, 225, 224, 223, 222, 221, 220
	276, 278, 279, 280, 281, 282
REGION IV	(RM 39-46)
39-41	219, 218, 217, 216, 215, 214, 213, 212, 211, 210, 209, 208
42-44	207, 206, 205, 204, 203, 202, 201
45-46	200, 199, 198
REGION V	(RM 47-55)
47-49	197, 196
50-52	195, 194, 193
53-55	192, 191, 190, 189
REGION VI	(RM 56-61)
56-58	188, 187, 186, 185, 184, 183, 182
59-61	181, 180, 179, 178, 177, 176, 175, 174
REGION VII	(RM 62-76)
62-64	173, 172, 171, 170, 169, 168, 167, 166, 165, 164, 163
65-67	162, 161, 160
68-70	159, 158, 157, 156, 155
71-73	154, 153, 152, 151, 150
74-76	149, 148, 147, 146, 145, 144

TABLE A.2-3 (Cont.)

REGION VIII	(RM 77-85)
77-79	143, 142, 141, 140, 139, 138
80-82	137, 136, 135, 134
83-85	133, 132, 131, 130, 129, 128, 127
REGION IX	(RM 86-93)
86-87	126, 125, 124, 123
88-90	122, 121, 120
91-93	119, 118, 117, 116
REGION X	(RM 94-106)
94-97	115, 114, 113, 112, 111, 110, 109, 108, 107, 106, 105, 104, 103, 102
98-100	101, 100, 99
101-103	-----
104-106	98, 97, 96
REGION XI	(RM 107-124)
107-109	95, 94, 93, 92
110-112	91, 90, 89, 88
113-115	87, 86, 85, 84, 83, 82, 81, 80, 79
116-118	78, 77, 76, 75, 74, 73
119-121	72, 71, 70, 69, 68, 67, 66, 65
122-124	64, 63, 62, 61, 60, 59, 58, 57, 56, 55
REGION XII	(RM 125-152)
125-128	54, 53, 52, 51, 50, 49, 48, 47, 46, 45, 44, 43
129-131	42, 41, 40, 39, 38, 37, 36, 35, 34, 33
132-134	32, 31, 30, 29, 28, 27
135-137	26, 25, 24
138-140	23, 22, 21, 20, 19, 18, 17, 16, 15, 14, 13, 12, 11, 10
141-143	9, 8, 7, 6
144-146	5, 4
147-149	3, 2
150-152	1

APPENDIX B

PHYSICAL/CHEMICAL PARAMETERS

APPENDIX B

LIST OF TABLES

TABLE B-1 DAILY FRESHWATER FLOW (m^3/sec) RECORDED AT GREEN ISLAND, NEW YORK, 1990[1]

DAY OF MONTH	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	271	473	609	620	433	600	229	123	146	189	490	470
2	345	521	555	617	379	462	217	131	159	230	428	430
3	320	603	552	782	394	445	174	120	153	184	413	439
4	300	547	538	1909	399	459	172	115	164	130	396	569
5	292	484	481	1841	323	385	161	110	150	173	396	977
6	345	456	447	1365	555	258	160	187	151	204	419	872
7	320	442	408	1104	538	266	160	490	136	223	436	699
8	289	445	391	909	518	253	150	453	135	227	456	595
9	251	459	371	776	558	214	142	357	141	200	311	569
10	234	821	388	753	479	259	137	246	182	180	631	527
11	240	1144	456	1252	867	226	145	216	192	212	2336	518
12	224	841	968	1628	929	218	140	323	195	234	1518	450
13	221	694	1557	1277	816	224	145	331	167	405	971	428
14	204	646	1637	1085	1560	197	120	459	168	620	810	433
15	198	626	1696	932	1235	176	141	518	173	501	756	368
16	194	671	1668	889	1059	178	139	391	166	396	643	337
17	224	1039	1739	807	1535	166	124	317	219	391	654	413
18	289	940	2101	787	1886	186	161	272	168	351	745	450
19	510	767	1855	719	1733	200	142	228	170	663	697	705
20	484	702	1651	663	1427	253	127	236	153	609	623	816
21	399	566	1730	623	1962	178	155	189	156	555	586	663
22	354	521	1467	702	2129	168	144	184	128	445	501	773
23	345	1028	1334	702	1668	195	136	183	134	445	592	923
24	303	1368	1184	626	1368	232	186	189	162	1441	660	1184
25	340	968	929	549	1155	227	231	198	154	1413	572	1393
26	841	736	793	552	954	198	236	190	153	988	515	1087
27	1116	580	759	600	861	194	196	170	138	799	473	818
28	745	612	685	640	756	172	147	155	145	646	496	674
29	606		654	575	756	133	121	208	156	623	586	614
30	541		609	549	731	187	98	213	148	589	487	796
31	530		609		742		138	176		538		1322

[1]Rounded to nearest m^3/sec.

TABLE B-2 LONG-TERM (1918-1989) AND 1990 MONTHLY MEAN FRESHWATER FLOW (m^3/sec) RECORDED AT GREEN ISLAND, NEW YORK

Month	Flow (m^3/sec)			
	1990[a] Average	Long-Term Average[b]	Long-Term Minimum[c]	Long-Term Maximum[c]
JAN	383	360	91	961
FEB	703	358	86	885
MAR	994	640	178	1,595
APR	894	868	290	1,461
MAY	990	536	122	1,156
JUN	250	278	92	839
JUL	157	193	81	637
AUG	248	158	70	414
SEP	159	182	81	612
OCT	477	244	72	854
NOV	653	364	93	929
DEC	687	399	123	948
Annual Average	549	381		

a. Provisional data.
b. Mean of monthly means weighted by number of days/month.
c. Monthly average.

TABLE B-3 MONTHLY MEAN FRESHWATER FLOW (m^3/sec) RECORDED AT GREEN ISLAND, NEW YORK FROM 1974 TO 1990

	Year																
Month	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
JAN	623	540	417	225	745	571	256	148	321	259	308	440	308	263	268	196	383
FEB	528	549	885	227	400	336	128	851	361	352	742	319	358	201	349	256	703
MAR	587	671	897	1,233	619	1,253	634	349	620	581	465	581	1,011	596	461	332	994
APR	854	724	1,041	1,149	950	1,080	748	385	1,085	1,063	940	456	683	897	476	548	894
MAY	650	566	901	454	530	554	274	328	354	1,037	844	232	342	122	357	620	990
JUN	249	367	431	207	282	236	192	169	432	358	418	157	404	175	123	389	250
JUL	334	211	433	162	131	132	144	140	182	127	289	133	228	162	131	92	157
AUG	180	254	414	154	169	149	130	134	124	155	176	104	307	118	139	61	248
SEP	294	482	271	408	175	221	118	233	122	133	190	171	218	341	164	120	159
OCT	256	663	658	854	244	314	158	457	124	154	181	203	337	466	211	256	477
NOV	487	637	508	664	227	465	242	395	196	339	277	419	545	415	565	565	653
DEC	549	532	399	750	303	430	273	321	233	799	448	330	524	412	330	180	687
Annual	465	516	603	543	398	479	275	322	345	447	438	295	439	347	298	301	549

TABLE B-4 POUGHKEEPSIE WATER WORKS DATA, MEAN, MINIMUM, AND MAXIMUM TEMPERATURE (°C) FOR EACH DAY OF THE YEAR, 1951-1990

		LONG-TERM TEMPERATURE (1951-1989)			
Month	Day	Mean	Min	Max	1990
1	1	1.6	0.6	4.4	0.8
1	2	1.5	0.0	4.4	0.9
1	3	1.6	0.6	4.4	1.4
1	4	1.5	0.6	3.3	1.2
1	5	1.5	0.0	3.3	1.3
1	6	1.3	0.0	3.3	1.4
1	7	1.3	0.0	3.3	1.3
1	8	1.2	0.0	3.3	1.7
1	9	1.2	0.0	3.3	1.3
1	10	1.1	0.0	2.8	1.3
1	11	1.1	0.0	2.8	1.3
1	12	1.1	0.6	2.8	1.3
1	13	1.1	0.0	2.8	1.3
1	14	1.1	0.0	2.8	0.9
1	15	1.1	0.0	2.8	1.1
1	16	1.1	0.5	2.8	0.8
1	17	1.1	0.6	2.8	1.1
1	18	1.1	0.6	3.3	1.1
1	19	1.0	0.6	2.8	1.2
1	20	1.0	0.5	2.2	1.3
1	21	1.0	0.0	2.4	---
1	22	1.0	0.6	2.2	---
1	23	1.0	0.6	2.2	1.7
1	24	1.0	0.0	2.2	1.0
1	25	1.0	0.0	3.1	1.1
1	26	0.9	0.0	2.2	1.1
1	27	1.0	0.0	2.2	1.0
1	28	1.0	0.6	2.2	1.1
1	29	1.0	0.6	2.2	1.4
1	30	1.0	0.6	2.2	2.1
1	31	0.9	0.6	2.2	1.9
2	1	1.0	0.6	2.2	1.9
2	2	1.0	0.6	2.2	2.1
2	3	1.0	0.6	2.2	2.0

Note: Dashes (---) indicate no sampling.

TABLE B-4 POUGHKEEPSIE WATER WORKS DATA, MEAN, MINIMUM, AND MAXIMUM TEMPERATURE (°C) FOR EACH DAY OF THE YEAR, 1951-1990

		LONG-TERM TEMPERATURE (1951-1989)			
Month	Day	Mean	Min	Max	1990
2	4	0.9	0.6	1.7	1.8
2	5	0.9	0.6	1.7	1.5
2	6	0.9	0.5	1.7	2.0
2	7	0.9	0.6	2.2	1.5
2	8	1.0	0.6	2.2	2.2
2	9	0.9	0.6	2.2	2.2
2	10	1.0	0.6	3.3	2.2
2	11	1.0	0.0	2.2	2.2
2	12	1.0	0.6	2.2	2.3
2	13	1.0	0.6	2.2	2.1
2	14	1.1	0.6	2.8	2.7
2	15	1.0	0.6	2.8	2.6
2	16	1.0	0.0	2.8	2.5
2	17	1.1	0.6	2.8	2.3
2	18	1.1	0.0	2.8	2.1
2	19	1.2	0.6	2.8	2.1
2	20	1.1	0.6	2.8	2.2
2	21	1.1	0.6	2.8	2.4
2	22	1.2	0.0	3.9	2.7
2	23	1.2	0.0	2.8	2.7
2	24	1.3	0.0	3.9	2.5
2	25	1.2	0.6	3.9	2.6
2	26	1.4	0.0	3.9	2.5
2	27	1.5	0.0	4.4	2.0
2	28	1.5	0.0	5.0	1.9
2	29	1.8	0.6	4.4	---
3	1	1.5	0.6	4.4	1.7
3	2	1.5	0.6	4.4	2.0
3	3	1.5	0.6	4.4	2.1
3	4	1.6	0.6	4.4	1.9
3	5	1.5	0.6	3.3	1.8
3	6	1.6	0.6	3.3	1.8
3	7	1.6	0.6	3.3	1.9
3	8	1.6	0.0	3.3	1.4

Note: Dashes (---) indicate no sampling.

TABLE B-4 POUGHKEEPSIE WATER WORKS DATA, MEAN, MINIMUM, AND MAXIMUM TEMPERATURE (°C) FOR EACH DAY OF THE YEAR, 1951-1990

		LONG-TERM TEMPERATURE (1951-1989)			
Month	Day	Mean	Min	Max	1990
3	9	1.8	0.6	4.4	1.5
3	10	1.8	0.6	4.4	1.7
3	11	1.9	0.6	4.4	2.0
3	12	2.0	0.6	4.4	2.0
3	13	2.1	0.6	4.4	2.5
3	14	2.2	0.6	4.4	2.7
3	15	2.2	0.6	5.0	4.6
3	16	2.4	0.6	5.0	5.6
3	17	2.5	0.6	5.0	5.7
3	18	2.5	0.6	5.0	5.9
3	19	2.6	0.6	5.6	7.7
3	20	2.7	0.6	5.6	7.5
3	21	2.8	0.6	5.6	7.3
3	22	3.0	0.6	5.6	7.2
3	23	3.2	0.6	6.1	7.1
3	24	3.4	0.6	6.1	7.1
3	25	3.5	0.6	5.6	5.9
3	26	3.7	0.6	6.1	6.0
3	27	4.0	1.1	6.7	5.9
3	28	4.3	1.1	6.7	5.8
3	29	4.4	1.1	6.7	5.7
3	30	4.6	1.1	7.8	6.0
3	31	4.9	1.1	8.3	6.2
4	1	5.1	1.7	9.4	5.6
4	2	5.3	2.2	8.3	5.7
4	3	5.5	2.8	8.9	5.8
4	4	5.7	2.8	8.9	5.8
4	5	5.9	2.8	8.9	5.9
4	6	6.1	3.3	8.9	6.0
4	7	6.2	2.8	9.4	6.0
4	8	6.3	2.8	9.4	6.6
4	9	6.3	2.8	8.9	6.7
4	10	6.4	2.8	9.4	6.8
4	11	6.6	2.8	9.4	7.1

Note: Dashes (---) indicate no sampling.

TABLE B-4 POUGHKEEPSIE WATER WORKS DATA, MEAN, MINIMUM, AND MAXIMUM TEMPERATURE (°C) FOR EACH DAY OF THE YEAR, 1951-1990

		LONG-TERM TEMPERATURE (1951-1989)			
Month	Day	Mean	Min	Max	1990
4	12	6.8	2.8	10.0	7.6
4	13	7.1	2.8	10.6	7.1
4	14	7.2	2.8	11.1	7.1
4	15	7.5	2.8	11.1	7.2
4	16	7.6	3.3	11.1	7.7
4	17	7.8	3.9	11.7	7.6
4	18	8.1	5.6	11.7	7.8
4	19	8.3	5.6	12.2	8.0
4	20	8.6	6.1	12.2	7.8
4	21	8.9	6.1	12.2	8.3
4	22	9.2	6.7	12.8	8.6
4	23	9.4	6.7	12.8	9.0
4	24	9.5	6.7	13.3	9.7
4	25	9.7	6.7	13.3	10.0
4	26	10.0	6.7	13.3	10.9
4	27	10.1	7.2	13.3	10.6
4	28	10.3	7.8	13.3	11.3
4	29	10.5	8.3	13.9	12.1
4	30	10.8	8.9	13.9	12.4
5	1	11.1	8.9	14.4	12.5
5	2	11.3	8.9	14.4	12.8
5	3	11.6	8.9	14.4	13.8
5	4	11.8	8.9	15.0	14.3
5	5	11.9	8.9	15.0	13.9
5	6	12.1	8.9	15.0	14.6
5	7	12.4	8.9	15.0	14.8
5	8	12.5	8.9	15.0	15.1
5	9	12.6	8.9	15.6	15.3
5	10	12.7	8.9	16.1	15.7
5	11	12.9	9.4	16.1	15.5
5	12	13.0	9.4	16.1	15.6
5	13	13.2	10.0	16.1	15.3
5	14	13.4	10.6	16.7	15.9
5	15	13.6	11.1	16.7	15.3

Note: Dashes (---) indicate no sampling.

TABLE B-4 POUGHKEEPSIE WATER WORKS DATA, MEAN, MINIMUM, AND MAXIMUM TEMPERATURE (°C) FOR EACH DAY OF THE YEAR, 1951-1990

		LONG-TERM TEMPERATURE (1951-1989)			
Month	Day	Mean	Min	Max	1990
5	16	14.0	11.1	16.7	14.8
5	17	14.2	11.7	16.7	14.7
5	18	14.4	12.2	16.7	14.6
5	19	14.7	12.2	17.2	14.2
5	20	14.9	12.2	17.8	14.2
5	21	15.2	12.8	17.8	14.2
5	22	15.4	12.8	18.3	14.0
5	23	15.7	12.8	18.3	13.3
5	24	15.9	12.8	18.3	12.9
5	25	16.1	12.8	18.9	13.1
5	26	16.3	12.2	18.9	13.3
5	27	16.5	12.2	20.6	13.0
5	28	16.8	12.2	20.6	13.5
5	29	17	12.8	20.6	13.9
5	30	17.1	12.8	20.6	14.1
5	31	17.3	13.3	20.6	14.6
6	1	17.6	13.3	20.6	15.2
6	2	17.8	13.3	22.2	16.3
6	3	18.0	14.4	21.7	16.8
6	4	18.2	13.9	22.2	17.1
6	5	18.4	15	22.2	17.2
6	6	18.6	15.6	21.7	17.6
6	7	18.7	15	21.7	18.2
6	8	19.0	16.1	21.7	18.5
6	9	19.2	16.1	21.1	18.6
6	10	19.4	16.1	21.7	18.8
6	11	19.6	17.2	21.7	18.9
6	12	19.7	17.2	22.2	18.9
6	13	19.9	17.8	22.2	19.1
6	14	20.0	17.8	21.7	19.1
6	15	20.1	17.8	22.2	19.3
6	16	20.3	17.8	22.2	19.5
6	17	20.4	17.8	22.2	19.6
6	18	20.6	17.8	22.2	20.3

Note: Dashes (---) indicate no sampling.

TABLE B-4 POUGHKEEPSIE WATER WORKS DATA, MEAN, MINIMUM, AND MAXIMUM TEMPERATURE (°C) FOR EACH DAY OF THE YEAR, 1951-1990

		LONG-TERM TEMPERATURE (1951-1989)			
Month	Day	Mean	Min	Max	1990
6	19	20.7	17.8	23.3	20.3
6	20	20.8	17.8	23.3	20.8
6	21	21.1	17.8	22.8	20.1
6	22	21.3	17.2	23.3	21.3
6	23	21.4	17.2	23.3	21.5
6	24	21.6	17.8	23.3	21.4
6	25	21.6	17.8	23.9	21.7
6	26	21.8	17.8	24.4	21.9
6	27	21.9	17.8	24.4	22.4
6	28	22.1	17.8	24.4	22.8
6	29	22.2	17.8	25.0	22.3
6	30	22.3	17.8	25.0	22.9
7	1	22.5	18.9	25.0	23.0
7	2	22.6	18.9	25.0	23.2
7	3	22.7	19.4	25.0	23.4
7	4	22.8	19.4	25.0	23.6
7	5	23.0	20.0	25.6	23.9
7	6	23.1	20.0	25.6	23.9
7	7	23.1	20.0	25.6	23.9
7	8	23.2	20.0	25.6	23.8
7	9	23.4	20.0	25.6	23.9
7	10	23.4	20.6	25.6	24.0
7	11	23.5	20.6	25.6	24.2
7	12	23.6	21.1	26.1	24.0
7	13	23.8	21.7	26.7	23.8
7	14	23.9	21.7	26.7	23.8
7	15	24.1	21.7	26.7	24.0
7	16	24.2	22.2	26.7	24.1
7	17	24.3	22.2	26.1	24.3
7	18	24.3	22.2	26.1	24.9
7	19	24.5	22.2	26.1	24.5
7	20	24.6	22.2	26.7	24.8
7	21	24.6	22.8	26.1	25.1
7	22	24.7	22.2	26.7	25.1

Note: Dashes (---) indicate no sampling.

TABLE B-4 POUGHKEEPSIE WATER WORKS DATA, MEAN, MINIMUM, AND MAXIMUM TEMPERATURE (°C) FOR EACH DAY OF THE YEAR, 1951-1990

		LONG-TERM TEMPERATURE (1951-1989)			
Month	Day	Mean	Min	Max	1990
7	23	24.7	22.2	26.7	25.4
7	24	24.8	22.8	26.7	25.2
7	25	24.8	22.8	26.7	25.2
7	26	24.9	22.8	26.7	25.6
7	27	25.1	22.8	27.2	25.8
7	28	25.1	22.8	27.2	25.8
7	29	25.1	22.8	26.7	26.3
7	30	25.1	23.3	26.7	26.3
7	31	25.2	23.3	26.7	26.2
8	1	25.2	23.3	26.7	26.2
8	2	25.2	22.8	26.7	26.2
8	3	25.2	23.3	26.8	26.3
8	4	25.3	23.3	26.9	26.5
8	5	25.3	23.3	27.2	26.6
8	6	25.3	23.3	27.2	26.5
8	7	25.3	23.3	27.4	26.5
8	8	25.3	23.3	27.4	26.3
8	9	25.3	23.3	27.8	26.0
8	10	25.3	23.3	27.8	26.2
8	11	25.3	22.8	27.8	25.9
8	12	25.3	22.8	28.1	26.0
8	13	25.1	22.2	28.0	26.1
8	14	25.0	22.2	28.4	25.8
8	15	25.0	22.2	28.4	25.7
8	16	25.0	22.2	28.4	25.6
8	17	24.9	22.2	28.1	25.6
8	18	24.9	22.8	28.0	26.0
8	19	24.8	22.2	27.7	25.8
8	20	24.9	22.8	27.6	25.8
8	21	24.8	22.2	27.5	25.0
8	22	24.7	22.2	27.1	24.8
8	23	24.7	22.8	26.9	25.0
8	24	24.6	22.2	26.7	25.0
8	25	24.5	21.7	26.2	24.3

Note: Dashes (---) indicate no sampling.

TABLE B-4 POUGHKEEPSIE WATER WORKS DATA, MEAN, MINIMUM, AND MAXIMUM TEMPERATURE (°C) FOR EACH DAY OF THE YEAR, 1951-1990

		LONG-TERM TEMPERATURE (1951-1989)			
Month	Day	Mean	Min	Max	1990
8	26	24.5	21.7	26.1	24.4
8	27	24.4	22.2	26.1	24.1
8	28	24.3	22.2	25.8	24.3
8	29	24.2	22.2	26.7	24.0
8	30	24.3	22.2	26.1	24.0
8	31	24.2	22.2	26.1	23.9
9	1	24.1	22.2	26.1	24.1
9	2	24.1	22.2	26.7	24.1
9	3	23.9	22.2	26.1	24.3
9	4	23.8	22.2	25.6	24.0
9	5	23.8	21.7	25.6	24.0
9	6	23.7	22.2	25.6	24.3
9	7	23.6	21.7	25.6	24.3
9	8	23.5	21.7	25.6	23.8
9	9	23.4	21.7	25.6	23.6
9	10	23.3	21.1	25.6	23.5
9	11	23.2	21.1	25.6	23.7
9	12	23.1	21.1	25.6	23.9
9	13	22.8	20.0	25.6	23.7
9	14	22.6	18.9	25.0	23.9
9	15	22.5	17.8	25.0	23.8
9	16	22.3	17.2	25.0	23.2
9	17	22.1	17.2	25.0	22.8
9	18	22.0	16.7	25.0	22.0
9	19	21.9	16.7	23.9	22.2
9	20	21.7	17.2	23.9	21.7
9	21	21.4	16.7	23.3	21.5
9	22	21.3	16.1	23.3	21.9
9	23	21.0	16.1	22.8	21.5
9	24	20.8	15.6	22.8	21.1
9	25	20.6	15.6	22.8	21.0
9	26	20.5	15.6	22.2	20.7
9	27	20.3	16.1	22.2	20.2
9	28	20.1	15.6	22.2	20.4

Note: Dashes (---) indicate no sampling.

TABLE B-4 POUGHKEEPSIE WATER WORKS DATA, MEAN, MINIMUM, AND MAXIMUM TEMPERATURE (°C) FOR EACH DAY OF THE YEAR, 1951-1990

		LONG-TERM TEMPERATURE (1951-1989)			
Month	Day	Mean	Min	Max	1990
9	29	19.9	15.6	22.2	20.3
9	30	19.7	15.6	22.2	20.0
10	1	19.6	16.1	22.2	20.1
10	2	19.4	15.6	22.2	19.9
10	3	19.3	15.6	22.2	19.4
10	4	19.0	15.6	21.7	19.5
10	5	18.7	15.0	21.1	19.3
10	6	18.6	15.0	21.1	19.1
10	7	18.5	15.0	21.1	19.4
10	8	18.2	14.4	21.1	19.5
10	9	18.0	14.4	21.1	19.4
10	10	17.8	14.4	21.1	19.0
10	11	17.7	13.9	21.1	18.7
10	12	17.4	13.3	21.1	18.9
10	13	17.1	13.3	20.0	19.1
10	14	16.9	12.8	21.1	19.0
10	15	16.8	12.2	20.0	18.9
10	16	16.6	12.2	20.0	18.6
10	17	16.2	12.2	20.0	18.8
10	18	16.0	12.2	20.0	18.8
10	19	15.8	11.7	20.0	18.5
10	20	15.6	10.6	19.4	18.4
10	21	15.3	10.6	18.9	17.8
10	22	15.0	10.0	18.9	17.2
10	23	14.9	10.0	18.9	17.0
10	24	14.7	10.0	18.3	16.3
10	25	14.5	10.0	18.3	15.6
10	26	14.3	10.0	17.8	14.6
10	27	14.1	9.4	17.8	13.8
10	28	14.0	8.9	17.8	13.5
10	29	13.7	8.3	17.8	12.7
10	30	13.5	7.8	16.7	12.0
10	31	13.2	7.2	16.7	12.0
11	1	13.1	7.2	16.7	11.1

Note: Dashes (---) indicate no sampling.

TABLE B-4 POUGHKEEPSIE WATER WORKS DATA, MEAN, MINIMUM, AND MAXIMUM TEMPERATURE (°C) FOR EACH DAY OF THE YEAR, 1951-1990

		LONG-TERM TEMPERATURE (1951-1989)			
Month	Day	Mean	Min	Max	1990
11	2	12.9	7.2	16.1	11.0
11	3	12.7	7.2	16.1	11.0
11	4	12.5	7.2	16.1	10.9
11	5	12.2	7.2	15.6	10.7
11	6	12.1	6.7	15.6	10.5
11	7	11.7	6.1	15.0	10.6
11	8	11.4	6.1	15.0	10.3
11	9	11.2	5.6	15.0	10.3
11	10	11.0	5.0	15.0	10.1
11	11	10.8	5.0	15.0	9.5
11	12	10.5	5.0	15.0	8.4
11	13	10.3	5.0	13.3	8.0
11	14	10.1	5.0	13.3	7.6
11	15	9.8	5.0	12.8	7.4
11	16	9.6	5.0	12.8	7.4
11	17	9.5	5.0	12.8	7.5
11	18	9.3	5.0	12.8	7.4
11	19	9.0	5.0	12.2	6.0
11	20	8.8	5.0	11.1	5.5
11	21	8.5	3.9	11.1	6.4
11	22	8.3	3.9	11.1	6.3
11	23	8.1	3.9	11.1	6.2
11	24	7.9	3.9	10.6	6.2
11	25	7.6	3.9	10.6	6.0
11	26	7.4	3.3	10.0	6.0
11	27	7.1	3.3	10.0	5.9
11	28	7.0	3.3	10.0	6.0
11	29	6.8	3.3	10.0	6.1
11	30	6.5	2.8	10.0	6.1
12	1	6.3	2.2	9.4	6.0
12	2	6.1	3.0	8.9	6.1
12	3	5.7	2.2	8.9	6.3
12	4	5.6	1.3	8.3	6.5
12	5	5.3	2.8	7.8	6.2

Note: Dashes (---) indicate no sampling.

TABLE B-4 POUGHKEEPSIE WATER WORKS DATA, MEAN, MINIMUM, AND MAXIMUM TEMPERATURE (°C) FOR EACH DAY OF THE YEAR, 1951-1990

		LONG-TERM TEMPERATURE (1951-1989)			
Month	Day	Mean	Min	Max	1990
12	6	5.2	2.6	7.8	---
12	7	5.0	2.0	7.8	6.1
12	8	4.7	2.0	7.8	6.0
12	9	4.5	1.7	7.2	5.7
12	10	4.2	1.1	7.2	5.0
12	11	4.0	1.1	7.2	4.8
12	12	3.8	0.6	7.2	4.8
12	13	3.7	0.6	6.7	4.7
12	14	3.5	0.6	6.7	4.0
12	15	3.3	0.6	6.7	4.0
12	16	3.2	0.6	6.7	4.0
12	17	3.0	0.6	5.6	3.5
12	18	2.8	0.6	5.6	3.4
12	19	2.7	0.6	5.0	3.2
12	20	2.7	0.6	5.0	2.9
12	21	2.4	0.6	4.4	2.8
12	22	2.2	0.6	4.4	2.9
12	23	2.0	0.6	5.0	3.3
12	24	2.0	0.6	5.6	3.2
12	25	2.0	0.6	5.6	3.3
12	26	1.9	0.0	6.1	4.1
12	27	1.8	0.0	6.1	3.9
12	28	1.8	0.0	6.1	3.9
12	29	1.7	0.0	6.1	3.9
12	30	1.7	0.6	6.1	3.5
12	31	1.7	0.0	5.0	2.9

Note: Dashes (---) indicate no sampling.

TABLE B-5 WEIGHTED MEAN TEMPERATURE (°C) BY REGION AND WEEK FROM 1990 LONGITUDINAL RIVER ICHTHYOPLANKTON AND FALL JUVENILE SURVEYS

Week Beginning Monday	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL
16APR90	8.8	8.9	---	9.9	10.2	10.0	---	---	7.0	---	7.2	7.2
23APR90	10.4	10.7	10.4	9.7	10.6	10.5	10.7	10.4	9.9	10.5	9.7	9.4
30APR90	12.6	12.6	12.8	12.3	11.2	12.0	12.1	13.1	13.7	13.7	14.4	14.9
07MAY90	14.9	15.1	14.8	13.5	13.1	14.2	14.7	14.9	15.2	14.9	14.7	14.1
14MAY90	14.6	14.7	15.1	15.9	16.0	15.6	15.0	14.1	13.9	13.1	12.7	12.4
21MAY90	15.3	15.7	15.1	14.9	14.2	14.4	13.6	13.0	12.3	12.0	11.6	11.0
28MAY90	16.6	16.4	15.7	15.3	14.9	14.4	14.3	14.6	15.1	15.2	15.5	15.8
04JUN90	17.3	17.6	17.4	18.9	16.0	16.2	16.9	17.4	18.1	18.1	18.1	18.5
11JUN90	18.3	17.8	18.6	19.0	18.6	18.7	18.8	19.2	19.6	18.8	18.8	19.0
18JUN90	20.5	21.5	22.2	21.1	20.9	20.8	20.7	20.4	21.1	21.2	21.9	22.1
25JUN90	22.9	23.0	23.8	23.2	23.1	23.1	22.5	22.7	23.1	23.0	23.4	23.6
02JUL90	23.2	24.3	25.2	24.7	24.7	24.3	23.5	23.6	23.9	23.7	23.7	23.2
09JUL90	25.1	24.9	25.6	25.5	24.2	25.0	23.9	24.4	25.1	25.1	24.9	24.9
16JUL90	24.9	25.4	26.3	26.4	25.6	25.4	25.8	---	---	---	---	---
23JUL90	26.5	26.7	28.2	27.5	26.4	26.4	25.8	25.8	26.2	26.5	26.7	27.3
30JUL90	26.3	27.4	27.9	28.2	27.1	27.0	27.0	---	---	---	---	---
06AUG90	26.2	26.9	27.5	27.1	26.9	26.5	26.1	26.1	25.8	26.3	26.6	26.9
13AUG90	27.1	27.5	27.8	27.9	26.9	27.0	26.6	---	---	---	---	---
20AUG90	23.9	24.7	25.5	25.5	24.6	24.7	24.8	24.3	23.6	23.4	23.2	23.4
03SEP90	23.4	25.1	25.6	25.7	25.1	25.1	24.4	23.9	23.4	23.3	23.6	24.4
17SEP90	21.9	22.2	23.4	23.5	22.6	22.4	22.5	21.7	21.0	21.0	21.0	21.3
01OCT90	19.5	19.2	20.2	20.6	20.5	20.4	20.5	19.0	18.3	18.3	18.2	18.0
15OCT90	20.5	20.5	20.1	20.1	20.0	19.2	18.4	18.1	18.1	18.1	17.4	17.1

NOTE: Dashes (---) indicate no sampling.

TABLE B-6 MEAN TEMPERATURE (°C) BY REGION AND WEEK FROM 1990 BEACH SEINE SURVEY

Week Beginning Monday	Regions											
	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL
18JUN90	20.3	24.0	22.7	21.6	21.1	22.6	22.7	22.8	22.3	22.5	22.2	22.1
02JUL90	24.3	25.1	25.7	26.0	22.8	22.5	24.7	25.3	25.1	24.4	24.0	23.0
16JUL90	26.7	27.9	28.0	25.2	23.3	22.9	25.7	25.5	25.6	24.9	25.7	25.5
30JUL90	28.5	28.2	27.0	28.2	27.9	27.2	27.1	27.6	27.3	26.3	28.0	27.9
13AUG90	27.3	26.9	29.8	28.2	27.0	28.1	26.9	25.1	26.8	26.6	24.7	25.1
27AUG90	30.1	26.6	28.5	26.5	26.8	26.6	25.0	24.4	25.2	23.7	24.5	24.3
10SEP90	24.8	25.3	24.9	25.1	25.3	24.8	24.0	24.1	23.0	22.5	23.1	22.4
24SEP90	21.3	19.2	20.9	22.8	21.0	20.1	21.1	20.4	19.1	18.4	18.8	17.6
08OCT90	19.4	19.8	21.8	22.7	20.2	19.8	19.4	18.5	17.7	17.9	18.5	18.0
22OCT90	18.6	18.2	18.5	18.6	17.7	16.8	17.1	16.1	15.5	14.7	14.0	13.0

TABLE B-7 WEIGHTED MEAN SALINITY (PPT) BY REGION AND WEEK FROM 1990 LONGITUDINAL RIVER ICHTHYOPLANKTON AND FALL JUVENILE SURVEYS

Week Beginning Monday	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL
16APR90	2.0	1.4	---	0.1	0.1	0.1	---	---	0.1	---	0.1	0.1
23APR90	4.7	2.1	1.0	0.3	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
30APR90	4.5	1.5	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
07MAY90	6.8	4.4	1.5	0.6	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
14MAY90	0.9	0.1	0.1	0.4	0.3	0.1	0.1	0.1	0.1	0.1	0.1	0.1
21MAY90	4.4	3.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
28MAY90	2.1	0.3	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
04JUN90	3.3	3.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
11JUN90	6.2	4.8	3.6	1.6	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
18JUN90	11.4	6.0	4.5	2.6	0.8	0.1	0.1	0.1	0.1	0.1	0.1	0.1
25JUN90	8.0	6.3	3.0	1.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1
02JUL90	10.6	5.6	5.3	3.8	2.0	0.8	0.1	0.1	0.1	0.1	0.1	0.1
09JUL90	9.3	8.8	6.4	4.0	0.9	0.3	0.1	0.1	0.1	0.1	0.1	0.1
16JUL90	9.6	7.5	4.7	3.8	1.5	0.7	0.1	---	---	---	---	---
23JUL90	9.5	7.6	4.1	2.1	0.5	0.2	0.1	0.1	0.1	0.1	0.1	0.1
30JUL90	10.5	7.5	5.1	3.7	2.9	1.0	0.1	---	---	---	---	---
06AUG90	11.0	8.0	5.8	2.5	1.0	0.5	0.1	0.2	0.1	0.1	0.1	0.1
13AUG90	5.7	3.3	1.8	1.0	0.3	0.2	0.1	---	---	---	---	---
20AUG90	11.3	5.4	1.4	0.5	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
03SEP90		6.8	5.7	2.3	2.1	0.5	0.1	0.1	0.1	0.1	0.1	0.1
17SEP90	10.1	7.8		2.0	0.9	0.3	0.1	0.1	0.1	0.1	0.1	0.1
01OCT90	7.0	6.2	6.0	4.5	1.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
15OCT90	9.2	4.8	2.5	1.8	0.3	0.1	0.1	0.1	0.1	0.1	0.1	0.1

NOTE: Dashes (---) indicate no sampling.

TABLE B-8 MEAN SALINITY (PPT) BY REGION AND WEEK FROM 1990 BEACH SEINE SURVEY

Week Beginning Monday	Regions											
	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL
18JUN90	8.3	4.7	3.1	2.4	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1
02JUL90	5.7	3.8	2.5	1.8	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1
16JUL90	8.8	6.3	4.3	2.7	0.8	0.2	0.1	0.1	0.1	0.1	0.2	0.1
30JUL90	7.2	5.2	4.3	4.3	1.4	0.4	0.2	0.1	0.1	0.1	0.1	0.1
13AUG90	4.5	3.4	1.5	0.5	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1
27AUG90	2.7	1.6	0.7	0.4	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
10SEP90	7.9	6.0	4.4	2.8	1.1	0.4	0.1	0.1	0.1	0.1	0.1	0.1
24SEP90	5.9	4.2	2.7	2.0	0.5	0.2	0.1	0.1	0.1	0.1	0.1	0.1
08OCT90	9.5	6.0	3.9	3.0	0.8	0.2	0.1	0.1	0.1	0.1	0.1	0.1
22OCT90	2.8	2.1	1.0	0.4	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1

TABLE B-9 WEIGHTED MEAN DISSOLVED OXYGEN (mg/L) BY REGION AND WEEK FROM 1990 LONGITUDINAL RIVER ICHTHYOPLANKTON AND FALL JUVENILE SURVEYS

Week Beginning Monday	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL
16APR90	11.1	11.4	---	10.3	10.9	10.6	---	---	12.5	---	11.5	12.0
23APR90	9.2	9.2	10.3	10.5	11.2	11.0	11.1	12.4	12.6	12.1	13.1	13.2
30APR90	9.5	11.1	10.8	10.7	10.6	10.5	9.8	9.5	9.5	9.4	9.3	9.2
07MAY90	8.6	9.1	10.1	9.7	9.7	9.0	8.8	8.8	9.5	8.9	8.6	9.1
14MAY90	9.5	9.3	9.4	10.0	9.0	8.8	8.7	9.0	9.1	9.3	9.9	10.3
21MAY90	9.3	9.3	9.1	9.4	9.5	9.1	8.6	9.0	9.3	9.4	9.9	10.6
28MAY90	9.5	9.5	9.7	10.0	10.0	9.2	9.0	9.0	8.9	8.7	8.7	8.8
04JUN90	8.1	8.0	8.3	8.6	8.5	8.5	8.7	8.7	9.2	8.9	8.7	8.0
11JUN90	8.6	8.6	8.6	8.7	8.6	8.0	8.1	8.7	9.1	9.2	8.0	7.4
18JUN90	8.9	9.2	11.2	8.7	8.2	7.8	7.7	7.7	8.2	8.5	7.7	6.4
25JUN90	8.1	8.8	9.7	8.2	8.0	7.9	7.7	7.7	7.9	8.1	7.2	6.2
02JUL90	7.1	7.3	7.5	7.0	7.1	7.7	7.8	7.5	8.5	9.7	8.7	7.4
09JUL90	6.1	6.1	7.1	6.5	6.5	6.7	6.7	7.7	7.5	7.6	6.3	6.0
16JUL90	5.8	6.3	6.2	6.2	6.0	6.2	6.3	---	---	---	---	---
23JUL90	5.7	6.2	6.1	5.7	5.8	6.0	6.4	7.0	7.1	7.2	7.6	5.9
30JUL90	6.8	7.3	6.4	5.9	5.9	6.7	6.7	---	---	---	---	---
06AUG90	6.0	6.1	5.6	6.4	6.4	5.3	5.6	6.1	7.6	8.7	7.2	5.8
13AUG90	6.2	6.5	5.9	5.9	6.3	6.1	5.8	---	---	---	---	---
20AUG90	8.1	8.0	7.9	6.9	5.5	4.9	5.4	6.9	7.9	7.9	6.9	7.0
03SEP90		7.6	7.1	6.4	5.7	6.4	6.7	7.4	8.7	9.5	8.8	6.8
17SEP90	6.0	7.0	7.1	6.4	6.4	7.0	6.6	7.4	8.3	8.5	8.4	7.5
01OCT90	7.5	7.7	7.4	6.7	7.1	7.1	6.8	7.7	8.5	8.4	8.9	7.9
15OCT90	6.9	7.7	7.1	7.4	7.5	7.7	8.1	8.7	8.9	7.9	7.8	8.6

NOTE: Dashes (---) indicate no sampling.

TABLE B-10 MEAN DISSOLVED OXYGEN (mg/L) BY REGION AND WEEK FROM 1990 BEACH SEINE SURVEY

Week Beginning Monday	Regions											
	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL
18JUN90	11.3	9.4	8.6	8.8	8.6	8.5	8.8	8.5	8.7	8.7	8.6	6.8
02JUL90	8.0	8.0	8.1	8.0	8.2	8.1	8.0	7.9	8.9	11.1	10.2	7.0
16JUL90	7.5	9.0	8.6	6.8	5.8	6.5	6.5	7.3	7.2	7.3	7.9	6.8
30JUL90	10.1	8.7	8.2	8.5	8.5	8.1	8.3	9.0	11.4	9.9	7.9	6.4
13AUG90	7.2	7.8	7.7	6.9	7.4	8.3	7.1	7.1	8.4	8.6	7.7	7.2
27AUG90	8.2	7.8	7.0	7.0	7.2	7.6	7.5	8.3	9.4	8.8	8.3	7.7
10SEP90	6.3	8.2	7.4	6.6	8.2	7.8	7.6	8.7	8.5	9.0	10.2	8.6
24SEP90	7.2	8.2	8.4	7.5	7.2	7.6	8.0	8.3	9.4	9.2	9.9	9.2
08OCT90	7.6	7.8	7.5	6.8	7.1	7.0	7.7	8.1	8.4	8.5	9.0	8.8
22OCT90	8.4	7.8	7.8	7.6	7.8	7.9	7.9	8.1	8.7	9.0	9.3	9.9

TABLE B-11 WEIGHTED MEAN PERCENT OXYGEN SATURATION BY REGION AND WEEK FROM 1990 LONGITUDINAL RIVER ICHTHYOPLANKTON AND FALL JUVENILE SURVEYS

Week Beginning Monday	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL
16APR90	97.5	98.9	---	91.3	97.2	94.1	---	---	102.9	---	95.1	99.6
23APR90	84.9	84.1	93.2	92.3	101.0	98.7	99.5	110.5	111.3	108.1	115.7	115.4
30APR90	92.5	105.5	102.4	99.7	96.4	97.1	91.4	90.4	91.4	91.1	91.2	91.5
07MAY90	89.1	93.0	100.8	93.7	92.6	87.9	86.3	87.2	94.3	87.7	85.0	88.6
14MAY90	93.9	91.7	93.3	101.5	91.2	88.6	86.1	87.3	88.7	88.2	93.3	96.9
21MAY90	95.4	95.5	90.5	93.1	93.0	89.1	83.2	85.6	86.7	87.7	90.9	96.2
28MAY90	99.3	97.5	97.9	99.6	99.4	90.5	87.5	88.1	88.3	86.7	86.9	89.0
04JUN90	86.0	85.9	86.5	92.1	85.8	86.4	90.0	90.9	97.1	94.4	92.3	85.1
11JUN90	95.3	93.9	94.2	94.9	91.9	86.1	87.3	94.5	99.6	98.6	85.6	80.3
18JUN90	10.0	108.9	131.9	99.3	91.7	87.3	86.0	85.9	91.7	95.4	87.4	73.3
25JUN90	99.2	107.3	116.6	96.5	93.6	91.9	89.3	89.1	92.0	94.6	85.0	73.7
02JUL90	88.2	90.6	93.3	86.3	86.5	92.8	91.6	88.2	100.2	114.3	102.8	86.5
09JUL90	77.9	77.8	90.2	81.8	78.1	81.3	79.2	92.1	91.5	92.3	76.1	72.6
16JUL90	74.3	80.7	78.8	78.1	74.0	76.0	77.9	---	---	---	---	---
23JUL90	74.8	80.6	79.8	73.3	72.0	74.0	78.1	85.6	87.7	89.0	94.9	74.4
30JUL90	89.5	96.7	84.7	76.8	75.4	84.3	83.6	---	---	---	---	---
06AUG90	78.9	79.7	73.7	81.4	80.1	66.6	68.6	75.7	93.9	107.2	88.3	71.6
13AUG90	81.1	83.6	76.4	75.7	79.5	76.3	72.2	---	---	---	---	---
20AUG90	103.6	100.1	97.1	84.7	66.1	59.5	65.0	82.3	93.4	92.6	81.0	82.2
03SEP90		96.1	90.0	80.4	70.1	78.0	80.3	88.0	101.7	111.1	103.9	81.1
17SEP90	72.9	83.0		75.7	74.5	80.9	76.6	84.5	93.2	94.8	93.8	85.0
01OCT90	85.2	86.5	85.1	76.6	79.2	79.0	76.0	82.7	89.8	88.8	94.0	83.3
15OCT90	81.7	88.3	79.6	82.9	82.3	83.3	85.9	91.9	93.8	83.9	81.0	89.5

NOTE: Dashes (---) indicate no sampling.

TABLE B-12 MEAN PERCENT OXYGEN SATURATION BY REGION AND WEEK FROM 1990 BEACH SEINE SURVEY

Week Beginning Monday	Regions											
	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL
18JUN90	131.7	115.3	102.0	100.9	96.3	98.1	101.4	99.1	99.9	100.8	98.5	78.1
02JUL90	98.6	99.1	101.2	99.5	95.1	93.0	95.8	95.7	99.2	132.4	121.6	82.1
16JUL90	99.4	119.1	113.4	83.4	68.7	75.3	80.0	89.1	87.9	87.7	97.0	82.5
30JUL90	135.5	115.5	105.8	111.6	108.4	101.9	104.3	113.6	143.2	122.4	100.5	82.0
13AUG90	94.0	99.7	102.9	88.8	93.1	106.0	89.5	85.5	105.0	107.5	93.1	86.9
27AUG90	110.1	98.2	90.2	86.8	90.1	95.1	90.7	98.8	114.4	104.2	99.2	92.5
10SEP90	79.8	104.1	92.3	81.4	100.3	93.7	90.3	103.2	99.7	104.0	119.6	99.2
24SEP90	84.8	91.4	94.7	88.0	81.1	83.2	90.2	92.3	101.2	97.8	106.2	95.9
08OCT90	88.2	88.7	87.3	79.6	78.2	77.3	83.8	86.5	88.0	90.0	96.0	93.4
22OCT90	91.8	83.5	83.5	81.4	81.7	81.7	81.6	82.5	87.0	88.9	89.8	94.0

TABLE B-13 WEIGHTED MEAN CONDUCTIVITY (mS/cm AT 25 C) BY REGION AND WEEK FROM 1990 LONGITUDINAL RIVER ICHTHYOPLANKTON AND FALL JUVENILE SURVEYS

Week Beginning Monday	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL
16APR90	3.4	2.5	---	0.3	0.2	0.1	---	---	0.2	---	0.2	0.2
23APR90	8.2	3.7	1.7	0.5	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2
30APR90	7.7	2.6	0.2	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.1
07MAY90	11.7	7.6	2.7	1.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
14MAY90	1.6	0.2	0.2	0.8	0.6	0.2	0.2	0.2	0.2	0.2	0.2	0.2
21MAY90	7.7	5.6	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
28MAY90	3.6	0.5	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1
04JUN90	5.7	5.2	0.2	0.2	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2
11JUN90	10.7	8.2	6.2	2.9	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
18JUN90	19.2	10.4	7.8	4.5	1.4	0.2	0.2	0.2	0.2	0.2	0.2	0.2
25JUN90	13.7	10.8	5.3	2.2	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2
02JUL90	17.8	9.7	9.1	6.6	3.5	1.4	0.2	0.2	0.2	0.2	0.2	0.2
09JUL90	15.8	14.9	11.0	7.1	1.6	0.5	0.2	0.2	0.2	0.2	0.2	0.3
16JUL90	16.2	12.9	8.1	6.6	2.7	1.2	0.2	---	---	---	---	---
23JUL90	16.1	13.1	7.1	3.7	0.9	0.3	0.3	0.3	0.3	0.3	0.3	0.2
30JUL90	17.6	12.8	8.8	6.4	5.1	1.7	0.3	---	---	---	---	---
06AUG90	18.7	13.7	10.1	4.3	1.7	0.8	0.3	0.3	0.2	0.3	0.2	0.2
13AUG90	10.0	5.7	3.1	1.7	0.4	0.3	0.2	---	---	---	---	---
20AUG90	18.9	9.3	2.5	0.9	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2
03SEP90		11.6	9.9	4.0	3.8	0.9	0.2	0.2	0.2	0.2	0.2	0.2
17SEP90	17.2	13.5		3.5	1.6	0.5	0.2	0.2	0.2	0.3	0.3	0.3
01OCT90	12.0	10.8	10.5	7.9	1.9	0.2	0.2	0.2	0.3	0.2	0.2	0.2
15OCT90	15.6	8.4	4.4	3.3	0.5	0.2	0.2	0.2	0.2	0.2	0.2	0.2

NOTE: Dashes (---) indicate no sampling.

TABLE B-14 MEAN CONDUCTIVITY (mS/cm AT 25 °C) BY REGION AND WEEK FROM 1990 BEACH SEINE SURVEY

Week Beginning Monday	Regions											
	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL
18JUN90	14.2	8.2	5.5	4.2	0.4	0.2	0.2	0.2	0.1	0.2	0.2	0.2
02JUL90	9.9	6.7	4.4	3.3	0.4	0.2	0.2	0.2	0.2	0.2	0.2	0.2
16JUL90	15.1	10.8	7.4	4.7	1.3	0.4	0.2	0.2	0.3	0.3	0.3	0.2
30JUL90	12.4	9.0	7.4	7.4	2.4	0.7	0.3	0.3	0.3	0.2	0.2	0.2
13AUG90	7.9	5.9	2.6	0.9	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2
27AUG90	4.8	2.8	1.3	0.7	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3
10SEP90	13.5	10.4	7.7	4.9	2.0	0.8	0.3	0.2	0.2	0.2	0.3	0.3
24SEP90	10.2	7.3	4.7	3.5	0.9	0.3	0.2	0.2	0.3	0.3	0.3	0.2
08OCT90	16.2	10.4	6.8	5.2	1.4	0.3	0.2	0.3	0.3	0.2	0.2	0.2
22OCT90	5.0	3.7	1.8	0.6	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2

APPENDIX C

DENSITY AND STANDING CROP ESTIMATES

APPENDIX C

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APPENDIX C

LIST OF TABLES (Cont.)

APPENDIX C

LIST OF TABLES (Cont.)

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APPENDIX C

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APPENDIX C

LIST OF TABLES

Table C-1 Regional Density (No./1,000m3) of Striped Bass Eggs
in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1990

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
19APR-23APR	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	0.00	NS	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00	0.00	0.00
	NO. TOWS		6	8	8	4	5	6	3		7		11	24	82
23APR-26APR	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		10	12	13	10	6	10	6	7	7	8	9	9	107
30APR-03MAY	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.94	1.91	29.06	2.91	0.36	2.52	12.83	4.21
	SE		0.00	0.00	0.00	0.00	0.00	0.61	1.22	14.63	1.26	0.36	2.52	10.81	18.46
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
07MAY-10MAY	DENSITY	NS	0.00	0.00	0.00	0.50	20.66	1505.27	338.71	318.39	21.52	18.13	0.00	0.00	185.26
	SE		0.00	0.00	0.00	0.50	7.54	448.22	109.29	151.63	5.80	9.91	0.00	0.00	485.83
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
14MAY-17MAY	DENSITY	NS	0.00	0.16	0.48	109.03	1022.54	327.76	344.76	26.69	1.51	1.01	2.51	0.00	153.04
	SE		0.00	0.16	0.24	74.26	500.93	267.16	110.73	24.26	0.93	1.01	2.51	0.00	583.67
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	5	10	116
21MAY-24MAY	DENSITY	NS	0.00	2.16	9.04	0.53	25.22	95.40	347.27	169.03	85.50	221.05	438.60	30.26	118.67
	SE		0.00	1.62	5.30	0.36	12.67	40.48	212.91	62.75	34.51	94.12	254.64	2.82	354.97
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	5	109
29MAY-02JUN	DENSITY	NS	0.00	4.92	0.45	0.77	10.91	76.58	257.86	1932.14	12.35	66.94	0.00	0.00	196.91
	SE		0.00	3.14	0.32	0.68	9.17	34.83	112.80	793.95	7.07	48.85	0.00	0.00	804.25
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
04JUN-07JUN	DENSITY	NS	0.00	0.00	10.19	39.98	433.41	725.43	1597.27	500.70	717.91	143.81	6.73	0.80	348.02
	SE		0.00	0.00	3.97	21.00	307.84	534.75	1043.98	282.30	419.88	52.93	6.73	0.80	1315.26
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
11JUN-14JUN	DENSITY	0.00	0.00	0.00	0.00	0.00	24.55	44.18	114.27	70.41	173.92	429.23	77.52	3.18	72.10
	SE	0.00	0.00	0.00	0.00	0.00	12.36	29.47	74.00	26.00	84.78	182.89	48.55	3.18	224.00
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
18JUN-21JUN	DENSITY	0.00	0.00	0.00	0.00	1.76	1.73	1.86	6.22	36.79	57.36	3.15	2.85	0.58	8.64
	SE	0.00	0.00	0.00	0.00	1.76	1.73	1.26	4.57	23.21	52.75	1.75	2.85	0.58	57.97
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
25JUN-28JUN	DENSITY	0.00	0.00	235.41	0.00	0.00	0.00	0.00	0.00	0.00	0.34	0.00	0.00	0.51	18.17
	SE	0.00	0.00	235.41	0.00	0.00	0.00	0.00	0.00	0.00	0.34	0.00	0.00	0.51	235.41
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
02JUL-06JUL	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	6	11	14	11	13	9	13	8	10	7	6	6	6	120
16JUL-19JUL	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						0.00
	NO. TOWS	7	10	11	12	10	6	10	6						72
30JUL-02AUG	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						0.00
	NO. TOWS	7	11	11	12	10	6	10	6						73
14AUG-16AUG	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						0.00
	NO. TOWS	7	11	11	12	10	5	9	6						71

Table C-2 Regional Standing Crop (In Thousands) of Striped Bass Eggs in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1990

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
19APR-23APR	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	0.00	NS	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00	0.00	0.00
	NO. TOWS		6	8	8	4	5	6	3		7		11	24	82
23APR-26APR	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		10	12	13	10	6	10	6	7	7	8	9	9	107
30APR-03MAY	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	131.86	567.97	4809.63	411.61	63.29	405.75	912.60	7302.70
	SE		0.00	0.00	0.00	0.00	0.00	85.33	364.07	2420.28	178.26	63.29	405.75	768.81	2605.59
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
07MAY-10MAY	St. Crop	NS	0.00	0.00	0.00	104.19	4286.89	210423.70	100979.81	52687.91	3044.02	3195.83	0.00	0.00	374722.34
	SE		0.00	0.00	0.00	104.19	1565.10	62657.37	32582.02	25092.80	820.76	1746.35	0.00	0.00	74989.11
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
14MAY-17MAY	St. Crop	NS	0.00	52.85	71.38	22714.62	212131.84	45818.05	102784.94	4416.18	213.27	178.78	403.51	0.00	388785.42
	SE		0.00	52.85	35.74	15470.34	103920.07	37346.53	33012.60	4014.58	131.72	178.78	403.51	0.00	116359.96
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	5	10	116
21MAY-24MAY	St. Crop	NS	0.00	696.49	1336.05	111.01	5232.56	13336.26	103532.49	27972.03	12095.95	38970.24	70497.07	2152.77	275932.92
	SE		0.00	520.44	782.94	75.32	2629.47	5658.36	63476.54	10384.16	4882.65	16593.49	40929.31	200.44	78430.58
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	5	109
29MAY-02JUN	St. Crop	NS	0.00	1582.02	66.38	161.36	2262.59	10704.89	76876.98	319738.79	1747.79	11800.77	0.00	0.00	424941.57
	SE		0.00	1010.56	47.64	141.11	1902.09	4868.81	33628.37	131386.08	999.96	8611.75	0.00	0.00	136002.57
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
04JUN-07JUN	St. Crop	NS	0.00	0.00	1505.83	8330.07	89913.72	101409.08	476199.13	82857.73	101562.63	25352.86	1081.50	56.63	888269.18
	SE		0.00	0.00	585.90	4374.86	63863.13	74753.32	311245.28	46716.45	59401.06	9330.54	1081.50	56.63	335199.66
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
11JUN-14JUN	St. Crop	0.00	0.00	0.00	0.00	0.00	5092.04	6175.53	34066.39	11651.96	24603.86	75671.43	12459.58	226.51	169947.29
	SE	0.00	0.00	0.00	0.00	0.00	2564.53	4119.75	22060.59	4303.33	11993.96	32242.31	7803.39	226.51	42108.23
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
18JUN-21JUN	St. Crop	0.00	0.00	0.00	0.00	367.08	359.44	259.98	1855.65	6088.84	8114.73	555.49	458.17	41.23	18100.61
	SE	0.00	0.00	0.00	0.00	367.08	359.44	175.69	1362.20	3840.64	7461.96	309.25	458.17	41.23	8537.51
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
25JUN-28JUN	St. Crop	0.00	0.00	75758.76	0.00	0.00	0.00	0.00	0.00	0.00	47.66	0.00	0.00	36.50	75842.92
	SE	0.00	0.00	75758.76	0.00	0.00	0.00	0.00	0.00	0.00	47.66	0.00	0.00	36.50	75758.79
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
02JUL-06JUL	St. Crop	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	6	11	14	11	13	9	13	8	10	7	6	6	6	120
16JUL-19JUL	St. Crop	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						0.00
	NO. TOWS	7	10	11	12	10	6	10	6						72
30JUL-02AUG	St. Crop	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						0.00
	NO. TOWS	7	11	11	12	10	6	10	6						73
14AUG-16AUG	St. Crop	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						0.00
	NO. TOWS	7	11	11	12	10	5	9	6						71

Table C-3 Regional Density (No./1,000m3) of Striped Bass Yolk-Sac Larvae in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1990

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
19APR-23APR	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	0.00	NS	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00	0.00	0.00
	NO. TOWS		6	8	8	4	5	6	3		7		11	24	82
23APR-26APR	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		10	12	13	10	6	10	6	7	7	8	9	9	107
30APR-03MAY	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.44	0.00	0.12
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.44	0.00	1.44
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
07MAY-10MAY	DENSITY	NS	0.00	0.00	0.00	1.16	7.38	89.68	116.85	51.66	10.93	21.86	0.00	0.00	24.96
	SE		0.00	0.00	0.00	0.62	2.82	24.19	20.60	21.59	4.41	9.10	0.00	0.00	39.82
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
14MAY-17MAY	DENSITY	NS	32.87	105.10	112.23	1415.87	403.95	46.84	5.03	15.66	0.00	0.00	13.96	0.64	179.35
	SE		14.06	48.59	24.99	460.80	82.99	15.17	2.21	15.11	0.00	0.00	13.96	0.64	472.30
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	5	10	116
21MAY-24MAY	DENSITY	NS	35.50	1868.16	84.03	152.74	7.80	52.86	21.85	9.85	1.09	0.00	0.00	2.36	186.35
	SE		10.21	440.37	17.19	76.51	2.07	27.50	7.77	2.38	0.84	0.00	0.00	1.80	448.34
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	5	109
29MAY-02JUN	DENSITY	NS	137.12	1577.96	783.31	764.78	228.66	391.34	1592.24	399.14	9.80	7.09	0.00	0.00	490.95
	SE		18.67	397.49	211.55	699.86	91.03	87.95	677.76	113.92	4.90	3.32	0.00	0.00	1086.87
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
04JUN-07JUN	DENSITY	NS	0.00	5.18	74.97	886.53	1228.35	2749.32	3269.14	1467.67	237.89	28.17	1.41	0.00	829.05
	SE		0.00	4.69	16.93	219.72	413.94	1575.09	1297.53	628.83	160.42	18.98	1.00	0.00	2192.25
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
11JUN-14JUN	DENSITY	0.50	0.00	0.31	0.53	152.50	1084.16	1877.23	1540.40	2713.55	459.19	576.26	38.82	1.17	649.58
	SE	0.50	0.00	0.31	0.32	112.29	306.92	1197.80	733.17	750.08	179.82	138.98	17.50	0.59	1641.24
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
18JUN-21JUN	DENSITY	0.00	0.00	0.00	0.00	66.17	38.13	332.99	280.07	509.04	181.08	35.54	24.30	0.00	112.87
	SE	0.00	0.00	0.00	0.00	37.56	16.04	79.11	88.14	191.09	73.59	14.91	10.42	0.00	240.74
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
25JUN-28JUN	DENSITY	0.00	0.00	0.00	0.26	0.50	6.65	4.42	16.81	1.55	0.89	1.77	0.00	1.34	2.63
	SE	0.00	0.00	0.00	0.26	0.40	3.13	2.33	6.75	1.20	0.89	1.08	0.00	1.34	8.14
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
02JUL-06JUL	DENSITY	0.00	0.00	0.00	0.00	0.17	0.53	0.00	0.69	0.62	0.00	0.00	0.76	0.54	0.25
	SE	0.00	0.00	0.00	0.00	0.17	0.53	0.00	0.69	0.62	0.00	0.00	0.76	0.54	1.42
	NO. TOWS	6	11	14	11	13	9	13	8	10	7	6	6	6	120
16JUL-19JUL	DENSITY	0.00	0.00	0.00	0.25	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.03
	SE	0.00	0.00	0.00	0.25	0.00	0.00	0.00	0.00						0.25
	NO. TOWS	7	10	11	12	10	6	10	6						72
30JUL-02AUG	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						0.00
	NO. TOWS	7	11	11	12	10	6	10	6						73
14AUG-16AUG	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						0.00
	NO. TOWS	7	11	11	12	10	5	9	6						71

Table C-4 Regional Standing Crop (In Thousands) of Striped Bass Yolk-Sac Larvae in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1990

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
19APR-	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	0.00	NS	0.00	0.00	0.00
23APR	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00	0.00	0.00
	NO. TOWS		6	8	8	4	5	6	3		7		11	24	82
23APR-	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
26APR	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		10	12	13	10	6	10	6	7	7	8	9	9	107
30APR-	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	232.06	0.00	232.06
03MAY	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	232.06	0.00	232.06
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
07MAY-	St. Crop	NS	0.00	0.00	0.00	241.37	1530.95	12535.81	34837.80	8549.72	1546.19	3854.13	0.00	0.00	63095.96
10MAY	SE		0.00	0.00	0.00	129.86	585.09	3381.20	6141.40	3572.53	624.19	1603.54	0.00	0.00	8076.67
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
14MAY-	St. Crop	NS	7540.33	33821.50	16580.63	294977.69	83801.28	6547.17	1499.36	2591.80	0.00	0.00	2243.96	45.64	449649.36
17MAY	SE		3225.64	15636.46	3691.73	96001.01	17216.48	2120.18	659.08	2499.85	0.00	0.00	2243.96	45.64	98981.56
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	5	10	116
21MAY-	St. Crop	NS	8145.18	601194.09	12414.52	31821.19	1618.68	7389.11	6513.31	1630.37	153.76	0.00	0.00	167.80	671047.99
24MAY	SE		2342.04	141716.95	2539.50	15939.04	429.56	3844.41	2316.11	393.99	119.26	0.00	0.00	127.81	142724.19
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	5	109
29MAY-	St. Crop	NS	31459.19	507806.51	115723.99	159331.16	47436.56	54705.63	474699.99	66052.08	1386.82	1250.69	0.00	0.00	1459852.62
02JUN	SE		4282.52	127915.64	31253.28	145807.18	18885.67	12294.07	202061.91	18852.04	692.81	584.65	0.00	0.00	283390.72
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
04JUN-	St. Crop	NS	0.00	1667.05	11076.18	184696.01	254827.69	384330.30	974639.12	242876.80	33654.49	4965.54	226.27	0.00	2092959.46
07JUN	SE		0.00	1510.79	2500.56	45776.47	85875.08	220183.28	386836.87	104062.42	22694.59	3345.77	160.30	0.00	467928.68
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
11JUN-	St. Crop	105.01	0.00	99.21	77.60	31770.58	224914.25	262420.17	459244.05	449050.93	64961.06	101591.81	6239.46	83.08	1600557.20
14JUN	SE	105.01	0.00	99.21	47.52	23394.40	63671.32	167441.76	218582.77	124127.50	25439.10	24502.44	2813.20	41.65	311575.99
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
18JUN-	St. Crop	0.00	0.00	0.00	0.00	13785.36	7910.53	46548.35	83497.63	84238.68	25617.13	6265.20	3905.72	0.00	271768.60
21JUN	SE	0.00	0.00	0.00	0.00	7824.35	3327.82	11059.28	26276.63	31622.22	10410.27	2628.98	1675.54	0.00	44756.24
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
25JUN-	St. Crop	0.00	0.00	0.00	39.02	104.83	1380.03	617.46	5011.36	256.42	125.36	312.20	0.00	95.16	7941.84
28JUN	SE	0.00	0.00	0.00	39.02	83.47	649.78	325.50	2011.94	198.32	125.36	190.87	0.00	95.16	2164.51
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
02JUL-	St. Crop	0.00	0.00	0.00	0.00	35.88	109.48	0.00	204.49	102.19	0.00	0.00	122.32	38.07	612.43
06JUL	SE	0.00	0.00	0.00	0.00	35.88	109.48	0.00	204.49	102.19	0.00	0.00	122.32	38.07	286.26
	NO. TOWS	6	11	14	11	13	9	13	8	10	7	6	6	6	120
16JUL-	St. Crop	0.00	0.00	0.00	37.30	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	37.30
19JUL	SE	0.00	0.00	0.00	37.30	0.00	0.00	0.00	0.00						37.30
	NO. TOWS	7	10	11	12	10	6	10	6						72
30JUL-	St. Crop	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
02AUG	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						0.00
	NO. TOWS	7	11	11	12	10	6	10	6						73
14AUG-	St. Crop	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
16AUG	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						0.00
	NO. TOWS	7	11	11	12	10	5	9	6						71

Table C-5 Regional Density (No./1,000m3) of Striped Bass Post Yolk-Sac Larvae in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1990

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
19APR-	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	0.00	NS	0.00	0.00	0.00
23APR	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00	0.00	0.00
	NO. TOWS		6	8	8	4	5	6	3		7		11	24	82
23APR-	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
26APR	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		10	12	13	10	6	10	6	7	7	8	9	9	107
30APR-	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
03MAY	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
07MAY-	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10MAY	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
14MAY-	DENSITY	NS	0.00	0.00	1.23	4.02	1.37	1.07	0.64	0.00	0.00	0.00	0.00	0.00	0.69
17MAY	SE		0.00	0.00	0.62	3.22	1.37	0.73	0.64	0.00	0.00	0.00	0.00	0.00	3.68
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	5	10	116
21MAY-	DENSITY	NS	132.09	382.53	126.22	46.77	11.18	4.25	0.00	0.00	0.00	0.00	0.00	0.00	58.59
24MAY	SE		110.13	69.12	52.95	16.98	4.42	1.75	0.00	0.00	0.00	0.00	0.00	0.00	141.50
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	5	109
29MAY-	DENSITY	NS	281.42	953.83	24.76	7.32	14.43	0.78	0.62	0.18	0.30	1.02	0.00	0.00	107.06
02JUN	SE		68.64	747.62	12.89	3.97	9.33	0.48	0.62	0.18	0.30	1.02	0.00	0.00	750.94
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
04JUN-	DENSITY	NS	14.69	211.01	50.59	143.02	503.94	336.67	1583.94	13.15	2.84	0.00	0.00	0.00	238.32
07JUN	SE		3.67	105.08	8.77	21.21	243.04	105.01	1287.37	6.75	2.02	0.00	0.00	0.00	1318.73
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
11JUN-	DENSITY	0.00	0.00	0.65	36.57	701.44	4577.23	6257.71	6991.25	2214.37	289.78	242.88	1.82	0.00	1639.52
14JUN	SE	0.00	0.00	0.65	24.38	160.41	2369.44	3604.95	3056.84	773.25	78.11	96.79	1.82	0.00	5347.33
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
18JUN-	DENSITY	0.00	0.19	20.62	201.37	3744.68	5149.53	5271.23	3533.01	1297.92	580.86	593.24	799.44	37.09	1633.01
21JUN	SE	0.00	0.19	7.94	56.18	393.48	2185.74	1655.58	733.82	219.54	145.92	254.04	680.76	37.09	2968.80
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
25JUN-	DENSITY	6.88	11.45	127.67	1004.73	1500.33	1135.51	1232.39	773.58	824.18	1207.50	513.87	615.25	3.11	688.96
28JUN	SE	1.89	2.46	26.13	255.51	234.40	294.14	166.19	193.83	194.64	246.15	325.74	298.45	2.61	752.52
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
02JUL-	DENSITY	0.00	3.69	63.09	74.58	269.58	353.41	1725.32	335.97	282.38	668.17	304.37	564.95	12.45	358.31
06JUL	SE	0.00	0.79	8.93	18.64	79.10	82.76	767.21	121.39	115.39	345.79	104.77	89.47	10.63	876.85
	NO. TOWS	6	11	14	11	13	9	13	8	10	7	6	6	6	120
16JUL-	DENSITY	0.00	0.00	2.60	225.36	19.73	1.57	29.44	14.68	NS	NS	NS	NS	NS	36.67
19JUL	SE	0.00	0.00	1.53	147.33	12.05	0.97	4.86	7.24						148.09
	NO. TOWS	7	10	11	12	10	6	10	6						72
30JUL-	DENSITY	0.00	0.00	0.00	0.00	0.00	6.43	0.16	0.00	NS	NS	NS	NS	NS	0.82
02AUG	SE	0.00	0.00	0.00	0.00	0.00	6.43	0.16	0.00						6.43
	NO. TOWS	7	11	11	12	10	6	10	6						73
14AUG-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
16AUG	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						0.00
	NO. TOWS	7	11	11	12	10	5	9	6						71

Table C-6 Regional Standing Crop (In Thousands) of Striped Bass Post Yolk-Sac Larvae in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1990

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
19APR-23APR	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	0.00	NS	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00	0.00	0.00
	NO. TOWS		6	8	8	4	5	6	3		7		11	24	82
23APR-26APR	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		10	12	13	10	6	10	6	7	7	8	9	9	107
30APR-03MAY	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
07MAY-10MAY	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
14MAY-17MAY	St. Crop	NS	0.00	0.00	182.37	837.89	284.94	148.93	191.21	0.00	0.00	0.00	0.00	0.00	1645.34
	SE		0.00	0.00	91.29	670.67	284.94	101.54	191.21	0.00	0.00	0.00	0.00	0.00	765.63
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	5	10	116
21MAY-24MAY	St. Crop	NS	30303.24	123102.24	18647.64	9744.56	2319.21	594.52	0.00	0.00	0.00	0.00	0.00	0.00	184711.42
	SE		25266.34	22243.91	7822.98	3536.99	916.09	244.98	0.00	0.00	0.00	0.00	0.00	0.00	34753.25
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	5	109
29MAY-02JUN	St. Crop	NS	64562.38	306954.32	3657.59	1525.40	2994.34	108.73	185.50	30.09	42.63	179.59	0.00	0.00	380240.57
	SE		15746.42	240591.27	1904.54	826.46	1935.41	66.91	185.50	30.09	42.63	179.59	0.00	0.00	241122.87
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
04JUN-07JUN	St. Crop	NS	3369.45	67906.88	7474.41	29795.23	104544.60	47062.81	472226.05	2176.58	401.13	0.00	0.00	0.00	734957.15
	SE		840.85	33815.98	1294.93	4419.78	50420.60	14679.78	383808.56	1116.70	286.23	0.00	0.00	0.00	388887.53
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
11JUN-14JUN	St. Crop	0.00	0.00	210.38	5402.36	146135.17	949572.03	874772.08	2084326.71	366444.41	40995.04	42819.17	292.01	0.00	4510969.36
	SE	0.00	0.00	210.38	3601.22	33419.67	491554.96	503940.05	911346.04	127961.64	11050.90	17063.30	292.01	0.00	1159332.09
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
18JUN-21JUN	St. Crop	0.00	42.70	6634.79	29749.76	780151.99	1068299.07	736870.13	1053307.09	214785.71	82174.00	104585.30	128494.79	2638.86	4207734.20
	SE	0.00	42.70	2555.96	8299.24	81976.65	453444.52	231434.91	218776.05	36330.10	20643.31	44786.07	109420.12	2638.86	574076.77
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
25JUN-28JUN	St. Crop	1438.10	2627.28	41085.07	148435.16	312573.21	235568.66	172276.85	230628.95	136388.39	170824.63	90592.51	98890.46	221.05	1641550.32
	SE	395.39	565.14	8409.90	37748.51	48832.98	61021.95	23232.45	57787.68	32210.28	34822.29	57426.96	47969.63	185.38	139042.16
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
02JUL-06JUL	St. Crop	0.00	847.58	20303.32	11018.37	56164.01	73316.22	241184.82	100164.27	46729.73	94525.36	53659.49	90805.93	885.91	789605.00
	SE	0.00	182.36	2873.24	2754.24	16479.09	17168.65	107249.47	36189.06	19096.00	48919.24	18471.13	14380.69	756.54	129230.81
	NO. TOWS	6	11	14	11	13	9	13	8	10	7	6	6	6	120
16JUL-19JUL	St. Crop	0.00	0.00	837.81	33294.24	4111.37	326.74	4114.76	4376.78	NS	NS	NS	NS	NS	47061.69
	SE	0.00	0.00	491.10	21766.13	2511.44	201.73	679.84	2157.84						22033.43
	NO. TOWS	7	10	11	12	10	6	10	6						72
30JUL-02AUG	St. Crop	0.00	0.00	0.00	0.00	0.00	1334.53	22.13	0.00	NS	NS	NS	NS	NS	1356.66
	SE	0.00	0.00	0.00	0.00	0.00	1334.53	22.13	0.00						1334.72
	NO. TOWS	7	11	11	12	10	6	10	6						73
14AUG-16AUG	St. Crop	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						0.00
	NO. TOWS	7	11	11	12	10	5	9	6						71

Table C-7 Regional Density (No./1,000m3) of Striped Bass Young of Year in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1990

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
19APR-23APR	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	0.00	NS	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00	0.00	0.00
	NO. TOWS		6	8	8	4	5	6	3		7		11	24	82
23APR-26APR	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		10	12	13	10	6	10	6	7	7	8	9	9	107
30APR-03MAY	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
07MAY-10MAY	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
14MAY-17MAY	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	5	10	116
21MAY-24MAY	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	5	109
29MAY-02JUN	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
04JUN-07JUN	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
11JUN-14JUN	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
18JUN-21JUN	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
25JUN-28JUN	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.94	0.00	0.00	0.00	0.00	0.00	0.00	0.07
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.67	0.00	0.00	0.00	0.00	0.00	0.00	0.67
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
02JUL-06JUL	DENSITY	0.00	0.00	8.96	15.54	1.95	2.50	13.88	0.62	0.78	10.82	24.61	10.82	0.70	7.01
	SE	0.00	0.00	2.80	7.31	1.15	2.16	9.65	0.36	0.64	9.07	13.44	6.20	0.70	21.51
	NO. TOWS	6	11	14	11	13	9	13	8	10	7	6	6	6	120
16JUL-19JUL	DENSITY	0.00	0.00	3.93	875.53	4.01	3.81	4.08	7.95	NS	NS	NS	NS	NS	112.41
	SE	0.00	0.00	3.61	828.29	0.86	1.02	1.26	2.10						828.30
	NO. TOWS	7	10	11	12	10	6	10	6						72
30JUL-02AUG	DENSITY	0.00	0.00	3.15	12.01	0.00	3.49	4.92	1.71	NS	NS	NS	NS	NS	3.16
	SE	0.00	0.00	3.15	11.20	0.00	2.53	3.44	1.71						12.51
	NO. TOWS	7	11	11	12	10	6	10	6						73
14AUG-16AUG	DENSITY	0.00	0.47	2.95	18.23	2.47	3.61	1.57	0.84	NS	NS	NS	NS	NS	3.77
	SE	0.00	0.47	0.45	14.60	1.86	3.61	0.76	0.84						15.21
	NO. TOWS	7	11	11	12	10	5	9	6						71

Table C-8 Regional Standing Crop (In Thousands) of Striped Bass Young of Year in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1990

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
19APR-23APR	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	0.00	NS	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00	0.00	0.00
	NO. TOWS		6	8	8	4	5	6	3		7		11	24	82
23APR-26APR	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		10	12	13	10	6	10	6	7	7	8	9	9	107
30APR-03MAY	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
07MAY-10MAY	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
14MAY-17MAY	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	5	10	116
21MAY-24MAY	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	5	109
29MAY-02JUN	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
04JUN-07JUN	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
11JUN-14JUN	St. Crop	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
18JUN-21JUN	St. Crop	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
25JUN-28JUN	St. Crop	0.00	0.00	0.00	0.00	0.00	0.00	131.05	0.00	0.00	0.00	0.00	0.00	0.00	131.05
	SE	0.00	0.00	0.00	0.00	0.00	0.00	93.66	0.00	0.00	0.00	0.00	0.00	0.00	93.66
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
02JUL-06JUL	St. Crop	0.00	0.00	2883.61	2295.57	406.09	518.40	1940.88	185.13	128.31	1531.29	4339.43	1738.89	49.98	16017.58
	SE	0.00	0.00	901.04	1079.27	240.24	449.05	1349.60	108.05	105.48	1282.70	2369.61	997.33	49.98	3512.52
	NO. TOWS	6	11	14	11	13	9	13	8	10	7	6	6	6	120
16JUL-19JUL	St. Crop	0.00	0.00	1263.96	129348.58	835.65	790.42	570.99	2369.35	NS	NS	NS	NS	NS	135178.96
	SE	0.00	0.00	1161.48	122369.15	179.46	211.03	175.88	625.06						122376.70
	NO. TOWS	7	10	11	12	10	6	10	6						72
30JUL-02AUG	St. Crop	0.00	0.00	1014.72	1773.95	0.00	723.01	687.41	510.19	NS	NS	NS	NS	NS	4709.28
	SE	0.00	0.00	1014.72	1654.84	0.00	524.65	480.82	510.19						2129.52
	NO. TOWS	7	11	11	12	10	6	10	6						73
14AUG-16AUG	St. Crop	0.00	107.91	950.58	2693.59	515.19	748.40	219.10	249.58	NS	NS	NS	NS	NS	5484.35
	SE	0.00	107.91	144.13	2156.84	387.63	748.40	106.77	249.58						2338.47
	NO. TOWS	7	11	11	12	10	5	9	6						71

Table C-9 Regional Density (No./1,000m3) of Striped Bass Young of Year in Hudson River Estuary Determined From Fall Juvenile Survey, 1990

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions COMBINED
09JUL-14JUL	DENSITY	0.00	0.05	1.00	0.00	4.02	9.77	2.73	10.16	0.19	2.04	5.68	0.00	2.97
	SE	0.00	0.05	0.41	0.00	2.70	9.28	1.17	6.32	0.11	1.10	4.84	0.00	12.63
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	12	209
23JUL-27JUL	DENSITY	0.50	1.58	10.20	0.12	0.28	0.53	0.00	0.00	0.83	0.00	1.53	1.34	1.41
	SE	0.31	0.57	8.73	0.08	0.09	0.43	0.00	0.00	0.57	0.00	1.11	0.73	8.88
	NO. TOWS	17	46	27	14	8	11	7	10	15	18	21	13	207
06AUG-10AUG	DENSITY	0.22	6.58	6.85	0.37	0.38	1.59	0.50	2.77	2.42	3.13	0.71	0.38	2.16
	SE	0.12	1.45	2.10	0.24	0.24	0.49	0.24	2.32	0.92	1.44	0.43	0.30	3.95
	NO. TOWS	16	46	27	14	8	13	8	10	15	18	21	13	209
20AUG-24AUG	DENSITY	0.64	7.26	8.65	1.22	1.00	0.47	0.06	0.23	0.79	0.67	0.60	0.21	1.82
	SE	0.21	1.02	2.01	0.51	0.92	0.12	0.06	0.11	0.54	0.35	0.37	0.15	2.61
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
04SEP-07SEP	DENSITY	0.39	5.45	3.00	0.36	0.00	0.08	0.05	0.04	0.65	3.16	0.32	0.00	1.12
	SE	0.17	1.15	0.82	0.14	0.00	0.06	0.05	0.04	0.37	2.62	0.15	0.00	3.02
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
17SEP-20SEP	DENSITY	0.13	3.34	0.91	0.34	0.00	0.35	0.09	0.03	0.18	1.85	0.39	0.00	0.64
	SE	0.06	0.57	0.56	0.27	0.00	0.19	0.06	0.03	0.11	1.04	0.29	0.00	1.39
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
01OCT-06OCT	DENSITY	0.00	0.80	0.54	0.10	0.00	0.10	0.52	0.04	0.34	0.09	0.15	0.06	0.23
	SE	0.00	0.26	0.17	0.10	0.00	0.07	0.52	0.04	0.34	0.05	0.10	0.06	0.72
	NO. TOWS	18	46	27	14	8	13	8	10	15	18	21	13	211
15OCT-17OCT	DENSITY	0.21	2.05	5.68	0.81	0.00	0.73	0.05	0.00	0.34	0.06	0.00	0.00	0.83
	SE	0.15	0.43	1.93	0.66	0.00	0.70	0.05	0.00	0.34	0.04	0.00	0.00	2.23
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210

Table C-10 Regional Standing Crops (in Thousands) of Striped Bass Young of Year in Hudson River Estuary Determined From Fall Juvenile Survey, 1990

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions COMBINED
09JUL-	St. Crop	0	17	148	0	833	1365	815	1681	27	360	913	0	6160
14JUL	SE	0	17	61	0	561	1297	348	1047	16	193	778	0	1965
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	12	209
23JUL-	St. Crop	116	509	1507	25	57	74	0	0	117	0	245	95	2745
27JUL	SE	70	183	1289	16	20	59	0	0	81	0	179	52	1322
	NO. TOWS	17	46	27	14	8	11	7	10	15	18	21	13	207
06AUG-	St. Crop	50	2116	1012	77	79	222	148	458	342	552	114	27	5197
10AUG	SE	27	467	311	50	50	69	73	385	130	254	70	21	752
	NO. TOWS	16	46	27	14	8	13	8	10	15	18	21	13	209
20AUG-	St. Crop	147	2337	1279	254	208	66	16	39	112	118	97	15	4688
24AUG	SE	49	329	296	106	190	17	16	19	77	61	59	10	510
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
04SEP-	St. Crop	89	1754	443	74	0	11	14	6	92	558	51	0	3092
07SEP	SE	40	370	122	29	0	9	14	6	53	462	24	0	610
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
17SEP-	St. Crop	30	1075	135	71	0	49	28	6	25	327	63	0	1808
20SEP	SE	14	183	83	57	0	26	17	6	15	184	47	0	285
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
01OCT-	St. Crop	0	258	80	22	0	15	155	6	48	16	24	4	626
06OCT	SE	0	83	25	22	0	10	155	6	48	9	16	4	186
	NO. TOWS	18	46	27	14	8	13	8	10	15	18	21	13	211
15OCT-	St. Crop	49	658	839	169	0	102	15	0	48	10	0	0	1891
17OCT	SE	34	140	285	138	0	98	15	0	48	7	0	0	365
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210

Table C-11 Regional Catch-Per-Unit-Effort (CPUE) of Striped Bass Young of Year in Hudson River Estuary Determined From Beach Seine Survey, 1990

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions COMBINED
18JUN-20JUN	CPUE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
02JUL-03JUL	CPUE	0.00	4.09	6.14	0.33	0.33	0.00	0.00	0.38	0.00	0.13	0.06	0.08	0.96
	SE	0.00	2.61	4.94	0.33	0.33	0.00	0.00	0.26	0.00	0.09	0.06	0.08	5.62
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	18	13	100
17JUL-19JUL	CPUE	11.33	24.64	4.29	5.00	39.67	1.00	56.38	22.75	7.13	7.20	6.58	3.25	15.77
	SE	3.84	10.79	2.41	2.65	36.20	0.58	46.54	9.55	3.81	1.99	2.84	3.16	61.22
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
31JUL-03AUG	CPUE	11.80	18.57	8.80	12.40	28.40	4.33	0.60	0.40	2.80	3.44	2.10	2.00	7.97
	SE	3.58	3.54	1.85	3.63	7.30	2.50	0.24	0.24	1.20	1.29	0.69	1.29	10.34
	NO. TOWS	5	23	15	5	5	6	5	5	5	9	10	7	100
14AUG-17AUG	CPUE	22.00	10.79	25.64	10.60	9.00	3.67	1.80	0.80	1.60	14.67	8.90	2.00	9.29
	SE	16.15	2.14	6.04	0.81	6.12	1.76	1.11	0.37	0.51	5.26	6.94	1.18	20.54
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
27AUG-29AUG	CPUE	8.20	14.38	14.07	18.20	11.60	5.17	0.80	2.20	1.60	2.67	3.00	3.71	7.13
	SE	3.12	3.05	5.07	5.52	4.82	1.58	0.58	1.96	0.93	1.58	1.26	1.60	10.61
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
10SEP-12SEP	CPUE	10.80	15.08	21.64	6.00	5.20	6.17	0.80	0.60	4.00	1.33	3.60	0.43	6.30
	SE	6.11	4.16	4.90	1.58	3.12	3.07	0.37	0.40	1.79	0.69	2.19	0.30	10.45
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
24SEP-26SEP	CPUE	3.60	9.29	17.29	11.20	5.20	2.17	0.40	0.60	1.80	0.67	4.40	0.86	4.79
	SE	1.50	2.41	3.72	9.33	2.06	0.75	0.24	0.40	0.58	0.44	2.01	0.55	10.90
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
08OCT-10OCT	CPUE	0.80	3.63	20.14	16.80	25.80	1.50	0.60	0.20	0.40	0.67	2.20	1.43	6.18
	SE	0.37	1.36	6.53	9.09	8.25	1.12	0.40	0.20	0.24	0.44	1.15	1.43	14.15
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
22OCT-24OCT	CPUE	0.40	1.63	3.71	5.20	1.80	2.17	0.60	0.20	5.40	1.89	1.10	0.29	2.03
	SE	0.40	0.75	1.25	1.32	0.66	0.60	0.60	0.20	5.15	0.86	0.46	0.29	5.73
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100

Table C-12 Regional Standing Crops (in Thousands) of Striped Bass Young of Year in Hudson River Estuary Determined From Beach Seine Survey, 1990

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions COMBINED
18JUN-20JUN	St. Crop	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
02JUL-03JUL	St. Crop	0.00	186.00	165.00	3.00	1.00	0.00	0.00	<0.005	0.00	2.00	1.00	1.00	360.00
	SE	0.00	119.00	133.00	3.00	1.00	0.00	0.00	<0.005	0.00	2.00	1.00	1.00	178.00
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	18	13	100
17JUL-19JUL	St. Crop	85.00	1119.00	115.00	46.00	105.00	11.00	400.00	28.00	61.00	126.00	129.00	44.00	2271.00
	SE	29.00	490.00	65.00	24.00	95.00	6.00	330.00	12.00	33.00	35.00	56.00	43.00	610.00
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
31JUL-03AUG	St. Crop	89.00	844.00	237.00	114.00	75.00	46.00	4.00	<0.005	24.00	60.00	41.00	27.00	1562.00
	SE	27.00	161.00	50.00	33.00	19.00	27.00	2.00	<0.005	10.00	23.00	14.00	18.00	180.00
	NO. TOWS	5	23	15	5	5	6	5	5	5	9	10	7	100
14AUG-17AUG	St. Crop	166.00	490.00	690.00	98.00	24.00	39.00	13.00	1.00	14.00	257.00	175.00	27.00	1993.00
	SE	122.00	97.00	162.00	7.00	16.00	19.00	8.00	<0.005	4.00	92.00	136.00	16.00	281.00
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
27AUG-29AUG	St. Crop	62.00	653.00	378.00	168.00	31.00	55.00	6.00	3.00	14.00	47.00	59.00	50.00	1525.00
	SE	24.00	138.00	136.00	51.00	13.00	17.00	4.00	2.00	8.00	28.00	25.00	22.00	208.00
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
10SEP-12SEP	St. Crop	81.00	685.00	582.00	55.00	14.00	66.00	6.00	1.00	34.00	23.00	71.00	6.00	1624.00
	SE	46.00	189.00	132.00	15.00	8.00	33.00	3.00	<0.005	15.00	12.00	43.00	4.00	243.00
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
24SEP-26SEP	St. Crop	27.00	422.00	465.00	103.00	14.00	23.00	3.00	1.00	15.00	12.00	87.00	12.00	1183.00
	SE	11.00	110.00	100.00	86.00	5.00	8.00	2.00	<0.005	5.00	8.00	40.00	8.00	177.00
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
08OCT-10OCT	St. Crop	6.00	165.00	542.00	155.00	68.00	16.00	4.00	<0.005	3.00	12.00	43.00	19.00	1034.00
	SE	3.00	62.00	175.00	84.00	22.00	12.00	3.00	<0.005	2.00	8.00	23.00	19.00	208.00
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
22OCT-24OCT	St. Crop	3.00	74.00	100.00	48.00	5.00	23.00	4.00	<0.005	46.00	33.00	22.00	4.00	362.00
	SE	3.00	34.00	34.00	12.00	2.00	6.00	4.00	<0.005	44.00	15.00	9.00	4.00	69.00
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100

Table C-13 Regional Density (No./1,000m3) of Striped Bass Yearling and Older in Hudson River Estuary Determined From Fall Juvenile Survey, 1990

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions COMBINED
09JUL-14JUL	DENSITY	0.02	0.04	0.17	0.00	0.00	0.00	0.00	0.22	0.05	0.00	0.00	0.00	0.04
	SE	0.02	0.02	0.17	0.00	0.00	0.00	0.00	0.22	0.05	0.00	0.00	0.00	0.28
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	12	209
23JUL-27JUL	DENSITY	0.01	0.03	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.23	0.07	0.03
	SE	0.01	0.02	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.23	0.07	0.25
	NO. TOWS	17	46	27	14	8	11	7	10	15	18	21	13	207
06AUG-10AUG	DENSITY	0.13	0.25	0.25	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05
	SE	0.11	0.08	0.15	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.21
	NO. TOWS	16	46	27	14	8	13	8	10	15	18	21	13	209
20AUG-24AUG	DENSITY	0.02	0.09	0.08	0.02	0.85	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09
	SE	0.02	0.04	0.05	0.02	0.85	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.85
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
04SEP-07SEP	DENSITY	0.00	0.37	0.03	0.05	0.00	0.71	0.00	0.00	0.00	0.00	0.00	0.00	0.10
	SE	0.00	0.29	0.03	0.04	0.00	0.66	0.00	0.00	0.00	0.00	0.00	0.00	0.72
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
17SEP-20SEP	DENSITY	0.00	0.50	0.04	0.01	0.00	0.00	0.04	0.00	0.00	0.00	0.03	0.00	0.05
	SE	0.00	0.38	0.04	0.01	0.00	0.00	0.04	0.00	0.00	0.00	0.03	0.00	0.39
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
01OCT-06OCT	DENSITY	0.09	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
	SE	0.09	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09
	NO. TOWS	18	46	27	14	8	13	8	10	15	18	21	13	211
15OCT-17OCT	DENSITY	0.00	0.04	0.09	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
	SE	0.00	0.02	0.04	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210

Table C-14 Regional Standing Crops (in Thousands) of Striped Bass Yearling and Older in Hudson River Estuary Determined From Fall Juvenile Survey, 1990

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions COMBINED
09JUL-14JUL	St. Crop	4	13	25	0	0	0	0	37	8	0	0	0	86
	SE	4	7	25	0	0	0	0	37	8	0	0	0	46
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	12	209
23JUL-27JUL	St. Crop	3	9	0	3	0	0	0	0	0	0	38	5	58
	SE	3	6	0	3	0	0	0	0	0	0	38	5	39
	NO. TOWS	17	46	27	14	8	11	7	10	15	18	21	13	207
06AUG-10AUG	St. Crop	31	81	37	2	0	0	0	0	0	0	0	0	150
	SE	25	25	23	2	0	0	0	0	0	0	0	0	43
	NO. TOWS	16	46	27	14	8	13	8	10	15	18	21	13	209
20AUG-24AUG	St. Crop	5	29	11	5	176	0	0	0	0	0	0	0	226
	SE	5	13	8	5	176	0	0	0	0	0	0	0	176
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
04SEP-07SEP	St. Crop	0	119	4	10	0	99	0	0	0	0	0	0	232
	SE	0	94	4	8	0	92	0	0	0	0	0	0	132
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
17SEP-20SEP	St. Crop	0	161	6	3	0	0	13	0	0	0	5	0	188
	SE	0	123	6	3	0	0	13	0	0	0	5	0	124
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
01OCT-06OCT	St. Crop	20	16	0	0	0	0	0	0	0	0	0	0	36
	SE	20	10	0	0	0	0	0	0	0	0	0	0	22
	NO. TOWS	18	46	27	14	8	13	8	10	15	18	21	13	211
15OCT-17OCT	St. Crop	0	13	14	2	0	0	0	0	0	0	0	0	30
	SE	0	8	6	2	0	0	0	0	0	0	0	0	10
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210

Table C-15 Regional Catch-Per-Unit-Effort (CPUE) of Striped Bass Yearling and Older in Hudson River Estuary Determined From Beach Seine Survey, 1990

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions COMBINED
18JUN-20JUN	CPUE	0.00	0.45	1.00	0.00	0.00	0.00	0.00	0.50	0.00	0.87	0.11	0.00	0.24
	SE	0.00	0.21	0.38	0.00	0.00	0.00	0.00	0.19	0.00	0.62	0.07	0.00	0.78
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
02JUL-03JUL	CPUE	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.13	0.25	0.33	0.00	0.00	0.08
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.13	0.25	0.27	0.00	0.00	0.46
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	18	13	100
17JUL-19JUL	CPUE	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.13	0.00	0.00	0.00	0.08	0.04
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.16	0.13	0.00	0.00	0.00	0.08	0.22
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
31JUL-03AUG	CPUE	0.40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03
	SE	0.40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.40
	NO. TOWS	5	23	15	5	5	6	5	5	5	9	10	7	100
14AUG-17AUG	CPUE	0.60	0.04	0.00	0.00	0.00	0.17	0.00	1.20	0.00	0.00	0.00	0.00	0.17
	SE	0.60	0.04	0.00	0.00	0.00	0.17	0.00	1.20	0.00	0.00	0.00	0.00	1.35
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
27AUG-29AUG	CPUE	0.00	0.04	0.14	0.00	0.00	0.00	0.20	0.00	0.00	0.00	0.00	0.43	0.07
	SE	0.00	0.04	0.14	0.00	0.00	0.00	0.20	0.00	0.00	0.00	0.00	0.43	0.50
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
10SEP-12SEP	CPUE	0.00	0.00	0.14	0.00	0.00	0.00	0.20	0.00	0.00	0.00	0.10	0.14	0.05
	SE	0.00	0.00	0.14	0.00	0.00	0.00	0.20	0.00	0.00	0.00	0.10	0.14	0.30
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
24SEP-26SEP	CPUE	0.40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.14	0.05
	SE	0.40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.14	0.42
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
08OCT-10OCT	CPUE	0.00	0.13	0.00	0.00	0.00	0.17	0.00	0.00	0.00	0.00	0.00	0.00	0.02
	SE	0.00	0.07	0.00	0.00	0.00	0.17	0.00	0.00	0.00	0.00	0.00	0.00	0.18
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
22OCT-24OCT	CPUE	0.00	0.17	0.07	0.00	0.20	0.00	0.40	0.00	0.00	0.22	0.60	0.00	0.14
	SE	0.00	0.10	0.07	0.00	0.20	0.00	0.40	0.00	0.00	0.22	0.50	0.00	0.72
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100

Table C-16 Regional Standing Crops (in Thousands) of Striped Bass Yearling and Older in Hudson River Estuary Determined From Beach Seine Survey, 1990

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions COMBINED
18JUN-20JUN	St. Crop	0	21	27	0	0	0	0	1.00	0	15	2	0	65
	SE	0	9	10	0	0	0	0	<0.005	0	11	1	0	18
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
02JUL-03JUL	St. Crop	0	0	0	0	0	0	2	<0.005	2	6	0	0	10
	SE	0	0	0	0	0	0	2	<0.005	2	5	0	0	6
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	18	13	100
17JUL-19JUL	St. Crop	0	0	0	0	0	0	2	<0.005	0	0	0	1	3
	SE	0	0	0	0	0	0	1	<0.005	0	0	0	1	2
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
31JUL-03AUG	St. Crop	3	0	0	0	0	0	0	0	0	0	0	0	3
	SE	3	0	0	0	0	0	0	0	0	0	0	0	3
	NO. TOWS	5	23	15	5	5	6	5	5	5	9	10	7	100
14AUG-17AUG	St. Crop	5	2	0	0	0	2	0	1	0	0	0	0	10
	SE	5	2	0	0	0	2	0	1	0	0	0	0	5
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
27AUG-29AUG	St. Crop	0	2	4	0	0	0	1	0	0	0	0	6	13
	SE	0	2	4	0	0	0	1	0	0	0	0	6	7
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
10SEP-12SEP	St. Crop	0	0	4	0	0	0	1	0	0	0	2	2	9
	SE	0	0	4	0	0	0	1	0	0	0	2	2	5
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
24SEP-26SEP	St. Crop	3	0	0	0	0	0	0	0	0	0	0	2	5
	SE	3	0	0	0	0	0	0	0	0	0	0	2	4
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
08OCT-10OCT	St. Crop	0	6	0	0	0	2	0	0	0	0	0	0	7
	SE	0	3	0	0	0	2	0	0	0	0	0	0	4
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
22OCT-24OCT	St. Crop	0	8	2	0	1	0	3	0	0	4	12	0	29
	SE	0	4	2	0	1	0	3	0	0	4	10	0	12
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100

Table C-17 Regional Density (No./1,000m3) of White Perch Eggs in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1990

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
19APR-23APR	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.62	NS	0.00	NS	0.00	0.00	0.06
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.62		0.00		0.00	0.00	0.62
	NO. TOWS		6	8	8	4	5	6	3		7		11	24	82
23APR-26APR	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.73	0.00	0.00	0.00	0.06
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.42	0.00	0.00	0.00	0.42
	NO. TOWS		10	12	13	10	6	10	6	7	7	8	9	9	107
30APR-03MAY	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.10	10.49	29.28	64.91	217.11	228.16	32.77	48.57
	SE		0.00	0.00	0.00	0.00	0.00	0.06	9.63	12.56	57.81	91.87	77.22	21.52	135.86
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
07MAY-10MAY	DENSITY	NS	0.00	0.00	0.00	0.50	1.44	18.25	16.45	84.05	168.50	78.15	102.98	285.95	63.02
	SE		0.00	0.00	0.00	0.50	0.69	11.32	6.18	14.79	85.46	43.07	81.51	197.32	234.78
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
14MAY-17MAY	DENSITY	NS	0.00	0.00	0.00	2.75	7.46	236.90	230.63	91.58	21.46	2.06	1092.32	2557.83	353.58
	SE		0.00	0.00	0.00	2.22	2.27	221.86	185.13	85.15	6.78	1.39	482.16	1340.48	1456.08
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	5	10	116
21MAY-24MAY	DENSITY	NS	0.00	0.00	0.61	1.70	2.00	10.32	0.87	44.03	86.18	342.41	78.00	875.05	120.10
	SE		0.00	0.00	0.37	1.64	1.19	10.03	0.87	31.81	83.27	56.96	66.86	116.28	171.13
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	5	109
29MAY-02JUN	DENSITY	NS	0.00	0.00	0.00	0.00	3.02	7.19	30.38	124.03	21.30	992.38	12086.48	1210.32	1206.26
	SE		0.00	0.00	0.00	0.00	2.90	5.26	1.97	59.19	15.33	506.50	5935.78	848.14	6017.73
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
04JUN-07JUN	DENSITY	NS	0.00	0.00	11.51	18.15	3.75	40.06	1.99	41.74	254.11	80.86	2295.30	250.52	249.83
	SE		0.00	0.00	9.70	16.88	3.48	40.02	1.69	32.88	212.10	34.93	675.38	180.75	733.55
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
11JUN-14JUN	DENSITY	0.00	0.00	0.00	0.00	0.37	800.90	22.73	260.07	1.74	25.74	757.83	450.55	1246.44	274.34
	SE	0.00	0.00	0.00	0.00	0.25	401.74	16.00	165.05	1.07	13.13	501.57	185.45	552.79	883.52
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
18JUN-21JUN	DENSITY	0.00	0.00	0.00	0.00	0.92	4.61	0.67	26.59	36.64	51.85	69.08	196.91	21.57	31.45
	SE	0.00	0.00	0.00	0.00	0.88	4.61	0.48	15.87	20.50	27.63	51.09	115.02	20.32	133.08
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
25JUN-28JUN	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.19	0.00	1.34	0.00	39.48	3.15
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.19	0.00	0.77	0.00	38.95	38.95
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
02JUL-06JUL	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.12	0.00	0.00	0.00	0.00	0.01
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.12	0.00	0.00	0.00	0.00	0.12
	NO. TOWS	6	11	14	11	13	9	13	8	10	7	6	6	6	120
16JUL-19JUL	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						0.00
	NO. TOWS	7	10	11	12	10	6	10	6						72
30JUL-02AUG	DENSITY	0.00	0.00	0.00	13.63	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	1.70
	SE	0.00	0.00	0.00	13.63	0.00	0.00	0.00	0.00						13.63
	NO. TOWS	7	11	11	12	10	6	10	6						73
14AUG-16AUG	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						0.00
	NO. TOWS	7	11	11	12	10	5	9	6						71

Table C-18 Regional Standing Crop (In Thousands) of White Perch Eggs in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1990

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
19APR-23APR	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	183.93	NS	0.00	NS	0.00	0.00	183.93
	SE		0.00	0.00	0.00	0.00	0.00	0.00	183.93		0.00		0.00	0.00	183.93
	NO. TOWS		6	8	8	4	5	6	3		7		11	24	82
23APR-26APR	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	102.80	0.00	0.00	0.00	102.80
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	59.41	0.00	0.00	0.00	59.41
	NO. TOWS		10	12	13	10	6	10	6	7	7	8	9	9	107
30APR-03MAY	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	14.04	3127.82	4844.59	9183.36	38275.87	36671.97	2331.66	94449.31
	SE		0.00	0.00	0.00	0.00	0.00	8.60	2871.42	2077.71	8178.08	16197.13	12411.80	1531.13	22320.10
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
07MAY-10MAY	St. Crop	NS	0.00	0.00	0.00	104.42	297.86	2550.91	4903.63	13908.20	23837.56	13777.07	16551.83	20344.76	96276.24
	SE		0.00	0.00	0.00	104.42	143.58	1582.67	1841.25	2447.18	12089.39	7593.85	13101.97	14039.16	24176.33
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
14MAY-17MAY	St. Crop	NS	0.00	0.00	0.00	572.92	1547.75	33116.46	68758.79	15155.44	3036.26	363.32	175570.55	181986.97	480108.45
	SE		0.00	0.00	0.00	461.97	471.19	31014.15	55194.71	14091.45	958.80	244.22	77497.68	95374.17	138962.00
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	5	10	116
21MAY-24MAY	St. Crop	NS	0.00	0.00	90.69	354.42	415.66	1442.68	257.97	7286.55	12192.21	60365.20	12537.59	62258.70	157201.68
	SE		0.00	0.00	54.83	341.62	247.01	1401.53	257.97	5263.46	11780.01	10041.34	10745.81	8273.17	21293.91
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	5	109
29MAY-02JUN	St. Crop	NS	0.00	0.00	0.00	0.00	626.48	1004.68	9058.46	20525.20	3013.63	174953.08	1942680.25	86113.37	2237975.15
	SE		0.00	0.00	0.00	0.00	601.45	735.14	586.98	9795.10	2169.27	89294.34	954067.49	60344.22	960188.30
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
04JUN-07JUN	St. Crop	NS	0.00	0.00	1699.75	3781.76	777.89	5599.85	594.30	6906.75	35948.96	14254.74	368927.86	17824.11	456315.97
	SE		0.00	0.00	1432.57	3515.83	721.55	5594.60	504.67	5441.47	30005.85	6158.05	108554.73	12860.37	113859.07
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
11JUN-14JUN	St. Crop	0.00	0.00	0.00	0.00	76.91	166151.02	3177.63	77535.15	288.48	3641.98	133601.60	72417.63	88682.87	545573.26
	SE	0.00	0.00	0.00	0.00	51.93	83343.05	2236.23	49205.90	177.79	1857.62	88423.79	29807.23	39330.50	140106.73
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
18JUN-21JUN	St. Crop	0.00	0.00	0.00	0.00	192.67	957.27	93.83	7926.60	6062.84	7335.52	12178.29	31649.79	1534.90	67931.72
	SE	0.00	0.00	0.00	0.00	183.77	957.27	67.38	4731.83	3393.01	3909.37	9006.19	18487.94	1446.04	21797.87
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
25JUN-28JUN	St. Crop	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	32.15	0.00	235.91	0.00	2808.85	3076.91
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	32.15	0.00	136.20	0.00	2770.90	2774.44
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
02JUL-06JUL	St. Crop	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	19.58	0.00	0.00	0.00	0.00	19.58
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	19.58	0.00	0.00	0.00	0.00	19.58
	NO. TOWS	6	11	14	11	13	9	13	8	10	7	6	6	6	120
16JUL-19JUL	St. Crop	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						0.00
	NO. TOWS	7	10	11	12	10	6	10	6						72
30JUL-02AUG	St. Crop	0.00	0.00	0.00	2013.09	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	2013.09
	SE	0.00	0.00	0.00	2013.09	0.00	0.00	0.00	0.00						2013.09
	NO. TOWS	7	11	11	12	10	6	10	6						73
14AUG-16AUG	St. Crop	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						0.00
	NO. TOWS	7	11	11	12	10	5	9	6						71

Table C-19 Regional Density (No./1,000m3) of White Perch Yolk-Sac Larvae in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1990

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
19APR-23APR	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	0.00	NS	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00	0.00	0.00
	NO. TOWS		6	8	8	4	5	6	3		7		11	24	82
23APR-26APR	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		10	12	13	10	6	10	6	7	7	8	9	9	107
30APR-03MAY	DENSITY	NS	0.00	0.00	0.25	0.00	0.00	1.53	0.17	0.47	2.73	2.83	0.72	0.00	0.73
	SE		0.00	0.00	0.25	0.00	0.00	0.69	0.17	0.47	1.61	2.83	0.72	0.00	3.45
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
07MAY-10MAY	DENSITY	NS	0.00	0.00	0.00	4.09	4.17	29.99	255.04	412.10	685.26	398.23	211.48	14.76	167.93
	SE		0.00	0.00	0.00	2.90	2.62	13.06	114.72	113.40	162.36	49.33	108.96	12.69	258.91
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
14MAY-17MAY	DENSITY	NS	0.61	5.61	24.50	296.71	134.14	51.21	36.37	20.94	21.16	3.85	0.00	0.96	49.67
	SE		0.61	3.61	5.60	69.52	35.00	19.77	19.30	13.21	6.52	2.50	0.00	0.67	84.20
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	5	10	116
21MAY-24MAY	DENSITY	NS	0.81	37.91	113.08	92.27	36.87	38.67	50.73	19.83	48.97	17.80	8.49	1.65	38.92
	SE		0.69	8.51	14.79	40.41	11.30	11.66	25.59	6.84	17.94	5.48	3.55	1.65	57.07
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	5	109
29MAY-02JUN	DENSITY	NS	1.88	9.30	6.97	2.04	5.12	23.17	78.89	83.28	34.30	56.27	22.83	24.79	29.07
	SE		1.32	4.10	1.48	1.78	2.36	14.61	32.19	18.03	14.57	21.79	10.19	15.42	51.31
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
04JUN-07JUN	DENSITY	NS	0.00	1.95	26.51	51.27	37.08	46.15	188.78	278.32	382.41	333.51	201.63	63.59	134.27
	SE		0.00	1.95	9.37	5.52	18.48	11.37	79.39	117.62	204.90	151.82	55.04	6.22	298.04
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
11JUN-14JUN	DENSITY	0.00	0.00	0.00	0.00	0.00	19.27	42.88	16.21	21.09	89.53	64.53	71.80	234.61	43.07
	SE	0.00	0.00	0.00	0.00	0.00	15.92	16.93	7.44	8.93	11.62	23.15	3.12	27.02	45.67
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
18JUN-21JUN	DENSITY	0.00	0.00	0.00	0.00	1.76	9.68	8.18	1.16	11.01	20.73	13.75	104.89	181.76	27.15
	SE	0.00	0.00	0.00	0.00	1.76	9.24	4.69	0.51	4.68	8.96	2.93	100.51	50.06	113.27
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
25JUN-28JUN	DENSITY	0.00	0.00	0.00	0.00	0.17	0.57	2.12	0.00	0.18	0.00	0.00	2.65	18.57	1.87
	SE	0.00	0.00	0.00	0.00	0.17	0.57	1.92	0.00	0.18	0.00	0.00	1.82	7.69	8.15
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
02JUL-06JUL	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.75	0.13
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.94	0.94
	NO. TOWS	6	11	14	11	13	9	13	8	10	7	6	6	6	120
16JUL-19JUL	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						0.00
	NO. TOWS	7	10	11	12	10	6	10	6						72
30JUL-02AUG	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						0.00
	NO. TOWS	7	11	11	12	10	6	10	6						73
14AUG-16AUG	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						0.00
	NO. TOWS	7	11	11	12	10	5	9	6						71

Table C-20 Regional Standing Crop (In Thousands) of White Perch Yolk-Sac Larvae in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1990

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
19APR-23APR	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	0.00	NS	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00	0.00	0.00
	NO. TOWS		6	8	8	4	5	6	3		7		11	24	82
23APR-26APR	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		10	12	13	10	6	10	6	7	7	8	9	9	107
30APR-03MAY	St. Crop	NS	0.00	0.00	36.45	0.00	0.00	214.32	50.50	77.85	386.87	498.65	116.03	0.00	1380.67
	SE		0.00	0.00	36.45	0.00	0.00	96.80	50.50	77.85	227.08	498.65	116.03	0.00	577.05
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
07MAY-10MAY	St. Crop	NS	0.00	0.00	0.00	851.07	864.61	4191.93	76035.66	68195.53	96943.38	70206.40	33991.18	1050.25	352330.00
	SE		0.00	0.00	0.00	603.99	544.33	1825.42	34201.93	18765.96	22968.91	8697.15	17513.86	903.17	49362.82
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
14MAY-17MAY	St. Crop	NS	139.13	1805.22	3620.03	61816.12	27829.02	7158.14	10842.47	3465.72	2993.06	679.00	0.00	68.34	120416.24
	SE		139.13	1161.64	826.62	14483.65	7260.61	2763.43	5753.05	2186.58	922.44	440.10	0.00	47.50	17638.22
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	5	10	116
21MAY-24MAY	St. Crop	NS	186.75	12199.82	16705.61	19223.73	7647.92	5405.47	15124.18	3281.60	6928.01	3138.75	1364.60	117.49	91323.94
	SE		158.45	2739.81	2184.56	8418.69	2343.65	1629.41	7628.10	1131.33	2538.31	965.53	570.03	117.49	12589.99
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	5	109
29MAY-02JUN	St. Crop	NS	431.51	2992.49	1029.37	424.70	1062.12	3238.77	23519.15	13781.64	4852.12	9920.24	3669.75	1763.51	66685.37
	SE		302.36	1318.77	219.39	370.53	490.30	2042.85	9597.33	2983.12	2061.03	3841.78	1637.28	1096.96	11416.15
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
04JUN-07JUN	St. Crop	NS	0.00	628.19	3916.81	10681.74	7691.55	6451.14	56280.38	46057.65	54098.83	58796.08	32408.66	4524.32	281535.34
	SE		0.00	628.19	1384.02	1150.64	3834.54	1589.26	23670.02	19464.08	28986.73	26764.94	8846.58	442.23	50941.48
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
11JUN-14JUN	St. Crop	0.00	0.00	0.00	0.00	0.00	3997.05	5994.71	4831.60	3490.79	12665.28	11376.79	11539.84	16692.41	70588.47
	SE	0.00	0.00	0.00	0.00	0.00	3301.80	2366.02	2218.55	1477.50	1644.49	4081.32	501.90	1922.68	6849.45
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
18JUN-21JUN	St. Crop	0.00	0.00	0.00	0.00	367.08	2008.92	1142.88	346.18	1821.93	2933.05	2424.09	16858.42	12931.97	40834.52
	SE	0.00	0.00	0.00	0.00	367.08	1916.87	655.55	150.66	773.67	1268.19	515.76	16155.26	3561.40	16745.46
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
25JUN-28JUN	St. Crop	0.00	0.00	0.00	0.00	36.36	118.04	296.99	0.00	29.91	0.00	0.00	426.61	1321.53	2229.45
	SE	0.00	0.00	0.00	0.00	36.36	118.04	268.69	0.00	29.91	0.00	0.00	291.74	546.93	687.45
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
02JUL-06JUL	St. Crop	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	124.36	124.36
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	66.72	66.72
	NO. TOWS	6	11	14	11	13	9	13	8	10	7	6	6	6	120
16JUL-19JUL	St. Crop	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						0.00
	NO. TOWS	7	10	11	12	10	6	10	6						72
30JUL-02AUG	St. Crop	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						0.00
	NO. TOWS	7	11	11	12	10	6	10	6						73
14AUG-16AUG	St. Crop	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						0.00
	NO. TOWS	7	11	11	12	10	5	9	6						71

Table C-21 Regional Density (No./1,000m3) of White Perch Post Yolk-Sac Larvae in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1990

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
19APR-23APR	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	0.00	NS	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00	0.00	0.00
	NO. TOWS		6	8	8	4	5	6	3		7		11	24	82
23APR-26APR	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		10	12	13	10	6	10	6	7	7	8	9	9	107
30APR-03MAY	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.50	0.00	0.00	0.00	0.00	0.00	0.00	0.04
	SE		0.00	0.00	0.00	0.00	0.00	0.50	0.00	0.00	0.00	0.00	0.00	0.00	0.50
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
07MAY-10MAY	DENSITY	NS	0.00	0.00	0.00	1.01	1.27	2.70	37.17	19.95	147.79	55.27	21.95	0.00	23.93
	SE		0.00	0.00	0.00	0.58	0.61	1.68	19.40	5.30	42.83	17.92	19.94	0.00	54.41
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
14MAY-17MAY	DENSITY	NS	2.82	8.96	40.19	1262.59	1137.09	829.68	320.08	46.29	23.38	2.73	0.00	0.30	306.18
	SE		2.82	2.86	4.53	355.69	229.42	209.39	69.10	30.37	11.27	1.77	0.00	0.30	478.39
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	5	10	116
21MAY-24MAY	DENSITY	NS	51.00	2020.99	425.96	613.14	8.18	9.40	1.19	0.56	0.95	0.00	0.00	1.65	261.09
	SE		12.32	398.44	102.88	385.32	1.95	2.63	0.92	0.56	0.95	0.00	0.00	1.65	563.90
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	5	109
29MAY-02JUN	DENSITY	NS	105.60	410.32	195.73	36.85	64.63	45.54	29.89	4.14	0.60	0.00	0.00	0.00	74.44
	SE		44.47	252.86	22.84	16.65	28.74	12.56	12.12	1.44	0.60	0.00	0.00	0.00	260.48
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
04JUN-07JUN	DENSITY	NS	0.36	80.06	115.16	163.02	82.26	101.54	677.04	725.37	1853.62	803.27	426.76	0.00	419.04
	SE		0.36	34.04	25.60	22.53	15.60	27.26	204.33	261.37	654.39	310.22	165.34	0.00	815.58
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
11JUN-14JUN	DENSITY	0.36	0.00	0.00	5.69	66.20	693.53	1576.70	1023.74	1052.22	2467.95	653.78	1135.03	9.38	668.04
	SE	0.36	0.00	0.00	2.92	28.84	472.67	214.10	322.82	242.33	736.15	100.51	195.79	4.43	1011.64
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
18JUN-21JUN	DENSITY	0.00	0.00	0.00	0.36	60.85	103.63	306.59	461.09	1549.07	1011.71	1167.24	3640.38	5330.03	1048.53
	SE	0.00	0.00	0.00	0.36	35.96	20.80	102.75	157.74	367.10	145.47	367.18	3113.49	5249.28	6129.99
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
25JUN-28JUN	DENSITY	0.00	0.11	0.28	12.88	55.13	102.22	446.71	466.35	943.26	1213.73	925.82	746.70	218.83	394.77
	SE	0.00	0.11	0.28	4.43	14.81	16.61	128.72	234.95	367.58	389.15	104.29	336.24	139.01	708.59
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
02JUL-06JUL	DENSITY	0.00	0.14	1.26	3.23	28.51	177.38	74.86	213.64	311.23	464.15	387.20	739.28	132.50	194.87
	SE	0.00	0.14	0.79	2.21	13.37	79.61	23.78	77.39	38.79	79.83	158.17	201.39	97.93	310.03
	NO. TOWS	6	11	14	11	13	9	13	8	10	7	6	6	6	120
16JUL-19JUL	DENSITY	1.00	1.71	0.00	5.88	8.22	10.60	12.80	12.84	NS	NS	NS	NS	NS	6.63
	SE	1.00	1.71	0.00	1.94	3.95	6.47	4.92	9.63						13.49
	NO. TOWS	7	10	11	12	10	6	10	6						72
30JUL-02AUG	DENSITY	0.00	0.16	0.00	0.00	0.00	0.00	0.13	0.00	NS	NS	NS	NS	NS	0.04
	SE	0.00	0.16	0.00	0.00	0.00	0.00	0.13	0.00						0.21
	NO. TOWS	7	11	11	12	10	6	10	6						73
14AUG-16AUG	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						0.00
	NO. TOWS	7	11	11	12	10	5	9	6						71

Table C-22 Regional Standing Crop (In Thousands) of White Perch Post Yolk-Sac Larvae in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1990

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
19APR-23APR	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	0.00	NS	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00	0.00	0.00
	NO. TOWS		6	8	8	4	5	6	3		7		11	24	82
23APR-26APR	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		10	12	13	10	6	10	6	7	7	8	9	9	107
30APR-03MAY	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	69.61	0.00	0.00	0.00	0.00	0.00	0.00	69.61
	SE		0.00	0.00	0.00	0.00	0.00	69.61	0.00	0.00	0.00	0.00	0.00	0.00	69.61
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
07MAY-10MAY	St. Crop	NS	0.00	0.00	0.00	210.22	262.97	376.81	11082.30	3301.20	20907.60	9743.70	3528.05	0.00	49412.85
	SE		0.00	0.00	0.00	120.99	127.15	235.14	5782.38	876.73	6059.28	3158.39	3205.19	0.00	9552.71
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
14MAY-17MAY	St. Crop	NS	647.93	2881.86	5938.03	263044.22	235896.60	115981.15	95425.26	7660.45	3307.50	480.93	0.00	21.46	731285.41
	SE		647.93	919.49	668.92	74102.70	47594.09	29270.74	20600.45	5026.34	1594.22	312.43	0.00	21.46	95221.74
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	5	10	116
21MAY-24MAY	St. Crop	NS	11700.51	650376.60	62930.25	127738.97	1697.58	1314.38	355.12	93.42	134.51	0.00	0.00	117.49	856458.83
	SE		2826.87	128222.87	15198.52	80276.72	405.40	367.70	275.66	93.42	134.51	0.00	0.00	117.49	152068.60
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	5	109
29MAY-02JUN	St. Crop	NS	24226.04	132046.09	28916.99	7676.82	13408.14	6366.01	8910.59	685.11	85.26	0.00	0.00	0.00	222321.06
	SE		10201.40	81374.17	3374.11	3468.13	5963.23	1756.46	3614.49	239.02	85.26	0.00	0.00	0.00	82468.24
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
04JUN-07JUN	St. Crop	NS	82.11	25765.17	17013.15	33963.83	17065.04	14194.81	201849.35	120038.02	262232.06	141612.80	68593.69	0.00	902410.01
	SE		82.11	10953.28	3782.06	4693.41	3236.30	3810.51	60918.39	43252.71	92575.99	54691.27	26576.16	0.00	134279.17
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
11JUN-14JUN	St. Crop	74.40	0.00	0.00	840.90	13790.84	143877.49	220408.82	305210.09	174126.49	349140.49	115258.78	182435.89	667.66	1505831.85
	SE	74.40	0.00	0.00	431.04	6008.55	98058.36	29929.81	96244.04	40102.69	104142.88	17719.78	31469.12	314.93	183217.92
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
18JUN-21JUN	St. Crop	0.00	0.00	0.00	53.24	12677.33	21498.77	42858.27	137465.27	256347.48	143126.64	205779.34	585124.17	379226.63	1784157.13
	SE	0.00	0.00	0.00	53.24	7490.74	4314.48	14363.62	47026.36	60749.22	20579.13	64732.88	500437.20	373481.81	633026.76
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
25JUN-28JUN	St. Crop	0.00	24.21	90.85	1902.99	11484.78	21205.76	62446.72	139033.49	156095.72	171706.84	163218.06	120017.81	15569.56	862796.79
	SE	0.00	24.21	90.85	655.08	3085.36	3444.93	17993.91	70047.90	60829.62	55052.75	18386.20	54044.15	9890.36	123854.77
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
02JUL-06JUL	St. Crop	0.00	31.98	405.30	477.18	5939.21	36797.92	10464.94	63692.29	51503.38	65663.31	68260.85	118825.13	9427.15	431488.62
	SE	0.00	31.98	253.49	327.19	2784.81	16515.65	3323.69	23071.33	6419.57	11293.90	27885.57	32369.91	6967.48	53542.06
	NO. TOWS	6	11	14	11	13	9	13	8	10	7	6	6	6	120
16JUL-19JUL	St. Crop	209.75	392.67	0.00	869.24	1712.16	2198.44	1788.80	3828.29	NS	NS	NS	NS	NS	10999.35
	SE	209.75	392.67	0.00	286.08	823.00	1341.20	687.58	2871.75						3387.60
	NO. TOWS	7	10	11	12	10	6	10	6						72
30JUL-02AUG	St. Crop	0.00	37.39	0.00	0.00	0.00	0.00	18.10	0.00	NS	NS	NS	NS	NS	55.49
	SE	0.00	37.39	0.00	0.00	0.00	0.00	18.10	0.00						41.54
	NO. TOWS	7	11	11	12	10	6	10	6						73
14AUG-16AUG	St. Crop	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						0.00
	NO. TOWS	7	11	11	12	10	5	9	6						71

Table C-23 Regional Density (No./1,000m3) of White Perch Young of Year
in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1990

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
19APR-23APR	DENSITY	NS	0.00	0.00	0.00	3.46	0.00	0.00	0.00	NS	0.00	NS	0.00	0.00	0.35
	SE		0.00	0.00	0.00	3.46	0.00	0.00	0.00		0.00		0.00	0.00	3.46
	NO. TOWS		6	8	8	4	5	6	3		7		11	24	82
23APR-26APR	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	1.54	0.00	0.00	0.00	0.85	0.00	0.00	0.20
	SE		0.00	0.00	0.00	0.00	0.00	1.54	0.00	0.00	0.00	0.85	0.00	0.00	1.76
	NO. TOWS		10	12	13	10	6	10	6	7	7	8	9	9	107
30APR-03MAY	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
07MAY-10MAY	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
14MAY-17MAY	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	5	10	116
21MAY-24MAY	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	5	109
29MAY-02JUN	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
04JUN-07JUN	DENSITY	NS	0.00	2.24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.19
	SE		0.00	2.24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.24
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
11JUN-14JUN	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
18JUN-21JUN	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
25JUN-28JUN	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	1.99	0.52	0.00	3.06	0.00	0.75	0.00	0.49
	SE	0.00	0.00	0.00	0.00	0.00	0.00	1.24	0.30	0.00	2.18	0.00	0.75	0.00	2.64
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
02JUL-06JUL	DENSITY	0.00	0.00	0.67	0.51	0.00	0.73	4.37	0.28	5.55	8.95	3.42	3.78	2.55	2.37
	SE	0.00	0.00	0.67	0.51	0.00	0.52	3.50	0.28	2.94	5.76	2.55	2.73	1.97	8.54
	NO. TOWS	6	11	14	11	13	9	13	8	10	7	6	6	6	120
16JUL-19JUL	DENSITY	0.00	0.00	1.01	80.88	0.40	4.48	12.58	11.86	NS	NS	NS	NS	NS	13.90
	SE	0.00	0.00	0.75	61.52	0.23	3.33	8.64	0.91						62.22
	NO. TOWS	7	10	11	12	10	6	10	6						72
30JUL-02AUG	DENSITY	0.00	0.00	0.00	0.00	0.00	1.34	0.31	0.80	NS	NS	NS	NS	NS	0.31
	SE	0.00	0.00	0.00	0.00	0.00	1.34	0.25	0.80						1.58
	NO. TOWS	7	11	11	12	10	6	10	6						73
14AUG-16AUG	DENSITY	0.00	0.00	0.00	0.00	0.23	0.00	0.45	0.86	NS	NS	NS	NS	NS	0.19
	SE	0.00	0.00	0.00	0.00	0.23	0.00	0.45	0.86						0.99
	NO. TOWS	7	11	11	12	10	5	9	6						71

Table C-24 Regional Standing Crop (In Thousands) of White Perch Young of Year in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1990

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
19APR-23APR	St. Crop	NS	0.00	0.00	0.00	721.23	0.00	0.00	0.00	NS	0.00	NS	0.00	0.00	721.23
	SE		0.00	0.00	0.00	721.23	0.00	0.00	0.00		0.00		0.00	0.00	721.23
	NO. TOWS		6	8	8	4	5	6	3		7		11	24	82
23APR-26APR	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	214.69	0.00	0.00	0.00	150.26	0.00	0.00	364.94
	SE		0.00	0.00	0.00	0.00	0.00	214.69	0.00	0.00	0.00	150.26	0.00	0.00	262.04
	NO. TOWS		10	12	13	10	6	10	6	7	7	8	9	9	107
30APR-03MAY	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
07MAY-10MAY	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
14MAY-17MAY	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	5	10	116
21MAY-24MAY	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	5	109
29MAY-02JUN	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
04JUN-07JUN	St. Crop	NS	0.00	720.88	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	720.88
	SE		0.00	720.88	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	720.88
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
11JUN-14JUN	St. Crop	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
18JUN-21JUN	St. Crop	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
25JUN-28JUN	St. Crop	0.00	0.00	0.00	0.00	0.00	0.00	277.93	154.92	0.00	433.59	0.00	120.26	0.00	986.70
	SE	0.00	0.00	0.00	0.00	0.00	0.00	173.99	89.80	0.00	308.82	0.00	120.26	0.00	384.93
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
02JUL-06JUL	St. Crop	0.00	0.00	214.01	74.62	0.00	151.03	610.97	82.88	918.20	1265.91	603.08	607.82	181.18	4709.70
	SE	0.00	0.00	214.01	74.62	0.00	107.12	489.43	82.88	486.13	815.43	449.83	438.95	140.40	1274.84
	NO. TOWS	6	11	14	11	13	9	13	8	10	7	6	6	6	120
16JUL-19JUL	St. Crop	0.00	0.00	326.09	11949.07	83.48	928.42	1759.17	3534.49	NS	NS	NS	NS	NS	18580.73
	SE	0.00	0.00	241.94	9088.56	47.18	689.91	1207.13	272.74						9201.64
	NO. TOWS	7	10	11	12	10	6	10	6						72
30JUL-02AUG	St. Crop	0.00	0.00	0.00	0.00	0.00	278.16	43.57	238.96	NS	NS	NS	NS	NS	560.70
	SE	0.00	0.00	0.00	0.00	0.00	278.16	34.45	238.96						368.33
	NO. TOWS	7	11	11	12	10	6	10	6						73
14AUG-16AUG	St. Crop	0.00	0.00	0.00	0.00	46.98	0.00	63.20	255.39	NS	NS	NS	NS	NS	365.57
	SE	0.00	0.00	0.00	0.00	46.98	0.00	63.20	255.39						267.25
	NO. TOWS	7	11	11	12	10	5	9	6						71

Table C-25 Regional Density (No./1,000m3) of White Perch Young of Year in Hudson River Estuary Determined From Fall Juvenile Survey, 1990

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions COMBINED
09JUL-	DENSITY	0.00	0.00	0.00	0.00	4.07	0.75	0.10	7.68	0.08	1.03	0.00	0.00	1.14
14JUL	SE	0.00	0.00	0.00	0.00	4.04	0.75	0.10	3.37	0.06	0.65	0.00	0.00	5.36
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	12	209
23JUL-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	1.27	0.00	24.51	0.00	0.07	0.07	2.16
27JUL	SE	0.00	0.00	0.00	0.00	0.00	0.00	1.22	0.00	24.51	0.00	0.05	0.07	24.54
	NO. TOWS	17	46	27	14	8	11	7	10	15	18	21	13	207
06AUG-	DENSITY	0.00	0.00	0.03	0.00	0.00	0.37	0.05	2.19	0.00	0.08	0.00	0.00	0.23
10AUG	SE	0.00	0.00	0.03	0.00	0.00	0.37	0.05	0.91	0.00	0.08	0.00	0.00	0.99
	NO. TOWS	16	46	27	14	8	13	8	10	15	18	21	13	209
20AUG-	DENSITY	0.00	0.00	0.00	0.26	0.06	0.72	0.00	5.09	0.00	0.04	0.44	0.47	0.59
24AUG	SE	0.00	0.00	0.00	0.11	0.06	0.24	0.00	5.09	0.00	0.04	0.36	0.34	5.12
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
04SEP-	DENSITY	0.00	0.00	0.00	0.81	0.00	0.12	0.00	0.29	0.00	0.03	0.28	0.32	0.15
07SEP	SE	0.00	0.00	0.00	0.81	0.00	0.06	0.00	0.13	0.00	0.03	0.28	0.18	0.89
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
17SEP-	DENSITY	0.00	0.00	0.00	0.02	0.00	0.25	0.05	0.43	0.04	3.33	0.16	0.29	0.38
20SEP	SE	0.00	0.00	0.00	0.02	0.00	0.11	0.05	0.21	0.04	2.64	0.08	0.11	2.65
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
01OCT-	DENSITY	0.00	0.00	0.02	0.03	0.00	0.17	0.13	0.17	0.75	0.13	0.09	0.76	0.19
06OCT	SE	0.00	0.00	0.02	0.03	0.00	0.07	0.05	0.07	0.68	0.07	0.07	0.30	0.76
	NO. TOWS	18	46	27	14	8	13	8	10	15	18	21	13	211
15OCT-	DENSITY	0.00	0.00	0.02	0.15	0.00	0.16	0.00	0.62	0.04	0.50	0.55	0.18	0.18
17OCT	SE	0.00	0.00	0.02	0.10	0.00	0.07	0.00	0.56	0.04	0.21	0.27	0.12	0.68
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210

Table C-26 Regional Standing Crops (in Thousands) of White Perch Young of Year in Hudson River Estuary Determined From Fall Juvenile Survey, 1990

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions COMBINED
09JUL-14JUL	St. Crop	0	0	0	0	844	105	29	1272	12	181	0	0	2443
	SE	0	0	0	0	838	105	29	558	8	114	0	0	1019
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	12	209
23JUL-27JUL	St. Crop	0	0	0	0	0	0	378	0	3467	0	11	5	3861
	SE	0	0	0	0	0	0	363	0	3467	0	8	5	3486
	NO. TOWS	17	46	27	14	8	11	7	10	15	18	21	13	207
06AUG-10AUG	St. Crop	0	0	4	0	0	52	16	362	0	13	0	0	447
	SE	0	0	4	0	0	52	16	150	0	13	0	0	161
	NO. TOWS	16	46	27	14	8	13	8	10	15	18	21	13	209
20AUG-24AUG	St. Crop	0	0	0	55	12	100	0	842	0	7	71	34	1121
	SE	0	0	0	23	12	34	0	842	0	7	58	24	845
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
04SEP-07SEP	St. Crop	0	0	0	169	0	17	0	48	0	5	45	23	306
	SE	0	0	0	169	0	8	0	21	0	5	45	13	176
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
17SEP-20SEP	St. Crop	0	0	0	4	0	35	15	71	5	588	26	21	765
	SE	0	0	0	4	0	15	15	35	5	465	12	8	467
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
01OCT-06OCT	St. Crop	0	0	3	7	0	24	39	28	105	22	14	54	298
	SE	0	0	3	7	0	9	16	11	96	13	11	21	103
	NO. TOWS	18	46	27	14	8	13	8	10	15	18	21	13	211
15OCT-17OCT	St. Crop	0	0	4	32	0	22	0	103	5	88	89	13	354
	SE	0	0	4	22	0	10	0	93	5	38	43	9	112
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210

Table C-27 Regional Catch-Per-Unit-Effort (CPUE) of White Perch Young of Year in Hudson River Estuary Determined From Beach Seine Survey, 1990

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions COMBINED
18JUN-20JUN	CPUE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
02JUL-03JUL	CPUE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.11	0.00	0.01
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.08	0.00	0.08
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	18	13	100
17JUL-19JUL	CPUE	0.00	0.00	0.00	0.00	10.67	0.33	3.88	21.00	2.63	3.00	1.63	0.50	3.64
	SE	0.00	0.00	0.00	0.00	10.67	0.33	3.20	5.70	1.70	1.77	0.51	0.34	12.77
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
31JUL-03AUG	CPUE	0.00	0.13	0.80	2.20	13.80	0.00	9.00	4.40	16.20	1.33	20.00	2.14	5.83
	SE	0.00	0.07	0.35	2.20	4.36	0.00	7.59	2.04	15.95	0.50	9.79	1.58	20.95
	NO. TOWS	5	23	15	5	5	6	5	5	5	9	10	7	100
14AUG-17AUG	CPUE	0.20	0.79	12.71	0.00	4.20	4.17	5.00	1.60	10.40	8.44	3.90	0.86	4.36
	SE	0.20	0.39	8.15	0.00	1.80	3.78	3.16	1.60	5.98	3.01	2.98	0.86	12.29
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
27AUG-29AUG	CPUE	0.00	1.00	1.64	3.00	9.60	5.67	0.60	4.40	2.80	1.89	8.20	6.71	3.79
	SE	0.00	0.69	0.80	2.00	4.18	5.67	0.60	2.64	2.13	1.10	5.99	4.20	11.01
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
10SEP-12SEP	CPUE	0.00	1.00	6.21	4.20	27.80	2.33	1.40	10.00	8.20	8.11	4.60	0.00	6.15
	SE	0.00	0.49	3.66	4.20	15.84	1.31	0.51	6.02	8.20	4.85	3.04	0.00	20.50
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
24SEP-26SEP	CPUE	0.00	0.17	1.36	4.60	16.80	3.00	1.20	8.00	4.00	5.44	3.60	1.43	4.13
	SE	0.00	0.08	0.55	4.60	15.08	1.65	0.37	8.00	1.87	4.13	3.16	1.02	18.63
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
08OCT-10OCT	CPUE	0.00	0.17	4.14	4.20	21.80	0.83	0.20	0.80	8.60	1.44	2.90	0.71	3.82
	SE	0.00	0.13	4.14	3.50	12.33	0.65	0.20	0.80	5.77	1.32	2.68	0.42	15.00
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
22OCT-24OCT	CPUE	0.00	0.17	0.36	4.80	2.60	5.17	2.40	0.20	2.00	2.11	3.10	0.43	1.94
	SE	0.00	0.13	0.25	2.31	1.89	4.38	2.40	0.20	1.55	1.05	1.72	0.30	6.36
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100

Table C-28 Regional Standing Crops (in Thousands) of White Perch Young of Year in Hudson River Estuary Determined From Beach Seine Survey, 1990

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions COMBINED
18JUN-20JUN	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
	SE	0	0	0	0	0	0	0	0	0	0	0	0	0
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
02JUL-03JUL	St. Crop	0	0	0	0	0	0	0	0	0	0	2	0	2
	SE	0	0	0	0	0	0	0	0	0	0	1	0	1
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	18	13	100
17JUL-19JUL	St. Crop	0	0	0	0	28	4	27	26	23	53	32	7	199
	SE	0	0	0	0	28	4	23	7	15	31	10	5	52
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
31JUL-03AUG	St. Crop	0	6	22	20	36	0	64	5	139	23	394	29	739
	SE	0	3	10	20	12	0	54	3	137	9	193	21	245
	NO. TOWS	5	23	15	5	5	6	5	5	5	9	10	7	100
14AUG-17AUG	St. Crop	2	36	342	0	11	44	35	2	90	148	77	12	798
	SE	2	18	219	0	5	40	22	2	51	53	59	12	244
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
27AUG-29AUG	St. Crop	0	45	44	28	25	60	4	5	24	33	161	91	522
	SE	0	32	22	18	11	60	4	3	18	19	118	57	153
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
10SEP-12SEP	St. Crop	0	45	167	39	73	25	10	12	71	142	91	0	675
	SE	0	22	98	39	42	14	4	7	71	85	60	0	172
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
24SEP-26SEP	St. Crop	0	8	36	42	44	32	9	10	34	96	71	19	401
	SE	0	4	15	42	40	18	3	10	16	72	62	14	117
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
08OCT-10OCT	St. Crop	0	8	111	39	57	9	1	1	74	25	57	10	393
	SE	0	6	111	32	33	7	1	1	50	23	53	6	143
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
22OCT-24OCT	St. Crop	0	8	10	44	7	55	17	<0.005	17	37	61	6	262
	SE	0	6	7	21	5	47	17	<0.005	13	18	34	4	69
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100

Table C-29 Regional Density (No./1,000m3) of White Perch Yearling and Older in Hudson River Estuary Determined From Fall Juvenile Survey, 1990

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions COMBINED
09JUL-14JUL	DENSITY	0.54	0.23	0.82	0.04	0.64	0.62	1.45	2.91	2.38	1.98	2.57	1.04	1.27
	SE	0.33	0.19	0.45	0.03	0.64	0.31	0.70	1.59	1.19	0.49	0.68	0.41	2.48
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	12	209
23JUL-27JUL	DENSITY	0.15	0.24	0.00	2.06	0.74	1.07	0.19	2.57	7.61	0.96	4.05	0.71	1.70
	SE	0.07	0.12	0.00	1.82	0.37	0.48	0.19	1.17	3.83	0.42	1.44	0.33	4.71
	NO. TOWS	17	46	27	14	8	11	7	10	15	18	21	13	207
06AUG-10AUG	DENSITY	0.29	3.10	4.22	0.47	0.03	10.15	0.81	2.25	3.33	1.60	2.32	0.92	2.46
	SE	0.29	0.75	1.31	0.36	0.03	5.74	0.40	1.39	0.99	0.45	0.59	0.36	6.26
	NO. TOWS	16	46	27	14	8	13	8	10	15	18	21	13	209
20AUG-24AUG	DENSITY	0.17	1.94	3.15	0.40	0.03	2.39	2.20	2.55	1.51	4.71	1.95	2.12	1.93
	SE	0.08	0.40	0.67	0.18	0.03	0.62	1.05	0.93	0.32	2.12	0.66	1.08	3.04
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
04SEP-07SEP	DENSITY	0.16	2.12	2.10	0.69	0.89	2.69	1.50	0.71	2.52	2.12	2.62	5.59	1.97
	SE	0.09	0.54	0.51	0.32	0.89	1.03	0.89	0.27	0.98	1.06	0.77	1.24	2.76
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
17SEP-20SEP	DENSITY	0.02	1.48	0.67	0.43	0.80	0.65	0.58	1.27	3.21	6.29	4.26	1.73	1.78
	SE	0.02	0.31	0.39	0.23	0.80	0.31	0.19	0.58	0.88	2.34	1.11	0.42	3.01
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
01OCT-06OCT	DENSITY	0.12	1.26	2.55	0.07	0.02	0.51	2.69	3.23	4.15	3.44	2.64	6.18	2.24
	SE	0.09	0.37	0.85	0.06	0.02	0.19	1.44	1.30	2.40	0.94	0.64	2.23	4.08
	NO. TOWS	18	46	27	14	8	13	8	10	15	18	21	13	211
15OCT-17OCT	DENSITY	0.04	4.34	12.06	2.84	0.00	0.94	0.22	2.71	2.63	3.77	9.11	1.09	3.31
	SE	0.04	0.95	1.75	1.09	0.00	0.69	0.12	1.70	0.93	1.43	5.34	0.39	6.33
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210

Table C-30 Regional Standing Crops (in Thousands) of White Perch Yearling and Older in Hudson River Estuary Determined From Fall Juvenile Survey, 1990

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions COMBINED
09JUL-14JUL	St. Crop	124	74	122	9	134	87	431	482	337	349	412	74	2636
	SE	76	62	66	7	134	43	208	263	168	87	109	29	441
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	12	209
23JUL-27JUL	St. Crop	34	76	0	428	153	150	56	424	1077	170	652	51	3271
	SE	17	39	0	380	76	68	56	194	541	74	232	24	742
	NO. TOWS	17	46	27	14	8	11	7	10	15	18	21	13	207
06AUG-10AUG	St. Crop	67	999	624	98	6	1419	241	372	471	282	373	66	5016
	SE	67	240	194	74	6	802	118	231	140	80	95	26	923
	NO. TOWS	16	46	27	14	8	13	8	10	15	18	21	13	209
20AUG-24AUG	St. Crop	39	625	466	83	6	334	655	422	214	830	314	151	4140
	SE	19	129	100	37	6	87	313	154	45	375	107	76	563
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
04SEP-07SEP	St. Crop	36	681	310	144	184	375	448	117	356	374	421	398	3845
	SE	21	174	75	67	184	143	265	45	139	188	124	89	495
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
17SEP-20SEP	St. Crop	5	475	99	89	166	91	172	210	454	1110	685	123	3677
	SE	5	98	58	47	166	43	57	96	124	413	178	30	525
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
01OCT-06OCT	St. Crop	28	406	376	14	5	71	801	535	587	606	425	440	4295
	SE	20	118	125	12	5	27	431	215	339	165	104	159	664
	NO. TOWS	18	46	27	14	8	13	8	10	15	18	21	13	211
15OCT-17OCT	St. Crop	8	1396	1782	591	0	131	66	449	372	665	1464	77	7002
	SE	8	307	258	226	0	96	36	281	131	253	858	28	1058
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210

Table C-31 Regional Catch-Per-Unit-Effort (CPUE) of White Perch Yearling and Older in Hudson River Estuary Determined From Beach Seine Survey, 1990

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions COMBINED
18JUN-20JUN	CPUE	0.00	15.09	23.43	10.67	0.33	26.67	13.25	35.38	4.50	0.80	3.58	28.25	13.50
	SE	0.00	3.13	5.46	9.68	0.33	14.31	6.83	10.52	1.89	0.37	1.40	23.65	32.57
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
02JUL-03JUL	CPUE	0.67	10.00	3.57	0.67	0.00	0.33	2.25	8.50	37.75	8.20	4.44	1.15	6.46
	SE	0.67	5.40	1.59	0.33	0.00	0.33	1.58	2.49	17.96	1.95	1.36	0.71	19.23
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	18	13	100
17JUL-19JUL	CPUE	0.00	4.27	2.00	0.33	6.67	3.33	3.00	8.75	9.50	11.53	9.79	2.67	5.15
	SE	0.00	2.34	1.23	0.33	3.53	2.03	1.10	2.66	4.37	4.01	2.38	2.14	8.80
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
31JUL-03AUG	CPUE	0.00	10.96	10.40	9.20	8.60	4.17	2.80	0.00	3.80	2.56	4.80	0.43	4.81
	SE	0.00	5.10	3.51	1.28	3.92	2.06	2.56	0.00	3.56	1.18	2.58	0.30	9.32
	NO. TOWS	5	23	15	5	5	6	5	5	5	9	10	7	100
14AUG-17AUG	CPUE	1.20	2.58	7.86	4.40	4.40	5.83	2.40	1.80	2.80	13.67	16.20	0.86	5.33
	SE	1.20	0.85	2.93	1.60	2.34	2.60	1.12	0.97	0.80	4.57	11.13	0.55	13.17
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
27AUG-29AUG	CPUE	0.00	10.08	2.14	1.20	1.20	2.17	0.00	0.60	1.80	0.33	3.80	1.86	2.10
	SE	0.00	5.24	1.04	0.80	0.58	0.83	0.00	0.40	0.92	0.17	1.69	1.39	6.00
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
10SEP-12SEP	CPUE	0.00	2.21	27.79	3.00	10.40	6.33	2.60	3.00	1.40	3.44	13.30	0.29	6.15
	SE	0.00	0.98	22.30	2.53	7.38	2.49	1.25	1.14	1.17	2.14	11.45	0.29	26.55
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
24SEP-26SEP	CPUE	0.00	0.17	0.29	1.00	2.20	8.17	1.60	1.80	3.80	0.56	16.30	3.43	3.28
	SE	0.00	0.12	0.29	0.55	1.24	1.45	0.75	1.80	2.73	0.34	8.52	3.11	9.88
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
08OCT-10OCT	CPUE	0.00	0.79	0.00	12.20	5.40	3.33	0.80	0.60	2.20	0.11	3.70	0.00	2.43
	SE	0.00	0.55	0.00	9.33	3.11	2.58	0.58	0.60	1.56	0.11	2.24	0.00	10.58
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
22OCT-24OCT	CPUE	1.20	1.04	0.07	1.00	1.40	2.00	1.00	0.80	0.40	1.11	5.40	2.71	1.51
	SE	0.58	0.47	0.07	0.32	1.17	1.29	1.00	0.58	0.24	0.65	3.07	1.76	4.24
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100

Table C-32 Regional Standing Crops (in Thousands) of White Perch Yearling and Older in Hudson River Estuary Determined From Beach Seine Survey, 1990

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions COMBINED
18JUN-20JUN	St. Crop	0	686	630	98	1	284	94	44	39	14	70	384	2344
	SE	0	142	147	89	1	152	48	13	16	6	28	321	424
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
02JUL-03JUL	St. Crop	5	454	96	6	0	4	16	11	325	144	87	16	1164
	SE	5	245	43	3	0	4	11	3	155	34	27	10	297
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	18	13	100
17JUL-19JUL	St. Crop	0	194	54	3	18	36	21	11	82	202	193	36	849
	SE	0	106	33	3	9	22	8	3	38	70	47	29	150
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
31JUL-03AUG	St. Crop	0	498	280	85	23	44	20	0	33	45	94	6	1127
	SE	0	232	94	12	10	22	18	0	31	21	51	4	260
	NO. TOWS	5	23	15	5	5	6	5	5	5	9	10	7	100
14AUG-17AUG	St. Crop	9	117	211	41	12	62	17	2	24	240	319	12	1066
	SE	9	39	79	15	6	28	8	1	7	80	219	8	252
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
27AUG-29AUG	St. Crop	0	458	58	11	3	23	0	1.00	15	6	75	25	675
	SE	0	238	28	7	2	9	0	<0.005	8	3	33	19	243
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
10SEP-12SEP	St. Crop	0	100	747	28	27	67	18	4	12	60	262	4	1330
	SE	0	44	600	23	19	26	9	1	10	37	225	4	645
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
24SEP-26SEP	St. Crop	0	8	8	9	6	87	11	2	33	10	321	47	541
	SE	0	5	8	5	3	15	5	2	23	6	168	42	176
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
08OCT-10OCT	St. Crop	0	36	0	112	14	36	6	1	19	2	73	0	298
	SE	0	25	0	86	8	27	4	1	13	2	44	0	105
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
22OCT-24OCT	St. Crop	9	47	2	9	4	21	7	1	3	20	106	37	267
	SE	4	21	2	3	3	14	7	1	2	11	60	24	71
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100

Table C-33 Regional Density (No./1,000m3) of Atlantic Tomcod Yolk-Sac Larvae in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1990

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
19APR-23APR	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	0.00	NS	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00	0.00	0.00
	NO. TOWS		6	8	8	4	5	6	3		7		11	24	82
23APR-26APR	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		10	12	13	10	6	10	6	7	7	8	9	9	107
30APR-03MAY	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
07MAY-10MAY	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
14MAY-17MAY	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	5	10	116
21MAY-24MAY	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	5	109
29MAY-02JUN	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
04JUN-07JUN	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
11JUN-14JUN	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
18JUN-21JUN	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
25JUN-28JUN	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
02JUL-06JUL	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	6	11	14	11	13	9	13	8	10	7	6	6	6	120
16JUL-19JUL	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						0.00
	NO. TOWS	7	10	11	12	10	6	10	6						72
30JUL-02AUG	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						0.00
	NO. TOWS	7	11	11	12	10	6	10	6						73
14AUG-16AUG	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						0.00
	NO. TOWS	7	11	11	12	10	5	9	6						71

Table C-34 Regional Standing Crop (In Thousands) of Atlantic Tomcod Yolk-Sac Larvae in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1990

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
19APR-23APR	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	0.00	NS	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00	0.00	0.00
	NO. TOWS		6	8	8	4	5	6	3		7		11	24	82
23APR-26APR	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		10	12	13	10	6	10	6	7	7	8	9	9	107
30APR-03MAY	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
07MAY-10MAY	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
14MAY-17MAY	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	5	10	116
21MAY-24MAY	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	5	109
29MAY-02JUN	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
04JUN-07JUN	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
11JUN-14JUN	St. Crop	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
18JUN-21JUN	St. Crop	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
25JUN-28JUN	St. Crop	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
02JUL-06JUL	St. Crop	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	6	11	14	11	13	9	13	8	10	7	6	6	6	120
16JUL-19JUL	St. Crop	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						0.00
	NO. TOWS	7	10	11	12	10	6	10	6						72
30JUL-02AUG	St. Crop	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						0.00
	NO. TOWS	7	11	11	12	10	6	10	6						73
14AUG-16AUG	St. Crop	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						0.00
	NO. TOWS	7	11	11	12	10	5	9	6						71

Table C-35 Regional Density (No./1,000m3) of Atlantic Tomcod Post Yolk-Sac Larvae in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1990

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
19APR-	DENSITY	NS	1938.17	3504.50	130.13	23.27	0.00	0.00	0.00	NS	0.00	NS	0.00	0.00	559.61
23APR	SE		1713.13	2090.35	72.91	12.24	0.00	0.00	0.00		0.00		0.00	0.00	2703.67
	NO. TOWS		6	8	8	4	5	6	3		7		11	24	82
23APR-	DENSITY	NS	1160.31	875.01	300.32	126.21	1.99	2.24	0.24	0.00	0.00	0.00	0.00	0.00	205.53
26APR	SE		274.14	506.07	96.90	54.43	1.64	0.91	0.24	0.00	0.00	0.00	0.00	0.00	586.19
	NO. TOWS		10	12	13	10	6	10	6	7	7	8	9	9	107
30APR-	DENSITY	NS	348.56	48.08	5.06	3.90	0.46	0.30	0.00	0.00	0.00	0.00	0.00	0.00	33.86
03MAY	SE		176.18	25.96	1.63	0.98	0.46	0.21	0.00	0.00	0.00	0.00	0.00	0.00	178.10
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
07MAY-	DENSITY	NS	61.42	25.84	3.28	11.71	0.42	0.18	0.00	0.00	0.00	0.00	0.00	0.00	8.57
10MAY	SE		13.35	9.44	0.62	2.32	0.42	0.18	0.00	0.00	0.00	0.00	0.00	0.00	16.53
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
14MAY-	DENSITY	NS	19.33	0.44	0.48	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.69
17MAY	SE		17.31	0.44	0.48	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	17.32
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	5	10	116
21MAY-	DENSITY	NS	0.00	1.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.11
24MAY	SE		0.00	0.90	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.90
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	5	109
29MAY-	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
02JUN	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
04JUN-	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
07JUN	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
11JUN-	DENSITY	0.00	0.00	0.00	0.00	0.00	1.64	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.13
14JUN	SE	0.00	0.00	0.00	0.00	0.00	1.64	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.64
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
18JUN-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
21JUN	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
25JUN-	DENSITY	0.00	0.00	0.00	0.00	0.60	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05
28JUN	SE	0.00	0.00	0.00	0.00	0.60	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.60
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
02JUL-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
06JUL	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	6	11	14	11	13	9	13	8	10	7	6	6	6	120
16JUL-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
19JUL	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						0.00
	NO. TOWS	7	10	11	12	10	6	10	6						72
30JUL-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
02AUG	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						0.00
	NO. TOWS	7	11	11	12	10	6	10	6						73
14AUG-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
16AUG	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						0.00
	NO. TOWS	7	11	11	12	10	5	9	6						71

Table C-36 Regional Standing Crop (In Thousands) of Atlantic Tomcod Post Yolk-Sac Larvae in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1990

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
19APR-23APR	St. Crop	NS	444654.85	1127787.30	19224.79	4848.35	0.00	0.00	0.00	NS	0.00	NS	0.00	0.00	1596515.29
	SE		393026.79	672698.13	10771.68	2549.12	0.00	0.00	0.00		0.00		0.00	0.00	779176.07
	NO. TOWS		6	8	8	4	5	6	3		7		11	24	82
23APR-26APR	St. Crop	NS	266199.39	281589.62	44368.10	26295.12	412.50	313.77	71.84	0.00	0.00	0.00	0.00	0.00	619250.33
	SE		62892.77	162859.18	14315.75	11339.59	340.54	127.12	71.84	0.00	0.00	0.00	0.00	0.00	175534.27
	NO. TOWS		10	12	13	10	6	10	6	7	7	8	9	9	107
30APR-03MAY	St. Crop	NS	79966.65	15472.43	748.27	813.45	94.95	41.44	0.00	0.00	0.00	0.00	0.00	0.00	97137.19
	SE		40419.76	8355.12	240.45	205.00	94.95	28.71	0.00	0.00	0.00	0.00	0.00	0.00	41275.60
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
07MAY-10MAY	St. Crop	NS	14091.95	8317.03	484.02	2439.30	87.74	24.57	0.00	0.00	0.00	0.00	0.00	0.00	25444.62
	SE		3062.85	3038.28	91.97	483.23	87.74	24.57	0.00	0.00	0.00	0.00	0.00	0.00	4343.10
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
14MAY-17MAY	St. Crop	NS	4435.25	140.68	70.64	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4646.57
	SE		3971.02	140.68	70.64	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3974.14
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	5	10	116
21MAY-24MAY	St. Crop	NS	0.00	428.49	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	428.49
	SE		0.00	290.41	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	290.41
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	5	109
29MAY-02JUN	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
04JUN-07JUN	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
11JUN-14JUN	St. Crop	0.00	0.00	0.00	0.00	0.00	341.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	341.14
	SE	0.00	0.00	0.00	0.00	0.00	341.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	341.14
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
18JUN-21JUN	St. Crop	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
25JUN-28JUN	St. Crop	0.00	0.00	0.00	0.00	124.79	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	124.79
	SE	0.00	0.00	0.00	0.00	124.79	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	124.79
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
02JUL-06JUL	St. Crop	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	6	11	14	11	13	9	13	8	10	7	6	6	6	120
16JUL-19JUL	St. Crop	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						0.00
	NO. TOWS	7	10	11	12	10	6	10	6						72
30JUL-02AUG	St. Crop	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						0.00
	NO. TOWS	7	11	11	12	10	6	10	6						73
14AUG-16AUG	St. Crop	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						0.00
	NO. TOWS	7	11	11	12	10	5	9	6						71

Table C-37 Regional Density (No./1,000m3) of Atlantic Tomcod Young of Year in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1990

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
19APR-23APR	DENSITY	NS	197.16	110.16	83.82	4.30	0.00	0.00	0.00	NS	0.00	NS	0.00	0.00	39.54
	SE		160.87	59.05	65.33	3.49	0.00	0.00	0.00		0.00		0.00	0.00	183.43
	NO. TOWS		6	8	8	4	5	6	3		7		11	24	82
23APR-26APR	DENSITY	NS	128.28	125.72	52.42	37.38	0.53	7.08	0.71	0.00	0.00	0.00	0.00	0.00	29.34
	SE		22.59	64.91	15.81	13.03	0.53	2.21	0.42	0.00	0.00	0.00	0.00	0.00	71.75
	NO. TOWS		10	12	13	10	6	10	6	7	7	8	9	9	107
30APR-03MAY	DENSITY	NS	400.85	95.50	28.20	32.85	8.60	21.33	6.27	2.20	0.00	0.00	0.00	0.00	49.65
	SE		123.64	36.52	8.96	14.18	6.47	8.70	2.82	0.80	0.00	0.00	0.00	0.00	130.49
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
07MAY-10MAY	DENSITY	NS	488.21	425.11	46.13	70.92	17.82	23.20	11.44	11.04	4.95	0.45	0.00	0.00	91.61
	SE		200.80	247.12	12.70	30.51	4.45	6.42	5.74	3.61	3.19	0.45	0.00	0.00	320.31
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
14MAY-17MAY	DENSITY	NS	1015.51	13.78	2.65	26.18	2.80	15.50	31.88	2.52	0.00	0.51	0.00	0.00	92.61
	SE		837.79	11.53	1.29	23.28	1.50	5.99	30.41	0.93	0.00	0.51	0.00	0.00	838.77
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	5	10	116
21MAY-24MAY	DENSITY	NS	24.54	169.45	2.10	7.29	12.06	2.93	6.33	0.00	0.00	0.00	0.00	0.00	18.73
	SE		10.50	157.18	1.86	3.88	3.68	1.30	5.60	0.00	0.00	0.00	0.00	0.00	157.73
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	5	109
29MAY-02JUN	DENSITY	NS	23.16	53.00	5.73	3.49	0.00	5.07	4.06	2.15	1.62	0.00	0.00	0.00	8.19
	SE		20.65	34.90	2.06	1.82	0.00	2.20	2.23	0.58	1.18	0.00	0.00	0.00	40.78
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
04JUN-07JUN	DENSITY	NS	55.79	51.21	8.31	5.37	1.23	2.61	3.76	0.86	0.59	0.00	0.00	0.00	10.81
	SE		39.28	42.14	5.04	3.43	0.58	1.44	2.05	0.61	0.59	0.00	0.00	0.00	57.99
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
11JUN-14JUN	DENSITY	10.37	0.00	0.00	0.00	12.90	6.67	1.90	5.29	0.00	0.34	0.00	0.00	0.00	2.88
	SE	9.02	0.00	0.00	0.00	3.55	2.87	0.71	1.81	0.00	0.34	0.00	0.00	0.00	10.30
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
18JUN-21JUN	DENSITY	25.77	39.31	20.58	6.32	3.49	1.94	13.29	4.26	0.16	0.00	0.00	0.00	0.00	8.86
	SE	19.34	14.95	9.58	4.09	1.99	1.78	3.42	1.46	0.16	0.00	0.00	0.00	0.00	26.96
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
25JUN-28JUN	DENSITY	21.58	7.11	10.24	0.41	5.60	2.27	6.88	5.69	0.35	0.00	0.00	0.00	0.51	4.67
	SE	17.85	4.48	4.45	0.41	3.77	1.05	4.67	1.55	0.35	0.00	0.00	0.00	0.51	19.96
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
02JUL-06JUL	DENSITY	0.00	16.48	0.63	0.00	14.30	9.60	16.76	1.30	0.38	0.00	0.00	0.75	0.00	4.63
	SE	0.00	16.48	0.38	0.00	6.46	6.99	6.58	0.81	0.16	0.00	0.00	0.75	0.00	20.17
	NO. TOWS	6	11	14	11	13	9	13	8	10	7	6	6	6	120
16JUL-19JUL	DENSITY	4.12	25.64	0.00	4.64	8.43	1.59	5.18	0.25	NS	NS	NS	NS	NS	6.23
	SE	3.25	21.95	0.00	0.45	7.37	0.32	4.19	0.25						23.76
	NO. TOWS	7	10	11	12	10	6	10	6						72
30JUL-02AUG	DENSITY	8.37	0.28	5.16	8.52	8.67	1.22	31.73	0.00	NS	NS	NS	NS	NS	7.99
	SE	5.92	0.28	3.61	6.60	8.67	1.22	15.89	0.00						20.52
	NO. TOWS	7	11	11	12	10	6	10	6						73
14AUG-16AUG	DENSITY	13.30	0.61	0.27	1.05	0.79	14.01	0.15	0.00	NS	NS	NS	NS	NS	3.77
	SE	7.35	0.61	0.27	1.05	0.49	1.80	0.10	0.00						7.69
	NO. TOWS	7	11	11	12	10	5	9	6						71

Table C-38 Regional Standing Crop (In Thousands) of Atlantic Tomcod Young of Year in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1990

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
19APR-23APR	St. Crop	NS	45233.02	35449.71	12383.85	896.14	0.00	0.00	0.00	NS	0.00	NS	0.00	0.00	93962.72
	SE		36905.87	19004.45	9652.08	726.57	0.00	0.00	0.00		0.00		0.00	0.00	42625.14
	NO. TOWS		6	8	8	4	5	6	3		7		11	24	82
23APR-26APR	St. Crop	NS	29430.15	40458.78	7744.43	7787.64	109.30	990.01	210.24	0.00	0.00	0.00	0.00	0.00	86730.57
	SE		5182.18	20888.36	2335.34	2715.01	109.30	309.16	124.54	0.00	0.00	0.00	0.00	0.00	21820.33
	NO. TOWS		10	12	13	10	6	10	6	7	7	8	9	9	107
30APR-03MAY	St. Crop	NS	91963.74	30732.61	4165.98	6844.30	1784.29	2981.94	1869.98	364.38	0.00	0.00	0.00	0.00	140707.23
	SE		28364.72	11753.66	1324.37	2955.18	1342.38	1216.02	839.48	131.79	0.00	0.00	0.00	0.00	30938.58
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
07MAY-10MAY	St. Crop	NS	112005.08	136806.41	6815.29	14775.98	3697.86	3242.50	3410.49	1827.33	700.41	79.50	0.00	0.00	283360.83
	SE		46066.92	79526.22	1875.67	6355.60	922.46	897.62	1712.37	597.56	451.73	79.50	0.00	0.00	92171.85
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
14MAY-17MAY	St. Crop	NS	232978.07	4435.11	391.90	5455.02	580.54	2167.29	9505.21	417.70	0.00	89.39	0.00	0.00	256020.23
	SE		192205.52	3709.66	189.85	4849.13	311.12	837.45	9065.98	153.15	0.00	89.39	0.00	0.00	192518.30
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	5	10	116
21MAY-24MAY	St. Crop	NS	5630.97	54530.02	310.13	1517.80	2502.86	410.27	1888.42	0.00	0.00	0.00	0.00	0.00	66790.48
	SE		2408.58	50580.87	275.31	807.44	763.60	181.39	1668.40	0.00	0.00	0.00	0.00	0.00	50678.92
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	5	109
29MAY-02JUN	St. Crop	NS	5312.36	17056.89	846.52	727.25	0.00	708.18	1210.86	356.23	229.15	0.00	0.00	0.00	26447.43
	SE		4736.40	11229.71	303.76	378.19	0.00	306.99	666.00	95.66	166.65	0.00	0.00	0.00	12220.88
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
04JUN-07JUN	St. Crop	NS	12799.52	16480.41	1227.11	1118.76	255.86	364.55	1120.16	141.64	83.30	0.00	0.00	0.00	33591.30
	SE		9012.60	13560.14	743.98	713.65	119.51	200.85	611.45	100.18	83.30	0.00	0.00	0.00	16328.27
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
11JUN-14JUN	St. Crop	2167.75	0.00	0.00	0.00	2687.94	1382.82	265.47	1578.45	0.00	47.70	0.00	0.00	0.00	8130.13
	SE	1885.32	0.00	0.00	0.00	738.63	594.45	99.81	539.82	0.00	47.70	0.00	0.00	0.00	2181.06
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
18JUN-21JUN	St. Crop	5387.24	9018.18	6624.12	933.18	727.37	401.54	1857.92	1269.10	27.08	0.00	0.00	0.00	0.00	26245.72
	SE	4041.74	3428.73	3083.28	603.75	414.73	368.44	477.63	434.55	27.08	0.00	0.00	0.00	0.00	6220.00
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
25JUN-28JUN	St. Crop	4510.62	1631.32	3293.89	60.68	1167.27	470.41	962.22	1696.81	58.10	0.00	0.00	0.00	36.50	13887.82
	SE	3729.92	1028.47	1431.25	60.68	784.56	217.41	653.16	461.41	58.10	0.00	0.00	0.00	36.50	4281.27
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
02JUL-06JUL	St. Crop	0.00	3780.57	201.52	0.00	2978.20	1991.07	2343.04	387.75	63.47	0.00	0.00	120.22	0.00	11865.84
	SE	0.00	3780.57	123.48	0.00	1345.66	1451.09	920.33	241.08	27.03	0.00	0.00	120.22	0.00	4375.47
	NO. TOWS	6	11	14	11	13	9	13	8	10	7	6	6	6	120
16JUL-19JUL	St. Crop	860.75	5882.82	0.00	685.29	1755.78	329.49	724.49	75.93	NS	NS	NS	NS	NS	10314.55
	SE	679.70	5035.57	0.00	66.56	1535.44	66.16	585.36	75.93						5341.70
	NO. TOWS	7	10	11	12	10	6	10	6						72
30JUL-02AUG	St. Crop	1749.94	65.14	1659.67	1259.06	1805.44	253.87	4436.17	0.00	NS	NS	NS	NS	NS	11229.29
	SE	1237.45	65.14	1161.33	975.79	1805.44	253.87	2221.95	0.00						3478.15
	NO. TOWS	7	11	11	12	10	6	10	6						73
14AUG-16AUG	St. Crop	2779.37	140.42	87.93	154.40	164.94	2906.27	21.20	0.00	NS	NS	NS	NS	NS	6254.55
	SE	1536.79	140.42	87.93	154.40	102.86	373.05	13.43	0.00						1600.92
	NO. TOWS	7	11	11	12	10	5	9	6						71

Table C-39 Regional Density (No./1,000m3) of Atlantic Tomcod Young of Year in Hudson River Estuary Determined From Fall Juvenile Survey, 1990

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions COMBINED
09JUL-14JUL	DENSITY	0.61	0.00	0.16	0.06	1.55	2.06	1.14	0.05	0.00	0.03	0.00	0.00	0.47
	SE	0.61	0.00	0.06	0.06	0.67	1.53	0.64	0.05	0.00	0.03	0.00	0.00	1.89
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	12	209
23JUL-27JUL	DENSITY	0.34	0.16	0.61	7.14	24.34	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.72
	SE	0.21	0.16	0.44	3.95	5.36	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.68
	NO. TOWS	17	46	27	14	8	11	7	10	15	18	21	13	207
06AUG-10AUG	DENSITY	0.30	0.67	0.75	2.21	1.31	0.61	0.05	0.00	0.00	0.00	0.00	0.00	0.49
	SE	0.15	0.27	0.35	0.79	0.38	0.28	0.05	0.00	0.00	0.00	0.00	0.00	1.03
	NO. TOWS	16	46	27	14	8	13	8	10	15	18	21	13	209
20AUG-24AUG	DENSITY	8.11	2.14	10.54	1.39	0.06	0.06	0.00	0.00	0.00	0.00	0.00	0.00	1.86
	SE	2.38	0.69	8.60	0.84	0.04	0.06	0.00	0.00	0.00	0.00	0.00	0.00	8.99
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
04SEP-07SEP	DENSITY	0.51	0.29	0.06	1.40	0.12	0.24	0.13	0.00	0.00	0.00	0.00	0.00	0.23
	SE	0.25	0.10	0.04	0.83	0.12	0.15	0.09	0.00	0.00	0.00	0.00	0.00	0.90
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
17SEP-20SEP	DENSITY	0.90	0.41	0.03	0.40	0.39	0.52	0.25	0.00	0.04	0.00	0.00	0.00	0.24
	SE	0.38	0.17	0.03	0.40	0.19	0.26	0.25	0.00	0.04	0.00	0.00	0.00	0.70
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
01OCT-06OCT	DENSITY	2.49	0.10	0.11	0.00	0.79	0.31	0.00	0.04	0.03	0.04	0.00	0.00	0.32
	SE	1.02	0.05	0.11	0.00	0.79	0.16	0.00	0.04	0.03	0.04	0.00	0.00	1.31
	NO. TOWS	18	46	27	14	8	13	8	10	15	18	21	13	211
15OCT-17OCT	DENSITY	0.58	0.76	0.09	0.53	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.17
	SE	0.21	0.21	0.09	0.37	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.48
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210

Table C-40 Regional Standing Crops (in Thousands) of Atlantic Tomcod Young of Year in Hudson River Estuary Determined From Fall Juvenile Survey, 1990

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions COMBINED
09JUL-14JUL	St. Crop	141	0	23	12	322	288	340	8	0	5	0	0	1139
	SE	141	0	9	12	139	214	190	8	0	5	0	0	348
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	12	209
23JUL-27JUL	St. Crop	77	51	90	1487	5050	0	0	0	0	0	0	0	6755
	SE	47	51	66	823	1113	0	0	0	0	0	0	0	1387
	NO. TOWS	17	46	27	14	8	11	7	10	15	18	21	13	207
06AUG-10AUG	St. Crop	69	215	111	460	272	85	16	0	0	0	0	0	1228
	SE	35	85	52	164	79	39	16	0	0	0	0	0	215
	NO. TOWS	16	46	27	14	8	13	8	10	15	18	21	13	209
20AUG-24AUG	St. Crop	1861	690	1557	289	12	8	0	0	0	0	0	0	4417
	SE	546	223	1271	175	7	8	0	0	0	0	0	0	1412
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
04SEP-07SEP	St. Crop	116	92	9	292	25	33	40	0	0	0	0	0	608
	SE	58	33	6	173	25	22	26	0	0	0	0	0	190
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
17SEP-20SEP	St. Crop	206	133	4	83	81	72	75	0	6	0	0	0	661
	SE	86	54	4	83	39	36	75	0	6	0	0	0	160
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
01OCT-06OCT	St. Crop	571	31	16	0	163	43	0	6	4	7	0	0	842
	SE	235	16	16	0	163	23	0	6	4	7	0	0	288
	NO. TOWS	18	46	27	14	8	13	8	10	15	18	21	13	211
15OCT-17OCT	St. Crop	133	244	13	110	10	0	0	0	0	0	0	0	510
	SE	48	69	13	76	10	0	0	0	0	0	0	0	115
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210

Table C-41 Regional Catch-Per-Unit-Effort (CPUE) of Atlantic Tomcod Young of Year in Hudson River Estuary Determined From Beach Seine Survey, 1990

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions COMBINED
18JUN-20JUN	CPUE	12.67	1.36	0.14	0.00	0.00	0.33	0.00	0.00	0.00	0.00	0.00	0.00	1.21
	SE	4.37	0.98	0.14	0.00	0.00	0.33	0.00	0.00	0.00	0.00	0.00	0.00	4.50
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
02JUL-03JUL	CPUE	0.00	0.27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02
	SE	0.00	0.19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.19
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	18	13	100
17JUL-19JUL	CPUE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
31JUL-03AUG	CPUE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	5	23	15	5	5	6	5	5	5	9	10	7	100
14AUG-17AUG	CPUE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
27AUG-29AUG	CPUE	0.00	0.54	0.43	0.20	0.40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.13
	SE	0.00	0.43	0.29	0.20	0.40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.69
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
10SEP-12SEP	CPUE	0.00	1.08	0.21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.11
	SE	0.00	0.58	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.59
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
24SEP-26SEP	CPUE	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	<0.005
	SE	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
08OCT-10OCT	CPUE	0.00	0.04	0.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02
	SE	0.00	0.04	0.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.15
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
22OCT-24OCT	CPUE	0.00	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
	SE	0.00	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.08
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100

Table C-42 Regional Standing Crops (in Thousands) of Atlantic Tomcod Young of Year in Hudson River Estuary Determined From Beach Seine Survey, 1990

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions COMBINED
18JUN-20JUN	St. Crop	95	62	4	0	0	4	0	0	0	0	0	0	165
	SE	33	45	4	0	0	4	0	0	0	0	0	0	56
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
02JUL-03JUL	St. Crop	0	12	0	0	0	0	0	0	0	0	0	0	12
	SE	0	9	0	0	0	0	0	0	0	0	0	0	9
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	18	13	100
17JUL-19JUL	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
	SE	0	0	0	0	0	0	0	0	0	0	0	0	0
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
31JUL-03AUG	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
	SE	0	0	0	0	0	0	0	0	0	0	0	0	0
	NO. TOWS	5	23	15	5	5	6	5	5	5	9	10	7	100
14AUG-17AUG	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
	SE	0	0	0	0	0	0	0	0	0	0	0	0	0
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
27AUG-29AUG	St. Crop	0	25	12	2	1	0	0	0	0	0	0	0	39
	SE	0	20	8	2	1	0	0	0	0	0	0	0	21
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
10SEP-12SEP	St. Crop	0	49	6	0	0	0	0	0	0	0	0	0	55
	SE	0	26	3	0	0	0	0	0	0	0	0	0	27
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
24SEP-26SEP	St. Crop	0	2	0	0	0	0	0	0	0	0	0	0	2
	SE	0	2	0	0	0	0	0	0	0	0	0	0	2
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
08OCT-10OCT	St. Crop	0	2	4	0	0	0	0	0	0	0	0	0	6
	SE	0	2	4	0	0	0	0	0	0	0	0	0	4
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
22OCT-24OCT	St. Crop	0	4	0	0	0	0	0	0	0	0	0	0	4
	SE	0	4	0	0	0	0	0	0	0	0	0	0	4
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100

Table C-43 Regional Density (No./1,000m3) of Atlantic Tomcod Yearling and Older in Hudson River Estuary Determined From Fall Juvenile Survey, 1990

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions COMBINED
09JUL-14JUL	DENSITY	0.00	0.00	0.09	0.01	0.07	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.02
	SE	0.00	0.00	0.06	0.01	0.07	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.10
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	12	209
23JUL-27JUL	DENSITY	0.00	0.03	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
	SE	0.00	0.03	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05
	NO. TOWS	17	46	27	14	8	11	7	10	15	18	21	13	207
06AUG-10AUG	DENSITY	0.24	0.12	0.00	0.21	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.05
	SE	0.22	0.07	0.00	0.19	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.30
	NO. TOWS	16	46	27	14	8	13	8	10	15	18	21	13	209
20AUG-24AUG	DENSITY	1.18	0.20	0.45	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.15
	SE	0.55	0.10	0.43	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.71
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
04SEP-07SEP	DENSITY	0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	<0.005
	SE	0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
17SEP-20SEP	DENSITY	0.00	0.04	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.01
	SE	0.00	0.03	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.04
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
01OCT-06OCT	DENSITY	0.25	0.02	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02
	SE	0.14	0.02	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.14
	NO. TOWS	18	46	27	14	8	13	8	10	15	18	21	13	211
15OCT-17OCT	DENSITY	0.26	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03
	SE	0.15	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.16
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210

Table C-44 Regional Standing Crops (in Thousands) of Atlantic Tomcod Yearling and Older in Hudson River Estuary Determined From Fall Juvenile Survey, 1990

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions COMBINED
09JUL-14JUL	St. Crop	0	0	14	2	14	7	0	0	0	0	0	0	37
	SE	0	0	9	2	14	7	0	0	0	0	0	0	18
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	12	209
23JUL-27JUL	St. Crop	0	8	0	10	0	0	0	0	0	0	0	0	18
	SE	0	8	0	10	0	0	0	0	0	0	0	0	13
	NO. TOWS	17	46	27	14	8	11	7	10	15	18	21	13	207
06AUG-10AUG	St. Crop	55	39	0	43	0	4	0	0	0	0	0	0	141
	SE	50	21	0	39	0	4	0	0	0	0	0	0	67
	NO. TOWS	16	46	27	14	8	13	8	10	15	18	21	13	209
20AUG-24AUG	St. Crop	272	64	67	0	0	0	0	0	0	0	0	0	402
	SE	127	32	63	0	0	0	0	0	0	0	0	0	146
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
04SEP-07SEP	St. Crop	0	0	0	7	0	0	0	0	0	0	0	0	7
	SE	0	0	0	7	0	0	0	0	0	0	0	0	7
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
17SEP-20SEP	St. Crop	0	14	0	0	0	4	0	0	0	0	0	0	17
	SE	0	10	0	0	0	2	0	0	0	0	0	0	10
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
01OCT-06OCT	St. Crop	57	6	4	0	0	0	0	0	0	0	0	0	67
	SE	32	6	4	0	0	0	0	0	0	0	0	0	33
	NO. TOWS	18	46	27	14	8	13	8	10	15	18	21	13	211
15OCT-17OCT	St. Crop	59	30	0	0	0	0	0	0	0	0	0	0	90
	SE	35	20	0	0	0	0	0	0	0	0	0	0	40
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210

Table C-45 Regional Catch-Per-Unit-Effort (CPUE) of Atlantic Tomcod Yearling and Older in Hudson River Estuary Determined From Beach Seine Survey, 1990

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions COMBINED
18JUN-20JUN	CPUE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
02JUL-03JUL	CPUE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	18	13	100
17JUL-19JUL	CPUE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
31JUL-03AUG	CPUE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	5	23	15	5	5	6	5	5	5	9	10	7	100
14AUG-17AUG	CPUE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
27AUG-29AUG	CPUE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
10SEP-12SEP	CPUE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
24SEP-26SEP	CPUE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
08OCT-10OCT	CPUE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
22OCT-24OCT	CPUE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100

Table C-46 Regional Standing Crops (in Thousands) of Atlantic Tomcod Yearling and Older in Hudson River Estuary Determined From Beach Seine Survey, 1990

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions COMBINED
18JUN-20JUN	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
	SE	0	0	0	0	0	0	0	0	0	0	0	0	0
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
02JUL-03JUL	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
	SE	0	0	0	0	0	0	0	0	0	0	0	0	0
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	18	13	100
17JUL-19JUL	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
	SE	0	0	0	0	0	0	0	0	0	0	0	0	0
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
31JUL-03AUG	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
	SE	0	0	0	0	0	0	0	0	0	0	0	0	0
	NO. TOWS	5	23	15	5	5	6	5	5	5	9	10	7	100
14AUG-17AUG	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
	SE	0	0	0	0	0	0	0	0	0	0	0	0	0
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
27AUG-29AUG	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
	SE	0	0	0	0	0	0	0	0	0	0	0	0	0
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
10SEP-12SEP	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
	SE	0	0	0	0	0	0	0	0	0	0	0	0	0
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
24SEP-26SEP	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
	SE	0	0	0	0	0	0	0	0	0	0	0	0	0
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
08OCT-10OCT	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
	SE	0	0	0	0	0	0	0	0	0	0	0	0	0
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
22OCT-24OCT	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
	SE	0	0	0	0	0	0	0	0	0	0	0	0	0
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100

Table C-47 Regional Density (No./1,000m3) of American Shad Eggs in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1990

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
19APR-23APR	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	0.00	NS	0.31	0.00	0.03
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.31	0.00	0.31
	NO. TOWS		6	8	8	4	5	6	3		7		11	24	82
23APR-26APR	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	11.18	41.22	15.74	84.47	12.72
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.70	22.52	6.80	65.79	70.19
	NO. TOWS		10	12	13	10	6	10	6	7	7	8	9	9	107
30APR-03MAY	DENSITY	NS	0.00	0.00	0.00	0.00	0.11	0.00	0.00	1.11	10.27	189.56	905.00	301.18	117.27
	SE		0.00	0.00	0.00	0.00	0.11	0.00	0.00	0.97	8.27	116.98	446.77	287.24	543.93
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
07MAY-10MAY	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.20	0.19	1.43	3.04	220.79	100.00	1777.00	175.22
	SE		0.00	0.00	0.00	0.00	0.00	0.20	0.19	0.70	1.30	195.75	74.40	1206.16	1224.21
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
14MAY-17MAY	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.57	3.05	5.16	1018.05	2756.44	315.27
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.57	0.95	3.78	592.69	900.90	1078.38
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	5	10	116
21MAY-24MAY	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.34	17.93	0.00	110.99	38.47	1616.00	148.64
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.34	17.03	0.00	67.48	7.86	762.19	765.40
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	5	109
29MAY-02JUN	DENSITY	NS	0.00	0.00	0.00	0.00	0.49	0.00	0.00	0.55	0.29	390.81	275.71	230.36	74.85
	SE		0.00	0.00	0.00	0.00	0.49	0.00	0.00	0.55	0.29	271.78	103.08	127.86	317.55
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
04JUN-07JUN	DENSITY	NS	0.00	0.00	0.00	0.00	0.11	0.00	0.00	2.20	44.79	15.37	162.29	147.66	31.04
	SE		0.00	0.00	0.00	0.00	0.11	0.00	0.00	1.90	44.34	8.97	110.09	132.31	177.98
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
11JUN-14JUN	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.20	0.00	23.33	53.48	101.75	13.75
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.20	0.00	19.63	46.64	47.95	69.71
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
18JUN-21JUN	DENSITY	2070.63	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.46	2.88	0.67	8.14	160.44
	SE	1775.67	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.46	2.88	0.67	8.14	1775.70
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
25JUN-28JUN	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.26	0.00	0.25
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.04	0.00	2.04
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
02JUL-06JUL	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	6	11	14	11	13	9	13	8	10	7	6	6	6	120
16JUL-19JUL	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						0.00
	NO. TOWS	7	10	11	12	10	6	10	6						72
30JUL-02AUG	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						0.00
	NO. TOWS	7	11	11	12	10	6	10	6						73
14AUG-16AUG	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						0.00
	NO. TOWS	7	11	11	12	10	5	9	6						71

Table C-48 Regional Standing Crop (In Thousands) of American Shad Eggs in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1990

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
19APR-23APR	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	0.00	NS	50.49	0.00	50.49
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		50.49	0.00	50.49
	NO. TOWS		6	8	8	4	5	6	3		7		11	24	82
23APR-26APR	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1581.77	7267.08	2529.14	6009.72	17387.71
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	947.33	3970.49	1092.63	4680.99	6306.17
	NO. TOWS		10	12	13	10	6	10	6	7	7	8	9	9	107
30APR-03MAY	St. Crop	NS	0.00	0.00	0.00	0.00	22.97	0.00	0.00	184.30	1453.16	33418.06	145461.89	21428.97	201969.36
	SE		0.00	0.00	0.00	0.00	22.97	0.00	0.00	160.51	1169.47	20623.02	71810.47	20436.68	77466.80
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
07MAY-10MAY	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	27.55	56.36	235.97	430.34	38924.37	16072.44	126431.69	182178.72
	SE		0.00	0.00	0.00	0.00	0.00	27.55	56.36	116.36	184.01	34509.65	11958.21	85817.33	93266.18
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
14MAY-17MAY	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	93.70	431.83	910.56	163632.83	196117.98	361186.90
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	93.70	134.43	665.75	95263.62	64097.92	114822.34
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	5	10	116
21MAY-24MAY	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	102.55	2966.54	0.00	19567.20	6184.09	114977.08	143797.46
	SE		0.00	0.00	0.00	0.00	0.00	0.00	102.55	2817.95	0.00	11897.20	1263.10	54229.15	55604.78
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	5	109
29MAY-02JUN	St. Crop	NS	0.00	0.00	0.00	0.00	102.31	0.00	0.00	91.81	41.55	68897.35	44315.91	16390.14	129839.07
	SE		0.00	0.00	0.00	0.00	102.31	0.00	0.00	91.81	41.55	47914.23	16567.50	9097.05	51507.59
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
04JUN-07JUN	St. Crop	NS	0.00	0.00	0.00	0.00	23.33	0.00	0.00	364.33	6336.58	2710.45	26084.88	10505.95	46025.52
	SE		0.00	0.00	0.00	0.00	23.33	0.00	0.00	314.91	6272.74	1581.59	17695.65	9414.04	21064.39
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
11JUN-14JUN	St. Crop	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	32.89	0.00	4112.91	8595.36	7239.08	19980.24
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	32.89	0.00	3461.40	7496.50	3411.35	8934.05
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
18JUN-21JUN	St. Crop	432787.96	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	489.22	507.51	108.12	578.97	434471.77
	SE	371138.38	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	489.22	507.51	108.12	578.97	371139.52
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
25JUN-28JUN	St. Crop	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	523.65	0.00	523.65
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	328.65	0.00	328.65
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
02JUL-06JUL	St. Crop	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	6	11	14	11	13	9	13	8	10	7	6	6	6	120
16JUL-19JUL	St. Crop	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						0.00
	NO. TOWS	7	10	11	12	10	6	10	6						72
30JUL-02AUG	St. Crop	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						0.00
	NO. TOWS	7	11	11	12	10	6	10	6						73
14AUG-16AUG	St. Crop	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						0.00
	NO. TOWS	7	11	11	12	10	5	9	6						71

Table C-49 Regional Density (No./1,000m3) of American Shad Yolk-Sac Larvae
in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1990

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
19APR-	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	0.00	NS	0.00	0.00	0.00
23APR	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00	0.00	0.00
	NO. TOWS		6	8	8	4	5	6	3		7		11	24	82
23APR-	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
26APR	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		10	12	13	10	6	10	6	7	7	8	9	9	107
30APR-	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
03MAY	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
07MAY-	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.51	7.40	13.51	53.45	838.04	76.08
10MAY	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.34	4.02	9.70	21.08	183.70	185.20
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
14MAY-	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	12.69	27.28	344.07	226.14	462.73	766.68	153.30
17MAY	SE		0.00	0.00	0.00	0.00	0.00	0.00	7.34	7.08	99.30	68.89	135.02	149.89	235.38
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	5	10	116
21MAY-	DENSITY	NS	0.00	0.00	0.00	0.75	13.52	58.54	418.33	114.11	264.93	237.41	417.78	313.03	153.20
24MAY	SE		0.00	0.00	0.00	0.75	5.51	31.27	239.36	34.58	55.92	28.10	57.58	213.69	335.25
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	5	109
29MAY-	DENSITY	NS	0.12	0.00	0.31	0.00	0.13	3.56	11.39	33.31	40.03	105.07	104.69	860.25	96.57
02JUN	SE		0.12	0.00	0.31	0.00	0.13	2.35	5.69	14.00	8.58	27.40	30.97	728.13	729.52
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
04JUN-	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.53	17.90	20.78	35.29	538.22	51.06
07JUN	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.53	16.37	11.20	16.28	183.39	185.17
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
11JUN-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.84	5.42	66.75	56.51	1230.85	104.64
14JUN	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.68	5.42	51.98	19.54	1033.29	1034.79
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
18JUN-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.56	45.80	3.57
21JUN	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.56	34.83	34.83
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
25JUN-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	21.97	1.69
28JUN	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.22	7.22
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
02JUL-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
06JUL	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	6	11	14	11	13	9	13	8	10	7	6	6	6	120
16JUL-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
19JUL	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						0.00
	NO. TOWS	7	10	11	12	10	6	10	6						72
30JUL-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
02AUG	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						0.00
	NO. TOWS	7	11	11	12	10	6	10	6						73
14AUG-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
16AUG	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						0.00
	NO. TOWS	7	11	11	12	10	5	9	6						71

Table C-50 Regional Standing Crop (In Thousands) of American Shad Yolk-Sac Larvae in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1990

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
19APR-23APR	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	0.00	NS	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00	0.00	0.00
	NO. TOWS		6	8	8	4	5	6	3		7		11	24	82
23APR-26APR	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		10	12	13	10	6	10	6	7	7	8	9	9	107
30APR-03MAY	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
07MAY-10MAY	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	83.79	1047.16	2381.49	8591.50	59625.73	71729.68
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	56.60	568.98	1710.89	3387.85	13069.86	13621.78
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
14MAY-17MAY	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	3784.73	4514.43	48675.69	39867.62	74374.74	54548.29	225765.51
	SE		0.00	0.00	0.00	0.00	0.00	0.00	2189.36	1171.04	14047.35	12144.98	21701.76	10664.34	30589.01
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	5	10	116
21MAY-24MAY	St. Crop	NS	0.00	0.00	0.00	156.63	2804.40	8183.37	124717.52	18883.34	37479.25	41854.31	67151.05	22271.50	323501.37
	SE		0.00	0.00	0.00	156.63	1142.70	4371.75	71360.58	5722.32	7911.12	4954.43	9254.36	15203.62	74494.60
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	5	109
29MAY-02JUN	St. Crop	NS	27.79	0.00	46.43	0.00	26.63	497.88	3395.17	5511.78	5662.37	18523.40	16827.37	61205.86	111724.69
	SE		27.79	0.00	46.43	0.00	26.63	328.04	1696.54	2317.25	1213.94	4830.94	4977.56	51806.15	52362.43
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
04JUN-07JUN	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	87.62	2531.94	3663.25	5671.83	38294.19	50248.83
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	87.62	2315.46	1974.02	2616.48	13047.69	13651.15
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
11JUN-14JUN	St. Crop	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	138.79	767.46	11768.18	9082.56	87574.02	109331.01
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	112.61	767.46	9163.60	3140.16	73517.49	74156.96
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
18JUN-21JUN	St. Crop	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	89.90	3258.92	3348.81
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	89.90	2478.12	2479.75
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
25JUN-28JUN	St. Crop	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1563.34	1563.34
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	513.98	513.98
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
02JUL-06JUL	St. Crop	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	6	11	14	11	13	9	13	8	10	7	6	6	6	120
16JUL-19JUL	St. Crop	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						0.00
	NO. TOWS	7	10	11	12	10	6	10	6						72
30JUL-02AUG	St. Crop	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						0.00
	NO. TOWS	7	11	11	12	10	6	10	6						73
14AUG-16AUG	St. Crop	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						0.00
	NO. TOWS	7	11	11	12	10	5	9	6						71

Table C-51 Regional Density (No./1,000m3) of American Shad Post Yolk-Sac Larvae in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1990

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
19APR-23APR	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	0.00	NS	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00	0.00	0.00
	NO. TOWS		6	8	8	4	5	6	3		7		11	24	82
23APR-26APR	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		10	12	13	10	6	10	6	7	7	8	9	9	107
30APR-03MAY	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
07MAY-10MAY	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.44	2.25	0.00	1.07	19.57	2.03
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.44	1.45	0.00	1.07	12.44	12.66
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
14MAY-17MAY	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	4.24	52.69	152.46	690.83	300.71	186.50	152.06	128.29
	SE		0.00	0.00	0.00	0.00	0.00	2.49	19.41	82.33	298.96	113.64	56.74	32.50	337.24
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	5	10	116
21MAY-24MAY	DENSITY	NS	0.00	0.00	3.48	38.00	52.76	115.87	205.30	80.82	33.23	117.69	21.39	29.06	58.13
	SE		0.00	0.00	2.50	18.03	20.38	29.14	101.16	47.96	17.72	40.50	8.87	12.07	127.70
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	5	109
29MAY-02JUN	DENSITY	NS	0.77	0.00	8.15	2.05	4.75	44.47	64.46	96.55	59.05	144.19	284.48	188.47	74.78
	SE		0.43	0.00	1.67	1.19	3.94	20.71	29.80	46.44	30.92	58.83	165.60	178.67	259.34
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
04JUN-07JUN	DENSITY	NS	0.00	0.00	0.22	0.00	0.98	1.70	16.74	23.64	46.50	76.08	91.22	1.80	21.57
	SE		0.00	0.00	0.22	0.00	0.67	0.73	15.95	16.66	41.95	31.15	51.26	1.80	76.77
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
11JUN-14JUN	DENSITY	0.00	0.00	0.00	0.00	0.00	9.30	3.75	3.08	3.92	199.57	43.41	634.65	1789.36	206.70
	SE	0.00	0.00	0.00	0.00	0.00	9.30	1.47	1.60	1.31	152.28	34.87	185.41	1350.10	1371.73
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
18JUN-21JUN	DENSITY	0.00	0.00	0.00	0.00	0.88	2.63	1.15	14.11	1.48	23.79	13.58	189.12	96.56	26.41
	SE	0.00	0.00	0.00	0.00	0.88	2.63	0.98	10.17	1.31	13.69	10.22	122.23	50.81	133.89
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
25JUN-28JUN	DENSITY	0.00	0.00	0.00	0.00	0.12	0.00	24.77	6.83	3.67	3.88	13.37	507.71	122.13	52.50
	SE	0.00	0.00	0.00	0.00	0.12	0.00	23.32	6.83	2.39	3.46	4.87	164.05	86.10	186.97
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
02JUL-06JUL	DENSITY	0.00	0.00	0.00	0.00	0.92	0.00	1.65	1.21	0.83	8.32	458.21	12.10	71.55	42.68
	SE	0.00	0.00	0.00	0.00	0.92	0.00	1.13	0.86	0.51	8.32	454.53	8.23	32.12	455.81
	NO. TOWS	6	11	14	11	13	9	13	8	10	7	6	6	6	120
16JUL-19JUL	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.37	NS	NS	NS	NS	NS	0.30
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.37						2.37
	NO. TOWS	7	10	11	12	10	6	10	6						72
30JUL-02AUG	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						0.00
	NO. TOWS	7	11	11	12	10	6	10	6						73
14AUG-16AUG	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						0.00
	NO. TOWS	7	11	11	12	10	5	9	6						71

Table C-52 Regional Standing Crop (In Thousands) of American Shad Post Yolk-Sac Larvae in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1990

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
19APR-23APR	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	0.00	NS	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00	0.00	0.00
	NO. TOWS		6	8	8	4	5	6	3		7		11	24	82
23APR-26APR	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		10	12	13	10	6	10	6	7	7	8	9	9	107
30APR-03MAY	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
07MAY-10MAY	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	239.09	317.89	0.00	171.48	1392.05	2120.51
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	239.09	205.53	0.00	171.48	885.33	955.32
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
14MAY-17MAY	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	592.64	15707.79	25229.99	97732.03	53013.18	29976.51	10819.06	233071.20
	SE		0.00	0.00	0.00	0.00	0.00	348.35	5787.90	13625.07	42293.76	20034.65	9120.00	2312.56	49979.35
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	5	10	116
21MAY-24MAY	St. Crop	NS	0.00	0.00	513.82	7916.44	10945.71	16196.99	61207.51	13374.73	4700.52	20749.01	3437.95	2067.81	141110.47
	SE		0.00	0.00	370.07	3756.26	4227.55	4073.95	30158.71	7935.96	2507.27	7140.76	1425.38	858.47	32882.95
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	5	109
29MAY-02JUN	St. Crop	NS	177.71	0.00	1204.77	427.28	986.27	6217.12	19216.35	15977.99	8354.25	25420.25	45724.21	13409.16	137115.38
	SE		98.27	0.00	247.43	247.21	817.39	2895.73	8883.45	7685.29	4374.15	10371.57	26617.57	12712.15	33822.49
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
04JUN-07JUN	St. Crop	NS	0.00	0.00	32.42	0.00	203.99	237.83	4990.26	3912.15	6578.67	13412.02	14662.54	127.95	44157.83
	SE		0.00	0.00	32.42	0.00	139.46	101.97	4755.35	2757.38	5934.99	5491.94	8238.38	127.95	12787.50
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
11JUN-14JUN	St. Crop	0.00	0.00	0.00	0.00	0.00	1930.04	524.88	917.79	648.53	28232.44	7653.21	102008.35	127311.66	269226.90
	SE	0.00	0.00	0.00	0.00	0.00	1930.04	205.24	477.07	216.40	21543.13	6147.99	29800.50	96058.48	103059.43
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
18JUN-21JUN	St. Crop	0.00	0.00	0.00	0.00	183.54	546.38	160.84	4206.88	244.55	3365.21	2394.76	30396.84	6870.42	48369.41
	SE	0.00	0.00	0.00	0.00	183.54	546.38	136.52	3031.01	217.04	1936.23	1800.92	19646.09	3615.21	20386.66
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
25JUN-28JUN	St. Crop	0.00	0.00	0.00	0.00	24.96	0.00	3462.71	2035.33	607.60	548.58	2356.99	81605.80	8689.53	99331.51
	SE	0.00	0.00	0.00	0.00	24.96	0.00	3259.75	2035.33	395.91	489.93	858.57	26368.19	6125.67	27362.54
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
02JUL-06JUL	St. Crop	0.00	0.00	0.00	0.00	192.35	0.00	230.41	361.61	136.67	1177.67	80779.88	1945.03	5091.01	89914.65
	SE	0.00	0.00	0.00	0.00	192.35	0.00	158.02	256.58	85.18	1177.67	80131.25	1323.00	2285.17	80184.24
	NO. TOWS	6	11	14	11	13	9	13	8	10	7	6	6	6	120
16JUL-19JUL	St. Crop	0.00	0.00	0.00	0.00	0.00	0.00	0.00	706.06	NS	NS	NS	NS	NS	706.06
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	706.06						706.06
	NO. TOWS	7	10	11	12	10	6	10	6						72
30JUL-02AUG	St. Crop	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						0.00
	NO. TOWS	7	11	11	12	10	6	10	6						73
14AUG-16AUG	St. Crop	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						0.00
	NO. TOWS	7	11	11	12	10	5	9	6						71

Table C-53 Regional Density (No./1,000m3) of American Shad Young of Year in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1990

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
19APR-23APR	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	0.00	NS	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00	0.00	0.00
	NO. TOWS		6	8	8	4	5	6	3		7		11	24	82
23APR-26APR	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		10	12	13	10	6	10	6	7	7	8	9	9	107
30APR-03MAY	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
07MAY-10MAY	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
14MAY-17MAY	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	5	10	116
21MAY-24MAY	DENSITY	NS	0.00	0.00	0.00	0.19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02
	SE		0.00	0.00	0.00	0.19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.19
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	5	109
29MAY-02JUN	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.00	<0.005
	SE		0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.05
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
04JUN-07JUN	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
11JUN-14JUN	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.66	0.00	0.00	0.00	0.00	0.05
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.66	0.00	0.00	0.00	0.00	0.66
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
18JUN-21JUN	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.18	0.00	0.00	0.00	0.00	0.00	0.09
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.18	0.00	0.00	0.00	0.00	0.00	1.18
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
25JUN-28JUN	DENSITY	0.00	0.00	0.00	0.00	0.04	0.57	0.87	0.49	8.14	6.35	23.11	193.48	9.66	18.67
	SE	0.00	0.00	0.00	0.00	0.04	0.57	0.87	0.49	4.47	3.68	19.35	77.26	6.95	80.16
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
02JUL-06JUL	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.93	13.96	46.27	137.37	65.13	112.35	29.08
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.69	9.61	22.93	87.05	19.98	67.52	114.70
	NO. TOWS	6	11	14	11	13	9	13	8	10	7	6	6	6	120
16JUL-19JUL	DENSITY	0.00	0.00	0.33	0.95	18.05	3.66	1.56	2.31	NS	NS	NS	NS	NS	3.36
	SE	0.00	0.00	0.33	0.60	15.15	3.66	1.03	1.74						15.73
	NO. TOWS	7	10	11	12	10	6	10	6						72
30JUL-02AUG	DENSITY	0.00	0.00	10.09	0.00	0.00	1.30	1.40	5.33	NS	NS	NS	NS	NS	2.26
	SE	0.00	0.00	10.09	0.00	0.00	1.06	0.83	3.95						10.92
	NO. TOWS	7	11	11	12	10	6	10	6						73
14AUG-16AUG	DENSITY	0.00	0.00	17.69	3.85	0.15	1.04	1.76	0.57	NS	NS	NS	NS	NS	3.13
	SE	0.00	0.00	17.39	2.20	0.15	1.04	1.61	0.57						17.64
	NO. TOWS	7	11	11	12	10	5	9	6						71

Table C-54 Regional Standing Crop (In Thousands) of American Shad Young of Year in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1990

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
19APR-23APR	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	0.00	NS	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00	0.00	0.00
	NO. TOWS		6	8	8	4	5	6	3		7		11	24	82
23APR-26APR	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		10	12	13	10	6	10	6	7	7	8	9	9	107
30APR-03MAY	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
07MAY-10MAY	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
14MAY-17MAY	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	5	10	116
21MAY-24MAY	St. Crop	NS	0.00	0.00	0.00	39.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	39.16
	SE		0.00	0.00	0.00	39.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	39.16
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	5	109
29MAY-02JUN	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	6.49	0.00	0.00	0.00	0.00	0.00	0.00	6.49
	SE		0.00	0.00	0.00	0.00	0.00	6.49	0.00	0.00	0.00	0.00	0.00	0.00	6.49
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
04JUN-07JUN	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
11JUN-14JUN	St. Crop	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	108.45	0.00	0.00	0.00	0.00	108.45
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	108.45	0.00	0.00	0.00	0.00	108.45
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
18JUN-21JUN	St. Crop	0.00	0.00	0.00	0.00	0.00	0.00	0.00	352.05	0.00	0.00	0.00	0.00	0.00	352.05
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	352.05	0.00	0.00	0.00	0.00	0.00	352.05
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
25JUN-28JUN	St. Crop	0.00	0.00	0.00	0.00	9.11	118.04	121.41	145.11	1346.89	898.58	4074.23	31098.54	687.55	38499.47
	SE	0.00	0.00	0.00	0.00	9.11	118.04	121.41	145.11	739.93	520.09	3411.51	12417.44	494.39	12920.66
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
02JUL-06JUL	St. Crop	0.00	0.00	0.00	0.00	0.00	0.00	0.00	872.63	2310.88	6545.27	24217.36	10468.71	7993.82	52408.68
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	504.78	1589.83	3243.70	15346.66	3211.86	4804.05	16799.37
	NO. TOWS	6	11	14	11	13	9	13	8	10	7	6	6	6	120
16JUL-19JUL	St. Crop	0.00	0.00	107.42	140.52	3759.77	758.88	218.35	689.42	NS	NS	NS	NS	NS	5674.36
	SE	0.00	0.00	107.42	88.57	3156.57	758.88	143.49	519.04						3293.82
	NO. TOWS	7	10	11	12	10	6	10	6						72
30JUL-02AUG	St. Crop	0.00	0.00	3247.10	0.00	0.00	269.11	195.13	1589.00	NS	NS	NS	NS	NS	5300.34
	SE	0.00	0.00	3247.10	0.00	0.00	220.63	115.62	1176.75						3462.72
	NO. TOWS	7	11	11	12	10	6	10	6						73
14AUG-16AUG	St. Crop	0.00	0.00	5693.30	568.68	31.53	215.04	246.21	170.26	NS	NS	NS	NS	NS	6925.02
	SE	0.00	0.00	5595.35	325.04	31.53	215.04	225.21	170.26						5616.09
	NO. TOWS	7	11	11	12	10	5	9	6						71

Table C-55 Regional Density (No./1,000m3) of American Shad Young of Year in Hudson River Estuary Determined From Fall Juvenile Survey, 1990

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions COMBINED
09JUL-14JUL	DENSITY	0.00	0.00	0.07	0.75	9.92	6.95	3.52	5.82	2.50	46.47	42.32	17.75	11.34
	SE	0.00	0.00	0.05	0.73	7.36	6.03	0.22	4.05	0.96	11.49	7.34	8.54	19.17
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	12	209
23JUL-27JUL	DENSITY	0.48	0.53	1.52	1.68	0.16	0.43	0.32	0.84	3.73	0.21	12.25	5.19	2.28
	SE	0.32	0.19	1.30	1.46	0.09	0.13	0.21	0.62	1.53	0.15	4.86	1.68	5.76
	NO. TOWS	17	46	27	14	8	11	7	10	15	18	21	13	207
06AUG-10AUG	DENSITY	0.06	1.08	0.76	0.22	0.03	2.37	4.10	0.00	0.95	0.62	1.46	0.95	1.05
	SE	0.04	0.29	0.19	0.07	0.03	2.21	4.04	0.00	0.85	0.59	0.70	0.39	4.80
	NO. TOWS	16	46	27	14	8	13	8	10	15	18	21	13	209
20AUG-24AUG	DENSITY	0.00	0.26	0.97	2.35	0.00	0.13	0.39	0.92	0.24	1.18	3.55	1.55	0.96
	SE	0.00	0.18	0.45	2.21	0.00	0.08	0.14	0.84	0.08	0.71	1.37	1.30	3.15
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
04SEP-07SEP	DENSITY	0.45	0.13	0.13	0.27	0.00	0.19	0.24	0.03	0.66	0.07	0.79	0.46	0.28
	SE	0.43	0.06	0.08	0.17	0.00	0.11	0.11	0.03	0.42	0.04	0.61	0.32	0.95
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
17SEP-20SEP	DENSITY	0.04	0.16	0.02	0.05	0.00	0.01	0.05	0.07	1.04	0.88	1.37	0.15	0.32
	SE	0.02	0.07	0.02	0.04	0.00	0.01	0.05	0.05	0.44	0.42	0.62	0.10	0.88
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
01OCT-06OCT	DENSITY	0.06	0.07	0.53	0.01	0.00	0.55	0.09	0.11	0.00	0.48	0.08	0.45	0.20
	SE	0.06	0.04	0.46	0.01	0.00	0.30	0.05	0.11	0.00	0.21	0.06	0.31	0.68
	NO. TOWS	18	46	27	14	8	13	8	10	15	18	21	13	211
15OCT-17OCT	DENSITY	0.03	0.13	0.34	0.71	0.10	0.10	0.14	0.00	0.42	0.37	1.29	0.55	0.35
	SE	0.02	0.05	0.14	0.66	0.04	0.06	0.06	0.00	0.27	0.13	0.52	0.33	0.96
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210

Table C-56 Regional Standing Crops (in Thousands) of American Shad Young of Year in Hudson River Estuary Determined From Fall Juvenile Survey, 1990

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions COMBINED
09JUL-14JUL	St. Crop	0	0	10	156	2057	972	1050	963	354	8192	6803	1263	21820
	SE	0	0	7	152	1527	843	65	671	135	2026	1180	608	3066
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	12	209
23JUL-27JUL	St. Crop	110	172	224	350	32	61	94	139	528	38	1969	369	4085
	SE	72	62	193	304	19	18	63	103	216	27	780	120	908
	NO. TOWS	17	46	27	14	8	11	7	10	15	18	21	13	207
06AUG-10AUG	St. Crop	14	347	112	46	6	332	1223	0	135	109	235	67	2625
	SE	10	93	28	15	6	309	1204	0	120	103	112	28	1262
	NO. TOWS	16	46	27	14	8	13	8	10	15	18	21	13	209
20AUG-24AUG	St. Crop	0	85	143	489	0	19	115	153	34	208	571	110	1926
	SE	0	56	66	461	0	11	42	139	12	124	220	93	560
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
04SEP-07SEP	St. Crop	103	42	19	57	0	26	71	5	93	12	128	32	589
	SE	99	20	12	35	0	15	33	5	59	8	98	23	163
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
17SEP-20SEP	St. Crop	9	51	4	10	0	2	13	12	147	154	220	10	633
	SE	6	22	4	8	0	2	13	8	62	73	100	7	142
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
01OCT-06OCT	St. Crop	15	23	78	2	0	77	26	19	0	84	13	32	369
	SE	15	11	68	2	0	42	16	19	0	37	9	22	97
	NO. TOWS	18	46	27	14	8	13	8	10	15	18	21	13	211
15OCT-17OCT	St. Crop	8	42	51	147	21	14	41	0	59	64	207	39	694
	SE	5	16	20	137	9	9	17	0	38	22	84	23	172
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210

Table C-57 Regional Catch-Per-Unit-Effort (CPUE) of American Shad Young of Year in Hudson River Estuary Determined From Beach Seine Survey, 1990

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions COMBINED
18JUN-20JUN	CPUE	0.00	0.00	0.00	0.00	0.00	1.33	0.00	0.00	0.00	0.00	1.47	0.00	0.23
	SE	0.00	0.00	0.00	0.00	0.00	1.33	0.00	0.00	0.00	0.00	1.47	0.00	1.99
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
02JUL-03JUL	CPUE	0.00	0.00	0.00	0.00	0.00	0.00	2.25	17.63	3.50	39.53	21.44	5.62	7.50
	SE	0.00	0.00	0.00	0.00	0.00	0.00	2.25	5.49	1.27	16.00	12.46	2.80	21.36
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	18	13	100
17JUL-19JUL	CPUE	0.00	22.82	7.57	16.33	371.00	33.67	23.75	18.88	26.63	33.87	34.89	6.50	49.66
	SE	0.00	16.72	2.84	9.84	299.20	10.90	7.83	6.49	8.45	7.16	12.18	2.53	300.68
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
31JUL-03AUG	CPUE	0.20	1.83	4.87	9.20	11.20	19.83	19.20	2.60	16.40	27.11	25.50	78.29	18.02
	SE	0.20	0.89	2.16	1.02	7.98	8.38	5.61	0.75	7.57	5.35	6.01	47.84	50.83
	NO. TOWS	5	23	15	5	5	6	5	5	5	9	10	7	100
14AUG-17AUG	CPUE	0.00	3.25	1.43	3.40	5.20	14.67	26.80	12.80	23.80	19.44	22.80	48.43	15.17
	SE	0.00	1.79	0.89	1.89	1.98	2.33	10.45	3.57	8.32	4.17	12.99	28.57	34.79
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
27AUG-29AUG	CPUE	0.00	0.54	1.71	3.60	10.00	31.00	12.80	34.60	20.40	10.89	42.80	41.57	17.49
	SE	0.00	0.29	1.09	1.36	8.58	10.49	5.05	14.12	9.06	2.82	11.42	12.60	28.13
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
10SEP-12SEP	CPUE	0.40	0.38	1.07	4.40	5.60	22.33	20.60	10.80	15.00	7.00	15.80	32.86	11.35
	SE	0.40	0.15	0.50	1.94	1.78	11.39	2.71	4.75	8.05	2.71	4.29	8.61	18.21
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
24SEP-26SEP	CPUE	0.00	0.71	3.14	4.20	16.40	14.50	45.40	10.80	6.00	5.67	21.70	40.86	14.11
	SE	0.00	0.39	1.51	3.95	7.57	8.31	19.37	5.31	2.59	1.86	7.06	10.72	26.88
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
08OCT-10OCT	CPUE	2.40	2.13	1.07	0.40	9.80	11.33	6.00	10.00	4.40	13.11	20.70	14.29	7.97
	SE	1.03	1.26	0.59	0.40	4.10	3.88	2.55	3.16	1.21	5.07	3.79	3.10	10.13
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
22OCT-24OCT	CPUE	27.40	4.83	2.93	3.80	7.00	5.50	5.60	1.40	8.60	3.00	3.90	6.43	6.70
	SE	15.77	1.07	0.62	2.15	5.03	1.67	2.62	0.68	3.19	1.68	0.67	1.72	17.51
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100

Table C-58 Regional Standing Crops (in Thousands) of American Shad Young of Year in Hudson River Estuary Determined From Beach Seine Survey, 1990

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions COMBINED
18JUN-20JUN	St. Crop	0	0	0	0	0	14	0	0	0	0	29	0	43
	SE	0	0	0	0	0	14	0	0	0	0	29	0	32
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
02JUL-03JUL	St. Crop	0	0	0	0	0	0	16	22	30	694	422	76	1260
	SE	0	0	0	0	0	0	16	7	11	281	245	38	375
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	18	13	100
17JUL-19JUL	St. Crop	0	1037	204	151	978	359	169	23	229	595	687	88	4518
	SE	0	760	76	91	789	116	56	8	73	126	240	34	1144
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
31JUL-03AUG	St. Crop	2	83	131	85	30	211	136	3	141	476	502	1064	2863
	SE	2	40	58	9	21	89	40	1	65	94	118	650	682
	NO. TOWS	5	23	15	5	5	6	5	5	5	9	10	7	100
14AUG-17AUG	St. Crop	0	148	38	31	14	156	190	16	205	341	449	658	2246
	SE	0	82	24	17	5	25	74	4	72	73	256	388	490
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
27AUG-29AUG	St. Crop	0	25	46	33	26	330	91	43	176	191	842	565	2368
	SE	0	13	29	13	23	112	36	18	78	50	225	171	323
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
10SEP-12SEP	St. Crop	3	17	29	41	15	238	146	13	129	123	311	446	1511
	SE	3	7	13	18	5	121	19	6	69	48	84	117	209
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
24SEP-26SEP	St. Crop	0	32	85	39	43	154	322	13	52	99	427	555	1822
	SE	0	18	41	36	20	89	137	7	22	33	139	146	269
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
08OCT-10OCT	St. Crop	18	97	29	4	26	121	43	12	38	230	407	194	1218
	SE	8	57	16	4	11	41	18	4	10	89	75	42	145
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
22OCT-24OCT	St. Crop	206	220	79	35	18	59	40	2	74	53	77	87	949
	SE	119	49	17	20	13	18	19	1	27	30	13	23	143
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100

Table C-59 Regional Density (No./1,000m3) of American Shad Yearling and Older in Hudson River Estuary Determined From Fall Juvenile Survey, 1990

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions COMBINED
09JUL-14JUL	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	12	209
23JUL-27JUL	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	17	46	27	14	8	11	7	10	15	18	21	13	207
06AUG-10AUG	DENSITY	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	<0.005
	SE	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04
	NO. TOWS	16	46	27	14	8	13	8	10	15	18	21	13	209
20AUG-24AUG	DENSITY	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	<0.005
	SE	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
04SEP-07SEP	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
17SEP-20SEP	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
01OCT-06OCT	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	18	46	27	14	8	13	8	10	15	18	21	13	211
15OCT-17OCT	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210

Table C-60 Regional Standing Crops (in Thousands) of American Shad Yearling and Older in Hudson River Estuary Determined From Fall Juvenile Survey, 1990

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions COMBINED
09JUL-14JUL	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
	SE	0	0	0	0	0	0	0	0	0	0	0	0	0
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	12	209
23JUL-27JUL	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
	SE	0	0	0	0	0	0	0	0	0	0	0	0	0
	NO. TOWS	17	46	27	14	8	11	7	10	15	18	21	13	207
06AUG-10AUG	St. Crop	0	13	0	0	0	0	0	0	0	0	0	0	13
	SE	0	13	0	0	0	0	0	0	0	0	0	0	13
	NO. TOWS	16	46	27	14	8	13	8	10	15	18	21	13	209
20AUG-24AUG	St. Crop	0	0	5	0	0	0	0	0	0	0	0	0	5
	SE	0	0	5	0	0	0	0	0	0	0	0	0	5
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
04SEP-07SEP	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
	SE	0	0	0	0	0	0	0	0	0	0	0	0	0
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
17SEP-20SEP	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
	SE	0	0	0	0	0	0	0	0	0	0	0	0	0
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
01OCT-06OCT	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
	SE	0	0	0	0	0	0	0	0	0	0	0	0	0
	NO. TOWS	18	46	27	14	8	13	8	10	15	18	21	13	211
15OCT-17OCT	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
	SE	0	0	0	0	0	0	0	0	0	0	0	0	0
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210

Table C-61 Regional Catch-Per-Unit-Effort (CPUE) of American Shad Yearling and Older in Hudson River Estuary Determined From Beach Seine Survey, 1990

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions COMBINED
18JUN-20JUN	CPUE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
02JUL-03JUL	CPUE	0.00	0.00	0.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
	SE	0.00	0.00	0.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.14
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	18	13	100
17JUL-19JUL	CPUE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
31JUL-03AUG	CPUE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	5	23	15	5	5	6	5	5	5	9	10	7	100
14AUG-17AUG	CPUE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.20	0.00	0.00	0.00	0.00	0.10
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.20	0.00	0.00	0.00	0.00	1.20
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
27AUG-29AUG	CPUE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
10SEP-12SEP	CPUE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
24SEP-26SEP	CPUE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
08OCT-10OCT	CPUE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
22OCT-24OCT	CPUE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100

Table C-62 Regional Standing Crops (in Thousands) of American Shad Yearling and Older in Hudson River Estuary Determined From Beach Seine Survey, 1990

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions COMBINED
18JUN-20JUN	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
	SE	0	0	0	0	0	0	0	0	0	0	0	0	0
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
02JUL-03JUL	St. Crop	0	0	4	0	0	0	0	0	0	0	0	0	4
	SE	0	0	4	0	0	0	0	0	0	0	0	0	4
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	18	13	100
17JUL-19JUL	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
	SE	0	0	0	0	0	0	0	0	0	0	0	0	0
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
31JUL-03AUG	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
	SE	0	0	0	0	0	0	0	0	0	0	0	0	0
	NO. TOWS	5	23	15	5	5	6	5	5	5	9	10	7	100
14AUG-17AUG	St. Crop	0	0	0	0	0	0	0	1	0	0	0	0	1
	SE	0	0	0	0	0	0	0	1	0	0	0	0	1
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
27AUG-29AUG	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
	SE	0	0	0	0	0	0	0	0	0	0	0	0	0
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
10SEP-12SEP	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
	SE	0	0	0	0	0	0	0	0	0	0	0	0	0
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
24SEP-26SEP	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
	SE	0	0	0	0	0	0	0	0	0	0	0	0	0
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
08OCT-10OCT	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
	SE	0	0	0	0	0	0	0	0	0	0	0	0	0
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
22OCT-24OCT	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
	SE	0	0	0	0	0	0	0	0	0	0	0	0	0
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100

Table C-63 Regional Density (No./1,000m3) of Alosa spp. Eggs
in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1990

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
19APR-23APR	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	0.00	NS	0.55	1.63	0.22
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.55	1.37	1.48
	NO. TOWS		6	8	8	4	5	6	3		7		11	24	82
23APR-26APR	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.33	0.29	1.32	36.32	3.44
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.48	0.29	0.98	31.83	31.95
	NO. TOWS		10	12	13	10	6	10	6	7	7	8	9	9	107
30APR-03MAY	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.00	31.41	105.26	336.08	35.45	42.77
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.54	27.07	44.19	91.15	31.48	109.50
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
07MAY-10MAY	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	1.89	3.22	13.09	71.51	110.77	140.63	11827.14	1014.02
	SE		0.00	0.00	0.00	0.00	0.00	1.89	3.04	10.76	49.36	55.96	53.56	3157.07	3158.43
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
14MAY-17MAY	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.29	0.15	14.80	23.50	33326.26	157684.86	15920.82
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.29	0.15	7.21	10.39	20195.34	73063.88	75803.57
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	5	10	116
21MAY-24MAY	DENSITY	NS	0.09	0.32	0.18	0.00	0.58	0.00	0.00	18.96	1507.81	5310.26	240.52	7101.74	1181.71
	SE		0.09	0.32	0.18	0.00	0.58	0.00	0.00	14.39	1492.32	2279.32	131.47	897.56	2871.49
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	5	109
29MAY-02JUN	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.63	4.22	11.04	1635.03	60413.92	3510.39	5464.60
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.32	2.66	7.95	835.98	35552.62	2497.60	35650.05
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
04JUN-07JUN	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.10	1.27	1.16	12.73	5.97	3222.80	5572.81	734.74
	SE		0.00	0.00	0.00	0.00	0.00	0.10	1.27	0.88	7.18	2.81	2582.04	2877.47	3866.11
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
11JUN-14JUN	DENSITY	0.00	0.00	0.00	30.00	0.00	0.73	0.00	0.00	0.20	0.38	53.71	41.27	2187.90	178.01
	SE	0.00	0.00	0.00	30.00	0.00	0.73	0.00	0.00	0.20	0.38	48.58	4.29	1027.04	1028.64
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
18JUN-21JUN	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.15	0.00	0.71	0.00	13.11	0.64	1.12
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.15	0.00	0.71	0.00	8.65	0.64	8.70
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
25JUN-28JUN	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.45	44.38	3.83
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.45	44.38	44.71
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
02JUL-06JUL	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	6	11	14	11	13	9	13	8	10	7	6	6	6	120
16JUL-19JUL	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						0.00
	NO. TOWS	7	10	11	12	10	6	10	6						72
30JUL-02AUG	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						0.00
	NO. TOWS	7	11	11	12	10	6	10	6						73
14AUG-16AUG	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						0.00
	NO. TOWS	7	11	11	12	10	5	9	6						71

Table C-64 Regional Standing Crop (In Thousands) of Alosa spp. Eggs in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1990

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
19APR-23APR	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	0.00	NS	89.14	116.27	205.41
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		89.14	97.46	132.07
	NO. TOWS		6	8	8	4	5	6	3		7		11	24	82
23APR-26APR	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	470.87	50.79	212.73	2584.00	3318.39
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	350.99	50.79	158.21	2264.85	2297.90
	NO. TOWS		10	12	13	10	6	10	6	7	7	8	9	9	107
30APR-03MAY	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	828.08	4442.97	18556.71	54018.07	2521.91	80367.73
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	420.36	3829.69	7790.30	14650.33	2239.64	17180.80
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
07MAY-10MAY	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	264.66	960.33	2165.94	10116.31	19528.83	22604.28	841490.24	897130.60
	SE		0.00	0.00	0.00	0.00	0.00	264.66	905.72	1781.35	6983.48	9866.01	8608.05	224623.05	225121.70
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
14MAY-17MAY	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	87.38	24.51	2093.66	4142.86	5356587.52	11219136.81	16582072.7
	SE		0.00	0.00	0.00	0.00	0.00	0.00	87.38	24.51	1020.12	1832.30	3246031.74	5198429.47	6128653.64
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	5	10	116
21MAY-24MAY	St. Crop	NS	19.90	102.47	27.07	0.00	119.74	0.00	0.00	3138.09	213310.31	936176.69	38658.52	505282.56	1696835.36
	SE		19.90	102.47	27.07	0.00	119.74	0.00	0.00	2381.67	211118.47	401834.86	21131.76	63860.46	458881.98
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	5	109
29MAY-02JUN	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	188.84	698.70	1561.52	288249.32	9710434.57	249761.39	10250894.3
	SE		0.00	0.00	0.00	0.00	0.00	0.00	94.42	440.65	1124.02	147378.97	5714434.83	177701.71	5719096.55
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
04JUN-07JUN	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	13.59	379.94	192.37	1800.33	1052.26	518007.05	396500.29	917945.83
	SE		0.00	0.00	0.00	0.00	0.00	13.59	379.94	146.40	1015.86	494.59	415016.26	204729.41	462767.83
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
11JUN-14JUN	St. Crop	0.00	0.00	0.00	4432.10	0.00	151.62	0.00	0.00	32.89	53.72	9468.70	6633.52	155667.18	176439.74
	SE	0.00	0.00	0.00	4432.10	0.00	151.62	0.00	0.00	32.89	53.72	8564.21	689.74	73073.28	73710.22
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
18JUN-21JUN	St. Crop	0.00	0.00	0.00	0.00	0.00	0.00	0.00	45.87	0.00	99.90	0.00	2107.84	45.89	2299.50
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	45.87	0.00	99.90	0.00	1389.68	45.89	1394.78
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
25JUN-28JUN	St. Crop	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	875.23	3157.24	4032.48
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	875.23	3157.24	3276.31
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
02JUL-06JUL	St. Crop	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	6	11	14	11	13	9	13	8	10	7	6	6	6	120
16JUL-19JUL	St. Crop	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						0.00
	NO. TOWS	7	10	11	12	10	6	10	6						72
30JUL-02AUG	St. Crop	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						0.00
	NO. TOWS	7	11	11	12	10	6	10	6						73
14AUG-16AUG	St. Crop	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						0.00
	NO. TOWS	7	11	11	12	10	5	9	6						71

Table C-65 Regional Density (No./1,000m3) of Alosa spp. Yolk-Sac Larvae
in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1990

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
19APR-23APR	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.65	0.00	NS	0.00	NS	0.00	0.00	0.07
	SE		0.00	0.00	0.00	0.00	0.00	0.65	0.00		0.00		0.00	0.00	0.65
	NO. TOWS		6	8	8	4	5	6	3		7		11	24	82
23APR-26APR	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		10	12	13	10	6	10	6	7	7	8	9	9	107
30APR-03MAY	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.30	0.34	5.87	4.66	4.45	5.65	1.87	1.93
	SE		0.00	0.00	0.00	0.00	0.00	0.17	0.34	3.80	2.19	2.49	3.22	1.17	6.11
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
07MAY-10MAY	DENSITY	NS	0.00	0.00	0.00	0.00	0.42	5.45	15.43	40.39	189.00	1168.91	1547.43	2449.41	451.37
	SE		0.00	0.00	0.00	0.00	0.42	2.70	6.21	15.07	77.55	960.39	766.99	411.65	1298.60
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
14MAY-17MAY	DENSITY	NS	0.00	0.00	0.57	10.64	0.93	14.60	199.19	188.66	337.02	95.34	120.88	135.00	91.90
	SE		0.00	0.00	0.57	7.61	0.59	10.34	123.72	36.45	66.52	44.92	56.23	62.06	173.94
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	5	10	116
21MAY-24MAY	DENSITY	NS	0.15	1.53	14.25	4.37	155.85	333.23	1045.58	530.61	338.21	401.73	329.40	125.01	273.33
	SE		0.15	1.25	7.83	2.25	42.61	111.40	661.37	102.09	102.42	71.03	91.29	87.80	702.64
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	5	109
29MAY-02JUN	DENSITY	NS	2.63	0.00	0.78	0.07	0.57	11.25	19.54	111.35	62.08	268.63	121.16	440.65	86.56
	SE		2.63	0.00	0.46	0.07	0.57	3.07	8.81	50.26	12.56	102.03	46.31	201.61	236.59
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
04JUN-07JUN	DENSITY	NS	0.00	0.00	0.00	0.00	0.37	0.45	6.49	67.67	290.78	826.12	983.12	12835.96	1250.91
	SE		0.00	0.00	0.00	0.00	0.37	0.45	5.26	40.84	92.07	137.16	496.30	6266.88	6288.81
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
11JUN-14JUN	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	1.10	4.95	4.76	3.44	58.29	114.58	417.86	46.54
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.93	3.96	2.14	1.72	52.17	42.26	111.68	130.40
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
18JUN-21JUN	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	86.77	822.68	69.96
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	54.03	380.48	384.29
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
25JUN-28JUN	DENSITY	0.00	0.00	0.00	0.00	0.00	0.30	0.00	0.00	0.00	0.00	0.00	0.00	39.92	3.09
	SE	0.00	0.00	0.00	0.00	0.00	0.30	0.00	0.00	0.00	0.00	0.00	0.00	30.48	30.48
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
02JUL-06JUL	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	6	11	14	11	13	9	13	8	10	7	6	6	6	120
16JUL-19JUL	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						0.00
	NO. TOWS	7	10	11	12	10	6	10	6						72
30JUL-02AUG	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						0.00
	NO. TOWS	7	11	11	12	10	6	10	6						73
14AUG-16AUG	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						0.00
	NO. TOWS	7	11	11	12	10	5	9	6						71

Table C-66 Regional Standing Crop (In Thousands) of Alosa spp. Yolk-Sac Larvae in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1990

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
19APR-23APR	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	91.49	0.00	NS	0.00	NS	0.00	0.00	91.49
	SE		0.00	0.00	0.00	0.00	0.00	91.49	0.00		0.00		0.00	0.00	91.49
	NO. TOWS		6	8	8	4	5	6	3		7		11	24	82
23APR-26APR	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		10	12	13	10	6	10	6	7	7	8	9	9	107
30APR-03MAY	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	41.58	101.00	971.76	659.73	784.50	908.42	133.34	3600.32
	SE		0.00	0.00	0.00	0.00	0.00	24.39	101.00	628.29	309.44	439.31	518.35	83.15	984.83
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
07MAY-10MAY	St. Crop	NS	0.00	0.00	0.00	0.00	87.74	762.43	4600.30	6683.72	26737.35	206073.30	248721.40	174273.20	667939.45
	SE		0.00	0.00	0.00	0.00	87.74	377.19	1852.83	2494.16	10971.06	169312.73	123278.96	29288.38	211784.04
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
14MAY-17MAY	St. Crop	NS	0.00	0.00	83.80	2217.14	193.85	2040.74	59385.17	31221.09	47678.58	16807.71	19428.81	9604.98	188661.87
	SE		0.00	0.00	83.80	1584.78	123.06	1444.98	36884.75	6032.24	9410.37	7918.41	9038.20	4415.80	40668.65
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	5	10	116
21MAY-24MAY	St. Crop	NS	33.41	493.78	2105.67	910.24	32333.01	46582.93	311722.72	87807.11	47846.93	70823.70	52944.33	8894.67	662498.51
	SE		33.41	402.96	1156.66	469.68	8839.04	15572.22	197177.37	16894.75	14488.69	12521.58	14672.86	6246.93	200269.12
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	5	109
29MAY-02JUN	St. Crop	NS	602.24	0.00	115.50	13.68	117.50	1572.91	5824.95	18427.48	8783.03	47358.58	19474.27	31352.04	133642.16
	SE		602.24	0.00	68.43	13.68	117.50	428.67	2627.79	8316.53	1776.86	17987.06	7442.82	14344.15	25777.45
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
04JUN-07JUN	St. Crop	NS	0.00	0.00	0.00	0.00	76.56	63.00	1934.96	11198.53	41137.09	145640.83	158019.18	913267.25	1271337.40
	SE		0.00	0.00	0.00	0.00	76.56	63.00	1566.94	6758.35	13025.51	24179.94	79771.67	445883.25	453847.85
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
11JUN-14JUN	St. Crop	0.00	0.00	0.00	0.00	0.00	0.00	153.31	1475.35	788.39	486.22	10276.37	18415.86	29730.61	61326.11
	SE	0.00	0.00	0.00	0.00	0.00	0.00	130.64	1179.19	354.55	243.49	9197.46	6792.10	7946.22	13980.73
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
18JUN-21JUN	St. Crop	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	13946.48	58532.68	72479.16
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8683.58	27070.57	28429.21
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
25JUN-28JUN	St. Crop	0.00	0.00	0.00	0.00	0.00	61.25	0.00	0.00	0.00	0.00	0.00	0.00	2840.14	2901.39
	SE	0.00	0.00	0.00	0.00	0.00	61.25	0.00	0.00	0.00	0.00	0.00	0.00	2168.78	2169.64
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
02JUL-06JUL	St. Crop	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	6	11	14	11	13	9	13	8	10	7	6	6	6	120
16JUL-19JUL	St. Crop	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						0.00
	NO. TOWS	7	10	11	12	10	6	10	6						72
30JUL-02AUG	St. Crop	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						0.00
	NO. TOWS	7	11	11	12	10	6	10	6						73
14AUG-16AUG	St. Crop	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						0.00
	NO. TOWS	7	11	11	12	10	5	9	6						71

Table C-67 Regional Density (No./1,000m3) of Alosa spp. Post Yolk-Sac Larvae
in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1990

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
19APR-23APR	DENSITY	NS	0.46	0.00	0.00	0.00	0.00	0.00	0.41	NS	0.00	NS	0.00	0.00	0.09
	SE		0.46	0.00	0.00	0.00	0.00	0.00	0.41		0.00		0.00	0.00	0.62
	NO. TOWS		6	8	8	4	5	6	3		7		11	24	82
23APR-26APR	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		10	12	13	10	6	10	6	7	7	8	9	9	107
30APR-03MAY	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	1.09	5.68	2.73	1.91	0.00	0.00	0.00	0.95
	SE		0.00	0.00	0.00	0.00	0.00	0.61	2.49	1.40	0.97	0.00	0.00	0.00	3.07
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
07MAY-10MAY	DENSITY	NS	0.00	0.00	0.00	0.93	2.31	13.24	17.05	31.43	115.78	316.79	405.24	27.11	77.49
	SE		0.00	0.00	0.00	0.55	1.26	4.59	3.26	6.85	45.18	124.63	164.21	11.85	211.56
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
14MAY-17MAY	DENSITY	NS	3.84	1.34	4.32	122.20	823.98	2600.03	3456.15	1097.20	475.48	67.71	3.69	69.58	727.13
	SE		2.11	0.69	1.43	58.19	167.97	886.53	1037.81	360.81	167.13	31.22	2.18	58.22	1434.26
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	5	10	116
21MAY-24MAY	DENSITY	NS	29.94	612.91	1334.99	1784.24	265.88	546.57	36.92	3.54	36.27	7.61	1.97	0.69	388.46
	SE		5.67	142.30	239.17	151.51	58.51	172.35	26.32	1.39	22.85	3.97	1.97	0.69	367.16
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	5	109
29MAY-02JUN	DENSITY	NS	24.93	389.12	628.69	68.02	254.96	148.99	40.78	176.32	19.85	42.21	14.76	0.00	150.72
	SE		7.88	210.78	84.33	12.74	87.72	42.27	12.53	127.00	5.03	26.89	12.59	0.00	280.07
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
04JUN-07JUN	DENSITY	NS	2.34	27.70	81.06	264.56	140.21	74.17	262.98	244.73	2204.69	1237.41	3833.12	2294.53	888.96
	SE		1.29	10.98	19.94	114.25	50.66	16.88	129.07	46.05	691.35	288.60	1888.23	1162.01	2347.80
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
11JUN-14JUN	DENSITY	2.36	0.22	1.57	12.45	39.68	951.85	247.90	251.85	682.86	2969.92	5877.13	5166.98	4196.09	1569.30
	SE	1.68	0.22	1.19	3.60	4.19	890.96	111.24	104.38	317.93	1104.73	2446.29	1232.31	596.79	3161.92
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
18JUN-21JUN	DENSITY	0.67	0.00	0.28	2.99	4.16	27.72	58.66	262.18	568.26	874.05	3387.88	9442.69	2205.91	1295.03
	SE	0.67	0.00	0.28	0.87	2.23	15.75	25.79	21.45	63.64	336.39	574.89	3629.28	715.50	3759.35
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
25JUN-28JUN	DENSITY	0.00	2.29	2.27	1.22	6.10	18.84	222.98	231.09	1012.47	1400.06	1953.09	2182.85	778.70	600.92
	SE	0.00	2.19	1.16	1.01	3.90	5.21	97.57	99.38	288.07	456.12	557.90	768.85	162.05	1113.16
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
02JUL-06JUL	DENSITY	0.97	0.00	0.88	1.84	3.36	1.51	15.62	73.94	217.01	576.85	505.24	1109.56	565.21	236.31
	SE	0.97	0.00	0.47	0.98	1.06	0.72	5.04	23.89	78.13	185.83	181.75	248.09	445.87	578.46
	NO. TOWS	6	11	14	11	13	9	13	8	10	7	6	6	6	120
16JUL-19JUL	DENSITY	0.00	0.00	22.94	0.00	0.00	0.00	0.00	2.00	NS	NS	NS	NS	NS	3.12
	SE	0.00	0.00	22.94	0.00	0.00	0.00	0.00	1.45						22.99
	NO. TOWS	7	10	11	12	10	6	10	6						72
30JUL-02AUG	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						0.00
	NO. TOWS	7	11	11	12	10	6	10	6						73
14AUG-16AUG	DENSITY	0.00	0.00	0.00	0.00	0.07	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.01
	SE	0.00	0.00	0.00	0.00	0.07	0.00	0.00	0.00						0.07
	NO. TOWS	7	11	11	12	10	5	9	6						71

Table C-68 Regional Standing Crop (In Thousands) of Alosa spp. Post Yolk-Sac Larvae in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1990

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
19APR-23APR	St. Crop	NS	105.53	0.00	0.00	0.00	0.00	0.00	122.62	NS	0.00	NS	0.00	0.00	228.16
	SE		105.53	0.00	0.00	0.00	0.00	0.00	122.62		0.00		0.00	0.00	161.78
	NO. TOWS		6	8	8	4	5	6	3		7		11	24	82
23APR-26APR	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		10	12	13	10	6	10	6	7	7	8	9	9	107
30APR-03MAY	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	151.68	1693.48	451.13	270.71	0.00	0.00	0.00	2567.00
	SE		0.00	0.00	0.00	0.00	0.00	84.78	741.60	231.08	136.75	0.00	0.00	0.00	793.25
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
07MAY-10MAY	St. Crop	NS	0.00	0.00	0.00	193.26	478.49	1851.35	5082.87	5200.64	16379.72	55848.68	65135.44	1928.52	152098.98
	SE		0.00	0.00	0.00	115.43	261.78	641.04	973.08	1133.41	6391.14	21970.96	26394.44	843.27	34981.02
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
14MAY-17MAY	St. Crop	NS	880.47	431.02	638.50	25457.84	170939.49	363461.00	1030393.33	181569.83	67266.69	11937.78	593.86	4950.47	1858520.27
	SE		484.11	222.89	211.65	12122.87	34845.44	123929.46	309406.36	59709.17	23644.03	5504.23	349.63	4142.28	341502.72
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	5	10	116
21MAY-24MAY	St. Crop	NS	6868.92	197240.82	197227.76	371722.79	55159.08	76406.25	11006.23	585.48	5131.79	1341.09	316.99	49.10	923056.32
	SE		1300.60	45792.93	35334.75	31565.80	12137.50	24092.82	7848.31	230.13	3231.99	699.46	316.99	49.10	71722.36
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	5	109
29MAY-02JUN	St. Crop	NS	5720.51	125223.34	92881.34	14170.99	52893.85	20827.86	12157.64	29177.56	2807.99	7441.99	2371.89	0.00	365674.96
	SE		1808.91	67832.49	12458.22	2654.52	18197.47	5909.36	3734.21	21017.14	712.07	4740.51	2023.61	0.00	74937.17
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
04JUN-07JUN	St. Crop	NS	537.57	8914.54	11976.01	55117.71	29086.87	10367.81	78404.23	40498.43	311897.48	218149.83	616103.88	163253.62	1544307.96
	SE		294.88	3533.28	2945.45	23802.35	10509.98	2359.29	38480.51	7620.88	97805.76	50878.83	303499.09	82676.01	336666.44
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
11JUN-14JUN	St. Crop	494.17	51.26	504.36	1839.27	8265.95	197465.90	34654.54	75086.05	113002.70	420154.78	1036112.14	830498.29	298548.11	3016677.53
	SE	350.74	51.26	384.33	531.43	872.09	184834.49	15550.82	31119.10	52612.49	156286.43	431271.03	198071.93	42461.06	538144.02
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
18JUN-21JUN	St. Crop	140.63	0.00	90.20	441.29	867.12	5751.08	8200.75	78163.89	94038.42	123651.05	597268.39	1517740.37	156948.69	2583301.86
	SE	140.63	0.00	90.20	129.08	465.62	3267.64	3605.65	6394.50	10531.92	47589.26	101351.25	583341.02	50907.33	596314.40
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
25JUN-28JUN	St. Crop	0.00	525.45	729.87	179.75	1270.79	3909.44	31170.46	68895.38	167548.70	198066.13	344320.83	350853.70	55403.65	1222874.15
	SE	0.00	501.82	373.56	149.37	812.38	1080.43	13638.92	29629.50	47671.79	64526.86	98354.61	123579.12	11529.93	180501.67
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
02JUL-06JUL	St. Crop	201.78	0.00	283.68	272.11	699.84	313.84	2182.88	22043.77	35911.40	81606.60	89071.52	178340.81	40214.33	451142.57
	SE	201.78	0.00	152.19	145.36	221.28	150.18	704.77	7123.61	12928.49	26289.23	32041.53	39875.34	31723.07	67325.51
	NO. TOWS	6	11	14	11	13	9	13	8	10	7	6	6	6	120
16JUL-19JUL	St. Crop	0.00	0.00	7382.19	0.00	0.00	0.00	0.00	597.01	NS	NS	NS	NS	NS	7979.20
	SE	0.00	0.00	7382.19	0.00	0.00	0.00	0.00	432.35						7394.84
	NO. TOWS	7	10	11	12	10	6	10	6						72
30JUL-02AUG	St. Crop	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						0.00
	NO. TOWS	7	11	11	12	10	6	10	6						73
14AUG-16AUG	St. Crop	0.00	0.00	0.00	0.00	14.56	0.00	0.00	0.00	NS	NS	NS	NS	NS	14.56
	SE	0.00	0.00	0.00	0.00	14.56	0.00	0.00	0.00						14.56
	NO. TOWS	7	11	11	12	10	5	9	6						71

Table C-69 Regional Density (No./1,000m3) of Alosa spp. Young of Year in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1990

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
19APR-23APR	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	0.00	NS	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00	0.00	0.00
	NO. TOWS		6	8	8	4	5	6	3		7		11	24	82
23APR-26APR	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		10	12	13	10	6	10	6	7	7	8	9	9	107
30APR-03MAY	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
07MAY-10MAY	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
14MAY-17MAY	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	5	10	116
21MAY-24MAY	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	5	109
29MAY-02JUN	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
04JUN-07JUN	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	<0.005
	SE		0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.04
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
11JUN-14JUN	DENSITY	0.00	0.00	0.00	0.25	0.00	9.30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.73
	SE	0.00	0.00	0.00	0.25	0.00	9.30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.31
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
18JUN-21JUN	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.68	0.00	0.00	0.00	0.00	0.05
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.68	0.00	0.00	0.00	0.00	0.68
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
25JUN-28JUN	DENSITY	0.00	0.00	0.00	0.00	0.05	0.00	10.56	0.49	11.17	1.83	2.04	16.40	5.83	3.72
	SE	0.00	0.00	0.00	0.00	0.05	0.00	8.25	0.49	11.17	1.27	1.52	16.40	3.77	21.91
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
02JUL-06JUL	DENSITY	0.00	0.00	0.00	0.00	0.00	0.50	1.65	70.34	125.24	556.04	363.87	361.61	219.07	130.64
	SE	0.00	0.00	0.00	0.00	0.00	0.50	1.65	28.46	99.51	423.10	328.62	189.51	168.25	601.62
	NO. TOWS	6	11	14	11	13	9	13	8	10	7	6	6	6	120
16JUL-19JUL	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						0.00
	NO. TOWS	7	10	11	12	10	6	10	6						72
30JUL-02AUG	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						0.00
	NO. TOWS	7	11	11	12	10	6	10	6						73
14AUG-16AUG	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						0.00
	NO. TOWS	7	11	11	12	10	5	9	6						71

Table C-70 Regional Standing Crop (In Thousands) of Alosa spp. Young of Year in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1990

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
19APR-23APR	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	0.00	NS	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00	0.00	0.00
	NO. TOWS		6	8	8	4	5	6	3		7		11	24	82
23APR-26APR	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		10	12	13	10	6	10	6	7	7	8	9	9	107
30APR-03MAY	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
07MAY-10MAY	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
14MAY-17MAY	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	5	10	116
21MAY-24MAY	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	5	109
29MAY-02JUN	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
04JUN-07JUN	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	6.10	0.00	0.00	0.00	0.00	0.00	0.00	6.10
	SE		0.00	0.00	0.00	0.00	0.00	6.10	0.00	0.00	0.00	0.00	0.00	0.00	6.10
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
11JUN-14JUN	St. Crop	0.00	0.00	0.00	36.59	0.00	1930.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1966.62
	SE	0.00	0.00	0.00	36.59	0.00	1930.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1930.38
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
18JUN-21JUN	St. Crop	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	112.98	0.00	0.00	0.00	0.00	112.98
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	112.98	0.00	0.00	0.00	0.00	112.98
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
25JUN-28JUN	St. Crop	0.00	0.00	0.00	0.00	9.51	0.00	1476.48	145.11	1848.21	258.21	358.89	2635.56	415.14	7147.11
	SE	0.00	0.00	0.00	0.00	9.51	0.00	1152.92	145.11	1848.21	179.78	268.40	2635.56	268.23	3448.00
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
02JUL-06JUL	St. Crop	0.00	0.00	0.00	0.00	0.00	103.55	230.73	20970.66	20724.56	78662.94	64147.96	58121.88	15586.74	258549.02
	SE	0.00	0.00	0.00	0.00	0.00	103.55	230.73	8485.72	16467.59	59856.37	57935.04	30460.57	11970.88	91398.33
	NO. TOWS	6	11	14	11	13	9	13	8	10	7	6	6	6	120
16JUL-19JUL	St. Crop	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						0.00
	NO. TOWS	7	10	11	12	10	6	10	6						72
30JUL-02AUG	St. Crop	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						0.00
	NO. TOWS	7	11	11	12	10	6	10	6						73
14AUG-16AUG	St. Crop	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						0.00
	NO. TOWS	7	11	11	12	10	5	9	6						71

Table C-71 Regional Density (No./1,000m3) of Blueback Herring Young of Year in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1990

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
19APR-23APR	DENSITY	NS	0.00	0.00	0.00	0.31	0.00	0.00	0.00	NS	0.00	NS	0.00	0.00	0.03
	SE		0.00	0.00	0.00	0.31	0.00	0.00	0.00		0.00		0.00	0.00	0.31
	NO. TOWS		6	8	8	4	5	6	3		7		11	24	82
23APR-26APR	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		10	12	13	10	6	10	6	7	7	8	9	9	107
30APR-03MAY	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
07MAY-10MAY	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
14MAY-17MAY	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	5	10	116
21MAY-24MAY	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	5	109
29MAY-02JUN	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.55	0.00	0.00	0.00	0.00	0.05
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.55	0.00	0.00	0.00	0.00	0.55
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
04JUN-07JUN	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
11JUN-14JUN	DENSITY	0.00	0.00	0.00	0.26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02
	SE	0.00	0.00	0.00	0.26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.26
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
18JUN-21JUN	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
25JUN-28JUN	DENSITY	0.00	0.00	0.00	0.00	0.00	1.15	0.13	0.00	0.00	0.00	0.00	0.65	0.00	0.15
	SE	0.00	0.00	0.00	0.00	0.00	1.15	0.13	0.00	0.00	0.00	0.00	0.65	0.00	1.32
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
02JUL-06JUL	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.76	1.19	5.30	4.46	0.00	2.79	1.12
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.76	0.75	5.30	4.46	0.00	2.79	7.54
	NO. TOWS	6	11	14	11	13	9	13	8	10	7	6	6	6	120
16JUL-19JUL	DENSITY	0.00	0.00	0.00	75.13	4.06	2.13	1.22	13.51	NS	NS	NS	NS	NS	12.01
	SE	0.00	0.00	0.00	64.05	3.31	1.66	1.04	11.37						65.17
	NO. TOWS	7	10	11	12	10	6	10	6						72
30JUL-02AUG	DENSITY	1.41	1.44	0.30	0.80	1.13	11.33	11.66	48.06	NS	NS	NS	NS	NS	9.52
	SE	1.41	1.07	0.30	0.80	1.03	5.57	6.71	19.67						21.63
	NO. TOWS	7	11	11	12	10	6	10	6						73
14AUG-16AUG	DENSITY	1.93	0.00	24.31	9.75	6.50	10.29	92.69	75.25	NS	NS	NS	NS	NS	27.59
	SE	1.93	0.00	21.54	6.14	3.98	8.30	51.48	41.42						70.40
	NO. TOWS	7	11	11	12	10	5	9	6						71

Table C-72 Regional Standing Crop (In Thousands) of Blueback Herring Young of Year in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1990

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
19APR-23APR	St. Crop	NS	0.00	0.00	0.00	65.57	0.00	0.00	0.00	NS	0.00	NS	0.00	0.00	65.57
	SE		0.00	0.00	0.00	65.57	0.00	0.00	0.00		0.00		0.00	0.00	65.57
	NO. TOWS		6	8	8	4	5	6	3		7		11	24	82
23APR-26APR	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		10	12	13	10	6	10	6	7	7	8	9	9	107
30APR-03MAY	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
07MAY-10MAY	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
14MAY-17MAY	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	5	10	116
21MAY-24MAY	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	5	109
29MAY-02JUN	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	91.62	0.00	0.00	0.00	0.00	91.62
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	91.62	0.00	0.00	0.00	0.00	91.62
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
04JUN-07JUN	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
11JUN-14JUN	St. Crop	0.00	0.00	0.00	38.94	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	38.94
	SE	0.00	0.00	0.00	38.94	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	38.94
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
18JUN-21JUN	St. Crop	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
25JUN-28JUN	St. Crop	0.00	0.00	0.00	0.00	0.00	237.73	18.52	0.00	0.00	0.00	0.00	104.46	0.00	360.71
	SE	0.00	0.00	0.00	0.00	0.00	237.73	18.52	0.00	0.00	0.00	0.00	104.46	0.00	260.33
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
02JUL-06JUL	St. Crop	0.00	0.00	0.00	0.00	0.00	0.00	0.00	227.70	196.56	749.43	786.26	0.00	198.30	2158.25
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	227.70	123.83	749.43	786.26	0.00	198.30	1134.18
	NO. TOWS	6	11	14	11	13	9	13	8	10	7	6	6	6	120
16JUL-19JUL	St. Crop	0.00	0.00	0.00	11098.84	846.65	442.63	170.25	4026.36	NS	NS	NS	NS	NS	16584.74
	SE	0.00	0.00	0.00	9462.76	690.31	344.47	145.98	3389.40						10082.08
	NO. TOWS	7	10	11	12	10	6	10	6						72
30JUL-02AUG	St. Crop	294.46	330.86	95.45	118.01	236.05	2350.35	1630.39	14327.12	NS	NS	NS	NS	NS	19382.69
	SE	294.46	245.77	95.45	118.01	215.25	1155.02	938.68	5865.27						6069.02
	NO. TOWS	7	11	11	12	10	6	10	6						73
14AUG-16AUG	St. Crop	404.35	0.00	7824.51	1440.41	1354.45	2135.36	12957.48	22433.19	NS	NS	NS	NS	NS	48549.76
	SE	404.35	0.00	6931.37	906.79	829.10	1721.44	7196.96	12347.91						16029.58
	NO. TOWS	7	11	11	12	10	5	9	6						71

Table C-73 Regional Density (No./1,000m3) of Blueback Herring Young of Year in Hudson River Estuary Determined From Fall Juvenile Survey, 1990

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions COMBINED
09JUL-14JUL	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.51	0.00	0.03	0.07	1.30	0.16
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.51	0.00	0.03	0.05	0.83	0.97
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	12	209
23JUL-27JUL	DENSITY	0.00	0.07	0.40	1.69	4.00	11.88	3.33	27.60	27.96	0.23	71.39	29.58	14.84
	SE	0.00	0.05	0.23	0.83	0.84	11.42	3.04	11.68	19.03	0.23	35.53	20.71	48.28
	NO. TOWS	17	46	27	14	8	11	7	10	15	18	21	13	207
06AUG-10AUG	DENSITY	0.15	5.19	6.87	1.76	6.99	18.21	96.47	92.48	118.33	120.69	117.07	46.02	52.52
	SE	0.08	1.83	3.99	1.11	3.75	13.36	71.91	36.92	33.39	65.39	46.15	25.16	122.07
	NO. TOWS	16	46	27	14	8	13	8	10	15	18	21	13	209
20AUG-24AUG	DENSITY	0.11	0.03	2.20	3.19	25.04	21.41	41.90	221.86	68.32	146.02	132.32	67.81	60.85
	SE	0.11	0.03	1.72	2.95	18.82	9.64	32.03	68.71	34.79	88.51	41.62	66.48	146.30
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
04SEP-07SEP	DENSITY	0.86	0.08	0.00	3.53	2.79	13.49	28.95	2.62	61.37	106.09	61.05	2.30	23.60
	SE	0.86	0.04	0.00	3.24	2.66	6.85	12.23	0.83	26.62	86.84	28.67	1.18	96.38
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
17SEP-20SEP	DENSITY	0.02	0.00	0.02	0.13	5.93	2.28	9.35	29.19	67.43	35.29	59.03	11.59	18.35
	SE	0.02	0.00	0.02	0.12	4.36	0.52	3.79	8.65	35.60	8.87	18.11	6.09	42.66
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
01OCT-06OCT	DENSITY	0.00	0.00	0.00	0.02	3.90	11.15	18.67	31.35	27.26	24.22	12.40	4.58	11.13
	SE	0.00	0.00	0.00	0.02	1.56	5.99	5.59	15.63	13.26	6.94	6.94	1.82	24.28
	NO. TOWS	18	46	27	14	8	13	8	10	15	18	21	13	211
15OCT-17OCT	DENSITY	0.03	0.07	0.59	1.43	22.49	17.93	5.19	9.99	18.67	86.49	50.84	28.35	20.17
	SE	0.02	0.04	0.19	0.71	10.34	5.86	1.95	3.61	5.54	37.06	11.26	4.82	41.38
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210

Table C-74 Regional Standing Crops (in Thousands) of Blueback Herring Young of Year in Hudson River Estuary Determined From Fall Juvenile Survey, 1990

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions COMBINED
09JUL-14JUL	St. Crop	0	0	0	0	0	0	0	84	0	5	11	93	193
	SE	0	0	0	0	0	0	0	84	0	5	8	59	103
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	12	209
23JUL-27JUL	St. Crop	0	22	58	352	830	1661	994	4568	3956	40	11474	2105	26060
	SE	0	15	34	173	174	1596	907	1933	2692	40	5710	1473	7014
	NO. TOWS	17	46	27	14	8	11	7	10	15	18	21	13	207
06AUG-10AUG	St. Crop	35	1669	1015	366	1450	2546	28760	15304	16740	21278	18818	3274	111255
	SE	19	588	589	231	778	1867	21440	6110	4724	11527	7417	1790	26744
	NO. TOWS	16	46	27	14	8	13	8	10	15	18	21	13	209
20AUG-24AUG	St. Crop	24	8	326	664	5194	2992	12491	36714	9665	25743	21268	4825	119915
	SE	24	8	255	615	3904	1348	9551	11370	4922	15605	6689	4730	23934
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
04SEP-07SEP	St. Crop	197	26	0	736	579	1886	8630	434	8683	18704	9813	164	49852
	SE	197	13	0	675	552	958	3646	138	3765	15309	4609	84	16877
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
17SEP-20SEP	St. Crop	5	0	4	27	1230	318	2788	4830	9539	6222	9488	824	35274
	SE	5	0	4	24	904	73	1131	1431	5037	1565	2911	434	6374
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
01OCT-06OCT	St. Crop	0	0	0	4	809	1559	5565	5188	3857	4270	1993	326	23570
	SE	0	0	0	4	324	837	1666	2587	1876	1224	1116	129	4069
	NO. TOWS	18	46	27	14	8	13	8	10	15	18	21	13	211
15OCT-17OCT	St. Crop	7	22	88	297	4666	2506	1547	1654	2641	15247	8172	2017	38863
	SE	5	14	28	149	2146	819	583	598	783	6533	1809	343	7258
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210

Table C-75 Regional Catch-Per-Unit-Effort (CPUE) of Blueback Herring Young of Year in Hudson River Estuary Determined From Beach Seine Survey, 1990

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions COMBINED
18JUN-20JUN	CPUE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
02JUL-03JUL	CPUE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.08	0.01
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.08	0.08
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	18	13	100
17JUL-19JUL	CPUE	0.00	0.00	0.00	0.00	1.67	6.33	76.63	10.88	12.88	3.33	4.95	6.08	10.23
	SE	0.00	0.00	0.00	0.00	1.67	2.33	42.77	5.92	7.93	1.70	1.87	5.99	44.47
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
31JUL-03AUG	CPUE	0.00	0.78	7.67	8.00	67.80	26.17	24.20	136.60	114.20	171.33	42.40	3.29	50.20
	SE	0.00	0.44	7.31	4.90	39.96	11.12	14.66	75.22	80.76	85.04	18.12	1.27	147.49
	NO. TOWS	5	23	15	5	5	6	5	5	5	9	10	7	100
14AUG-17AUG	CPUE	0.20	1.75	2.64	1.20	28.20	24.83	478.80	47.00	62.20	284.67	25.70	71.14	85.69
	SE	0.20	0.96	2.64	1.20	20.91	5.93	250.80	20.99	57.24	80.60	15.72	39.76	274.64
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
27AUG-29AUG	CPUE	0.00	0.29	1.21	5.40	6.60	14.00	232.20	663.80	529.00	25.56	96.80	33.14	134.00
	SE	0.00	0.21	0.72	2.50	3.22	5.28	115.45	338.15	475.59	19.68	46.60	25.18	597.57
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
10SEP-12SEP	CPUE	0.00	0.50	0.00	13.00	63.60	98.67	379.40	231.40	848.00	198.22	20.40	30.29	156.96
	SE	0.00	0.18	0.00	9.17	45.87	48.63	355.78	83.02	440.05	77.07	12.54	16.11	581.41
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
24SEP-26SEP	CPUE	0.00	0.00	0.57	8.80	279.60	57.83	69.20	97.20	29.00	52.22	49.00	168.00	67.62
	SE	0.00	0.00	0.40	8.80	174.75	22.35	36.01	47.43	9.63	26.31	45.84	153.28	247.07
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
08OCT-10OCT	CPUE	0.00	0.17	0.57	0.60	34.80	105.67	124.80	62.00	156.20	87.89	37.10	99.29	59.09
	SE	0.00	0.10	0.27	0.40	24.99	33.92	45.90	48.81	75.36	61.19	16.75	50.68	136.15
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
22OCT-24OCT	CPUE	35.20	47.08	9.86	48.20	49.60	42.17	1.00	0.00	128.60	41.22	5.20	6.57	34.56
	SE	13.67	26.73	3.08	33.25	40.48	30.26	0.77	0.00	79.93	35.58	3.41	2.96	110.67
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100

Table C-76 Regional Standing Crops (in Thousands) of Blueback Herring Young of Year in Hudson River Estuary Determined From Beach Seine Survey, 1990

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions COMBINED
18JUN-20JUN	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
	SE	0	0	0	0	0	0	0	0	0	0	0	0	0
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
02JUL-03JUL	St. Crop	0	0	0	0	0	0	0	0	0	0	0	1	1
	SE	0	0	0	0	0	0	0	0	0	0	0	1	1
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	18	13	100
17JUL-19JUL	St. Crop	0	0	0	0	4	67	544	13	111	59	97	83	978
	SE	0	0	0	0	4	25	303	7	68	30	37	81	326
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
31JUL-03AUG	St. Crop	0	36	206	74	179	279	172	169	983	3008	834	45	5984
	SE	0	20	197	45	105	118	104	93	695	1493	356	17	1710
	NO. TOWS	5	23	15	5	5	6	5	5	5	9	10	7	100
14AUG-17AUG	St. Crop	2	80	71	11	74	265	3397	58	535	4997	506	967	10963
	SE	2	44	71	11	55	63	1780	26	493	1415	309	540	2411
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
27AUG-29AUG	St. Crop	0	13	33	50	17	149	1648	823	4554	449	1905	450	10091
	SE	0	10	19	23	8	56	819	419	4094	345	917	342	4323
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
10SEP-12SEP	St. Crop	0	23	0	120	168	1051	2692	287	7300	3480	401	411	15933
	SE	0	8	0	85	121	518	2524	103	3788	1353	247	219	4792
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
24SEP-26SEP	St. Crop	0	0	15	81	737	616	491	121	250	917	964	2283	6474
	SE	0	0	11	81	461	238	256	59	83	462	902	2083	2391
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
08OCT-10OCT	St. Crop	0	8	15	6	92	1125	886	77	1345	1543	730	1349	7175
	SE	0	4	7	4	66	361	326	61	649	1074	330	689	1550
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
22OCT-24OCT	St. Crop	265	2139	265	444	131	449	7	0	1107	724	102	89	5723
	SE	103	1215	83	306	107	322	5	0	688	625	67	40	1604
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100

Table C-77 Regional Density (No./1,000m3) of Blueback Herring Yearling and Older in Hudson River Estuary Determined From Fall Juvenile Survey, 1990

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions COMBINED
09JUL-14JUL	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	12	209
23JUL-27JUL	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	17	46	27	14	8	11	7	10	15	18	21	13	207
06AUG-10AUG	DENSITY	0.00	0.43	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04
	SE	0.00	0.43	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.43
	NO. TOWS	16	46	27	14	8	13	8	10	15	18	21	13	209
20AUG-24AUG	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.49	0.00	0.00	0.64	0.00	0.09
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.49	0.00	0.00	0.64	0.00	0.80
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
04SEP-07SEP	DENSITY	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	<0.005
	SE	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
17SEP-20SEP	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00	<0.005
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.03
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
01OCT-06OCT	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	18	46	27	14	8	13	8	10	15	18	21	13	211
15OCT-17OCT	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210

Table C-78 Regional Standing Crops (in Thousands) of Blueback Herring Yearling and Older in Hudson River Estuary Determined From Fall Juvenile Survey, 1990

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions COMBINED
09JUL-14JUL	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
	SE	0	0	0	0	0	0	0	0	0	0	0	0	0
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	12	209
23JUL-27JUL	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
	SE	0	0	0	0	0	0	0	0	0	0	0	0	0
	NO. TOWS	17	46	27	14	8	11	7	10	15	18	21	13	207
06AUG-10AUG	St. Crop	0	138	0	0	0	0	0	0	0	0	0	0	138
	SE	0	138	0	0	0	0	0	0	0	0	0	0	138
	NO. TOWS	16	46	27	14	8	13	8	10	15	18	21	13	209
20AUG-24AUG	St. Crop	0	0	0	0	0	0	0	81	0	0	103	0	184
	SE	0	0	0	0	0	0	0	81	0	0	103	0	131
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
04SEP-07SEP	St. Crop	0	14	0	0	0	0	0	0	0	0	0	0	14
	SE	0	14	0	0	0	0	0	0	0	0	0	0	14
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
17SEP-20SEP	St. Crop	0	0	0	0	0	0	0	6	0	0	0	0	6
	SE	0	0	0	0	0	0	0	6	0	0	0	0	6
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
01OCT-06OCT	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
	SE	0	0	0	0	0	0	0	0	0	0	0	0	0
	NO. TOWS	18	46	27	14	8	13	8	10	15	18	21	13	211
15OCT-17OCT	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
	SE	0	0	0	0	0	0	0	0	0	0	0	0	0
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210

Table C-79 Regional Catch-Per-Unit-Effort (CPUE) of Blueback Herring Yearling and Older in Hudson River Estuary Determined From Beach Seine Survey, 1990

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions COMBINED
18JUN-20JUN	CPUE	0.00	0.18	2.86	0.00	0.00	0.00	0.13	0.00	0.00	0.00	0.00	0.33	0.29
	SE	0.00	0.18	1.22	0.00	0.00	0.00	0.13	0.00	0.00	0.00	0.00	0.33	1.29
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
02JUL-03JUL	CPUE	0.00	0.00	0.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
	SE	0.00	0.00	0.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.14
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	18	13	100
17JUL-19JUL	CPUE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
31JUL-03AUG	CPUE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	5	23	15	5	5	6	5	5	5	9	10	7	100
14AUG-17AUG	CPUE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
27AUG-29AUG	CPUE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.57	0.05
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.57	0.57
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
10SEP-12SEP	CPUE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
24SEP-26SEP	CPUE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
08OCT-10OCT	CPUE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
22OCT-24OCT	CPUE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100

Table C-80 Regional Standing Crops (in Thousands) of Blueback Herring Yearling and Older in Hudson River Estuary Determined From Beach Seine Survey, 1990

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions COMBINED
18JUN-20JUN	St. Crop	0	8	77	0	0	0	1	0	0	0	0	5	91
	SE	0	8	33	0	0	0	1	0	0	0	0	5	34
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
02JUL-03JUL	St. Crop	0	0	4	0	0	0	0	0	0	0	0	0	4
	SE	0	0	4	0	0	0	0	0	0	0	0	0	4
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	18	13	100
17JUL-19JUL	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
	SE	0	0	0	0	0	0	0	0	0	0	0	0	0
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
31JUL-03AUG	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
	SE	0	0	0	0	0	0	0	0	0	0	0	0	0
	NO. TOWS	5	23	15	5	5	6	5	5	5	9	10	7	100
14AUG-17AUG	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
	SE	0	0	0	0	0	0	0	0	0	0	0	0	0
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
27AUG-29AUG	St. Crop	0	0	0	0	0	0	0	0	0	0	0	8	8
	SE	0	0	0	0	0	0	0	0	0	0	0	8	8
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
10SEP-12SEP	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
	SE	0	0	0	0	0	0	0	0	0	0	0	0	0
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
24SEP-26SEP	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
	SE	0	0	0	0	0	0	0	0	0	0	0	0	0
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
08OCT-10OCT	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
	SE	0	0	0	0	0	0	0	0	0	0	0	0	0
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
22OCT-24OCT	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
	SE	0	0	0	0	0	0	0	0	0	0	0	0	0
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100

Table C-81 Regional Density (No./1,000m3) of Alewife Young of Year in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1990

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
19APR-23APR	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	0.00	NS	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00	0.00	0.00
	NO. TOWS		6	8	8	4	5	6	3		7		11	24	82
23APR-26APR	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		10	12	13	10	6	10	6	7	7	8	9	9	107
30APR-03MAY	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
07MAY-10MAY	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
14MAY-17MAY	DENSITY	NS	0.00	0.00	0.00	0.55	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05
	SE		0.00	0.00	0.00	0.55	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.55
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	5	10	116
21MAY-24MAY	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	5	109
29MAY-02JUN	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
04JUN-07JUN	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
11JUN-14JUN	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
18JUN-21JUN	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
25JUN-28JUN	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
02JUL-06JUL	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.29	0.00	0.00	0.80	0.00	0.00	0.24
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.29	0.00	0.00	0.80	0.00	0.00	2.43
	NO. TOWS	6	11	14	11	13	9	13	8	10	7	6	6	6	120
16JUL-19JUL	DENSITY	0.00	0.00	0.00	0.98	0.80	0.82	0.12	0.50	NS	NS	NS	NS	NS	0.40
	SE	0.00	0.00	0.00	0.98	0.80	0.82	0.07	0.25						1.53
	NO. TOWS	7	10	11	12	10	6	10	6						72
30JUL-02AUG	DENSITY	0.00	0.00	0.38	0.00	0.00	1.26	0.00	5.78	NS	NS	NS	NS	NS	0.93
	SE	0.00	0.00	0.38	0.00	0.00	1.13	0.00	4.53						4.69
	NO. TOWS	7	11	11	12	10	6	10	6						73
14AUG-16AUG	DENSITY	0.00	0.00	0.49	0.55	2.04	0.00	0.90	0.57	NS	NS	NS	NS	NS	0.57
	SE	0.00	0.00	0.49	0.39	0.94	0.00	0.81	0.57						1.50
	NO. TOWS	7	11	11	12	10	5	9	6						71

Table C-82 Regional Standing Crop (In Thousands) of Alewife Young of Year in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1990

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
19APR-	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	0.00	NS	0.00	0.00	0.00
23APR	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00	0.00	0.00
	NO. TOWS		6	8	8	4	5	6	3		7		11	24	82
23APR-	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
26APR	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		10	12	13	10	6	10	6	7	7	8	9	9	107
30APR-	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
03MAY	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
07MAY-	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10MAY	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
14MAY-	St. Crop	NS	0.00	0.00	0.00	114.27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	114.27
17MAY	SE		0.00	0.00	0.00	114.27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	114.27
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	5	10	116
21MAY-	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24MAY	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	5	109
29MAY-	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
02JUN	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
04JUN-	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
07JUN	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
11JUN-	St. Crop	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
14JUN	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
18JUN-	St. Crop	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
21JUN	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
25JUN-	St. Crop	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
28JUN	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
02JUL-	St. Crop	0.00	0.00	0.00	0.00	0.00	0.00	0.00	683.10	0.00	0.00	141.60	0.00	0.00	824.70
06JUL	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	683.10	0.00	0.00	141.60	0.00	0.00	697.62
	NO. TOWS	6	11	14	11	13	9	13	8	10	7	6	6	6	120
16JUL-	St. Crop	0.00	0.00	0.00	145.47	166.17	169.54	17.17	148.84	NS	NS	NS	NS	NS	647.19
19JUL	SE	0.00	0.00	0.00	145.47	166.17	169.54	9.97	74.46						288.38
	NO. TOWS	7	10	11	12	10	6	10	6						72
30JUL-	St. Crop	0.00	0.00	121.39	0.00	0.00	260.38	0.00	1722.82	NS	NS	NS	NS	NS	2104.60
02AUG	SE	0.00	0.00	121.39	0.00	0.00	234.23	0.00	1351.66						1377.16
	NO. TOWS	7	11	11	12	10	6	10	6						73
14AUG-	St. Crop	0.00	0.00	159.24	81.20	424.63	0.00	126.49	170.26	NS	NS	NS	NS	NS	961.80
16AUG	SE	0.00	0.00	159.24	58.14	195.17	0.00	112.69	170.26						329.41
	NO. TOWS	7	11	11	12	10	5	9	6						71

Table C-83 Regional Density (No./1,000m3) of Alewife Young of Year in Hudson River Estuary Determined From Fall Juvenile Survey, 1990

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions COMBINED
09JUL-14JUL	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.03	1.14	3.22	0.48	0.00	0.57
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.03	0.67	1.58	0.38	0.00	2.69
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	12	209
23JUL-27JUL	DENSITY	0.00	0.00	0.00	0.01	0.08	0.02	0.05	2.92	4.96	0.27	1.24	0.31	0.82
	SE	0.00	0.00	0.00	0.01	0.05	0.01	0.05	0.94	3.49	0.23	0.43	0.16	3.65
	NO. TOWS	17	46	27	14	8	11	7	10	15	18	21	13	207
06AUG-10AUG	DENSITY	0.00	0.00	0.47	0.02	0.00	0.01	1.62	1.49	0.06	1.21	1.25	0.00	0.51
	SE	0.00	0.00	0.44	0.01	0.00	0.01	1.62	0.84	0.06	1.17	1.21	0.00	2.52
	NO. TOWS	16	46	27	14	8	13	8	10	15	18	21	13	209
20AUG-24AUG	DENSITY	0.00	0.03	0.00	0.74	0.03	0.01	1.04	0.75	0.55	0.48	2.53	0.00	0.51
	SE	0.00	0.03	0.00	0.74	0.03	0.01	0.99	0.66	0.35	0.35	1.13	0.00	1.87
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
04SEP-07SEP	DENSITY	0.00	0.03	0.04	0.01	0.00	0.00	0.00	0.03	0.07	0.00	0.00	0.00	0.02
	SE	0.00	0.02	0.04	0.01	0.00	0.00	0.00	0.03	0.05	0.00	0.00	0.00	0.07
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
17SEP-20SEP	DENSITY	0.00	0.13	0.00	0.08	0.57	0.00	0.05	1.33	3.99	2.00	1.80	0.20	0.85
	SE	0.00	0.12	0.00	0.06	0.57	0.00	0.05	0.67	1.71	1.06	0.54	0.14	2.27
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
01OCT-06OCT	DENSITY	0.07	0.05	0.02	0.01	0.00	0.07	0.00	0.00	1.21	0.53	0.04	0.00	0.17
	SE	0.07	0.04	0.02	0.01	0.00	0.05	0.00	0.00	1.14	0.28	0.04	0.00	1.18
	NO. TOWS	18	46	27	14	8	13	8	10	15	18	21	13	211
15OCT-17OCT	DENSITY	0.05	0.03	0.05	0.03	0.00	0.10	0.05	0.63	1.24	0.18	0.49	0.14	0.25
	SE	0.05	0.02	0.04	0.03	0.00	0.07	0.05	0.56	1.08	0.11	0.31	0.14	1.27
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210

Table C-84 Regional Standing Crops (in Thousands) of Alewife Young of Year in Hudson River Estuary Determined From Fall Juvenile Survey, 1990

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions COMBINED
09JUL-14JUL	St. Crop	0	0	0	0	0	0	0	336	162	568	77	0	1143
	SE	0	0	0	0	0	0	0	336	95	278	61	0	451
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	12	209
23JUL-27JUL	St. Crop	0	0	0	2	16	3	16	483	702	47	199	22	1492
	SE	0	0	0	2	11	2	16	156	494	40	68	12	525
	NO. TOWS	17	46	27	14	8	11	7	10	15	18	21	13	207
06AUG-10AUG	St. Crop	0	0	69	5	0	2	482	246	8	213	200	0	1225
	SE	0	0	65	3	0	2	482	139	8	207	195	0	580
	NO. TOWS	16	46	27	14	8	13	8	10	15	18	21	13	209
20AUG-24AUG	St. Crop	0	10	0	154	6	2	310	125	78	84	406	0	1174
	SE	0	10	0	154	6	2	294	110	50	61	181	0	402
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
04SEP-07SEP	St. Crop	0	11	5	2	0	0	0	5	11	0	0	0	35
	SE	0	8	5	2	0	0	0	5	7	0	0	0	13
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
17SEP-20SEP	St. Crop	0	43	0	16	119	0	15	219	564	353	289	14	1633
	SE	0	38	0	13	119	0	15	111	241	187	87	10	359
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
01OCT-06OCT	St. Crop	16	16	3	2	0	10	0	0	171	93	6	0	317
	SE	16	12	3	2	0	7	0	0	161	50	6	0	170
	NO. TOWS	18	46	27	14	8	13	8	10	15	18	21	13	211
15OCT-17OCT	St. Crop	11	9	7	6	0	14	14	104	175	32	78	10	461
	SE	11	6	5	6	0	10	14	93	153	19	49	10	188
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210

Table C-85 Regional Catch-Per-Unit-Effort (CPUE) of Alewife Young of Year in Hudson River Estuary Determined From Beach Seine Survey, 1990

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions COMBINED
18JUN-20JUN	CPUE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
02JUL-03JUL	CPUE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.63	0.13	0.00	0.23	0.08
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.26	0.13	0.00	0.17	0.34
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	18	13	100
17JUL-19JUL	CPUE	0.00	0.18	0.00	0.33	13.67	0.00	0.13	6.38	6.00	4.80	3.11	0.00	2.88
	SE	0.00	0.12	0.00	0.33	12.20	0.00	0.13	4.99	4.88	2.36	1.36	0.00	14.32
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
31JUL-03AUG	CPUE	0.00	1.22	0.33	0.20	8.40	0.33	0.00	1.00	2.80	2.11	2.80	0.00	1.60
	SE	0.00	0.83	0.27	0.20	8.40	0.33	0.00	0.55	2.56	1.15	1.93	0.00	9.13
	NO. TOWS	5	23	15	5	5	6	5	5	5	9	10	7	100
14AUG-17AUG	CPUE	0.00	0.42	1.43	0.00	0.80	0.00	0.80	0.80	1.40	5.89	0.00	0.00	0.96
	SE	0.00	0.26	1.43	0.00	0.49	0.00	0.58	0.37	1.17	2.87	0.00	0.00	3.53
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
27AUG-29AUG	CPUE	0.00	0.75	0.14	7.00	0.20	1.83	2.60	0.40	0.60	0.44	0.70	0.00	1.22
	SE	0.00	0.56	0.10	5.78	0.20	1.83	1.12	0.24	0.60	0.34	0.42	0.00	6.25
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
10SEP-12SEP	CPUE	0.00	0.13	0.00	6.40	3.20	0.00	0.20	6.60	0.80	3.44	0.00	0.00	1.73
	SE	0.00	0.07	0.00	6.40	2.06	0.00	0.20	2.82	0.80	2.61	0.00	0.00	7.79
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
24SEP-26SEP	CPUE	0.00	0.04	0.43	1.00	2.00	3.00	0.80	4.00	3.00	2.00	0.00	0.00	1.36
	SE	0.00	0.04	0.43	1.00	1.05	1.32	0.80	2.59	2.76	1.48	0.00	0.00	4.60
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
08OCT-10OCT	CPUE	0.00	0.04	0.07	0.00	0.80	1.33	0.00	0.40	1.80	3.78	0.00	0.00	0.69
	SE	0.00	0.04	0.07	0.00	0.58	0.56	0.00	0.40	1.11	3.31	0.00	0.00	3.61
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
22OCT-24OCT	CPUE	0.00	0.21	0.00	0.00	0.20	0.17	0.00	0.00	0.80	0.22	0.00	0.00	0.13
	SE	0.00	0.13	0.00	0.00	0.20	0.17	0.00	0.00	0.58	0.15	0.00	0.00	0.67
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100

Table C-86 Regional Standing Crops (in Thousands) of Alewife Young of Year in Hudson River Estuary Determined From Beach Seine Survey, 1990

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions COMBINED
18JUN-20JUN	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
	SE	0	0	0	0	0	0	0	0	0	0	0	0	0
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
02JUL-03JUL	St. Crop	0	0	0	0	0	0	0	0	5	2	0	3	11
	SE	0	0	0	0	0	0	0	0	2	2	0	2	4
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	18	13	100
17JUL-19JUL	St. Crop	0	8	0	3	36	0	1	8	52	84	61	0	253
	SE	0	6	0	3	32	0	1	6	42	41	27	0	73
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
31JUL-03AUG	St. Crop	0	55	9	2	22	4	0	1	24	37	55	0	209
	SE	0	38	7	2	22	4	0	1	22	20	38	0	66
	NO. TOWS	5	23	15	5	5	6	5	5	5	9	10	7	100
14AUG-17AUG	St. Crop	0	19	38	0	2	0	6	1.00	12	103	0	0	182
	SE	0	12	38	0	1	0	4	<0.005	10	50	0	0	65
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
27AUG-29AUG	St. Crop	0	34	4	65	1	20	18	<0.005	5	8	14	0	168
	SE	0	25	3	53	1	20	8	<0.005	5	6	8	0	64
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
10SEP-12SEP	St. Crop	0	6	0	59	8	0	1	8	7	60	0	0	150
	SE	0	3	0	59	5	0	1	3	7	46	0	0	75
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
24SEP-26SEP	St. Crop	0	2	12	9	5	32	6	5	26	35	0	0	131
	SE	0	2	12	9	3	14	6	3	24	26	0	0	41
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
08OCT-10OCT	St. Crop	0	2	2	0	2	14	0	<0.005	15	66	0	0	102
	SE	0	2	2	0	2	6	0	<0.005	10	58	0	0	59
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
22OCT-24OCT	St. Crop	0	9	0	0	1	2	0	0	7	4	0	0	23
	SE	0	6	0	0	1	2	0	0	5	3	0	0	9
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100

Table C-87 Regional Density (No./1,000m3) of Alewife Yearling and Older in Hudson River Estuary Determined From Fall Juvenile Survey, 1990

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions COMBINED
09JUL-	DENSITY	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	<0.005
14JUL	SE	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	12	209
23JUL-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
27JUL	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	17	46	27	14	8	11	7	10	15	18	21	13	207
06AUG-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10AUG	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	16	46	27	14	8	13	8	10	15	18	21	13	209
20AUG-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24AUG	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
04SEP-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
07SEP	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
17SEP-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.06	0.00	0.01
20SEP	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.04	0.00	0.05
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
01OCT-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	<0.005
06OCT	SE	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.04
	NO. TOWS	18	46	27	14	8	13	8	10	15	18	21	13	211
15OCT-	DENSITY	0.00	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.19	0.07	0.00	0.00	0.03
17OCT	SE	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.10	0.07	0.00	0.00	0.13
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210

Table C-88 Regional Standing Crops (in Thousands) of Alewife Yearling and Older in Hudson River Estuary Determined From Fall Juvenile Survey, 1990

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions COMBINED
09JUL-14JUL	St. Crop	0	8	0	0	0	0	0	0	0	0	0	0	8
	SE	0	8	0	0	0	0	0	0	0	0	0	0	8
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	12	209
23JUL-27JUL	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
	SE	0	0	0	0	0	0	0	0	0	0	0	0	0
	NO. TOWS	17	46	27	14	8	11	7	10	15	18	21	13	207
06AUG-10AUG	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
	SE	0	0	0	0	0	0	0	0	0	0	0	0	0
	NO. TOWS	16	46	27	14	8	13	8	10	15	18	21	13	209
20AUG-24AUG	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
	SE	0	0	0	0	0	0	0	0	0	0	0	0	0
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
04SEP-07SEP	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
	SE	0	0	0	0	0	0	0	0	0	0	0	0	0
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
17SEP-20SEP	St. Crop	0	0	0	0	0	0	0	0	0	5	10	0	15
	SE	0	0	0	0	0	0	0	0	0	5	7	0	8
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
01OCT-06OCT	St. Crop	0	0	0	0	0	6	0	0	0	0	0	0	6
	SE	0	0	0	0	0	6	0	0	0	0	0	0	6
	NO. TOWS	18	46	27	14	8	13	8	10	15	18	21	13	211
15OCT-17OCT	St. Crop	0	0	9	0	0	0	0	0	27	12	0	0	48
	SE	0	0	6	0	0	0	0	0	14	12	0	0	19
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210

Table C-89 Regional Catch-Per-Unit-Effort (CPUE) of Alewife in Hudson River Estuary Determined From Beach Seine Survey, 1990 Yearling and Older

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions COMBINED
18JUN-	CPUE	0.00	0.00	0.00	3.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.25
20JUN	SE	0.00	0.00	0.00	3.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.00
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
02JUL-	CPUE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
03JUL	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	18	13	100
17JUL-	CPUE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19JUL	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
31JUL-	CPUE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
03AUG	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	5	23	15	5	5	6	5	5	5	9	10	7	100
14AUG-	CPUE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
17AUG	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
27AUG-	CPUE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
29AUG	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
10SEP-	CPUE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12SEP	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
24SEP-	CPUE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
26SEP	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
08OCT-	CPUE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10OCT	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
22OCT-	CPUE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24OCT	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100

Table C-90 Regional Standing Crops (in Thousands) of Alewife Yearling and Older in Hudson River Estuary Determined From Beach Seine Survey, 1990

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions COMBINED
18JUN-20JUN	St. Crop	0	0	0	28	0	0	0	0	0	0	0	0	28
	SE	0	0	0	28	0	0	0	0	0	0	0	0	28
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
02JUL-03JUL	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
	SE	0	0	0	0	0	0	0	0	0	0	0	0	0
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	18	13	100
17JUL-19JUL	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
	SE	0	0	0	0	0	0	0	0	0	0	0	0	0
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
31JUL-03AUG	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
	SE	0	0	0	0	0	0	0	0	0	0	0	0	0
	NO. TOWS	5	23	15	5	5	6	5	5	5	9	10	7	100
14AUG-17AUG	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
	SE	0	0	0	0	0	0	0	0	0	0	0	0	0
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
27AUG-29AUG	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
	SE	0	0	0	0	0	0	0	0	0	0	0	0	0
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
10SEP-12SEP	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
	SE	0	0	0	0	0	0	0	0	0	0	0	0	0
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
24SEP-26SEP	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
	SE	0	0	0	0	0	0	0	0	0	0	0	0	0
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
08OCT-10OCT	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
	SE	0	0	0	0	0	0	0	0	0	0	0	0	0
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
22OCT-24OCT	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
	SE	0	0	0	0	0	0	0	0	0	0	0	0	0
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100

Table C-91 Regional Density (No./1,000m3) of Bay Anchovy Eggs in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1990

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
19APR-23APR	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	0.00	NS	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00	0.00	0.00
	NO. TOWS		6	8	8	4	5	6	3		7		11	24	82
23APR-26APR	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		10	12	13	10	6	10	6	7	7	8	9	9	107
30APR-03MAY	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
07MAY-10MAY	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
14MAY-17MAY	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	5	10	116
21MAY-24MAY	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	5	109
29MAY-02JUN	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	190.55	0.00	15.88
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	190.55	0.00	190.55
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
04JUN-07JUN	DENSITY	NS	3203.80	14.01	0.00	0.00	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	268.16
	SE		1355.78	10.53	0.00	0.00	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1355.82
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
11JUN-14JUN	DENSITY	1842.17	2066.65	4911.66	0.00	5.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	53.48	683.00
	SE	1084.35	1969.80	2641.19	0.00	4.85	0.00	0.00	0.00	0.00	0.00	0.00	0.00	53.48	3469.11
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
18JUN-21JUN	DENSITY	3196.75	14586.35	13539.63	598.68	5.32	2.58	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2456.10
	SE	1379.54	9931.61	7103.53	402.32	3.47	1.54	0.00	0.00	0.00	0.00	0.00	0.00	0.00	12294.80
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
25JUN-28JUN	DENSITY	25402.80	5899.47	2037.19	2.14	0.00	0.00	0.08	0.00	0.00	0.00	0.00	0.00	0.00	2564.74
	SE	7073.24	2343.01	936.61	2.14	0.00	0.00	0.08	0.00	0.00	0.00	0.00	0.00	0.00	7509.84
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
02JUL-06JUL	DENSITY	2752.58	33467.72	63587.48	2947.75	4474.44	0.54	0.00	0.00	0.00	0.00	0.00	9.08	0.00	8249.20
	SE	2195.69	8481.55	19703.43	2879.77	4105.57	0.54	0.00	0.00	0.00	0.00	0.00	6.27	0.00	22138.92
	NO. TOWS	6	11	14	11	13	9	13	8	10	7	6	6	6	120
16JUL-19JUL	DENSITY	22484.63	9608.96	4792.81	5100.42	10.11	132.64	0.00	0.00	NS	NS	NS	NS	NS	5266.20
	SE	3241.23	2485.00	2045.17	2649.56	9.40	123.94	0.00	0.00						5281.96
	NO. TOWS	7	10	11	12	10	6	10	6						72
30JUL-02AUG	DENSITY	20923.14	11671.14	1609.93	304.19	3337.30	19.70	6.20	0.00	NS	NS	NS	NS	NS	4733.95
	SE	3943.33	7463.18	748.65	167.28	3117.20	9.36	6.20	0.00						9030.75
	NO. TOWS	7	11	11	12	10	6	10	6						73
14AUG-16AUG	DENSITY	2.31	0.97	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.41
	SE	2.31	0.97	0.00	0.00	0.00	0.00	0.00	0.00						2.50
	NO. TOWS	7	11	11	12	10	5	9	6						71

Table C-92 Regional Standing Crop (In Thousands) of Bay Anchovy Eggs in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1990

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
19APR-23APR	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	0.00	NS	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00	0.00	0.00
	NO. TOWS		6	8	8	4	5	6	3		7		11	24	82
23APR-26APR	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		10	12	13	10	6	10	6	7	7	8	9	9	107
30APR-03MAY	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
07MAY-10MAY	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
14MAY-17MAY	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	5	10	116
21MAY-24MAY	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	5	109
29MAY-02JUN	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	30627.35	0.00	30627.35
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	30627.35	0.00	30627.35
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
04JUN-07JUN	St. Crop	NS	735017.35	4507.80	0.00	0.00	23.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	739548.48
	SE		311043.15	3388.63	0.00	0.00	23.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	311061.61
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
11JUN-14JUN	St. Crop	385037.39	474132.50	1580626.96	0.00	1052.45	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3805.36	2444654.65
	SE	226642.41	451912.77	849966.21	0.00	1010.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3805.36	988964.10
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
18JUN-21JUN	St. Crop	668161.27	3346403.84	4357207.58	88446.48	1108.78	535.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8461863.04
	SE	288341.89	2278513.18	2285998.85	59436.93	722.76	318.87	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3241001.00
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
25JUN-28JUN	St. Crop	5309506.91	1353458.04	655590.71	316.45	0.00	0.00	11.71	0.00	0.00	0.00	0.00	0.00	0.00	7318883.81
	SE	1478396.68	537533.22	301411.43	316.45	0.00	0.00	11.71	0.00	0.00	0.00	0.00	0.00	0.00	1601701.48
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
02JUL-06JUL	St. Crop	575324.21	7678174.28	20463178.7	435490.64	932187.62	111.66	0.00	0.00	0.00	0.00	0.00	1459.88	0.00	30085927.0
	SE	458926.74	1945839.28	6340790.23	425447.43	855339.22	111.66	0.00	0.00	0.00	0.00	0.00	1007.75	0.00	6716780.24
	NO. TOWS	6	11	14	11	13	9	13	8	10	7	6	6	6	120
16JUL-19JUL	St. Crop	4699572.83	2204491.23	1542379.76	753520.12	2105.95	27517.07	0.00	0.00	NS	NS	NS	NS	NS	9229586.96
	SE	677457.13	570109.17	658160.69	391436.99	1959.20	25712.86	0.00	0.00						1170912.47
	NO. TOWS	7	10	11	12	10	6	10	6						72
30JUL-02AUG	St. Crop	4373204.30	2677595.46	518092.74	44939.77	695280.02	4086.76	866.50	0.00	NS	NS	NS	NS	NS	8314065.56
	SE	824206.52	1712204.89	240924.60	24713.91	649426.71	1941.57	866.50	0.00						2022715.25
	NO. TOWS	7	11	11	12	10	6	10	6						73
14AUG-16AUG	St. Crop	482.35	223.15	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	705.50
	SE	482.35	223.15	0.00	0.00	0.00	0.00	0.00	0.00						531.46
	NO. TOWS	7	11	11	12	10	5	9	6						71

Table C-93 Regional Density (No./1,000m3) of Bay Anchovy Yolk-Sac Larvae
in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1990

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
19APR-	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	0.00	NS	0.00	0.00	0.00
23APR	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00	0.00	0.00
	NO. TOWS		6	8	8	4	5	6	3		7		11	24	82
23APR-	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
26APR	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		10	12	13	10	6	10	6	7	7	8	9	9	107
30APR-	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
03MAY	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
07MAY-	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10MAY	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
14MAY-	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
17MAY	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	5	10	116
21MAY-	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24MAY	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	5	109
29MAY-	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
02JUN	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
04JUN-	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
07JUN	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
11JUN-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
14JUN	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
18JUN-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
21JUN	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
25JUN-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
28JUN	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
02JUL-	DENSITY	0.00	0.00	0.81	13.90	3.08	0.00	0.23	0.00	0.00	0.00	0.00	0.00	0.00	1.39
06JUL	SE	0.00	0.00	0.81	10.78	1.53	0.00	0.23	0.00	0.00	0.00	0.00	0.00	0.00	10.92
	NO. TOWS	6	11	14	11	13	9	13	8	10	7	6	6	6	120
16JUL-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
19JUL	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						0.00
	NO. TOWS	7	10	11	12	10	6	10	6						72
30JUL-	DENSITY	1.58	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.20
02AUG	SE	1.58	0.00	0.00	0.00	0.00	0.00	0.00	0.00						1.58
	NO. TOWS	7	11	11	12	10	6	10	6						73
14AUG-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
16AUG	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						0.00
	NO. TOWS	7	11	11	12	10	5	9	6						71

Table C-94 Regional Standing Crop (In Thousands) of Bay Anchovy Yolk-Sac Larvae in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1990

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
19APR-23APR	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	0.00	NS	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00	0.00	0.00
	NO. TOWS		6	8	8	4	5	6	3		7		11	24	82
23APR-26APR	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		10	12	13	10	6	10	6	7	7	8	9	9	107
30APR-03MAY	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
07MAY-10MAY	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
14MAY-17MAY	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	5	10	116
21MAY-24MAY	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	5	109
29MAY-02JUN	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
04JUN-07JUN	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
11JUN-14JUN	St. Crop	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
18JUN-21JUN	St. Crop	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
25JUN-28JUN	St. Crop	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
02JUL-06JUL	St. Crop	0.00	0.00	259.97	2053.23	641.55	0.00	32.36	0.00	0.00	0.00	0.00	0.00	0.00	2987.10
	SE	0.00	0.00	259.97	1592.09	319.56	0.00	32.36	0.00	0.00	0.00	0.00	0.00	0.00	1644.84
	NO. TOWS	6	11	14	11	13	9	13	8	10	7	6	6	6	120
16JUL-19JUL	St. Crop	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						0.00
	NO. TOWS	7	10	11	12	10	6	10	6						72
30JUL-02AUG	St. Crop	330.71	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	330.71
	SE	330.71	0.00	0.00	0.00	0.00	0.00	0.00	0.00						330.71
	NO. TOWS	7	11	11	12	10	6	10	6						73
14AUG-16AUG	St. Crop	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						0.00
	NO. TOWS	7	11	11	12	10	5	9	6						71

Table C-95 Regional Density (No./1,000m3) of Bay Anchovy Post Yolk-Sac Larvae in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1990

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
19APR-23APR	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	0.00	NS	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00	0.00	0.00
	NO. TOWS		6	8	8	4	5	6	3		7		11	24	82
23APR-26APR	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		10	12	13	10	6	10	6	7	7	8	9	9	107
30APR-03MAY	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
07MAY-10MAY	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
14MAY-17MAY	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	5	10	116
21MAY-24MAY	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	5	109
29MAY-02JUN	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
04JUN-07JUN	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
11JUN-14JUN	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
18JUN-21JUN	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
25JUN-28JUN	DENSITY	0.00	1.35	18.04	8.88	2.80	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.39
	SE	0.00	1.04	6.62	4.61	2.56	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.53
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
02JUL-06JUL	DENSITY	1.56	22.08	76.33	435.47	184.88	27.79	1.26	0.00	0.95	0.00	0.00	0.00	5.62	58.15
	SE	0.95	9.43	24.67	86.25	80.42	14.83	0.89	0.00	0.95	0.00	0.00	0.00	5.62	121.89
	NO. TOWS	6	11	14	11	13	9	13	8	10	7	6	6	6	120
16JUL-19JUL	DENSITY	2419.72	497.92	1465.97	5007.58	4344.28	302.63	135.53	102.11	NS	NS	NS	NS	NS	1784.47
	SE	1106.86	155.82	593.60	920.11	1375.11	153.91	45.09	45.97						2089.77
	NO. TOWS	7	10	11	12	10	6	10	6						72
30JUL-02AUG	DENSITY	672.75	960.68	2047.07	1122.99	1566.53	2083.81	2496.71	382.72	NS	NS	NS	NS	NS	1416.66
	SE	142.12	531.22	648.00	362.95	873.28	517.13	1378.05	139.88						1950.04
	NO. TOWS	7	11	11	12	10	6	10	6						73
14AUG-16AUG	DENSITY	452.82	2203.90	4220.21	2536.16	303.20	323.60	179.31	20.61	NS	NS	NS	NS	NS	1279.98
	SE	86.69	940.19	552.71	1103.36	63.37	66.79	53.84	8.98						1557.50
	NO. TOWS	7	11	11	12	10	5	9	6						71

Table C-96 Regional Standing Crop (In Thousands) of Bay Anchovy Post Yolk-Sac Larvae in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1990

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
19APR-23APR	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	0.00	NS	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00	0.00	0.00
	NO. TOWS		6	8	8	4	5	6	3		7		11	24	82
23APR-26APR	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		10	12	13	10	6	10	6	7	7	8	9	9	107
30APR-03MAY	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
07MAY-10MAY	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
14MAY-17MAY	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	5	10	116
21MAY-24MAY	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	5	109
29MAY-02JUN	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
04JUN-07JUN	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
11JUN-14JUN	St. Crop	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
18JUN-21JUN	St. Crop	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
25JUN-28JUN	St. Crop	0.00	309.95	5805.20	1311.33	583.77	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8010.24
	SE	0.00	239.18	2131.54	680.52	533.31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2312.61
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
02JUL-06JUL	St. Crop	326.96	5064.66	24564.85	64335.04	38517.91	5765.27	176.43	0.00	156.67	0.00	0.00	0.00	399.81	139307.60
	SE	198.86	2162.61	7937.87	12742.52	16754.44	3075.82	124.85	0.00	156.67	0.00	0.00	0.00	399.81	22813.81
	NO. TOWS	6	11	14	11	13	9	13	8	10	7	6	6	6	120
16JUL-19JUL	St. Crop	505753.22	114232.00	471765.08	739804.16	905070.91	62781.78	18945.67	30443.26	NS	NS	NS	NS	NS	2848796.09
	SE	231347.09	35747.91	191026.89	135933.95	286484.37	31929.58	6302.48	13705.50						439419.00
	NO. TOWS	7	10	11	12	10	6	10	6						72
30JUL-02AUG	St. Crop	140613.14	220398.99	658770.98	165907.38	326364.63	432298.05	349017.73	114101.78	NS	NS	NS	NS	NS	2407472.67
	SE	29704.88	121872.01	208534.54	53620.98	181935.45	107281.79	192639.30	41703.29						381518.00
	NO. TOWS	7	11	11	12	10	6	10	6						73
14AUG-16AUG	St. Crop	94645.99	505619.15	1358112.51	374683.48	63167.15	67132.89	25065.59	6144.16	NS	NS	NS	NS	NS	2494570.91
	SE	18118.94	215698.47	177868.75	163006.43	13202.91	13856.11	7526.06	2675.81						324796.28
	NO. TOWS	7	11	11	12	10	5	9	6						71

Table C-97 Regional Density (No./1,000m3) of Bay Anchovy Young of Year
in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1990

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
19APR-	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	0.00	NS	0.00	0.00	0.00
23APR	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00	0.00	0.00
	NO. TOWS		6	8	8	4	5	6	3		7		11	24	82
23APR-	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
26APR	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		10	12	13	10	6	10	6	7	7	8	9	9	107
30APR-	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
03MAY	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
07MAY-	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10MAY	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
14MAY-	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
17MAY	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	5	10	116
21MAY-	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24MAY	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	5	109
29MAY-	DENSITY	NS	0.00	0.00	0.00	0.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02
02JUN	SE		0.00	0.00	0.00	0.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.20
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
04JUN-	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
07JUN	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
11JUN-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
14JUN	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
18JUN-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
21JUN	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
25JUN-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
28JUN	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
02JUL-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
06JUL	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	6	11	14	11	13	9	13	8	10	7	6	6	6	120
16JUL-	DENSITY	16.06	0.00	1.13	6.42	22.66	0.00	0.00	2.36	NS	NS	NS	NS	NS	6.08
19JUL	SE	16.06	0.00	1.13	5.20	12.12	0.00	0.00	1.37						20.85
	NO. TOWS	7	10	11	12	10	6	10	6						72
30JUL-	DENSITY	0.00	1.95	22.59	72.09	18.00	60.51	95.62	11.61	NS	NS	NS	NS	NS	35.29
02AUG	SE	0.00	0.85	19.58	19.63	9.03	26.89	63.45	4.82						74.99
	NO. TOWS	7	11	11	12	10	6	10	6						73
14AUG-	DENSITY	53.95	171.07	1048.65	241.95	70.05	30.54	166.31	27.60	NS	NS	NS	NS	NS	226.27
16AUG	SE	35.23	45.70	346.56	66.90	23.18	7.43	26.08	11.53						359.60
	NO. TOWS	7	11	11	12	10	5	9	6						71

Table C-98 Regional Standing Crop (In Thousands) of Bay Anchovy Young of Year in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1990

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
19APR-	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	0.00	NS	0.00	0.00	0.00
23APR	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00	0.00	0.00
	NO. TOWS		6	8	8	4	5	6	3		7		11	24	82
23APR-	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
26APR	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		10	12	13	10	6	10	6	7	7	8	9	9	107
30APR-	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
03MAY	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
07MAY-	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10MAY	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
14MAY-	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
17MAY	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	5	10	116
21MAY-	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24MAY	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	5	109
29MAY-	St. Crop	NS	0.00	0.00	0.00	42.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	42.12
02JUN	SE		0.00	0.00	0.00	42.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	42.12
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
04JUN-	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
07JUN	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
11JUN-	St. Crop	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
14JUN	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
18JUN-	St. Crop	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
21JUN	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
25JUN-	St. Crop	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
28JUN	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
02JUL-	St. Crop	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
06JUL	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	6	11	14	11	13	9	13	8	10	7	6	6	6	120
16JUL-	St. Crop	3355.95	0.00	363.31	948.57	4719.87	0.00	0.00	703.19	NS	NS	NS	NS	NS	10090.89
19JUL	SE	3355.95	0.00	363.31	768.33	2524.74	0.00	0.00	407.65						4304.10
	NO. TOWS	7	10	11	12	10	6	10	6						72
30JUL-	St. Crop	0.00	446.57	7268.80	10650.44	3749.30	12552.57	13366.44	3460.32	NS	NS	NS	NS	NS	51494.44
02AUG	SE	0.00	195.46	6301.37	2900.29	1880.94	5578.83	8869.90	1436.30						12788.92
	NO. TOWS	7	11	11	12	10	6	10	6						73
14AUG-	St. Crop	11276.64	39247.64	337468.09	35745.61	14593.60	6335.84	23249.08	8228.46	NS	NS	NS	NS	NS	476144.96
16AUG	SE	7362.68	10485.65	111526.19	9882.91	4829.96	1541.75	3645.40	3438.72						112919.17
	NO. TOWS	7	11	11	12	10	5	9	6						71

Table C-99 Regional Density (No./1,000m3) of Bay Anchovy Young of Year in Hudson River Estuary Determined From Fall Juvenile Survey, 1990

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions COMBINED
09JUL-14JUL	DENSITY	0.00	0.00	0.03	0.00	1.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09
	SE	0.00	0.00	0.03	0.00	1.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.01
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	12	209
23JUL-27JUL	DENSITY	0.00	0.04	9.60	0.91	4.00	0.60	0.00	0.00	0.00	0.00	0.00	0.36	1.29
	SE	0.00	0.03	9.54	0.91	2.19	0.60	0.00	0.00	0.00	0.00	0.00	0.36	9.85
	NO. TOWS	17	46	27	14	8	11	7	10	15	18	21	13	207
06AUG-10AUG	DENSITY	13.97	126.06	246.73	13.21	185.85	142.44	0.00	0.00	4.53	2.03	1.14	0.31	61.36
	SE	13.95	40.00	133.46	7.33	175.88	75.47	0.00	0.00	1.91	2.03	0.36	0.31	237.27
	NO. TOWS	16	46	27	14	8	13	8	10	15	18	21	13	209
20AUG-24AUG	DENSITY	32.98	181.66	315.07	30.56	157.35	264.52	40.61	22.29	24.92	0.00	0.00	0.32	89.19
	SE	11.16	78.18	163.12	13.91	100.60	219.13	26.68	16.69	15.01	0.00	0.00	0.32	303.96
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
04SEP-07SEP	DENSITY	70.90	92.76	264.47	34.48	248.96	71.37	1.52	10.31	38.43	5.37	5.80	0.00	70.36
	SE	32.95	20.16	120.40	8.44	114.11	63.80	0.74	6.20	14.66	1.61	3.17	0.00	182.81
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
17SEP-20SEP	DENSITY	141.49	76.76	79.26	50.14	104.09	203.18	11.69	44.70	29.02	3.62	3.88	0.58	62.37
	SE	49.46	8.10	49.14	16.07	24.78	113.88	4.67	15.48	9.74	1.94	3.88	0.58	138.36
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
01OCT-06OCT	DENSITY	50.80	118.33	26.72	48.32	190.29	80.19	31.87	10.04	0.26	0.00	0.00	0.00	46.40
	SE	20.39	18.70	15.96	48.11	76.58	38.89	20.81	7.70	0.26	0.00	0.00	0.00	105.85
	NO. TOWS	18	46	27	14	8	13	8	10	15	18	21	13	211
15OCT-17OCT	DENSITY	157.81	203.45	224.48	123.43	39.11	60.53	5.58	11.06	2.46	0.00	0.00	0.00	68.99
	SE	54.56	55.46	26.33	68.38	35.89	42.76	5.49	7.13	1.71	0.00	0.00	0.00	120.92
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210

Table C-100 Regional Standing Crops (in Thousands) of Bay Anchovy Young of Year in Hudson River Estuary Determined From Fall Juvenile Survey, 1990

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions COMBINED
09JUL-14JUL	St. Crop	0	0	4	0	210	0	0	0	0	0	0	0	213
	SE	0	0	4	0	210	0	0	0	0	0	0	0	210
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	12	209
23JUL-27JUL	St. Crop	0	14	1418	189	830	84	0	0	0	0	0	25	2560
	SE	0	10	1409	189	454	84	0	0	0	0	0	25	1495
	NO. TOWS	17	46	27	14	8	11	7	10	15	18	21	13	207
06AUG-10AUG	St. Crop	3206	40567	36451	2753	38557	19912	0	0	641	359	183	22	142650
	SE	3201	12873	19716	1528	36488	10550	0	0	271	359	58	22	44832
	NO. TOWS	16	46	27	14	8	13	8	10	15	18	21	13	209
20AUG-24AUG	St. Crop	7566	58460	46547	6366	32643	36977	12106	3688	3525	0	0	23	207901
	SE	2561	25160	24098	2897	20871	30632	7954	2763	2123	0	0	23	51750
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
04SEP-07SEP	St. Crop	16267	29851	39071	7182	51648	9977	453	1706	5437	947	932	0	163470
	SE	7560	6488	17788	1759	23672	8919	220	1026	2074	284	509	0	32625
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
17SEP-20SEP	St. Crop	32461	24702	11710	10446	21594	28403	3486	7397	4105	638	624	41	145607
	SE	11348	2608	7259	3347	5141	15919	1393	2561	1379	343	624	41	22141
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
01OCT-06OCT	St. Crop	11654	38080	3947	10067	39476	11209	9502	1661	37	0	0	0	125633
	SE	4678	6017	2359	10022	15888	5436	6205	1274	37	0	0	0	22049
	NO. TOWS	18	46	27	14	8	13	8	10	15	18	21	13	211
15OCT-17OCT	St. Crop	36205	65472	33165	25716	8113	8462	1663	1831	348	0	0	0	180975
	SE	12518	17847	3890	14246	7445	5977	1636	1180	242	0	0	0	28082
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210

Table C-101 Regional Catch-Per-Unit-Effort (CPUE) of Bay Anchovy Young of Year in Hudson River Estuary Determined From Beach Seine Survey, 1990

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions COMBINED
18JUN-20JUN	CPUE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
02JUL-03JUL	CPUE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	18	13	100
17JUL-19JUL	CPUE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
31JUL-03AUG	CPUE	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	<0.005
	SE	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04
	NO. TOWS	5	23	15	5	5	6	5	5	5	9	10	7	100
14AUG-17AUG	CPUE	1.40	2.38	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.31
	SE	1.17	1.27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.73
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
27AUG-29AUG	CPUE	0.00	0.46	1.43	9.40	18.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.44
	SE	0.00	0.29	0.92	4.63	16.78	0.00	0.00	0.00	0.00	0.00	0.00	0.00	17.43
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
10SEP-12SEP	CPUE	3.80	2.21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.50
	SE	2.82	0.99	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.99
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
24SEP-26SEP	CPUE	23.00	8.71	1.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.73
	SE	23.00	7.08	0.93	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24.08
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
08OCT-10OCT	CPUE	1.60	3.33	0.36	1.40	0.00	2.33	0.00	0.00	0.00	0.00	0.00	0.00	0.75
	SE	0.68	2.25	0.36	1.40	0.00	2.33	0.00	0.00	0.00	0.00	0.00	0.00	3.61
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
22OCT-24OCT	CPUE	56.80	34.92	0.00	0.00	0.00	0.00	0.00	0.00	0.20	0.00	0.00	0.00	7.66
	SE	42.61	19.74	0.00	0.00	0.00	0.00	0.00	0.00	0.20	0.00	0.00	0.00	46.97
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100

Table C-102 Regional Standing Crops (in Thousands) of Bay Anchovy Young of Year in Hudson River Estuary Determined From Beach Seine Survey, 1990

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions COMBINED
18JUN-20JUN	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
	SE	0	0	0	0	0	0	0	0	0	0	0	0	0
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
02JUL-03JUL	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
	SE	0	0	0	0	0	0	0	0	0	0	0	0	0
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	18	13	100
17JUL-19JUL	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
	SE	0	0	0	0	0	0	0	0	0	0	0	0	0
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
31JUL-03AUG	St. Crop	0	2	0	0	0	0	0	0	0	0	0	0	2
	SE	0	2	0	0	0	0	0	0	0	0	0	0	2
	NO. TOWS	5	23	15	5	5	6	5	5	5	9	10	7	100
14AUG-17AUG	St. Crop	11	108	0	0	0	0	0	0	0	0	0	0	118
	SE	9	58	0	0	0	0	0	0	0	0	0	0	58
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
27AUG-29AUG	St. Crop	0	21	38	87	47	0	0	0	0	0	0	0	193
	SE	0	13	25	43	44	0	0	0	0	0	0	0	68
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
10SEP-12SEP	St. Crop	29	100	0	0	0	0	0	0	0	0	0	0	129
	SE	21	45	0	0	0	0	0	0	0	0	0	0	50
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
24SEP-26SEP	St. Crop	173	396	29	0	0	0	0	0	0	0	0	0	598
	SE	173	322	25	0	0	0	0	0	0	0	0	0	366
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
08OCT-10OCT	St. Crop	12	151	10	13	0	25	0	0	0	0	0	0	211
	SE	5	102	10	13	0	25	0	0	0	0	0	0	107
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
22OCT-24OCT	St. Crop	428	1586	0	0	0	0	0	0	2	0	0	0	2016
	SE	321	897	0	0	0	0	0	0	2	0	0	0	953
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100

Table C-103 Regional Density (No./1,000m3) of Bay Anchovy Yearling and Older in Hudson River Estuary Determined From Fall Juvenile Survey, 1990

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions COMBINED
09JUL-14JUL	DENSITY	42.21	58.65	10.82	5.84	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.79
	SE	15.59	22.19	5.67	4.80	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	28.11
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	12	209
23JUL-27JUL	DENSITY	7.08	11.37	3.28	4.19	5.59	0.48	0.00	0.00	0.00	0.00	0.00	0.00	2.67
	SE	2.89	5.96	1.88	2.02	1.42	0.22	0.00	0.00	0.00	0.00	0.00	0.00	7.32
	NO. TOWS	17	46	27	14	8	11	7	10	15	18	21	13	207
06AUG-10AUG	DENSITY	1.59	4.57	3.82	0.57	3.91	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.21
	SE	0.65	1.75	2.22	0.24	2.26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.68
	NO. TOWS	16	46	27	14	8	13	8	10	15	18	21	13	209
20AUG-24AUG	DENSITY	6.81	5.77	4.80	0.80	0.91	11.76	1.04	0.00	0.00	0.00	0.00	0.00	2.66
	SE	4.97	1.86	1.91	0.74	0.91	9.50	0.99	0.00	0.00	0.00	0.00	0.00	11.15
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
04SEP-07SEP	DENSITY	1.95	2.32	1.41	12.44	12.87	0.01	1.53	0.00	0.00	0.00	0.00	0.00	2.71
	SE	1.11	0.85	1.06	1.19	5.44	0.01	1.53	0.00	0.00	0.00	0.00	0.00	6.03
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
17SEP-20SEP	DENSITY	2.48	1.38	0.12	3.31	9.28	0.00	0.00	1.10	0.00	0.00	0.00	0.00	1.47
	SE	0.95	0.72	0.05	1.90	0.31	0.00	0.00	0.64	0.00	0.00	0.00	0.00	2.35
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
01OCT-06OCT	DENSITY	0.76	0.99	1.96	0.78	0.96	0.80	1.05	1.80	0.00	0.00	0.00	0.00	0.76
	SE	0.44	0.34	1.83	0.74	0.79	0.73	1.05	1.80	0.00	0.00	0.00	0.00	3.11
	NO. TOWS	18	46	27	14	8	13	8	10	15	18	21	13	211
15OCT-17OCT	DENSITY	2.17	1.07	1.80	1.00	1.87	1.45	0.00	0.00	0.00	0.00	0.00	0.00	0.78
	SE	1.19	0.47	0.79	0.83	1.84	0.69	0.00	0.00	0.00	0.00	0.00	0.00	2.61
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210

Table C-104 Regional Standing Crops (in Thousands) of Bay Anchovy Yearling and Older in Hudson River Estuary Determined From Fall Juvenile Survey, 1990

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions COMBINED
09JUL-14JUL	St. Crop	9685	18874	1599	1217	0	0	0	0	0	0	0	0	31375
	SE	3576	7140	838	1001	0	0	0	0	0	0	0	0	8091
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	12	209
23JUL-27JUL	St. Crop	1625	3660	485	873	1160	67	0	0	0	0	0	0	7871
	SE	662	1919	278	422	295	31	0	0	0	0	0	0	2113
	NO. TOWS	17	46	27	14	8	11	7	10	15	18	21	13	207
06AUG-10AUG	St. Crop	365	1470	565	119	811	0	0	0	0	0	0	0	3330
	SE	148	562	329	51	469	0	0	0	0	0	0	0	817
	NO. TOWS	16	46	27	14	8	13	8	10	15	18	21	13	209
20AUG-24AUG	St. Crop	1562	1858	709	167	190	1644	310	0	0	0	0	0	6442
	SE	1140	598	282	153	190	1327	294	0	0	0	0	0	1910
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
04SEP-07SEP	St. Crop	448	745	208	2592	2669	2	455	0	0	0	0	0	7119
	SE	255	274	156	247	1128	2	455	0	0	0	0	0	1306
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
17SEP-20SEP	St. Crop	568	444	18	690	1926	0	0	182	0	0	0	0	3829
	SE	218	232	8	396	65	0	0	105	0	0	0	0	523
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
01OCT-06OCT	St. Crop	174	320	290	162	199	112	312	299	0	0	0	0	1868
	SE	102	108	270	154	165	101	312	299	0	0	0	0	585
	NO. TOWS	18	46	27	14	8	13	8	10	15	18	21	13	211
15OCT-17OCT	St. Crop	498	343	266	208	387	202	0	0	0	0	0	0	1905
	SE	274	152	116	172	381	97	0	0	0	0	0	0	544
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210

Table C-105 Regional Catch-Per-Unit-Effort (CPUE) of Bay Anchovy Yearling and Older in Hudson River Estuary Determined From Beach Seine Survey, 1990

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions COMBINED
18JUN-	CPUE	222.67	9.91	36.14	19.67	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24.03
20JUN	SE	103.67	5.44	32.04	19.17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	110.32
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
02JUL-	CPUE	340.67	6.91	0.29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	28.99
03JUL	SE	318.20	2.09	0.29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	318.21
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	18	13	100
17JUL-	CPUE	1.00	1.82	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.23
19JUL	SE	0.58	0.72	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.93
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
31JUL-	CPUE	0.00	0.13	0.07	0.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03
03AUG	SE	0.00	0.10	0.07	0.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.23
	NO. TOWS	5	23	15	5	5	6	5	5	5	9	10	7	100
14AUG-	CPUE	0.00	0.08	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
17AUG	SE	0.00	0.06	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
27AUG-	CPUE	0.00	0.00	0.14	0.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03
29AUG	SE	0.00	0.00	0.14	0.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.25
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
10SEP-	CPUE	0.20	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02
12SEP	SE	0.20	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.20
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
24SEP-	CPUE	0.40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03
26SEP	SE	0.40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.40
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
08OCT-	CPUE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10OCT	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
22OCT-	CPUE	0.00	1.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09
24OCT	SE	0.00	0.87	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.87
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100

Table C-106 Regional Standing Crops (in Thousands) of Bay Anchovy Yearling and Older in Hudson River Estuary Determined From Beach Seine Survey, 1990

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions COMBINED
18JUN-20JUN	St. Crop	1677	450	972	181	0	0	0	0	0	0	0	0	3280
	SE	781	247	862	177	0	0	0	0	0	0	0	0	1202
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
02JUL-03JUL	St. Crop	2566	314	8	0	0	0	0	0	0	0	0	0	2887
	SE	2396	95	8	0	0	0	0	0	0	0	0	0	2398
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	18	13	100
17JUL-19JUL	St. Crop	8	83	0	0	0	0	0	0	0	0	0	0	90
	SE	4	33	0	0	0	0	0	0	0	0	0	0	33
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
31JUL-03AUG	St. Crop	0	6	2	2	0	0	0	0	0	0	0	0	10
	SE	0	4	2	2	0	0	0	0	0	0	0	0	5
	NO. TOWS	5	23	15	5	5	6	5	5	5	9	10	7	100
14AUG-17AUG	St. Crop	0	4	2	0	0	0	0	0	0	0	0	0	6
	SE	0	3	2	0	0	0	0	0	0	0	0	0	3
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
27AUG-29AUG	St. Crop	0	0	4	2	0	0	0	0	0	0	0	0	6
	SE	0	0	4	2	0	0	0	0	0	0	0	0	4
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
10SEP-12SEP	St. Crop	2	2	0	0	0	0	0	0	0	0	0	0	3
	SE	2	2	0	0	0	0	0	0	0	0	0	0	2
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
24SEP-26SEP	St. Crop	3	0	0	0	0	0	0	0	0	0	0	0	3
	SE	3	0	0	0	0	0	0	0	0	0	0	0	3
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
08OCT-10OCT	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
	SE	0	0	0	0	0	0	0	0	0	0	0	0	0
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
22OCT-24OCT	St. Crop	0	49	0	0	0	0	0	0	0	0	0	0	49
	SE	0	40	0	0	0	0	0	0	0	0	0	0	40
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100

Table C-107 Regional Density (No./1,000m3) of Weakfish Young of Year
in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1990

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
19APR-	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	0.00	NS	0.00	0.00	0.00
23APR	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00	0.00	0.00
	NO. TOWS		6	8	8	4	5	6	3		7		11	24	82
23APR-	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
26APR	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		10	12	13	10	6	10	6	7	7	8	9	9	107
30APR-	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
03MAY	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
07MAY-	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10MAY	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
14MAY-	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
17MAY	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	5	10	116
21MAY-	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24MAY	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	5	109
29MAY-	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
02JUN	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
04JUN-	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
07JUN	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
11JUN-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
14JUN	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
18JUN-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
21JUN	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
25JUN-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
28JUN	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
02JUL-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
06JUL	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	6	11	14	11	13	9	13	8	10	7	6	6	6	120
16JUL-	DENSITY	0.00	0.00	0.00	25.67	9.11	0.82	0.00	0.00	NS	NS	NS	NS	NS	4.45
19JUL	SE	0.00	0.00	0.00	16.30	7.80	0.82	0.00	0.00						18.09
	NO. TOWS	7	10	11	12	10	6	10	6						72
30JUL-	DENSITY	0.00	0.16	10.09	11.80	0.60	1.34	0.76	0.00	NS	NS	NS	NS	NS	3.10
02AUG	SE	0.00	0.16	10.09	11.36	0.60	1.34	0.76	0.00						15.28
	NO. TOWS	7	11	11	12	10	6	10	6						73
14AUG-	DENSITY	0.00	5.85	10.31	3.32	1.28	0.00	0.00	0.00	NS	NS	NS	NS	NS	2.59
16AUG	SE	0.00	4.68	9.73	1.85	0.97	0.00	0.00	0.00						10.99
	NO. TOWS	7	11	11	12	10	5	9	6						71

Table C-108 Regional Standing Crop (In Thousands) of Weakfish Young of Year
in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1990

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
19APR-23APR	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	0.00	NS	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00	0.00	0.00
	NO. TOWS		6	8	8	4	5	6	3		7		11	24	82
23APR-26APR	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		10	12	13	10	6	10	6	7	7	8	9	9	107
30APR-03MAY	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
07MAY-10MAY	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
14MAY-17MAY	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	5	10	116
21MAY-24MAY	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	5	109
29MAY-02JUN	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
04JUN-07JUN	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
11JUN-14JUN	St. Crop	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
18JUN-21JUN	St. Crop	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
25JUN-28JUN	St. Crop	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
02JUL-06JUL	St. Crop	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	6	11	14	11	13	9	13	8	10	7	6	6	6	120
16JUL-19JUL	St. Crop	0.00	0.00	0.00	3792.84	1898.42	169.54	0.00	0.00	NS	NS	NS	NS	NS	5860.80
	SE	0.00	0.00	0.00	2407.86	1624.54	169.54	0.00	0.00						2909.58
	NO. TOWS	7	10	11	12	10	6	10	6						72
30JUL-02AUG	St. Crop	0.00	37.39	3247.10	1743.52	125.16	278.16	106.85	0.00	NS	NS	NS	NS	NS	5538.19
	SE	0.00	37.39	3247.10	1677.84	125.16	278.16	106.85	0.00						3669.42
	NO. TOWS	7	11	11	12	10	6	10	6						73
14AUG-16AUG	St. Crop	0.00	1342.56	3316.67	489.83	265.63	0.00	0.00	0.00	NS	NS	NS	NS	NS	5414.69
	SE	0.00	1073.19	3130.03	273.48	201.83	0.00	0.00	0.00						3326.31
	NO. TOWS	7	11	11	12	10	5	9	6						71

Table C-109 Regional Density (No./1,000m3) of Weakfish Young of Year in Hudson River Estuary Determined From Fall Juvenile Survey, 1990

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions COMBINED
09JUL-14JUL	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	12	209
23JUL-27JUL	DENSITY	1.07	0.21	1.76	1.69	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.39
	SE	0.70	0.08	1.32	0.83	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.71
	NO. TOWS	17	46	27	14	8	11	7	10	15	18	21	13	207
06AUG-10AUG	DENSITY	0.51	1.10	1.57	1.17	0.42	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.40
	SE	0.30	0.36	0.69	0.41	0.18	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.95
	NO. TOWS	16	46	27	14	8	13	8	10	15	18	21	13	209
20AUG-24AUG	DENSITY	4.34	2.82	3.40	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.88
	SE	1.26	0.87	1.34	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.04
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
04SEP-07SEP	DENSITY	0.57	1.08	0.27	0.95	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.24
	SE	0.11	0.37	0.10	0.82	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.91
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
17SEP-20SEP	DENSITY	0.23	0.48	0.20	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.08
	SE	0.16	0.11	0.17	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.26
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
01OCT-06OCT	DENSITY	0.97	0.01	0.24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.10
	SE	0.56	0.01	0.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.57
	NO. TOWS	18	46	27	14	8	13	8	10	15	18	21	13	211
15OCT-17OCT	DENSITY	0.11	0.16	0.22	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04
	SE	0.06	0.08	0.12	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.16
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210

Table C-110 Regional Standing Crops (in Thousands) of Weakfish Young of Year in Hudson River Estuary Determined From Fall Juvenile Survey, 1990

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions COMBINED
09JUL-14JUL	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
	SE	0	0	0	0	0	0	0	0	0	0	0	0	0
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	12	209
23JUL-27JUL	St. Crop	244	67	260	351	0	0	0	0	0	0	0	0	922
	SE	160	26	195	173	0	0	0	0	0	0	0	0	307
	NO. TOWS	17	46	27	14	8	11	7	10	15	18	21	13	207
06AUG-10AUG	St. Crop	116	355	231	243	88	8	0	0	0	0	0	0	1041
	SE	69	114	102	84	37	8	0	0	0	0	0	0	192
	NO. TOWS	16	46	27	14	8	13	8	10	15	18	21	13	209
20AUG-24AUG	St. Crop	995	907	502	11	0	0	0	0	0	0	0	0	2414
	SE	290	281	199	8	0	0	0	0	0	0	0	0	450
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
04SEP-07SEP	St. Crop	130	346	40	198	0	0	0	0	0	0	0	0	714
	SE	26	120	14	170	0	0	0	0	0	0	0	0	210
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
17SEP-20SEP	St. Crop	53	153	30	14	0	0	0	0	0	0	0	0	250
	SE	36	34	25	9	0	0	0	0	0	0	0	0	56
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
01OCT-06OCT	St. Crop	222	4	36	0	0	0	0	0	0	0	0	0	262
	SE	128	4	18	0	0	0	0	0	0	0	0	0	130
	NO. TOWS	18	46	27	14	8	13	8	10	15	18	21	13	211
15OCT-17OCT	St. Crop	25	50	32	6	0	0	0	0	0	0	0	0	114
	SE	13	24	18	6	0	0	0	0	0	0	0	0	34
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210

Table C-111 Regional Catch-Per-Unit-Effort (CPUE) of Weakfish Young of Year in Hudson River Estuary Determined From Beach Seine Survey, 1990

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions COMBINED
18JUN-	CPUE	0.00	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
20JUN	SE	0.00	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
02JUL-	CPUE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
03JUL	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	18	13	100
17JUL-	CPUE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19JUL	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
31JUL-	CPUE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
03AUG	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	5	23	15	5	5	6	5	5	5	9	10	7	100
14AUG-	CPUE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
17AUG	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
27AUG-	CPUE	0.00	0.00	1.14	0.00	0.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.11
29AUG	SE	0.00	0.00	1.14	0.00	0.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.16
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
10SEP-	CPUE	0.20	0.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04
12SEP	SE	0.20	0.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.25
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
24SEP-	CPUE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
26SEP	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
08OCT-	CPUE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10OCT	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
22OCT-	CPUE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24OCT	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100

Table C-112 Regional Standing Crops (in Thousands) of Weakfish Young of Year in Hudson River Estuary Determined From Beach Seine Survey, 1990

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions COMBINED
18JUN-20JUN	St. Crop	0	4	0	0	0	0	0	0	0	0	0	0	4
	SE	0	4	0	0	0	0	0	0	0	0	0	0	4
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
02JUL-03JUL	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
	SE	0	0	0	0	0	0	0	0	0	0	0	0	0
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	18	13	100
17JUL-19JUL	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
	SE	0	0	0	0	0	0	0	0	0	0	0	0	0
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
31JUL-03AUG	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
	SE	0	0	0	0	0	0	0	0	0	0	0	0	0
	NO. TOWS	5	23	15	5	5	6	5	5	5	9	10	7	100
14AUG-17AUG	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
	SE	0	0	0	0	0	0	0	0	0	0	0	0	0
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
27AUG-29AUG	St. Crop	0	0	31	0	1	0	0	0	0	0	0	0	31
	SE	0	0	31	0	1	0	0	0	0	0	0	0	31
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
10SEP-12SEP	St. Crop	2	15	0	0	0	0	0	0	0	0	0	0	17
	SE	2	7	0	0	0	0	0	0	0	0	0	0	7
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
24SEP-26SEP	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
	SE	0	0	0	0	0	0	0	0	0	0	0	0	0
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
08OCT-10OCT	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
	SE	0	0	0	0	0	0	0	0	0	0	0	0	0
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
22OCT-24OCT	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
	SE	0	0	0	0	0	0	0	0	0	0	0	0	0
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100

Table C-113 Regional Density (No./1,000m3) of Weakfish Yearling and Older in Hudson River Estuary Determined From Fall Juvenile Survey, 1990

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions COMBINED
09JUL-14JUL	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	12	209
23JUL-27JUL	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	17	46	27	14	8	11	7	10	15	18	21	13	207
06AUG-10AUG	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	16	46	27	14	8	13	8	10	15	18	21	13	209
20AUG-24AUG	DENSITY	3.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.26
	SE	1.30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.30
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
04SEP-07SEP	DENSITY	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	<0.005
	SE	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
17SEP-20SEP	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
01OCT-06OCT	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	18	46	27	14	8	13	8	10	15	18	21	13	211
15OCT-17OCT	DENSITY	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	<0.005
	SE	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210

Table C-114 Regional Standing Crops (in Thousands) of Weakfish Yearling and Older in Hudson River Estuary Determined From Fall Juvenile Survey, 1990

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions COMBINED
09JUL-14JUL	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
	SE	0	0	0	0	0	0	0	0	0	0	0	0	0
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	12	209
23JUL-27JUL	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
	SE	0	0	0	0	0	0	0	0	0	0	0	0	0
	NO. TOWS	17	46	27	14	8	11	7	10	15	18	21	13	207
06AUG-10AUG	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
	SE	0	0	0	0	0	0	0	0	0	0	0	0	0
	NO. TOWS	16	46	27	14	8	13	8	10	15	18	21	13	209
20AUG-24AUG	St. Crop	715	0	0	0	0	0	0	0	0	0	0	0	715
	SE	299	0	0	0	0	0	0	0	0	0	0	0	299
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
04SEP-07SEP	St. Crop	4	0	0	0	0	0	0	0	0	0	0	0	4
	SE	4	0	0	0	0	0	0	0	0	0	0	0	4
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
17SEP-20SEP	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
	SE	0	0	0	0	0	0	0	0	0	0	0	0	0
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
01OCT-06OCT	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
	SE	0	0	0	0	0	0	0	0	0	0	0	0	0
	NO. TOWS	18	46	27	14	8	13	8	10	15	18	21	13	211
15OCT-17OCT	St. Crop	4	0	0	0	0	0	0	0	0	0	0	0	4
	SE	4	0	0	0	0	0	0	0	0	0	0	0	4
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210

Table C-115 Regional Catch-Per-Unit-Effort (CPUE) of Weakfish Yearling and Older in Hudson River Estuary Determined From Beach Seine Survey, 1990

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions COMBINED
18JUN-20JUN	CPUE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
02JUL-03JUL	CPUE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	18	13	100
17JUL-19JUL	CPUE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
31JUL-03AUG	CPUE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	5	23	15	5	5	6	5	5	5	9	10	7	100
14AUG-17AUG	CPUE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
27AUG-29AUG	CPUE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
10SEP-12SEP	CPUE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
24SEP-26SEP	CPUE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
08OCT-10OCT	CPUE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
22OCT-24OCT	CPUE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100

Table C-116 Regional Standing Crops (in Thousands) of Weakfish Yearling and Older in Hudson River Estuary Determined From Beach Seine Survey, 1990

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions COMBINED
18JUN-20JUN	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
	SE	0	0	0	0	0	0	0	0	0	0	0	0	0
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
02JUL-03JUL	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
	SE	0	0	0	0	0	0	0	0	0	0	0	0	0
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	18	13	100
17JUL-19JUL	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
	SE	0	0	0	0	0	0	0	0	0	0	0	0	0
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
31JUL-03AUG	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
	SE	0	0	0	0	0	0	0	0	0	0	0	0	0
	NO. TOWS	5	23	15	5	5	6	5	5	5	9	10	7	100
14AUG-17AUG	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
	SE	0	0	0	0	0	0	0	0	0	0	0	0	0
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
27AUG-29AUG	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
	SE	0	0	0	0	0	0	0	0	0	0	0	0	0
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
10SEP-12SEP	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
	SE	0	0	0	0	0	0	0	0	0	0	0	0	0
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
24SEP-26SEP	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
	SE	0	0	0	0	0	0	0	0	0	0	0	0	0
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
08OCT-10OCT	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
	SE	0	0	0	0	0	0	0	0	0	0	0	0	0
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
22OCT-24OCT	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
	SE	0	0	0	0	0	0	0	0	0	0	0	0	0
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100

Table C-117 Regional Density (No./1,000m3) of White Catfish Young of Year in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1990

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
19APR-23APR	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	0.00	NS	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00	0.00	0.00
	NO. TOWS		6	8	8	4	5	6	3		7		11	24	82
23APR-26APR	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		10	12	13	10	6	10	6	7	7	8	9	9	107
30APR-03MAY	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
07MAY-10MAY	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
14MAY-17MAY	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	5	10	116
21MAY-24MAY	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	5	109
29MAY-02JUN	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
04JUN-07JUN	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
11JUN-14JUN	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
18JUN-21JUN	DENSITY	0.00	0.00	0.00	0.00	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
	SE	0.00	0.00	0.00	0.00	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.11
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
25JUN-28JUN	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.13	0.00	0.00	0.00	0.00	0.00	0.00	0.01
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.13	0.00	0.00	0.00	0.00	0.00	0.00	0.13
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
02JUL-06JUL	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	6	11	14	11	13	9	13	8	10	7	6	6	6	120
16JUL-19JUL	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						0.00
	NO. TOWS	7	10	11	12	10	6	10	6						72
30JUL-02AUG	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						0.00
	NO. TOWS	7	11	11	12	10	6	10	6						73
14AUG-16AUG	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						0.00
	NO. TOWS	7	11	11	12	10	5	9	6						71

Table C-118 Regional Standing Crop (In Thousands) of White Catfish Young of Year in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1990

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
19APR-23APR	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	0.00	NS	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00	0.00	0.00
	NO. TOWS		6	8	8	4	5	6	3		7		11	24	82
23APR-26APR	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		10	12	13	10	6	10	6	7	7	8	9	9	107
30APR-03MAY	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
07MAY-10MAY	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
14MAY-17MAY	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	5	10	116
21MAY-24MAY	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	5	109
29MAY-02JUN	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
04JUN-07JUN	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
11JUN-14JUN	St. Crop	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
18JUN-21JUN	St. Crop	0.00	0.00	0.00	0.00	22.58	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	22.58
	SE	0.00	0.00	0.00	0.00	22.58	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	22.58
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
25JUN-28JUN	St. Crop	0.00	0.00	0.00	0.00	0.00	0.00	18.79	0.00	0.00	0.00	0.00	0.00	0.00	18.79
	SE	0.00	0.00	0.00	0.00	0.00	0.00	18.79	0.00	0.00	0.00	0.00	0.00	0.00	18.79
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
02JUL-06JUL	St. Crop	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	6	11	14	11	13	9	13	8	10	7	6	6	6	120
16JUL-19JUL	St. Crop	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						0.00
	NO. TOWS	7	10	11	12	10	6	10	6						72
30JUL-02AUG	St. Crop	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						0.00
	NO. TOWS	7	11	11	12	10	6	10	6						73
14AUG-16AUG	St. Crop	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						0.00
	NO. TOWS	7	11	11	12	10	5	9	6						71

Table C-119 Regional Density (No./1,000m3) of White Catfish Young of Year in Hudson River Estuary Determined From Fall Juvenile Survey, 1990

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions COMBINED
09JUL-14JUL	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	12	209
23JUL-27JUL	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	17	46	27	14	8	11	7	10	15	18	21	13	207
06AUG-10AUG	DENSITY	0.00	0.00	0.00	0.00	0.00	0.29	0.00	0.04	0.05	0.10	0.04	0.29	0.07
	SE	0.00	0.00	0.00	0.00	0.00	0.22	0.00	0.04	0.05	0.05	0.04	0.29	0.38
	NO. TOWS	16	46	27	14	8	13	8	10	15	18	21	13	209
20AUG-24AUG	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.83	0.12	0.11	0.95	1.83	0.32
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.83	0.06	0.06	0.41	0.61	1.11
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
04SEP-07SEP	DENSITY	0.00	0.00	0.00	0.00	0.00	0.06	0.00	0.00	0.00	0.19	0.47	0.71	0.12
	SE	0.00	0.00	0.00	0.00	0.00	0.06	0.00	0.00	0.00	0.07	0.13	0.41	0.44
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
17SEP-20SEP	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.43	0.05	0.35	0.14	0.08
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.28	0.05	0.29	0.09	0.42
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
01OCT-06OCT	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.24	0.13	0.84	0.10
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.12	0.06	0.54	0.56
	NO. TOWS	18	46	27	14	8	13	8	10	15	18	21	13	211
15OCT-17OCT	DENSITY	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.07	0.00	0.06	0.46	0.15	0.06
	SE	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.04	0.00	0.04	0.25	0.10	0.28
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210

Table C-120 Regional Standing Crops (in Thousands) of White Catfish Young of Year in Hudson River Estuary Determined From Fall Juvenile Survey, 1990

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions COMBINED
09JUL-14JUL	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
	SE	0	0	0	0	0	0	0	0	0	0	0	0	0
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	12	209
23JUL-27JUL	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
	SE	0	0	0	0	0	0	0	0	0	0	0	0	0
	NO. TOWS	17	46	27	14	8	11	7	10	15	18	21	13	207
06AUG-10AUG	St. Crop	0	0	0	0	0	41	0	7	7	18	6	21	100
	SE	0	0	0	0	0	30	0	7	7	10	6	21	40
	NO. TOWS	16	46	27	14	8	13	8	10	15	18	21	13	209
20AUG-24AUG	St. Crop	0	0	0	0	0	0	0	138	16	19	153	130	456
	SE	0	0	0	0	0	0	0	138	8	10	66	43	159
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
04SEP-07SEP	St. Crop	0	0	0	0	0	8	0	0	0	34	75	50	168
	SE	0	0	0	0	0	8	0	0	0	13	21	29	39
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
17SEP-20SEP	St. Crop	0	0	0	0	0	0	0	0	61	9	56	10	136
	SE	0	0	0	0	0	0	0	0	40	9	46	6	62
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
01OCT-06OCT	St. Crop	0	0	0	0	0	0	0	0	5	42	21	60	129
	SE	0	0	0	0	0	0	0	0	5	21	10	39	45
	NO. TOWS	18	46	27	14	8	13	8	10	15	18	21	13	211
15OCT-17OCT	St. Crop	0	0	0	0	0	2	0	12	0	11	74	11	109
	SE	0	0	0	0	0	2	0	7	0	7	41	7	43
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210

Table C-121 Regional Catch-Per-Unit-Effort (CPUE) of White Catfish Young of Year in Hudson River Estuary Determined From Beach Seine Survey, 1990

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions COMBINED
18JUN-20JUN	CPUE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
02JUL-03JUL	CPUE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	18	13	100
17JUL-19JUL	CPUE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
31JUL-03AUG	CPUE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	5	23	15	5	5	6	5	5	5	9	10	7	100
14AUG-17AUG	CPUE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
27AUG-29AUG	CPUE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
10SEP-12SEP	CPUE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
24SEP-26SEP	CPUE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
08OCT-10OCT	CPUE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
22OCT-24OCT	CPUE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100

Table C-122 Regional Standing Crops (in Thousands) of White Catfish Young of Year in Hudson River Estuary Determined From Beach Seine Survey, 1990

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions COMBINED
18JUN-20JUN	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
	SE	0	0	0	0	0	0	0	0	0	0	0	0	0
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
02JUL-03JUL	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
	SE	0	0	0	0	0	0	0	0	0	0	0	0	0
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	18	13	100
17JUL-19JUL	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
	SE	0	0	0	0	0	0	0	0	0	0	0	0	0
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
31JUL-03AUG	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
	SE	0	0	0	0	0	0	0	0	0	0	0	0	0
	NO. TOWS	5	23	15	5	5	6	5	5	5	9	10	7	100
14AUG-17AUG	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
	SE	0	0	0	0	0	0	0	0	0	0	0	0	0
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
27AUG-29AUG	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
	SE	0	0	0	0	0	0	0	0	0	0	0	0	0
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
10SEP-12SEP	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
	SE	0	0	0	0	0	0	0	0	0	0	0	0	0
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
24SEP-26SEP	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
	SE	0	0	0	0	0	0	0	0	0	0	0	0	0
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
08OCT-10OCT	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
	SE	0	0	0	0	0	0	0	0	0	0	0	0	0
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
22OCT-24OCT	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
	SE	0	0	0	0	0	0	0	0	0	0	0	0	0
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100

Table C-123 Regional Density (No./1,000m3) of White Catfish Yearling and Older in Hudson River Estuary Determined From Fall Juvenile Survey, 1990

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions COMBINED
09JUL-14JUL	DENSITY	0.00	0.00	0.00	0.00	0.06	0.00	0.00	0.28	0.24	0.22	0.28	0.00	0.09
	SE	0.00	0.00	0.00	0.00	0.04	0.00	0.00	0.24	0.08	0.15	0.11	0.00	0.32
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	12	209
23JUL-27JUL	DENSITY	0.00	0.00	0.00	0.01	0.03	0.02	0.00	0.00	0.34	0.14	0.07	0.00	0.05
	SE	0.00	0.00	0.00	0.01	0.03	0.02	0.00	0.00	0.20	0.11	0.05	0.00	0.23
	NO. TOWS	17	46	27	14	8	11	7	10	15	18	21	13	207
06AUG-10AUG	DENSITY	0.00	0.17	0.30	0.05	0.00	0.15	0.00	0.00	0.15	0.15	0.15	0.07	0.10
	SE	0.00	0.10	0.11	0.04	0.00	0.09	0.00	0.00	0.08	0.12	0.09	0.07	0.25
	NO. TOWS	16	46	27	14	8	13	8	10	15	18	21	13	209
20AUG-24AUG	DENSITY	0.00	0.08	0.31	0.11	0.00	0.05	0.00	0.00	0.00	0.11	0.25	0.00	0.08
	SE	0.00	0.04	0.11	0.05	0.00	0.02	0.00	0.00	0.00	0.11	0.13	0.00	0.21
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
04SEP-07SEP	DENSITY	0.04	0.09	0.33	0.08	0.00	0.00	0.00	0.03	0.04	0.06	0.06	0.22	0.08
	SE	0.04	0.04	0.15	0.05	0.00	0.00	0.00	0.03	0.04	0.06	0.06	0.22	0.30
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
17SEP-20SEP	DENSITY	0.02	0.02	0.00	0.03	0.00	0.01	0.00	0.00	0.11	0.06	0.19	0.14	0.05
	SE	0.02	0.02	0.00	0.02	0.00	0.01	0.00	0.00	0.06	0.06	0.08	0.09	0.15
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
01OCT-06OCT	DENSITY	0.00	0.06	0.06	0.00	0.00	0.01	0.05	0.03	0.00	0.12	0.00	0.16	0.04
	SE	0.00	0.03	0.03	0.00	0.00	0.01	0.05	0.03	0.00	0.05	0.00	0.16	0.18
	NO. TOWS	18	46	27	14	8	13	8	10	15	18	21	13	211
15OCT-17OCT	DENSITY	0.00	0.15	0.32	0.00	0.00	0.01	0.00	0.00	0.07	0.00	0.09	0.06	0.06
	SE	0.00	0.05	0.10	0.00	0.00	0.01	0.00	0.00	0.07	0.00	0.07	0.06	0.17
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210

Table C-124 Regional Standing Crops (in Thousands) of White Catfish Yearling and Older in Hudson River Estuary Determined From Fall Juvenile Survey, 1990

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions COMBINED
09JUL-14JUL	St. Crop	0	0	0	0	13	0	0	46	33	38	45	0	176
	SE	0	0	0	0	8	0	0	39	11	27	18	0	53
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	12	209
23JUL-27JUL	St. Crop	0	0	0	3	6	3	0	0	48	24	11	0	95
	SE	0	0	0	3	6	3	0	0	28	19	8	0	35
	NO. TOWS	17	46	27	14	8	11	7	10	15	18	21	13	207
06AUG-10AUG	St. Crop	0	55	44	11	0	22	0	0	21	27	25	5	210
	SE	0	32	17	9	0	12	0	0	11	20	14	5	48
	NO. TOWS	16	46	27	14	8	13	8	10	15	18	21	13	209
20AUG-24AUG	St. Crop	0	25	46	23	0	7	0	0	0	19	40	0	161
	SE	0	13	16	10	0	3	0	0	0	19	21	0	37
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
04SEP-07SEP	St. Crop	10	30	48	16	0	0	0	5	6	10	9	16	151
	SE	10	14	22	10	0	0	0	5	6	10	9	16	37
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
17SEP-20SEP	St. Crop	4	5	0	7	0	2	0	0	16	10	31	10	84
	SE	4	5	0	3	0	2	0	0	8	10	13	6	20
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
01OCT-06OCT	St. Crop	0	18	9	0	0	2	13	5	0	21	0	11	79
	SE	0	9	5	0	0	2	13	5	0	9	0	11	23
	NO. TOWS	18	46	27	14	8	13	8	10	15	18	21	13	211
15OCT-17OCT	St. Crop	0	47	48	0	0	2	0	0	10	0	15	5	127
	SE	0	17	15	0	0	2	0	0	10	0	11	5	28
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210

Table C-125 Regional Catch-Per-Unit-Effort (CPUE) of White Catfish Yearling and Older in Hudson River Estuary Determined From Beach Seine Survey, 1990

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions COMBINED
18JUN-20JUN	CPUE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.00	0.00	0.00	0.00	0.02
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.16	0.00	0.00	0.00	0.00	0.16
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
02JUL-03JUL	CPUE	0.00	0.09	0.00	0.00	0.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04
	SE	0.00	0.09	0.00	0.00	0.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.35
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	18	13	100
17JUL-19JUL	CPUE	0.00	0.00	0.00	0.00	0.00	0.00	0.13	0.00	0.13	0.00	0.00	0.00	0.02
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.13	0.00	0.13	0.00	0.00	0.00	0.18
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
31JUL-03AUG	CPUE	0.00	0.13	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02
	SE	0.00	0.10	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.12
	NO. TOWS	5	23	15	5	5	6	5	5	5	9	10	7	100
14AUG-17AUG	CPUE	0.00	0.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
	SE	0.00	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.07
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
27AUG-29AUG	CPUE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
10SEP-12SEP	CPUE	0.00	0.00	0.00	0.00	0.00	0.00	0.20	0.00	0.00	0.00	0.00	0.00	0.02
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.20	0.00	0.00	0.00	0.00	0.00	0.20
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
24SEP-26SEP	CPUE	0.00	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
	SE	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
08OCT-10OCT	CPUE	0.00	0.00	0.00	0.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02
	SE	0.00	0.00	0.00	0.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.20
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
22OCT-24OCT	CPUE	0.00	0.21	0.00	0.00	0.00	0.00	0.00	0.20	0.00	0.00	0.00	0.00	0.03
	SE	0.00	0.13	0.00	0.00	0.00	0.00	0.00	0.20	0.00	0.00	0.00	0.00	0.24
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100

Table C-126 Regional Standing Crops (in Thousands) of White Catfish Yearling and Older in Hudson River Estuary Determined From Beach Seine Survey, 1990

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions COMBINED
18JUN-20JUN	St. Crop	0	0	0	0	0	0	0	<0.005	0	0	0	0	<0.005
	SE	0	0	0	0	0	0	0	<0.005	0	0	0	0	<0.005
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
02JUL-03JUL	St. Crop	0	4	0	0	1	0	0	0	0	0	0	0	5
	SE	0	4	0	0	1	0	0	0	0	0	0	0	4
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	18	13	100
17JUL-19JUL	St. Crop	0	0	0	0	0	0	1	0	1	0	0	0	2
	SE	0	0	0	0	0	0	1	0	1	0	0	0	1
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
31JUL-03AUG	St. Crop	0	6	2	0	0	0	0	0	0	0	0	0	8
	SE	0	4	2	0	0	0	0	0	0	0	0	0	5
	NO. TOWS	5	23	15	5	5	6	5	5	5	9	10	7	100
14AUG-17AUG	St. Crop	0	6	0	0	0	0	0	0	0	0	0	0	6
	SE	0	3	0	0	0	0	0	0	0	0	0	0	3
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
27AUG-29AUG	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
	SE	0	0	0	0	0	0	0	0	0	0	0	0	0
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
10SEP-12SEP	St. Crop	0	0	0	0	0	0	1	0	0	0	0	0	1
	SE	0	0	0	0	0	0	1	0	0	0	0	0	1
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
24SEP-26SEP	St. Crop	0	4	0	0	0	0	0	0	0	0	0	0	4
	SE	0	3	0	0	0	0	0	0	0	0	0	0	3
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
08OCT-10OCT	St. Crop	0	0	0	2	0	0	0	0	0	0	0	0	2
	SE	0	0	0	2	0	0	0	0	0	0	0	0	2
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
22OCT-24OCT	St. Crop	0	9	0	0	0	0	0	<0.005	0	0	0	0	10
	SE	0	6	0	0	0	0	0	<0.005	0	0	0	0	6
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100

Table C-127 Regional Density (No./1,000m3) of Spottail Shiner Young of Year in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1990

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
19APR-23APR	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	0.00	NS	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00	0.00	0.00
	NO. TOWS		6	8	8	4	5	6	3		7		11	24	82
23APR-26APR	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		10	12	13	10	6	10	6	7	7	8	9	9	107
30APR-03MAY	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
07MAY-10MAY	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
14MAY-17MAY	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	5	10	116
21MAY-24MAY	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	5	109
29MAY-02JUN	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
04JUN-07JUN	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
11JUN-14JUN	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
18JUN-21JUN	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
25JUN-28JUN	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
02JUL-06JUL	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	6	11	14	11	13	9	13	8	10	7	6	6	6	120
16JUL-19JUL	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.28	0.00	NS	NS	NS	NS	NS	0.04
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.28	0.00						0.28
	NO. TOWS	7	10	11	12	10	6	10	6						72
30JUL-02AUG	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						0.00
	NO. TOWS	7	11	11	12	10	6	10	6						73
14AUG-16AUG	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						0.00
	NO. TOWS	7	11	11	12	10	5	9	6						71

Table C-128 Regional Standing Crop (In Thousands) of Spottail Shiner Young of Year in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1990

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
19APR-23APR	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	0.00	NS	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00	0.00	0.00
	NO. TOWS		6	8	8	4	5	6	3		7		11	24	82
23APR-26APR	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		10	12	13	10	6	10	6	7	7	8	9	9	107
30APR-03MAY	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
07MAY-10MAY	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
14MAY-17MAY	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	5	10	116
21MAY-24MAY	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	5	109
29MAY-02JUN	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
04JUN-07JUN	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
11JUN-14JUN	St. Crop	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
18JUN-21JUN	St. Crop	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
25JUN-28JUN	St. Crop	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
02JUL-06JUL	St. Crop	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	6	11	14	11	13	9	13	8	10	7	6	6	6	120
16JUL-19JUL	St. Crop	0.00	0.00	0.00	0.00	0.00	0.00	39.23	0.00	NS	NS	NS	NS	NS	39.23
	SE	0.00	0.00	0.00	0.00	0.00	0.00	39.23	0.00						39.23
	NO. TOWS	7	10	11	12	10	6	10	6						72
30JUL-02AUG	St. Crop	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						0.00
	NO. TOWS	7	11	11	12	10	6	10	6						73
14AUG-16AUG	St. Crop	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						0.00
	NO. TOWS	7	11	11	12	10	5	9	6						71

Table C-129 Regional Density (No./1,000m3) of Spottail Shiner Young of Year in Hudson River Estuary Determined From Fall Juvenile Survey, 1990

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions COMBINED
09JUL-14JUL	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.03	0.00	0.01
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.03	0.00	0.05
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	12	209
23JUL-27JUL	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.16	0.01
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.10	0.10
	NO. TOWS	17	46	27	14	8	11	7	10	15	18	21	13	207
06AUG-10AUG	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.10	0.00	0.00	0.00	0.01
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.07	0.00	0.00	0.00	0.07
	NO. TOWS	16	46	27	14	8	13	8	10	15	18	21	13	209
20AUG-24AUG	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.16	0.01
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.16	0.16
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
04SEP-07SEP	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.67	0.06
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.38	0.38
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
17SEP-20SEP	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.07	0.01
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.07	0.07
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
01OCT-06OCT	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.20	0.02
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.13	0.13
	NO. TOWS	18	46	27	14	8	13	8	10	15	18	21	13	211
15OCT-17OCT	DENSITY	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.03	0.00	<0.005
	SE	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.04
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210

Table C-130 Regional Standing Crops (in Thousands) of Spottail Shiner Young of Year in Hudson River Estuary Determined From Fall Juvenile Survey, 1990

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions COMBINED
09JUL-14JUL	St. Crop	0	0	0	0	0	0	0	0	6	0	5	0	11
	SE	0	0	0	0	0	0	0	0	6	0	5	0	8
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	12	209
23JUL-27JUL	St. Crop	0	0	0	0	0	0	0	0	0	0	0	11	11
	SE	0	0	0	0	0	0	0	0	0	0	0	7	7
	NO. TOWS	17	46	27	14	8	11	7	10	15	18	21	13	207
06AUG-10AUG	St. Crop	0	0	0	0	0	0	0	0	15	0	0	0	15
	SE	0	0	0	0	0	0	0	0	10	0	0	0	10
	NO. TOWS	16	46	27	14	8	13	8	10	15	18	21	13	209
20AUG-24AUG	St. Crop	0	0	0	0	0	0	0	0	0	0	0	12	12
	SE	0	0	0	0	0	0	0	0	0	0	0	12	12
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
04SEP-07SEP	St. Crop	0	0	0	0	0	0	0	0	0	0	0	48	48
	SE	0	0	0	0	0	0	0	0	0	0	0	27	27
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
17SEP-20SEP	St. Crop	0	0	0	0	0	0	0	0	0	0	0	5	5
	SE	0	0	0	0	0	0	0	0	0	0	0	5	5
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
01OCT-06OCT	St. Crop	0	0	0	0	0	0	0	0	0	0	0	14	14
	SE	0	0	0	0	0	0	0	0	0	0	0	10	10
	NO. TOWS	18	46	27	14	8	13	8	10	15	18	21	13	211
15OCT-17OCT	St. Crop	0	0	0	0	6	0	0	0	0	0	5	0	11
	SE	0	0	0	0	6	0	0	0	0	0	5	0	8
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210

Table C-131 Regional Catch-Per-Unit-Effort (CPUE) of Spottail Shiner Young of Year in Hudson River Estuary Determined From Beach Seine Survey, 1990

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions COMBINED
18JUN-20JUN	CPUE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
02JUL-03JUL	CPUE	0.00	0.00	0.00	0.67	0.00	0.00	0.00	0.00	0.00	0.00	0.67	1.31	0.22
	SE	0.00	0.00	0.00	0.67	0.00	0.00	0.00	0.00	0.00	0.00	0.31	0.67	1.00
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	18	13	100
17JUL-19JUL	CPUE	0.00	0.18	0.00	0.00	1.33	0.33	2.75	19.13	10.50	3.20	4.79	8.75	4.25
	SE	0.00	0.18	0.00	0.00	1.33	0.33	1.76	6.52	8.25	1.38	2.10	5.04	12.14
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
31JUL-03AUG	CPUE	0.00	0.00	0.27	0.00	6.20	1.00	4.20	14.80	26.60	4.11	16.00	6.14	6.61
	SE	0.00	0.00	0.27	0.00	2.96	0.63	3.72	6.72	26.10	1.76	6.97	4.06	28.59
	NO. TOWS	5	23	15	5	5	6	5	5	5	9	10	7	100
14AUG-17AUG	CPUE	0.00	0.00	0.64	0.00	1.20	2.17	12.20	16.80	4.20	9.89	3.30	8.00	4.87
	SE	0.00	0.00	0.44	0.00	0.80	1.51	9.64	12.66	2.35	4.02	1.30	4.85	17.41
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
27AUG-29AUG	CPUE	0.00	0.17	0.36	5.40	5.00	1.33	8.40	4.80	27.60	1.22	6.00	27.57	7.32
	SE	0.00	0.17	0.36	4.47	2.83	1.33	3.44	1.88	22.09	0.98	2.59	13.85	27.07
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
10SEP-12SEP	CPUE	0.00	0.04	0.50	3.60	9.80	0.00	23.80	29.80	16.40	10.56	5.00	8.71	9.02
	SE	0.00	0.04	0.50	3.60	7.86	0.00	18.29	12.95	11.47	6.22	3.32	6.89	28.39
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
24SEP-26SEP	CPUE	0.00	0.00	0.00	5.00	6.80	1.17	24.00	32.40	6.40	19.22	11.50	25.29	10.98
	SE	0.00	0.00	0.00	5.00	6.30	0.98	17.15	27.22	2.38	12.70	10.19	11.19	38.69
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
08OCT-10OCT	CPUE	0.00	0.00	0.07	0.00	4.20	2.33	3.60	15.60	11.60	12.11	4.20	5.43	4.93
	SE	0.00	0.00	0.07	0.00	2.20	1.61	1.91	12.17	5.35	6.25	2.48	3.73	15.72
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
22OCT-24OCT	CPUE	0.00	0.00	0.00	1.60	6.80	4.50	11.60	9.40	9.40	12.89	1.20	4.29	5.14
	SE	0.00	0.00	0.00	1.17	4.45	3.04	5.42	6.49	7.56	9.74	0.73	2.10	16.09
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100

Table C-132 Regional Standing Crops (in Thousands) of Spottail Shiner Young of Year in Hudson River Estuary Determined From Beach Seine Survey, 1990

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions COMBINED
18JUN-20JUN	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
	SE	0	0	0	0	0	0	0	0	0	0	0	0	0
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
02JUL-03JUL	St. Crop	0	0	0	6	0	0	0	0	0	0	13	18	37
	SE	0	0	0	6	0	0	0	0	0	0	6	9	13
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	18	13	100
17JUL-19JUL	St. Crop	0	8	0	0	4	4	20	24	90	56	94	119	418
	SE	0	8	0	0	4	4	12	8	71	24	41	68	111
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
31JUL-03AUG	St. Crop	0	0	7	0	16	11	30	18	229	72	315	83	782
	SE	0	0	7	0	8	7	26	8	225	31	137	55	272
	NO. TOWS	5	23	15	5	5	6	5	5	5	9	10	7	100
14AUG-17AUG	St. Crop	0	0	17	0	3	23	87	21	36	174	65	109	534
	SE	0	0	12	0	2	16	68	16	20	71	26	66	125
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
27AUG-29AUG	St. Crop	0	8	10	50	13	14	60	6	238	21	118	375	912
	SE	0	8	10	41	7	14	24	2	190	17	51	188	278
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
10SEP-12SEP	St. Crop	0	2	13	33	26	0	169	37	141	185	98	118	823
	SE	0	2	13	33	21	0	130	16	99	109	65	94	231
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
24SEP-26SEP	St. Crop	0	0	0	46	18	12	170	40	55	337	226	344	1249
	SE	0	0	0	46	17	10	122	34	20	223	200	152	363
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
08OCT-10OCT	St. Crop	0	0	2	0	11	25	26	19	100	213	83	74	552
	SE	0	0	2	0	6	17	14	15	46	110	49	51	141
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
22OCT-24OCT	St. Crop	0	0	0	15	18	48	82	12	81	226	24	58	564
	SE	0	0	0	11	12	32	38	8	65	171	14	29	193
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100

Table C-133 Regional Density (No./1,000m3) of Spottail Shiner Yearling and Older in Hudson River Estuary Determined From Fall Juvenile Survey, 1990

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions COMBINED
09JUL-14JUL	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.01
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.09
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	12	209
23JUL-27JUL	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	<0.005
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.03
	NO. TOWS	17	46	27	14	8	11	7	10	15	18	21	13	207
06AUG-10AUG	DENSITY	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	<0.005
	SE	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.02
	NO. TOWS	16	46	27	14	8	13	8	10	15	18	21	13	209
20AUG-24AUG	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.47	0.04
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.26	0.26
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
04SEP-07SEP	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.39	0.04
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.17	0.18
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
17SEP-20SEP	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.07	0.01
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.07	0.07
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
01OCT-06OCT	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.27	0.02
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.21	0.21
	NO. TOWS	18	46	27	14	8	13	8	10	15	18	21	13	211
15OCT-17OCT	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210

Table C-134 Regional Standing Crops (in Thousands) of Spottail Shiner Yearling and Older in Hudson River Estuary Determined From Fall Juvenile Survey, 1990

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions COMBINED
09JUL-14JUL	St. Crop	0	0	0	0	0	0	0	0	0	0	0	7	7
	SE	0	0	0	0	0	0	0	0	0	0	0	7	7
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	12	209
23JUL-27JUL	St. Crop	0	0	0	0	0	0	0	0	0	0	5	0	5
	SE	0	0	0	0	0	0	0	0	0	0	5	0	5
	NO. TOWS	17	46	27	14	8	11	7	10	15	18	21	13	207
06AUG-10AUG	St. Crop	0	0	0	0	0	3	0	0	0	0	0	0	3
	SE	0	0	0	0	0	3	0	0	0	0	0	0	3
	NO. TOWS	16	46	27	14	8	13	8	10	15	18	21	13	209
20AUG-24AUG	St. Crop	0	0	0	0	0	0	0	0	0	0	0	34	34
	SE	0	0	0	0	0	0	0	0	0	0	0	18	18
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
04SEP-07SEP	St. Crop	0	0	0	0	0	0	0	0	0	0	6	28	34
	SE	0	0	0	0	0	0	0	0	0	0	6	12	14
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
17SEP-20SEP	St. Crop	0	0	0	0	0	0	0	0	0	0	0	5	5
	SE	0	0	0	0	0	0	0	0	0	0	0	5	5
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
01OCT-06OCT	St. Crop	0	0	0	0	0	0	0	0	0	0	0	19	19
	SE	0	0	0	0	0	0	0	0	0	0	0	15	15
	NO. TOWS	18	46	27	14	8	13	8	10	15	18	21	13	211
15OCT-17OCT	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
	SE	0	0	0	0	0	0	0	0	0	0	0	0	0
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210

Table C-135 Regional Catch-Per-Unit-Effort (CPUE) of Spottail Shiner Yearling and Older in Hudson River Estuary Determined From Beach Seine Survey, 1990

DATE	^	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions COMBINED
18JUN-20JUN	CPUE	0.00	0.09	0.29	0.00	3.33	4.67	9.13	7.00	0.25	0.00	0.58	0.08	2.12
	SE	0.00	0.09	0.18	0.00	2.40	2.91	5.98	2.58	0.25	0.00	0.34	0.08	7.54
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
02JUL-03JUL	CPUE	0.00	0.00	0.14	0.00	2.67	0.00	0.88	5.38	4.25	1.60	0.56	0.31	1.31
	SE	0.00	0.00	0.14	0.00	2.67	0.00	0.52	2.39	1.44	0.77	0.35	0.21	3.99
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	18	13	100
17JUL-19JUL	CPUE	0.00	0.00	0.14	0.00	5.00	0.33	2.50	7.88	0.63	3.20	5.05	0.25	2.08
	SE	0.00	0.00	0.14	0.00	2.52	0.33	1.18	2.73	0.18	1.27	2.74	0.13	4.95
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
31JUL-03AUG	CPUE	0.00	0.00	0.07	0.20	2.00	0.00	0.00	5.80	1.20	1.44	1.30	0.00	1.00
	SE	0.00	0.00	0.07	0.20	1.30	0.00	0.00	5.80	0.97	1.44	1.19	0.00	6.31
	NO. TOWS	5	23	15	5	5	6	5	5	5	9	10	7	100
14AUG-17AUG	CPUE	0.00	0.00	0.43	0.00	2.80	4.67	0.60	0.00	0.20	1.22	1.90	0.29	1.01
	SE	0.00	0.00	0.43	0.00	1.74	4.67	0.40	0.00	0.20	0.49	1.90	0.29	5.40
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
27AUG-29AUG	CPUE	0.00	0.00	0.00	1.00	1.00	0.17	1.60	1.20	0.00	0.11	0.50	0.14	0.48
	SE	0.00	0.00	0.00	1.00	0.77	0.17	1.36	0.97	0.00	0.11	0.31	0.14	2.13
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
10SEP-12SEP	CPUE	0.00	0.00	0.07	3.00	2.40	0.00	0.80	0.60	0.20	0.67	2.50	0.29	0.88
	SE	0.00	0.00	0.07	3.00	1.50	0.00	0.80	0.60	0.20	0.67	2.39	0.29	4.31
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
24SEP-26SEP	CPUE	0.00	0.00	0.00	6.20	2.40	0.67	14.60	5.00	0.40	3.78	6.00	4.43	3.62
	SE	0.00	0.00	0.00	6.20	1.94	0.33	10.40	5.00	0.40	2.83	5.56	4.10	15.22
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
08OCT-10OCT	CPUE	0.00	0.00	0.07	1.00	3.40	1.67	0.20	1.40	0.20	1.11	0.40	0.14	0.80
	SE	0.00	0.00	0.07	1.00	1.21	0.92	0.20	1.17	0.20	0.59	0.22	0.14	2.27
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
22OCT-24OCT	CPUE	0.00	0.00	0.00	3.20	3.40	3.17	3.60	4.20	1.60	5.11	1.10	1.57	2.25
	SE	0.00	0.00	0.00	2.08	1.78	1.58	2.46	3.72	1.17	4.29	0.48	1.02	7.13
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100

Table C-136 Regional Standing Crops (in Thousands) of Spottail Shiner Yearling and Older in Hudson River Estuary Determined From Beach Seine Survey, 1990

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions COMBINED
18JUN-20JUN	St. Crop	0	4	8	0	9	50	65	9	2	0	11	1	158
	SE	0	4	5	0	6	31	42	3	2	0	7	1	54
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
02JUL-03JUL	St. Crop	0	0	4	0	7	0	6	7	37	28	11	4	104
	SE	0	0	4	0	7	0	4	3	12	13	7	3	22
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	18	13	100
17JUL-19JUL	St. Crop	0	0	4	0	13	4	18	10	5	56	99	3	212
	SE	0	0	4	0	7	4	8	3	2	22	54	2	60
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
31JUL-03AUG	St. Crop	0	0	2	2	5	0	0	7	10	25	26	0	77
	SE	0	0	2	2	3	0	0	7	8	25	23	0	37
	NO. TOWS	5	23	15	5	5	6	5	5	5	9	10	7	100
14AUG-17AUG	St. Crop	0	0	12	0	7	50	4	0	2	21	37	4	137
	SE	0	0	12	0	5	50	3	0	2	9	37	4	64
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
27AUG-29AUG	St. Crop	0	0	0	9	3	2	11	1	0	2	10	2	40
	SE	0	0	0	9	2	2	10	1	0	2	6	2	15
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
10SEP-12SEP	St. Crop	0	0	2	28	6	0	6	1	2	12	49	4	109
	SE	0	0	2	28	4	0	6	1	2	12	47	4	56
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
24SEP-26SEP	St. Crop	0	0	0	57	6	7	104	6	3	66	118	60	428
	SE	0	0	0	57	5	4	74	6	3	50	109	56	162
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
08OCT-10OCT	St. Crop	0	0	2	9	9	18	1	2	2	20	8	2	72
	SE	0	0	2	9	3	10	1	1	2	10	4	2	18
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
22OCT-24OCT	St. Crop	0	0	0	29	9	34	26	5	14	90	22	21	249
	SE	0	0	0	19	5	17	17	5	10	75	9	14	84
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100

Table C-137 Regional Density (No./1,000m3) of Atlantic Sturgeon Young of Year in Hudson River Estuary Determined From Fall Juvenile Survey, 1990

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions COMBINED
09JUL-14JUL	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	12	209
23JUL-27JUL	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	17	46	27	14	8	11	7	10	15	18	21	13	207
06AUG-10AUG	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	16	46	27	14	8	13	8	10	15	18	21	13	209
20AUG-24AUG	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
04SEP-07SEP	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
17SEP-20SEP	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
01OCT-06OCT	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	18	46	27	14	8	13	8	10	15	18	21	13	211
15OCT-17OCT	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210

Table C-138 Regional Standing Crops (in Thousands) of Atlantic Sturgeon Young of Year in Hudson River Estuary Determined From Fall Juvenile Survey, 1990

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions COMBINED
09JUL-14JUL	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
	SE	0	0	0	0	0	0	0	0	0	0	0	0	0
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	12	209
23JUL-27JUL	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
	SE	0	0	0	0	0	0	0	0	0	0	0	0	0
	NO. TOWS	17	46	27	14	8	11	7	10	15	18	21	13	207
06AUG-10AUG	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
	SE	0	0	0	0	0	0	0	0	0	0	0	0	0
	NO. TOWS	16	46	27	14	8	13	8	10	15	18	21	13	209
20AUG-24AUG	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
	SE	0	0	0	0	0	0	0	0	0	0	0	0	0
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
04SEP-07SEP	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
	SE	0	0	0	0	0	0	0	0	0	0	0	0	0
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
17SEP-20SEP	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
	SE	0	0	0	0	0	0	0	0	0	0	0	0	0
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
01OCT-06OCT	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
	SE	0	0	0	0	0	0	0	0	0	0	0	0	0
	NO. TOWS	18	46	27	14	8	13	8	10	15	18	21	13	211
15OCT-17OCT	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
	SE	0	0	0	0	0	0	0	0	0	0	0	0	0
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210

Table C-139 Regional Density (No./1,000m3) of Atlantic Sturgeon Yearling and Older in Hudson River Estuary Determined From Fall Juvenile Survey, 1990

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions COMBINED
09JUL-14JUL	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	<0.005
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.03
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	12	209
23JUL-27JUL	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	17	46	27	14	8	11	7	10	15	18	21	13	207
06AUG-10AUG	DENSITY	0.00	0.00	0.00	0.00	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.01
	SE	0.00	0.00	0.00	0.00	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.06
	NO. TOWS	16	46	27	14	8	13	8	10	15	18	21	13	209
20AUG-24AUG	DENSITY	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.01
	SE	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.04
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
04SEP-07SEP	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.00	<0.005
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.00	0.04
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
17SEP-20SEP	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	<0.005
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.03
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
01OCT-06OCT	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	18	46	27	14	8	13	8	10	15	18	21	13	211
15OCT-17OCT	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210

Table C-140 Regional Standing Crops (in Thousands) of Atlantic Sturgeon Yearling and Older in Hudson River Estuary Determined From Fall Juvenile Survey, 1990

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions COMBINED
09JUL-14JUL	St. Crop	0	0	0	0	0	0	0	0	0	6	0	0	6
	SE	0	0	0	0	0	0	0	0	0	6	0	0	6
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	12	209
23JUL-27JUL	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
	SE	0	0	0	0	0	0	0	0	0	0	0	0	0
	NO. TOWS	17	46	27	14	8	11	7	10	15	18	21	13	207
06AUG-10AUG	St. Crop	0	0	0	0	0	9	0	0	0	0	0	0	9
	SE	0	0	0	0	0	9	0	0	0	0	0	0	9
	NO. TOWS	16	46	27	14	8	13	8	10	15	18	21	13	209
20AUG-24AUG	St. Crop	0	0	4	0	0	0	0	0	0	5	0	0	10
	SE	0	0	4	0	0	0	0	0	0	5	0	0	7
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
04SEP-07SEP	St. Crop	0	0	0	0	0	0	0	0	0	7	0	0	7
	SE	0	0	0	0	0	0	0	0	0	7	0	0	7
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
17SEP-20SEP	St. Crop	0	0	0	0	0	0	0	0	0	5	0	0	5
	SE	0	0	0	0	0	0	0	0	0	5	0	0	5
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
01OCT-06OCT	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
	SE	0	0	0	0	0	0	0	0	0	0	0	0	0
	NO. TOWS	18	46	27	14	8	13	8	10	15	18	21	13	211
15OCT-17OCT	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
	SE	0	0	0	0	0	0	0	0	0	0	0	0	0
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210

Table C-141 Regional Density (No./1,000m3) of Shortnose Sturgeon Young of Year in Hudson River Estuary Determined From Fall Juvenile Survey, 1990

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions COMBINED
09JUL-14JUL	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	12	209
23JUL-27JUL	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	17	46	27	14	8	11	7	10	15	18	21	13	207
06AUG-10AUG	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	16	46	27	14	8	13	8	10	15	18	21	13	209
20AUG-24AUG	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
04SEP-07SEP	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
17SEP-20SEP	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
01OCT-06OCT	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	18	46	27	14	8	13	8	10	15	18	21	13	211
15OCT-17OCT	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210

Table C-142 Regional Standing Crops (in Thousands) of Shortnose Sturgeon Young of Year in Hudson River Estuary Determined From Fall Juvenile Survey, 1990

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions COMBINED
09JUL-14JUL	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
	SE	0	0	0	0	0	0	0	0	0	0	0	0	0
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	12	209
23JUL-27JUL	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
	SE	0	0	0	0	0	0	0	0	0	0	0	0	0
	NO. TOWS	17	46	27	14	8	11	7	10	15	18	21	13	207
06AUG-10AUG	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
	SE	0	0	0	0	0	0	0	0	0	0	0	0	0
	NO. TOWS	16	46	27	14	8	13	8	10	15	18	21	13	209
20AUG-24AUG	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
	SE	0	0	0	0	0	0	0	0	0	0	0	0	0
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
04SEP-07SEP	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
	SE	0	0	0	0	0	0	0	0	0	0	0	0	0
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
17SEP-20SEP	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
	SE	0	0	0	0	0	0	0	0	0	0	0	0	0
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
01OCT-06OCT	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
	SE	0	0	0	0	0	0	0	0	0	0	0	0	0
	NO. TOWS	18	46	27	14	8	13	8	10	15	18	21	13	211
15OCT-17OCT	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
	SE	0	0	0	0	0	0	0	0	0	0	0	0	0
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210

Table C-143 Regional Density (No./1,000m3) of Shortnose Sturgeon Yearling and Older in Hudson River Estuary Determined From Fall Juvenile Survey, 1990

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions COMBINED
09JUL-14JUL	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.00	<0.005
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.04
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	12	209
23JUL-27JUL	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	17	46	27	14	8	11	7	10	15	18	21	13	207
06AUG-10AUG	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	16	46	27	14	8	13	8	10	15	18	21	13	209
20AUG-24AUG	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
04SEP-07SEP	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
17SEP-20SEP	DENSITY	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	<0.005
	SE	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
01OCT-06OCT	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	18	46	27	14	8	13	8	10	15	18	21	13	211
15OCT-17OCT	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210

Table C-144 Regional Standing Crops (in Thousands) of Shortnose Sturgeon Yearling and Older in Hudson River Estuary Determined From Fall Juvenile Survey, 1990

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions COMBINED
09JUL-14JUL	St. Crop	0	0	0	0	0	0	0	7	0	0	0	0	7
	SE	0	0	0	0	0	0	0	7	0	0	0	0	7
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	12	209
23JUL-27JUL	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
	SE	0	0	0	0	0	0	0	0	0	0	0	0	0
	NO. TOWS	17	46	27	14	8	11	7	10	15	18	21	13	207
06AUG-10AUG	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
	SE	0	0	0	0	0	0	0	0	0	0	0	0	0
	NO. TOWS	16	46	27	14	8	13	8	10	15	18	21	13	209
20AUG-24AUG	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
	SE	0	0	0	0	0	0	0	0	0	0	0	0	0
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
04SEP-07SEP	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
	SE	0	0	0	0	0	0	0	0	0	0	0	0	0
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
17SEP-20SEP	St. Crop	0	6	0	0	0	0	0	0	0	0	0	0	6
	SE	0	6	0	0	0	0	0	0	0	0	0	0	6
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
01OCT-06OCT	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
	SE	0	0	0	0	0	0	0	0	0	0	0	0	0
	NO. TOWS	18	46	27	14	8	13	8	10	15	18	21	13	211
15OCT-17OCT	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
	SE	0	0	0	0	0	0	0	0	0	0	0	0	0
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210

Table C-145 Regional Density (No./1,000m3) of Rainbow Smelt Eggs in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1990

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
19APR-23APR	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	0.00	NS	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00	0.00	0.00
	NO. TOWS		6	8	8	4	5	6	3		7		11	24	82
23APR-26APR	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		10	12	13	10	6	10	6	7	7	8	9	9	107
30APR-03MAY	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
07MAY-10MAY	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
14MAY-17MAY	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	5	10	116
21MAY-24MAY	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	5	109
29MAY-02JUN	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
04JUN-07JUN	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
11JUN-14JUN	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
18JUN-21JUN	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
25JUN-28JUN	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
02JUL-06JUL	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	6	11	14	11	13	9	13	8	10	7	6	6	6	120
16JUL-19JUL	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						0.00
	NO. TOWS	7	10	11	12	10	6	10	6						72
30JUL-02AUG	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						0.00
	NO. TOWS	7	11	11	12	10	6	10	6						73
14AUG-16AUG	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						0.00
	NO. TOWS	7	11	11	12	10	5	9	6						71

Table C-146 Regional Standing Crop (In Thousands) of Rainbow Smelt Eggs in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1990

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
19APR-23APR	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	0.00	NS	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00	0.00	0.00
	NO. TOWS		6	8	8	4	5	6	3		7		11	24	82
23APR-26APR	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		10	12	13	10	6	10	6	7	7	8	9	9	107
30APR-03MAY	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
07MAY-10MAY	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
14MAY-17MAY	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	5	10	116
21MAY-24MAY	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	5	109
29MAY-02JUN	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
04JUN-07JUN	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
11JUN-14JUN	St. Crop	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
18JUN-21JUN	St. Crop	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
25JUN-28JUN	St. Crop	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
02JUL-06JUL	St. Crop	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	6	11	14	11	13	9	13	8	10	7	6	6	6	120
16JUL-19JUL	St. Crop	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						0.00
	NO. TOWS	7	10	11	12	10	6	10	6						72
30JUL-02AUG	St. Crop	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						0.00
	NO. TOWS	7	11	11	12	10	6	10	6						73
14AUG-16AUG	St. Crop	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						0.00
	NO. TOWS	7	11	11	12	10	5	9	6						71

Table C-147 Regional Density (No./1,000m3) of Rainbow Smelt Yolk-Sac Larvae in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1990

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
19APR-23APR	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	0.00	NS	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00	0.00	0.00
	NO. TOWS		6	8	8	4	5	6	3		7		11	24	82
23APR-26APR	DENSITY	NS	0.00	0.00	0.30	0.96	0.00	0.00	0.24	6.41	3.40	16.75	0.43	0.00	2.37
	SE		0.00	0.00	0.30	0.92	0.00	0.00	0.24	3.63	3.40	7.62	0.43	0.00	9.17
	NO. TOWS		10	12	13	10	6	10	6	7	7	8	9	9	107
30APR-03MAY	DENSITY	NS	0.00	0.00	0.00	0.00	0.38	0.04	0.00	0.62	2.72	3.62	1.39	0.61	0.78
	SE		0.00	0.00	0.00	0.00	0.38	0.04	0.00	0.46	1.27	2.35	0.98	0.43	2.94
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
07MAY-10MAY	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.74	0.00	0.00	0.00	0.06
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.74	0.00	0.00	0.00	0.74
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
14MAY-17MAY	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	5	10	116
21MAY-24MAY	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	5	109
29MAY-02JUN	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
04JUN-07JUN	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
11JUN-14JUN	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
18JUN-21JUN	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
25JUN-28JUN	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
02JUL-06JUL	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	6	11	14	11	13	9	13	8	10	7	6	6	6	120
16JUL-19JUL	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						0.00
	NO. TOWS	7	10	11	12	10	6	10	6						72
30JUL-02AUG	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						0.00
	NO. TOWS	7	11	11	12	10	6	10	6						73
14AUG-16AUG	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						0.00
	NO. TOWS	7	11	11	12	10	5	9	6						71

Table C-148 Regional Standing Crop (In Thousands) of Rainbow Smelt Yolk-Sac Larvae in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1990

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
19APR-23APR	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	0.00	NS	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00	0.00	0.00
	NO. TOWS		6	8	8	4	5	6	3		7		11	24	82
23APR-26APR	St. Crop	NS	0.00	0.00	44.04	200.97	0.00	0.00	71.84	1061.41	480.66	2952.21	69.59	0.00	4880.72
	SE		0.00	0.00	44.04	192.48	0.00	0.00	71.84	601.50	480.66	1343.97	69.59	0.00	1564.64
	NO. TOWS		10	12	13	10	6	10	6	7	7	8	9	9	107
30APR-03MAY	St. Crop	NS	0.00	0.00	0.00	0.00	79.14	5.23	0.00	103.37	385.18	638.04	223.24	43.59	1477.80
	SE		0.00	0.00	0.00	0.00	79.14	5.23	0.00	75.62	179.96	414.51	157.98	30.85	492.06
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
07MAY-10MAY	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	105.37	0.00	0.00	0.00	105.37
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	105.37	0.00	0.00	0.00	105.37
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
14MAY-17MAY	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	5	10	116
21MAY-24MAY	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	5	109
29MAY-02JUN	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
04JUN-07JUN	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
11JUN-14JUN	St. Crop	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
18JUN-21JUN	St. Crop	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
25JUN-28JUN	St. Crop	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
02JUL-06JUL	St. Crop	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	6	11	14	11	13	9	13	8	10	7	6	6	6	120
16JUL-19JUL	St. Crop	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						0.00
	NO. TOWS	7	10	11	12	10	6	10	6						72
30JUL-02AUG	St. Crop	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						0.00
	NO. TOWS	7	11	11	12	10	6	10	6						73
14AUG-16AUG	St. Crop	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						0.00
	NO. TOWS	7	11	11	12	10	5	9	6						71

Table C-149 Regional Density (No./1,000m3) of Rainbow Smelt Post Yolk-Sac Larvae in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1990

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
19APR-23APR	DENSITY	NS	0.55	0.00	2.15	0.00	0.00	0.00	0.00	NS	0.00	NS	0.00	0.00	0.27
	SE		0.55	0.00	0.98	0.00	0.00	0.00	0.00		0.00		0.00	0.00	1.12
	NO. TOWS		6	8	8	4	5	6	3		7		11	24	82
23APR-26APR	DENSITY	NS	0.00	0.11	0.30	0.00	0.00	1.28	2.17	0.73	0.75	2.84	0.75	0.00	0.74
	SE		0.00	0.11	0.30	0.00	0.00	1.24	2.17	0.73	0.75	2.18	0.54	0.00	3.53
	NO. TOWS		10	12	13	10	6	10	6	7	7	8	9	9	107
30APR-03MAY	DENSITY	NS	0.12	0.67	4.49	1.96	0.76	11.35	19.05	30.42	14.70	11.96	9.27	0.00	8.73
	SE		0.12	0.53	1.02	1.92	0.76	3.59	13.28	13.19	6.63	7.80	2.38	0.00	21.89
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
07MAY-10MAY	DENSITY	NS	0.68	0.84	4.99	31.46	3.85	6.34	78.53	64.13	37.55	5.82	0.00	0.00	19.52
	SE		0.50	0.59	2.59	16.48	1.37	3.08	33.61	17.50	15.67	2.94	0.00	0.00	44.50
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
14MAY-17MAY	DENSITY	NS	9.13	6.77	8.19	41.75	60.47	92.21	8.00	0.00	6.11	0.00	0.00	1.82	19.54
	SE		5.47	1.95	2.40	19.97	44.56	55.79	6.22	0.00	6.11	0.00	0.00	1.49	74.93
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	5	10	116
21MAY-24MAY	DENSITY	NS	14.44	22.56	38.15	226.67	3.24	3.49	0.77	0.00	0.00	0.00	0.00	0.00	25.78
	SE		6.20	13.81	16.86	107.74	2.67	1.81	0.77	0.00	0.00	0.00	0.00	0.00	110.15
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	5	109
29MAY-02JUN	DENSITY	NS	26.44	55.50	5.87	2.88	2.64	2.73	4.25	0.00	0.00	0.00	0.00	0.00	8.36
	SE		7.29	9.44	2.54	1.33	2.28	1.79	2.38	0.00	0.00	0.00	0.00	0.00	12.83
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
04JUN-07JUN	DENSITY	NS	9.58	60.63	5.60	0.51	2.33	2.48	2.40	0.56	0.00	0.00	0.00	0.00	7.01
	SE		2.57	28.46	3.00	0.29	1.12	1.75	1.79	0.56	0.00	0.00	0.00	0.00	28.87
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
11JUN-14JUN	DENSITY	2.58	4.15	7.38	24.47	12.94	10.03	12.96	0.00	1.40	0.00	0.00	0.00	0.00	5.84
	SE	0.57	1.42	2.27	9.54	9.80	9.15	8.20	0.00	0.86	0.00	0.00	0.00	0.00	18.61
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
18JUN-21JUN	DENSITY	0.00	0.11	0.00	0.51	1.27	0.00	0.63	0.00	0.00	0.00	10.69	129.15	0.00	10.95
	SE	0.00	0.11	0.00	0.51	1.07	0.00	0.63	0.00	0.00	0.00	10.69	129.15	0.00	129.60
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
25JUN-28JUN	DENSITY	0.00	0.35	0.33	0.00	0.00	0.10	0.00	0.00	0.00	2.11	0.00	0.00	0.00	0.22
	SE	0.00	0.35	0.33	0.00	0.00	0.10	0.00	0.00	0.00	2.11	0.00	0.00	0.00	2.17
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
02JUL-06JUL	DENSITY	0.00	0.00	0.00	0.24	0.00	9.68	0.29	0.00	3.03	0.00	0.72	0.00	0.00	1.07
	SE	0.00	0.00	0.00	0.24	0.00	8.25	0.29	0.00	3.03	0.00	0.72	0.00	0.00	8.83
	NO. TOWS	6	11	14	11	13	9	13	8	10	7	6	6	6	120
16JUL-19JUL	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						0.00
	NO. TOWS	7	10	11	12	10	6	10	6						72
30JUL-02AUG	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						0.00
	NO. TOWS	7	11	11	12	10	6	10	6						73
14AUG-16AUG	DENSITY	0.00	0.00	0.49	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.06
	SE	0.00	0.00	0.49	0.00	0.00	0.00	0.00	0.00						0.49
	NO. TOWS	7	11	11	12	10	5	9	6						71

Table C-150 Regional Standing Crop (In Thousands) of Rainbow Smelt Post Yolk-Sac Larvae in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1990

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
19APR-23APR	St. Crop	NS	126.43	0.00	317.29	0.00	0.00	0.00	0.00	NS	0.00	NS	0.00	0.00	443.72
	SE		126.43	0.00	144.48	0.00	0.00	0.00	0.00		0.00		0.00	0.00	191.99
	NO. TOWS		6	8	8	4	5	6	3		7		11	24	82
23APR-26APR	St. Crop	NS	0.00	34.65	44.04	0.00	0.00	178.61	646.54	120.03	105.90	500.84	119.75	0.00	1750.37
	SE		0.00	34.65	44.04	0.00	0.00	173.34	646.54	120.03	105.90	384.06	86.01	0.00	794.81
	NO. TOWS		10	12	13	10	6	10	6	7	7	8	9	9	107
30APR-03MAY	St. Crop	NS	28.13	215.92	663.77	408.56	158.28	1586.75	5680.79	5034.85	2079.81	2108.87	1489.63	0.00	19455.35
	SE		28.13	170.36	151.19	399.37	158.28	501.43	3959.33	2182.66	938.22	1375.93	382.65	0.00	4883.52
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
07MAY-10MAY	St. Crop	NS	156.59	270.25	736.50	6553.57	797.97	886.03	23413.90	10612.32	5311.69	1026.57	0.00	0.00	49765.40
	SE		113.61	191.10	382.06	3434.08	284.32	430.53	10018.81	2896.77	2216.32	518.71	0.00	0.00	11234.03
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
14MAY-17MAY	St. Crop	NS	2095.66	2178.42	1209.32	8699.06	12543.96	12889.54	2385.72	0.00	864.12	0.00	0.00	129.67	42995.48
	SE		1254.94	626.46	355.07	4159.89	9243.89	7799.31	1853.52	0.00	864.12	0.00	0.00	106.02	13033.43
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	5	10	116
21MAY-24MAY	St. Crop	NS	3312.44	7261.55	5636.03	47223.92	671.75	487.20	229.34	0.00	0.00	0.00	0.00	0.00	64822.23
	SE		1423.47	4444.44	2491.23	22445.99	553.85	253.44	229.34	0.00	0.00	0.00	0.00	0.00	23070.14
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	5	109
29MAY-02JUN	St. Crop	NS	6066.49	17859.86	867.92	600.85	547.77	381.37	1266.39	0.00	0.00	0.00	0.00	0.00	27590.66
	SE		1673.41	3036.47	375.62	277.80	472.55	250.32	708.48	0.00	0.00	0.00	0.00	0.00	3609.24
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
04JUN-07JUN	St. Crop	NS	2197.16	19511.31	826.66	105.26	482.79	346.23	715.95	93.18	0.00	0.00	0.00	0.00	24278.54
	SE		590.21	9158.23	442.96	61.03	232.61	244.58	532.58	93.18	0.00	0.00	0.00	0.00	9210.20
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
11JUN-14JUN	St. Crop	538.34	953.22	2373.42	3615.19	2694.98	2079.81	1811.25	0.00	232.13	0.00	0.00	0.00	0.00	14298.34
	SE	118.23	324.91	731.85	1409.63	2042.55	1898.14	1146.46	0.00	142.66	0.00	0.00	0.00	0.00	3428.10
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
18JUN-21JUN	St. Crop	0.00	25.98	0.00	74.89	264.79	0.00	88.17	0.00	0.00	0.00	1883.74	20758.83	0.00	23096.39
	SE	0.00	25.98	0.00	74.89	223.66	0.00	88.17	0.00	0.00	0.00	1883.74	20758.83	0.00	20845.66
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
25JUN-28JUN	St. Crop	0.00	80.63	105.05	0.00	0.00	20.61	0.00	0.00	0.00	298.60	0.00	0.00	0.00	504.89
	SE	0.00	80.63	105.05	0.00	0.00	20.61	0.00	0.00	0.00	298.60	0.00	0.00	0.00	327.30
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
02JUL-06JUL	St. Crop	0.00	0.00	0.00	35.86	0.00	2007.26	40.54	0.00	501.97	0.00	127.37	0.00	0.00	2713.00
	SE	0.00	0.00	0.00	35.86	0.00	1712.33	40.54	0.00	501.97	0.00	127.37	0.00	0.00	1789.74
	NO. TOWS	6	11	14	11	13	9	13	8	10	7	6	6	6	120
16JUL-19JUL	St. Crop	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						0.00
	NO. TOWS	7	10	11	12	10	6	10	6						72
30JUL-02AUG	St. Crop	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						0.00
	NO. TOWS	7	11	11	12	10	6	10	6						73
14AUG-16AUG	St. Crop	0.00	0.00	158.77	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	158.77
	SE	0.00	0.00	158.77	0.00	0.00	0.00	0.00	0.00						158.77
	NO. TOWS	7	11	11	12	10	5	9	6						71

Table C-151 Regional Density (No./1,000m3) of Rainbow Smelt Young of Year
in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1990

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
19APR-23APR	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	0.00	NS	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00	0.00	0.00
	NO. TOWS		6	8	8	4	5	6	3		7		11	24	82
23APR-26APR	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		10	12	13	10	6	10	6	7	7	8	9	9	107
30APR-03MAY	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
07MAY-10MAY	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
14MAY-17MAY	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	5	10	116
21MAY-24MAY	DENSITY	NS	0.00	0.00	0.00	0.00	2.75	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.23
	SE		0.00	0.00	0.00	0.00	1.72	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.72
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	5	109
29MAY-02JUN	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	3.64	0.00	0.00	0.00	0.00	0.00	0.00	0.30
	SE		0.00	0.00	0.00	0.00	0.00	3.10	0.00	0.00	0.00	0.00	0.00	0.00	3.10
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
04JUN-07JUN	DENSITY	NS	0.00	1.17	0.00	0.00	0.00	0.45	0.00	0.00	0.00	0.00	0.00	0.00	0.14
	SE		0.00	1.17	0.00	0.00	0.00	0.45	0.00	0.00	0.00	0.00	0.00	0.00	1.26
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
11JUN-14JUN	DENSITY	0.49	3.69	8.96	12.60	7.11	0.00	9.21	0.00	0.00	0.00	0.00	0.00	0.00	3.23
	SE	0.49	2.50	2.20	4.45	2.02	0.00	8.27	0.00	0.00	0.00	0.00	0.00	0.00	10.18
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
18JUN-21JUN	DENSITY	1.51	1.44	8.36	18.61	36.73	9.89	0.93	0.24	0.00	0.95	0.00	0.00	0.00	6.05
	SE	1.51	1.09	5.52	6.82	4.89	3.42	0.63	0.24	0.00	0.95	0.00	0.00	0.00	10.84
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
25JUN-28JUN	DENSITY	4.39	20.14	8.86	14.62	7.04	5.70	4.54	1.38	0.00	0.00	0.00	0.00	0.00	5.13
	SE	3.29	8.94	2.45	3.47	2.42	2.15	2.34	1.38	0.00	0.00	0.00	0.00	0.00	11.25
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
02JUL-06JUL	DENSITY	0.00	2.95	35.37	6.61	10.68	11.77	14.71	0.00	2.47	0.00	0.00	0.00	0.00	6.50
	SE	0.00	1.48	10.58	3.47	0.93	4.45	4.31	0.00	2.47	0.00	0.00	0.00	0.00	13.10
	NO. TOWS	6	11	14	11	13	9	13	8	10	7	6	6	6	120
16JUL-19JUL	DENSITY	0.86	2.16	1.94	8.77	18.97	6.20	14.78	1.58	NS	NS	NS	NS	NS	6.91
	SE	0.86	1.25	0.96	8.20	7.34	3.31	8.00	1.58						14.20
	NO. TOWS	7	10	11	12	10	6	10	6						72
30JUL-02AUG	DENSITY	2.07	6.78	0.00	0.00	0.00	6.75	8.89	1.70	NS	NS	NS	NS	NS	3.27
	SE	2.07	2.68	0.00	0.00	0.00	4.47	5.57	0.85						7.95
	NO. TOWS	7	11	11	12	10	6	10	6						73
14AUG-16AUG	DENSITY	0.00	0.00	2.36	0.00	0.00	19.72	0.90	0.00	NS	NS	NS	NS	NS	2.87
	SE	0.00	0.00	1.77	0.00	0.00	8.33	0.01	0.00						8.52
	NO. TOWS	7	11	11	12	10	5	9	6						71

Table C-152 Regional Standing Crop (In Thousands) of Rainbow Smelt Young of Year in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1990

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
19APR-23APR	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	0.00	NS	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00	0.00	0.00
	NO. TOWS		6	8	8	4	5	6	3		7		11	24	82
23APR-26APR	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		10	12	13	10	6	10	6	7	7	8	9	9	107
30APR-03MAY	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
07MAY-10MAY	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
14MAY-17MAY	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	5	10	116
21MAY-24MAY	St. Crop	NS	0.00	0.00	0.00	0.00	570.54	0.00	0.00	0.00	0.00	0.00	0.00	0.00	570.54
	SE		0.00	0.00	0.00	0.00	356.81	0.00	0.00	0.00	0.00	0.00	0.00	0.00	356.81
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	5	109
29MAY-02JUN	St. Crop	NS	0.00	0.00	0.00	0.00	0.00	508.33	0.00	0.00	0.00	0.00	0.00	0.00	508.33
	SE		0.00	0.00	0.00	0.00	0.00	433.31	0.00	0.00	0.00	0.00	0.00	0.00	433.31
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
04JUN-07JUN	St. Crop	NS	0.00	376.91	0.00	0.00	0.00	63.02	0.00	0.00	0.00	0.00	0.00	0.00	439.94
	SE		0.00	376.91	0.00	0.00	0.00	63.02	0.00	0.00	0.00	0.00	0.00	0.00	382.15
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
11JUN-14JUN	St. Crop	102.54	846.02	2882.89	1861.67	1480.58	0.00	1286.98	0.00	0.00	0.00	0.00	0.00	0.00	8460.69
	SE	102.54	573.50	706.54	658.11	420.97	0.00	1156.71	0.00	0.00	0.00	0.00	0.00	0.00	1669.41
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
18JUN-21JUN	St. Crop	316.10	330.61	2689.63	2749.15	7652.40	2052.71	129.43	70.40	0.00	133.70	0.00	0.00	0.00	16124.13
	SE	316.10	249.38	1777.12	1007.41	1019.56	709.74	87.38	70.40	0.00	133.70	0.00	0.00	0.00	2430.81
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
25JUN-28JUN	St. Crop	917.94	4619.61	2850.56	2160.18	1467.08	1181.71	634.13	412.57	0.00	0.00	0.00	0.00	0.00	14243.77
	SE	687.00	2051.52	787.79	512.59	504.52	445.52	327.33	412.57	0.00	0.00	0.00	0.00	0.00	2508.88
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
02JUL-06JUL	St. Crop	0.00	676.27	11383.29	976.99	2224.72	2440.85	2055.91	0.00	408.77	0.00	0.00	0.00	0.00	20166.81
	SE	0.00	339.41	3405.90	512.27	192.74	924.01	603.06	0.00	408.77	0.00	0.00	0.00	0.00	3660.53
	NO. TOWS	6	11	14	11	13	9	13	8	10	7	6	6	6	120
16JUL-19JUL	St. Crop	179.51	495.09	625.11	1295.42	3951.27	1285.23	2066.46	470.71	NS	NS	NS	NS	NS	10368.78
	SE	179.51	286.38	310.33	1211.29	1528.88	686.33	1117.88	470.71						2440.80
	NO. TOWS	7	10	11	12	10	6	10	6						72
30JUL-02AUG	St. Crop	433.29	1556.03	0.00	0.00	0.00	1400.43	1242.11	505.75	NS	NS	NS	NS	NS	5137.62
	SE	433.29	615.28	0.00	0.00	0.00	926.46	778.17	252.91						1447.11
	NO. TOWS	7	11	11	12	10	6	10	6						73
14AUG-16AUG	St. Crop	0.00	0.00	761.08	0.00	0.00	4090.85	125.27	0.00	NS	NS	NS	NS	NS	4977.19
	SE	0.00	0.00	569.41	0.00	0.00	1728.79	1.13	0.00						1820.15
	NO. TOWS	7	11	11	12	10	5	9	6						71

Table C-153 Regional Density (No./1,000m3) of Rainbow Smelt Young of Year in Hudson River Estuary Determined From Fall Juvenile Survey, 1990

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions COMBINED
09JUL-14JUL	DENSITY	0.00	0.13	0.00	0.00	2.85	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.25
	SE	0.00	0.13	0.00	0.00	1.53	0.01	0.00	0.00	0.00	0.00	0.00	0.00	1.53
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	12	209
23JUL-27JUL	DENSITY	4.24	1.56	0.00	0.03	34.39	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.35
	SE	4.24	0.75	0.00	0.03	2.71	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.09
	NO. TOWS	17	46	27	14	8	11	7	10	15	18	21	13	207
06AUG-10AUG	DENSITY	0.24	0.78	0.00	5.74	0.10	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.58
	SE	0.16	0.73	0.00	2.66	0.10	0.06	0.00	0.00	0.00	0.00	0.00	0.00	2.77
	NO. TOWS	16	46	27	14	8	13	8	10	15	18	21	13	209
20AUG-24AUG	DENSITY	0.00	0.80	2.94	5.34	3.86	1.64	0.00	0.00	0.00	0.00	0.00	0.00	1.22
	SE	0.00	0.58	2.57	3.22	3.77	1.52	0.00	0.00	0.00	0.00	0.00	0.00	5.82
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
04SEP-07SEP	DENSITY	0.00	0.00	0.00	0.00	8.24	0.12	0.05	0.00	0.00	0.00	0.00	0.00	0.70
	SE	0.00	0.00	0.00	0.00	4.15	0.11	0.05	0.00	0.00	0.00	0.00	0.00	4.16
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
17SEP-20SEP	DENSITY	0.00	0.02	0.00	0.00	10.52	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.88
	SE	0.00	0.02	0.00	0.00	5.99	0.01	0.00	0.00	0.00	0.00	0.00	0.00	5.99
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
01OCT-06OCT	DENSITY	0.00	0.00	0.00	0.00	0.00	0.02	0.61	0.00	0.00	0.00	0.00	0.00	0.05
	SE	0.00	0.00	0.00	0.00	0.00	0.01	0.61	0.00	0.00	0.00	0.00	0.00	0.61
	NO. TOWS	18	46	27	14	8	13	8	10	15	18	21	13	211
15OCT-17OCT	DENSITY	0.00	0.00	0.04	0.00	0.10	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.01
	SE	0.00	0.00	0.04	0.00	0.04	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.06
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210

Table C-154 Regional Standing Crops (in Thousands) of Rainbow Smelt Young of Year in Hudson River Estuary Determined From Fall Juvenile Survey, 1990

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions COMBINED
09JUL-14JUL	St. Crop	0	43	0	0	591	2	0	0	0	0	0	0	636
	SE	0	43	0	0	317	2	0	0	0	0	0	0	320
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	12	209
23JUL-27JUL	St. Crop	973	503	0	7	7135	0	0	0	0	0	0	0	8618
	SE	973	243	0	7	562	0	0	0	0	0	0	0	1149
	NO. TOWS	17	46	27	14	8	11	7	10	15	18	21	13	207
06AUG-10AUG	St. Crop	54	250	0	1195	20	9	0	0	0	0	0	0	1528
	SE	37	234	0	555	20	9	0	0	0	0	0	0	604
	NO. TOWS	16	46	27	14	8	13	8	10	15	18	21	13	209
20AUG-24AUG	St. Crop	0	257	434	1113	802	229	0	0	0	0	0	0	2835
	SE	0	186	380	670	783	213	0	0	0	0	0	0	1134
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
04SEP-07SEP	St. Crop	0	0	0	0	1709	17	15	0	0	0	0	0	1741
	SE	0	0	0	0	862	15	15	0	0	0	0	0	862
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
17SEP-20SEP	St. Crop	0	8	0	0	2182	2	0	0	0	0	0	0	2192
	SE	0	8	0	0	1243	2	0	0	0	0	0	0	1243
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
01OCT-06OCT	St. Crop	0	0	0	0	0	3	182	0	0	0	0	0	186
	SE	0	0	0	0	0	2	182	0	0	0	0	0	182
	NO. TOWS	18	46	27	14	8	13	8	10	15	18	21	13	211
15OCT-17OCT	St. Crop	0	0	6	0	21	3	0	0	0	0	0	0	30
	SE	0	0	6	0	9	3	0	0	0	0	0	0	11
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210

Table C-155 Regional Catch-Per-Unit-Effort (CPUE) of Rainbow Smelt Young of Year in Hudson River Estuary Determined From Beach Seine Survey, 1990

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions COMBINED
18JUN-20JUN	CPUE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
02JUL-03JUL	CPUE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	18	13	100
17JUL-19JUL	CPUE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
31JUL-03AUG	CPUE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	5	23	15	5	5	6	5	5	5	9	10	7	100
14AUG-17AUG	CPUE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
27AUG-29AUG	CPUE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
10SEP-12SEP	CPUE	0.00	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
	SE	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
24SEP-26SEP	CPUE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
08OCT-10OCT	CPUE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
22OCT-24OCT	CPUE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100

Table C-156 Regional Standing Crops (in Thousands) of Rainbow Smelt Young of Year in Hudson River Estuary Determined From Beach Seine Survey, 1990

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions COMBINED
18JUN-	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
20JUN	SE	0	0	0	0	0	0	0	0	0	0	0	0	0
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
02JUL-	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
03JUL	SE	0	0	0	0	0	0	0	0	0	0	0	0	0
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	18	13	100
17JUL-	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
19JUL	SE	0	0	0	0	0	0	0	0	0	0	0	0	0
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
31JUL-	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
03AUG	SE	0	0	0	0	0	0	0	0	0	0	0	0	0
	NO. TOWS	5	23	15	5	5	6	5	5	5	9	10	7	100
14AUG-	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
17AUG	SE	0	0	0	0	0	0	0	0	0	0	0	0	0
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
27AUG-	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
29AUG	SE	0	0	0	0	0	0	0	0	0	0	0	0	0
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
10SEP-	St. Crop	0	4	0	0	0	0	0	0	0	0	0	0	4
12SEP	SE	0	3	0	0	0	0	0	0	0	0	0	0	3
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
24SEP-	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
26SEP	SE	0	0	0	0	0	0	0	0	0	0	0	0	0
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
08OCT-	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
10OCT	SE	0	0	0	0	0	0	0	0	0	0	0	0	0
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
22OCT-	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
24OCT	SE	0	0	0	0	0	0	0	0	0	0	0	0	0
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100

Table C-157 Regional Density (No./1,000m3) of Rainbow Smelt Yearling and Older in Hudson River Estuary Determined From Fall Juvenile Survey, 1990

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions COMBINED
09JUL-14JUL	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	12	209
23JUL-27JUL	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	17	46	27	14	8	11	7	10	15	18	21	13	207
06AUG-10AUG	DENSITY	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	<0.005
	SE	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.02
	NO. TOWS	16	46	27	14	8	13	8	10	15	18	21	13	209
20AUG-24AUG	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
04SEP-07SEP	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
17SEP-20SEP	DENSITY	0.00	0.00	0.00	0.91	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.08
	SE	0.00	0.00	0.00	0.91	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.91
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
01OCT-06OCT	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	18	46	27	14	8	13	8	10	15	18	21	13	211
15OCT-17OCT	DENSITY	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	<0.005
	SE	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.01
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210

Table C-158 Regional Standing Crops (in Thousands) of Rainbow Smelt Yearling and Older in Hudson River Estuary Determined From Fall Juvenile Survey, 1990

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions COMBINED
09JUL-14JUL	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
	SE	0	0	0	0	0	0	0	0	0	0	0	0	0
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	12	209
23JUL-27JUL	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
	SE	0	0	0	0	0	0	0	0	0	0	0	0	0
	NO. TOWS	17	46	27	14	8	11	7	10	15	18	21	13	207
06AUG-10AUG	St. Crop	0	0	0	0	0	3	0	0	0	0	0	0	3
	SE	0	0	0	0	0	3	0	0	0	0	0	0	3
	NO. TOWS	16	46	27	14	8	13	8	10	15	18	21	13	209
20AUG-24AUG	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
	SE	0	0	0	0	0	0	0	0	0	0	0	0	0
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
04SEP-07SEP	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
	SE	0	0	0	0	0	0	0	0	0	0	0	0	0
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
17SEP-20SEP	St. Crop	0	0	0	189	0	0	0	0	0	0	0	0	189
	SE	0	0	0	189	0	0	0	0	0	0	0	0	189
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
01OCT-06OCT	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
	SE	0	0	0	0	0	0	0	0	0	0	0	0	0
	NO. TOWS	18	46	27	14	8	13	8	10	15	18	21	13	211
15OCT-17OCT	St. Crop	0	0	0	0	0	2	0	0	0	0	0	0	2
	SE	0	0	0	0	0	2	0	0	0	0	0	0	2
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210

Table C-159 Regional Catch-Per-Unit-Effort (CPUE) of Rainbow Smelt Yearling and Older in Hudson River Estuary Determined From Beach Seine Survey, 1990

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions COMBINED
18JUN-20JUN	CPUE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
02JUL-03JUL	CPUE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	18	13	100
17JUL-19JUL	CPUE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
31JUL-03AUG	CPUE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	5	23	15	5	5	6	5	5	5	9	10	7	100
14AUG-17AUG	CPUE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
27AUG-29AUG	CPUE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
10SEP-12SEP	CPUE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
24SEP-26SEP	CPUE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
08OCT-10OCT	CPUE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
22OCT-24OCT	CPUE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100

Table C-160 Regional Standing Crops (in Thousands) of Rainbow Smelt Yearling and Older in Hudson River Estuary Determined From Beach Seine Survey, 1990

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions COMBINED
18JUN-20JUN	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
	SE	0	0	0	0	0	0	0	0	0	0	0	0	0
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
02JUL-03JUL	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
	SE	0	0	0	0	0	0	0	0	0	0	0	0	0
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	18	13	100
17JUL-19JUL	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
	SE	0	0	0	0	0	0	0	0	0	0	0	0	0
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
31JUL-03AUG	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
	SE	0	0	0	0	0	0	0	0	0	0	0	0	0
	NO. TOWS	5	23	15	5	5	6	5	5	5	9	10	7	100
14AUG-17AUG	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
	SE	0	0	0	0	0	0	0	0	0	0	0	0	0
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
27AUG-29AUG	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
	SE	0	0	0	0	0	0	0	0	0	0	0	0	0
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
10SEP-12SEP	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
	SE	0	0	0	0	0	0	0	0	0	0	0	0	0
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
24SEP-26SEP	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
	SE	0	0	0	0	0	0	0	0	0	0	0	0	0
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
08OCT-10OCT	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
	SE	0	0	0	0	0	0	0	0	0	0	0	0	0
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
22OCT-24OCT	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
	SE	0	0	0	0	0	0	0	0	0	0	0	0	0
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100

APPENDIX D

ABUNDANCE INDICES

APPENDIX D

LIST OF TABLES

Table D-1 COMBINED REGIONAL STANDING CROP (IN THOUSANDS) OF STRIPED BASS YOUNG-OF-YEAR IN HUDSON RIVER ESTUARY DETERMINED FROM FALL SHOALS AND BEACH SEINE SURVEYS, 1990

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	ALL REGIONS COMBINED
09JUL-	ST. CROP	0	1570	1495	26	1651	2656	1491	3367	27	558	1697	9	14546
10JUL	SE	0	1052	1155	26	1121	2593	688	2093	16	365	1551	9	4221
17JUL-	ST. CROP	802	9574	2406	395	1726	1452	4096	1918	625	1328	2138	454	26915
19JUL	SE	297	4598	1410	221	995	1299	2883	1053	308	416	1087	372	6079
24JUL-	ST. CROP	888	9758	3736	405	933	159	3351	236	710	1059	1505	539	23279
26JUL	SE	321	4600	2632	222	822	81	2863	112	337	374	633	382	6158
31JUL-	ST. CROP	850	8227	3866	1001	695	529	110	425	502	919	638	326	18089
03AUG	SE	288	2075	1546	352	215	247	40	384	184	310	266	164	2718
07AUG-	ST. CROP	782	9007	2980	1027	706	602	184	846	606	1332	509	255	18836
10AUG	SE	280	2101	702	354	218	248	75	768	195	488	175	157	2479
14AUG-	ST. CROP	1469	5980	6849	951	437	467	189	449	373	2658	1625	249	21695
17AUG	SE	1064	1260	1892	198	239	178	83	385	123	949	1193	144	2990
21AUG-	ST. CROP	1512	5911	6924	1014	596	392	123	47	227	2332	1621	243	20943
24AUG	SE	1064	1243	1890	207	405	174	72	19	89	916	1194	143	2964
27AUG-	ST. CROP	614	7072	3915	1537	455	499	63	45	236	989	597	430	16450
29AUG	SE	230	1694	1353	529	225	174	39	24	99	575	242	205	2358
03SEP-	ST. CROP	587	6868	3512	1472	256	471	61	29	245	1410	545	423	15879
05SEP	SE	230	1697	1343	527	120	174	39	22	110	954	235	204	2465
10SEP-	ST. CROP	729	6864	5098	524	115	577	68	12	366	982	650	49	16034
12SEP	SE	414	2038	1542	162	73	300	29	7	151	645	386	36	2723
17SEP-	ST. CROP	707	6590	4978	518	115	593	75	12	314	750	656	49	15357
19SEP	SE	414	2032	1541	165	73	301	30	7	145	369	387	36	2666
24SEP-	ST. CROP	240	4058	3979	900	115	221	193	12	190	383	768	100	11159
26SEP	SE	107	1209	1199	746	52	81	156	7	70	190	369	67	1919
01OCT-	ST. CROP	227	3731	3960	881	115	206	333	12	226	114	749	102	10656
03OCT	SE	107	1206	1199	745	52	80	310	8	108	69	368	67	1929
08OCT-	ST. CROP	70	1772	4922	1456	570	240	198	5	124	111	374	165	10008
10OCT	SE	29	609	1783	770	221	143	157	4	97	69	206	166	2079
15OCT-	ST. CROP	90	1971	5240	1599	570	333	50	2	124	108	363	163	10613
17OCT	SE	37	621	1797	805	221	223	29	2	97	69	206	166	2110
22OCT-	ST. CROP	55	1110	1380	632	40	346	124	4	485	290	187	34	4686
24OCT	SE	33	340	394	246	17	163	86	3	393	140	86	33	741

Table D-2 COMBINED REGIONAL STANDING CROP (IN THOUSANDS) OF WHITE PERCH YOUNG-OF-YEAR IN HUDSON RIVER ESTUARY DETERMINED FROM FALL SHOALS AND BEACH SEINE SURVEYS, 1990

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	ALL REGIONS COMBINED
09JUL-	ST. CROP	0	0	0	0	1682	210	29	2543	12	362	20	0	4859
10JUL	SE	0	0	0	0	1676	210	29	1115	8	229	14	0	2038
17JUL-	ST. CROP	0	0	0	0	1101	138	639	1513	3682	669	303	66	8110
19JUL	SE	0	0	0	0	878	110	419	562	3470	309	93	42	3663
24JUL-	ST. CROP	0	0	0	0	260	33	995	241	7143	488	308	68	9536
26JUL	SE	0	0	0	0	260	33	754	65	6935	287	93	43	6988
31JUL-	ST. CROP	0	55	201	188	337	26	969	352	4758	223	3649	272	11029
03AUG	SE	0	30	88	188	106	26	616	144	3693	82	1783	199	4162
07AUG-	ST. CROP	0	55	202	188	337	52	607	653	1291	230	3643	270	7527
10AUG	SE	0	30	88	188	106	52	499	285	1271	82	1783	199	2287
14AUG-	ST. CROP	14	333	3167	23	109	484	336	1161	829	1383	774	136	8748
17AUG	SE	14	164	2028	9	44	375	208	982	477	490	546	110	2463
21AUG-	ST. CROP	14	333	3165	45	115	505	328	1702	829	1379	838	165	9419
24AUG	SE	14	164	2028	18	46	374	208	1684	477	490	555	117	2820
27AUG-	ST. CROP	0	421	409	447	240	613	39	917	223	313	1602	884	6109
29AUG	SE	0	292	200	240	102	559	39	842	170	179	1095	529	1661
03SEP-	ST. CROP	0	421	409	593	234	573	39	99	223	312	1583	867	5354
05SEP	SE	0	292	200	378	102	559	39	37	170	179	1094	529	1460
10SEP-	ST. CROP	0	421	1547	529	678	254	99	175	656	1874	895	22	7151
12SEP	SE	0	204	911	396	387	130	34	75	654	914	555	10	1665
17SEP-	ST. CROP	0	421	1547	361	678	264	107	186	659	2425	864	21	7533
19SEP	SE	0	204	911	358	387	130	37	78	654	1218	553	8	1841
24SEP-	ST. CROP	0	70	339	397	410	325	106	142	422	1449	676	217	4553
26SEP	SE	0	33	137	392	368	163	29	95	177	816	576	129	1180
01OCT-	ST. CROP	0	70	341	398	410	319	118	120	520	907	670	234	4107
03OCT	SE	0	33	137	393	368	163	29	92	243	671	576	130	1097
08OCT-	ST. CROP	0	70	1034	374	532	104	33	121	789	290	599	123	4068
10OCT	SE	0	55	1031	299	301	65	15	93	470	217	490	55	1331
15OCT-	ST. CROP	0	70	1034	383	532	102	13	204	691	322	656	103	4111
17OCT	SE	0	55	1031	299	301	65	13	185	460	218	495	54	1339
22OCT-	ST. CROP	0	70	92	430	63	530	167	156	214	414	664	77	2877
24OCT	SE	0	55	62	198	46	432	158	139	133	173	320	39	656

TABLE D-3 UNIVARIATE AND BIVARIATE INDICES OF YOUNG-OF-YEAR ABUNDANCE FOR STRIPED BASS IN THE HUDSON RIVER ESTUARY, 1974-1990

	Univariate Indices		Bivariate Indices	
Year	BSS	FJS	BSS	FJS
1974	5.65	1.70	41.67	36.12
1975	4.56	4.67	34.40	57.25
1976	3.45	8.21	23.17	67.50
1977	5.92	8.73	50.80	68.25
1978	9.11	2.21	60.20	39.25
1979	3.76	1.60	27.20	32.00
1980	5.60	1.02	44.60	25.00
1981	6.61	1.64	52.25	34.50
1982	3.82	1.97	26.25	34.40
1983	6.58	1.29	48.00	28.75
1984	5.14	2.35	36.75	45.25
1985	1.07	0.06	4.25	2.75
1986	1.62	0.28	7.25	9.75
1987	13.01	1.60	71.50	35.50
1988	4.91	3.81	38.50	57.75
1989	5.65	1.59	44.50	34.50
1990	6.42	0.88	52.75	22.00

TABLE D-4 UNIVARIATE AND BIVARIATE INDICES OF YOUNG-OF-YEAR ABUNDANCE FOR WHITE PERCH IN THE HUDSON RIVER ESTUARY, 1974-1990

Year	Univariate Indices		Bivariate Indices	
	BSS	FJS	BSS	FJS
1974	4.09	1.32	15.67	43.62
1975	8.03	5.90	35.40	68.00
1976	9.53	3.92	50.00	64.00
1977	6.78	0.59	33.00	34.25
1978	13.92	1.09	58.20	41.75
1979	17.03	5.38	63.20	67.25
1980	10.66	2.52	52.20	57.50
1981	10.29	1.81	53.75	54.75
1982	10.00	0.82	53.50	40.40
1983	10.36	0.82	53.50	40.00
1984	4.20	0.37	18.25	27.75
1985	4.35	0.09	18.00	10.50
1986	5.60	0.17	25.50	14.50
1987	8.86	0.09	44.75	10.00
1988	7.55	0.33	38.75	26.50
1989	6.29	0.19	28.25	18.00
1990	3.86	0.02	14.75	2.75

TABLE D-5 UNIVARIATE AND BIVARIATE INDICES OF YOUNG-OF-YEAR ABUNDANCE FOR AMERICAN SHAD IN THE HUDSON RIVER ESTUARY, 1979-1990

Year	Univariate Indices		Bivariate Indices	
	BSS	FJS	BSS	FJS
1979	11.65	0.53	20.20	14.75
1980	10.75	0.46	19.00	14.00
1981	17.62	0.89	32.75	25.25
1982	16.32	0.64	30.00	24.50
1983	19.68	1.59	32.75	20.75
1984	8.78	0.57	14.00	20.25
1985	8.07	0.91	12.50	27.50
1986	19.14	1.85	33.00	42.00
1987	13.60	0.50	25.75	14.75
1988	7.71	0.66	11.00	22.25
1989	22.12	1.44	40.50	40.75
1990	18.75	0.82	37.50	27.25

APPENDIX E

LENGTH-FREQUENCY DISTRIBUTION

APPENDIX E

LIST OF TABLES

Table E-1. LENGTH FREQUENCY DISTRIBUTION OF LARVAL AND YOUNG-OF-YEAR STRIPED BASS IN HUDSON RIVER ESTUARY DETERMINED FROM LONGITUDINAL RIVER ICHTHYOPLANKTON SURVEY, 1990

DATES	0.0-1.9	2.0-3.9	4.0-5.9	6.0-7.9	8.0-9.9	10.0-11.9	12.0-13.9	14.0-15.9	16.0-17.9	18.0-19.9	20.0-21.9	22.0-23.9	24.0-25.9	26.0-27.9	28.0-29.9	30.0-31.9
19APR-23APR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23APR-26APR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30APR-03MAY	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07MAY-10MAY	0	63	348	114	0	0	0	0	0	0	0	0	0	0	0	0
14MAY-17MAY	0	69	800	244	0	0	0	0	0	0	0	0	0	0	0	0
21MAY-24MAY	6	168	645	462	3	1	0	0	0	0	0	0	0	0	0	0
29MAY-02JUN	3	485	1314	366	26	0	0	0	0	0	0	0	0	0	0	0
04JUN-07JUN	0	252	1066	856	37	0	0	0	0	0	0	0	0	0	0	0
11JUN-14JUN	0	188	906	920	30	5	0	0	0	0	0	0	0	0	0	0
18JUN-21JUN	0	36	572	1489	326	6	4	0	0	0	0	0	0	0	0	0
25JUN-28JUN	0	4	203	969	1068	423	83	19	2	2	0	0	0	0	0	0

DATES	32.0-33.9	34.0-35.9	36.0-37.9	38.0-39.9	40.0-41.9	42.0-43.9	44.0-45.9	46.0-47.9	48.0-49.9	50.0-51.9	52.0-53.9	54.0-55.9	56.0-57.9	58.0-59.9	60.0-61.9	62.0-63.9
19APR-23APR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23APR-26APR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30APR-03MAY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07MAY-10MAY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14MAY-17MAY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21MAY-24MAY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
29MAY-02JUN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04JUN-07JUN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11JUN-14JUN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18JUN-21JUN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25JUN-28JUN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

DATES	64.0-65.9	66.0-67.9	68.0-69.9	70.0-71.9	72.0-73.9	74.0-75.9	76.0-77.9	78.0-79.9	80.0-81.9	82.0-83.9+	N	MEAN	MIN	MED	MAX	SD
19APR-23APR	0	0	0	0	0	0	0	0	0	0	0	.	.	.	.	.
23APR-26APR	0	0	0	0	0	0	0	0	0	0	0	.	.	.	.	.
30APR-03MAY	0	0	0	0	0	0	0	0	0	0	2	2.7	2.7	2.7	2.8	0.1
07MAY-10MAY	0	0	0	0	0	0	0	0	0	0	525	5.1	2.6	5.3	6.9	0.9
14MAY-17MAY	0	0	0	0	0	0	0	0	0	0	1113	5.3	2.8	5.3	7.6	0.9
21MAY-24MAY	0	0	0	0	0	0	0	0	0	0	1285	5.4	1.2	5.5	10.2	1.2
29MAY-02JUN	0	0	0	0	0	0	0	0	0	0	2194	4.9	1.4	5.0	9.5	1.3
04JUN-07JUN	0	0	0	0	0	0	0	0	0	0	2211	5.4	2.1	5.4	9.7	1.2
11JUN-14JUN	0	0	0	0	0	0	0	0	0	0	2049	5.7	2.1	5.9	10.5	1.2
18JUN-21JUN	0	0	0	0	0	0	0	0	0	0	2433	6.7	2.2	6.6	13.7	1.2
25JUN-28JUN	0	0	0	0	0	0	0	0	0	0	2773	8.4	3.3	8.3	18.2	1.8

NOTE: N = Number of lengths, MEAN = Mean length, MIN = Minimum length, MED = Median length, MAX = Maximum length, SD = Standard deviation

Table E-1. (Cont.) LENGTH FREQUENCY DISTRIBUTION OF LARVAL AND YOUNG-OF-YEAR STRIPED BASS IN HUDSON RIVER ESTUARY DETERMINED FROM LONGITUDINAL RIVER ICHTHYOPLANKTON SURVEY, 1990

DATES	0.0-1.9	2.0-3.9	4.0-5.9	6.0-7.9	8.0-9.9	10.0-11.9	12.0-13.9	14.0-15.9	16.0-17.9	18.0-19.9	20.0-21.9	22.0-23.9	24.0-25.9	26.0-27.9	28.0-29.9	30.0-31.9
02JUL-06JUL	0	1	28	439	561	500	334	176	112	63	32	17	5	4	3	1
16JUL-19JUL	0	1	0	9	19	38	46	65	24	22	11	7	13	10	10	11
30JUL-02AUG	0	0	0	0	1	2	0	2	1	1	2	1	3	2	2	1
14AUG-16AUG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	======	======	======	======	======	======	======	======	======	======	======	======	======	======	======	======
	9	1269	5882	5868	2071	975	467	262	139	88	45	25	21	16	15	13

DATES	32.0-33.9	34.0-35.9	36.0-37.9	38.0-39.9	40.0-41.9	42.0-43.9	44.0-45.9	46.0-47.9	48.0-49.9	50.0-51.9	52.0-53.9	54.0-55.9	56.0-57.9	58.0-59.9	60.0-61.9	62.0-63.9
02JUL-06JUL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16JUL-19JUL	15	6	5	3	1	1	0	0	1	1	0	0	0	0	0	0
30JUL-02AUG	3	4	1	2	1	1	3	2	0	4	0	0	0	0	0	0
14AUG-16AUG	1	3	2	1	2	5	2	2	3	1	1	8	2	1	7	5
	======	======	======	======	======	======	======	======	======	======	======	======	======	======	======	======
	19	13	8	6	4	7	5	4	4	6	1	8	2	1	7	5

DATES	64.0-65.9	66.0-67.9	68.0-69.9	70.0-71.9	72.0-73.9	74.0-75.9	76.0-77.9	78.0-79.9	80.0-81.9	82.0-83.9+	N	MEAN	MIN	MED	MAX	SD
02JUL-06JUL	0	0	0	0	0	0	0	0	0	0	2276	11.0	3.0	10.2	30.0	3.6
16JUL-19JUL	0	0	0	0	0	0	0	0	0	1	320	18.2	3.6	15.0	88.0	9.2
30JUL-02AUG	0	0	0	0	0	0	0	0	0	0	39	31.6	8.8	32.0	50.0	12.3
14AUG-16AUG	2	1	1	2	1	0	0	0	1	3	57	55.2	32.0	55.0	95.0	14.3
	======	======	======	======	======	======	======	======	======	======	======					
	2	1	1	2	1	0	0	0	1	4	17277					

NOTE: N = Number of lengths, MEAN = Mean length, MIN = Minimum length, MED = Median length, MAX = Maximum length, SD = Standard deviation

Table E-2. LENGTH FREQUENCY DISTRIBUTION OF STRIPED BASS IN HUDSON RIVER ESTUARY DETERMINED FROM FALL SHOALS SURVEY, 1990

DATES	10.0-14.9	15.0-19.9	20.0-24.9	25.0-29.9	30.0-34.9	35.0-39.9	40.0-44.9	45.0-49.9	50.0-54.9	55.0-59.9	60.0-64.9	65.0-69.9	70.0-74.9	75.0-79.9	80.0-84.9	85.0-89.9	90.0-94.9
09JUL-14JUL	1	10	24	22	12	10	3	0	0	0	0	0	0	0	0	0	0
23JUL-27JUL	0	0	1	6	13	22	24	16	14	6	2	1	0	0	0	0	0
06AUG-10AUG	0	0	2	2	3	4	14	22	30	22	16	9	4	3	0	0	0
20AUG-24AUG	0	0	0	0	1	2	3	11	12	30	12	13	15	4	7	2	0
04SEP-07SEP	0	0	0	0	0	0	0	0	3	8	11	16	22	9	9	6	6
17SEP-20SEP	0	0	0	0	0	0	0	1	2	2	10	12	20	14	10	8	3
01OCT-06OCT	0	0	0	0	0	0	0	0	0	1	0	5	6	6	13	7	6
15OCT-17OCT	0	0	0	0	0	0	0	0	0	0	0	3	1	4	8	13	7
	======	======	======	======	======	======	======	======	======	======	======	======	======	======	======	======	======
	1	10	27	30	29	38	44	50	61	69	51	59	68	40	47	36	22

DATES	95.0-99.9	100.0-104.9	105.0-109.9	110.0-114.9	115.0-119.9	120.0-124.9	125.0-129.9	130.0-134.9	135.0-139.9	140.0-144.9	145.0-149.9+	N	MEAN	MIN	MED	MAX	SD
09JUL-14JUL	0	0	0	0	0	0	0	0	0	0	0	82	26.9	14.0	25.5	44.0	6.5
23JUL-27JUL	0	0	0	0	0	0	0	0	0	0	0	106	42.5	24.0	42.0	65.0	8.7
06AUG-10AUG	0	0	0	0	0	0	0	0	0	0	0	135	52.8	22.0	53.0	79.0	10.6
20AUG-24AUG	0	0	0	0	0	0	0	0	0	0	0	113	60.9	34.0	59.0	87.0	11.2
04SEP-07SEP	4	0	0	0	0	0	0	0	0	0	0	96	72.4	50.0	70.0	99.0	11.3
17SEP-20SEP	3	1	0	0	0	0	0	0	0	0	0	90	73.8	47.0	73.0	100.0	10.6
01OCT-06OCT	2	1	3	1	1	0	0	0	0	0	0	53	83.2	57.0	83.0	115.0	12.5
15OCT-17OCT	5	8	8	1	0	4	0	0	0	0	0	62	93.0	67.0	90.0	124.0	13.3
	======	======	======	======	======	======	======	======	======	======	======	======					
	14	10	11	2	1	4	0	0	0	0	0	737					

NOTE: N = Number of lengths, MEAN = Mean length, MIN = Minimum length, MED = Median length, MAX = Maximum length, SD = Standard deviation

Table E-3. LENGTH FREQUENCY DISTRIBUTION OF STRIPED BASS IN HUDSON RIVER ESTUARY DETERMINED FROM BEACH SEINE SURVEY, 1990

DATES	20.0-24.9	25.0-29.9	30.0-34.9	35.0-39.9	40.0-44.9	45.0-49.9	50.0-54.9	55.0-59.9	60.0-64.9	65.0-69.9	70.0-74.9	75.0-79.9	80.0-84.9	85.0-89.9	90.0-94.9	95.0-99.9
18JUN-20JUN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02JUL-03JUL	5	7	4	10	2	0	0	0	0	0	0	0	0	0	0	0
17JUL-19JUL	9	19	23	26	30	15	4	2	0	0	0	0	0	0	0	0
31JUL-03AUG	1	10	11	9	20	22	23	16	12	8	3	4	1	1	0	0
14AUG-17AUG	0	0	8	4	9	13	10	17	16	10	13	16	9	6	4	0
27AUG-29AUG	0	0	0	1	5	9	19	20	19	21	16	8	7	4	2	2
10SEP-12SEP	0	0	0	0	0	3	6	13	14	28	23	20	6	6	8	3
24SEP-26SEP	0	0	0	0	0	0	0	6	10	11	20	21	25	9	9	3
08OCT-10OCT	0	0	0	0	0	0	1	1	7	17	17	14	10	10	7	8
22OCT-24OCT	0	0	0	0	0	0	0	2	3	4	27	24	18	11	6	2
	======	======	======	======	======	======	======	======	======	======	======	======	======	======	======	======
	15	36	46	50	66	62	63	77	81	99	119	107	76	47	36	18

DATES	100.0-104.9	105.0-109.9	110.0-114.9	115.0-119.9	120.0-124.9	125.0-129.9	130.0-134.9	135.0-139.9	140.0-144.9+	N	MEAN	MIN	MED	MAX	SD
18JUN-20JUN	0	0	0	0	0	0	0	0	0	0	.	.	.	.	.
02JUL-03JUL	0	0	0	0	0	0	0	0	0	28	32.1	21.0	31.5	41.0	6.4
17JUL-19JUL	0	0	0	0	0	0	0	0	0	129	36.6	19.0	37.0	58.0	8.1
31JUL-03AUG	0	0	0	0	0	0	0	0	0	142	49.2	24.0	49.0	89.0	13.1
14AUG-17AUG	1	0	0	0	0	0	0	0	0	142	61.8	30.0	63.0	101.0	15.6
27AUG-29AUG	0	0	0	0	0	0	0	0	0	142	63.3	39.0	62.0	95.0	11.8
10SEP-12SEP	6	0	0	0	0	0	0	0	0	140	71.6	45.0	70.0	103.0	12.6
24SEP-26SEP	0	1	1	0	0	0	0	0	0	120	76.3	55.0	76.0	110.0	10.8
08OCT-10OCT	3	5	1	0	0	0	0	0	0	101	79.5	50.0	77.0	113.0	13.3
22OCT-24OCT	3	1	0	1	0	0	0	0	0	103	78.8	59.0	77.0	116.0	9.8
	======	======	======	======	======	======	======	======	======	======					
	13	7	2	1	0	0	0	0	0	1047					

NOTE: N = Number of lengths, MEAN = Mean length, MIN = Minimum length, MED = Median length, MAX = Maximum length, SD = Standard deviation

Table E-4. LENGTH FREQUENCY DISTRIBUTION OF LARVAL AND YOUNG-OF-YEAR WHITE PERCH IN HUDSON RIVER ESTUARY DETERMINED FROM LONGITUDINAL RIVER ICHTHYOPLANKTON SURVEY, 1990

DATES	0.0-1.9	2.0-3.9	4.0-5.9	6.0-7.9	8.0-9.9	10.0-11.9	12.0-13.9	14.0-15.9	16.0-17.9	18.0-19.9	20.0-21.9	22.0-23.9	24.0-25.9	26.0-27.9	28.0-29.9
19APR-23APR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23APR-26APR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30APR-03MAY	0	12	11	0	0	0	0	0	0	0	0	0	0	0	0
07MAY-10MAY	1	465	536	0	0	0	0	0	0	0	0	0	0	0	0
14MAY-17MAY	1	212	1313	2	0	0	0	0	0	0	0	0	0	0	0
21MAY-24MAY	0	471	973	143	0	0	0	0	0	0	0	0	0	0	0
29MAY-02JUN	0	536	1046	92	2	0	0	0	0	0	0	0	0	0	0
04JUN-07JUN	0	837	1413	28	1	0	0	0	0	0	0	0	0	0	0
11JUN-14JUN	0	645	1251	68	6	1	0	0	0	0	0	0	0	0	0
18JUN-21JUN	0	304	1069	258	27	0	0	0	0	0	0	0	0	0	0
25JUN-28JUN	0	183	1203	404	113	37	13	10	3	0	0	0	0	0	0

DATES	30.0-31.9	32.0-33.9	34.0-35.9	36.0-37.9	38.0-39.9	40.0-41.9	42.0-43.9	44.0-45.9	46.0-47.9	48.0-49.9	50.0-51.9	52.0-53.9	54.0-55.9	56.0-57.9	58.0-59.9
19APR-23APR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23APR-26APR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30APR-03MAY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07MAY-10MAY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14MAY-17MAY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21MAY-24MAY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
29MAY-02JUN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04JUN-07JUN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11JUN-14JUN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18JUN-21JUN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25JUN-28JUN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

DATES	60.0-61.9	62.0-63.9	64.0-65.9	66.0-67.9	68.0-69.9	70.0-71.9	72.0-73.9	74.0-75.9	76.0-77.9+	N	MEAN	MIN	MED	MAX	SD
19APR-23APR	0	0	0	0	0	0	0	0	0	0	.	.	.	.	.
23APR-26APR	0	0	0	0	0	0	0	0	0	0	.	.	.	.	.
30APR-03MAY	0	0	0	0	0	0	0	0	0	23	3.7	2.7	3.9	4.5	0.5
07MAY-10MAY	0	0	0	0	0	0	0	0	0	1004	3.9	1.9	4.0	4.7	0.4
14MAY-17MAY	0	0	0	0	0	0	0	0	0	1528	4.4	1.9	4.4	6.2	0.5
21MAY-24MAY	0	0	0	0	0	0	0	0	0	1587	4.5	2.0	4.2	7.6	0.9
29MAY-02JUN	0	0	0	0	0	0	0	0	0	1676	4.2	2.2	4.1	8.0	0.8
04JUN-07JUN	0	0	0	0	0	0	0	0	0	2279	4.1	2.2	4.1	8.2	0.6
11JUN-14JUN	0	0	0	0	0	0	0	0	0	1971	4.4	2.2	4.3	10.1	0.9
18JUN-21JUN	0	0	0	0	0	0	0	0	0	1658	5.0	2.1	4.9	9.4	1.1
25JUN-28JUN	0	0	0	0	0	0	0	0	0	1966	5.6	2.6	5.2	17.3	1.8

NOTE: N = Number of lengths, MEAN = Mean length, MIN = Minimum length, MED = Median length, MAX = Maximum length, SD = Standard deviation

Table E-4 (Cont.) LENGTH FREQUENCY DISTRIBUTION OF LARVAL AND YOUNG-OF-YEAR WHITE PERCH IN HUDSON RIVER ESTUARY DETERMINED FROM LONGITUDINAL RIVER ICHTHYOPLANKTON SURVEY, 1990

DATES	0.0-1.9	2.0-3.9	4.0-5.9	6.0-7.9	8.0-9.9	10.0-11.9	12.0-13.9	14.0-15.9	16.0-17.9	18.0-19.9	20.0-21.9	22.0-23.9	24.0-25.9	26.0-27.9	28.0-29.9
02JUL-06JUL	0	41	322	359	433	277	146	34	6	3	3	0	0	0	0
16JUL-19JUL	0	0	3	10	19	47	43	40	14	4	3	1	2	4	1
30JUL-02AUG	0	0	0	0	0	2	1	3	1	0	1	1	0	0	0
14AUG-16AUG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	======	======	======	======	======	======	======	======	======	======	======	======	======	======	======
	2	3706	9140	1364	601	364	203	87	24	7	7	2	2	4	1

DATES	30.0-31.9	32.0-33.9	34.0-35.9	36.0-37.9	38.0-39.9	40.0-41.9	42.0-43.9	44.0-45.9	46.0-47.9	48.0-49.9	50.0-51.9	52.0-53.9	54.0-55.9	56.0-57.9	58.0-59.9
02JUL-06JUL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16JUL-19JUL	4	1	0	0	0	0	0	0	0	0	0	0	0	0	0
30JUL-02AUG	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
14AUG-16AUG	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0
	======	======	======	======	======	======	======	======	======	======	======	======	======	======	======
	4	1	0	0	1	0	0	0	0	0	1	0	1	0	0

DATES	60.0-61.9	62.0-63.9	64.0-65.9	66.0-67.9	68.0-69.9	70.0-71.9	72.0-73.9	74.0-75.9	76.0-77.9+	N	MEAN	MIN	MED	MAX	SD
02JUL-06JUL	0	0	0	0	0	0	0	0	0	1624	8.4	2.6	8.4	21.5	2.8
16JUL-19JUL	0	0	0	0	0	0	0	0	0	196	13.4	4.6	12.6	33.0	4.9
30JUL-02AUG	0	0	0	0	0	0	0	0	0	10	17.8	10.0	15.0	39.5	8.6
14AUG-16AUG	1	1	1	0	0	0	0	0	0	5	58.4	50.0	60.0	65.0	6.3
	======	======	======	======	======	======	======	======	======	======					
	1	1	1	0	0	0	0	0	0	15527					

NOTE: N = Number of lengths, MEAN = Mean length, MIN = Minimum length, MED = Median length, MAX = Maximum length, SD = Standard deviation

Table E-5. LENGTH FREQUENCY DISTRIBUTION OF WHITE PERCH IN HUDSON RIVER ESTUARY DETERMINED FROM BEACH SEINE SURVEY, 1990

DATES	15.0-19.9	20.0-24.9	25.0-29.9	30.0-34.9	35.0-39.9	40.0-44.9	45.0-49.9	50.0-54.9	55.0-59.9	60.0-64.9	65.0-69.9	70.0-74.9
18JUN-20JUN	0	0	0	0	0	0	0	0	0	0	0	0
02JUL-03JUL	1	0	0	1	0	0	0	0	0	0	0	0
17JUL-19JUL	2	26	28	26	11	1	1	5	0	0	0	0
31JUL-03AUG	0	3	8	10	25	13	12	5	3	2	0	0
14AUG-17AUG	0	0	0	4	4	14	15	19	19	10	6	3
27AUG-29AUG	0	0	0	0	1	5	4	11	17	13	21	5
10SEP-12SEP	0	0	0	0	0	0	2	4	9	11	24	30
24SEP-26SEP	0	0	0	0	0	0	1	1	3	3	14	24
08OCT-10OCT	0	0	0	0	0	0	0	0	1	7	14	14
22OCT-24OCT	0	0	0	0	0	0	0	0	2	6	12	17
	======	======	======	======	======	======	======	======	======	======	======	======
	3	29	36	41	41	33	35	45	54	52	91	93

DATES	75.0-79.9	80.0-84.9	85.0-89.9	90.0-94.9	95.0-99.9+	N	MEAN	MIN	MED	MAX	SD
18JUN-20JUN	0	0	0	0	0	0	.	.	.	.	.
02JUL-03JUL	0	0	0	0	0	2	23.5	17.0	23.5	30.0	9.2
17JUL-19JUL	0	0	0	0	0	100	29.7	19.0	28.0	52.0	7.5
31JUL-03AUG	0	0	0	0	0	81	39.4	21.0	39.0	64.0	8.8
14AUG-17AUG	1	0	0	0	0	98	52.5	31.0	53.0	75.0	9.6
27AUG-29AUG	0	0	0	0	0	89	59.1	35.0	60.0	74.0	8.1
10SEP-12SEP	11	4	2	0	0	100	67.9	49.0	69.0	88.0	8.0
24SEP-26SEP	18	10	7	1	0	84	72.9	47.0	73.0	90.0	8.2
08OCT-10OCT	9	14	5	0	0	65	73.5	56.0	73.0	89.0	7.7
22OCT-24OCT	24	18	6	3	0	89	75.1	55.0	76.0	94.0	7.9
	======	======	======	======	======	======					
	63	46	20	4	0	708					

NOTE: N = Number of lengths, MEAN = Mean length, MIN = Minimum length, MED = Median length, MAX = Maximum length, SD = Standard deviation

Table E-6. LENGTH FREQUENCY DISTRIBUTION OF WHITE PERCH IN HUDSON RIVER ESTUARY DETERMINED FROM FALL SHOALS SURVEY, 1990

DATES	10.0-14.9	15.0-19.9	20.0-24.9	25.0-29.9	30.0-34.9	35.0-39.9	40.0-44.9	45.0-49.9	50.0-54.9	55.0-59.9	60.0-64.9	65.0-69.9
09JUL-14JUL	8	10	4	0	0	0	0	0	0	0	0	0
23JUL-27JUL	0	3	2	1	0	1	0	0	0	0	0	0
06AUG-10AUG	0	0	1	7	6	1	0	1	3	3	0	0
20AUG-24AUG	0	0	0	0	0	3	0	2	1	1	8	17
04SEP-07SEP	0	0	0	0	0	3	2	3	2	3	2	2
17SEP-20SEP	0	0	0	0	0	0	0	0	0	1	4	3
01OCT-06OCT	0	0	0	0	0	0	0	0	0	1	0	6
15OCT-17OCT	0	0	0	0	0	0	0	0	0	0	1	0
	======	======	======	======	======	======	======	======	======	======	======	======
	8	13	7	8	6	8	2	6	6	9	15	28

DATES	70.0-74.9	75.0-79.9	80.0-84.9	85.0-89.9	90.0-94.9+	N	MEAN	MIN	MED	MAX	SD
09JUL-14JUL	0	0	0	0	0	22	16.2	13.0	16.0	22.0	2.9
23JUL-27JUL	0	0	0	0	0	7	23.3	18.0	22.0	35.0	6.4
06AUG-10AUG	0	0	0	0	0	22	36.6	20.0	30.5	59.0	12.2
20AUG-24AUG	3	0	0	0	0	37	61.6	36.0	65.0	73.0	9.3
04SEP-07SEP	2	0	2	0	0	21	55.9	35.0	55.0	83.0	14.1
17SEP-20SEP	6	10	5	0	0	29	72.9	57.0	75.0	84.0	7.3
01OCT-06OCT	4	12	5	2	0	30	75.0	59.0	76.5	86.0	6.5
15OCT-17OCT	6	11	13	5	2	38	79.8	64.0	80.0	96.0	6.0
	======	======	======	======	======	======					
	21	33	25	7	2	206					

NOTE: N = Number of lengths, MEAN = Mean length, MIN = Minimum length, MED = Median length, MAX = Maximum length, SD = Standard deviation

Table E-7. LENGTH FREQUENCY DISTRIBUTION OF LARVAL AND YOUNG-OF-YEAR AMERICAN SHAD IN HUDSON RIVER ESTUARY DETERMINED FROM LONGITUDINAL RIVER ICHTHYOPLANKTON SURVEY, 1990

DATES	4.0-5.9	6.0-7.9	8.0-9.9	10.0-11.9	12.0-13.9	14.0-15.9	16.0-17.9	18.0-19.9	20.0-21.9	22.0-23.9	24.0-25.9	26.0-27.9	28.0-29.9	30.0-31.9	32.0-33.9	34.0-35.9	36.0-37.9
19APR-23APR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23APR-26APR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30APR-03MAY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07MAY-10MAY	0	6	101	182	7	0	0	0	0	0	0	0	0	0	0	0	0
14MAY-17MAY	0	9	156	616	246	2	0	0	0	0	0	0	0	0	0	0	0
21MAY-24MAY	1	20	235	968	287	13	0	0	0	0	0	0	0	0	2	0	1
29MAY-02JUN	0	0	81	649	230	20	1	0	0	0	0	0	0	0	0	1	0
04JUN-07JUN	0	11	37	85	151	32	2	0	0	0	0	0	0	0	0	0	0
11JUN-14JUN	0	3	52	59	35	42	41	10	1	2	0	1	0	0	0	0	0
18JUN-21JUN	0	1	5	19	18	19	21	19	14	11	2	0	0	0	0	0	0
25JUN-28JUN	0	0	6	21	2	15	17	22	15	53	64	55	14	1	3	1	3

DATES	38.0-39.9	40.0-41.9	42.0-43.9	44.0-45.9	46.0-47.9	48.0-49.9	50.0-51.9	52.0-53.9	54.0-55.9	56.0-57.9	58.0-59.9	60.0-61.9	62.0-63.9	64.0-65.9	66.0-67.9	68.0-69.9	70.0-71.9
19APR-23APR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23APR-26APR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30APR-03MAY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07MAY-10MAY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14MAY-17MAY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21MAY-24MAY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
29MAY-02JUN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04JUN-07JUN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11JUN-14JUN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18JUN-21JUN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25JUN-28JUN	1	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0

DATES	72.0-73.9	74.0-75.9	76.0-77.9	78.0-79.9	80.0-81.9	82.0-83.9	84.0-85.9	86.0-87.9	88.0-89.9	90.0-91.9	92.0-93.9+	N	MEAN	MIN	MED	MAX	SD
19APR-23APR	0	0	0	0	0	0	0	0	0	0	0	0	.	.	.	.	.
23APR-26APR	0	0	0	0	0	0	0	0	0	0	0	0	.	.	.	.	.
30APR-03MAY	0	0	0	0	0	0	0	0	0	0	0	0	.	.	.	.	.
07MAY-10MAY	0	0	0	0	0	0	0	0	0	0	0	296	10.2	6.8	10.4	12.5	1.0
14MAY-17MAY	0	0	0	0	0	0	0	0	0	0	0	1029	11.1	6.7	11.2	14.0	1.2
21MAY-24MAY	0	0	0	0	0	0	0	0	0	0	0	1527	11.0	5.0	11.0	36.2	1.6
29MAY-02JUN	0	0	0	0	0	0	0	0	0	0	0	982	11.3	8.0	11.3	34.1	1.3
04JUN-07JUN	0	0	0	0	0	0	0	0	0	0	0	318	11.9	6.2	12.2	17.0	1.8
11JUN-14JUN	0	0	0	0	0	0	0	0	0	0	0	246	13.0	7.3	12.5	27.0	3.3
18JUN-21JUN	0	0	0	0	0	0	0	0	0	0	0	129	16.0	6.7	16.0	25.0	4.2
25JUN-28JUN	0	0	0	0	0	0	0	0	0	0	0	296	22.3	8.8	23.5	43.0	5.8

NOTE: N = Number of lengths, MEAN = Mean length, MIN = Minimum length, MED = Median length, MAX = Maximum length, SD = Standard deviation

Table E-7 (Cont.) LENGTH FREQUENCY DISTRIBUTION OF LARVAL AND YOUNG-OF-YEAR AMERICAN SHAD IN HUDSON RIVER ESTUARY DETERMINED FROM LONGITUDINAL RIVER ICHTHYOPLANKTON SURVEY, 1990

DATES	4.0-5.9	6.0-7.9	8.0-9.9	10.0-11.9	12.0-13.9	14.0-15.9	16.0-17.9	18.0-19.9	20.0-21.9	22.0-23.9	24.0-25.9	26.0-27.9	28.0-29.9	30.0-31.9	32.0-33.9	34.0-35.9	36.0-37.9
02JUL-06JUL	0	0	0	2	3	3	9	15	25	34	27	29	36	33	42	38	37
16JUL-19JUL	0	0	0	0	0	1	2	0	0	0	0	0	0	0	0	0	0
30JUL-02AUG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14AUG-16AUG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	======	======	======	======	======	======	======	======	======	======	======	======	======	======	======	======	======
	1	50	673	2601	979	147	93	66	55	100	93	85	50	34	47	40	41

DATES	38.0-39.9	40.0-41.9	42.0-43.9	44.0-45.9	46.0-47.9	48.0-49.9	50.0-51.9	52.0-53.9	54.0-55.9	56.0-57.9	58.0-59.9	60.0-61.9	62.0-63.9	64.0-65.9	66.0-67.9	68.0-69.9	70.0-71.9
02JUL-06JUL	12	2	0	1	0	0	1	1	1	0	0	0	0	0	0	0	0
16JUL-19JUL	0	1	1	0	1	2	5	5	7	5	2	2	1	1	1	0	0
30JUL-02AUG	0	1	0	2	0	0	0	2	1	0	0	2	3	0	2	1	0
14AUG-16AUG	0	0	0	0	0	0	0	0	0	0	0	0	1	4	3	4	2
	======	======	======	======	======	======	======	======	======	======	======	======	======	======	======	======	======
	13	6	2	3	1	2	6	8	9	5	2	4	5	5	6	5	2

DATES	72.0-73.9	74.0-75.9	76.0-77.9	78.0-79.9	80.0-81.9	82.0-83.9	84.0-85.9	86.0-87.9	88.0-89.9	90.0-91.9	92.0-93.9+	N	MEAN	MIN	MED	MAX	SD
02JUL-06JUL	0	0	0	0	0	0	0	0	0	0	0	351	28.8	10.6	29.0	55.0	6.8
16JUL-19JUL	0	0	0	0	0	0	0	0	0	0	0	37	51.0	15.4	54.0	66.0	11.6
30JUL-02AUG	0	0	0	0	0	0	0	0	0	0	0	14	57.1	40.0	60.0	68.0	8.9
14AUG-16AUG	1	2	0	1	0	0	0	0	0	0	0	18	68.7	63.0	68.0	79.0	4.3
	======	======	======	======	======	======	======	======	======	======	======	======					
	1	2	0	1	0	0	0	0	0	0	0	5243					

NOTE: N = Number of lengths, MEAN = Mean length, MIN = Minimum length, MED = Median length, MAX = Maximum length, SD = Standard deviation

Table E-8 LENGTH FREQUENCY DISTRIBUTION OF AMERICAN SHAD IN HUDSON RIVER ESTUARY DETERMINED FROM FALL SHOALS SURVEY, 1990

DATES	20.0-24.9	25.0-29.9	30.0-34.9	35.0-39.9	40.0-44.9	45.0-49.9	50.0-54.9	55.0-59.9	60.0-64.9	65.0-69.9	70.0-74.9	75.0-79.9	80.0-84.9	85.0-89.9	90.0-94.9
09JUL-14JUL	0	5	6	6	7	8	23	6	0	1	0	0	0	0	0
23JUL-27JUL	0	1	0	2	0	3	7	45	20	8	3	0	0	0	0
06AUG-10AUG	0	0	0	0	1	0	1	13	22	27	8	3	2	1	0
20AUG-24AUG	0	0	0	0	0	0	0	0	11	24	17	6	3	1	1
04SEP-07SEP	0	0	0	0	0	0	1	0	0	7	15	10	3	4	1
17SEP-20SEP	0	0	0	0	0	0	0	1	0	0	8	5	5	10	5
01OCT-06OCT	0	0	0	0	0	0	0	0	0	0	1	4	4	8	7
15OCT-17OCT	0	0	0	0	0	0	0	0	0	0	1	3	4	15	13
	======	======	======	======	======	======	======	======	======	======	======	======	======	======	======
	0	6	6	8	8	11	32	65	53	67	53	31	21	39	27

DATES	95.0-99.9	100.0-104.9	105.0-109.9	110.0-114.9	115.0-119.9	120.0-124.9	125.0-129.9	130.0-134.9	135.0-139.9+	N	MEAN	MIN	MED	MAX	SD
09JUL-14JUL	0	0	0	0	0	0	0	0	0	63	46.0	25.0	49.0	68.0	9.4
23JUL-27JUL	0	0	0	0	0	0	0	0	0	100	58.3	28.0	58.0	73.0	6.5
06AUG-10AUG	0	0	0	0	0	0	0	0	0	89	64.4	42.0	64.0	85.0	6.3
20AUG-24AUG	0	0	0	0	0	0	0	0	0	66	69.5	60.0	68.5	90.0	6.2
04SEP-07SEP	0	0	0	0	1	0	0	0	0	42	75.2	52.0	73.5	115.0	9.7
17SEP-20SEP	2	0	0	0	0	0	0	0	0	36	81.8	59.0	81.5	96.0	8.4
01OCT-06OCT	6	0	0	0	0	0	0	0	0	30	87.3	74.0	88.0	98.0	6.6
15OCT-17OCT	13	3	2	2	1	0	0	0	0	57	92.3	73.0	92.0	116.0	8.6
	======	======	======	======	======	======	======	======	======	======					
	21	3	2	2	2	0	0	0	0	483					

NOTE: N = Number of lengths, MEAN = Mean length, MIN = Minimum length, MED = Median length, MAX = Maximum length, SD = Standard deviation

Table E-9 LENGTH FREQUENCY DISTRIBUTION OF AMERICAN SHAD IN HUDSON RIVER ESTUARY DETERMINED FROM BEACH SEINE SURVEY, 1990

DATES	20.0-24.9	25.0-29.9	30.0-34.9	35.0-39.9	40.0-44.9	45.0-49.9	50.0-54.9	55.0-59.9	60.0-64.9	65.0-69.9	70.0-74.9	75.0-79.9
18JUN-20JUN	18	2	0	0	0	0	0	0	0	0	0	0
02JUL-03JUL	2	23	46	29	6	2	1	1	0	0	0	0
17JUL-19JUL	0	3	21	45	27	30	19	11	3	0	0	1
31JUL-03AUG	0	0	0	2	2	12	35	62	16	6	3	0
14AUG-17AUG	0	0	0	0	0	0	5	21	51	35	2	0
27AUG-29AUG	0	0	0	0	0	0	0	3	15	37	42	13
10SEP-12SEP	0	0	0	0	0	0	0	1	8	9	31	37
24SEP-26SEP	0	0	0	0	0	0	0	0	0	2	27	53
08OCT-10OCT	0	0	0	0	0	0	0	0	0	0	8	25
22OCT-24OCT	0	0	0	0	0	0	0	0	0	2	6	25
	======	======	======	======	======	======	======	======	======	======	======	======
	20	28	67	76	35	44	60	99	93	91	119	154

DATES	80.0-84.9	85.0-89.9	90.0-94.9	95.0-99.9	100.0-104.9	105.0-109.9+	N	MEAN	MIN	MED	MAX	SD
18JUN-20JUN	0	0	0	0	0	0	20	23.3	21.0	23.0	29.0	1.7
02JUL-03JUL	0	0	0	0	0	0	110	33.3	22.0	33.0	55.0	5.1
17JUL-19JUL	0	0	0	0	0	0	161	42.8	27.0	42.0	78.0	8.5
31JUL-03AUG	1	0	0	0	0	0	147	56.2	39.0	57.0	83.0	6.1
14AUG-17AUG	0	0	0	0	0	0	126	62.3	51.0	62.5	71.0	4.1
27AUG-29AUG	1	0	0	0	0	0	112	69.0	55.0	69.5	80.0	4.7
10SEP-12SEP	11	3	0	0	0	0	100	74.0	59.0	75.0	87.0	5.5
24SEP-26SEP	31	11	1	0	0	0	125	77.8	67.0	77.0	90.0	4.5
08OCT-10OCT	69	31	1	0	0	0	134	81.9	72.0	82.0	94.0	3.8
22OCT-24OCT	49	50	21	3	3	2	161	84.5	67.0	84.0	105.0	6.4
	======	======	======	======	======	======	======					
	162	95	23	3	3	2	1196					

NOTE: N = Number of lengths, MEAN = Mean length, MIN = Minimum length, MED = Median length, MAX = Maximum length, SD = Standard deviation

Table E-10 LENGTH FREQUENCY DISTRIBUTION OF BLUEBACK HERRING IN HUDSON RIVER ESTUARY DETERMINED FROM FALL SHOALS SURVEY, 1990

DATES	35.0-39.9	40.0-44.9	45.0-49.9	50.0-54.9	55.0-59.9	60.0-64.9	65.0-69.9	70.0-74.9	75.0-79.9	80.0-84.9	85.0-89.9	90.0-94.9
09JUL-14JUL	0	3	1	1	2	0	0	0	0	0	0	0
23JUL-27JUL	0	19	25	18	5	2	0	0	0	0	0	0
06AUG-10AUG	4	14	31	41	30	6	0	1	0	0	0	0
20AUG-24AUG	1	6	16	33	32	8	2	1	0	0	0	0
04SEP-07SEP	1	2	2	11	32	11	11	0	1	0	0	0
17SEP-20SEP	0	0	0	5	35	26	11	3	1	0	0	0
01OCT-06OCT	0	0	0	4	26	12	10	6	1	0	0	0
15OCT-17OCT	0	0	0	3	8	25	30	18	25	17	2	0
	======	======	======	======	======	======	======	======	======	======	======	======
	6	44	75	116	170	90	64	29	28	17	2	0

DATES	95.0-99.9	100.0-104.9	105.0-109.9	110.0-114.9	115.0-119.9	120.0-124.9+	N	MEAN	MIN	MED	MAX	SD
09JUL-14JUL	0	0	0	0	0	0	7	47.3	41.0	45.0	55.0	6.2
23JUL-27JUL	0	0	0	0	0	0	70	48.0	41.0	47.5	62.0	5.0
06AUG-10AUG	0	0	0	0	0	0	130	51.2	36.0	51.0	72.0	6.3
20AUG-24AUG	0	0	0	0	0	0	101	53.4	37.0	54.0	71.0	5.9
04SEP-07SEP	0	0	0	0	0	0	83	58.2	37.0	58.0	76.0	6.5
17SEP-20SEP	0	0	0	0	0	0	92	60.3	51.0	60.0	75.0	4.6
01OCT-06OCT	0	0	0	0	0	0	70	61.0	51.0	60.0	79.0	5.4
15OCT-17OCT	0	0	0	0	0	0	133	69.8	53.0	68.0	86.0	8.0
	======	======	======	======	======	======	======					
	0	0	0	0	0	0	686					

NOTE: N = Number of lengths, MEAN = Mean length, MIN = Minimum length, MED = Median length, MAX = Maximum length, SD = Standard deviation

Table E-11 LENGTH FREQUENCY DISTRIBUTION OF BLUEBACK HERRING IN HUDSON RIVER ESTUARY DETERMINED FROM BEACH SEINE SURVEY, 1990

DATES	30.0-34.9	35.0-39.9	40.0-44.9	45.0-49.9	50.0-54.9	55.0-59.9	60.0-64.9	65.0-69.9	70.0-74.9
18JUN-20JUN	0	0	0	0	0	0	0	0	0
02JUL-03JUL	0	0	0	1	0	0	0	0	0
17JUL-19JUL	0	0	101	22	6	0	0	0	0
31JUL-03AUG	0	0	29	62	29	8	0	0	0
14AUG-17AUG	0	6	23	30	39	12	1	0	0
27AUG-29AUG	1	0	6	10	27	27	9	5	1
10SEP-12SEP	0	1	8	5	15	31	10	12	4
24SEP-26SEP	0	0	1	6	13	44	21	9	3
08OCT-10OCT	0	0	0	0	8	24	27	14	5
22OCT-24OCT	0	1	0	1	7	16	38	46	25
	======	======	======	======	======	======	======	======	======
	1	8	168	137	144	162	106	86	38

DATES	75.0-79.9	80.0-84.9	85.0-89.9+	N	MEAN	MIN	MED	MAX	SD
18JUN-20JUN	0	0	0	0	.	.	.	.	.
02JUL-03JUL	0	0	0	1	45.0	45.0	45.0	45.0	.
17JUL-19JUL	0	0	0	129	43.0	40.0	42.0	53.0	2.8
31JUL-03AUG	0	0	0	128	47.6	41.0	47.0	57.0	3.9
14AUG-17AUG	0	0	0	111	48.3	37.0	49.0	61.0	5.3
27AUG-29AUG	0	0	0	90	54.2	32.0	55.0	70.0	6.7
10SEP-12SEP	1	0	0	96	57.0	39.0	57.0	77.0	7.8
24SEP-26SEP	0	0	0	107	58.1	44.0	58.0	71.0	5.2
08OCT-10OCT	5	1	0	92	62.2	52.0	61.0	82.0	6.3
22OCT-24OCT	13	5	2	163	65.5	27.0	65.0	91.0	8.1
	======	======	======	======					
	19	6	2	917					

NOTE: N = Number of lengths, MEAN = Mean length, MIN = Minimum length, MED = Median length, MAX = Maximum length, SD = Standard deviation

Table E-12 LENGTH FREQUENCY DISTRIBUTION OF ALEWIFE IN HUDSON RIVER ESTUARY DETERMINED FROM FALL SHOALS SURVEY, 1990

DATES	40.0-44.9	45.0-49.9	50.0-54.9	55.0-59.9	60.0-64.9	65.0-69.9	70.0-74.9	75.0-79.9	80.0-84.9	85.0-89.9	90.0-94.9	95.0-99.9
09JUL-14JUL	8	8	2	0	0	1	0	0	0	0	0	0
23JUL-27JUL	0	3	3	6	3	5	4	1	0	0	0	0
06AUG-10AUG	3	1	1	1	2	3	4	2	2	0	0	0
20AUG-24AUG	0	0	0	0	0	3	6	5	6	4	0	0
04SEP-07SEP	0	0	0	0	0	0	2	1	0	1	2	0
17SEP-20SEP	0	0	0	0	0	0	1	4	6	16	4	3
01OCT-06OCT	0	0	0	1	0	4	0	1	1	7	3	2
15OCT-17OCT	0	0	0	0	0	0	0	2	1	3	5	6
	======	======	======	======	======	======	======	======	======	======	======	======
	11	12	6	8	5	16	17	16	16	31	14	11

DATES	100.0-104.9	105.0-109.9	110.0-114.9	115.0-119.9	120.0-124.9	125.0-129.9+	N	MEAN	MIN	MED	MAX	SD
09JUL-14JUL	0	0	0	0	0	0	19	46.6	41.0	45.0	69.0	6.5
23JUL-27JUL	0	0	0	0	0	0	27	60.9	47.0	60.0	78.0	8.3
06AUG-10AUG	0	0	0	0	0	0	19	63.8	40.0	66.0	84.0	14.0
20AUG-24AUG	0	0	0	0	0	0	24	77.3	67.0	76.5	89.0	6.3
04SEP-07SEP	0	0	0	0	0	0	6	81.8	72.0	82.5	90.0	8.4
17SEP-20SEP	1	0	0	0	0	0	35	86.5	74.0	87.0	100.0	6.3
01OCT-06OCT	4	0	0	0	0	0	23	85.7	58.0	88.0	100.0	12.6
15OCT-17OCT	7	2	3	0	0	0	29	96.9	77.0	97.0	113.0	9.1
	======	======	======	======	======	======	======					
	12	2	3	0	0	0	182					

NOTE: N = Number of lengths, MEAN = Mean length, MIN = Minimum length, MED = Median length, MAX = Maximum length, SD = Standard deviation

Table E-13 LENGTH FREQUENCY DISTRIBUTION OF ALEWIFE IN HUDSON RIVER ESTUARY DETERMINED FROM BEACH SEINE SURVEY, 1990

DATES	20.0-24.9	25.0-29.9	30.0-34.9	35.0-39.9	40.0-44.9	45.0-49.9	50.0-54.9	55.0-59.9	60.0-64.9	65.0-69.9	70.0-74.9	75.0-79.9	80.0-84.9
18JUN-20JUN	0	0	0	0	0	0	0	0	0	0	0	0	0
02JUL-03JUL	0	0	0	2	7	0	0	0	0	0	0	0	0
17JUL-19JUL	0	0	0	1	43	17	9	10	1	2	0	0	0
31JUL-03AUG	0	0	0	0	2	6	6	10	12	11	4	0	0
14AUG-17AUG	0	0	0	0	0	0	0	1	3	7	5	1	0
27AUG-29AUG	0	0	0	0	0	0	0	1	2	6	10	11	6
10SEP-12SEP	0	0	0	0	0	0	0	0	1	1	12	10	5
24SEP-26SEP	0	0	0	0	0	0	0	0	0	5	14	13	19
08OCT-10OCT	0	0	0	0	0	0	0	0	1	4	7	6	6
22OCT-24OCT	0	0	0	0	0	0	0	0	0	0	0	2	4
	======	======	======	======	======	======	======	======	======	======	======	======	======
	0	0	0	3	52	23	15	22	20	36	52	43	40

DATES	85.0-89.9	90.0-94.9	95.0-99.9	100.0-104.9	105.0-109.9	110.0-114.9+	N	MEAN	MIN	MED	MAX	SD
18JUN-20JUN	0	0	0	0	0	0	0	.	.	.	.	.
02JUL-03JUL	0	0	0	0	0	0	10	42.7	36.0	41.0	60.0	6.5
17JUL-19JUL	0	0	0	0	0	0	84	47.1	39.0	44.0	65.0	6.3
31JUL-03AUG	0	0	0	0	0	0	51	59.2	44.0	61.0	74.0	8.0
14AUG-17AUG	0	0	0	0	0	0	18	67.3	59.0	68.0	77.0	5.0
27AUG-29AUG	0	0	0	0	0	0	36	73.4	58.0	72.5	84.0	6.2
10SEP-12SEP	2	0	2	1	0	0	34	77.4	63.0	76.5	100.0	8.2
24SEP-26SEP	7	2	0	0	0	0	61	77.7	60.0	79.0	92.0	6.6
08OCT-10OCT	2	3	0	0	0	0	29	77.3	64.0	77.0	94.0	8.0
22OCT-24OCT	2	0	2	0	0	1	11	87.5	78.0	82.0	110.0	9.7
	======	======	======	======	======	======	======					
	13	5	4	1	0	1	334					

NOTE: N = Number of lengths, MEAN = Mean length, MIN = Minimum length, MED = Median length, MAX = Maximum length, SD = Standard deviation