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1991 Year Class Report for the Hudson River Estuary Monitoring Program

January 1996

Jointly Funded by

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

LMS **LAWLER, MATUSKY & SKELLY ENGINEERS LLP**
Environmental Science & Engineering Consultants
One Blue Hill Plaza • Pearl River, New York 10965

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Prepared for

Consolidated Edison Company of New York, Inc.
4 Irving Place
New York, New York 10003

January 1996

Prepared by

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CONTENTS

	Page
LIST OF FIGURES	vi
LIST OF TABLES	xiii
EXECUTIVE SUMMARY	ES-1
1 INTRODUCTION	1-1
2 MATERIALS AND METHODS	2-1
2.1 Sampling Design	2-1
2.2 Longitudinal River Ichthyoplankton Survey	2-3
2.2.1 Field Methods	2-3
2.2.2 Laboratory Methods	2-15
2.3 Fall Juvenile Survey	2-22
2.3.1 Field Methods	2-22
2.3.2 Laboratory Methods	2-29
2.4 Beach Seine Survey	2-30
2.4.1 Field Methods	2-30
2.4.2 Laboratory Methods	2-30
2.5 Analytical Methods	2-33
2.5.1 Physical/Chemical Parameters	2-33
2.5.2 Spatiotemporal Distribution Indices	2-34
2.5.3 Annual Young of Year Abundance Indices	2-42
2.5.4 Growth	2-49
3 PHYSICAL/CHEMICAL PARAMETERS	3-1
3.1 Green Island Dam Flows	3-1
3.1.1 Introduction	3-1
3.1.2 Seasonal Pattern	3-1
3.1.3 Comparison to Long-Term Record	3-3

CONTENTS (Cont.)

	Page
3.2 Poughkeepsie Water Works Temperatures	3-3
3.2.1 Introduction	3-3
3.2.2 Seasonal Pattern	3-3
3.2.3 Comparison to Long-Term Record	3-5
3.3 Longitudinal River Ichthyoplankton/Fall Juvenile Surveys	3-5
3.3.1 Spatiotemporal Pattern in Temperature	3-5
3.3.2 Spatiotemporal Pattern in Salinity	3-6
3.3.3 Spatiotemporal Pattern in Dissolved Oxygen (DO)	3-7
3.4 General Summary of Physical/Chemical Conditions	3-10
4 SPATIOTEMPORAL DISTRIBUTION OF SELECTED SPECIES OF HUDSON RIVER ESTUARY FISHES	4-1
4.1 Fish Community	4-1
4.1.1 General Description of the Fish Community	4-1
4.1.2 Species Occurrence Through Time	4-2
4.2 Striped Bass	4-6
4.2.1 Egg Distribution	4-13
4.2.2 Yolk-Sac Larval Distribution	4-13
4.2.3 Post Yolk-Sac Larval Distribution	4-15
4.2.4 Young of Year Distribution	4-15
4.2.5 Yearling and Older Fish Distribution	4-18
4.2.6 Comparison to Previous Years	4-18
4.2.7 Microdistribution Patterns	4-18
4.3 White Perch	4-23
4.3.1 Egg Distribution	4-26
4.3.2 Yolk-Sac Larval Distribution	4-26
4.3.3 Post Yolk-Sac Larval Distribution	4-26
4.3.4 Young of Year Distribution	4-29
4.3.5 Yearling and Older Fish Distribution	4-29
4.3.6 Comparison to Previous Years	4-29
4.3.7 Microdistribution Patterns	4-33

CONTENTS (Cont.)

	Page
4.4 Atlantic Tomcod	4-37
4.4.1 Egg Distribution	4-38
4.4.2 Yolk-Sac Larval Distribution	4-38
4.4.3 Post Yolk-Sac Larval Distribution	4-38
4.4.4 Young of Year Distribution	4-38
4.4.5 Yearling and Older Fish Distribution	4-41
4.4.6 Comparison to Previous Years	4-41
4.5 American Shad	4-41
4.5.1 Egg Distribution	4-45
4.5.2 Yolk-Sac Larval Distribution	4-47
4.5.3 Post Yolk-Sac Larval Distribution	4-47
4.5.4 Young of Year Distribution	4-47
4.5.5 Yearling and Older Fish Distribution	4-50
4.5.6 Comparison to Previous Years	4-50
4.5.7 Microdistribution Patterns	4-50
4.6 River Herrings	4-54
4.6.1 Egg Distribution	4-55
4.6.2 Yolk-Sac Larval Distribution	4-55
4.6.3 Post Yolk-Sac Larval Distribution	4-55
4.6.4 Early Young of Year Distribution	4-58
4.7 Blueback Herring	4-58
4.7.1 Young of Year Distribution	4-58
4.7.2 Yearling and Older Fish Distribution	4-61
4.8 Alewife	4-61
4.8.1 Young of Year Distribution	4-61
4.8.2 Yearling and Older Fish Distribution	4-65
4.9 Bay Anchovy	4-65
4.9.1 Egg Distribution	4-67
4.9.2 Yolk-Sac Larval Distribution	4-67
4.9.3 Post Yolk-Sac Larval Distribution	4-69
4.9.4 Young of Year Distribution	4-69

CONTENTS (Cont.)

	Page
4.9.5 Yearling and Older Fish Distribution	4-69
4.9.6 Comparison to Previous Years	4-73
4.10 Weakfish	4-73
4.10.1 Young of Year Distribution	4-75
4.10.2 Yearling and Older Fish Distribution	4-75
4.11 White Catfish	4-75
4.11.1 Young of Year Distribution	4-79
4.11.2 Yearling and Older Fish Distribution	4-79
4.12 Spottail Shiner	4-79
4.12.1 Young of Year Distribution	4-82
4.12.2 Yearling and Older Fish Distribution	4-82
4.13 Atlantic Sturgeon	4-85
4.13.1 Early Life Stage Distribution	4-86
4.13.2 Young of Year Distribution	4-86
4.13.3 Yearling and Older Fish Distribution	4-86
4.14 Shortnose Sturgeon	4-86
4.14.1 Young of Year Distribution	4-90
4.14.2 Yearling and Older Fish Distribution	4-90
4.14.3 Unidentified Sturgeon	4-90
4.15 Rainbow Smelt	4-90
4.15.1 Egg Distribution	4-93
4.15.2 Yolk-Sac Larvae Distribution	4-93
4.15.3 Post Yolk-Sac Larvae Distribution	4-93
4.15.4 Young of Year Distribution	4-93
4.15.5 Yearling and Older Distribution	4-93
5 YOUNG-OF-YEAR ABUNDANCE INDICES	5-1
OMITTED	

CONTENTS (Cont.)

	Page
6 GROWTH	6-1
6.1 Striped Bass	6-1
6.2 White Perch	6-3
6.3 American Shad	6-7
6.4 Alewife	6-11
6.5 Blueback Herring	6-15
REFERENCES	R-1

APPENDICES

A: Bibliography of the Utilities and NYSDEC Hudson River Biomonitoring Technical Reports and Related Manuscripts
B: Quality Assurance Program and Data Quality Control Review
C: Physical/Chemical Parameters
D: Density and Standing Crop Estimates
E: Abundance Indices
F: Length-Frequency Distribution
G: Historic Changes in Utility Sampling Programs

LIST OF FIGURES

Number	Title	Page
2-1	Location of 13 geographic regions (with river mile boundaries) sampled during 1991 field sampling programs in the Hudson River estuary.	2-2
2-2	Cross sections of the Hudson River estuary showing locations and typical proportional relationships of the shoal, bottom, and channel strata.	2-4
2-3	Design and dimensions of 1.0-m^2 Tucker trawl.	2-7
2-4	Design and dimensions of 1.0-m^2 Tucker trawl mounted on an epibenthic sled.	2-8
2-5	Sampling schedule for 1991.	2-12
2-6	Sampling schedule for Ichthyoplankton surveys in the Hudson River estuary, 1974-1991.	2-13
2-7	Spatial distribution of sampling for the Ichthyoplankton surveys in the Hudson River estuary, 1974-1991.	2-14
2-8	Conceptual diagram of the splitting process.	2-19
2-9	Inspection plan for evaluation of splitting precision.	2-20
2-10	Design and dimensions of the 3.0-m beam trawl used in the 1991 Fall Juvenile Survey.	2-23
2-11	Sampling schedule for Beach Seine and Fall Juvenile surveys in the Hudson River estuary, 1974-1991.	2-27
2-12	Spatial distribution of sampling for the Ichthyoplankton surveys in Hudson River estuary, 1974-1991.	2-28
3-1	Hudson River daily average flow rates in 1991 and monthly average flow rates from 1918 to 1990, Green Island Dam, Troy, New York.	3-2
3-2	Seasonal variations in water temperature from 1991 Hudson River surveys and 1951-1990 Poughkeepsie Water Works.	3-4

LIST OF FIGURES (Cont.)

Number	Title	Page
3-3	Seasonal variations in salinity based on the 1991 Longitudinal River Ichthyoplankton and Fall Juvenile surveys.	3-8
3-4	Seasonal variations in dissolved oxygen and percent saturation from 1990 Hudson River surveys.	3-9
4-1	Spatiotemporal distribution of egg and yolk-sac stages of striped bass in the Hudson River estuary based on the 1991 Longitudinal River Ichthyoplankton Survey.	4-14
4-2	Spatiotemporal distribution of post yolk-sac and young-of-year stages of striped bass in the Hudson River estuary based on the 1991 Longitudinal River Ichthyoplankton Survey.	4-16
4-3	Spatiotemporal distribution of young-of-year striped bass in the Hudson River estuary based on the 1991 Fall Juvenile and Beach Seine surveys.	4-17
4-4	Spatiotemporal distribution of yearling and older striped bass in the Hudson River estuary based on the 1991 Fall Juvenile and Beach Seine surveys.	4-19
4-5	Temporal distribution indices for the early life stages of striped bass collected during Longitudinal River Ichthyoplankton surveys of the Hudson River estuary, 1974-1991.	4-20
4-6	Geographic distribution indices for the early life stages of striped bass collected during Longitudinal River Ichthyoplankton surveys of the Hudson River estuary, 1974-1991.	4-21
4-7	Geographic distribution indices for young-of-year striped bass collected during Beach Seine surveys of the Hudson River estuary, 1974-1991.	4-22
4-8	Microdistribution (mean density by river mile) of striped bass in the Hudson River estuary based on the 1991 Longitudinal River Ichthyoplankton Survey.	4-24
4-9	Spatiotemporal distribution of egg and yolk-sac stages of white perch in the Hudson River estuary based on the 1991 Longitudinal River Ichthyoplankton Survey.	4-27

LIST OF FIGURES (Cont.)

Number	Title	Page
4-10	Spatiotemporal distribution of post yolk-sac and young-of-year stages of white perch in the Hudson River estuary based on the 1991 Longitudinal River Ichthyoplankton Survey.	4-28
4-11	Spatiotemporal distribution of young-of-year white perch in the Hudson River estuary based on the 1991 Fall Juvenile and Beach Seine surveys.	4-30
4-12	Spatiotemporal distribution of yearling and older white perch in the Hudson River estuary based on the 1991 Fall Juvenile and Beach Seine surveys.	4-31
4-13	Temporal distribution indices for the early life stages of white perch collected during Longitudinal River Ichthyoplankton surveys of the Hudson River estuary, 1974-1991.	4-32
4-14	Geographic distribution indices for the early life stages of white perch collected during Longitudinal River Ichthyoplankton surveys of the Hudson River estuary, 1974-1991.	4-34
4-15	Geographic distribution indices for young-of-year white perch collected during Beach Seine surveys of the Hudson River estuary, 1974-1991.	4-35
4-16	Microdistribution (mean density by river mile) of white perch in the Hudson River estuary based on the 1991 Longitudinal River Ichthyoplankton Survey.	4-36
4-17	Spatiotemporal distribution of egg and yolk-sac stages of Atlantic tomcod in the Hudson River estuary based on the 1991 Longitudinal River Ichthyoplankton Survey.	4-39
4-18	Spatiotemporal distribution of post yolk-sac and young-of-year stages of Atlantic tomcod in the Hudson River estuary based on the 1991 Longitudinal River Ichthyoplankton Survey.	4-40
4-19	Spatiotemporal distribution of young-of-year Atlantic tomcod in the Hudson River estuary based on the 1991 Fall Juvenile and Beach Seine surveys.	4-42

LIST OF FIGURES (Cont.)

Number	Title	Page
4-20	Spatiotemporal distribution of yearling and older Atlantic tomcod in the Hudson River estuary based on the 1991 Fall Juvenile and Beach Seine surveys.	4-43
4-21	Geographic distribution indices for young-of-year Atlantic tomcod collected during Beach Seine surveys of the Hudson River estuary, 1974-1991.	4-44
4-22	Spatiotemporal distribution of egg and yolk-sac stages of American shad in the Hudson River estuary based on the 1991 Longitudinal River Ichthyoplankton Survey.	4-46
4-23	Spatiotemporal distribution of post yolk-sac and young-of-year stages of American shad in the Hudson River estuary based on the 1991 Longitudinal River Ichthyoplankton Survey.	4-48
4-24	Spatiotemporal distribution of young-of-year American shad in the Hudson River estuary based on the 1991 Fall Juvenile and Beach Seine surveys.	4-49
4-25	Spatiotemporal distribution of yearling and older American shad in the Hudson River estuary based on the 1991 Fall Juvenile and Beach Seine surveys.	4-51
4-26	Geographic distribution indices for young of year American shad collected during Beach Seine surveys of the Hudson River estuary, 1974-1991.	4-52
4-27	Microdistribution (mean density by river mile) of American shad in the Hudson River estuary based on the 1991 Longitudinal River Ichthyoplankton Survey.	4-53
4-28	Spatiotemporal distribution of egg and yolk-sac stages of *Alosa* spp. in the Hudson River estuary based on the 1991 Longitudinal River Ichthyoplankton Survey.	4-56
4-29	Spatiotemporal distribution of post yolk-sac and young-of-year stages of *Alosa* spp. in the Hudson River estuary based on the 1991 Longitudinal River Ichthyoplankton Survey.	4-57

LIST OF FIGURES (Cont.)

Number	Title	Page
4-30	Spatiotemporal distribution of young-of-year blueback herring in the Hudson River estuary based on the 1991 Hudson River surveys.	4-59
4-31	Spatiotemporal distribution of young-of-year blueback herring in the Hudson River estuary based on the 1991 Fall Juvenile and Beach Seine River Ichthyoplankton Surveys.	4-60
4-32	Spatiotemporal distribution of yearling and older blueback herring in the Hudson River estuary based on the 1991 Fall Juvenile and Beach Seine Ichthyoplankton surveys.	4-62
4-33	Spatiotemporal distribution of young-of-year stage of alewife in the Hudson River estuary based on the 1991 Hudson River surveys.	4-63
4-34	Spatiotemporal distribution of young-of-year alewife in the Hudson River estuary based on the 1991 Fall Juvenile and Beach Seine River Ichthyoplankton survey	4-64
4-35	Spatiotemporal distribution of yearling and older alewife in the Hudson River estuary based on the 1991 Fall Juvenile and Beach Seine River Ichthyoplankton surveys	4-66
4-36	Spatiotemporal distribution of egg and yolk-sac stages of bay anchovy in the Hudson River estuary based on the 1991 Long River Ichthyoplankton Survey.	4-68
4-37	Spatiotemporal distribution of post yolk-sac and young-of-year stages of bay anchovy in the Hudson River estuary based on the 1991 Long River Ichthyoplankton Survey.	4-70
4-38	Spatiotemporal distribution of young-of-year bay anchovy in the Hudson River estuary based on the 1991 Fall Juvenile and Beach Seine River Ichthyoplankton surveys.	4-71
4-39	Spatiotemporal distribution of yearling and older bay anchovy in the Hudson River estuary based on the 1991 Fall Juvenile and Beach Seine surveys.	4-72
4-40	Geographic distribution indices for young-of-year bay anchovy collected during Beach Seine surveys of the Hudson River estuary, 1974-1991.	4-74

LIST OF FIGURES (Cont.)

Number	Title	Page
4-41	Spatiotemporal distribution of young-of-year weakfish in the Hudson River estuary based on the 1991 Long River Ichthyoplankton surveys.	4-76
4-42	Spatiotemporal distribution of young-of-year weakfish in the Hudson River estuary based on the 1991 Fall Juvenile and Beach Seine River Ichthyoplankton surveys.	4-77
4-43	Spatiotemporal distribution of yearling and older weakfish in the Hudson River estuary based on the 1991 Fall Juvenile and Beach Seine River Ichthyoplankton surveys.	4-78
4-44	Spatiotemporal distribution of young-of-year white catfish in the Hudson River estuary based on the 1991 Fall Juvenile and Beach Seine River Ichthyoplankton surveys.	4-80
4-45	Spatiotemporal distribution of yearling and older white catfish in the Hudson River estuary based on the 1991 Fall Juvenile and Beach Seine River Ichthyoplankton surveys.	4-81
4-46	Spatiotemporal distribution of young-of-year spottail shiner in the Hudson River estuary based on the 1991 Fall Juvenile and Beach Seine River Ichthyoplankton surveys.	4-83
4-47	Spatiotemporal distribution of yearling and older spottail shiner in the Hudson River estuary based on the 1991 Fall Juvenile and Beach Seine River Ichthyoplankton surveys.	4-84
4-48	Spatiotemporal distribution of young-of-year Atlantic sturgeon in the Hudson River estuary based on the 1991 Fall Juvenile and Beach Seine River Ichthyoplankton surveys.	4-87
4-49	Spatiotemporal distribution of yearling and older Atlantic sturgeon in the Hudson River estuary based on the 1991 Fall Juvenile and Beach Seine River Ichthyoplankton surveys.	4-88
4-50	Spatiotemporal distribution of yearling and older shortnose sturgeon in the Hudson River estuary based on the 1991 Fall Juvenile and Beach Seine River Ichthyoplankton surveys.	4-91

LIST OF FIGURES (Cont.)

Number	Title	Page
4-51	Spatiotemporal distribution of eggs and yolk-sac stages of rainbow smelt in the Hudson River estuary based on the 1991 Long River Ichthyoplankton Survey.	4-94
4-52	Spatiotemporal distribution of post yolk-sac and young-of-year stages of rainbow smelt in the Hudson River estuary based on the 1991 Long River Ichthyoplankton Survey.	4-95
6-1	Weekly length statistics for striped bass larvae and young of year in the Hudson River estuary, 1991.	6-2
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, 1991.	6-4
6-3	Weekly length statistics for white perch larvae and young of year in the Hudson River estuary, 1991.	6-6
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, 1991.	6-8
6-5	Weekly length statistics for American shad larvae and young of year in the Hudson River estuary, 1991.	6-10
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, 1991.	6-12
6-7	Weekly length statistics for alewife young of year in the Hudson River estuary, 1991.	6-14
6-8	Weekly length statistics for blueback herring young of year in the Hudson River estuary, 1991.	6-16

LIST OF TABLES

Number	Title	Page
1-1	Fish species selected for presentation in the 1991 Year Class Report.	1-3
2-1	Strata sampled within the 13 geographic regions of the Hudson River estuary during 1991.	2-5
2-2	Summary of 1991 Hudson River surveys.	2-6
2-3	Specifications of sampling gear used during the 1991 Longitudinal River Ichthyoplankton Survey.	2-9
2-4	Summary of 1991 sample collection information by river region and stratum for the Longitudinal River Ichthyoplankton Survey.	2-11
2-5	Water quality sampling locations during the 1991 Longitudinal River Ichthyoplankton Survey.	2-16
2-6	Summary of 1991 sample analysis information by river region and stratum for the Longitudinal River Ichthyoplankton Survey.	2-17
2-7	Specifications of sampling gear used during the 1991 Fall Juvenile Survey.	2-24
2-8	Number of biweekly samples collected during the 1991 Fall Juvenile Survey.	2-26
2-9	Specifications of sampling gear used during the 1991 Beach Seine Survey.	2-31
2-10	Number of biweekly samples collected during the 1991 Beach Seine Survey.	2-32
2-11	Stratum and region volumes and surface areas used in analysis of 1991 Hudson River estuary data.	2-38
2-12	Revised volume estimates used for weighting strata means and number of beaches used for weighting regional means of abundance for the annual abundance indices.	2-43

LIST OF TABLES (Cont.)

Number	Title	Page
2-13	Adjustment factors for the beam trawl to standardize values with those of the epibenthic sled.	2-45
4-1	Species composition of fish collected during Hudson River studies from 1974 to 1991.	4-3
4-2	Species composition of fish collected in each of the Hudson River surveys during 1990.	4-7
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.	6-5
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.	6-9
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.	6-13

EXECUTIVE SUMMARY

In 1991 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 typically have been presented in a series of annual Year Class reports. These and other Hudson River related reports and manuscripts are listed in Appendix A.

The studies conducted in 1991 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 early July and approximately 88 samples per week every other week thereafter through mid-October. Sampling was conducted with fine mesh nets near the bottom and in open water from the southern tip of Manhattan to Albany. Approximately 62% 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 mid-July through late October. Approximately 210 samples were collected between the George Washington Bridge and Albany during 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 late June through late October. Approximately 100 samples were collected 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 (USGS) gauging station at Green Island, New York (freshwater inflow). The major objectives and results of the 1991 Year Class Report were:

1. *Describe the patterns and variability of environmental parameters that may have affected fish distribution and abundance in 1991.*

   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 operations.

   In 1991 freshwater inflow as measured at the Green Island Dam was among the lowest recorded since the biological monitoring programs began in 1974. Below-average flows occurred from mid-March through December. As freshwater inflow was low throughout the sampling period, the saltfront extended up into the area between Poughkeepsie and Hyde Park in May and remained there until freshwater flows began to increase in the fall. Water temperatures were above the long-term average from March through October. In addition, water temperatures reached peak values early in the year and remained near peak values for an extended period of time; the result is a temperature profile with a broad flat peak. 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 1991.*

   The spatial and temporal distributions of fish within the Hudson River estuary are important in determining the potential vulnerability of each species to entrainment and impingement at the power plants. These distribution patterns are in turn influenced by various abiotic factors such as freshwater flow or temperature. In 1991 a total of 91 fish species were collected. Forty-five marine species were collected, the second highest number reported in a single year of the 18-year study. The number of freshwater species collected was similar to previous years.

   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. Description of the spatial and temporal distributions of rainbow smelt were first added last year and were studied again this year. The results of these analyses indicate that the eggs, larvae, and young of year of several of the species were

collected earlier in the year than most years studied and that the shore zone distribution of several of the species was shifted upriver.

Densities of striped bass eggs in 1991 were similar to 1990 values, which were higher than most previous years. Peak striped bass egg and yolk-sac larval populations occurred a week earlier in May than the historic trend. The temporal distribution of post yolk-sac larvae and young of year was similar, however, to the long-term values. As in 1990, the geographical distribution of the striped bass egg catch was shifted upriver from the historic long-term trend. Peak striped bass egg distribution occurred in the Poughkeepsie and Hyde Park regions upriver of the historic trend of Indian Point and West Point regions. The geographic distribution of the subsequent larval stages of striped bass and young of year in the Ichthyoplankton Survey paralleled the historical patterns, whereas the shore zone population of young of year was shifted upriver of the long-term trend. The young of year striped bass shore zone population, although abundant in the historic peak areas (Tappan Zee and Croton-Haverstraw regions), was also similarly abundant in the Saugerties to Albany regions. Analysis of the microdistribution pattern for eggs during peak abundance indicated their presence in a broad band from River Mile (RM) 48 to 105, with peak catch at RM 81. There is a general downriver shift in the peak abundance areas from the egg through young of year stages. Eggs and larval stages were abundant in areas near vegetated shallows and the mouths of tributary creeks.

White perch eggs and larval stages appeared one to two weeks earlier in May and June than observed in the long-term temporal distribution data. The young of year temporal distribution indicates a slight increase in the percent of the population collected during late June/early July. In some years the white perch population of eggs through young of year displays a bimodal temporal pattern. No such pattern was observed in 1991. The geographical distribution of the white perch egg, larvae, and young of year in the Ichthyoplankton Survey was similar to the long-term trend. As observed with the striped bass, however, the shore zone population of young of year was shifted upriver of the long-term trend. Young of year white perch were distributed more in the Kingston, Saugerties, Cornwall, and Poughkeepsie regions than the historical peak distribution in the Tappan Zee and Croton-Haverstraw regions. Analysis of the microdistribution patterns for egg, larvae, and young of year life stages indicates peak egg abundance at RM 101, where Esopus Creek enters the river. There is a slight downriver shift in the peak abundance of early life stages and young of year from that of the egg stage. Eggs and larvae were most abundant near extensive vegetated shallow areas of upriver regions.

No Atlantic tomcod eggs or yolk-sac larvae were collected in the Ichthyoplankton Survey. Spawning typically occurs from December through February, with hatching and development to the post-yolk-sac stage occurring before mid-April; ichthyoplankton sampling did not start until mid-April and ended in mid-October. The spatial and temporal distributions of the post yolk-sac and young of year life stages collected were similar to

previous years. Ichthyoplankton sampling typically begins in mid- to late April and either just misses or coincides with the occurrence of peak Atlantic tomcod post yolk-sac larvae and young of year. As observed in previous years, post yolk-sac and young of year were found primarily in the higher salinity regions below the Croton-Haverstraw region. In the shore zone, young of year were found primarily in the Tappan Zee region, which corresponds to the long-term trend.

American shad egg abundance peaked in late April, which is one week earlier than most prior years; a similar early peak in abundance was observed in 1978, 1986, 1987, and 1988. American shad yolk-sac and post yolk-sac larvae peak abundance occurred in mid-May and mid-June, respectively, which is within the typical range. As in recent years, peak abundance of young of year in the Ichthyoplankton Survey occurred the last week of sampling for upper regions of the river in early July. The spatial distribution of all life stages in the Ichthyoplankton Survey was similar to previous years, but, as with striped bass and white perch, the shore zone distribution of young of year was shifted upriver. The 1974-1990 long-term geographic distribution pattern for young of year is trimodal, with greatest abundance in the Tappan Zee and Croton-Haverstraw regions in the lower estuary, the Cornwall and Peekskill regions in the middle estuary, and the Saugerties, Catskill, and Albany regions in the upper estuary. In 1991 a biomodal pattern was observed, with most young of year found in the upper estuary and a smaller peak in the middle estuary. The lower flow and increased upriver intrusion of the saltfront in 1991 may have influenced the distribution pattern. Analysis of microdistribution patterns of American shad revealed that eggs and yolk sac larvae were most abundant in the northernmost areas of the Hudson River estuary, with only a slight downriver shift in distribution for larval and young of year life stages.

Because of the difficulty in distinguishing early life stages of the river herrings (alewife and blueback), the early life stages of these species were studied collectively. Spawning runs of the two species overlap to some extent, resulting in a bimodal temporal distribution pattern in the Hudson River. River herring peak egg and larvae abundance occurred one to three weeks earlier this year. Peaks in egg abundance occurred in late April and early May rather than the typical early to mid-May and mid- to late May pattern. Peak post yolk-sac abundance occurred in mid- and late May, with the typical range being late May and early to mid-June. Geographic distribution of early life stages was similar to previous years: highest densities were found in the upper freshwater regions of the estuary, with young of year densities decreasing in the upper regions and increasing in the lower regions as emigration from the river occurred in the fall.

The peak in bay anchovy egg abundance occurred in late June, which is similar to the late June to early July range from 1987 to 1990; in 1986 the peak occurred in early June. Larval and young of year peak populations in the Ichthyoplankton Survey occurred two to four weeks earlier than reported in 1986 to 1990. The shore zone population of young of year was shifted upriver from the long-term trend. Bay anchovy young of year were collected primarily in the shore areas of the Cornwall and Poughkeepsie regions instead of the Yonkers and Tappan Zee regions.

No rainbow smelt eggs were detected in the Ichthyoplankton Survey. Yolk sac larvae were collected primarily in late April in the middle and upper estuary in the Ichthyoplankton Survey. 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 waters of the lower and middle estuary. By late August young of year rainbow smelt were no longer collected; however, adult rainbow smelt were collected sporadically through mid-October 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 1991.*

The abundance of fish populations varies from year to year in response to changes in natural mortality, egg deposition, and 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. 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 1991 to indices calculated for previous years. The striped bass young of year indices suggest that the 1991 year class strength did not differ from most years. The Beach Seine index value of 5.0 and the peak

weekly combined standing crop estimate of 56 million were both well within the typical range for each. The Fall Juvenile abundance index of 0.2 was the second lowest value reported. The coordinate pair index indicated that the shore component value of 36 was within the typical range but the offshore value of 11 was low. Striped bass spawned two to three weeks earlier this year, temperatures were warmer than usual, and saline waters extended up into the Poughkeepsie region for a longer period of time than most years. The low Fall Juvenile index likely reflects distributional differences rather than poor year class strength. No evidence of a long-term decline or increase in young of year striped bass abundance within the Hudson River estuary is apparent for the period 1974-1991.

The abundance indices for young of year white perch suggest that 1991 is possibly a poor year class. The Beach Seine index value of 4 was the second lowest recorded in the 18 years of the study; however, it is very similar to values recorded in several of the years (4.1, 4.2, and 4.3 in 1990, 1974, and 1985, respectively). The Fall Shoals Juvenile index value of 0.03 was the second lowest recorded and continues a trend of lower offshore abundance extending back to 1980. The peak combined standing crop of 10.4 million was the lowest recorded except for 1990; peak combined standing crops of 20-58 million have been reported previously. Both the shore and offshore components in the coordinate pair index are low. Although a declining trend has been observed in the Fall Juvenile index since 1980, a similar trend has not been observed in the Beach Seine index. This suggests reasons other than declining population for the trend observed in the offshore collections. A recent analysis of white perch young of year and adult indices for the Hudson River suggests that although young of year indices indicate lower abundance, other white perch indices using older fish indicate 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 (e.g., expanded 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 1991 year class strength was similar to previous years. The Beach Seine index value of 12.02 was within the typical range of 10 to 18. The Fall Juvenile index value of 0.75 was also around the typical range of 0.50 to 0.91. The offshore component value of 29.75 was at the high end of the typical range of 15 to 29.5 and the shore component value of 21.75 was also within the typical range of 16 to 36.

4. *Describe the patterns in first-year growth for striped bass, white perch, and American shad in the Hudson River estuary in 1991.*

Growth during the first year of life is studied because fish growth is a highly variable process that can be greatly influenced by numerous biotic and abiotic environmental factors. Because of 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 to 1990, the earliest years for which estimates from the Hudson River estuary are available. Except for the log-linear growth rate estimate for American shad young of year (30 to 60 mm), which was the highest recorded for the period of study (1974 to 1991), 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 that 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, 1989, and 1990 Year Class Reports (EA 1990, 1991; LMS 1992) described the results of the 1988, 1989, and 1990 Longitudinal River Ichthyoplankton, Fall Juvenile, and Beach Seine surveys, respectively. These reports focused on physical/chemical parameter patterns and spatiotemporal distribution for 12 selected species (13 in 1990), 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 data base by describing the results of the Longitudinal River Ichthyoplankton, Fall Juvenile, and Beach Seine surveys for 1991. The 1991 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 1991.

2. Describe the distribution and abundance of 13 selected species of fish (Table 1-1) in the Hudson River estuary in 1991.

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 1991.

TABLE 1-1 FISH SPECIES SELECTED FOR PRESENTATION IN THE 1991 YEAR CLASS REPORT

Common Name	Scientific Name[a]	Life Stages[b]
Alewife	*Alosa pseudoharengus*	YOY, YRL[c]
American shad	*Alosa sapidissima*	Egg, YSL, PYSL, YOY, YRL
Atlantic sturgeon	*Acipenser oxyrhynchus*	YOY, YRL
Atlantic tomcod	*Microgadus tomcod*	YSL, PYSL, YOY, YRL
Bay anchovy	*Anchoa mitchilli*	Egg, YSL, PYSL, YOY, YRL
Blueback herring	*Alosa aestivalis*	YOY, YRL[c]
Rainbow smelt	*Osmerus mordax*	Egg, YSL, PYSL, YOY, YRL
Shortnose sturgeon	*Acipenser brevirostrum*	YOY, YRL
Spottail shiner	*Notropis hudsonius*	YOY, YRL
Striped bass	*Morone saxatilis*	Egg, YSL, PYSL, YOY, YRL
Weakfish	*Cynoscion regalis*	YOY, YRL
White catfish	*Ictalurus catus*	YOY, YRL
White perch	*Morone americana*	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. A bibliography of final reports from the Hudson River Utilities and New York State Department of Conservation (NYSDEC) Hudson River biomonitoring studies and associated manuscripts are given in Appendix A. Detailed data tables supporting report analyses are contained within the appendix section as follows: Appendix B - Quality Assurance Program and Data Quality Control Review; Appendix C - Physical/ Chemical Parameters; Appendix D - Density and Standing Crop Estimates; Appendix E - Abundance Indices; and Appendix F - Length-Frequency Distribution. Appendix G lists change in the Ichthyoplankton, Fall Juvenile, and Beach Seine programs since 1974.

CHAPTER 2
MATERIALS AND METHODS

2.1 SAMPLING DESIGN

In 1991 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 of interest 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/or larvae of these species are usually abundant in the estuary. This year the LRS sampling period extended into late summer/early fall to ensure complete coverage of early life stages of blueback herring (*Alosa aestivalis*) and alewife (*Alosa pseudoharengus*).

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 use the shore zone as a nursery area.

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). In 1991, as in recent years (1988-1990), an additional region from the Battery (RM 1) to the George

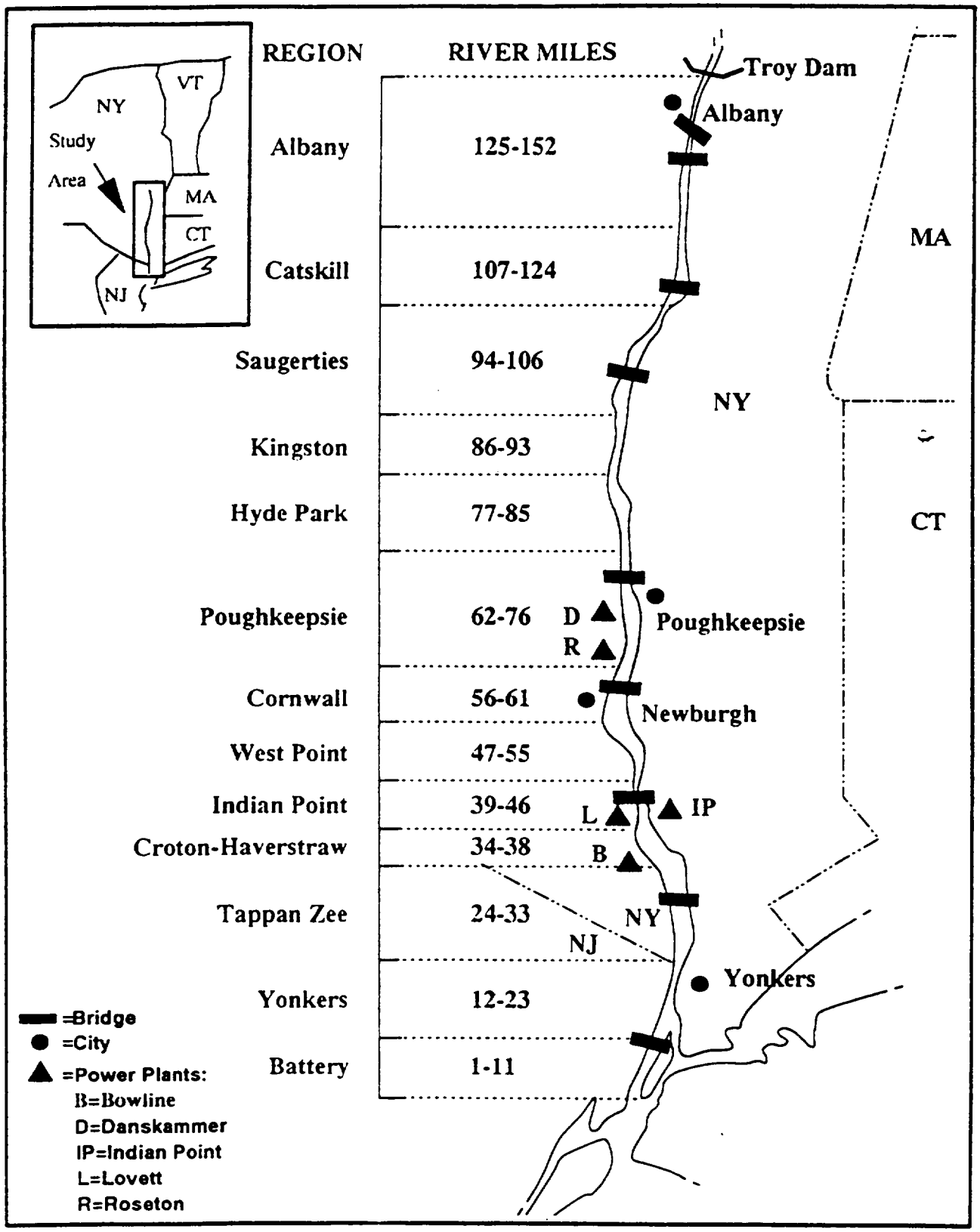

Figure 2-1. Location of 13 geographic regions (with river mile boundaries) sampled during 1991 field sampling programs in the Hudson River estuary.

Washington Bridge was sampled for the LRS. 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 are 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 eight weeks (first third) of the LRS or in the Hyde Park through Albany regions during the final 13 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 1991 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, and an epibenthic sled-mounted 1.0-m^2 net similar in design to the Tucker trawl (Figure 2-4) to sample the bottom strata. Both gear types were used to sample the shoal strata. Table 2-3 presents design specifications for the sampling gear.

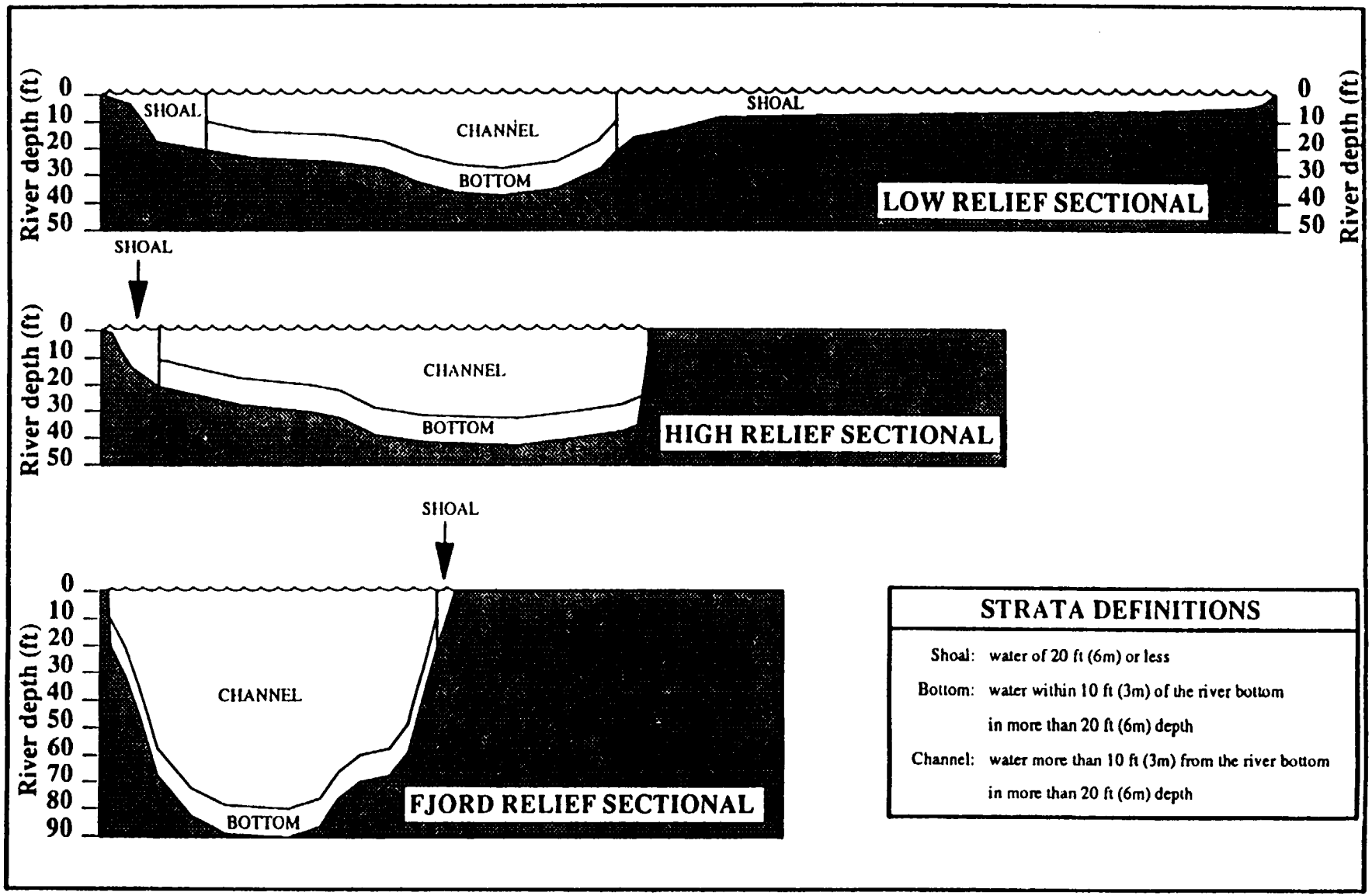

Figure 2-2. Cross sections of the Hudson River estuary showing locations and typical proportional relationships of the shoal, bottom, and channel strata.

TABLE 2-1 STRATA SAMPLED WITHIN THE 13 GEOGRAPHIC REGIONS OF THE HUDSON RIVER ESTUARY DURING 1991

Region	Abbreviation	River Miles	River Kilometers	1991 Survey			
				Shore	Shoal	Channel	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 1991 HUDSON RIVER SURVEYS

Program Phase	Sampling Schedule		Number of River Runs	Sampling Frequency	Strata Sampled	Sample Number			Sampling Gear
	Start Date	End Date				Collection Projected	Collection Actual	Lab Analysis	
Longitudinal River Ichthyoplankton Survey	15 APR	17 OCT	20	Weekly/ Biweekly	Shoal	502	503	416	1.0-m^2 net on epibenthic sled or 1.0-m^2 Tucker trawl
					Channel	1,687*	1,687	788	1.0-m^2 Tucker trawl
					Bottom	1,157	1,157	787	1.0-m^2 net on epibenthic sled
Fall Juvenile Survey	15 JUL	25 OCT	8	Biweekly	Shoal	512	510		3.0-m beam trawl
					Channel	440	440		1.0-m^2 Tucker trawl
					Bottom	728	728		3.0-m beam trawl
Beach Seine Survey	24 JUN	01 NOV	10	Biweekly	Shore	1,000	1,000		30.5-m beach seine

* Includes 141 samples collected for striped bass otolith analysis.

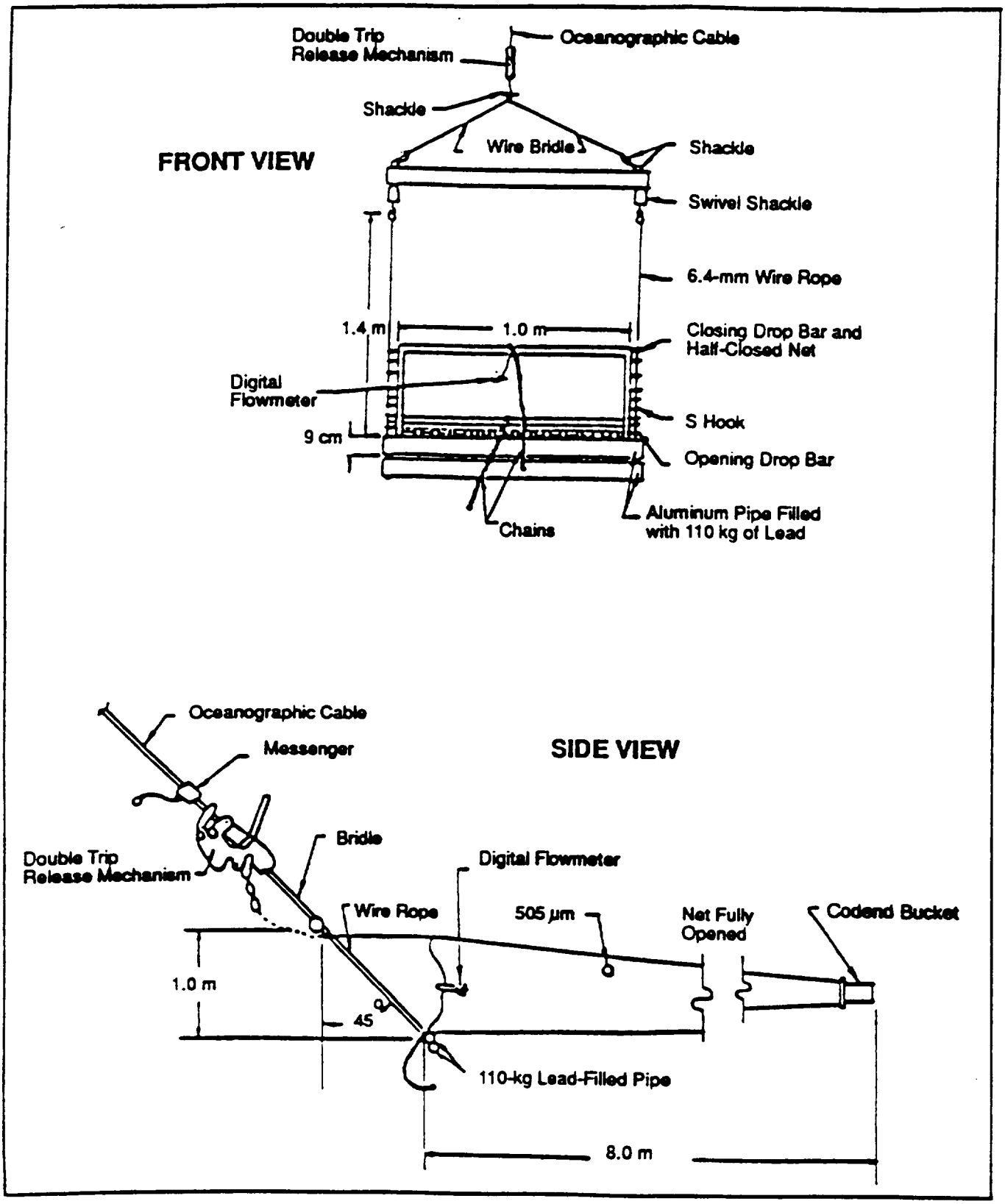

Figure 2-3. Design and dimensions of 1.0-m^2 Tucker trawl.

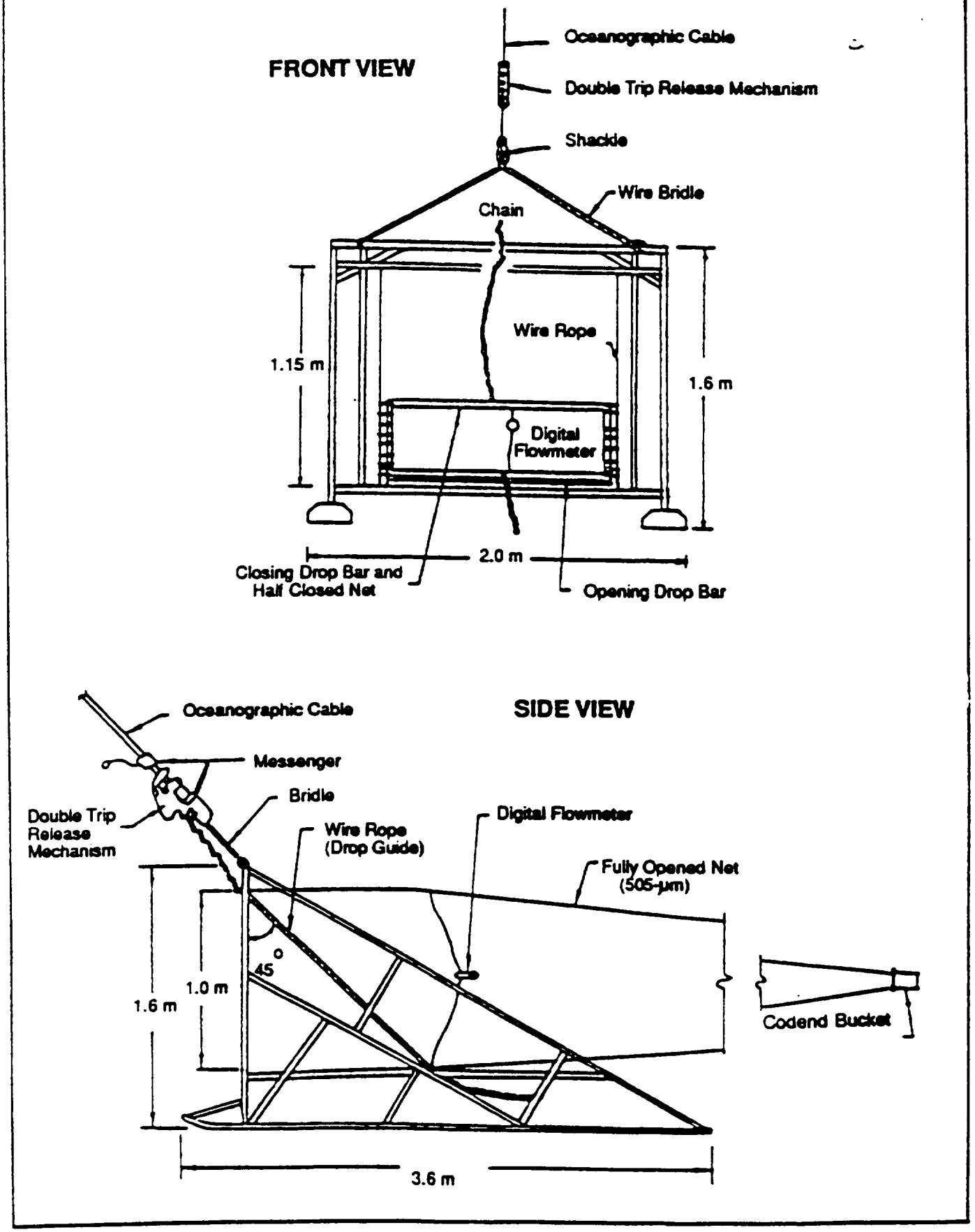

Figure 2-4. Design and dimensions of 1.0-m^2 Tucker trawl mounted on an epibenthic sled.

TABLE 2-3 SPECIFICATIONS OF SAMPLING GEAR USED DURING THE 1991 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	505 µm
Net material	Nytex (monofilament nylon)
Collection cup	30 cm
Length	30 cm
Length with net-retaining ring	37 cm
Mesh size	505 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	505 µm
Net material	Nytex (monofilament nylon)

Both gear types were towed against the prevailing current for 5 minutes. If consistently large numbers of fish were caught, 2-minute tows were allowed. The tow started with the remote opening of the net and terminated with its remote closing. If the river depth was 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 1991 LRS covered 27 weeks, from 15 April to 17 October (Table 2-2 and Figure 2-5), with all sampling conducted at night. Sampling was conducted weekly for the first eight weeks between RM 12 and RM 152. For the next five consecutive weeks, sampling encompassed RM 1 - RM 152. Beginning the week of 22 July and ending during the week of 14 October, sampling was conducted biweekly between RM 1 and 76. A special nocturnal seven-week sampling program that incorporated an additional 141 trawl (channel stratum) samples, approximately 20 per week, was conducted between 27 May and 12 July 1991. The samples collected during this survey were scheduled for a special aging study of striped bass larvae using daily otolith rings. Gear selectivity studies were conducted during the nights of 1 through 2 June, 2 through 3 June, and 2 through 3 July for larval *Morone* spp. An additional 116 trawl (channel stratum) samples were collected. In these gear studies a 1.0 m^2 Tucker trawl with 505- or 750-μm mesh and a 4.0-m^2 Tucker Trawl with 750-μm mesh were deployed.

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 1991 LRS sampling program was scheduled as five separate multiweek efforts. The first, which covered the last two weeks of April through the first week of May, was directed toward the collection of American shad eggs. The second effort covered the next two weeks of May and was designed to collect eggs of *Morone* spp. and American shad. The third effort encompassed the last two weeks of May and the first week of June and targeted *Morone* spp. and American shad yolk-sac larvae. The fourth effort consisted of five weeks, extending from the second week of June through the second 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 14-week period, sampled biweekly, from the end of July to the middle of October. 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 1991, 3346 ichthyoplankton samples (including 141 striped bass otolith aging samples) were scheduled for collection; 3345 samples were collected, accounting for 99.97 percent of the scheduled total. Since the beginning of the Hudson River studies, the sampling schedule for the LRS has varied from year to year (Figure 2-6) but the type of gear used has been consistent (Figure 2-7). In recent years channel and bottom strata sampling was extended to include more of the river (Figure 2-7). Details on changes in sampling effort and sample weeks are given in Appendix G.

TABLE 2-4 SUMMARY OF 1991 SAMPLE COLLECTION INFORMATION BY RIVER REGION AND STRATUM FOR THE LONGITUDINAL RIVER ICHTHYOPLANKTON SURVEY

	3-Week Period from 15 APR to 3 MAY					2-Week Period from 6 MAY to 18 MAY					3-Week Period from 20 MAY to 8 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	6	6	9	9	30	4	2	6	6	18	6	3	9	9	27
Tappan Zee	12	9	12	12	45	4	2	8	6	20	6	3	12	12	33
Croton-Haverstraw	18	12	12	12	54	8	4	6	12	30	9	6	12	14	41
Indian Point	6	6	9	9	30	6	2	14	50	72	6	3	18	48	75
West Point	--	--	9	9	18	--	--	8	62	70	--	--	21	79	100
Cornwall	9	6	9	9	33	6	4	24	10	44	9	6	27	19	61
Poughkeepsie	--	--	9	9	18	--	--	20	20	40	--	--	48	76	124
Hyde Park	--	--	9	9	30	--	--	18	22	40	--	--	21	42	63
Kingston	--	--	24	21	42	--	--	12	14	26	--	--	12	18	30
Saugerties	--	--	30	18	48	--	--	6	6	12	--	--	15	9	24
Catskill	--	--	60	30	90	--	--	6	6	12	--	--	9	9	18
Albany	--	--	96	45	141	--	--	10	10	20	--	--	9	9	18
Total	51	39	288	201	579	28	14	138	224	404	36	21	213	344	614

	5-Week Period from 10 JUN to 13 JUL					13 Week Period from 22 JUL to 17 OCT				
	Shoal		Bottom	Channel		Shoal		Bottom	Channel	
Region	Sled	Trawl	Sled	Trawl	Total	Sled	Trawl	Sled	Trawl	Total
Battery	--	--	10	20	30	--	--	21	55	76
Yonkers	10	10	30	35	85	14	14	21	49	98
Tappan Zee	10	10	25	33	78	28	21	21	28	98
Croton-Haverstraw	15	10	30	40	95	42	29	21	27	119
Indian Point	15	10	25	100	150	14	14	21	21	70
West Point	--	--	40	150	190	--	--	21	21	42
Cornwall	10	10	60	80	160	14	14	21	21	70
Poughkeepsie	--	--	35	90	125	--	--	21	21	42
Hyde Park	--	--	25	55	80	--	--	--	--	--
Kingston	--	--	20	30	50	--	--	--	--	--
Saugerties	--	--	20	10	30	--	--	--	--	--
Catskill	--	--	15	15	30	--	--	--	--	--
Albany	--	--	15	15	30	--	--	--	--	--
Total	60	50	350	673	1,133	112	92	168	243	615

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

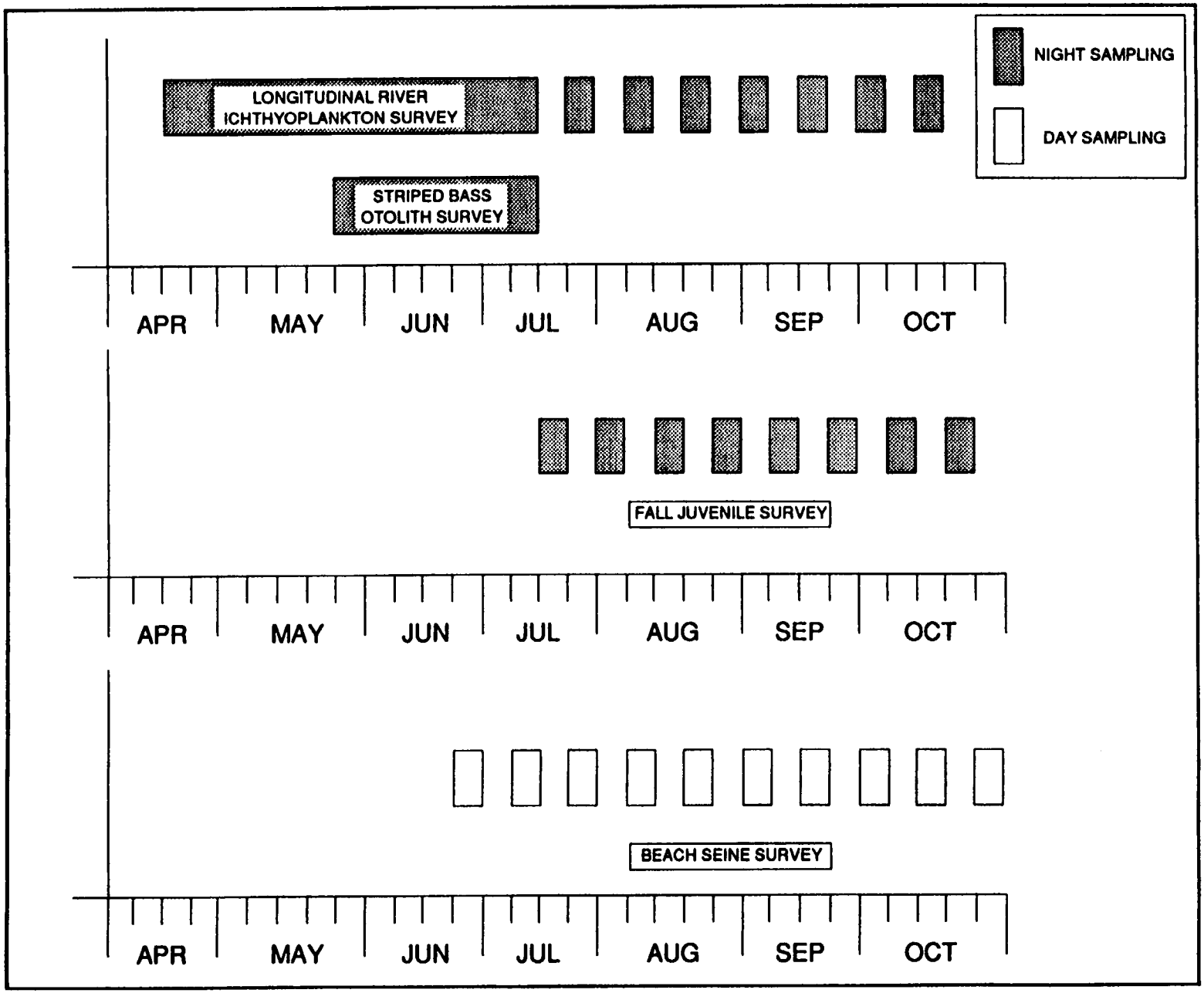

Figure 2-5. Sampling schedule for 1991

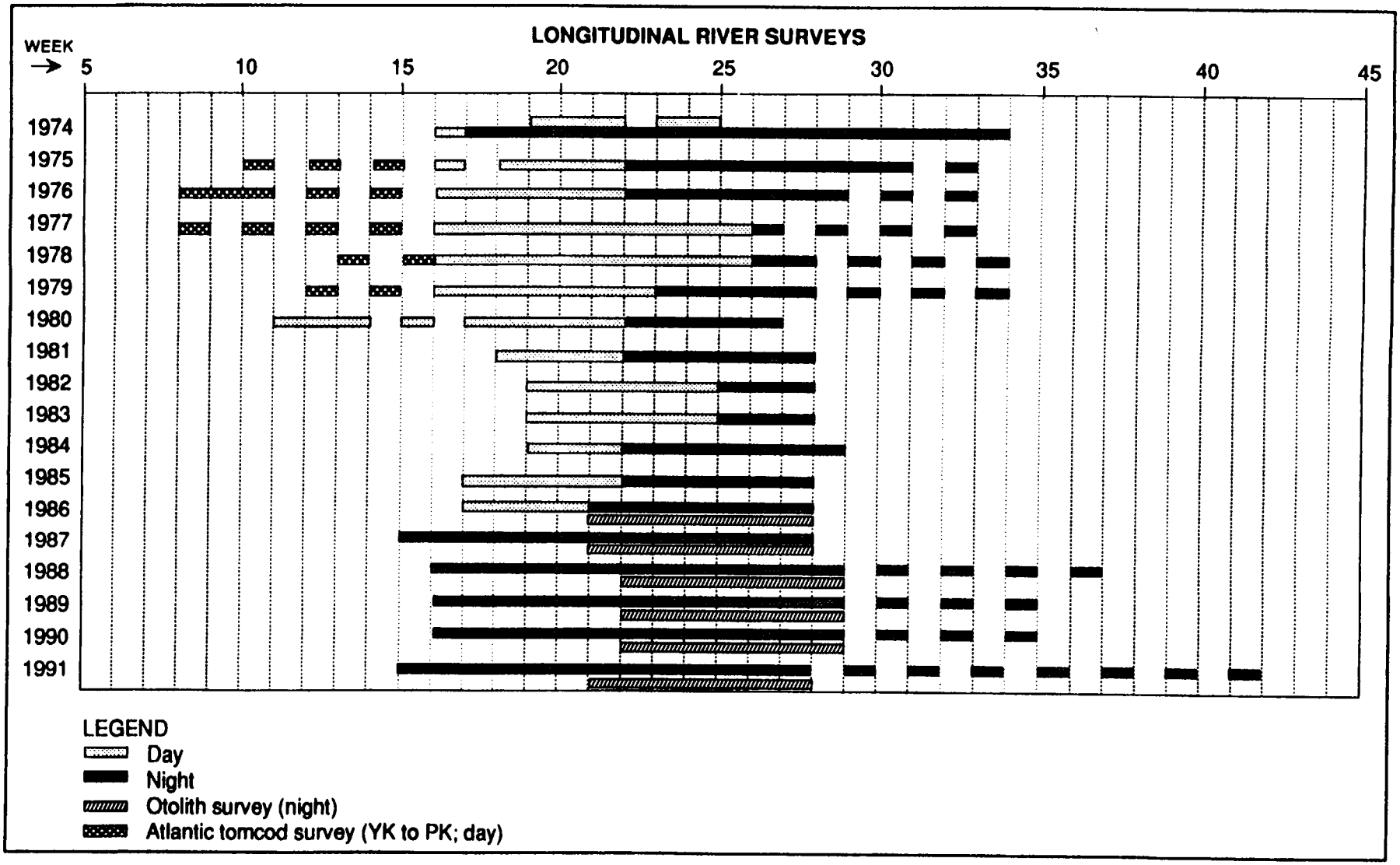

Figure 2-6. Sampling schedule for Ichthyoplankton surveys in the Hudson River Estuary, 1974-1991.

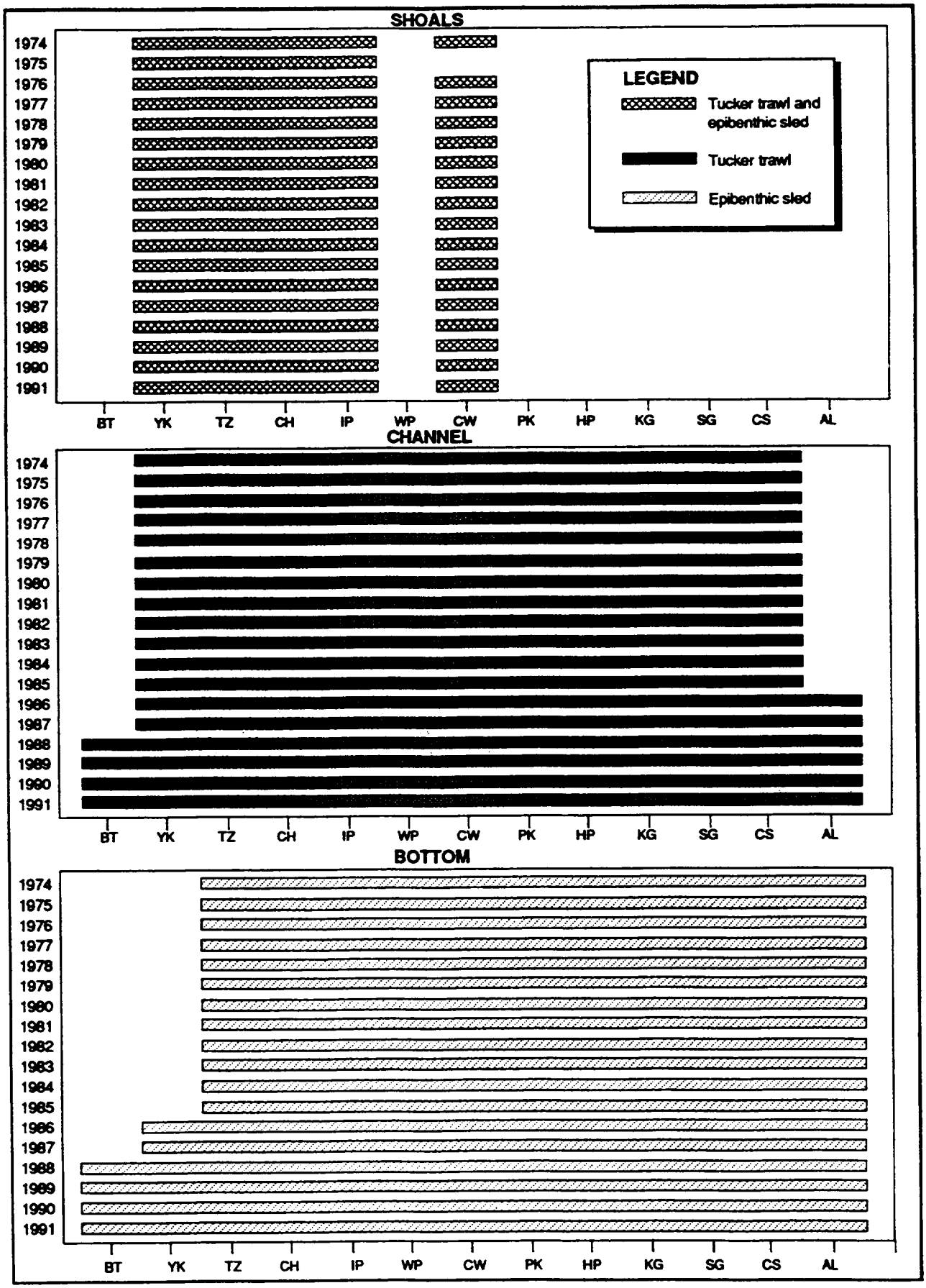

Figure 2-7. Spatial distribution of sampling for the Ichthyoplankton surveys in the Hudson River Estuary, 1974-1991. (Note: extent of sampling 1974-1986 YK RM 14-23, AL RM 125-140; 1987-1991 YK RM 12-23, AL RM 125-152.)

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 if the sample contents filled 25 percent or more of the jar or with 7 percent formalin if the sample contents filled less than 25 percent of the jar.

In situ measurements of water temperature (°C), dissolved oxygen (mg/liter), and specific conductance (microsiemen/cm at 25°C) were taken with calibrated meters at fixed river mile and stratum stations in conjunction with field sampling. Physical/chemical sampling locations, by river mile and strata, are presented in Table 2-5 for the 1991 LRS. Physical/chemical measurements were recorded from surface, mid, and bottom water depth at channel stations and from the surface and bottom water depth at shoal stations. During the 20 collection weeks of the 1991 LRS program, 2899 samples were scheduled, with 2895 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) with crystals of calcium carbonate (or other appropriate chemical) added to each container to ensure pH of each sample was above 7.0.

2.2.2 Laboratory Methods

In 1991, 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 stratum. Based on these groupings, samples were selected based on one of the following criteria:

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

2. If there were between six 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 1191, constituting 62.14 percent of the collected regular samples.

In 1991, as in the previous year, splitting (or subsampling) was permitted. A trained technician first determined whether the sample needed splitting. This was done by visual inspection. Any

TABLE 2-5 WATER QUALITY SAMPLING LOCATIONS DURING THE 1991 LONGITUDINAL RIVER ICHTHYOPLANKTON SURVEY

River Region	Sampling Locations (RM) Shoals*	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	(River runs 1 to 13)		167
	(River runs 14 to 20)		104

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

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

TABLE 2-6 SUMMARY OF 1991 SAMPLE ANALYSIS INFORMATION BY RIVER REGION AND STRATUM FOR THE LONGITUDINAL RIVER ICHTHYOPLANKTON SURVEY

	3-Week Period from 15 APR to 3 MAY					2-Week Period from 6 MAY to 18 MAY					3-Week Period from 20 MAY to 8 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	6	6	9	9	30	4	2	6	6	18	6	3	9	9	27
Tappan Zee	8	4	12	12	36	4	2	8	6	20	6	3	12	12	33
Croton-Haverstraw	10	5	12	12	39	4	2	6	6	18	9	6	12	12	39
Indian Point	6	6	9	9	30	6	2	8	10	26	6	3	9	9	27
West Point	--	--	9	9	18	--	--	8	12	20	--	--	12	15	27
Cornwall	9	6	9	9	33	6	4	12	10	32	9	6	15	15	45
Poughkeepsie	--	--	9	9	18	--	--	10	10	20	--	--	9	12	21
Hyde Park	--	--	9	12	21	--	--	10	12	22	--	--	12	18	30
Kingston	--	--	12	9	21	--	--	6	8	14	--	--	12	9	21
Saugerties	--	--	15	9	24	--	--	6	6	12	--	--	15	9	24
Catskill	--	--	12	15	27	--	--	6	6	12	--	--	8	9	18
Albany	--	--	18	9	27	--	--	10	10	20	--	--	9	9	18
Total	39	27	135	123	324	24	12	96	102	234	36	21	135	138	330

	5-Week Period from 10 JUN to 13 JUL					13 Week Period from 22 JUL to 17 OCT				
	Shoal		Bottom	Channel		Shoal		Bottom	Channel	
Region	Sled	Trawl	Sled	Trawl	Total	Sled	Trawl	Sled	Trawl	Total
Battery	--	--	10	20	30	--	--	21	28	49
Yonkers	10	10	15	20	55	14	14	20	28	76
Tappan Zee	10	10	24	25	69	17	12	21	28	78
Croton-Haverstraw	15	10	15	15	55	21	15	21	27	84
Indian Point	14	10	25	15	64	14	14	21	21	70
West Point	--	--	20	25	45	--	--	21	21	42
Cornwall	10	10	30	15	65	14	13	21	21	69
Poughkeepsie	--	--	20	15	35	--	--	21	21	42
Hyde Park	--	--	25	25	50	--	--	--	--	--
Kingston	--	--	20	15	35	--	--	--	--	--
Saugerties	--	--	20	10	30	--	--	--	--	--
Catskill	--	--	15	15	30	--	--	--	--	--
Albany	--	--	15	15	30	--	--	--	--	--
Total	59	50	254	230	593	80	68	167	195	510

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

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 50 non-*Morone* larvae were sorted. Because some of the more difficult distinctions between species (e.g., striped bass vs white perch) or between life stages cannot 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 and subsampling was allowed between the sorting and identification stage. An exception to this may have been made, at the discretion of the laboratory supervisor, when extremely large numbers of non-*Morone* larvae occurred in the sample and a qualified identifier verified that sufficient numbers of both *Morone* and non-*Morone* larvae had been sorted to meet their respective subsampling quotas. The purpose of this exception was to allow splitting before sorting of taxa such as clupeids, which can readily be distinguished from *Morone* by sorters.

A second set of criteria for subsampling larvae applied to the 11 other river runs (before and after the period of striped bass abundance) not covered in the previous paragraph. 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 2-8. 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 2-9 (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 O3 = observed counts for splits 1, 2, and 3

E = expected value for the sample (average of O_1, O_2, and O_3).

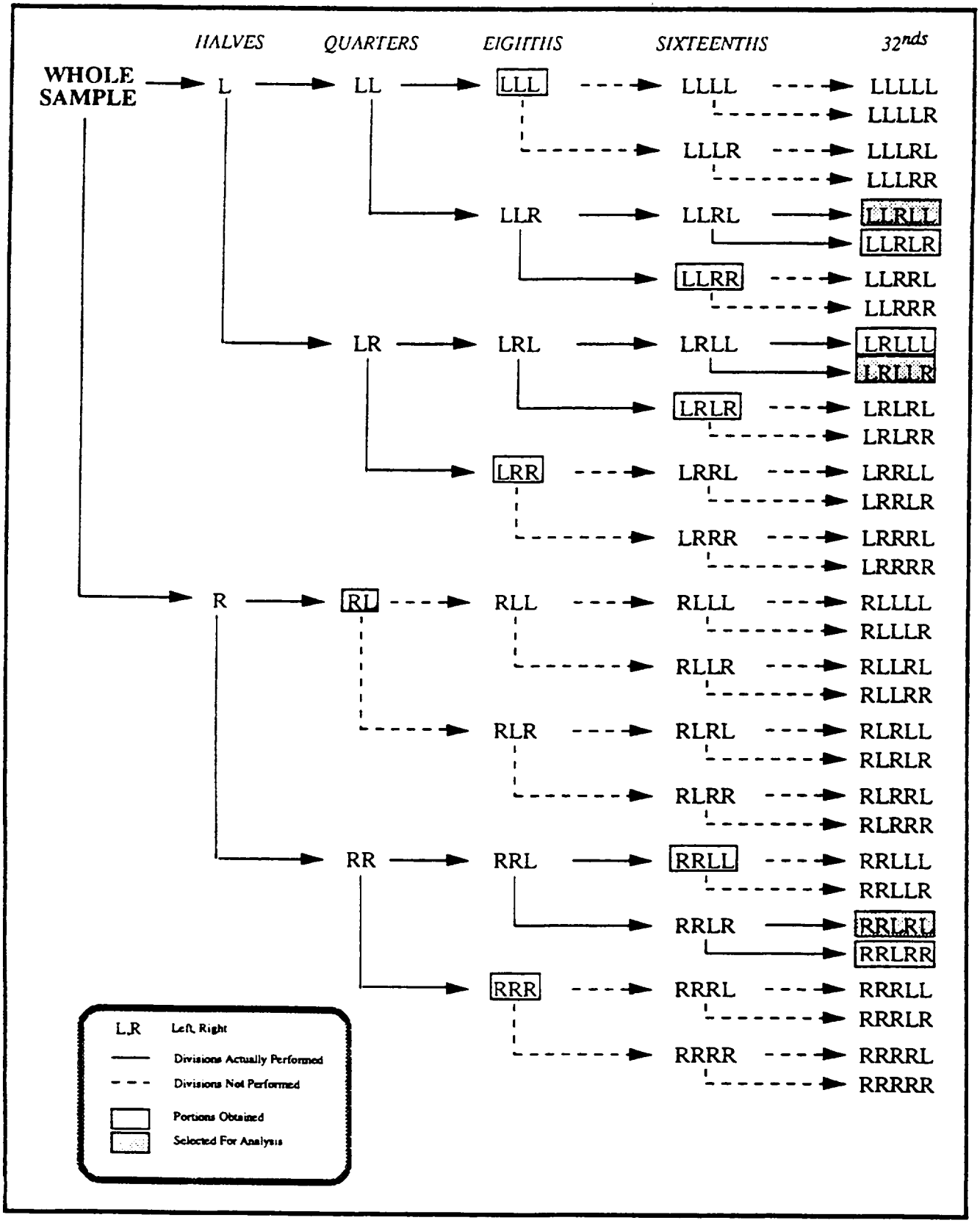

Figure 2-8. Conceptual diagram of the splitting process.

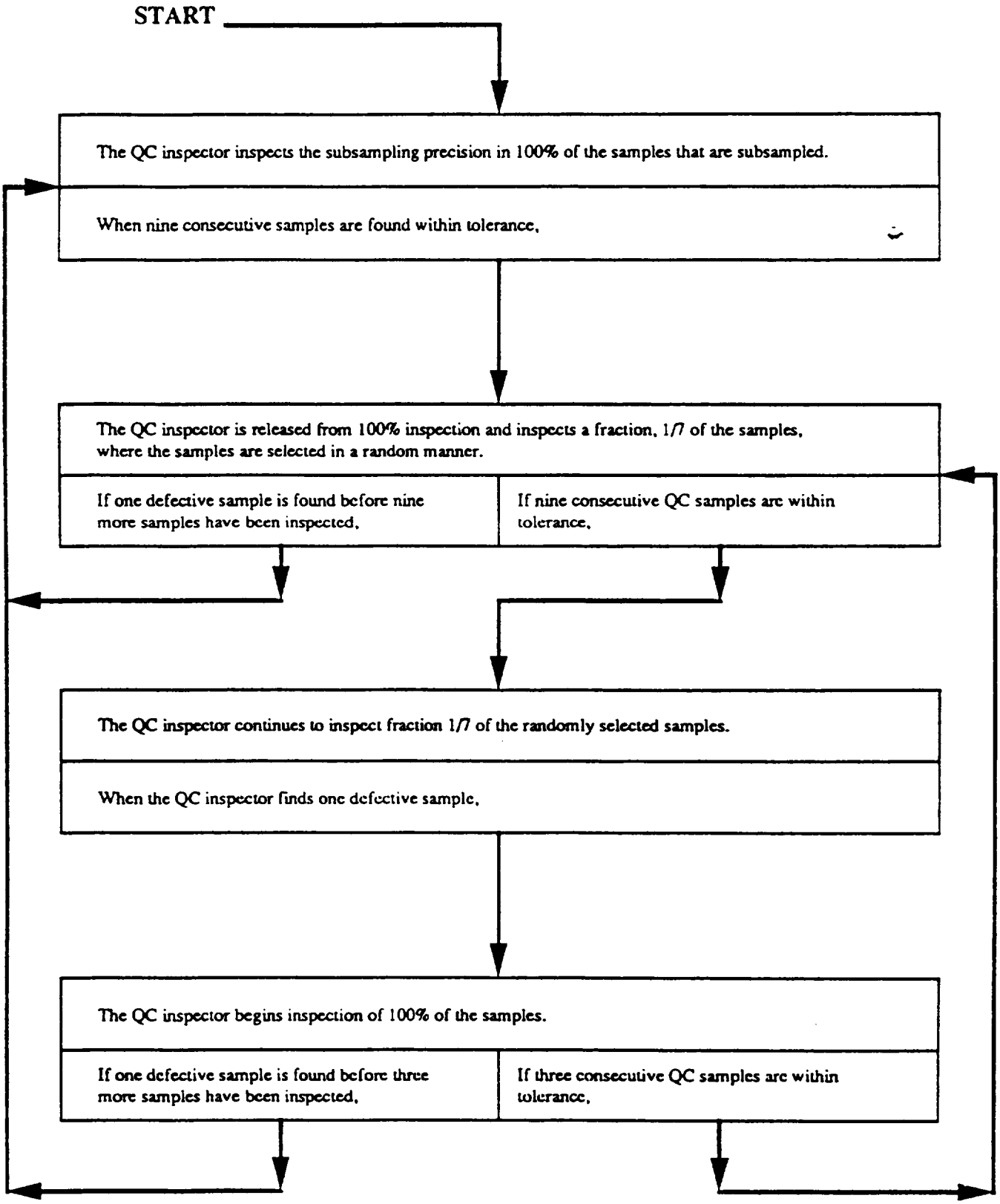

Figure 2-9. Inspection plan for evaluation of splitting precision.

If the calculated value for chi-square was less than 5.99, the splits of that sample were considered random 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, 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:

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, striped bass egg measurements were taken for five samples with the greatest number of striped bass eggs from each of the six weeks determined to constitute the major part of the striped bass spawning season (total of 30 samples). From each sample, 30 eggs were measured and an aggregate dry weight taken. 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. Eggs with well-developed embryos were selected for measurement, if present in the sample. 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 on a laboratory-wide basis (i.e., the samples sorted by all personnel in the laboratory facilities were pooled) or the first eight samples analyzed for larval identification by an individual were subject to 100 percent QC reanalysis. If all eight passed the reanalysis the laboratory (or laboratories) or the individual was placed in the CSP Mode 2, i.e., if ≤10 percent of the ichthyoplankton were missed or misidentified per sample, the individual was placed in CSP Mode 2. If any sample failed the QC check during Mode 1, then Mode 1 was continued until eight consecutive samples passed. For example, if a sample with QC No. 7 failed, then samples with QC Nos. 8 through 15 were subject to QC resorting.

Mode 2: Lots consisting of seven consecutive samples per individual or pooled laboratory were assigned. One sample from each lot was randomly chosen for QC analysis. If a sample failed (>10 percent of organisms missed or misidentified) during Mode 2, QC inspection frequency returned to Mode 1. For example, if a sample with QC No. 6 failed in a lot of seven samples, then samples with QC Nos. 7 through 14 were subject to QC reanalysis. If samples 7 through 14 passed, the individual was again placed in Mode 2.

Results of the 1991 CSP-1 QA/QC Program are contained in Appendix A.2.

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 stratum, and the beam trawl (Figure 2-10) 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 unless consistently large numbers of fish were caught, in which case tows were approximately 2 minutes in duration. For the Tucker trawl vessel speed was adjusted as necessary to achieve and maintain a 45° wire angle; the resultant tow speed was recorded. The beam trawl was towed at a 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 on-deck 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.

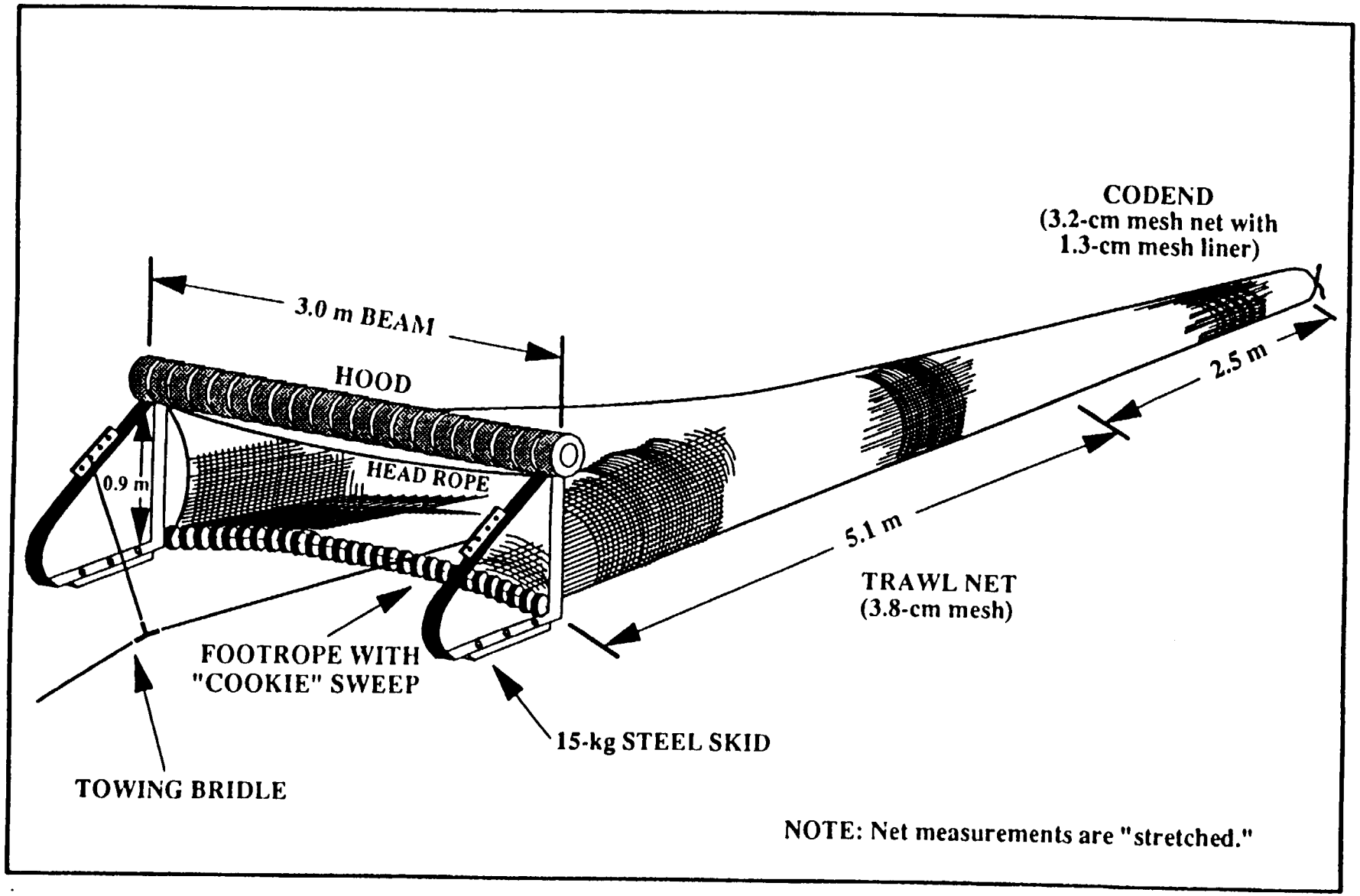

Figure 2-10. Design and dimensions of the 3.0-m beam trawl used in the 1991 Fall Juvenile Survey.

TABLE 2-7 SPECIFICATIONS OF SAMPLING GEAR USED DURING THE 1991 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 (cod end)	
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)
Cod end	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

The 1991 FJS biweekly sampling program covered 15 weeks from 15 July to 25 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 1991 FJS. In 1991 1680 samples were scheduled for collection; 1678 samples, or 99.9 percent of the scheduled number were actually collected. Since the beginning of the Hudson River studies, the sampling schedule for the FJS has varied from year to year (Figure 2-11), the type of gear used has differed (Figure 2-12), and channel and bottom strata sampling was extended to include more of the river (Figure 2-12). Details on changes in sampling effort and sample weeks are given in Appendix G.

Calibrated meters were used to measure water temperature (°C), dissolved oxygen (mg/liter), and specific conductance (microsiemen/cm at 25°C) at fixed river mile and stratum stations in conjunction with field sampling. Sampling locations were the same as those used for the 1991 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 eight collection weeks of the 1991 FJS, 1336 samples were scheduled and all samples were collected.

Samples of young of year collected during the first two sampling periods (river runs 1 and 2) for the 1991 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 and yearling or older fish, based on length categorization; if any of these were alive they 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 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 1991, 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

TABLE 2-8 NUMBER OF BIWEEKLY SAMPLES COLLECTED DURING THE 1991 FALL JUVENILE SURVEY

15 July - 25 October

Region	Strata: Shoal (Beam Trawl)	Strata: Channel (Tucker Trawl)	Strata: Bottom (Beam Trawl)	Total
Yonkers	56	40	40	136
Tappan Zee	238	64	64	366
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	--	40	64	104
Total	510	440	728	1,678*

* All samples collected at night.

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

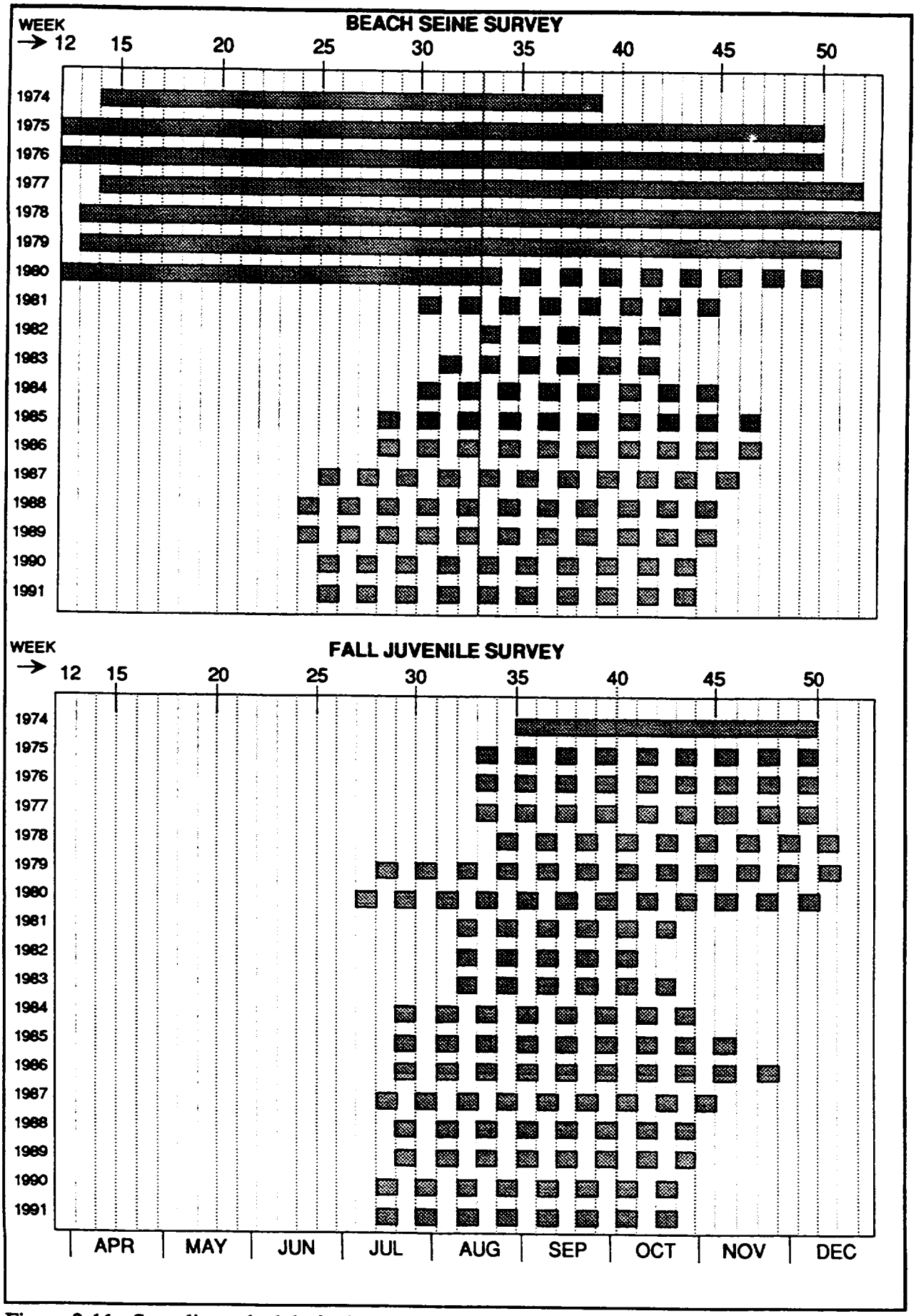

Figure 2-11. Sampling schedule for Beach Seine and Fall Juvenile surveys in the Hudson River Estuary, 1974-1991. (Note: Week one starts on the first monday of the year.)

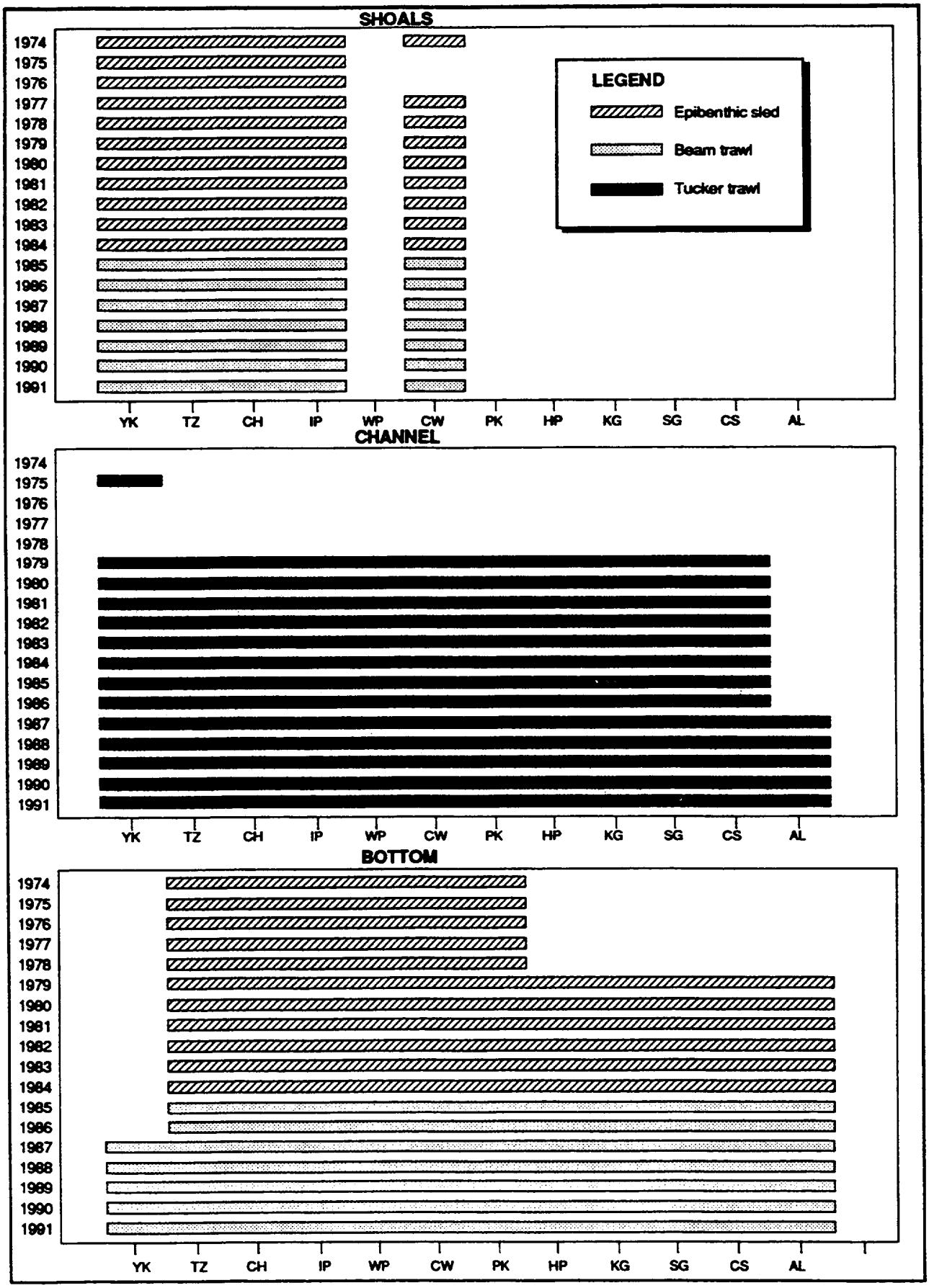

Figure 2-12. Spatial distribution of sampling for the Ichthyoplankton surveys in the Hudson River Estuary, 1974-1991. (Note: extent of sampling 1974-1986 YK RM 14-23, AL RM 125-140; 1987-1991 YK RM 12-23, AL RM 125-152.)

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 represented the upper length limit for yearling fish for all species. From 1 June through 31 December, Division 2 was 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 was 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 1991 BSS biweekly sampling program was conducted from 24 June through 1 November (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 1991 BSS are presented in Table 2-10. All of the scheduled 1000 samples scheduled for collection in 1991 were collected. Since the beginning of the Hudson River studies, the sampling schedule for the BSS has varied from year to year (Figure 2-11). Details on historic sampling effort and sampling weeks are given in Appendix G.

Measurements of water temperature (°C), dissolved oxygen (mg/liter), and specific conductance (microsiemen/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 1991 BSS, 1000 samples were scheduled and all samples were collected.

Young of year fishes collected during the first four beach seine river runs in 1991 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 1991 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).

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.

TABLE 2-9 SPECIFICATIONS OF SAMPLING GEAR USED DURING THE 1991 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 1991 BEACH SEINE SURVEY

24 June - 1 November

Region	Number of Beaches Sampled
Yonkers	44
Tappan Zee	201
Croton-Haverstraw	119
Indian Point	44
West Point	44
Cornwall	51
Poughkeepsie	59
Hyde Park	59
Kingston	59
Saugerties	108
Catskill	127
Albany	85
Total	1,000

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 (below) 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 (microsiemen/cm at 25°C) using Equation 3 (TI 1976). This equation differs from that used in some of the previous Year Class Reports (1985-1987) in that pressure data are 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

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

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

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

where

C_{25} = Conductivity (millisiemen/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

$$D_{ikrw} = \frac{C_{ikrw}}{V_{ikrw}} \quad (4)$$

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

$$D_{krw} = \frac{1}{n_{krw}} \sum_{i=1}^{n_{krw}} D_{ikrw} \quad (5)$$

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

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

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

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

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

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

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:

$$C_{rw} = \frac{1}{n_{rw}} \sum_{i=1}^{n_{rw}} C_{irw} \quad (9)$$

*When a stratum was not sampled, P_k for the sampled stratum was considered equal to the sum of the P_k for both the sampled and the unsampled stratum.

where

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

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

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

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

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).

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

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

TABLE 2-11 STRATUM AND REGION VOLUMES (m^3) AND SURFACE AREAS (m^2) USED IN ANALYSIS OF 1991 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

* Shore zone surface area was unknown and not used in data analysis as no beach seine sampling was performed in the Battery region. Estimation of strata volumes for the Battery Region is described in the 1989 Year Class Report (EA 1990).

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

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

$$SC_{rw}^{**} = \sum_{k=1}^{3} SC_{krw} \quad (13)$$

where

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

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

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

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

$$SC_{w} = \sum_{r=1}^{12**} SC_{rw} \quad (15)$$

**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.

where

SC_w = Standing crop estimate for week w

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

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

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).

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

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)

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

***For the LRS, r=0.

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 using the relative standing crop in each region. Prior to 1985 both the geographic and temporal distribution indices were based on regional standing crop data. Geographic indices in the 1985 through 1990 Year Class Reports were based on regional density and temporal indices were still based on standing crop. To be consistent, the 1991 geographical abundance index was based on standing crop. Since the beginning of the Hudson River studies, the sampling schedule and geographic extent for the LRS (Figures 2-6 and 2-7) and the sampling schedule for the BSS (Figure 2-11) has varied from year to year. Details on changes from year to year are given in Appendix G. To allow comparisons of 1991 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:

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

where

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

D_{rwy} = Regional standing crop for week w in year y calculated in Equation 13

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):

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

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:

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

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)

To ensure temporal consistency across all years, the overall Beach Seine abundance index for 1991 was calculated as the mean of the weekly average CPUE for weeks 33 through 40 (sampling from 20 August through 4 October).

TABLE 2-12 REVISED VOLUME (m^3) ESTIMATES USED FOR WEIGHTING STRATUM 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.

2.5.3.2 Fall Juvenile Abundance Index

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

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

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 vs the epibenthic sled. The adjustment factors correspond to modified bottom and shoal stratum 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.

These stratum 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 stratum density estimates. The volumes used in calculating these weekly average density estimates were less than the total stratum volume, and only included the portion of the stratum 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 volume of all bottom strata. Similarly, shoal stratum 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):

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

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

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

To ensure temporal consistency across all years the overall FJS abundance index for 1991 was calculated as the mean of the average offshore density estimates for weeks 33 through 40 (sampling from 26 August through 11 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 1991 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 stratum 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. Because 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 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 1991 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:

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

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

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

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 during alternate weeks (Figure 2-11). 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 that extended from weeks 33 to 40. A weighted CPUE was first calculated for each week of each year from the BSS (Equation 21); then all weeks in all years were ranked and a mean rank for each year was 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 1991 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 method 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:

$$\ln (L_t) = \ln (L_0) + \beta(t) \qquad (26)$$

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 total length (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:

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

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

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

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.

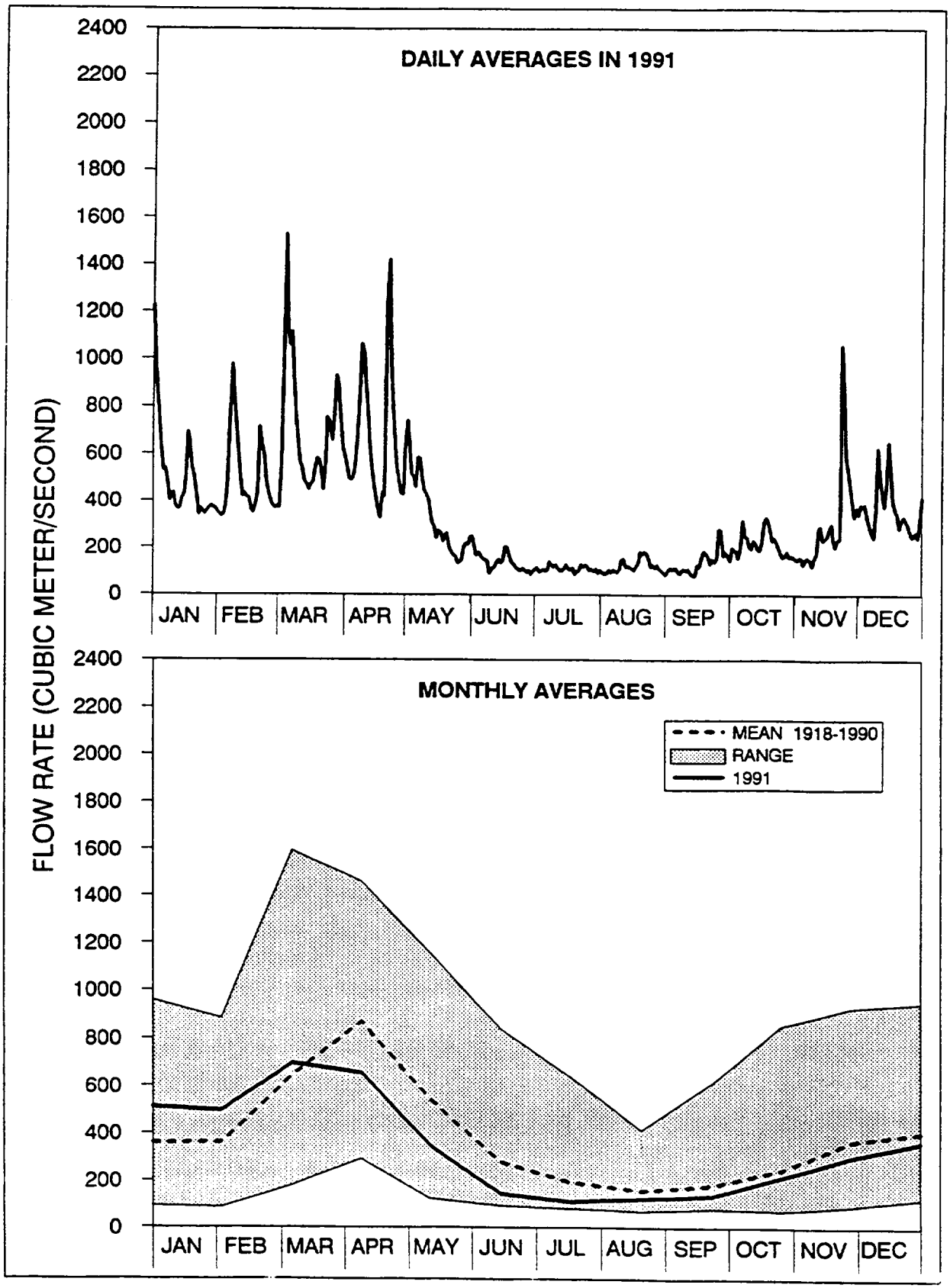

Figure 3-1. Hudson River daily average flow rates in 1991 and monthly average flow rates from 1918 to 1990, Green Island Dam, Troy, New York.

CHAPTER 3
PHYSICAL/CHEMICAL PARAMETERS

Major factors influencing 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 (DO), as measured during the 1991 surveys, to these influencing factors. Although parameters were measured during 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 C.

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, whereas low freshwater input allows the saltfront to advance further up into the Hudson River. Sudden and sustained decreases in temperature may be related to high discharges of cooler fresh water. DO 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 spring, with peak flow occurring in April. Freshwater flow is low throughout the summer and early fall, with lowest flow occurring in August, followed by a slight increase in flow in December (Figure 3-1). The overall 1991 seasonal pattern of freshwater flow is similar to the long-term pattern.

During the spring peak flow period, daily flows ranged from 371 to 1531 m^3/sec/day in March, 331 to 1421 m^3/sec/day in April, and 136 to 741 m^3/sec/day in May (Figure 3-1 and Appendix Table C-1). The peak daily discharge of 1531 m^3/sec/day occurred on 5 March 1991. From mid-June through mid-October flow was typically <200 m^3/sec/day; during

approximately three quarters of this time flow was <150 m^3/sec/day. In November and December flow was typically >200 m^3/sec/day but <400 m^3/sec/day.

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 159 m^3/sec/month in August to a high of 868 m^3/sec/month in April (Figure 3-1 and Table C-2). Monthly averages in 1991 ranged from a low of 112 m^3/sec/month in July to a high of 696 m^3/sec/month in March. Fall and winter freshwater discharge in 1990-1991 (October 1990-February 1991) was higher than the long-term average (Figure 3-1 and LMS 1991). Freshwater discharge in March was close to the long-term average, whereas the remainder of the year (April-December) was below the long-term monthly averages, 24.5-36.2% less in mid- and late spring (April-May), 22.6-48.0% less in the summer (June-August), 12.6-24.5% less in the fall (September-November), and 9.7% less in December.

In comparison to recent years (1974-1990), discharges in 1975, 1976, 1977, and 1990 were the highest recorded (Table C-3). The 1990 average monthly discharge (549 m^3/sec/month) was second only to the average recorded in 1976 (603 m^3/sec/month). The 1991 average monthly discharge (341 m^3/sec/month) is toward the lower end of the historic range (275-603 m^3/sec/month).

3.2 POUGHKEEPSIE WATER WORKS TEMPERATURES

3.2.1 Introduction

Long-term (1951-1991) 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 (Figure 3-2 and Table C-4). The lowest recorded temperature in 1991 was 0.7°C on 14 January. Water temperatures in 1991 remained relatively low (<2.5°C) through the first of March when the water began to warm. Temperatures increased relatively steadily throughout the spring and summer. Peak water

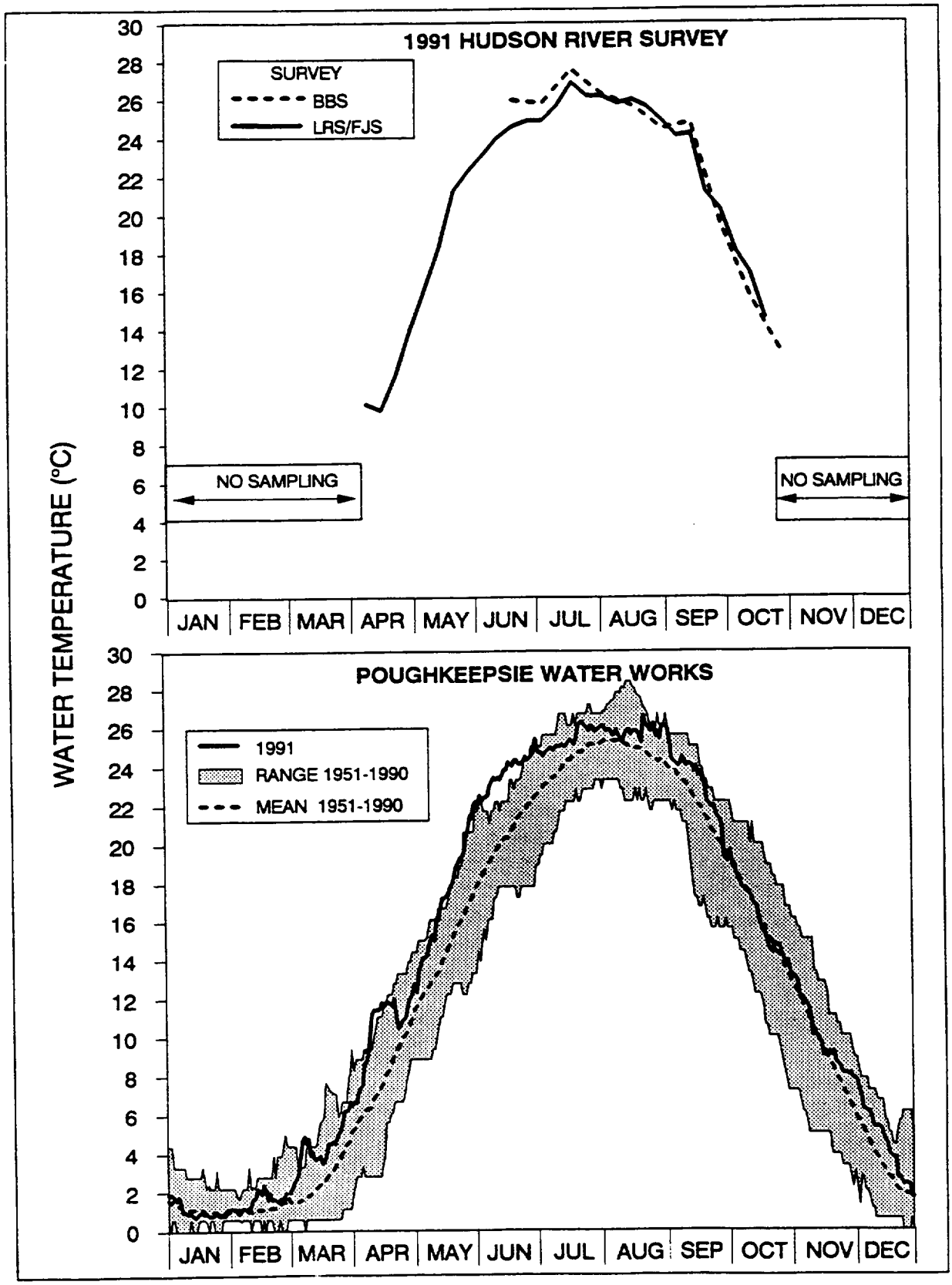

Figure 3-2. Seasonal variation in water temperature from 1991 Hudson River surveys and 1951-1990 Poughkeepsie Water Works.

temperature (26.3°C) occurred on 24 July. Typically, the seasonal pattern has a relatively sharp peak, with average temperatures of 24.5°C occurring from late July to late August. In 1991 temperatures >24.5°C occurred from late June through early September (Figure 3-2). Starting in September, water temperatures began a relatively steady decline.

3.2.3 Comparison to Long-Term Record

Water temperatures were higher (>2°C 38% of the time, >1.5°C 57% of the time, and >1°C 78% of the time) than the average long-term values throughout the spring, summer, and early and late fall/early winter (Figure 3-1). As noted in the previous section water temperatures close to the long-term peak value of approximately 25°C were reached earlier in the season and remained there for an extended period of time. During 3-10 March, 9-18 April, and 16 May-26 June water temperatures reached record highs, exceeding previous maximum values by 0.4-1.6°, 0.3-1.8°, and 0.1-1.4°C, respectively, and exceeding the average by 1 to 5°C throughout the spring and early summer.

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 and peaked in mid-July, with temperatures remaining around 25 to 27°C until late August, and then decreasing steadily until the end of the sampling program in October (Figure 3-2). This temporal pattern, observed throughout the Hudson River estuary, reflected 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 22 July; the riverwide mean was 26.9°C and regional mean values were between 25.9 and 27.8°C (Table C-5). Lowest values occurred during the second week of sampling, when the mean riverwide temperature was 9.8°C (PWW daily temperatures were 10.5-12°C) and regional mean temperatures ranged from 8.1 to 11.1°C.

During the first two weeks of sampling (weeks of 15 and 22 April) and the week of 6 May water temperatures where coolest in the upper- and lowermost regions of the estuary. As water temperatures began to warm throughout the river (weeks of 6 May through 10 June) the lower regions (Yonkers through West Point) were typically cooler than the middle and

upper regions of the Hudson River. During the summer months (17 June through the week of 2 September) Croton-Haverstraw and Indian Point were the warmest regions. The Croton-Haverstraw and Indian Point regions have broad, shallow areas where decreased water movement and increased surface area for solar radiation contribute to higher temperatures. Influx of cool ocean waters kept mean temperatures in the Yonkers region lower than most other regions throughout the summer and early fall and because of the low freshwater input, which allowed marine waters to advance further into the river, the Tappan Zee region during the summer and early fall was also cooler than upriver regions. Water temperatures began to decrease steadily in September and the LRS/FJS sampling weeks that include the upper reaches indicate these regions are cooler than the lower regions. In the fall, the upriver regions, especially Albany, cool more quickly than other regions because of the increased flow of cooler fresh water and the smaller regional water volumes. Typically, 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); in 1991, the upper estuary was warmer than downriver regions in mid- to late spring.

Temporal patterns in the BSS temperature data are generally in agreement with LRS/FJS measurements (Figure 3-2). At the start of the BSS sampling program (the week of 24 June) mean weekly water temperatures were already close to the peak (27.6 °C during the week of 22 July). The peak mean regional temperature was 28.7°C in the Cornwall region during the week of 22 July (Table C-6). The shallowness of the shore zone probably resulted in the slightly higher temperatures measured during BSS than on corresponding weeks during LRS/FJS in the spring and summer (Figure 3-2). BSS mean temperatures in early September started to decrease steadily through the end of the fall sampling period, generally on par with LRS/FJS temperatures. A minimum mean temperature of 11.0°C was recorded from the Cornwall region during the last week of sampling, which began on 28 October. In 1991 the shore zone areas in the upper Hudson River estuary (Cornwall and Albany) were typically cooler than downriver regions in the fall (week of 30 September through 28 October), probably a result of the increasing discharges of cooler fresh water (Figures 3-1 and 3-2) during this time. The shore zone areas of the lower to mid-Hudson River estuary were generally warmer than upriver areas.

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 1991 resemble the pattern observed in previous years of the Hudson River surveys: lower values in spring in response to increased freshwater flows, increasing summer levels as freshwater input slows, and finally, lower salinity in the fall as freshwater discharges increase again. During the sampling program saltwater intrusion into the Hudson River was at its lowest during the week of 29 April with salinities <0.3 ppt found in the Tappan Zee region (Figure 3-3 and Table C-7).

The saltwater intrusion pattern reflects the Green Island flow pattern. Saline waters intruded further upriver as freshwater discharge decreased throughout May with two downriver excursions that reflect increased freshwater discharge events that occurred in April and May (Figures 3-1 and 3-3); lag periods of about one to two weeks occur before changes in Green Island flow are reflected as changes in saltfront position (Abood 1974, 1977). Flow was relatively stable throughout the summer and early fall and this stability is reflected in the salinity intrusion pattern. Salinity in the range of 0.3 to 2.0 ppt remained in the Poughkeepsie region throughout this time period. As the freshwater discharge increases toward the end of September the saltfront is pushed down river.

Spatial patterns of salinity measured in the Hudson River estuary are dictated by the degree of intrusion of seawater. The proximity of the Yonkers region to the ocean leads to the highest mean regional salinity values in the study area. Due to the below average freshwater flows salinities between 0.3 to 2.0 ppt extended upriver into the Poughkeepsie region for an extended period of time.

Salinity encountered during the BSS was lower than during concurrent LRS/FJS measurements because of the tendency for the denser, saline water to follow the deeper channel rather than the shore zone area. The overall pattern of higher salinities in the Yonkers region and decreasing upriver salinities (Table C-8) mirrors the LRS/FJS pattern. Mean weekly salinity in the Poughkeepsie shore zone ranged from 0.2 to 0.6 ppt from 24 June through 28 August.

3.3.3 Spatiotemporal Pattern in Dissolved Oxygen (DO)

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, DO changes directly with changes in turbulence and photosynthesis.

Temperature was a primary influence on DO concentrations during the 1991 surveys, effecting 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 10.2-12.4 mg/liter during the week of 15 April to minimum mean levels of 5.2-8.1 mg/liter during the week of 8 July and 5.5-6.4 mg/liter the week of 19 August (Figure 3-4 and Table C-9). DO concentrations increased in the fall, responding to declining temperatures.

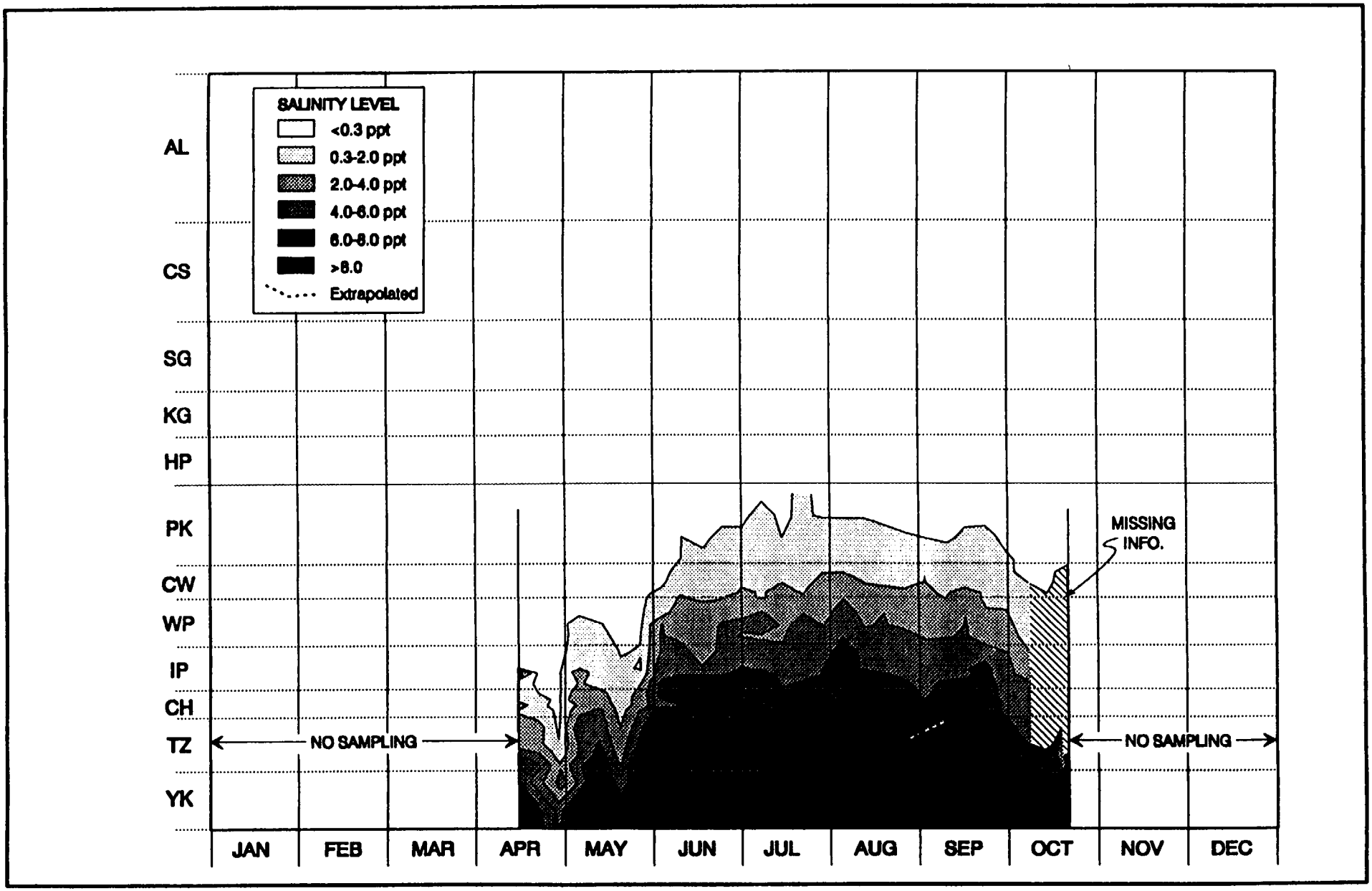

Figure 3-3. Seasonal variations in salinity based on the 1991 Longitudinal River Ichthyoplankton and Fall Juvenile Surveys.

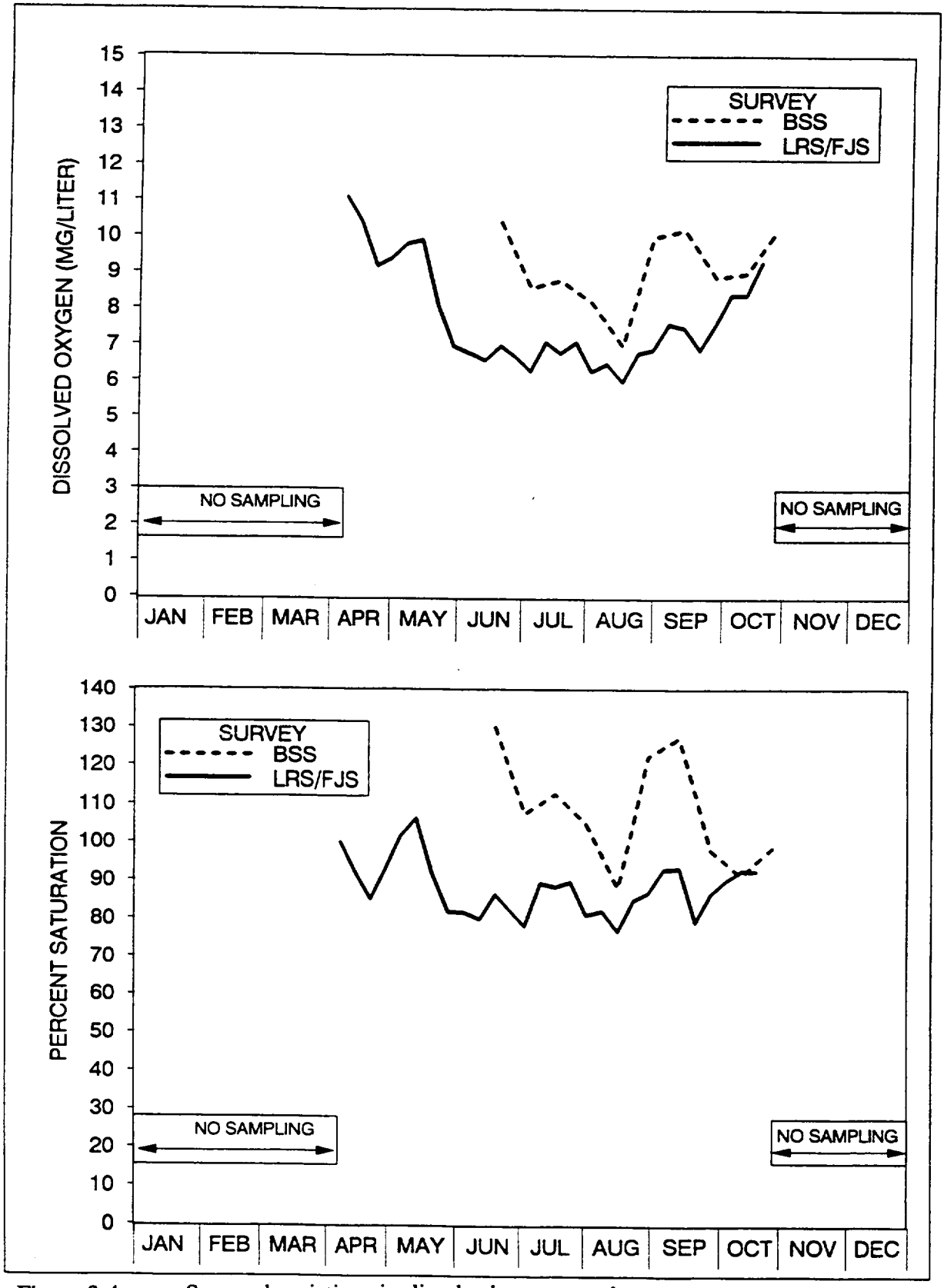

Figure 3-4. Seasonal variations in dissolved oxygen and percent saturation from 1991 Hudson River surveys.

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 1991 were still well above levels that might be detrimental to aquatic life. The highest mean DO values from 1991 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 3-4 and Table C-11). Percent saturation declined slightly in the summer but still generally averaged above 80 percent. Individual mean weekly regional values never dropped below 64.7 percent, with the minimum recorded during the week of 17 June from the West Point 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 the 1991 LRS/FJS, DO was typically higher in the upper regions of the river, Kingston through Catskill, in the summer and fall (17 June through 21 October). A similar trend was noted in the 1991 LRS/FJS (LMS 1992). Also, both Indian Point and West Point regions tended to have lower values than the other regions. In other studies, few regular trends have been observable in the longitudinal distribution of DO (TI 1976).

There was no longitudinal trend observed in the BSS DO data; DO was not observed to be slightly higher at the upper Hudson River sites as was noted above in the LRS/FJS. Lack of a distinct longitudinal pattern is consistent with observations made in previous years (Versar 1978; LMS 1989). DO values recorded in the BSS remained above levels considered to be detrimental to aquatic life.

DO and percent saturation were higher in the shore zone than the deeper areas measured as part of the LRS/FJS program. Mean weekly DO reached peak values of approximately 10 mg/liter on four dates in the BSS (weeks of 24 June, 2 September, 16 September, and 28 October) (Table C-10). Saturated and supersaturated conditions existed during these and other periods (Table C-12). Previous reports have also noted supersaturation in the shore zone even in the summer months (MMES 1986; EA 1990, 1991). 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 1991 temperature pattern was higher in the spring, summer, and early fall when compared to previous Hudson River survey years. For an extended period of time temperatures were above the long-term average peak

temperature. Freshwater flow, tidal amplitude, and river morphometry affect the salinity pattern in the Hudson River estuary. Due to low freshwater flows throughout the sampling season, the saltfront remained near the border between Poughkeepsie and Hyde Park regions for an extended period of time. 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 FISH COMMUNITY

4.1.1 General Description of the Fish Community

The fish community of the Hudson River estuary reflects the convergence of the two primary fish habitats: fresh water and salt water. Fish are generally confined to one or the other habitat, but a relatively small number of estuarine and migratory species can pass from one to the other, or live in the narrow zone where there is a gradient between fresh and salt water. As a result of this convergence of different habitats, in estuaries such as the Hudson many species can be found in a relatively small area. The Hudson River estuary's species diversity is enhanced by its mid-latitude location on the Atlantic coast. Southern tropical marine forms enter the Hudson during the summer, and a number of northern fishes are near their southern limit.

Smith and Lake (1990) documented the Hudson River fish fauna, including the river upstream of the dam at Green Island and the Mohawk River subsystem. They report 201 species, including three known from contiguous waters but not yet reported from the Hudson. Beebe and Savidge (1988), based on sampling through 1980, reported 140 fish species in the Hudson south of the dam at Green Island. Smith and Lake (1990) classified the probable origin of each species, showing that the fish community, particularly in the estuarine reach, is a mixture of both temperate and tropical marine forms, freshwater forms, and intentional and accidental introductions.

The estuary and its tributary streams provide a wide range of chemical, physical, and biological habitat conditions. This diversity is reflected in the range of migratory and movement patterns, reproductive strategies, and food preferences among the members of the fish community. Daniels and Lawrence (1991) grouped 71 Hudson estuary fish species collected in a variety of sampling programs from 1936 through 1991 into eight trophic categories (feeding behavior) developed by Grossman et al. (1982): surface feeders, water column feeders, soft-bottom benthos feeders, rocky-bottom feeders, ooze feeders, algae feeders, macrocarnivores, and omnivores. Although this analysis did not include all recorded fish species from the estuary, it illustrates the broad range of feeding behaviors among the members of the Hudson estuary fish community. Such an array of feeding behaviors reflects a diversity of habitat conditions.

Carlson (1986) identified assemblages of fish species based on six habitat types for the freshwater portion of the Hudson estuary: vegetated backwaters, tributaries, rock pile, shore,

offshore shoals and channel, and tailwater. Carlson's assemblages illustrate the diversity of physical habitats in the estuary. A similar analysis for the middle and lower regions of the estuary would show additional physical habitat types, including man-made habitats such as riprap shoreline, bulkheading, and piling clusters associated with piers and docking facilities.

Because many fish species are tolerant of a wide range of habitat conditions and because there are no well-defined boundaries between habitat types, it is useful to classify the fish community into assemblages based on migratory behavior (anadromous and catadromous) and salinity preference (fresh water, estuarine, and marine). In the Hudson only the American eel is catadromous; thus, our discussion is focused on the other four assemblages.

4.1.2 Species Occurrence Through Time

The number of species in these assemblages over long periods of time shows broad-scale suitability of the environment for each assemblage. The disappearance of species may indicate some change has taken place, such as degradation of environmental conditions, introduction of competing species, or overexploitation. Although presence or absence data are limited because they do not reveal major shifts in abundance, one can expect to see broad trends in environmental conditions.

The total number of fish species collected in the utilities' monitoring program in the Hudson River estuary has varied from 63 to 95 between 1973 and 1991 (Table 4-1) with no apparent trend. Although the estuarine and anadromous assemblages have fluctuated very little, there have been changes in the freshwater and marine assemblages. The freshwater assemblage has shown fewer species in recent years compared to the years from 1973 to 1980. However, the fewest species in this assemblage occurred in 1982 and 1983, and numbers have increased slowly since then.

When the individual species in the freshwater assemblage are examined, there is only one species, bluntnose minnow, that occurred consistently in the early years and has not been recorded recently. The bluntnose minnow occurred from 1973 through 1980; more than two-thirds of the occurrences were between RM 125 and RM 152, well beyond the influence of Roseton, Indian Point, or Bowline Point. It has not been recorded since then. Pugnose shiner was the only new freshwater species recorded in 1991.

Marine species show more year-to-year variation, but overall there is a trend toward more marine species (Table 4-1). As expected, the largest increase in marine species occurred in the downstream sampling segments. The complementary trends in the freshwater and marine assemblages could be related to the shift in annual freshwater inflow. During the 1970s, when the number of freshwater species was relatively high, freshwater flow was higher than normal. In the 1980s freshwater flow was typically below normal, and freshwater species declined while the number of marine species increased. Newly captured marine species in 1991 were goosefish and king mackerel.

TABLE 4-1 SPECIES COMPOSITION OF FISH COLLECTED DURING HUDSON RIVER STUDIES FROM 1974 TO 1991

Common Name	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Fresh Water																		
Banded killifish	X	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	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	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													X
Brown bullhead	X	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	X
Central mudminnow			X			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	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						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	X
Fallfish	X	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	X
Golden shiner	X	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	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	X
Logperch	X		X	X		X	X			X					X	X		
Longear sunfish																	X	
Longnose dace		X	X	X	X				X			X						
Margined madtom														X				X
Mimic shiner	X																	
Northern hog sucker	X		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	X
Pugnose shiner																		X
Pumpkinseed	X	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	X
Redfin pickerel	X	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		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	X
Smallmouth bass	X	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	X
Tessellated darter	X	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		X
White bass				X														
White catfish	X	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	X
White sucker	X	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	X
Total	42	39	42	44	40	38	40	32	25	24	29	28	27	29	32	30	29	31

TABLE 4-1 SPECIES COMPOSITION OF FISH COLLECTED DURING HUDSON RIVER STUDIES FROM 1974 TO 1991 (Continued)

Common Name	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Marine																		
American sandlance													X	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	X
Atlantic mackerel															X			X
Atlantic menhaden	X	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	X
Atlantic silverside	X	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	X
Black seabass					X							X			X			
Bluefish	X	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	X
Conger eel						X		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	X
Cunner									X	X	X	X	X		X	X	X	X
Fourbeard rockling						X	X								X	X	X	X
Fourspot flounder	X						X	X			X	X	X		X	X	X	
Goosefish																		X
Gray snapper							X					X	X	X				X
Grubby													X		X	X	X	X
Hickory shad		X			X	X				X			X					
Inshore lizardfish	X					X	X	X			X	X			X	X		X
King mackerel																		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	X
Northern kingfish	X	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	X
Northern puffer		X		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	X
Northern stargazer	X						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	X
Rough silverside		X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X
Scup	X																	X
Seaboard goby		X	X				X								X			X
Seahorse															X		X	X
Sea raven							X											
Searobin		X	X		X		X	X							X		X	X
Sharptail goby																	X	
Sheepshead								X										
Silver hake	X	X		X									X		X	X	X	X
Silver perch	X					X					X	X	X		X			X
Smallmouth flounder						X	X		X		X	X			X		X	X
Spanish mackerel																	X	X
Speckled worm eel					X		X				X			X	X			
Spot	X	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	X
Striped anchovy		X				X			X			X						
Striped cuskeel							X					X	X	X	X	X		X
Striped killifish			X															
Striped mullet	X		X	X		X	X	X	X	X	X	X	X	X	X			X
Striped burrfish													X					

TABLE 4-1 SPECIES COMPOSITION OF FISH COLLECTED DURING HUDSON RIVER STUDIES FROM 1974 TO 1991 (Continued)

Common Name	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Marine (Cont.)																		
Striped searobin		X			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	X
Tautog		X				X	X	X	X	X	X	X	X	X	X	X	X	X
Weakfish	X	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	X
Windowpane	X	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	X
Yellowtail flounder	X																	
Total	28	30	29	24	22	31	38	28	29	25	32	39	40	32	46	37	40	45
Estuarine																		
Fat sleeper													X					
Fourspine stickleback	X	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	X
Inland silverside	X	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	X
Shortnose sturgeon	X		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	X
White perch	X	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	7
Catadromous																		
American eel	X	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	1
Anadromous																		
Alewife	X	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	X
Atlantic sturgeon	X	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	X
Blueback herring	X	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	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	X
Total	8	8	7	7	7	8	8	8	7	7	8	7	7	7	8	7	8	7
All Categories																		
Total	85	83	85	82	75	84	93	75	68	63	76	81	82	75	93	82	85	91

Thirty-one out of the 91 species were collected in all three sampling surveys. Thirty-six species were collected in only one of the surveys (Table 4-2); of the 31 freshwater species, 15 (48%) of them were collected only in the BSS. Aside from catches of freshwater and "undetermined" fish, nearly equivalent numbers of taxa were collected in all three surveys.

Although all analyses show generally robust fish assemblages that may vary from year to year but have not changed substantially from the mid-1970s to early 1990s, there is a general perception among some Hudson River fishermen and the lay public that abundance of several species of fish, amphibians, and invertebrates in the upper areas of the estuary has declined severely from prior levels. The evidence and possible explanations for the decline were discussed at a public meeting hosted by the Hudson River Foundation in 1990. There was general agreement that data support a decline in some species, but no clear explanation for the declines was apparent. Hypotheses that were considered included chlorine discharges at upriver sewage treatment facilities, improving water quality leading to a subsequent increase in pollution-intolerant predator species, declining nutrient levels, and habitat degradation caused by expansion of water chestnut (Waldman 1991).

The cause for the decline in the number of freshwater species sampled in the estuary since the 1970s is not clear, and in fact may be due to changes in the temporal extent of the sampling. In the 1970s the BSS program began in April and continued through November. In the 1980s the program typically ran from July or August to October. Alternatively, habitat alteration due to the increase in water chestnut or a general decline in freshwater inflow may be responsible for the changes.

Similarly, the increase in marine species may result from changes to the sampling programs and from changes in the more saline areas of the estuary. The lower freshwater flow in the 1980s relative to the 1970s would result in higher salinities in the lower part of the estuary, making it suitable for more obligate saltwater species. Additionally, due to increased treatment of sewage in New York City, dissolved oxygen levels have increased at the mouth of the Hudson, increasing the potential for movement of marine fish into the river.

4.2 STRIPED BASS

Striped bass (*Morone saxatilis*) are anadromous (i.e., they spend most of their life in the marine environment but return to fresh water to reproduce) members of the temperate bass family (the Percichthyidae). They are native to North America and range along the Atlantic coast from the St. Lawrence River in Canada to the St. Johns River in northern Florida and from western Florida to Louisiana along the coast of the Gulf of Mexico. They were introduced in the Sacramento-San Joaquin River system in 1879 and are now found from British Columbia to Ensalada, Mexico. Striped bass have also been successfully introduced into the inland waters of at least 24 states. The U.S. east coast rivers and bays that support the principal spawning populations are the Hudson River; Delaware Bay and Delaware River; Chesapeake Bay and tributaries; the Roanoke and Chowan rivers and Albermarle Sound, North Carolina; the Santee River, South Carolina; and the St. Johns River, Florida. Small

TABLE 4-2 SPECIES COMPOSITION OF FISH COLLECTED IN EACH OF THE HUDSON RIVER SURVEYS DURING 1991

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
Striped bass	X	X	X
Total	6	7	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		
Shortnose sturgeon		X	X
Threespine stickleback	X		
White perch	X	X	X
Total	6	3	5
Freshwater			
Banded killifish	X	X	
Black crappie	X		
Bluegill	X	X	X
Brook trout		X	
Brown bullhead	X	X	X
Carp	X	X	X
Channel catfish		X	X
Creek chub	X		

TABLE 4-2 SPECIES COMPOSITION OF FISH COLLECTED IN EACH OF THE HUDSON RIVER SURVEYS DURING 1991 (Continued)

Common Name	BSS	FJS	LRS
Freshwater (Cont.)			
Emerald shiner	X		
Fallfish	X		
Gizzard shad	X		X
Golden shiner	X		
Goldfish	X		X
Largemouth bass	X		X
Margined madtom		X	
Northern hog sucker	X		
Northern pike	X		
Pugnose shiner	X		
Pumpkinseed	X	X	X
Redbreast sunfish	X		
Redfin pickerel	X		
Rock bass	X		
Silvery minnow	X		
Smallmouth bass	X		
Spottail shiner	X	X	X
Tesselated darter	X	X	X
Walleye			X
White catfish	X	X	X
White crappie	X		
White sucker	X		
Yellow perch	X		X
Total	27	11	13
Marine			
American sand lance			X
Atlantic herring			X
Atlantic mackerel			X
Atlantic menhaden	X	X	X
Atlantic needlefish	X	X	
Atlantic silverside	X	X	X
Bay anchovy	X	X	X

TABLE 4-2 SPECIES COMPOSITION OF FISH COLLECTED IN EACH OF THE HUDSON RIVER SURVEYS DURING 1991 (Continued)

Common Name	BSS	FJS	LRS
Marine (Cont.)			
Bluefish	X	X	X
Butterfish		X	X
Conger eel			X
Crevalle jack	X	X	X
Cunner			X
Fourbeard rockling			X
Goosefish	X		X
Gray snapper	X		
Grubby			X
Inshore lizardfish	X	X	X
King mackerel			X
Naked goby	X	X	X
Northern kingfish	X	X	X
Northern pipefish	X	X	X
Northern puffer	X	X	X
Northern searobin	X	X	X
Northern stargazer	X	X	
Rock gunnel			X
Rough silverside			X
Scup		X	X
Seaboard goby		X	X
Sea horse			X
Searobin	X		X
Silver hake		X	
Silver perch	X	X	
Smallmouth flounder			X
Spot	X	X	
Spanish mackerel	X	X	X
Spotted hake		X	X
Striped cuskeel		X	X
Striped mullet	X		
Striped searobin	X	X	X
Summer flounder	X	X	X
Tautog	X		X

TABLE 4-2 SPECIES COMPOSITION OF FISH COLLECTED IN EACH OF THE HUDSON RIVER SURVEYS DURING 1991 (Continued)

Common Name	BSS	FJS	LRS
Marine (Cont.)			
Weakfish	X	X	X
White mullet	X		
Windowpane	X	X	X
Winter flounder	X	X	X
Total	27	27	37
Undetermined			
Acipenseridae			X
Atherinidae			X
Bothidae			X
Castastomidae			X
Centrarchidae	X		X
Clupeidae	X	X	X
Cyprinidae	X		X
Fundulus sp.			X
Gobiidae			X
Labridae			X
Morone spp.			X
Percidae			X
Pleuronectidae			X
Unidentifiable			X
Total	3	1	14

spawning populations also occur in several river systems in eastern Canada. Since 1983, the utilities' striped bass hatchery has provided larvae for rearing and stocking by the State of Maine in its efforts to establish striped bass in the Kennebec River.

On the Atlantic coast adult striped bass, which commonly reach 30 lb and can weigh over 50 lb, feed in nearshore waters from summer through late winter. During the warmer months fish typically travel north and return south as the coastal waters cool in the fall. Northward migration of Hudson River fish extends as far north as the Bay of Fundy, Nova Scotia, and older fish tend to travel farther north. Over the winter adult striped bass tend to aggregate near the mouths of their natal rivers. Once water temperatures rise in the spring, native adults (ages 4 and older) begin moving upriver to spawning areas in the freshwater portions of the estuaries.

Spawning begins in the spring when water temperatures are rising rapidly and reach about 57°F. Peak spawning occurs at about 60 to 65°F in freshwater areas where currents are moderate to swift (Albrecht 1964; Setzler et al. 1980). In the Hudson River spawning occurs primarily between mid-May and mid-June in the middle portion of the Hudson River estuary. Depending on their age and size, females produce up to several million semibuoyant eggs that are suspended by currents. The eggs are relatively large (average ⅛ in. in diameter after water hardening), but vary with the size of the female. Older, larger females tend to have larger eggs.

In one to four days, depending on temperature, yolk-sac larvae (YSL) hatch from the eggs. Typically ⅛ in. long, they initially drift with the current but can swim for short bursts. During the YSL stage the eyes become pigmented, the jaws and digestive tract form, fin buds appear, and they at least partially absorb the yolk-sac and oil globule. Older YSL are mobile and exhibit a positive phototaxis, or movement toward light (Doroshev 1970). The end of the yolk-sac stage is marked by the completion of the digestive tract, although some of the yolk sac and oil globule may still remain. Striped bass YSL are most abundant upriver, where the eggs were most abundant; this difference in distribution has also been noted in other estuaries. The difference in distribution may mean that YSL migrate upriver using tidal currents, although other explanations have been proposed (Polgar et al. 1976; Fay et al. 1983).

Transformation to the post-yolk-sac larvae (PYSL) stage occurs from four to nine days after hatching, when the larvae are ¼ in. long. The remainder of the yolk sac and oil globule are absorbed, body pigmentation becomes noticeable, fins begin to form, the gas bladder is inflated, and larvae begin to feed actively on zooplankton. This stage lasts approximately one month or longer, ending when the fin rays are fully developed, which occurs when the fish are just over ½ in. long. Striped bass PYSL are most abundant in the middle estuary, but they are found throughout the estuary.

Toward the end of the PYSL stage young striped bass begin moving out of the middle estuary into the lower estuary, which is broader, shallower, and may be more productive, and they feed on copepods and amphipods. Larger juveniles, over 2½ in. long, feed on insect larvae,

worms, opossum shrimps, crabs, and small fish (Gardinier and Hoff 1982). In many years the majority (80% or more) of the juvenile striped bass population is located in this region.

At the end of their first summer many of the juvenile striped bass move to the southern extreme of the estuary and are found in New York Harbor, western Long Island Sound, and along the south shore of Long Island (McKown 1992a). As striped bass grow, fish become an increasingly important component of their diet. Juvenile striped bass are also preyed upon by some marine and estuarine predator species.

At age 2 or 3 striped bass leave Atlantic coast estuaries and begin the typical seasonal migration, northward during the spring and summer and southward during the fall. Adult striped bass are at the top of the food chain and have few natural enemies other than man. As they rarely go more than 10 miles offshore, they are typically available to sport and commercial fishermen all along their migration route.

Historically, striped bass have contributed an important commercial fishery in the coastal waters of the northeastern states and in spawning areas such as the Hudson River estuary. Additionally, striped bass have been a popular sport fish because of their large size and fighting ability. Both the sport and commercial fisheries harvested a mixed stock composed of fish from the major spawning rivers (Roanoke River, Chesapeake Bay, Delaware River, Hudson River), with the largest contribution usually from the Chesapeake. In the 1970s the Hudson was thought to contribute typically less than 10% of the fish along the coast north of Chesapeake Bay, though ranging up to perhaps 40-50% for some year classes (Van Winkle et al. 1988). Due to the tendency of striped bass to migrate northward upon leaving their natal streams (Waldman et al. 1990), the contribution of Hudson River fish was principally in New York and the New England states.

In New York the presence of high levels of PCBs in striped bass flesh adds to the management picture as public health concerns impose further restrictions on the harvest of striped bass. In 1976 the river commercial fishery was closed due to PCB contamination. Although striped bass caught in the Hudson River could not be sold legally, they were still being caught in the gill nets that fishermen used to catch American shad. In 1986, when all coastal fisheries were substantially restricted to help conserve the Chesapeake stock, New York closed its coastal fishery entirely due to high PCB levels in fish caught along the coast. The fishery was subsequently reopened on a limited basis on the eastern end of Long Island in 1990.

4.2.1 Egg Distribution

Striped bass eggs were first collected in the river in late April (week of 22 April) in the Albany region. Average water temperature in the Albany region during this week was 8.1°C (Table D-5), with warmer temperatures occurring in downriver regions. Eggs were collected in greatest numbers during the weeks of 13 through 27 May (Figure 4-1), with the highest recorded peak density (1081/1000 m^3) occurring in Hyde Park the week of 13 May. The mean water temperature in the Hyde Park region during the period of peak egg abundance was 17.1°C. (In 1990 peak egg abundance also occurred in the Hyde Park region and mean regional temperature was 17.4°C.) The mean water temperatures in areas where eggs were found during the period of greatest egg abundance ranged from 15.9 to 17.1°C, 17.1 to 19.6°C, and 20.4 to 23.1°C during the weeks of 13, 20, and 27 May, respectively.

As noted in the 1990 Year Class Report (LMS 1992), historic peak weekly regional egg densities rarely exceeded 500 eggs/1000 m^3. In 1991 and recent years (1989 and 1990) peak egg densities have exceeded 1000/1000 m^3 in addition to other regions where the count exceeded 500/1000 m^3.

Striped bass eggs were found in every region except the Battery, which was not sampled during the first eight weeks of the program (the period of peak egg abundance in other regions). Regional density estimates were greatest in the West Point through Saugerties regions. Overall, relatively few eggs were found in the saline portion of the lower Hudson River estuary, with egg density in regions south of West Point not exceeding 15/1000 m^3 during any sampling period. Salinity south of the West Point region during peak abundance was greater than 0.3 ppt. Also, relatively few eggs were collected in the Albany region.

4.2.2 Yolk-Sac Larval Distribution

Striped bass YSL were first collected the week of 29 April (one week after eggs were first collected in the Albany region) in the Tappan Zee and Indian Point regions (Table D-3). YSL were collected from late April through mid-June, with highest densities recorded in mid- to late May, which coincides with the period of peak egg densities. The highest regional density (4694/1000 m^3) was recorded in the Hyde Park region in late May (week of 20 May, which is the week following peak egg density in this same region).

YSL were found in all regions except the Battery, which was not sampled during the period of peak abundance, and were collected in the Yonkers region only during the week of 27 May. During the weeks of greatest abundance, yolk-sac densities were highest in the Croton-Haverstraw through Saugerties regions. In most sampling periods, YSL densities were relatively low in the regions north of Saugerties.

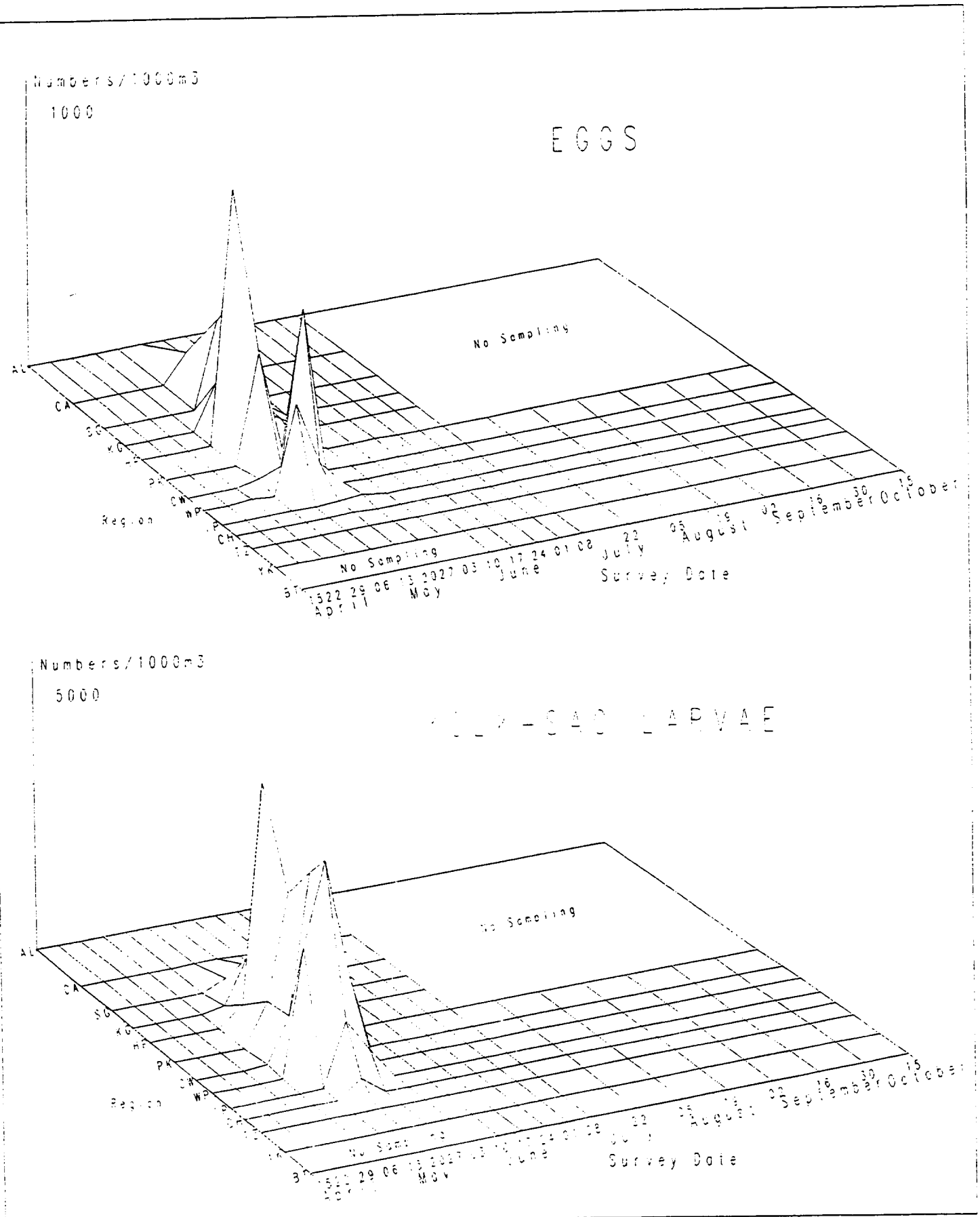

Figure 4–1. Spatiotemporal distribution of egg and yolk–sac stages of striped bass in the Hudson River estuary based on the 1991 Long River Ichthyoplankton Survey.

4.2.3 Post Yolk-Sac Larval Distribution

Striped bass PYSL were first collected in early May (week of 6 May [Table D-5]) in the Indian Point region, with the highest densities and standing crop found from late May to mid-June (Figure 4-2). This peak in post YSL 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). The highest density of PYSL (11,286/1000 m^3) occurred in the Cornwall region the week of 3 June. Densities exceeded 6000/1000 m^3 in late May to early June in the Indian Point to Poughkeepsie regions. In all regions the PYSL density declined to less than 13/1000 m^3 by late July (no sampling was conducted in the upper river, Hyde Park to Albany, in late July).

PYSL were collected throughout the Hudson River estuary in 1991, with the greatest number occurring from the Indian Point through Saugerties region. Similar spatial distributions have been reported in previous years.

4.2.4 Young of Year Distribution

YOY striped bass were first collected in the LRS in mid-June. Greatest densities were recorded in late June through early July (Figure 4-2). YOY were collected in each of the FJS and BSS sampling periods (Figure 4-3). In the FJS, peak abundance occurred in the first sampling week (15 July), followed by a decline through the first week of September. There was a slight increase in the FJS catch in late September through late October in the first several weeks of collection (10/1000 m^3), with a steady decline through September; a small peak (5.7/1000 m^3) was observed in Croton-Haverstraw in October. Peak abundance in the BSS also occurred the first week of sampling in late June (24 June). Striped bass abundance steadily declined in the shore zone area throughout the sampling program.

Striped bass YOY were collected from every region of the Hudson River estuary except the Battery in 1991. Salinities were >12 ppt in the Yonkers region in the summer and early fall. Collections of YOY striped bass in the LRS were made as far north as Albany. In the FJS, YOY were collected in greatest numbers during the early weeks of the FJS and were collected from all regions of the river. Densities were highest in the Croton-Haverstraw and Hyde Park to Saugerties regions. By the end of sampling (late-October) YOY were collected primarily in the lower region of the estuary.

In the BSS, highest densities of YOY were collected in the lower and upper portions of the estuary. By late October/early November YOY were found primarily in the lower estuary in the Croton-Haverstraw and Indian Point regions. Water temperatures in the shore zone had declined to 11-13°C in the upper estuary, 12-13° in the Yonkers and Tappan Zee region, and were around 16°C in the Croton-Haverstraw and Indian Point regions.

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

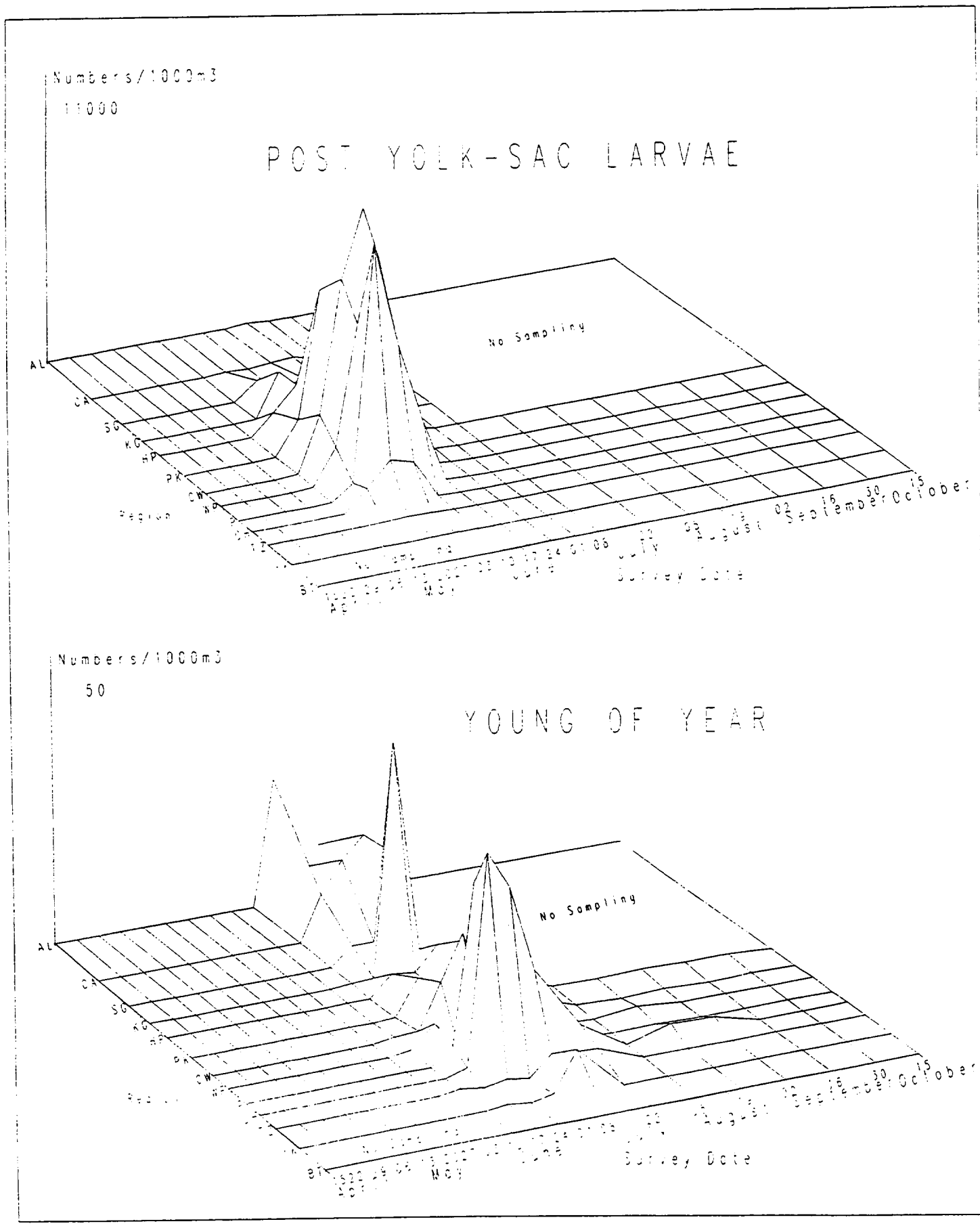

Figure 4–2. Spatiotemporal distribution of post yolk–sac and young–of–year stages of striped bass in the Hudson River estuary based on the 1991 Long River Ichthyoplankton Survey.

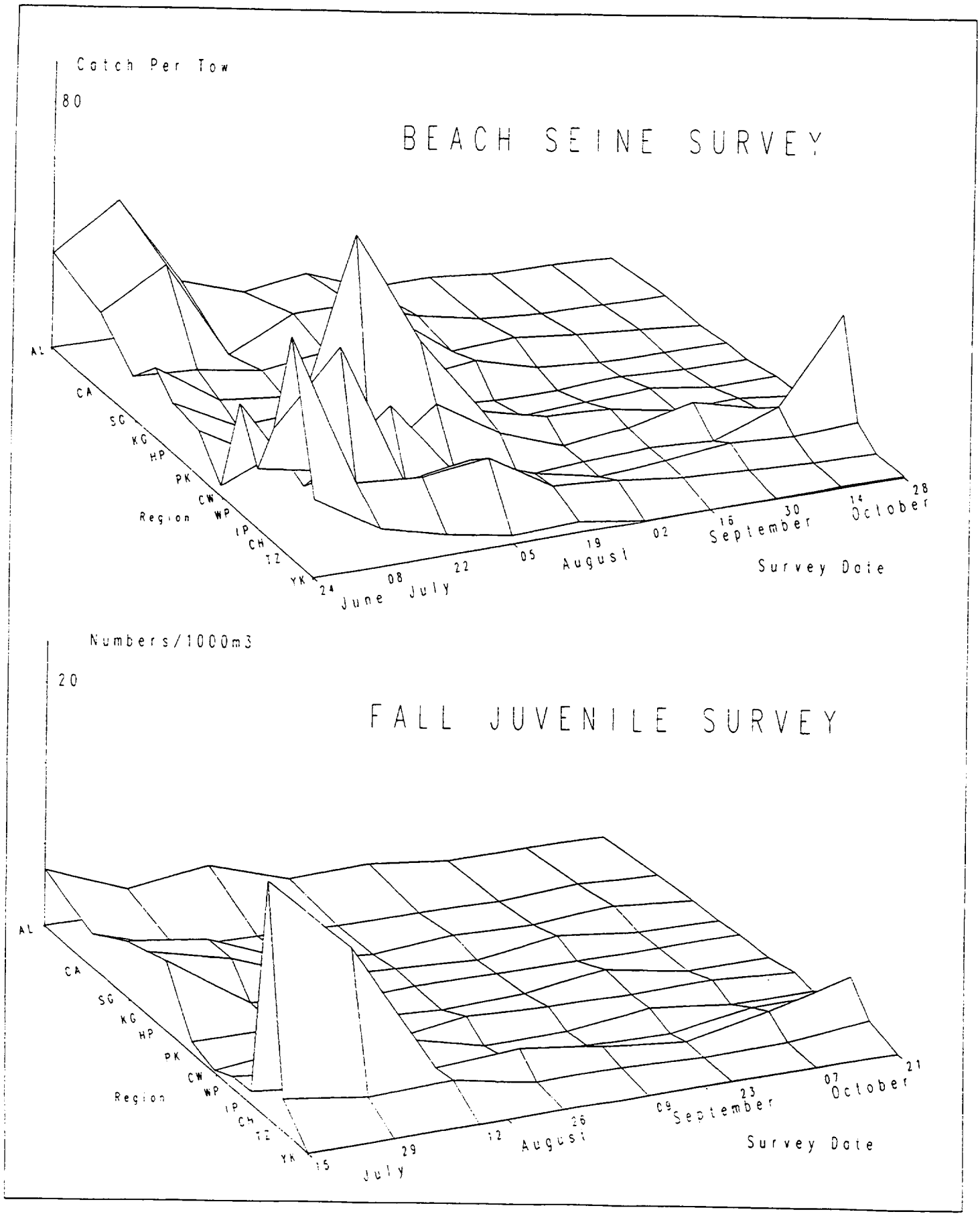

Figure 4–3. Spatiotemporal distribution of young–of–year striped bass in the Hudson River estuary based on the 1991 Fall Juvenile and Beach Seine River Ichthyoplankton Surveys.

(McFadden et al. 1978). From the data collected, a trend in YOY distribution toward the lower estuary was evident in both the BSS and FJS. The migration of YOY downriver to overwintering grounds during the fall has been reported in previous years (TI 1981; NAI 1985a; LMS 1989; EA 1990, 1991).

4.2.5 Yearling and Older Fish Distribution

Yearling and older striped bass were collected during all sampling periods in both the 1991 FJS and BSS (Figure 4-4); densities never exceeded 1/1000 m^3 in the FJS. Most BSS densities never exceeded 1/tow. In the FJS, the yearling and older striped bass estimated standing crop (Table D-14) was highest in mid-July to mid-August. Standing crop estimates remained relatively high in the Tappan Zee and Croton-Haverstraw regions throughout the FJS sampling program (late October). A few were collected sporadically in the Hyde Park through Catskill regions during summer and early fall but they disappeared from the upper and middle estuary by late October. In the BSS, the yearling and older striped bass estimated standing crop (Table D-16) was highest during the weeks of 24 June and 5 August. In the shore zone, yearling and older striped bass were found primarily in the Saugerties to Albany region from 24 June to 20 August and in the Tappan Zee and Croton-Haverstraw region throughout the sampling program (late October).

4.2.6 Comparison to Previous Years

Peak egg density in 1991 occurred within the historical temporal range (Figure 4-5). Peak yolk-sac and post yolk sac abundance tended to be on the early side of the historical range and long-term average. YOY appeared earlier in collections than the long-term index.

Peak striped bass egg distribution in the 1991 LRS was shifted upriver of the long-term trend (Figure 4-6). Peak distribution occurred in the Poughkeepsie and Hyde Park regions rather than Indian Point and West Point. Freshwater flow was lower than the long-term average during the period covered by the index and likely affected the downriver movement of eggs. In addition, due to the low flows the saltfront was located around West Point during peak egg abundance. The long-term pattern indicates that these regions have also been areas of high abundance. The 1991 PYSL and YOY distribution was very similar to the historical trend.

The 1991 BSS YOY geographical index was similar to the historical trend (Figure 4-7). Historically and in 1991 YOY were found primarily in the lower estuary, Tappan Zee and Croton-Haverstraw regions, with secondary peak distribution in Cornwall and the upper 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 1991 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 (13

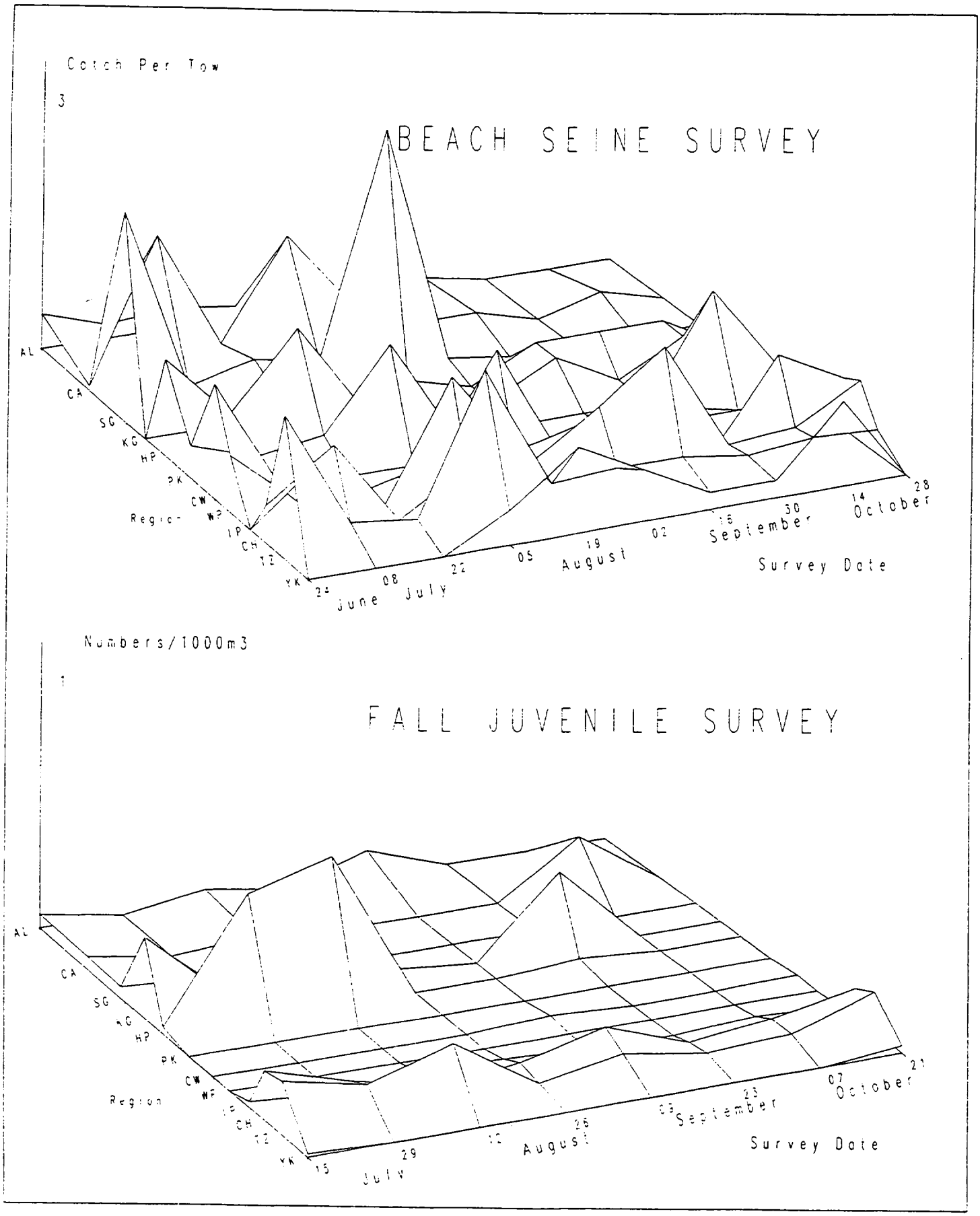

Figure 4–4. Spatiotemporal distribution of yearling and older striped bass in the Hudson River estuary based on the 1991 Fall Juvenile and Beach Seine River Ichthyoplankton Surveys.

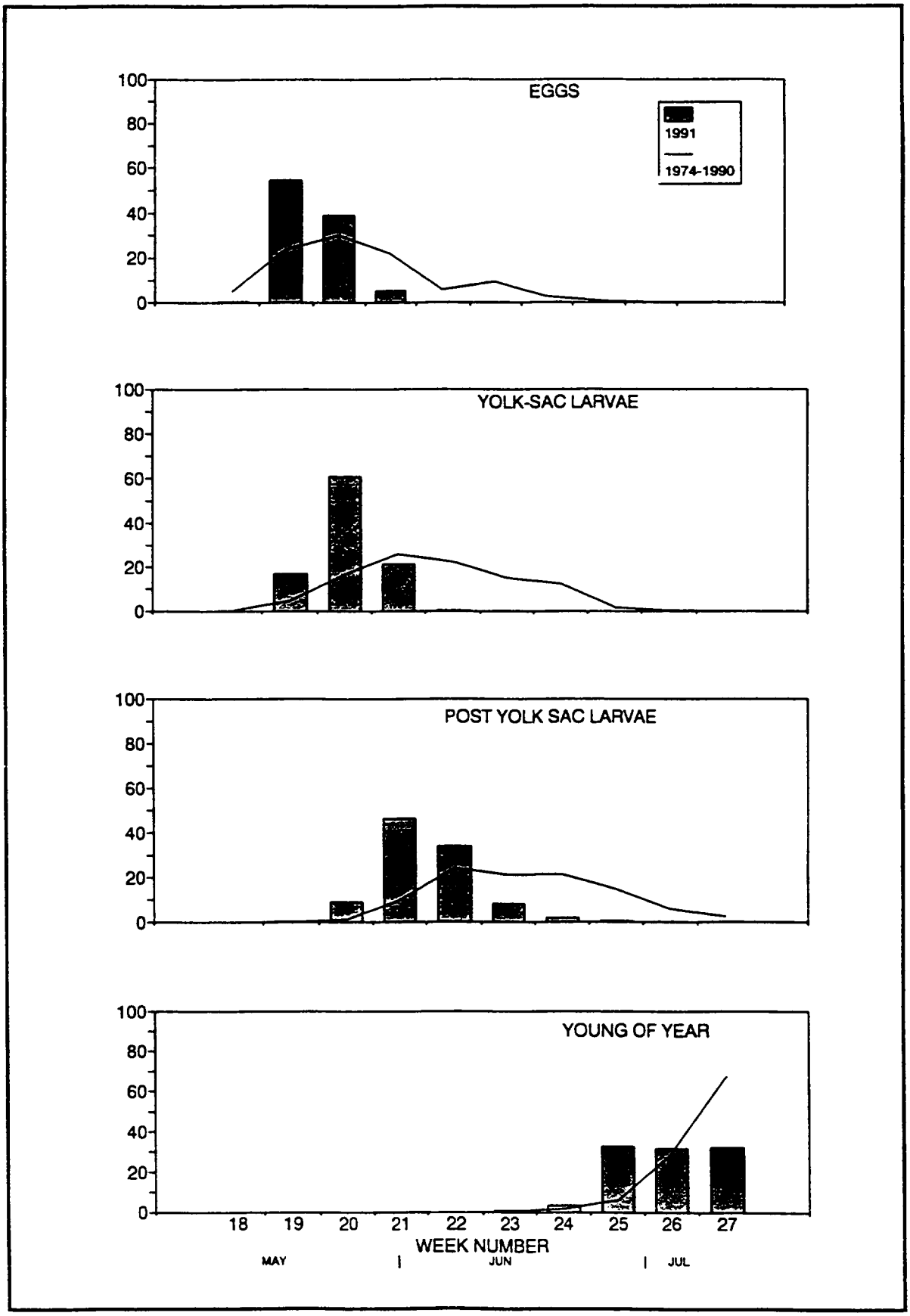

Figure 4-5. Temporal distribution indices for the early life stages of striped bass collected during Longitudinal River Ichthyoplankton Surveys of the Hudson River estuary, 1974-1991.

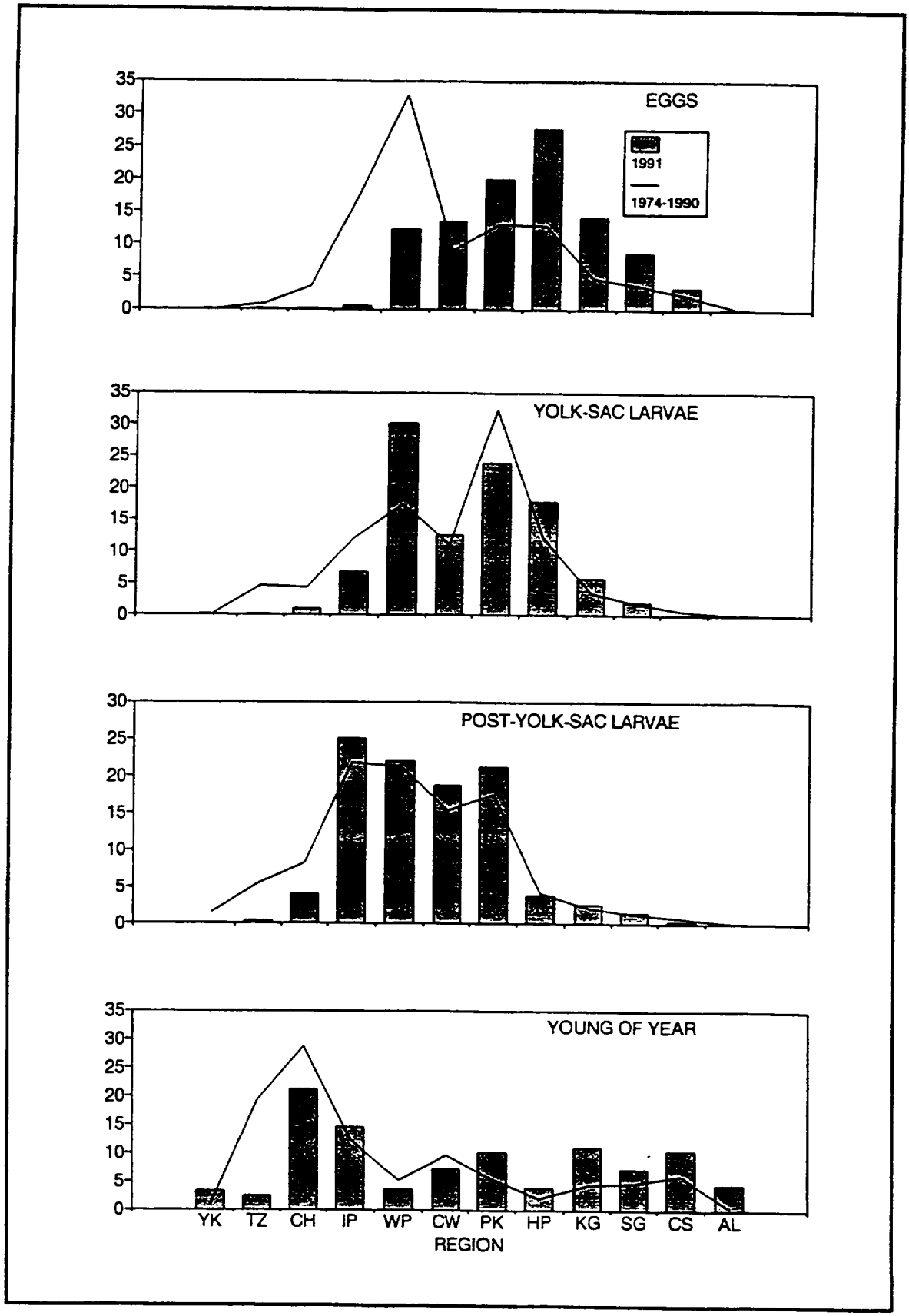

Figure 4-6. Geographic distribution indices for the early life stages of striped bass collected during Longitudinal River Ichthyoplankton Surveys of the Hudson River estuary, 1974-1991.

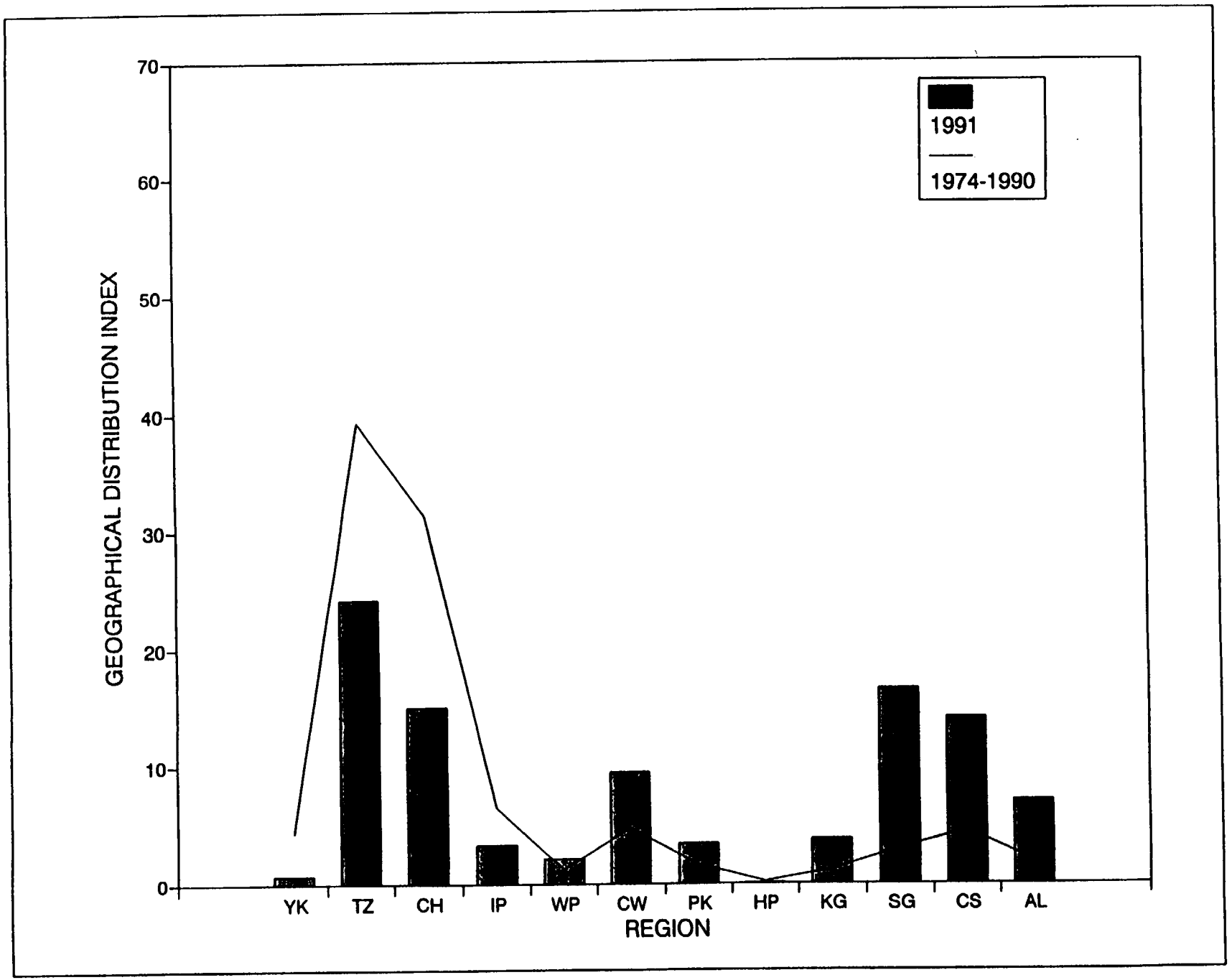

Figure 4-7. Geographic distribution indices for young of year striped bass collected during Beach Seine surveys of the Hudson River estuary, 1974-1991.

May to 27 May), the greatest striped bass egg density was recorded at RM 81. The river bends around a prominent point, Crum Elbow, at RM 79-81; the river channel is deep along the western shore with limited shallows along the eastern shore and just north of the bend on the western shore (Figure 4-8). Abundant numbers of eggs were also collected around RM 60 and from RM 83-110. At RM 60 the river channel is deep along the western shore, but an extensive zone of shallow water with vegetation exists along the eastern shore at RM 83-110. The river is relatively narrow and deep in this section but there are shallow vegetated areas found throughout this section. 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, 1991).

In 1991 the peak striped bass YSL abundance was recorded from 13 to 27 May; greatest densities during this period were collected at RM 49, 51, 56 and 83 (Figure 4-8). YSL distribution during peak abundance was shifted slightly downriver of the egg distribution. The river channel at RM 49 is very narrow. The land out from the western shore forming a hook, Conhook, which has some shallow vegetated areas on both the upriver and downriver sides. RM 51 is south of Constitution Marsh, a large vegetated shallow area. RM 56 is just south of Moodna Creek (RM 58) on the western shore and Fishkill Creek (RM 60) on the eastern shore; extensive vegetated shallows exist in this area along the eastern shore. RM 83 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 PYSL abundance (EA 1990).

Striped bass PYSL were most abundant from 20 May to 17 June. Peak density occurred at RM 51, which is just south of Constitution Marsh. PYSL were also abundant near the outfall of Peekskill Hollow Creek (RM 44) and around RM 60 which has an extensive shallow vegetated area along the eastern shore of the Hudson River. Peaks in PYSL abundance historically have been found at RM 41-51 in 1986, RM 48-63 in 1987 (LMS 1989), and RM 46-50 in 1988 (EA 1990).

During the period of peak abundance of YOY striped bass (24 June to 8 July), the highest YOY densities were collected at RM 39 (Figure 4-8). A large zone of shallow water exists in the vicinity of RM 39, which is in the northern end of Croton-Haverstraw Bay. Croton-Haverstraw Bay has been an area of peak striped bass YOY abundance in past years (EA 1990; LMS 1992).

4.3 WHITE PERCH

White perch (*Morone americana*) resemble the closely related striped bass in general form and structure but are deeper bodied, more laterally compressed, and have no stripes. Adult white perch are much smaller than adult striped bass, averaging less than 10 in. in length and less than 3 lb in weight. Coloration ranges from dark olive to dark gray on the dorsal surface, shading to silvery white on the belly.

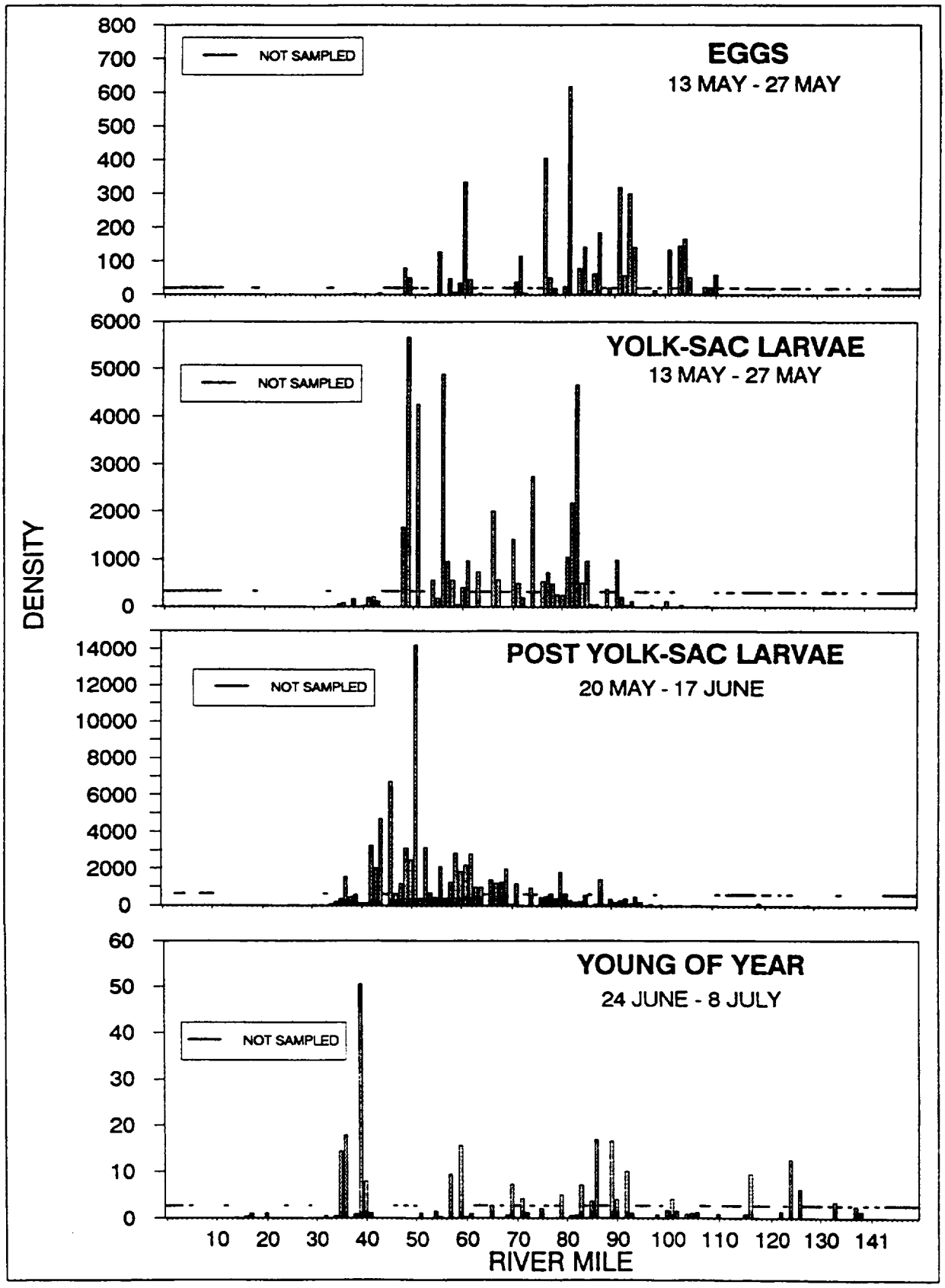

Figure 4-8. Microdistribution (mean density by river mile) of striped bass in the Hudson River estuary based on the 1991 Longitudinal River Ichthyoplankton Survey.

The natural range of this species extends along the Atlantic coast of North America from the southern Maritime Provinces of Canada and the St. Lawrence River to South Carolina in brackish and freshwater areas near the coast. White perch are essentially estuarine, but landlocked populations exist in fresh water throughout their range (Mansueti 1964). Freshwater populations predominate in the northern part of the range and white perch are uncommon in salt water north of Cape Cod (Rounsefell 1975). Probably as a result of dispersal through canals, they are now found in Lakes Ontario and Erie (Hubbs and Lagler 1958). They have also been introduced accidentally into the Missouri River drainage (Hergenrader and Bliss 1971).

Coastal populations overwinter in the deeper waters of middle and lower estuaries (Mansueti 1957; Markle 1976). White perch spawn in shallow water following upstream migrations to areas of fresh or slightly brackish waters during the spring and early summer. Spawning also occurs in tributary streams. After spawning, adult white perch generally return to the lower reaches of estuaries. In the Hudson River estuary spawning occurs from early May to early July, primarily north of Croton Bay. After spawning, many adults move downriver to areas of higher salinity in Haverstraw Bay and the Tappan Zee region.

Female Hudson River white perch produce from 16,000 to 161,000 eggs (Bath and O'Connor 1982). White perch eggs do not contain an oil globule and are small, 1/16 in. in diameter. They sink to the bottom and, because they are very adhesive, stick to each other and to anything else they contact (Mansueti 1964). In the Hudson River white perch eggs are most abundant in the upper estuary.

Hatching occurs in one-and-a-half to six days, with development occurring faster at higher temperatures. Newly hatched YSL are 1/16 to 1/8 in. long. They remain on or near the bottom for three to five days and do not move about actively until the yolk sac is absorbed (Mansueti 1964). White perch YSL larvae are most abundant in the upper estuary but downriver of the area where eggs were most abundant.

The yolk sac is completely absorbed when the larvae are a little over 1/8 in. long; the end of the PYSL stage occurs when the adult fin complement develops, usually about one month after hatching and when the young white perch are about 1 in. in length. White perch PYSL are abundant in the upper estuary, but co-occur extensively with striped bass PYSL in the middle estuary.

Juvenile white perch are about 3 in. long by the end of their first summer (Klauda et al. 1988a). They are prey for larger predators (including adult white perch and striped bass). In the Hudson River estuary some white perch of both sexes become sexually mature at age 2, but all males and females are mature by ages 4 and 5, respectively (Klauda et al. 1988a).

White perch are commonly caught by recreational fishermen, but because of their small size in the Hudson River they are not the object of a major recreational fishery. In addition, the public health advisory recommending against the consumption of fish from the Hudson River

because of PCB levels in excess of the FDA limit further reduces the recreational interest in this species.

4.3.1 Egg Distribution

White perch eggs were collected in low numbers during the first LRS sampling period (15-19 April) in the upper estuary (Figure 4-9), when mean weekly water temperatures in these regions ranged from 9 to 11°C. White perch eggs were collected through mid-June. Peak regional densities of 1114/1000 m^3 and 1112/1000 m^3 occurred in the Saugerties and Catskill regions, respectively, during the week of 27 May when mean weekly water temperatures ranged from 22 to 23°C in the upper estuary; the week prior to this (20 May) mean weekly temperatures ranged from 19.1 to 19.6°C. In the Hudson River estuary, peak egg deposition reportedly occurs at 16-20°C (Klauda et al. 1988a).

White perch eggs were collected primarily in the middle and upper estuary, with the greatest densities in upriver regions from Kingston to Catskill. Eggs were collected in very low numbers occasionally in the lower estuary as far down as Yonkers.

4.3.2 Yolk-Sac Larval Distribution

White perch YSL were collected in the Hudson River estuary from mid-April through mid-June (Figure 4-9); no YSL were collected after mid-June and no YSL were collected during the first LRS sampling week. Peak YSL abundance was recorded from weeks 6 through 27 May. No YSL were collected after mid-June. Peak yolk-sac abundance occurred prior to the largest peak in egg abundance. Because of the demersal, adhesive nature of white perch eggs, peak egg abundance in the catches may not accurately reflect peak abundance in the river.

White perch YSL were collected from all regions except the Battery, which was not sampled during the period of yolk-sac abundance and in the Tappan Zee region. White perch YSL were most abundant in regions from Peekskill through Saugerties. Peak density (336/1000 m^3) occurred in the Hyde Park region in mid-May.

4.3.3 Post Yolk-Sac Larval Distribution

White perch PYSL were first collected in the 1991 LRS during the week of 29 April in the Tappan Zee region (Figure 4-10) and were collected in greatest numbers from early May through mid-June. Peak densities occurred the week of 27 May, and the peak regional density of 4281/1000 m^3 occurred in Kingston. White perch PYSL were most prevalent from Cornwall through Saugerties, which is a slight shift downriver of the peak yolk-sac abundance distribution. Very low numbers were collected as far downriver as the Yonkers region. PYSL were collected in upper river regions the last week the LRS sampled the Hyde Park to Albany regions (8 July).

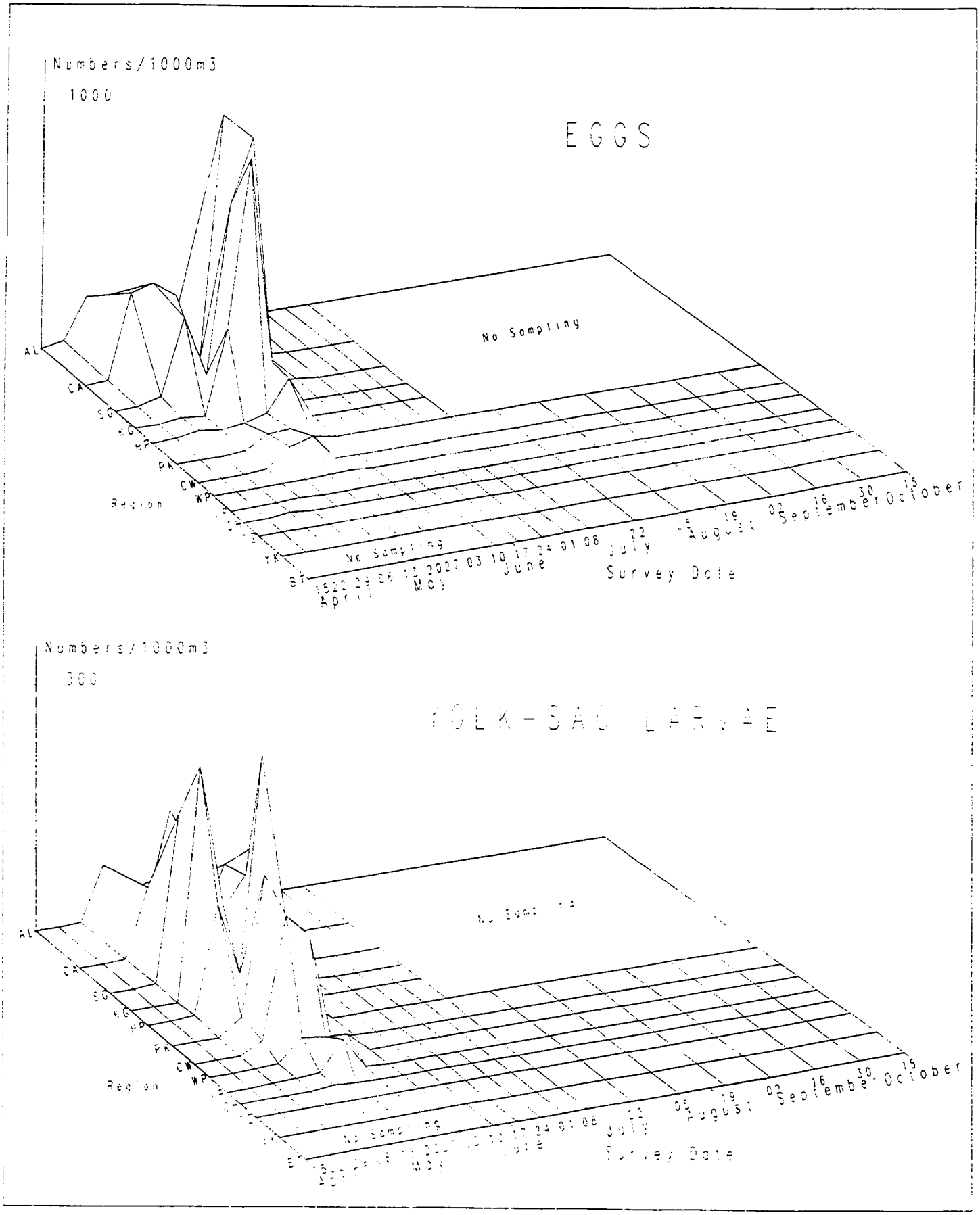

Figure 4–9. Spatiotemporal distribution of egg and yolk–sac stages of white perch in the Hudson River estuary based on the 1991 Long River Ichthyoplankton Survey.

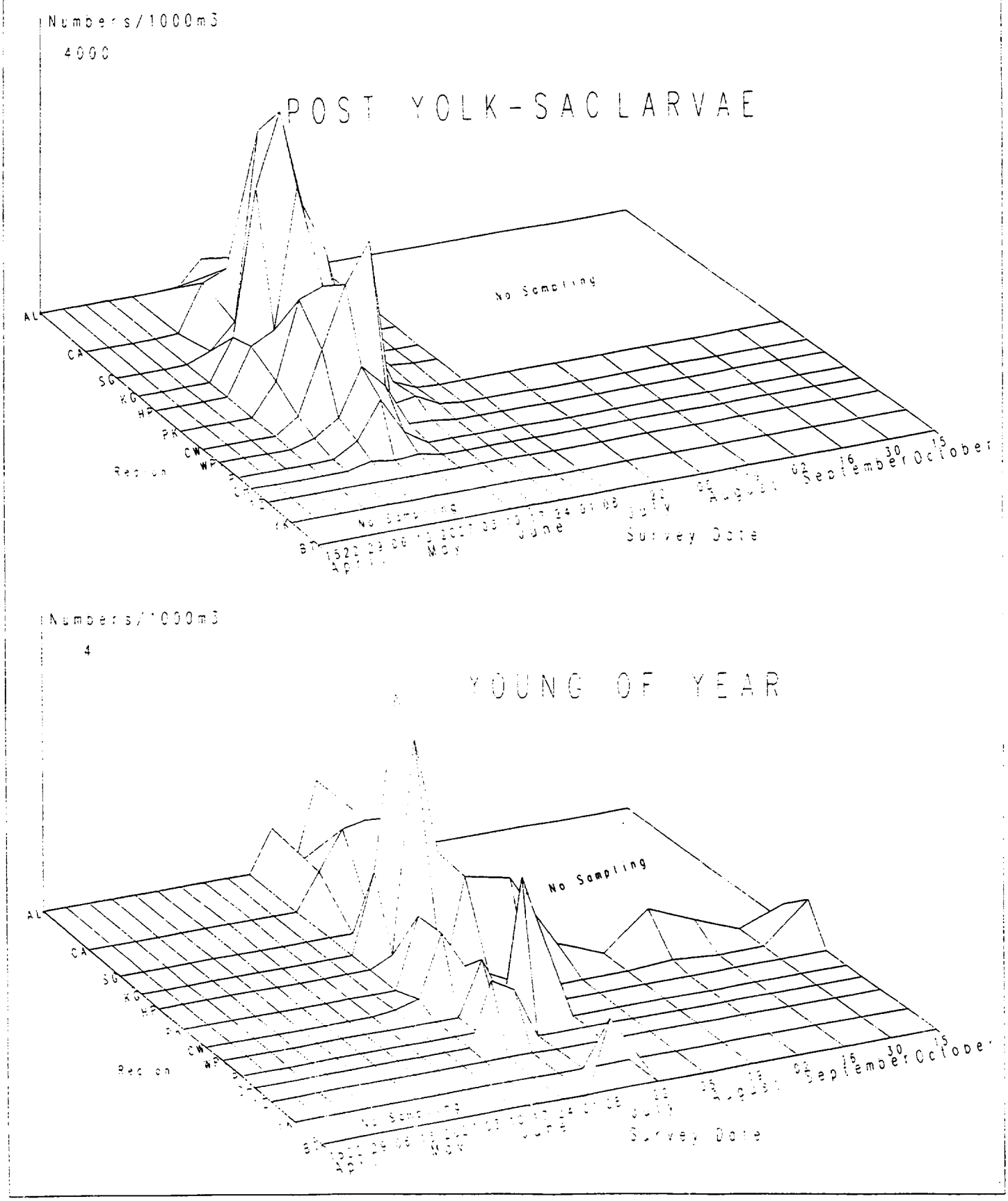

Figure 4–10. Spatiotemporal distribution of post yolk–sac and young–of–year stages of white perch in the Hudson River estuary based on the 1991 Long River Ichthyoplankton Survey.

4.3.4 Young of Year Distribution

YOY white perch were first collected the week of 10 June in the Cornwall region in the 1991 LRS (Figure 4-10). The greatest number of YOY white perch in the LRS was recorded in the Indian Point through Catskill regions in mid-July, the last week the LRS sampled regions from Hyde Park through Albany. Densities of $\leq 2/1000$ m^3 were collected in these regions. YOY white perch were collected during all weeks of the BSS and the FJS (Figure 4-11). In the FJS, YOY densities were low ($\leq 2/1000$ m^3) throughout the sampling period and the YOY that were collected were found primarily in the Peekskill and Hyde Park regions. Standing crop estimates (Table D-26) were highest at the start of the FJS in mid-July, followed by a steady decline through late August, and then an increase again in fall. In the BSS, YOY white perch remained relatively abundant from early July through late September/early October (week of 30 September). Temperature in shore zone areas were 16-19°C in the upper reaches and 20-22°C in the lower estuary during the week of 30 September.

In the LRS, YOY white perch were collected primarily in reaches north of Cornwall. In the BSS, YOY were taken from every region except Yonkers but were most abundant in the middle and upper reaches; salinities in the Yonker shore zone areas were >9 ppt.

4.3.5 Yearling and Older Fish Distribution

Yearling and older white perch were collected during all sampling periods in both the 1991 FJS and BSS (Figure 4-12). Yearling and older abundance in the FJS was similar throughout the sampling period; 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 week of 24 June in the Indian Point region (32/1000 m^3). The estimated standing crop (Table D-32) of yearling and older white perch in the BSS generally decreased through the summer and fall in the upper and middle regions of the river.

Yearling and older white perch were collected in all of the Hudson River regions sampled in both the BSS and FJS (Yonkers through Albany). In the FJS, densities were highest in the Tappan Zee and Croton-Haverstraw regions of the lower estuary and Peekskill through Albany in the upper estuary. BSS standing crop estimates indicate a large portion of the population were located in the Kingston and Saugerties, Cornwall, Poughkeepsie, and Tappan Zee regions, which is attributable to the amount of shore zone present in these regions.

4.3.6 Comparison to Previous Years

White perch spawn over an extended period of time and is reflected in the long-term temporal distribution pattern (Figure 4-13). The 1991 distribution indicates a large portion of the egg catch was shifted toward the left (occurred earlier in the year). The 1991 yolk-sac and post yolk-sac patterns are also shifted toward the left from the long-term average pattern (present earlier in the year). YOY temporal distribution in 1991 reflected the long-term trend, with

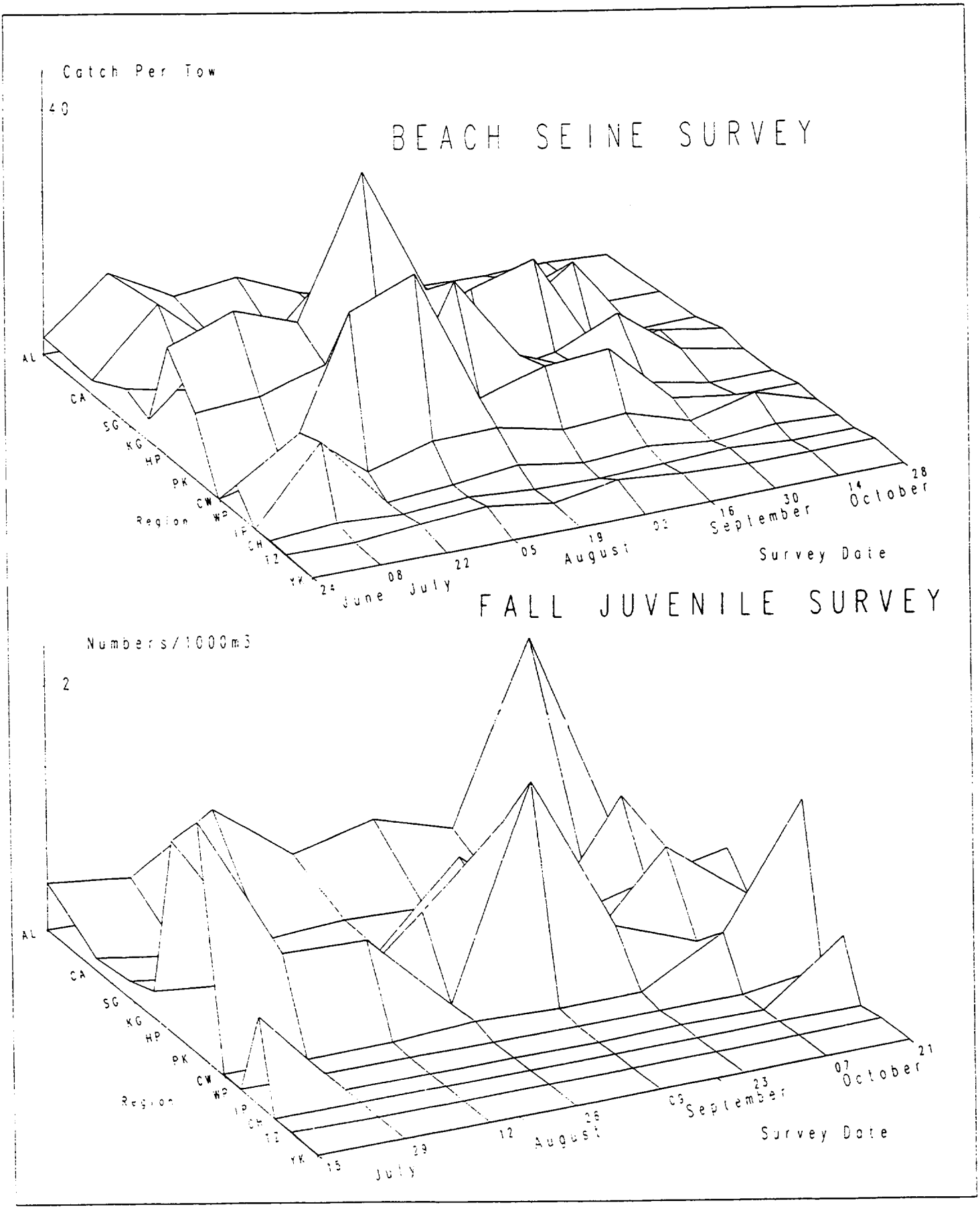

Figure 4–11. Spatiotemporal distribution of young–of–year white perch in the Hudson River estuary based on the 1991 Fall Juvenile and Beach Seine River Ichthyoplankton Surveys.

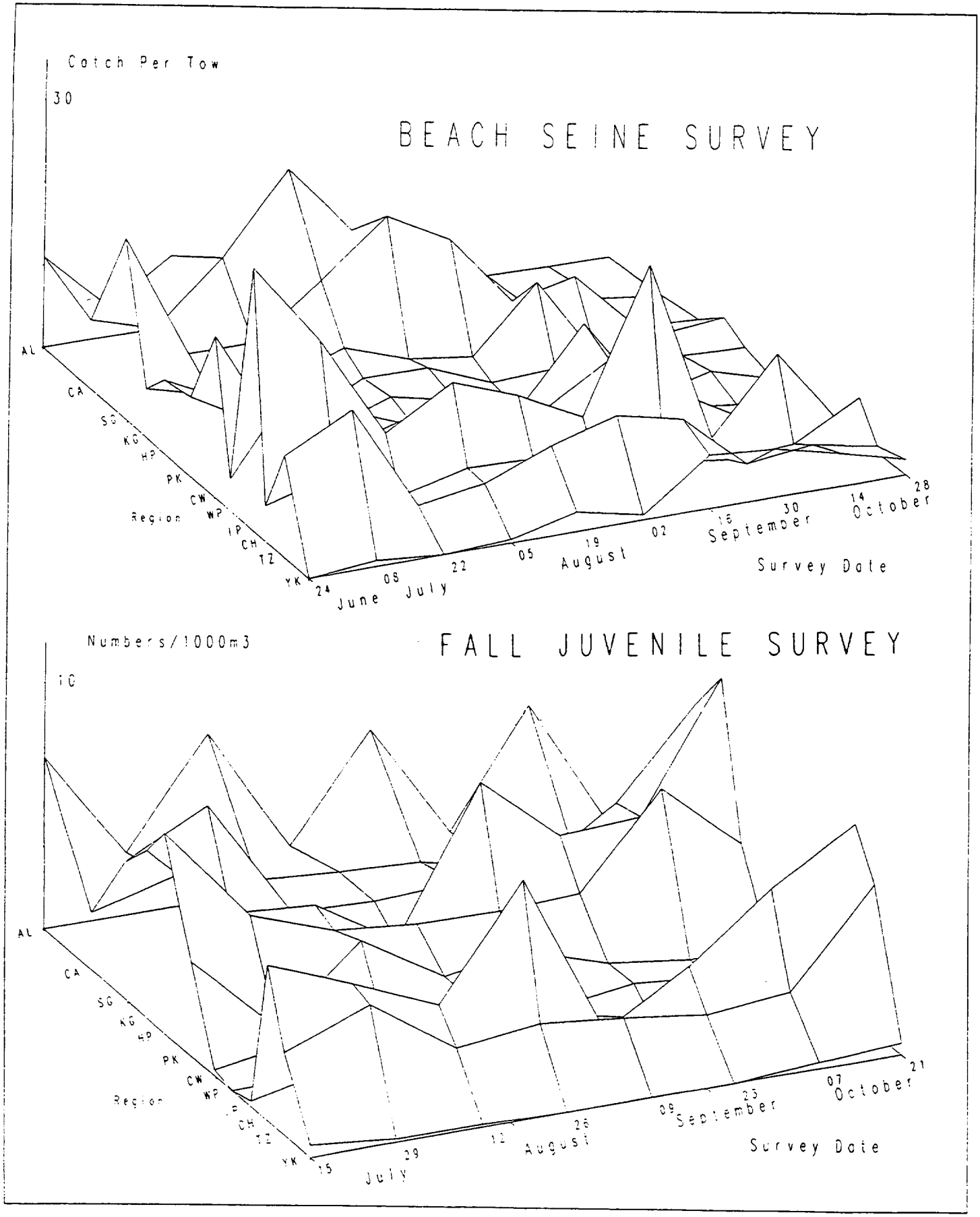

Figure 4–12. Spatiotemporal distribution of yearling and older white perch in the Hudson River estuary based on the 1991 Fall Juvenile and Beach Seine River Ichthyoplankton Surveys.

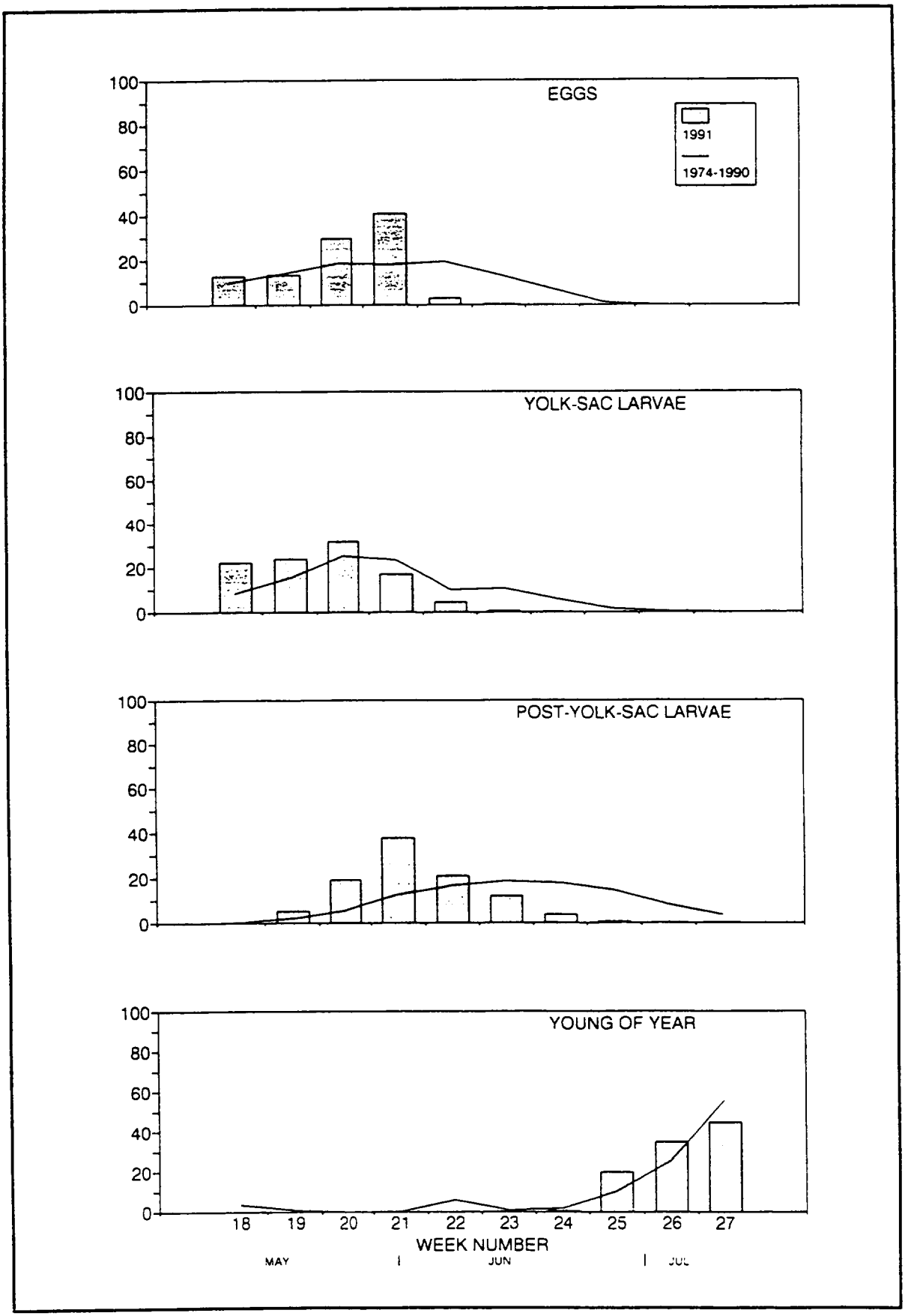

Figure 4-13. Temporal indices for the early life stages of white perch collected during Longitudinal River Ichthyoplankton Surveys of the Hudson River estuary, 1974-1991.

YOY present primarily during late June (week 25 [24 June]). The percentage occurring during this week and the following is slightly higher than the long-term trend.

The geographic distributions for eggs, YSL, PYSL, and YOY white perch as recorded in the 1991 LRS were generally consistent with the long-term trends (Figure 4-14).

The 1991 BSS geographic index values for YOY 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 to Cornwall and Poughkeepsie and a slight downriver shift from Saugerties and Catskill to Kingston and Saugerties with peak abundance in Saugerties.

4.3.7 Microdistribution Patterns

White perch eggs were most abundant from 29 April to 27 May. During this time peak abundance of white perch eggs was recorded at RM 101 (Figure 4-16). Esopus Creek enters the Hudson River at RM 101 (Figure 4-16); here the main channel of the Hudson River is relatively narrow, with vegetated shallow water zones along the western shoreline above and below where the creek enters the river. Abundant numbers were also collected in the vicinity of RM 89 to 93 and RM 113. Catskill Creek enters the Hudson River between RM 112 and 113 and Rondout Creek at around RM 91. 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 113, and 123 to 129 (LMS 1989, 1992; EA 1990).

During the period of peak white perch YSL abundance (6 May-3 June), the greatest numbers of white perch YSL were found at RM 95, but relatively high numbers were also recorded at a number of locations (Figure 4-16). Several extensive shallow flats exist in the area around RM 95.

From 13 May to 17 June, peak abundance for white perch PYSL occurred at RM 87, but relatively high numbers of PYSL were also recorded at a number of locations (Figure 4-16). Esopus Meadows, which occurs at RM 87, is a large vegetated shallow-water area on both shores of the River; Roundout Creek enters the river just upstream (RM 91). The distribution of PYSL density is shifted downriver of yolk-sac abundance.

Peak white perch YOY abundance occurred from 24 June - 8 July and during this period, the greatest YOY densities were recorded at RM 89 (Figure 4-16). Esopus Creek is located at RM 89 and the area contains a relatively large zone of vegetated shallows.

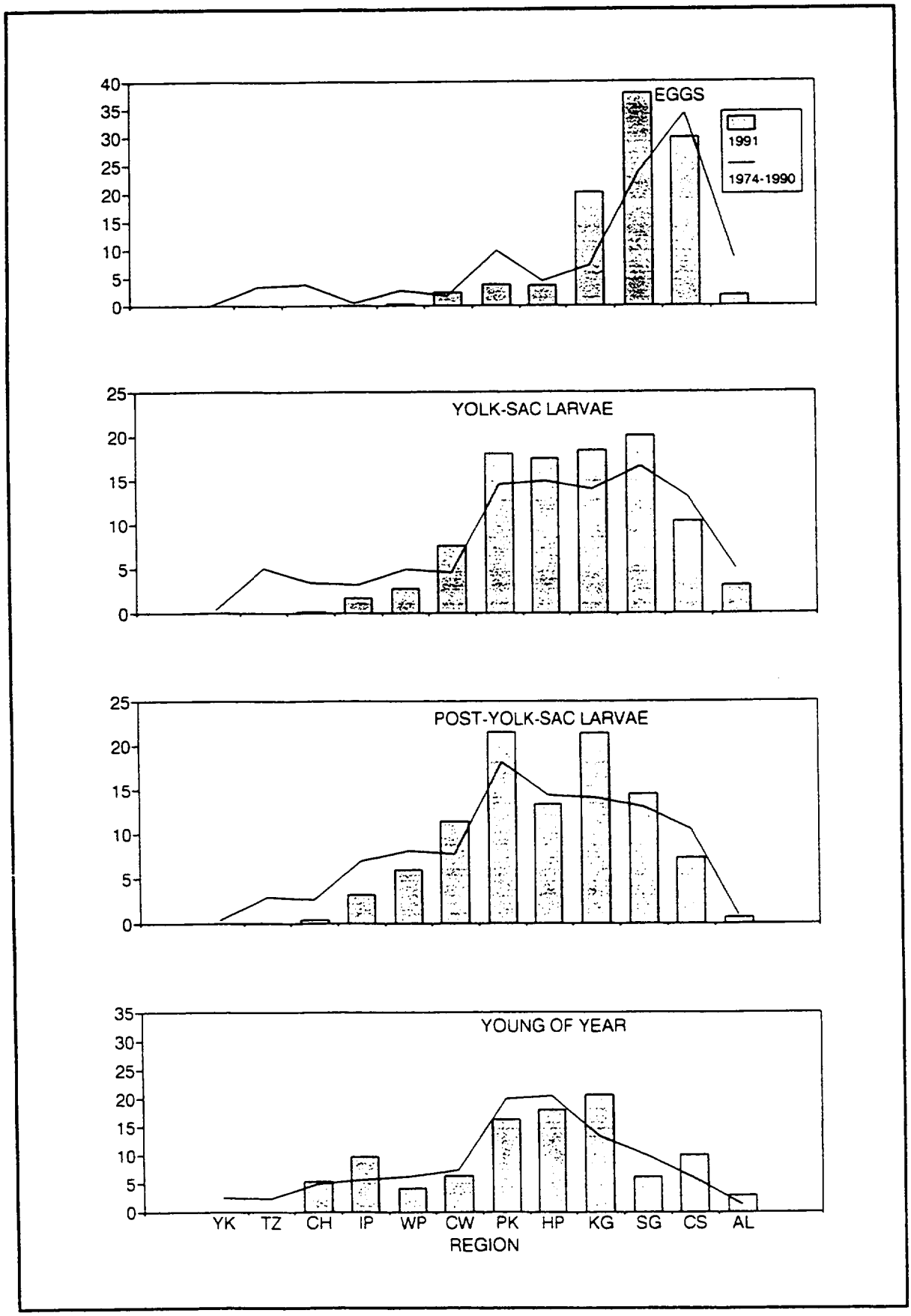

Figure 4-14. Geographic distribution indices for the early life stages of white perch collected during Longitudinal River Ichthyoplankton Surveys of the Hudson River estuary, 1974-1991.

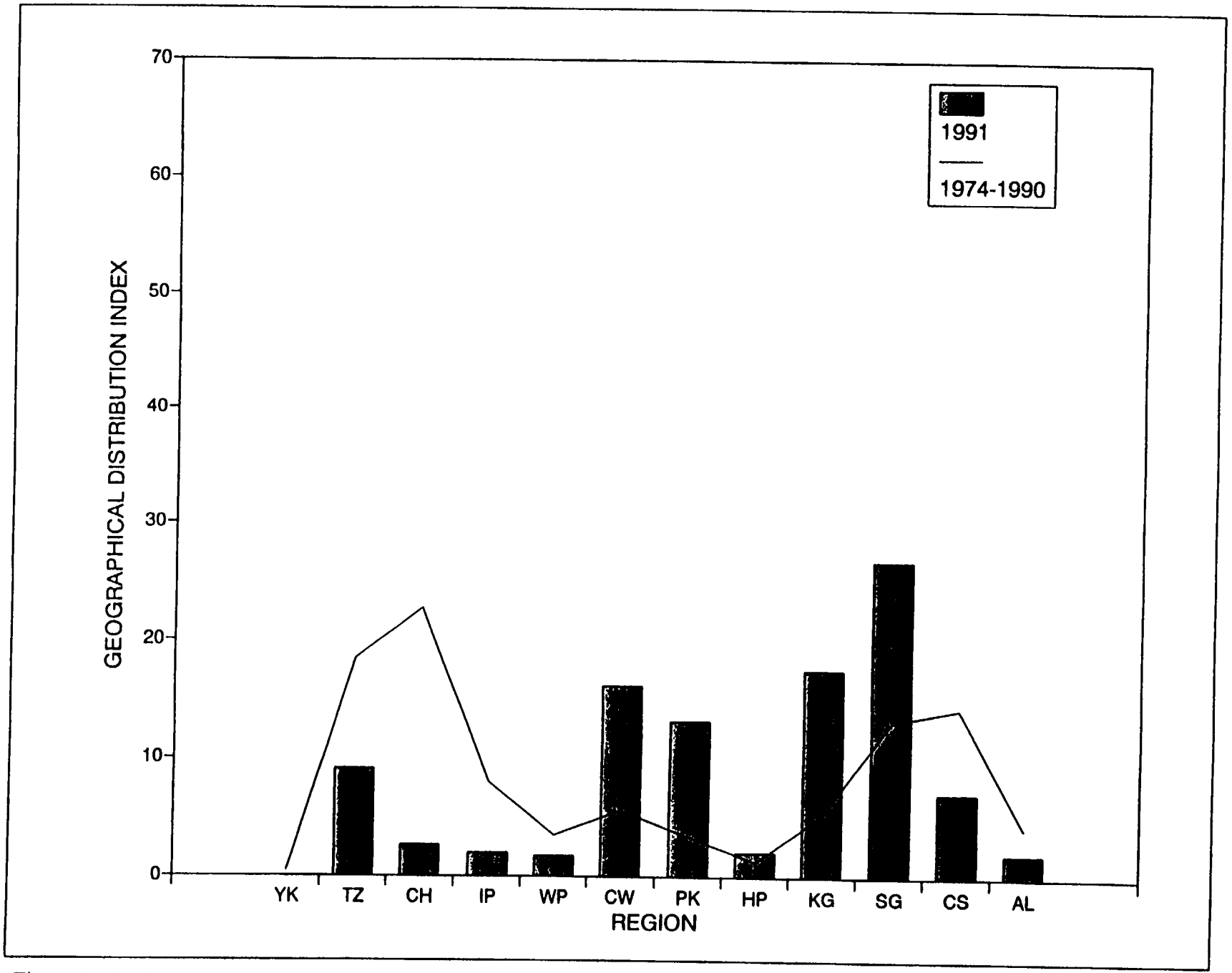

Figure 4-15. Geographic distribution indices for young of year white perch collected during Beach Seine Surveys of the Hudson River estuary, 1974-1991.

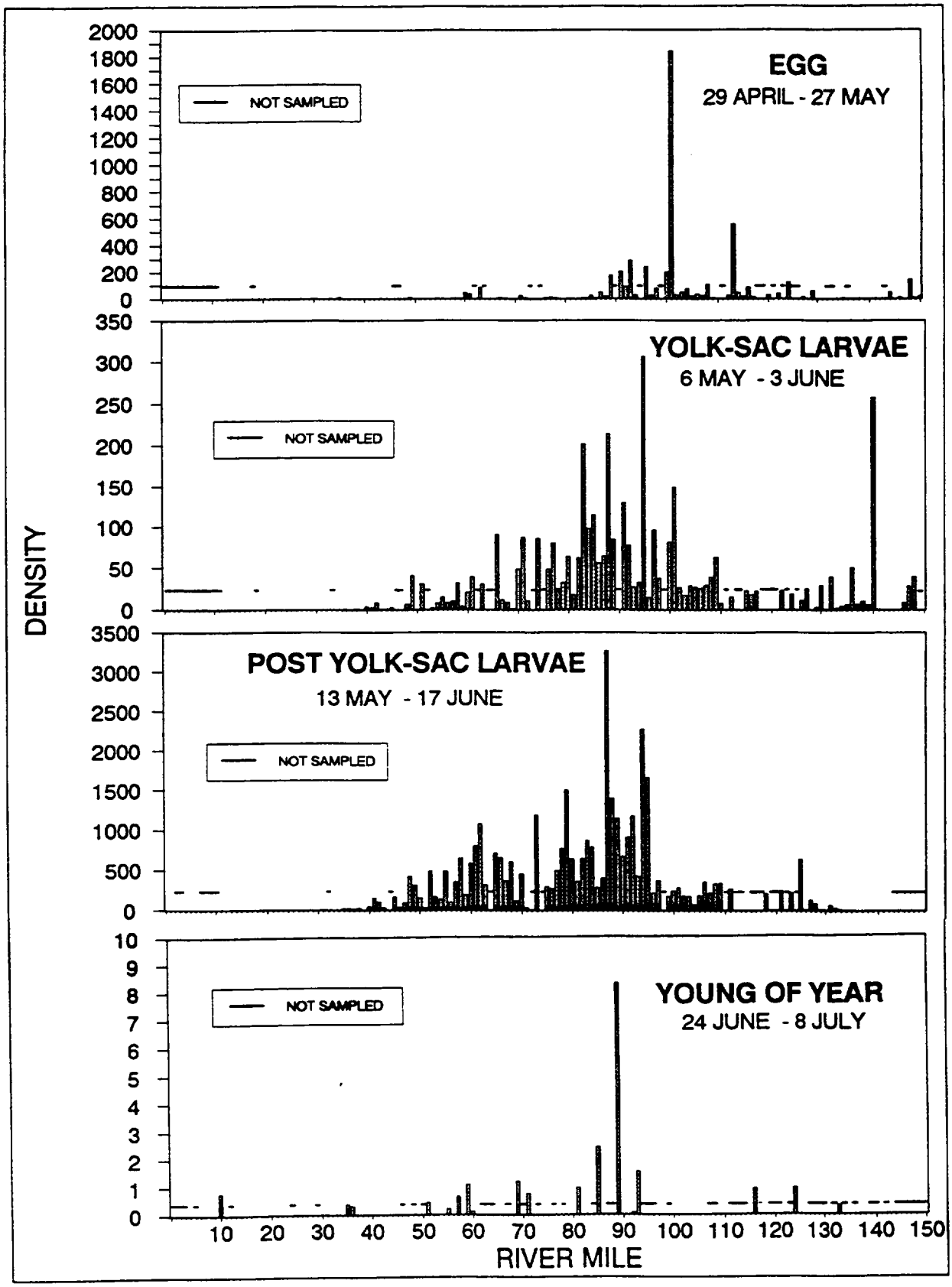

Figure 4-16. Microdistribution (mean density by river mile) of white perch in the Hudson River estuary based on the 1991 Longitudinal River Ichthyoplankton Survey.

4.4 ATLANTIC TOMCOD

Nineteen members of the codfish family (Gadidae) are found along the Atlantic coast of Canada and the United States, but only the Atlantic tomcod (*Microgadus tomcod*), an inshore species that ranges from Labrador to the Chesapeake Bay, is anadromous; the southern limit of its spawning range is the Hudson River (Grabe 1978). In Canada the Atlantic tomcod occurs in the mid- to lower St. Lawrence River and is landlocked in at least two freshwater lakes (Scott and Crossman 1973).

Atlantic tomcod enter coastal estuaries and rivers to spawn in shallow fresh or brackish water during midwinter. In the Hudson River estuary adult Atlantic tomcod occur at least as far north as the Saugerties region during spawning runs; the largest concentrations, however, are consistently found in the middle estuary between West Point and Poughkeepsie. After spawning in late December or early January, Atlantic tomcod return to coastal waters.

The Hudson River population is the southernmost major breeding population (Dew and Hecht 1976). No spawning has been documented in either the Connecticut River (Marcy 1976) or Long Island Sound (Richards 1959), and limited spawning may occur in the Raritan River and/or Raritan Bay (IA 1977). Unlike more northern populations, age 1 fish constitute most of the Hudson River spawning stock.

Atlantic tomcod eggs are about 1/16 in. in diameter and nonadhesive. The average number of eggs per female in the Hudson River population has ranged from 12,400 to 22,500 eggs at age 1 and from 32,500 to 53,100 eggs at age 2 (NAI 1992). In the Hudson River water temperatures are generally less than 37°F when spawning occurs, and the eggs take at least a month to hatch.

Tomcod larvae are about 1/5 in. long at hatching. YSL are pelagic and move downstream as they develop. In the Hudson River the abundance of YSL peaks in March. YSL are found throughout the lower half of the estuary, whereas PYSL are concentrated in the Yonkers and Tappan Zee regions. The yolk sac is absorbed by ¼ in., and onset of feeding by PYSL may depend on water temperatures. PYSL appear during March and peak in abundance during April in the Hudson River estuary. Juvenile Atlantic tomcod appear in April and reach their peak numbers in the Hudson River in mid-May. Although some juvenile tomcod remain in the Hudson River throughout the summer, some proportion of the population may move out of the lower estuary into New York Bay and Raritan Bay when water temperatures rise during late May and June. By mid-May juvenile tomcod range in length from 1 to 2 in.; by July their average length is about 3 in.

Juvenile growth slows or ceases in summer (Grabe 1978; Klauda et al. 1988b). Growth slows at temperatures above 66°F and essentially stops in early July when temperatures exceed 71°F. It begins again when water temperatures fall below 77°F during late August and early September (TI 1978). Following a period of rapid growth during the fall, mature young-of-year (YOY) migrate upriver to spawn. Juvenile tomcod generally double their summer length

by December to a mean total length about 6 in. Most of the juvenile Atlantic tomcod in the Hudson River are sexually mature by the end of December and reproduce in early January.

Juvenile tomcod feed on copepods and amphipods. Adult tomcod feed on shrimp, amphipods, marine worms, small mollusks, and occasional juvenile fish. Juvenile tomcod are eaten by many larger predators, including juvenile bluefish during the summer months (TI 1976b).

There is no commercial fishery either in the Hudson River or in coastal waters. Due to the tomcod's small size and limited availibility to fishermen during the mid-winter spawning run, there is only a small active sport fishery in the river. During the 1970s, only 0.5% or less of tags applied to tomcod were returned by fishermen (McLaren et al. 1988). It is likely that recreational interest in the species is further reduced by the health advisory against consumption of Hudson River fish due to PCB contamination.

4.4.1 Egg Distribution

Atlantic tomcod eggs were not collected during the 1991 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 15 April.

4.4.2 Yolk-Sac Larval Distribution

No Atlantic tomcod YSL were present in the 1991 sampling program (Figure 4-17). The LRS sampling began 15 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 1991, Atlantic tomcod PYSL were collected in quantity during the first several sampling weeks (15 April - 29 April) of the LRS and were collected in low numbers through mid-May (Figure 4-18). As in previous years, maximum abundance occurred at the start of sampling (early to mid-April). Peak density (671/1,000 m^3) was recorded in the Yonkers region. During the first week of sampling, Atlantic tomcod PYSL were found from the Yonkers through Poughkeepsie regions (Battery region was not sampled during the period of peak abundance in other regions) with highest densities in the Yonkers to West Point regions. In the following weeks there was a downriver shift in distribution. During this time mean weekly water temperatures in these lower regions increased from around 9°C to 13°C.

4.4.4 Young of Year Distribution

YOY Atlantic tomcod were taken during all periods of the 1991 LRS except the week of 16 September and the last week of sampling (15 October). They were most abundant in the April and May collections (Figure 4-18), with a steady decline throughout the summer and fall. YOY Atlantic tomcod were taken during all sampling periods in the FJS and in all weeks except one

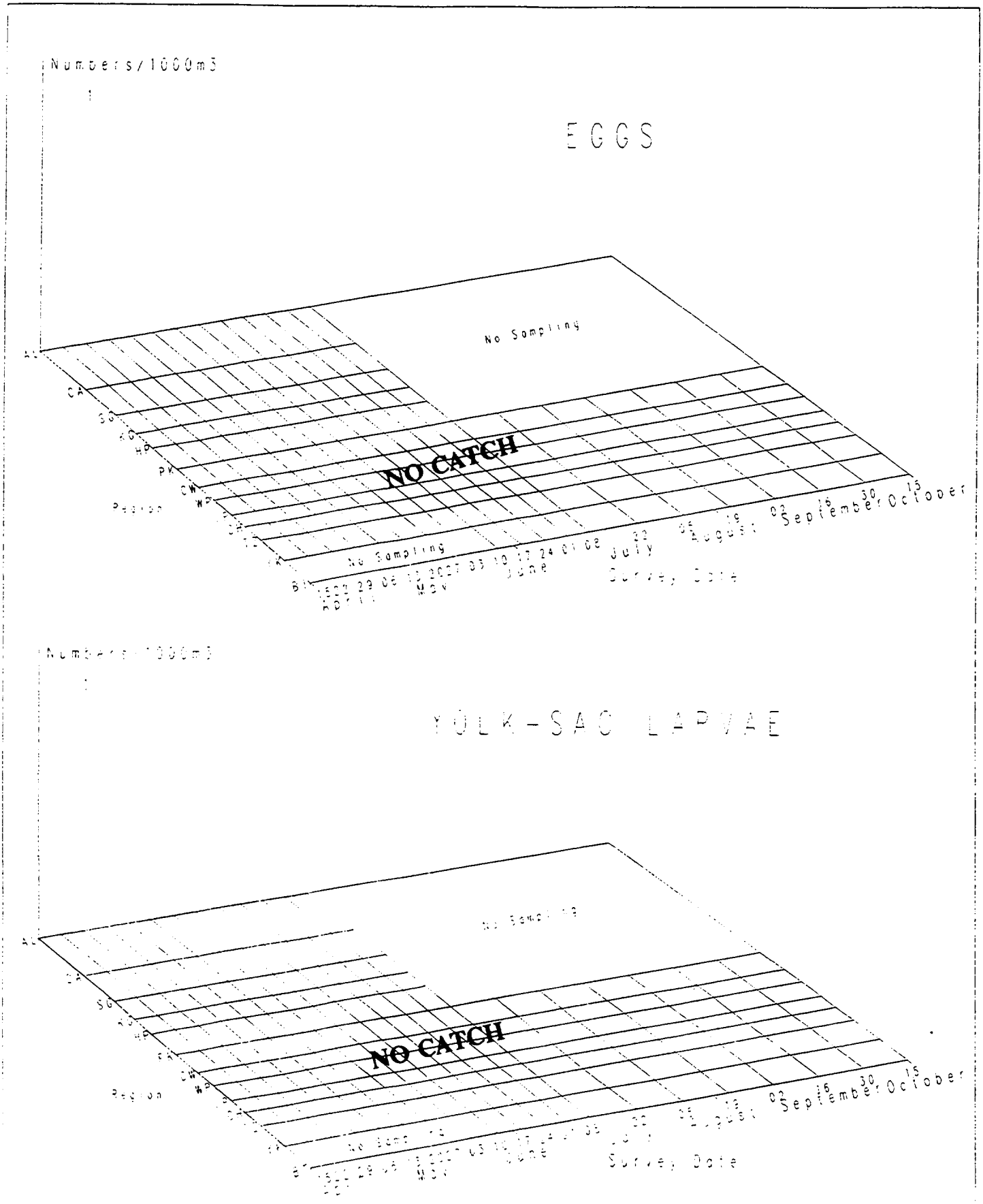

Figure 4–17. Spatiotemporal distribution of egg and yolk–sac stages of Atlantic tomcod in the Hudson River estuary based on the 1991 Long River Ichthyoplankton Survey.

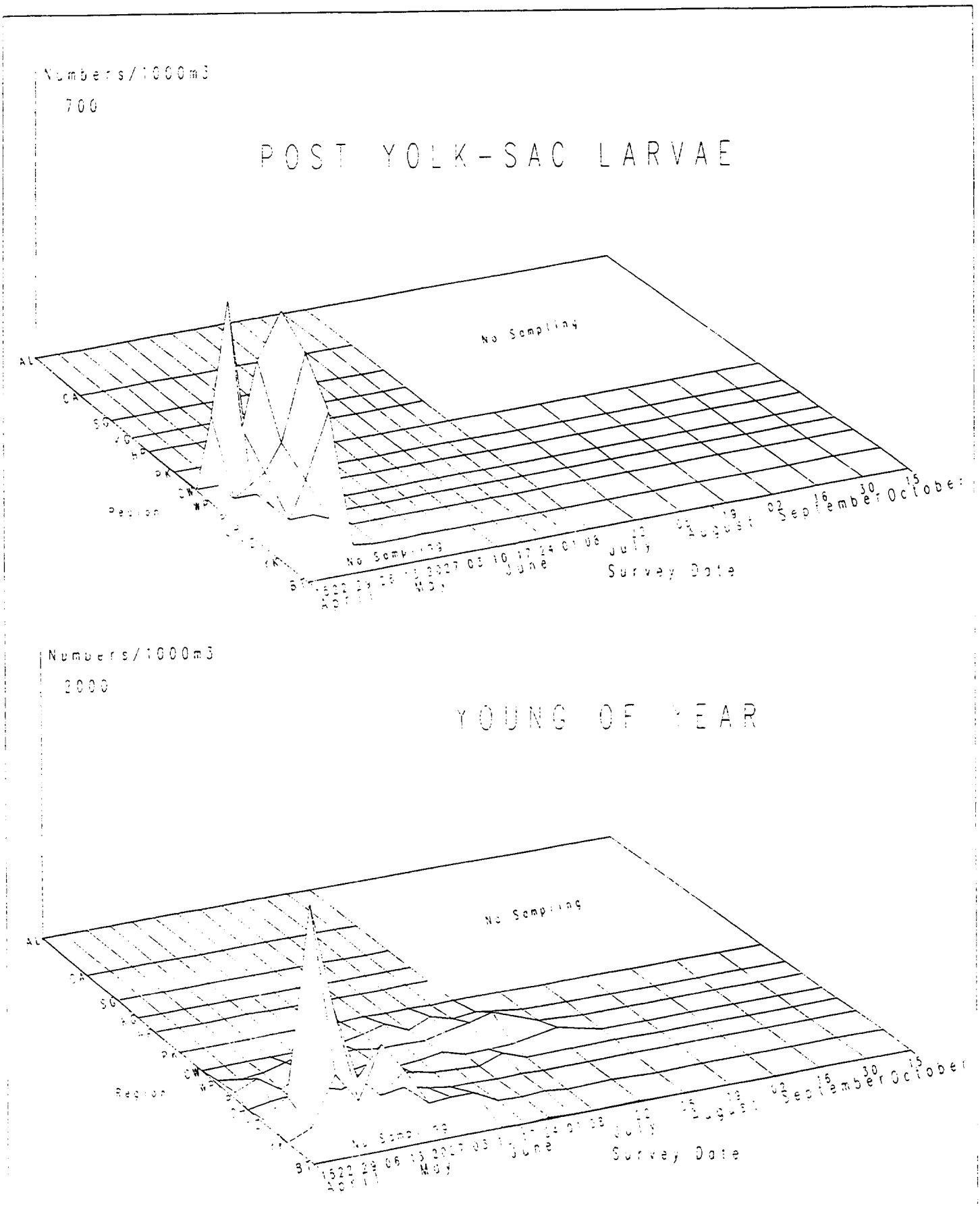

Figure 4–18. Spatiotemporal distribution of post yolk–sac and young–of–year stages of Atlantic tomcod in the Hudson River estuary based on the 1991 Long River Ichthyoplankton Survey.

(30 September) in the BSS (Figure 4-19). In the BSS a peak density of 58/tow was recorded during the week of 24 June, and in the FJS a peak of 124/1000 m^3 was recorded in mid-July in the West Point region.

In all three surveys, young of the year Atlantic tomcod were found at highest densities in the lower to mid-Hudson River estuary. In the LRS YOY Atlantic tomcod were collected in all regions but the majority were located in the lower estuary. In the FJS Atlantic tomcod YOY were collected in all regions except Albany, most were collected in the lower estuary from Indian Point to Cornwall early in the sampling program. In the BSS Atlantic tomcod YOY were collected only in the Yonkers through Croton-Haverstraw regions with the greatest abundance occurring in the Tappan Zee region. LRS/FJS weekly mean temperatures show the lower region ranged from 25 to 26°C from mid-July through late August before declining. The shore zone area values ranged from 26 to 27°C from late June through mid-August before declining. Atlantic tomcod prefer cooler, deeper water and thus were not found in great abundance in the higher temperatures present in the shore zone area.

4.4.5 Yearling and Older Fish Distribution

A few yearling and older Atlantic tomcod were collected in the 1991 BSS in late September and early October in the Tappan Zee region otherwise yearling and older Atlantic tomcod were not found in shorezone areas (Figure 4-20). In the FJS a few yearling and older Atlantic tomcod were collected in the Yonkers, Tappan Zee, and West Point regions with greatest catches occurring in the Tappan Zee and Yonkers region in mid- to late July.

4.4.6 Comparison to Previous Years

The geographic distribution of Atlantic tomcod YOY from the 1991 BSS was similar to the long-term (1974-1990) average distribution (Figure 4-21). Peak occurrence was in the Tappan Zee region.

4.5 AMERICAN SHAD

American shad (*Alosa sapidissima*) are the largest of the North American species of anadromous herrings. They range from Newfoundland to northern Florida along the Atlantic coast and over the continental shelf. They may live to 13 years, attain a length of 30 in., and weigh up to 12 lb. American shad usually become sexually mature after three to six years at sea, although some males may mature within two years. Most females mature by their fourth or fifth year.

Shad, like many anadromous herrings, have well-developed homing abilities and are capable of returning to their natal rivers and tributaries from far off the coast. After spawning, the adults soon return to the ocean. They can repeat their annual spawning sequence up to eight times. In more southerly rivers along the Atlantic coast increasing percentages of the adult population die after spawning; south of Cape Fear, North Carolina, all spawners die on their first run.

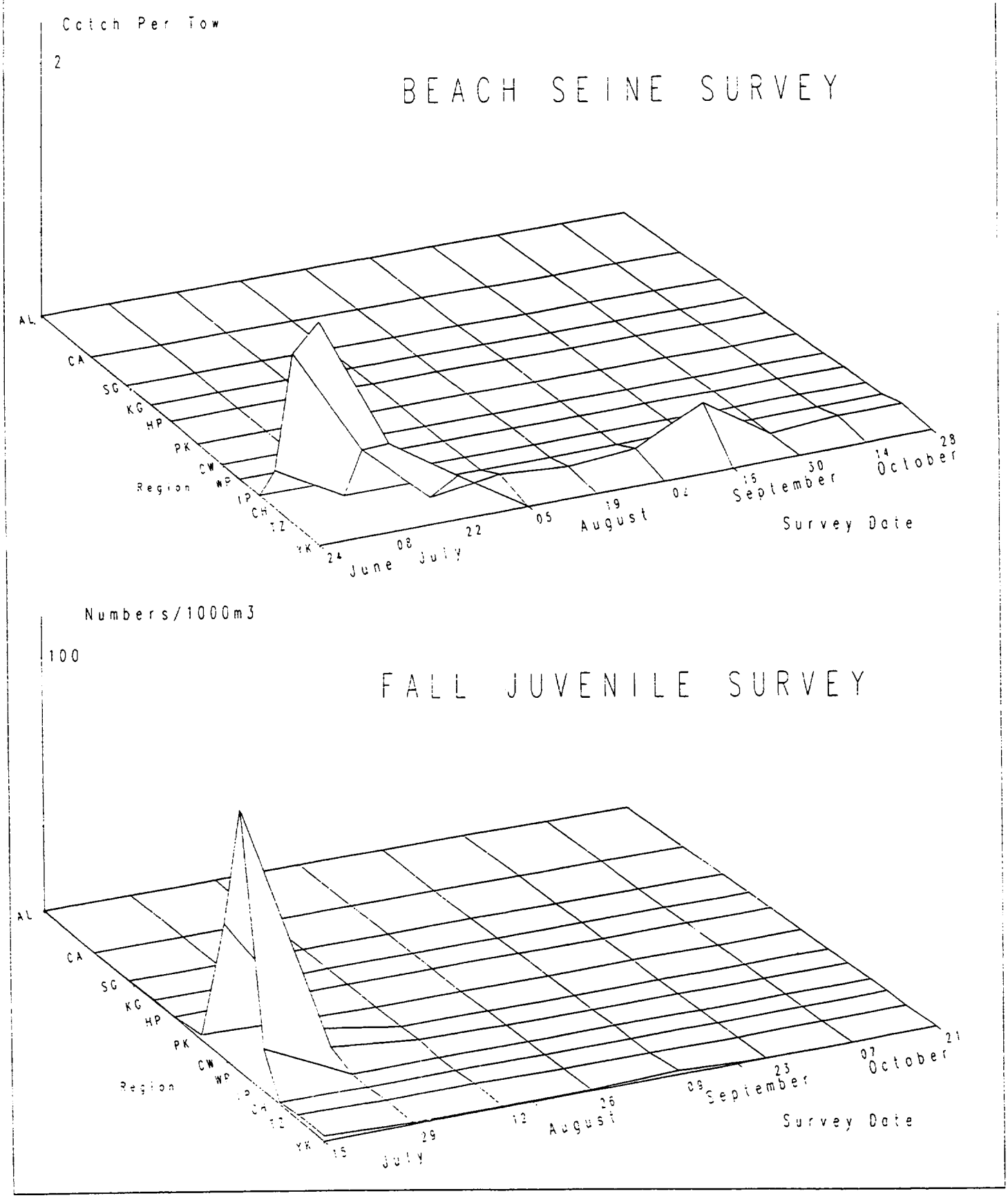

Figure 4–19. Spatiotemporal distribution of young–of–year Atlantic tomcod in the Hudson River estuary based on the 1991 Fall Juvenile and Beach Seine River Ichthyoplankton Surveys.

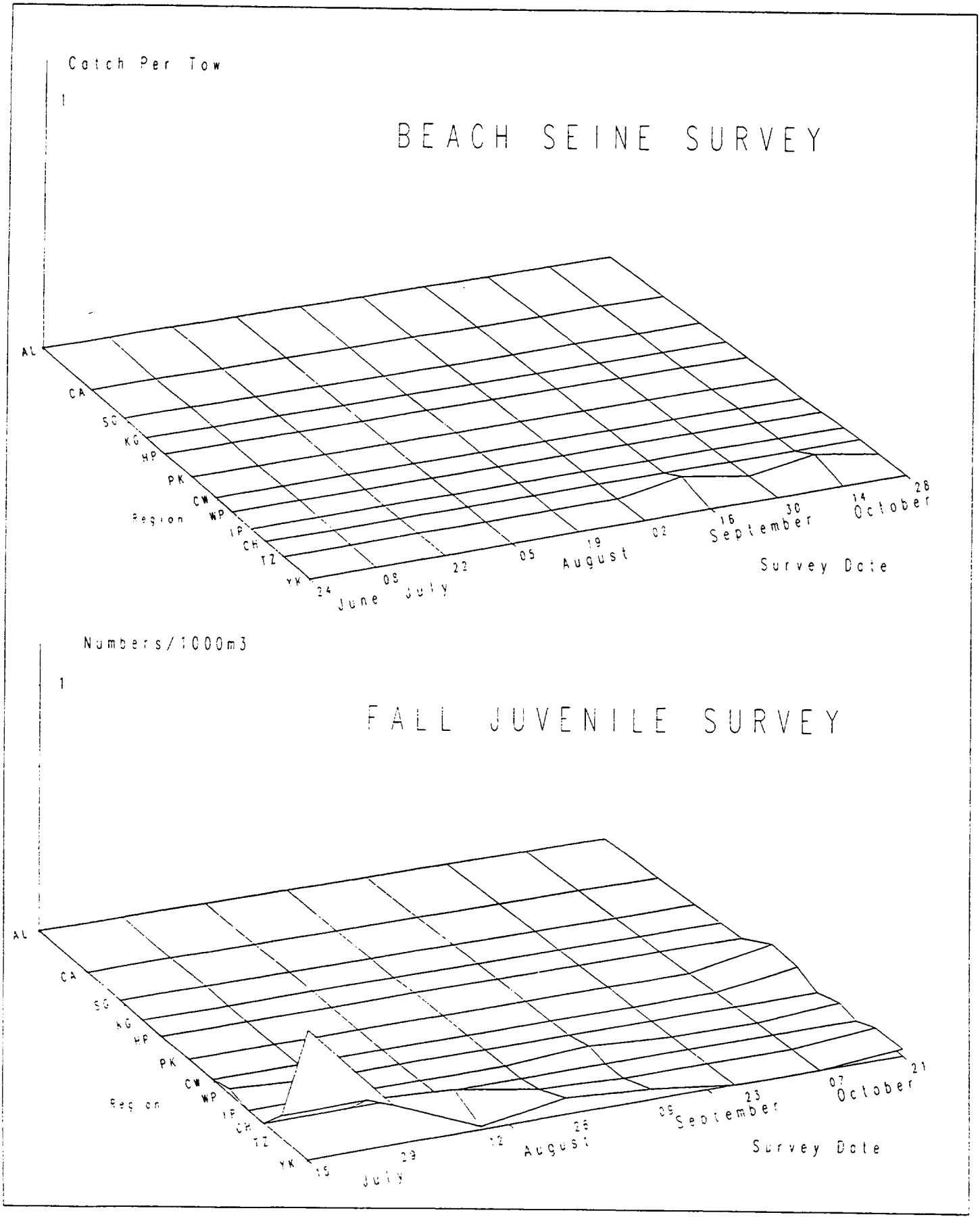

Figure 4–20. Spatiotemporal distribution of yearling and older Atlantic tomcod in the Hudson River estuary based on the 1991 Fall Juvenile and Beach Seine River Ichthyoplankton Surveys.

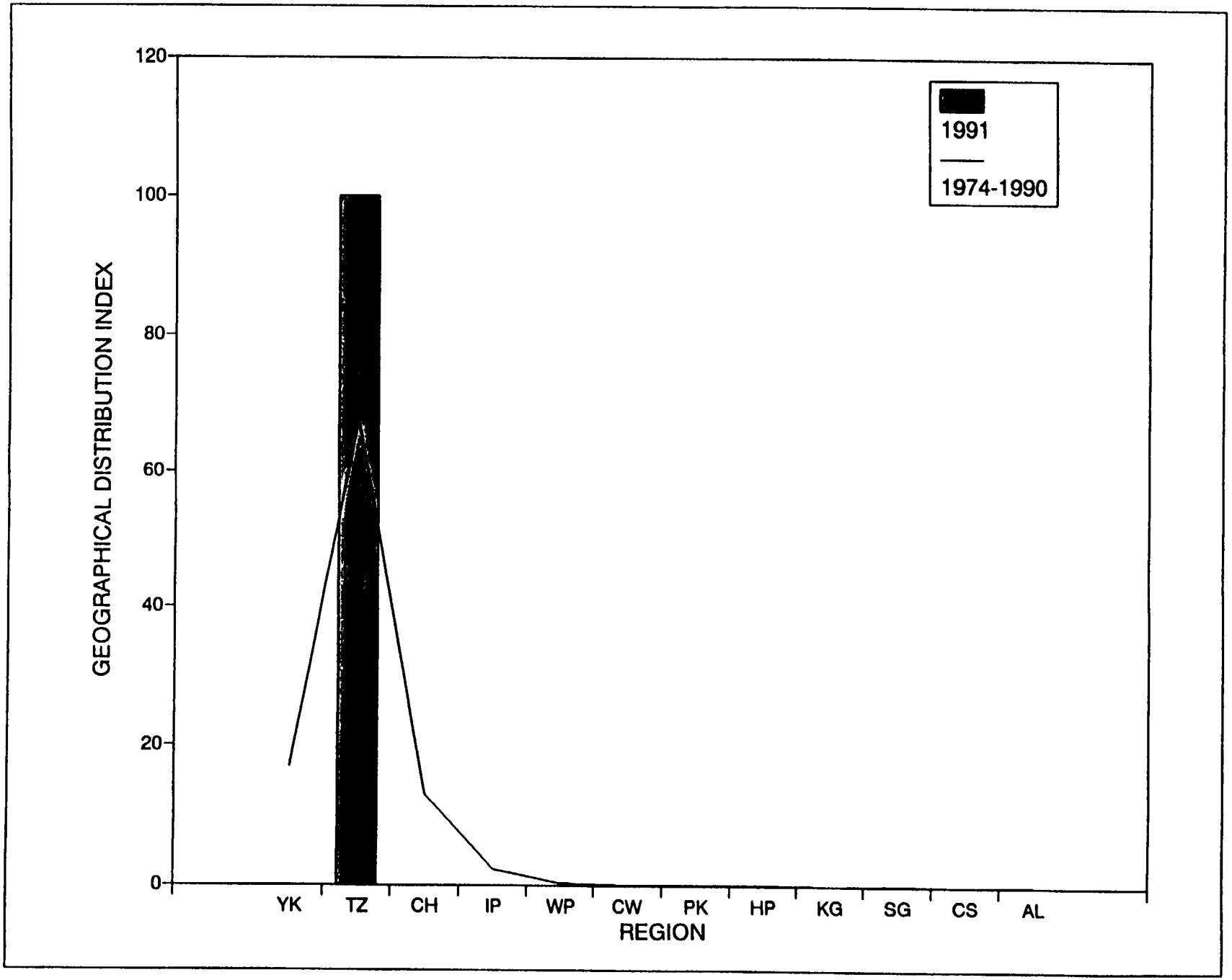

Figure 4-21. Geographic distribution indices for young of year Atlantic tomcod collected during Beach Seine Surveys of the Hudson River Estuary, 1974-1991

Peak spawning activity for American shad in the Hudson River occurs during May in the upper estuary. Shad have been reported to spawn on dark afternoons or evening hours over shallow, broad flats washed by moderate currents in the main body of coastal rivers (Leggett 1976). At present shad are not known to utilize Hudson River tributaries, the Mohawk River, or the upper Hudson River for spawning (Schmidt et al. 1988), although historically the Mohawk and upper Hudson may have been part of the shad spawning and nursery range.

American shad produce 116,000 to 468,000 eggs per female. The eggs are 1/16 to 1/8 in. in diameter, semibuoyant, and nonadhesive. They hatch in three to 12 days, depending upon water temperature. Newly hatched YSL are approximately ¼ in. long and grow very rapidly. They absorb the yolk sac within one week and are approximately ½ in. long at the beginning of the PYSL stage. Although some downriver dispersal is apparent, both YSL and PYSL are found primarily in the upper estuary between Poughkeepsie and Albany (Figure V-52). Larval shad alternately swim toward the surface and passively sink (Chittenden 1969), but behavior has not been completely described. Within a month the young shad about 1 in. long become juveniles that resemble miniature adults. Juvenile shad are found throughout the estuary and are most abundant in the upper estuary.

At the time they emigrate from the Hudson at the end of the summer, juvenile shad range from 3 to 4 in. long. This emigration is triggered by declining water temperatures and may be related to size (Schmidt et al. 1988): larger juveniles may tend to emigrate earlier. The shad emigration is a gradual movement of the population seaward over several months. Shad emigrate from the estuary earlier than either of the other two anadromous herrings commonly found in the Hudson River, alewives and blueback herring, and Schmidt et al. (1988) speculated that the earlier migration might be a behavioral adaptation that reduces competition with juveniles of the other two herring species.

In spring American shad migrate north, and by summer they are feeding in the Gulf of Maine, the Bay of Fundy, Georges Bank, and the Gulf of the St. Lawrence (Neves and Depres 1979; Dadswell et al. 1987). In fall they move south again along the perimeter of the Gulf of Maine and Georges Bank at depths greater than 60 m (Neves and Depres 1979); by winter they may congregate along the edge of the continental shelf. Based on tagging experiments conducted in 1950 and 1951, Talbot (1954) reported that American shad of Hudson River origin were recaptured from Maine to North Carolina. Most recaptured fish were from the fishery along the New Jersey coast in spring. Prespawning adults move along the coast in the spring to their natal rivers (Dadswell et al. 1987), which they enter as river temperatures reach 50° to 60°F.

4.5.1 Egg Distribution

American shad eggs were collected from the beginning of the sampling period (15 April) through late June (Figure 4-22). Eggs were most abundant in late April through early June. There were two peaks in egg density, one (142,231/1000 m^3) the week of 29 April in the Albany region and one (145,735/1000 m^3) the week of 13 May in the Saugerties region. Previous studies have also reported peak egg density for American shad in early to mid-May in the Hudson River estuary.

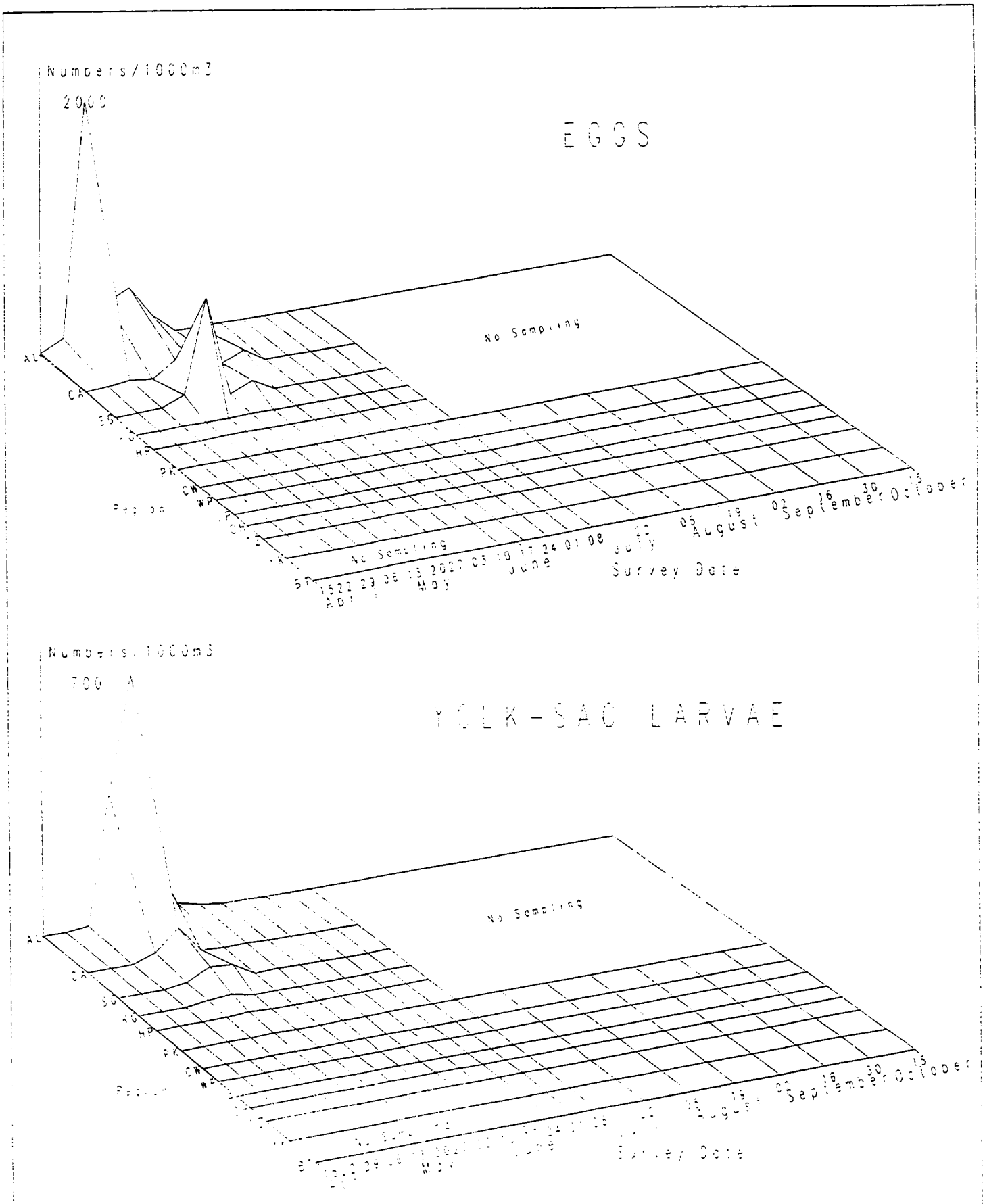

Figure 4–22. Spatiotemporal distribution of egg and yolk–sac stages of American shad in the Hudson River estuary based on the 1991 Long River Ichthyoplankton Survey.

The majority of American shad eggs were collected in regions north of Hyde Park, with greatest densities occurring in the Saugerties and Albany regions. Mean weekly water temperatures ranged from 11 to 17°C in the upper regions from late April through mid-May.

4.5.2 Yolk-Sac Larval Distribution

American shad YSL were collected from late April/early May through mid-June (17 June) in the 1991 LRS (Figure 4-22). The greatest abundance of YSL was recorded in mid-May in the Albany region two weeks after the peak egg abundance observed in Albany. No similar peak in yolk-sac distribution was noted for the peak in egg density that occurred in the Saugerties region. YSL were found in the Albany through Poughkeepsie regions, with greatest densities occurring in the Albany region.

4.5.3 Post Yolk-Sac Larval Distribution

American shad PYSL were present in the 1991 LRS beginning in late April/early May and were collected through 8 July, the last week of LRS sampling in the upper estuary (Figure 4-23). Peak abundance was recorded the week of 13 June. PYSL were present in very low densities in the upper region prior to the discontinuation of LRS sampling in the upper estuary.

PYSL were collected from Albany to as far downriver as the Indian Point region; the greatest PYSL densities were found from Kingston to Albany with lesser downriver peaks recorded in the Cornwall and Poughkeepsie regions. The peak PYSL density of 526/1,000 m^3 occurred in the Catskill region the week of 13 June. Similar spatial distribution was reported in previous years, except during 1984 when secondary peaks were noted in downriver regions (MMES 1986). Peak PYSL density occurred three weeks after peak PYSL abundance.

4.5.4 Young of Year Distribution

American shad YOY were first collected in the LRS during the week of 10 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). Densities of YOY were high in the upper regions the last week of LRS sampling for this area. Thus trends in temporal and spatial distribution can not be fully accessed by the LRS data. In the FJS highest densities were recorded the first week of sampling (15 July). In subsequent weeks low densities were found throughout the FJS sampling period and throughout the river. In the BSS densities were relatively high in the upper estuary through early September. No YOY were found in the Saugerties through Albany region in late October/early November and only a few were collected in the rest of the river.

In the LRS peak YOY densities of 95/1000 m^3, 86/1000 m^3, and 94/1000 m^3 occurred in the Albany, Catskill, and Kingston regions, respectively, during the week of 17 June. American shad YOY were most abundant in the upper regions of the river but were found in all regions.

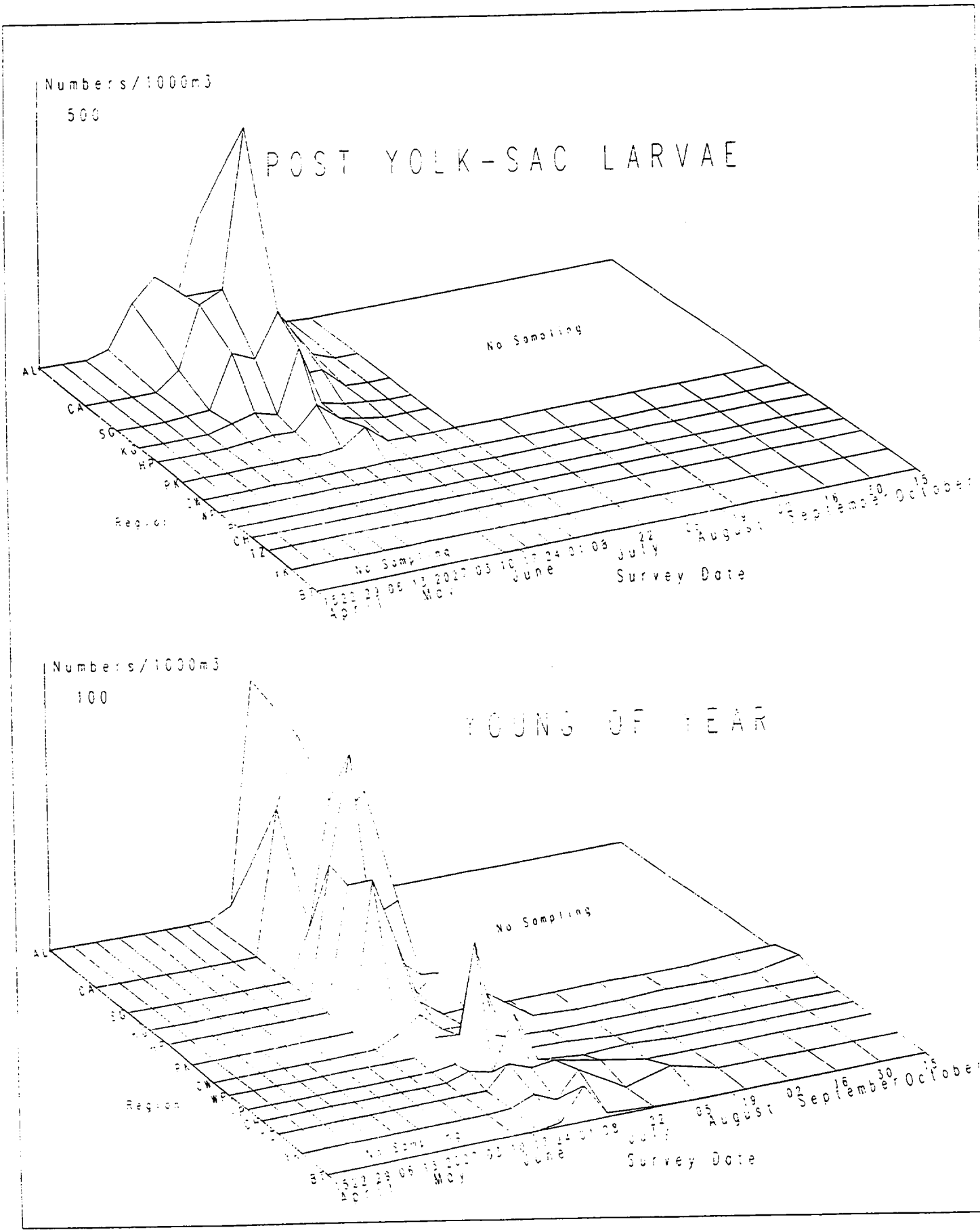

Figure 4–23. Spatiotemporal distribution of post yolk–sac and young–of–year stages of American shad in the Hudson River estuary based on the 1991 Long River Ichthyoplankton Survey.

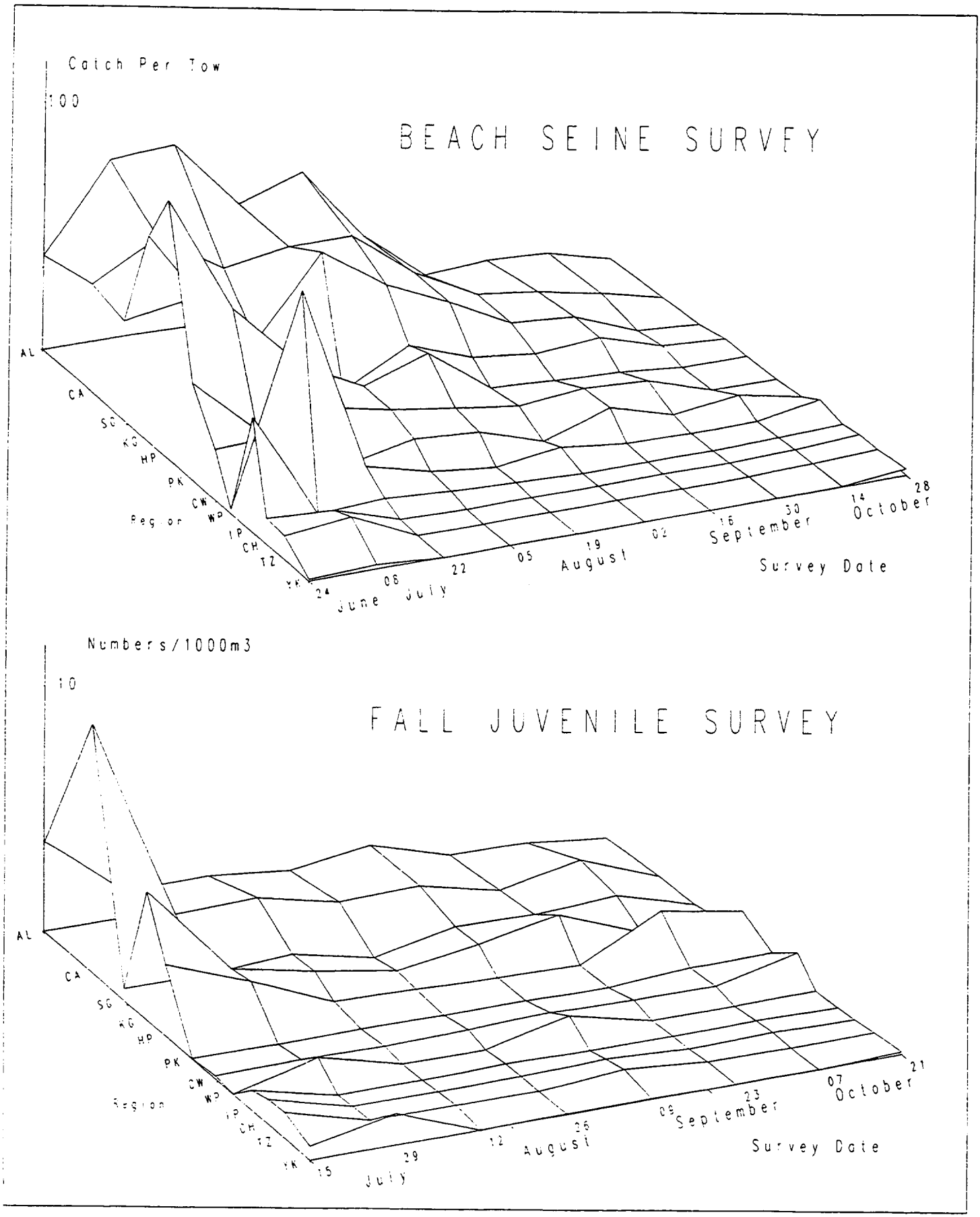

Figure 4–24. Spatiotemporal distribution of young–of–year American shad in the Hudson River estuary based on the 1991 Fall Juvenile and Beach Seine River Ichthyoplankton Surveys.

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 several regions of the river (Figure 4-25). No yearling and older American shad were collected in the shore zone (Figure 4-25).

4.5.6 Comparison to Previous Years

The 1974-1990 long-term pattern for BSS geographic distribution of YOY 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 1991, a bimodal distribution pattern was noted; most YOY were found in the upper estuary and with a few in the middle estuary. Salinities in the shore zone areas of the lower estuary (Yonkers through West Point) ranged from 2.5 to 10 ppt during peak abundance of YOY American shad.

4.5.7 Microdistribution Patterns

Peak abundance of American shad eggs was recorded from 29 April to 3 May, with highest densities at RM 144, 149, and 150 (Figure 4-27). This is at the upper reaches of the river just below Troy Dam. The river is narrow and deep with little shoal or shore zone areas. Abundant egg collections were made a little farther downriver in previous years: RM 125-129 in 1986 (LMS 1989); RM 131 to 137 (LMS 1989, 1992; EA 1990).

American shad YSL, collected in greatest densities from 13 to 20 May, were most abundant at RM 127 and between RM 130 to 139 and (Figure 4-27). A similar peak in YSL was recorded at RM 127 in 1990 (LMS 1992). 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 130 to 139 are similar. Schodack Creek (RM 130) and Binnen Kill (RM 134) join with the Hudson River in this area. Peak occurrence in the past four years has been observed at RM 124-126 (EA 1990; LMS 1992).

The greatest densities of American shad PYSL were collected from 20 May to 8 June. Peak PYSL abundance occurred at RM 97 and from RM 122 to 133 (Figure 4-27). The distribution of PYSL are shifted downriver of the YSL abundance distribution. Throughout RM 122 to 133 the river channel is narrow, with a vegetated shallow-water zone existing in only a thin fringe along the shoreline, and some larger vegetated shallow areas interspersed (i.e., Stockport [RM 121]. Presence of PYSL near the vegetated shallows may be related to their feeding preferences, which include copepods, terrestrial insects, and cladocerans. In previous years, peak PYSL distribution was found in areas containing shallow vegetated flats (LMS 1989, 1992; EA 1990).

During the period of peak abundance of American shad YOY (24 June to 13 July), the highest density was collected at RM 135 (Figure 4-27); this is where Binnen Kill joins the Hudson River. YOY were abundant in the estuary above RM 40. In past years, peak PYSL abundance has been

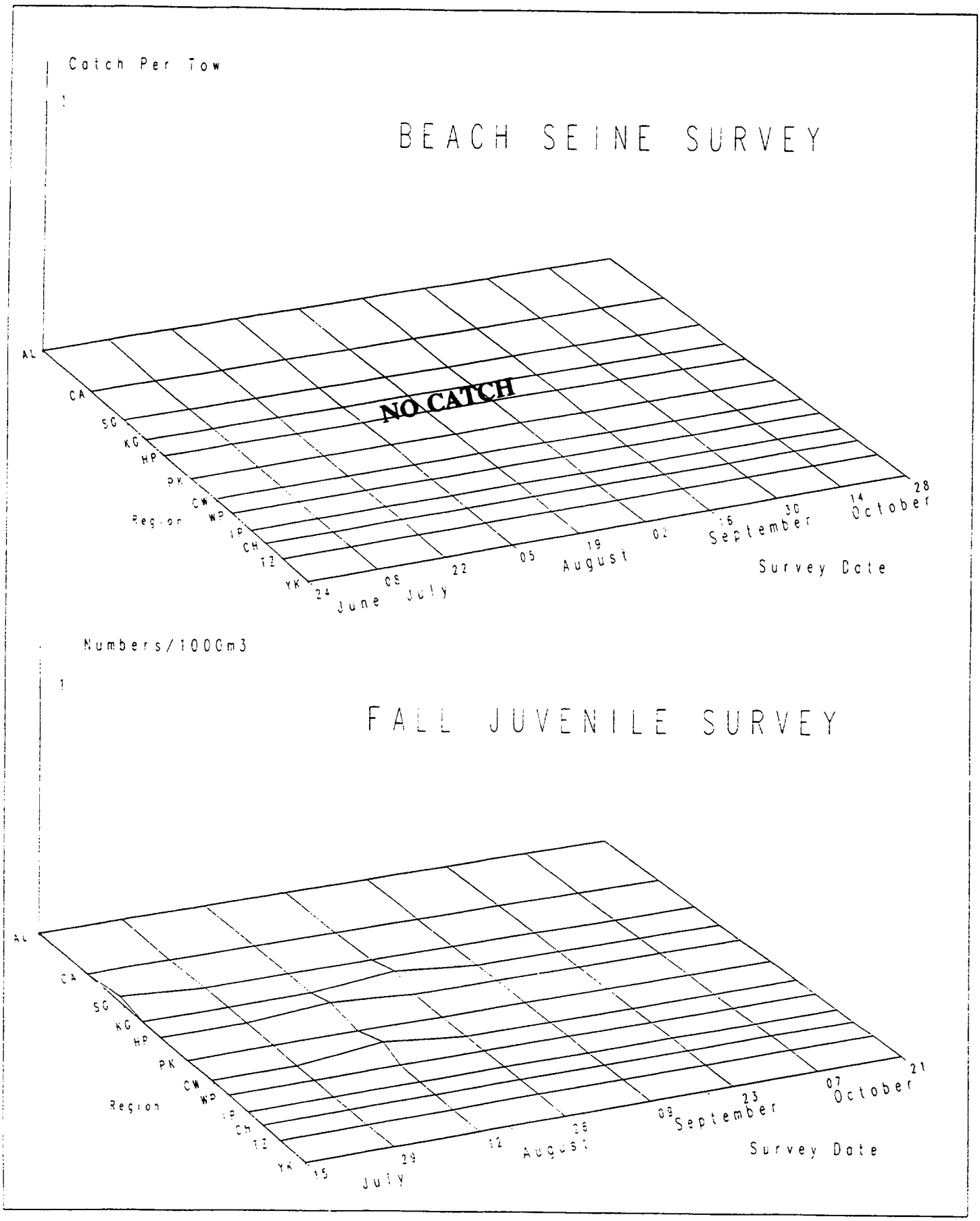

Figure 4–25. Spatiotemporal distribution of yearling and older American shad in the Hudson River estuary based on the 1991 Fall Juvenile and Beach Seine River Ichthyoplankton Surveys.

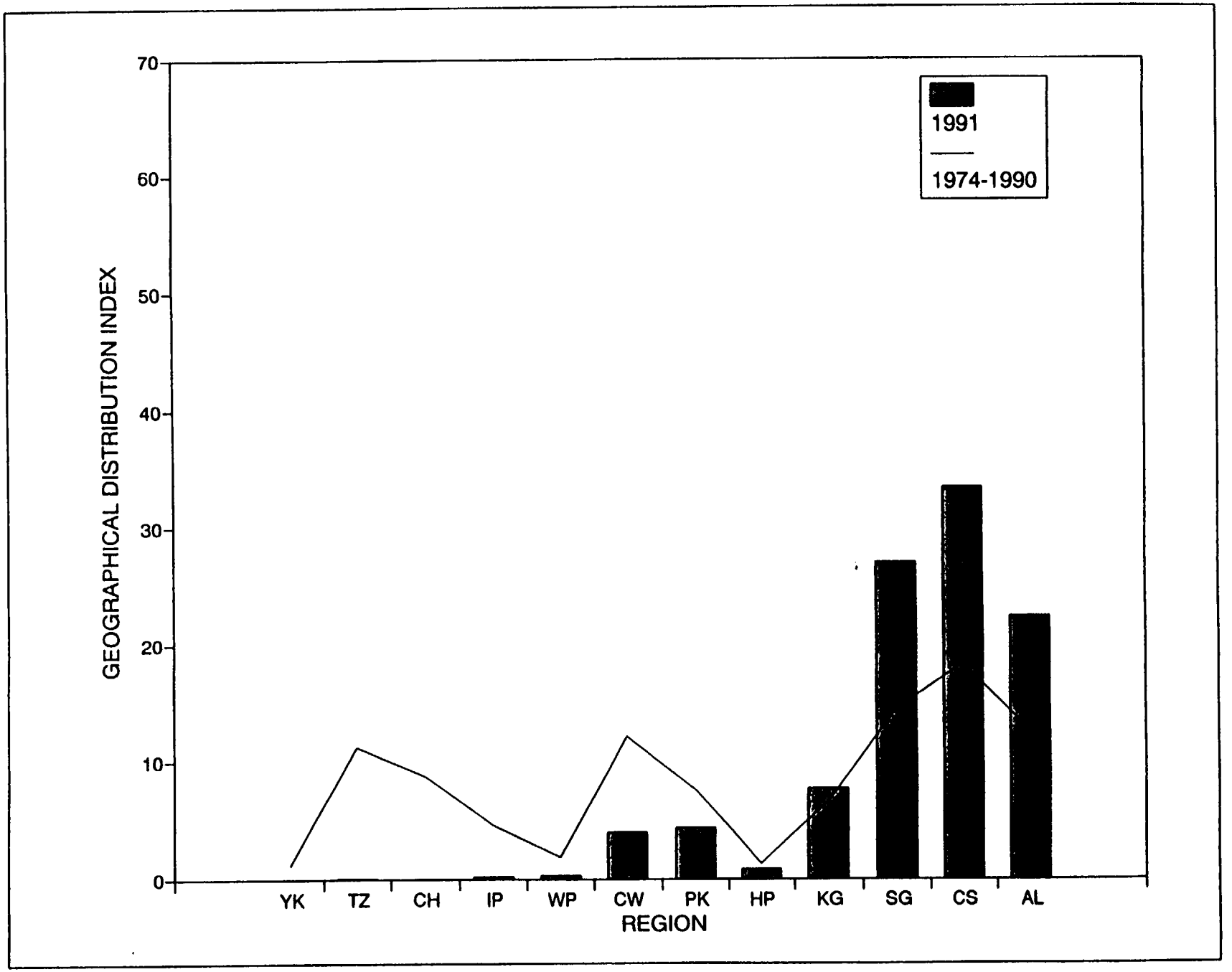

Figure 4-26. Geographic distribution indices for young of year American shad collected during Beach Seine Surveys of the Hudson River estuary, 1974-1991

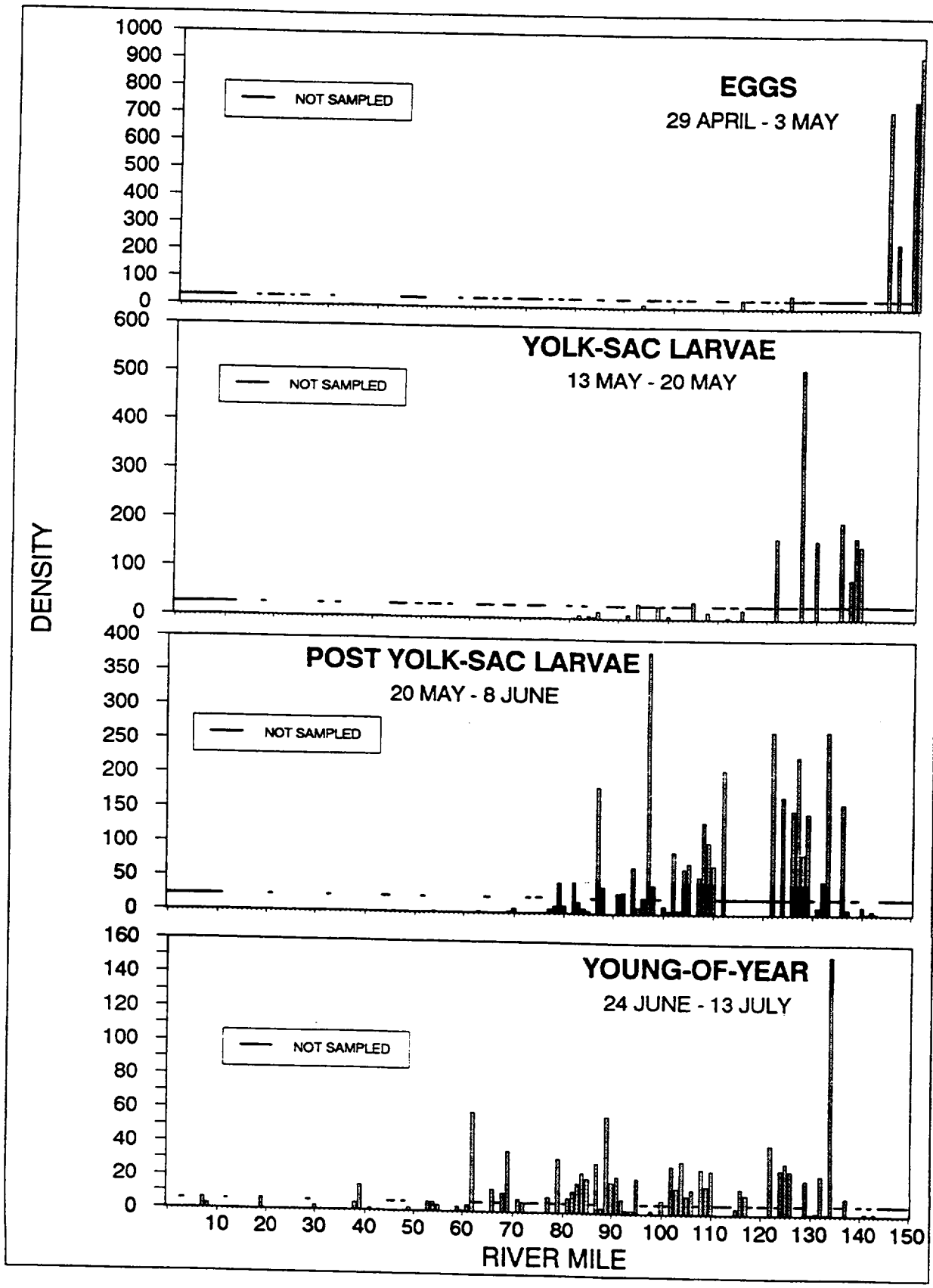

Figure 4-27. Microdistribution (mean density by river mile) of American shad in the Hudson River estuary based on the 1991 Longitudinal River Ichthyoplankton Survey.

recorded in Hudson River reaches containing shallow-water vegetated areas (EA 1990). Like PYSL, the presence of YOY American shad in shallow-water vegetated areas is probably related to their food preferences.

4.6 RIVER HERRINGS

Blueback herring (*Alosa aestivalis*) and its congener alewife (*A. pseudoharengus*) are similar in general form to American shad, but are much smaller and not as deep bodied when adult. Blueback herring grow to a maximum length of 15 in. and a weight of about 1 lb and live for up to eight or nine years (Scott and Crossman 1973). Blueback herring and alewives are very much alike in external appearance, especially as larvae, but older alewives have proportionately larger eyes and deeper bodies than blueback herring.

Of the three anadromous herring species that spawn in the Hudson River estuary, blueback herring are the last to begin their spring spawning run, preferring warmer water than American shad or alewives. Their peak spawning activity occurs near the end of May. Spawning activity occurs within the river, but preferred spawning habitat is in fast-flowing tributaries, where eggs are released over hard substrates (Loesch and Lund 1977). In the Hudson blueback herring travel through the locks, and spawning occurs within the Mohawk River and upper Hudson River.

Blueback herring produce 45,000 to 350,000 eggs per female. The eggs are 1/16 in. in diameter and adhesive upon release, but they may later become dislodged and be pelagic. In the Hudson River peak abundance of herring eggs (combined alewife and blueback herring) appears to occur in the upper estuary in the Catskill region during mid-May. Development proceeds rapidly and hatching occurs in two to three days. Newly hatched blueback herring are 0.125 in. long and the yolk sac is absorbed in about four days. At the beginning of the post-yolk-sac stage the larvae are about 0.1875 in. long. In the Hudson River PYSL appear to be most abundant within the Albany and Catskill regions of the estuary during late May.

Male anadromous alewives reach maturity in about three years, females in about four years. Alewife eggs are semidemersal, slightly adhesive, but easily torn free and carried by currents. The egg diameter is about 1/16 in. Spawning activity is most intense when water temperatures are 51° to 71°F, which results in slightly earlier spawning than that of blueback herring. Hatching takes two to 15 days, depending upon temperature (Smith 1985).

In Hudson River sampling, eggs and larvae of alewives and blueback herring are not differentiated. Any references in this document to eggs and larvae pertain to the combined numbers from both species. Juveniles of these two species are differentiated by the size of the eyes and the mouth morphology.

Peak abundance of herring eggs (alewife and blueback herring combined) appears to occur in the Hudson River upper estuary in the Catskill region during mid-May. PYSL are most abundant

within the Albany and Catskill regions of the estuary during late May. Peak abundance of early juveniles occurs in the upper estuary, but they are also found in the middle estuary.

4.6.1 Egg Distribution

In 1991 peak *Alosa* spp. egg abundance occurred during the weeks of 29 April and 13 May in the Albany and Catskill regions, respectively (Figure 4-28), when water temperatures were about 12 and 17°C (Table C-5), respectively; no eggs were found after the week of 10 June. Peak densities occurred in the same regions in 1990 (LMS 1992). A bimodal 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). In 1990 temperatures at the time of the two peaks reflect the preferred spawning temperatures and may represent separate spawning periods of the two species.

Peak river herring egg densities were 15,665/1000 m^3 in the Albany region and 16,412/1000 m^3 in the Catskill region. Regional densities south of Kingston generally did not exceed 5/1,000 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 YSL were collected from late April (the second sampling week [22 April] of the LRS) through mid-June in 1991, with peak abundance occurring in early May, the weeks of 6 and 13 May (Figure 4-28). A smaller peak in YSL density was recorded in late May. The 6 May peak occurred one week after the first recorded peak in egg density. The second peak (13 May) in yolk-sac density occurred two weeks after the first peak egg density and during the week of the second. The smaller late May peak YSL density occurs two weeks after the second peak in egg density and downriver of the Albany region. Previous studies have also recorded YSL peaks one week after the egg abundance peak in the Hudson River estuary.

YSL were collected as far downriver as the Indian Point region but were most abundant in the upper estuary from Kingston to Albany. As in previous years, in 1991 peak abundance of river herring YSL occurred in the Albany region, and in 1991, the peak densities of 1987/1000 m^3 and 1378/1000 m^3 was recorded from this region.

4.6.3 Post Yolk-Sac Larval Distribution

River herring PYSL were collected in 1991 LRS collections from late April through early July when the LRS stopped sampling in the upper regions and during the week of 1 October in the Battery region (Figure 4-29). Peak abundance occurred from late May through mid-June and most PYSL were collected before 24 June. Peak river herring PYSL densities occurred the week of 20 May in the Kingston (7011/1000 m^3) and Catskill (6489/1000 m^3) regions and 27 May in the Catskill region (7047/1000 m^3).

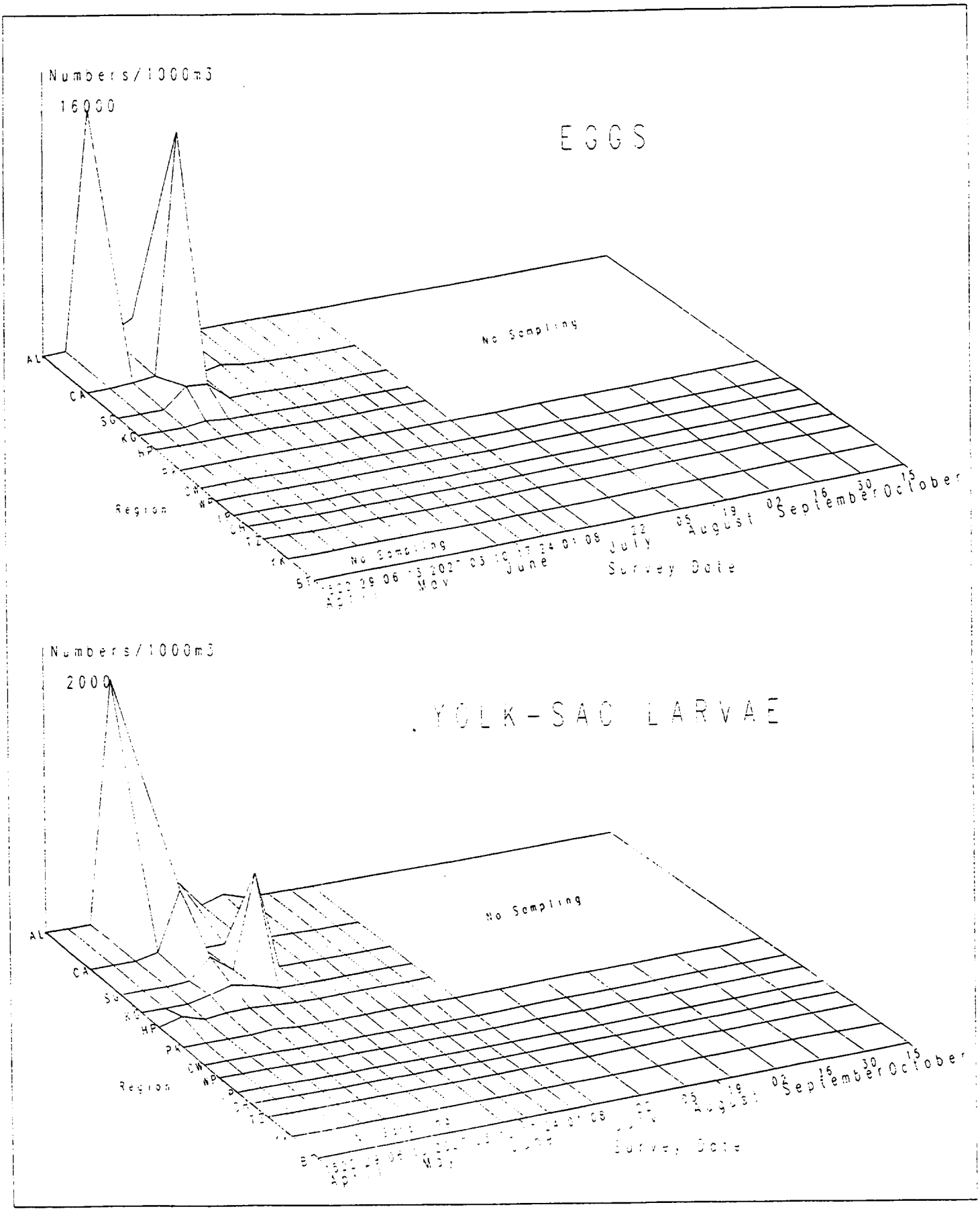

Figure 4–28. Spatiotemporal distribution of egg and yolk–sac stages of Alosa spp. in the Hudson River estuary based on the 1991 Long River Ichthyoplankton Survey.

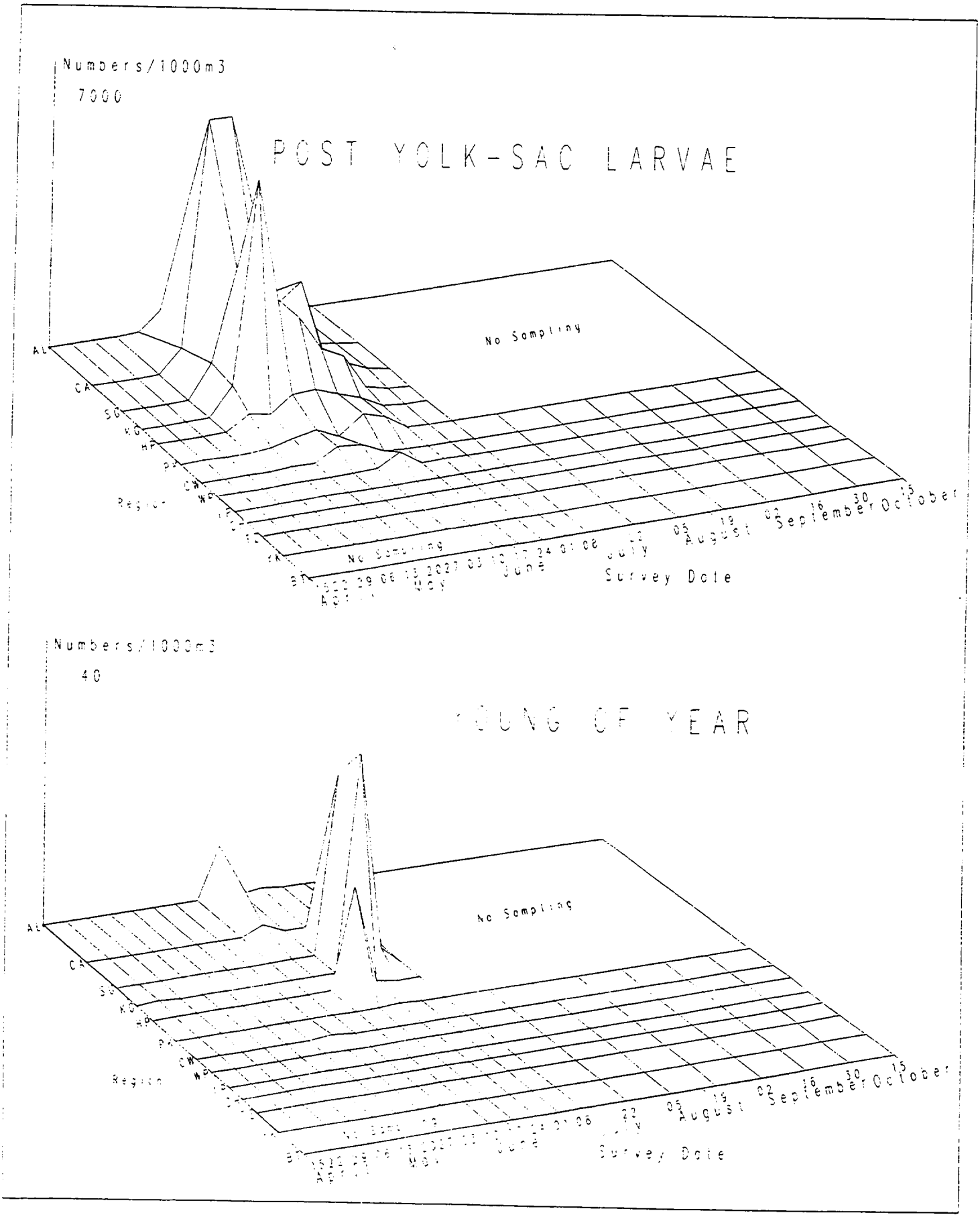

Figure 4–29. Spatiotemporal distribution of post yolk–sac and young–of–year stages of Alosa spp. in the Hudson River estuary based on the 1991 Long River Ichthyoplankton Survey.

4.6.4 Early Young of Year Distribution

River herring YOY (<40 mm TL) were first collected in mid-June, six weeks after the first egg abundance peak (Figure 4-29). The greatest abundance of unidentified river herring YOY occurred in the Hyde Park to Saugerties regions in late June with a peak density estimate of 35/1000 m^3 in the Kingston and Saugerties region respectively. LRS sampling was discontinued in the upper estuary in early July and no <40 mm YOY river herring were collected in the lower regions in the remaining sampling weeks.

4.7 BLUEBACK HERRING

Blueback herring range from southern New Brunswick and Nova Scotia southward to northern Florida. Although they are caught as far as 70 to 80 miles offshore, little is known about the oceanic migration patterns. The presence of alewives and blueback herring in the Bay of Fundy has led to speculation that these species have an oceanic migratory pattern similar to that of American shad, although that has not been confirmed (Harris and Rulifson 1989). The degree to which river herring of Hudson River origin return to the Hudson River is not known nor is the degree to which spawning stocks from different river systems mix.

Within a month of hatching the young blueback herring assume adult characteristics and are about 0.5 in. long. In the Hudson River the peak abundance of early juveniles occurs in the upper estuary in the Albany region during the last half of June. Juvenile blueback remain in the upper estuary throughout the summer. During this period they are about 10 times more abundant than juvenile alewives. Juvenile blueback herring grow more slowly than juvenile alewives and begin their downriver migration later than the other herring species. It has been reported that blueback herring exhibit a tendency to spend their first year or two in the lower reaches of estuaries (Hildebrand 1963).

4.7.1 Young of Year Distribution

Identifiable blueback herring YOY (35-40 mm) were first collected during mid-June in the LRS (Figure 4-30). Blueback herring YOY were collected in all regions but were most abundant in the upper estuary during late June. LRS sampling was discontinued in the upper estuary in mid-July. Peak densities occurred in Albany (1047/1000 m^3) the week of 24 June and in Albany (1451/1000 m^3) and Kingston (1113/1000 m^3) the week of 30 June. Blue back herring YOY were collected in all BSS and FJS sampling weeks (Figure 4-31). Blueback herring were most abundant in BSS and FJS catches in the middle and upper estuary through mid-September. Densities and standing crop estimates in the BSS and FJS decreased as fall progressed and probably reflect mortality and migration from the river in fall. In the LRS, BSS, and FJS only a very few blueback herring YOY were collected south of Hyde Park, which was just north of the saltfront.

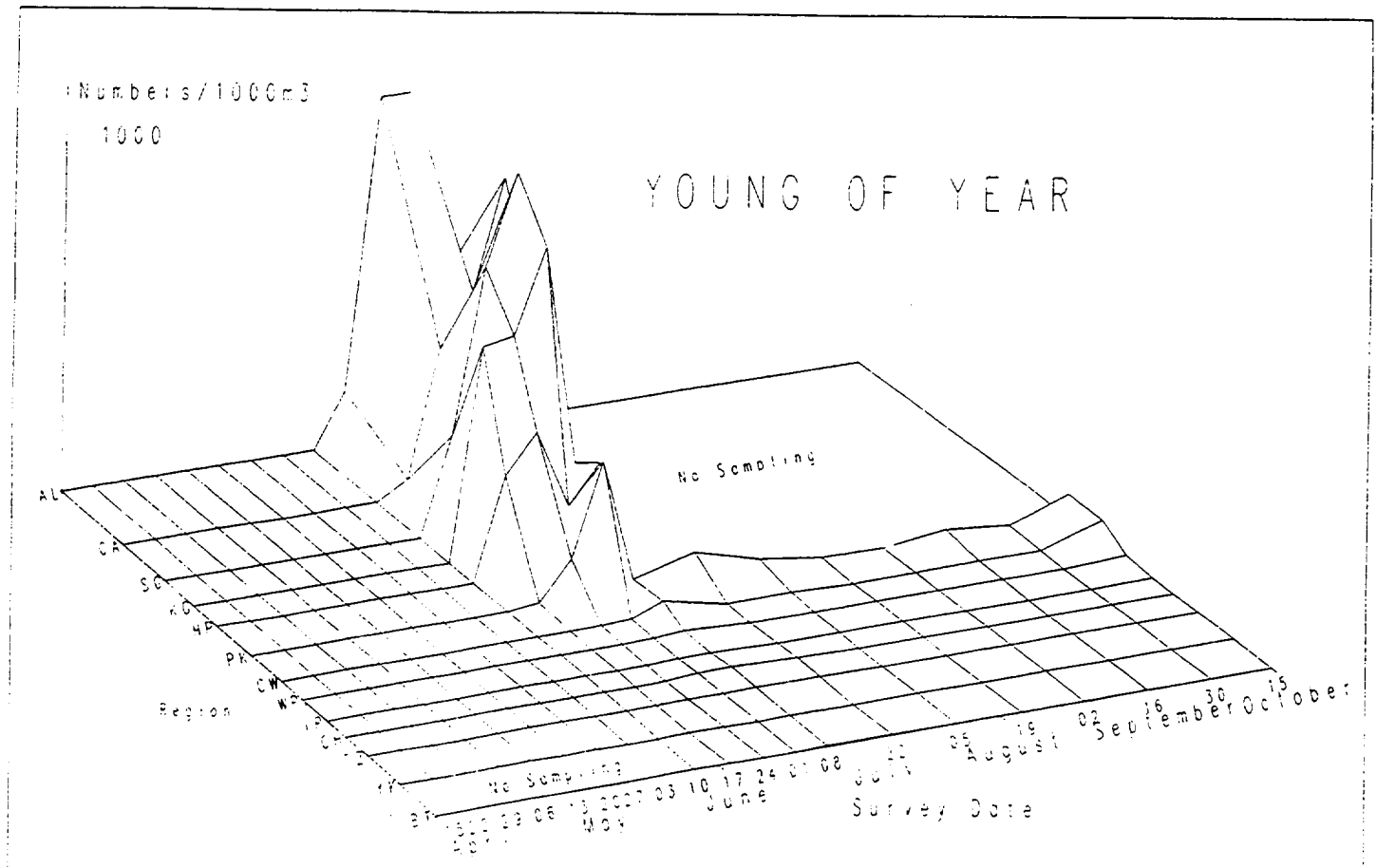

Figure 4–30. Spatiotemporal distribution of young–of–year stage of blueback herring in the Hudson River estuary based on the 1991 Long River Ichthyoplankton Survey.

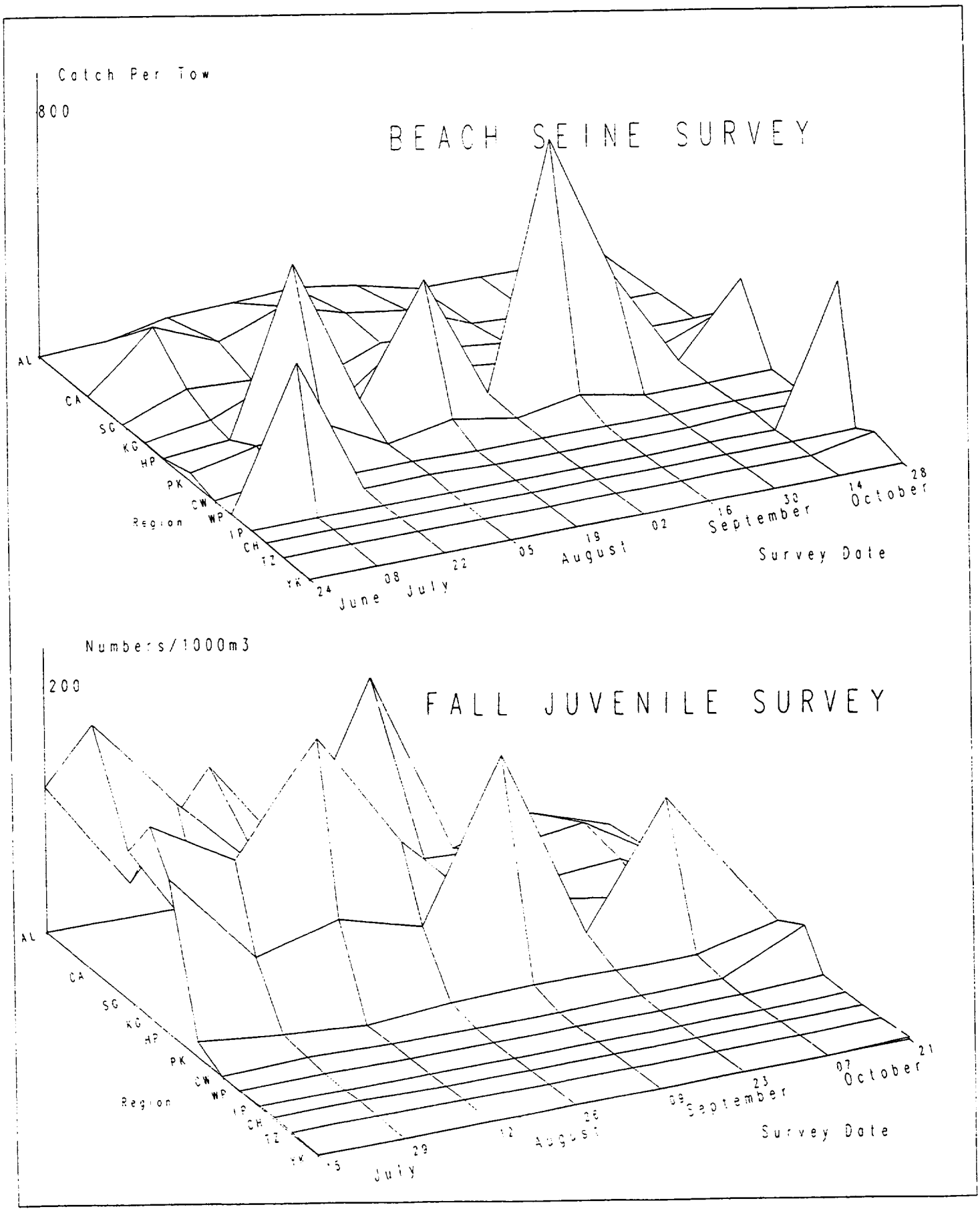

Figure 4–31. Spatiotemporal distribution of young–of–year blueback herring in the Hudson River estuary based on the 1991 Fall Juvenile and Beach Seine River Ichthyoplankton Surveys.

4.7.2 Yearling and Older Fish Distribution

As in previous years, yearling and older blueback herring were caught sporadically and in very low numbers in both the 1991 BSS and FJS; in both surveys there was no trend to their pattern of distribution (Figure 4-32).

4.8 ALEWIFE

Alewives are physically similar to blueback herring and can be distinguished from blueback herring on the basis of the color of the lining of the body cavity, eye size, and body shape. Alewives are usually anadromous and inhabit coastal waters from Newfoundland to South Carolina but they have also been introduced into the upper Great Lakes and inland lakes in Rhode Island, Maine, New Hampshire, Virginia, Ontario, and New York, where they provide forage for large predatory species. Anadromous alewives spend most of their lives in salt water and return to fresh water to spawn in lakes and quiet stretches of rivers (Scott and Crossman 1973). They are capable of homing to their natal rivers after they mature at ages 3 or 4, even though substantial numbers may not return and considerable mixing of river stocks may occur (reviewed in Fay et al. 1983). Adults are typically about 10 to 12 in. long and have a maximum life span of about nine years.

The alewife is chiefly a plankton feeder; copepods, amphipods, shrimps, and appendicularians are the chief diet. However, they also take small fish, such as herring, eels, lance, cunners, and their own species, as well as fish eggs. After returning to the lower estuary after spawning, alewife feed heavily on shrimp. (Bigelow and Schroeder 1953).

Like young blueback herring, alewife assume adult characteristics at about one month of age and about ½ in. in length. At this stage they tend to move inshore during the day and offshore into deeper waters at night. They remain in estuaries until water temperatures begin declining in the fall, when they move into coastal waters. Their emigration pattern is prolonged, like that of American shad. Timing of migration may also be related to size, and larger juveniles migrate earlier (Schmidt et al. 1988). Little is known about the migration patterns at sea. The presence of alewives and blueback herring in the Bay of Fundy has led to speculation that these species have an oceanic migratory pattern similar to American shad, although that has not been confirmed (Harris and Rulifson 1989).

4.8.1 Young of Year Distribution

Identifiable alewife YOY (35-44 mm and greater) were first collected in the 10 June sampling week of the LRS (Figure 4-33), which was one week earlier than blueback herring YOY collections and six weeks after the first river herring egg peak. Peak densities occurred in the LRS during mid-June and were found primarily in the upper estuary. Peak densities were collected in the Kingston (226/1000 m^3) and Saugerties (310/1000 m^3) regions. Alewife YOY were collected in every sampling week of both the FJS and BSS (Figure 4-34). In the BSS,

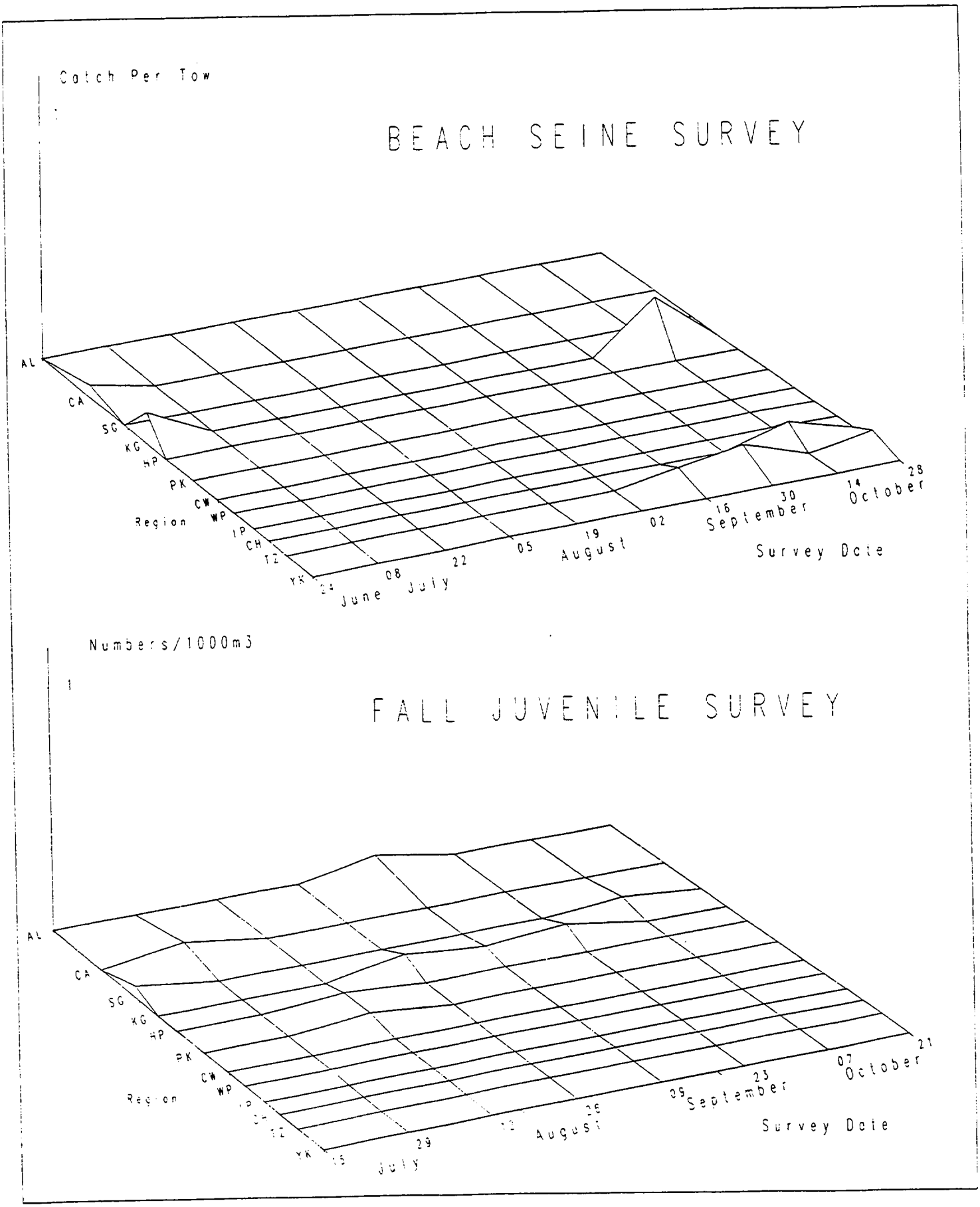

Figure 4 – 32. Spatiotemporal distribution of yearling and older blueback herring in the Hudson River estuary based on the 1991 Fall Juvenile and Beach Seine River Ichthyoplankton Surveys.

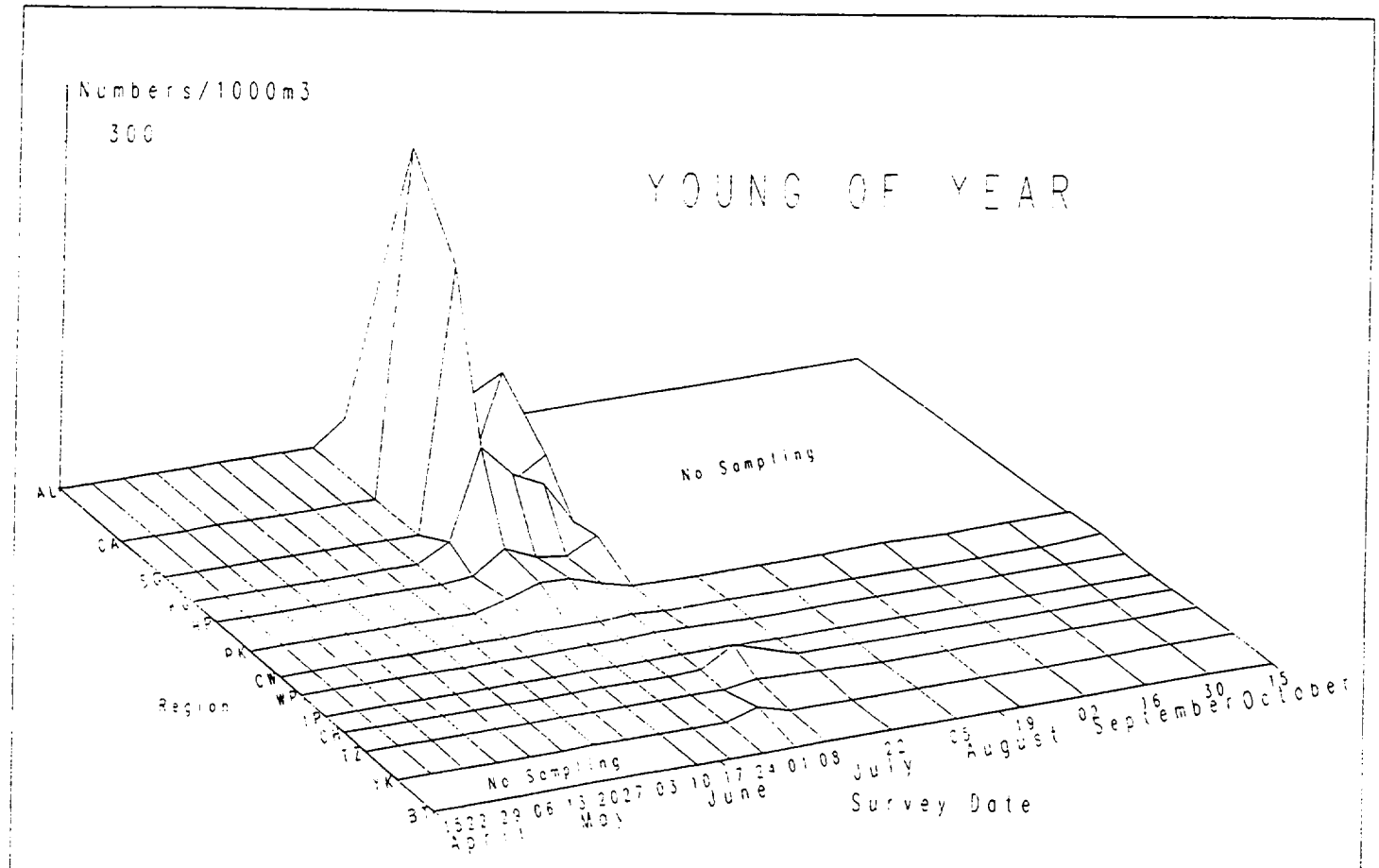

Figure 4–33. Spatiotemporal distribution of young–of–year stage of alewife in the Hudson River estuary based on the 1991 Long River Ichthyoplankton Survey.

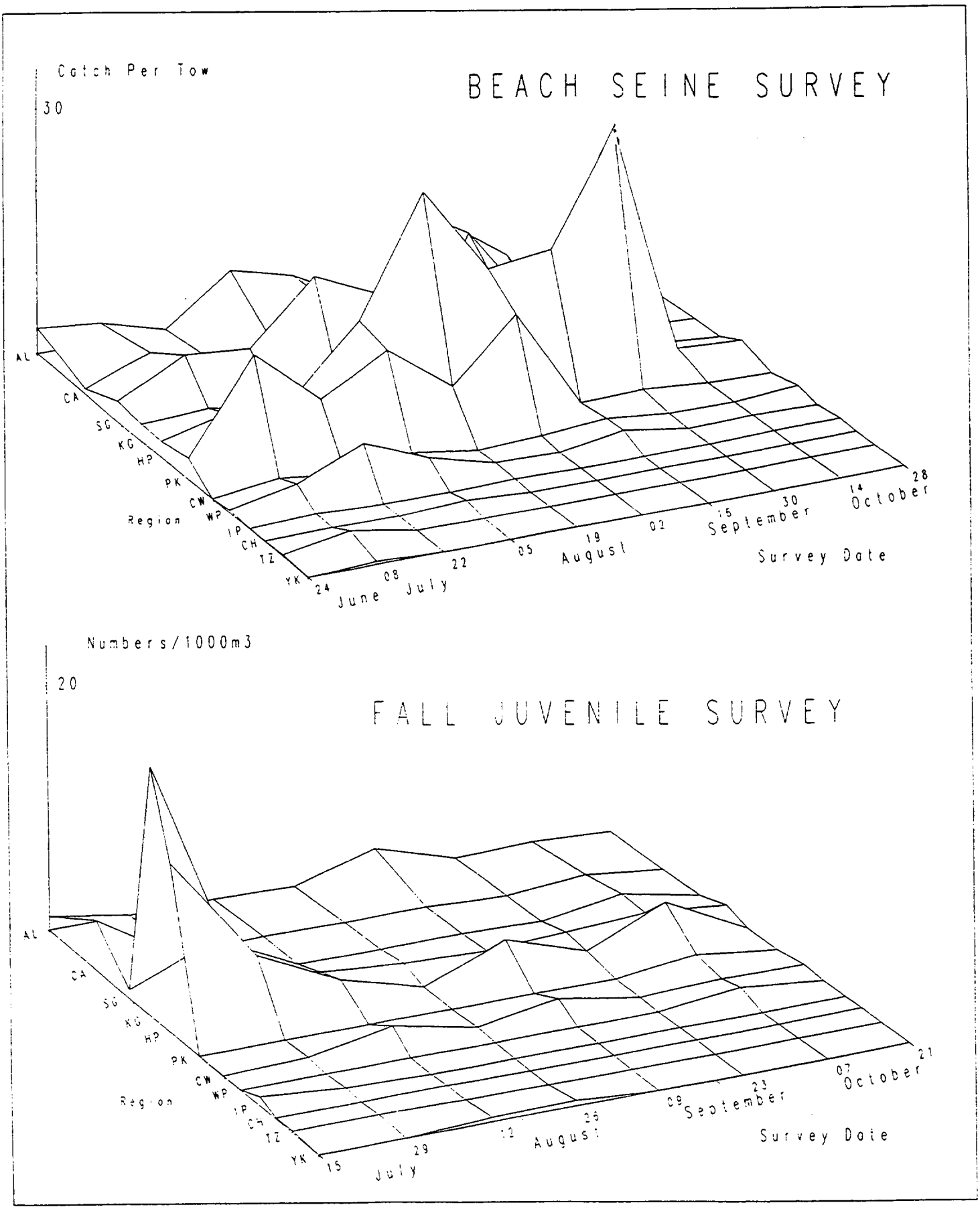

Figure 4–34. Spatiotemporal distribution of young–of–year alewife in the Hudson River estuary based on the 1991 Fall Juvenile and Beach Seine River Ichthyoplankton Surveys.

alewife were found primarily in the middle and upper estuary. Densities increased in the middle estuary as catches decreased in shore areas of the upper estuary in early September.

In the FJS, the greatest densities of YOY alewife were recorded primarily from the upper estuary regions. Peak densities in the FJS occurred the first week of sampling (15 July) in the Hyde Park and Kingston regions. Standing crop estimates (Table D-84) reflect a downriver migration in late October. The fall migration of YOY alewife from upper to lower estuary reaches does not appear in the BSS pattern of spatial distribution.

4.8.2 Yearling and Older Fish Distribution

As in previous years, relatively few yearling and older alewife were collected in the 1991 BSS or FJS. In the BSS, yearling and older alewife were found only once, in the Yonkers region in mid-September (Figure 4-35). In the FJS they were collected sporadically and in very low numbers throughout the study.

4.9 BAY ANCHOVY

Bay anchovies (*Anchoa mitchilli*) are small, slender fish, 1½ to 4 in. long, that are ubiquitous in shallow coastal waters of North America from southern Maine to the Yucatan Peninsula. They have a wide salinity tolerance, from fresh water to more than twice the salinity of normal sea water, but they prefer salinities found at seaward ends of estuaries. Where temperatures do not drop below 41°F during the winter, bay anchovies remain in the estuaries throughout the year (Wang and Kernehan 1979). However, north of Delaware Bay, where water temperatures do go below 41°F during the winter, NMFS trawl data indicate that a movement of bay anchovies out of coastal estuaries and southward during the fall results in an overwintering distribution ranging from Cape Hatteras to Delaware Bay and the virtual absence of bay anchovy from the inshore continental shelf of New York and New Jersey during the winter months (Vouglitois et al. 1987).

Bay anchovy school in large numbers and feed on plankton as they swim. Their mouths are large relative to their small size, which enables them to pass relatively large quantities of water through their gill rakers (long, slender projections on their gills) and filter out their prey. They feed throughout the water column and primarily eat invertebrates. Larval anchovies feed on a variety of microzooplankton, including the larval stages of crustaceans and mollusks. Juvenile and adult bay anchovy feed on larger macrozooplankton, including copepods, cladocerans, amphipods, and mysids.

Bay anchovies rarely survive more than two years. They grow rapidly and mature at a size of 1 to 2 in. In warm waters they may mature within three months of hatching, but in cooler, northern waters they usually mature in their second summer, 11 to 14 months after hatching. They are also very prolific: individual females may spawn 50 or more times per year, averaging about 1100 eggs per spawn (Houde and Zastrow 1991). Partially as a result of this early maturity and high fecundity, bay anchovies may be the most abundant fish species in the western north Atlantic (McHugh 1967).

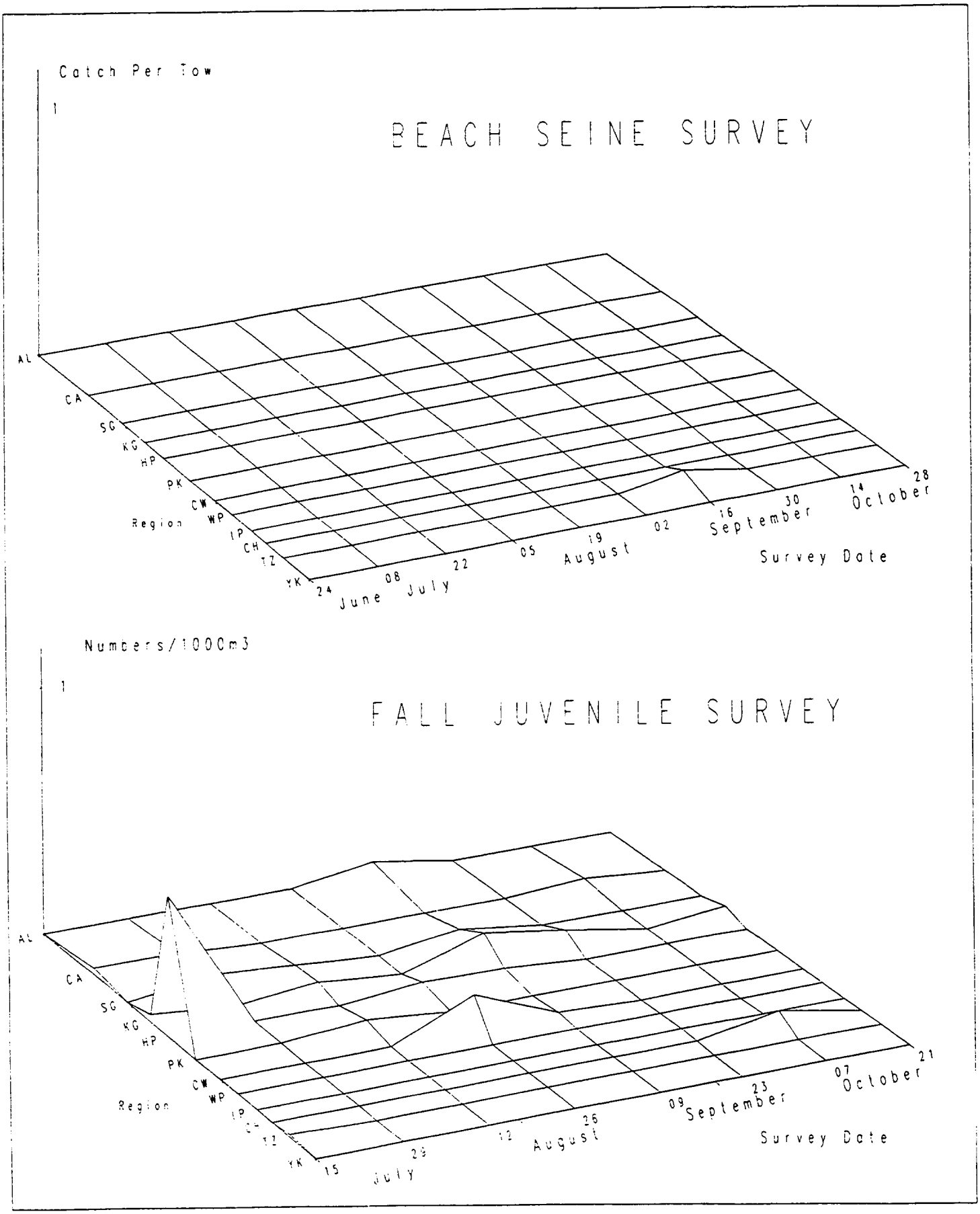

Figure 4–35. Spatiotemporal distribution of yearling and older alewife in the Hudson River estuary based on the 1991 Fall Juvenile and Beach Seine River Ichthyoplankton Surveys.

Bay anchovies spawn in lower estuarine and inshore coastal waters throughout the warmer months of the year. In the New York Bight spawning occurs from May through August and September, with peak egg abundance occurring in late June or early July when water temperatures exceed 70°F. Adults spawn in areas where the salinity is greater than 10 ppt. Egg abundance is typically highest in waters with salinities greater than 20 ppt, and egg viability apparently declines at salinities lower than 8 ppt. Spawning occurs throughout all areas of the Hudson-Raritan Bay complex, including Raritan and Newark bays, Arthur Kill, Kill Van Kill, and the upper and lower bays as well as throughout Long Island Sound.

Within the Hudson River, bay anchovy eggs are most abundant between RM 12 and RM 34. The eggs, which are about 1/16 in. long, are transparent and initially buoyant, but sink after 12 to 16 hrs of floating. Hatching occurs approximately 24 hrs after spawning. Newly hatched YSL are about 1/16 to 1/8 in. long, transparent, and drift along the bottom with the tidal currents. The YSL stage is very brief, and typically lasts less than one day. Due to their small size, short duration, and epibenthic nature, few YSL are collected in the utilities' ichthyoplankton samples. The PYSL stage is longer, and lasts about a month. In the Hudson River the peak abundance of PYSL occurs during early July, and the center of their distribution shifts slightly upriver compared to that of eggs and YSL.

Bay anchovies are about ½ in. long at the beginning of the juvenile stage. Juvenile anchovies are found in the Hudson River estuary from mid-August through October and as far upriver as Albany (Schmidt 1992). However, most of the juvenile population is located downstream of RM 38. Juveniles grow rapidly and reach an average size of 2 to 3 in. before declining water temperatures cause them to leave the estuary and move offshore to overwinter.

4.9.1 Egg Distribution

Bay anchovy eggs were first collected in the 1991 LRS during early May in very low numbers and were found in LRS collections through early September (Figure 4-36). A peak egg density of 191,211/1000 m^3 was recorded in the week of 24 June in the Yonkers region. Based on egg densities, spawning activities were almost entirely limited to the lower estuary. Greatest egg densities were recorded south of Indian Point but eggs were collected as far north as Albany. Mean weekly water temperatures ranged from 22 to 26°C and salinities from 2 to 16 ppt in the lower regions during peak abundance.

4.9.2 Yolk-Sac Larval Distribution

Bay anchovy YSL were first collected during the week of 27 May in the 1991 LRS (Figure 4-36). The greatest peak in density (220/1000 m^3) was recorded during early June (3 June) in the Tappan Zee region. This peak occurs prior to peak egg density. Most collections of YSL were made south of West Point, although a few ($\leq$0.5/1000 m^3) were made in the Cornwall region during early August.

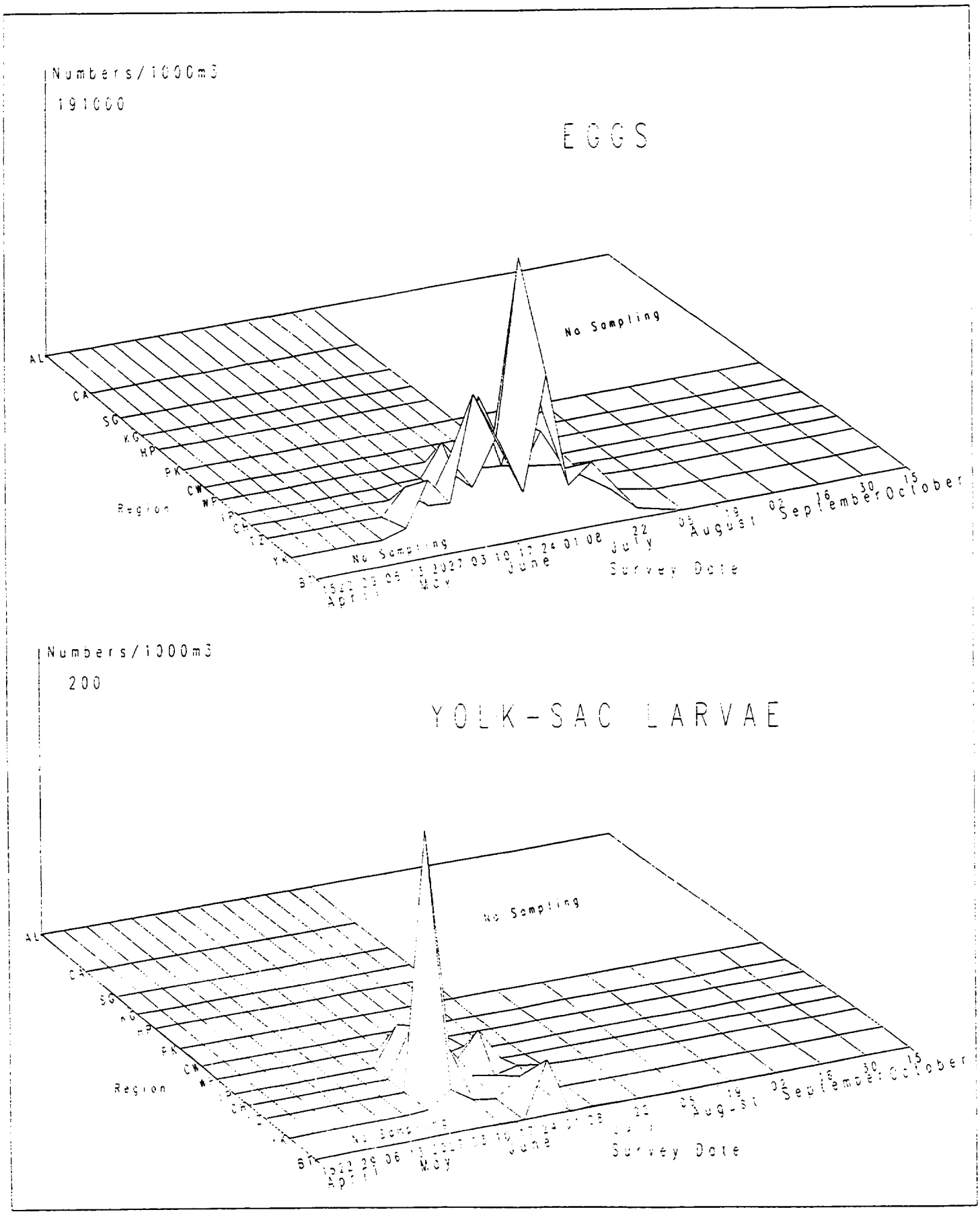

Figure 4–36. Spatiotemporal distribution of egg and yolk–sac stages of bay anchovy in the Hudson River estuary based on the 1991 Long River Ichthyoplankton Survey.

4.9.3 Post Yolk-Sac Larval Distribution

Bay anchovy PYSL first appeared in very low numbers in the 1991 LRS during the week of 6 May but were not collected in large quantities until early June (Figure 4-37). Very high densities ($\geq$10,000/1000 m^3) were collected mid- through late June in the lower estuary. Peak densities of $\geq$20,000/1000 m^3 occurred in the Croton-Haverstraw and Indian Point regions the week of 10 June, Indian Point the week of 24 June, and Yonkers the week of 30 June. PYSL were found as far north as Albany, but densities were highest between the Battery and Cornwall regions.

4.9.4 Young of Year Distribution

In the LRS, YOY bay anchovy were first taken in the Tappan Zee region during the week of 29 April; high densities were not collected, however, until late June/early July. YOY were present during every sampling week of the FJS and BSS (Figure 4-38). In the BSS, catches were sporadic throughout the sampling program (Figure 4-38). Peak densities of 120/tow and 145/tow occurred in the Yonkers and Poughkeepsie regions, respectively. YOY were never collected in shore zone areas in the upper estuary (Hyde Park to Albany). From early July through the middle of October regions north of Poughkeepsie were not sampled in the LRS; peak densities of YOY bay anchovy occurred in the lower estuary during this time. Bay anchovy densities of approximately 1000/1000 m^3 were collected in the Tappan Zee through Croton-Haverstraw regions from early July through late August. Water temperatures started declining below 25°C in September.

YOY bay anchovy were found in all regions of the Hudson River estuary in the FJS. The greatest abundance (400 to 500/1000 m^3) was recorded in the lower estuary and Cornwall in mid- to late July. Catches in the 1991 BSS were sporadic; no temporal pattern was evident. Spatiotemporal patterns for the FJS standing crop estimates (Table D-100) indicate a slight downriver migration from the upper and middle estuary to the lower estuary in the fall (mid-September). Temperatures were 19 to 20°C in the upper estuary and approximately 22°C in the middle lower (Table C-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. In the BSS collections, yearling and older bay anchovy peaked in early July in the Tappan Zee region and occurred only sporadically, in BSS catches the rest of the study.

In the FJS, greatest abundance of yearling and older bay anchovy occurred in late September in the Yonkers region. A few sporadic catches were made as far north as the Kingston region but most catches were made in the lower estuary.

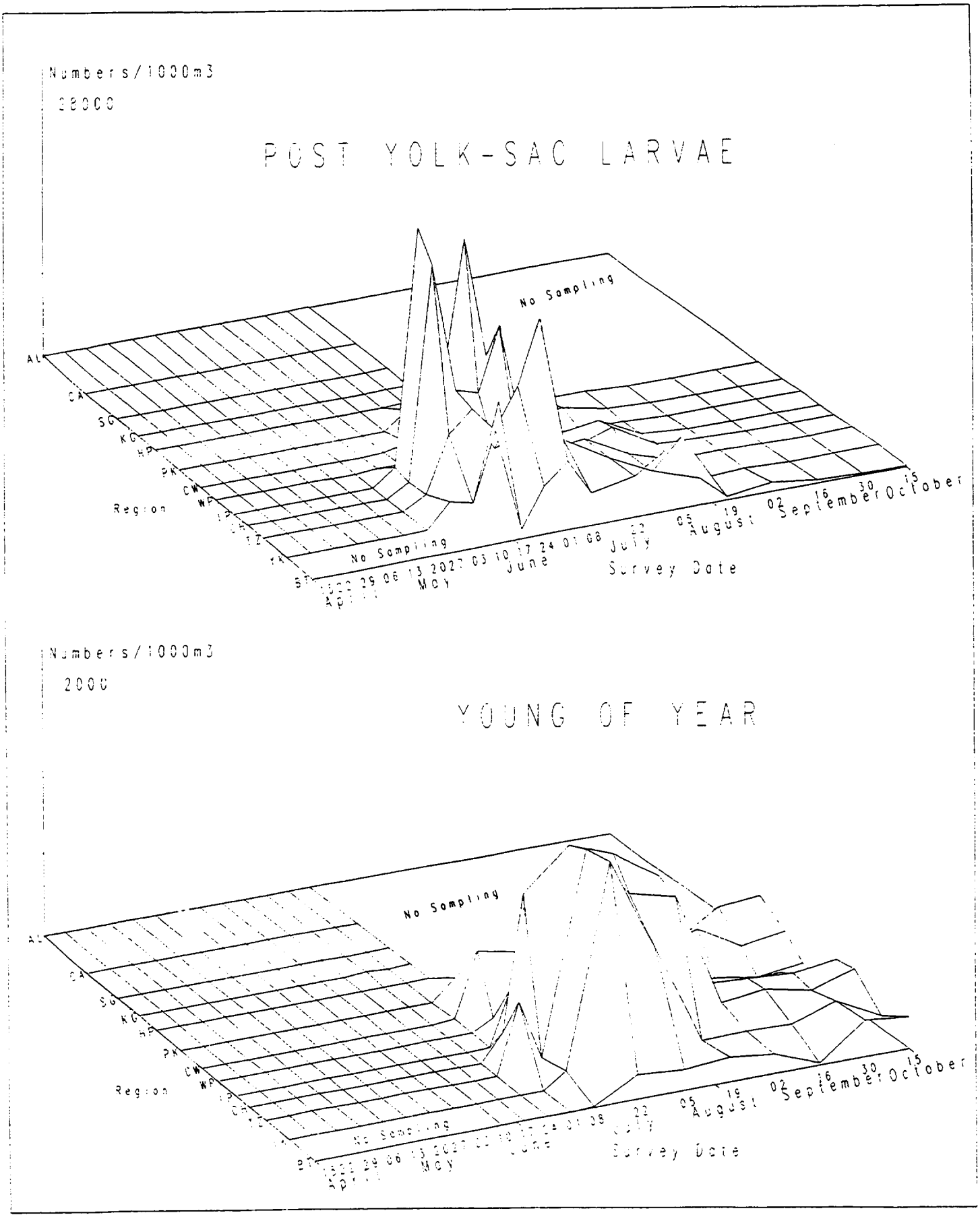

Figure 4–37. Spatiotemporal distribution of post yolk–sac and young–of–year stages of bay anchovy in the Hudson River estuary based on the 1991 Long River Ichthyoplankton Survey.

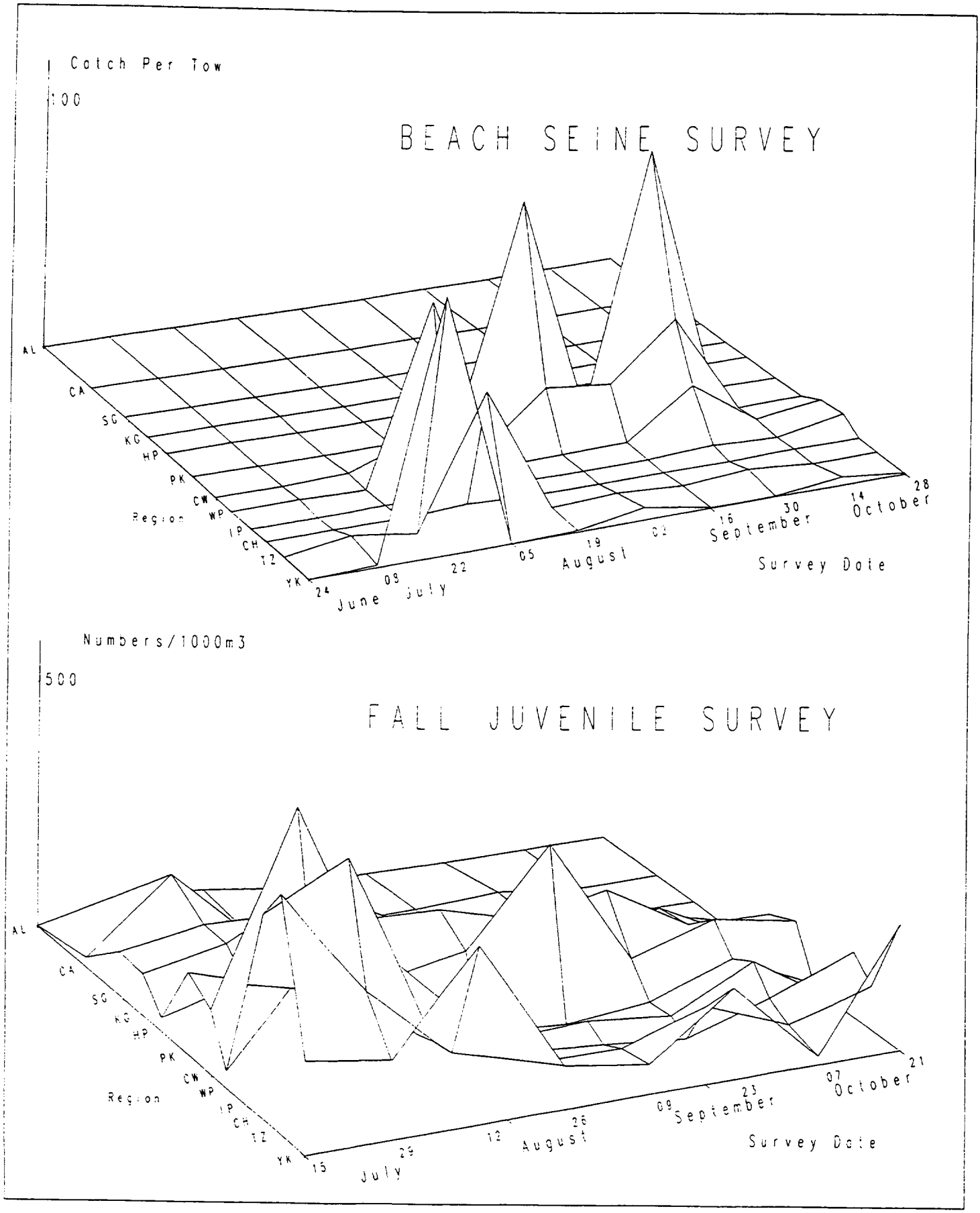

Figure 4–38. Spatiotemporal distribution of young–of–year bay anchovy in the Hudson River estuary based on the 1991 Fall Juvenile and Beach Seine River Ichthyoplankton Surveys.

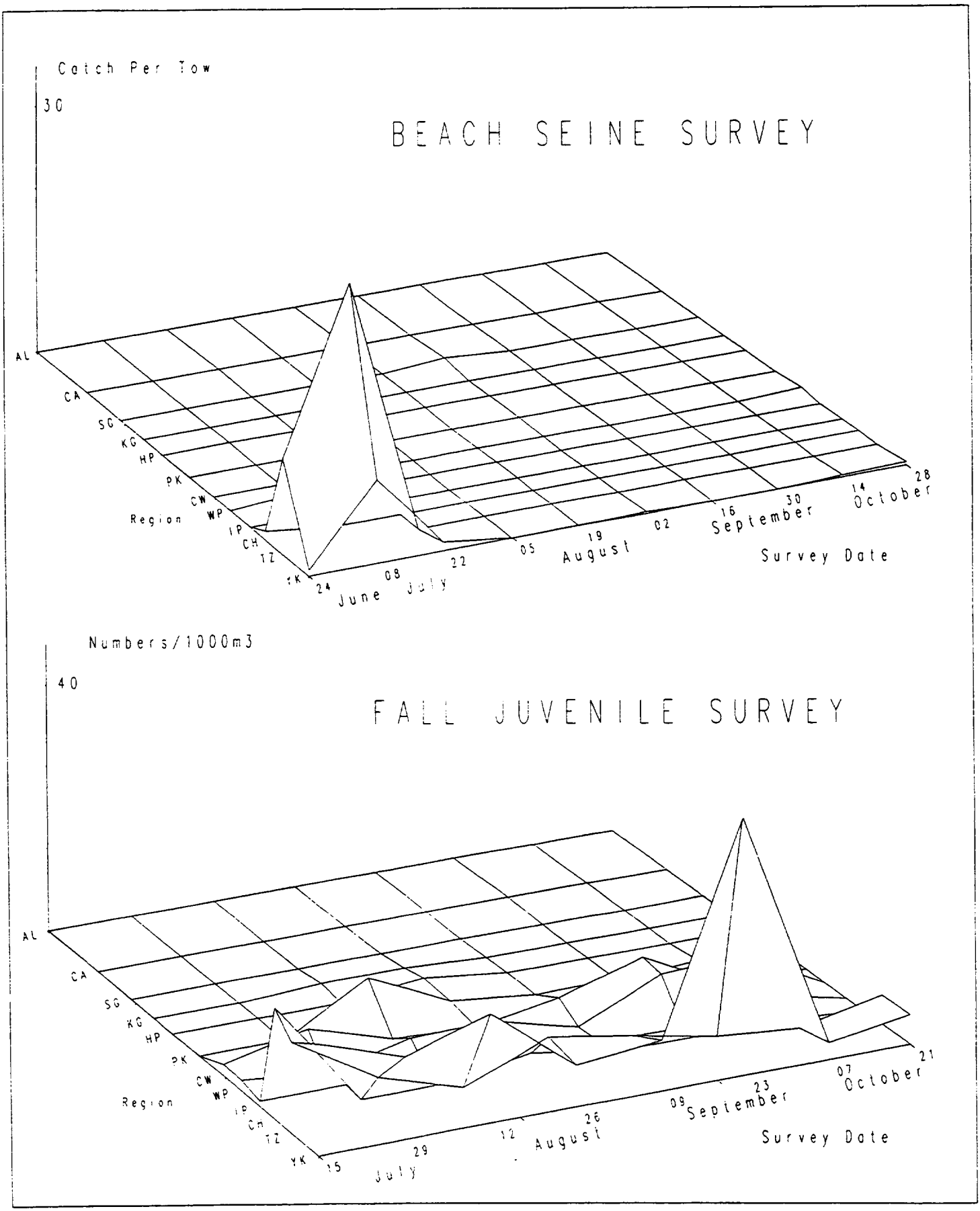

Figure 4–39. Spatiotemporal distribution of yearling and older bay anchovy in the Hudson River estuary based on the 1991 Fall Juvenile and Beach Seine River Ichthyoplankton Surveys.

4.9.6 Comparison to Previous Years

In 1991, catches of bay anchovy were sporadic in the shore zone areas and the BSS geographical distribution pattern does not resemble the long-term index (Figure 4-40). Typically, bay anchovy YOY are collected in the Tappan Zee region. This year the saltfront reached up into the Poughkeepsie region and remained there for an extended period of time.

4.10 WEAKFISH

Weakfish (*Cynoscion regalis*) is a member of the drum family commonly inhabiting nearshore waters from North Carolina to New York and occasionally straying as far as Nova Scotia or the eastern Gulf of Mexico. Weakfish overwinter in deeper waters of the continental shelf, generally between Chesapeake Bay and Cape Fear, North Carolina. When inshore waters begin to warm each spring, older weakfish begin to move toward shore and then head north along the coast. These older individuals are followed by successively younger groups of adult weakfish. During warmer months of the year, weakfish are found throughout inshore waters in their geographic range, with larger individuals the most abundant in northern areas. As water temperatures decline in the fall, weakfish begin to migrate southward and return to offshore overwintering areas.

Spawning occurs in nearshore coastal and marine waters in spring and summer, depending upon geographic location. Extensive spawning occurs in the south and in the New York Bight. Weakfish eggs are buoyant and hatch in about two days. The newly hatched larvae, which are less than 1/8 in. long, are weak swimmers and move shoreward up into the bays and estuaries. Duration of the larval stage appears to depend partially on prey density. In the nursery areas young weakfish feed on invertebrates and grow rapidly. They reach a length of 3 to 6 in. by the end of the first summer. Young weakfish can be found throughout the saline and brackish areas of estuaries but tend to be most common in areas where salinities are over 10 ppt. As water temperatures decline in fall, juvenile weakfish begin to leave these nursery areas and move toward southern overwintering areas.

In the New York Bight spawning typically occurs from May to mid-July, and there are two spawning peaks. Weakfish larvae are rarely encountered north of the George Washington Bridge, preferring more saline waters. Weakfish juveniles (YOY) typically first enter the areas north of the George Washington Bridge during July and most have emigrated from the estuary by mid-August. During this period YOY weakfish are most common in the most southern (higher salinity) areas sampled but can be found as far upriver as the Newburgh-Beacon Bridge. The general increasing trend of YOY weakfish abundance downstream suggests that YOY are even more abundant in areas of the estuary south of the George Washington Bridge.

Young weakfish feed on a variety of invertebrates. As weakfish reach adulthood, fish become an increasingly important component of their diet. Weakfish can live up to 11 years and reach a maximum size of 32 in. and about 20 lb. Most weakfish are sexually mature by their second summer and virtually all are mature by the end of their third summer. Growth in adult weakfish

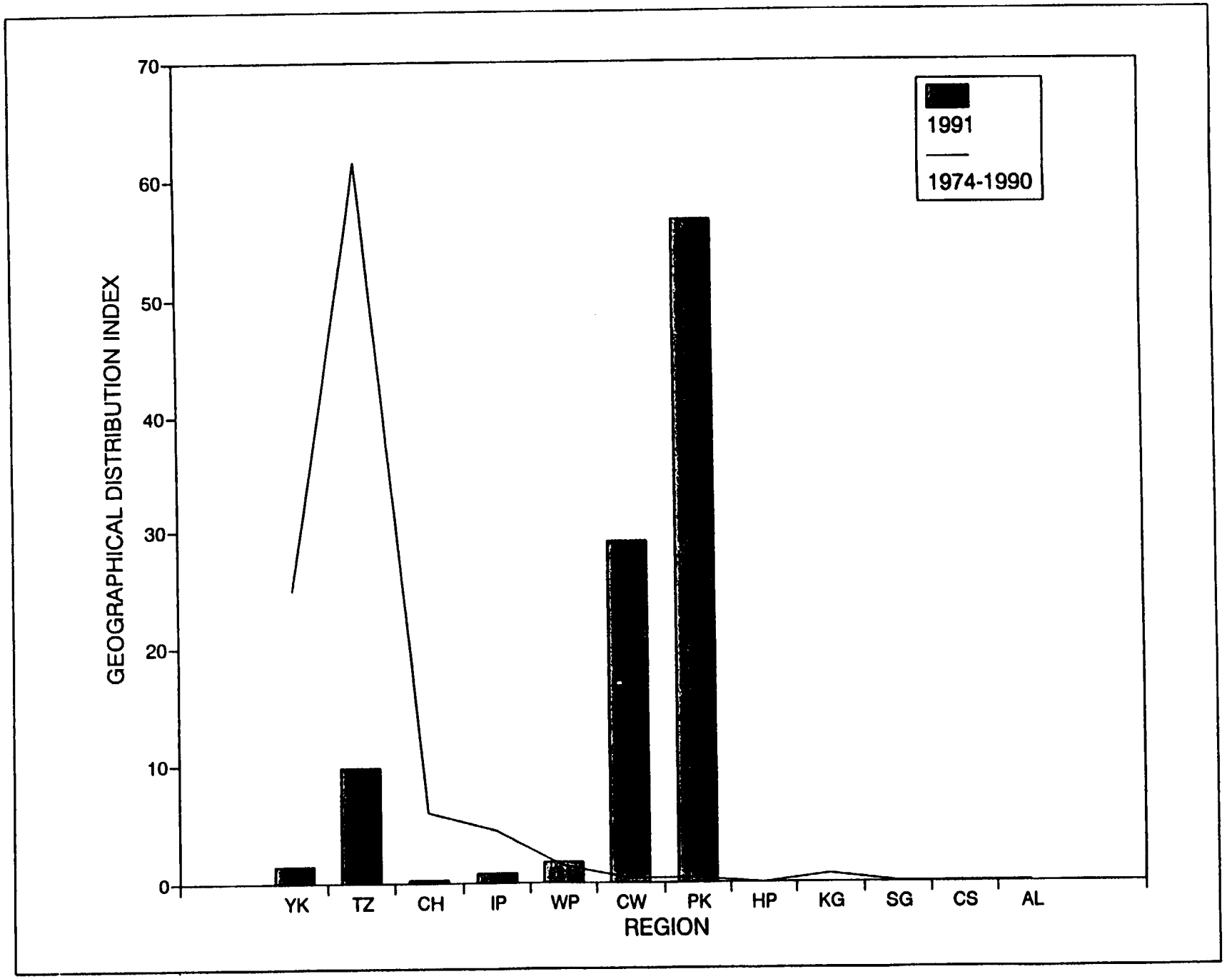

Figure 4-40. Geographic distribution indices for young of year bay anchovy collected during Beach Seine Surveys of the Hudson
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appears to be related to environmental factors, prey availability, and migratory energy requirements.

4.10.1 Young of Year Distribution

Weakfish YOY were caught in the LRS, FJS, and BSS in 1991, with the earliest collections occurring the week of 10 June in the LRS (Figure 4-41), the first FJS and BSS sampling week, 15 July and 24 June, respectively (Figure 4-42). Peak YOY densities (60 to 70/1000 m^3) occurred in late June and early July in the LRS, during the first sampling week of the FJS (22/1000 m^3), and during the early July in BSS (3/tow).

In all three surveys YOY were most abundant in the lower estuary. In the LRS, YOY were collected as far north as the Albany region but in very low numbers. Peak densities (> 10,000/1000 m^3) were recorded in the Battery through Cornwall regions. Densities declined in early August. In the FJS, peak occurrence of YOY weakfish was recorded in the Tappan Zee and Yonkers region; collections as far north as Poughkeepsie were made. In the FJS, numbers declined throughout the summer and fall. As observed in 1990 catches of YOY weakfish in the BSS did not extend north of the Croton-Haverstraw region (LMS 1992).

4.10.2 Yearling and Older Fish Distribution

A few sporadic catches (< 1/tow) of yearling and older weakfish were collected during the 1991 BSS, primarily in the lower estuary. A few (< 1/1000 m^3) were also collected in the FJS (Figure 4-43). Collections were made as far north as the Cornwall region in the BSS and FJS. Salinities in the Cornwall region were around 2 ppt in the shore zone and 2 to 3 ppt in the main channel during these collections.

4.11 WHITE CATFISH

White catfish occur in freshwater lakes and ponds and have been introduced widely on the west coast and into the Northeast. The natural distribution was originally from the Chesapeake Bay region in coastal streams southward to Texas. It is found in estuaries all along the Atlantic coast from the Hudson River to Florida and west along the Gulf of Mexico to Mobile Bay. It prefers fresh and slightly brackish waters and moderate water currents. White catfish do not tolerate high salinity, so estuarine populations generally remain in their natal systems.

In southern waters young white catfish are about 3 in. long at the end of the first growing season. White catfish generally do not mature until they are three to four years old and 7 to 8 in. long. They continue to grow slowly, attaining lengths of 17 in. at age 8 and 22 in. at age 11. This species seldom exceeds 3 lb in weight.

White catfish move upstream to spawn. In spring white catfish have been reported in tidal creeks and shallow marsh habitats. Like the other members of the catfish family, the white catfish is a nest builder, and the male guards the young for some time after they hatch. Both

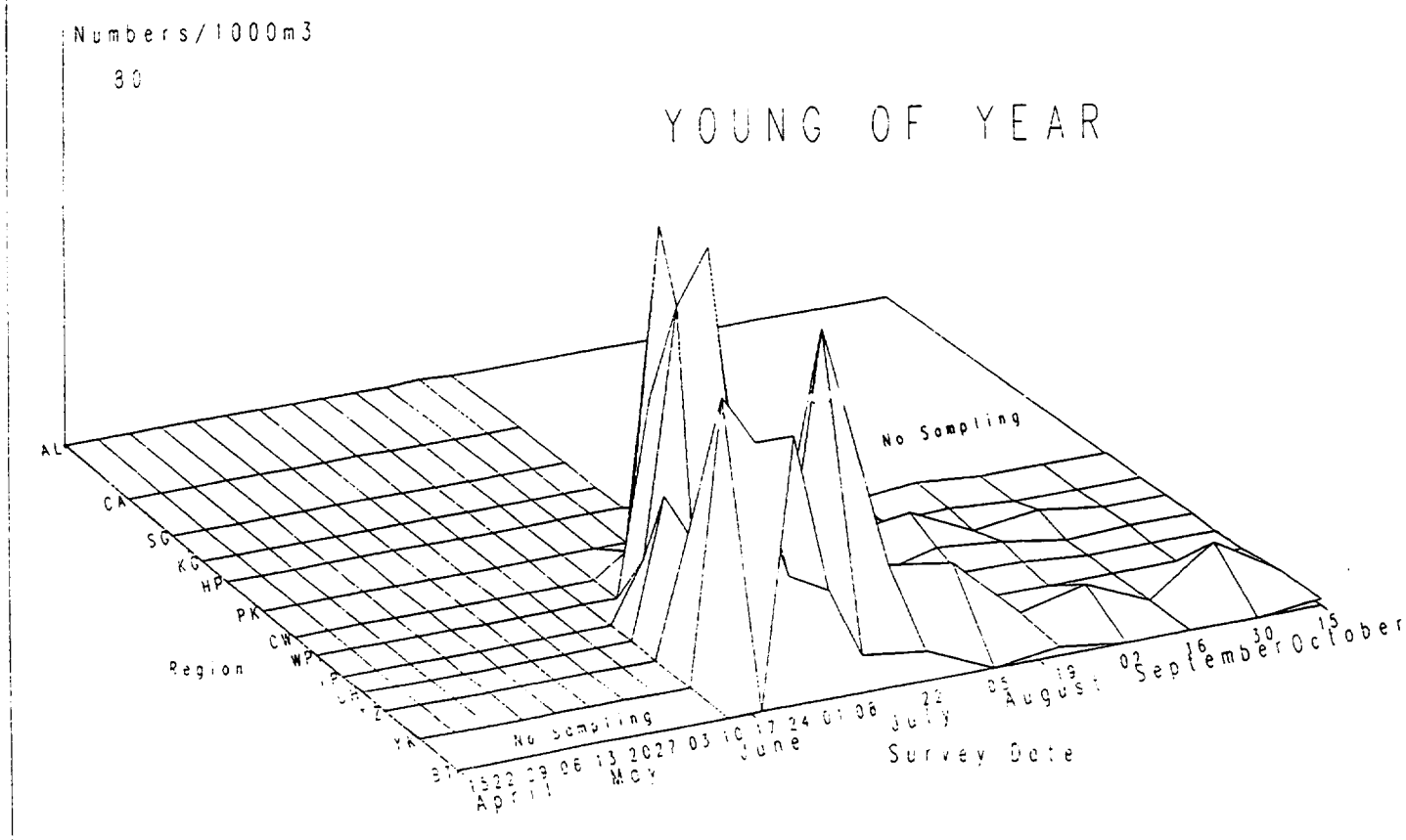

Figure 4–41. Spatiotemporal distribution of young–of–year stage of weakfish in the Hudson River estuary based on the 1991 Long River Ichthyoplankton Survey.

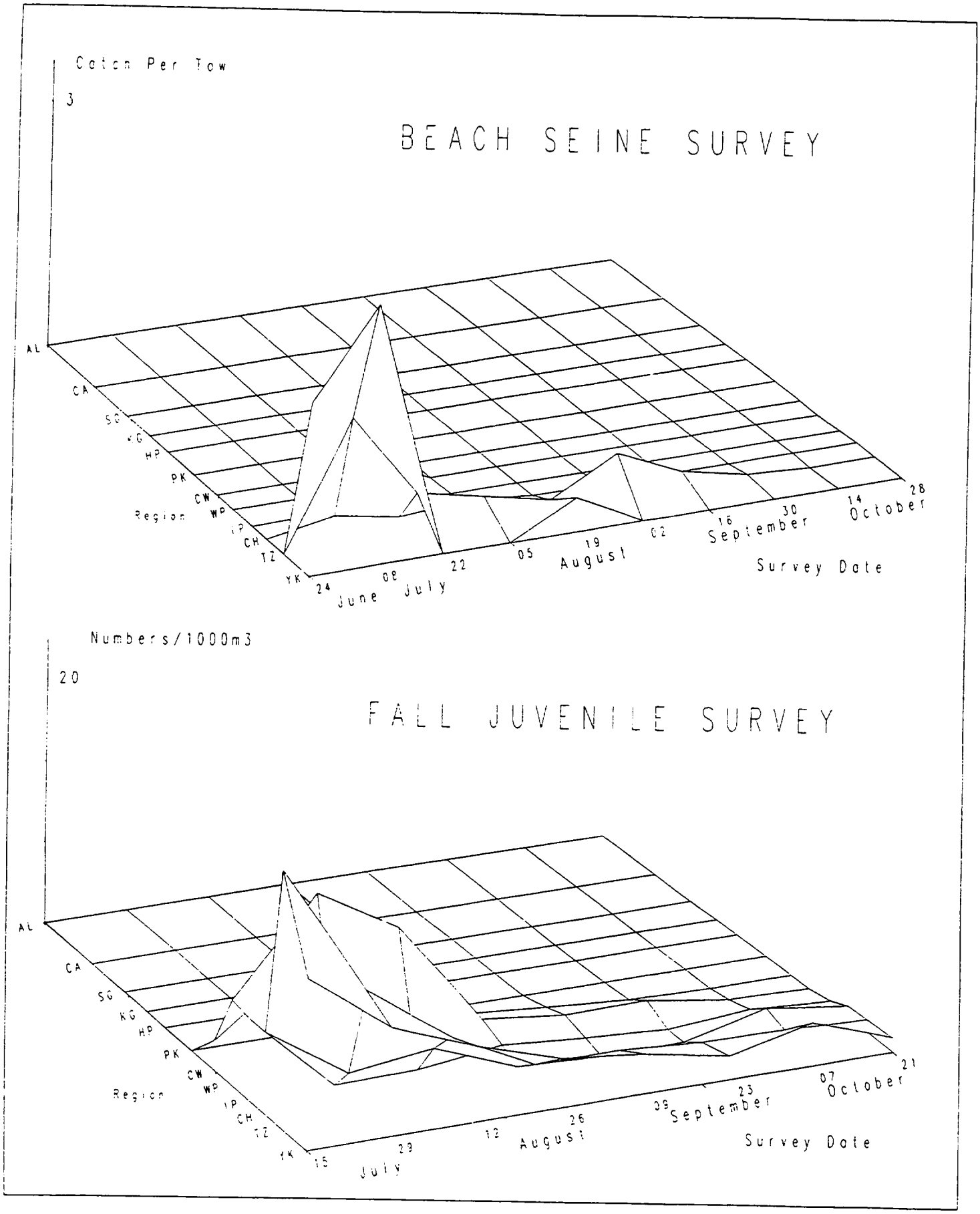

Figure 4–42. Spatiotemporal distribution of young–of–year weakfish in the Hudson River estuary based on the 1991 Fall Juvenile and Beach Seine River Ichthyoplankton Surveys.

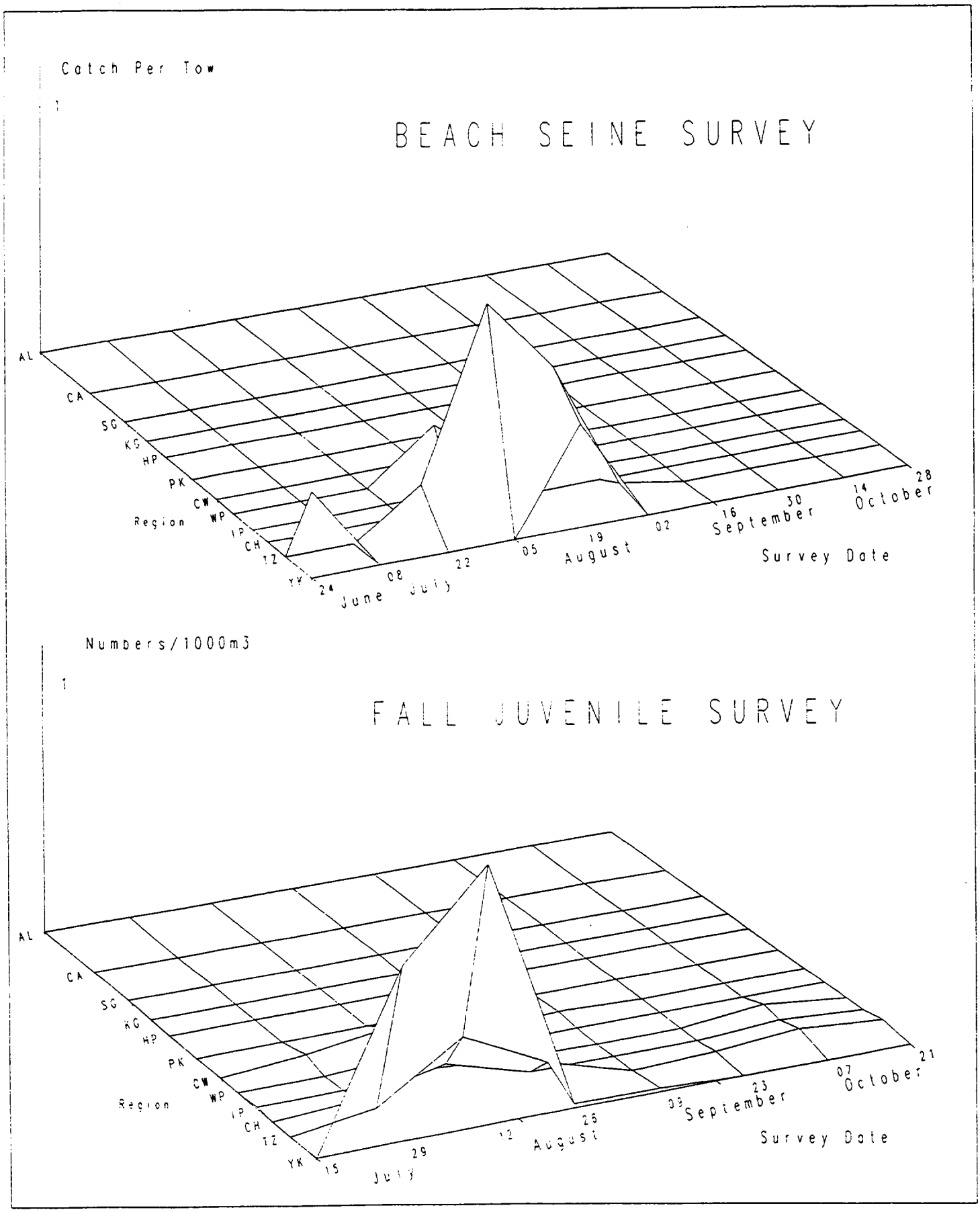

Figure 4–43. Spatiotemporal distribution of yearling and older weakfish in the Hudson River estuary based on the 1991 Fall Juvenile and Beach Seine River Ichthyoplankton Surveys.

parents participate in the construction of a nest up to 3 ft in diameter on sand and gravel bars. White catfish spawn when water temperatures reach about 70°F, i.e., in late June and early July in the Hudson River. An 11- to 12-in. female carries only 3200 to 3500 eggs, but the eggs are large, approximately ¼ in. in diameter. The male (or less often both parents) protects and fans water over the eggs in the nest.

White catfish eggs, larvae, and early juveniles were rarely collected during the utilities' ichthyoplankton surveys. However, the bottom samples from the FSS consistently capture low numbers of juveniles, yearlings and older white catfish. The FSS regional indices indicated that juvenile catfish were more abundant in the upper estuary and that yearling and older catfish were more abundant in the lower estuary. Juvenile white catfish generally appeared in the FSS catches around the end of July. After moving into the deeper river strata during September and October, yearling and older white catfish migrate downstream to overwinter in the lower estuary when temperatures in the upper estuary drop below 59°F (NAI 1985).

Small white catfish feed on midge larvae until they become large enough to eat fish. Larger white catfish have a diverse diet that includes midge larvae, crustaceans, algae, fish eggs, and a variety of fish (Smith 1985).

4.11.1 Young of Year Distribution

No white catfish YOY were collected in the 1991 LRS and were collected only once in very small numbers in the West Point region during the BSS (Figure 4-44). As YOY white catfish prefer deep-water habitat, infrequent catches of YOY in the BSS are not unusual. White catfish YOY were collected during all FJS sample weeks. Peak YOY densities in the FJS were recorded in mid- to late August. All YOY white catfish were collected north of and including the Kingston region, and most were collected in the Catskill and Albany regions. In previous years YOY white catfish have been collected in the middle estuary in both the LRS and FJS (LMS 1992). The saltfront extended to the border of Poughkeepsie and Hyde Park this year, which may have been a factor in limiting the downriver spatial extent this year.

4.11.2 Yearling and Older Fish Distribution

Yearling and older white catfish were collected sporadically in the BSS in 1991 (Figure 4-45). In the BSS, yearling and older white catfish were found as far south as the Tappan Zee region and as far north as the Catskill region. In the FJS, yearling and older white catfish were found in all regions except Yonkers. Densities were $<0.5/1000\ m^3$. Although densities were low, white perch yearling and older were consistently collected in the Saugerties to Albany regions and the Tappan Zee to Indian Point regions. No temporal pattern was evident.

4.12 SPOTTAIL SHINER

The spottail shiner (*Notropis hudsonius*) is a small, silvery, freshwater minnow that reaches a maximum total length of over 5 in. in the Hudson River. It is usually recognizable by a large

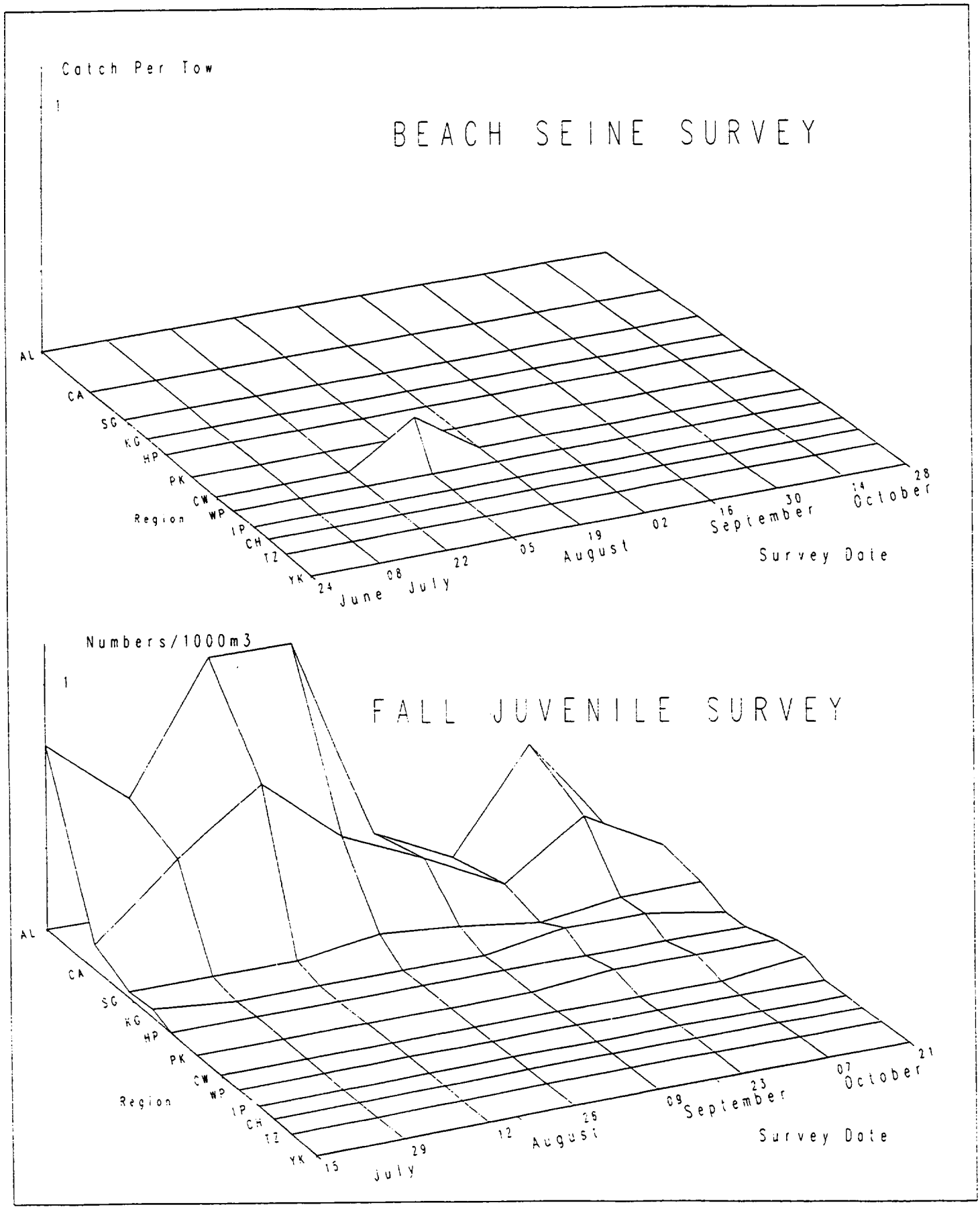

Figure 4–44. Spatiotemporal distribution of young–of–year white catfish in the Hudson River estuary based on the 1991 Fall Juvenile and Beach Seine River Ichthyoplankton Surveys.

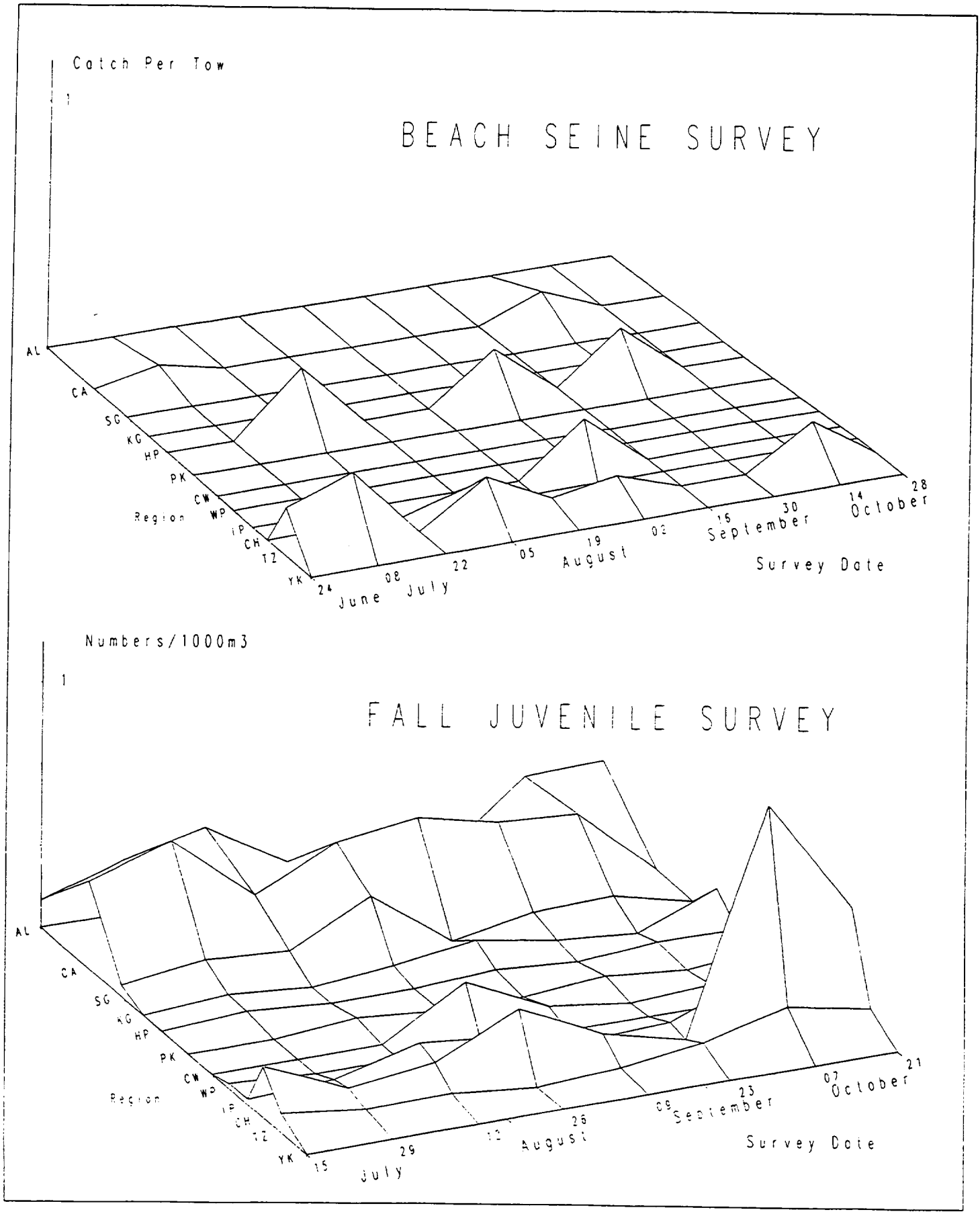

Figure 4–45. Spatiotemporal distribution of yearling and older white catfish in the Hudson River estuary based on the 1991 Fall Juvenile and Beach Seine River Ichthyoplankton Surveys.

oval spot at the base of the tail, but in large individuals the spot is sometimes small and somewhat masked by silvery pigment. It occurs in a variety of freshwater habitats from large lakes and rivers to small streams and is widely distributed in Canada and the United States (Smith 1985).

The spottail shiner is a freshwater species and does not enter marine coastal waters. Thus, the Hudson River population is probably isolated from those in other coastal rivers along the east coast of the United States.

Adult spottail shiners may form large spawning aggregations over sand or gravel substrates in shallow water or at the mouths of tributaries. In the Hudson River adult spottail shiners appear in the ichthyoplankton samples from the upper, freshwater regions of the estuary during May. Spottail shiners produce from 100 to 2600 eggs, depending upon the age and size of the female. Very few eggs and larvae have been collected during the LRS, which is probably a reflection of the fact that this species spawns in shallow-water habitats that are not sampled efficiently during the ichthyoplankton surveys. Juvenile spottail shiners first appear during early July and are most abundant in the shore zone above RM 86, which is also the portion of the estuary with the greatest number of tributaries.

In general, spottail shiners are opportunistic predators that feed on aquatic insect larvae, zooplankton, benthic invertebrates, and the eggs and larvae of fish, including their own species. The smaller fish eat the smaller organisms and zooplankton (Scott and Crossman 1973).

There is no commercial or sport fishery on this species, although they are collected for use as bait.

4.12.1 Young of Year Distribution

YOY spottail shiner were collected in low numbers in four weeks of the LRS: the first was during the week of 10 June in the Saugerties region, the second during the week of 30 June in Cornwall, the third in Albany during the week of 8 July, and the fourth in Poughkeepsie in late August. Spottail shiner YOY were found in every sampling period of the BSS and FJS (Figure 4-46). Peak abundance in the FJS occurred in early October, while high densities were recorded in the BSS from late June to mid-October. In the FJS, YOY spottail shiner were collected only in the Catskill and Albany regions. In the BSS, spottail YOY were collected as far downriver as the Tappan Zee region; most were collected in the middle and upper estuary. YOY densities in the BSS started to decline in mid-October.

4.12.2 Yearling and Older Fish Distribution

Spottail shiner yearling and older spatiotemporal distribution in the 1991 BSS and FJS was very similar to the YOY distributions (Figure 4-47). In the FJS yearling and older spottail shiner were found only in the Catskill and Albany regions throughout the sampling period. Peak density occurred in Albany during early-October. In the BSS, yearling and older spottail shiner

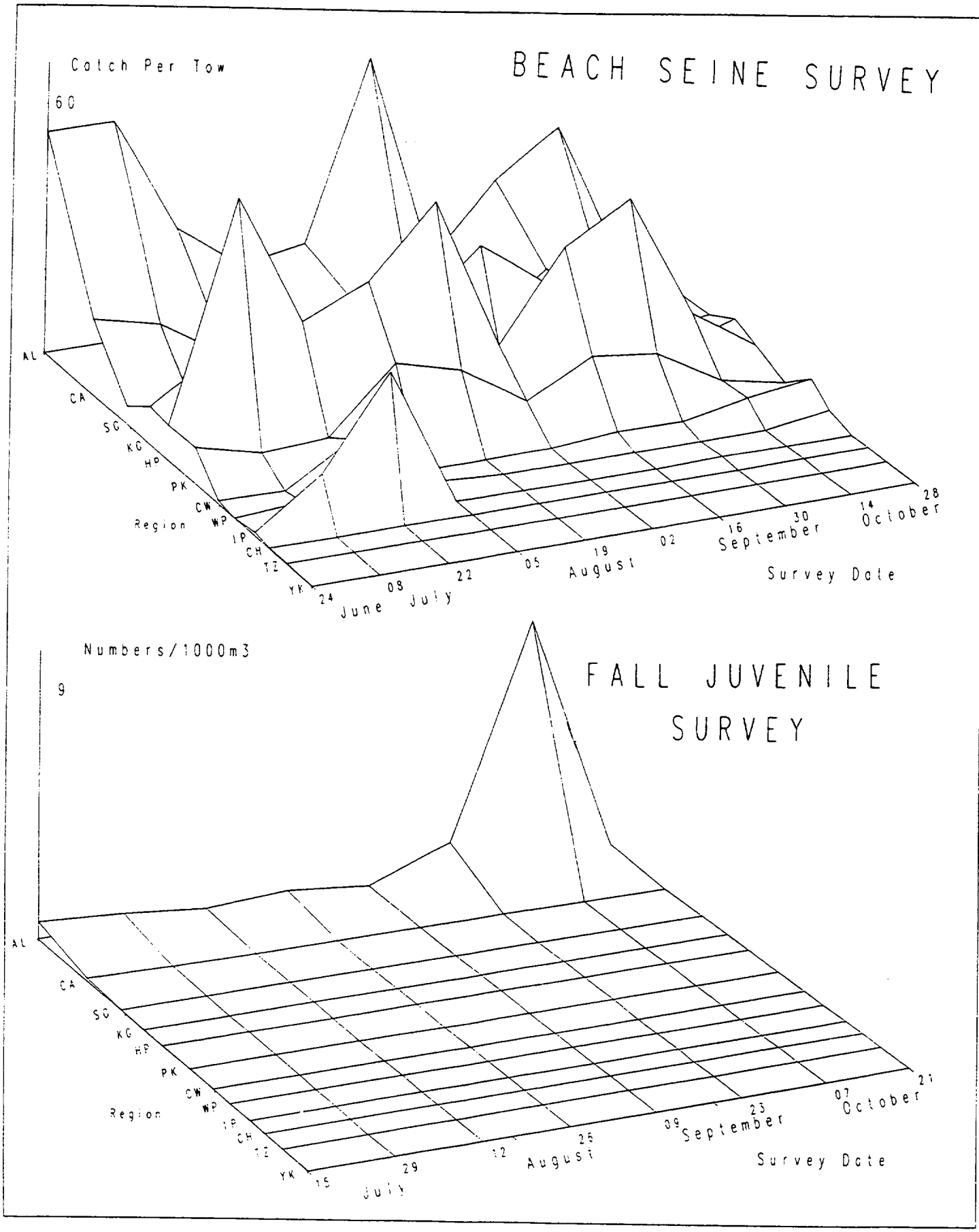

Figure 4–46. Spatiotemporal distribution of young–of–year spottail shiner in the Hudson River estuary based on the 1991 Fall Juvenile and Beach Seine River Ichthyoplankton Surveys.

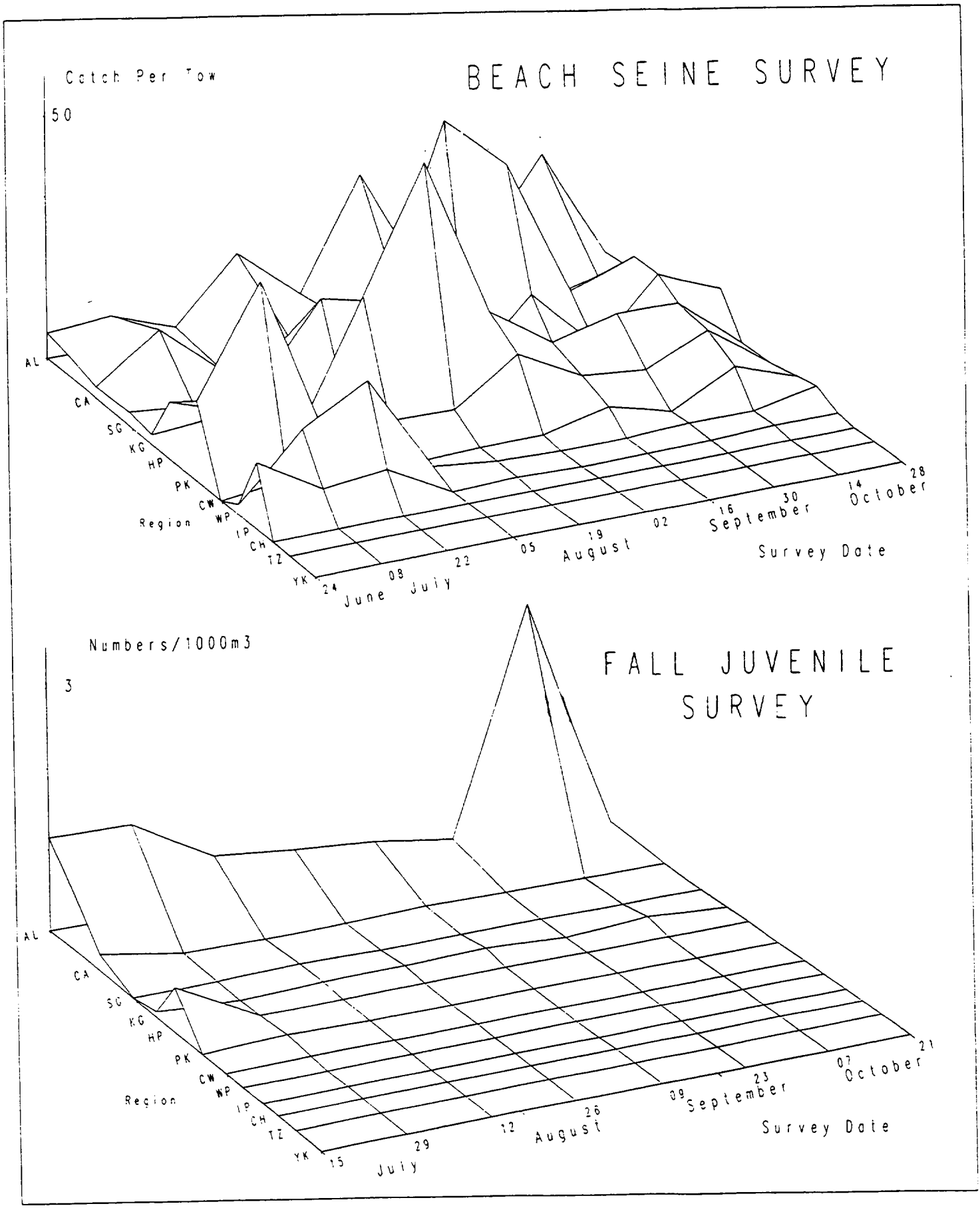

Figure 4–47. Spatiotemporal distribution of yearling and older spottail shiner in the Hudson River estuary based on the 1991 Fall Juvenile and Beach Seine River Ichthyoplankton Surveys.

were collected in relatively low numbers in the middle and upper estuary. Collections were made as far downriver as the Indian Point region. No temporal pattern in the BSS data was apparent.

4.13 ATLANTIC STURGEON

The Atlantic sturgeon, *Acipenser oxyrhynchus*, has two recognized subspecies, *A. o. oxyrhynchus* and *A. o. desotoi*. The former ranges from Hamilton River, Labrador, and George River, Ungava Bay, to northeastern Florida, while the latter is confined to the northeastern Gulf of Mexico (Gruchy and Parker 1980a). Adults are large fishes with barbels extending across most of the width of the snout, heavy bony plates (called scutes) covering the body, and an extended upper lobe of the tail fin. Berggren (1983) reported that by age 29, Atlantic sturgeon averaged 7.8 ft. The largest Atlantic sturgeon reported by Dovel (1977) was an 8.5-ft specimen weighing 245 lb.

Atlantic sturgeon are long-lived, slow-maturing fishes. Although in the Hudson River the maximum reported age is 29, the oldest known Atlantic sturgeon is a 60-year-old individual from the St. Lawrence River (Gilbert 1989). Male Atlantic sturgeon reach maturity at about 12 years and females at 18-19 years (Dovel and Berggren 1983). They are believed to spawn at intervals of about 3 years.

Tagging studies reported by Dovel and Berggren (1983) indicate that Atlantic sturgeon disperse over great distances and spend at least part of their lives in other estuary systems. Atlantic sturgeon tagged in the Hudson River have been recaptured as far north as Marblehead, Massachusetts, and as far south as Ocracoke. Many of the tags were returned by Delaware Bay and Chesapeake Bay commercial fisherman. Presumably, Atlantic sturgeon that spawned in other rivers and estuaries find their way into the Hudson River.

Mature male Atlantic sturgeon enter the Hudson estuary by early April, before water temperatures rise above 43°F, while mature females do not arrive until several weeks later (Dovel and Berggren 1983). Spawning begins when gravid females appear in upper Haverstraw Bay (RM 38), about mid-May, when temperatures are approximately 55°F. At this time the salt-front is typically in this vicinity. As the season progresses and the saltfront moves upriver, spawning also appears to move progressively upriver, but no farther than about Catskill (RM 113). Most spawning occurs between Croton Point (RM 35) and Hyde Park (RM 76) from May to August, usually in water over 25 ft deep. After spawning, females may remain in the estuary for four to six weeks before moving back to the ocean, while males may remain in the lower estuary for up to eight months (April through November).

Eggs are presumably broadcast into flowing water, becoming widely dispersed after fertilization. There is no evidence of parental care. The eggs are demersal and become strongly adhesive after about 20 min and attach to rocks, weeds, and other submerged objects (Gilbert 1989).

Based on the capture locations of larvae and juvenile sturgeon, the nursery area appears to be in the middle estuary (Hoff et al. 1988). Most, if not all, of the Atlantic sturgeon found in the estuary from December through March are immature individuals that congregate in the deep water (>25 ft) between the Bear Mountain Bridge and the George Washington Bridge.

Sturgeon feed by rooting along the bottom and "vacuuming" with their protrusible mouths. This results in a large amount of nonfood matter, mostly mud, in the stomach. Actual food items include mollusks, polychaete worms, gastropods, shrimp, isopods, amphipods, and small benthic fishes. Juvenile shortnose sturgeon typically prey on benthic crustaceans and insect larvae.

4.13.1 Early Life Stage Distribution

Eighteen Atlantic sturgeon PYSL were collected in the LRS in 1991. They were collected in the bottom stratum in Poughkeepsie and the channel stratum in Catskill in early to mid-June. Mean weekly water temperatures in the Poughkeepsie and Catskill regions during this time were 22° and 23°C, respectively; both collections occurred in fresh water. These are the first collections of early life stage Atlantic sturgeon in the LRS since 1973-1976, when a total of 46 larvae (22 YSL and 24 PYSL) were reported (Battelle 1983).

4.13.2 Young of Year Distribution

One YOY Atlantic sturgeon was collected in the 1991 LRS on 10 June in the Albany region. No YOY or earlier life stages were collected in the BSS or FJS (Figure 4-48).

4.13.3 Yearling and Older Fish Distribution

Seventeen yearling and older Atlantic sturgeon were collected in 1991 (Figure 4-49); all were released alive after sample processing. Ten were collected in the FJS and seven in the LRS. Atlantic sturgeon were collected sporadically from Indian Point to Albany and from early May to late October. The number of yearling and older collected is similar to the number collected in 1990 (LMS 1992). Both values are higher than recent years.

4.14 SHORTNOSE STURGEON

The shortnose sturgeon, *Acipenser brevirostrum*, is less widespread, ranging from the St. John River, New Brunswick, to the St. Johns River, Florida (Gruchy and Parker 1980b). Both the Atlantic and the shortnose sturgeons are similar in appearance. As adults, shortnose sturgeon can be distinguished from the Atlantic sturgeon by a shorter and blunter snout, wider mouth, and smaller size of the anal fin. Individuals over 4 ft long are invariably Atlantic sturgeon. Small sturgeon, under 2 ft, and especially larvae, are difficult to distinguish.

Although numerous studies have summarized the life history of Atlantic sturgeon since the late 1800s, little attention was paid to shortnose sturgeon, likely because of its limited commercial importance. With the listing of shortnose sturgeon as an endangered species in the United States

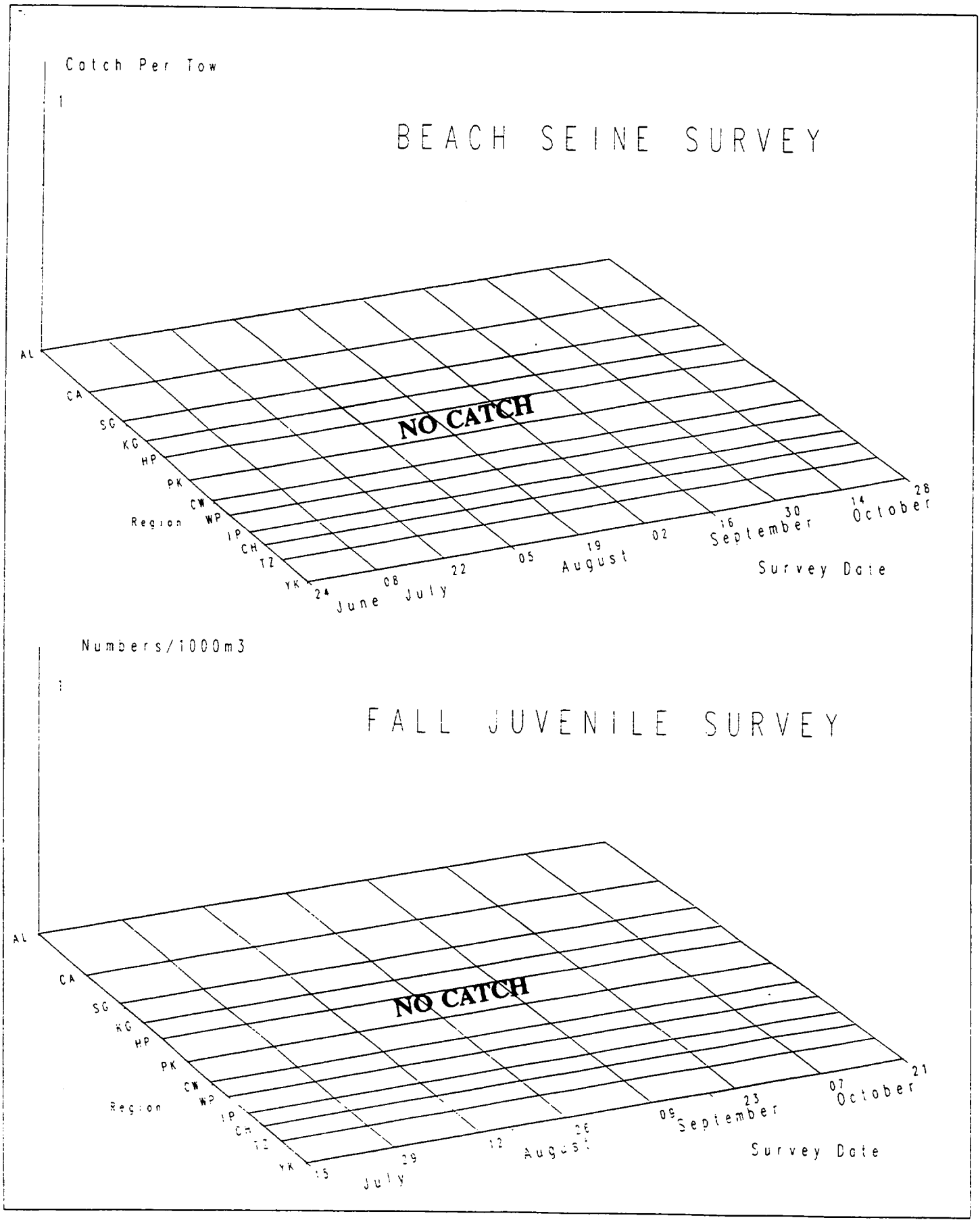

Figure 4–48. Spatiotemporal distribution of young–of–year Atlantic sturgeon in the Hudson River estuary based on the 1991 Fall Juvenile and Beach Seine River Ichthyoplankton Surveys.

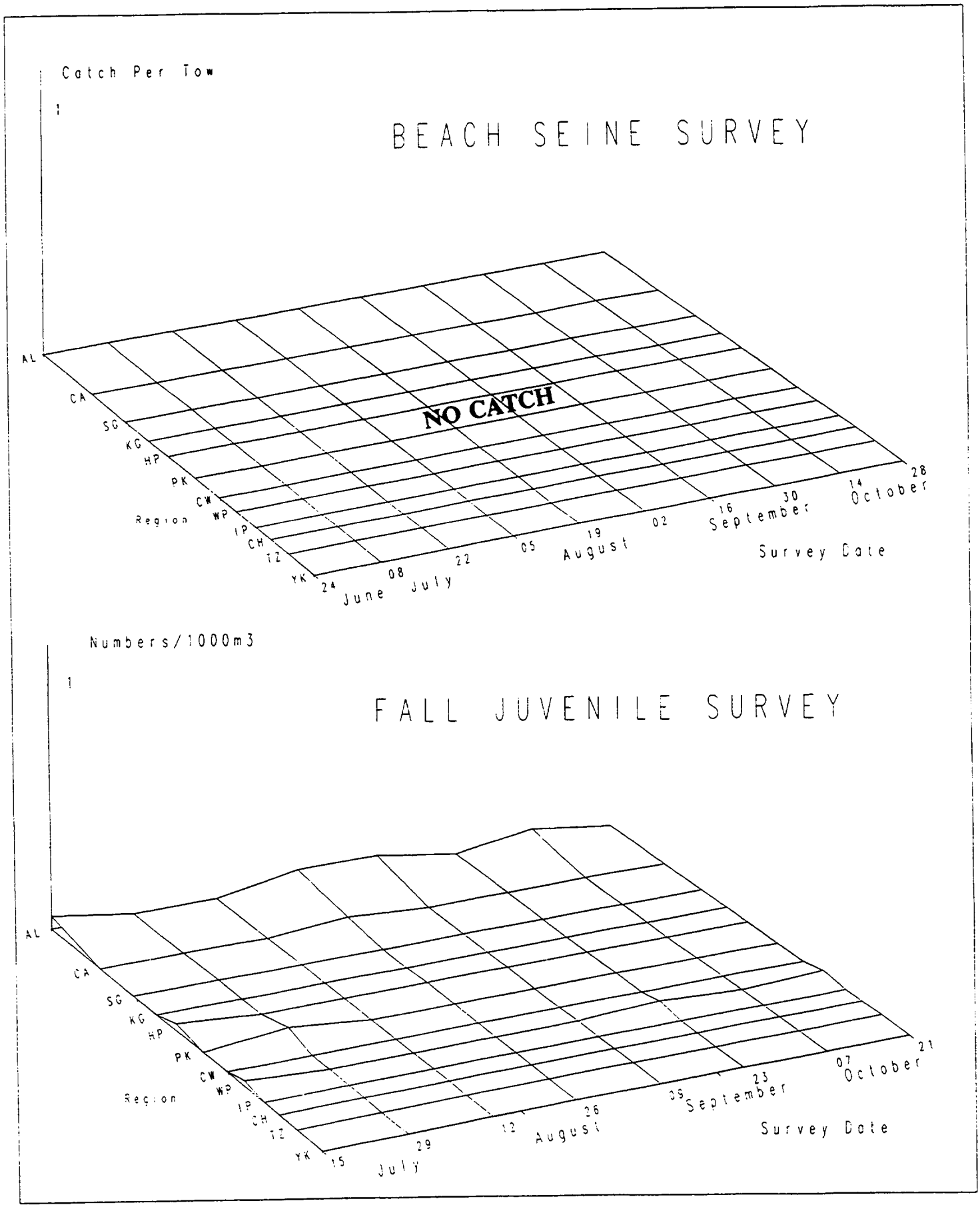

Figure 4–49. Spatiotemporal distribution of yearling and older Atlantic sturgeon in the Hudson River estuary based on the 1991 Fall Juvenile and Beach Seine River Ichthyoplankton Surveys.

and its classification as rare in Canada (Gorham and McAllister 1974), more effort has been directed toward understanding this species. The early life histories of these species remain relatively unknown due to the difficulty in distinguishing between the eggs, larvae, and YOY of the two species coupled with the infrequency of their capture.

Like Atlantic sturgeon, shortnose sturgeon are long-lived, slow-maturing fishes. In the Hudson River the maximum reported age for shortnose sturgeon is 37 years but the oldest known shortnose sturgeon is a 67-year-old female from St. John River, Canada (Gilbert 1989). Shortnose sturgeon do not reach sexual maturity until age 8-10 (Dovel and Berggren 1983) and appear to be nonannual spawners.

Shortnose sturgeon appear are closely linked to the estuary. Greeley (1937) stated that shortnose sturgeon were permanent residents of the freshwater portion of the Hudson River, with some movement into brackish waters. However, Dovel (1977), on the basis of barnacles found on the tags of three individuals, postulated that they did venture into marine waters. During their spawning migrations, shortnose sturgeon move upriver as far as accessible habitat permits (Dovel et al. 1992). Adult shortnose sturgeon reach the spawning grounds between Coeymans and Troy (RM 124-153) as early as the first week of April. After spawning, they move downriver to feed, some as far south as the Tappan Zee. From October through March they concentrate near Esopus Meadows (RM 87) and in deeper, warmer channel locations in Haverstraw Bay and the Tappan Zee.

Early growth is rapid. For shortnose sturgeon, larvae are approximately 0.7 in. in total length at the end of May and 4.9 to 5.1 in. by the end of July. By the end of their second summer, they average approximately 11.5 in. (Dovel et al. 1992). Dovel and Berggren (1983) reported that by the end of their second summer average size is 12.8 in. After about the third year of life, growth slows considerably. Greeley (1937) reported a maximum size of about 34 in. at 15 years for shortnose sturgeon while Dadswell et al. (1984) reported a maximum of approximately 35 in. at age 40. The largest shortnose sturgeon reported by Dovel et al. (1992) was a 3.5-ft specimen that weighed 23.6 lb.

Juvenile shortnose sturgeon appear to overwinter in the Esopus Meadows region. Dovel et al. (1992) also reported collecting a few Atlantic sturgeon from this location.

Dadswell et al. (1984) reported that whether each river population of shortnose sturgeon is distinct from the others must await future studies. He noted, however, that southern populations may mix in the sea while northern populations appear confined to their separate drainage systems. Shortnose sturgeon move considerable distances within the Hudson River, but appear rarely to migrate to the ocean or to neighboring systems.

Although a century ago shortnose sturgeon were harvested along with Atlantic sturgeon, they are no longer harvested due to their protected status as an endangered or threatened species.

4.14.1 Young of Year Distribution

No YOY or earlier life stages of shortnose sturgeon were collected in any of the 1990 sampling programs.

4.14.2 Yearling and Older Fish Distribution

Twenty-seven shortnose sturgeon were captured during 1991; all were yearling or older (Figure 4-50) and were released alive after sample processing. Shortnose sturgeon were collected in the Tappan Zee through Albany regions form early May through late October. No shortnose sturgeon were collected in the BSS.

4.14.3 Unidentified Sturgeon

Seven unidentifiable sturgeon PYSL were collected in early May in Albany in the 1991 LRS. In addition, two yearling sturgeon were collected in Albany during early June and could not be identified.

4.15 RAINBOW SMELT

The rainbow smelt are greenish, slender, salmon-like fish with deeply forked tails. They occur along the Atlantic coast from Labrador to the Delaware River, along the Arctic Coast, and along the coasts of Alaska and British Columbia. They are landlocked naturally in many lakes and ponds in Canada, Maine, and New Hampshire and have been introduced to other landlocked freshwaters. Within New York State rainbow smelt are found in the Hudson River, Long Island streams, several Adirondac lakes, and the Great Lakes (Smith 1985).

Anadromous rainbow smelt may spend the whole year in or near estuaries. In the fall they move into the bays and estuaries. Rainbow smelt spawn in tributaries in spring when the water temperature reaches 48°F. Even landlocked populations continue to migrate from their lake habitats to tributary streams to spawn. Spawners move into the lower reaches of streams in the evening, spawn at night, and move out in the day. Adult smelt leave the tributaries immediately after spawning. They spawn where water velocities are high, and larval survival decreases where water velocities are low (Buckley 1989). In the summer adults move to deeper, cooler water just outside bays and estuaries.

Adult smelt usually average 7 to 8 in. in total length, but occasionally reach lengths of 13 to 14 in. Female smelt grow faster than males and may reach maturity as early as age 1 along the southern edge of their range. However, maturity occurs more commonly at ages 2 through 5. The number of eggs produced by an adult smelt may range from 7000 to 70,000.
The eggs are approximately 1/16 in. or less in diameter and sink to the bottom, where they stick in clusters to pebbles or whatever they happen to touch (Bigelow and Schroeder 1953). In the Hudson River rainbow smelt eggs are most abundant in the ichthyoplankton catches from the upper estuary from RM 107 to RM 124. They hatch in about a week to almost a month,

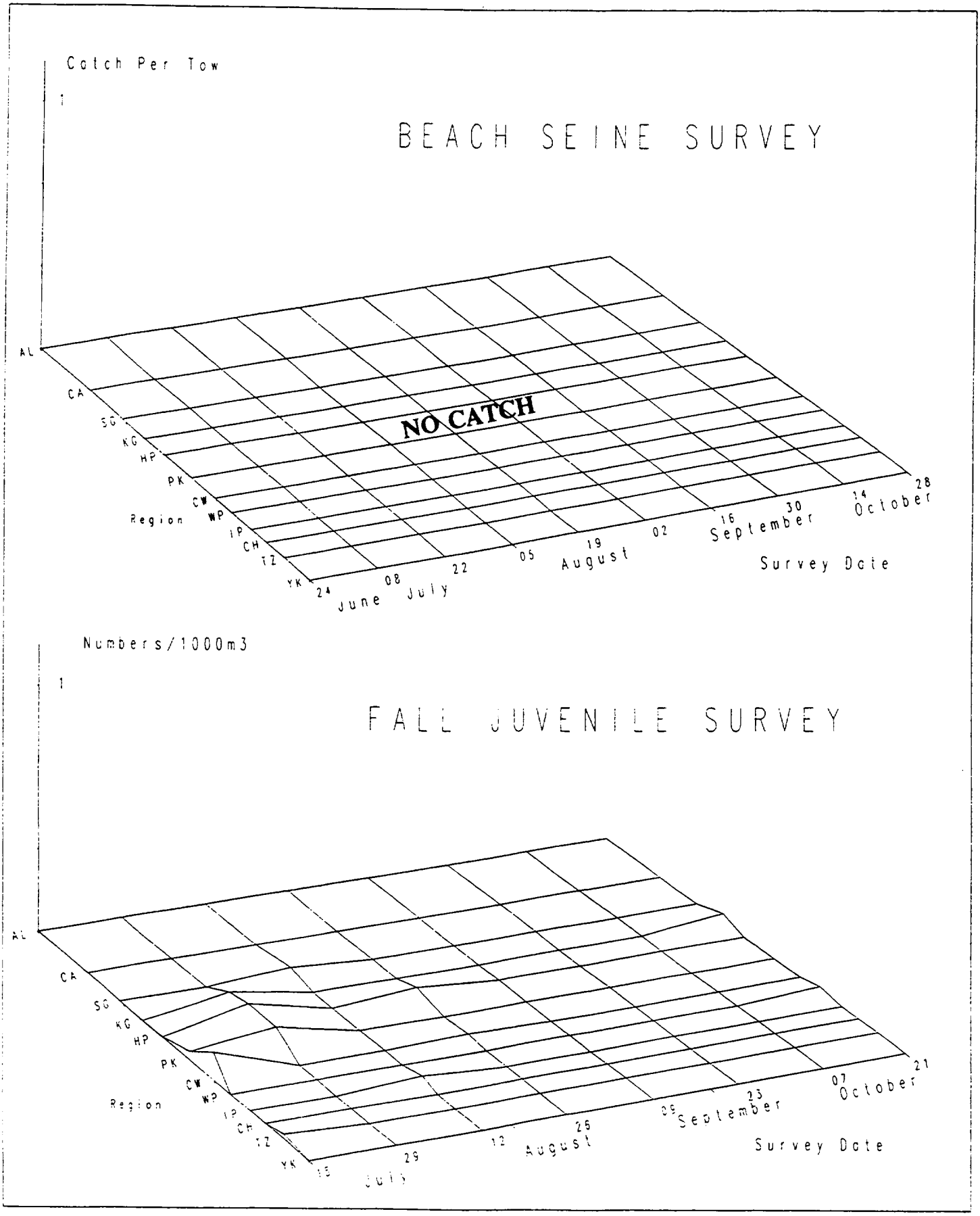

Figure 4–50. Spatiotemporal distribution of yearling and older shortnose sturgeon in the Hudson River estuary based on the 1991 Fall Juvenile and Beach Seine River Ichthyoplankton Surveys.

depending on temperature, and eggs are present in the Hudson River ichthyoplankton catches for about two weeks, which suggests a short spawning period.

Newly hatched larvae are about 1/5 in. long. These larvae are carried downstream and out of the tributaries by current flows. YSL are abundant from the first week through the third week in May and are fairly uniformly distributed downriver from RM 106 to RM 56. The yolk sac is absorbed when the fish are about ¼ in. in length. PYSL are commonly found from RM 106 to RM 23, and are abundant from the third week in May through the second week in June. As rainbow smelt larvae grow, they move closer to the bottom during the day and move back toward the surface at night, probably to feed on zooplankton, which exhibit similar vertical migrations in the water column.

Juvenile rainbow smelt are abundant in the LRS catches from the third week in June through the first week in July. Juvenile smelt are exceedingly slender and nearly transparent. At about ¾ in. they begin to school. Juvenile rainbow smelt move into shallow water at night and back to deep channels during the day (Buckley 1989). They grow quickly and are at least 2 in. long by August. The older juveniles are most abundant in the lower estuary, RM 24 to RM 33, but are common from RM 33 to RM 61. By late summer the young smelt leave the estuary.

Yearling and older smelt gather in brackish estuaries and may move into and out of small harbors with the tides. They generally do not move much more than a mile offshore or to depths greater than 20 ft. Smelt overwinter in estuaries between harbor mouths and brackish water (Bigelow and Schroeder 1953).

Though smelt may prefer small crustaceans, polychaetes and small fish can be important parts of the diet. Smelt also eat young herring, mummichogs, cunners, anchovies, sand lance, stickleback, silversides, anchovies, shellfish, squid, and crabs. Young smelt eat copepods and other small crustaceans (Smith 1985). Adult rainbow smelt are preyed upon by striped bass, bluefish, harbor seals, and other large predators (Buckley 1989).

Rainbow smelt stocks are generally confined to their natal estuaries and nearby coastal areas. Bigelow and Schroeder (1953) concluded that rainbow smelt move down the river to the lower part of the estuary or to nearshore coastal waters as they grow, and they reported that smelt have never been observed or captured much more than 1 mile from shore or in depths greater than 20 ft. Rainbow smelt exploited in the Parker River system in Massachusetts (Murawski et al. 1980) appeared to remain within the river system, even though they may not have returned to their natal streams. Rupp (1968) reported that rainbow smelt stocks did "wander" among rivers during spawning in a Maine estuary, although this behavior was seen only occasionally in the Miramachi River in New Brunswick, Canada (McKenzie 1964). Frechet et al. (1983) concluded that the degree of homing to natal rivers was inversely related to the distance between rivers within a specific geographic area, such as an estuary. Therefore, it is unlikely that rainbow smelt of Hudson River origin contribute significantly to other coastal stocks.

4.15.1 Egg Distribution

Rainbow smelt eggs were not collected during the 1991 LRS (Figure 4-51).

4.15.2 Yolk-Sac Larvae Distribution

Rainbow smelt YSL were collected only in three weeks of the LRS (22 April through 12 May), with peak abundance occurring during the week of 6 May in the Croton-Haverstraw region (Figure 4-51). YSL were found (2/1000 m^3) in middle and lower estuary reaches. In 1990 collections, YSL were collected primarily in the middle and upper reaches of the river.

4.15.3 Post Yolk-Sac Larvae Distribution

PYSL rainbow smelt were first collected in the LRS during the week of 22 April. The greatest densities were recorded between late May and mid-June, with peak densities occurring the week of 27 May in Cornwall, the week of 3 June in West Point, and 10 June in Indian Point. There appears to be a downriver shift in distribution from the first peak as time proceeds. PYSL were collected from Yonkers through Kingston (the Battery region was not sampled during the period of peak yolk-sac abundance).

4.15.4 Young of Year Distribution

In the LRS, rainbow smelt YOY were first collected the week of 3 June and were found in catches through late August (Figure 4-52). Most YOY were collected in late June/early July in the region from Yonkers to Croton-Haverstraw. One peak (20/1000 m^3) was collected in the West Point region during early June. Rainbow smelt YOY were collected sporadically in the 1991 FJS. Highest densities were observed the first week of sampling (15 July) and YOY were collected from the Yonkers through Poughkeepsie regions. No YOY were collected in the BSS.

4.15.5 Yearling and Older Distribution

No yearling and older rainbow smelt were collected in the 1991 BSS (Appendix C). Yearling and older rainbow smelt were collected sporadically throughout the 1991 FJS. Collections occurred from West Point through Kingston.

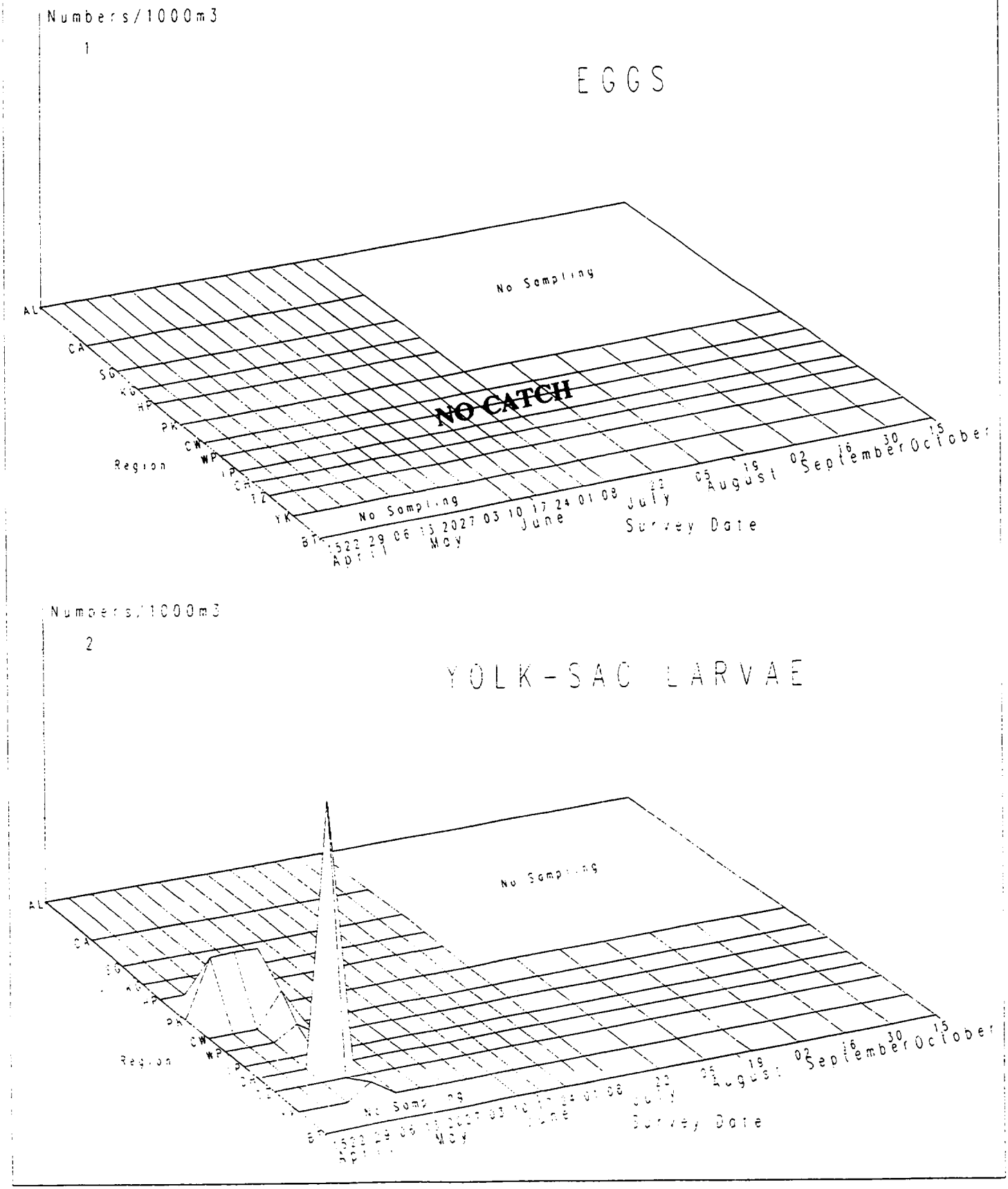

Figure 4–51. Spatiotemporal distribution of egg and yolk–sac stages of rainbow smelt in the Hudson River estuary based on the 1991 Long River Ichthyoplankton Survey.

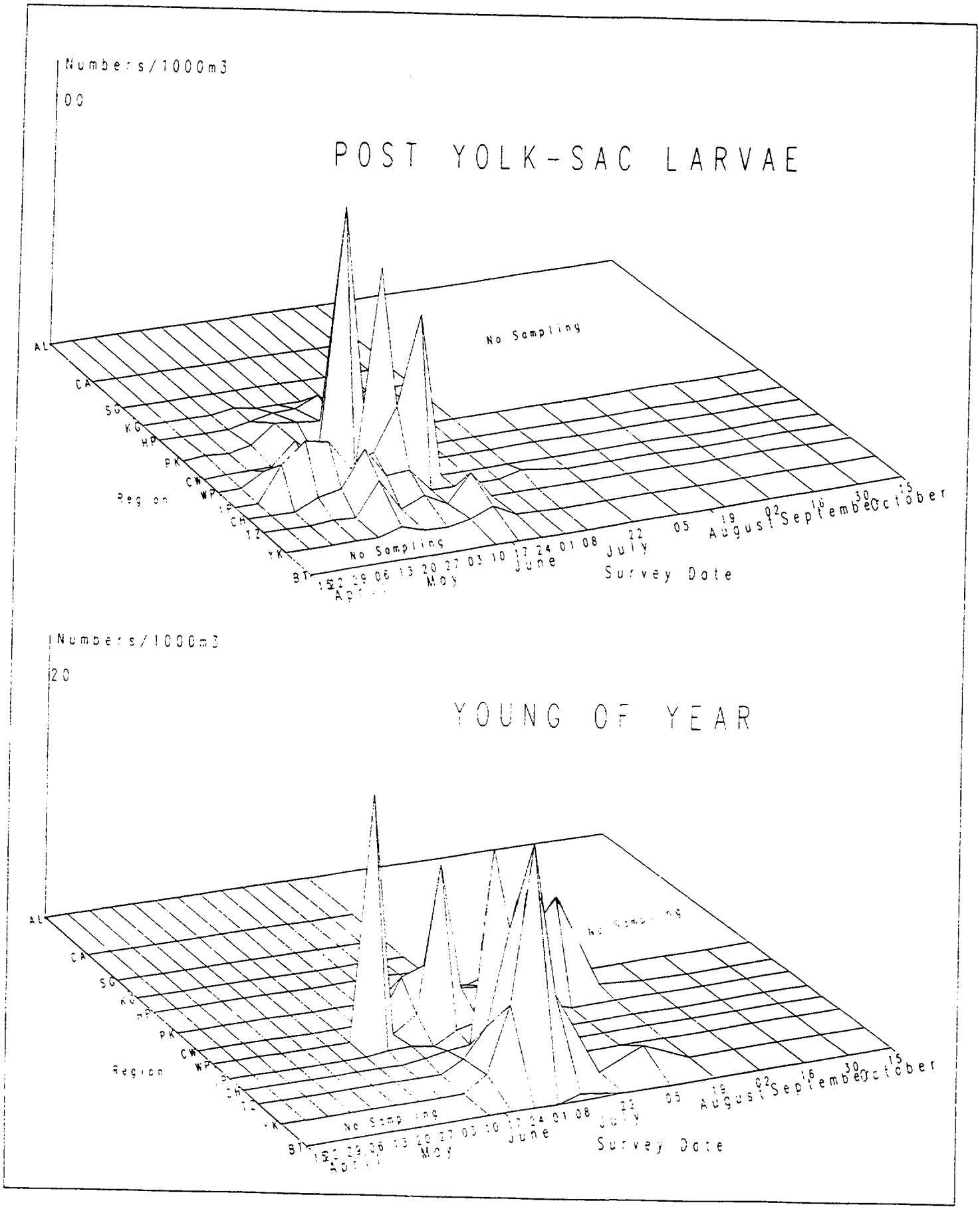

Figure 4–52. Spatiotemporal distribution of post yolk–sac and young–of–year stages of rainbow smelt in the Hudson River estuary based on the 1991 Long River Ichthyoplankton Survey.

CHAPTER 5
YOUNG OF YEAR ABUNDANCE INDICES

OMITTED

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 that can be affected by a variety of biotic and abiotic 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 growth patterns of larval and young of year striped bass, white perch, American shad, alewife, and blueback herring in the Hudson River estuary during 1991. 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 1991 are presented in Appendix E.

6.1 STRIPED BASS

In 1991 the median length of larval and young of year striped bass increased from 4.0 mm in late April/early May to 87 mm in late October (Figure 6-1). The small median length is based on only nine 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 2.2 mm and the largest was 150 mm. The 25th and 75th percentiles for the young of year lengths were generally within 10-15 mm of the median value in each week. This general uniformity in length at any point in time in addition to the relatively brief period of peak yolk-sac abundance (one to two weeks) suggests that growth rates among most individuals was relatively similar.

The seasonal pattern of growth for larval and young of year striped bass during 1991 was typical of that for previous years. Median lengths appeared to increase exponentially through late July/early August, when growth rates reached their peak. This period of maximum growth occurred just prior to the period of highest water temperatures (>26°C, 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).

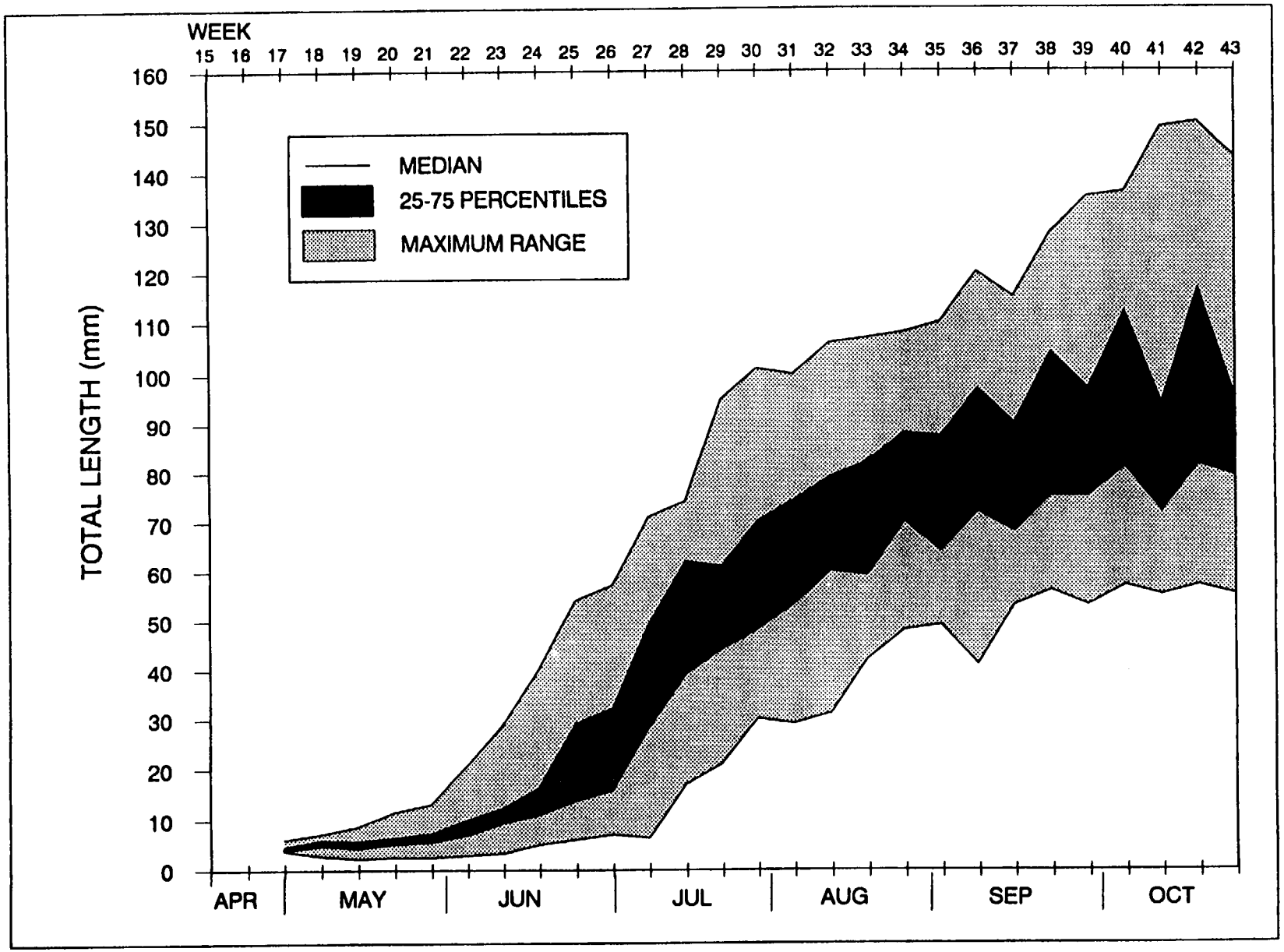

Figure 6-1. Weekly length statistics for striped bass larvae and young of year in the Hudson River estuary, 1991.

The rate of growth appears to start slowing in mid-July (Figure 6-1), when regional water temperatures ranged from 26.1 to 28.7 °C in the shore zone areas and 25.9 to 27.8°C in the river proper. By mid- to late October, growth appeared to be ceasing and water temperatures declined to around 14-15°C. Beginning in mid-August and continuing through October, weekly mean lengths alternated from higher to lower with mean lengths from the FJS (Figure 6-2, even week numbers ≥28) consistently higher than those measured in the BSS/LRS combined catches (Figure 6-2, odd week numbers ≥25; week 43 is BSS only). A similar pattern with mean lengths in the FJS being higher than BSS catches has been observed in previous years for striped bass (LMS 1989, 1992; EA 1991). In addition, mean length in BSS/LRS catches appeared to reach a plateau toward the end of October, whereas mean length in the FJS still increased.

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 1991 (Figure 6-2). Based on the resulting equation (K = 91.986; A = 4.4697; R = 0.046), the young of year striped bass population was estimated to have reached mean lengths of 30 and 60 mm (TL) on 4 July and 27 July, respectively (Table 6-1). Mean hatch date (16 May) was set to the midpoint of the week of peak egg abundance (peak yolk-sac larval abundance occurred the following week). Based on these end points, larval growth (4-30 mm) was estimated to be 0.5 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.

Using only the BSS data, a log-linear model was fit to the 1991 weekly estimated mean lengths when mean lengths were between 30 and 65 mm (includes the first week when total length exceeded 60 mm) to estimate size-specific growth rates in a manner consistent with previous years (Figure 6-2). Based on the resulting equation ($\ln Y = 2.556 + 0.016[t]$), the young of year population was estimated to have reached 30 and 60 mm (TL) on 23 June and 5 August, respectively. Based on these two points and the assumed mean hatch date (time of peak egg abundance - 16 May), larval and young of year growth rate was estimated to be 0.7 mm/day (Table 6-1). The larval and young of year growth rates estimated using the log-linear model were within the ranges reported for previous years.

6.2 WHITE PERCH

The median length of larval and young of year white perch increased from 3.3 mm (larger 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 to 90 mm in late October 1991) (Figure 6-3). The smallest individual reported was 1.0 mm and the largest was 100 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 1991 was typical of previous years. Median lengths appeared to increase exponentially through late July, when growth rates were at their peak and regional water temperatures were around 26-27°C. This period of maximum growth occurred during the period of highest water temperatures (Section 3.3). The water temperatures at which maximum growth occurs for

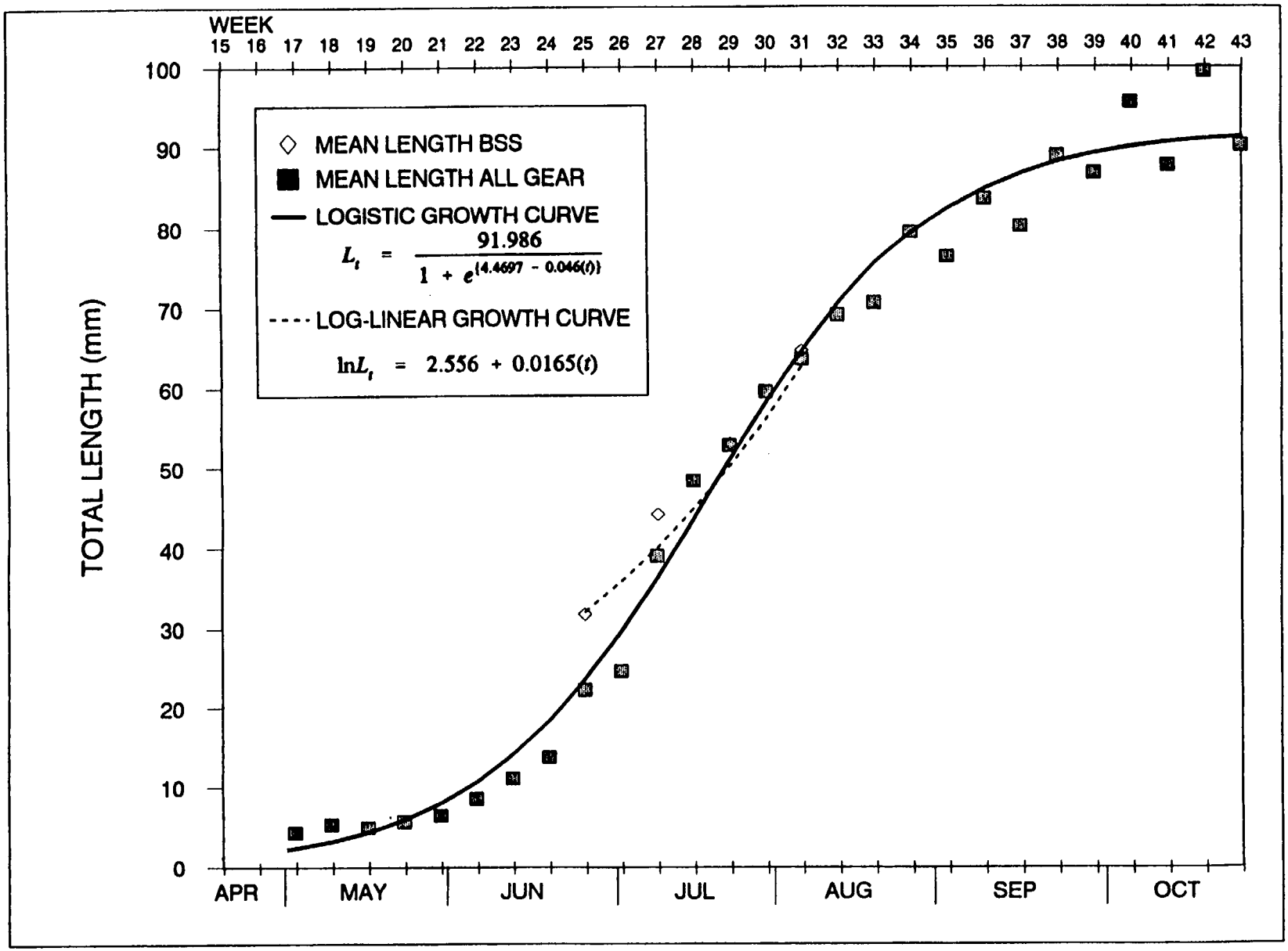

Figure 6-2. Weekly mean lengths and estimated logistic and log-linear growth curves for larval and young of year striped bass in the Hudson River estuary, 1991.

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
1991	16 MAY - 23 JUN	0.7	23 JUN - 05 AUG	0.7
1991[c]	16 MAY - 04 JUL	0.5	04 JUL - 27 JUL	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.

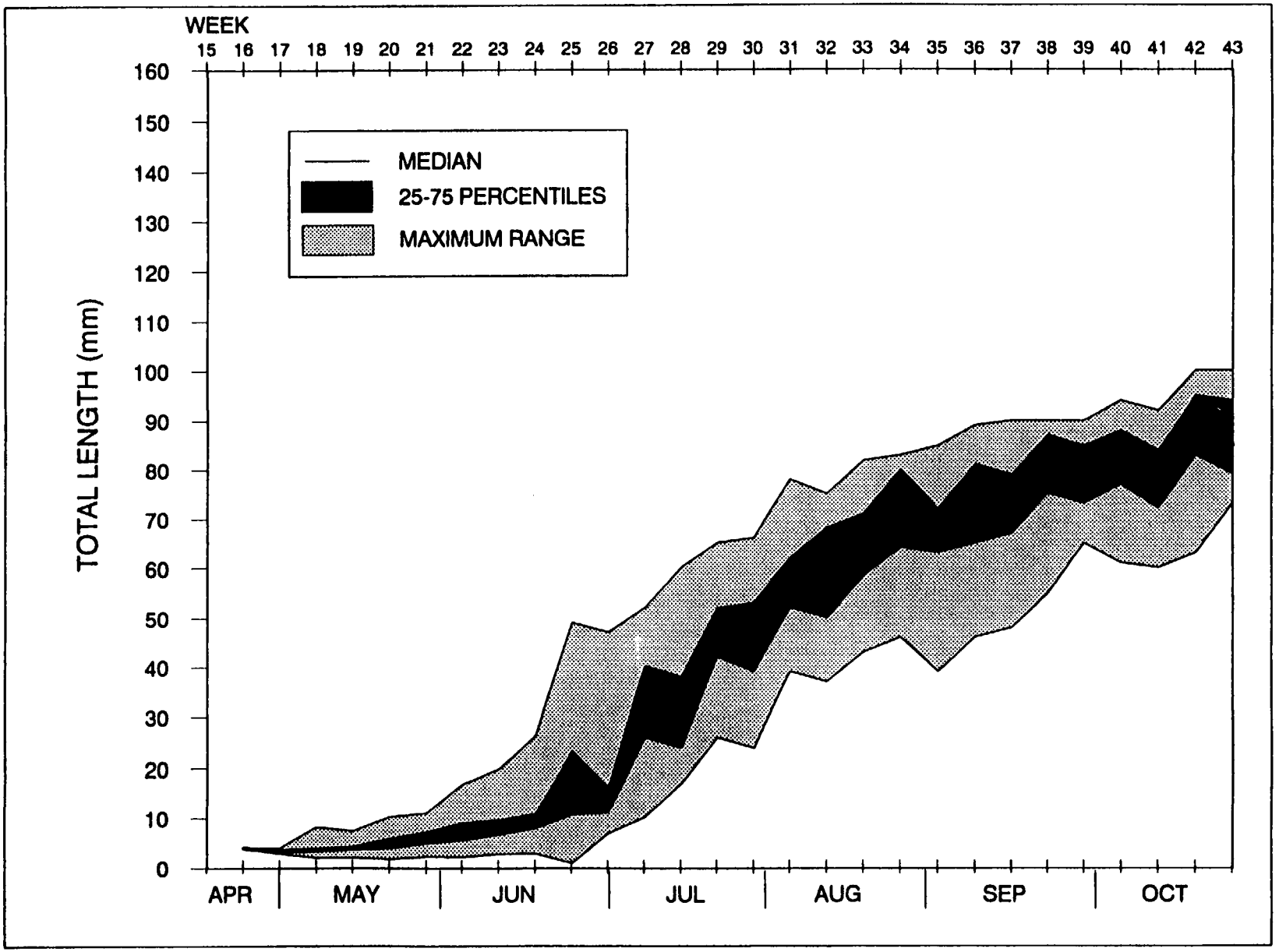

Figure 6-3. Weekly length statistics for white perch larvae and young of year in the Hudson River estuary, 1991.

young of year white perch has been reported to be 29.7°C (EA 1978), which is higher than temperatures reported in 1991.

The rate of growth appeared to start slowing in late July/early August, when water temperatures began were at the peak in the upper regions (Table B-5). Mean lengths during October ranged from 78 to 88 mm, which are on the upper end of reported values for previous years in October (TI 1981; MMES 1986; Versar 1987; LMS 1989, 1992; EA 1990). During the period of maximum growth, mean lengths in the BSS during weeks 25 and 27 (Figure 6-4) were higher than the combined LRS/BSS catch values (week 25 and 27) or the alternate week LRS catch alone (week 26). Starting in the fall (late August) weekly mean catch lengths alternated from lower to higher, with mean lengths from the FJS consistently higher than those measured in the combined BSS/LRS catch (odd number weeks ≥25 on Figure 6-4) and the BSS alone (week 43). The length and growth rate estimates will be influenced by size-related emigration and/or gear avoidance.

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 1991 (Figure 6-4). Based on the resulting equation (K = 83.415; A = 4.7309; R = 0.046), the young of year white perch population was estimated to have reached mean lengths of 25 and 60 mm (TL) on 7 July and 15 August, respectively (Table 6-2). Mean hatch date (16 May) was assumed to be the midpoint of peak yolk-sac larval abundance (13 May - 25 May). Based on these end points, larval growth rate (3-25 mm) was estimated to be 0.5 mm/day, while young of year growth rate (25-60 mm) was estimated to be 0.9 mm/day. The larval growth rate in 1991 was the second highest reported for the logistic model estimates (Table 6-2). The young of year growth rate was within the range previously reported for logistic model estimates.

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 1991 in a manner consistent with previous years (Figure 6-4). Based on the resulting equation ($\ln Y = 2.303 + 0.018[t]$), the young of year population was estimated to have reached 25 and 60 mm (TL) on 7 July and 9 August, respectively. Based on these two points and the assumed mean hatch date (20 May), the larval growth rate was estimated to be 0.7 mm/day and the young of year growth rate was estimated to be 0.7 mm/day (Table 6-2), the same as observed in 1975 (Table 6-2). The estimated larval and young of year growth rates were within the reported ranges for previous years (Table 6-2).

6.3 AMERICAN SHAD

The median length of larval and young of year American shad increased from 6.2 mm in early May to 98 mm in October 1991 (Figure 6-5). The smallest individual reported was 6.2 mm and the largest was 129 mm. The 25th and 75th percentiles for the young of year lengths were generally within 10 mm of the median value in each week. This general uniformity in length at any point in time in addition to the relatively brief period of peak yolk-sac larvae abundance (one to two weeks) suggests that growth rates among a majority of individuals was relatively similar.

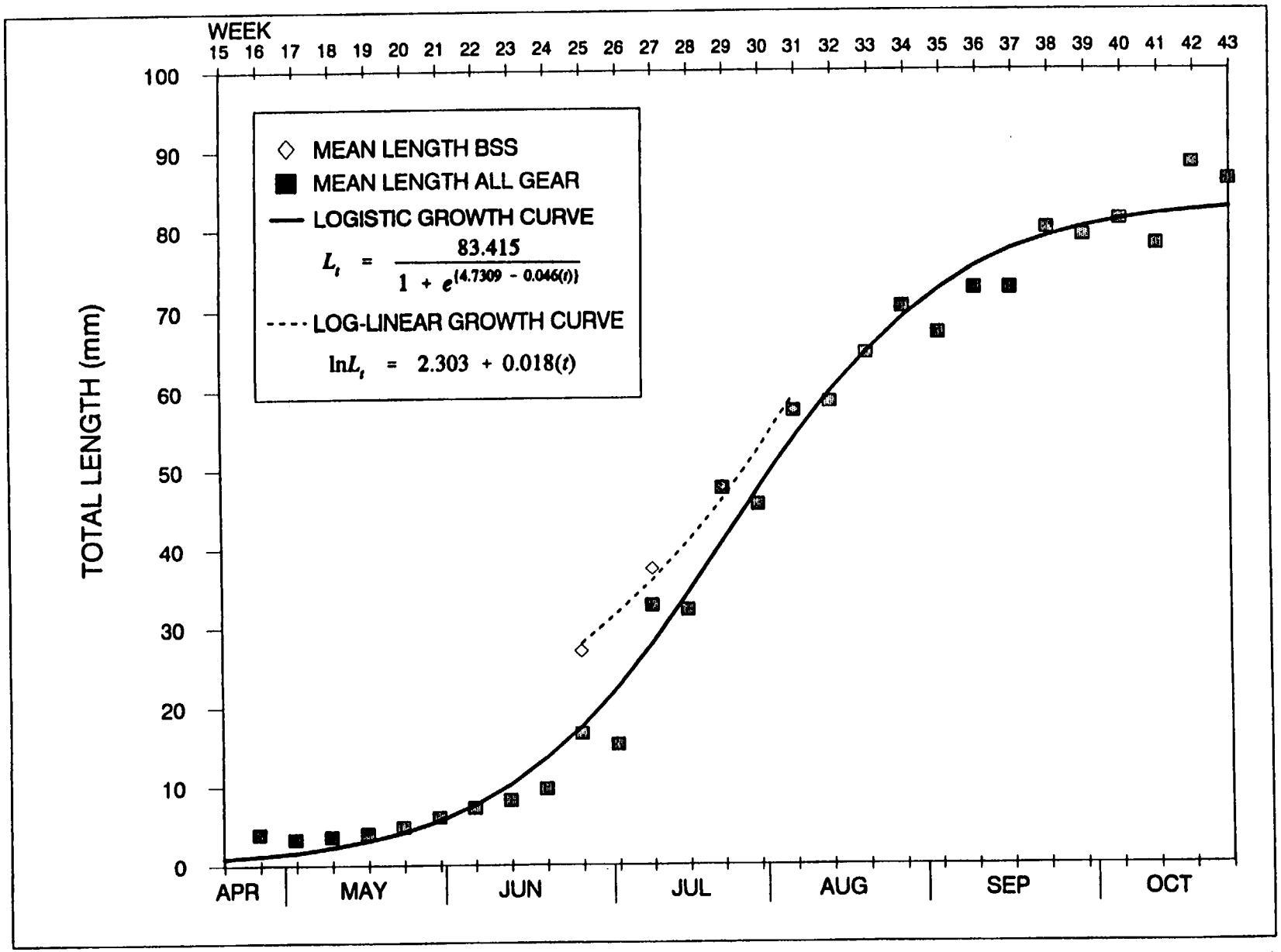

Figure 6-4. Weekly mean lengths and estimated logistic and log-linear growth curves for larval and young of year white perch in the Hudson River estuary, 1991.

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]

Year	Larvae and Early Young of Year		Young of 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
1991	20 MAY - 21 JUN	0.7	21 JUN - 09 AUG	0.7
1991[c]	20 MAY - 07 JUL	0.5	07 JUL - 15 AUG	0.9

[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.

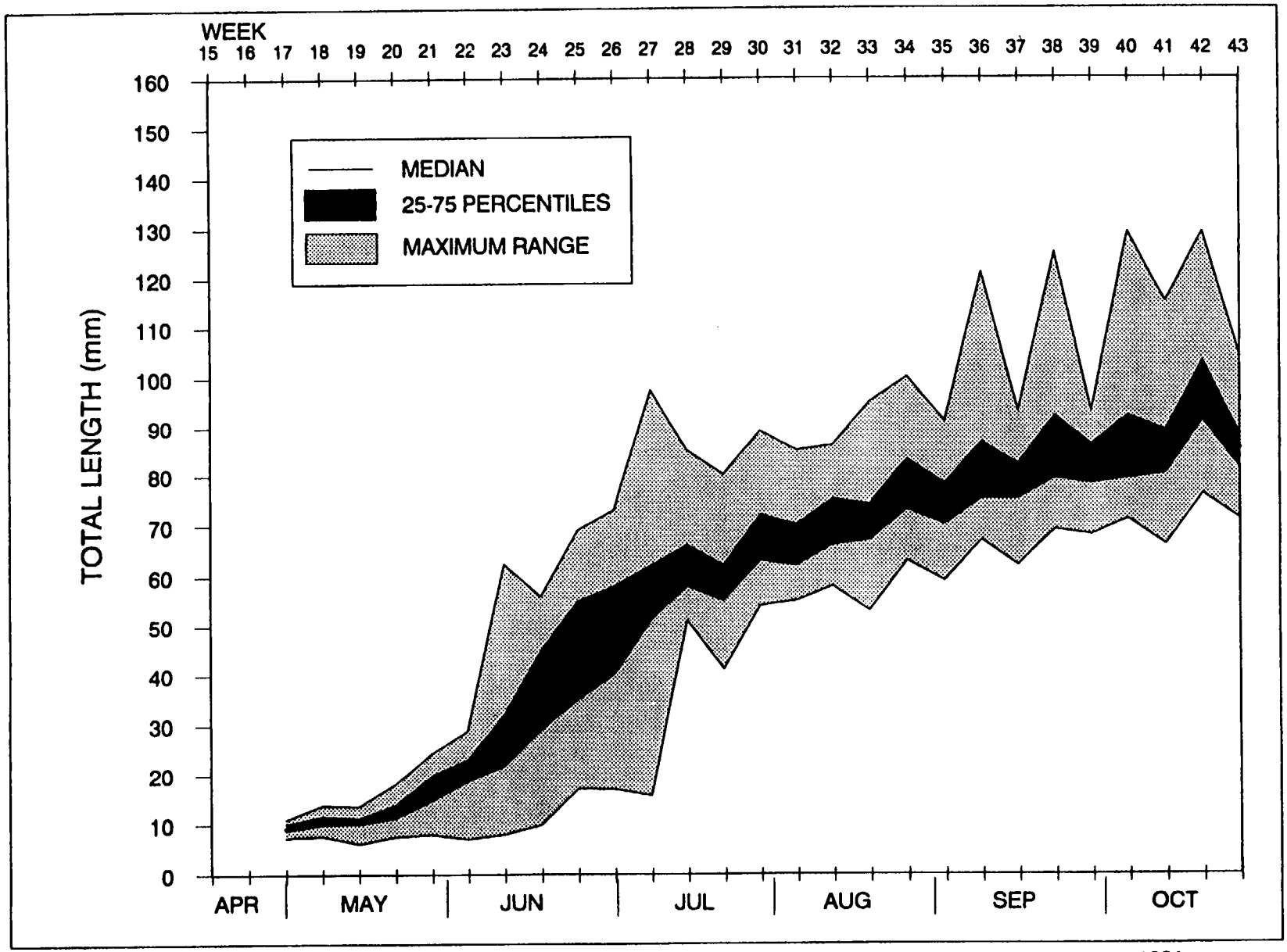

Figure 6-5. Weekly length statistics for American shad larvae and young of year in the Hudson River estuary, 1991.

The seasonal pattern of growth for larval and young of year American shad during 1991 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 just prior to the period of highest water temperatures (Section 3.3).

The rate of growth appeared to start slowing in July as water temperatures reached their peak and began to decrease. Growth appeared to start ceasing in late October as water temperatures declined to 14-15°C. Mean lengths during October ranged from 85 to 97 mm, values that were within the range reported for previous years (MMES 1986; Versar 1987; LMS 1989, 1992; EA 1990). Beginning in mid-July and continuing through October, weekly mean lengths alternated from higher to lower with mean lengths from the FJS being consistently higher than those measured in the combined BSS/LRS catches. Length and growth rates estimates are likely affected by size-related migration, distribution, and or gear avoidance.

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 1991 (Figure 6-6). Based on the resulting equation (K = 86.706; A = 2.9537; R = 0.0138), the young of year American shad population was estimated to have reached mean lengths of 30 and 60 mm (TL) on 13 June and 21 July, respectively (Table 6-3). Mean hatch date (16 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) and young of year growth (30-60 mm) were estimated to be 0.8 mm/day. The larval growth rate estimated using the logistic model was the highest recorded (Table 6-3); the young of year rate was within the range previously reported (Table 6-3).

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 during 1991 in a manner consistent with previous years (Figure 6-6). Based on the resulting equation ($\ln Y = 2.044 + 0.026[t]$), the young of year population was estimated to have reached 30 and 60 mm (TL) on 22 June and 19 July, respectively. Based on these two points and the assumed mean hatch date (16 May), larval growth rate was estimated to be 0.6 mm/day; young of year growth rate was estimated to be 1.1 mm/day (Table 6-3). The larval growth rate estimate was similar to that reported for the past few years; the young of year growth rate was the highest reported using the log-linear model (Table 6-3).

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 1991. When first collected as identifiable, the median length of young of year alewife was 44 mm and increased to 91 mm in 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 35 mm and the largest was 108 mm. The 25th and 75th percentiles for young of year lengths were

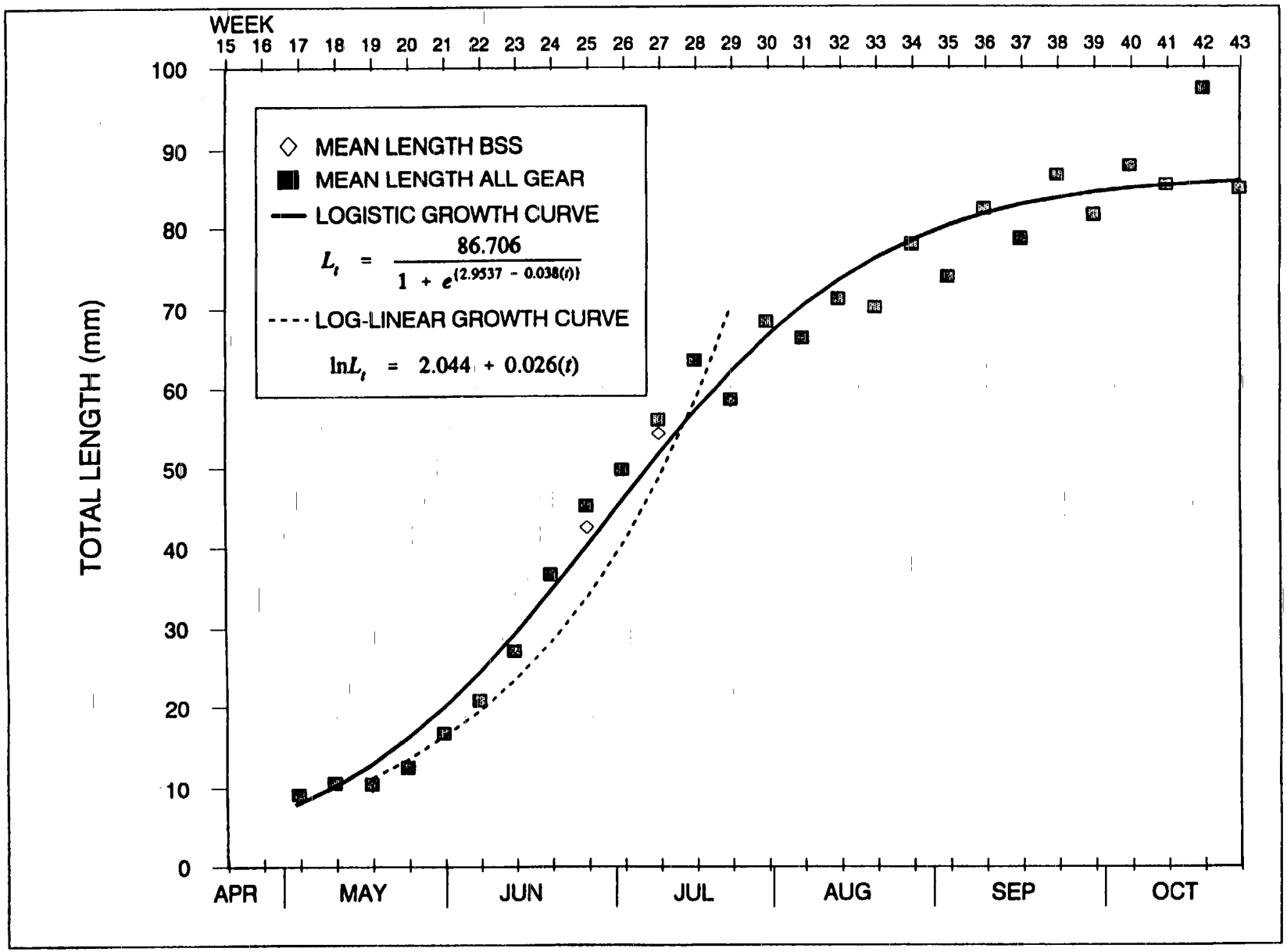

Figure 6-6. Weekly mean lengths and estimated logistic and log-linear growth curves for larval and young of year American shad in the Hudson River estuary, 1991.

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

Year	Larvae and Early Young of Year		Young of 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
1991[a]	16 MAY - 22 JUN	0.6	22 JUN - 19 JUL	1.1
1991[b]	16 MAY - 13 JUN	0.8	13 JUN - 21 JUL	0.8

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

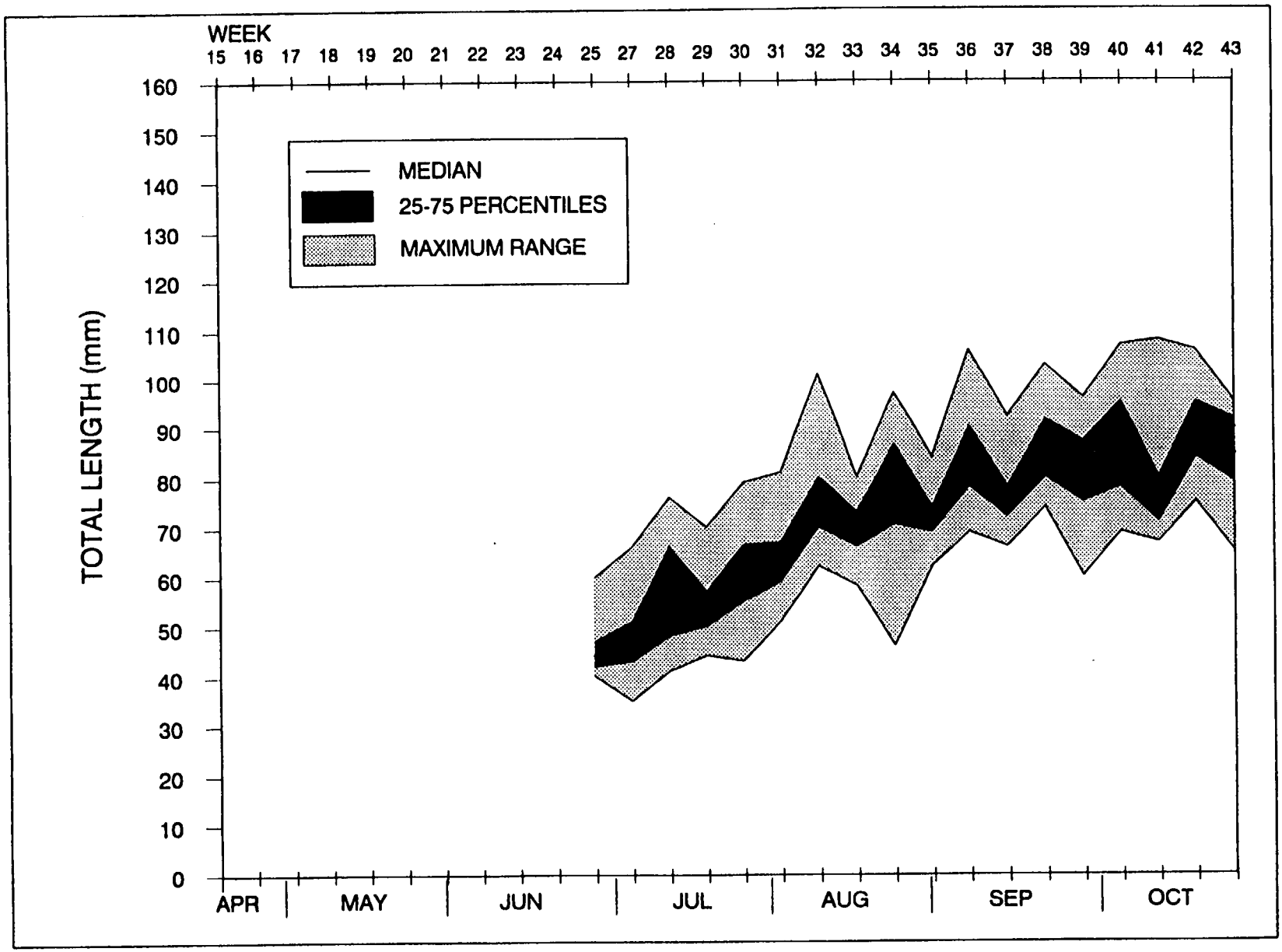

Figure 6-7. Weekly length statistics for alewife young of year in the Hudson River estuary, 1991.

generally within 10 mm of the median value for each week, suggesting a similarity in individual growth rates.

The seasonal pattern of young of year growth suggested by these median length values indicates that by the time alewife were uniquely identifiable, growth rates were close to the summer peak or were beginning to decline. Water temperatures ranged from 24.7 to 25.9°C in the regions of highest abundance during this time. The water temperature at which maximum growth occurs has been reported to be 26.4°C (EA 1978). Water temperatures reached 26°C in late July.

Growth appeared to be ceasing in late October. As with the other species discussed, a weekly alternating pattern of high FJS and low BSS/LRS median lengths was apparent and likely influenced the length and growth estimates. During October, mean length estimates for young of year alewife ranged from 71 to 84 mm.

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 in late June 1991. When first collected, the median length of young of year blueback herring was 42 mm and increased to 77 mm in 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 36 mm and the largest was 95 mm. The 25th and 75th percentiles for young of year lengths were generally within 5 mm of the median value for each week, suggesting a similarity 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. 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 throughout the end of the sampling period. During October, mean length estimates for young of year blueback herring ranged from 72 to 77 mm. These values are lower than those 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.

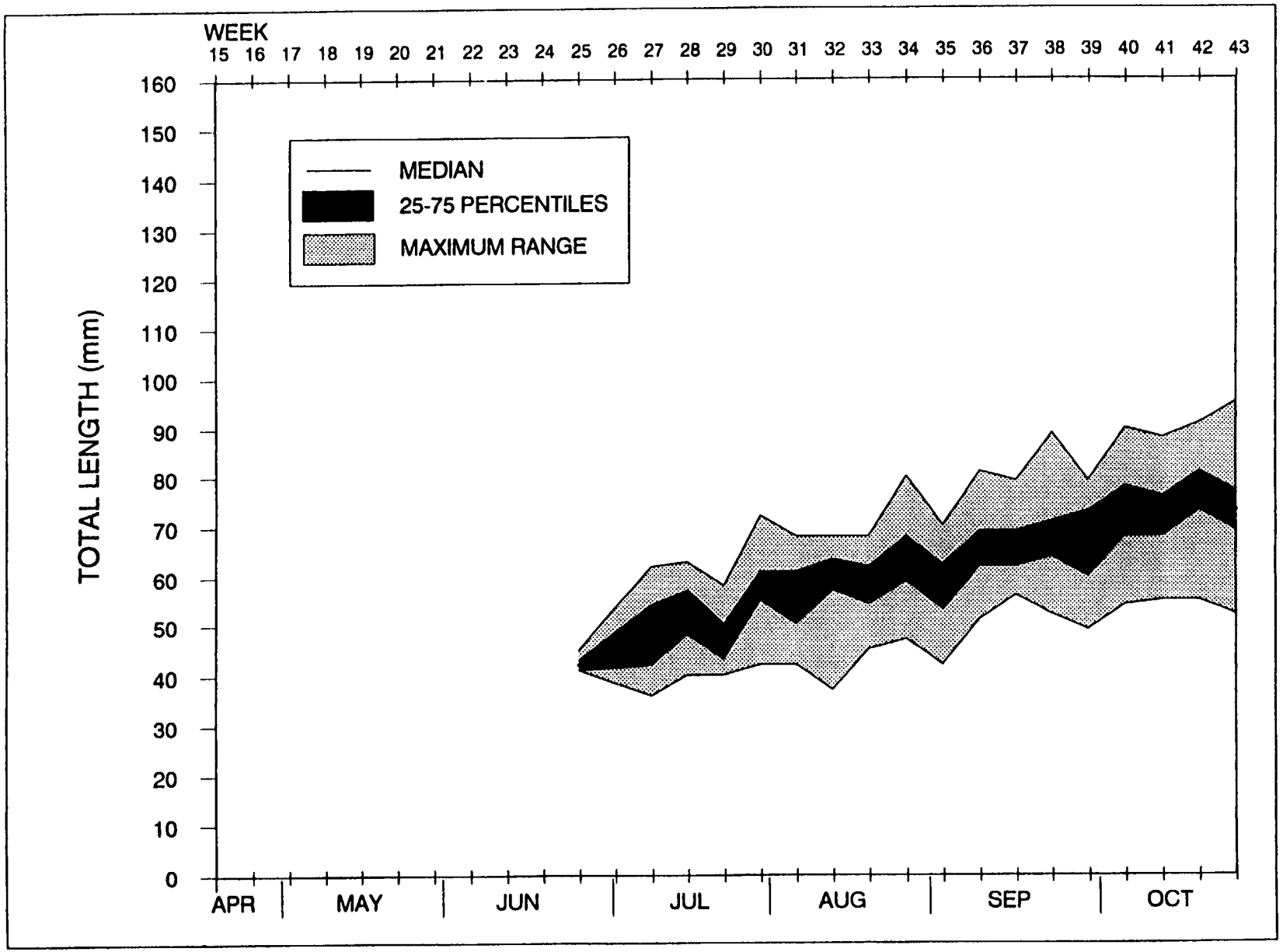

Figure 6-8. Weekly length statistics for blueback herring young of year in the Hudson River estuary, 1991.

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APPENDIX A

BIBLIOGRAPHY OF THE UTILITIES AND NYSDEC HUDSON RIVER BIOMONITORING TECHNICAL REPORTS AND RELATED MANUSCRIPTS

APPENDIX A.1

BIOMONITORING TECHNICAL REPORTS

Enclosure 1

Biological Monitoring Reports

Listing is grouped by the following categories:

I. Impingement

- A. Indian Point Monitoring
- B. Bowline Point Monitoring
- C. Roseton and Danskammer Point Monitoring
- D. Impingement Special Studies

II. Entrainment

- A. Indian Point Monitoring
- B. Bowline Point Monitoring
- C. Roseton and Danskammer Point Monitoring
- D. Entrainment Special Studies

III. Fish Stock Assessment

- A. General
- B. Striped Bass
- C. White Perch
- D. Atlantic Tomcod
- E. Gear Evaluation

IV. Striped Bass Hatchery

- A. Hatchery Production
- B. Hatchery Evaluation

V. Outage and Flow Restriction Evaluation

VI. Miscellaneous

I. Impingement

A. Indian Point Monitoring

Hudson River Ecological Study in the Area of Indian Point.
1990 Annual Report.
Lawler, Matusky & Skelly Engineers, October 1991.

Hudson River Ecological Study in the Area of Indian Point.
1989 Annual Report.
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I. Impingement

B. Bowline Point Monitoring

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C. Roseton and Danskammer Point Monitoring

Roseton and Danskammer Point Generating Stations Impingement Monitoring
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Roseton and Danskammer Point Generating Stations Impingement Monitoring
Program. 1989 Annual Progress Report.
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I. Impingement

C. Roseton and Danskammer Point Monitoring (continued)

Impingement Monitoring Program at the Roseton and Danskammer Point Generating Stations. 1988 Annual Progress Report.
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Impingement Monitoring Program at the Roseton and Danskammer Point Generating Stations. 1987 Annual Progress Report.
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D. Impingement Special Studies

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Normandeau Associates, Inc., November 1984.

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I. **Impingement**

D. **Impingement Special Studies (Continued)**

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II. **Entrainment**

A. **Indian Point Monitoring**

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B. **Bowline Point Monitoring**

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II. Entrainment

B. Bowline Point Monitoring (Continued)

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C. Roseton and Danskammer Point Monitoring

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II. Entrainment

C. Roseton and Danskammer Point Monitoring (Continued)

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D. Entrainment Special Studies

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III. Fish Stock Assessment

A. General

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III. Fish Stock Assessment

A. General (Continued)

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III. **Fish Stock Assessment**

B. **Striped Bass (Continued)**

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III. **Fish Stock Assessment**

C. **White Perch**

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APPENDIX A.2

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APPENDIX B

QUALITY ASSURANCE PROGRAM AND DATA QUALITY CONTROL REVIEW

APPENDIX B.1

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

QUALITY ASSURANCE REPORT FOR THE 1991 HUDSON RIVER ICHTHYOPLANKTON LABORATORY PROGRAM AND 1991 FALL JUVENILE SURVEY

Prepared for

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TABLE OF CONTENTS

		PAGE
1.0	INTRODUCTION	1
2.0	QUALITY CONTROL/QUALITY ASSURANCE METHODS	2
2.1	QUALITY CONTROL PROGRAMS	2
2.2	QUALITY CONTROL REPORTING METHODS	6
2.2.1	Fraction Inspected	7
2.2.2	Process Average (Percent Nonconforming)	7
2.2.3	Percent Measurement Error	8
2.2.4	Average Outgoing Quality	11
2.2.5	Cumulative Error Rates	12
3.0	RESULTS	13
3.1	HUDSON RIVER ICHTHYOPLANKTON LABORATORY PROGRAM	13
3.2	FALL JUVENILE SURVEY	23
4.0	BIBLIOGRAPHY	27

LIST OF FIGURES

		PAGE
1.	Quality control inspection plan for ichthyoplankton sorting and identification tasks	3
2.	Quality control inspection plan for identification and length measurement of young-of-the-year fishes	5
3.	Example of percent measurement error calculations for individual taxa during the identification task	10

LIST OF TABLES

		PAGE
1.	TASK SPECIFIC APPLICATIONS OF CONTINUOUS SAMPLING PLANS FOR THE 1991 HUDSON RIVER ICHTHYOPLANKTON LABORATORY PROGRAM . . .	4
2.	TASK SPECIFIC APPLICATIONS OF CONTINUOUS SAMPLING PLANS FOR THE 1991 FALL JUVENILE SURVEY	6
3.	FRACTION INSPECTED, PROCESS AVERAGE, MEAN PERCENT MEASUREMENT ERROR, AND AVERAGE OUTGOING QUALITY OF TASKS PERFORMED BY NAI FOR THE 1991 HUDSON RIVER ICHTHYOPLANKTON LABORATORY PROGRAM .	14
4.	SAMPLE SORTING FRACTION INSPECTED RESULTS, 1991 HUDSON RIVER ICHTHYOPLANKTON LABORATORY PROGRAM	15
5.	SAMPLE SORTING PERCENT NONCONFORMANCE RESULTS, 1991 HUDSON RIVER ICHTHYOPLANKTON LABORATORY PROGRAM	16
6.	SAMPLE SORTING MEAN PERCENT MEASUREMENT ERROR RESULTS, 1991 HUDSON RIVER ICHTHYOPLANKTON LABORATORY PROGRAM	17
7.	SAMPLE IDENTIFICATION FRACTION INSPECTED RESULTS, 1991 HUDSON RIVER ICHTHYOPLANKTON LABORATORY PROGRAM	18
8.	SAMPLE IDENTIFICATION PERCENT NONCONFORMANCE RESULTS, 1991 HUDSON RIVER ICHTHYOPLANKTON LABORATORY PROGRAM	19
9.	SAMPLE IDENTIFICATION MEAN PERCENT MEASUREMENT ERROR RESULTS, 1991 HUDSON RIVER ICHTHYOPLANKTON LABORATORY PROGRAM	20
10.	RANKING OF SPECIES MISSED DURING INITIAL SORT AND FOUND DURING SORT QC	21
11.	SUMMARY BY LIFE STAGE OF THE SIX HIGHEST RANKED TAXA MISSED DURING ORIGINAL SORT AND FOUND DURING SORT QC COMPARED TO TOTAL COUNT	22
12.	CUMULATIVE NET AND ABSOLUTE ERROR RATES FOR COMMONLY ENCOUNTERED TAXA IN SAMPLES SELECTED FOR QC INSPECTION OF IDENTIFICATION AND COUNTING PROCESS	24
13.	FRACTION INSPECTED, PROCESS AVERAGE, AND AVERAGE OUTGOING QUALITY OF TASKS PERFORMED BY NAI FOR THE 1991 FALL JUVENILE SURVEY	26

QUALITY ASSURANCE REPORT FOR THE 1991 HUDSON RIVER ICHTHYOPLANKTON LABORATORY PROGRAM AND 1991 FALL JUVENILE SURVEY

1.0 INTRODUCTION

This quality assurance report for the laboratory tasks of the 1991 Hudson River Ichthyoplankton Survey and the 1991 Fall Juvenile Survey was prepared for Con Edison by Normandeau Associates Inc. (NAI).

To comply with Consolidated Edison's requirements for valid and reliable data on the Hudson River Ichthyoplankton Laboratory Program and the Fall Juvenile Survey, NAI implemented a Quality Assurance Plan that provides a 10% 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. The system monitors and documents the reliability and validity (accuracy, precision, completeness) of daily operations. The specific features of the QC system are determined by the Quality Assurance Department to insure that all procedures conform to Consolidated Edison's data requirements. The QA system is managed by NAI's Quality Assurance Director and utilizes project independent personnel familiar with the work or activities under evaluation to conduct performance and systems audits. These audits are designed to provide objective evidence that the quality control program and technical requirements, methods, and procedures as outlined in the program Standard Operating Procedures are being implemented. The outcomes 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 follow-up, and

- objective validation or improvement of project operations.

This report provides a compilation of QC system data verifying the results of the 1991 Hudson River Ichthyoplankton Laboratory Program and 1991 Fall Juvenile Survey activities. Determinations of the fraction inspected, process average (percent nonconforming), and average outgoing quality are presented for both programs. In addition, for the 1991 Hudson River Ichthyoplankton Laboratory Program the results include percent measurement error, a summary of the number of each taxon-life stage found during sorting QA, and cumulative error rates for each taxon-life stage.

2.0 QUALITY CONTROL/QUALITY ASSURANCE METHODS

2.1 QUALITY CONTROL PROGRAMS

For sorting and identification of samples from the 1991 Hudson River Ichthyoplankton Laboratory Program, NAI used a continuous sampling plan designed to provide a 10% Average Outgoing Quality Limit (U.S. Department of Defense 1981). A flow diagram of how the sampling plan was applied is presented in Figure 1. A summary of the sampling plan, tolerances and QC sample definitions used for each measurement parameter is presented in Table 1. Quality control inspection was applied on a laboratory-wide basis for the sorting task and to each individual processor for the identification task. Quality control 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 quality control samples 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 quality control value and the original value exceeded acceptable tolerances (Table 1), a third measurement was obtained to verify one of the

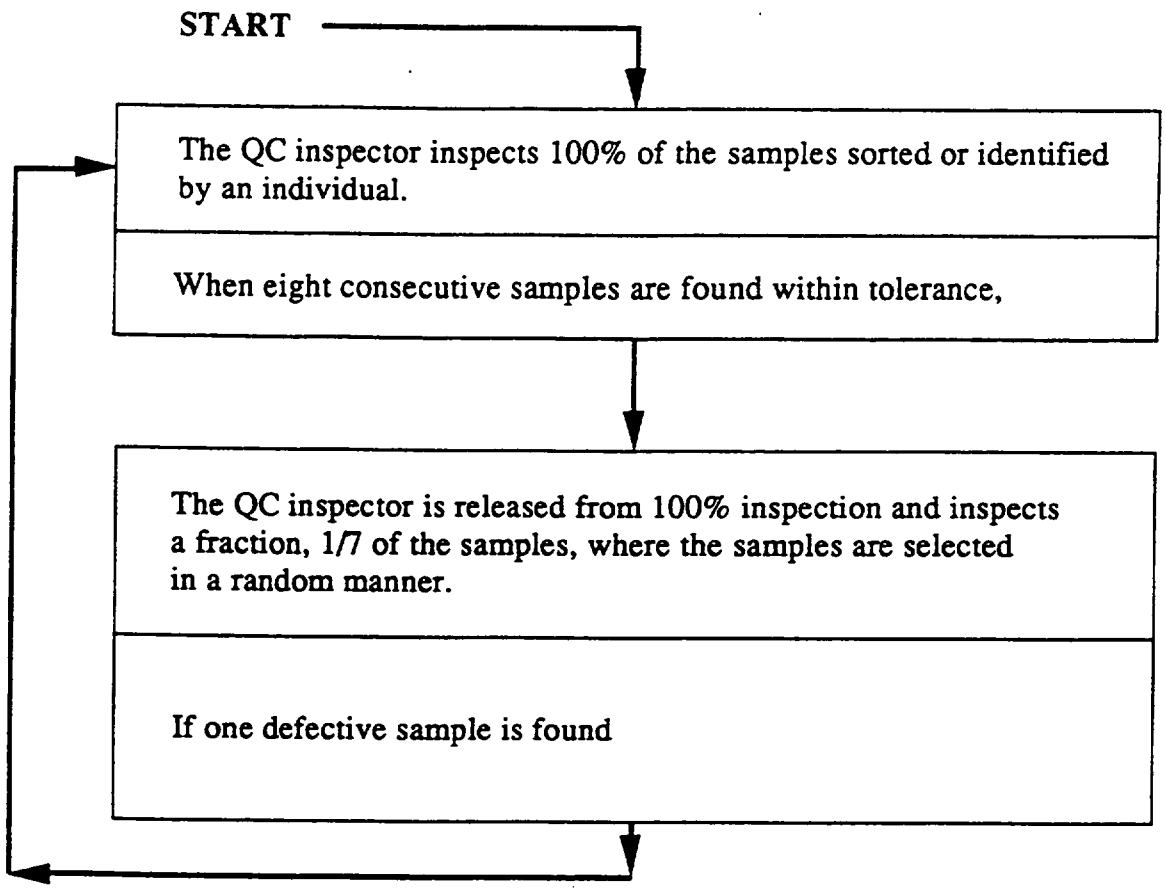

Figure 1. Quality control inspection plan for ichthyoplankton sorting and identification tasks.

measurements. If a sample was found to have exceeded acceptable tolerances, all subsequent samples processed by the laboratory (for sorting) or by the same technician (for identification) were subjected to 100% quality control until an appropriate number of consecutive samples (i) were found within tolerance as determined by the continuous sampling plan (Table 1 and Figure 1). The Quality Assurance Plan for the 1991 and 1992 Hudson River Ichthyoplankton Laboratory Programs (Rev. 1, Change 0, 30 Dec 91) documents specific QA/QC methods utilized for this program.

TABLE 1. TASK SPECIFIC APPLICATIONS OF CONTINUOUS SAMPLING PLANS FOR THE 1991 HUDSON RIVER ICHTHYOPLANKTON LABORATORY PROGRAM.

LABORATORY TASK	CSP-1 AOQL-10% i	f	SAMPLE TOLERANCE	QC SAMPLE DEFINITION
Sorting	8	1/7	± 2 if ≤20 organisms ± 10% if > 20 organisms	one sample
Identification	8	1/7	± 2 if ≤ 20 ± 10% if > 20 for every taxon in the sample (in identifying, assigning a life stage, or counting any species, errors are cumulative by life stage within each taxon)	one sample

For identification and length measurements of young-of-the-year fishes in the 1991 Fall Juvenile Survey, NAI used a continuous sampling plan designed to provide a 10% Average Outgoing Quality Limit (U.S. Department of Defense, 1981). A flow diagram of how the plan was applied is presented in Figure 2. A summary of the sampling plan, tolerances, and QC sample definitions used for each task is shown in Table 2. QC samples were selected as specified by the appropriate plan in Table 2, using random numbers, and reprocessed by QC inspectors. If

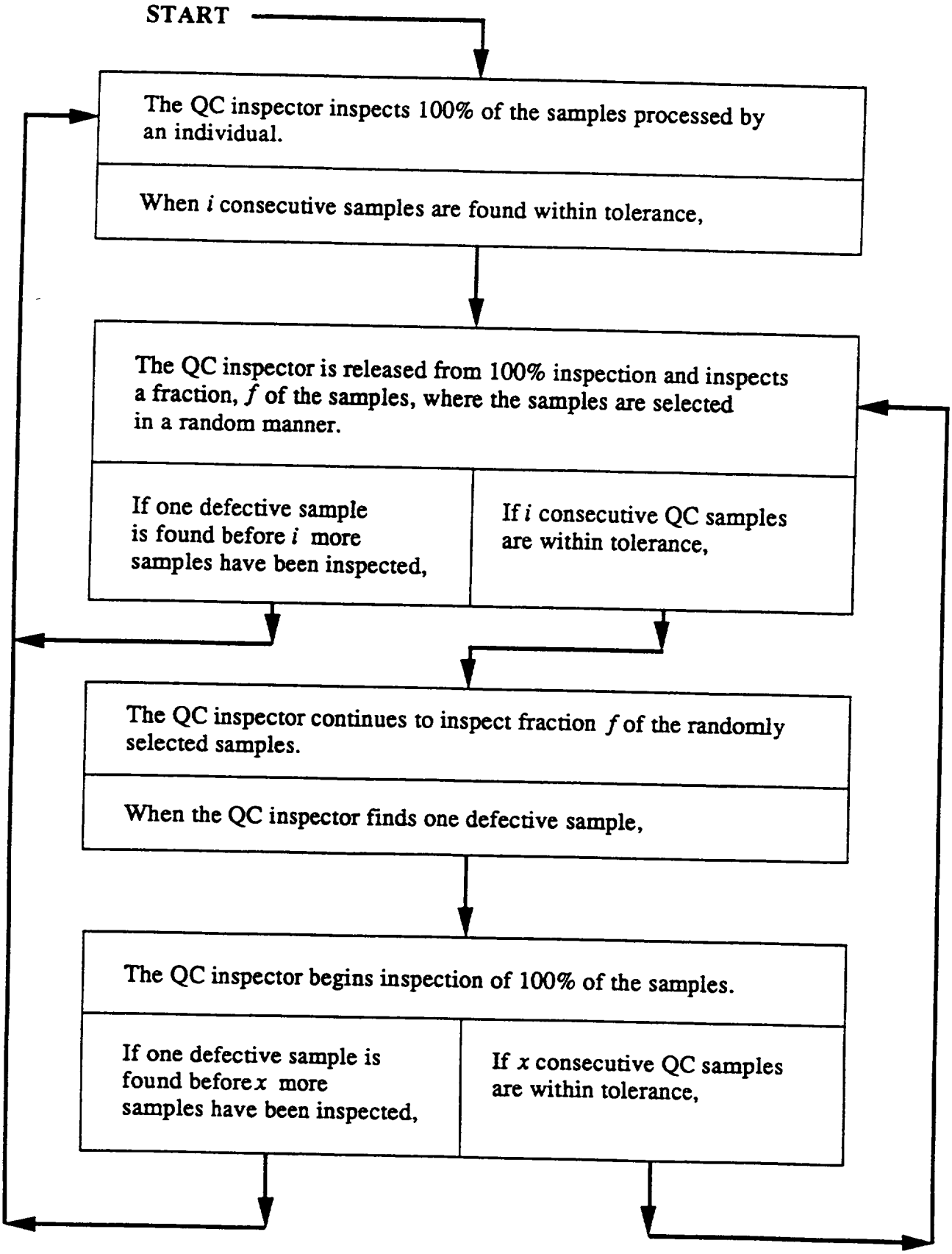

Figure 2. Quality control inspection plan for identification and length measurement of young-of-the-year fishes.

the difference between original and QC values exceeded the acceptable tolerance, a third value was obtained as a resolution. The QC methods are documented in the 1991 Hudson River Fall Juvenile and Beach Seine Surveys Standard Operating Procedures (Rev. 8, Change 1, 3/6/92). Young-of-the-year fishes were identified in the laboratory for the first two Fall Shoals river runs and the first three Beach Seine Survey river runs. Young-of-the-year fishes were identified in the field starting with Fall Shoals river run 3 and Beach Seine Survey river run 4. The same quality control procedures applied to both field and laboratory identifications. All length measurements of young-of-the-year fishes occurred in the laboratory.

TABLE 2. TASK SPECIFIC APPLICATIONS OF CONTINUOUS SAMPLING PLANS FOR THE 1991 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 >34mm TL	One fish

2.2 QUALITY CONTROL REPORTING METHODS

For each weekly sampling event (river run), the Quality Assurance Department reviewed copies of the 1991 Hudson River Ichthyoplankton Laboratory Program Sort and Identification Quality Control Logs. 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. For the 1991 Fall Juvenile Survey, QC data were used to determine fraction inspected and process average (percent nonconforming) for the entire study (combining all river runs of both the Fall Shoals Survey and the Beach Seine Survey).

2.2.1 Fraction Inspected

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 one hundred 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 one hundred times the number of samples inspected divided by the total number of samples analyzed during the study.

2.2.2 Process Average (Percent Nonconforming)

Process Average (Percent Nonconforming)

$$= \frac{\text{Number Nonconforming Samples Inspected}}{\text{Number of Samples Inspected}} \times 100 \qquad \text{(Equation 2)}$$

River Run: Process average for a river run (Equation 2) was one hundred times the number of nonconforming quality control samples found for that river run divided by the total number of quality control samples inspected for that river run.

Entire Study: Process average for the entire study was one hundred times the total number of nonconforming quality control samples for the study divided by the total number of quality control samples inspected 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

Sorting Percent Measurement Error =

$$\frac{\text{Quality Control Value}}{\text{(Original Value + Quality Control Value)}} \times 100 \quad \text{(Equation 3)}$$

Sample: Percent measurement error for a sorted sample (Equation 3) was one hundred times the quality control value divided by the sum of the original value and the quality control value.

River Run: Mean percent measurement error for sorted samples for a river run was the sum of the percent measurement errors 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 percent measurement errors 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

Life Stage Percent Measurement Error =

$$\frac{\text{(Original Value - Quality Control Value)}}{\text{Quality Control Value}} \times 100 \quad \text{(Equation 4)}$$

Life Stage: Percent measurement error for a life stage (Equation 4) was one hundred times the difference between the original

value and the quality control value divided by the quality control value. For life stages where the quality control value was 20 or less, if the original and quality control values differed by less than or equal to two organisms the percent measurement error was considered zero. For life stages where the quality control value was 20 or less and the original and quality control values differed by greater than two organisms, the percent measurement error was calculated utilizing Equation 4. In the latter case, if either the quality control value or original value was zero, the percent measurement error was calculated by multiplying the difference between the original and quality control values by 100. This results in percent measurement error values which are at times extremely large (e.g. possibly 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.

Taxon: Percent measurement error for an identified taxon 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 the identification task for a river run was the sum of the percent measurement errors for all taxa 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 samples because even though complete samples were inspected and reworked for identification quality control, the pass/fail criterion was whether any taxon in the sample individually exceeded the 10% tolerance.

Entire Study: Mean percent measurement error for identified taxa for the entire study was the sum of the percent measurement errors for all taxa inspected during the study divided by the total number of taxa inspected for the study.

	EGGS	POST YOLK-SAC LARVAE	UNDETERMINED	TOTAL
Taxon 1				
Original Value	103	176	25	
Quality Control Value	100	194	26	
% Measurement Error Life Stage	3.0	-9.3	-3.8	16.1
Taxon 2				
Original Value		2		
Quality Control Value		1		
% Measurement Error Life Stage		0		0
Taxon 3				
Original Value		8		
Quality Control Value		2		
% Measurement Error Life Stage		300		300

Figure 3. Example of percent measurement error calculations for individual taxa during the identification task.

2.2.4 Average Outgoing Quality

At the completion of these studies, the Quality Assurance Department calculated the Average Outgoing Quality (AOQ) for each measurement parameter inspected. Continuous sampling plans were used for all 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% screening of a number of subsequent units depending on the sampling plan. Average Outgoing Quality 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:

$$AOQ = \frac{p'(1-f)q^i}{f+(1-f)q^i} \times 100 \qquad \text{(Equation 5)}$$

where

p' = Process average (percent nonconforming) as a decimal fraction

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:

$p' = 0.0689$

$f = 1/7 = 0.1429$

$$q = 1-0.0689 = 0.9311$$

$$i = 8$$

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

The above equation for calculating AOQ was formulated specifically for CSP-1 sampling plans such as those used for the ichthyoplankton sorting and identification (Table 1). The same equation was used to calculate AOQ for young-of-the-year identifications and measurements, which used CSP-V plans (Table 2). When Equation 5 is used for CSP-V plans, the calculated AOQ is conservatively high, because the equation does not take into account the times when the number of consecutive reinspection following a failure is x (which is smaller than i).

2.2.5 Cumulative Error Rates

Due to the non-independence of identification errors across taxa and life stages, and to the culmination 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 calculated for the identification/counting process.

Absolute Error Rate =

$$\sum_{i=1}^{n} |I_i - Q_i| \ / \ \sum_{i=1}^{n} Q_i \qquad \text{Equation 6}$$

Net Error Rate =

$$\sum_{i=1}^{n} (I_i - Q_i) \ / \ \sum_{i=1}^{n} Q_i \qquad \text{Equation 7}$$

where

I_i = initial count for taxon-life stage in sample i
Q_i = QC count for taxon-life stage in sample i
n = number of samples in the entire study

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.

3.0 RESULTS

3.1 HUDSON RIVER ICHTHYOPLANKTON LABORATORY PROGRAM

The Average Outgoing Quality (AOQ) for the sorting and identification tasks of the 1991 Hudson River Ichthyoplankton Laboratory Program was 2.36% and 2.93% respectively. This AOQ represents the actual or achieved quality for measurement parameters and was well within the 10% AOQL requirement of Con Edison. The Average Fraction Inspected (AFI) was 19.51% for sorting and 29.47% for identification (Table 3).

Sorting and identification tasks were also evaluated on a sampling week basis representing river runs (sampling weeks) 1 through 20 and for two gear selectivity studies. Sorted samples were inspected at a rate of 7.56% to 51.26% for individual river runs (Table 4). River run nonconformities among the inspected samples ranged from 0% to 20.45% and was 6.33% overall (Table 5). Measurement error was between 0% and 6.37% and averaged 3.13% for the study (Table 6). For the task of

TABLE 3. FRACTION INSPECTED, PROCESS AVERAGE, MEAN PERCENT MEASUREMENT ERROR, AND AVERAGE OUTGOING QUALITY OF TASKS PERFORMED BY NAI FOR THE 1991 HUDSON RIVER ICHTHYOPLANKTON LABORATORY PROGRAM.

TASK	FRACTION INSPECTED(%)	PROCESS AVERAGE(%)	MEAN PERCENT MEASUREMENT ERROR(%)	AOQ(%)
Sorting	19.51	6.33	3.13	2.36
Identification	29.47	19.81	23.11	2.93

sample identification, 14.29% to 73.50% of samples were inspected from individual river runs (Table 7). Percent nonconforming ranged among river runs from 0% to 33.33% (Table 8) and measurement error from 1.12% to 73.68% (Table 9). Overall percent nonconformance (Table 8) and measurement error (Table 9) for the identification task of this study were 19.81% and 23.11%, 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. Five taxa accounted for 90% of the additional organisms found during sort QC: bay anchovy, white perch, striped bass, clupeids, and *Morone* sp. (Table 10).

For the six taxa most commonly encountered during sort QC the total number of each life stage found in the sort QC was low compared to the total number sorted (Table 11). Bay anchovy yolk-sac larvae and *Morone* sp. eggs were under-represented in the samples and percentages

TABLE 4. SAMPLE SORTING FRACTION INSPECTED RESULTS, 1991 HUDSON RIVER ICHTHYOPLANKTON LABORATORY PROGRAM.

SAMPLING WEEK (BEGINNING MONDAY)	FRACTION INSPECTED SORTING QC: TOTAL # OF SAMPLES INSPECTED	TOTAL # OF SAMPLES SORTED	FRACTION INSPECTED
04/15/91	17	108	15.74
04/22/91	16	108	14.81
04/29/91	12	108	11.11
05/06/91	27	117	23.08
05/13/91	28	117	23.93
05/20/91	22	110	20.00
05/27/91	44	110	40.00
06/03/91	26	110	23.64
06/10/91	61	119	51.26
06/17/91	9	119	7.56
06/24/91	18	119	15.13
07/01/91	22	119	18.49
07/08/91	20	117	17.09
07/15/91	7	73	9.59
07/22/91	11	73	15.07
07/29/91	10	73	13.70
09/02/91	16	72	22.22
09/16/91	10	73	13.70
09/30/91	10	72	13.89
10/14/91	9	74	12.16
333-µm	7	56	12.50
750-µm	9	60	15.00
STUDY	411	2107	19.51

NOTE: Sampling weeks designated as 333-µm and 750-µm represent gear selectivity studies.

TABLE 5. SAMPLE SORTING PERCENT NONCONFORMANCE RESULTS, 1991 HUDSON RIVER ICHTHYOPLANKTON LABORATORY PROGRAM.

SAMPLING WEEK (BEGINNING MONDAY)	% NONCONFORMANCE SORTING QC # OF NONCON-FORMITIES	TOTAL # OF SAMPLES INSPECTED	% NON-CONFORMANCE (WEEK)	% NON-CONFORMANCE (STUDY)
04/15/91	0	17	0.00	0.00
04/22/91	0	16	0.00	0.00
04/29/91	0	12	0.00	0.00
05/06/91	2	27	7.41	2.78
05/13/91	1	28	3.57	3.00
05/20/91	1	22	4.55	3.28
05/27/91	9	44	20.45	7.83
06/03/91	2	26	7.69	7.81
06/10/91	9	61	14.75	9.49
06/17/91	1	9	11.11	9.54
06/24/91	0	18	0.00	8.93
07/01/91	0	22	0.00	8.28
07/08/91	0	20	0.00	7.76
07/15/91	0	7	0.00	7.60
07/22/91	0	11	0.00	7.35
07/29/91	0	10	0.00	7.14
09/02/91	1	16	6.25	7.10
09/16/91	0	10	0.00	6.91
09/30/91	0	10	0.00	6.74
10/14/91	0	9	0.00	6.58
333-µm	0	7	0.00	6.47
750-µm	0	9	0.00	6.33
STUDY	26	411		

NOTE: Sampling weeks designated as 333-µm and 750-µm represent gear selectivity studies.

TABLE 6. SAMPLE SORTING MEAN PERCENT MEASUREMENT ERROR RESULTS, 1991 HUDSON RIVER ICHTHYOPLANKTON LABORATORY PROGRAM.

SAMPLING WEEK (BEGINNING MONDAY)	MEAN PERCENT MEASUREMENT ERROR SORTING QC TOTAL # OF SAMPLES INSPECTED	MEAN PERCENT MEASUREMENT ERROR
04/15/91	17	0.31
04/22/91	16	0.02
04/29/91	12	0.17
05/06/91	27	6.37
05/13/91	28	2.72
05/20/91	22	3.36
05/27/91	44	6.01
06/03/91	26	3.94
06/10/91	61	5.36
06/17/91	9	3.38
06/24/91	18	1.70
07/01/91	22	2.01
07/08/91	20	2.00
07/15/91	7	2.11
07/22/91	11	1.72
07/29/91	10	0.91
09/02/91	16	2.59
09/16/91	10	0.00
09/30/91	10	0.00
10/14/91	9	0.61
333-µm	7	2.75
750-µm	9	0.87
STUDY	411	3.13

NOTE: Sampling weeks designated as 333-µm and 750-µm represent gear selectivity studies.

TABLE 7. SAMPLE IDENTIFICATION FRACTION INSPECTED RESULTS, 1991 HUDSON RIVER ICHTHYOPLANKTON LABORATORY PROGRAM.

SAMPLING WEEK (BEGINNING MONDAY)	FRACTION INSPECTED IDENTIFICATION QC: TOTAL # OF SAMPLES INSPECTED	TOTAL # OF SAMPLES IDENTIFIED	FRACTION INSPECTED
04/15/91	62	108	57.41
04/22/91	22	108	20.37
04/29/91	19	108	17.59
05/06/91	60	117	51.28
05/13/91	36	117	30.77
05/20/91	49	110	44.55
05/27/91	20	110	18.18
06/03/91	19	110	17.27
06/10/91	21	119	17.65
06/17/91	26	119	21.85
06/24/91	23	119	19.33
07/01/91	45	119	37.82
07/08/91	86	117	73.50
07/15/91	33	73	45.21
07/22/91	13	73	17.81
07/29/91	19	73	26.03
09/02/91	11	72	15.28
09/16/91	17	73	23.29
09/30/91	11	72	15.28
10/14/91	12	74	16.22
333-µm	8	56	14.29
750-µm	9	60	15.00
STUDY	621	2107	29.47

NOTE: Sampling weeks designated as 333-µm and 750-µm represent gear selectivity studies.

TABLE 8. SAMPLE IDENTIFICATION PERCENT NONCONFORMANCE RESULTS, 1991 HUDSON RIVER ICHTHYOPLANKTON LABORATORY PROGRAM.

SAMPLING WEEK (BEGINNING MONDAY)	% NONCONFORMANCE IDENTIFICATION QC # OF NONCONFORMITIES	TOTAL # OF SAMPLES INSPECTED	% NONCONFORMANCE (WEEK)	% NONCONFORMANCE (STUDY)
04/15/91	1	62	1.61	1.61
04/22/91	1	22	4.55	2.38
04/29/91	4	19	21.05	5.83
05/06/91	13	60	21.67	11.66
05/13/91	11	36	30.56	15.08
05/20/91	11	49	22.45	16.53
05/27/91	4	20	20.00	16.79
06/03/91	6	19	31.58	17.77
06/10/91	7	21	33.33	18.83
06/17/91	4	26	15.38	18.56
06/24/91	5	23	21.74	18.77
07/01/91	12	45	26.67	19.65
07/08/91	28	86	32.56	21.93
07/15/91	8	33	24.24	22.07
07/22/91	0	13	0.00	21.54
07/29/91	2	19	10.53	21.16
09/02/91	1	11	9.09	20.92
09/16/91	2	17	11.76	20.65
09/30/91	1	11	9.09	20.44
10/14/91	1	12	8.33	20.20
333-µm	0	8	0.00	19.93
750-µm	1	9	11.11	19.81
STUDY	123	621		

NOTE: Sampling weeks designated as 333-µm and 750-µm represent gear selectivity studies.

TABLE 9. SAMPLE IDENTIFICATION MEAN PERCENT MEASUREMENT ERROR RESULTS, 1991 HUDSON RIVER ICHTHYOPLANKTON LABORATORY PROGRAM.

SAMPLING WEEK (BEGINNING MONDAY)	TOTAL # OF SAMPLES INSPECTED	MEAN PERCENT MEASUREMENT ERROR IDENTIFICATION QC	NUMBER OF TAXA INSPECTED
04/15/91	62	1.97	167
04/22/91	22	0.77	54
04/29/91	19	9.57	53
05/06/91	60	49.41	278
05/13/91	36	34.24	211
05/20/91	49	42.78	264
05/27/91	20	20.38	102
06/03/91	19	5.12	141
06/10/91	21	18.97	149
06/17/91	26	5.92	186
06/24/91	23	5.57	158
07/01/91	45	6.67	257
07/08/91	86	43.43	512
07/15/91	33	26.85	170
07/22/91	13	0.98	41
07/29/91	19	2.59	67
09/02/91	11	16.11	32
09/16/91	17	4.26	44
09/30/91	11	0.95	24
10/14/91	12	5.35	35
333-µm	8	1.12	58
750-µm	9	3.81	55
STUDY	621	23.11	3058

NOTE: Sampling weeks designated as 333-µm and 750-µm represent gear selectivity studies.

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

TAXON	NUMBER OF ORGANISMS FOUND IN SORT QC	PERCENT
BAY ANCHOVY	2521	32.16
WHITE PERCH	2254	28.75
STRIPED BASS	1278	16.30
UNIDENTIFIED	572	7.30
CLUPEID UNID.	464	5.92
MORONE SP.	435	5.55
GOBIID UNID.	81	1.03
HOGCHOKER	73	0.93
BLUEBACK HERRING	67	0.85
TESSELLATED DARTER	21	0.27
CYPRINID UNID.	20	0.26
WEAKFISH	10	0.13
ATLANTIC TOMCOD	6	0.08
CARP	5	0.06
YELLOW PERCH	5	0.06
RAINBOW SMELT	4	0.05
WINDOWPANE	4	0.05
AMERICAN SHAD	3	0.04
NORTHERN PIPEFISH	3	0.04
GRUBBY	2	0.03
NORTHERN PUFFER	2	0.03
ALEWIFE	1	0.01
ATLANTIC MENHADEN	1	0.01
CUNNER	1	0.01
GOLDFISH	1	0.01
PERCIDAE UNID.	1	0.01
SEABOARD GOBY	1	0.01
SMALLMOUTH FLOUNDER	1	0.01
TAUTOG	1	0.01
WINTER FLOUNDER	1	0.01
TOTAL	7839	100.00

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

TAXON	LIFE STAGE	NUMBER	PERCENT IN EACH STAGE	PERCENT OF TOTAL FOUND	TOTAL ORGANISMS FOUND[a]
BAY ANCHOVY	EGGS	918	36.41	0.91	101144
	YOLK-SAC LARVAE	123	4.88	14.77	833
	POST YOLK-SAC LARVAE	1452	57.60	1.47	99009
	YOUNG-OF-THE-YEAR	18	0.71	0.08	22767
	UNIDENTIFIED	10	0.40	5.78	173
CLUPEID UNID.	EGGS	17	3.66	0.06	27832
	YOLK-SAC LARVAE	16	3.45	0.49	3262
	POST YOLK-SAC LARVAE	417	89.87	1.50	27830
	YOUNG-OF-THE-YEAR	2	0.43	1.75	114
	UNIDENTIFIED	12	2.59	1.95	615
GOBIID UNID.	POST YOLK-SAC LARVAE	81	100.00	0.85	9500
	YOUNG-OF-THE-YEAR	0	0.00	0.00	38
MORONE SP	EGGS	1	0.23	50.00	2
	YOLK-SAC LARVAE	31	7.13	4.23	732
	POST YOLK-SAC LARVAE	274	62.99	3.16	8664
	UNIDENTIFIED	129	29.66	3.42	3771
STRIPED BASS	EGGS	135	10.56	1.90	7101
	YOLK-SAC LARVAE	319	24.96	1.10	29123
	POST YOLK-SAC LARVAE	823	64.40	0.78	105242
	YOUNG-OF-THE-YEAR	0	0.00	0.00	1453
	UNIDENTIFIED	1	0.08	0.41	246
WHITE PERCH	EGGS	436	19.34	4.25	10252
	YOLK-SAC LARVAE	169	7.50	2.81	6004
	POST YOLK-SAC LARVAE	1644	72.94	2.26	72689
	YOUNG-OF-THE-YEAR	0	0.00	0.00	109
	UNIDENTIFIED	5	0.22	4.59	109

[a]Includes both original count and additional organisms found during sort QC.

appear high, but for most taxa-life stages the percentage missed by the original sorter was typically well under 5%.

The dominant life stage for the taxa commonly found during the sort QC was post-yolk-sac larvae (Table 11). For bay anchovy, eggs found during sort QC were also prevalent. Eggs and yolk-sac larvae of striped bass and white perch were also found in moderate numbers.

Absolute error rates of the identification process for commonly encountered taxa ranged from 0 to greater than 1, but most taxa-life stages had rates less than 0.15, and excluding taxa-life stages with total counts under ten, most were less than 0.10 (Table 12). If absolute error rates were near or above 0.1, often a taxon had relatively high error rate for both post yolk-sac larvae and either yolk-sac larvae or young-of-the-year, suggesting misidentification of life stage by the initial identifier. High absolute errors characterized the undetermined lifestage for several taxa, indicating discrepancies in counts resulting from the more experienced QC inspectors being able to assign a life stage to specimens in poor condition when the original identifier had been more conservative.

Net error rates were substantially lower than the absolute error rates in many cases, demonstrating that errors often tended to cancel each other out. This was noticeable for many of the more abundant taxa-life stages, such as bay anchovy post yolk-sac larvae and young-of-the-year and post yolk-sac larvae of both striped bass and white perch.

3.2 FALL JUVENILE SURVEY

Results of the quality control program for the 1991 Fall Juvenile Survey (consisting of the Bench Seine Survey and the Fall

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	NET ERROR RATE	ABSOLUTE ERROR RATE	N
BAY ANCHOVY	UNIDENTIFIED	54	0.59259	0.70370	27
	EGGS	31653	0.01801	0.03159	158
	YOLK-SAC LARVAE	648	0.02315	0.02932	6
	POST YOLK-SAC LARVAE	28737	0.00063	0.03870	298
	YOUNG-OF-THE-YEAR	6019	0.00017	0.04070	176
AMERICAN SHAD	UNIDENTIFIED	23	-0.04348	0.30435	8
	EGGS	1146	0.00785	0.02356	36
	YOLK-SAC LARVAE	262	-0.03817	0.06107	32
	POST YOLK-SAC LARVAE	317	0.33123	0.35647	48
	YOUNG-OF-THE-YEAR	324	-0.04321	0.09259	95
HOGCHOKER	EGGS	4941	0.01133	0.02469	62
	YOLK-SAC LARVAE	3	-0.33333	0.33333	3
	POST YOLK-SAC LARVAE	20	-0.05000	0.05000	12
	YOUNG-OF-THE-YEAR	30	0.00000	0.00000	14
TESSELLATED DARTER	UNIDENTIFIED	5	1.20000	2.00000	8
	YOLK-SAC LARVAE	332	-0.00904	0.11145	72
	POST YOLK-SAC LARVAE	110	-0.07273	0.21818	44
	YOUNG-OF-THE-YEAR	1	-1.00000	1.00000	1
ATLANTIC MENHADEN	EGGS	79	0.06329	0.06329	12
	POST YOLK-SAC LARVAE	33	-0.36364	0.54545	17
	YOUNG-OF-THE-YEAR	16	-0.06250	0.06250	8
BLUEBACK HERRING	UNIDENTIFIED	3	0.00000	0.00000	2
	POST YOLK-SAC LARVAE	0	2.00000	2.00000	2
	YOUNG-OF-THE-YEAR	4091	-0.05549	0.08091	120
RAINBOW SMELT	UNIDENTIFIED	1	2.00000	4.00000	2
	YOLK-SAC LARVAE	0	7.00000	7.00000	3
	POST YOLK-SAC LARVAE	380	-0.05000	0.06579	76
	YOUNG-OF-THE-YEAR	63	0.01587	0.01587	29
STRIPED BASS	UNIDENTIFIED	36	0.86111	0.86111	13
	EGGS	2004	0.01148	0.03942	49
	YOLK-SAC LARVAE	7079	-0.03207	0.05665	100
	POST YOLK-SAC LARVAE	20136	0.00005	0.04365	174
	YOUNG-OF-THE-YEAR	595	-0.01345	0.09748	86
ATLANTIC TOMCOD	UNIDENTIFIED	10	-0.10000	0.10000	6
	YOLK-SAC LARVAE	0	3.00000	3.00000	1
	POST YOLK-SAC LARVAE	4997	0.01381	0.02822	59
	YOUNG-OF-THE-YEAR	7121	-0.01208	0.01882	222

(continued)

TABLE 12. (CONTINUED)

TAXON	STAGE	TOTAL COUNT	NET ERROR RATE	ABSOLUTE ERROR RATE	N
WHITE PERCH	UNIDENTIFIED	40	1.50000	1.55000	18
	EGGS	3000	-0.01100	0.03033	68
	YOLK-SAC LARVAE	1917	-0.04173	0.08764	90
	POST YOLK-SAC LARVAE	13125	-0.00587	0.04091	166
	YOUNG-OF-THE-YEAR	91	0.34066	0.47253	38
WEAKFISH	POST YOLK-SAC LARVAE	151	0.12583	0.16556	73
	YOUNG-OF-THE-YEAR	725	-0.02897	0.05103	87
CLUPEID UNID.	UNIDENTIFIED	314	-0.01911	0.23567	35
	EGGS	5128	0.01677	0.03120	58
	YOLK-SAC LARVAE	1199	0.07923	0.13595	53
	POST YOLK-SAC LARVAE	5743	-0.00366	0.04440	170
	YOUNG-OF-THE-YEAR	30	0.13333	0.13333	6
MORONE SP.	UNIDENTIFIED	650	0.07846	0.12154	34
	YOLK-SAC LARVAE	55	0.23636	0.45455	14
	POST YOLK-SAC LARVAE	1330	0.02030	0.13308	63
ATLANTIC HERRING	POST YOLK-SAC LARVAE	490	-0.02041	0.02449	35
	YOUNG-OF-THE-YEAR	155	0.07097	0.07097	14
GOBIID UNID.	YOLK-SAC LARVAE	1	-1.00000	1.00000	1
	POST YOLK-SAC LARVAE	3941	0.00279	0.02106	159
	YOUNG-OF-THE-YEAR	0	1.00000	1.00000	1

Shoals Survey) were summarized by the same methods as the QC results for the 1991 Hudson River Ichthyoplankton Laboratory Program (Section 2.2) and are as follows:

TABLE 13. FRACTION INSPECTED, PROCESS AVERAGE, AND AVERAGE OUTGOING QUALITY OF TASKS PERFORMED BY NAI FOR THE 1991 FALL JUVENILE SURVEY.

TASK	AVERAGE FRACTION INSPECTED(%)	PROCESS AVERAGE(%)	AVERAGE OUTGOING QUALITY(%)
Identification	3.59	0.79	0.73
Measurement	5.20	0.48	0.47

A total of 7,940 and 6,148 young-of-the-year fish identification records were made in the laboratory for the Fall Shoals and Beach Seine surveys respectively and 5,607 and 6,410 young-of-the-year fish length measurement records were made for the Fall Shoals and Beach Seine surveys respectively.

4.0 BIBLIOGRAPHY

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U.S. Department of Defense. 1981. Military standard. Single- and multi-level continuous sampling procedures and table for inspection by attributes. MIL-STD-1235B.

APPENDIX B.2

DATA REVIEW QUALITY CONTROL REPORT

APPENDIX B.2

LIST OF TABLES

Number	Title
B.2-1	Variable check for Subtask 2.2, samples with wrong depth for strata from the 1991 Fall Juvenile Survey.
B.2-2	Variable check for Subtask 2.2, samples with wrong depth for strata from the 1991 Longitudinal River Ichthyoplankton Survey.
B.2-3	Designation of 1991 Beach Seine Survey sites within subregions.
B.2-4	Variable check for Subtask 2.2, samples with disagreements between ICHLRL5S and ICHLRLV5 (counts) and ICHLRLV6 (number of length measurements) files from the 1991 Longitudinal River Ichthyoplankton Survey.

APPENDIX B.2

LIST OF FIGURES

Number	Title
B.2-1	Variable check for Subtask 2.2, VOLUME vs. FLO_DIF from the 1991 Fall Juvenile Survey.
B.2-2	Variable check for Subtask 2.2, VOLUME vs. FLO_DIF from the 1991 Longitudinal River Ichthyoplankton Survey.

APPENDIX B.2

DATA REVIEW QUALITY CONTROL REPORT

As part of the Quality Assurance Plan for Consolidated Edison Company of New York, Inc.'s (Con Edison) 1991 Year Class Report, LMS performed quality assurance audits of the data received. LMS audited Con Edison's 1991 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 1991 Year Class Report. Computer databases were updated when errors were discovered and permission granted from Con Edison.

B.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 1991 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.

B.1.1 Beach Seine Survey - 1991

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 316 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 2,528 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 367 observations were checked for the following parameters from data set BSSLV6:

SAMPLE	LIFE_STG
TAXON	LENGTH
FISH_ID	PM

A total of 2,202 data fields were reviewed and no errors were found.

Overall, 50 samples containing 5,380 fields were checked for accuracy and no errors were found.

B.1.2 Fall Juvenile Survey - 1991

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 and no errors were found.

ICHFSLV5

Eighty-six samples with 425 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 3,400 data fields were reviewed:

- SAMPLE 3271, a TAXON 50 observation appeared on the computer listing but was not on any data sheets.

There was one error giving accuracy rate of 99.76 percent.

Note: An error in this file was found in output from the the SAS program STURG. There was a record for SAMPLE = 3413 TAXON = 27 but no count indicated. Field sheets indicated CT_LC3 = 1 for this record.

ICHFSLV6

Eighty-six samples with 367 observations were checked for the following parameters from data set ICHFSLV6:

SAMPLE	LENGTH
TAXON	PM
FISH_ID	LIFE_STG

A total of 2,190 data fields were reviewed and no errors were found. Laboratory length sheet for SAMPLE 2083 was unable to be checked for verification of database records; length sheet was not on microfilm and original no longer exists. There were two records, six parameters, each that could not be verified (12 fields total); these records were assumed to be correct.

Overall, 86 samples containing 7,332 fields were checked for accuracy there were no major errors. Two length records could not be verified because of loss of length sheets for SAMPLE 2083.

B.1.3 Longitudinal River Ichthyoplankton Survey - 1991

ICHLRLV3 and ICHLRLV4, Catch Code 1 and 2

One hundred 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 2,000 data fields were reviewed and no errors were found.

ICHLRL5S, Catch Code 1 and 2

One hundred samples with 640 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 5,120 data fields were reviewed:

- SAMPLE 3936, TAXON 35, CT_LC2 appeared as 2 on the computer listing and was 0 on the data sheets.
- SAMPLE 3936, TAXON 35, CT_LC3 appeared as 0 on the computer listing and was 2 on the data sheets.

There were two errors, giving an accuracy rate of 99.96 percent.

One hundred samples with 644 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 7,728 data fields were reviewed and no errors were found.

ICHLRLV6

One hundred samples with 1,868 observations were checked for the following parameters from data set ICHLRLV6:

SAMPLE	LIF_STG
TAXON	LENGTH

A total of 7,472 data fields were reviewed.

- SAMPLE 4249, TAXON 30, two fish LENGTH 5.5, LIFE_STG 2 were missing from the computer listing.

There were two errors (4 parameters each), giving an accuracy rate of 99.59 percent.

ICHLRLV3 and ICHLRLV4, Catch Code 3

Seventy-five 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 1,500 data fields were reviewed:

- SAMPLE 5994, FLO_END is 510000 on the computer listing but the last four digits are missing on the data sheet.

There was one error, giving an accuracy rate of 99.93 percent.

ICHLRL5S, Catch Code 3

Seventy five 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 544 data fields and no errors were found.

Overall, 175 samples with 24,364 data fields were checked for accuracy. There were no major or unresolved errors. Corrections made in ICHLRL5S were also made to data set ICHLRLV5.

B.1.4 Total 1991 Samples

The total number of samples checked was 311 and the total number of data fields was 37,066. With 6 errors (19 data fields), there is an overall accuracy rate of 99.95 percent.

Note: Table from WQCHECK program indicated some typographical problems in the ICHWCLV5 file. The following corrections were made: for SAMPLE 439 DATE was changed from 6/26/91 to 6/7/91, for SAMPLE 507 DATE was changed from 6/19/91 to 6/14/91, for SAMPLE 1372 DATE was changed from 5/9/91 to 9/5/91, for SAMPLE 1375 DATE was changed from 7/6/91 to 9/6/91, and for SAMPLE 1173 DATE was changed from 9/18/91 to 9/11/91.

B.2 SUBTASK 2.2 - 100 PERCENT QC OF ELEVEN FIELDS

Eleven 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 fields that were checked are:

For BSS (data set BSSLV3):

BEACH	RIV_RUN
RIV_MILE	

For BSS (data sets BSSLV5 and BSSLV6):

CT_LC1 CT_LC2 + CT_LC3 + CT_LC4

For FJS (data sets ICHFSLV3 and ICHFSLV4):

VOLUME
STRATA
RIV_MILE
RIV_RUN

For FJS (data sets ICHFSLV5 and ICHFSLV6):

CT_LC1 CT_LC2 + CT_LC3 + CT_LC4

For LRS (data sets ICHLRLV3 and ICHLRLV4):

VOLUME
STRATA
RIV_MILE
RIV_RUN

For LRS (data sets ICHLRLV5 and ICHLRLV6):

CT_EGGS CT_UNID
CT_YSL CT_LC1
CT_PYSL

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 for FJS and FLOWDATA for LRS.

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. No errors in VOLUME were found. Figures B.2-1 and B.2-2 graph VOLUME vs. FLO_DIF for FJS and LRS data, respectively.

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)

Tables B.2-1 and B.2-2 show nonconforming observations for FJS and LRS data, respectively. The variable, DPTH_DIF, represents RIV_DPTH minus SAM_DPTH. Changes were not made to any of the nonconforming strata observations. Most of the nonconforming observations were channel samples that were taken at the border of the bottom (≤3.1 m). In years where this data is reported (1985-1990) no changes were made to this type of sample. The number included in the analyses varies among years (i.e., one sample in the FJS and none in the LRS 1990 programs; to 20 in the 1988 FJS and 100 in the 1989 LRS). This year both the FJS and LRS have a proportionally large number of samples designated channel that were collected in the bottom strata (12.3% and 13.0%, respectively). These collections were made with the trucker trawl. Three LRS bottom samples were collected in water depth <6.1 m due to tidal stage and were not changed.

BEACH, RIV_MILE, RIV_RUN

Table B.2-3 (Con Edison's 1991 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.

ICHLRLV5 (counts), ICHLRLV6 (number of length measurements)

Table B.2-4 lists the nonconforming observations and the resolution of these disagreements. Some disagreements arose from typographical errors. In some cases, data was entered as written on the tally and length measurement portions of the data sheets but counts between these sheets did not agree. To resolve these disagreements, the basic assumption was that the life stage designation listed in the length measurement portion of the field/lab sheet was correct. Changes were made to the ICHLRLV5, ICHLRL5S, and ICHLRLV6 files as indicated in Table B.2-4.

TABLE B.2-1 VARIABLE CHECK FOR SUBTASK 2.2, SAMPLES WITH WRONG DEPTH FOR STRATA FROM THE 1991 FALL JUVENILE SURVEY

OBS	TASK	SAMPLE	YEAR	RIV_RUN	DATE	TIME	USE_CODE	GEAR	RIV_MILE	STRATA	RIV_DPTH	SAM_DPTH	DPTH DIF
1	98	1534	91	2	29-Jul-91	21:21	1	65	15	3	7.3	4.3	3.0
2	98	1537	91	2	29-Jul-91	21:47	1	65	15	3	10.4	7.3	3.1
3	98	1567	91	2	30-Jul-91	3:26	1	65	28	3	7.9	4.9	3.0
4	98	1592	91	2	30-Jul-91	22:23	1	65	33	3	9.4	6.4	3.0
5	98	1851	91	2	31-Jul-91	23:45	1	65	128	3	10.4	7.3	3.1
6	98	1859	91	2	01-Aug-91	1:54	1	65	118	3	11.9	8.8	3.1
7	98	1895	91	2	01-Aug-91	23:19	1	65	93	3	9.1	6.1	3.0
8	98	1897	91	2	01-Aug-91	23:37	1	65	91	3	7.6	4.6	3.0
9	98	1959	91	3	12-Aug-91	22:28	5	65	16	3	7.6	4.6	3.0
10	98	1960	91	3	12-Aug-91	22:35	1	65	16	3	7.6	4.6	3.0
11	98	2159	91	1	19-Jul-91	1:22	1	65	88	3	8.5	5.5	3.0
12	98	2243	91	3	14-Aug-91	0:52	1	65	31	3	7.6	4.6	3.0
13	98	2247	91	3	14-Aug-91	1:33	1	65	33	3	9.1	6.1	3.0
14	98	2251	91	3	14-Aug-91	2:19	1	65	36	3	7.6	4.6	3.0
15	98	2253	91	3	14-Aug-91	2:51	1	65	37	3	7.6	4.6	3.0
16	98	2305	91	3	15-Aug-91	3:48	1	65	104	3	9.1	6.1	3.0
17	98	2316	91	3	15-Aug-91	20:21	1	65	96	3	9.1	6.1	3.0
18	98	2317	91	3	15-Aug-91	20:27	1	65	95	3	8.8	5.8	3.0
19	98	2325	91	3	15-Aug-91	21:52	1	65	91	3	6.7	3.7	3.0
20	98	2357	91	3	16-Aug-91	4:47	1	65	61	3	9.1	6.1	3.0
21	98	2387	91	4	26-Aug-91	21:22	1	65	16	3	10.4	7.3	3.1

TABLE B.2-1 VARIABLE CHECK FOR SUBTASK 2.2, SAMPLES WITH WRONG DEPTH FOR STRATA FROM THE 1991 FALL JUVENILE SURVEY

OBS	TASK	SAMPLE	YEAR	RIV_RUN	DATE	TIME	USE_CODE	GEAR	RIV_MILE	STRATA	RIV_DPTH	SAM_DPTH	DPTH DIF
22	98	2450	91	4	27-Aug-91	23:09	1	65	33	3	8.2	5.2	3.0
23	98	2453	91	4	27-Aug-91	23:38	1	65	31	3	7.6	4.6	3.0
24	98	2470	91	4	28-Aug-91	3:29	1	65	38	3	9.1	6.1	3.0
25	98	2478	91	4	28-Aug-91	5:18	1	65	42	3	7.9	4.9	3.0
26	98	2499	91	4	29-Aug-91	0:01	1	65	123	3	10.4	7.3	3.1
27	98	2530	91	4	29-Aug-91	20:06	1	65	95	3	6.7	3.7	3.0
28	98	2539	91	4	29-Aug-91	21:27	1	65	92	3	6.7	3.7	3.0
29	98	2548	91	4	29-Aug-91	22:54	1	65	89	3	8.8	5.8	3.0
30	98	2566	91	4	30-Aug-91	2:55	1	65	66	3	13.7	10.7	3.0
31	98	2676	91	5	11-Sep-91	1:21	1	65	30	3	7.6	4.6	3.0
32	98	2688	91	5	11-Sep-91	3:34	1	65	36	3	8.2	5.2	3.0
33	98	2747	91	5	12-Sep-91	4:35	1	65	100	3	6.4	3.4	3.0
34	98	2818	91	6	23-Sep-91	20:41	1	65	15	3	6.7	3.7	3.0
35	98	2855	91	6	24-Sep-91	4:05	1	65	28	3	11.0	7.9	3.1
36	98	2856	91	6	24-Sep-91	4:14	1	65	28	3	7.9	4.9	3.0
37	98	2895	91	6	25-Sep-91	0:24	1	65	35	3	8.5	5.5	3.0
38	98	2921	91	6	25-Sep-91	21:45	1	65	145	3	7.0	4.0	3.0
39	98	2923	91	6	25-Sep-91	22:00	1	65	147	3	6.7	3.7	3.0
40	98	2924	91	6	25-Sep-91	22:07	1	65	142	3	6.7	3.7	3.0
41	98	3039	91	6	27-Sep-91	20:17	1	65	56	3	15.2	12.2	3.0
42	98	3057	91	7	07-Oct-91	22:20	1	65	21	3	13.7	10.7	3.0
43	98	3097	91	7	08-Oct-91	5:53	1	65	31	3	6.4	3.4	3.0

TABLE B.2-1 VARIABLE CHECK FOR SUBTASK 2.2, SAMPLES WITH WRONG DEPTH FOR STRATA FROM THE 1991 FALL JUVENILE SURVEY

OBS	TASK	SAMPLE	YEAR	RIV_RUN	DATE	TIME	USE_CODE	GEAR	RIV_MILE	STRATA	RIV_DPTH	SAM_DPTH	DPTH DIF
44	98	3127	91	7	08-Oct-91	22:39	1	65	33	3	9.1	6.1	3.0
45	98	3130	91	7	08-Oct-91	23:13	1	65	35	3	9.1	6.1	3.0
46	98	3139	91	7	09-Oct-91	1:23	1	65	38	3	7.6	4.6	3.0
47	98	3214	91	7	10-Oct-91	5:47	1	65	93	3	8.2	5.2	3.0
48	98	3216	91	7	10-Oct-91	6:00	1	65	93	3	7.6	4.6	3.0
49	98	3259	91	7	11-Oct-91	2:28	1	65	57	3	9.1	6.1	3.0
50	98	3369	91	8	23-Oct-91	4:40	1	65	32	3	7.6	4.6	3.0
51	98	3405	91	8	24-Oct-91	2:43	1	65	108	3	8.5	5.5	3.0
52	98	3417	91	8	24-Oct-91	5:16	1	65	98	3	9.1	6.1	3.0
53	98	3426	91	8	24-Oct-91	19:00	1	65	92	3	8.5	5.5	3.0
54	98	3462	91	8	25-Oct-91	3:07	1	65	60	3	9.1	6.1	3.0

TABLE B.2-2 VARIABLE CHECK FOR SUBTASK 2.2, SAMPLES WITH WRONG DEPTH FOR STRATA FROM THE 1991 LONGITUDINAL RIVER ICHTHYOPLANKTON SURVEY

OBS	TASK	SAMPLE	YEAR	RIV_RUN	DATE	TIME	USE_COD	GEAR	RIV_MILE	STRATA	RIV_DPTH	SAM_DPTH	DPTH DIF
1	88	180	91	1	15-Apr-91	23:20	1	65	13	3	9.4	6.4	3.0
2	88	181	91	1	15-Apr-91	23:29	1	65	13	3	10.4	7.3	3.1
3	88	197	91	1	16-Apr-91	3:21	1	65	33	3	9.4	6.4	3.0
4	88	212	91	1	16-Apr-91	5:40	1	65	36	3	7.6	4.6	3.0
5	88	218	91	1	16-Apr-91	21:22	1	65	149	3	6.4	3.4	3.0
6	88	219	91	1	16-Apr-91	21:29	1	65	149	3	6.4	3.4	3.0
7	88	224	91	1	16-Apr-91	22:18	1	65	147	3	7.6	4.6	3.0
8	88	226	91	1	16-Apr-91	22:35	1	65	147	3	6.4	3.4	3.0
9	88	238	91	1	17-Apr-91	1:06	1	65	139	3	11.0	7.9	3.1
10	88	250	91	1	17-Apr-91	3:27	1	65	133	3	12.5	9.4	3.1
11	88	3024	91	1	17-Apr-91	5:29	1	65	126	3	12.8	9.8	3.0
12	88	3030	91	1	17-Apr-91	20:36	1	65	121	3	13.4	10.4	3.0
13	88	3046	91	1	17-Apr-91	23:33	1	65	112	3	15.2	12.2	3.0
14	88	3059	91	1	18-Apr-91	0:29	1	65	109	3	7.6	4.6	3.0
15	88	3061	91	1	18-Apr-91	0:48	1	65	109	3	7.6	4.6	3.0
16	88	3065	91	1	18-Apr-91	1:21	1	65	108	3	8.2	5.2	3.0
17	88	3070	91	1	18-Apr-91	2:18	1	65	104	3	13.4	10.4	3.0
18	88	3073	91	1	18-Apr-91	2:50	1	65	103	3	13.7	10.7	3.0
19	88	3074	91	1	18-Apr-91	3:01	1	65	102	3	18.3	15.2	3.1
20	88	3087	91	1	18-Apr-91	5:21	1	65	92	3	8.5	5.5	3.0
21	88	3096	91	1	18-Apr-91	21:08	1	65	83	3	15.8	12.8	3.0
22	88	3098	91	1	18-Apr-91	21:34	1	65	80	3	14.6	11.6	3.0
23	88	3099	91	1	18-Apr-91	21:42	1	65	80	3	14.0	11.0	3.0

TABLE B.2-2 VARIABLE CHECK FOR SUBTASK 2.2, SAMPLES WITH WRONG DEPTH FOR STRATA FROM THE 1991 LONGITUDINAL RIVER ICHTHYOPLANKTON SURVEY

OBS	TASK	SAMPLE	YEAR	RIV_RUN	DATE	TIME	USE_COD	GEAR	RIV_MILE	STRATA	RIV_DPTH	SAM_DPTH	DPTH DIF
24	88	3112	91	1	18-Apr-91	23:26	1	65	74	3	14.9	11.9	3.0
25	88	3113	91	1	19-Apr-91	0:04	1	65	65	3	14.9	11.9	3.0
26	88	3118	91	1	19-Apr-91	1:05	1	65	62	3	11.9	8.8	3.1
27	88	3126	91	1	19-Apr-91	2:17	1	65	60	3	11.0	7.9	3.1
28	88	3141	91	1	19-Apr-91	20:26	1	65	37	3	8.2	5.2	3.0
29	88	3148	91	1	19-Apr-91	21:36	1	65	40	3	15.8	12.8	3.0
30	88	3169	91	2	22-Apr-91	23:43	1	65	29	3	9.4	6.4	3.0
31	88	3173	91	2	23-Apr-91	0:23	1	65	31	3	9.4	6.4	3.0
32	88	3193	91	2	23-Apr-91	3:37	1	65	36	3	7.3	4.3	3.0
33	88	3195	91	2	23-Apr-91	3:54	1	65	37	3	8.5	5.5	3.0
34	88	3216	91	2	23-Apr-91	21:44	1	65	146	3	8.8	5.8	3.0
35	88	3221	91	2	23-Apr-91	22:30	1	65	144	3	8.2	5.2	3.0
36	88	3241	91	2	24-Apr-91	2:32	1	65	136	3	11.9	8.8	3.1
37	88	3254	91	2	24-Apr-91	5:09	5	65	127	3	11.0	7.9	3.1
38	88	3255	91	2	24-Apr-91	5:19	1	65	127	3	11.3	8.2	3.1
39	88	3259	91	2	24-Apr-91	20:19	1	65	121	3	13.4	10.4	3.0
40	88	3287	91	2	25-Apr-91	1:15	1	65	108	3	8.2	5.2	3.0
41	88	3299	91	2	25-Apr-91	3:16	1	65	102	3	12.5	9.4	3.1
42	88	3322	91	2	25-Apr-91	21:22	1	65	84	3	8.5	5.5	3.0
43	88	3327	91	2	25-Apr-91	22:08	1	65	82	3	12.8	9.8	3.0
44	88	3345	91	2	26-Apr-91	2:27	1	65	58	3	9.4	6.4	3.0
45	88	3360	91	3	29-Apr-91	21:24	1	65	15	3	6.7	3.7	3.0
46	88	3388	91	3	30-Apr-91	3:17	1	65	37	3	7.6	4.6	3.0

TABLE B.2-2 VARIABLE CHECK FOR SUBTASK 2.2, SAMPLES WITH WRONG DEPTH FOR STRATA FROM THE 1991 LONGITUDINAL RIVER ICHTHYOPLANKTON SURVEY

OBS	TASK	SAMPLE	YEAR	RIV_RUN	DATE	TIME	USE_COD	GEAR	RIV_MILE	STRATA	RIV_DPTH	SAM_DPTH	DPTH DIF
47	88	3389	91	3	30-Apr-91	3:24	1	65	37	3	7.6	4.6	3.0
48	88	3402	91	3	30-Apr-91	20:35	1	65	150	3	6.7	3.7	3.0
49	88	3406	91	3	30-Apr-91	21:14	1	65	149	3	7.0	4.0	3.0
50	88	3411	91	3	30-Apr-91	22:04	1	65	148	3	7.6	4.6	3.0
51	88	3437	91	3	01-May-91	3:10	1	65	137	3	11.9	8.8	3.1
52	88	3451	91	3	01-May-91	20:43	1	65	124	3	12.8	9.8	3.0
53	88	3456	91	3	01-May-91	21:47	1	65	120	3	11.9	8.8	3.1
54	88	3462	91	3	01-May-91	22:49	1	65	117	3	12.8	9.8	3.0
55	88	3478	91	3	02-May-91	1:55	1	65	109	3	7.6	4.6	3.0
56	88	3482	91	3	02-May-91	2:32	1	65	106	3	12.8	9.8	3.0
57	88	3505	91	3	02-May-91	21:19	1	65	92	3	6.4	3.4	3.0
58	88	3508	91	3	02-May-91	22:00	1	65	87	3	17.7	14.6	3.1
59	88	3518	91	3	02-May-91	23:47	1	65	82	3	14.9	11.9	3.0
60	88	3519	91	3	02-May-91	23:59	1	65	80	3	15.8	12.8	3.0
61	88	3529	91	3	03-May-91	3:06	1	65	58	3	12.8	9.8	3.0
62	88	3545	91	3	03-May-91	20:37	1	65	42	3	8.5	5.5	3.0
63	88	3553	91	4	06-May-91	20:53	5	65	12	3	10.4	7.3	3.1
64	88	3554	91	4	06-May-91	21:05	1	65	12	3	10.4	7.3	3.1
65	88	3578	91	4	07-May-91	3:41	1	65	36	3	6.7	3.7	3.0
66	88	3580	91	4	07-May-91	3:59	1	65	37	3	7.6	4.6	3.0
67	88	3583	91	4	07-May-91	4:32	1	65	37	3	8.5	5.5	3.0
68	88	3589	91	4	07-May-91	5:25	1	65	39	3	12.5	9.4	3.1
69	88	3590	91	4	07-May-91	20:29	1	64	148	2	5.5	5.5	0.0

TABLE B.2-2 VARIABLE CHECK FOR SUBTASK 2.2, SAMPLES WITH WRONG DEPTH FOR STRATA FROM THE 1991 LONGITUDINAL RIVER ICHTHYOPLANKTON SURVEY

OBS	TASK	SAMPLE	YEAR	RIV_RUN	DATE	TIME	USE_COD	GEAR	RIV_MILE	STRATA	RIV_DPTH	SAM_DPTH	DPTH DIF
70	88	3591	91	4	07-May-91	20:38	1	64	148	2	5.2	5.2	0.0
71	88	3592	91	4	07-May-91	20:47	1	64	147	2	5.5	5.5	0.0
72	88	3596	91	4	07-May-91	21:26	1	65	144	3	6.4	3.4	3.0
73	88	3602	91	4	08-May-91	1:01	1	65	109	3	8.5	5.5	3.0
74	88	3607	91	4	08-May-91	2:15	1	65	100	3	8.5	5.5	3.0
75	88	3614	91	4	08-May-91	3:53	1	65	92	3	6.7	3.7	3.0
76	88	3618	91	4	08-May-91	4:22	1	65	92	3	7.3	4.3	3.0
77	88	3620	91	4	08-May-91	4:43	1	65	90	3	7.6	4.6	3.0
78	88	3621	91	4	08-May-91	4:50	1	65	89	3	15.2	12.2	3.0
79	88	3629	91	4	08-May-91	20:59	1	65	85	3	6.7	3.7	3.0
80	88	3642	91	4	08-May-91	23:06	1	65	78	3	14.6	11.6	3.0
81	88	3644	91	4	08-May-91	23:23	1	65	77	3	15.2	12.2	3.0
82	88	3660	91	4	09-May-91	2:06	1	65	67	3	13.1	10.1	3.0
83	88	3695	91	4	09-May-91	22:53	1	65	54	3	15.2	12.2	3.0
84	88	3741	91	4	10-May-91	20:29	1	65	42	3	8.5	5.5	3.0
85	88	3746	91	4	10-May-91	21:08	1	65	42	3	8.5	5.5	3.0
86	88	3750	91	4	10-May-91	21:40	1	65	42	3	14.9	11.9	3.0
87	88	3753	91	4	10-May-91	22:01	1	65	41	3	12.8	9.8	3.0
88	88	3762	91	5	13-May-91	21:44	1	65	15	3	8.2	5.2	3.0
89	88	3778	91	5	14-May-91	1:49	1	65	32	3	7.9	4.9	3.0
90	88	3791	91	5	14-May-91	4:13	1	65	37	3	8.2	5.2	3.0
91	88	3792	91	5	14-May-91	4:20	1	65	38	3	6.7	3.7	3.0
92	88	3813	91	5	14-May-91	23:16	1	65	42	3	14.3	11.3	3.0

TABLE B.2-2 VARIABLE CHECK FOR SUBTASK 2.2, SAMPLES WITH WRONG DEPTH FOR STRATA FROM THE 1991 LONGITUDINAL RIVER ICHTHYOPLANKTON SURVEY

OBS	TASK	SAMPLE	YEAR	RIV_RUN	DATE	TIME	USE_COD	GEAR	RIV_MILE	STRATA	RIV_DPTH	SAM_DPTH	DPTH DIF
93	88	3816	91	5	14-May-91	23:43	1	65	42	3	8.2	5.2	3.0
94	88	3822	91	5	15-May-91	0:36	1	65	42	3	9.1	6.1	3.0
95	88	3840	91	5	15-May-91	3:42	1	65	48	3	15.5	12.5	3.0
96	88	3842	91	5	15-May-91	4:00	1	65	48	3	15.2	12.2	3.0
97	88	3864	91	5	16-May-91	1:44	1	65	108	3	7.9	4.9	3.0
98	88	3874	91	5	16-May-91	4:38	1	65	92	3	8.5	5.5	3.0
99	88	3876	91	5	16-May-91	4:52	1	65	92	3	8.2	5.2	3.0
100	88	3879	91	5	16-May-91	20:53	1	65	87	3	15.2	12.2	3.0
101	88	3912	91	5	17-May-91	2:49	1	65	73	3	15.5	12.5	3.0
102	88	3942	91	5	17-May-91	23:25	1	65	58	3	7.6	4.6	3.0
103	88	3949	91	5	18-May-91	0:39	1	65	55	3	15.2	12.2	3.0
104	88	3976	91	6	20-May-91	22:18		65	20	3	11.9	8.8	3.
105	88	3984	91	6	21-May-91	0:05	1	65	28	3	8.2	5.2	3.0
106	88	3996	91	6	21-May-91	2:36	1	65	36	3	7.6	4.6	3.0
107	88	4002	91	6	21-May-91	3:38	1	65	38	3	9.4	6.4	3.0
108	88	4055	91	6	22-May-91	3:59	1	65	55	3	15.5	12.5	3.0
109	88	4083	91	6	23-May-91	3:56	1	65	92	3	7.6	4.6	3.0
110	88	4084	91	6	23-May-91	4:08	1	65	91	3	9.1	6.1	3.0
111	88	4088	91	6	23-May-91	4:40	1	65	89	3	11.9	8.8	3.1
112	88	4095	91	6	23-May-91	21:18	1	65	84	3	8.8	5.8	3.0
113	88	4101	91	6	23-May-91	22:08	1	65	82	3	13.1	10.1	3.0
114	88	4123	91	6	24-May-91	1:47	1	65	72	3	14.6	11.6	3.0
115	88	4131	91	6	24-May-91	3:12	1	65	68	3	9.1	6.1	3.0

TABLE B.2-2 VARIABLE CHECK FOR SUBTASK 2.2, SAMPLES WITH WRONG DEPTH FOR STRATA FROM THE 1991 LONGITUDINAL RIVER ICHTHYOPLANKTON SURVEY

OBS	TASK	SAMPLE	YEAR	RIV_RUN	DATE	TIME	USE_COD	GEAR	RIV_MILE	STRATA	RIV_DPTH	SAM_DPTH	DPTH DIF
116	88	4162	91	6	24-May-91	23:04	1	65	58	3	9.4	6.4	3.0
117	88	4189	91	7	28-May-91	1:08	1	65	31	3	7.6	4.6	3.0
118	88	4197	91	7	28-May-91	2:41	1	65	36	3	7.6	4.6	3.0
119	88	4199	91	7	28-May-91	3:02	1	65	36	3	7.6	4.6	3.0
120	88	4203	91	7	28-May-91	3:43	1	65	37	3	7.6	4.6	3.0
121	88	4206	91	7	28-May-91	4:11	1	65	39	3	10.4	7.3	3.1
122	88	4214	91	7	28-May-91	20:55	1	65	41	3	8.5	7.3	1.2
123	88	4283	91	7	30-May-91	3:06	1	65	96	3	7.6	4.6	3.0
124	88	4289	91	7	30-May-91	4:00	1	65	92	3	8.5	5.5	3.0
125	88	4332	91	7	31-May-91	2:35	1	65	72	3	15.5	12.5	3.0
126	88	4343	91	7	31-May-91	4:14	1	65	68	3	11.3	8.2	3.1
127	88	4345	91	7	31-May-91	4:30	1	65	68	3	13.4	10.4	3.0
128	88	4358	91	7	31-May-91	22:04	1	65	57	3	12.8	9.8	3.0
129	88	4395	91	8	04-Jun-91	1:07	1	65	108	3	7.9	4.9	3.0
130	88	4396	91	8	04-Jun-91	1:19	1	65	107	3	10.4	7.3	3.1
131	88	4421	91	8	04-Jun-91	22:37	1	65	83	3	15.5	12.5	3.0
132	88	4451	91	8	05-Jun-91	3:37	5	65	73	3	15.5	12.5	3.0
133	88	4452	91	8	05-Jun-91	3:47	1	65	73	3	15.5	12.5	3.0
134	88	4497	91	8	06-Jun-91	2:59	1	65	59	3	9.1	6.1	3.0
135	88	4524	91	8	07-Jun-91	0:21	1	65	30	3	9.1	6.1	3.0
136	88	4533	91	8	07-Jun-91	2:01	1	65	36	3	7.3	4.3	3.0
137	88	4606	91	8	07-Jun-91	4:34	1	65	39	3	13.1	10.1	3.0
138	88	4683	91	9	11-Jun-91	21:11	1	65	90	3	9.1	6.1	3.0

TABLE B.2-2 VARIABLE CHECK FOR SUBTASK 2.2, SAMPLES WITH WRONG DEPTH FOR STRATA FROM THE 1991 LONGITUDINAL RIVER ICHTHYOPLANKTON SURVEY

OBS	TASK	SAMPLE	YEAR	RIV_RUN	DATE	TIME	USE_COD	GEAR	RIV_MILE	STRATA	RIV_DPTH	SAM_DPTH	DPTH DIF
139	88	4758	91	9	13-Jun-91	4:00	1	65	30	3	8.8	5.8	3.0
140	88	4760	91	9	13-Jun-91	4:20	1	65	31	3	7.3	4.3	3.0
141	88	4781	91	9	13-Jun-91	23:37	1	65	36	3	7.6	4.6	3.0
142	88	4805	91	9	14-Jun-91	3:10	5	65	42	3	8.2	5.2	3.0
143	88	4806	91	9	14-Jun-91	3:17	1	65	42	3	8.2	5.2	3.0
144	88	4818	91	9	14-Jun-91	21:05	1	65	63	3	12.5	9.4	3.1
145	88	4825	91	9	14-Jun-91	22:01	1	65	60	3	9.1	6.1	3.0
146	88	4827	91	9	14-Jun-91	22:15	1	65	60	3	10.4	7.3	3.1
147	88	4845	91	9	15-Jun-91	0:44	1	65	57	3	12.5	9.4	3.1
148	88	4851	91	9	15-Jun-91	1:31	1	65	56	3	13.7	10.7	3.0
149	88	4868	91	9	15-Jun-91	4:04	1	65	54	3	12.5	9.4	3.1
150	88	4881	91	9	15-Jun-91	21:58	1	65	49	3	15.8	12.8	3.0
151	88	4896	91	10	17-Jun-91	22:12	1	65	134	3	12.5	9.4	3.1
152	88	4913	91	10	18-Jun-91	3:27	1	65	92	3	6.7	3.7	3.0
153	88	4917	91	10	18-Jun-91	4:04	1	65	91	3	7.6	4.6	3.0
154	88	4924	91	10	18-Jun-91	21:15	1	65	85	3	6.4	3.4	3.0
155	88	4925	91	10	18-Jun-91	21:22	1	65	85	3	6.4	3.4	3.0
156	88	4963	91	10	19-Jun-91	3:57	1	65	63	3	7.9	4.9	3.0
157	88	4991	91	10	20-Jun-91	3:30	1	65	58	3	9.1	6.1	3.0
158	88	4992	91	10	20-Jun-91	3:37	1	65	58	3	8.5	5.5	3.0
159	88	4996	91	10	20-Jun-91	4:08	1	65	58	3	12.5	9.4	3.1
160	88	5009	91	10	20-Jun-91	22:30	1	65	54	3	13.7	10.7	3.0
161	88	5026	91	10	21-Jun-91	1:17	1	65	51	3	15.2	12.2	3.0

TABLE B.2-2 VARIABLE CHECK FOR SUBTASK 2.2, SAMPLES WITH WRONG DEPTH FOR STRATA FROM THE 1991 LONGITUDINAL RIVER ICHTHYOPLANKTON SURVEY

OBS	TASK	SAMPLE	YEAR	RIV_RUN	DATE	TIME	USE_COD	GEAR	RIV_MILE	STRATA	RIV_DPTH	SAM_DPTH	DPTH DIF
162	88	5083	91	10	22-Jun-91	21:05	1	65	31	3	7.6	4.6	3.0
163	88	5095	91	10	22-Jun-91	22:39	1	65	35	3	9.4	6.4	3.0
164	88	5096	91	10	22-Jun-91	22:49	1	65	35	3	9.1	6.1	3.0
165	88	5104	91	10	22-Jun-91	23:54	1	65	37	3	7.6	4.6	3.0
166	88	5114	91	10	23-Jun-91	1:36	5	65	40	3	15.2	12.2	3.0
167	88	5115	91	10	23-Jun-91	1:44	1	65	40	3	15.2	12.2	3.0
168	88	5122	91	10	23-Jun-91	2:49	1	65	42	3	11.0	7.9	3.1
169	88	5142	91	11	24-Jun-91	23:20	1	65	59	3	10.4	9.1	1.3
170	88	5145	91	11	24-Jun-91	23:56	1	65	58	3	7.6	4.6	3.0
171	88	5154	91	11	25-Jun-91	1:37	1	65	57	3	13.1	11.6	1.5
172	88	5163	91	11	25-Jun-91	4:01	1	65	56	3	15.2	12.2	3.0
173	88	5164	91	11	25-Jun-91	4:09	1	65	56	3	14.0	11.0	3.0
174	88	5173	91	11	25-Jun-91	22:18	1	65	53	3	12.8	11.3	1.5
175	88	5238	91	11	27-Jun-91	2:27	1	65	39	3	9.4	6.4	3.0
176	88	5246	91	11	27-Jun-91	3:51	1	65	36	3	7.6	4.6	3.0
177	88	5261	91	11	27-Jun-91	22:09	1	65	13	3	8.8	5.8	3.0
178	88	5262	91	11	27-Jun-91	22:17	1	65	13	3	7.3	4.3	3.0
179	88	5290	91	11	28-Jun-91	2:44	1	65	31	3	7.3	4.3	3.0
180	88	5292	91	11	28-Jun-91	3:08	1	65	32	3	7.6	4.6	3.0
181	88	5293	91	11	28-Jun-91	3:16	1	65	32	3	7.6	4.6	3.0
182	88	5309	91	11	28-Jun-91	23:46	1	65	122	3	10.4	7.3	3.1
183	88	5322	91	11	29-Jun-91	4:01	1	65	93	3	9.1	6.1	3.0
184	88	5326	91	11	29-Jun-91	4:26	1	65	92	3	6.7	3.7	3.0

TABLE B.2-2 VARIABLE CHECK FOR SUBTASK 2.2, SAMPLES WITH WRONG DEPTH FOR STRATA FROM THE 1991 LONGITUDINAL RIVER ICHTHYOPLANKTON SURVEY

OBS	TASK	SAMPLE	YEAR	RIV_RUN	DATE	TIME	USE_COD	GEAR	RIV_MILE	STRATA	RIV_DPTH	SAM_DPTH	DPTH DIF
185	88	5353	91	11	30-Jun-91	0:56	1	65	72	3	13.7	10.7	3.0
186	88	5364	91	11	30-Jun-91	2:36	1	65	68	3	10.4	7.3	3.1
187	88	5365	91	11	30-Jun-91	2:49	1	65	67	3	15.5	12.5	3.0
188	88	5366	91	11	30-Jun-91	3:03	1	65	67	3	15.5	12.5	3.0
189	88	5368	91	11	30-Jun-91	3:30	1	65	65	3	16.2	13.1	3.1
190	88	5370	91	11	30-Jun-91	3:44	1	65	65	3	15.8	12.8	3.0
191	88	5388	91	12	30-Jun-91	23:44	1	65	18	3	13.7	10.7	3.0
192	88	5407	91	12	01-Jul-91	3:34	1	65	32	3	7.6	4.6	3.0
193	88	5409	91	12	01-Jul-91	3:47	5	65	33	3	9.4	6.4	3.0
194	88	5410	91	12	01-Jul-91	3:55	1	65	33	3	9.4	6.4	3.0
195	88	5420	91	12	01-Jul-91	23:03	1	65	41	3	15.2	12.2	3.0
196	88	5483	91	12	04-Jul-91	2:56	1	65	93	3	6.7	3.7	3.0
197	88	5489	91	12	04-Jul-91	3:49	1	65	89	3	12.8	9.8	3.0
198	88	5570	91	12	03-Jul-91	21:11	1	65	35	3	10.1	7.3	2.8
199	88	5612	91	12	05-Jul-91	2:57	1	65	61	3	9.1	6.1	3.0
200	88	5620	91	12	05-Jul-91	3:51	1	65	60	3	7.6	4.6	3.0
201	88	5631	91	13	08-Jul-91	21:20	1	65	9	3	9.1	6.1	3.0
202	88	5638	91	13	08-Jul-91	22:26	1	65	15	3	6.4	3.4	3.0
203	88	5656	91	13	09-Jul-91	1:46	1	65	25	3	8.8	5.8	3.0
204	88	5677	91	13	09-Jul-91	21:13	1	65	36	3	8.2	5.2	3.0
205	88	5682	91	13	09-Jul-91	22:01	1	65	37	3	7.9	4.9	3.0
206	88	5683	91	13	09-Jul-91	22:09	1	65	37	3	7.9	4.9	3.0
207	88	5684	91	13	09-Jul-91	22:17	1	65	37	3	7.6	4.6	3.0

TABLE B.2-2 VARIABLE CHECK FOR SUBTASK 2.2, SAMPLES WITH WRONG DEPTH FOR STRATA FROM THE 1991 LONGITUDINAL RIVER ICHTHYOPLANKTON SURVEY

OBS	TASK	SAMPLE	YEAR	RIV_RUN	DATE	TIME	USE_COD	GEAR	RIV_MILE	STRATA	RIV_DPTH	SAM_DPTH	DPTH DIF
208	88	5686	91	13	09-Jul-91	22:33	1	65	37	3	7.9	4.9	3.0
209	88	5690	91	13	09-Jul-91	23:07	1	65	39	3	11.9	8.8	3.1
210	88	5696	91	13	10-Jul-91	0:07	5	65	39	3	14.9	11.9	3.0
211	88	5697	91	13	10-Jul-91	0:17	1	65	39	3	14.9	11.9	3.0
212	88	5713	91	12	04-Jul-91	22:13	1	65	51	3	14.3	12.2	2.1
213	88	5740	91	12	05-Jul-91	4:02	5	65	56	3	10.1	7.3	2.8
214	88	5741	91	12	05-Jul-91	4:11	1	65	56	3	10.1	7.3	2.8
215	88	5744	91	12	05-Jul-91	4:48	1	65	58	1	6.1	3.0	3.1
216	88	5783	91	13	11-Jul-91	0:56	1	65	115	3	12.5	9.4	3.1
217	88	5793	91	13	11-Jul-91	4:15	1	65	93	3	7.9	4.9	3.0
218	88	5797	91	13	11-Jul-91	4:44	1	65	92	3	7.6	4.6	3.0
219	88	5836	91	13	12-Jul-91	2:21	1	65	68	3	9.1	6.1	3.0
220	88	5892	91	13	13-Jul-91	1:54	1	65	54	3	15.5	12.5	3.0
221	88	5901	91	13	13-Jul-91	3:20	1	65	51	3	18.0	14.9	3.1
222	88	5925	91	14	23-Jul-91	1:46	1	65	11	3	7.3	4.3	3.0
223	88	5931	91	14	23-Jul-91	3:58	1	65	20	3	10.4	7.3	3.1
224	88	5935	91	14	23-Jul-91	4:53	1	65	21	3	12.8	9.8	3.0
225	88	5974	91	14	24-Jul-91	4:42	5	65	37	3	7.3	4.3	3.0
226	88	5976	91	14	24-Jul-91	4:54	1	65	37	3	7.3	4.3	3.0
227	88	6013	91	15	06-Aug-91	21:38	1	65	10	3	7.6	4.6	3.0
228	88	6015	91	15	06-Aug-91	21:50	1	65	11	3	7.6	4.6	3.0
229	88	6019	91	15	06-Aug-91	22:24	1	65	13	3	9.1	6.1	3.0
230	88	6028	91	15	06-Aug-91	23:37	1	65	16	3	7.6	4.6	3.0

TABLE B.2-2 VARIABLE CHECK FOR SUBTASK 2.2, SAMPLES WITH WRONG DEPTH FOR STRATA FROM THE 1991 LONGITUDINAL RIVER ICHTHYOPLANKTON SURVEY

OBS	TASK	SAMPLE	YEAR	RIV_RUN	DATE	TIME	USE_COD	GEAR	RIV_MILE	STRATA	RIV_DPTH	SAM_DPTH	DPTH DIF
231	88	6046	91	15	07-Aug-91	3:13	1	65	31	3	7.6	4.6	3.0
232	88	6048	91	15	07-Aug-91	3:36	1	65	32	3	7.6	4.6	3.0
233	88	6052	91	15	07-Aug-91	4:13	1	65	34	3	7.6	4.6	3.0
234	88	6069	91	15	07-Aug-91	22:22	1	65	60	3	9.1	6.1	3.0
235	88	6074	91	15	07-Aug-91	23:18	1	65	58	3	7.6	4.6	3.0
236	88	6097	91	15	08-Aug-91	4:14	1	65	37	3	7.6	4.6	3.0
237	88	6098	91	15	08-Aug-91	4:17	1	65	37	3	7.6	4.6	3.0
238	88	6099	91	15	08-Aug-91	4:27	1	65	38	3	7.9	4.9	3.0
239	88	6104	91	16	20-Aug-91	21:35	1	65	64	3	12.5	9.4	3.1
240	88	6133	91	16	21-Aug-91	3:20	1	65	38	3	7.6	4.6	3.0
241	88	6147	91	16	21-Aug-91	5:17	1	65	38	3	7.6	4.6	3.0
242	88	6156	91	16	21-Aug-91	21:21	5	65	10	3	7.3	4.3	3.0
243	88	6158	91	16	21-Aug-91	21:35	1	65	11	3	7.6	4.6	3.0
244	88	6166	91	16	21-Aug-91	22:54	1	65	17	3	6.7	3.7	3.0
245	88	6184	91	16	22-Aug-91	2:51	1	65	32	3	7.6	4.6	3.0
246	88	6202	91	17	03-Sep-91	23:19	1	65	11	3	13.7	10.7	3.0
247	88	6219	91	17	04-Sep-91	23:00	1	65	25	3	8.2	5.2	3.0
248	88	6240	91	17	05-Sep-91	3:14	1	65	37	3	6.7	4.0	2.7
249	88	6259	91	17	05-Sep-91	21:49	1	65	68	3	14.0	11.0	3.0
250	88	6275	91	17	06-Sep-91	1:27	1	65	56	3	7.6	4.6	3.0
251	88	6298	91	18	16-Sep-91	22:44	1	65	11	3	6.7	3.7	3.0
252	88	6315	91	18	17-Sep-91	3:40	1	65	26	3	6.4	3.4	3.0
253	88	6360	91	18	18-Sep-91	2:29	1	65	38	3	11.0	7.9	3.1

TABLE B.2-2 VARIABLE CHECK FOR SUBTASK 2.2, SAMPLES WITH WRONG DEPTH FOR STRATA FROM THE 1991 LONGITUDINAL RIVER ICHTHYOPLANKTON SURVEY

OBS	TASK	SAMPLE	YEAR	RIV_RUN	DATE	TIME	USE_COD	GEAR	RIV_MILE	STRATA	RIV_DPTH	SAM_DPTH	DPTH DIF
254	88	6389	91	19	01-Oct-91	21:04	1	65	10	3	7.3	4.3	3.0
255	88	6391	91	19	01-Oct-91	21:15	1	65	10	3	7.3	4.3	3.0
256	88	6431	91	19	02-Oct-91	21:20	1	65	58	3	10.4	7.3	3.1
257	88	6450	91	19	03-Oct-91	1:09	1	65	42	3	15.2	12.2	3.0
258	88	6456	91	19	03-Oct-91	2:29	1	65	37	3	7.6	4.6	3.0
259	88	6458	91	19	03-Oct-91	2:49	1	65	35	3	7.3	4.3	3.0
260	88	6484	91	20	15-Oct-91	22:19	1	65	58	3	11.3	8.2	3.1
261	88	6516	91	20	16-Oct-91	5:12	1	65	37	3	7.0	4.0	3.0
262	88	6517	91	20	16-Oct-91	5:19	1	65	37	3	7.0	4.0	3.0
263	88	6530	91	20	16-Oct-91	20:46	1	65	10	3	7.0	4.0	3.0
264	88	6532	91	20	16-Oct-91	21:20	1	65	14	3	7.3	4.3	3.0
265	88	6544	91	20	16-Oct-91	23:10	1	65	21	3	11.9	8.8	3.1
266	88	6558	91	20	17-Oct-91	1:12	1	65	31	3	7.3	4.3	3.0
267	88	6559	91	20	17-Oct-91	1:15	1	65	31	3	7.3	4.3	3.0
268	88	6560	91	20	17-Oct-91	1:30	1	65	32	3	7.6	4.6	3.0

TABLE B.2-3

DESIGNATION OF 1991 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

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

TABLE B.2-4 VARIABLE CHECK FOR SUBTASK 2.2, SAMPLES WITH DISAGREEMENTS BETWEEN ICHLRLV5 (counts) AND ICHLRLV6 (number of length measurements) FILES FROM THE 1991 LONGITUDINAL RIVER ICHYOPLANKTON SURVEY

SAMPLE	TAXON	LENGTH SHEET			TALLY SHEET			RESOLUTION				
								ICHLRLV5 and ICHLRL5S			ICHLRLV6	RATIO
		YSL	PYSL	YOY	YSL	PYSL	YOY	CT_YSL	CT_PYSL	CT_YOY		
3606	3	0	4	0	0	0	0	0	4[a]	0		
3650	35	13	1[b]	0	13	1	0	13	1	0	LENGTH=4.6 LIFE_STG=3	
3682	35	6	1[b]	0	6	1	0	6	1	0	LENGTH=3.8 LIFE_STG=3	
3687	35	2	2[b]	0	2	2	0	2	2	0	LENGTH=4.8 LIFE_STG=3	
											LENGTH=5.0 LIFE_STG=3	
3938	35	10[c]	20	0	5	41	0	13	33	0		
3941	35	21[c]	9	0	18	79	0	38	59	0		5/25
4001	35	0	26	0	10	16	0	0	26	0		3/12
4009	35	20[c]	10	0	6	51	0	36	21	0		
4065	3	15	10	0	0	25	0	15 (240)[d]	10 (160)[d]	0		14/24
4066	3	0	3	0	3	0	0	0	3 (48)[d]	0		
4161	35	0	52	0	52	0	0	0	52	0		

[a] Taxon is added to the file.
[b] A wrong LIFE_STG designation in ICHLRLV6.
[c] Assumed length LIFE_STG designations correct which means some of the PYSL on tally sheet should be YSL. PYSL (tally sheet) x RATIO = No. YSL.
[d] Split factor = 16. No. in ( ) used for ICHLRLV5 file.
[e] Split factor = 8. No. in ( ) used for ICHLRLV5 file.
[f] YSL values appeared transposed between TAXON 30 and 35 in SAMPLE 4504.
[g] Assumed length LIFE_STG designations correct which means some PYSL on tally sheet should be YOY. PYSL (tally sheet) x RATIO + No. YOY.
[h] Split factor = 4. No. in ( ) used for ICHLRLV5 file.
[i] Change indicated by Normandeau (communications).
RATIO = excess YSL or YOY on length sheet not accounted for on tally sheet + (excess YSL [or YOY]+PYSL) from length sheet.

TABLE B.2-4 VARIABLE CHECK FOR SUBTASK 2.2, SAMPLES WITH DISAGREEMENTS BETWEEN ICHLRLV5 (counts) AND ICHLRLV6 (number of length measurements) FILES FROM THE 1991 LONGITUDINAL RIVER ICHYOPLANKTON SURVEY

		LENGTH SHEET			TALLY SHEET			RESOLUTION ICHLRLV5 and ICHLRL5S			ICHLRLV6	RATIO
SAMPLE	TAXON	YSL	PYSL	YOY	YSL	PYSL	YOY	CT_YSL	CT_PYSL	CT_YOY		
4196	30	1	29	0	0	266	0	1	266	0		
4219	30	5[c]	25	0	0	340	0	57 (456)[e]	283 (2264)[e]	0		5/30
4277	30	19	7	0	7	19	0	19	7	0		
4278	30	4	26[b]	0	4	27	0	4	27	0	LENGTH=5.4 LIFE_STG=3	
4285	35	3[c]	27	0	0	288	0	29 (232)[e]	259 (2072)[e]	0		3/30
4325	30	3[c]	27	0	0	105	0	10	95	0		3/30
4504[f]	30	6	24	0	2	205	0	6	205	0		
4504[e]	35	2	28	0	6	454	0	2	454	0		
4687	3	0	0	1	0	1	0	0	0	1 (4)[h]		
5081	30	0	2	0	0	0	0	0	2[a]	0		
5086	3	0	0	1	0	1	0	0	0	1		
5161	30	0	8	2	0	10	0	0	8	2		

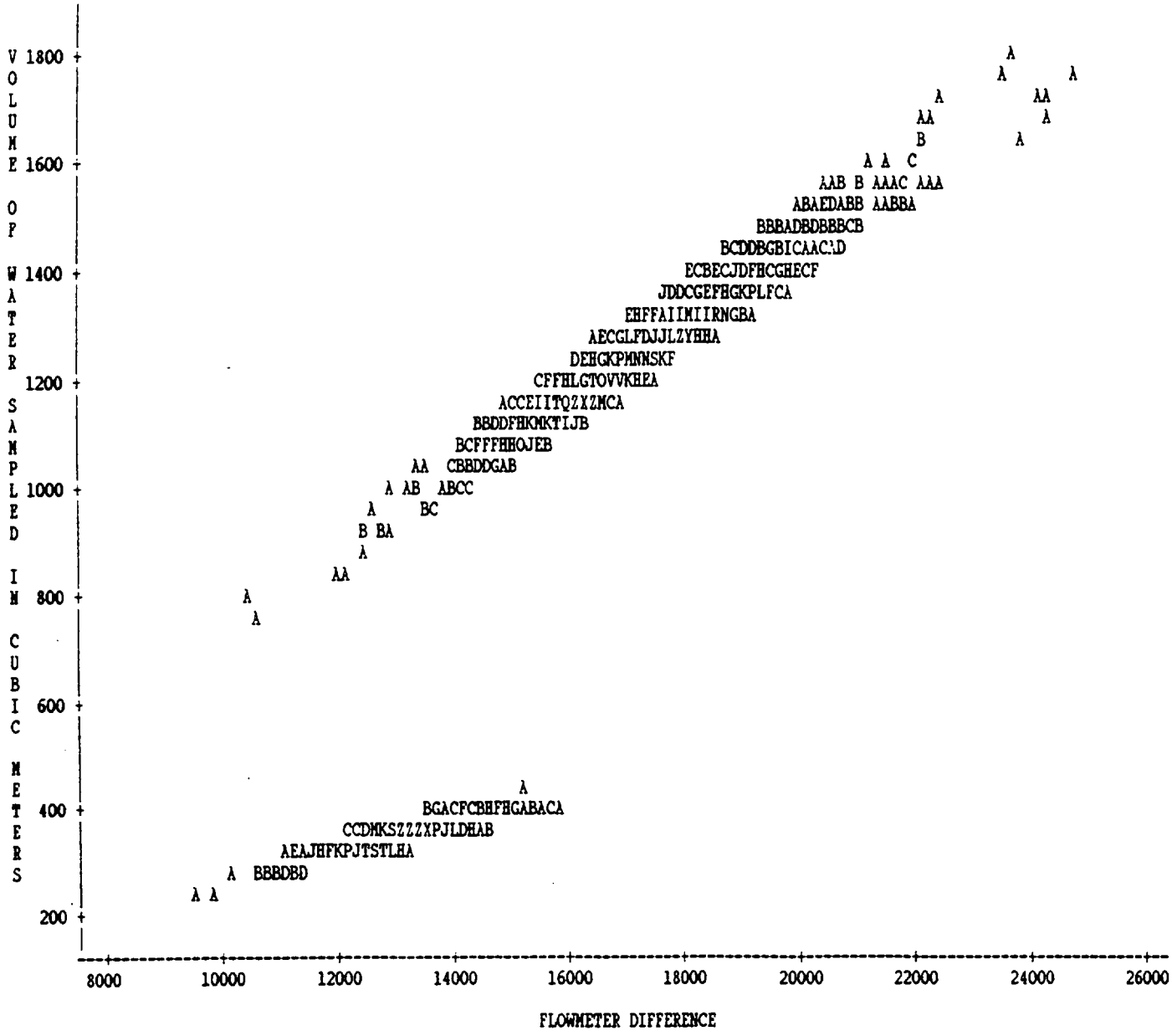
[a] Taxon is added to the file.
[b] A wrong LIFE_STG designation in ICHLRLV6.
[c] Assumed length LIFE_STG designations correct which means some of the PYSL on tally sheet should be YSL. PYSL (tally sheet) x RATIO = No. YSL.
[d] Split factor = 16. No. in ( ) used for ICHLRLV5 file.
[e] Split factor = 8. No. in ( ) used for ICHLRLV5 file.
[f] YSL values appeared transposed between TAXON 30 and 35 in SAMPLE 4504.
[g] Assumed length LIFE_STG designations correct which means some PYSL on tally sheet should be YOY. PYSL (tally sheet) x RATIO + No. YOY.
[h] Split factor = 4. No. in ( ) used for ICHLRLV5 file.
[i] Change indicated by Normandeau (communications).
RATIO = excess YSL or YOY on length sheet not accounted for on tally sheet + (excess YSL [or YOY]+PYSL) from length sheet.

TABLE B.2-4 VARIABLE CHECK FOR SUBTASK 2.2, SAMPLES WITH DISAGREEMENTS BETWEEN ICHLRLV5 (counts) AND ICHLRLV6 (number of length measurements) FILES FROM THE 1991 LONGITUDINAL RIVER ICHYOPLANKTON SURVEY

		LENGTH SHEET			TALLY SHEET			RESOLUTION				
								ICHLRLV5 and ICHLRL5S			ICHLRLV6	RATIO
SAMPLE	TAXON	YSL	PYSL	YOY	YSL	PYSL	YOY	CT_YSL	CT_PYSL	CT_YOY		
5468	3	0	6	12	0	4	14	0	6	12		
5492	30	0	0	15	0	2	13	0	0	15		
5492	35	0	0	9	0	3	6	0	0	9		
5604	30	0	0	1	0	1	0	0	0	1		
5613	30	0	25	5[g]	0	42	4	0	40	6		1/26
5731	30	0	1	0	0	0	0	0	1[a]	0		
5792	35	0	0	1	0	1	0	0	0	1		
5794	30	0	2	1	0	1	2	0	2	1		
5829	30	0	0	3	0	2	1	0	0	3		
5829	35	0	0	3	0	3	0	0	0	3		
5832	30	0	7	11	0	11	7	0	7	11		
5902	3	0	0	1	0	0	0	0	0	1[a]		
6103	3	0	0	1	0	0	0	0	0	1[a]		
6103	22						5			4[i]		

[a] Taxon is added to the file.
[b] A wrong LIFE_STG designation in ICHLRLV6.
[c] Assumed length LIFE_STG designations correct which means some of the PYSL on tally sheet should be YSL. PYSL (tally sheet) x RATIO = No. YSL.
[d] Split factor = 16. No. in ( ) used for ICHLRLV5 file.
[e] Split factor = 8. No. in ( ) used for ICHLRLV5 file.
[f] YSL values appeared transposed between TAXON 30 and 35 in SAMPLE 4504.
[g] Assumed length LIFE_STG designations correct which means some PYSL on tally sheet should be YOY. PYSL (tally sheet) x RATIO + No. YOY.
[h] Split factor = 4. No. in ( ) used for ICHLRLV5 file.
[i] Change indicated by Normandeau (communications).
RATIO = excess YSL or YOY on length sheet not accounted for on tally sheet ÷ (excess YSL [or YOY]+PYSL) from length sheet.

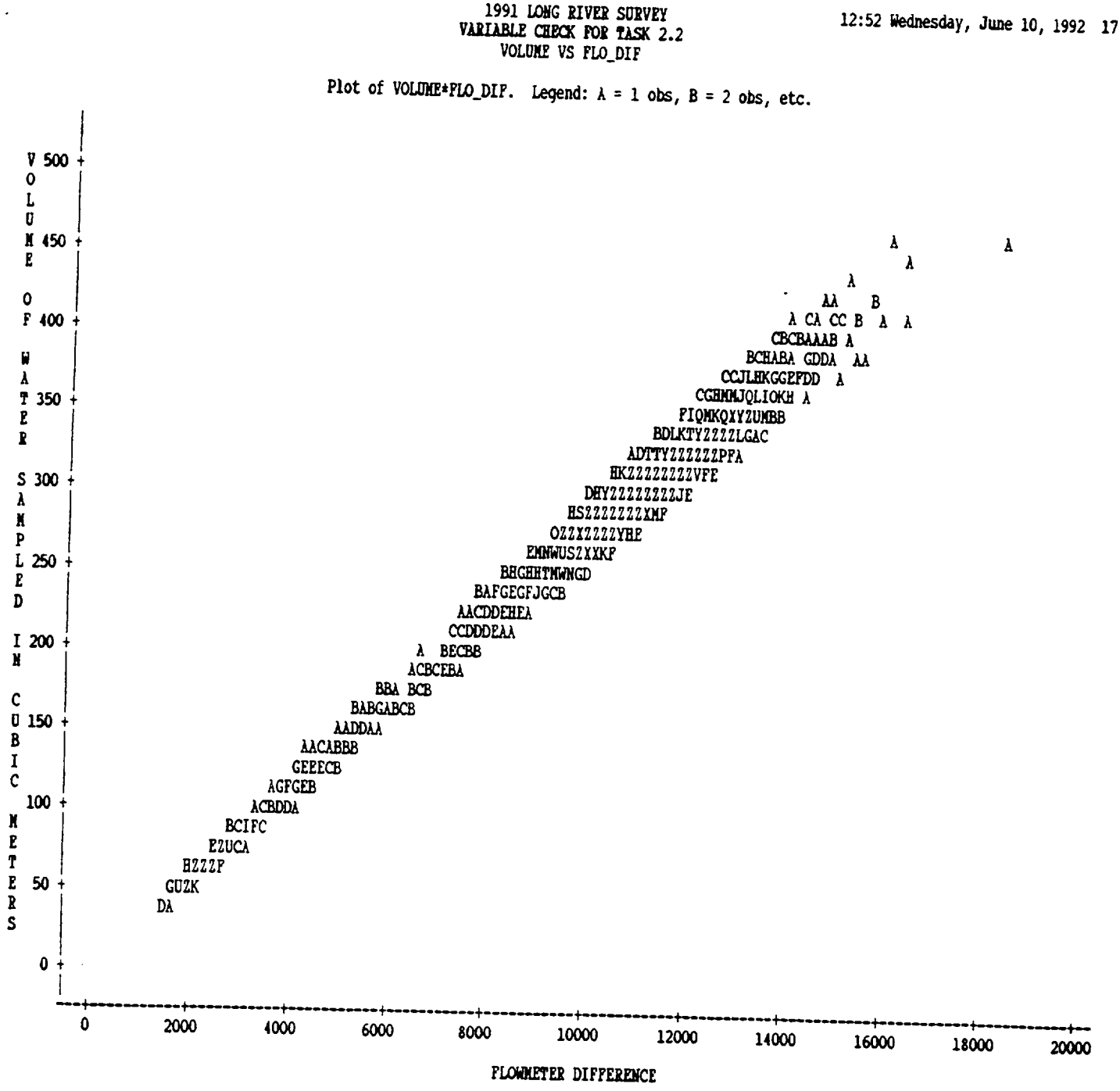
Plot of VOLUME*FLO_DIF. Legend: A = 1 obs, B = 2 obs, etc.



NOTE: 11 obs hidden.

Figure B.2-1. Variable check for Subtask 2.2 VOLUME vs FLO_DIF from the 1991 Fall Juvenile Survey.

Figure B.2-2. Variable check for Subtask 2.2 VOLUME vs FLO_DIF from the 1991 Longitudinal River Ichthyoplankton Survey.



APPENDIX C

PHYSICAL/CHEMICAL PARAMETERS

APPENDIX C

LIST OF TABLES

Number	Title
C-1	Daily freshwater flow (m^3/sec)recorded at Green Island, New York, 1991.
C-2	Long-Term (1918-1990) and 1991 monthly mean freshwater flow (m^3/sec) recorded at Green Island, New York.
C-3	Monthly mean freshwater flow (m^3/sec)recorded at Green Island, New York, from 1974 to 1991.
C-4	Poughkeepsie Water Works data, mean, minimum, and maximum temperature (°C)for each day of the year, 1951-1991.
C-5	Weighted mean temperature (°C)by region and week from 1991 Longitudinal River Ichthyoplankton and Fall Juvenile Surveys.
C-6	Mean temperature (°C)by region an week from 1991 Beach Seine Survey
C-7	Weighted mean salinity (ppt by region and week from 1991 Longitudinal River Ichthyoplankton and Fall Juvenile Surveys.
C-8	Mean salinity (ppt) by region and week from 1991 Beach Seine Survey.
C-9	Weighted mean dissolved oxygen (mg/l) by region and week from 1991 Longitudinal River Ichthyoplankton and Fall Juvenile Surveys.
C-10	Mean dissolved oxygen (mg/l) by region and week from 1991 Beach Seine Survey.
C-11	Weighted mean percent oxygen saturation by region and week from 1991 Longitudinal River Ichthyoplankton and Fall Juvenile Surveys.
C-12	Mean percent oxygen saturation by region an week from 1991 Beach Seine Survey.
C-13	Weighted mean conductivity (mS/cm at 25°C)by region and week from 1991 Longitudinal River Ichthyoplankton and Fall Juvenile Surveys.
C-14	Mean conductivity (mS/cm at 25°C)by region and week from 1991 Beach Seine Survey.

TABLE C-1 DAILY FRESHWATER FLOW (m^3/sec) RECORDED AT GREEN ISLAND, NEW YORK, 1991[1]

DAY OF MONTH	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	1225	359	379	631	617	248	110	105	84	148	153	345
2	999	345	371	597	741	249	116	95	103	201	152	385
3	863	337	552	543	645	208	100	88	113	190	157	379
4	767	342	965	498	515	171	103	91	110	189	156	385
5	637	385	1531	492	504	181	107	106	112	159	133	328
6	532	490	1126	501	461	164	103	96	113	207	153	289
7	538	733	1061	555	586	154	106	105	94	317	158	269
8	490	976	1115	657	583	147	142	102	89	250	151	247
9	402	843	889	860	498	145	132	96	107	248	125	365
10	430	713	753	1064	450	89	122	109	107	206	156	625
11	436	606	659	1022	430	114	129	150	105	197	174	529
12	379	498	569	900	410	116	113	153	108	230	282	430
13	365	422	543	773	357	142	102	119	87	226	291	379
14	368	433	484	631	306	151	104	123	83	194	235	453
15	410	419	473	529	294	136	114	120	83	190	239	651
16	430	413	450	464	241	146	130	112	126	218	251	543
17	509	362	473	410	273	203	112	106	120	311	276	402
18	693	351	478	359	265	203	108	123	160	331	300	362
19	648	388	532	331	228	164	113	142	186	317	240	342
20	546	441	583	439	259	139	87	183	177	280	204	286
21	501	716	577	422	263	132	99	173	164	231	237	314
22	436	634	535	1228	209	116	101	184	134	243	239	334
23	342	600	450	1421	186	109	130	178	153	225	1056	320
24	368	484	526	985	170	103	119	150	142	198	843	303
25	357	430	756	795	164	111	126	119	158	179	589	275
26	345	402	730	659	136	108	123	128	280	163	535	250
27	359	382	659	543	140	97	105	117	275	168	456	253
28	371	371	770	484	148	104	109	130	168	184	393	269
29	379		928	436	203	86	101	111	184	162	334	246
30	374		891	430	218	97	110	102	170	165	371	300
31	368		761		215		92	93		164		416

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

TABLE C-2 LONG-TERM (1918-1990) AND 1991 MONTHLY MEAN FRESHWATER FLOW (m^3/sec) RECORDED AT GREEN ISLAND, NEW YORK

	Flow (m^3/sec)			
Month	1991[a] Average	Long-Term Average[b]	Long-Term Minimum[c]	Long-Term Maximum[c]
JAN	512	360	91	961
FEB	496	363	86	885
MAR	696	645	178	1,595
APR	655	868	290	1,461
MAY	346	542	122	1,156
JUN	144	278	92	839
JUL	112	193	81	637
AUG	123	159	70	414
SEP	136	182	81	612
OCT	216	247	72	854
NOV	301	368	93	929
DEC	364	403	123	948
Annual Average	341	384		

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

TABLE C-3 MONTHLY MEAN FRESHWATER FLOW (m^3/sec) RECORDED AT GREEN ISLAND, NEW YORK FROM 1974 TO 1991

Month	Year																	
	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
JAN	623	540	417	225	745	571	256	148	321	259	308	440	308	263	268	196	383	512
FEB	528	549	885	227	400	336	128	851	361	352	742	319	358	201	349	256	703	496
MAR	587	671	897	1,233	619	1,253	634	349	620	581	465	581	1,011	596	461	332	994	696
APR	854	724	1,041	1,149	950	1,080	748	385	1,085	1,063	940	456	683	897	476	548	894	655
MAY	650	566	901	454	530	554	274	328	354	1,037	844	232	342	122	357	620	990	346
JUN	249	367	431	207	282	236	192	169	432	358	418	157	404	175	123	389	250	144
JUL	334	211	433	162	131	132	144	140	182	127	289	133	228	162	131	92	157	112
AUG	180	254	414	154	169	149	130	134	124	155	176	104	307	118	139	61	248	123
SEP	294	482	271	408	175	221	118	233	122	133	190	171	218	341	164	120	159	136
OCT	256	663	658	854	244	314	158	457	124	154	181	203	337	466	211	256	477	216
NOV	487	637	508	664	227	465	242	395	196	339	277	419	545	415	565	565	653	301
DEC	549	532	399	750	303	430	273	321	233	799	448	330	524	412	330	180	687	364
Annual	465	516	603	543	398	479	275	322	345	447	438	295	439	347	298	301	549	341

TABLE C-4 POUGHKEEPSIE WATER WORKS DATA, MEAN, MINIMUM, AND MAXIMUM TEMPERATURE (°C) FOR EACH DAY OF THE YEAR, 1951-1991

		LONG-TERM TEMPERATURE (1951-1990)			
Month	Day	Mean	Min	Max	1991
1	1	1.6	0.6	4.4	1.9
1	2	1.5	0.0	4.4	1.9
1	3	1.6	0.6	4.4	1.9
1	4	1.5	0.6	3.3	1.7
1	5	1.5	0.0	3.3	1.6
1	6	1.3	0.0	3.3	1.8
1	7	1.3	0.0	3.3	1.5
1	8	1.2	0.0	3.3	1.0
1	9	1.2	0.0	3.3	1.0
1	10	1.1	0.0	2.8	0.9
1	11	1.1	0.0	2.8	0.9
1	12	1.1	0.6	2.8	0.9
1	13	1.1	0.0	2.8	0.8
1	14	1.1	0.0	2.8	0.7
1	15	1.1	0.0	2.8	0.8
1	16	1.1	0.5	2.8	0.9
1	17	1.1	0.6	2.8	1.0
1	18	1.1	0.6	3.3	0.9
1	19	1.0	0.6	2.8	0.9
1	20	1.0	0.5	2.2	0.9
1	21	1.0	0.0	2.4	0.8
1	22	1.0	0.6	2.2	0.8
1	23	1.0	0.6	2.2	0.8
1	24	1.0	0.0	2.2	0.9
1	25	1.0	0.0	3.1	0.9
1	26	0.9	0.0	2.2	0.8
1	27	1.0	0.0	2.2	0.9
1	28	1.0	0.6	2.2	0.8
1	29	1.0	0.6	2.2	0.8
1	30	1.0	0.6	2.2	1.1
1	31	1.0	0.6	2.2	1.1
2	1	1.0	0.6	2.2	1.2
2	2	1.0	0.6	2.2	1.1
2	3	1.0	0.6	2.2	1.1

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

TABLE C-4 POUGHKEEPSIE WATER WORKS DATA, MEAN, MINIMUM, AND MAXIMUM TEMPERATURE (°C) FOR EACH DAY OF THE YEAR, 1951-1991

Month	Day	LONG-TERM TEMPERATURE (1951-1990) Mean	Min	Max	1991
2	4	0.9	0.6	1.8	1.1
2	5	0.9	0.6	1.7	1.1
2	6	1.0	0.5	2.0	1.1
2	7	0.9	0.6	2.2	1.2
2	8	1.0	0.6	2.2	1.1
2	9	1.0	0.6	2.2	1.2
2	10	1.1	0.6	3.3	1.1
2	11	1.0	0.0	2.2	1.4
2	12	1.0	0.6	2.3	1.7
2	13	1.1	0.6	2.2	1.7
2	14	1.1	0.6	2.8	2.2
2	15	1.1	0.6	2.8	2.1
2	16	1.1	0.0	2.8	1.9
2	17	1.1	0.6	2.8	2.4
2	18	1.1	0.0	2.8	2.2
2	19	1.2	0.6	2.8	1.6
2	20	1.2	0.6	2.8	2.0
2	21	1.2	0.6	2.8	1.6
2	22	1.2	0.0	3.9	1.7
2	23	1.3	0.0	2.8	1.6
2	24	1.3	0.0	3.9	1.5
2	25	1.3	0.6	3.9	1.7
2	26	1.5	0.0	3.9	1.7
2	27	1.5	0.0	4.4	1.6
2	28	1.5	0.0	5.0	2.0
2	29	1.8	0.6	4.4	
3	1	1.5	0.6	4.4	2.0
3	2	1.5	0.6	4.4	2.2
3	3	1.5	0.6	4.4	2.5
3	4	1.6	0.6	4.4	2.7
3	5	1.5	0.6	3.3	2.9
3	6	1.6	0.6	3.3	3.7
3	7	1.6	0.6	3.3	4.7
3	8	1.6	0.0	3.3	4.9

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

TABLE C-4 POUGHKEEPSIE WATER WORKS DATA, MEAN, MINIMUM, AND MAXIMUM TEMPERATURE (°C) FOR EACH DAY OF THE YEAR, 1951-1991

		LONG-TERM TEMPERATURE (1951-1990)			
Month	Day	Mean	Min	Max	1991
3	9	1.8	0.6	4.4	4.5
3	10	1.8	0.6	4.4	4.8
3	11	1.9	0.6	4.4	3.9
3	12	2.0	0.6	4.4	4.1
3	13	2.1	0.6	4.4	3.7
3	14	2.2	0.6	4.4	3.7
3	15	2.3	0.6	5.0	3.8
3	16	2.4	0.6	5.6	3.9
3	17	2.6	0.6	5.7	3.5
3	18	2.6	0.6	5.9	3.6
3	19	2.7	0.6	7.7	3.9
3	20	2.9	0.6	7.5	4.5
3	21	2.9	0.6	7.3	4.5
3	22	3.1	0.6	7.2	4.6
3	23	3.3	0.6	7.1	4.5
3	24	3.5	0.6	7.1	4.8
3	25	3.6	0.6	5.9	5.0
3	26	3.8	0.6	6.1	5.2
3	27	4.1	1.1	6.7	5.6
3	28	4.3	1.1	6.7	6.2
3	29	4.5	1.1	6.7	6.2
3	30	4.6	1.1	7.8	6.3
3	31	4.9	1.1	8.3	6.7
4	1	5.2	1.7	9.4	6.5
4	2	5.3	2.2	8.3	6.7
4	3	5.5	2.8	8.9	6.6
4	4	5.7	2.8	8.9	7.1
4	5	5.9	2.8	8.9	7.4
4	6	6.0	3.3	8.9	7.5
4	7	6.2	2.8	9.4	8.7
4	8	6.3	2.8	9.4	8.7
4	9	6.3	2.8	8.9	9.2
4	10	6.4	2.8	9.4	10.2
4	11	6.7	2.8	9.4	11.2

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

TABLE C-4 POUGHKEEPSIE WATER WORKS DATA, MEAN, MINIMUM, AND MAXIMUM TEMPERATURE (°C) FOR EACH DAY OF THE YEAR, 1951-1991

		LONG-TERM TEMPERATURE (1951-1990)			
Month	Day	Mean	Min	Max	1991
4	12	6.9	2.8	10.0	11.4
4	13	7.1	2.8	10.6	11.4
4	14	7.2	2.8	11.1	11.4
4	15	7.4	2.8	11.1	11.5
4	16	7.6	3.3	11.1	11.8
4	17	7.8	3.9	11.7	11.6
4	18	8.1	5.6	11.7	11.8
4	19	8.3	5.6	12.2	11.8
4	20	8.6	6.1	12.2	11.7
4	21	8.9	6.1	12.2	11.6
4	22	9.2	6.7	12.8	12.0
4	23	9.4	6.7	12.8	11.1
4	24	9.5	6.7	13.3	10.5
4	25	9.7	6.7	13.3	10.6
4	26	10.0	6.7	13.3	10.9
4	27	10.1	7.2	13.3	11.0
4	28	10.3	7.8	13.3	11.2
4	29	10.5	8.3	13.9	11.9
4	30	10.8	8.9	13.9	12.0
5	1	11.1	8.9	14.4	12.4
5	2	11.4	8.9	14.4	12.8
5	3	11.6	8.9	14.4	12.3
5	4	11.9	8.9	15.0	13.4
5	5	12.0	8.9	15.0	13.7
5	6	12.2	8.9	15.0	14.1
5	7	12.4	8.9	15.0	14.1
5	8	12.5	8.9	15.1	14.2
5	9	12.6	8.9	15.6	14.7
5	10	12.8	8.9	16.1	15.0
5	11	13.0	9.4	16.1	15.3
5	12	13.1	9.4	16.1	15.0
5	13	13.3	10.0	16.1	16.2
5	14	13.4	10.6	16.7	16.1
5	15	13.7	11.1	16.7	16.7

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

TABLE C-4 POUGHKEEPSIE WATER WORKS DATA, MEAN, MINIMUM, AND MAXIMUM TEMPERATURE (°C) FOR EACH DAY OF THE YEAR, 1951-1991

		LONG-TERM TEMPERATURE (1951-1990)			
Month	Day	Mean	Min	Max	1991
5	16	14.0	11.1	16.7	17.2
5	17	14.2	11.7	16.7	17.2
5	18	14.4	12.2	16.7	17.3
5	19	14.7	12.2	17.2	17.5
5	20	14.9	12.2	17.8	17.8
5	21	15.2	12.8	17.8	18.0
5	22	15.4	12.8	18.3	18.5
5	23	15.6	12.8	18.3	18.9
5	24	15.8	12.8	18.3	19.0
5	25	16.0	12.8	18.9	19.3
5	26	16.3	12.2	18.9	19.4
5	27	16.4	12.2	20.6	19.6
5	28	16.7	12.2	20.6	20.4
5	29	16.9	12.8	20.6	20.7
5	30	17.1	12.8	20.6	21.5
5	31	17.2	13.3	20.6	21.3
6	1	17.6	13.3	20.6	22.0
6	2	17.8	13.3	22.2	22.2
6	3	18.0	14.4	21.7	22.1
6	4	18.2	13.9	22.2	22.5
6	5	18.4	15.0	22.2	22.2
6	6	18.6	15.6	21.7	22.4
6	7	18.7	15.0	21.7	22.4
6	8	19.0	16.1	21.7	22.5
6	9	19.1	16.1	21.1	23.0
6	10	19.4	16.1	21.7	23.2
6	11	19.6	17.2	21.7	23.4
6	12	19.7	17.2	22.2	23.3
6	13	19.9	17.8	22.2	23.4
6	14	20.0	17.8	21.7	23.3
6	15	20.1	17.8	22.2	23.5
6	16	20.3	17.8	22.2	23.8
6	17	20.3	17.8	22.2	23.8
6	18	20.6	17.8	22.2	24.2

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

TABLE C-4 POUGHKEEPSIE WATER WORKS DATA, MEAN, MINIMUM, AND MAXIMUM TEMPERATURE (°C) FOR EACH DAY OF THE YEAR, 1951-1991

		LONG-TERM TEMPERATURE (1951-1990)			
Month	Day	Mean	Min	Max	1991
6	19	20.7	17.8	23.3	24.1
6	20	20.8	17.8	23.3	24.0
6	21	21.1	17.8	22.8	24.3
6	22	21.3	17.2	23.3	24.3
6	23	21.4	17.2	23.3	24.1
6	24	21.6	17.8	23.3	24.1
6	25	21.6	17.8	23.9	24.2
6	26	21.8	17.8	24.4	24.5
6	27	22.0	17.8	24.4	24.3
6	28	22.1	17.8	24.4	24.4
6	29	22.2	17.8	25.0	24.5
6	30	22.3	17.8	25.0	24.7
7	1	22.5	18.9	25.0	25.4
7	2	22.6	18.9	25.0	24.7
7	3	22.7	19.4	25.0	24.7
7	4	22.8	19.4	25.0	24.7
7	5	23.0	20.0	25.6	24.5
7	6	23.1	20.0	25.6	24.7
7	7	23.1	20.0	25.6	24.8
7	8	23.3	20.0	25.6	24.9
7	9	23.4	20.0	25.6	24.9
7	10	23.4	20.6	25.6	24.8
7	11	23.5	20.6	25.6	25.0
7	12	23.7	21.1	26.1	25.0
7	13	23.8	21.7	26.7	25.0
7	14	23.9	21.7	26.7	25.1
7	15	24.1	21.7	26.7	25.0
7	16	24.2	22.2	26.7	25.0
7	17	24.3	22.2	26.1	25.2
7	18	24.3	22.2	26.1	25.4
7	19	24.5	22.2	26.1	25.3
7	20	24.6	22.2	26.7	25.1
7	21	24.6	22.8	26.1	25.4
7	22	24.7	22.2	26.7	26.1

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

TABLE C-4 POUGHKEEPSIE WATER WORKS DATA, MEAN, MINIMUM, AND MAXIMUM TEMPERATURE (°C) FOR EACH DAY OF THE YEAR, 1951-1991

		LONG-TERM TEMPERATURE (1951-1990)			
Month	Day	Mean	Min	Max	1991
7	23	24.7	22.2	26.7	26.2
7	24	24.8	22.8	26.7	26.3
7	25	24.8	22.8	26.7	26.1
7	26	24.9	22.8	26.7	26.0
7	27	25.1	22.8	27.2	25.8
7	28	25.1	22.8	27.2	26.1
7	29	25.1	22.8	26.7	26.0
7	30	25.1	23.3	26.7	25.8
7	31	25.2	23.3	26.7	25.9
8	1	25.2	23.3	26.7	26.0
8	2	25.2	22.8	26.7	26.1
8	3	25.3	23.3	26.8	26.1
8	4	25.3	23.3	26.9	25.8
8	5	25.3	23.3	27.2	25.9
8	6	25.3	23.3	27.2	25.9
8	7	25.3	23.3	27.4	25.6
8	8	25.3	23.3	27.4	25.6
8	9	25.3	23.3	27.8	25.9
8	10	25.3	23.3	27.8	25.6
8	11	25.3	22.8	27.8	25.4
8	12	25.3	22.8	28.1	25.2
8	13	25.1	22.2	28.0	25.6
8	14	25.1	22.2	28.4	25.8
8	15	25.0	22.2	28.4	25.9
8	16	25.0	22.2	28.4	25.6
8	17	24.9	22.2	28.1	25.8
8	18	24.9	22.8	28.0	25.8
8	19	24.9	22.2	27.7	25.8
8	20	24.9	22.8	27.6	25.5
8	21	24.8	22.2	27.5	25.2
8	22	24.7	22.2	27.1	26.6
8	23	24.7	22.8	26.9	26.1
8	24	24.6	22.2	26.7	26.1
8	25	24.5	21.7	26.2	25.8

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

TABLE C-4 POUGHKEEPSIE WATER WORKS DATA, MEAN, MINIMUM, AND MAXIMUM TEMPERATURE (°C) FOR EACH DAY OF THE YEAR, 1951-1991

		LONG-TERM TEMPERATURE (1951-1990)			
Month	Day	Mean	Min	Max	1991
8	26	24.4	21.7	26.1	25.8
8	27	24.4	22.2	26.1	26.2
8	28	24.3	22.2	25.8	25.5
8	29	24.2	22.2	26.7	25.8
8	30	24.3	22.2	26.1	25.4
8	31	24.1	22.2	26.1	26.1
9	1	24.1	22.2	26.1	26.1
9	2	24.1	22.2	26.7	26.0
9	3	23.9	22.2	26.1	25.9
9	4	23.8	22.2	25.6	25.1
9	5	23.8	21.7	25.6	24.3
9	6	23.8	22.2	25.6	24.2
9	7	23.6	21.7	25.6	24.1
9	8	23.5	21.7	25.6	24.0
9	9	23.4	21.7	25.6	24.1
9	10	23.3	21.1	25.6	24.5
9	11	23.2	21.1	25.6	24.3
9	12	23.1	21.1	25.6	24.0
9	13	22.9	20.0	25.6	24.1
9	14	22.7	18.9	25.0	24.1
9	15	22.5	17.8	25.0	24.0
9	16	22.3	17.2	25.0	23.7
9	17	22.1	17.2	25.0	24.0
9	18	22.0	16.7	25.0	23.5
9	19	21.9	16.7	23.9	23.7
9	20	21.7	17.2	23.9	23.2
9	21	21.4	16.7	23.3	23.0
9	22	21.3	16.1	23.3	22.2
9	23	21.0	16.1	22.8	22.1
9	24	20.8	15.6	22.8	21.9
9	25	20.6	15.6	22.8	22.0
9	26	20.5	15.6	22.2	21.8
9	27	20.3	16.1	22.2	21.4
9	28	20.1	15.6	22.2	21.3

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

TABLE C-4 POUGHKEEPSIE WATER WORKS DATA, MEAN, MINIMUM, AND MAXIMUM TEMPERATURE (°C) FOR EACH DAY OF THE YEAR, 1951-1991

		LONG-TERM TEMPERATURE (1951-1990)			
Month	Day	Mean	Min	Max	1991
9	29	19.9	15.6	22.2	21.0
9	30	19.7	15.6	22.2	19.4
10	1	19.6	16.1	22.2	19.2
10	2	19.4	15.6	22.2	19.1
10	3	19.3	15.6	22.2	19.7
10	4	19.0	15.6	21.7	19.1
10	5	18.7	15.0	21.1	19.0
10	6	18.6	15.0	21.1	18.5
10	7	18.5	15.0	21.1	18.2
10	8	18.2	14.4	21.1	18.0
10	9	18.0	14.4	21.1	17.8
10	10	17.9	14.4	21.1	17.7
10	11	17.7	13.9	21.1	17.5
10	12	17.4	13.3	21.1	17.5
10	13	17.2	13.3	20.0	17.3
10	14	17.0	12.8	21.1	17.0
10	15	16.8	12.2	20.0	16.8
10	16	16.6	12.2	20.0	16.8
10	17	16.3	12.2	20.0	16.3
10	18	16.1	12.2	20.0	15.8
10	19	15.9	11.7	20.0	15.4
10	20	15.7	10.6	19.4	15.4
10	21	15.3	10.6	18.9	14.9
10	22	15.1	10.0	18.9	14.6
10	23	15.0	10.0	18.9	14.4
10	24	14.7	10.0	18.3	14.3
10	25	14.5	10.0	18.3	14.8
10	26	14.3	10.0	17.8	14.7
10	27	14.1	9.4	17.8	14.7
10	28	14.0	8.9	17.8	14.3
10	29	13.7	8.3	17.8	14.0
10	30	13.5	7.8	16.7	13.8
10	31	13.2	7.2	16.7	13.9
11	1	13.0	7.2	16.7	13.4

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

TABLE C-4 POUGHKEEPSIE WATER WORKS DATA, MEAN, MINIMUM, AND MAXIMUM TEMPERATURE (°C) FOR EACH DAY OF THE YEAR, 1951-1991

Month	Day	LONG-TERM TEMPERATURE (1951-1990) Mean	Min	Max	1991
11	2	12.8	7.2	16.1	13.2
11	3	12.7	7.2	16.1	13.1
11	4	12.4	7.2	16.1	13.0
11	5	12.2	7.2	15.6	12.7
11	6	12.0	6.7	15.6	11.9
11	7	11.7	6.1	15.0	12.0
11	8	11.4	6.1	15.0	11.8
11	9	11.2	5.6	15.0	11.7
11	10	11.0	5.0	15.0	11.5
11	11	10.7	5.0	15.0	11.1
11	12	10.5	5.0	15.0	10.0
11	13	10.3	5.0	13.3	10.1
11	14	10.0	5.0	13.3	10.0
11	15	9.8	5.0	12.8	9.8
11	16	9.6	5.0	12.8	9.7
11	17	9.5	5.0	12.8	9.0
11	18	9.3	5.0	12.8	9.0
11	19	8.9	5.0	12.2	9.0
11	20	8.7	5.0	11.1	9.2
11	21	8.5	3.9	11.1	9.0
11	22	8.3	3.9	11.1	9.2
11	23	8.1	3.9	11.1	8.6
11	24	7.8	3.9	10.6	8.6
11	25	7.6	3.9	10.6	8.4
11	26	7.4	3.3	10.0	8.1
11	27	7.1	3.3	10.0	8.1
11	28	7.0	3.3	10.0	8.1
11	29	6.8	3.3	10.0	8.0
11	30	6.5	2.8	10.0	8.1
12	1	6.3	2.2	9.4	7.8
12	2	6.1	3.0	8.9	7.8
12	3	5.7	2.2	8.9	7.7
12	4	5.6	1.3	8.3	7.2
12	5	5.3	2.8	7.8	6.9

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

TABLE C-4 POUGHKEEPSIE WATER WORKS DATA, MEAN, MINIMUM, AND MAXIMUM TEMPERATURE (°C) FOR EACH DAY OF THE YEAR, 1951-1991

		LONG-TERM TEMPERATURE (1951-1990)			
Month	Day	Mean	Min	Max	1991
12	6	5.2	2.6	7.8	6.2
12	7	5.0	2.0	7.8	6.2
12	8	4.8	2.0	7.8	6.1
12	9	4.5	1.7	7.2	6.1
12	10	4.2	1.1	7.2	5.7
12	11	4.1	1.1	7.2	5.3
12	12	3.9	0.6	7.2	5.3
12	13	3.7	0.6	6.7	5.3
12	14	3.5	0.6	6.7	5.3
12	15	3.3	0.6	6.7	5.2
12	16	3.2	0.6	6.7	4.8
12	17	3.0	0.6	5.6	4.6
12	18	2.8	0.6	5.6	4.4
12	19	2.7	0.6	5.0	3.9
12	20	2.7	0.6	5.0	3.8
12	21	2.4	0.6	4.4	3.7
12	22	2.2	0.6	4.4	3.7
12	23	2.1	0.6	5.0	2.7
12	24	2.0	0.6	5.6	2.7
12	25	2.0	0.6	5.6	2.5
12	26	2.0	0.0	6.1	2.3
12	27	1.9	0.0	6.1	2.4
12	28	1.8	0.0	6.1	2.3
12	29	1.8	0.0	6.1	2.3
12	30	1.7	0.6	6.1	1.7
12	31	1.7	0.0	5.0	1.7

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

TABLE C-5 WEIGHTED MEAN TEMPERATURE (°C) BY REGION AND WEEK FROM 1991 LONGITUDINAL RIVER ICHTHYOPLANKTON AND FALL JUVENILE SURVEYS

Week Beginning Monday	Regions											
	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL
15APR91	9.0	9.2	9.9	9.9	9.8	10.2	11.2	11.4	11.4	10.8	9.3	8.7
22APR91	9.3	9.8	10.1	10.2	11.1	11.1	10.0	9.6	9.4	9.0	8.2	8.1
29APR91	12.0	12.4	12.7	12.1	10.6	10.6	10.6	11.2	11.5	11.3	12.2	11.7
06MAY91	13.7	13.7	13.7	14.0	13.9	14.2	14.1	14.4	14.5	14.1	13.8	13.9
13MAY91	14.6	15.5	15.7	15.1	15.9	16.9	16.8	17.1	17.1	16.8	16.8	17.2
20MAY91	17.1	17.4	17.2	17.5	17.6	19.4	18.4	19.1	19.3	19.2	19.6	19.5
27MAY91	19.9	20.2	20.9	20.4	20.3	22.1	21.5	21.5	21.9	23.1	23.1	23.3
03JUN91	20.7	21.4	22.1	22.1	22.1	22.3	22.2	22.6	23.3	23.5	23.8	23.9
10JUN91	21.9	22.7	23.4	23.2	22.9	23.3	23.4	23.2	23.6	23.6	24.1	23.5
17JUN91	23.6	24.3	24.4	24.3	23.8	24.1	23.9	23.8	24.0	23.9	24.1	24.3
24JUN91	23.7	24.3	24.6	24.7	24.2	24.6	25.1	24.7	24.7	24.7	25.6	25.9
01JUL91	24.2	24.6	25.7	26.2	25.2	25.0	24.9	24.5	24.3	24.3	24.6	25.2
08JUL91	23.5	24.8	25.6	25.4	25.5	25.4	25.3	24.6	24.6	24.4	24.9	24.8
15JUL91	24.9	25.2	26.3	26.5	26.0	26.4	25.7	25.1	25.2	25.7	25.8	25.9
22JUL91	25.9	26.6	27.6	27.8	27.0	27.4	26.6	--	--	--	--	--
29JUL91	25.1	25.3	27.1	27.3	26.7	26.8	26.7	26.1	26.0	25.7	26.3	26.8
05AUG91	25.0	25.7	26.9	27.1	26.6	26.5	26.2	--	--	--	--	--
12AUG91	24.8	25.1	26.9	27.3	26.6	26.4	25.9	25.3	25.3	25.4	25.7	25.6
19AUG91	24.4	25.4	26.9	27.2	26.6	26.3	26.0	--	--	--	--	--
26AUG91	25.1	25.2	26.3	26.9	26.5	26.3	25.9	25.0	24.9	24.6	25.2	25.1
02SEP91	23.9	24.0	25.9	26.5	25.4	25.0	25.1	--	--	--	--	--
09SEP91	24.1	24.5	25.4	26.3	24.6	24.1	23.8	23.1	22.7	22.2	23.1	23.7
16SEP91	22.8	23.4	25.3	25.0	24.7	24.8	24.5	--	--	--	--	--
23SEP91	21.5	21.3	22.8	23.1	21.6	21.7	21.9	20.5	19.4	19.3	19.6	19.1
30SEP91	19.0	18.9	21.5	22.0	20.9	20.5	20.4	--	--	--	--	--
07OCT91	19.0	19.0	19.7	20.2	19.0	18.7	18.1	17.3	16.7	16.2	16.1	16.3
14OCT91	16.3	17.1	17.8	18.0	17.2	16.6	16.5	--	--	--	--	--
21OCT91	15.4	15.4	16.0	16.3	16.0	15.6	14.8	13.3	12.8	12.4	12.2	11.9

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

TABLE C-6 MEAN TEMPERATURE (°C) BY REGION AND WEEK FROM 1991 BEACH SEINE SURVEY

Week Beginning Monday	Regions											
	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL
24JUN91	27.2	27.2	27.1	26.1	24.7	24.6	26.3	25.0	25.5	25.0	26.4	25.4
08JUL91	25.3	25.8	26.5	26.1	26.4	26.8	25.6	24.1	24.6	24.8	27.2	26.4
22JUL91	26.1	26.6	27.6	28.1	28.1	28.7	28.2	27.7	27.2	27.4	28.2	28.0
05AUG91	26.4	27.0	27.5	26.2	27.1	28.5	25.2	25.4	25.9	25.1	25.5	25.6
19AUG91	25.0	25.7	26.8	26.4	27.6	27.6	25.9	24.5	25.5	24.3	25.0	25.0
02SEP91	25.2	24.7	26.0	25.4	25.5	24.9	24.6	24.0	23.0	23.4	23.3	24.4
16SEP91	26.4	25.4	25.2	23.9	25.0	25.6	25.1	23.1	23.2	23.6	24.0	23.5
30SEP91	19.9	20.1	22.2	22.2	20.7	20.9	19.9	19.0	17.6	18.0	16.8	15.8
14OCT91	15.3	15.6	15.7	20.6	17.4	16.7	15.8	14.7	15.2	15.0	15.2	14.3
28OCT91	13.3	12.6	15.7	16.3	13.7	13.0	13.1	12.9	12.5	12.1	11.0	11.2

TABLE C-7 WEIGHTED MEAN SALINITY (PPT) BY REGION AND WEEK FROM 1991 LONGITUDINAL RIVER ICHTHYOPLANKTON AND FALL JUVENILE SURVEYS

Week Beginning Monday	Regions											
	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL
15APR91	10.5	4.9	1.9	1.5	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
22APR91	7.2	4.0	0.6	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
29APR91	4.0	0.9	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
06MAY91	7.8	5.0	3.5	1.6	0.4	0.1	0.1	0.1	0.1	0.1	0.1	0.1
13MAY91	11.6	6.6	3.5	1.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1
20MAY91	7.4	2.8	0.9	0.5	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
27MAY91	11.1	7.8	3.2	0.7	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1
03JUN91	13.3	9.3	6.4	5.3	2.6	0.3	0.1	0.1	0.1	0.1	0.1	0.1
10JUN91	15.4	9.3	6.6	5.8	2.9	1.3	0.2	0.1	0.1	0.1	0.1	0.1
17JUN91	13.1	9.0	7.7	4.7	2.3	1.0	0.2	0.1	0.1	0.1	0.1	0.1
24JUN91	12.1	9.4	7.6	6.4	3.5	1.1	0.5	0.1	0.1	0.1	0.1	0.1
01JUL91	12.9	10.9	8.0	6.0	3.6	1.9	0.4	0.1	0.1	0.1	0.2	0.2
08JUL91	16.2	9.6	8.0	6.4	4.0	1.9	0.9	0.1	0.1	0.2	0.2	0.2
15JUL91	12.5	9.7	7.2	4.9	3.3	2.2	0.4	0.2	0.2	0.2	0.1	0.1
22JUL91	14.4	11.5	7.4	5.5	4.2	1.7	0.6	--	--	--	--	--
29JUL91	13.1	10.8	7.8	6.2	3.8	2.7	0.7	0.1	0.1	0.1	0.1	0.1
05AUG91	14.9	10.4	7.9	7.4	5.2	3.1	0.7	--	--	--	--	--
12AUG91	12.4	10.4	7.8	6.5	3.8	2.3	0.5	0.1	0.1	0.1	0.1	
19AUG91	15.5	10.5	6.9	6.0	4.0	2.1	0.4	--	--	--	--	
26AUG91	11.8	9.2	7.0	5.8	3.6	1.8	0.4	0.2	0.1	0.2	0.2	0.1
02SEP91	14.9	9.8	6.3	4.8	3.1	2.1	0.4	--	--	--	--	--
09SEP91	13.4	9.2	7.0	5.4	3.0	1.4	0.3	0.1	0.1	0.1	0.1	0.1
16SEP91	11.7	8.8	7.0	5.8	3.9	2.1	0.4	--	--	--	--	--
23SEP91	12.4	9.9	7.5	6.5	2.3	1.4	0.4	0.1	0.1	0.1	0.1	0.2
30SEP91	11.5	8.2	5.4	4.3	2.5	1.0	0.2	--	--	--	--	--
07OCT91	9.9	6.8	4.9	3.4	0.9	0.4	0.2	0.2	0.2	0.2	0.1	0.1
14OCT91	8.9	5.7				0.4	0.2	--	--	--	--	--
21OCT91	10.3	7.8	6.8	5.2	1.9	0.8	0.2	0.1	0.1	0.1	0.2	0.1

NOTE: Dashes (---) indicate no sampling.
Blank indicates not sampled.

TABLE C-8 MEAN SALINITY (PPT) BY REGION AND WEEK FROM 1991 BEACH SEINE SURVEY

Week Beginning Monday	Regions											
	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL
24JUN91	9.2	7.7	6.0	4.1	2.7	0.7	0.2	0.1	0.1	0.1	0.1	0.1
08JUL91	11.5	8.2	5.6	6.4	2.5	1.6	0.4	0.1	0.1	0.1	0.1	0.1
22JUL91	11.0	9.0	6.6	4.7	2.4	1.6	0.6	0.1	0.1	0.1	0.1	0.1
05AUG91	10.7	9.3	7.3	5.5	2.3	1.9	0.2	0.1	0.1	0.1	0.1	0.1
19AUG91	10.4	7.8	6.2	5.0	2.5	1.2	0.4	0.1	0.1	0.1	0.1	0.1
02SEP91	10.2	7.8	6.1	5.1	2.6	1.2	0.3	0.2	0.1	0.1	0.1	0.1
16SEP91	9.2	7.1	6.1	4.3	2.2	1.0	0.5	0.2	0.2	0.1	0.2	0.2
30SEP91	9.0	6.0	4.5	2.9	1.4	0.6	0.2	0.2	0.1	0.1	0.1	0.1
14OCT91	6.8	4.0	2.7	1.8	0.4	0.2	0.2	0.2	0.2	0.1	0.1	0.1
28OCT91	10.9	7.7	4.0	3.4	1.2	0.8	0.3	0.1	0.1	0.1	0.1	0.2

TABLE C-9 WEIGHTED MEAN DISSOLVED OXYGEN (mg/L) BY REGION AND WEEK FROM 1991 LONGITUDINAL RIVER ICHTHYOPLANKTON AND FALL JUVENILE SURVEYS

Week Beginning Monday	Regions											
	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL
15APR91	10.3	10.6	11.3	10.9	10.2	10.2	11.4	12.1	11.2	11.9	12.4	12.2
22APR91	9.7	9.9	10.6	10.4	9.7	9.8	10.2	10.3	10.6	11.3	11.7	11.8
29APR91	9.2	9.1	9.0	9.4	9.2	9.2	9.1	9.2	9.5	9.4	9.3	9.6
06MAY91	9.7	9.5	9.5	9.7	9.9	9.6	9.4	9.2	8.9	9.3	9.4	9.4
13MAY91	10.2	10.7	9.6	9.0	9.0	9.8	9.4	10.6	11.0	10.7	8.9	8.3
20MAY91	9.7	9.8	8.5	8.9	9.9	9.9	9.9	10.6	11.0	12.3	10.3	7.8
27MAY91	7.3	7.5	8.1	8.6	8.9	9.4	9.0	7.7	7.8	8.0	7.5	5.9
03JUN91	7.3	7.1	6.3	6.2	6.9	7.6	7.4	6.5	6.8	7.7	6.7	6.0
10JUN91	5.9	7.5	8.2	7.0	6.3	6.3	5.9	5.6	7.2	7.9	7.5	6.6
17JUN91	6.4	6.8	7.2	6.2	5.4	6.3	5.4	5.7	7.2	7.7	9.1	7.6
24JUN91	7.6	8.1	6.5	6.1	5.5	6.1	5.7	6.7	7.6	8.9	8.0	6.7
01JUL91	6.8	6.6	6.1	6.3	5.6	5.9	6.0	6.6	8.0	8.5	7.7	6.3
08JUL91	5.7	6.3	6.0	5.7	5.2	5.8	5.6	7.1	8.1	7.9	7.2	6.3
15JUL91	6.2	6.7	6.3	6.1	6.4	7.1	6.2	6.7	8.2	10.3	10.1	7.4
22JUL91	9.1	7.0	6.5	5.9	5.9	6.5	6.2	--	--	--	--	--
29JUL91	6.3	6.0	6.3	6.1	6.3	6.9	6.6	7.6	9.5	10.0	9.0	6.7
05AUG91	5.9	6.1	6.2	6.7	6.3	6.8	6.3	--	--	--	--	--
12AUG91	6.0	6.1	6.4	6.0	6.3	6.4	5.5	5.9	7.4	8.9	8.5	7.2
19AUG91	5.5	5.8	6.2	6.3	6.2	6.4	5.9	--	--	--	--	--
26AUG91	5.9	6.2	6.5	5.7	5.8	6.4	6.2	7.4	8.6	9.1	9.2	6.7
02SEP91	6.5	8.5	7.7	6.5	6.2	6.6	6.5	--	--	--	--	--
09SEP91	7.5	10.0	9.1	7.0	6.3	6.6	6.2	6.5	7.5	8.4	8.0	6.9
16SEP91	9.2	8.7	7.0	6.8	6.9	7.0	6.6	--	--	--	--	--
23SEP91	5.9	6.8	7.1	6.7	6.5	6.9	6.4	6.8	7.8	8.3	7.6	6.8
30SEP91	7.5	8.4	7.8	7.3	7.0	7.5	7.4	--	--	--	--	--
07OCT91	8.4	8.6	7.8	7.3	7.6	7.9	8.2	9.2	9.4	9.2	9.0	8.5
14OCT91	8.8	8.8	8.0	7.6	8.0	8.4	8.9	--	--	--	--	--
21OCT91	8.5	8.7	8.2	8.3	8.7	8.9	9.1	10.2	10.7	10.6	10.5	10.6

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

TABLE C-10 MEAN DISSOLVED OXYGEN (mg/L) BY REGION AND WEEK FROM 1991 BEACH SEINE SURVEY

Week Beginning Monday	Regions											
	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL
24JUN91	11.7	15.7	9.3	9.2	6.3	7.5	7.7	7.5	9.7	11.4	10.6	8.3
08JUL91	6.9	8.9	8.4	8.1	7.0	7.6	7.2	9.3	10.6	10.0	9.1	8.6
22JUL91	8.0	8.0	6.9	8.8	7.5	12.0	8.5	8.8	9.8	9.5	9.4	8.1
05AUG91	10.5	10.8	9.2	7.2	8.3	9.8	5.5	5.0	5.2	6.2	7.4	7.9
19AUG91	6.3	6.7	7.0	5.8	6.9	7.2	6.1	7.1	8.9	8.5	8.1	6.7
02SEP91	9.7	10.4	8.0	7.0	13.1	12.2	11.5	11.2	9.5	8.0	8.8	8.1
16SEP91	15.4	12.5	10.6	6.5	8.5	8.9	8.7	6.5	8.6	8.8	8.0	6.2
30SEP91	7.5	9.9	8.9	7.6	7.3	8.0	7.2	8.4	10.3	10.0	10.1	8.3
14OCT91	9.3	9.3	9.4	8.0	8.9	9.3	8.8	9.2	8.9	8.6	8.3	8.2
28OCT91	10.0	10.5	9.6	9.4	9.8	10.3	10.3	9.7	10.2	10.4	10.6	10.2

TABLE C-11 WEIGHTED MEAN PERCENT OXYGEN SATURATION BY REGION AND WEEK FROM 1991 LONGITUDINAL RIVER ICHTHYOPLANKTON AND FALL JUVENILE SURVEYS

Week Beginning Monday	Regions											
	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL
15APR91	95.9	95.3	101.1	97.8	90.3	90.9	103.4	111.2	102.9	107.4	107.8	104.5
22APR91	89.0	89.9	94.6	92.2	88.5	89.0	90.2	90.1	92.9	98.3	99.2	99.8
29APR91	87.5	86.2	85.0	87.8	82.7	82.5	81.7	83.7	86.9	85.7	86.5	88.4
06MAY91	98.0	94.7	93.4	95.4	96.1	93.8	91.3	89.8	87.7	90.0	91.0	90.7
13MAY91	108.9	112.1	99.0	90.2	91.1	100.8	97.2	110.2	114.3	110.7	92.1	86.2
20MAY91	105.7	103.9	88.3	93.0	104.0	108.1	105.9	114.1	119.9	132.7	112.1	85.4
27MAY91	86.3	86.6	92.7	95.4	98.5	107.7	102.4	87.3	89.0	92.9	87.7	69.0
03JUN91	88.3	84.7	75.5	73.6	80.2	87.2	84.7	75.5	79.7	91.1	79.0	70.9
10JUN91	74.8	92.2	100.9	85.3	74.9	74.9	69.7	65.1	85.2	92.8	88.8	77.2
17JUN91	82.7	86.4	90.3	76.4	64.7	74.8	64.2	67.4	86.0	90.9	108.4	91.3
24JUN91	97.2	102.9	81.5	75.8	67.5	74.0	69.8	80.4	91.7	106.5	98.1	82.2
01JUL91	88.3	85.0	78.7	80.8	69.1	72.0	72.9	79.5	95.3	101.9	92.4	76.1
08JUL91	74.4	80.1	77.4	72.9	65.1	71.5	68.5	85.8	97.8	94.5	87.2	75.6
15JUL91	81.6	86.8	81.5	77.9	80.2	89.8	75.8	81.2	100.0	125.8	123.7	91.2
22JUL91	122.2	94.0	86.3	77.6	75.8	83.0	77.3	--	--	--	--	--
29JUL91	82.5	78.2	82.9	80.3	80.1	87.7	82.7	93.2	117.4	122.6	110.9	84.1
05AUG91	78.2	80.2	81.5	87.6	81.0	85.6	77.7	--	--	--	--	--
12AUG91	78.6	78.8	84.1	78.7	80.5	80.7	67.4	71.8	89.8	108.3	103.8	--
19AUG91	72.7	75.3	81.3	81.8	79.4	80.5	73.0	--	--	--	--	--
26AUG91	77.7	79.4	83.8	74.1	74.2	80.5	76.5	89.3	103.6	108.9	111.5	81.0
02SEP91	84.9	107.1	98.6	82.9	77.6	80.4	79.0	--	--	--	--	--
09SEP91	96.6	127.2	116.2	89.7	77.3	79.5	73.6	75.6	87.4	96.3	94.0	81.8
16SEP91	114.9	108.6	89.3	84.9	84.6	85.3	79.5	--	--	--	--	--
23SEP91	72.6	81.6	86.6	81.5	75.0	79.1	73.0	75.8	84.9	90.5	83.2	73.8
30SEP91	87.8	95.5	91.5	85.3	79.1	84.1	81.6	--	--	--	--	--
07OCT91	96.8	96.4	87.7	82.2	81.8	84.6	86.8	95.5	96.5	93.6	91.1	86.5
14OCT91	95.5	94.9				86.9	91.0	--	--	--	--	--
21OCT91	90.8	91.6	86.7	87.3	89.3	90.1	90.2	97.5	100.9	99.6	98.1	98.3

NOTE: Dashes (---) indicate no sampling.
Blank indicates not sampled.

TABLE C-12 MEAN PERCENT OXYGEN SATURATION BY REGION AND WEEK FROM 1991 BEACH SEINE SURVEY

Week Beginning Monday	Regions											
	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL
24JUN91	156.4	206.3	121.2	116.3	76.6	90.0	95.3	91.2	118.7	137.7	131.0	101.4
08JUL91	89.8	115.8	108.0	105.2	88.3	96.1	87.8	110.5	127.3	120.4	114.8	107.0
22JUL91	105.2	105.7	91.6	115.5	97.2	156.9	109.5	112.0	123.8	119.5	120.6	103.2
05AUG91	139.6	143.4	122.0	92.2	105.1	128.1	67.0	60.4	64.2	75.1	90.8	96.9
19AUG91	81.1	86.7	91.4	74.8	89.3	92.2	74.9	85.1	108.4	101.2	98.4	80.6
02SEP91	125.9	131.7	102.4	88.7	162.3	148.8	138.7	133.1	111.0	93.6	103.5	96.5
16SEP91	201.9	159.6	133.8	79.5	104.2	109.5	105.5	76.3	100.1	104.0	95.4	72.8
30SEP91	86.6	114.0	105.2	89.1	81.9	89.2	79.4	90.4	107.8	105.7	103.7	83.8
14OCT91	97.5	96.1	96.8	89.7	93.4	95.8	88.4	90.6	88.3	85.7	82.6	80.0
28OCT91	102.9	103.7	99.2	97.9	94.9	98.3	98.6	92.2	95.7	96.9	96.6	92.8

TABLE C-13 WEIGHTED MEAN CONDUCTIVITY (mS/cm AT 25°C) BY REGION AND WEEK FROM 1991 LONGITUDINAL RIVER ICHTHYOPLANKTON AND FALL JUVENILE SURVEYS

Week Beginning Monday	Regions											
	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL
15APR91	17.7	8.4	3.3	2.7	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2
22APR91	12.4	6.8	1.0	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
29APR91	6.9	1.6	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
06MAY91	13.0	8.4	5.9	2.8	0.7	0.2	0.2	0.2	0.2	0.2	0.2	0.2
13MAY91	19.5	11.4	6.1	2.1	0.5	0.2	0.2	0.2	0.2	0.2	0.2	0.2
20MAY91	12.7	5.0	1.7	0.9	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
27MAY91	18.6	13.3	5.6	1.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2
03JUN91	22.0	15.7	11.1	9.2	4.5	0.6	0.2	0.2	0.2	0.2	0.2	0.2
10JUN91	25.4	15.9	11.4	10.0	5.0	2.3	0.4	0.2	0.2	0.2	0.2	0.2
17JUN91	21.8	15.2	13.1	8.2	4.0	1.8	0.4	0.2	0.2	0.3	0.3	0.3
24JUN91	20.3	16.0	13.0	11.0	6.1	1.8	0.9	0.3	0.3	0.2	0.3	0.3
01JUL91	21.6	18.3	13.7	10.4	6.3	3.3	0.7	0.3	0.3	0.3	0.3	0.3
08JUL91	26.7	16.4	13.7	11.0	7.0	3.3	1.5	0.3	0.3	0.3	0.3	0.3
15JUL91	21.0	16.6	12.3	8.5	5.8	3.9	0.7	0.3	0.3	0.3	0.2	0.2
22JUL91	23.9	19.3	12.7	9.6	7.3	3.0	1.1	--	--	--	--	--
29JUL91	21.8	18.2	13.4	10.8	6.6	4.8	1.2	0.3	0.2	0.3	0.2	0.2
05AUG91	24.7	17.6	13.6	12.7	9.0	5.4	1.3	--	--	--	--	--
12AUG91	20.8	17.7	13.5	11.1	6.7	4.1	0.9	0.3	0.2	0.3	0.2	
19AUG91	25.6	17.7	11.8	10.4	7.0	3.7	0.7	--	--	--	--	--
26AUG91	19.8	15.7	12.0	10.1	6.2	3.3	0.7	0.3	0.2	0.3	0.3	0.3
02SEP91	24.6	16.6	10.8	8.4	5.5	3.7	0.7	--	--	--	--	--
09SEP91	22.4	15.6	12.1	9.4	5.3	2.5	0.5	0.3	0.3	0.3	0.3	0.3
16SEP91	19.7	14.9	12.1	10.1	6.8	3.6	0.7	--	--	--	--	--
23SEP91	20.8	16.8	13.0	11.3	4.1	2.5	0.7	0.3	0.3	0.3	0.3	0.3
30SEP91	19.3	14.0	9.3	7.5	4.3	1.8	0.4	--	--	--	--	--
07OCT91	16.8	11.7	8.5	6.0	1.6	0.7	0.3	0.3	0.3	0.3	0.3	0.2
14OCT91	15.2	9.8				0.7	0.3	--	--	--	--	--
21OCT91	17.5	13.4	11.7	9.1	3.3	1.4	0.3	0.2	0.2	0.2	0.3	0.2

NOTE: Dashes (---) indicate no sampling.
Blank indicates not sampled.

TABLE C-14 MEAN CONDUCTIVITY (mS/cm AT 25°C) BY REGION AND WEEK FROM 1991 BEACH SEINE SURVEY

Week Beginning Monday	Regions											
	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL
24JUN91	15.6	13.3	10.3	7.1	4.7	1.2	0.4	0.2	0.2	0.2	0.2	0.2
08JUL91	19.3	14.1	9.7	11.0	4.4	2.7	0.8	0.3	0.3	0.3	0.2	0.2
22JUL91	18.5	15.3	11.4	8.1	4.1	2.9	1.1	0.2	0.2	0.2	0.2	0.3
05AUG91	18.0	15.9	12.5	9.6	4.1	3.3	0.4	0.3	0.3	0.3	0.3	0.2
19AUG91	17.6	13.3	10.8	8.7	4.4	2.1	0.6	0.3	0.3	0.3	0.2	0.3
02SEP91	17.3	13.4	10.5	8.8	4.6	2.2	0.5	0.3	0.3	0.3	0.3	0.2
16SEP91	15.6	12.3	10.5	7.5	3.9	1.9	0.8	0.3	0.3	0.3	0.3	0.3
30SEP91	15.3	10.4	7.9	5.1	2.5	1.0	0.4	0.3	0.3	0.3	0.3	0.2
14OCT91	11.8	6.9	4.8	3.1	0.7	0.3	0.3	0.3	0.3	0.3	0.2	0.2
28OCT91	18.3	13.1	6.9	6.1	2.1	1.3	0.6	0.3	0.3	0.2	0.3	0.3

APPENDIX D

DENSITY AND STANDING CROP ESTIMATES

APPENDIX D

LIST OF TABLES

Number	Title
D-1	Regional density (no./1,000 m^3) of striped bass eggs in the Hudson River estuary determined from the Longitudinal River Ichthyoplankton Survey, 1991.
D-2	Regional standing crop (in thousands) of striped bass eggs in the Hudson River estuary determined from the Longitudinal River Ichthyoplankton Survey, 1991.
D-3	Regional density (no./1,000 m^3) of striped bass yolk-sac larvae in the Hudson River estuary determined from the Longitudinal River Ichthyoplankton Survey, 1991.
D-4	Regional standing crop of striped bass yolk-sac larvae in the Hudson River estuary determined from the Longitudinal River Ichthyoplankton Survey, 1991.
D-5	Regional density (no./1,000 m^3) of striped bass post yolk-sac larvae in the Hudson River estuary determined from the Longitudinal River Ichthyoplankton Survey, 1991.
D-6	Regional standing crop (in thousands) of striped bass post yolk-sac larvae in the Hudson River estuary determined from the Longitudinal River Ichthyoplankton Survey, 1991.
D-7	Regional density (no./1,000 m^3) of striped bass young of year in the Hudson River estuary determined from the Longitudinal River Ichthyoplankton Survey, 1991.
D-8	Regional standing crop (in thousands) of striped bass young of year in the Hudson River estuary determined from the Longitudinal River Ichthyoplankton Survey, 1991.
D-9	Regional density (no./1,000 m^3) of striped bass young of year in the Hudson River estuary determined from the Fall Juvenile Survey, 1991.
D-10	Regional standing crop (in thousands) of striped bass young of year in the Hudson River estuary determined from the Fall Juvenile Survey, 1991.
D-11	Regional catch-per-unit-effort (CPUE) of striped bass young of year in the Hudson River estuary determined from the Beach Seine Survey, 1991.
D-12	Regional standing crop (in thousands) of striped bass young of year in the Hudson River estuary determined from the Beach Seine Survey, 1991.
D-13	Regional density (no./1,000 m^3) of striped bass yearling and older in the Hudson River estuary determined from the Fall Juvenile Survey, 1991.
D-14	Regional standing crop (in thousands) of striped bass yearling and older in the Hudson River estuary determined from the Fall Juvenile Survey, 1991.

APPENDIX D

LIST OF TABLES (Cont.)

Number	Title
D-15	Regional catch-per-unit-effort (CPUE) of striped bass yearling and older in the Hudson River estuary determined from the Beach Seine Survey, 1991.
D-16	Regional standing crop (in thousands) of striped bass yearling and older in the Hudson River estuary determined from the Beach Seine Survey, 1991.
D-17	Regional density (no./1,000 m^3) of white perch eggs in the Hudson River estuary determined from the Longitudinal River Ichthyoplankton Survey, 1991.
D-18	Regional standing crop (in thousands) of white perch eggs in the Hudson River estuary determined from the Longitudinal River Ichthyoplankton Survey, 1991.
D-19	Regional density (no./1,000 m^3) of white perch yolk-sac larvae in the Hudson River estuary determined from the Longitudinal River Ichthyoplankton Survey, 1991.
D-20	Regional standing crop (in thousands) of white perch yolk-sac larvae in the Hudson River estuary determined from the Longitudinal River Ichthyoplankton Survey, 1991.
D-21	Regional density (no./1,000 m^3) of white perch post yolk-sac larvae in the Hudson River estuary determined from the Longitudinal River Ichthyoplankton Survey, 1991.
D-22	Regional standing crop (in thousands) of white perch post yolk-sac larvae in the Hudson River estuary determined from the Longitudinal River Ichthyoplankton Survey, 1991.
D-23	Regional density (no./1,000 m^3) of white perch young of year in the Hudson River estuary determined from the Longitudinal River Ichthyoplankton Survey, 1991.
D-24	Regional standing crop (in thousands) of white perch young of year in the Hudson River estuary determined from the Longitudinal River Ichthyoplankton Survey, 1991.
D-25	Regional density (no./1,000 m^3) of white perch young of year in the Hudson River estuary determined from the Fall Juvenile Survey, 1991.
D-26	Regional standing crop (in thousands) of white perch young of year in the Hudson River estuary determined from the Fall Juvenile Survey, 1991.
D-27	Regional catch-per-unit-effort (CPUE) of white perch young of year in the Hudson River estuary determined from the Beach Seine Survey, 1991.
D-28	Regional standing crop (in thousands) of white perch young of year in the Hudson River estuary determined from the Beach Seine Survey, 1991.

APPENDIX D

LIST OF TABLES (Cont.)

Number	Title
D-29	Regional density (no./1,000 m^3) of white perch yearling and older in the Hudson River estuary determined from the Fall Juvenile Survey, 1991.
D-30	Regional standing crop (in thousands) of white perch yearling and older in the Hudson River estuary determined from the Fall Juvenile Survey, 1991.
D-31	Regional catch-per-unit-effort (CPUE) of white perch yearling and older in the Hudson River estuary determined from the Beach Seine Survey, 1991.
D-32	Regional standing crop (in thousands) of white perch yearling and older in the Hudson River estuary determined from the Beach Seine Survey, 1991.
D-33	Regional density (no./1,000 m^3) of Atlantic tomcod yolk-sac larvae in the Hudson River estuary determined from the Longitudinal River Ichthyoplankton Survey, 1991.
D-34	Regional standing crop (in thousands) of Atlantic tomcod yolk-sac larvae in the Hudson River estuary determined from the Longitudinal River Ichthyoplankton Survey, 1991.
D-35	Regional density (no./1,000 m^3) of Atlantic tomcod post yolk-sac larvae in the Hudson River estuary determined from the Longitudinal River Ichthyoplankton Survey, 1991.
D-36	Regional standing crop (in thousands) of Atlantic tomcod post yolk-sac larvae in the Hudson River estuary determined from the Longitudinal River Ichthyoplankton Survey, 1991.
D-37	Regional density (no./1,000 m^3) of Atlantic tomcod young of year in the Hudson River estuary determined from the Longitudinal River Ichthyoplankton Survey, 1991.
D-38	Regional standing crop (in thousands) of Atlantic tomcod young of year in the Hudson River estuary determined from the Longitudinal River Ichthyoplankton Survey, 1991.
D-39	Regional density (no./1,000 m^3) of Atlantic tomcod young of year in the Hudson River estuary determined from the Fall Juvenile Survey, 1991.
D-40	Regional standing crop (in thousands) of Atlantic tomcod young of year in the Hudson River estuary determined from the Fall Juvenile Survey, 1991.
D-41	Regional catch-per-unit-effort (CPUE) of Atlantic tomcod young of year in the Hudson River estuary determined from the Beach Seine Survey, 1991.

APPENDIX D

LIST OF TABLES (Cont.)

Number	Title
D-42	Regional standing crop (in thousands) of Atlantic tomcod young of year in the Hudson River estuary determined from the Beach Seine Survey, 1991.
D-43	Regional density (no./1,000 m^3) of Atlantic tomcod yearling and older in the Hudson River estuary determined from the Fall Juvenile Survey, 1991.
D-44	Regional standing crop (in thousands) of Atlantic tomcod yearling and older in the Hudson River estuary determined from the Fall Juvenile Survey, 1991.
D-45	Regional catch-per-unit-effort (CPUE) of Atlantic tomcod yearling and older in the Hudson River estuary determined from the Beach Seine Survey, 1991.
D-46	Regional standing crop (in thousands) of Atlantic tomcod yearling and older in the Hudson River estuary determined from the Beach Seine Survey, 1991.
D-47	Regional density (no./1,000 m^3) of American shad eggs in the Hudson River estuary determined from the Longitudinal River Ichthyoplankton Survey, 1991.
D-48	Regional standing crop (in thousands) of American shad eggs in the Hudson River estuary determined from the Longitudinal River Ichthyoplankton Survey, 1991.
D-49	Regional density (no./1,000 m^3) of American shad yolk-sac larvae in the Hudson River estuary determined from the Longitudinal River Ichthyoplankton Survey, 1991.
D-50	Regional standing crop (in thousands) of American shad yolk-sac larvae in the Hudson River estuary determined from the Longitudinal River Ichthyoplankton Survey, 1991.
D-51	Regional density (no./1,000 m^3) of American shad post yolk-sac larvae in the Hudson River estuary determined from the Longitudinal River Ichthyoplankton Survey, 1991.
D-52	Regional standing crop (in thousands) of American shad post yolk-sac larvae in the Hudson River estuary determined from the Longitudinal River Ichthyoplankton Survey, 1991.
D-53	Regional density (no./1,000 m^3) of American shad young of year in the Hudson River estuary determined from the Longitudinal River Ichthyoplankton Survey, 1991.
D-54	Regional standing crop (in thousands) of American shad young of year in the Hudson River estuary determined from the Longitudinal River Ichthyoplankton Survey, 1991.

APPENDIX D

LIST OF TABLES (Cont.)

Number	Title
D-55	Regional density (no./1,000 m^3) of American shad young of year in the Hudson River estuary determined from the Fall Juvenile Survey, 1991.
D-56	Regional standing crop (in thousands) of American shad young of year in the Hudson River estuary determined from the Fall Juvenile Survey, 1991.
D-57	Regional catch-per-unit-effort (CPUE) of American shad young of year in the Hudson River estuary determined from the Beach Seine Survey, 1991.
D-58	Regional standing crop (in thousands) of American shad young of year in the Hudson River estuary determined from the Beach Seine Survey, 1991.
D-59	Regional density (no./1,000 m^3) of American shad yearling and older in the Hudson River estuary determined from the Fall Juvenile Survey, 1991.
D-60	Regional standing crop (in thousands) of American shad yearling and older in the Hudson River estuary determined from the Fall Juvenile Survey, 1991.
D-61	Regional catch-per-unit-effort (CPUE) of American shad yearling and older in the Hudson River estuary determined from the Beach Seine Survey, 1991.
D-62	Regional standing crop (in thousands) of American shad yearling and older in the Hudson River estuary determined from the Beach Seine Survey, 1991.
D-63	Regional density (no./1,000 m^3) of Alosa spp. eggs in the Hudson River estuary determined from the Longitudinal River Ichthyoplankton Survey, 1991.
D-64	Regional standing crop (in thousands) of Alosa spp. eggs in the Hudson River estuary determined from the Longitudinal River Ichthyoplankton Survey, 1991.
D-65	Regional density (no./1,000 m^3) of Alosa spp. yolk-sac larvae in the Hudson River estuary determined from the Longitudinal River Ichthyoplankton Survey, 1991.
D-66	Regional standing crop (in thousands) of Alosa spp. yolk-sac larvae in the Hudson River estuary determined from the Longitudinal River Ichthyoplankton Survey, 1991.
D-67	Regional density (no./1,000 m^3) of Alosa spp. post yolk-sac larvae in the Hudson River estuary determined from the Longitudinal River Ichthyoplankton Survey, 1991.
D-68	Regional standing crop (in thousands) of Alosa spp. post yolk-sac larvae in the Hudson River estuary determined from the Longitudinal River Ichthyoplankton Survey, 1991.

APPENDIX D

LIST OF TABLES (Cont.)

Number	Title
D-69	Regional density (no./1,000 m^3) of Alosa spp. young of year in the Hudson River estuary determined from the Longitudinal River Ichthyoplankton Survey, 1991.
D-70	Regional standing crop (in thousands) of Alosa spp. young of year in the Hudson River estuary determined from the Longitudinal River Ichthyoplankton Survey, 1991.
D-71	Regional density (no./1,000 m^3) of blueback herring young of year in the Hudson River estuary determined from the Longitudinal River Ichthyoplankton Survey, 1991.
D-72	Regional standing crop (in thousands) of blueback herring young of year in the Hudson River estuary determined from the Longitudinal River Ichthyoplankton Survey, 1991.
D-73	Regional density (no./1,000 m^3) of blueback herring young of year in the Hudson River estuary determined from the Fall Juvenile Survey, 1991.
D-74	Regional standing crop (in thousands) of blueback herring young of year in the Hudson River estuary determined from the Fall Juvenile Survey, 1991.
D-75	Regional catch-per-unit-effort (CPUE) of blueback herring young of year in the Hudson River estuary determined from the Beach Seine Survey, 1991.
D-76	Regional standing crop (in thousands) of blueback herring young of year in the Hudson River estuary determined from the Beach Seine Survey, 1991.
D-77	Regional density (no./1,000 m^3) of blueback herring yearling and older in the Hudson River estuary determined from the Fall Juvenile Survey, 1991.
D-78	Regional standing crop (in thousands) of blueback herring yearling and older in the Hudson River estuary determined from the Fall Juvenile Survey, 1991.
D-79	Regional catch-per-unit-effort (CPUE) of blueback herring yearling and older in the Hudson River estuary determined from the Beach Seine Survey, 1991.
D-80	Regional standing crop (in thousands) of blueback herring yearling and older in the Hudson River estuary determined from the Beach Seine Survey, 1991.
D-81	Regional density (no./1,000 m^3) of alewife young of year in the Hudson River estuary determined from the Longitudinal River Ichthyoplankton Survey, 1991.
D-82	Regional standing crop (in thousands) of alewife young of year in the Hudson River estuary determined from the Longitudinal River Ichthyoplankton Survey, 1991.

APPENDIX D

LIST OF TABLES (Cont.)

Number	Title
D-83	Regional density (no./1,000 m^3) of alewife young of year in the Hudson river estuary determined from the Fall Juvenile Survey, 1991.
D-84	Regional standing crop (in thousands) of alewife young of year in the Hudson River estuary determined from the Fall Juvenile Survey, 1991.
D-85	Regional catch-per-unit-effort (CPUE) of alewife young of year in the Hudson River estuary determined from the Beach Seine Survey, 1991.
D-86	Regional standing crop (in thousands) of alewife young of year in the Hudson River estuary determined from the Beach Seine Survey, 1991.
D-87	Regional density (no./1,000 m^3) of alewife yearling and older in the Hudson River estuary determined from the Fall Juvenile Survey, 1991.
D-88	Regional standing crop (in thousands) of alewife yearling and older in the Hudson River estuary determined from the Fall Juvenile Survey, 1991.
D-89	Regional catch-per-unit-effort (CPUE) of alewife yearling and older in the Hudson River estuary determined from the Beach Seine Survey, 1991.
D-90	Regional standing crop (in thousands) of alewife yearling and older in the Hudson River estuary determined from the Beach Seine Survey, 1991.
D-91	Regional density (no./1,000 m^3) of bay anchovy eggs in the Hudson River estuary determined from the Longitudinal River Ichthyoplankton Survey, 1991.
D-92	Regional standing crop (in thousands) of bay anchovy eggs in the Hudson River estuary determined from the Longitudinal River Ichthyoplankton Survey, 1991.
D-93	Regional density (no./1,000 m^3) of bay anchovy yolk-sac larvae in the Hudson River estuary determined from the Longitudinal River Ichthyoplankton Survey, 1991.
D-94	Regional standing crop (in thousands) of bay anchovy yolk-sac larvae in the Hudson River estuary determined from the Longitudinal River Ichthyoplankton Survey, 1991.
D-95	Regional density (no./1,000 m^3) of bay anchovy post yolk-sac larvae in the Hudson River estuary determined from the Longitudinal River Ichthyoplankton Survey, 1991.
D-96	Regional standing crop (in thousands) of bay anchovy post yolk-sac larvae in the Hudson River estuary determined from the Longitudinal River Ichthyoplankton Survey, 1991.

APPENDIX D

LIST OF TABLES (Cont.)

Number	Title
D-97	Regional density (no./1,000 m^3) of bay anchovy young of year in the Hudson River estuary determined from the Longitudinal River Ichthyoplankton Survey, 1991.
D-98	Regional standing crop (in thousands) of bay anchovy young of year in the Hudson River estuary determined from the Longitudinal River Ichthyoplankton Survey, 1991.
D-99	Regional density (no./1,000 m^3) of bay anchovy young of year in the Hudson River estuary determined from the Fall Juvenile Survey, 1991.
D-100	Regional standing crop (in thousands) of bay anchovy young of year in the Hudson River estuary determined from the Fall Juvenile Survey, 1991.
D-101	Regional catch-per-unit-effort (CPUE) of bay anchovy young of year in the Hudson River estuary determined from the Beach Seine Survey, 1991.
D-102	Regional standing crop (in thousands) of bay anchovy young of year in the Hudson River estuary determined from the Beach Seine Survey, 1991.
D-103	Regional density (no./1,000 m^3) of bay anchovy yearling and older in the Hudson River estuary determined from the Fall Juvenile Survey, 1991.
D-104	Regional standing crop (in thousands) of bay anchovy yearling and older in the Hudson River estuary determined from the Fall Juvenile Survey, 1991.
D-105	Regional catch-per-unit-effort (CPUE) of bay anchovy yearling and older in the Hudson River estuary determined from the Beach Seine Survey, 1991.
D-106	Regional standing crop (in thousands) of bay anchovy yearling and older in the Hudson River estuary determined from the Beach Seine Survey, 1991.
D-107	Regional density (no./1,000 m^3) of weakfish young of year in the Hudson River estuary determined from the Longitudinal River Ichthyoplankton Survey, 1991.
D-108	Regional standing crop (in thousands) of weakfish young of year in the Hudson River estuary determined from the Longitudinal River Ichthyoplankton Survey, 1991.
D-109	Regional density (no./1,000 m^3) of weakfish young of year in the Hudson River estuary determined from the Fall Juvenile Survey, 1991.
D-110	Regional standing crop (in thousands) of weakfish young of year in the Hudson River estuary determined from the Fall Juvenile Survey, 1991.

APPENDIX D

LIST OF TABLES (Cont.)

Number	Title
D-111	Regional density (no./1,000 m^3) of weakfish young-of-year in the Hudson River estuary determined from the Beach Seine Survey, 1991.
D-112	Regional standing crop (in thousands) of weakfish young-of-year in the Hudson River estuary determined from the Beach Seine Survey, 1991.
D-113	Regional density (no./1,000 m^3) of weakfish yearling and older in the Hudson River estuary determined from the Fall Juvenile Survey, 1991.
D-114	Regional standing crop (in thousands) of weakfish yearling and older in the Hudson River estuary determined from the Fall Juvenile Survey, 1991.
D-115	Regional catch-per-unit-effort (CPUE) of weakfish yearling and older in the Hudson River estuary determined from the Beach Seine Survey, 1991.
D-116	Regional standing crop (in thousands) of weakfish yearling and older in the Hudson River estuary determined from the Beach Seine Survey, 1991.
D-117	Regional density (no./1,000 m^3) of white catfish young of year in the Hudson River estuary determined from the Longitudinal River Ichthyoplankton Survey, 1991.
D-118	Regional standing crop (in thousands) of white catfish young of year in the Hudson River estuary determined from the Longitudinal River Ichthyoplankton Survey, 1991.
D-119	Regional density (no./1,000 m^3) of white catfish young of year in the Hudson River estuary determined from the Fall Juvenile Survey, 1991.
D-120	Regional standing crop (in thousands) of white catfish young of year in the Hudson River estuary determined from the Fall Juvenile Survey, 1991.
D-121	Regional catch-per-unit-effort (CPUE) of White catfish young of year in the Hudson River estuary determined from the Beach Seine Survey, 1991.
D-122	Regional standing crop (in thousands) of White catfish young of year in the Hudson River estuary determined from the Beach Seine Survey, 1991.
D-123	Regional density (no./1,000 m^3) of white catfish yearling and older in the Hudson River estuary determined from the Fall Juvenile Survey, 1991.
D-124	Regional standing crop (in thousands) of white catfish yearling and older in the Hudson River estuary determined from the Fall Juvenile Survey, 1991.

APPENDIX D

LIST OF TABLES (Cont.)

Number	Title
D-125	Regional catch-per-unit-effort (CPUE) of white catfish yearling and older in the Hudson River estuary determined from the Beach Seine Survey, 1991.
D-126	Regional standing crop (in thousands) of white catfish yearling and older in the Hudson River estuary determined from the Beach Seine Survey, 1991.
D-127	Regional density (no./1,000 m^3) of spottail shiner young of year in the Hudson River estuary determined from the Longitudinal River Ichthyoplankton Survey, 1991.
D-128	Regional standing crop (in thousands) of spottail shiner young of year in the Hudson River estuary determined from the Longitudinal River Ichthyoplankton Survey, 1991.
D-129	Regional density (no./1,000 m^3) of spottail shiner young of year in the Hudson River estuary determined from the Fall Juvenile Survey, 1991.
D-130	Regional standing crop (in thousands) of spottail shiner young of year in the Hudson River estuary determined from the Fall Juvenile Survey, 1991.
D-131	Regional catch-per-unit-effort (CPUE) of spottail shiner young of year in the Hudson River estuary determined from the Beach Seine Survey, 1991.
D-132	Regional standing crop (in thousands) of spottail shiner young of year in the Hudson River estuary determined from the Beach Seine Survey, 1991.
D-133	Regional density (no./1,000 m^3) of spottail shiner yearling and older in the Hudson River estuary determined from the Fall Juvenile Survey, 1991.
D-134	Regional standing crop (in thousands) of spottail shiner yearling and older in the Hudson River estuary determined from the Fall Juvenile Survey, 1991.
D-135	Regional catch-per-unit-effort (CPUE) of spottail shiner yearling and older in the Hudson River estuary determined from the Beach Seine Survey, 1991.
D-136	Regional standing crop (in thousands) of spottail shiner yearling and older in the Hudson River estuary determined from the Beach Seine Survey, 1991.
D-137	Regional density (no./1,000 m^3) of Atlantic sturgeon young-of-year in the Hudson River estuary determined from the Fall Juvenile Survey, 1991.
D-138	Regional standing crop (in thousands) of Atlantic sturgeon young-of-year in the Hudson River estuary determined from the Fall Juvenile Survey, 1991.

APPENDIX D

LIST OF TABLES (Cont.)

Number	Title
D-139	Regional density (no./1,000 m^3) of Atlantic sturgeon yearling and older in the Hudson River estuary determined from the Fall Juvenile Survey, 1991.
D-140	Regional standing crop (in thousands) of Atlantic sturgeon yearling and older in the Hudson River estuary determined from the Fall Juvenile Survey, 1991.
D-141	Regional density (no./1,000 m^3) of shortnose sturgeon young-of-year in the Hudson River estuary determined from the Fall Juvenile Survey, 1991.
D-142	Regional standing crop (in thousands) of shortnose sturgeon young-of-year in the Hudson River estuary determined from the Fall Juvenile Survey, 1991.
D-143	Regional density (no./1,000 m^3) of shortnose sturgeon yearling and older in the Hudson River estuary determined from the Fall Juvenile Survey, 1991.
D-144	Regional standing crop (in thousands) of shortnose sturgeon yearling and older in the Hudson River estuary determined from the Fall Juvenile Survey, 1991.
D-145	Regional density (no./1,000 m^3) of rainbow smelt eggs in the Hudson River estuary determined from the Longitudinal River Ichthyoplankton Survey, 1991.
D-146	Regional standing crop (in thousands) of rainbow smelt eggs in the Hudson River estuary determined from the Longitudinal River Ichthyoplankton Survey, 1991.
D-147	Regional density (no./1,000 m^3) of rainbow smelt yolk-sac larvae in the Hudson River estuary determined from the Longitudinal River Ichthyoplankton Survey, 1991.
D-148	Regional standing crop of rainbow smelt yolk-sac larvae in the Hudson River estuary determined from the Longitudinal River Ichthyoplankton Survey, 1991.
D-149	Regional density (no./1,000 m^3) of rainbow smelt post yolk-sac larvae in the Hudson River estuary determined from the Longitudinal River Ichthyoplankton Survey, 1991.
D-150	Regional standing crop (in thousands) of rainbow smelt post yolk-sac larvae in the Hudson River estuary determined from the Longitudinal River Ichthyoplankton Survey, 1991.
D-151	Regional density (no./1,000 m^3) of rainbow smelt young of year in the Hudson River estuary determined from the Longitudinal River Ichthyoplankton Survey, 1991.
D-152	Regional standing crop (in thousands) of rainbow smelt young of year in the Hudson River estuary determined from the Longitudinal River Ichthyoplankton Survey, 1991.

APPENDIX D

LIST OF TABLES

Number	Title
D-153	Regional density (no./1,000 m^3) of rainbow smelt young of year in the Hudson River estuary determined from the Fall Juvenile Survey, 1991.
D-154	Regional standing crop (in thousands) of rainbow smelt young of year in the Hudson River estuary determined from the Fall Juvenile Survey, 1991.
D-155	Regional catch-per-unit-effort (CPUE) of rainbow smelt young of year in the Hudson River estuary determined from the Beach Seine Survey, 1991.
D-156	Regional standing crop (in thousands) of rainbow smelt young of year in the Hudson River estuary determined from the Beach Seine Survey, 1991.
D-157	Regional density (no./1,000 m^3) of rainbow smelt yearling and older in the Hudson River estuary determined from the Fall Juvenile Survey, 1991.
D-158	Regional standing crop (in thousands) of rainbow smelt yearling and older in the Hudson River estuary determined from the Fall Juvenile Survey, 1991.
D-159	Regional catch-per-unit-effort (CPUE) of rainbow smelt yearling and older in the Hudson River estuary determined from the Beach Seine Survey, 1991.
D-160	Regional standing crop (in thousands) of rainbow smelt yearling and older in the Hudson River estuary determined from the Beach Seine Survey, 1991.

Table D-1 Regional Density (No./1,000m3) of Striped Bass Eggs in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1991

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
15APR-	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
19APR	SE		0.00	0.00	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	11	6	7	7	8	9	9	108
22APR-	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.60	0.05
26APR	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.38	0.38
	NO. TOWS		10	12	13	10	6	11	6	7	7	8	9	9	108
29APR-	DENSITY	NS	0.00	0.00	0.00	0.97	8.90	0.70	0.00	0.00	0.00	1.00	0.69	0.00	1.02
03MAY	SE		0.00	0.00	0.00	0.88	7.35	0.70	0.00	0.00	0.00	0.54	0.69	0.00	7.48
	NO. TOWS		10	12	13	10	6	11	6	7	7	8	9	9	108
06MAY-	DENSITY	NS	0.00	0.00	0.00	1.31	0.10	19.86	0.73	1.67	0.00	0.00	0.00	0.00	1.97
10MAY	SE		0.00	0.00	0.00	0.86	0.10	10.11	0.56	1.05	0.00	0.00	0.00	0.00	10.22
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
13MAY-	DENSITY	NS	0.00	0.00	0.00	0.00	342.29	51.84	426.60	1081.16	177.14	0.00	1.19	0.00	173.35
18MAY	SE		0.00	0.00	0.00	0.00	217.54	19.32	173.04	729.98	102.60	0.00	1.19	0.00	788.06
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
20MAY-	DENSITY	NS	0.61	1.58	3.95	4.76	96.30	651.42	36.69	111.18	504.52	344.27	114.82	1.82	155.99
24MAY	SE		0.61	0.84	3.62	3.86	54.40	568.43	30.55	50.39	188.10	64.63	21.79	1.82	607.96
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
27MAY-	DENSITY	NS	0.00	0.00	0.00	15.24	3.30	0.61	35.22	58.37	60.95	14.77	30.07	0.00	18.21
01JUN	SE		0.00	0.00	0.00	15.24	1.62	0.47	35.22	21.48	24.66	6.99	14.47	0.00	52.95
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
03JUN-	DENSITY	NS	0.00	0.00	0.23	0.00	0.00	0.00	0.00	0.00	0.00	2.17	8.95	0.00	0.95
08JUN	SE		0.00	0.00	0.23	0.00	0.00	0.00	0.00	0.00	0.00	1.56	4.62	0.00	4.88
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
10JUN-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.12	0.00	0.00	0.00	3.82	3.26	0.00	0.00	0.55
15JUN	SE	0.00	0.00	0.00	0.00	0.00	0.12	0.00	0.00	0.00	2.21	3.26	0.00	0.00	3.94
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
17JUN-	DENSITY	0.00	0.00	0.67	0.00	0.00	0.00	0.26	3.47	0.00	0.00	0.00	0.00	0.00	0.34
23JUN	SE	0.00	0.00	0.67	0.00	0.00	0.00	0.26	3.19	0.00	0.00	0.00	0.00	0.00	3.27
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
24JUN-	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
30JUN	SE	0.00	0.00	0.00	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
30JUN-	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
05JUL	SE	0.00	0.00	0.00	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
08JUL-	DENSITY	0.00	0.00	0.47	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04
13JUL	SE	0.00	0.00	0.47	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.47
	NO. TOWS	6	11	13	11	12	9	13	7	10	7	6	6	6	117
22JUL-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
25JUL	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
06AUG-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
08AUG	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

Table D-1 Regional Density (No./1,000m3) of Striped Bass Eggs in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1991

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
20AUG-22AUG	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
03SEP-06SEP	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
16SEP-18SEP	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
01OCT-03OCT	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	9	6						72
15OCT-17OCT	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	12	12	10	6	10	6						74

Table D-2 Regional Standing Crop (In Thousands) of Striped Bass Eggs in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1991

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
15APR-19APR	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS		10	12	13	10	6	11	6	7	7	8	9	9	108
22APR-26APR	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	42.3	42.3
	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	26.8	26.8
	NO. TOWS		10	12	13	10	6	11	6	7	7	8	9	9	108
29APR-03MAY	St. Crop	NS	0.0	0.0	0.0	201.9	1845.5	98.5	0.0	0.0	0.0	176.9	111.1	0.0	2433.9
	SE		0.0	0.0	0.0	184.1	1523.8	98.5	0.0	0.0	0.0	95.8	111.1	0.0	1545.0
	NO. TOWS		10	12	13	10	6	11	6	7	7	8	9	9	108
06MAY-10MAY	St. Crop	NS	0.0	0.0	0.0	273.8	21.7	2775.8	218.8	276.2	0.0	0.0	0.0	0.0	3566.3
	SE		0.0	0.0	0.0	179.8	21.7	1413.0	168.2	174.3	0.0	0.0	0.0	0.0	1445.0
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
13MAY-18MAY	St. Crop	NS	0.0	0.0	0.0	0.0	71009.8	7246.6	127185.1	178915.6	25060.7	0.0	190.6	0.0	409608.4
	SE		0.0	0.0	0.0	0.0	45130.0	2700.8	51589.9	120800.3	14514.8	0.0	190.6	0.0	139674.4
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
20MAY-24MAY	St. Crop	NS	140.9	507.8	582.9	990.7	19977.7	91062.7	10937.1	18397.9	71374.2	60693.1	18454.5	129.8	293249.2
	SE		140.9	271.5	535.1	804.2	11285.4	79461.6	9108.5	8338.7	26610.3	11393.9	3502.8	129.8	86285.9
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
27MAY-01JUN	St. Crop	NS	0.0	0.0	0.0	3174.8	684.3	85.0	10501.6	9658.7	8622.8	2603.8	4832.5	0.0	40163.6
	SE		0.0	0.0	0.0	3174.8	335.4	65.9	10501.6	3554.6	3489.0	1232.4	2325.8	0.0	12337.6
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
03JUN-08JUN	St. Crop	NS	0.0	0.0	34.1	0.0	0.0	0.0	0.0	0.0	0.0	382.8	1438.2	0.0	1855.1
	SE		0.0	0.0	34.1	0.0	0.0	0.0	0.0	0.0	0.0	275.3	742.2	0.0	792.3
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
10JUN-15JUN	St. Crop	0.0	0.0	0.0	0.0	0.0	25.7	0.0	0.0	0.0	540.4	574.3	0.0	0.0	1140.4
	SE	0.0	0.0	0.0	0.0	0.0	25.7	0.0	0.0	0.0	312.0	574.3	0.0	0.0	654.1
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
17JUN-23JUN	St. Crop	0.0	0.0	215.7	0.0	0.0	0.0	36.9	1033.1	0.0	0.0	0.0	0.0	0.0	1285.7
	SE	0.0	0.0	215.7	0.0	0.0	0.0	36.9	951.1	0.0	0.0	0.0	0.0	0.0	976.0
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
24JUN-30JUN	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
30JUN-05JUL	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
08JUL-13JUL	St. Crop	0.0	0.0	150.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	150.9
	SE	0.0	0.0	150.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	150.9
	NO. TOWS	6	11	13	11	12	9	13	7	10	7	6	6	6	117
22JUL-25JUL	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	11	11	12	10	6	10	6						73
06AUG-08AUG	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	11	11	12	10	6	10	6						73

Table D-2. Regional Standing Crop (In Thousands) of Striped Bass Eggs in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1991

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
20AUG-22AUG	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	11	11	12	10	6	10	6						73
03SEP-06SEP	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	10	11	12	10	6	10	6						72
16SEP-18SEP	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	11	11	12	10	6	10	6						73
01OCT-03OCT	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	11	11	12	10	6	9	6						72
15OCT-17OCT	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	11	12	12	10	6	10	6						74

Table D-3 Regional Density (No./1,000m3) of Striped Bass Yolk-Sac Larvae in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1991

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
15APR-	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
19APR	SE		0.00	0.00	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	11	6	7	7	8	9	9	108
22APR-	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	11	6	7	7	8	9	9	108
29APR-	DENSITY	NS	0.00	0.27	0.00	3.61	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.32
03MAY	SE		0.00	0.27	0.00	1.82	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.84
	NO. TOWS		10	12	13	10	6	11	6	7	7	8	9	9	108
06MAY-	DENSITY	NS	0.00	0.00	5.09	2.92	4.28	34.68	2.25	1.38	0.00	0.00	0.00	0.00	4.22
10MAY	SE		0.00	0.00	1.81	1.37	2.22	6.65	0.98	0.85	0.00	0.00	0.00	0.00	7.48
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
13MAY-	DENSITY	NS	0.00	0.00	0.62	17.83	2474.64	897.46	849.08	390.89	101.26	9.75	0.00	0.00	395.13
18MAY	SE		0.00	0.00	0.62	8.69	1067.15	466.82	270.84	103.62	28.18	5.51	0.00	0.00	1200.72
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
20MAY-	DENSITY	NS	0.00	3.32	342.10	1228.44	4085.57	3615.40	2886.13	4694.18	960.88	224.32	20.51	1.06	1505.16
24MAY	SE		0.00	1.91	110.08	562.31	1089.24	824.95	995.87	1591.67	258.84	89.49	6.80	0.76	2407.39
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
27MAY-	DENSITY	NS	0.91	0.00	2.30	583.59	1731.80	590.10	817.52	1037.57	1225.21	395.41	26.78	1.06	534.35
01JUN	SE		0.77	0.00	1.44	216.30	641.30	299.11	473.64	684.57	888.50	258.60	6.82	0.75	1448.05
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
03JUN-	DENSITY	NS	0.00	0.00	0.00	0.72	3.66	1.75	26.86	28.55	7.80	16.65	4.57	5.18	7.98
08JUN	SE		0.00	0.00	0.00	0.72	3.66	0.86	17.82	9.93	3.62	6.17	1.61	2.72	22.18
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
10JUN-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.27	0.86	4.38	0.29	0.59	0.96	0.64
15JUN	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.56	0.25	1.24	0.29	0.59	0.96	1.81
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
17JUN-	DENSITY	0.00	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
23JUN	SE	0.00	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	6	11	14	11	13	9	13	7	10	7	6	6	6	119
24JUN-	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
30JUN	SE	0.00	0.00	0.00	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
30JUN-	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
05JUL	SE	0.00	0.00	0.00	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
08JUL-	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
13JUL	SE	0.00	0.00	0.00	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	13	11	12	9	13	7	10	7	6	6	6	117
22JUL-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
25JUL	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
06AUG-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
08AUG	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

Table D-3 Regional Density (No./1,000m3) of Striped Bass Yolk-Sac Larvae in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1991

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
20AUG-22AUG	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
03SEP-06SEP	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
16SEP-18SEP	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
01OCT-03OCT	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	9	6						72
15OCT-17OCT	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	12	12	10	6	10	6						74

Table D-4 Regional Standing Crop (In Thousands) of Striped Bass Yolk-Sac Larvae in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1991

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
15APR-	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
19APR	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS		10	12	13	10	6	11	6	7	7	8	9	9	108
22APR-	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
26APR	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS		10	12	13	10	6	11	6	7	7	8	9	9	108
29APR-	St. Crop	NS	0.0	86.2	0.0	752.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	838.9
03MAY	SE		0.0	86.2	0.0	380.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	389.7
	NO. TOWS		10	12	13	10	6	11	6	7	7	8	9	9	108
06MAY-	St. Crop	NS	0.0	0.0	752.5	607.5	888.3	4847.5	670.1	228.0	0.0	0.0	0.0	0.0	7993.9
10MAY	SE		0.0	0.0	267.9	285.7	460.9	929.3	293.6	140.6	0.0	0.0	0.0	0.0	1155.6
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
13MAY-	St. Crop	NS	0.0	0.0	91.6	3715.1	513377.9	125456.9	253138.6	64686.8	14325.1	1719.3	0.0	0.0	976511.4
18MAY	SE		0.0	0.0	91.6	1809.5	221387.1	65256.7	80747.7	17146.7	3987.1	970.8	0.0	0.0	245163.3
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
20MAY-	St. Crop	NS	0.0	1069.0	50540.4	255928.5	847574.5	505400.0	860452.2	776814.6	135935.6	39546.9	3296.3	75.4	3476633.1
24MAY	SE		0.0	614.2	16263.2	117149.8	225968.4	115320.8	296902.3	263397.3	36618.7	15777.3	1092.3	54.2	487308.6
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
27MAY-	St. Crop	NS	209.2	0.0	340.4	121583.6	359271.0	82491.4	243729.8	171701.7	173330.0	69709.3	4305.1	75.3	1226746.8
01JUN	SE		176.6	0.0	212.8	45063.4	133041.1	41813.5	141208.3	113285.6	125696.4	45589.9	1095.8	53.4	268573.5
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
03JUN-	St. Crop	NS	0.0	0.0	0.0	149.1	760.0	245.2	8006.7	4724.0	1103.4	2936.1	735.0	368.8	19028.3
08JUN	SE		0.0	0.0	0.0	149.1	760.0	120.4	5313.2	1642.8	512.0	1087.0	259.5	193.2	5752.5
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
10JUN-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	379.8	142.7	620.2	51.2	95.3	68.2	1357.4
15JUN	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	167.5	41.3	174.8	51.2	95.3	68.2	276.9
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
17JUN-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	59.8	0.0	0.0	0.0	0.0	0.0	59.8
23JUN	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	59.8	0.0	0.0	0.0	0.0	0.0	59.8
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
24JUN-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
30JUN	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
30JUN-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
05JUL	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
08JUL-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
13JUL	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS	6	11	13	11	12	9	13	7	10	7	6	6	6	117
22JUL-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
25JUL	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	11	11	12	10	6	10	6						73
06AUG-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
08AUG	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	11	11	12	10	6	10	6						73

Table D-4 Regional Standing Crop (In Thousands) of Striped Bass Yolk-Sac Larvae in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1991

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
20AUG-22AUG	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	11	11	12	10	6	10	6						73
03SEP-06SEP	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	10	11	12	10	6	10	6						72
16SEP-18SEP	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	11	11	12	10	6	10	6						73
01OCT-03OCT	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	11	11	12	10	6	9	6						72
15OCT-17OCT	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	11	12	12	10	6	10	6						74

Table D-5 Regional Density (No./1,000m3) of Striped Bass Post Yolk-Sac Larvae in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1991

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
15APR-	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
19APR	SE		0.00	0.00	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	11	6	7	7	8	9	9	108
22APR-	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	11	6	7	7	8	9	9	108
29APR-	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		10	12	13	10	6	11	6	7	7	8	9	9	108
06MAY-	DENSITY	NS	0.00	0.00	0.00	0.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
10MAY	SE		0.00	0.00	0.00	0.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.13
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
13MAY-	DENSITY	NS	0.00	0.00	0.00	4.84	66.04	58.44	23.75	4.93	0.00	0.00	0.00	0.00	13.17
18MAY	SE		0.00	0.00	0.00	2.70	20.86	28.53	9.72	1.97	0.00	0.00	0.00	0.00	36.81
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
20MAY-	DENSITY	NS	0.48	30.75	928.13	670.78	1585.42	2433.91	1496.76	918.72	37.18	4.07	0.00	0.00	675.52
24MAY	SE		0.48	9.85	240.83	210.00	787.57	411.20	385.45	358.54	19.77	2.49	0.00	0.00	1081.23
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
27MAY-	DENSITY	NS	1.51	77.96	1949.06	10757.39	6687.30	8125.17	6934.59	1952.20	1907.54	783.74	57.20	0.00	3269.47
01JUN	SE		1.51	30.60	929.83	3649.32	2590.27	2779.45	2760.34	500.82	765.78	499.65	22.14	0.00	6109.40
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
03JUN-	DENSITY	NS	2.80	66.12	1678.33	6218.44	9287.56	11286.52	1740.05	497.87	696.99	33.92	2.87	0.67	2626.01
08JUN	SE		1.38	39.02	346.17	3855.65	2672.94	4797.14	926.71	82.12	221.47	6.00	1.51	0.67	6786.70
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
10JUN-	DENSITY	0.00	4.37	11.99	62.17	2737.42	370.55	560.93	1527.85	158.94	385.35	538.81	121.68	1.23	498.56
15JUN	SE	0.00	1.58	3.32	10.72	1292.23	98.47	127.47	272.29	48.70	110.72	241.71	44.02	1.23	1358.33
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
17JUN-	DENSITY	0.00	2.05	7.37	20.31	96.20	132.52	311.06	249.95	417.34	115.60	62.15	187.06	96.44	130.62
23JUN	SE	0.00	1.28	3.27	4.94	49.66	39.71	139.60	85.63	139.69	32.74	30.39	145.77	94.58	287.41
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
24JUN-	DENSITY	0.75	0.55	0.47	3.99	30.68	38.71	66.22	169.17	49.05	4.13	7.13	1.76	4.84	29.03
30JUN	SE	0.75	0.55	0.35	1.87	19.78	11.84	18.64	86.14	13.07	1.53	2.51	1.32	4.12	92.20
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
30JUN-	DENSITY	0.00	0.20	0.00	0.00	4.01	2.86	9.51	3.14	25.26	1.68	7.92	6.94	0.00	4.73
05JUL	SE	0.00	0.20	0.00	0.00	2.53	1.93	5.57	1.50	11.65	1.68	4.20	3.98	0.00	14.68
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
08JUL-	DENSITY	0.00	0.30	0.00	0.00	0.11	0.00	0.29	2.70	13.37	1.12	0.00	0.00	0.77	1.44
13JUL	SE	0.00	0.30	0.00	0.00	0.06	0.00	0.21	1.36	7.83	0.65	0.00	0.00	0.77	8.02
	NO. TOWS	6	11	13	11	12	9	13	7	10	7	6	6	6	117
22JUL-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.56	NS	NS	NS	NS	NS	0.07
25JUL	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.56						0.56
	NO. TOWS	7	11	11	12	10	6	10	6						73
06AUG-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
08AUG	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

Table D-5 Regional Density (No./1,000m3) of Striped Bass Post Yolk-Sac Larvae in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1991

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
20AUG-22AUG	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
03SEP-06SEP	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
16SEP-18SEP	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
01OCT-03OCT	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	9	6						72
15OCT-17OCT	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	12	12	10	6	10	6						74

Table D-6 Regional Standing Crop (In Thousands) of Striped Bass Post Yolk-Sac Larvae in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1991

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
15APR-	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
19APR	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS		10	12	13	10	6	11	6	7	7	8	9	9	108
22APR-	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
26APR	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS		10	12	13	10	6	11	6	7	7	8	9	9	108
29APR-	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
03MAY	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS		10	12	13	10	6	11	6	7	7	8	9	9	108
06MAY-	St. Crop	NS	0.0	0.0	0.0	27.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	27.0
10MAY	SE		0.0	0.0	0.0	27.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	27.0
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
13MAY-	St. Crop	NS	0.0	0.0	0.0	1008.8	13700.2	8169.4	7080.0	815.9	0.0	0.0	0.0	0.0	30774.3
18MAY	SE		0.0	0.0	0.0	562.5	4327.8	3987.7	2898.9	325.4	0.0	0.0	0.0	0.0	6592.2
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
20MAY-	St. Crop	NS	109.7	9894.7	137119.4	139748.2	328905.5	340238.6	446234.1	152034.6	5259.7	716.6	0.0	0.0	1560261.0
24MAY	SE		109.7	3168.6	35579.4	43750.9	163386.1	57482.4	114914.9	59332.4	2796.9	439.5	0.0	0.0	223434.8
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
27MAY-	St. Crop	NS	345.6	25087.3	287947.4	2241154.2	1387318.4	1135825.8	2067434.4	323058.4	269860.0	138170.2	9193.9	0.0	7885395.5
01JUN	SE		345.6	9847.5	137370.1	760285.0	537366.3	388541.8	822950.0	82877.6	108334.5	88086.9	3557.9	0.0	1319224.0
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
03JUN-	St. Crop	NS	641.5	21278.5	247951.0	1295527.5	1926758.3	1577753.6	518767.5	82390.4	98603.7	5979.9	460.7	47.4	5776160.2
08JUN	SE		317.3	12557.4	51142.2	803272.8	554516.9	670597.6	276282.5	13589.9	31332.0	1057.7	243.1	47.4	1217665.8
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
10JUN-	St. Crop	0.0	1002.8	3859.1	9184.6	570304.6	76871.9	78412.3	455503.2	26302.5	54515.7	94990.1	19558.0	87.7	1390592.3
15JUN	SE	0.0	361.8	1069.1	1583.0	269218.7	20428.8	17819.1	81179.7	8058.5	15663.5	42611.9	7075.8	87.7	286327.8
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
17JUN-	St. Crop	0.0	470.6	2371.7	3001.2	20041.9	27491.5	43482.7	74518.2	69063.8	16353.6	10957.6	30067.1	6861.5	304681.5
23JUN	SE	0.0	293.3	1051.3	729.6	10346.1	8238.0	19515.1	25527.9	23115.8	4632.0	5357.8	23429.5	6729.6	48865.9
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
24JUN-	St. Crop	157.6	125.5	149.7	588.8	6390.8	8030.1	9257.1	50435.8	8117.4	583.7	1256.9	283.5	344.5	85721.4
30JUN	SE	157.6	125.5	114.2	276.1	4119.9	2457.2	2606.0	25681.4	2162.5	216.4	441.8	212.0	292.9	26353.7
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
30JUN-	St. Crop	0.0	45.2	0.0	0.0	835.8	592.6	1328.7	935.5	4180.3	238.2	1396.0	1114.8	0.0	10667.1
05JUL	SE	0.0	45.2	0.0	0.0	527.9	399.4	778.4	448.3	1928.7	238.2	739.7	639.5	0.0	2445.4
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
08JUL-	St. Crop	0.0	69.6	0.0	0.0	22.8	0.0	41.1	805.2	2211.8	158.4	0.0	0.0	54.9	3363.7
13JUL	SE	0.0	69.6	0.0	0.0	13.2	0.0	29.1	405.0	1296.5	91.5	0.0	0.0	54.9	1364.6
	NO. TOWS	6	11	13	11	12	9	13	7	10	7	6	6	6	117
22JUL-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	168.3	NS	NS	NS	NS	NS	168.3
25JUL	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	168.3						168.3
	NO. TOWS	7	11	11	12	10	6	10	6						73
06AUG-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
08AUG	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	11	11	12	10	6	10	6						73

Table D-6 Regional Standing Crop (In Thousands) of Striped Bass Post Yolk-Sac Larvae in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1991

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
20AUG-22AUG	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	11	11	12	10	6	10	6						73
03SEP-06SEP	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	10	11	12	10	6	10	6						72
16SEP-18SEP	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	11	11	12	10	6	10	6						73
01OCT-03OCT	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	11	11	12	10	6	9	6						72
15OCT-17OCT	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	11	12	12	10	6	10	6						74

Table D-7 Regional Density (No./1,000m3) of Striped Bass Young of Year in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1991

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
15APR-19APR	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	11	6	7	7	8	9	9	108
22APR-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	11	6	7	7	8	9	9	108
29APR-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		10	12	13	10	6	11	6	7	7	8	9	9	108
06MAY-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
13MAY-18MAY	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
20MAY-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	6	110
27MAY-01JUN	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
03JUN-08JUN	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
10JUN-15JUN	DENSITY	0.00	0.00	0.63	0.00	0.00	0.55	0.70	0.00	0.00	0.00	0.00	0.00	0.00	0.14
	SE	0.00	0.00	0.40	0.00	0.00	0.55	0.61	0.00	0.00	0.00	0.00	0.00	0.00	0.91
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
17JUN-23JUN	DENSITY	0.00	0.58	0.00	1.34	3.41	4.97	1.02	0.21	0.00	0.31	0.00	0.00	0.00	0.91
	SE	0.00	0.58	0.00	1.16	2.08	4.97	0.70	0.21	0.00	0.31	0.00	0.00	0.00	5.59
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
24JUN-30JUN	DENSITY	0.00	0.00	0.74	42.41	34.53	0.12	9.78	7.19	4.11	0.57	3.63	9.12	25.29	10.58
	SE	0.00	0.00	0.62	22.18	33.57	0.12	6.13	3.50	1.52	0.33	2.42	4.37	15.92	44.16
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
30JUN-05JUL	DENSITY	0.00	0.78	0.00	34.88	3.72	4.52	18.54	2.88	3.62	47.14	3.59	15.29	6.46	10.88
	SE	0.00	0.55	0.00	15.42	3.07	3.03	11.65	1.33	2.05	27.96	2.15	15.29	3.19	37.80
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
08JUL-13JUL	DENSITY	0.00	8.47	3.89	17.90	5.57	1.65	5.31	12.96	8.35	4.57	20.34	19.58	10.42	9.16
	SE	0.00	4.56	1.23	16.74	2.36	1.15	2.39	8.67	3.33	2.14	12.05	9.46	7.54	26.41
	NO. TOWS	6	11	13	11	12	9	13	7	10	7	6	6	6	117
22JUL-25JUL	DENSITY	0.00	0.00	3.32	5.44	0.60	0.33	3.24	3.97	NS	NS	NS	NS	NS	2.11
	SE	0.00	0.00	3.32	5.06	0.35	0.33	1.60	0.76						6.33
	NO. TOWS	7	11	11	12	10	6	10	6						73
06AUG-08AUG	DENSITY	0.00	0.00	0.00	0.00	0.06	0.00	0.44	0.57	NS	NS	NS	NS	NS	0.13
	SE	0.00	0.00	0.00	0.00	0.06	0.00	0.33	0.29						0.44
	NO. TOWS	7	11	11	12	10	6	10	6						73

Table D-7 Regional Density (No./1,000m3) of Striped Bass Young of Year in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1991

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
20AUG-22AUG	DENSITY	0.00	0.00	0.00	2.47	0.23	0.93	0.00	0.54	NS	NS	NS	NS	NS	0.52
	SE	0.00	0.00	0.00	1.24	0.23	0.93	0.00	0.54						1.65
	NO. TOWS	7	11	11	12	10	6	10	6						73
03SEP-06SEP	DENSITY	0.00	0.00	0.00	2.16	0.00	0.17	0.30	0.83	NS	NS	NS	NS	NS	0.43
	SE	0.00	0.00	0.00	1.61	0.00	0.17	0.30	0.83						1.84
	NO. TOWS	7	10	11	12	10	6	10	6						72
16SEP-18SEP	DENSITY	0.00	0.00	0.00	0.00	0.00	0.18	0.00	0.54	NS	NS	NS	NS	NS	0.09
	SE	0.00	0.00	0.00	0.00	0.00	0.18	0.00	0.54						0.57
	NO. TOWS	7	11	11	12	10	6	10	6						73
01OCT-03OCT	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.14	0.57	NS	NS	NS	NS	NS	0.09
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.07	0.57						0.58
	NO. TOWS	7	11	11	12	10	6	9	6						72
15OCT-17OCT	DENSITY	0.00	0.00	0.00	0.23	0.00	0.15	0.00	0.00	NS	NS	NS	NS	NS	0.05
	SE	0.00	0.00	0.00	0.23	0.00	0.15	0.00	0.00						0.27
	NO. TOWS	7	11	12	12	10	6	10	6						74

Table D-8 Regional Standing Crop (In Thousands) of Striped Bass Young of Year in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1991

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
15APR-	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
19APR	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS		10	12	13	10	6	11	6	7	7	8	9	9	108
22APR-	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
26APR	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS		10	12	13	10	6	11	6	7	7	8	9	9	108
29APR-	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
03MAY	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS		10	12	13	10	6	11	6	7	7	8	9	9	108
06MAY-	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10MAY	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
13MAY-	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
18MAY	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
20MAY-	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
24MAY	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
27MAY-	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
01JUN	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
03JUN-	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08JUN	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
10JUN-	St. Crop	0.0	0.0	202.6	0.0	0.0	113.8	98.3	0.0	0.0	0.0	0.0	0.0	0.0	414.6
15JUN	SE	0.0	0.0	128.2	0.0	0.0	113.8	85.6	0.0	0.0	0.0	0.0	0.0	0.0	191.6
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
17JUN-	St. Crop	0.0	132.8	0.0	198.1	709.8	1030.7	142.0	61.3	0.0	43.2	0.0	0.0	0.0	2317.9
23JUN	SE	0.0	132.8	0.0	171.1	432.8	1030.7	97.3	61.3	0.0	43.2	0.0	0.0	0.0	1145.3
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
24JUN-	St. Crop	0.0	0.0	238.6	6265.4	7193.1	24.6	1366.5	2144.7	680.8	81.3	640.7	1466.0	1799.3	21901.2
30JUN	SE	0.0	0.0	199.2	3276.3	6994.1	24.6	856.7	1044.3	252.1	46.9	425.9	703.1	1132.4	7971.2
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
30JUN-	St. Crop	0.0	179.1	0.0	5153.4	774.7	937.8	2591.7	858.8	599.4	6669.2	633.2	2458.2	459.9	21315.4
05JUL	SE	0.0	126.8	0.0	2278.0	640.5	628.2	1628.3	397.3	339.5	3955.7	379.8	2458.2	227.1	5551.7
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
08JUL-	St. Crop	0.0	1943.7	1252.1	2644.5	1159.9	342.6	743.0	3864.4	1382.6	647.1	3585.9	3146.4	741.4	21453.6
13JUL	SE	0.0	1045.0	396.4	2473.0	492.7	238.5	333.5	2586.3	551.5	302.8	2123.6	1520.0	536.1	4687.0
	NO. TOWS	6	11	13	11	12	9	13	7	10	7	6	6	6	117
22JUL-	St. Crop	0.0	0.0	1069.3	804.1	124.3	69.3	452.7	1184.7	NS	NS	NS	NS	NS	3704.4
25JUL	SE	0.0	0.0	1069.3	747.5	72.5	69.3	224.1	225.7						1346.6
	NO. TOWS	7	11	11	12	10	6	10	6						73
06AUG-	St. Crop	0.0	0.0	0.0	0.0	11.7	0.0	61.1	170.6	NS	NS	NS	NS	NS	243.4
08AUG	SE	0.0	0.0	0.0	0.0	11.7	0.0	45.8	85.4						97.6
	NO. TOWS	7	11	11	12	10	6	10	6						73

Table D-8 Regional Standing Crop (In Thousands) of Striped Bass Young of Year in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1991

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
20AUG-22AUG	St. Crop	0.0	0.0	0.0	364.8	47.3	192.7	0.0	160.2	NS	NS	NS	NS	NS	765.0
	SE	0.0	0.0	0.0	182.5	47.3	192.7	0.0	160.2						313.6
	NO. TOWS	7	11	11	12	10	6	10	6						73
03SEP-06SEP	St. Crop	0.0	0.0	0.0	319.5	0.0	36.2	41.5	248.1	NS	NS	NS	NS	NS	645.3
	SE	0.0	0.0	0.0	237.4	0.0	36.2	41.5	248.1						347.8
	NO. TOWS	7	10	11	12	10	6	10	6						72
16SEP-18SEP	St. Crop	0.0	0.0	0.0	0.0	0.0	37.8	0.0	162.4	NS	NS	NS	NS	NS	200.3
	SE	0.0	0.0	0.0	0.0	0.0	37.8	0.0	162.4						166.8
	NO. TOWS	7	11	11	12	10	6	10	6						73
01OCT-03OCT	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	19.0	170.6	NS	NS	NS	NS	NS	189.6
	SE	0.0	0.0	0.0	0.0	0.0	0.0	9.5	170.6						170.8
	NO. TOWS	7	11	11	12	10	6	9	6						72
15OCT-17OCT	St. Crop	0.0	0.0	0.0	33.4	0.0	30.7	0.0	0.0	NS	NS	NS	NS	NS	64.1
	SE	0.0	0.0	0.0	33.4	0.0	30.7	0.0	0.0						45.3
	NO. TOWS	7	11	12	12	10	6	10	6						74

Table D-9 Regional Density (No./1,000m3) of Striped Bass Young of Year in Hudson River Estuary Determined From Fall Juvenile Survey, 1991

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
15JUL-	DENSITY	0.05	2.54	18.34	1.05	0.89	0.24	0.90	5.58	5.05	4.37	2.70	4.58	3.86
20JUL	SE	0.04	0.81	4.41	0.73	0.81	0.16	0.33	1.48	1.81	2.24	0.60	1.59	5.90
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
29JUL-	DENSITY	0.00	1.62	12.12	0.16	0.17	1.02	0.90	1.17	3.43	3.42	0.51	1.94	2.21
03AUG	SE	0.00	0.42	3.92	0.10	0.10	0.37	0.33	0.23	1.15	0.96	0.13	0.58	4.30
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
12AUG-	DENSITY	0.02	1.76	1.60	0.30	1.65	0.30	0.62	0.12	0.81	0.69	0.35	2.81	0.92
17AUG	SE	0.02	0.36	0.47	0.17	0.80	0.14	0.29	0.06	0.41	0.44	0.12	0.61	1.37
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
26AUG-	DENSITY	0.00	0.51	2.04	0.43	0.00	1.21	0.17	0.28	0.43	0.05	0.15	0.65	0.49
30AUG	SE	0.00	0.19	0.37	0.18	0.00	0.53	0.05	0.09	0.34	0.03	0.06	0.31	0.85
	NO. TOWS	17	45	27	14	8	13	8	10	15	18	21	13	209
09SEP-	DENSITY	0.00	0.53	1.06	0.17	0.00	0.89	0.39	0.22	0.06	0.54	0.10	0.84	0.40
13SEP	SE	0.00	0.18	0.27	0.13	0.00	0.63	0.29	0.12	0.04	0.28	0.04	0.43	0.94
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
23SEP-	DENSITY	0.00	0.21	0.32	0.01	0.82	0.81	1.21	0.13	0.94	0.33	0.00	0.05	0.40
27SEP	SE	0.00	0.08	0.10	0.01	0.82	0.68	0.75	0.07	0.52	0.23	0.00	0.05	1.43
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
07OCT-	DENSITY	0.00	0.35	1.73	1.03	0.00	0.83	0.00	0.11	0.20	0.80	0.34	0.10	0.46
11OCT	SE	0.00	0.15	0.48	0.69	0.00	0.58	0.00	0.05	0.09	0.45	0.23	0.07	1.16
	NO. TOWS	17	45	27	14	8	13	8	10	15	18	21	13	209
21OCT-	DENSITY	0.00	1.00	3.36	1.13	0.02	0.39	0.04	0.13	0.00	0.14	0.05	0.00	0.52
25OCT	SE	0.00	0.26	0.65	0.55	0.02	0.13	0.04	0.08	0.00	0.09	0.03	0.00	0.91
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210

Table D-10 Regional Standing Crops (in Thousands) of Striped Bass Young of Year in Hudson River Estuary Determined From Fall Juvenile Survey, 1991

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
15JUL -	St. Crop	13	816	2709	218	184	34	267	924	714	770	434	326	7410
20JUL	SE	8	260	651	152	168	22	100	245	256	395	96	113	926
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
29JUL -	St. Crop	0	520	1791	34	36	143	269	194	486	604	82	138	4296
03AUG	SE	0	136	579	20	21	52	99	38	162	170	21	42	652
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
12AUG -	St. Crop	4	566	236	63	343	42	186	20	115	121	56	200	1950
17AUG	SE	4	117	70	36	166	20	87	10	58	77	19	43	258
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
26AUG -	St. Crop	0	163	302	89	0	169	50	47	62	9	24	47	960
30AUG	SE	0	60	55	36	0	74	15	16	48	6	9	22	130
	NO. TOWS	17	45	27	14	8	13	8	10	15	18	21	13	209
09SEP -	St. Crop	0	170	157	35	0	125	116	37	8	95	16	60	820
13SEP	SE	0	58	40	27	0	88	85	19	5	50	7	31	157
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
23SEP -	St. Crop	0	68	47	2	169	113	360	21	133	58	0	4	974
27SEP	SE	0	25	14	2	169	95	224	12	73	41	0	4	309
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
07OCT -	St. Crop	0	111	256	214	0	116	0	18	29	142	55	7	948
11OCT	SE	0	47	72	144	0	81	0	9	13	79	37	5	206
	NO. TOWS	17	45	27	14	8	13	8	10	15	18	21	13	209
21OCT -	St. Crop	0	322	497	236	4	55	11	21	0	25	8	0	1177
25OCT	SE	0	84	97	114	4	18	11	13	0	16	5	0	174
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210

Table D-11 Regional Catch-Per-Unit-Effort (CPUE) of Striped Bass Young of Year in Hudson River Estuary Determined From Beach Seine Survey, 1991

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
24JUN-	CPUE	24.00	67.45	34.57	18.33	33.67	3.33	14.38	15.88	22.13	13.20	24.68	30.50	25.18
29JUN	SE	15.18	15.56	6.47	9.84	27.82	0.33	11.55	7.91	8.47	3.92	8.24	20.11	46.26
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
08JUL-	CPUE	11.67	19.00	56.71	14.00	4.33	12.00	2.25	5.25	8.63	12.00	36.58	44.83	18.94
12JUL	SE	4.26	3.56	27.26	13.01	3.38	3.21	0.62	1.68	2.45	4.65	14.92	25.62	43.30
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
23JUL-	CPUE	6.33	17.36	11.57	31.33	8.33	75.33	9.63	6.50	6.25	8.53	4.53	14.83	16.71
25JUL	SE	5.36	4.89	5.19	23.33	1.86	24.50	5.50	3.00	1.76	1.62	1.14	11.34	37.45
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
05AUG-	CPUE	2.60	19.96	14.79	7.20	23.40	39.00	9.20	3.60	8.40	11.22	14.50	8.43	13.52
08AUG	SE	1.08	2.89	3.19	3.88	12.35	19.91	4.36	2.62	2.62	2.17	5.06	3.93	25.73
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
20AUG-	CPUE	3.20	7.71	7.07	2.20	11.00	13.33	8.20	1.40	5.20	19.56	14.30	11.00	8.68
23AUG	SE	1.16	1.34	1.53	1.32	4.62	5.96	2.37	0.51	2.40	5.06	3.88	3.85	11.45
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
03SEP-	CPUE	0.20	6.17	2.64	3.40	3.40	8.33	2.40	0.20	8.20	5.00	7.30	3.29	4.21
06SEP	SE	0.20	1.56	0.89	1.57	1.57	4.09	1.12	0.20	2.75	1.54	2.33	1.23	6.56
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
16SEP-	CPUE	0.00	3.38	4.29	4.60	5.80	7.33	3.20	0.00	2.60	6.33	3.20	3.43	3.68
19SEP	SE	0.00	1.04	1.27	3.14	1.69	2.65	1.77	0.00	1.12	1.17	1.43	0.84	5.56
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
30SEP-	CPUE	0.20	2.29	6.50	3.20	10.40	3.50	4.60	1.20	0.80	3.67	1.70	1.57	3.30
04OCT	SE	0.20	0.82	2.83	1.02	1.81	0.76	2.91	0.58	0.37	2.70	0.90	0.69	5.58
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
15OCT-	CPUE	0.40	1.29	5.21	10.80	5.40	4.17	1.40	0.20	0.80	2.22	1.20	1.43	2.88
18OCT	SE	0.40	0.33	1.84	3.77	3.50	1.74	1.40	0.20	0.37	0.66	0.39	0.78	6.04
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
28OCT-	CPUE	0.40	0.88	6.29	36.80	2.00	1.83	1.80	0.20	0.60	0.00	1.00	0.29	4.34
01NOV	SE	0.24	0.34	1.19	22.96	0.63	0.87	1.11	0.20	0.60	0.00	0.80	0.18	23.07
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100

Table D-12 Regional Standing Crops (in Thousands) of Striped Bass Young of Year in Hudson River Estuary Determined From Beach Seine Survey, 1991

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
24JUN-	St. Crop	181	3065	930	169	89	36	102	20	190	232	486	414	5912
29JUN	SE	114	707	174	91	73	4	82	10	73	69	162	273	821
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
08JUL-	St. Crop	88	863	1525	129	11	128	16	7	74	211	720	609	4381
12JUL	SE	32	162	733	120	9	34	4	2	21	82	294	348	891
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
23JUL-	St. Crop	48	789	311	289	22	802	68	8	54	150	89	202	2831
25JUL	SE	40	222	140	215	5	261	39	4	15	29	22	154	460
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
05AUG-	St. Crop	20	907	398	66	62	415	65	4	72	197	285	115	2606
08AUG	SE	8	131	86	36	33	212	31	3	23	38	99	53	296
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
20AUG-	St. Crop	24	350	190	20	29	142	58	2	45	343	281	149	1635
23AUG	SE	9	61	41	12	12	63	17	1	21	89	76	52	164
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
03SEP-	St. Crop	2	280	71	31	9	89	17	<0.005	71	88	144	45	846
06SEP	SE	2	71	24	14	4	44	8	<0.005	24	27	46	17	107
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
16SEP-	St. Crop	0	153	115	42	15	78	23	0	22	111	63	47	670
19SEP	SE	0	47	34	29	4	28	13	0	10	20	28	11	82
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
30SEP-	St. Crop	2	104	175	29	27	37	33	1	7	64	33	21	535
04OCT	SE	2	37	76	9	5	8	21	1	3	47	18	9	102
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
15OCT-	St. Crop	3	59	140	100	14	44	10	<0.005	7	39	24	19	459
18OCT	SE	3	15	50	35	9	19	10	<0.005	3	12	8	11	69
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
28OCT-	St. Crop	3	40	169	339	5	20	13	<0.005	5	0	20	4	617
01NOV	SE	2	16	32	212	2	9	8	<0.005	5	0	16	3	216
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100

Table D-13 Regional Density (No./1,000m3) of Striped Bass Yearling and Older in Hudson River Estuary Determined From Fall Juvenile Survey, 1991

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
15JUL-	DENSITY	0.01	0.21	0.19	0.02	0.00	0.00	0.00	0.03	0.32	0.05	0.05	0.06	0.08
20JUL	SE	0.01	0.11	0.09	0.02	0.00	0.00	0.00	0.03	0.29	0.03	0.04	0.06	0.34
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
29JUL-	DENSITY	0.00	0.14	0.10	0.00	0.00	0.00	0.00	0.50	0.03	0.02	0.00	0.00	0.07
03AUG	SE	0.00	0.05	0.06	0.00	0.00	0.00	0.00	0.50	0.03	0.02	0.00	0.00	0.51
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
12AUG-	DENSITY	0.00	0.24	0.02	0.02	0.00	0.00	0.00	0.60	0.03	0.33	0.02	0.05	0.11
17AUG	SE	0.00	0.09	0.02	0.02	0.00	0.00	0.00	0.55	0.03	0.33	0.02	0.05	0.65
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
26AUG-	DENSITY	0.00	0.03	0.06	0.02	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.01
30AUG	SE	0.00	0.02	0.04	0.02	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.06
	NO. TOWS	17	45	27	14	8	13	8	10	15	18	21	13	209
09SEP-	DENSITY	0.00	0.09	0.14	0.01	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.11	0.03
13SEP	SE	0.00	0.07	0.08	0.01	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.07	0.13
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
23SEP-	DENSITY	0.00	0.03	0.02	0.00	0.00	0.00	0.00	0.02	0.31	0.00	0.00	0.00	0.03
27SEP	SE	0.00	0.02	0.02	0.00	0.00	0.00	0.00	0.02	0.31	0.00	0.00	0.00	0.32
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
07OCT-	DENSITY	0.00	0.05	0.06	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.22	0.00	0.03
11OCT	SE	0.00	0.03	0.04	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.22	0.00	0.23
	NO. TOWS	17	45	27	14	8	13	8	10	15	18	21	13	209
21OCT-	DENSITY	0.03	0.16	0.12	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.03
25OCT	SE	0.02	0.05	0.07	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.09
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210

Table D-14 Regional Standing Crops (in Thousands) of Striped Bass Yearling and Older in Hudson River Estuary Determined From Fall Juvenile Survey, 1991

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
15JUL-	St. Crop	3	67	29	5	0	0	0	4	45	8	8	4	174
20JUL	SE	3	37	13	3	0	0	0	4	41	6	6	4	58
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
29JUL-	St. Crop	0	46	15	0	0	0	0	83	4	4	0	0	151
03AUG	SE	0	16	8	0	0	0	0	83	4	4	0	0	85
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
12AUG-	St. Crop	0	79	3	5	0	0	0	99	4	58	4	4	255
17AUG	SE	0	28	3	5	0	0	0	91	4	58	4	4	112
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
26AUG-	St. Crop	0	11	8	5	0	0	0	0	4	0	0	0	28
30AUG	SE	0	6	6	5	0	0	0	0	4	0	0	0	11
	NO. TOWS	17	45	27	14	8	13	8	10	15	18	21	13	209
09SEP-	St. Crop	0	29	20	2	0	3	0	0	0	0	0	8	62
13SEP	SE	0	21	12	2	0	3	0	0	0	0	0	5	25
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
23SEP-	St. Crop	0	11	3	0	0	0	0	4	44	0	0	0	63
27SEP	SE	0	6	3	0	0	0	0	4	44	0	0	0	45
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
07OCT-	St. Crop	0	16	8	4	0	0	0	0	0	0	36	0	64
11OCT	SE	0	10	6	2	0	0	0	0	0	0	36	0	38
	NO. TOWS	17	45	27	14	8	13	8	10	15	18	21	13	209
21OCT-	St. Crop	6	52	18	0	0	1	0	0	0	0	0	0	77
25OCT	SE	4	17	10	0	0	1	0	0	0	0	0	0	21
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210

Table D-15 Regional Catch-Per-Unit-Effort (CPUE) of Striped Bass Yearling and Older in Hudson River Estuary Determined From Beach Seine Survey, 1991

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
24JUN-	CPUE	0.00	1.64	0.43	0.00	0.67	1.33	0.38	1.13	0.00	2.47	0.05	0.42	0.71
29JUN	SE	0.00	0.94	0.30	0.00	0.67	0.67	0.18	0.99	0.00	1.38	0.05	0.23	2.19
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
08JUL-	CPUE	0.00	0.27	1.00	0.67	0.00	0.00	0.13	0.38	0.00	0.27	1.74	0.17	0.38
12JUL	SE	0.00	0.27	0.69	0.67	0.00	0.00	0.13	0.18	0.00	0.12	1.52	0.11	1.84
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
23JUL-	CPUE	0.00	0.18	0.00	0.00	0.00	0.00	0.25	1.25	0.25	0.47	0.32	0.25	0.25
25JUL	SE	0.00	0.18	0.00	0.00	0.00	0.00	0.16	0.98	0.25	0.47	0.22	0.13	1.17
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
05AUG-	CPUE	0.40	1.79	0.50	1.40	0.20	0.00	1.20	0.20	0.00	0.33	1.50	0.14	0.64
08AUG	SE	0.24	1.11	0.25	1.17	0.20	0.00	0.80	0.20	0.00	0.24	0.99	0.14	2.12
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
20AUG-	CPUE	1.00	0.33	0.43	0.40	1.40	0.00	0.00	0.00	0.20	3.44	0.60	0.29	0.67
23AUG	SE	0.77	0.13	0.17	0.24	1.40	0.00	0.00	0.00	0.20	2.12	0.31	0.18	2.71
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
03SEP-	CPUE	0.60	0.38	0.93	0.60	0.00	0.00	0.00	0.00	0.00	0.11	0.20	0.00	0.23
06SEP	SE	0.40	0.15	0.20	0.24	0.00	0.00	0.00	0.00	0.00	0.11	0.13	0.00	0.56
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
16SEP-	CPUE	0.20	0.38	1.50	0.20	0.00	0.00	0.00	0.40	0.40	0.00	0.20	0.14	0.28
19SEP	SE	0.20	0.18	0.63	0.20	0.00	0.00	0.00	0.40	0.24	0.00	0.20	0.14	0.89
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
30SEP-	CPUE	0.20	0.25	0.21	0.00	0.20	0.17	0.00	0.00	0.40	0.00	0.00	0.00	0.12
04OCT	SE	0.20	0.11	0.11	0.00	0.20	0.17	0.00	0.00	0.40	0.00	0.00	0.00	0.54
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
15OCT-	CPUE	1.00	0.33	0.29	1.00	0.20	0.00	1.20	0.40	0.40	0.00	0.20	0.00	0.42
18OCT	SE	0.77	0.12	0.16	0.63	0.20	0.00	0.97	0.40	0.24	0.00	0.20	0.00	1.51
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
28OCT-	CPUE	0.00	0.29	0.71	0.60	0.00	0.00	0.20	0.20	0.00	0.00	0.00	0.00	0.17
01NOV	SE	0.00	0.15	0.19	0.24	0.00	0.00	0.20	0.20	0.00	0.00	0.00	0.00	0.45
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100

Table D-16 Regional Standing Crops (in Thousands) of Striped Bass Yearling and Older in Hudson River Estuary Determined From Beach Seine Survey, 1991

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
24JUN-	St. Crop	0	74	12	0	2	14	3	1	0	43	1	6	156
29JUN	SE	0	43	8	0	2	7	1	1	0	24	1	3	50
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
08JUL-	St. Crop	0	12	27	6	0	0	1	<0.005	0	5	34	2	88
12JUL	SE	0	12	19	6	0	0	1	<0.005	0	2	30	2	38
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
23JUL-	St. Crop	0	8	0	0	0	0	2	2	2	8	6	3	32
25JUL	SE	0	8	0	0	0	0	1	1	2	8	4	2	13
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
05AUG-	St. Crop	3	81	13	13	1	0	9	<0.005	0	6	30	2	157
08AUG	SE	2	51	7	11	1	0	6	<0.005	0	4	20	2	56
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
20AUG-	St. Crop	8	15	12	4	4	0	0	0	2	60	12	4	119
23AUG	SE	6	6	5	2	4	0	0	0	2	37	6	3	39
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
03SEP-	St. Crop	5	17	25	6	0	0	0	0	0	2	4	0	58
06SEP	SE	3	7	5	2	0	0	0	0	0	2	3	0	10
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
16SEP-	St. Crop	2	17	40	2	0	0	0	<0.005	3	0	4	2	71
19SEP	SE	2	8	17	2	0	0	0	<0.005	2	0	4	2	19
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
30SEP-	St. Crop	2	11	6	0	1	2	0	0	3	0	0	0	24
04OCT	SE	2	5	3	0	1	2	0	0	3	0	0	0	7
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
15OCT-	St. Crop	8	15	8	9	1	0	9	<0.005	3	0	4	0	56
18OCT	SE	6	5	4	6	1	0	7	<0.005	2	0	4	0	14
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
28OCT-	St. Crop	0	13	19	6	0	0	1	<0.005	0	0	0	0	40
01NOV	SE	0	7	5	2	0	0	1	<0.005	0	0	0	0	9
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100

Table D-17 Regional Density (No./1,000m3) of White Perch Eggs in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1991

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
15APR-19APR	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.70	2.83	0.00	0.63	0.00	0.35
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.70	1.48	0.00	0.45	0.00	1.70
	NO. TOWS		10	12	13	10	6	11	6	7	7	8	9	9	108
22APR-26APR	DENSITY	NS	0.00	0.00	0.00	0.00	0.13	0.26	0.87	3.69	1.24	3.50	5.47	15.91	2.59
	SE		0.00	0.00	0.00	0.00	0.13	0.26	0.69	2.53	0.27	2.29	2.10	7.38	8.43
	NO. TOWS		10	12	13	10	6	11	6	7	7	8	9	9	108
29APR-03MAY	DENSITY	NS	0.00	0.00	9.29	0.05	0.00	0.66	0.44	18.76	12.04	26.36	342.18	179.97	49.14
	SE		0.00	0.00	9.29	0.05	0.00	0.30	0.44	2.74	7.15	8.78	238.55	69.86	249.01
	NO. TOWS		10	12	13	10	6	11	6	7	7	8	9	9	108
06MAY-10MAY	DENSITY	NS	0.00	0.00	0.00	4.77	0.22	5.67	5.09	7.45	3.24	330.11	367.96	171.62	74.68
	SE		0.00	0.00	0.00	2.38	0.12	3.86	4.39	4.44	1.06	142.92	161.29	168.96	273.95
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
13MAY-18MAY	DENSITY	NS	0.00	0.15	0.00	0.00	0.98	75.63	55.63	18.03	341.36	85.55	302.87	9.62	74.15
	SE		0.00	0.15	0.00	0.00	0.98	69.39	38.06	5.98	288.58	42.57	175.53	3.43	349.59
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
20MAY-24MAY	DENSITY	NS	1.36	0.00	0.00	0.00	4.39	102.10	60.74	41.48	1000.73	749.93	0.53	15.73	164.75
	SE		1.36	0.00	0.00	0.00	2.62	75.60	43.11	33.75	397.64	574.65	0.53	10.10	705.10
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
27MAY-01JUN	DENSITY	NS	0.00	0.00	0.00	0.00	7.81	2.87	14.71	166.95	174.92	1114.68	1112.47	42.85	219.77
	SE		0.00	0.00	0.00	0.00	7.27	2.26	12.56	157.28	134.55	391.64	518.01	16.47	681.94
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
03JUN-08JUN	DENSITY	NS	0.00	0.00	0.00	0.92	1.11	0.00	0.00	1.01	0.79	1.28	192.98	20.50	18.22
	SE		0.00	0.00	0.00	0.78	1.11	0.00	0.00	1.01	0.79	1.28	90.55	14.79	91.78
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
10JUN-15JUN	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.91	9.99	8.48	26.71	3.62
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.21	9.99	8.48	11.12	17.23
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
17JUN-23JUN	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.32	0.00	0.00	0.02
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.32	0.00	0.00	0.32
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
24JUN-30JUN	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
30JUN-05JUL	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
08JUL-13JUL	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	13	11	12	9	13	7	10	7	6	6	6	117
22JUL-25JUL	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
06AUG-08AUG	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

Table D-17 Regional Density (No./1,000m3) of White Perch Eggs in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1991

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
20AUG-22AUG	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
03SEP-06SEP	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
16SEP-18SEP	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
01OCT-03OCT	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	9	6						72
15OCT-17OCT	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	12	12	10	6	10	6						74

Table D-18 Regional Standing Crop (In Thousands) of White Perch Eggs in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1991

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
15APR-	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	115.7	399.9	0.0	101.2	0.0	616.8
19APR	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	115.7	209.2	0.0	71.9	0.0	249.6
	NO. TOWS		10	12	13	10	6	11	6	7	7	8	9	9	108
22APR-	St. Crop	NS	0.0	0.0	0.0	0.0	26.5	36.5	259.1	610.5	175.2	616.2	879.2	1131.8	3735.2
26APR	SE		0.0	0.0	0.0	0.0	26.5	36.5	204.2	418.3	38.9	403.4	337.8	525.1	879.1
	NO. TOWS		10	12	13	10	6	11	6	7	7	8	9	9	108
29APR-	St. Crop	NS	0.0	0.0	1371.9	9.4	0.0	92.4	131.4	3104.4	1702.7	4647.3	54998.7	12804.4	78862.4
03MAY	SE		0.0	0.0	1371.9	9.4	0.0	41.7	131.4	453.1	1012.1	1548.0	38342.0	4970.5	38734.2
	NO. TOWS		10	12	13	10	6	11	6	7	7	8	9	9	108
06MAY-	St. Crop	NS	0.0	0.0	0.0	994.0	44.9	793.0	1517.4	1233.2	458.0	58196.3	59142.3	12210.4	134589.5
10MAY	SE		0.0	0.0	0.0	496.6	25.9	539.5	1308.2	735.3	149.5	25196.4	25924.9	12021.3	38135.1
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
13MAY-	St. Crop	NS	0.0	47.7	0.0	0.0	203.9	10572.5	16583.8	2983.5	48292.5	15082.1	48680.6	684.5	143131.1
18MAY	SE		0.0	47.7	0.0	0.0	203.9	9700.1	11347.3	990.1	40825.7	7504.3	28213.3	244.0	52373.5
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
20MAY-	St. Crop	NS	313.2	0.0	0.0	0.0	911.4	14273.1	18108.9	6864.6	141573.0	132208.8	84.6	1119.0	315456.7
24MAY	SE		313.2	0.0	0.0	0.0	542.9	10567.9	12852.5	5585.5	56253.5	101308.4	84.6	718.6	117204.3
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
27MAY-	St. Crop	NS	0.0	0.0	0.0	0.0	1619.4	401.0	4386.1	27627.6	24746.4	196513.2	178809.0	3048.7	437151.3
01JUN	SE		0.0	0.0	0.0	0.0	1508.7	316.3	3744.8	26028.2	19034.9	69043.7	83260.8	1171.9	112946.7
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
03JUN-	St. Crop	NS	0.0	0.0	0.0	191.0	231.2	0.0	0.0	167.4	112.3	226.2	31017.3	1458.6	33403.9
08JUN	SE		0.0	0.0	0.0	162.9	231.2	0.0	0.0	167.4	112.3	226.2	14554.7	1052.2	14598.5
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
10JUN-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	269.6	1762.1	1362.4	1900.1	5294.2
15JUN	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	171.6	1762.1	1362.4	791.2	2369.9
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
17JUN-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	56.8	0.0	0.0	56.8
23JUN	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	56.8	0.0	0.0	56.8
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
24JUN-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
30JUN	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
30JUN-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
05JUL	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
08JUL-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
13JUL	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS	6	11	13	11	12	9	13	7	10	7	6	6	6	117
22JUL-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
25JUL	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	11	11	12	10	6	10	6						73
06AUG-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
08AUG	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	11	11	12	10	6	10	6						73

Table D-18 Regional Standing Crop (In Thousands) of White Perch Eggs in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1991

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
20AUG-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
22AUG	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	11	11	12	10	6	10	6						73
03SEP-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
06SEP	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	10	11	12	10	6	10	6						72
16SEP-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
18SEP	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	11	11	12	10	6	10	6						73
01OCT-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
03OCT	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	11	11	12	10	6	9	6						72
15OCT-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
17OCT	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	11	12	12	10	6	10	6						74

Table D-19 Regional Density (No./1,000m3) of White Perch Yolk-Sac Larvae
in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1991

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
15APR-19APR	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	11	6	7	7	8	9	9	108
22APR-26APR	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.24	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	0.24	0.00	0.00	0.00	0.00	0.00	0.24
	NO. TOWS		10	12	13	10	6	11	6	7	7	8	9	9	108
29APR-03MAY	DENSITY	NS	0.00	0.00	0.00	1.40	0.77	0.11	0.00	2.71	0.00	2.13	1.28	1.38	0.82
	SE		0.00	0.00	0.00	1.40	0.77	0.07	0.00	1.07	0.00	1.75	0.96	1.14	3.00
	NO. TOWS		10	12	13	10	6	11	6	7	7	8	9	9	108
06MAY-10MAY	DENSITY	NS	0.00	0.00	0.00	1.91	1.76	13.35	19.90	130.17	278.22	201.55	83.61	66.42	66.41
	SE		0.00	0.00	0.00	1.48	1.01	3.36	4.49	26.07	38.59	60.68	17.14	37.81	87.23
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
13MAY-18MAY	DENSITY	NS	0.00	0.00	2.74	3.54	27.62	155.94	184.18	43.24	105.73	62.43	94.71	31.21	59.28
	SE		0.00	0.00	2.14	1.75	8.94	59.61	56.38	11.65	23.88	9.03	11.20	10.17	88.52
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
20MAY-24MAY	DENSITY	NS	0.00	0.00	0.82	38.37	23.49	127.59	112.52	336.91	139.95	132.61	81.15	16.50	84.16
	SE		0.00	0.00	0.49	29.07	6.40	32.15	44.76	57.27	33.82	27.04	12.99	8.95	96.58
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
27MAY-01JUN	DENSITY	NS	0.16	0.00	0.34	2.00	22.32	3.92	20.21	78.81	181.21	144.29	61.71	119.89	52.91
	SE		0.16	0.00	0.34	1.13	13.80	1.95	6.37	46.56	91.89	98.61	29.09	71.08	162.70
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
03JUN-08JUN	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	1.30	0.00	0.59	19.96	94.67	22.51	4.24	11.94
	SE		0.00	0.00	0.00	0.00	0.00	1.24	0.00	0.45	18.83	80.23	9.06	3.48	82.99
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
10JUN-15JUN	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.28	0.00	19.57	3.68	1.89
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.28	0.00	19.57	1.48	19.67
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
17JUN-23JUN	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.13	0.00	0.00	0.00	3.24	0.26
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.13	0.00	0.00	0.00	3.24	3.24
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
24JUN-30JUN	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
30JUN-05JUL	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
08JUL-13JUL	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	13	11	12	9	13	7	10	7	6	6	6	117
22JUL-25JUL	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
06AUG-08AUG	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

Table D-19 Regional Density (No./1,000m3) of White Perch Yolk-Sac Larvae in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1991

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
20AUG-22AUG	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
03SEP-06SEP	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
16SEP-18SEP	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
01OCT-03OCT	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	9	6						72
15OCT-17OCT	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	12	12	10	6	10	6						74

Table D-20 Regional Standing Crop (In Thousands) of White Perch Yolk-Sac Larvae in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1991

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
15APR-	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
19APR	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS		10	12	13	10	6	11	6	7	7	8	9	9	108
22APR-	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	71.3	0.0	0.0	0.0	0.0	0.0	71.3
26APR	SE		0.0	0.0	0.0	0.0	0.0	0.0	71.3	0.0	0.0	0.0	0.0	0.0	71.3
	NO. TOWS		10	12	13	10	6	11	6	7	7	8	9	9	108
29APR-	St. Crop	NS	0.0	0.0	0.0	291.6	159.0	15.3	0.0	449.1	0.0	375.4	206.4	98.5	1595.3
03MAY	SE		0.0	0.0	0.0	291.6	159.0	10.2	0.0	177.9	0.0	308.5	154.5	80.9	517.4
	NO. TOWS		10	12	13	10	6	11	6	7	7	8	9	9	108
06MAY-	St. Crop	NS	0.0	0.0	0.0	398.0	364.7	1866.0	5933.0	21541.9	39360.2	35532.7	13439.3	4726.1	123161.8
10MAY	SE		0.0	0.0	0.0	308.5	210.0	469.5	1337.2	4313.6	5458.8	10698.1	2755.7	2690.1	13410.2
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
13MAY-	St. Crop	NS	0.0	0.0	404.4	738.5	5730.9	21799.5	54909.6	7155.1	14957.2	11005.8	15223.3	2220.5	134144.7
18MAY	SE		0.0	0.0	315.6	364.2	1854.4	8332.9	16808.4	1928.4	3378.9	1592.8	1800.2	723.9	19418.2
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
20MAY-	St. Crop	NS	0.0	0.0	120.7	7994.1	4872.8	17835.9	33547.0	55753.0	19798.5	23379.2	13042.7	1174.2	177518.2
24MAY	SE		0.0	0.0	72.9	6056.5	1327.6	4494.3	13343.7	9477.5	4784.6	4767.6	2087.4	636.7	19414.2
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
27MAY-	St. Crop	NS	36.4	0.0	50.2	416.8	4629.6	548.0	6026.3	13041.5	25636.0	25438.1	9918.8	8530.1	94271.9
01JUN	SE		36.4	0.0	50.2	236.2	2863.8	273.0	1899.7	7705.4	13000.2	17384.2	4675.5	5057.2	24289.2
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
03JUN-	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	182.2	0.0	97.7	2823.7	16690.3	3618.1	302.0	23714.0
08JUN	SE		0.0	0.0	0.0	0.0	0.0	172.7	0.0	74.2	2663.2	14144.7	1455.5	247.5	14470.0
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
10JUN-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	181.3	0.0	3145.5	261.8	3588.6
15JUN	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	181.3	0.0	3145.5	105.4	3152.5
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
17JUN-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	21.3	0.0	0.0	0.0	230.4	251.7
23JUN	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	21.3	0.0	0.0	0.0	230.4	231.4
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
24JUN-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
30JUN	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
30JUN-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
05JUL	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
08JUL-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
13JUL	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS	6	11	13	11	12	9	13	7	10	7	6	6	6	117
22JUL-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
25JUL	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	11	11	12	10	6	10	6						73
06AUG-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
08AUG	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	11	11	12	10	6	10	6						73

Table D-20 Regional Standing Crop (In Thousands) of White Perch Yolk-Sac Larvae in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1991

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
20AUG-22AUG	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	11	11	12	10	6	10	6						73
03SEP-06SEP	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	10	11	12	10	6	10	6						72
16SEP-18SEP	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	11	11	12	10	6	10	6						73
01OCT-03OCT	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	11	11	12	10	6	9	6						72
15OCT-17OCT	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	11	12	12	10	6	10	6						74

Table D-21 Regional Density (No./1,000m3) of White Perch Post Yolk-Sac Larvae in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1991

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
15APR-	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
19APR	SE		0.00	0.00	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	11	6	7	7	8	9	9	108
22APR-	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	11	6	7	7	8	9	9	108
29APR-	DENSITY	NS	0.00	0.23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02
03MAY	SE		0.00	0.23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.23
	NO. TOWS		10	12	13	10	6	11	6	7	7	8	9	9	108
06MAY-	DENSITY	NS	0.00	0.00	0.00	0.41	0.58	0.61	0.43	1.98	0.33	0.00	0.00	0.00	0.36
10MAY	SE		0.00	0.00	0.00	0.41	0.48	0.43	0.29	0.98	0.33	0.00	0.00	0.00	1.31
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
13MAY-	DENSITY	NS	0.00	0.00	0.42	2.60	105.86	245.36	500.23	718.33	634.50	146.06	17.08	0.00	197.54
18MAY	SE		0.00	0.00	0.42	1.51	54.24	60.68	97.89	125.83	185.43	50.94	8.71	0.00	262.87
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
20MAY-	DENSITY	NS	0.12	1.65	86.86	224.54	350.78	1188.65	1673.36	900.74	2867.35	532.14	739.67	10.02	714.66
24MAY	SE		0.12	0.90	21.48	167.99	94.95	185.34	319.60	257.35	1121.18	83.05	153.76	8.63	1236.15
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
27MAY-	DENSITY	NS	0.00	0.00	38.95	788.24	1064.99	2110.41	1817.10	3046.50	4280.79	3437.03	892.62	27.75	1458.70
01JUN	SE		0.00	0.00	12.70	325.85	310.85	363.86	529.50	641.90	1715.15	1722.61	250.02	17.35	2645.69
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
03JUN-	DENSITY	NS	0.00	0.50	73.66	237.27	704.88	2711.45	695.92	1004.03	2500.37	1244.42	1024.81	404.25	883.47
08JUN	SE		0.00	0.37	42.73	76.73	245.57	1086.67	184.58	123.01	688.61	463.01	176.42	207.67	1435.57
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
10JUN-	DENSITY	0.00	0.00	0.33	0.50	12.23	70.05	164.44	1012.96	483.26	1707.65	1188.16	634.61	104.36	413.73
15JUN	SE	0.00	0.00	0.33	0.31	11.77	23.77	44.44	185.50	111.72	752.78	383.51	109.89	35.80	881.29
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
17JUN-	DENSITY	0.00	0.00	0.00	0.20	9.11	53.28	221.38	169.54	399.79	341.38	148.36	385.56	217.82	149.73
23JUN	SE	0.00	0.00	0.00	0.20	6.50	13.65	48.54	25.01	146.69	66.20	31.01	76.28	174.93	257.86
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
24JUN-	DENSITY	0.00	0.00	0.00	0.00	1.06	4.06	43.08	19.61	34.13	12.85	28.91	10.93	29.19	14.14
30JUN	SE	0.00	0.00	0.00	0.00	0.94	2.12	12.93	4.77	11.63	5.61	4.35	3.58	25.94	32.66
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
30JUN-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.65	1.25	0.77	12.14	0.26	13.79	15.45	3.01	3.64
05JUL	SE	0.00	0.00	0.00	0.00	0.00	0.65	0.68	0.32	5.13	0.26	9.49	10.42	2.18	15.19
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
08JUL-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.12	0.21	1.94	3.96	1.20	4.25	0.58	0.77	1.00
13JUL	SE	0.00	0.00	0.00	0.00	0.00	0.12	0.17	1.07	1.79	0.47	4.25	0.58	0.77	4.86
	NO. TOWS	6	11	13	11	12	9	13	7	10	7	6	6	6	117
22JUL-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
25JUL	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
06AUG-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
08AUG	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

Table D-21 Regional Density (No./1,000m3) of White Perch Post Yolk-Sac Larvae in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1991

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
20AUG-22AUG	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
03SEP-06SEP	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
16SEP-18SEP	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
01OCT-03OCT	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	9	6						72
15OCT-17OCT	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	12	12	10	6	10	6						74

Table D-22 Regional Standing Crop (In Thousands) of White Perch Post Yolk-Sac Larvae in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1991

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
15APR-	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
19APR	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS		10	12	13	10	6	11	6	7	7	8	9	9	108
22APR-	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
26APR	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS		10	12	13	10	6	11	6	7	7	8	9	9	108
29APR-	St. Crop	NS	0.0	74.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	74.8
03MAY	SE		0.0	74.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	74.8
	NO. TOWS		10	12	13	10	6	11	6	7	7	8	9	9	108
06MAY-	St. Crop	NS	0.0	0.0	0.0	84.9	119.9	85.6	129.0	327.1	47.1	0.0	0.0	0.0	793.6
10MAY	SE		0.0	0.0	0.0	84.9	98.9	60.3	85.5	161.5	47.1	0.0	0.0	0.0	237.1
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
13MAY-	St. Crop	NS	0.0	0.0	61.5	542.7	21962.1	34298.8	149136.3	118872.4	89762.9	25750.6	2745.7	0.0	443133.1
18MAY	SE		0.0	0.0	61.5	315.5	11252.4	8482.7	29184.5	20822.8	26233.5	8980.8	1400.5	0.0	47484.8
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
20MAY-	St. Crop	NS	27.4	530.1	12832.7	46780.7	72771.8	166163.1	498885.2	149057.8	405643.5	93814.6	118887.7	712.6	1566107.3
24MAY	SE		27.4	289.5	3173.2	34998.4	19698.4	25909.2	95283.1	42587.8	158612.5	14641.0	24713.5	613.8	197915.1
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
27MAY-	St. Crop	NS	0.0	0.0	5754.7	164218.4	220937.7	295016.4	541738.1	504149.0	605602.8	605934.3	143471.8	1974.5	3088797.7
01JUN	SE		0.0	0.0	1876.7	67885.9	64486.8	50863.7	157861.2	106224.9	242642.0	303688.4	40185.4	1234.4	447526.3
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
03JUN-	St. Crop	NS	0.0	161.8	10882.2	49432.5	146232.5	379036.9	207476.9	166152.3	353727.1	219385.8	164720.0	28762.3	1725970.3
08JUN	SE		0.0	117.9	6313.3	15985.1	50944.5	151906.5	55028.3	20356.6	97417.1	81626.4	28355.7	14775.6	215833.6
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
10JUN-	St. Crop	0.0	0.0	105.1	74.4	2548.0	14531.5	22987.3	301997.2	79972.7	241580.3	209468.2	102002.2	7425.1	982691.9
15JUN	SE	0.0	0.0	105.1	45.8	2451.9	4931.9	6211.7	55304.4	18487.6	106495.6	67610.4	17662.1	2547.1	140357.5
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
17JUN-	St. Crop	0.0	0.0	0.0	29.6	1897.3	11054.1	30947.1	50547.0	66158.9	48295.2	26156.0	61971.1	15497.7	312553.9
23JUN	SE	0.0	0.0	0.0	29.6	1354.4	2832.1	6785.1	7457.7	24274.7	9365.5	5467.4	12261.3	12446.5	33520.6
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
24JUN-	St. Crop	0.0	0.0	0.0	0.0	219.9	842.8	6022.0	5847.5	5647.7	1818.2	5097.0	1756.0	2076.9	29327.9
30JUN	SE	0.0	0.0	0.0	0.0	196.0	440.4	1806.9	1422.0	1925.0	793.2	767.4	575.4	1846.0	3765.9
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
30JUN-	St. Crop	0.0	0.0	0.0	0.0	0.0	133.9	174.3	229.5	2009.2	36.8	2430.3	2483.3	214.0	7711.3
05JUL	SE	0.0	0.0	0.0	0.0	0.0	133.9	94.6	95.3	848.1	36.8	1673.8	1675.2	154.9	2527.5
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
08JUL-	St. Crop	0.0	0.0	0.0	0.0	0.0	25.9	29.8	579.0	656.0	169.7	750.0	93.6	54.9	2358.8
13JUL	SE	0.0	0.0	0.0	0.0	0.0	25.9	24.4	320.0	295.9	66.9	750.0	93.6	54.9	877.5
	NO. TOWS	6	11	13	11	12	9	13	7	10	7	6	6	6	117
22JUL-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
25JUL	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	11	11	12	10	6	10	6						73
06AUG-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
08AUG	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	11	11	12	10	6	10	6						73

Table D-22 Regional Standing Crop (In Thousands) of White Perch Post Yolk-Sac Larvae in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1991

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
20AUG-22AUG	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	11	11	12	10	6	10	6						73
03SEP-06SEP	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	10	11	12	10	6	10	6						72
16SEP-18SEP	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	11	11	12	10	6	10	6						73
01OCT-03OCT	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	11	11	12	10	6	9	6						72
15OCT-17OCT	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	11	12	12	10	6	10	6						74

Table D-23 Regional Density (No./1,000m3) of White Perch Young of Year in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1991

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
15APR-19APR	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	11	6	7	7	8	9	9	108
22APR-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	11	6	7	7	8	9	9	108
29APR-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		10	12	13	10	6	11	6	7	7	8	9	9	108
06MAY-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
13MAY-18MAY	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
20MAY-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	6	110
27MAY-01JUN	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
03JUN-08JUN	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
10JUN-15JUN	DENSITY	0.00	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	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.05
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
17JUN-23JUN	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.16	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	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.10
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
24JUN-30JUN	DENSITY	0.00	0.00	0.00	0.97	0.00	0.00	1.09	1.08	0.17	1.23	0.00	0.58	0.67	0.44
	SE	0.00	0.00	0.00	0.44	0.00	0.00	0.75	0.65	0.17	1.23	0.00	0.58	0.67	1.87
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
30JUN-05JUL	DENSITY	0.00	0.00	0.00	0.76	0.00	0.83	0.52	0.00	3.45	3.94	0.00	1.18	0.00	0.82
	SE	0.00	0.00	0.00	0.31	0.00	0.72	0.38	0.00	1.49	2.90	0.00	1.18	0.00	3.57
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
08JUL-13JUL	DENSITY	1.08	0.00	0.00	0.00	2.25	0.13	0.35	1.57	1.62	1.87	1.69	1.25	1.30	1.01
	SE	1.08	0.00	0.00	0.00	1.24	0.13	0.22	0.68	0.92	0.99	1.12	1.25	1.30	3.09
	NO. TOWS	6	11	13	11	12	9	13	7	10	7	6	6	6	117
22JUL-25JUL	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.42	NS	NS	NS	NS	NS	0.18
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.02						1.02
	NO. TOWS	7	11	11	12	10	6	10	6						73
06AUG-08AUG	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.29	NS	NS	NS	NS	NS	0.04
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.29						0.29
	NO. TOWS	7	11	11	12	10	6	10	6						73

Table D-23 Regional Density (No./1,000m3) of White Perch Young of Year in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1991

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
20AUG-22AUG	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
03SEP-06SEP	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.55	NS	NS	NS	NS	NS	0.08
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.55						0.56
	NO. TOWS	7	10	11	12	10	6	10	6						72
16SEP-18SEP	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.27	NS	NS	NS	NS	NS	0.03
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.27						0.27
	NO. TOWS	7	11	11	12	10	6	10	6						73
01OCT-03OCT	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	9	6						72
15OCT-17OCT	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.61	0.26	NS	NS	NS	NS	NS	0.11
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.61	0.26						0.66
	NO. TOWS	7	11	12	12	10	6	10	6						74

Table D-24 Regional Standing Crop (In Thousands) of White Perch Young of Year in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1991

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
15APR-	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
19APR	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS		10	12	13	10	6	11	6	7	7	8	9	9	108
22APR-	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
26APR	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS		10	12	13	10	6	11	6	7	7	8	9	9	108
29APR-	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
03MAY	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS		10	12	13	10	6	11	6	7	7	8	9	9	108
06MAY-	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10MAY	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
13MAY-	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
18MAY	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
20MAY-	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
24MAY	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
27MAY-	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
01JUN	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
03JUN-	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08JUN	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
10JUN-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	6.9	0.0	0.0	0.0	0.0	0.0	0.0	6.9
15JUN	SE	0.0	0.0	0.0	0.0	0.0	0.0	6.9	0.0	0.0	0.0	0.0	0.0	0.0	6.9
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
17JUN-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	21.9	0.0	0.0	0.0	0.0	0.0	0.0	21.9
23JUN	SE	0.0	0.0	0.0	0.0	0.0	0.0	14.2	0.0	0.0	0.0	0.0	0.0	0.0	14.2
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
24JUN-	St. Crop	0.0	0.0	0.0	143.0	0.0	0.0	152.7	320.6	27.4	173.4	0.0	92.6	47.8	957.5
30JUN	SE	0.0	0.0	0.0	65.7	0.0	0.0	104.5	194.6	27.4	173.4	0.0	92.6	47.8	307.9
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
30JUN-	St. Crop	0.0	0.0	0.0	112.8	0.0	171.8	73.1	0.0	570.2	556.8	0.0	189.1	0.0	1673.8
05JUL	SE	0.0	0.0	0.0	46.3	0.0	149.3	53.2	0.0	246.9	409.9	0.0	189.1	0.0	540.4
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
08JUL-	St. Crop	226.4	0.0	0.0	0.0	469.0	27.8	49.6	467.5	268.5	264.5	298.7	200.3	92.5	2364.6
13JUL	SE	226.4	0.0	0.0	0.0	257.8	27.8	31.4	202.5	152.8	140.1	198.3	200.3	92.5	539.9
	NO. TOWS	6	11	13	11	12	9	13	7	10	7	6	6	6	117
22JUL-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	422.3	NS	NS	NS	NS	NS	422.3
25JUL	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	302.9						302.9
	NO. TOWS	7	11	11	12	10	6	10	6						73
06AUG-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	87.2	NS	NS	NS	NS	NS	87.2
08AUG	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	87.2						87.2
	NO. TOWS	7	11	11	12	10	6	10	6						73

Table D-24 Regional Standing Crop (In Thousands) of White Perch Young of Year in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1991

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
20AUG-22AUG	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	11	11	12	10	6	10	6						73
03SEP-06SEP	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	7.0	165.4	NS	NS	NS	NS	NS	172.3
	SE	0.0	0.0	0.0	0.0	0.0	0.0	7.0	165.4						165.5
	NO. TOWS	7	10	11	12	10	6	10	6						72
16SEP-18SEP	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	79.2	NS	NS	NS	NS	NS	79.2
	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	79.2						79.2
	NO. TOWS	7	11	11	12	10	6	10	6						73
01OCT-03OCT	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	11	11	12	10	6	9	6						72
15OCT-17OCT	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	84.6	77.0	NS	NS	NS	NS	NS	161.6
	SE	0.0	0.0	0.0	0.0	0.0	0.0	84.6	77.0						114.4
	NO. TOWS	7	11	12	12	10	6	10	6						74

Table D-25 Regional Density (No./1,000m3) of White Perch Young of Year in Hudson River Estuary Determined From Fall Juvenile Survey, 1991

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
15JUL-	DENSITY	0.00	0.01	0.00	0.69	0.00	0.01	1.83	1.52	0.21	0.14	0.10	0.38	0.41
20JUL	SE	0.00	0.01	0.00	0.67	0.00	0.01	0.56	0.65	0.09	0.07	0.04	0.15	1.11
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
29JUL-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.68	0.56	0.14	0.05	0.00	0.31	0.15
03AUG	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.52	0.19	0.07	0.03	0.00	0.20	0.60
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
12AUG-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.01	0.67	0.03	0.08	0.00	0.00	0.75	0.13
17AUG	SE	0.00	0.00	0.00	0.00	0.00	0.01	0.41	0.03	0.04	0.00	0.00	0.17	0.45
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
26AUG-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.05	0.03	0.60	0.07	0.02	0.05	0.27	0.09
30AUG	SE	0.00	0.00	0.00	0.00	0.00	0.02	0.03	0.36	0.07	0.02	0.03	0.18	0.41
	NO. TOWS	17	45	27	14	8	13	8	10	15	18	21	13	209
09SEP-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.04	1.70	1.21	0.40	0.67	0.03	0.44	0.37
13SEP	SE	0.00	0.00	0.00	0.00	0.00	0.04	0.95	0.75	0.28	0.56	0.03	0.18	1.38
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
23SEP-	DENSITY	0.00	0.00	0.00	0.01	0.00	0.04	0.42	0.10	0.20	0.04	0.00	0.25	0.09
27SEP	SE	0.00	0.00	0.00	0.01	0.00	0.04	0.15	0.05	0.11	0.04	0.00	0.20	0.28
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
07OCT-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.39	0.17	0.77	0.37	0.93	0.07	1.74	0.37
11OCT	SE	0.00	0.00	0.00	0.00	0.00	0.10	0.13	0.25	0.22	0.68	0.04	0.47	0.90
	NO. TOWS	17	45	27	14	8	13	8	10	15	18	21	13	209
21OCT-	DENSITY	0.00	0.01	0.00	0.47	0.09	1.34	0.27	0.26	0.52	0.04	0.09	0.05	0.26
25OCT	SE	0.00	0.01	0.00	0.36	0.07	0.54	0.11	0.15	0.25	0.03	0.05	0.05	0.73
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210

Table D-26 Regional Standing Crops (in Thousands) of White Perch Young of Year in Hudson River Estuary Determined From Fall Juvenile Survey, 1991

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
15JUL-	St. Crop	0	3	0	143	0	1	547	252	29	24	16	27	1044
20JUL	SE	0	3	0	140	0	1	167	108	13	13	7	11	244
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
29JUL-	St. Crop	0	0	0	0	0	0	203	93	20	8	0	22	347
03AUG	SE	0	0	0	0	0	0	156	31	11	6	0	14	160
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
12AUG-	St. Crop	0	0	0	0	0	1	198	4	12	0	0	53	269
17AUG	SE	0	0	0	0	0	1	121	4	6	0	0	12	122
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
26AUG-	St. Crop	0	0	0	0	0	7	10	99	9	4	8	19	157
30AUG	SE	0	0	0	0	0	3	10	59	9	4	5	13	62
	NO. TOWS	17	45	27	14	8	13	8	10	15	18	21	13	209
09SEP-	St. Crop	0	0	0	0	0	5	506	200	56	117	4	31	920
13SEP	SE	0	0	0	0	0	5	283	125	40	99	4	13	327
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
23SEP-	St. Crop	0	0	0	2	0	5	125	17	28	8	0	18	202
27SEP	SE	0	0	0	2	0	5	45	9	15	8	0	14	51
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
07OCT-	St. Crop	0	0	0	0	0	54	51	127	53	164	12	124	584
11OCT	SE	0	0	0	0	0	14	40	41	31	119	6	34	141
	NO. TOWS	17	45	27	14	8	13	8	10	15	18	21	13	209
21OCT-	St. Crop	0	4	0	97	18	187	81	44	74	8	15	4	530
25OCT	SE	0	4	0	76	14	76	34	24	35	5	8	4	122
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210

Table D-27 Regional Catch-Per-Unit-Effort (CPUE) of White Perch Young of Year in Hudson River Estuary Determined From Beach Seine Survey, 1991

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
24JUN-	CPUE	0.00	0.27	0.14	0.00	4.33	0.00	10.50	17.38	3.50	5.33	2.26	2.75	3.87
29JUN	SE	0.00	0.19	0.14	0.00	3.84	0.00	5.29	7.56	1.78	2.09	0.86	2.32	10.66
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
08JUL-	CPUE	0.00	0.18	1.00	11.67	10.67	2.33	11.13	21.38	12.75	3.27	12.84	11.50	8.23
12JUL	SE	0.00	0.12	0.69	5.78	5.61	1.20	6.59	8.93	8.36	1.72	10.01	6.79	20.23
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
23JUL-	CPUE	0.00	1.09	0.43	0.33	2.67	25.67	14.38	17.75	6.38	6.33	3.84	5.92	7.06
25JUL	SE	0.00	0.58	0.43	0.33	2.19	14.25	11.73	6.90	2.78	2.06	1.57	5.12	20.84
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
05AUG-	CPUE	0.00	2.00	1.21	1.20	5.60	29.83	3.60	43.80	14.00	17.33	1.30	7.14	10.59
08AUG	SE	0.00	0.88	0.45	0.49	4.86	12.97	1.86	25.52	6.17	10.84	1.09	6.81	32.41
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
20AUG-	CPUE	0.00	0.50	0.50	2.40	5.80	8.33	24.00	19.20	11.60	6.67	2.40	2.86	7.02
23AUG	SE	0.00	0.26	0.29	1.75	2.69	4.50	19.14	6.18	5.87	3.47	2.40	2.54	22.22
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
03SEP-	CPUE	0.00	2.17	0.21	0.80	3.60	11.50	10.20	4.00	15.20	9.67	0.30	0.00	4.80
06SEP	SE	0.00	0.95	0.15	0.49	1.94	5.78	6.28	2.81	8.34	5.54	0.30	0.00	13.64
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
16SEP-	CPUE	0.00	1.21	0.50	1.40	4.20	12.33	6.20	5.40	18.20	5.44	0.20	0.29	4.61
19SEP	SE	0.00	0.66	0.31	1.40	2.40	7.53	3.88	1.69	17.70	2.15	0.20	0.29	20.02
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
30SEP-	CPUE	0.00	0.71	1.00	0.20	1.00	2.50	2.00	10.00	1.40	13.11	5.40	0.14	3.12
04OCT	SE	0.00	0.42	0.72	0.20	0.63	1.71	1.26	9.02	0.98	11.42	5.08	0.14	15.63
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
15OCT-	CPUE	0.00	0.58	0.14	1.00	3.60	1.00	0.00	2.20	2.80	0.00	0.20	0.57	1.01
18OCT	SE	0.00	0.37	0.10	0.55	1.63	0.68	0.00	1.96	2.33	0.00	0.13	0.43	3.61
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
28OCT-	CPUE	0.00	0.63	0.14	0.40	0.40	0.83	0.00	0.20	1.20	0.22	0.10	0.00	0.34
01NOV	SE	0.00	0.44	0.10	0.24	0.40	0.40	0.00	0.20	0.80	0.15	0.10	0.00	1.14
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100

Table D-28 Regional Standing Crops (in Thousands) of White Perch Young of Year in Hudson River Estuary Determined From Beach Seine Survey, 1991

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
24JUN-	St. Crop	0	12	4	0	11	0	75	22	30	94	45	37	329
29JUN	SE	0	9	4	0	10	0	38	9	15	37	17	32	68
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
08JUL-	St. Crop	0	8	27	108	28	25	79	27	110	57	253	156	877
12JUL	SE	0	6	19	53	15	13	47	11	72	30	197	92	244
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
23JUL-	St. Crop	0	50	12	3	7	273	102	22	55	111	76	80	791
25JUL	SE	0	26	12	3	6	152	83	9	24	36	31	70	196
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
05AUG-	St. Crop	0	91	33	11	15	318	26	54	121	304	26	97	1094
08AUG	SE	0	40	12	5	13	138	13	32	53	190	21	93	265
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
20AUG-	St. Crop	0	23	13	22	15	89	170	24	100	117	47	39	659
23AUG	SE	0	12	8	16	7	48	136	8	51	61	47	35	176
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
03SEP-	St. Crop	0	98	6	7	9	122	72	5	131	170	6	0	627
06SEP	SE	0	43	4	5	5	62	45	3	72	97	6	0	150
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
16SEP-	St. Crop	0	55	13	13	11	131	44	7	157	96	4	4	534
19SEP	SE	0	30	8	13	6	80	28	2	152	38	4	4	182
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
30SEP-	St. Crop	0	32	27	2	3	27	14	12	12	230	106	2	467
04OCT	SE	0	19	19	2	2	18	9	11	8	201	100	2	227
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
15OCT-	St. Crop	0	27	4	9	9	11	0	3	24	0	4	8	98
18OCT	SE	0	17	3	5	4	7	0	2	20	0	3	6	29
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
28OCT-	St. Crop	0	28	4	4	1	9	0	<0.005	10	4	2	0	62
01NOV	SE	0	20	3	2	1	4	0	<0.005	7	3	2	0	22
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100

Table D-29 Regional Density (No./1,000m3) of White Perch Yearling and Older in Hudson River Estuary Determined From Fall Juvenile Survey, 1991

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
15JUL-	DENSITY	0.47	3.19	5.98	0.23	0.00	0.24	3.70	7.91	6.62	5.45	2.31	6.92	3.59
20JUL	SE	0.23	1.06	1.38	0.09	0.00	0.10	1.36	2.82	1.57	1.24	0.48	1.88	4.55
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
29JUL-	DENSITY	0.13	4.44	4.69	1.02	0.03	0.83	0.53	4.13	3.59	7.15	3.21	2.54	2.69
03AUG	SE	0.08	1.66	1.14	0.51	0.02	0.34	0.19	1.92	1.21	2.47	0.46	0.88	4.09
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
12AUG-	DENSITY	0.10	2.22	3.34	2.03	0.33	0.67	3.44	2.99	3.38	2.32	2.53	6.87	2.52
17AUG	SE	0.09	0.65	0.61	0.80	0.12	0.38	1.81	1.29	0.69	0.50	0.79	2.05	3.48
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
26AUG-	DENSITY	0.00	2.63	7.69	0.91	0.06	1.32	1.47	2.71	1.41	2.23	2.30	1.76	2.04
30AUG	SE	0.00	0.58	1.17	0.41	0.02	0.48	0.75	0.83	0.37	0.74	0.36	0.48	2.10
	NO. TOWS	17	45	27	14	8	13	8	10	15	18	21	13	209
09SEP-	DENSITY	0.03	2.29	1.25	0.35	0.74	0.39	1.94	2.68	7.25	2.46	2.20	6.02	2.30
13SEP	SE	0.02	0.47	0.41	0.12	0.74	0.14	1.26	1.20	3.71	0.56	0.35	1.06	4.40
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
23SEP-	DENSITY	0.00	1.87	3.21	0.40	0.07	0.86	0.93	2.85	4.61	2.58	1.48	1.32	1.68
27SEP	SE	0.00	0.34	0.72	0.12	0.05	0.45	0.21	0.71	1.30	0.39	0.49	0.48	1.93
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
07OCT-	DENSITY	0.27	2.19	5.74	1.90	0.03	0.60	0.52	6.58	4.83	4.67	0.71	6.05	2.84
11OCT	SE	0.08	0.27	1.08	0.58	0.02	0.18	0.26	2.39	1.53	0.78	0.29	2.20	3.91
	NO. TOWS	17	45	27	14	8	13	8	10	15	18	21	13	209
21OCT-	DENSITY	0.46	5.90	7.80	3.59	0.14	3.05	0.67	3.83	13.77	8.20	0.66	0.86	4.08
25OCT	SE	0.17	0.90	2.08	1.45	0.11	1.22	0.28	1.08	4.04	2.26	0.20	0.32	5.62
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210

Table D-30 Regional Standing Crops (in Thousands) of White Perch Yearling and Older in Hudson River Estuary Determined From Fall Juvenile Survey, 1991

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
15JUL-	St. Crop	108	1026	883	49	0	34	1102	1308	936	961	372	493	7272
20JUL	SE	52	342	203	18	0	14	405	467	222	218	78	134	815
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
29JUL-	St. Crop	29	1428	693	212	7	115	157	684	509	1260	516	181	5790
03AUG	SE	19	535	169	106	4	47	56	318	171	435	74	62	813
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
12AUG-	St. Crop	24	714	493	423	68	94	1025	494	478	409	407	489	5118
17AUG	SE	21	209	91	167	25	53	540	213	98	88	126	146	689
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
26AUG-	St. Crop	0	848	1136	190	13	185	438	448	200	394	370	125	4346
30AUG	SE	0	185	173	85	5	67	225	138	52	130	58	34	412
	NO. TOWS	17	45	27	14	8	13	8	10	15	18	21	13	209
09SEP-	St. Crop	6	737	185	72	153	55	578	443	1026	433	353	428	4471
13SEP	SE	4	151	61	25	153	19	377	199	525	98	57	75	726
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
23SEP-	St. Crop	0	601	474	84	15	120	277	471	653	456	238	94	3482
27SEP	SE	0	108	107	26	11	63	61	118	185	68	79	34	303
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
07OCT-	St. Crop	62	703	848	395	7	84	154	1089	684	824	114	430	5393
11OCT	SE	18	88	160	120	4	25	77	396	216	138	46	157	551
	NO. TOWS	17	45	27	14	8	13	8	10	15	18	21	13	209
21OCT-	St. Crop	106	1899	1152	748	29	427	199	634	1948	1446	106	61	8755
25OCT	SE	39	289	307	302	24	171	84	179	572	398	33	23	909
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210

Table D-31 Regional Catch-Per-Unit-Effort (CPUE) of White Perch Yearling and Older in Hudson River Estuary Determined From Beach Seine Survey, 1991

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
24JUN-	CPUE	0.00	11.45	4.00	31.67	3.67	18.67	9.25	8.63	5.75	21.27	8.26	11.00	11.13
29JUN	SE	0.00	4.68	1.65	11.35	1.20	15.68	4.03	2.80	1.97	5.77	3.28	4.71	22.25
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
08JUL-	CPUE	0.67	15.45	6.57	20.33	14.33	5.67	5.00	4.88	3.75	6.33	6.00	3.67	7.72
12JUL	SE	0.67	12.80	2.91	14.90	8.69	4.18	1.64	1.55	2.37	2.11	2.81	2.25	22.71
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
23JUL-	CPUE	0.00	3.09	2.57	8.33	6.00	7.33	2.75	0.63	3.75	6.40	13.26	8.67	5.23
25JUL	SE	0.00	1.94	1.31	6.01	2.52	1.33	1.93	0.38	1.28	1.31	5.05	5.49	10.61
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
05AUG-	CPUE	0.40	4.33	4.43	13.00	8.20	4.33	5.40	5.00	6.80	12.67	22.70	2.29	7.46
08AUG	SE	0.24	1.18	1.07	10.81	2.78	2.28	3.57	2.55	3.51	3.33	14.05	1.46	19.36
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
20AUG-	CPUE	2.20	7.42	4.21	10.20	7.40	2.83	3.80	5.00	4.20	19.11	14.20	6.57	7.26
23AUG	SE	1.96	1.84	1.55	7.88	4.86	1.49	1.93	1.22	1.85	5.31	7.53	6.41	15.24
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
03SEP-	CPUE	0.60	9.63	1.64	6.40	2.00	3.83	1.40	2.00	3.20	15.11	3.20	0.00	4.08
06SEP	SE	0.40	5.49	0.85	2.54	0.84	1.87	0.87	1.55	1.71	5.14	1.58	0.00	8.75
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
16SEP-	CPUE	6.20	7.92	1.29	23.00	6.40	8.33	10.40	2.40	11.00	6.44	2.30	4.86	7.54
19SEP	SE	5.21	3.41	0.62	14.01	4.84	3.94	3.08	1.17	4.43	2.41	1.36	4.04	18.13
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
30SEP-	CPUE	5.60	1.42	0.21	1.40	4.20	1.33	0.20	2.20	0.60	8.22	0.40	0.14	2.16
04OCT	SE	3.59	0.48	0.11	1.40	2.06	0.67	0.20	1.71	0.40	5.06	0.22	0.14	6.97
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
15OCT-	CPUE	3.80	2.33	0.71	10.00	0.00	0.50	2.20	1.40	2.20	0.89	1.00	0.00	2.09
18OCT	SE	1.98	0.46	0.35	3.89	0.00	0.34	1.56	0.93	0.80	0.48	0.42	0.00	4.88
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
28OCT-	CPUE	1.80	0.88	5.00	0.40	0.60	0.33	0.00	1.20	3.00	0.44	0.00	0.00	1.14
01NOV	SE	0.92	0.31	1.68	0.40	0.24	0.21	0.00	0.73	1.67	0.18	0.00	0.00	2.72
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100

Table D-32 Regional Standing Crops (in Thousands) of White Perch Yearling and Older in Hudson River Estuary Determined From Beach Seine Survey, 1991

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
24JUN-29JUN	St. Crop	0	520	108	292	10	199	66	11	50	373	163	149	1940
	SE	0	213	44	105	3	167	29	3	17	101	65	64	325
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
08JUL-12JUL	St. Crop	5	702	177	187	38	60	35	6	32	111	118	50	1522
	SE	5	581	78	137	23	44	12	2	20	37	55	31	609
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
23JUL-25JUL	St. Crop	0	140	69	77	16	78	20	1	32	112	261	118	924
	SE	0	88	35	55	7	14	14	<0.005	11	23	99	75	169
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
05AUG-08AUG	St. Crop	3	197	119	120	22	46	38	6	59	222	447	31	1310
	SE	2	53	29	100	7	24	25	3	30	58	277	20	310
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
20AUG-23AUG	St. Crop	17	337	113	94	20	30	27	6	36	336	279	89	1384
	SE	15	84	42	73	13	16	14	2	16	93	148	87	231
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
03SEP-06SEP	St. Crop	5	437	44	59	5	41	10	2	28	265	63	0	959
	SE	3	249	23	23	2	20	6	2	15	90	31	0	270
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
16SEP-19SEP	St. Crop	47	360	35	212	17	89	74	3	95	113	45	66	1154
	SE	39	155	17	129	13	42	22	1	38	42	27	55	228
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
30SEP-04OCT	St. Crop	42	64	6	13	11	14	1	3	5	144	8	2	314
	SE	27	22	3	13	5	7	1	2	3	89	4	2	97
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
15OCT-18OCT	St. Crop	29	106	19	92	0	5	16	2	19	16	20	0	323
	SE	15	21	10	36	0	4	11	1	7	9	8	0	49
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
28OCT-01NOV	St. Crop	14	40	134	4	2	4	0	1	26	8	0	0	232
	SE	7	14	45	4	1	2	0	1	14	3	0	0	50
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100

Table D-33 Regional Density (No./1,000m3) of Atlantic Tomcod Yolk-Sac Larvae in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1991

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
15APR-	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
19APR	SE		0.00	0.00	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	11	6	7	7	8	9	9	108
22APR-	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	11	6	7	7	8	9	9	108
29APR-	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		10	12	13	10	6	11	6	7	7	8	9	9	108
06MAY-	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
13MAY-	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
18MAY	SE		0.00	0.00	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
20MAY-	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	6	110
27MAY-	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
01JUN	SE		0.00	0.00	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
03JUN-	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
08JUN	SE		0.00	0.00	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
10JUN-	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
15JUN	SE	0.00	0.00	0.00	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
17JUN-	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
23JUN	SE	0.00	0.00	0.00	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
24JUN-	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
30JUN	SE	0.00	0.00	0.00	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
30JUN-	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
05JUL	SE	0.00	0.00	0.00	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
08JUL-	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
13JUL	SE	0.00	0.00	0.00	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	13	11	12	9	13	7	10	7	6	6	6	117
22JUL-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
25JUL	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
06AUG-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
08AUG	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

Table D-33 Regional Density (No./1,000m3) of Atlantic Tomcod Yolk-Sac Larvae in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1991

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
20AUG-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
22AUG	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
03SEP-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
06SEP	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
16SEP-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
18SEP	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
01OCT-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
03OCT	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	9	6						72
15OCT-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
17OCT	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						0.00
	NO. TOWS	7	11	12	12	10	6	10	6						74

Table D-34 Regional Standing Crop (In Thousands) of Atlantic Tomcod Yolk-Sac Larvae in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1991

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
15APR-	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
19APR	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS		10	12	13	10	6	11	6	7	7	8	9	9	108
22APR-	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
26APR	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS		10	12	13	10	6	11	6	7	7	8	9	9	108
29APR-	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
03MAY	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS		10	12	13	10	6	11	6	7	7	8	9	9	108
06MAY-	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10MAY	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
13MAY-	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
18MAY	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
20MAY-	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
24MAY	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
27MAY-	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
01JUN	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
03JUN-	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08JUN	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
10JUN-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
15JUN	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
17JUN-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
23JUN	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
24JUN-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
30JUN	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
30JUN-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
05JUL	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
08JUL-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
13JUL	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS	6	11	13	11	12	9	13	7	10	7	6	6	6	117
22JUL-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
25JUL	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	11	11	12	10	6	10	6						73
06AUG-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
08AUG	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	11	11	12	10	6	10	6						73

Table D-34 Regional Standing Crop (In Thousands) of Atlantic Tomcod Yolk-Sac Larvae in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1991

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
20AUG-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
22AUG	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	11	11	12	10	6	10	6						73
03SEP-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
06SEP	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	10	11	12	10	6	10	6						72
16SEP-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
18SEP	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	11	11	12	10	6	10	6						73
01OCT-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
03OCT	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	11	11	12	10	6	9	6						72
15OCT-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
17OCT	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	11	12	12	10	6	10	6						74

Table D-35 Regional Density (No./1,000m3) of Atlantic Tomcod Post Yolk-Sac Larvae in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1991

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
15APR-19APR	DENSITY	NS	670.74	487.15	272.86	587.88	236.51	1.86	0.23	0.00	0.00	0.00	0.00	0.00	188.10
	SE		213.78	182.03	47.01	318.36	121.84	1.49	0.23	0.00	0.00	0.00	0.00	0.00	444.13
	NO. TOWS		10	12	13	10	6	11	6	7	7	8	9	9	108
22APR-26APR	DENSITY	NS	545.98	254.57	141.14	77.15	0.00	0.03	0.00	1.02	0.00	0.00	0.00	0.00	84.99
	SE		384.73	65.50	28.75	42.78	0.00	0.03	0.00	1.02	0.00	0.00	0.00	0.00	393.65
	NO. TOWS		10	12	13	10	6	11	6	7	7	8	9	9	108
29APR-03MAY	DENSITY	NS	378.19	143.86	0.00	0.00	0.00	0.00	0.00	0.52	0.00	0.00	0.00	0.00	43.55
	SE		305.56	44.08	0.00	0.00	0.00	0.00	0.00	0.52	0.00	0.00	0.00	0.00	308.72
	NO. TOWS		10	12	13	10	6	11	6	7	7	8	9	9	108
06MAY-10MAY	DENSITY	NS	6.55	26.55	0.48	0.41	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.83
	SE		6.55	24.42	0.48	0.41	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	25.29
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
13MAY-18MAY	DENSITY	NS	0.00	0.00	0.62	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06
	SE		0.00	0.00	0.62	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.62
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
20MAY-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	6	110
27MAY-01JUN	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
03JUN-08JUN	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
10JUN-15JUN	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
17JUN-23JUN	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
24JUN-30JUN	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
30JUN-05JUL	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
08JUL-13JUL	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	13	11	12	9	13	7	10	7	6	6	6	117
22JUL-25JUL	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
06AUG-08AUG	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

Table D-35 Regional Density (No./1,000m3) of Atlantic Tomcod Post Yolk-Sac Larvae in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1991

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
20AUG-22AUG	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
03SEP-06SEP	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
16SEP-18SEP	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
01OCT-03OCT	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	9	6						72
15OCT-17OCT	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	12	12	10	6	10	6						74

Table D-36 Regional Standing Crop (In Thousands) of Atlantic Tomcod Post Yolk-Sac Larvae in Hudson River Estuary Determined from Longitudinal River Ichthyoplankton Survey, 1991

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
15APR-	St. Crop	NS	153880.6	156769.8	40312.0	122476.7	49065.0	260.3	69.5	0.0	0.0	0.0	0.0	0.0	522833.9
19APR	SE		49044.6	58579.4	6944.9	66326.8	25276.8	208.0	69.5	0.0	0.0	0.0	0.0	0.0	104514.9
	NO. TOWS		10	12	13	10	6	11	6	7	7	8	9	9	108
22APR-	St. Crop	NS	125258.4	81923.0	20851.5	16073.2	0.0	4.3	0.0	169.4	0.0	0.0	0.0	0.0	244279.7
26APR	SE		88264.3	21078.2	4247.2	8913.4	0.0	4.3	0.0	169.4	0.0	0.0	0.0	0.0	91282.0
	NO. TOWS		10	12	13	10	6	11	6	7	7	8	9	9	108
29APR-	St. Crop	NS	86763.8	46296.0	0.0	0.0	0.0	0.0	0.0	86.8	0.0	0.0	0.0	0.0	133146.6
03MAY	SE		70101.3	14183.9	0.0	0.0	0.0	0.0	0.0	86.8	0.0	0.0	0.0	0.0	71522.0
	NO. TOWS		10	12	13	10	6	11	6	7	7	8	9	9	108
06MAY-	St. Crop	NS	1503.0	8544.4	70.4	84.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10202.5
10MAY	SE		1503.0	7859.5	70.4	84.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8002.7
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
13MAY-	St. Crop	NS	0.0	0.0	91.6	8.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.5
18MAY	SE		0.0	0.0	91.6	8.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	92.0
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
20MAY-	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
24MAY	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
27MAY-	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
01JUN	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
03JUN-	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08JUN	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
10JUN-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
15JUN	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
17JUN-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
23JUN	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
24JUN-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
30JUN	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
30JUN-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
05JUL	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
08JUL-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
13JUL	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS	6	11	13	11	12	9	13	7	10	7	6	6	6	117
22JUL-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
25JUL	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	11	11	12	10	6	10	6						73
06AUG-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
08AUG	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	11	11	12	10	6	10	6						73

Table D-36 Regional Standing Crop (In Thousands) of Atlantic Tomcod Post Yolk-Sac Larvae in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1991

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
20AUG-22AUG	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	11	11	12	10	6	10	6						73
03SEP-06SEP	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	10	11	12	10	6	10	6						72
16SEP-18SEP	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	11	11	12	10	6	10	6						73
01OCT-03OCT	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	11	11	12	10	6	9	6						72
15OCT-17OCT	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	11	12	12	10	6	10	6						74

Table D-37 Regional Density (No./1,000m3) of Atlantic Tomcod Young of Year in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1991

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
15APR-	DENSITY	NS	4.36	28.74	0.31	46.17	29.70	0.54	0.00	0.00	0.00	0.00	0.00	0.00	9.15
19APR	SE		4.36	28.74	0.31	29.23	29.70	0.54	0.00	0.00	0.00	0.00	0.00	0.00	50.82
	NO. TOWS		10	12	13	10	6	11	6	7	7	8	9	9	108
22APR-	DENSITY	NS	73.24	170.44	29.52	122.39	0.00	0.10	0.90	0.00	0.00	0.00	0.00	0.00	33.05
26APR	SE		38.02	89.99	10.94	109.02	0.00	0.07	0.21	0.00	0.00	0.00	0.00	0.00	146.79
	NO. TOWS		10	12	13	10	6	11	6	7	7	8	9	9	108
29APR-	DENSITY	NS	451.57	1612.04	1.11	1.35	16.45	3.63	1.49	1.05	0.24	0.00	0.00	0.00	174.08
03MAY	SE		233.02	738.90	0.65	0.91	8.90	2.09	1.27	1.05	0.24	0.00	0.00	0.00	774.83
	NO. TOWS		10	12	13	10	6	11	6	7	7	8	9	9	108
06MAY-	DENSITY	NS	212.41	774.21	72.77	114.05	61.64	2.96	0.14	1.60	0.00	0.00	0.00	0.00	103.32
10MAY	SE		73.23	350.48	21.25	65.10	26.63	0.97	0.14	1.18	0.00	0.00	0.00	0.00	365.51
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
13MAY-	DENSITY	NS	614.38	215.60	19.06	48.23	116.81	3.16	5.39	6.31	1.66	1.27	0.63	0.00	86.04
18MAY	SE		163.58	78.76	11.88	20.96	88.63	0.94	1.99	2.69	1.66	1.27	0.63	0.00	203.50
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
20MAY-	DENSITY	NS	381.05	42.04	67.32	45.63	44.64	12.90	4.41	0.77	0.00	1.08	0.00	1.82	50.14
24MAY	SE		157.43	10.09	12.83	15.16	27.99	2.89	1.01	0.77	0.00	0.85	0.00	1.05	161.48
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
27MAY-	DENSITY	NS	94.12	70.33	76.71	79.88	59.83	2.61	2.78	0.00	0.33	0.00	1.13	4.52	32.69
01JUN	SE		38.78	18.95	26.55	48.18	20.78	0.94	2.37	0.00	0.33	0.00	0.56	3.99	73.10
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
03JUN-	DENSITY	NS	106.98	30.20	52.79	13.91	36.93	44.64	2.91	0.43	0.59	0.00	0.00	0.00	24.11
08JUN	SE		57.37	6.28	12.77	7.45	11.48	11.32	1.58	0.25	0.34	0.00	0.00	0.00	61.74
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
10JUN-	DENSITY	5.27	106.94	6.08	17.40	22.74	32.49	90.83	12.18	0.54	0.00	0.00	0.79	0.00	22.71
15JUN	SE	5.27	20.84	3.27	3.93	15.93	10.28	35.33	3.46	0.54	0.00	0.00	0.79	0.00	45.92
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
17JUN-	DENSITY	2.08	14.84	4.94	9.17	50.73	25.72	9.77	5.15	0.80	0.00	0.00	0.00	1.27	9.57
23JUN	SE	2.08	6.24	1.32	4.58	43.03	9.16	4.03	2.06	0.25	0.00	0.00	0.00	1.27	44.99
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
24JUN-	DENSITY	13.52	10.10	2.24	0.56	0.34	65.61	82.11	7.84	1.36	0.29	0.00	0.57	0.00	14.19
30JUN	SE	1.45	2.36	1.03	0.28	0.22	21.48	32.13	4.72	0.65	0.29	0.00	0.57	0.00	39.06
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
30JUN-	DENSITY	5.90	24.44	10.01	67.02	6.03	102.00	32.66	0.76	4.85	0.55	0.00	0.00	0.00	19.56
05JUL	SE	2.79	10.59	5.82	61.87	2.67	43.62	17.78	0.30	3.52	0.32	0.00	0.00	0.00	78.87
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
08JUL-	DENSITY	0.00	3.06	0.00	0.26	14.15	154.17	56.28	6.67	2.55	1.61	0.00	0.00	0.00	18.37
13JUL	SE	0.00	3.06	0.00	0.26	11.64	50.17	14.34	1.08	1.39	1.02	0.00	0.00	0.00	53.59
	NO. TOWS	6	11	13	11	12	9	13	7	10	7	6	6	6	117
22JUL-	DENSITY	9.80	11.90	0.00	2.11	75.76	23.43	11.93	6.49	NS	NS	NS	NS	NS	17.68
25JUL	SE	1.08	11.53	0.00	2.11	51.71	8.01	7.59	4.51						54.36
	NO. TOWS	7	11	11	12	10	6	10	6						73
06AUG-	DENSITY	0.00	0.00	1.31	5.48	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.85
08AUG	SE	0.00	0.00	1.31	5.48	0.00	0.00	0.00	0.00						5.63
	NO. TOWS	7	11	11	12	10	6	10	6						73

Table D-37 Regional Density (No./1,000m3) of Atlantic Tomcod Young of Year in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1991

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
20AUG-	DENSITY	0.00	0.41	0.00	0.00	0.00	0.00	0.05	0.73	NS	NS	NS	NS	NS	0.15
22AUG	SE	0.00	0.41	0.00	0.00	0.00	0.00	0.05	0.73						0.84
	NO. TOWS	7	11	11	12	10	6	10	6						73
03SEP-	DENSITY	0.00	0.15	0.00	0.00	0.36	0.00	0.00	0.30	NS	NS	NS	NS	NS	0.10
06SEP	SE	0.00	0.15	0.00	0.00	0.36	0.00	0.00	0.30						0.49
	NO. TOWS	7	10	11	12	10	6	10	6						72
16SEP-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
18SEP	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
01OCT-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.84	0.00	0.57	NS	NS	NS	NS	NS	0.18
03OCT	SE	0.00	0.00	0.00	0.00	0.00	0.84	0.00	0.57						1.02
	NO. TOWS	7	11	11	12	10	6	9	6						72
15OCT-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
17OCT	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						0.00
	NO. TOWS	7	11	12	12	10	6	10	6						74

Table D-38 Regional Standing Crop (In Thousands) of Atlantic Tomcod Young of Year in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1991

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
15APR-	St. Crop	NS	999.2	9249.4	45.3	9619.8	6161.8	75.4	0.0	0.0	0.0	0.0	0.0	0.0	26150.9
19APR	SE		999.2	9249.4	45.3	6090.7	6161.8	75.4	0.0	0.0	0.0	0.0	0.0	0.0	12713.0
	NO. TOWS		10	12	13	10	6	11	6	7	7	8	9	9	108
22APR-	St. Crop	NS	16803.5	54848.0	4361.6	25498.4	0.0	13.8	267.5	0.0	0.0	0.0	0.0	0.0	101792.8
26APR	SE		8722.8	28959.7	1616.0	22711.9	0.0	9.4	64.0	0.0	0.0	0.0	0.0	0.0	37857.6
	NO. TOWS		10	12	13	10	6	11	6	7	7	8	9	9	108
29APR-	St. Crop	NS	103600.2	518772.6	164.0	280.5	3413.4	506.8	443.1	173.6	34.4	0.0	0.0	0.0	627388.5
03MAY	SE		53460.2	237786.0	95.7	190.4	1845.7	291.7	379.9	173.6	34.4	0.0	0.0	0.0	243729.1
	NO. TOWS		10	12	13	10	6	11	6	7	7	8	9	9	108
06MAY-	St. Crop	NS	48731.6	249149.2	10751.1	23761.3	12787.0	413.1	42.6	264.9	0.0	0.0	0.0	0.0	345900.8
10MAY	SE		16800.9	112788.4	3139.5	13563.1	5524.2	135.7	42.6	195.1	0.0	0.0	0.0	0.0	115012.5
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
13MAY-	St. Crop	NS	140950.5	69381.5	2815.6	10047.3	24232.4	442.0	1607.6	1044.0	234.5	224.3	100.5	0.0	251080.1
18MAY	SE		37528.0	25344.6	1755.6	4366.7	18387.2	131.2	593.6	444.7	234.5	224.3	100.5	0.0	49108.3
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
20MAY-	St. Crop	NS	87420.1	13528.7	9945.7	9506.2	9260.2	1802.9	1313.3	126.8	0.0	189.6	0.0	129.7	133223.3
24MAY	SE		36116.7	3247.2	1895.2	3158.8	5807.5	403.6	301.0	126.8	0.0	149.2	0.0	74.9	36912.9
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
27MAY-	St. Crop	NS	21593.4	22632.0	11333.0	16641.8	12412.4	365.2	828.9	0.0	47.1	0.0	181.1	321.4	86356.3
01JUN	SE		8896.5	6098.8	3922.6	10036.9	4310.0	131.9	705.7	0.0	47.1	0.0	90.6	284.1	15863.5
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
03JUN-	St. Crop	NS	24543.0	9717.5	7798.4	2897.6	7662.0	6240.8	867.2	71.0	83.3	0.0	0.0	0.0	59880.9
08JUN	SE		13162.3	2022.5	1887.1	1552.1	2380.9	1582.6	471.9	41.1	48.2	0.0	0.0	0.0	13845.8
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
10JUN-	St. Crop	1102.3	24534.0	1956.7	2570.9	4737.8	6739.4	12697.5	3631.7	89.6	0.0	0.0	127.3	0.0	58187.2
15JUN	SE	1102.3	4780.3	1051.6	580.7	3319.6	2133.4	4938.3	1030.7	89.6	0.0	0.0	127.3	0.0	8158.0
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
17JUN-	St. Crop	435.0	3404.2	1589.9	1354.4	10568.0	5335.2	1365.2	1535.9	131.8	0.0	0.0	0.0	90.1	25809.7
23JUN	SE	435.0	1432.4	425.7	677.2	8965.7	1899.3	562.9	614.8	41.4	0.0	0.0	0.0	90.1	9358.2
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
24JUN-	St. Crop	2825.2	2318.0	721.1	82.3	71.0	13611.3	11477.6	2338.6	225.1	40.4	0.0	91.0	0.0	33801.6
30JUN	SE	303.5	540.8	331.3	41.6	46.8	4455.8	4491.7	1407.7	107.8	40.4	0.0	91.0	0.0	6521.6
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
30JUN-	St. Crop	1233.3	5607.8	3220.9	9901.2	1257.0	21159.5	4566.0	226.6	803.4	78.2	0.0	0.0	0.0	48053.9
05JUL	SE	583.0	2430.2	1871.6	9141.0	555.7	9049.2	2485.0	90.7	582.4	45.3	0.0	0.0	0.0	13491.7
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
08JUL-	St. Crop	0.0	702.5	0.0	39.1	2949.0	31983.6	7867.5	1988.5	422.7	227.3	0.0	0.0	0.0	46180.2
13JUL	SE	0.0	702.5	0.0	39.1	2424.3	10408.4	2004.1	323.0	230.0	144.0	0.0	0.0	0.0	10904.2
	NO. TOWS	6	11	13	11	12	9	13	7	10	7	6	6	6	117
22JUL-	St. Crop	2047.9	2731.2	0.0	311.1	15783.3	4860.4	1667.8	1934.6	NS	NS	NS	NS	NS	29336.3
25JUL	SE	225.1	2646.4	0.0	311.1	10773.2	1661.5	1060.8	1343.5						11353.6
	NO. TOWS	7	11	11	12	10	6	10	6						73
06AUG-	St. Crop	0.0	0.0	422.6	808.9	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	1231.5
08AUG	SE	0.0	0.0	422.6	808.9	0.0	0.0	0.0	0.0						912.6
	NO. TOWS	7	11	11	12	10	6	10	6						73

Table D-38 Regional Standing Crop (In Thousands) of Atlantic Tomcod Young of Year in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1991

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
20AUG-	St. Crop	0.0	93.7	0.0	0.0	0.0	0.0	6.5	217.0	NS	NS	NS	NS	NS	317.2
22AUG	SE	0.0	93.7	0.0	0.0	0.0	0.0	6.5	217.0						236.5
	NO. TOWS	7	11	11	12	10	6	10	6						73
03SEP-	St. Crop	0.0	34.2	0.0	0.0	74.5	0.0	0.0	88.3	NS	NS	NS	NS	NS	197.1
06SEP	SE	0.0	34.2	0.0	0.0	74.5	0.0	0.0	88.3						120.5
	NO. TOWS	7	10	11	12	10	6	10	6						72
16SEP-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
18SEP	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	11	11	12	10	6	10	6						73
01OCT-	St. Crop	0.0	0.0	0.0	0.0	0.0	174.2	0.0	170.6	NS	NS	NS	NS	NS	344.8
03OCT	SE	0.0	0.0	0.0	0.0	0.0	174.2	0.0	170.6						243.8
	NO. TOWS	7	11	11	12	10	6	9	6						72
15OCT-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
17OCT	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	11	12	12	10	6	10	6						74

Table D-39 Regional Density (No./1,000m3) of Atlantic Tomcod Young of Year in Hudson River Estuary Determined From Fall Juvenile Survey, 1991

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
15JUL-	DENSITY	1.95	1.81	0.60	16.04	124.05	51.62	1.84	0.08	0.35	0.19	0.05	0.00	16.55
20JUL	SE	0.28	0.66	0.25	11.15	36.20	10.35	0.79	0.03	0.13	0.10	0.05	0.00	39.28
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
29JUL-	DENSITY	0.64	0.73	0.09	0.19	4.11	5.63	0.84	0.05	0.00	0.00	0.00	0.00	1.02
03AUG	SE	0.22	0.28	0.03	0.08	2.05	2.38	0.67	0.03	0.00	0.00	0.00	0.00	3.23
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
12AUG-	DENSITY	0.47	0.83	0.18	0.05	0.84	0.18	0.06	0.03	0.00	0.00	0.00	0.00	0.22
17AUG	SE	0.15	0.27	0.09	0.05	0.77	<0.005	0.04	0.03	0.00	0.00	0.00	0.00	0.84
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
26AUG-	DENSITY	0.50	0.26	0.06	0.09	0.04	0.16	0.00	0.00	0.00	0.00	0.00	0.00	0.09
30AUG	SE	0.29	0.09	0.03	0.07	0.02	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.32
	NO. TOWS	17	45	27	14	8	13	8	10	15	18	21	13	209
09SEP-	DENSITY	1.51	0.07	0.00	0.27	0.08	0.00	0.03	0.00	0.03	0.00	0.00	0.00	0.17
13SEP	SE	0.36	0.05	0.00	0.11	0.06	0.00	0.03	0.00	0.03	0.00	0.00	0.00	0.38
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
23SEP-	DENSITY	0.09	0.03	0.00	0.00	0.07	0.04	0.12	0.00	0.00	0.00	0.00	0.00	0.03
27SEP	SE	0.06	0.02	0.00	0.00	0.03	0.04	0.09	0.00	0.00	0.00	0.00	0.00	0.12
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
07OCT-	DENSITY	0.05	0.11	0.00	0.07	0.05	0.04	0.00	0.00	0.00	0.03	0.00	0.00	0.03
11OCT	SE	0.04	0.06	0.00	0.04	0.03	0.04	0.00	0.00	0.00	0.03	0.00	0.00	0.10
	NO. TOWS	17	45	27	14	8	13	8	10	15	18	21	13	209
21OCT-	DENSITY	0.09	0.06	0.02	0.00	0.04	0.04	0.03	0.00	0.00	0.00	0.00	0.00	0.02
25OCT	SE	0.08	0.04	0.02	0.00	0.02	0.04	0.03	0.00	0.00	0.00	0.00	0.00	0.11
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210

Table D-40 Regional Standing Crops (in Thousands) of Atlantic Tomcod Young of Year in Hudson River Estuary Determined From Fall Juvenile Survey, 1991

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
15JUL-	St. Crop	448	583	88	3342	25734	7216	550	12	50	33	7	0	38063
20JUL	SE	65	213	37	2323	7510	1447	237	6	18	18	7	0	8000
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
29JUL-	St. Crop	147	235	13	40	853	787	250	8	0	0	0	0	2334
03AUG	SE	49	89	5	17	425	332	201	5	0	0	0	0	585
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
12AUG-	St. Crop	108	267	26	11	174	26	19	4	0	0	0	0	634
17AUG	SE	34	88	13	11	160	1	12	4	0	0	0	0	186
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
26AUG-	St. Crop	114	82	9	20	8	23	0	0	0	0	0	0	257
30AUG	SE	66	29	5	14	5	11	0	0	0	0	0	0	75
	NO. TOWS	17	45	27	14	8	13	8	10	15	18	21	13	209
09SEP-	St. Crop	347	24	0	56	16	0	10	0	4	0	0	0	456
13SEP	SE	82	17	0	22	12	0	10	0	4	0	0	0	88
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
23SEP-	St. Crop	21	10	0	0	15	5	37	0	0	0	0	0	89
27SEP	SE	13	8	0	0	7	5	27	0	0	0	0	0	32
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
07OCT-	St. Crop	11	35	0	14	10	5	0	0	0	5	0	0	79
11OCT	SE	8	18	0	9	7	5	0	0	0	5	0	0	24
	NO. TOWS	17	45	27	14	8	13	8	10	15	18	21	13	209
21OCT-	St. Crop	21	20	3	0	8	6	10	0	0	0	0	0	67
25OCT	SE	18	12	3	0	5	6	10	0	0	0	0	0	25
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210

Table D-41 Regional Catch-Per-Unit-Effort (CPUE) of Atlantic Tomcod Young of Year in Hudson River Estuary Determined From Beach Seine Survey, 1991

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
24JUN-	CPUE	1.67	1.27	0.29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.27
29JUN	SE	0.88	0.92	0.18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.28
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
08JUL-	CPUE	0.67	0.45	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09
12JUL	SE	0.67	0.45	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.81
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
23JUL-	CPUE	0.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03
25JUL	SE	0.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.33
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
05AUG-	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
08AUG	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
20AUG-	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
23AUG	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
03SEP-	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
06SEP	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
16SEP-	CPUE	0.00	0.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03
19SEP	SE	0.00	0.22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.22
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
30SEP-	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
04OCT	SE	0.00	0.00	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
15OCT-	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
18OCT	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
28OCT-	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
01NOV	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

Table D-42 Regional Standing Crops (in Thousands) of Atlantic Tomcod Young of Year in Hudson River Estuary Determined From Beach Seine Survey, 1991

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
24JUN-	St. Crop	13	58	8	0	0	0	0	0	0	0	0	0	78
29JUN	SE	7	42	5	0	0	0	0	0	0	0	0	0	42
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
08JUL-	St. Crop	5	21	0	0	0	0	0	0	0	0	0	0	26
12JUL	SE	5	21	0	0	0	0	0	0	0	0	0	0	21
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
23JUL-	St. Crop	3	0	0	0	0	0	0	0	0	0	0	0	3
25JUL	SE	3	0	0	0	0	0	0	0	0	0	0	0	3
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
05AUG-	St. Crop	0	4	0	0	0	0	0	0	0	0	0	0	4
08AUG	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
20AUG-	St. Crop	0	2	0	0	0	0	0	0	0	0	0	0	2
23AUG	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
03SEP-	St. Crop	0	4	0	0	0	0	0	0	0	0	0	0	4
06SEP	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
16SEP-	St. Crop	0	15	0	0	0	0	0	0	0	0	0	0	15
19SEP	SE	0	10	0	0	0	0	0	0	0	0	0	0	10
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
30SEP-	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
04OCT	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
15OCT-	St. Crop	0	2	0	0	0	0	0	0	0	0	0	0	2
18OCT	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
28OCT-	St. Crop	0	2	0	0	0	0	0	0	0	0	0	0	2
01NOV	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

Table D-43 Regional Density (No./1,000m3) of Atlantic Tomcod Yearling and Older in Hudson River Estuary Determined From Fall Juvenile Survey, 1991

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
15JUL-	DENSITY	0.50	0.09	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05
20JUL	SE	0.19	0.06	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.20
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
29JUL-	DENSITY	0.15	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02
03AUG	SE	0.05	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.07
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
12AUG-	DENSITY	0.01	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
17AUG	SE	0.01	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	13	210
26AUG-	DENSITY	0.06	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
30AUG	SE	0.05	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05
	NO. TOWS	17	45	27	14	8	13	8	10	15	18	21	13	209
09SEP-	DENSITY	0.04	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
13SEP	SE	0.04	0.00	0.00	0.02	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
23SEP-	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
27SEP	SE	0.00	0.00	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
07OCT-	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
11OCT	SE	0.00	0.00	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	45	27	14	8	13	8	10	15	18	21	13	209
21OCT-	DENSITY	0.03	0.03	0.00	0.02	0.00	0.05	0.06	0.00	0.00	0.00	0.00	0.00	0.02
25OCT	SE	0.02	0.02	0.00	0.02	0.00	0.05	0.06	0.00	0.00	0.00	0.00	0.00	0.09
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210

Table D-44 Regional Standing Crops (in Thousands) of Atlantic Tomcod Yearling and Older in Hudson River Estuary Determined From Fall Juvenile Survey, 1991

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
15JUL-	St. Crop	114	28	0	0	4	0	0	0	0	0	0	0	146
20JUL	SE	44	18	0	0	4	0	0	0	0	0	0	0	48
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
29JUL-	St. Crop	35	29	0	0	0	0	0	0	0	0	0	0	63
03AUG	SE	12	14	0	0	0	0	0	0	0	0	0	0	19
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
12AUG-	St. Crop	3	23	0	0	0	0	0	0	0	0	0	0	26
17AUG	SE	3	10	0	0	0	0	0	0	0	0	0	0	11
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
26AUG-	St. Crop	15	4	0	0	0	0	0	0	0	0	0	0	19
30AUG	SE	12	4	0	0	0	0	0	0	0	0	0	0	12
	NO. TOWS	17	45	27	14	8	13	8	10	15	18	21	13	209
09SEP-	St. Crop	9	0	0	5	0	0	0	0	0	0	0	0	14
13SEP	SE	9	0	0	5	0	0	0	0	0	0	0	0	10
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
23SEP-	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
27SEP	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
07OCT-	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
11OCT	SE	0	0	0	0	0	0	0	0	0	0	0	0	0
	NO. TOWS	17	45	27	14	8	13	8	10	15	18	21	13	209
21OCT-	St. Crop	6	9	0	5	0	7	19	0	0	0	0	0	46
25OCT	SE	4	7	0	5	0	7	19	0	0	0	0	0	22
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210

Table D-45 Regional Catch-Per-Unit-Effort (CPUE) of Atlantic Tomcod Yearling and Older in Hudson River Estuary Determined From Beach Seine Survey, 1991

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
24JUN-	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
29JUN	SE	0.00	0.00	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
08JUL-	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
12JUL	SE	0.00	0.00	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
23JUL-	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
25JUL	SE	0.00	0.00	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
05AUG-	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
08AUG	SE	0.00	0.00	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
20AUG-	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
23AUG	SE	0.00	0.00	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
03SEP-	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
06SEP	SE	0.00	0.00	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
16SEP-	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
19SEP	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
30SEP-	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
04OCT	SE	0.00	0.00	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
15OCT-	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
18OCT	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
28OCT-	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
01NOV	SE	0.00	0.00	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 D-46 Regional Standing Crops (in Thousands) of Atlantic Tomcod Yearling and Older in Hudson River Estuary Determined From Beach Seine Survey, 1991

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
24JUN-	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
29JUN	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
08JUL-	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
12JUL	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
23JUL-	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
25JUL	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
05AUG-	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
08AUG	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
20AUG-	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
23AUG	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
03SEP-	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
06SEP	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
16SEP-	St. Crop	0	2	0	0	0	0	0	0	0	0	0	0	2
19SEP	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
30SEP-	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
04OCT	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
15OCT-	St. Crop	0	2	0	0	0	0	0	0	0	0	0	0	2
18OCT	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
28OCT-	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
01NOV	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 D-47 Regional Density (No./1,000m3) of American Shad Eggs
in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1991

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
15APR-	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.46	0.68	15.16	1.36
19APR	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.46	0.48	5.82	5.86
	NO. TOWS		10	12	13	10	6	11	6	7	7	8	9	9	108
22APR-	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.25	3.41	8.28	99.69	9.30
26APR	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.25	2.37	3.83	32.49	32.80
	NO. TOWS		10	12	13	10	6	11	6	7	7	8	9	9	108
29APR-	DENSITY	NS	0.00	0.00	1.55	0.00	0.00	0.00	0.00	0.20	2.01	7.70	29.28	1999.06	169.98
03MAY	SE		0.00	0.00	1.55	0.00	0.00	0.00	0.00	0.20	1.06	3.69	17.22	700.25	700.48
	NO. TOWS		10	12	13	10	6	11	6	7	7	8	9	9	108
06MAY-	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.25	0.00	76.26	3.23	337.93	35.06
10MAY	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.25	0.00	41.87	2.18	200.61	204.97
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
13MAY-	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	3.35	5.90	0.78	826.65	127.33	420.88	115.41
18MAY	SE		0.00	0.00	0.00	0.00	0.00	0.00	2.54	2.17	0.78	260.70	94.21	116.52	300.71
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
20MAY-	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.77	6.73	20.17	0.00	166.16	16.15
24MAY	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.77	2.38	14.47	0.00	55.15	57.07
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
27MAY-	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.33	95.74	33.91	5.22	11.27
01JUN	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.33	69.68	26.84	2.56	74.71
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
03JUN-	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.20	0.00	1.40	110.62	1.33	9.46
08JUN	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.20	0.00	1.40	93.77	1.33	93.79
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
10JUN-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.01	0.00	6.26	0.79
15JUN	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.56	0.00	2.71	4.48
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
17JUN-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.58	2.75	0.00	0.26
23JUN	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.58	2.75	0.00	2.81
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
24JUN-	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
30JUN	SE	0.00	0.00	0.00	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
30JUN-	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
05JUL	SE	0.00	0.00	0.00	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
08JUL-	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
13JUL	SE	0.00	0.00	0.00	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	13	11	12	9	13	7	10	7	6	6	6	117
22JUL-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
25JUL	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
06AUG-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
08AUG	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

Table D-47 Regional Density (No./1,000m3) of American Shad Eggs in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1991

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
20AUG-22AUG	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
03SEP-06SEP	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
16SEP-18SEP	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
01OCT-03OCT	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	9	6						72
15OCT-17OCT	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	12	12	10	6	10	6						74

Table D-48 Regional Standing Crop (In Thousands) of American Shad Eggs in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1991

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
15APR-	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	81.4	108.7	1078.6	1268.8
19APR	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	81.4	77.9	414.1	429.1
	NO. TOWS		10	12	13	10	6	11	6	7	7	8	9	9	108
22APR-	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	35.4	600.5	1331.4	7092.8	9060.0
26APR	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	35.4	418.2	615.7	2311.7	2428.8
	NO. TOWS		10	12	13	10	6	11	6	7	7	8	9	9	108
29APR-	St. Crop	NS	0.0	0.0	228.7	0.0	0.0	0.0	0.0	32.4	284.6	1358.1	4705.7	142231.3	148840.8
03MAY	SE		0.0	0.0	228.7	0.0	0.0	0.0	0.0	32.4	149.5	649.8	2767.6	49822.4	49904.2
	NO. TOWS		10	12	13	10	6	11	6	7	7	8	9	9	108
06MAY-	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	538.4	0.0	13445.1	518.9	24043.4	38545.8
10MAY	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	538.4	0.0	7382.1	350.7	14273.2	16082.1
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
13MAY-	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	998.9	976.2	109.8	145735.2	20466.6	29945.0	198231.6
18MAY	SE		0.0	0.0	0.0	0.0	0.0	0.0	758.0	358.7	109.8	45960.9	15142.2	8290.0	49103.3
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
20MAY-	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	127.8	951.5	3555.2	0.0	11822.3	16456.8
24MAY	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	127.8	337.0	2550.8	0.0	3923.8	4693.9
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
27MAY-	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	47.1	16878.2	5450.0	371.3	22746.6
01JUN	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	47.1	12284.0	4313.4	182.0	13020.7
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
03JUN-	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	33.5	0.0	246.4	17780.9	94.9	18155.7
08JUN	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	33.5	0.0	246.4	15072.4	94.9	15074.7
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
10JUN-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	707.1	0.0	445.5	1152.5
15JUN	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	628.4	0.0	193.1	657.4
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
17JUN-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	103.0	442.2	0.0	545.2
23JUN	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	103.0	442.2	0.0	454.0
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
24JUN-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
30JUN	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
30JUN-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
05JUL	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
08JUL-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
13JUL	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS	6	11	13	11	12	9	13	7	10	7	6	6	6	117
22JUL-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
25JUL	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	11	11	12	10	6	10	6						73
06AUG-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
08AUG	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	11	11	12	10	6	10	6						73

Table D-48 Regional Standing Crop (In Thousands) of American Shad Eggs in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1991

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
20AUG-22AUG	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	11	11	12	10	6	10	6						73
03SEP-06SEP	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	10	11	12	10	6	10	6						72
16SEP-18SEP	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	11	11	12	10	6	10	6						73
01OCT-03OCT	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	11	11	12	10	6	9	6						72
15OCT-17OCT	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	11	12	12	10	6	10	6						74

Table D-49 Regional Density (No./1,000m3) of American Shad Yolk-Sac Larvae
in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1991

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
15APR-	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
19APR	SE		0.00	0.00	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	11	6	7	7	8	9	9	108
22APR-	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	11	6	7	7	8	9	9	108
29APR-	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.62	6.48	0.59
03MAY	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.38	3.17	3.19
	NO. TOWS		10	12	13	10	6	11	6	7	7	8	9	9	108
06MAY-	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.14	1.49	8.11	8.22	21.90	367.01	33.91
10MAY	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.14	0.86	2.95	6.14	6.79	232.40	232.60
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
13MAY-	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.20	1.20	4.44	11.92	40.89	81.27	722.24	71.85
18MAY	SE		0.00	0.00	0.00	0.00	0.00	0.20	1.04	1.99	7.10	14.26	53.38	256.77	262.76
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
20MAY-	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.72	36.12	7.90	167.68	17.70
24MAY	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.72	13.85	7.90	112.84	113.96
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
27MAY-	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.27	2.87	27.40	2.54
01JUN	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.27	2.87	11.07	11.44
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
03JUN-	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.79	4.42	12.73	1.58
08JUN	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.12	4.42	12.73	13.52
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
10JUN-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.59	2.15	0.21
15JUN	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.59	1.09	1.24
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
17JUN-	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	3.63	0.28
23JUN	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.63	3.63
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
24JUN-	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
30JUN	SE	0.00	0.00	0.00	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
30JUN-	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
05JUL	SE	0.00	0.00	0.00	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
08JUL-	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
13JUL	SE	0.00	0.00	0.00	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	13	11	12	9	13	7	10	7	6	6	6	117
22JUL-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
25JUL	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
06AUG-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
08AUG	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

Table D-49 Regional Density (No./1,000m3) of American Shad Yolk-Sac Larvae
in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1991

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
20AUG-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
22AUG	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
03SEP-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
06SEP	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
16SEP-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
18SEP	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
01OCT-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
03OCT	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	9	6						72
15OCT-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
17OCT	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						0.00
	NO. TOWS	7	11	12	12	10	6	10	6						74

Table D-50 Regional Standing Crop (In Thousands) of American Shad Yolk-Sac Larvae in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1991

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
15APR-	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
19APR	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS		10	12	13	10	6	11	6	7	7	8	9	9	108
22APR-	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
26APR	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS		10	12	13	10	6	11	6	7	7	8	9	9	108
29APR-	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	461.2	561.2
03MAY	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	61.4	225.5	233.7
	NO. TOWS		10	12	13	10	6	11	6	7	7	8	9	9	108
06MAY-	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	42.6	246.1	1146.8	1448.7	3520.6	26112.2	32517.0
10MAY	SE		0.0	0.0	0.0	0.0	0.0	0.0	42.6	143.1	417.1	1083.1	1091.6	16535.2	16612.4
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
13MAY-	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	27.9	358.3	735.0	1686.6	7209.4	13063.3	51386.9	74467.4
18MAY	SE		0.0	0.0	0.0	0.0	0.0	27.9	309.5	328.8	1004.3	2513.2	8580.0	18269.1	20369.3
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
20MAY-	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	101.3	6367.3	1269.8	11930.1	19668.6
24MAY	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	101.3	2440.8	1269.8	8028.6	8487.5
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
27MAY-	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	48.1	461.0	1949.2	2458.2
01JUN	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	48.1	461.0	788.0	914.2
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
03JUN-	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	315.9	710.0	905.9	1931.8
08JUN	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	196.9	710.0	905.9	1167.7
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
10JUN-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	94.7	152.8	247.5
15JUN	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	94.7	77.8	122.5
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
17JUN-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	258.5	258.5
23JUN	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	258.5	258.5
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
24JUN-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
30JUN	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
30JUN-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
05JUL	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
08JUL-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
13JUL	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS	6	11	13	11	12	9	13	7	10	7	6	6	6	117
22JUL-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
25JUL	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	11	11	12	10	6	10	6						73
06AUG-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
08AUG	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	11	11	12	10	6	10	6						73

Table D-50 Regional Standing Crop (In Thousands) of American Shad Yolk-Sac Larvae in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1991

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
20AUG-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
22AUG	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	11	11	12	10	6	10	6						73
03SEP-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
06SEP	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	10	11	12	10	6	10	6						72
16SEP-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
18SEP	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	11	11	12	10	6	10	6						73
01OCT-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
03OCT	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	11	11	12	10	6	9	6						72
15OCT-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
17OCT	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	11	12	12	10	6	10	6						74

Table D-51 Regional Density (No./1,000m3) of American Shad Post Yolk-Sac Larvae in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1991

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
15APR-19APR	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	11	6	7	7	8	9	9	108
22APR-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	11	6	7	7	8	9	9	108
29APR-03MAY	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.44	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	0.44	0.00	0.00	0.00	0.00	0.00	0.00	0.44
	NO. TOWS		10	12	13	10	6	11	6	7	7	8	9	9	108
06MAY-10MAY	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	2.01	0.86	0.00	0.33	2.84	0.00	12.75	1.57
	SE		0.00	0.00	0.00	0.00	0.00	1.24	0.86	0.00	0.33	2.49	0.00	12.75	13.08
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
13MAY-18MAY	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.18	4.01	13.66	6.28	36.46	98.52	13.26
	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.18	1.63	5.67	5.88	22.95	52.63	58.02
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
20MAY-24MAY	DENSITY	NS	0.00	0.00	0.00	0.18	1.54	0.00	1.27	8.44	25.73	111.11	159.57	143.34	37.60
	SE		0.00	0.00	0.00	0.18	1.54	0.00	1.27	3.46	17.84	60.79	105.09	67.54	140.13
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
27MAY-01JUN	DENSITY	NS	0.00	0.00	0.00	0.00	0.25	0.04	0.00	6.33	12.96	91.34	182.05	93.18	32.18
	SE		0.00	0.00	0.00	0.00	0.25	0.04	0.00	4.01	12.96	52.77	84.46	47.41	111.13
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
03JUN-08JUN	DENSITY	NS	0.00	0.00	0.00	0.82	0.92	0.04	3.83	51.56	136.94	175.86	525.68	245.92	95.13
	SE		0.00	0.00	0.00	0.82	0.92	0.04	1.99	15.65	49.23	111.38	147.05	51.48	198.38
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
10JUN-15JUN	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	2.26	37.37	15.91	19.16	42.41	145.70	162.09	32.68
	SE	0.00	0.00	0.00	0.00	0.00	0.00	2.26	9.58	7.43	14.53	34.89	59.12	36.64	80.11
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
17JUN-23JUN	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.71	7.44	8.27	42.60	76.54	36.78	13.26
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.71	3.63	5.16	40.33	28.21	25.71	55.89
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
24JUN-30JUN	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.98	2.52	16.42	3.71	2.05
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.28	2.52	11.14	3.01	12.26
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
30JUN-05JUL	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	3.22	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	0.00	2.53	2.53
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
08JUL-13JUL	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.59	0.00	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	0.59	0.00	0.59
	NO. TOWS	6	11	13	11	12	9	13	7	10	7	6	6	6	117
22JUL-25JUL	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
06AUG-08AUG	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

Table D-51 Regional Density (No./1,000m3) of American Shad Post Yolk-Sac Larvae in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1991

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
20AUG-22AUG	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
03SEP-06SEP	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
16SEP-18SEP	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
01OCT-03OCT	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	9	6						72
15OCT-17OCT	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	12	12	10	6	10	6						74

Table D-52 Regional Standing Crop (In Thousands) of American Shad Post Yolk-Sac Larvae in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1991

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
15APR-	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
19APR	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS		10	12	13	10	6	11	6	7	7	8	9	9	108
22APR-	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
26APR	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS		10	12	13	10	6	11	6	7	7	8	9	9	108
29APR-	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	61.2	0.0	0.0	0.0	0.0	0.0	0.0	61.2
03MAY	SE		0.0	0.0	0.0	0.0	0.0	61.2	0.0	0.0	0.0	0.0	0.0	0.0	61.2
	NO. TOWS		10	12	13	10	6	11	6	7	7	8	9	9	108
06MAY-	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	281.0	255.4	0.0	47.1	500.8	0.0	906.9	1991.2
10MAY	SE		0.0	0.0	0.0	0.0	0.0	174.0	255.4	0.0	47.1	439.6	0.0	906.9	1055.2
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
13MAY-	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	53.0	664.2	1932.0	1106.5	5860.7	7009.3	16625.7
18MAY	SE		0.0	0.0	0.0	0.0	0.0	0.0	53.0	269.6	802.1	1037.2	3689.2	3744.5	5424.6
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
20MAY-	St. Crop	NS	0.0	0.0	0.0	36.9	320.3	0.0	377.6	1397.3	3640.1	19588.7	25647.6	10198.2	61206.8
24MAY	SE		0.0	0.0	0.0	36.9	320.3	0.0	377.6	573.2	2523.8	10716.7	16891.7	4805.6	20741.7
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
27MAY-	St. Crop	NS	0.0	0.0	0.0	0.0	51.7	5.9	0.0	1046.9	1833.0	16103.4	29261.9	6629.8	54932.5
01JUN	SE		0.0	0.0	0.0	0.0	51.7	5.9	0.0	663.2	1833.0	9303.8	13574.9	3373.3	16912.1
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
03JUN-	St. Crop	NS	0.0	0.0	0.0	171.6	190.0	5.1	1141.1	8533.1	19372.7	31003.9	84494.1	17497.1	162408.5
08JUN	SE		0.0	0.0	0.0	171.6	190.0	5.1	592.5	2589.2	6965.2	19636.5	23634.9	3663.0	31831.6
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
10JUN-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	316.5	11140.6	2632.6	2710.7	7477.0	23419.2	11532.3	59228.8
15JUN	SE	0.0	0.0	0.0	0.0	0.0	0.0	316.5	2855.8	1228.9	2055.1	6150.2	9502.0	2607.0	12202.4
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
17JUN-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	210.8	1230.8	1170.0	7510.2	12301.6	2617.1	25040.4
23JUN	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	210.8	601.1	729.3	7110.0	4535.0	1829.3	8683.5
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
24JUN-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	562.5	443.5	2639.2	264.0	3909.2
30JUN	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	463.5	443.5	1791.3	213.9	1914.7
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
30JUN-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	229.1	229.1
05JUL	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	180.3	180.3
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
08JUL-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	95.5	0.0	95.5
13JUL	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	95.5	0.0	95.5
	NO. TOWS	6	11	13	11	12	9	13	7	10	7	6	6	6	117
22JUL-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
25JUL	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	11	11	12	10	6	10	6						73
06AUG-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
08AUG	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	11	11	12	10	6	10	6						73

Table D-52 Regional Standing Crop (In Thousands) of American Shad Post Yolk-Sac Larvae in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1991

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
20AUG-22AUG	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	11	11	12	10	6	10	6						73
03SEP-06SEP	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	10	11	12	10	6	10	6						72
16SEP-18SEP	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	11	11	12	10	6	10	6						73
01OCT-03OCT	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	11	11	12	10	6	9	6						72
15OCT-17OCT	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	11	12	12	10	6	10	6						74

Table D-53 Regional Density (No./1,000m3) of American Shad Young of Year
in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1991

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
15APR-	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
19APR	SE		0.00	0.00	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	11	6	7	7	8	9	9	108
22APR-	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	11	6	7	7	8	9	9	108
29APR-	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		10	12	13	10	6	11	6	7	7	8	9	9	108
06MAY-	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
13MAY-	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
18MAY	SE		0.00	0.00	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
20MAY-	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	6	110
27MAY-	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
01JUN	SE		0.00	0.00	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
03JUN-	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
08JUN	SE		0.00	0.00	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
10JUN-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	3.77	58.47	48.79	51.70	20.03	57.90	4.82	18.88
15JUN	SE	0.00	0.00	0.00	0.00	0.00	0.00	3.77	22.71	9.03	17.95	17.41	23.15	1.32	42.12
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
17JUN-	DENSITY	0.00	0.53	0.13	2.71	1.28	6.08	10.24	32.14	37.37	94.13	69.02	86.53	95.38	33.50
23JUN	SE	0.00	0.53	0.13	2.32	0.94	3.02	3.38	3.43	9.92	27.24	19.11	24.14	48.28	64.49
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
24JUN-	DENSITY	1.47	4.29	8.89	0.85	47.36	5.45	2.64	6.76	7.63	3.68	25.80	46.69	37.73	15.33
30JUN	SE	1.04	3.33	5.20	0.52	43.84	2.61	1.21	3.63	4.45	1.59	8.74	8.02	15.36	48.80
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
30JUN-	DENSITY	13.88	0.51	5.52	21.65	0.40	4.43	2.17	0.00	1.12	8.11	19.98	49.30	8.34	10.42
05JUL	SE	3.50	0.37	3.82	16.21	0.21	2.98	1.17	0.00	1.12	0.64	14.28	15.72	5.77	28.04
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
08JUL-	DENSITY	1.62	10.53	6.84	2.23	1.94	1.17	13.26	0.44	7.05	0.75	24.02	58.55	18.70	11.32
13JUL	SE	1.62	2.70	3.87	0.74	1.18	0.72	12.82	0.25	5.74	0.75	14.47	28.35	11.23	36.94
	NO. TOWS	6	11	13	11	12	9	13	7	10	7	6	6	6	117
22JUL-	DENSITY	0.44	0.00	3.21	0.40	1.44	0.00	1.01	0.00	NS	NS	NS	NS	NS	0.81
25JUL	SE	0.44	0.00	2.36	0.40	1.34	0.00	0.70	0.00						2.87
	NO. TOWS	7	11	11	12	10	6	10	6						73
06AUG-	DENSITY	0.00	4.77	0.00	1.03	0.00	0.00	0.05	0.00	NS	NS	NS	NS	NS	0.73
08AUG	SE	0.00	2.62	0.00	1.03	0.00	0.00	0.05	0.00						2.81
	NO. TOWS	7	11	11	12	10	6	10	6						73

Table D-53 Regional Density (No./1,000m3) of American Shad Young of Year
in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1991

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
20AUG-	DENSITY	0.00	0.41	0.00	0.00	0.00	0.00	0.36	0.27	NS	NS	NS	NS	NS	0.13
22AUG	SE	0.00	0.41	0.00	0.00	0.00	0.00	0.27	0.27						0.56
	NO. TOWS	7	11	11	12	10	6	10	6						73
03SEP-	DENSITY	0.00	0.30	0.00	0.00	0.00	0.00	1.02	0.00	NS	NS	NS	NS	NS	0.16
06SEP	SE	0.00	0.30	0.00	0.00	0.00	0.00	0.70	0.00						0.76
	NO. TOWS	7	10	11	12	10	6	10	6						72
16SEP-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.18	0.62	0.00	NS	NS	NS	NS	NS	0.10
18SEP	SE	0.00	0.00	0.00	0.00	0.00	0.18	0.57	0.00						0.60
	NO. TOWS	7	11	11	12	10	6	10	6						73
01OCT-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.95	1.16	NS	NS	NS	NS	NS	0.26
03OCT	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.75						0.75
	NO. TOWS	7	11	11	12	10	6	9	6						72
15OCT-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.15	4.29	1.31	NS	NS	NS	NS	NS	0.72
17OCT	SE	0.00	0.00	0.00	0.00	0.00	0.15	1.60	0.95						1.86
	NO. TOWS	7	11	12	12	10	6	10	6						74

Table D-54 Regional Standing Crop (In Thousands) of American Shad Young of Year in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1991

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
15APR-	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
19APR	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS		10	12	13	10	6	11	6	7	7	8	9	9	108
22APR-	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
26APR	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS		10	12	13	10	6	11	6	7	7	8	9	9	108
29APR-	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
03MAY	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS		10	12	13	10	6	11	6	7	7	8	9	9	108
06MAY-	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10MAY	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
13MAY-	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
18MAY	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
20MAY-	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
24MAY	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
27MAY-	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
01JUN	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
03JUN-	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08JUN	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
10JUN-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	527.5	17433.3	8074.1	7313.7	3531.4	9307.1	343.2	46530.2
15JUN	SE	0.0	0.0	0.0	0.0	0.0	0.0	527.5	6769.5	1495.0	2539.7	3069.9	3720.6	93.9	8835.4
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
17JUN-	St. Crop	0.0	122.4	40.8	400.1	267.5	1261.0	1430.9	9581.2	6184.6	13316.8	12167.9	13907.4	6786.5	65467.0
23JUN	SE	0.0	122.4	40.8	342.8	196.0	627.1	472.7	1021.9	1641.1	3853.1	3369.7	3880.7	3435.2	7588.7
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
24JUN-	St. Crop	306.4	985.1	2861.6	125.2	9865.9	1130.6	369.6	2015.9	1263.4	520.5	4548.0	7505.1	2684.2	34181.3
30JUN	SE	216.7	763.6	1674.7	77.4	9133.3	541.0	169.0	1080.8	736.4	225.0	1541.3	1288.9	1092.7	9704.2
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
30JUN-	St. Crop	2900.2	117.8	1777.9	3198.7	82.6	918.2	303.4	0.0	185.0	1147.6	3523.0	7923.6	593.5	22671.4
05JUL	SE	732.4	85.0	1229.1	2394.9	44.1	617.7	163.9	0.0	185.0	89.9	2517.6	2526.7	410.6	4597.1
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
08JUL-	St. Crop	339.5	2415.2	2200.5	329.1	404.5	243.6	1854.3	130.4	1166.9	106.2	4234.9	9411.5	1330.8	24167.3
13JUL	SE	339.5	619.4	1244.2	110.0	246.0	149.3	1791.5	75.3	949.5	106.2	2551.4	4557.1	799.1	5846.8
	NO. TOWS	6	11	13	11	12	9	13	7	10	7	6	6	6	117
22JUL-	St. Crop	92.4	0.0	1031.7	58.8	299.6	0.0	141.5	0.0	NS	NS	NS	NS	NS	1624.0
25JUL	SE	92.4	0.0	760.2	58.8	279.6	0.0	97.8	0.0						823.2
	NO. TOWS	7	11	11	12	10	6	10	6						73
06AUG-	St. Crop	0.0	1093.4	0.0	152.1	0.0	0.0	6.6	0.0	NS	NS	NS	NS	NS	1252.1
08AUG	SE	0.0	600.6	0.0	152.1	0.0	0.0	6.6	0.0						619.6
	NO. TOWS	7	11	11	12	10	6	10	6						73

Table D-5y Regional Standing Crop (In Thousands) of American Shad Young of Year in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1991

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
20AUG-	St. Crop	0.0	93.7	0.0	0.0	0.0	0.0	50.6	80.1	NS	NS	NS	NS	NS	224.4
22AUG	SE	0.0	93.7	0.0	0.0	0.0	0.0	38.3	80.1						129.1
	NO. TOWS	7	11	11	12	10	6	10	6						73
03SEP-	St. Crop	0.0	68.5	0.0	0.0	0.0	0.0	142.2	0.0	NS	NS	NS	NS	NS	210.7
06SEP	SE	0.0	68.5	0.0	0.0	0.0	0.0	97.5	0.0						119.2
	NO. TOWS	7	10	11	12	10	6	10	6						72
16SEP-	St. Crop	0.0	0.0	0.0	0.0	0.0	37.8	86.2	0.0	NS	NS	NS	NS	NS	124.1
18SEP	SE	0.0	0.0	0.0	0.0	0.0	37.8	79.2	0.0						87.8
	NO. TOWS	7	11	11	12	10	6	10	6						73
01OCT-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	133.3	345.4	NS	NS	NS	NS	NS	478.6
03OCT	SE	0.0	0.0	0.0	0.0	0.0	0.0	2.1	223.8						223.9
	NO. TOWS	7	11	11	12	10	6	9	6						72
15OCT-	St. Crop	0.0	0.0	0.0	0.0	0.0	30.3	599.0	390.8	NS	NS	NS	NS	NS	1020.1
17OCT	SE	0.0	0.0	0.0	0.0	0.0	30.3	223.2	283.2						361.9
	NO. TOWS	7	11	12	12	10	6	10	6						74

Table D-55 Regional Density (No./1,000m3) of American Shad Young of Year in Hudson River Estuary Determined From Fall Juvenile Survey, 1991

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
15JUL-	DENSITY	0.55	1.01	0.94	0.78	0.00	0.14	0.03	2.84	5.11	0.46	11.13	3.65	2.22
20JUL	SE	0.38	0.25	0.46	0.67	0.00	0.05	0.03	2.05	2.40	0.13	1.96	1.79	4.23
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
29JUL-	DENSITY	1.22	0.11	0.09	0.03	0.85	0.21	0.00	1.60	1.49	0.51	1.82	1.08	0.75
03AUG	SE	0.43	0.04	0.04	0.02	0.85	0.09	0.00	0.96	1.10	0.34	0.91	0.72	2.12
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
12AUG-	DENSITY	0.00	0.13	0.09	0.03	0.02	0.14	0.03	0.25	0.86	0.77	1.92	1.20	0.45
17AUG	SE	0.00	0.04	0.04	0.02	0.02	0.06	0.03	0.12	0.35	0.31	0.45	0.37	0.76
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
26AUG-	DENSITY	0.05	0.08	0.08	0.08	0.00	0.23	0.03	0.18	0.30	0.07	1.23	0.90	0.27
30AUG	SE	0.05	0.03	0.05	0.03	0.00	0.11	0.03	0.09	0.08	0.05	0.36	0.39	0.57
	NO. TOWS	17	45	27	14	8	13	8	10	15	18	21	13	209
09SEP-	DENSITY	0.05	0.34	0.19	0.03	0.77	0.33	0.03	0.08	0.83	0.79	1.34	1.38	0.51
13SEP	SE	0.05	0.18	0.08	0.02	0.77	0.12	0.03	0.06	0.52	0.38	0.28	0.35	1.13
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
23SEP-	DENSITY	0.00	0.06	0.00	0.00	0.00	0.27	0.00	0.05	1.47	0.71	0.61	0.46	0.30
27SEP	SE	0.00	0.03	0.00	0.00	0.00	0.13	0.00	0.05	0.63	0.23	0.09	0.20	0.72
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
07OCT-	DENSITY	0.00	0.01	0.06	0.04	0.00	0.26	0.24	1.68	0.21	0.96	1.33	0.41	0.43
11OCT	SE	0.00	0.01	0.03	0.03	0.00	0.06	0.17	1.60	0.10	0.35	0.58	0.21	1.76
	NO. TOWS	17	45	27	14	8	13	8	10	15	18	21	13	209
21OCT-	DENSITY	0.10	0.03	0.00	0.00	0.05	1.04	0.27	1.12	0.15	0.04	0.10	0.11	0.25
25OCT	SE	0.06	0.02	0.00	0.00	0.05	0.40	0.14	1.04	0.08	0.03	0.04	0.11	1.14
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210

Table D-56 Regional Standing Crops (in Thousands) of American Shad Young of Year in Hudson River Estuary Determined From Fall Juvenile Survey, 1991

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
15JUL-	St. Crop	126	326	139	163	0	20	10	470	723	81	1789	260	4106
20JUL	SE	88	80	68	140	0	7	10	339	340	22	315	127	620
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
29JUL-	St. Crop	279	36	14	7	177	29	0	265	210	90	292	77	1475
03AUG	SE	100	12	6	3	177	12	0	158	156	59	146	51	344
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
12AUG-	St. Crop	0	41	13	7	4	19	10	41	121	135	309	85	785
17AUG	SE	0	12	6	4	4	9	10	20	50	54	72	26	110
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
26AUG-	St. Crop	12	25	12	16	0	33	10	31	42	12	197	64	453
30AUG	SE	12	10	7	7	0	15	10	16	12	9	58	28	72
	NO. TOWS	17	45	27	14	8	13	8	10	15	18	21	13	209
09SEP-	St. Crop	11	110	28	7	159	47	10	14	117	139	215	99	954
13SEP	SE	11	59	11	5	159	17	10	10	74	67	45	25	205
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
23SEP-	St. Crop	0	18	0	0	0	38	0	9	208	126	98	32	530
27SEP	SE	0	9	0	0	0	18	0	9	90	41	15	14	103
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
07OCT-	St. Crop	0	4	9	9	0	36	72	278	30	169	214	29	849
11OCT	SE	0	4	5	7	0	9	51	264	14	61	93	15	292
	NO. TOWS	17	45	27	14	8	13	8	10	15	18	21	13	209
21OCT-	St. Crop	24	10	0	0	11	146	81	185	22	8	16	8	509
25OCT	SE	14	6	0	0	11	56	41	173	11	5	7	8	188
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210

Table D-57 Regional Catch-Per-Unit-Effort (CPUE) of American Shad Young of Year in Hudson River Estuary Determined From Beach Seine Survey, 1991

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
24JUN-29JUN	CPUE	0.67	8.91	9.86	43.67	1.67	19.33	37.13	109.00	80.00	39.00	42.74	38.08	35.84
	SE	0.33	4.55	3.81	6.39	1.20	4.26	13.30	25.46	13.14	6.75	12.88	14.19	38.81
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
08JUL-12JUL	CPUE	1.67	11.73	8.57	2.33	82.33	20.67	14.13	53.50	44.88	44.20	57.05	72.50	34.46
	SE	1.67	4.32	8.57	1.33	42.60	15.68	5.43	15.55	19.04	13.37	16.29	11.93	58.12
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
23JUL-25JUL	CPUE	0.00	0.09	0.57	3.67	9.67	5.00	19.38	27.75	15.00	23.20	41.05	74.83	18.35
	SE	0.00	0.09	0.43	3.67	6.17	1.00	11.58	7.73	6.04	5.33	7.94	16.84	25.65
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
05AUG-08AUG	CPUE	0.00	0.08	0.14	2.20	3.40	10.50	14.20	14.60	6.80	54.44	45.60	46.86	16.57
	SE	0.00	0.06	0.10	2.20	1.96	3.81	3.94	4.53	1.83	19.01	12.21	14.68	28.08
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
20AUG-23AUG	CPUE	0.00	0.00	0.00	1.00	0.60	8.83	10.60	23.60	20.40	37.33	46.00	56.14	17.04
	SE	0.00	0.00	0.00	1.00	0.24	3.41	2.29	11.72	7.43	10.48	11.04	22.39	30.72
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
03SEP-06SEP	CPUE	0.00	0.08	0.00	0.00	4.00	0.83	6.80	5.40	11.60	26.22	27.10	25.71	8.98
	SE	0.00	0.08	0.00	0.00	3.30	0.40	2.48	1.86	5.81	11.35	8.21	11.61	19.63
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
16SEP-19SEP	CPUE	0.00	0.08	0.00	0.00	1.00	9.67	9.80	4.00	8.40	13.44	14.20	5.86	5.54
	SE	0.00	0.06	0.00	0.00	1.00	3.24	4.80	1.38	3.06	2.74	5.26	1.24	9.09
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
30SEP-04OCT	CPUE	0.00	0.00	0.00	0.00	0.40	2.33	8.20	3.00	10.80	11.78	10.80	7.71	4.59
	SE	0.00	0.00	0.00	0.00	0.24	0.80	2.56	1.38	5.84	4.02	4.96	1.89	9.36
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
15OCT-18OCT	CPUE	0.20	0.83	0.71	0.60	0.80	5.83	0.40	0.60	3.00	1.67	6.10	6.43	2.26
	SE	0.20	0.28	0.53	0.60	0.49	2.47	0.24	0.40	1.18	0.41	1.59	2.54	4.23
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
28OCT-01NOV	CPUE	2.40	2.04	2.21	1.60	5.20	0.83	0.00	0.80	1.80	0.00	0.00	0.00	1.41
	SE	1.50	0.64	0.66	1.12	3.98	0.40	0.00	0.49	1.20	0.00	0.00	0.00	4.70
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100

Table D-58 Regional Standing Crops (in Thousands) of American Shad Young of Year in Hudson River Estuary Determined From Beach Seine Survey, 1991

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
24JUN-	St. Crop	5	405	265	402	4	206	263	135	689	685	841	517	4418
29JUN	SE	3	207	102	59	3	45	94	32	113	119	253	193	444
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
08JUL-	St. Crop	13	533	230	22	217	220	100	66	386	776	1123	985	4671
12JUL	SE	13	196	230	12	112	167	39	19	164	235	321	162	588
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
23JUL-	St. Crop	0	4	15	34	25	53	137	34	129	407	808	1017	2665
25JUL	SE	0	4	12	34	16	11	82	10	52	93	156	229	311
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
05AUG-	St. Crop	0	4	4	20	9	112	101	18	59	956	897	637	2816
08AUG	SE	0	3	3	20	5	41	28	6	16	334	240	199	460
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
20AUG-	St. Crop	0	0	0	9	2	94	75	29	176	655	905	763	2708
23AUG	SE	0	0	0	9	1	36	16	15	64	184	217	304	424
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
03SEP-	St. Crop	0	4	0	0	11	9	48	7	100	460	533	349	1521
06SEP	SE	0	4	0	0	9	4	18	2	50	199	162	158	306
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
16SEP-	St. Crop	0	4	0	0	3	103	70	5	72	236	279	80	851
19SEP	SE	0	3	0	0	3	35	34	2	26	48	104	17	128
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
30SEP-	St. Crop	0	0	0	0	1	25	58	4	93	207	212	105	705
04OCT	SE	0	0	0	0	1	9	18	2	50	71	98	26	134
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
15OCT-	St. Crop	2	38	19	6	2	62	3	1	26	29	120	87	394
18OCT	SE	2	13	14	6	1	26	2	<0.005	10	7	31	35	58
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
28OCT-	St. Crop	18	93	60	15	14	9	0	1	15	0	0	0	224
01NOV	SE	11	29	18	10	10	4	0	1	10	0	0	0	40
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100

Table D-59 Regional Density (No./1,000m3) of American Shad Yearling and Older in Hudson River Estuary Determined From Fall Juvenile Survey, 1991

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
15JUL-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	<0.005
20JUL	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.02
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
29JUL-	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
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	17	46	27	14	8	13	8	10	15	18	21	13	210
12AUG-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.02	0.00	0.00	0.00	0.00	<0.005
17AUG	SE	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.02	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
26AUG-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.00	<0.005
30AUG	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.03
	NO. TOWS	17	45	27	14	8	13	8	10	15	18	21	13	209
09SEP-	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
13SEP	SE	0.00	0.00	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
23SEP-	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
27SEP	SE	0.00	0.00	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
07OCT-	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
11OCT	SE	0.00	0.00	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	45	27	14	8	13	8	10	15	18	21	13	209
21OCT-	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
25OCT	SE	0.00	0.00	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 D-60 Regional Standing Crops (in Thousands) of American Shad Yearling and Older in Hudson River Estuary Determined From Fall Juvenile Survey, 1991

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
15JUL-20JUL	St. Crop	0	0	0	0	0	0	0	0	0	4	0	0	4
	SE	0	0	0	0	0	0	0	0	0	4	0	0	4
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
29JUL-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	17	46	27	14	8	13	8	10	15	18	21	13	210
12AUG-17AUG	St. Crop	0	0	0	0	0	5	0	4	0	0	0	0	9
	SE	0	0	0	0	0	5	0	4	0	0	0	0	6
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
26AUG-30AUG	St. Crop	0	0	0	0	0	0	0	0	4	0	0	0	4
	SE	0	0	0	0	0	0	0	0	4	0	0	0	4
	NO. TOWS	17	45	27	14	8	13	8	10	15	18	21	13	209
09SEP-13SEP	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
23SEP-27SEP	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
07OCT-11OCT	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	45	27	14	8	13	8	10	15	18	21	13	209
21OCT-25OCT	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 D-61 Regional Catch-Per-Unit-Effort (CPUE) of American Shad Yearling and Older in Hudson River Estuary Determined From Beach Seine Survey, 1991

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
24JUN-	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
29JUN	SE	0.00	0.00	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
08JUL-	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
12JUL	SE	0.00	0.00	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
23JUL-	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
25JUL	SE	0.00	0.00	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
05AUG-	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
08AUG	SE	0.00	0.00	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
20AUG-	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
23AUG	SE	0.00	0.00	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
03SEP-	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
06SEP	SE	0.00	0.00	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
16SEP-	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
19SEP	SE	0.00	0.00	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
30SEP-	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
04OCT	SE	0.00	0.00	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
15OCT-	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
18OCT	SE	0.00	0.00	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
28OCT-	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
01NOV	SE	0.00	0.00	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 D-62 Regional Standing Crops (in Thousands) of American Shad Yearling and Older in Hudson River Estuary Determined From Beach Seine Survey, 1991

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
24JUN-	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
29JUN	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
08JUL-	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
12JUL	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
23JUL-	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
25JUL	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
05AUG-	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
08AUG	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
20AUG-	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
23AUG	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
03SEP-	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
06SEP	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
16SEP-	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
19SEP	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
30SEP-	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
04OCT	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
15OCT-	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
18OCT	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
28OCT-	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
01NOV	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 D-63 Regional Density (No./1,000m3) of Alosa spp. Eggs
in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1991

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
15APR-	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.43	2.80	0.85	0.59
19APR	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.64	0.80	0.58	2.82
	NO. TOWS		10	12	13	10	6	11	6	7	7	8	9	9	108
22APR-	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.74	3.07	3.61	13.68	63.66	7.40
26APR	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.74	2.43	1.76	5.90	33.74	34.71
	NO. TOWS		10	12	13	10	6	11	6	7	7	8	9	9	108
29APR-	DENSITY	NS	0.00	0.00	17.54	0.00	0.00	0.00	0.00	0.22	5.61	17.47	113.22	15665.46	1318.29
03MAY	SE		0.00	0.00	17.54	0.00	0.00	0.00	0.00	0.22	5.27	7.45	52.77	8399.62	8399.81
	NO. TOWS		10	12	13	10	6	11	6	7	7	8	9	9	108
06MAY-	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.40	171.55	1273.26	287.23	565.24	191.47
10MAY	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.40	88.60	686.71	100.95	281.15	754.10
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
13MAY-	DENSITY	NS	0.00	0.00	0.00	0.00	0.57	0.00	0.18	1.73	9.23	1163.83	16412.24	1460.77	1587.38
18MAY	SE		0.00	0.00	0.00	0.00	0.47	0.00	0.18	0.69	4.31	589.43	13157.32	240.84	13172.71
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
20MAY-	DENSITY	NS	9.14	0.00	0.00	0.62	0.64	0.00	0.00	0.90	9.84	11.52	0.49	2131.20	180.36
24MAY	SE		5.52	0.00	0.00	0.62	0.53	0.00	0.00	0.90	3.86	7.81	0.49	1257.58	1257.62
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
27MAY-	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.32	22.66	311.66	51.58	32.18
01JUN	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.32	14.55	159.91	21.45	162.00
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
03JUN-	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	56.05	0.00	4.67
08JUN	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	56.05	0.00	56.05
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
10JUN-	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	0.65	0.05
15JUN	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.65	0.65
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
17JUN-	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
23JUN	SE	0.00	0.00	0.00	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
24JUN-	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
30JUN	SE	0.00	0.00	0.00	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
30JUN-	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
05JUL	SE	0.00	0.00	0.00	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
08JUL-	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
13JUL	SE	0.00	0.00	0.00	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	13	11	12	9	13	7	10	7	6	6	6	119
22JUL-	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
25JUL	SE	0.00	0.00	0.00	0.00	0.00	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	10	7	6	6	6	117
06AUG-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
08AUG	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
	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

Table D-63 Regional Density (No./1,000m3) of Alosa spp. Eggs in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1991

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
20AUG-22AUG	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
03SEP-06SEP	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
16SEP-18SEP	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
01OCT-03OCT	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	9	6						72
15OCT-17OCT	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	12	12	10	6	10	6						74

Table D-64 Regional Standing Crop (In Thousands) of Alosa spp. Eggs in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1991

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
15APR-19APR	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	604.8	449.3	60.6	1114.7
	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	464.9	128.4	41.2	484.1
	NO. TOWS		10	12	13	10	6	11	6	7	7	8	9	9	108
22APR-26APR	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	784.2	433.6	635.6	2198.9	4529.3	8581.7
	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	784.2	343.2	310.2	949.0	2400.7	2737.3
	NO. TOWS		10	12	13	10	6	11	6	7	7	8	9	9	108
29APR-03MAY	St. Crop	NS	0.0	0.0	2591.4	0.0	0.0	0.0	0.0	36.4	793.6	3079.3	18197.3	1114583.6	1139281.6
	SE		0.0	0.0	2591.4	0.0	0.0	0.0	0.0	36.4	745.0	1313.2	8482.0	597625.8	597693.5
	NO. TOWS		10	12	13	10	6	11	6	7	7	8	9	9	108
06MAY-10MAY	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	65.7	24268.7	224470.3	46167.1	40216.5	335188.2
	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	65.7	12534.2	121064.5	16226.7	20003.9	124407.4
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
13MAY-18MAY	St. Crop	NS	0.0	0.0	0.0	0.0	118.3	0.0	53.4	286.1	1306.2	205178.2	2637967.8	103932.6	2948842.6
	SE		0.0	0.0	0.0	0.0	97.8	0.0	53.4	114.1	609.3	103913.9	2114798.2	17135.2	2117419.1
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
20MAY-24MAY	St. Crop	NS	2098.0	0.0	0.0	128.7	133.0	0.0	0.0	149.4	1392.5	2030.2	79.4	151633.1	157644.1
	SE		1265.8	0.0	0.0	128.7	109.9	0.0	0.0	149.4	546.2	1377.3	79.4	89475.7	89497.2
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
27MAY-01JUN	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	45.2	3994.5	50093.3	3670.1	57803.2
	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	45.2	2565.2	25703.3	1526.1	25876.1
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
03JUN-08JUN	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9009.4	0.0	9009.4
	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9009.4	0.0	9009.4
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
10JUN-15JUN	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	46.5	46.5
	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	46.5	46.5
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
17JUN-23JUN	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
24JUN-30JUN	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
30JUN-05JUL	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
08JUL-13JUL	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS	6	11	13	11	12	9	13	7	10	7	6	6	6	117
22JUL-25JUL	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	11	11	12	10	6	10	6						73
06AUG-08AUG	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	11	11	12	10	6	10	6						73

Table D-64 Regional Standing Crop (In Thousands) of Alosa spp. Eggs in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1991

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
20AUG-22AUG	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	11	11	12	10	6	10	6						73
03SEP-06SEP	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	10	11	12	10	6	10	6						72
16SEP-18SEP	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	11	11	12	10	6	10	6						73
01OCT-03OCT	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	11	11	12	10	6	9	6						72
15OCT-17OCT	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	11	12	12	10	6	10	6						74

Table D-65 Regional Density (No./1,000m3) of Alosa spp. Yolk-Sac Larvae
in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1991

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
15APR-	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
19APR	SE		0.00	0.00	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	11	6	7	7	8	9	9	108
22APR-	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.07	2.92	52.66	2.02	0.00	0.00	0.00	4.81
26APR	SE		0.00	0.00	0.00	0.00	0.00	0.04	2.28	50.78	1.62	0.00	0.00	0.00	50.86
	NO. TOWS		10	12	13	10	6	11	6	7	7	8	9	9	108
29APR-	DENSITY	NS	0.00	0.00	0.00	2.06	1.41	0.86	1.16	0.52	0.23	0.78	1.36	1.00	0.78
03MAY	SE		0.00	0.00	0.00	2.06	1.41	0.59	0.84	0.52	0.23	0.61	0.83	0.71	3.03
	NO. TOWS		10	12	13	10	6	11	6	7	7	8	9	9	108
06MAY-	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	2.20	0.43	16.20	41.51	13.88	36.17	1987.81	174.85
10MAY	SE		0.00	0.00	0.00	0.00	0.00	1.83	0.43	11.14	11.98	11.48	9.48	705.90	706.25
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
13MAY-	DENSITY	NS	0.00	0.00	0.00	0.00	0.11	0.54	15.37	17.87	87.06	174.97	514.45	1377.74	182.34
18MAY	SE		0.00	0.00	0.00	0.00	0.11	0.33	4.85	6.79	16.42	27.67	124.38	336.83	360.60
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
20MAY-	DENSITY	NS	0.00	0.00	0.00	0.00	2.45	2.33	1.24	6.01	52.83	37.18	10.44	273.28	32.15
24MAY	SE		0.00	0.00	0.00	0.00	1.88	1.92	1.24	3.79	37.36	25.62	10.44	95.53	106.35
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
27MAY-	DENSITY	NS	0.16	0.00	0.00	0.00	0.00	0.00	2.27	0.90	2.00	790.67	11.60	208.38	84.66
01JUN	SE		0.16	0.00	0.00	0.00	0.00	0.00	2.27	0.64	2.00	707.02	9.11	169.26	727.06
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
03JUN-	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.05	0.00	0.09
08JUN	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.05	0.00	1.05
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
10JUN-	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	61.85	4.76
15JUN	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	61.85	61.85
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
17JUN-	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
23JUN	SE	0.00	0.00	0.00	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
24JUN-	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
30JUN	SE	0.00	0.00	0.00	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
30JUN-	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
05JUL	SE	0.00	0.00	0.00	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
08JUL-	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
13JUL	SE	0.00	0.00	0.00	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	13	11	12	9	13	7	10	7	6	6	6	117
22JUL-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
25JUL	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
06AUG-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
08AUG	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

Table D-65 Regional Density (No./1,000m3) of Alosa spp. Yolk-Sac Larvae
in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1991

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
20AUG-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
22AUG	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
03SEP-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
06SEP	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
16SEP-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
18SEP	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
01OCT-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
03OCT	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	9	6						72
15OCT-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
17OCT	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						0.00
	NO. TOWS	7	11	12	12	10	6	10	6						74

Table D-66 Regional Standing Crop (In Thousands) of Alosa spp. Yolk-Sac Larvae
in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1991

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
15APR-	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
19APR	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS		10	12	13	10	6	11	6	7	7	8	9	9	108
22APR-	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	9.9	871.0	8715.1	285.4	0.0	0.0	0.0	9881.3
26APR	SE		0.0	0.0	0.0	0.0	0.0	6.1	681.2	8403.8	228.7	0.0	0.0	0.0	8434.5
	NO. TOWS		10	12	13	10	6	11	6	7	7	8	9	9	108
29APR-	St. Crop	NS	0.0	0.0	0.0	428.9	293.2	120.8	344.4	86.5	33.0	137.1	218.3	71.2	1733.4
03MAY	SE		0.0	0.0	0.0	428.9	293.2	82.1	250.3	86.5	33.0	107.8	133.8	50.5	616.4
	NO. TOWS		10	12	13	10	6	11	6	7	7	8	9	9	108
06MAY-	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	308.2	128.4	2680.0	5872.6	2447.7	5814.5	141431.2	158682.5
10MAY	SE		0.0	0.0	0.0	0.0	0.0	255.8	128.4	1843.3	1694.8	2024.2	1523.6	50224.2	50351.2
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
13MAY-	St. Crop	NS	0.0	0.0	0.0	0.0	22.4	75.5	4582.0	2957.5	12316.1	30846.5	82687.8	98025.2	231513.0
18MAY	SE		0.0	0.0	0.0	0.0	22.4	46.6	1446.8	1123.5	2322.6	4877.4	19992.5	23965.4	31726.7
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
20MAY-	St. Crop	NS	0.0	0.0	0.0	0.0	507.6	325.6	368.3	994.1	7473.9	6555.0	1677.9	19443.8	37346.2
24MAY	SE		0.0	0.0	0.0	0.0	390.2	268.6	368.3	627.0	5284.7	4517.1	1677.9	6797.0	9904.5
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
27MAY-	St. Crop	NS	36.4	0.0	0.0	0.0	0.0	0.0	677.5	148.3	282.4	139392.1	1863.9	14826.0	157226.6
01JUN	SE		36.4	0.0	0.0	0.0	0.0	0.0	677.5	106.0	282.4	124644.4	1463.8	12043.0	125235.6
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
03JUN-	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	168.0	0.0	168.0
08JUN	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	168.0	0.0	168.0
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
10JUN-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4400.3	4400.3
15JUN	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4400.3	4400.3
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
17JUN-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
23JUN	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
24JUN-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
30JUN	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
30JUN-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
05JUL	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
08JUL-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
13JUL	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS	6	11	13	11	12	9	13	7	10	7	6	6	6	117
22JUL-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
25JUL	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	11	11	12	10	6	10	6						73
06AUG-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
08AUG	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	11	11	12	10	6	10	6						73

Table D-66 Regional Standing Crop (In Thousands) of Alosa spp. Yolk-Sac Larvae in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1991

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
20AUG-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
22AUG	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	11	11	12	10	6	10	6						73
03SEP-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
06SEP	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	10	11	12	10	6	10	6						72
16SEP-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
18SEP	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	11	11	12	10	6	10	6						73
01OCT-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
03OCT	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	11	11	12	10	6	9	6						72
15OCT-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
17OCT	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	11	12	12	10	6	10	6						74

Table D-67 Regional Density (No./1,000m3) of Alosa spp. Post Yolk-Sac Larvae
in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1991

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
15APR-	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
19APR	SE		0.00	0.00	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	11	6	7	7	8	9	9	108
22APR-	DENSITY	NS	0.00	0.19	0.00	0.00	0.28	0.29	9.36	1.97	0.26	0.00	0.00	0.00	1.03
26APR	SE		0.00	0.19	0.00	0.00	0.14	0.29	4.54	1.60	0.26	0.00	0.00	0.00	4.84
	NO. TOWS		10	12	13	10	6	11	6	7	7	8	9	9	108
29APR-	DENSITY	NS	0.00	0.00	0.27	7.09	3.71	12.34	0.00	0.00	0.00	0.00	0.00	0.00	1.95
03MAY	SE		0.00	0.00	0.27	4.31	0.78	6.78	0.00	0.00	0.00	0.00	0.00	0.00	8.07
	NO. TOWS		10	12	13	10	6	11	6	7	7	8	9	9	108
06MAY-	DENSITY	NS	0.00	0.45	0.49	1.38	3.14	3.15	2.76	8.85	5.69	3.21	0.00	0.00	2.43
10MAY	SE		0.00	0.45	0.49	0.85	1.60	1.37	0.82	3.32	2.94	2.58	0.00	0.00	5.71
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
13MAY-	DENSITY	NS	0.00	0.58	0.21	0.89	9.05	33.67	55.57	424.47	807.17	944.24	651.13	27.67	246.22
18MAY	SE		0.00	0.46	0.21	0.55	3.14	12.29	18.07	141.79	95.64	89.28	145.53	19.93	243.49
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
20MAY-	DENSITY	NS	0.00	0.00	1.39	3.04	0.37	24.56	203.25	314.42	6489.24	3504.12	7011.97	573.37	1510.48
24MAY	SE		0.00	0.00	0.60	1.57	0.24	7.51	59.75	48.08	3639.10	759.61	1508.03	440.28	4036.59
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
27MAY-	DENSITY	NS	0.00	0.00	0.98	2.64	12.00	389.21	344.30	763.37	3009.83	2595.66	7046.67	685.79	1237.54
01JUN	SE		0.00	0.00	0.45	1.60	7.25	225.32	215.86	210.96	698.91	1184.53	2257.77	239.84	2681.15
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
03JUN-	DENSITY	NS	0.96	0.39	1.29	1.74	50.57	339.39	71.33	800.07	2417.79	2371.22	4473.91	2317.54	1070.52
08JUN	SE		0.83	0.39	0.41	0.99	16.45	154.26	21.74	104.90	352.28	119.64	676.21	405.01	891.77
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
10JUN-	DENSITY	14.06	2.00	0.00	0.00	0.00	391.34	63.63	607.18	578.73	1450.60	2849.24	1825.46	1018.40	676.97
15JUN	SE	14.06	1.42	0.00	0.00	0.00	390.28	57.97	99.00	190.82	299.50	1599.59	279.33	184.65	1721.22
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
17JUN-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.96	24.65	415.53	385.01	1152.03	874.63	1324.23	1028.32	400.41
23JUN	SE	0.00	0.00	0.00	0.00	0.00	0.71	20.79	110.74	192.49	214.59	135.51	236.83	392.54	569.50
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
24JUN-	DENSITY	1.50	0.00	0.00	0.00	0.00	0.00	5.88	28.88	58.71	187.14	390.61	179.28	127.21	75.32
30JUN	SE	1.50	0.00	0.00	0.00	0.00	0.00	3.37	27.63	18.62	54.81	64.27	63.05	27.76	114.04
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
30JUN-	DENSITY	17.38	0.00	0.00	15.88	0.00	0.00	0.00	1.86	6.03	48.23	119.15	103.03	26.32	25.99
05JUL	SE	17.38	0.00	0.00	15.88	0.00	0.00	0.00	1.86	2.34	15.28	49.56	20.89	12.39	61.99
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
08JUL-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.63	13.52	6.00	18.08	3.86	3.39
13JUL	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.63	1.12	5.36	11.56	3.86	13.46
	NO. TOWS	6	11	13	11	12	9	13	7	10	7	6	6	6	117
22JUL-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
25JUL	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
06AUG-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
08AUG	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

Table D-67 Regional Density (No./1,000m3) of Alosa spp. Post Yolk-Sac Larvae in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1991

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
20AUG-22AUG	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
03SEP-06SEP	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
16SEP-18SEP	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
01OCT-03OCT	DENSITY	2.73	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.34
	SE	2.73	0.00	0.00	0.00	0.00	0.00	0.00	0.00						2.73
	NO. TOWS	7	11	11	12	10	6	9	6						72
15OCT-17OCT	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	12	12	10	6	10	6						74

Table D-68 Regional Standing Crop (In Thousands) of Alosa spp. Post Yolk-Sac Larvae in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1991

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
15APR-	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
19APR	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS		10	12	13	10	6	11	6	7	7	8	9	9	108
22APR-	St. Crop	NS	0.0	60.4	0.0	0.0	58.4	40.6	2790.0	326.2	36.5	0.0	0.0	0.0	3312.0
26APR	SE		0.0	60.4	0.0	0.0	29.2	40.6	1354.4	264.1	36.5	0.0	0.0	0.0	1382.6
	NO. TOWS		10	12	13	10	6	11	6	7	7	8	9	9	108
29APR-	St. Crop	NS	0.0	0.0	40.3	1476.1	770.0	1725.1	0.0	0.0	0.0	0.0	0.0	0.0	4011.5
03MAY	SE		0.0	0.0	40.3	897.2	161.5	947.3	0.0	0.0	0.0	0.0	0.0	0.0	1315.3
	NO. TOWS		10	12	13	10	6	11	6	7	7	8	9	9	108
06MAY-	St. Crop	NS	0.0	145.1	72.4	288.1	650.5	440.1	821.8	1464.0	805.6	566.1	0.0	0.0	5253.7
10MAY	SE		0.0	145.1	72.4	177.5	332.4	190.8	244.3	549.2	416.6	454.1	0.0	0.0	972.5
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
13MAY-	St. Crop	NS	0.0	186.6	30.5	186.1	1877.9	4707.4	16566.3	70242.9	114190.8	166464.7	104656.8	1968.8	481078.9
18MAY	SE		0.0	146.9	30.5	114.5	650.6	1717.3	5387.7	23463.8	13530.7	15740.2	23390.6	1418.4	39534.1
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
20MAY-	St. Crop	NS	0.0	0.0	205.2	632.7	77.3	3433.8	60594.5	52032.2	918031.8	617762.1	1127045.6	40794.4	2820609.6
24MAY	SE		0.0	0.0	88.8	326.6	50.0	1050.5	17814.0	7956.8	514823.3	133916.2	242388.9	31325.5	585740.7
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
27MAY-	St. Crop	NS	0.0	0.0	145.1	549.1	2490.2	54408.6	102648.3	126326.2	425800.1	457604.2	1132623.5	48793.7	2351389.0
01JUN	SE		0.0	0.0	67.0	332.5	1505.1	31497.1	64355.5	34911.2	98874.6	208827.1	362895.2	17064.6	437862.9
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
03JUN-	St. Crop	NS	221.1	127.0	190.9	362.6	10491.9	47443.9	21266.2	132399.7	342043.8	418035.3	719099.3	164890.8	1856572.6
08JUN	SE		190.8	127.0	60.2	206.7	3412.8	21563.9	6482.0	17360.1	49837.3	21091.9	108689.1	28816.1	128033.0
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
10JUN-	St. Crop	2939.4	460.0	0.0	0.0	0.0	81186.4	8894.6	181021.3	95770.8	205216.2	502308.4	293409.3	72458.3	1443664.8
15JUN	SE	2939.4	325.4	0.0	0.0	0.0	80966.0	8103.7	29516.3	31578.2	42370.2	282000.3	44897.4	13137.6	303325.0
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
17JUN-	St. Crop	0.0	0.0	0.0	0.0	0.0	200.2	3446.2	123884.5	63713.5	162977.9	154192.9	212845.2	73164.1	794424.5
23JUN	SE	0.0	0.0	0.0	0.0	0.0	147.3	2906.5	33015.1	31854.4	30357.6	23889.8	38066.6	27928.7	76384.3
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
24JUN-	St. Crop	312.9	0.0	0.0	0.0	0.0	0.0	821.9	8609.5	9714.8	26474.3	68862.9	28816.2	9051.0	152663.4
30JUN	SE	312.9	0.0	0.0	0.0	0.0	0.0	470.9	8236.1	3081.6	7754.4	11331.2	10133.3	1975.3	19307.0
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
30JUN-	St. Crop	3632.6	0.0	0.0	2346.8	0.0	0.0	0.0	555.0	998.1	6823.4	21005.1	16560.4	1872.4	53793.9
05JUL	SE	3632.6	0.0	0.0	2346.8	0.0	0.0	0.0	555.0	387.3	2161.8	8737.7	3357.5	881.6	10594.0
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
08JUL-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	435.0	1912.6	1057.3	2906.7	274.3	6586.0
13JUL	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	269.3	158.0	945.2	1858.5	274.3	2126.1
	NO. TOWS	6	11	13	11	12	9	13	7	10	7	6	6	6	117
22JUL-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
25JUL	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	11	11	12	10	6	10	6						73
06AUG-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
08AUG	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	11	11	12	10	6	10	6						73

Table D-6a Regional Standing Crop (In Thousands) of Alosa spp. Post Yolk-Sac Larvae in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1991

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
20AUG-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
22AUG	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	11	11	12	10	6	10	6						73
03SEP-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
06SEP	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	10	11	12	10	6	10	6						72
16SEP-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
18SEP	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	11	11	12	10	6	10	6						73
01OCT-	St. Crop	570.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	570.4
03OCT	SE	570.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0						570.4
	NO. TOWS	7	11	11	12	10	6	9	6						72
15OCT-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
17OCT	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	11	12	12	10	6	10	6						74

Table D-69 Regional Density (No./1,000m3) of Alosa spp. Young of Year in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1991

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
15APR-	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
19APR	SE		0.00	0.00	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	11	6	7	7	8	9	9	108
22APR-	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.26	0.00	0.00	0.00	0.02
26APR	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.26	0.00	0.00	0.00	0.26
	NO. TOWS		10	12	13	10	6	11	6	7	7	8	9	9	108
29APR-	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		10	12	13	10	6	11	6	7	7	8	9	9	108
06MAY-	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
13MAY-	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
18MAY	SE		0.00	0.00	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
20MAY-	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	6	110
27MAY-	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.38	0.00	0.00	0.00	0.00	0.00	0.00	0.03
01JUN	SE		0.00	0.00	0.00	0.00	0.00	0.38	0.00	0.00	0.00	0.00	0.00	0.00	0.38
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
03JUN-	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
08JUN	SE		0.00	0.00	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
10JUN-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.58	8.49	0.77
15JUN	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.58	3.68	4.01
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
17JUN-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	16.29	0.00	0.00	0.00	0.00	1.25
23JUN	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	16.29	0.00	0.00	0.00	0.00	16.29
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
24JUN-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.21	0.52	35.20	29.58	0.00	0.40	5.07
30JUN	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.21	0.52	15.06	17.49	0.00	0.40	23.10
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
30JUN-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.07	15.91	0.00	0.00	1.46
05JUL	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.79	15.91	0.00	0.00	16.15
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
08JUL-	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
13JUL	SE	0.00	0.00	0.00	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	13	11	12	9	13	7	10	7	6	6	6	117
22JUL-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
25JUL	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
06AUG-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
08AUG	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

Table D-69 Regional Density (No./1,000m3) of Alosa spp. Young of Year in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1991

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
20AUG-22AUG	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
03SEP-06SEP	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
16SEP-18SEP	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
01OCT-03OCT	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	9	6						72
15OCT-17OCT	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	12	12	10	6	10	6						74

Table D-70 Regional Standing Crop (In Thousands) of Alosa spp. Young of Year in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1991

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
15APR-	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
19APR	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS		10	12	13	10	6	11	6	7	7	8	9	9	108
22APR-	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	36.5	0.0	0.0	0.0	36.5
26APR	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	36.5	0.0	0.0	0.0	36.5
	NO. TOWS		10	12	13	10	6	11	6	7	7	8	9	9	108
29APR-	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
03MAY	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS		10	12	13	10	6	11	6	7	7	8	9	9	108
06MAY-	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10MAY	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
13MAY-	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
18MAY	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
20MAY-	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
24MAY	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
27MAY-	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	52.7	0.0	0.0	0.0	0.0	0.0	0.0	52.7
01JUN	SE		0.0	0.0	0.0	0.0	0.0	52.7	0.0	0.0	0.0	0.0	0.0	0.0	52.7
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
03JUN-	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08JUN	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
10JUN-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	254.6	603.8	858.4
15JUN	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	254.6	261.7	365.1
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
17JUN-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2695.4	0.0	0.0	0.0	0.0	2695.4
23JUN	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2695.4	0.0	0.0	0.0	0.0	2695.4
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
24JUN-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	61.7	85.3	4979.2	5215.7	0.0	28.6	10370.5
30JUN	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	61.7	85.3	2131.2	3084.1	0.0	28.6	3750.4
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
30JUN-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	434.3	2804.9	0.0	0.0	3239.2
05JUL	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	395.0	2804.9	0.0	0.0	2832.6
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
08JUL-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
13JUL	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS	6	11	13	11	12	9	13	7	10	7	6	6	6	117
22JUL-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
25JUL	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	11	11	12	10	6	10	6						73
06AUG-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
08AUG	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	11	11	12	10	6	10	6						73

Table D-70 Regional Standing Crop (In Thousands) of Alosa spp. Young of Year in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1991

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
20AUG-22AUG	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	11	11	12	10	6	10	6						73
03SEP-06SEP	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	10	11	12	10	6	10	6						72
16SEP-18SEP	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	11	11	12	10	6	10	6						73
01OCT-03OCT	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	11	11	12	10	6	9	6						72
15OCT-17OCT	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	11	12	12	10	6	10	6						74

Table D-71 Regional Density (No./1,000m3) of Blueback Herring Young of Year in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1991

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
15APR-19APR	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	11	6	7	7	8	9	9	108
22APR-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	11	6	7	7	8	9	9	108
29APR-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		10	12	13	10	6	11	6	7	7	8	9	9	108
06MAY-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
13MAY-18MAY	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
20MAY-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	6	110
27MAY-01JUN	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
03JUN-08JUN	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
10JUN-15JUN	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
17JUN-23JUN	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.16	9.50	287.64	601.28	277.46	49.73	155.69	106.27
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.16	0.72	95.22	350.42	162.12	37.63	101.73	412.20
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
24JUN-30JUN	DENSITY	0.00	0.55	0.00	0.00	0.00	0.62	0.41	118.19	394.38	616.83	746.45	415.81	1047.28	256.96
	SE	0.00	0.55	0.00	0.00	0.00	0.62	0.29	65.75	111.33	97.07	347.75	103.69	500.26	638.82
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
30JUN-05JUL	DENSITY	0.00	0.00	0.93	5.73	2.55	2.55	5.96	377.93	173.43	852.27	1113.26	565.49	1450.91	350.08
	SE	0.00	0.00	0.57	3.52	1.56	1.00	2.75	122.59	52.02	277.16	193.48	218.76	915.89	1009.31
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
08JUL-13JUL	DENSITY	2.63	0.96	2.79	8.24	3.46	7.86	40.56	30.67	281.03	225.79	416.94	878.29	423.32	178.66
	SE	2.63	0.96	1.63	3.13	2.54	2.65	23.94	10.38	88.19	48.01	35.55	515.81	188.26	559.96
	NO. TOWS	6	11	13	11	12	9	13	7	10	7	6	6	6	117
22JUL-25JUL	DENSITY	1.77	0.00	3.32	5.10	0.21	0.17	3.22	77.78	NS	NS	NS	NS	NS	11.45
	SE	1.77	0.00	3.32	3.82	0.21	0.17	2.54	60.54						60.83
	NO. TOWS	7	11	11	12	10	6	10	6						73
06AUG-08AUG	DENSITY	0.00	1.42	0.00	0.00	0.00	0.16	5.32	29.00	NS	NS	NS	NS	NS	4.49
	SE	0.00	1.42	0.00	0.00	0.00	0.16	3.11	14.11						14.52
	NO. TOWS	7	11	11	12	10	6	10	6						73

Table D-71 Regional Density (No./1,000m3) of Blueback Herring Young of Year in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1991

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
20AUG-22AUG	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.42	NS	NS	NS	NS	NS	0.43
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.58						1.58
	NO. TOWS	7	11	11	12	10	6	10	6						73
03SEP-06SEP	DENSITY	0.00	2.11	0.00	0.00	0.00	0.17	0.00	1.25	NS	NS	NS	NS	NS	0.44
	SE	0.00	2.11	0.00	0.00	0.00	0.17	0.00	0.76						2.25
	NO. TOWS	7	10	11	12	10	6	10	6						72
16SEP-18SEP	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	2.83	21.77	NS	NS	NS	NS	NS	3.08
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.30	19.84						19.84
	NO. TOWS	7	11	11	12	10	6	10	6						73
01OCT-03OCT	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	2.21	5.42	NS	NS	NS	NS	NS	0.95
	SE	0.00	0.00	0.00	0.00	0.00	0.00	2.21	5.42						5.85
	NO. TOWS	7	11	11	12	10	6	9	6						72
15OCT-17OCT	DENSITY	0.00	0.00	0.00	0.00	1.06	9.45	61.14	63.74	NS	NS	NS	NS	NS	16.92
	SE	0.00	0.00	0.00	0.00	0.86	2.33	16.10	12.07						20.28
	NO. TOWS	7	11	12	12	10	6	10	6						74

Table D-72 Regional Standing Crop (In Thousands) of Blueback Herring Young of Year in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1991

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
15APR-	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
19APR	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS		10	12	13	10	6	11	6	7	7	8	9	9	108
22APR-	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
26APR	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS		10	12	13	10	6	11	6	7	7	8	9	9	108
29APR-	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
03MAY	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS		10	12	13	10	6	11	6	7	7	8	9	9	108
06MAY-	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10MAY	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
13MAY-	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
18MAY	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
20MAY-	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
24MAY	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
27MAY-	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
01JUN	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
03JUN-	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08JUN	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
10JUN-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
15JUN	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
17JUN-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	22.2	2833.0	47599.6	85062.4	48915.0	7993.5	11077.0	203502.8
23JUN	SE	0.0	0.0	0.0	0.0	0.0	0.0	22.2	213.9	15757.4	49573.6	28581.8	6048.8	7237.9	60098.1
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
24JUN-	St. Crop	0.0	125.5	0.0	0.0	0.0	129.2	57.2	35235.7	65263.2	87262.4	131595.6	66833.2	74512.8	461014.9
30JUN	SE	0.0	125.5	0.0	0.0	0.0	129.2	40.7	19602.3	18422.9	13732.2	61307.3	16666.9	35593.3	78838.6
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
30JUN-	St. Crop	0.0	0.0	299.3	846.2	530.7	528.3	833.6	112673.9	28700.1	120570.5	196263.8	90892.2	103230.6	655369.2
05JUL	SE	0.0	0.0	185.0	520.3	324.0	208.3	384.0	36547.6	8608.1	39210.0	34109.1	35162.2	65164.5	97949.3
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
08JUL-	St. Crop	549.8	219.4	898.7	1216.9	720.5	1630.3	5669.6	9144.1	46506.3	31942.0	73504.1	141169.5	30119.0	343290.2
13JUL	SE	549.8	219.4	523.4	462.5	528.2	550.5	3346.3	3093.4	14593.8	6791.5	6267.0	82907.0	13394.2	85869.4
	NO. TOWS	6	11	13	11	12	9	13	7	10	7	6	6	6	117
22JUL-	St. Crop	369.5	0.0	1069.3	753.9	43.8	36.0	450.2	23189.9	NS	NS	NS	NS	NS	25912.5
25JUL	SE	369.5	0.0	1069.3	565.0	43.8	36.0	355.5	18049.5						18097.3
	NO. TOWS	7	11	11	12	10	6	10	6						73
06AUG-	St. Crop	0.0	324.7	0.0	0.0	0.0	32.2	743.5	8646.4	NS	NS	NS	NS	NS	9746.7
08AUG	SE	0.0	324.7	0.0	0.0	0.0	32.2	434.2	4206.6						4241.6
	NO. TOWS	7	11	11	12	10	6	10	6						73

Table D-72 Regional Standing Crop (In Thousands) of Blueback Herring Young of Year in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1991

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
20AUG-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1019.5	NS	NS	NS	NS	NS	1019.5
22AUG	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	471.7						471.7
	NO. TOWS	7	11	11	12	10	6	10	6						73
03SEP-	St. Crop	0.0	484.6	0.0	0.0	0.0	35.8	0.0	373.4	NS	NS	NS	NS	NS	893.8
06SEP	SE	0.0	484.6	0.0	0.0	0.0	35.8	0.0	227.7						536.6
	NO. TOWS	7	10	11	12	10	6	10	6						72
16SEP-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	395.9	6491.4	NS	NS	NS	NS	NS	6887.3
18SEP	SE	0.0	0.0	0.0	0.0	0.0	0.0	41.5	5913.5						5913.6
	NO. TOWS	7	11	11	12	10	6	10	6						73
01OCT-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	309.1	1614.5	NS	NS	NS	NS	NS	1923.5
03OCT	SE	0.0	0.0	0.0	0.0	0.0	0.0	309.1	1614.5						1643.8
	NO. TOWS	7	11	11	12	10	6	9	6						72
15OCT-	St. Crop	0.0	0.0	0.0	0.0	220.6	1959.8	8546.9	19002.6	NS	NS	NS	NS	NS	29729.8
17OCT	SE	0.0	0.0	0.0	0.0	179.0	483.3	2250.9	3598.1						4275.3
	NO. TOWS	7	11	12	12	10	6	10	6						74

Table D-73 Regional Density (No./1,000m3) of Blueback Herring Young of Year in Hudson River Estuary Determined From Fall Juvenile Survey, 1991

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
15JUL-	DENSITY	0.54	0.99	1.50	0.73	0.00	0.03	12.16	123.31	152.88	119.44	242.93	117.58	64.34
20JUL	SE	0.23	0.29	0.53	0.67	0.00	0.02	6.01	64.56	45.14	39.66	60.47	58.14	121.87
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
29JUL-	DENSITY	0.20	1.00	1.81	0.08	0.17	2.51	5.19	49.42	114.83	24.56	123.76	28.02	29.30
03AUG	SE	0.09	0.28	0.84	0.03	0.09	0.77	2.09	27.31	54.36	4.27	17.55	14.00	65.03
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
12AUG-	DENSITY	0.03	0.50	0.10	0.03	0.00	0.57	0.03	67.09	229.50	75.33	59.79	111.27	45.35
17AUG	SE	0.02	0.19	0.05	0.03	0.00	0.49	0.03	25.71	106.80	16.10	8.30	37.98	117.63
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
26AUG-	DENSITY	0.36	0.08	0.06	0.02	0.00	0.25	5.44	49.62	105.90	11.44	46.94	25.45	20.46
30AUG	SE	0.14	0.04	0.03	0.01	0.00	0.17	4.35	9.64	11.83	2.75	7.40	7.19	19.13
	NO. TOWS	17	45	27	14	8	13	8	10	15	18	21	13	209
09SEP-	DENSITY	0.01	0.02	0.04	0.01	0.00	0.26	7.67	174.95	39.35	25.17	43.98	164.13	37.97
13SEP	SE	0.01	0.02	0.03	0.01	0.00	0.15	3.88	142.95	19.23	6.15	7.75	28.51	147.41
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
23SEP-	DENSITY	0.00	0.01	0.00	0.00	0.00	1.61	6.48	19.96	35.81	36.39	41.57	9.21	12.59
27SEP	SE	0.00	0.01	0.00	0.00	0.00	1.27	2.35	7.70	13.19	9.20	3.69	2.06	18.51
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
07OCT-	DENSITY	0.00	0.00	0.00	0.00	0.03	1.70	6.59	116.63	24.76	41.43	49.52	26.42	22.26
11OCT	SE	0.00	0.00	0.00	0.00	0.02	0.78	3.21	75.12	7.95	7.23	10.34	14.39	78.00
	NO. TOWS	17	45	27	14	8	13	8	10	15	18	21	13	209
21OCT-	DENSITY	1.54	0.60	0.04	1.27	2.93	32.92	21.83	31.48	15.59	6.42	10.19	4.59	10.78
25OCT	SE	0.56	0.33	0.03	0.88	1.62	10.19	6.95	10.92	6.86	1.15	1.82	1.40	18.13
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210

Table D-74 Regional Standing Crops (in Thousands) of Blueback Herring Young of Year in Hudson River Estuary Determined From Fall Juvenile Survey, 1991

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
15JUL-	St. Crop	124	320	222	153	0	4	3625	20406	21628	21057	39046	8366	114950
20JUL	SE	53	94	78	140	0	3	1791	10684	6386	6993	9719	4137	17851
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
29JUL-	St. Crop	45	321	268	17	35	351	1546	8178	16245	4330	19892	1994	53222
03AUG	SE	20	89	124	6	20	107	624	4520	7691	752	2820	996	9461
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
12AUG-	St. Crop	6	162	15	7	0	79	9	11103	32467	13280	9610	7916	74655
17AUG	SE	4	61	7	5	0	68	9	4255	15108	2838	1335	2702	16233
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
26AUG-	St. Crop	83	25	10	4	0	35	1621	8211	14981	2018	7545	1811	36342
30AUG	SE	32	12	5	2	0	23	1297	1596	1673	485	1189	512	2990
	NO. TOWS	17	45	27	14	8	13	8	10	15	18	21	13	209
09SEP-	St. Crop	3	7	6	2	0	37	2288	28951	5567	4437	7068	11678	60045
13SEP	SE	3	5	4	2	0	20	1158	23655	2721	1083	1245	2029	23982
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
23SEP-	St. Crop	0	4	0	0	0	226	1932	3304	5066	6415	6682	656	24284
27SEP	SE	0	4	0	0	0	177	700	1273	1866	1622	592	146	2937
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
07OCT-	St. Crop	0	0	0	0	6	238	1966	19301	3503	7304	7960	1880	42158
11OCT	SE	0	0	0	0	4	108	957	12432	1125	1274	1662	1024	12735
	NO. TOWS	17	45	27	14	8	13	8	10	15	18	21	13	209
21OCT-	St. Crop	353	194	6	264	608	4602	6509	5209	2205	1132	1638	327	23048
25OCT	SE	128	107	4	182	335	1424	2071	1807	970	203	292	100	3292
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210

Table D-75 Regional Catch-Per-Unit-Effort (CPUE) of Blueback Herring Young of Year in Hudson River Estuary Determined From Beach Seine Survey, 1991

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
24JUN-	CPUE	0.00	0.00	0.00	0.00	0.00	0.00	25.75	1.38	2.50	0.20	1.16	0.17	2.60
29JUN	SE	0.00	0.00	0.00	0.00	0.00	0.00	20.00	0.68	1.60	0.14	0.76	0.17	20.09
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
08JUL-	CPUE	0.67	1.45	1.43	0.00	438.33	31.00	71.63	22.63	37.38	76.73	190.26	12.33	73.65
12JUL	SE	0.67	0.58	1.27	0.00	264.51	31.00	58.50	11.64	33.51	57.85	155.03	7.45	321.01
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
23JUL-	CPUE	0.00	0.09	0.00	1.00	4.33	3.00	105.88	548.00	126.38	67.13	104.42	54.33	84.55
25JUL	SE	0.00	0.09	0.00	1.00	3.38	1.15	105.45	323.00	111.22	20.79	38.25	29.99	361.42
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
05AUG-	CPUE	0.00	0.00	0.00	0.00	8.60	8.00	1.80	76.20	20.40	29.78	182.10	66.57	32.79
08AUG	SE	0.00	0.00	0.00	0.00	7.19	4.41	0.92	74.95	12.43	10.95	130.11	39.18	156.29
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
20AUG-	CPUE	0.00	0.00	0.00	0.00	1.00	0.67	40.40	423.00	182.00	111.89	122.60	78.43	80.00
23AUG	SE	0.00	0.00	0.00	0.00	1.00	0.49	36.45	215.04	95.37	51.21	58.92	33.89	252.80
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
03SEP-	CPUE	0.00	0.08	0.00	0.00	0.40	1.33	5.40	17.40	57.00	56.67	95.00	48.29	23.46
06SEP	SE	0.00	0.06	0.00	0.00	0.40	0.71	3.17	13.58	30.46	31.33	66.13	26.24	84.65
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
16SEP-	CPUE	0.00	0.04	0.00	0.00	0.00	0.67	41.00	807.60	35.40	34.00	12.30	1.14	77.68
19SEP	SE	0.00	0.04	0.00	0.00	0.00	0.33	19.09	435.72	12.95	7.06	4.92	0.55	436.42
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
30SEP-	CPUE	0.00	0.00	0.00	0.00	0.00	0.33	1.80	318.60	35.80	27.67	3.60	0.86	32.39
04OCT	SE	0.00	0.00	0.00	0.00	0.00	0.33	1.20	285.78	15.89	9.84	2.30	0.26	286.41
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
15OCT-	CPUE	0.00	0.13	0.50	0.20	9.80	1.67	0.20	5.80	3.80	0.22	0.00	0.29	1.88
18OCT	SE	0.00	0.09	0.50	0.20	5.74	0.49	0.20	5.80	3.80	0.22	0.00	0.29	9.04
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
28OCT-	CPUE	1.00	35.17	2.36	440.60	9.80	1.00	3.60	234.20	77.20	0.00	0.60	0.00	67.13
01NOV	SE	1.00	25.19	0.91	421.73	3.25	0.52	2.46	145.80	38.46	0.00	0.60	0.00	448.60
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100

Table D-76 Regional Standing Crops (in Thousands) of Blueback Herring Young of Year in Hudson River Estuary Determined From Beach Seine Survey, 1991

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
24JUN-29JUN	St. Crop	0	0	0	0	0	0	183	2	22	4	23	2	234
	SE	0	0	0	0	0	0	142	1	14	3	15	2	143
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
08JUL-12JUL	St. Crop	5	66	38	0	1155	330	508	28	322	1347	3744	168	7711
	SE	5	26	34	0	697	330	415	14	289	1016	3050	101	3346
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
23JUL-25JUL	St. Crop	0	4	0	9	11	32	751	680	1088	1179	2055	738	6547
	SE	0	4	0	9	9	12	748	401	957	365	753	407	1582
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
05AUG-08AUG	St. Crop	0	0	0	0	23	85	13	94	176	523	3583	904	5401
	SE	0	0	0	0	19	47	7	93	107	192	2560	532	2626
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
20AUG-23AUG	St. Crop	0	0	0	0	3	7	287	525	1567	1964	2412	1066	7830
	SE	0	0	0	0	3	5	259	267	821	899	1159	460	1782
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
03SEP-06SEP	St. Crop	0	4	0	0	1	14	38	22	491	995	1869	656	4090
	SE	0	3	0	0	1	8	23	17	262	550	1301	356	1481
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
16SEP-19SEP	St. Crop	0	2	0	0	0	7	291	1001	305	597	242	16	2461
	SE	0	2	0	0	0	4	135	540	111	124	97	8	590
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
30SEP-04OCT	St. Crop	0	0	0	0	0	4	13	395	308	486	71	12	1288
	SE	0	0	0	0	0	4	9	354	137	173	45	4	420
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
15OCT-18OCT	St. Crop	0	6	13	2	26	18	1	7	33	4	0	4	114
	SE	0	4	13	2	15	5	1	7	33	4	0	4	40
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
28OCT-01NOV	St. Crop	8	1598	63	4060	26	11	26	290	665	0	12	0	6758
	SE	8	1145	25	3886	9	6	17	181	331	0	12	0	4069
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100

Table D-77 Regional Density (No./1,000m3) of Blueback Herring Yearling and Older in Hudson River Estuary Determined From Fall Juvenile Survey, 1991

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
15JUL-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.00	<0.005
20JUL	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
29JUL-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.00	<0.005
03AUG	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.05
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
12AUG-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.03	0.00	0.00	0.00	0.00	<0.005
17AUG	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.03	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
26AUG-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.00	0.00	0.00	<0.005
30AUG	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.04
	NO. TOWS	17	45	27	14	8	13	8	10	15	18	21	13	209
09SEP-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.06	0.01
13SEP	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.06	0.06
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
23SEP-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.00	0.00	<0.005
27SEP	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.04
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
07OCT-	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
11OCT	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	45	27	14	8	13	8	10	15	18	21	13	209
21OCT-	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
25OCT	SE	0.00	0.00	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 D-78 Regional Standing Crops (in Thousands) of Blueback Herring Yearling and Older in Hudson River Estuary Determined From Fall Juvenile Survey, 1991

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
15JUL-	St. Crop	0	0	0	0	0	0	0	0	0	8	0	0	8
20JUL	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
29JUL-	St. Crop	0	0	0	0	0	0	0	0	0	0	8	0	8
03AUG	SE	0	0	0	0	0	0	0	0	0	0	8	0	8
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
12AUG-	St. Crop	0	0	0	0	0	0	9	4	0	0	0	0	13
17AUG	SE	0	0	0	0	0	0	9	4	0	0	0	0	10
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
26AUG-	St. Crop	0	0	0	0	0	0	0	0	8	0	0	0	8
30AUG	SE	0	0	0	0	0	0	0	0	5	0	0	0	5
	NO. TOWS	17	45	27	14	8	13	8	10	15	18	21	13	209
09SEP-	St. Crop	0	0	0	0	0	0	0	0	3	0	0	4	7
13SEP	SE	0	0	0	0	0	0	0	0	3	0	0	4	5
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
23SEP-	St. Crop	0	0	0	0	0	0	0	0	8	0	0	0	8
27SEP	SE	0	0	0	0	0	0	0	0	5	0	0	0	5
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
07OCT-	St. Crop	0	0	0	0	0	0	0	0	0	5	0	0	5
11OCT	SE	0	0	0	0	0	0	0	0	0	5	0	0	5
	NO. TOWS	17	45	27	14	8	13	8	10	15	18	21	13	209
21OCT-	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
25OCT	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 D-79 Regional Catch-Per-Unit-Effort (CPUE) of Blueback Herring Yearling and Older in Hudson River Estuary Determined From Beach Seine Survey, 1991

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
24JUN-	CPUE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.13	0.00	0.05	0.00	0.01
29JUN	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.13	0.00	0.05	0.00	0.14
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
08JUL-	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
12JUL	SE	0.00	0.00	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
23JUL-	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
25JUL	SE	0.00	0.00	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
05AUG-	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
08AUG	SE	0.00	0.00	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
20AUG-	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
23AUG	SE	0.00	0.00	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
03SEP-	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
06SEP	SE	0.00	0.00	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
16SEP-	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
19SEP	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
30SEP-	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
04OCT	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
15OCT-	CPUE	0.00	0.00	0.07	0.00	0.00	0.00	0.00	0.00	0.20	0.00	0.00	0.00	0.02
18OCT	SE	0.00	0.00	0.07	0.00	0.00	0.00	0.00	0.00	0.20	0.00	0.00	0.00	0.21
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
28OCT-	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
01NOV	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

Table D-80 Regional Standing Crops (in Thousands) of Blueback Herring Yearling and Older in Hudson River Estuary Determined From Beach Seine Survey, 1991

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
24JUN-	St. Crop	0	0	0	0	0	0	0	0	1	0	1	0	2
29JUN	SE	0	0	0	0	0	0	0	0	1	0	1	0	1
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
08JUL-	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
12JUL	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
23JUL-	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
25JUL	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
05AUG-	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
08AUG	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
20AUG-	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
23AUG	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
03SEP-	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
06SEP	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
16SEP-	St. Crop	0	2	0	0	0	0	0	0	0	0	0	0	2
19SEP	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
30SEP-	St. Crop	0	4	0	0	0	0	0	0	0	0	0	0	4
04OCT	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
15OCT-	St. Crop	0	0	2	0	0	0	0	0	2	0	0	0	4
18OCT	SE	0	0	2	0	0	0	0	0	2	0	0	0	3
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
28OCT-	St. Crop	0	2	0	0	0	0	0	0	0	0	0	0	2
01NOV	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

Table D-81 Regional Density (No./1,000m3) of Alewife Young of Year
in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1991

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
15APR-	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
19APR	SE		0.00	0.00	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	11	6	7	7	8	9	9	108
22APR-	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	11	6	7	7	8	9	9	108
29APR-	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		10	12	13	10	6	11	6	7	7	8	9	9	108
06MAY-	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
13MAY-	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
18MAY	SE		0.00	0.00	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
20MAY-	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	6	110
27MAY-	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
01JUN	SE		0.00	0.00	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
03JUN-	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
08JUN	SE		0.00	0.00	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
10JUN-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	1.51	7.46	3.09	15.00	0.00	0.00	0.00	2.08
15JUN	SE	0.00	0.00	0.00	0.00	0.00	0.00	1.51	7.46	2.28	6.58	0.00	0.00	0.00	10.31
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
17JUN-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.65	17.08	21.89	92.23	226.31	301.25	20.55	52.30
23JUN	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.65	8.77	12.49	39.86	168.00	129.43	14.55	216.82
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
24JUN-	DENSITY	0.00	0.19	0.00	0.00	0.00	0.00	0.41	15.80	10.42	65.01	26.85	38.52	15.19	13.26
30JUN	SE	0.00	0.19	0.00	0.00	0.00	0.00	0.26	9.13	4.48	37.29	19.06	17.83	11.64	48.07
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
30JUN-	DENSITY	0.00	8.22	0.00	1.31	0.92	1.78	2.52	7.36	6.31	51.76	33.69	8.55	0.00	9.42
05JUL	SE	0.00	8.22	0.00	0.74	0.66	1.06	1.65	7.36	3.67	16.85	10.70	3.91	0.00	23.53
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
08JUL-	DENSITY	0.00	0.96	4.42	16.92	0.85	1.74	0.32	0.45	19.68	14.64	52.09	93.06	7.04	16.32
13JUL	SE	0.00	0.96	3.07	16.14	0.52	1.17	0.12	0.26	6.93	6.29	5.97	85.44	3.21	87.79
	NO. TOWS	6	11	13	11	12	9	13	7	10	7	6	6	6	117
22JUL-	DENSITY	0.00	0.00	2.07	1.09	0.26	0.00	0.72	0.00	NS	NS	NS	NS	NS	0.52
25JUL	SE	0.00	0.00	2.07	1.09	0.22	0.00	0.62	0.00						2.43
	NO. TOWS	7	11	11	12	10	6	10	6						73
06AUG-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.62	0.00	NS	NS	NS	NS	NS	0.08
08AUG	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.40	0.00						0.40
	NO. TOWS	7	11	11	12	10	6	10	6						73

Table D-81 Regional Density (No./1,000m3) of Alewife Young of Year in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1991

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
20AUG-22AUG	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.88	0.27	NS	NS	NS	NS	NS	0.14
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.66	0.27						0.72
	NO. TOWS	7	11	11	12	10	6	10	6						73
03SEP-06SEP	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.09	1.43	NS	NS	NS	NS	NS	0.19
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.09	1.43						1.43
	NO. TOWS	7	10	11	12	10	6	10	6						72
16SEP-18SEP	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.11	0.00	NS	NS	NS	NS	NS	0.01
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.11	0.00						0.11
	NO. TOWS	7	11	11	12	10	6	10	6						73
01OCT-03OCT	DENSITY	0.00	0.00	0.00	0.00	0.00	0.82	0.07	1.02	NS	NS	NS	NS	NS	0.24
	SE	0.00	0.00	0.00	0.00	0.00	0.82	0.07	0.79						1.14
	NO. TOWS	7	11	11	12	10	6	9	6						72
15OCT-17OCT	DENSITY	0.00	0.00	0.00	0.00	0.00	0.44	3.20	0.83	NS	NS	NS	NS	NS	0.56
	SE	0.00	0.00	0.00	0.00	0.00	0.25	1.60	0.83						1.83
	NO. TOWS	7	11	12	12	10	6	10	6						74

Table D-82 Regional Standing Crop (In Thousands) of Alewife Young of Year in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1991

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
15APR-	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
19APR	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS		10	12	13	10	6	11	6	7	7	8	9	9	108
22APR-	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
26APR	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS		10	12	13	10	6	11	6	7	7	8	9	9	108
29APR-	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
03MAY	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS		10	12	13	10	6	11	6	7	7	8	9	9	108
06MAY-	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10MAY	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
13MAY-	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
18MAY	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
20MAY-	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
24MAY	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
27MAY-	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
01JUN	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
03JUN-	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08JUN	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
10JUN-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	211.0	2222.8	510.6	2122.6	0.0	0.0	0.0	5067.0
15JUN	SE	0.0	0.0	0.0	0.0	0.0	0.0	211.0	2222.8	377.2	931.2	0.0	0.0	0.0	2448.4
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
17JUN-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	90.7	5093.5	3623.2	13047.1	39898.1	48420.0	1461.8	111634.5
23JUN	SE	0.0	0.0	0.0	0.0	0.0	0.0	90.7	2615.6	2066.1	5639.1	29618.3	20803.5	1035.6	36797.0
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
24JUN-	St. Crop	0.0	44.4	0.0	0.0	0.0	0.0	57.9	4709.3	1724.6	9197.3	4733.1	6191.7	1081.1	27739.5
30JUN	SE	0.0	44.4	0.0	0.0	0.0	0.0	36.9	2721.4	741.5	5275.2	3361.0	2865.9	828.3	7482.2
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
30JUN-	St. Crop	0.0	1886.9	0.0	192.9	190.9	370.2	352.1	2194.8	1044.5	7322.6	5939.2	1374.6	0.0	20868.6
05JUL	SE	0.0	1886.9	0.0	108.6	137.5	219.1	230.8	2194.8	607.5	2383.6	1886.0	629.0	0.0	4302.6
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
08JUL-	St. Crop	0.0	219.4	1421.3	2499.0	177.0	360.8	44.8	134.5	3256.7	2071.6	9183.1	14957.6	500.6	34826.5
13JUL	SE	0.0	219.4	989.4	2384.9	107.8	242.5	16.4	77.7	1147.3	890.3	1051.8	13733.7	228.3	14095.1
	NO. TOWS	6	11	13	11	12	9	13	7	10	7	6	6	6	117
22JUL-	St. Crop	0.0	0.0	666.9	161.7	54.2	0.0	100.3	0.0	NS	NS	NS	NS	NS	983.1
25JUL	SE	0.0	0.0	666.9	161.7	45.0	0.0	87.3	0.0						693.2
	NO. TOWS	7	11	11	12	10	6	10	6						73
06AUG-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	86.3	0.0	NS	NS	NS	NS	NS	86.3
08AUG	SE	0.0	0.0	0.0	0.0	0.0	0.0	55.3	0.0						55.3
	NO. TOWS	7	11	11	12	10	6	10	6						73

Table D-8Z Regional Standing Crop (In Thousands) of Alewife Young of Year in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1991

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
20AUG-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	123.0	80.1	NS	NS	NS	NS	NS	203.1
22AUG	SE	0.0	0.0	0.0	0.0	0.0	0.0	92.7	80.1						122.5
	NO. TOWS	7	11	11	12	10	6	10	6						73
03SEP-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	13.1	425.1	NS	NS	NS	NS	NS	438.2
06SEP	SE	0.0	0.0	0.0	0.0	0.0	0.0	13.1	425.1						425.3
	NO. TOWS	7	10	11	12	10	6	10	6						72
16SEP-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	14.7	0.0	NS	NS	NS	NS	NS	14.7
18SEP	SE	0.0	0.0	0.0	0.0	0.0	0.0	14.7	0.0						14.7
	NO. TOWS	7	11	11	12	10	6	10	6						73
01OCT-	St. Crop	0.0	0.0	0.0	0.0	0.0	169.6	9.5	303.6	NS	NS	NS	NS	NS	482.7
03OCT	SE	0.0	0.0	0.0	0.0	0.0	169.6	9.5	234.6						289.6
	NO. TOWS	7	11	11	12	10	6	9	6						72
15OCT-	St. Crop	0.0	0.0	0.0	0.0	0.0	91.3	447.8	248.9	NS	NS	NS	NS	NS	788.0
17OCT	SE	0.0	0.0	0.0	0.0	0.0	52.5	224.2	248.9						339.1
	NO. TOWS	7	11	12	12	10	6	10	6						74

Table D-83 Regional Density (No./1,000m3) of Alewife Young of Year in Hudson River Estuary Determined From Fall Juvenile Survey, 1991

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
15JUL-	DENSITY	0.00	0.19	0.06	0.75	0.00	0.00	0.00	13.42	20.51	0.68	4.01	1.12	3.39
20JUL	SE	0.00	0.15	0.03	0.67	0.00	0.00	0.00	5.33	5.68	0.19	2.03	0.58	8.11
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
29JUL-	DENSITY	0.05	0.18	0.06	0.18	0.03	0.22	0.00	4.91	2.44	3.50	0.00	0.00	0.96
03AUG	SE	0.04	0.14	0.03	0.11	0.02	0.01	0.00	1.94	1.38	1.49	0.00	0.00	2.81
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
12AUG-	DENSITY	0.34	0.09	0.08	0.00	0.02	1.41	0.00	1.79	1.20	0.33	0.35	0.10	0.48
17AUG	SE	0.34	0.05	0.07	0.00	0.02	1.33	0.00	1.18	0.29	0.15	0.08	0.07	1.85
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
26AUG-	DENSITY	0.43	0.02	0.00	0.00	0.00	0.12	0.00	0.03	0.69	0.31	0.26	0.00	0.15
30AUG	SE	0.37	0.02	0.00	0.00	0.00	0.03	0.00	0.03	0.42	0.31	0.21	0.00	0.68
	NO. TOWS	17	45	27	14	8	13	8	10	15	18	21	13	209
09SEP-	DENSITY	0.00	0.00	0.02	0.00	0.00	1.12	0.00	2.61	0.52	0.41	0.34	1.99	0.58
13SEP	SE	0.00	0.00	0.02	0.00	0.00	0.66	0.00	1.66	0.34	0.21	0.12	0.84	2.02
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
23SEP-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.07	0.00	0.55	0.82	0.19	0.07	0.05	0.15
27SEP	SE	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.55	0.36	0.05	0.04	0.05	0.67
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
07OCT-	DENSITY	0.00	0.00	0.00	0.00	0.76	0.36	0.75	3.27	1.22	1.30	0.69	0.23	0.72
11OCT	SE	0.00	0.00	0.00	0.00	0.74	0.09	0.69	2.04	0.63	0.27	0.18	0.23	2.40
	NO. TOWS	17	45	27	14	8	13	8	10	15	18	21	13	209
21OCT-	DENSITY	0.00	0.00	0.04	0.00	0.07	0.28	0.03	0.03	0.74	0.00	0.00	0.00	0.10
25OCT	SE	0.00	0.00	0.03	0.00	0.05	0.10	0.03	0.03	0.39	0.00	0.00	0.00	0.41
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210

Table D-84 Regional Standing Crops (in Thousands) of Alewife Young of Year in Hudson River Estuary Determined From Fall Juvenile Survey, 1991

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
15JUL-	St. Crop	0	60	8	157	0	0	0	2220	2901	121	644	79	6191
20JUL	SE	0	48	5	140	0	0	0	883	804	34	326	42	1247
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
29JUL-	St. Crop	12	57	9	37	7	30	0	813	346	617	0	0	1927
03AUG	SE	9	45	5	22	4	1	0	320	195	264	0	0	461
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
12AUG-	St. Crop	78	30	12	0	4	197	0	296	170	59	56	7	910
17AUG	SE	78	16	10	0	4	186	0	196	42	27	13	5	287
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
26AUG-	St. Crop	99	6	0	0	0	17	0	4	97	55	42	0	320
30AUG	SE	85	6	0	0	0	5	0	4	59	55	34	0	123
	NO. TOWS	17	45	27	14	8	13	8	10	15	18	21	13	209
09SEP-	St. Crop	0	0	3	0	0	157	0	432	73	72	55	142	934
13SEP	SE	0	0	3	0	0	92	0	275	48	38	19	59	303
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
23SEP-	St. Crop	0	0	0	0	0	9	0	92	116	34	12	3	265
27SEP	SE	0	0	0	0	0	6	0	92	51	10	6	3	106
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
07OCT-	St. Crop	0	0	0	0	157	50	225	542	173	229	110	17	1503
11OCT	SE	0	0	0	0	154	13	205	337	89	48	29	17	437
	NO. TOWS	17	45	27	14	8	13	8	10	15	18	21	13	209
21OCT-	St. Crop	0	0	6	0	15	39	10	4	104	0	0	0	179
25OCT	SE	0	0	4	0	11	15	10	4	56	0	0	0	60
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210

Table D-85 Regional Catch-Per-Unit-Effort (CPUE) of Alewife Young of Year in Hudson River Estuary Determined From Beach Seine Survey, 1991

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
24JUN-	CPUE	0.00	0.09	0.00	0.00	0.33	0.00	2.50	1.88	2.00	2.53	0.63	3.08	1.09
29JUN	SE	0.00	0.09	0.00	0.00	0.33	0.00	1.65	0.93	0.94	1.28	0.26	2.81	3.77
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
08JUL-	CPUE	0.33	1.45	0.14	0.33	2.00	1.00	13.25	3.75	2.50	6.60	3.58	2.33	3.11
12JUL	SE	0.33	0.99	0.14	0.33	1.15	0.58	11.17	0.75	2.36	4.40	2.26	1.18	12.64
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
23JUL-	CPUE	0.00	0.00	0.00	0.00	5.33	0.00	6.63	4.13	1.00	6.00	0.89	0.17	2.01
25JUL	SE	0.00	0.00	0.00	0.00	2.73	0.00	5.80	1.94	0.73	2.41	0.52	0.11	7.17
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
05AUG-	CPUE	0.00	0.00	0.50	0.00	2.20	1.17	11.00	12.00	3.00	13.44	0.20	6.14	4.14
08AUG	SE	0.00	0.00	0.43	0.00	1.96	0.83	10.27	5.39	1.55	10.55	0.20	6.14	17.05
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
20AUG-	CPUE	0.00	0.00	0.00	0.20	0.20	0.00	5.40	26.20	1.40	9.89	3.90	4.14	4.28
23AUG	SE	0.00	0.00	0.00	0.20	0.20	0.00	2.64	15.63	0.75	5.64	3.79	3.67	17.65
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
03SEP-	CPUE	0.00	0.04	0.00	0.00	0.00	0.33	12.60	15.60	18.20	17.33	0.00	0.00	5.34
06SEP	SE	0.00	0.04	0.00	0.00	0.00	0.33	5.71	9.94	7.11	12.71	0.00	0.00	18.53
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
16SEP-	CPUE	0.00	0.00	0.00	0.00	1.20	1.00	0.60	16.60	8.20	12.00	0.00	0.00	3.30
19SEP	SE	0.00	0.00	0.00	0.00	1.20	1.00	0.40	5.01	5.99	7.03	0.00	0.00	10.63
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
30SEP-	CPUE	0.00	0.00	0.00	0.00	0.00	0.17	0.80	32.40	9.80	2.33	1.80	1.43	4.06
04OCT	SE	0.00	0.00	0.00	0.00	0.00	0.17	0.37	27.96	4.29	0.82	1.80	1.02	28.38
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
15OCT-	CPUE	0.00	0.04	0.00	0.20	0.20	0.17	0.20	1.80	0.60	0.33	0.20	0.00	0.31
18OCT	SE	0.00	0.04	0.00	0.20	0.20	0.17	0.20	1.11	0.60	0.33	0.13	0.00	1.37
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
28OCT-	CPUE	0.00	0.04	0.00	0.20	0.00	0.67	0.00	1.40	0.00	0.11	0.00	0.00	0.20
01NOV	SE	0.00	0.04	0.00	0.20	0.00	0.67	0.00	1.17	0.00	0.11	0.00	0.00	1.36
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100

Table D-86 Regional Standing Crops (in Thousands) of Alewife Young of Year in Hudson River Estuary Determined From Beach Seine Survey, 1991

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
24JUN-29JUN	St. Crop	0	4	0	0	1	0	18	2	17	44	12	42	141
	SE	0	4	0	0	1	0	12	1	8	22	5	38	47
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
08JUL-12JUL	St. Crop	3	66	4	3	5	11	94	5	22	116	70	32	430
	SE	3	45	4	3	3	6	79	1	20	77	45	16	130
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
23JUL-25JUL	St. Crop	0	0	0	0	14	0	47	5	9	105	18	2	200
	SE	0	0	0	0	7	0	41	2	6	42	10	2	61
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
05AUG-08AUG	St. Crop	0	0	13	0	6	12	78	15	26	236	4	83	474
	SE	0	0	12	0	5	9	73	7	13	185	4	83	217
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
20AUG-23AUG	St. Crop	0	0	0	2	1	0	38	32	12	174	77	56	392
	SE	0	0	0	2	1	0	19	19	6	99	75	50	136
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
03SEP-06SEP	St. Crop	0	2	0	0	0	4	89	19	157	304	0	0	575
	SE	0	2	0	0	0	4	40	12	61	223	0	0	235
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
16SEP-19SEP	St. Crop	0	0	0	0	3	11	4	21	71	211	0	0	320
	SE	0	0	0	0	3	11	3	6	52	123	0	0	134
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
30SEP-04OCT	St. Crop	0	0	0	0	0	2	6	40	84	41	35	19	228
	SE	0	0	0	0	0	2	3	35	37	14	35	14	65
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
15OCT-18OCT	St. Crop	0	2	0	2	1	2	1	2	5	6	4	0	25
	SE	0	2	0	2	1	2	1	1	5	6	3	0	9
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
28OCT-01NOV	St. Crop	0	2	0	2	0	7	0	2	0	2	0	0	15
	SE	0	2	0	2	0	7	0	1	0	2	0	0	8
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100

Table D-87 Regional Density (No./1,000m3) of Alewife Yearling and Older
in Hudson River Estuary Determined From Fall Juvenile Survey, 1991

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
15JUL-	DENSITY	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.56	0.03	0.00	0.03	0.00	0.05
20JUL	SE	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.53	0.03	0.00	0.03	0.00	0.53
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
29JUL-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.02	0.00	0.01
03AUG	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.02	0.00	0.05
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
12AUG-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.03	0.02	0.00	0.00	0.01
17AUG	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.03	0.02	0.00	0.00	0.05
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
26AUG-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.14	0.00	0.03	0.00	0.00	0.00	0.00	0.01
30AUG	SE	0.00	0.00	0.00	0.00	0.00	0.09	0.00	0.03	0.00	0.00	0.00	0.00	0.09
	NO. TOWS	17	45	27	14	8	13	8	10	15	18	21	13	209
09SEP-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.02	0.10	0.04	0.00	0.06	0.02
13SEP	SE	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.02	0.06	0.04	0.00	0.06	0.10
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
23SEP-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.00	0.00	<0.005
27SEP	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.04
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
07OCT-	DENSITY	0.00	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.01
11OCT	SE	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.04
	NO. TOWS	17	45	27	14	8	13	8	10	15	18	21	13	209
21OCT-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.00	<0.005
25OCT	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.03
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210

Table D-88 Regional Standing Crops (in Thousands) of Alewife Yearling and Older in Hudson River Estuary Determined From Fall Juvenile Survey, 1991

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
15JUL-	St. Crop	0	3	0	0	0	0	0	92	4	0	4	0	103
20JUL	SE	0	3	0	0	0	0	0	88	4	0	4	0	88
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
29JUL-	St. Crop	0	0	0	0	0	0	0	0	0	8	4	0	12
03AUG	SE	0	0	0	0	0	0	0	0	0	8	4	0	9
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
12AUG-	St. Crop	0	0	0	0	0	0	9	0	4	4	0	0	17
17AUG	SE	0	0	0	0	0	0	9	0	4	4	0	0	11
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
26AUG-	St. Crop	0	0	0	0	0	20	0	4	0	0	0	0	24
30AUG	SE	0	0	0	0	0	12	0	4	0	0	0	0	13
	NO. TOWS	17	45	27	14	8	13	8	10	15	18	21	13	209
09SEP-	St. Crop	0	0	0	0	0	1	0	4	15	8	0	4	32
13SEP	SE	0	0	0	0	0	1	0	4	8	8	0	4	13
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
23SEP-	St. Crop	0	0	0	0	0	0	0	0	8	0	0	0	8
27SEP	SE	0	0	0	0	0	0	0	0	5	0	0	0	5
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
07OCT-	St. Crop	0	0	9	0	0	0	0	0	0	0	4	0	13
11OCT	SE	0	0	5	0	0	0	0	0	0	0	4	0	6
	NO. TOWS	17	45	27	14	8	13	8	10	15	18	21	13	209
21OCT-	St. Crop	0	0	0	0	0	0	0	0	4	0	0	0	4
25OCT	SE	0	0	0	0	0	0	0	0	4	0	0	0	4
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210

Table D-89 Regional Catch-Per-Unit-Effort (CPUE) of Alewife Yearling and Older in Hudson River Estuary Determined From Beach Seine Survey, 1991

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
24JUN-	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
29JUN	SE	0.00	0.00	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
08JUL-	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
12JUL	SE	0.00	0.00	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
23JUL-	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
25JUL	SE	0.00	0.00	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
05AUG-	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
08AUG	SE	0.00	0.00	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
20AUG-	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
23AUG	SE	0.00	0.00	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
03SEP-	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
06SEP	SE	0.00	0.00	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
16SEP-	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
19SEP	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
30SEP-	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
04OCT	SE	0.00	0.00	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
15OCT-	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
18OCT	SE	0.00	0.00	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
28OCT-	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
01NOV	SE	0.00	0.00	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 D-90 Regional Standing Crops (in Thousands) of Alewife Yearling and Older in Hudson River Estuary Determined from Beach Seine Survey, 1991

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
24JUN-	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
29JUN	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
08JUL-	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
12JUL	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
23JUL-	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
25JUL	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
05AUG-	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
08AUG	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
20AUG-	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
23AUG	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
03SEP-	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
06SEP	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
16SEP-	St. Crop	0	2	0	0	0	0	0	0	0	0	0	0	2
19SEP	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
30SEP-	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
04OCT	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
15OCT-	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
18OCT	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
28OCT-	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
01NOV	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 D-91 Regional Density (No./1,000m3) of Bay Anchovy Eggs
in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1991

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
15APR-	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
19APR	SE		0.00	0.00	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	11	6	7	7	8	9	9	108
22APR-	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	11	6	7	7	8	9	9	108
29APR-	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		10	12	13	10	6	11	6	7	7	8	9	9	108
06MAY-	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.33	0.03
10MAY	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.33	0.33
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
13MAY-	DENSITY	NS	16.54	15.07	0.49	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.67
18MAY	SE		4.96	7.53	0.49	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.04
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
20MAY-	DENSITY	NS	5650.84	0.00	0.00	0.00	0.94	0.70	0.00	0.00	0.00	0.25	0.00	0.00	471.06
24MAY	SE		3504.59	0.00	0.00	0.00	0.94	0.50	0.00	0.00	0.00	0.25	0.00	0.00	3504.59
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
27MAY-	DENSITY	NS	38709.83	19435.70	0.66	0.00	0.00	0.00	0.00	0.00	0.00	12.65	0.00	0.00	4846.57
01JUN	SE		29829.20	11695.68	0.66	0.00	0.00	0.00	0.00	0.00	0.00	11.25	0.00	0.00	32040.14
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
03JUN-	DENSITY	NS	18196.50	2170.88	468.86	1161.40	2.30	0.36	0.60	0.00	0.00	0.00	0.00	0.00	1833.41
08JUN	SE		7266.71	824.20	286.50	569.69	2.14	0.22	0.60	0.00	0.00	0.00	0.00	0.00	7341.05
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
10JUN-	DENSITY	76371.71	96092.39	35538.19	1782.17	1477.41	0.00	0.31	0.00	0.00	0.00	0.00	0.00	0.00	16250.94
15JUN	SE	11524.64	23128.96	10363.60	570.67	448.02	0.00	0.31	0.00	0.00	0.00	0.00	0.00	0.00	27851.33
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
17JUN-	DENSITY	35556.49	59861.29	9727.69	8283.79	25671.24	0.10	0.00	0.00	0.13	0.00	0.00	0.55	0.42	10700.13
23JUN	SE	5933.68	30560.41	5263.35	2235.65	23450.97	0.10	0.00	0.00	0.13	0.00	0.00	0.55	0.42	39392.85
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
24JUN-	DENSITY	118968.88	191211.71	49749.19	65352.33	2826.91	5.38	0.00	0.00	0.00	0.00	0.31	0.00	0.00	32931.90
30JUN	SE	36227.78	72917.15	17111.98	8339.54	1698.78	5.38	0.00	0.00	0.00	0.00	0.31	0.00	0.00	83633.83
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
30JUN-	DENSITY	34045.17	73916.51	51237.19	10221.43	543.23	42.59	0.00	0.18	0.15	0.00	0.00	0.00	0.00	13077.42
05JUL	SE	9856.69	23395.53	30327.30	5069.28	310.92	42.59	0.00	0.18	0.15	0.00	0.00	0.00	0.00	39875.39
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
08JUL-	DENSITY	48163.38	28412.33	42300.65	6836.16	4730.74	337.44	0.17	0.00	2.39	0.00	0.33	4.16	0.51	10060.64
13JUL	SE	12940.12	11228.40	17575.35	3798.33	2254.74	135.54	0.17	0.00	2.39	0.00	0.33	4.16	0.51	24938.85
	NO. TOWS	6	11	13	11	12	9	13	7	10	7	6	6	6	117
22JUL-	DENSITY	7683.55	6715.35	1826.88	1102.21	197.79	19.38	1.59	2.49	NS	NS	NS	NS	NS	2193.65
25JUL	SE	4740.42	2517.10	1385.72	456.59	137.39	15.44	1.50	1.84						5563.74
	NO. TOWS	7	11	11	12	10	6	10	6						73
06AUG-	DENSITY	42.83	283.09	134.21	65.33	49.11	52.83	0.00	0.00	NS	NS	NS	NS	NS	78.43
08AUG	SE	28.10	116.17	66.14	62.33	15.65	49.29	0.00	0.00						158.81
	NO. TOWS	7	11	11	12	10	6	10	6						73

Table D-9f Regional Density (No./1,000m3) of Bay Anchovy Eggs in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1991

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
20AUG-22AUG	DENSITY	0.00	0.00	0.00	7.82	450.58	31.99	0.00	0.00	NS	NS	NS	NS	NS	61.30
	SE	0.00	0.00	0.00	4.52	209.18	17.75	0.00	0.00						209.98
	NO. TOWS	7	11	11	12	10	6	10	6						73
03SEP-06SEP	DENSITY	8.80	17.89	0.00	4.70	57.72	1.38	0.00	0.00	NS	NS	NS	NS	NS	11.31
	SE	6.24	12.71	0.00	2.68	29.62	1.38	0.00	0.00						32.97
	NO. TOWS	7	10	11	12	10	6	10	6						72
16SEP-18SEP	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
01OCT-03OCT	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	9	6						72
15OCT-17OCT	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	12	12	10	6	10	6						74

Table D-92 Regional Standing Crop (In Thousands) of Bay Anchovy Eggs
in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1991

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
15APR-	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
19APR	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS		10	12	13	10	6	11	6	7	7	8	9	9	108
22APR-	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
26APR	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS		10	12	13	10	6	11	6	7	7	8	9	9	108
29APR-	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
03MAY	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS		10	12	13	10	6	11	6	7	7	8	9	9	108
06MAY-	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	23.5	23.5
10MAY	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	23.5	23.5
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
13MAY-	St. Crop	NS	3795.2	4848.8	72.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8716.1
18MAY	SE		1139.0	2424.6	72.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2679.8
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
20MAY-	St. Crop	NS	1296417.0	0.0	0.0	0.0	195.1	97.6	0.0	0.0	0.0	44.3	0.0	0.0	1296754.0
24MAY	SE		804023.3	0.0	0.0	0.0	195.1	69.8	0.0	0.0	0.0	44.3	0.0	0.0	804023.3
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
27MAY-	St. Crop	NS	8880820.2	6254629.9	97.4	0.0	0.0	0.0	0.0	0.0	0.0	2229.7	0.0	0.0	15137777.1
01JUN	SE		6843424.4	3763805.5	97.4	0.0	0.0	0.0	0.0	0.0	0.0	1983.6	0.0	0.0	7810166.1
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
03JUN-	St. Crop	NS	4174647.2	698615.4	69267.7	241961.4	477.8	50.6	180.1	0.0	0.0	0.0	0.0	0.0	5185200.2
08JUN	SE		1667130.0	265238.4	42326.3	118687.3	443.1	31.1	180.1	0.0	0.0	0.0	0.0	0.0	1692794.2
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
10JUN-	St. Crop	15962663.8	22045543.7	11436596.0	263292.7	307797.5	0.0	43.0	0.0	0.0	0.0	0.0	0.0	0.0	50015936.6
15JUN	SE	2408795.0	5306253.6	3335124.2	84309.2	93339.0	0.0	43.0	0.0	0.0	0.0	0.0	0.0	0.0	6715466.8
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
17JUN-	St. Crop	7431763.7	13733395.4	3130483.7	1223819.8	5348249.4	20.5	0.0	0.0	20.9	0.0	0.0	88.4	30.2	30867871.9
23JUN	SE	1240214.9	7011179.2	1693807.5	330287.0	4885687.7	20.5	0.0	0.0	20.9	0.0	0.0	88.4	30.2	8805838.1
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
24JUN-	St. Crop	24866029.7	43867845.6	16009859.0	9654940.5	588948.5	1116.7	0.0	0.0	0.0	0.0	55.4	0.0	0.0	94988795.3
30JUN	SE	7572074.4	16728673.8	5506830.1	1232056.6	353917.3	1116.7	0.0	0.0	0.0	0.0	55.4	0.0	0.0	19213360.9
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
30JUN-	St. Crop	7115877.8	16957946.8	16488716.1	1510081.5	113174.2	8834.7	0.0	54.9	24.2	0.0	0.0	0.0	0.0	42194710.2
05JUL	SE	2060176.0	5367409.2	9759674.4	748919.6	64775.0	8834.7	0.0	54.9	24.2	0.0	0.0	0.0	0.0	11352083.7
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
08JUL-	St. Crop	10066764.8	6518365.1	13612834.7	1009952.0	985584.6	70004.7	23.6	0.0	395.1	0.0	58.9	668.5	36.2	32264687.9
13JUL	SE	2704651.9	2576022.4	5655949.3	561152.7	469744.4	28117.6	23.6	0.0	395.1	0.0	58.9	668.5	36.2	6817414.4
	NO. TOWS	6	11	13	11	12	9	13	7	10	7	6	6	6	117
22JUL-	St. Crop	1605961.3	1540636.6	587909.4	162836.5	41207.0	4020.9	222.1	741.2	NS	NS	NS	NS	NS	3943535.0
25JUL	SE	990809.3	577474.9	445941.5	67454.8	28622.5	3204.0	209.9	548.0						1232649.2
	NO. TOWS	7	11	11	12	10	6	10	6						73
06AUG-	St. Crop	8951.6	64946.8	43191.4	9652.0	10232.1	10959.7	0.0	0.0	NS	NS	NS	NS	NS	147933.8
08AUG	SE	5873.6	26652.4	21285.4	9207.9	3259.9	10226.5	0.0	0.0						37388.6
	NO. TOWS	7	11	11	12	10	6	10	6						73

Table D-92 Regional Standing Crop (In Thousands) of Bay Anchovy Eggs in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1991

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
20AUG-22AUG	St. Crop	0.0	0.0	0.0	1155.4	93872.3	6637.1	0.0	0.0	NS	NS	NS	NS	NS	101664.8
	SE	0.0	0.0	0.0	668.2	43579.3	3681.3	0.0	0.0						43739.6
	NO. TOWS	7	11	11	12	10	6	10	6						73
03SEP-06SEP	St. Crop	1838.8	4104.4	0.0	694.7	12024.9	286.8	0.0	0.0	NS	NS	NS	NS	NS	18949.6
	SE	1303.3	2915.8	0.0	396.0	6171.4	286.8	0.0	0.0						6966.0
	NO. TOWS	7	10	11	12	10	6	10	6						72
16SEP-18SEP	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	11	11	12	10	6	10	6						73
01OCT-03OCT	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	11	11	12	10	6	9	6						72
15OCT-17OCT	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	11	12	12	10	6	10	6						74

Table D-93 Regional Density (No./1,000m3) of Bay Anchovy Yolk-Sac Larvae in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1991

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
15APR-	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
19APR	SE		0.00	0.00	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	11	6	7	7	8	9	9	108
22APR-	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	11	6	7	7	8	9	9	108
29APR-	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		10	12	13	10	6	11	6	7	7	8	9	9	108
06MAY-	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
13MAY-	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
18MAY	SE		0.00	0.00	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
20MAY-	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	6	110
27MAY-	DENSITY	NS	1.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09
01JUN	SE		0.83	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.83
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
03JUN-	DENSITY	NS	13.81	220.55	38.54	30.93	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	25.32
08JUN	SE		9.11	204.85	33.29	30.77	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	210.00
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
10JUN-	DENSITY	0.00	2.60	26.84	0.00	0.00	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.27
15JUN	SE	0.00	2.22	16.44	0.00	0.00	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	16.59
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
17JUN-	DENSITY	0.00	0.00	3.25	4.60	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.60
23JUN	SE	0.00	0.00	3.25	4.60	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.63
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
24JUN-	DENSITY	42.86	14.81	0.00	25.61	3.93	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.71
30JUN	SE	42.86	10.97	0.00	25.61	3.93	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	51.26
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
30JUN-	DENSITY	0.00	0.00	4.63	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.36
05JUL	SE	0.00	0.00	4.63	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.63
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
08JUL-	DENSITY	1.03	0.00	1.60	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.20
13JUL	SE	1.03	0.00	1.60	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.91
	NO. TOWS	6	11	13	11	12	9	13	7	10	7	6	6	6	117
22JUL-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
25JUL	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
06AUG-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.57	0.00	NS	NS	NS	NS	NS	0.07
08AUG	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.57	0.00						0.57
	NO. TOWS	7	11	11	12	10	6	10	6						73

Table D-93 Regional Density (No./1,000m3) of Bay Anchovy Yolk-Sac Larvae in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1991

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
20AUG-22AUG	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
03SEP-06SEP	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
16SEP-18SEP	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
01OCT-03OCT	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	9	6						72
15OCT-17OCT	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	12	12	10	6	10	6						74

Table D-94 Regional Standing Crop (In Thousands) of Bay Anchovy Yolk-Sac Larvae in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1991

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
15APR-	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
19APR	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS		10	12	13	10	6	11	6	7	7	8	9	9	108
22APR-	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
26APR	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS		10	12	13	10	6	11	6	7	7	8	9	9	108
29APR-	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
03MAY	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS		10	12	13	10	6	11	6	7	7	8	9	9	108
06MAY-	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10MAY	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
13MAY-	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
18MAY	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
20MAY-	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
24MAY	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
27MAY-	St. Crop	NS	249.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	249.4
01JUN	SE		191.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	191.0
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
03JUN-	St. Crop	NS	3168.4	70974.9	5693.3	6444.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	86281.1
08JUN	SE		2090.3	65921.6	4917.8	6411.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	66447.8
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
10JUN-	St. Crop	0.0	595.5	8638.3	0.0	0.0	22.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9255.9
15JUN	SE	0.0	509.8	5291.6	0.0	0.0	22.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5316.2
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
17JUN-	St. Crop	0.0	0.0	1045.6	679.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1724.8
23JUN	SE	0.0	0.0	1045.6	679.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1246.8
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
24JUN-	St. Crop	8957.6	3397.0	0.0	3782.9	817.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	16955.3
30JUN	SE	8957.6	2516.1	0.0	3782.9	817.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10077.1
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
30JUN-	St. Crop	0.0	0.0	1490.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1490.4
05JUL	SE	0.0	0.0	1490.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1490.4
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
08JUL-	St. Crop	215.9	0.0	515.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	731.5
13JUL	SE	215.9	0.0	515.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	559.0
	NO. TOWS	6	11	13	11	12	9	13	7	10	7	6	6	6	117
22JUL-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
25JUL	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	11	11	12	10	6	10	6						73
06AUG-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	79.7	0.0	NS	NS	NS	NS	NS	79.7
08AUG	SE	0.0	0.0	0.0	0.0	0.0	0.0	79.7	0.0						79.7
	NO. TOWS	7	11	11	12	10	6	10	6						73

Table D-94 Regional Standing Crop (In Thousands) of Bay Anchovy Yolk-Sac Larvae in Hudson River Estuary Determined from Longitudinal River Ichthyoplankton Survey, 1991

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
20AUG-22AUG	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	11	11	12	10	6	10	6						73
03SEP-06SEP	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	10	11	12	10	6	10	6						72
16SEP-18SEP	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	11	11	12	10	6	10	6						73
01OCT-03OCT	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	11	11	12	10	6	9	6						72
15OCT-17OCT	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	11	12	12	10	6	10	6						74

Table D-95 Regional Density (No./1,000m3) of Bay Anchovy Post Yolk-Sac Larvae
in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1991

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
15APR-	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
19APR	SE		0.00	0.00	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	11	6	7	7	8	9	9	108
22APR-	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	11	6	7	7	8	9	9	108
29APR-	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		10	12	13	10	6	11	6	7	7	8	9	9	108
06MAY-	DENSITY	NS	0.00	0.00	0.24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02
10MAY	SE		0.00	0.00	0.24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.24
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
13MAY-	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
18MAY	SE		0.00	0.00	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
20MAY-	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	6	110
27MAY-	DENSITY	NS	17.03	0.65	0.24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.49
01JUN	SE		11.37	0.46	0.24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	11.38
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
03JUN-	DENSITY	NS	2729.97	1426.65	1406.90	1887.21	173.29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	635.33
08JUN	SE		431.53	385.72	202.95	1268.67	135.94	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1415.69
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
10JUN-	DENSITY	15541.72	2125.04	7620.09	24627.91	27595.70	154.91	109.96	11.18	0.00	0.00	0.00	0.00	0.00	5983.58
15JUN	SE	3229.22	740.26	1633.44	2508.69	9254.54	30.50	18.49	11.18	0.00	0.00	0.00	0.00	0.00	10275.47
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
17JUN-	DENSITY	1028.50	9664.86	9974.85	10632.81	8361.28	661.30	687.16	33.32	1.32	0.00	1.17	0.00	0.00	3157.43
23JUN	SE	395.60	2012.45	1373.24	1117.22	2149.80	290.75	264.13	32.49	1.32	0.00	1.17	0.00	0.00	3481.01
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
24JUN-	DENSITY	5265.63	13987.60	5209.87	9886.87	25556.60	6463.07	371.93	1962.84	7.58	2.34	7.19	1.19	4.12	5286.68
30JUN	SE	1400.81	8644.32	601.89	1858.07	10213.65	2295.43	120.60	1683.03	2.82	2.34	6.04	1.19	2.42	13890.15
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
30JUN-	DENSITY	7578.33	20856.07	6053.17	16692.37	12321.10	5093.63	4498.23	684.28	59.62	59.94	27.83	20.89	22.99	5689.88
05JUL	SE	4571.38	13859.50	973.21	1467.86	2429.97	1756.11	1656.02	367.20	18.46	18.96	16.78	6.78	18.89	15098.09
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
08JUL-	DENSITY	3608.74	7214.51	3867.97	4246.23	1951.92	979.45	2674.96	2685.10	156.97	49.41	81.83	21.12	28.80	2120.54
13JUL	SE	923.29	3220.24	1071.91	1290.44	179.31	284.78	689.24	424.90	61.29	9.40	3.52	8.86	25.58	3848.38
	NO. TOWS	6	11	13	11	12	9	13	7	10	7	6	6	6	117
22JUL-	DENSITY	4536.41	4305.81	4338.09	1894.10	2133.51	616.85	1422.06	417.72	NS	NS	NS	NS	NS	2458.07
25JUL	SE	2409.60	1586.36	1371.35	435.80	520.29	214.90	697.73	321.44						3361.59
	NO. TOWS	7	11	11	12	10	6	10	6						73
06AUG-	DENSITY	7949.62	1927.22	1797.91	3331.55	2868.71	323.54	1344.24	313.78	NS	NS	NS	NS	NS	2482.07
08AUG	SE	1660.96	403.99	1197.90	405.29	425.58	20.63	636.17	90.18						2261.77
	NO. TOWS	7	11	11	12	10	6	10	6						73

Table D-95 Regional Density (No./1,000m3) of Bay Anchovy Post Yolk-Sac Larvae in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1991

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
20AUG-22AUG	DENSITY	357.46	119.57	219.30	581.07	518.21	278.82	372.65	345.65	NS	NS	NS	NS	NS	349.09
	SE	67.43	33.93	26.66	76.84	48.82	77.99	138.80	140.36						244.43
	NO. TOWS	7	11	11	12	10	6	10	6						73
03SEP-06SEP	DENSITY	1029.64	356.85	332.21	306.75	95.21	23.40	103.10	61.15	NS	NS	NS	NS	NS	288.54
	SE	253.65	50.32	100.43	67.55	19.82	4.89	56.05	45.38						295.20
	NO. TOWS	7	10	11	12	10	6	10	6						72
16SEP-18SEP	DENSITY	387.00	144.10	165.13	136.42	22.75	10.43	28.89	1.09	NS	NS	NS	NS	NS	111.98
	SE	257.76	22.21	45.66	24.74	11.48	3.58	7.99	1.09						264.27
	NO. TOWS	7	11	11	12	10	6	10	6						73
01OCT-03OCT	DENSITY	146.61	170.38	31.87	103.29	31.22	2.25	7.40	10.89	NS	NS	NS	NS	NS	62.99
	SE	44.58	48.77	7.43	21.26	9.82	1.75	3.34	8.24						71.07
	NO. TOWS	7	11	11	12	10	6	9	6						72
15OCT-17OCT	DENSITY	104.45	244.79	107.16	77.13	5.23	0.98	0.45	10.53	NS	NS	NS	NS	NS	68.84
	SE	26.84	32.71	34.15	17.54	2.04	0.85	0.33	6.47						57.54
	NO. TOWS	7	11	12	12	10	6	10	6						74

Table D-96 Regional Standing Crop (In Thousands) of Bay Anchovy Post Yolk-Sac Larvae in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1991

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
15APR-	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
19APR	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS		10	12	13	10	6	11	6	7	7	8	9	9	108
22APR-	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
26APR	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS		10	12	13	10	6	11	6	7	7	8	9	9	108
29APR-	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
03MAY	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS		10	12	13	10	6	11	6	7	7	8	9	9	108
06MAY-	St. Crop	NS	0.0	0.0	35.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	35.2
10MAY	SE		0.0	0.0	35.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	35.2
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
13MAY-	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
18MAY	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
20MAY-	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
24MAY	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
27MAY-	St. Crop	NS	3906.9	209.6	35.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4151.4
01JUN	SE		2608.4	148.2	35.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2612.9
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
03JUN-	St. Crop	NS	626310.5	459111.0	207850.9	393174.2	35949.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1722396.2
08JUN	SE		99002.3	124130.6	29982.5	264309.0	28201.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	311068.1
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
10JUN-	St. Crop	3248420.1	487528.3	2452233.6	3638447.6	5749185.4	32136.0	15371.1	3334.2	0.0	0.0	0.0	0.0	0.0	15626656.3
15JUN	SE	674947.5	169829.9	525658.3	370626.1	1928055.9	6327.2	2585.0	3334.2	0.0	0.0	0.0	0.0	0.0	2148379.3
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
17JUN-	St. Crop	214969.6	2217315.9	3210020.2	1570856.9	1741958.4	137189.5	96058.6	9932.8	218.6	0.0	206.0	0.0	0.0	9198726.6
23JUN	SE	82685.2	461696.2	441924.0	165054.5	447881.9	60317.8	36922.3	9687.5	218.6	0.0	206.0	0.0	0.0	805129.5
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
24JUN-	St. Crop	1100585.3	3209039.9	1676594.4	1460653.9	5324367.0	1340802.1	51991.9	585186.9	1253.8	330.9	1268.4	190.6	293.3	14752558.5
30JUN	SE	292787.2	1983182.1	193693.7	274505.9	2127874.7	476200.6	16859.1	501766.6	467.2	330.9	1064.7	190.6	172.2	3022958.7
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
30JUN-	St. Crop	1583969.0	4784806.4	1947980.0	2466075.8	2566931.9	1056702.5	628812.3	204006.3	9865.6	8479.8	4905.8	3357.1	1635.7	15267528.3
05JUL	SE	955476.9	3179651.6	313190.8	216857.3	506251.8	364315.3	231496.1	109475.6	3054.7	2682.4	2957.4	1090.1	1344.3	3409231.0
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
08JUL-	St. Crop	754272.8	1655153.9	1244758.0	627323.5	406656.6	203192.3	373934.8	800519.3	25975.8	6989.7	14426.5	3394.8	2048.9	6118646.9
13JUL	SE	192979.4	738788.3	344952.1	190645.5	37357.2	59078.3	96349.3	126677.3	10143.0	1329.6	620.2	1424.6	1820.1	876763.0
	NO. TOWS	6	11	13	11	12	9	13	7	10	7	6	6	6	117
22JUL-	St. Crop	948165.9	987839.3	1396046.5	279828.1	444488.4	127968.4	198790.9	124534.8	NS	NS	NS	NS	NS	4507662.4
25JUL	SE	503636.1	363943.7	441316.4	64383.4	108396.2	44582.3	97536.4	95831.5						785776.1
	NO. TOWS	7	11	11	12	10	6	10	6						73
06AUG-	St. Crop	1661571.4	442144.4	578587.5	492192.3	597656.6	67119.6	187913.0	93547.6	NS	NS	NS	NS	NS	4120732.5
08AUG	SE	347162.6	92683.8	385496.5	59875.9	88664.1	4279.0	88930.2	26886.0						545725.1
	NO. TOWS	7	11	11	12	10	6	10	6						73

Table D-96 Regional Standing Crop (In Thousands) of Bay Anchovy Post Yolk-Sac Larvae in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1991

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
20AUG-22AUG	St. Crop	74713.4	27432.7	70573.2	85845.2	107962.8	57843.6	52092.7	103050.9	NS	NS	NS	NS	NS	579514.5
	SE	14092.8	7784.0	8578.5	11352.5	10171.6	16178.9	19402.9	41847.3						54355.8
	NO. TOWS	7	11	11	12	10	6	10	6						73
03SEP-06SEP	St. Crop	215208.5	81869.1	106909.7	45318.8	19835.0	4853.6	14412.3	18231.2	NS	NS	NS	NS	NS	506638.2
	SE	53016.9	11544.4	32319.9	9979.7	4129.5	1014.5	7835.9	13530.6						65960.6
	NO. TOWS	7	10	11	12	10	6	10	6						72
16SEP-18SEP	St. Crop	80887.4	33058.5	53140.4	20154.2	4740.2	2163.3	4038.9	324.8	NS	NS	NS	NS	NS	198507.6
	SE	53875.6	5096.2	14692.7	3654.9	2391.5	742.1	1117.5	324.8						56262.0
	NO. TOWS	7	11	11	12	10	6	10	6						73
01OCT-03OCT	St. Crop	30642.4	39087.7	10257.7	15259.1	6503.3	467.5	1034.8	3246.4	NS	NS	NS	NS	NS	106498.9
	SE	9317.0	11188.1	2389.6	3140.6	2045.8	362.7	466.9	2455.9						15431.1
	NO. TOWS	7	11	11	12	10	6	9	6						72
15OCT-17OCT	St. Crop	21830.7	56158.9	34486.1	11394.7	1088.7	203.9	62.3	3140.6	NS	NS	NS	NS	NS	128365.8
	SE	5609.0	7504.9	10989.2	2591.5	424.4	175.8	46.5	1929.5						14805.4
	NO. TOWS	7	11	12	12	10	6	10	6						74

Table D-97 Regional Density (No./1,000m3) of Bay Anchovy Young of Year in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1991

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
15APR-	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
19APR	SE		0.00	0.00	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	11	6	7	7	8	9	9	108
22APR-	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	11	6	7	7	8	9	9	108
29APR-	DENSITY	NS	0.00	3.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.25
03MAY	SE		0.00	3.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.05
	NO. TOWS		10	12	13	10	6	11	6	7	7	8	9	9	108
06MAY-	DENSITY	NS	0.00	0.83	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.07
10MAY	SE		0.00	0.83	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.83
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
13MAY-	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
18MAY	SE		0.00	0.00	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
20MAY-	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	6	110
27MAY-	DENSITY	NS	0.00	1.27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.11
01JUN	SE		0.00	1.27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.27
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
03JUN-	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
08JUN	SE		0.00	0.00	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
10JUN-	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
15JUN	SE	0.00	0.00	0.00	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
17JUN-	DENSITY	0.00	2.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.19
23JUN	SE	0.00	2.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.50
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
24JUN-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	10.70	0.00	0.00	0.00	0.82
30JUN	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	10.70	0.00	0.00	0.00	10.70
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
30JUN-	DENSITY	0.00	0.00	540.94	205.13	4.18	6.29	12.63	0.00	0.00	0.00	0.00	0.00	0.00	59.17
05JUL	SE	0.00	0.00	540.94	120.68	2.54	3.17	11.97	0.00	0.00	0.00	0.00	0.00	0.00	554.39
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
08JUL-	DENSITY	8.33	120.84	79.75	1251.18	424.71	90.60	514.12	165.12	0.98	9.81	1.61	0.00	0.00	205.16
13JUL	SE	8.33	49.18	20.84	733.47	236.14	32.81	166.96	71.15	0.98	3.89	1.61	0.00	0.00	794.17
	NO. TOWS	6	11	13	11	12	9	13	7	10	7	6	6	6	117
22JUL-	DENSITY	191.12	1675.12	1631.61	1567.43	710.30	41.67	445.53	89.04	NS	NS	NS	NS	NS	793.98
25JUL	SE	101.99	539.05	246.26	316.74	299.05	25.56	84.76	67.81						750.88
	NO. TOWS	7	11	11	12	10	6	10	6						73
06AUG-	DENSITY	161.40	948.66	1226.09	1441.19	413.58	28.45	573.87	217.69	NS	NS	NS	NS	NS	626.37
08AUG	SE	50.03	190.27	134.99	152.19	93.97	8.43	121.00	77.57						331.14
	NO. TOWS	7	11	11	12	10	6	10	6						73

Table D-97 Regional Density (No./1,000m3) of Bay Anchovy Young of Year in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1991

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
20AUG-22AUG	DENSITY	194.74	159.06	1137.72	1205.68	296.60	107.13	419.73	353.07	NS	NS	NS	NS	NS	484.22
	SE	48.75	32.30	329.22	75.45	73.00	22.42	95.80	143.76						391.37
	NO. TOWS	7	11	11	12	10	6	10	6						73
03SEP-06SEP	DENSITY	152.91	168.24	242.74	287.70	54.07	15.27	269.60	550.24	NS	NS	NS	NS	NS	217.60
	SE	62.60	42.27	28.96	68.77	21.98	3.36	70.28	122.96						178.40
	NO. TOWS	7	10	11	12	10	6	10	6						72
16SEP-18SEP	DENSITY	18.79	158.96	284.33	266.06	35.91	73.40	363.78	125.50	NS	NS	NS	NS	NS	165.84
	SE	9.68	29.85	64.31	45.80	11.84	16.25	27.08	35.95						98.22
	NO. TOWS	7	11	11	12	10	6	10	6						73
01OCT-03OCT	DENSITY	284.14	274.43	210.55	246.64	163.86	17.42	166.03	344.72	NS	NS	NS	NS	NS	213.47
	SE	114.48	65.08	24.40	43.92	34.44	5.10	51.69	152.89						217.08
	NO. TOWS	7	11	11	12	10	6	9	6						72
15OCT-17OCT	DENSITY	246.25	92.58	313.06	293.27	39.70	66.60	223.01	376.21	NS	NS	NS	NS	NS	206.33
	SE	91.81	22.40	30.77	37.79	8.64	36.51	89.36	43.97						150.44
	NO. TOWS	7	11	12	12	10	6	10	6						74

Table D-98 Regional Standing Crop (In Thousands) of Bay Anchovy Young of Year in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1991

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
15APR-	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
19APR	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS		10	12	13	10	6	11	6	7	7	8	9	9	108
22APR-	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
26APR	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS		10	12	13	10	6	11	6	7	7	8	9	9	108
29APR-	St. Crop	NS	0.0	982.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	982.1
03MAY	SE		0.0	982.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	982.1
	NO. TOWS		10	12	13	10	6	11	6	7	7	8	9	9	108
06MAY-	St. Crop	NS	0.0	267.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	267.7
10MAY	SE		0.0	267.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	267.7
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
13MAY-	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
18MAY	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
20MAY-	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
24MAY	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
27MAY-	St. Crop	NS	0.0	408.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	408.9
01JUN	SE		0.0	408.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	408.9
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
03JUN-	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08JUN	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
10JUN-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
15JUN	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
17JUN-	St. Crop	0.0	574.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	574.5
23JUN	SE	0.0	574.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	574.5
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
24JUN-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1514.4	0.0	0.0	0.0	1514.4
30JUN	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1514.4	0.0	0.0	0.0	1514.4
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
30JUN-	St. Crop	0.0	0.0	174081.9	30304.6	869.9	1304.4	1765.0	0.0	0.0	0.0	0.0	0.0	0.0	208325.9
05JUL	SE	0.0	0.0	174081.9	17828.4	529.0	658.2	1673.4	0.0	0.0	0.0	0.0	0.0	0.0	175002.5
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
08JUL-	St. Crop	1741.1	27723.2	25663.0	184845.2	88482.1	18795.2	71869.7	49227.8	161.7	1388.2	283.3	0.0	0.0	470180.3
13JUL	SE	1741.1	11283.5	6705.7	108361.1	49196.5	6805.9	23340.2	21212.1	161.7	550.5	283.3	0.0	0.0	124012.8
	NO. TOWS	6	11	13	11	12	9	13	7	10	7	6	6	6	117
22JUL-	St. Crop	39945.5	384306.9	525070.8	231566.5	147982.0	8644.7	62281.1	26546.6	NS	NS	NS	NS	NS	1426344.1
25JUL	SE	21318.1	123668.8	79250.4	46794.8	62302.1	5301.6	11848.9	20216.8						169344.6
	NO. TOWS	7	11	11	12	10	6	10	6						73
06AUG-	St. Crop	33735.5	217641.1	394569.8	212916.6	86164.7	5902.4	80222.4	64900.6	NS	NS	NS	NS	NS	1096053.1
08AUG	SE	10457.5	43652.2	43441.8	22484.0	19578.1	1748.8	16914.5	23126.6						74932.6
	NO. TOWS	7	11	11	12	10	6	10	6						73

Table D-98 Regional Standing Crop (In Thousands) of Bay Anchovy Young of Year
in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1991

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
20AUG-	St. Crop	40703.2	36491.6	366132.8	178123.5	61792.5	22225.7	58674.1	105260.6	NS	NS	NS	NS	NS	869404.2
22AUG	SE	10189.3	7409.6	105945.8	11146.2	15207.8	4652.2	13391.4	42859.3						117374.0
	NO. TOWS	7	11	11	12	10	6	10	6						73
03SEP-	St. Crop	31960.8	38596.7	78115.8	42504.2	11265.2	3167.9	37687.7	164044.3	NS	NS	NS	NS	NS	407342.6
06SEP	SE	13085.1	9698.6	9321.2	10159.2	4579.8	696.5	9824.8	36657.9						43785.5
	NO. TOWS	7	10	11	12	10	6	10	6						72
16SEP-	St. Crop	3928.1	36467.8	91500.1	39306.6	7482.3	15228.1	50852.8	37414.6	NS	NS	NS	NS	NS	282180.5
18SEP	SE	2023.1	6849.3	20695.6	6766.5	2466.5	3370.5	3785.7	10716.7						25917.6
	NO. TOWS	7	11	11	12	10	6	10	6						73
01OCT-	St. Crop	59388.0	62959.6	67756.1	36437.9	34138.3	3612.9	23209.0	102772.5	NS	NS	NS	NS	NS	390274.0
03OCT	SE	23927.1	14931.0	7851.0	6488.0	7175.7	1058.8	7226.1	45580.4						55511.9
	NO. TOWS	7	11	11	12	10	6	9	6						72
15OCT-	St. Crop	51470.4	21239.2	100745.9	43326.8	8270.8	13816.0	31175.0	112159.6	NS	NS	NS	NS	NS	382203.5
17OCT	SE	19189.0	5137.9	9903.2	5582.7	1800.0	7573.9	12492.2	13108.7						30205.1
	NO. TOWS	7	11	12	12	10	6	10	6						74

Table D-99 Regional Density (No./1,000m3) of Bay Anchovy Young of Year in Hudson River Estuary Determined From Fall Juvenile Survey, 1991

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
15JUL-	DENSITY	181.48	462.68	397.05	234.83	34.57	127.19	160.67	26.50	81.66	87.97	19.79	1.87	151.35
20JUL	SE	35.42	96.15	155.84	44.06	11.53	16.75	146.30	11.17	18.25	26.26	5.22	0.84	244.38
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
29JUL-	DENSITY	154.83	245.64	479.84	194.36	231.75	542.03	108.95	71.41	117.47	117.40	162.53	39.13	205.45
03AUG	SE	28.75	43.32	41.86	58.98	57.53	77.95	74.43	25.65	20.72	48.53	85.45	37.76	187.16
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
12AUG-	DENSITY	347.52	99.36	94.38	82.33	187.00	127.90	212.92	148.14	206.12	112.49	11.97	22.36	137.71
17AUG	SE	84.34	19.92	27.13	8.76	122.09	40.48	45.21	26.91	68.04	22.67	3.27	9.52	181.34
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
26AUG-	DENSITY	85.45	50.94	43.28	42.68	25.86	161.13	206.39	60.13	110.56	35.29	10.98	0.05	69.39
30AUG	SE	20.69	13.08	15.02	21.64	16.56	82.96	52.55	17.02	22.31	17.63	4.79	0.05	111.05
	NO. TOWS	17	45	27	14	8	13	8	10	15	18	21	13	209
09SEP-	DENSITY	58.71	49.59	29.16	51.29	13.34	346.44	159.00	106.37	31.96	19.32	12.92	4.00	73.51
13SEP	SE	16.88	14.48	3.71	18.37	5.20	18.94	69.70	40.87	17.16	8.33	3.03	2.20	90.21
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
23SEP-	DENSITY	179.79	103.66	11.64	32.19	28.78	89.05	190.45	34.06	32.93	16.50	19.62	0.00	61.56
27SEP	SE	50.86	29.02	6.21	21.07	15.22	40.40	88.86	8.48	8.86	5.16	5.36	0.00	117.80
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
07OCT-	DENSITY	17.14	38.83	62.51	113.06	88.50	141.23	92.23	82.66	43.42	1.52	0.27	0.26	56.80
11OCT	SE	3.17	8.03	14.06	85.14	24.56	7.52	64.59	61.00	32.68	1.52	0.22	0.26	130.94
	NO. TOWS	17	45	27	14	8	13	8	10	15	18	21	13	209
21OCT-	DENSITY	251.14	85.98	128.64	5.99	8.52	109.98	85.35	0.00	0.00	0.00	0.00	0.00	56.30
25OCT	SE	54.26	21.08	12.11	1.92	5.40	31.55	56.11	0.00	0.00	0.00	0.00	0.00	87.81
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210

Table D-100 Regional Standing Crops (in Thousands) of Bay Anchovy Young of Year in Hudson River Estuary Determined From Fall Juvenile Survey, 1991

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
15JUL-20JUL	St. Crop	41636	148895	58658	48924	7171	17780	47902	4385	11552	15509	3180	133	405726
	SE	8126	30941	23024	9180	2392	2341	43617	1849	2582	4629	839	60	59863
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
29JUL-03AUG	St. Crop	35521	79050	70890	40493	48079	75771	32482	11817	16618	20697	26124	2784	460325
	SE	6596	13941	6184	12287	11935	10896	22190	4245	2931	8555	13735	2687	38423
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
12AUG-17AUG	St. Crop	79728	31974	13943	17153	38795	17879	63478	24515	29160	19831	1924	1591	339971
	SE	19349	6410	4008	1824	25329	5659	13480	4454	9626	3996	525	678	37675
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
26AUG-30AUG	St. Crop	19603	16392	6393	8892	5365	22525	61531	9951	15641	6221	1765	4	174283
	SE	4747	4210	2219	4509	3435	11597	15666	2817	3156	3108	770	4	22031
	NO. TOWS	17	45	27	14	8	13	8	10	15	18	21	13	209
09SEP-13SEP	St. Crop	13469	15959	4308	10686	2768	48429	47403	17602	4521	3405	2076	285	170912
	SE	3872	4659	548	3827	1078	2648	20780	6764	2427	1469	487	157	23360
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
23SEP-27SEP	St. Crop	41248	33360	1720	6707	5970	12448	56780	5636	4658	2909	3153	0	174589
	SE	11669	9340	917	4390	3157	5648	26491	1403	1253	909	862	0	31500
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
07OCT-11OCT	St. Crop	3932	12496	9235	23554	18360	19743	27496	13678	6143	268	43	19	134966
	SE	727	2583	2077	17738	5096	1051	19256	10095	4623	268	36	19	29110
	NO. TOWS	17	45	27	14	8	13	8	10	15	18	21	13	209
21OCT-25OCT	St. Crop	57617	27670	19005	1247	1768	15375	25444	0	0	0	0	0	148126
	SE	12448	6784	1789	400	1120	4410	16728	0	0	0	0	0	22469
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210

Table D-101 Regional Catch-Per-Unit-Effort (CPUE) of Bay Anchovy Young of Year in Hudson River Estuary Determined From Beach Seine Survey, 1991

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
24JUN-	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
29JUN	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
08JUL-	CPUE	1.00	4.00	0.43	0.00	0.67	0.00	0.00	0.00	0.13	0.00	0.00	0.00	0.52
12JUL	SE	0.00	2.64	0.43	0.00	0.67	0.00	0.00	0.00	0.13	0.00	0.00	0.00	2.76
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
23JUL-	CPUE	119.67	0.09	0.00	0.33	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	10.09
25JUL	SE	119.17	0.09	0.00	0.33	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	119.17
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
05AUG-	CPUE	0.00	50.63	1.50	0.00	69.80	10.00	0.00	0.00	0.00	0.00	0.00	0.00	10.99
08AUG	SE	0.00	15.70	1.02	0.00	42.86	10.00	0.00	0.00	0.00	0.00	0.00	0.00	46.74
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
20AUG-	CPUE	0.60	1.17	0.36	0.60	0.40	0.33	0.20	0.00	0.00	0.00	0.00	0.00	0.30
23AUG	SE	0.40	0.56	0.25	0.40	0.24	0.21	0.20	0.00	0.00	0.00	0.00	0.00	0.92
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
03SEP-	CPUE	4.80	2.29	0.00	0.40	0.40	21.17	88.00	0.00	0.00	0.00	0.00	0.00	9.75
06SEP	SE	4.32	1.06	0.00	0.40	0.40	11.85	88.00	0.00	0.00	0.00	0.00	0.00	88.91
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
16SEP-	CPUE	0.40	0.54	0.00	0.20	0.80	18.33	1.40	0.00	0.00	0.00	0.00	0.00	1.81
19SEP	SE	0.40	0.18	0.00	0.20	0.80	4.91	0.98	0.00	0.00	0.00	0.00	0.00	5.09
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
30SEP-	CPUE	0.20	2.33	0.00	1.40	18.80	40.17	145.20	0.00	0.00	0.00	0.00	0.00	17.34
04OCT	SE	0.20	2.33	0.00	0.98	8.72	37.97	145.20	0.00	0.00	0.00	0.00	0.00	150.36
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
15OCT-	CPUE	3.20	0.13	0.14	0.00	1.00	0.17	0.40	0.00	0.00	0.00	0.00	0.14	0.43
18OCT	SE	2.52	0.09	0.10	0.00	1.00	0.17	0.40	0.00	0.00	0.00	0.00	0.14	2.75
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
28OCT-	CPUE	0.40	0.29	0.21	5.00	4.40	0.33	0.00	0.00	0.00	0.00	0.00	0.00	0.89
01NOV	SE	0.24	0.25	0.11	4.52	4.40	0.21	0.00	0.00	0.00	0.00	0.00	0.00	6.32
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100

Table D-102 Regional Standing Crops (in Thousands) of Bay Anchovy Young of Year in Hudson River Estuary Determined From Beach Seine Survey, 1991

DATE		YK	TZ	CH	IP	WP	CY	PK	HP	KG	SG	CS	AL	Regions Combined
24JUN-	St. Crop	0	4	0	0	0	0	0	0	0	0	0	0	4
29JUN	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
08JUL-	St. Crop	8	182	12	0	2	0	0	0	1	0	0	0	204
12JUL	SE	0	120	12	0	2	0	0	0	1	0	0	0	120
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
23JUL-	St. Crop	901	4	0	3	0	11	0	0	0	0	0	0	919
25JUL	SE	897	4	0	3	0	11	0	0	0	0	0	0	898
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
05AUG	St. Crop	0	2300	40	0	184	107	0	0	0	0	0	0	2631
08AUG	SE	0	713	27	0	113	107	0	0	0	0	0	0	731
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
20AUG-	St. Crop	5	53	10	6	1	4	1	0	0	0	0	0	79
23AUG	SE	3	25	7	4	1	2	1	0	0	0	0	0	27
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
03SEP-	St. Crop	36	104	0	4	1	225	624	0	0	0	0	0	995
06SEP	SE	33	48	0	4	1	126	624	0	0	0	0	0	640
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
16SEP-	St. Crop	3	25	0	2	2	195	10	0	0	0	0	0	237
19SEP	SE	3	8	0	2	2	52	7	0	0	0	0	0	54
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
30SEP-	St. Crop	2	106	0	13	50	428	1030	0	0	0	0	0	1628
04OCT	SE	2	106	0	9	23	404	1030	0	0	0	0	0	1112
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
15OCT-	St. Crop	24	6	4	0	3	2	3	0	0	0	0	2	43
18OCT	SE	19	4	3	0	3	2	3	0	0	0	0	2	20
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
28OCT-	St. Crop	3	13	6	46	12	4	0	0	0	0	0	0	83
01NOV	SE	2	11	3	42	12	2	0	0	0	0	0	0	45
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100

Table D-103 Regional Density (No./1,000m3) of Bay Anchovy Yearling and Older
in Hudson River Estuary Determined From Fall Juvenile Survey, 1991

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
15JUL-	DENSITY	16.97	14.08	17.29	0.90	1.61	1.81	0.04	0.00	0.00	0.00	0.00	0.00	4.39
20JUL	SE	6.21	3.64	9.05	0.71	1.61	1.03	0.04	0.00	0.00	0.00	0.00	0.00	11.75
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
29JUL-	DENSITY	12.60	6.21	0.51	0.86	0.07	4.91	0.04	0.00	0.00	0.00	0.00	0.00	2.10
03AUG	SE	4.78	3.83	0.10	0.75	0.05	2.83	0.04	0.00	0.00	0.00	0.00	0.00	6.79
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
12AUG-	DENSITY	16.74	2.21	0.58	0.23	3.18	0.88	7.47	0.00	0.63	0.00	0.00	0.00	2.66
17AUG	SE	8.15	0.78	0.12	0.08	0.70	0.68	7.44	0.00	0.40	0.00	0.00	0.00	11.11
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
26AUG-	DENSITY	6.47	7.60	2.89	2.41	3.41	0.33	1.38	1.56	0.70	0.00	0.00	0.00	2.23
30AUG	SE	5.88	3.32	1.42	2.31	2.14	0.17	1.38	1.56	0.68	0.00	0.00	0.00	7.90
	NO. TOWS	17	45	27	14	8	13	8	10	15	18	21	13	209
09SEP-	DENSITY	7.80	5.33	0.71	0.29	0.11	2.57	0.00	0.02	0.00	0.00	0.00	0.00	1.40
13SEP	SE	1.69	1.33	0.15	0.10	0.07	2.41	0.00	0.02	0.00	0.00	0.00	0.00	3.23
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
23SEP-	DENSITY	44.18	2.80	0.57	0.05	6.12	6.62	0.13	0.00	0.00	0.00	0.00	0.00	5.04
27SEP	SE	8.81	1.19	0.46	0.05	3.23	4.52	0.10	0.00	0.00	0.00	0.00	0.00	10.49
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
07OCT-	DENSITY	2.66	1.73	0.70	2.83	6.80	0.06	0.68	0.00	0.00	0.00	0.00	0.00	1.29
11OCT	SE	2.25	1.14	0.40	1.81	3.84	0.04	0.68	0.00	0.00	0.00	0.00	0.00	5.00
	NO. TOWS	17	45	27	14	8	13	8	10	15	18	21	13	209
21OCT-	DENSITY	4.68	4.58	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.77
25OCT	SE	2.55	3.07	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	3.99
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210

Table D-104 Regional Standing Crops (in Thousands) of Bay Anchovy Yearling and Older in Hudson River Estuary Determined From Fall Juvenile Survey, 1991

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
15JUL-20JUL	St. Crop	3892	4531	2555	188	335	253	11	0	0	0	0	0	11766
	SE	1426	1171	1337	148	335	144	11	0	0	0	0	0	2312
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
29JUL-03AUG	St. Crop	2890	2000	76	179	14	686	10	0	0	0	0	0	5854
	SE	1096	1232	14	157	10	396	10	0	0	0	0	0	1703
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
12AUG-17AUG	St. Crop	3841	711	85	47	659	124	2226	0	89	0	0	0	7783
	SE	1870	250	18	16	145	95	2217	0	57	0	0	0	2917
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
26AUG-30AUG	St. Crop	1483	2445	426	502	707	46	413	258	100	0	0	0	6380
	SE	1350	1068	210	480	444	23	413	258	96	0	0	0	1919
	NO. TOWS	17	45	27	14	8	13	8	10	15	18	21	13	209
09SEP-13SEP	St. Crop	1788	1715	105	60	22	359	0	4	0	0	0	0	4053
	SE	387	427	22	21	15	337	0	4	0	0	0	0	669
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
23SEP-27SEP	St. Crop	10136	900	84	10	1269	925	40	0	0	0	0	0	13363
	SE	2021	382	68	10	669	632	29	0	0	0	0	0	2255
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
07OCT-11OCT	St. Crop	610	557	103	589	1411	8	204	0	0	0	0	0	3482
	SE	516	368	59	377	798	6	204	0	0	0	0	0	1107
	NO. TOWS	17	45	27	14	8	13	8	10	15	18	21	13	209
21OCT-25OCT	St. Crop	1074	1473	0	0	0	1	0	0	0	0	0	0	2548
	SE	585	988	0	0	0	1	0	0	0	0	0	0	1148
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210

Table D-105 Regional Catch-Per-Unit-Effort (CPUE) of Bay Anchovy Yearling and Older
in Hudson River Estuary Determined From Beach Seine Survey, 1991

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
24JUN-	CPUE	0.67	11.09	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.06
29JUN	SE	0.67	3.00	0.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.11
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
08JUL-	CPUE	9.67	34.27	0.00	0.00	0.67	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.72
12JUL	SE	8.67	12.82	0.00	0.00	0.67	0.00	0.00	0.00	0.00	0.00	0.00	0.00	15.49
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
23JUL-	CPUE	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.08
25JUL	SE	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
05AUG-	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
08AUG	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
20AUG-	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
23AUG	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
03SEP-	CPUE	0.20	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.56	0.00	0.00	0.07
06SEP	SE	0.20	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.56	0.00	0.00	0.59
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
16SEP-	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
19SEP	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
30SEP-	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
04OCT	SE	0.00	0.00	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
15OCT-	CPUE	0.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02
18OCT	SE	0.20	0.00	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
28OCT-	CPUE	0.40	0.00	0.00	0.00	0.00	0.33	0.00	0.00	0.00	0.00	0.00	0.00	0.06
01NOV	SE	0.40	0.00	0.00	0.00	0.00	0.33	0.00	0.00	0.00	0.00	0.00	0.00	0.52
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100

Table D-106 Regional Standing Crops (in Thousands) of Bay Anchovy Yearling and Older in Hudson River Estuary Determined From Beach Seine Survey, 1991

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
24JUN-	St. Crop	5	504	27	0	0	0	0	0	0	0	0	0	536
29JUN	SE	5	137	12	0	0	0	0	0	0	0	0	0	137
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
08JUL-	St. Crop	73	1557	0	0	2	0	0	0	0	0	0	0	1632
12JUL	SE	65	583	0	0	2	0	0	0	0	0	0	0	586
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
23JUL-	St. Crop	8	0	0	0	0	0	0	0	0	0	0	0	8
25JUL	SE	8	0	0	0	0	0	0	0	0	0	0	0	8
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
05AUG-	St. Crop	0	2	0	0	0	0	0	0	0	0	0	0	2
08AUG	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
20AUG-	St. Crop	0	4	0	0	0	0	0	0	0	0	0	0	4
23AUG	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
03SEP-	St. Crop	2	2	0	0	0	0	0	0	0	10	0	0	13
06SEP	SE	2	2	0	0	0	0	0	0	0	10	0	0	10
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
16SEP-	St. Crop	0	4	0	0	0	0	0	0	0	0	0	0	4
19SEP	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
30SEP-	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
04OCT	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
15OCT-	St. Crop	2	0	0	0	0	0	0	0	0	0	0	0	2
18OCT	SE	2	0	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
28OCT-	St. Crop	3	0	0	0	0	4	0	0	0	0	0	0	7
01NOV	SE	3	0	0	0	0	4	0	0	0	0	0	0	5
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100

Table D-107 Regional Density (No./1,000m3) of Weakfish Young of Year
in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1991

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
15APR-	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
19APR	SE		0.00	0.00	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	11	6	7	7	8	9	9	108
22APR-	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	11	6	7	7	8	9	9	108
29APR-	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		10	12	13	10	6	11	6	7	7	8	9	9	108
06MAY-	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
13MAY-	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
18MAY	SE		0.00	0.00	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
20MAY-	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	6	110
27MAY-	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
01JUN	SE		0.00	0.00	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
03JUN-	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
08JUN	SE		0.00	0.00	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
10JUN-	DENSITY	0.00	0.00	0.00	0.27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02
15JUN	SE	0.00	0.00	0.00	0.27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.27
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
17JUN-	DENSITY	0.00	60.62	25.98	29.97	13.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.97
23JUN	SE	0.00	36.35	12.20	21.77	7.30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	44.69
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
24JUN-	DENSITY	57.18	49.54	29.22	0.56	66.19	42.48	5.03	0.00	0.00	0.00	0.00	0.00	0.00	19.25
30JUN	SE	22.75	22.07	10.40	0.28	59.97	20.19	3.66	0.00	0.00	0.00	0.00	0.00	0.00	71.62
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
30JUN-	DENSITY	23.21	20.00	39.50	45.15	77.96	55.50	74.72	0.00	0.00	0.00	0.00	0.00	0.48	25.89
05JUL	SE	5.83	2.74	15.71	22.25	30.24	14.09	67.65	0.00	0.00	0.00	0.00	0.00	0.48	80.45
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
08JUL-	DENSITY	8.12	71.56	23.89	20.15	20.01	22.37	37.82	6.40	0.00	0.00	0.00	0.00	0.00	16.18
13JUI	SE	8.12	40.90	10.15	8.51	9.96	7.36	25.23	6.40	0.00	0.00	0.00	0.00	0.00	52.40
	NO. TOWS	6	11	13	11	12	9	13	7	10	7	6	6	6	117
22JUL-	DENSITY	6.15	18.27	19.93	5.50	1.89	5.79	4.51	1.40	NS	NS	NS	NS	NS	7.93
25JUL	SE	5.55	10.30	15.63	3.55	1.33	3.55	3.29	1.40						20.52
	NO. TOWS	7	11	11	12	10	6	10	6						73
06AUG-	DENSITY	0.00	16.04	2.40	0.00	0.06	4.67	10.20	0.00	NS	NS	NS	NS	NS	4.17
08AUG	SE	0.00	5.58	1.69	0.00	0.06	3.70	4.87	0.00						8.45
	NO. TOWS	7	11	11	12	10	6	10	6						73

Table D-107 Regional Density (No./1,000m3) of Weakfish Young of Year in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1991

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
20AUG-22AUG	DENSITY	1.73	2.67	0.00	1.26	3.53	6.64	0.50	0.00	NS	NS	NS	NS	NS	2.04
	SE	1.73	2.67	0.00	1.26	3.53	4.69	0.35	0.00						6.80
	NO. TOWS	7	11	11	12	10	6	10	6						73
03SEP-06SEP	DENSITY	0.00	6.21	0.00	1.25	2.15	0.17	1.04	1.18	NS	NS	NS	NS	NS	1.50
	SE	0.00	6.06	0.00	1.25	2.15	0.17	0.53	1.18						6.68
	NO. TOWS	7	10	11	12	10	6	10	6						72
16SEP-18SEP	DENSITY	0.00	0.00	0.00	0.00	0.00	2.06	0.00	0.00	NS	NS	NS	NS	NS	0.26
	SE	0.00	0.00	0.00	0.00	0.00	1.20	0.00	0.00						1.20
	NO. TOWS	7	11	11	12	10	6	10	6						73
01OCT-03OCT	DENSITY	0.00	9.93	0.00	0.00	0.52	0.00	0.00	0.00	NS	NS	NS	NS	NS	1.31
	SE	0.00	2.44	0.00	0.00	0.52	0.00	0.00	0.00						2.49
	NO. TOWS	7	11	11	12	10	6	9	6						72
15OCT-17OCT	DENSITY	1.23	1.03	0.00	0.00	0.35	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.33
	SE	1.23	1.03	0.00	0.00	0.18	0.00	0.00	0.00						1.61
	NO. TOWS	7	11	12	12	10	6	10	6						74

Table D-108 Regional Standing Crop (In Thousands) of Weakfish Young of Year
in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1991

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
15APR-	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
19APR	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS		10	12	13	10	6	11	6	7	7	8	9	9	108
22APR-	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
26APR	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS		10	12	13	10	6	11	6	7	7	8	9	9	108
29APR-	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
03MAY	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS		10	12	13	10	6	11	6	7	7	8	9	9	108
06MAY-	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10MAY	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
13MAY-	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
18MAY	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
20MAY-	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
24MAY	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
27MAY-	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
01JUN	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
03JUN-	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08JUN	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
10JUN-	St. Crop	0.0	0.0	0.0	39.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	39.7
15JUN	SE	0.0	0.0	0.0	39.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	39.7
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
17JUN-	St. Crop	0.0	13907.8	8362.1	4427.7	2724.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	29421.9
23JUN	SE	0.0	8339.6	3925.3	3215.8	1520.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9879.7
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
24JUN-	St. Crop	11951.0	11366.3	9402.1	82.3	13789.5	8812.8	703.3	0.0	0.0	0.0	0.0	0.0	0.0	56107.3
30JUN	SE	4755.2	5062.7	3347.1	41.6	12493.1	4188.2	511.7	0.0	0.0	0.0	0.0	0.0	0.0	15275.1
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
30JUN-	St. Crop	4851.3	4589.3	12711.2	6670.9	16242.8	11512.8	10445.4	0.0	0.0	0.0	0.0	0.0	34.2	67058.0
05JUL	SE	1218.7	629.5	5054.3	3286.4	6300.0	2922.4	9456.7	0.0	0.0	0.0	0.0	0.0	34.2	13262.3
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
08JUL-	St. Crop	1697.6	16416.7	7688.2	2977.2	4168.5	4641.4	5286.9	1907.5	0.0	0.0	0.0	0.0	0.0	44784.2
13JUL	SE	1697.6	9384.1	3266.5	1257.7	2074.5	1526.8	3526.6	1907.5	0.0	0.0	0.0	0.0	0.0	11220.8
	NO. TOWS	6	11	13	11	12	9	13	7	10	7	6	6	6	117
22JUL-	St. Crop	1285.3	4190.6	6413.2	812.8	394.5	1202.0	631.1	418.2	NS	NS	NS	NS	NS	15347.6
25JUL	SE	1161.0	2363.1	5030.5	523.8	278.0	735.9	459.6	418.2						5789.4
	NO. TOWS	7	11	11	12	10	6	10	6						73
06AUG-	St. Crop	0.0	3680.6	771.3	0.0	11.7	969.3	1425.4	0.0	NS	NS	NS	NS	NS	6858.4
08AUG	SE	0.0	1280.6	545.4	0.0	11.7	766.7	681.2	0.0						1729.0
	NO. TOWS	7	11	11	12	10	6	10	6						73

Table D-10 Regional Standing Crop (In Thousands) of Weakfish Young of Year in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1991

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
20AUG-	St. Crop	361.3	613.1	0.0	185.9	735.9	1378.0	69.9	0.0	NS	NS	NS	NS	NS	3344.1
22AUG	SE	361.3	613.1	0.0	185.9	735.9	972.5	49.6	0.0						1425.0
	NO. TOWS	7	11	11	12	10	6	10	6						73
03SEP-	St. Crop	0.0	1424.4	0.0	184.0	447.1	36.2	145.5	353.2	NS	NS	NS	NS	NS	2590.3
06SEP	SE	0.0	1390.6	0.0	184.0	447.1	36.2	74.5	353.2						1516.2
	NO. TOWS	7	10	11	12	10	6	10	6						72
16SEP-	St. Crop	0.0	0.0	0.0	0.0	0.0	427.7	0.0	0.0	NS	NS	NS	NS	NS	427.7
18SEP	SE	0.0	0.0	0.0	0.0	0.0	249.8	0.0	0.0						249.8
	NO. TOWS	7	11	11	12	10	6	10	6						73
01OCT-	St. Crop	0.0	2278.3	0.0	0.0	107.5	0.0	0.0	0.0	NS	NS	NS	NS	NS	2385.7
03OCT	SE	0.0	559.2	0.0	0.0	107.5	0.0	0.0	0.0						569.5
	NO. TOWS	7	11	11	12	10	6	9	6						72
15OCT-	St. Crop	257.4	235.4	0.0	0.0	73.5	0.0	0.0	0.0	NS	NS	NS	NS	NS	566.2
17OCT	SE	257.4	235.4	0.0	0.0	36.7	0.0	0.0	0.0						350.7
	NO. TOWS	7	11	12	12	10	6	10	6						74

Table D-109 Regional Density (No./1,000m3) of Weakfish Young of Year
in Hudson River Estuary Determined From Fall Juvenile Survey, 1991

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
15JUL-	DENSITY	13.27	21.87	6.44	6.45	6.63	2.38	0.00	0.00	0.00	0.00	0.00	0.00	4.75
20JUL	SE	5.07	3.42	1.36	1.85	3.50	0.90	0.00	0.00	0.00	0.00	0.00	0.00	7.46
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
29JUL-	DENSITY	8.45	9.72	2.10	0.15	13.97	7.13	0.00	0.00	0.00	0.00	0.00	0.00	3.46
03AUG	SE	2.03	1.38	0.78	0.11	1.45	4.10	0.00	0.00	0.00	0.00	0.00	0.00	5.05
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
12AUG-	DENSITY	5.91	4.97	2.96	0.29	10.23	1.25	0.83	0.00	0.00	0.00	0.00	0.00	2.20
17AUG	SE	1.70	0.76	1.08	0.08	7.32	0.73	0.83	0.00	0.00	0.00	0.00	0.00	7.71
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
26AUG-	DENSITY	3.88	1.73	0.42	1.16	1.93	1.20	0.00	0.00	0.00	0.00	0.00	0.00	0.86
30AUG	SE	0.73	0.36	0.16	0.78	1.16	0.45	0.00	0.00	0.00	0.00	0.00	0.00	1.68
	NO. TOWS	17	45	27	14	8	13	8	10	15	18	21	13	209
09SEP-	DENSITY	3.10	1.74	0.14	0.62	1.16	0.65	0.00	0.00	0.00	0.00	0.00	0.00	0.62
13SEP	SE	0.61	0.49	0.05	0.25	0.30	0.63	0.00	0.00	0.00	0.00	0.00	0.00	1.08
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
23SEP-	DENSITY	1.88	1.29	0.18	0.22	1.22	0.15	0.00	0.00	0.00	0.00	0.00	0.00	0.41
27SEP	SE	0.48	0.18	0.06	0.07	0.43	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.68
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
07OCT-	DENSITY	3.42	1.20	1.75	0.70	0.19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.61
11OCT	SE	1.88	0.24	0.33	0.41	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.97
	NO. TOWS	17	45	27	14	8	13	8	10	15	18	21	13	209
21OCT-	DENSITY	1.14	0.91	0.87	0.29	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.27
25OCT	SE	0.43	0.23	0.23	0.10	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.55
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210

Table D-110 Regional Standing Crops (in Thousands) of Weakfish Young of Year in Hudson River Estuary Determined From Fall Juvenile Survey, 1991

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
15JUL-	St. Crop	3044	7037	951	1343	1375	332	0	0	0	0	0	0	14082
20JUL	SE	1162	1099	201	385	727	126	0	0	0	0	0	0	1814
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
29JUL-	St. Crop	1939	3128	310	32	2898	997	0	0	0	0	0	0	9304
03AUG	SE	466	444	115	23	301	573	0	0	0	0	0	0	920
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
12AUG-	St. Crop	1357	1598	438	60	2123	175	246	0	0	0	0	0	5996
17AUG	SE	391	243	160	16	1518	101	246	0	0	0	0	0	1616
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
26AUG-	St. Crop	891	557	63	241	400	168	0	0	0	0	0	0	2319
30AUG	SE	168	116	23	162	240	63	0	0	0	0	0	0	360
	NO. TOWS	17	45	27	14	8	13	8	10	15	18	21	13	209
09SEP-	St. Crop	712	560	21	128	242	91	0	0	0	0	0	0	1754
13SEP	SE	141	157	7	51	62	88	0	0	0	0	0	0	242
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
23SEP-	St. Crop	431	414	26	45	253	21	0	0	0	0	0	0	1190
27SEP	SE	111	58	8	15	90	5	0	0	0	0	0	0	155
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
07OCT-	St. Crop	785	386	259	146	40	0	0	0	0	0	0	0	1617
11OCT	SE	431	76	48	86	23	0	0	0	0	0	0	0	449
	NO. TOWS	17	45	27	14	8	13	8	10	15	18	21	13	209
21OCT-	St. Crop	263	294	128	61	15	0	0	0	0	0	0	0	761
25OCT	SE	100	74	33	21	7	0	0	0	0	0	0	0	130
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210

Table D-111 Regional Catch-Per-Unit-Effort (CPUE) of Weakfish Young of Year
in Hudson River Estuary Determined From Beach Seine Survey, 1991

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
24JUN-	CPUE	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.17
29JUN	SE	1.53	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.53
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
08JUL-	CPUE	3.00	1.45	0.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.38
12JUL	SE	1.53	0.64	0.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.66
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
23JUL-	CPUE	0.00	0.45	0.00	0.00	0.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.07
25JUL	SE	0.00	0.28	0.00	0.00	0.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.44
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
05AUG-	CPUE	0.00	0.29	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03
08AUG	SE	0.00	0.18	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.19
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
20AUG-	CPUE	0.40	0.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04
23AUG	SE	0.40	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.41
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
03SEP-	CPUE	0.00	0.54	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05
06SEP	SE	0.00	0.23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.23
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
16SEP-	CPUE	0.00	0.21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02
19SEP	SE	0.00	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.10
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
30SEP-	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
04OCT	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
15OCT-	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
18OCT	SE	0.00	0.00	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
28OCT-	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
01NOV	SE	0.00	0.00	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 D-112 Regional Standing Crops (in Thousands) of Weakfish Young of Year in Hudson River Estuary Determined From Beach Seine Survey, 1991

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
24JUN-	St. Crop	15	0	0	0	0	0	0	0	0	0	0	0	15
29JUN	SE	12	0	0	0	0	0	0	0	0	0	0	0	12
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
08JUL-	St. Crop	23	66	4	0	0	0	0	0	0	0	0	0	93
12JUL	SE	12	29	4	0	0	0	0	0	0	0	0	0	31
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
23JUL-	St. Crop	0	21	0	0	1	0	0	0	0	0	0	0	22
25JUL	SE	0	13	0	0	1	0	0	0	0	0	0	0	13
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
05AUG-	St. Crop	0	13	2	0	0	0	0	0	0	0	0	0	15
08AUG	SE	0	8	2	0	0	0	0	0	0	0	0	0	8
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
20AUG-	St. Crop	3	6	0	0	0	0	0	0	0	0	0	0	9
23AUG	SE	3	3	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
03SEP-	St. Crop	0	25	0	0	0	0	0	0	0	0	0	0	25
06SEP	SE	0	10	0	0	0	0	0	0	0	0	0	0	10
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
16SEP-	St. Crop	0	9	0	0	0	0	0	0	0	0	0	0	9
19SEP	SE	0	5	0	0	0	0	0	0	0	0	0	0	5
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
30SEP-	St. Crop	0	2	0	0	0	0	0	0	0	0	0	0	2
04OCT	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
15OCT-	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
18OCT	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
28OCT-	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
01NOV	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 D-113 Regional Density (No./1,000m3) of Weakfish Yearling and Older
in Hudson River Estuary Determined From Fall Juvenile Survey, 1991

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
15JUL-	DENSITY	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	<0.005
20JUL	SE	0.00	0.00	0.00	0.01	0.00	0.00	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
29JUL-	DENSITY	0.67	0.04	0.02	0.01	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.06
03AUG	SE	0.20	0.02	0.02	0.01	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.21
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
12AUG-	DENSITY	1.12	0.25	0.10	0.03	0.02	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.13
17AUG	SE	0.47	0.06	0.05	0.03	0.02	0.07	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
26AUG-	DENSITY	0.02	0.10	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
30AUG	SE	0.02	0.08	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09
	NO. TOWS	17	45	27	14	8	13	8	10	15	18	21	13	209
09SEP-	DENSITY	0.01	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	<0.005
13SEP	SE	0.01	0.00	0.00	0.00	0.00	0.01	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
23SEP-	DENSITY	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	<0.005
27SEP	SE	0.00	0.01	0.00	0.00	0.00	0.00	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
07OCT-	DENSITY	0.00	0.04	0.02	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
11OCT	SE	0.00	0.02	0.02	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04
	NO. TOWS	17	45	27	14	8	13	8	10	15	18	21	13	209
21OCT-	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
25OCT	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

Table D-114 Regional Standing Crops (in Thousands) of Weakfish Yearling and Older in Hudson River Estuary Determined From Fall Juvenile Survey, 1991

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
15JUL-	St. Crop	0	0	0	2	0	0	0	0	0	0	0	0	2
20JUL	SE	0	0	0	2	0	0	0	0	0	0	0	0	2
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
29JUL-	St. Crop	154	14	3	2	0	4	0	0	0	0	0	0	177
03AUG	SE	47	7	3	2	0	3	0	0	0	0	0	0	48
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
12AUG-	St. Crop	256	82	14	5	4	10	0	0	0	0	0	0	371
17AUG	SE	107	21	8	5	4	10	0	0	0	0	0	0	110
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
26AUG-	St. Crop	4	31	0	2	0	0	0	0	0	0	0	0	36
30AUG	SE	4	27	0	2	0	0	0	0	0	0	0	0	28
	NO. TOWS	17	45	27	14	8	13	8	10	15	18	21	13	209
09SEP-	St. Crop	3	0	0	0	0	1	0	0	0	0	0	0	4
13SEP	SE	3	0	0	0	0	1	0	0	0	0	0	0	3
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
23SEP-	St. Crop	0	4	0	0	0	0	0	0	0	0	0	0	4
27SEP	SE	0	4	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
07OCT-	St. Crop	0	13	3	7	0	0	0	0	0	0	0	0	23
11OCT	SE	0	8	3	5	0	0	0	0	0	0	0	0	10
	NO. TOWS	17	45	27	14	8	13	8	10	15	18	21	13	209
21OCT-	St. Crop	0	5	0	0	0	0	0	0	0	0	0	0	5
25OCT	SE	0	5	0	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

Table D-115 Regional Catch-Per-Unit-Effort (CPUE) of Weakfish Yearling and Older
in Hudson River Estuary Determined From Beach Seine Survey, 1991

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
24JUN-	CPUE	0.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03
29JUN	SE	0.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.33
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
08JUL-	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
12JUL	SE	0.00	0.00	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
23JUL-	CPUE	0.00	0.18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02
25JUL	SE	0.00	0.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.12
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
05AUG-	CPUE	0.00	0.83	0.07	0.00	0.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09
08AUG	SE	0.00	0.29	0.07	0.00	0.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.36
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
20AUG-	CPUE	0.40	0.54	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.08
23AUG	SE	0.40	0.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.47
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
03SEP-	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
06SEP	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
16SEP-	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
19SEP	SE	0.00	0.00	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
30SEP-	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
04OCT	SE	0.00	0.00	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
15OCT-	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
18OCT	SE	0.00	0.00	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
28OCT-	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
01NOV	SE	0.00	0.00	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 D-116 Regional Standing Crops (in Thousands) of Weakfish Yearling and Older
in Hudson River Estuary Determined From Beach Seine Survey, 1991

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
24JUN-	St. Crop	3	0	0	0	0	0	0	0	0	0	0	0	3
29JUN	SE	3	0	0	0	0	0	0	0	0	0	0	0	3
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
08JUL-	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
12JUL	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
23JUL-	St. Crop	0	8	0	0	0	0	0	0	0	0	0	0	8
25JUL	SE	0	6	0	0	0	0	0	0	0	0	0	0	6
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
05AUG-	St. Crop	0	38	2	0	1	0	0	0	0	0	0	0	40
08AUG	SE	0	13	2	0	1	0	0	0	0	0	0	0	13
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
20AUG-	St. Crop	3	25	0	0	0	0	0	0	0	0	0	0	28
23AUG	SE	3	11	0	0	0	0	0	0	0	0	0	0	12
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
03SEP-	St. Crop	0	2	0	0	0	0	0	0	0	0	0	0	2
06SEP	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
16SEP-	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
19SEP	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
30SEP-	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
04OCT	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
15OCT-	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
18OCT	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
28OCT-	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
01NOV	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 D-117 Regional Density (No./1,000m3) of White Catfish Young of Year
in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1991

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
15APR-	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
19APR	SE		0.00	0.00	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	11	6	7	7	8	9	9	108
22APR-	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	11	6	7	7	8	9	9	108
29APR-	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		10	12	13	10	6	11	6	7	7	8	9	9	108
06MAY-	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
13MAY-	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
18MAY	SE		0.00	0.00	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
20MAY-	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	6	110
27MAY-	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
01JUN	SE		0.00	0.00	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
03JUN-	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
08JUN	SE		0.00	0.00	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
10JUN-	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
15JUN	SE	0.00	0.00	0.00	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
17JUN-	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
23JUN	SE	0.00	0.00	0.00	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
24JUN-	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
30JUN	SE	0.00	0.00	0.00	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
30JUN-	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
05JUL	SE	0.00	0.00	0.00	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
08JUL-	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
13JUL	SE	0.00	0.00	0.00	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	13	11	12	9	13	7	10	7	6	6	6	117
22JUL-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
25JUL	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
06AUG-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
08AUG	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

Table D-117 Regional Density (No./1,000m3) of White Catfish Young of Year
in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1991

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
20AUG-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
22AUG	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
03SEP-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
06SEP	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
16SEP-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
18SEP	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
01OCT-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
03OCT	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	9	6						72
15OCT-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
17OCT	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						0.00
	NO. TOWS	7	11	12	12	10	6	10	6						74

Table D-118 Regional Standing Crop (In Thousands) of White Catfish Young of Year in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1991

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
15APR-	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
19APR	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS		10	12	13	10	6	11	6	7	7	8	9	9	108
22APR-	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
26APR	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS		10	12	13	10	6	11	6	7	7	8	9	9	108
29APR-	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
03MAY	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS		10	12	13	10	6	11	6	7	7	8	9	9	108
06MAY-	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10MAY	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
13MAY-	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
18MAY	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
20MAY-	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
24MAY	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
27MAY-	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
01JUN	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
03JUN-	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08JUN	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
10JUN-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
15JUN	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
17JUN-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
23JUN	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
24JUN-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
30JUN	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
30JUN-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
05JUL	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
08JUL-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
13JUL	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS	6	11	13	11	12	9	13	7	10	7	6	6	6	117
22JUL-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
25JUL	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	11	11	12	10	6	10	6						73
06AUG-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
08AUG	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	11	11	12	10	6	10	6						73

Table D-11g Regional Standing Crop (In Thousands) of White Catfish Young of Year in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1991

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
20AUG-22AUG	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	11	11	12	10	6	10	6						73
03SEP-06SEP	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	10	11	12	10	6	10	6						72
16SEP-18SEP	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	11	11	12	10	6	10	6						73
01OCT-03OCT	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	11	11	12	10	6	9	6						72
15OCT-17OCT	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	11	12	12	10	6	10	6						74

Table D-119 Regional Density (No./1,000m3) of White Catfish Young of Year in Hudson River Estuary Determined From Fall Juvenile Survey, 1991

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
15JUL-20JUL	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.02	0.10	0.75	0.08
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.02	0.05	0.46	0.47
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
29JUL-03AUG	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.39	0.48	0.07
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.14	0.27	0.31
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
12AUG-17AUG	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.63	1.36	0.17
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.13	0.56	0.57
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
26AUG-30AUG	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.07	0.36	1.08	0.13
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.11	0.42	0.44
	NO. TOWS	17	45	27	14	8	13	8	10	15	18	21	13	209
09SEP-13SEP	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.22	0.16	0.03
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.05	0.11	0.12
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
23SEP-27SEP	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.05	0.00	0.05	0.00	0.01
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.05	0.00	0.03	0.00	0.07
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
07OCT-11OCT	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.05	0.05	0.27	0.41	0.07
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.04	0.03	0.22	0.11	0.26
	NO. TOWS	17	45	27	14	8	13	8	10	15	18	21	13	209
21OCT-25OCT	DENSITY	0.00	0.00	0.00	0.00	0.00	0.04	0.03	0.00	0.00	0.05	0.10	0.00	0.02
	SE	0.00	0.00	0.00	0.00	0.00	0.02	0.03	0.00	0.00	0.03	0.04	0.00	0.07
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210

Table D-120 Regional Standing Crops (in Thousands) of White Catfish Young of Year in Hudson River Estuary Determined From Fall Juvenile Survey, 1991

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
15JUL-20JUL	St. Crop	0	0	0	0	0	0	0	0	5	4	16	53	78
	SE	0	0	0	0	0	0	0	0	5	4	7	33	34
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
29JUL-03AUG	St. Crop	0	0	0	0	0	0	0	0	0	4	63	34	100
	SE	0	0	0	0	0	0	0	0	0	4	22	19	30
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
12AUG-17AUG	St. Crop	0	0	0	0	0	0	0	0	0	4	101	97	203
	SE	0	0	0	0	0	0	0	0	0	4	21	39	45
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
26AUG-30AUG	St. Crop	0	0	0	0	0	0	0	0	0	13	58	77	147
	SE	0	0	0	0	0	0	0	0	0	9	18	30	36
	NO. TOWS	17	45	27	14	8	13	8	10	15	18	21	13	209
09SEP-13SEP	St. Crop	0	0	0	0	0	0	0	0	0	8	35	11	54
	SE	0	0	0	0	0	0	0	0	0	5	8	8	12
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
23SEP-27SEP	St. Crop	0	0	0	0	0	0	9	0	7	0	8	0	25
	SE	0	0	0	0	0	0	9	0	7	0	6	0	13
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
07OCT-11OCT	St. Crop	0	0	0	0	0	0	9	0	8	8	44	29	98
	SE	0	0	0	0	0	0	9	0	5	6	36	8	39
	NO. TOWS	17	45	27	14	8	13	8	10	15	18	21	13	209
21OCT-25OCT	St. Crop	0	0	0	0	0	6	10	0	0	9	15	0	40
	SE	0	0	0	0	0	3	10	0	0	6	7	0	14
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210

Table D-121 Regional Catch-Per-Unit-Effort (CPUE) of White Catfish Young of Year in Hudson River Estuary Determined From Beach Seine Survey, 1991

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
24JUN-	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
29JUN	SE	0.00	0.00	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
08JUL-	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
12JUL	SE	0.00	0.00	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
23JUL-	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
25JUL	SE	0.00	0.00	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
05AUG-	CPUE	0.00	0.00	0.00	0.00	0.00	0.17	0.00	0.00	0.00	0.00	0.00	0.00	0.01
08AUG	SE	0.00	0.00	0.00	0.00	0.00	0.17	0.00	0.00	0.00	0.00	0.00	0.00	0.17
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
20AUG-	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
23AUG	SE	0.00	0.00	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
03SEP-	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
06SEP	SE	0.00	0.00	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
16SEP-	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
19SEP	SE	0.00	0.00	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
30SEP-	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
04OCT	SE	0.00	0.00	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
15OCT-	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
18OCT	SE	0.00	0.00	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
28OCT-	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
01NOV	SE	0.00	0.00	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 D-122 Regional Standing Crops (in Thousands) of White Catfish Young of Year in Hudson River Estuary Determined From Beach Seine Survey, 1991

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
24JUN-	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
29JUN	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
08JUL-	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
12JUL	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
23JUL-	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
25JUL	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
05AUG-	St. Crop	0	0	0	0	0	2	0	0	0	0	0	0	2
08AUG	SE	0	0	0	0	0	2	0	0	0	0	0	0	2
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
20AUG-	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
23AUG	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
03SEP-	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
06SEP	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
16SEP-	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
19SEP	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
30SEP-	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
04OCT	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
15OCT-	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
18OCT	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
28OCT-	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
01NOV	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 D-123 Regional Density (No./1,000m3) of White Catfish Yearling and Older in Hudson River Estuary Determined From Fall Juvenile Survey, 1991

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
15JUL-	DENSITY	0.00	0.07	0.20	0.02	0.02	0.00	0.00	0.00	0.00	0.04	0.35	0.11	0.07
20JUL	SE	0.00	0.04	0.08	0.02	0.02	0.00	0.00	0.00	0.00	0.04	0.13	0.07	0.18
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
29JUL-	DENSITY	0.00	0.03	0.06	0.04	0.00	0.00	0.00	0.02	0.03	0.09	0.46	0.22	0.08
03AUG	SE	0.00	0.03	0.04	0.03	0.00	0.00	0.00	0.02	0.03	0.05	0.16	0.22	0.29
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
12AUG-	DENSITY	0.00	0.03	0.10	0.13	0.00	0.00	0.03	0.00	0.00	0.07	0.19	0.30	0.07
17AUG	SE	0.00	0.02	0.06	0.10	0.00	0.00	0.03	0.00	0.00	0.04	0.09	0.20	0.25
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
26AUG-	DENSITY	0.00	0.00	0.25	0.09	0.00	0.19	0.00	0.00	0.03	0.24	0.35	0.10	0.10
30AUG	SE	0.00	0.00	0.07	0.04	0.00	0.14	0.00	0.00	0.03	0.15	0.14	0.07	0.27
	NO. TOWS	17	45	27	14	8	13	8	10	15	18	21	13	209
09SEP-	DENSITY	0.00	0.02	0.10	0.03	0.00	0.04	0.00	0.02	0.08	0.00	0.39	0.11	0.07
13SEP	SE	0.00	0.02	0.05	0.01	0.00	0.03	0.00	0.02	0.08	0.00	0.14	0.07	0.19
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
23SEP-	DENSITY	0.00	0.06	0.02	0.04	0.00	0.00	0.03	0.00	0.03	0.06	0.33	0.05	0.05
27SEP	SE	0.00	0.03	0.02	0.03	0.00	0.00	0.03	0.00	0.03	0.03	0.14	0.05	0.16
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
07OCT-	DENSITY	0.00	0.15	0.89	0.17	0.00	0.02	0.00	0.03	0.00	0.08	0.30	0.30	0.16
11OCT	SE	0.00	0.06	0.60	0.06	0.00	0.02	0.00	0.03	0.00	0.04	0.15	0.17	0.64
	NO. TOWS	17	45	27	14	8	13	8	10	15	18	21	13	209
21OCT-	DENSITY	0.00	0.09	0.44	0.05	0.02	0.31	0.03	0.02	0.13	0.00	0.02	0.31	0.12
25OCT	SE	0.00	0.04	0.16	0.03	0.02	0.15	0.03	0.02	0.07	0.00	0.02	0.17	0.30
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210

able D-124 Regional Standing Crops (in Thousands) of White Catfish Yearling and Older in Hudson River Estuary Determined From Fall Juvenile Survey, 1991

ATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
5JUL-	St. Crop	0	23	29	5	4	0	0	0	0	8	57	8	135
0JUL	SE	0	11	12	3	4	0	0	0	0	8	21	5	29
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
9JUL-	St. Crop	0	10	8	9	0	0	0	4	4	16	74	16	140
3AUG	SE	0	10	6	6	0	0	0	4	4	9	26	16	35
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
2AUG-	St. Crop	0	11	14	26	0	0	9	0	0	13	30	21	124
7AUG	SE	0	6	8	20	0	0	9	0	0	7	14	14	32
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
6AUG-	St. Crop	0	0	37	20	0	27	0	0	4	42	56	7	194
0AUG	SE	0	0	10	9	0	19	0	0	4	26	22	5	42
	NO. TOWS	17	45	27	14	8	13	8	10	15	18	21	13	209
9SEP-	St. Crop	0	7	15	5	0	6	0	4	12	0	63	8	119
3SEP	SE	0	5	7	2	0	4	0	4	12	0	23	5	28
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
3SEP-	St. Crop	0	20	3	8	0	0	9	0	4	11	52	4	112
7SEP	SE	0	10	3	6	0	0	9	0	4	6	22	4	28
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
7OCT-	St. Crop	0	48	132	35	0	3	0	5	0	13	49	21	307
1OCT	SE	0	19	88	12	0	3	0	5	0	7	24	12	95
	NO. TOWS	17	45	27	14	8	13	8	10	15	18	21	13	209
1OCT-	St. Crop	0	29	65	11	4	43	10	4	18	0	4	22	209
5OCT	SE	0	11	24	7	4	21	10	4	10	0	4	12	40
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210

Table D-125 Regional Catch-Per-Unit-Effort (CPUE) of White Catfish Yearling and Older in Hudson River Estuary Determined From Beach Seine Survey, 1991

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
24JUN-	CPUE	0.00	0.18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02
29JUN	SE	0.00	0.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.12
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
08JUL-	CPUE	0.00	0.27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.03
12JUL	SE	0.00	0.19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.20
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
23JUL-	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
25JUL	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
05AUG-	CPUE	0.00	0.17	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02
08AUG	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	24	14	5	5	6	5	5	5	9	10	7	100
20AUG-	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
23AUG	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
03SEP-	CPUE	0.00	0.08	0.00	0.20	0.00	0.00	0.00	0.20	0.00	0.00	0.00	0.00	0.04
06SEP	SE	0.00	0.06	0.00	0.20	0.00	0.00	0.00	0.20	0.00	0.00	0.00	0.00	0.29
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
16SEP-	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
19SEP	SE	0.00	0.00	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
30SEP-	CPUE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.20	0.00	0.00	0.10	0.00	0.03
04OCT	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.20	0.00	0.00	0.10	0.00	0.22
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
15OCT-	CPUE	0.00	0.17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
18OCT	SE	0.00	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.10
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
28OCT-	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
01NOV	SE	0.00	0.00	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 D-126 Regional Standing Crops (in Thousands) of White Catfish Yearling and Older in Hudson River Estuary Determined From Beach Seine Survey, 1991

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
24JUN-	St. Crop	0	8	0	0	0	0	0	0	0	0	0	0	8
29JUN	SE	0	6	0	0	0	0	0	0	0	0	0	0	6
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
08JUL-	St. Crop	0	12	0	0	0	0	0	0	0	0	1	0	13
12JUL	SE	0	9	0	0	0	0	0	0	0	0	1	0	9
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
23JUL-	St. Crop	0	0	0	0	0	0	0	<0.005	0	0	0	0	<0.005
25JUL	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
05AUG-	St. Crop	0	8	2	0	0	0	0	0	0	0	0	0	9
08AUG	SE	0	4	2	0	0	0	0	0	0	0	0	0	5
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
20AUG-	St. Crop	0	2	0	0	0	0	0	0	0	0	0	0	2
23AUG	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
03SEP-	St. Crop	0	4	0	2	0	0	0	<0.005	0	0	0	0	6
06SEP	SE	0	3	0	2	0	0	0	<0.005	0	0	0	0	3
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
16SEP-	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
19SEP	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
30SEP-	St. Crop	0	0	0	0	0	0	0	<0.005	0	0	2	0	2
04OCT	SE	0	0	0	0	0	0	0	<0.005	0	0	2	0	2
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
15OCT-	St. Crop	0	8	0	0	0	0	0	0	0	0	0	0	8
18OCT	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
28OCT-	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
01NOV	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 D-127 Regional Density (No./1,000m3) of Spottail Shiner Young of Year
in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1991

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
15APR-	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
19APR	SE		0.00	0.00	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	11	6	7	7	8	9	9	108
22APR-	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	11	6	7	7	8	9	9	108
29APR-	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		10	12	13	10	6	11	6	7	7	8	9	9	108
06MAY-	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
13MAY-	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
18MAY	SE		0.00	0.00	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
20MAY-	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	6	110
27MAY-	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
01JUN	SE		0.00	0.00	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
03JUN-	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
08JUN	SE		0.00	0.00	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
10JUN-	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
15JUN	SE	0.00	0.00	0.00	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	8	6	6	110
17JUN-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.09	0.00	0.00	0.08
23JUN	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.09	0.00	0.00	1.09
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
24JUN-	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
30JUN	SE	0.00	0.00	0.00	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
30JUN-	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
05JUL	SE	0.00	0.00	0.00	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
08JUL-	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
13JUL	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	13	11	12	9	13	7	10	7	6	6	6	117
22JUL-	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	1.80	0.14
25JUL	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.82	0.82
	NO. TOWS	7	11	11	12	10	6	10	6						73
06AUG-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
08AUG	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

Table D-127 Regional Density (No./1,000m3) of Spottail Shiner Young of Year in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1991

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
20AUG-22AUG	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.54	NS	NS	NS	NS	NS	0.07
	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.54						0.54
	NO. TOWS	7	11	11	12	10	6	10	6						73
03SEP-06SEP	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
16SEP-18SEP	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
01OCT-03OCT	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	9	6						72
15OCT-17OCT	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	12	12	10	6	10	6						74

Table D-128 Regional Standing Crop (In Thousands) of Spottail Shiner Young of Year
in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1991

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
15APR-19APR	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS		10	12	13	10	6	11	6	7	7	8	9	9	108
22APR-26APR	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS		10	12	13	10	6	11	6	7	7	8	9	9	108
29APR-03MAY	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS		10	12	13	10	6	11	6	7	7	8	9	9	108
06MAY-10MAY	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
13MAY-18MAY	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
20MAY-24MAY	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
27MAY-01JUN	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
03JUN-08JUN	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
10JUN-15JUN	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	191.4	0.0	0.0	191.4
	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	191.4	0.0	0.0	191.4
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
17JUN-23JUN	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
24JUN-30JUN	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
30JUN-05JUL	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	17.8	0.0	0.0	0.0	0.0	0.0	0.0	17.8
	SE	0.0	0.0	0.0	0.0	0.0	0.0	17.8	0.0	0.0	0.0	0.0	0.0	0.0	17.8
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
08JUL-13JUL	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	127.8	127.8
	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	58.4	58.4
	NO. TOWS	6	11	13	11	12	9	13	7	10	7	6	6	6	117
22JUL-25JUL	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	11	11	12	10	6	10	6						73
06AUG-08AUG	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	11	11	12	10	6	10	6						73

Table D-128 Regional Standing Crop (In Thousands) of Spottail Shiner Young of Year in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1991

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
20AUG-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	160.2	NS	NS	NS	NS	NS	160.2
22AUG	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	160.2						160.2
	NO. TOWS	7	11	11	12	10	6	10	6						73
03SEP-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
06SEP	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	10	11	12	10	6	10	6						72
16SEP-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
18SEP	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	11	11	12	10	6	10	6						73
01OCT-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
03OCT	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	11	11	12	10	6	9	6						72
15OCT-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
17OCT	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	11	12	12	10	6	10	6						74

Table D-129 Regional Density (No./1,000m3) of Spottail Shiner Young of Year in Hudson River Estuary Determined From Fall Juvenile Survey, 1991

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
15JUL-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.10	0.63	0.06
20JUL	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.45	0.46
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
29JUL-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.44	0.04
03AUG	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.17	0.17
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
12AUG-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.15	0.01
17AUG	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.10	0.10
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
26AUG-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.33	0.03
30AUG	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.14	0.14
	NO. TOWS	17	45	27	14	8	13	8	10	15	18	21	13	209
09SEP-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	<0.005
13SEP	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.05
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
23SEP-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	1.22	0.10
27SEP	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.55	0.55
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
07OCT-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.12	0.76
11OCT	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.84	2.84
	NO. TOWS	17	45	27	14	8	13	8	10	15	18	21	13	209
21OCT-	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
25OCT	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.15	0.15
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210

Table D-130 Regional Standing Crops (in Thousands) of Spottail Shiner Young of Year in Hudson River Estuary Determined From Fall Juvenile Survey, 1991

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
15JUL-	St. Crop	0	0	0	0	0	0	0	0	0	0	17	45	61
20JUL	SE	0	0	0	0	0	0	0	0	0	0	10	32	34
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
29JUL-	St. Crop	0	0	0	0	0	0	0	0	0	0	4	31	35
03AUG	SE	0	0	0	0	0	0	0	0	0	0	4	12	13
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
12AUG-	St. Crop	0	0	0	0	0	0	0	0	0	0	0	10	10
17AUG	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	13	210
26AUG-	St. Crop	0	0	0	0	0	0	0	0	0	0	0	24	24
30AUG	SE	0	0	0	0	0	0	0	0	0	0	0	10	10
	NO. TOWS	17	45	27	14	8	13	8	10	15	18	21	13	209
09SEP-	St. Crop	0	0	0	0	0	0	0	0	0	0	0	4	4
13SEP	SE	0	0	0	0	0	0	0	0	0	0	0	4	4
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
23SEP-	St. Crop	0	0	0	0	0	0	0	0	0	0	4	87	91
27SEP	SE	0	0	0	0	0	0	0	0	0	0	4	39	39
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
07OCT-	St. Crop	0	0	0	0	0	0	0	0	0	0	0	649	649
11OCT	SE	0	0	0	0	0	0	0	0	0	0	0	202	202
	NO. TOWS	17	45	27	14	8	13	8	10	15	18	21	13	209
21OCT-	St. Crop	0	0	0	0	0	0	0	0	0	0	0	15	15
25OCT	SE	0	0	0	0	0	0	0	0	0	0	0	11	11
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210

Table D-131 Regional Catch-Per-Unit-Effort (CPUE) of Spottail Shiner Young of Year in Hudson River Estuary Determined From Beach Seine Survey, 1991

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
24JUN-	CPUE	0.00	0.09	0.14	0.67	0.00	0.67	8.38	8.13	8.75	4.13	17.84	53.00	8.48
29JUN	SE	0.00	0.09	0.14	0.67	0.00	0.33	7.26	3.35	4.52	1.51	10.71	29.81	33.02
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
08JUL-	CPUE	0.00	0.00	0.00	11.67	1.33	0.33	4.50	58.75	18.63	1.27	14.32	53.33	13.68
12JUL	SE	0.00	0.00	0.00	11.67	1.33	0.33	1.66	28.55	12.39	0.64	5.54	25.52	42.33
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
23JUL-	CPUE	0.00	0.00	0.00	32.67	3.00	10.00	5.50	27.38	12.63	4.87	4.47	25.08	10.47
25JUL	SE	0.00	0.00	0.00	32.67	1.73	8.50	4.11	11.51	5.22	1.70	2.11	14.51	39.21
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
05AUG-	CPUE	0.00	0.00	0.00	0.20	1.00	0.00	20.40	34.40	21.20	1.22	1.60	13.71	7.81
08AUG	SE	0.00	0.00	0.00	0.20	0.55	0.00	12.50	14.96	11.61	0.91	1.30	8.01	24.12
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
20AUG-	CPUE	0.00	0.00	0.00	0.00	0.00	0.00	16.40	51.00	20.80	6.78	12.00	16.71	10.31
23AUG	SE	0.00	0.00	0.00	0.00	0.00	0.00	6.88	18.81	13.29	2.53	6.97	12.47	28.08
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
03SEP-	CPUE	0.00	0.00	0.00	0.00	0.00	0.17	6.60	14.60	34.60	7.22	0.70	64.57	10.71
06SEP	SE	0.00	0.00	0.00	0.00	0.00	0.17	3.41	5.74	18.38	4.85	0.30	29.85	36.01
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
16SEP-	CPUE	0.00	0.00	0.00	0.00	0.00	1.50	14.60	35.40	23.40	3.78	1.50	7.86	7.34
19SEP	SE	0.00	0.00	0.00	0.00	0.00	1.50	6.00	15.45	20.18	1.70	0.73	7.36	27.24
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
30SEP-	CPUE	0.00	0.00	0.00	0.20	0.00	1.33	12.80	44.40	8.40	5.56	13.10	25.14	9.24
04OCT	SE	0.00	0.00	0.00	0.20	0.00	1.33	8.66	33.76	4.86	1.63	6.52	11.97	37.80
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
15OCT-	CPUE	0.00	0.00	0.00	0.00	0.00	4.33	4.00	14.60	2.80	1.44	3.30	36.00	5.54
18OCT	SE	0.00	0.00	0.00	0.00	0.00	2.86	3.51	3.82	0.92	0.93	2.40	15.97	17.25
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
28OCT-	CPUE	0.00	0.00	0.00	0.00	2.20	6.33	0.80	4.60	7.20	3.67	3.40	1.43	2.47
01NOV	SE	0.00	0.00	0.00	0.00	1.28	1.17	0.58	3.36	2.67	1.28	3.07	0.69	5.77
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100

Table D-132 Regional Standing Crops (in Thousands) of Spottail Shiner Young of Year in Hudson River Estuary Determined From Beach Seine Survey, 1991

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
24JUN-	St. Crop	0	4	4	6	0	7	59	10	75	73	351	720	1310
29JUN	SE	0	4	4	6	0	4	51	4	39	27	211	405	462
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
08JUL-	St. Crop	0	0	0	108	4	4	32	73	160	22	282	725	1408
12JUL	SE	0	0	0	108	4	4	12	35	107	11	109	347	396
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
23JUL-	St. Crop	0	0	0	301	8	107	39	34	109	85	88	341	1111
25JUL	SE	0	0	0	301	5	91	29	14	45	30	42	197	379
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
05AUG-	St. Crop	0	0	0	2	3	0	145	43	183	21	31	186	614
08AUG	SE	0	0	0	2	1	0	89	19	100	16	26	109	176
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
20AUG-	St. Crop	0	0	0	0	0	0	116	63	179	119	236	227	941
23AUG	SE	0	0	0	0	0	0	49	23	114	44	137	169	256
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
03SEP-	St. Crop	0	0	0	0	0	2	47	18	298	127	14	877	1382
06SEP	SE	0	0	0	0	0	2	24	7	158	85	6	406	444
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
16SEP-	St. Crop	0	0	0	0	0	16	104	44	201	66	30	107	568
19SEP	SE	0	0	0	0	0	16	43	19	174	30	14	100	209
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
30SEP-	St. Crop	0	0	0	2	0	14	91	55	72	98	258	342	931
04OCT	SE	0	0	0	2	0	14	61	42	42	29	128	163	226
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
15OCT-	St. Crop	0	0	0	0	0	46	28	18	24	25	65	489	696
18OCT	SE	0	0	0	0	0	30	25	5	8	16	47	217	226
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
28OCT-	St. Crop	0	0	0	0	6	67	6	6	62	64	67	19	297
01NOV	SE	0	0	0	0	3	13	4	4	23	22	60	9	71
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100

Table D-133 Regional Density (No./1,000m3) of Spottail Shiner Yearling and Older in Hudson River Estuary Determined From Fall Juvenile Survey, 1991

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
15JUL-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.53	0.06	0.00	0.20	1.15	0.16
20JUL	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.53	0.06	0.00	0.09	0.43	0.69
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
29JUL-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.01	0.03	0.00	0.00	0.00	0.02	1.12	0.10
03AUG	SE	0.00	0.00	0.00	0.00	0.00	0.01	0.03	0.00	0.00	0.00	0.02	0.37	0.37
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
12AUG-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.03	0.00	0.55	0.05
17AUG	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.03	0.00	0.13	0.13
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
26AUG-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.44	0.04
30AUG	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.19	0.19
	NO. TOWS	17	45	27	14	8	13	8	10	15	18	21	13	209
09SEP-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.00	0.03	0.35	0.04
13SEP	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.00	0.03	0.24	0.24
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
23SEP-	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
27SEP	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	17	46	27	14	8	13	8	10	15	18	21	13	210
07OCT-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.00	0.00	3.25	0.28
11OCT	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.00	1.20	1.20
	NO. TOWS	17	45	27	14	8	13	8	10	15	18	21	13	209
21OCT-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	<0.005
25OCT	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.05
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210

Table D-134 Regional Standing Crops (in Thousands) of Spottail Shiner Yearling and Older in Hudson River Estuary Determined From Fall Juvenile Survey, 1991

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
15JUL-	St. Crop	0	0	0	0	0	0	0	88	9	0	32	82	210
20JUL	SE	0	0	0	0	0	0	0	88	9	0	14	31	94
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
29JUL-	St. Crop	0	0	0	0	0	1	10	0	0	0	4	80	95
03AUG	SE	0	0	0	0	0	1	10	0	0	0	4	26	29
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
12AUG-	St. Crop	0	0	0	0	0	0	0	0	4	5	0	39	47
17AUG	SE	0	0	0	0	0	0	0	0	4	5	0	9	11
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
26AUG-	St. Crop	0	0	0	0	0	0	0	0	5	0	0	31	36
30AUG	SE	0	0	0	0	0	0	0	0	5	0	0	14	14
	NO. TOWS	17	45	27	14	8	13	8	10	15	18	21	13	209
09SEP-	St. Crop	0	0	0	0	0	0	0	0	8	0	4	25	37
13SEP	SE	0	0	0	0	0	0	0	0	8	0	4	17	19
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
23SEP-	St. Crop	0	0	0	0	0	0	0	0	0	0	0	14	14
27SEP	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
07OCT-	St. Crop	0	0	0	0	0	0	0	0	9	0	0	231	240
11OCT	SE	0	0	0	0	0	0	0	0	6	0	0	85	85
	NO. TOWS	17	45	27	14	8	13	8	10	15	18	21	13	209
21OCT-	St. Crop	0	0	0	0	0	0	0	0	0	0	0	4	4
25OCT	SE	0	0	0	0	0	0	0	0	0	0	0	4	4
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210

Table D-135 Regional Catch-Per-Unit-Effort (CPUE) of Spottail Shiner Yearling and Older in Hudson River Estuary Determined From Beach Seine Survey, 1991

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
24JUN-	CPUE	0.00	0.00	0.00	13.33	2.00	0.00	16.00	11.50	2.00	2.73	2.32	5.17	4.59
29JUN	SE	0.00	0.00	0.00	10.93	1.15	0.00	4.57	5.61	1.10	0.93	1.99	1.75	13.50
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
08JUL-	CPUE	0.00	0.00	0.00	5.67	14.33	1.67	37.13	7.00	2.88	1.47	11.42	6.25	7.32
12JUL	SE	0.00	0.00	0.00	4.70	13.35	1.20	19.04	3.44	2.31	0.62	5.04	3.04	24.83
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
23JUL-	CPUE	0.00	0.00	0.00	7.00	21.33	0.00	3.25	0.75	0.88	2.47	0.16	1.50	3.11
25JUL	SE	0.00	0.00	0.00	7.00	15.30	0.00	1.42	0.41	0.52	0.92	0.12	0.75	16.94
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
05AUG-	CPUE	0.00	0.00	0.00	0.00	2.00	0.00	4.40	25.20	0.60	18.11	5.30	14.29	5.82
08AUG	SE	0.00	0.00	0.00	0.00	1.52	0.00	2.69	15.97	0.60	9.79	4.75	10.65	22.29
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
20AUG-	CPUE	0.00	0.00	0.00	0.40	0.40	0.33	4.20	52.80	2.20	15.22	5.40	3.57	7.04
23AUG	SE	0.00	0.00	0.00	0.40	0.40	0.33	3.29	29.72	1.02	9.38	3.19	1.76	31.58
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
03SEP-	CPUE	0.00	0.00	0.00	0.00	0.00	0.50	12.80	17.20	3.60	50.44	0.40	26.14	9.26
06SEP	SE	0.00	0.00	0.00	0.00	0.00	0.50	8.74	6.76	2.16	26.87	0.22	15.21	32.86
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
16SEP-	CPUE	0.00	0.00	0.00	0.00	0.00	3.50	6.20	8.60	15.40	38.56	3.40	2.29	6.50
19SEP	SE	0.00	0.00	0.00	0.00	0.00	2.92	2.80	1.96	10.30	19.74	1.50	2.29	22.88
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
30SEP-	CPUE	0.00	0.00	0.00	0.20	0.60	0.17	4.80	12.00	2.40	10.22	1.50	7.57	3.29
04OCT	SE	0.00	0.00	0.00	0.20	0.40	0.17	2.56	5.65	1.12	8.28	0.58	3.65	11.05
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
15OCT-	CPUE	0.00	0.00	0.00	0.60	0.40	6.67	10.40	11.80	14.80	14.78	5.60	23.57	7.38
18OCT	SE	0.00	0.00	0.00	0.60	0.40	3.17	7.58	6.07	5.62	5.62	3.66	13.63	19.16
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
28OCT-	CPUE	0.00	0.00	0.00	0.60	3.00	2.33	1.20	1.20	9.40	1.89	1.10	0.29	1.75
01NOV	SE	0.00	0.00	0.00	0.60	2.53	1.33	0.37	0.58	5.04	0.79	0.48	0.18	5.94
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100

Table D-136 Regional Standing Crops (in Thousands) of Spottail Shiner Yearling and Older in Hudson River Estuary Determined From Beach Seine Survey, 1991

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
24JUN-	St. Crop	0	0	0	123	5	0	114	14	17	48	46	70	437
29JUN	SE	0	0	0	101	3	0	32	7	9	16	39	24	117
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
08JUL-	St. Crop	0	0	0	52	38	18	263	9	25	26	225	85	740
12JUL	SE	0	0	0	43	35	13	135	4	20	11	99	41	183
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
23JUL-	St. Crop	0	0	0	65	56	0	23	1	8	43	3	20	219
25JUL	SE	0	0	0	65	40	0	10	1	4	16	2	10	79
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
05AUG-	St. Crop	0	0	0	0	5	0	31	31	5	318	104	194	689
08AUG	SE	0	0	0	0	4	0	19	20	5	172	93	145	245
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
20AUG-	St. Crop	0	0	0	4	1	4	30	65	19	267	106	49	545
23AUG	SE	0	0	0	4	1	4	23	37	9	165	63	24	183
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
03SEP-	St. Crop	0	0	0	0	0	5	91	21	31	886	8	355	1397
06SEP	SE	0	0	0	0	0	5	62	8	19	472	4	207	519
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
16SEP-	St. Crop	0	0	0	0	0	37	44	11	133	677	67	31	999
19SEP	SE	0	0	0	0	0	31	20	2	89	346	30	31	362
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
30SEP-	St. Crop	0	0	0	2	2	2	34	15	21	179	30	103	387
04OCT	SE	0	0	0	2	1	2	18	7	10	145	11	50	155
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
15OCT-	St. Crop	0	0	0	6	1	71	74	15	127	259	110	320	983
18OCT	SE	0	0	0	6	1	34	54	8	48	99	72	185	236
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100
28OCT-	St. Crop	0	0	0	6	8	25	9	1	81	33	22	4	188
01NOV	SE	0	0	0	6	7	14	3	1	43	14	9	3	50
	NO. TOWS	5	24	14	5	5	6	5	5	5	9	10	7	100

Table D-137 Regional Density (No./1,000m3) of Atlantic Sturgeon Young of Year in Hudson River Estuary Determined From Fall Juvenile Survey, 1991

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
15JUL-20JUL	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
29JUL-03AUG	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
12AUG-17AUG	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
26AUG-30AUG	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	45	27	14	8	13	8	10	15	18	21	13	209
09SEP-13SEP	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
23SEP-27SEP	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
07OCT-11OCT	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	45	27	14	8	13	8	10	15	18	21	13	210
21OCT-25OCT	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	209

Table D-138 Regional Standing Crops (in Thousands) of Atlantic Sturgeon Young of Year in Hudson River Estuary Determined From Fall Juvenile Survey, 1991

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
15JUL-	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
20JUL	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
29JUL-	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	17	46	27	14	8	13	8	10	15	18	21	13	210
12AUG-	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	17	46	27	14	8	13	8	10	15	18	21	13	210
26AUG-	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
30AUG	SE	0	0	0	0	0	0	0	0	0	0	0	0	0
	NO. TOWS	17	45	27	14	8	13	8	10	15	18	21	13	209
09SEP-	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
13SEP	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
23SEP-	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
27SEP	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
07OCT-	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
11OCT	SE	0	0	0	0	0	0	0	0	0	0	0	0	0
	NO. TOWS	17	45	27	14	8	13	8	10	15	18	21	13	209
21OCT-	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
25OCT	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 D-139 Regional Density (No./1,000m3) of Atlantic Sturgeon Yearling and Older in Hudson River Estuary Determined From Fall Juvenile Survey, 1991

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
15JUL-	DENSITY	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.03	0.00	0.00	0.00	0.05	0.01
20JUL	SE	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.03	0.00	0.00	0.00	0.05	0.06
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
29JUL-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	<0.005
03AUG	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.03	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
12AUG-	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
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	17	46	27	14	8	13	8	10	15	18	21	13	210
26AUG-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.06	0.01
30AUG	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.06	0.06
	NO. TOWS	17	45	27	14	8	13	8	10	15	18	21	13	209
09SEP-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06	<0.005
13SEP	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.06
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
23SEP-	DENSITY	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	<0.005
27SEP	SE	0.00	0.00	0.00	0.00	0.02	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
07OCT-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	<0.005
11OCT	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.05
	NO. TOWS	17	45	27	14	8	13	8	10	15	18	21	13	209
21OCT-	DENSITY	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	<0.005
25OCT	SE	0.00	0.00	0.00	0.00	0.02	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 D-140 Regional Standing Crops (in Thousands) of Atlantic Sturgeon Yearling and Older in Hudson River Estuary Determined From Fall Juvenile Survey, 1991

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
15JUL-	St. Crop	0	0	0	0	4	0	0	4	0	0	0	4	12
20JUL	SE	0	0	0	0	4	0	0	4	0	0	0	4	7
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
29JUL-	St. Crop	0	0	0	0	0	0	10	0	0	0	0	0	10
03AUG	SE	0	0	0	0	0	0	10	0	0	0	0	0	10
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
12AUG-	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	17	46	27	14	8	13	8	10	15	18	21	13	210
26AUG-	St. Crop	0	0	0	0	0	0	0	0	0	0	4	4	8
30AUG	SE	0	0	0	0	0	0	0	0	0	0	4	4	6
	NO. TOWS	17	45	27	14	8	13	8	10	15	18	21	13	209
09SEP-	St. Crop	0	0	0	0	0	0	0	0	0	0	0	4	4
13SEP	SE	0	0	0	0	0	0	0	0	0	0	0	4	4
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
23SEP-	St. Crop	0	0	0	0	4	0	0	0	0	0	0	0	4
27SEP	SE	0	0	0	0	4	0	0	0	0	0	0	0	4
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
07OCT-	St. Crop	0	0	0	0	0	0	0	0	0	0	0	3	3
11OCT	SE	0	0	0	0	0	0	0	0	0	0	0	3	3
	NO. TOWS	17	45	27	14	8	13	8	10	15	18	21	13	209
21OCT-	St. Crop	0	0	0	0	4	0	0	0	0	0	0	0	4
25OCT	SE	0	0	0	0	4	0	0	0	0	0	0	0	4
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210

Table D-141 Regional Density (No./1,000m3) of Shortnose Sturgeon Young of Year in Hudson River Estuary Determined From Fall Juvenile Survey, 1991

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
15JUL-	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
20JUL	SE	0.00	0.00	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
29JUL-	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
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	17	46	27	14	8	13	8	10	15	18	21	13	210
12AUG-	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
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	17	46	27	14	8	13	8	10	15	18	21	13	210
26AUG-	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
30AUG	SE	0.00	0.00	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	45	27	14	8	13	8	10	15	18	21	13	209
09SEP-	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
13SEP	SE	0.00	0.00	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
23SEP-	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
27SEP	SE	0.00	0.00	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
07OCT-	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
11OCT	SE	0.00	0.00	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	45	27	14	8	13	8	10	15	18	21	13	209
21OCT-	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
25OCT	SE	0.00	0.00	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 D-142 Regional Standing Crops (in Thousands) of Shortnose Sturgeon Young of Year in Hudson River Estuary Determined From Fall Juvenile Survey, 1991

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
15JUL-20JUL	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
29JUL-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	17	46	27	14	8	13	8	10	15	18	21	13	210
12AUG-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	17	46	27	14	8	13	8	10	15	18	21	13	210
26AUG-30AUG	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	45	27	14	8	13	8	10	15	18	21	13	209
09SEP-13SEP	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
23SEP-27SEP	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
07OCT-11OCT	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	45	27	14	8	13	8	10	15	18	21	13	209
21OCT-25OCT	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 D-143 Regional Density (No./1,000m3) of Shortnose Sturgeon Yearling and Older in Hudson River Estuary Determined From Fall Juvenile Survey, 1991

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
15JUL-	DENSITY	0.00	0.02	0.00	0.00	0.00	0.11	0.03	0.00	0.00	0.00	0.00	0.00	0.01
20JUL	SE	0.00	0.02	0.00	0.00	0.00	0.11	0.03	0.00	0.00	0.00	0.00	0.00	0.11
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
29JUL-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.07	0.07	0.06	0.00	0.00	0.00	0.02
03AUG	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.07	0.05	0.04	0.00	0.00	0.00	0.09
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
12AUG-	DENSITY	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	<0.005
17AUG	SE	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.03
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
26AUG-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.03	0.00	0.00	0.00	0.00	<0.005
30AUG	SE	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.03	0.00	0.00	0.00	0.00	0.03
	NO. TOWS	17	45	27	14	8	13	8	10	15	18	21	13	209
09SEP-	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
13SEP	SE	0.00	0.00	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
23SEP-	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
27SEP	SE	0.00	0.00	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
07OCT-	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
11OCT	SE	0.00	0.00	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	45	27	14	8	13	8	10	15	18	21	13	210
21OCT-	DENSITY	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.03	0.02	0.00	0.00	0.01
25OCT	SE	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.03	0.02	0.00	0.00	0.04
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210

Table D-144 Regional Standing Crops (in Thousands) of Shortnose Sturgeon Yearling and Older in Hudson River Estuary Determined From Fall Juvenile Survey, 1991

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
15JUL-	St. Crop	0	6	0	0	0	15	10	0	0	0	0	0	31
20JUL	SE	0	6	0	0	0	15	10	0	0	0	0	0	19
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
29JUL-	St. Crop	0	0	0	0	0	0	21	12	8	0	0	0	41
03AUG	SE	0	0	0	0	0	0	21	8	5	0	0	0	23
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
12AUG-	St. Crop	0	0	0	4	0	0	0	0	0	4	0	0	9
17AUG	SE	0	0	0	4	0	0	0	0	0	4	0	0	6
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
26AUG-	St. Crop	0	0	0	0	0	1	0	4	0	0	0	0	6
30AUG	SE	0	0	0	0	0	1	0	4	0	0	0	0	4
	NO. TOWS	17	45	27	14	8	13	8	10	15	18	21	13	209
09SEP-	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
13SEP	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
23SEP-	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
27SEP	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
07OCT-	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
11OCT	SE	0	0	0	0	0	0	0	0	0	0	0	0	0
	NO. TOWS	17	45	27	14	8	13	8	10	15	18	21	13	209
21OCT-	St. Crop	0	0	0	0	4	0	0	0	5	4	0	0	12
25OCT	SE	0	0	0	0	4	0	0	0	5	4	0	0	7
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210

Table D-145 Regional Density (No./1,000m3) of Rainbow Smelt Eggs in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1991

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
15APR-19APR	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	11	6	7	7	8	9	9	108
22APR-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	11	6	7	7	8	9	9	108
29APR-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		10	12	13	10	6	11	6	7	7	8	9	9	108
06MAY-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
13MAY-18MAY	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
20MAY-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	6	110
27MAY-01JUN	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
03JUN-08JUN	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
10JUN-15JUN	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
17JUN-23JUN	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
24JUN-30JUN	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
30JUN-05JUL	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
08JUL-13JUL	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	13	11	12	9	13	7	10	7	6	6	6	117
22JUL-25JUL	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
06AUG-08AUG	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

able D-145 Regional Density (No./1,000m3) of Rainbow Smelt Eggs in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1991

ATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
0AUG-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
2AUG	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
3SEP-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
6SEP	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
6SEP-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
8SEP	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
1OCT-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
3OCT	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	9	6						72
5OCT-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
7OCT	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						0.00
	NO. TOWS	7	11	12	12	10	6	10	6						74

Table D-146 Regional Standing Crop (In Thousands) of Rainbow Smelt Eggs
in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1991

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
15APR-19APR	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS		10	12	13	10	6	11	6	7	7	8	9	9	108
22APR-26APR	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS		10	12	13	10	6	11	6	7	7	8	9	9	108
29APR-03MAY	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS		10	12	13	10	6	11	6	7	7	8	9	9	108
06MAY-10MAY	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
13MAY-18MAY	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
20MAY-24MAY	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
27MAY-01JUN	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
03JUN-08JUN	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
10JUN-15JUN	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
17JUN-23JUN	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
24JUN-30JUN	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
30JUN-05JUL	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
08JUL-13JUL	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS	6	11	13	11	12	9	13	7	10	7	6	6	6	119
22JUL-25JUL	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	11	11	12	10	6	10	6						73
06AUG-08AUG	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	11	11	12	10	6	10	6						73

Table D-146 Regional Standing Crop (In Thousands) of Rainbow Smelt Eggs in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1991

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
20AUG-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
22AUG	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	11	11	12	10	6	10	6						73
03SEP-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
06SEP	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	10	11	12	10	6	10	6						72
16SEP-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
18SEP	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	11	11	12	10	6	10	6						73
01OCT-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
03OCT	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	11	11	12	10	6	9	6						72
15OCT-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
17OCT	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	11	12	12	10	6	10	6						74

Table D-147 Regional Density (No./1,000m3) of Rainbow Smelt Yolk-Sac Larvae
in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1991

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
15APR-	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
19APR	SE		0.00	0.00	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	11	6	7	7	8	9	9	108
22APR-	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.44	0.00	0.00	0.00	0.00	0.00	0.04
26APR	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.44	0.00	0.00	0.00	0.00	0.00	0.44
	NO. TOWS		10	12	13	10	6	11	6	7	7	8	9	9	108
29APR-	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.00	0.45	0.00	0.00	0.00	0.00	0.00	0.04
03MAY	SE		0.00	0.00	0.00	0.00	0.00	0.00	0.23	0.00	0.00	0.00	0.00	0.00	0.23
	NO. TOWS		10	12	13	10	6	11	6	7	7	8	9	9	108
06MAY-	DENSITY	NS	0.12	0.00	2.05	0.00	0.10	0.26	0.44	0.00	0.00	0.00	0.00	0.00	0.25
10MAY	SE		0.12	0.00	2.05	0.00	0.10	0.26	0.44	0.00	0.00	0.00	0.00	0.00	2.12
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
13MAY-	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
18MAY	SE		0.00	0.00	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
20MAY-	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	6	110
27MAY-	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
01JUN	SE		0.00	0.00	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
03JUN-	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
08JUN	SE		0.00	0.00	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
10JUN-	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
15JUN	SE	0.00	0.00	0.00	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
17JUN-	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
23JUN	SE	0.00	0.00	0.00	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
24JUN-	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
30JUN	SE	0.00	0.00	0.00	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
30JUN-	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
05JUL	SE	0.00	0.00	0.00	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
08JUL-	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
13JUL	SE	0.00	0.00	0.00	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	13	11	12	9	13	7	10	7	6	6	6	117
22JUL-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
25JUL	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
06AUG-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
08AUG	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

Table D-147 Regional Density (No./1,000m3) of Rainbow Smelt Yolk-Sac Larvae
in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1991

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
20AUG-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
22AUG	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
03SEP-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
06SEP	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
16SEP-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
18SEP	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
01OCT-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
03OCT	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	9	6						72
15OCT-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
17OCT	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						0.00
	NO. TOWS	7	11	12	12	10	6	10	6						74

Table D-148 Regional Standing Crop (In Thousands) of Rainbow Smelt Yolk-Sac Larvae
in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1991

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
15APR-	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
19APR	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS		10	12	13	10	6	11	6	7	7	8	9	9	108
22APR-	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	131.7	0.0	0.0	0.0	0.0	0.0	131.7
26APR	SE		0.0	0.0	0.0	0.0	0.0	0.0	131.7	0.0	0.0	0.0	0.0	0.0	131.7
	NO. TOWS		10	12	13	10	6	11	6	7	7	8	9	9	108
29APR-	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	135.2	0.0	0.0	0.0	0.0	0.0	135.2
03MAY	SE		0.0	0.0	0.0	0.0	0.0	0.0	67.7	0.0	0.0	0.0	0.0	0.0	67.7
	NO. TOWS		10	12	13	10	6	11	6	7	7	8	9	9	108
06MAY-	St. Crop	NS	26.6	0.0	303.3	0.0	21.7	36.6	132.0	0.0	0.0	0.0	0.0	0.0	520.2
10MAY	SE		26.6	0.0	303.3	0.0	21.7	36.6	132.0	0.0	0.0	0.0	0.0	0.0	334.6
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
13MAY-	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
18MAY	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
20MAY-	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
24MAY	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
27MAY-	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
01JUN	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
03JUN-	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08JUN	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
10JUN-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
15JUN	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
17JUN-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
23JUN	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
24JUN-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
30JUN	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
30JUN-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
05JUL	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
08JUL-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
13JUL	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS	6	11	13	11	12	9	13	7	10	7	6	6	6	117
22JUL-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
25JUL	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	11	11	12	10	6	10	6						73
06AUG-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
08AUG	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	11	11	12	10	6	10	6						73

able D-148 Regional Standing Crop (In Thousands) of Rainbow Smelt Yolk-Sac Larvae in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1991

ATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
0AUG-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
2AUG	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	11	11	12	10	6	10	6						73
3SEP-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
6SEP	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	10	11	12	10	6	10	6						72
6SEP-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
8SEP	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	11	11	12	10	6	10	6						73
1OCT-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
3OCT	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	11	11	12	10	6	9	6						72
5OCT-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
7OCT	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	11	12	12	10	6	10	6						74

Table D-149 Regional Density (No./1,000m3) of Rainbow Smelt Post Yolk-Sac Larvae
in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1991

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
15APR-	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
19APR	SE		0.00	0.00	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	11	6	7	7	8	9	9	108
22APR-	DENSITY	NS	0.00	0.00	0.00	0.00	0.00	0.43	0.66	0.00	0.00	0.00	0.00	0.00	0.09
26APR	SE		0.00	0.00	0.00	0.00	0.00	0.31	0.66	0.00	0.00	0.00	0.00	0.00	0.73
	NO. TOWS		10	12	13	10	6	11	6	7	7	8	9	9	108
29APR-	DENSITY	NS	0.00	0.00	0.00	14.00	5.50	0.45	0.00	0.00	0.00	0.00	0.00	0.00	1.66
03MAY	SE		0.00	0.00	0.00	14.00	3.35	0.36	0.00	0.00	0.00	0.00	0.00	0.00	14.40
	NO. TOWS		10	12	13	10	6	11	6	7	7	8	9	9	108
06MAY-	DENSITY	NS	0.27	0.82	4.33	21.99	0.57	0.50	1.92	0.00	0.00	0.00	0.00	0.00	2.53
10MAY	SE		0.27	0.58	0.69	13.34	0.48	0.18	1.08	0.00	0.00	0.00	0.00	0.00	13.43
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
13MAY-	DENSITY	NS	0.00	0.00	6.14	20.15	3.41	9.62	9.38	1.68	1.57	0.00	0.00	0.00	4.33
18MAY	SE		0.00	0.00	3.32	9.17	2.44	2.05	4.29	0.95	1.57	0.00	0.00	0.00	11.27
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
20MAY-	DENSITY	NS	2.92	13.11	20.38	8.05	0.00	1.39	8.48	3.86	0.00	0.00	0.00	0.00	4.85
24MAY	SE		1.44	3.16	6.37	3.24	0.00	0.59	1.54	1.25	0.00	0.00	0.00	0.00	8.21
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
27MAY-	DENSITY	NS	0.31	0.58	8.44	13.19	0.14	142.29	7.54	4.35	0.00	0.00	0.00	0.00	14.74
01JUN	SE		0.31	0.44	2.28	12.80	0.14	119.65	4.10	2.47	0.00	0.00	0.00	0.00	120.45
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
03JUN-	DENSITY	NS	0.00	4.52	9.16	30.21	79.59	16.63	3.64	8.44	0.00	0.00	0.00	0.00	12.68
08JUN	SE		0.00	1.91	2.54	17.44	57.87	9.69	1.55	7.43	0.00	0.00	0.00	0.00	61.76
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
10JUN-	DENSITY	0.00	1.66	0.00	0.00	65.48	0.37	5.87	1.61	0.58	0.00	0.00	0.00	0.00	5.81
15JUN	SE	0.00	0.86	0.00	0.00	58.18	0.12	3.16	0.84	0.58	0.00	0.00	0.00	0.00	58.28
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
17JUN-	DENSITY	0.00	5.23	10.68	0.00	0.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.23
23JUN	SE	0.00	5.23	10.68	0.00	0.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	11.90
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
24JUN-	DENSITY	0.00	0.57	0.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05
30JUN	SE	0.00	0.57	0.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.59
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
30JUN-	DENSITY	0.00	0.31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02
05JUL	SE	0.00	0.31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.31
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
08JUL-	DENSITY	0.00	0.00	0.00	2.28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.18
13JUL	SE	0.00	0.00	0.00	2.28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.28
	NO. TOWS	6	11	13	11	12	9	13	7	10	7	6	6	6	117
22JUL-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.33	0.00	0.00	NS	NS	NS	NS	NS	0.04
25JUL	SE	0.00	0.00	0.00	0.00	0.00	0.33	0.00	0.00						0.33
	NO. TOWS	7	11	11	12	10	6	10	6						73
06AUG-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
08AUG	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

Table D-149 Regional Density (No./1,000m3) of Rainbow Smelt Post Yolk-Sac Larvae in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1991

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
30AUG-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
03SEP-05SEP	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
05SEP-13SEP	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
10OCT-30OCT	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	9	6						72
30OCT-07OCT	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	12	12	10	6	10	6						74

Table D-150 Regional Standing Crop (In Thousands) of Rainbow Smelt Post Yolk-Sac Larvae in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1991

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
15APR-	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
19APR	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS		10	12	13	10	6	11	6	7	7	8	9	9	108
22APR-	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	60.4	197.5	0.0	0.0	0.0	0.0	0.0	257.9
26APR	SE		0.0	0.0	0.0	0.0	0.0	43.2	197.5	0.0	0.0	0.0	0.0	0.0	202.2
	NO. TOWS		10	12	13	10	6	11	6	7	7	8	9	9	108
29APR-	St. Crop	NS	0.0	0.0	0.0	2915.9	1140.0	62.7	0.0	0.0	0.0	0.0	0.0	0.0	4118.5
03MAY	SE		0.0	0.0	0.0	2915.9	695.2	50.5	0.0	0.0	0.0	0.0	0.0	0.0	2998.1
	NO. TOWS		10	12	13	10	6	11	6	7	7	8	9	9	108
06MAY-	St. Crop	NS	62.6	264.5	639.2	4581.0	119.1	70.1	573.1	0.0	0.0	0.0	0.0	0.0	6309.6
10MAY	SE		62.6	187.9	101.7	2779.3	98.7	24.7	322.7	0.0	0.0	0.0	0.0	0.0	2808.7
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
13MAY-	St. Crop	NS	0.0	0.0	906.7	4197.3	707.9	1344.5	2797.2	278.6	222.6	0.0	0.0	0.0	10454.8
18MAY	SE		0.0	0.0	490.0	1909.7	506.7	287.1	1279.4	157.1	222.6	0.0	0.0	0.0	2436.7
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
20MAY-	St. Crop	NS	670.1	4218.2	3011.3	1676.3	0.0	193.8	2527.7	638.3	0.0	0.0	0.0	0.0	12935.7
24MAY	SE		331.4	1016.1	941.5	674.4	0.0	83.1	460.2	207.3	0.0	0.0	0.0	0.0	1656.9
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
27MAY-	St. Crop	NS	71.7	185.9	1247.5	2749.0	28.1	19890.7	2248.5	719.9	0.0	0.0	0.0	0.0	27141.3
01JUN	SE		71.7	143.0	336.5	2667.7	28.1	16726.1	1222.8	408.3	0.0	0.0	0.0	0.0	16990.6
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
03JUN-	St. Crop	NS	0.0	1454.4	1353.2	6293.4	16511.3	2324.6	1084.9	1396.0	0.0	0.0	0.0	0.0	30417.8
08JUN	SE		0.0	613.9	375.4	3633.4	12005.5	1354.5	462.1	1229.7	0.0	0.0	0.0	0.0	12704.8
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
10JUN-	St. Crop	0.0	380.6	0.0	0.0	13641.2	76.1	820.2	480.9	96.1	0.0	0.0	0.0	0.0	15495.1
15JUN	SE	0.0	198.1	0.0	0.0	12121.7	25.4	442.1	251.4	96.1	0.0	0.0	0.0	0.0	12134.3
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
17JUN-	St. Crop	0.0	1201.0	3438.3	0.0	25.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4664.8
23JUN	SE	0.0	1201.0	3438.3	0.0	25.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3642.1
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
24JUN-	St. Crop	0.0	130.6	44.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	175.3
30JUN	SE	0.0	130.6	44.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	138.0
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
30JUN-	St. Crop	0.0	70.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	70.7
05JUL	SE	0.0	70.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	70.7
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
08JUL-	St. Crop	0.0	0.0	0.0	336.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	336.5
13JUL	SE	0.0	0.0	0.0	336.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	336.5
	NO. TOWS	6	11	13	11	12	9	13	7	10	7	6	6	6	117
22JUL-	St. Crop	0.0	0.0	0.0	0.0	0.0	69.3	0.0	0.0	NS	NS	NS	NS	NS	69.3
25JUL	SE	0.0	0.0	0.0	0.0	0.0	69.3	0.0	0.0						69.3
	NO. TOWS	7	11	11	12	10	6	10	6						73
06AUG-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
08AUG	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	11	11	12	10	6	10	6						73

Table D-16A Regional Standing Crop (In Thousands) of Rainbow Smelt Post Yolk-Sac Larvae in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1991

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
20AUG-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
22AUG	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	11	11	12	10	6	10	6						73
03SEP-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
06SEP	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	10	11	12	10	6	10	6						72
16SEP-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
18SEP	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	11	11	12	10	6	10	6						73
01OCT-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
03OCT	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	11	11	12	10	6	9	6						72
15OCT-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
17OCT	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	11	12	12	10	6	10	6						74

Table D-151 Regional Density (No./1,000m3) of Rainbow Smelt Young of Year
in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1991

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
15APR-	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
19APR	SE		0.00	0.00	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	11	6	7	7	8	9	9	108
22APR-	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	11	6	7	7	8	9	9	108
29APR-	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		10	12	13	10	6	11	6	7	7	8	9	9	108
06MAY-	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
13MAY-	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
18MAY	SE		0.00	0.00	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
20MAY-	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	6	110
27MAY-	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
01JUN	SE		0.00	0.00	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
03JUN-	DENSITY	NS	0.00	0.00	0.00	0.21	19.60	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.65
08JUN	SE		0.00	0.00	0.00	0.21	15.94	0.00	0.00	0.00	0.00	0.00	0.00	0.00	15.94
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
10JUN-	DENSITY	0.00	0.00	0.00	0.27	0.35	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06
15JUN	SE	0.00	0.00	0.00	0.27	0.35	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.45
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
17JUN-	DENSITY	0.00	1.24	0.97	0.60	0.04	1.45	3.38	0.00	0.00	0.00	0.00	0.00	0.00	0.59
23JUN	SE	0.00	1.24	0.97	0.60	0.04	1.34	2.25	0.00	0.00	0.00	0.00	0.00	0.00	3.11
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
24JUN-	DENSITY	0.00	6.48	3.24	0.77	1.04	13.19	4.06	0.00	0.14	0.00	0.00	0.00	0.00	2.22
30JUN	SE	0.00	1.93	1.49	0.77	0.73	11.26	2.50	0.00	0.14	0.00	0.00	0.00	0.00	11.83
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
30JUN-	DENSITY	0.00	18.99	10.75	16.09	1.45	3.00	1.96	0.71	0.00	0.00	0.00	0.00	0.00	4.07
05JUL	SE	0.00	12.66	9.95	16.09	1.04	1.53	1.44	0.71	0.00	0.00	0.00	0.00	0.00	22.90
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
08JUL-	DENSITY	0.54	6.69	0.94	4.19	1.42	2.80	1.94	0.23	0.00	0.00	0.00	0.00	0.00	1.44
13JUL	SE	0.54	3.37	0.94	4.19	1.42	0.91	1.77	0.23	0.00	0.00	0.00	0.00	0.00	6.01
	NO. TOWS	6	11	13	11	12	9	13	7	10	7	6	6	6	117
22JUL-	DENSITY	0.00	0.00	0.00	0.00	0.00	1.09	3.10	0.00	NS	NS	NS	NS	NS	0.52
25JUL	SE	0.00	0.00	0.00	0.00	0.00	0.81	3.00	0.00						3.11
	NO. TOWS	7	11	11	12	10	6	10	6						73
06AUG-	DENSITY	0.00	1.50	0.00	0.00	0.00	0.00	8.01	0.29	NS	NS	NS	NS	NS	1.22
08AUG	SE	0.00	1.50	0.00	0.00	0.00	0.00	5.26	0.29						5.47
	NO. TOWS	7	11	11	12	10	6	10	6						73

able D-15l Regional Density (No./1,000m3) of Rainbow Smelt Young of Year
in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1991

ATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
0AUG-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.32	0.00	NS	NS	NS	NS	NS	0.04
2AUG	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.32	0.00						0.32
	NO. TOWS	7	11	11	12	10	6	10	6						73
3SEP-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
6SEP	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
6SEP-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
8SEP	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
1OCT-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
3OCT	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	9	6						72
5OCT-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NS	NS	NS	NS	NS	0.00
7OCT	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						0.00
	NO. TOWS	7	11	12	12	10	6	10	6						74

Table D-152 Regional Standing Crop (In Thousands) of Rainbow Smelt Young of Year in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1991

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
15APR-	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
19APR	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS		10	12	13	10	6	11	6	7	7	8	9	9	108
22APR-	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
26APR	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS		10	12	13	10	6	11	6	7	7	8	9	9	108
29APR-	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
03MAY	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS		10	12	13	10	6	11	6	7	7	8	9	9	108
06MAY-	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10MAY	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
13MAY-	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
18MAY	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS		9	10	9	13	10	16	10	11	7	6	6	10	117
20MAY-	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
24MAY	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
27MAY-	St. Crop	NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
01JUN	SE		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
03JUN-	St. Crop	NS	0.0	0.0	0.0	44.6	4065.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4109.7
08JUN	SE		0.0	0.0	0.0	44.6	3306.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3306.5
	NO. TOWS		9	11	13	9	9	15	7	10	7	8	6	6	110
10JUN-	St. Crop	0.0	0.0	0.0	0.0	39.9	73.0	22.0	0.0	0.0	0.0	0.0	0.0	0.0	134.9
15JUN	SE	0.0	0.0	0.0	0.0	39.9	73.0	22.0	0.0	0.0	0.0	0.0	0.0	0.0	86.0
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
17JUN-	St. Crop	0.0	285.5	312.6	88.8	7.7	301.7	472.6	0.0	0.0	0.0	0.0	0.0	0.0	1468.9
23JUN	SE	0.0	285.5	312.6	88.8	7.7	277.4	314.0	0.0	0.0	0.0	0.0	0.0	0.0	602.2
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
24JUN-	St. Crop	0.0	1485.9	1043.2	113.5	216.5	2735.3	568.1	0.0	22.6	0.0	0.0	0.0	0.0	6185.2
30JUN	SE	0.0	442.2	480.1	113.5	152.8	2335.1	349.8	0.0	22.6	0.0	0.0	0.0	0.0	2457.2
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
30JUN-	St. Crop	0.0	4356.5	3461.0	2377.2	301.7	623.0	274.3	211.9	0.0	0.0	0.0	0.0	0.0	11605.6
05JUL	SE	0.0	2905.0	3201.6	2377.2	215.8	317.6	201.2	211.9	0.0	0.0	0.0	0.0	0.0	4957.1
	NO. TOWS	6	11	14	11	13	9	13	7	10	7	6	6	6	119
08JUL-	St. Crop	113.2	1535.0	302.6	618.5	296.4	580.1	270.9	68.6	0.0	0.0	0.0	0.0	0.0	3785.2
13JUL	SE	113.2	772.6	302.6	618.5	296.4	189.0	247.1	68.6	0.0	0.0	0.0	0.0	0.0	1128.4
	NO. TOWS	6	11	13	11	12	9	13	7	10	7	6	6	6	117
22JUL-	St. Crop	0.0	0.0	0.0	0.0	0.0	226.9	433.0	0.0	NS	NS	NS	NS	NS	659.9
25JUL	SE	0.0	0.0	0.0	0.0	0.0	168.1	419.3	0.0						451.7
	NO. TOWS	7	11	11	12	10	6	10	6						73
06AUG-	St. Crop	0.0	343.3	0.0	0.0	0.0	0.0	1119.9	86.4	NS	NS	NS	NS	NS	1549.5
08AUG	SE	0.0	343.3	0.0	0.0	0.0	0.0	734.6	86.4						815.5
	NO. TOWS	7	11	11	12	10	6	10	6						73

Table D-152 Regional Standing Crop (In Thousands) of Rainbow Smelt Young of Year in Hudson River Estuary Determined From Longitudinal River Ichthyoplankton Survey, 1991

DATE		BT	YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
20AUG-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	44.5	0.0	NS	NS	NS	NS	NS	44.5
22AUG	SE	0.0	0.0	0.0	0.0	0.0	0.0	44.5	0.0						44.5
	NO. TOWS	7	11	11	12	10	6	10	6						73
03SEP-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
06SEP	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	10	11	12	10	6	10	6						72
16SEP-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
18SEP	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	11	11	12	10	6	10	6						73
01OCT-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
03OCT	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	11	11	12	10	6	9	6						72
15OCT-	St. Crop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS	NS	0.0
17OCT	SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0
	NO. TOWS	7	11	12	12	10	6	10	6						74

Table D-153 Regional Density (No./1,000m3) of Rainbow Smelt Young of Year in Hudson River Estuary Determined From Fall Juvenile Survey, 1991

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
15JUL-	DENSITY	3.75	0.55	0.06	0.02	3.17	6.22	0.68	0.00	0.00	0.00	0.00	0.00	1.20
20JUL	SE	1.41	0.38	0.03	0.02	2.16	1.40	0.65	0.00	0.00	0.00	0.00	0.00	3.03
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
29JUL-	DENSITY	0.03	0.05	0.10	0.02	4.71	0.72	0.09	0.00	0.00	0.00	0.00	0.00	0.48
03AUG	SE	0.02	0.04	0.05	0.02	2.60	0.65	0.09	0.00	0.00	0.00	0.00	0.00	2.68
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
12AUG-	DENSITY	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	<0.005
17AUG	SE	0.04	0.00	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
26AUG-	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
30AUG	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	17	45	27	14	8	13	8	10	15	18	21	13	209
09SEP-	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
13SEP	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
23SEP-	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
27SEP	SE	0.00	0.00	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
07OCT-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	<0.005
11OCT	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.03
	NO. TOWS	17	45	27	14	8	13	8	10	15	18	21	13	209
21OCT-	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
25OCT	SE	0.00	0.00	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 D-154 Regional Standing Crops (in Thousands) of Rainbow Smelt Young of Year in Hudson River Estuary Determined From Fall Juvenile Survey, 1991

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
15JUL-20JUL	St. Crop	861	176	9	4	658	869	204	0	0	0	0	0	2781
	SE	324	122	5	4	448	195	194	0	0	0	0	0	629
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
29JUL-03AUG	St. Crop	6	16	15	5	978	100	27	0	0	0	0	0	1147
	SE	4	13	7	5	539	91	27	0	0	0	0	0	548
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
12AUG-17AUG	St. Crop	10	0	0	0	0	0	0	0	0	0	0	0	10
	SE	10	0	0	0	0	0	0	0	0	0	0	0	10
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
26AUG-30AUG	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	17	45	27	14	8	13	8	10	15	18	21	13	209
09SEP-13SEP	St. Crop	0	0	0	0	0	0	0	4	0	0	0	0	4
	SE	0	0	0	0	0	0	0	4	0	0	0	0	4
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
23SEP-27SEP	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
07OCT-11OCT	St. Crop	0	0	0	0	0	0	10	0	0	0	0	0	10
	SE	0	0	0	0	0	0	10	0	0	0	0	0	10
	NO. TOWS	17	45	27	14	8	13	8	10	15	18	21	13	209
21OCT-25OCT	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 D-155 Regional Catch-Per-Unit-Effort (CPUE) of Rainbow Smelt Young of Year in Hudson River Estuary Determined From Beach Seine Survey, 1991

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
24JUN-	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
29JUN	SE	0.00	0.00	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
08JUL-	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
12JUL	SE	0.00	0.00	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
23JUL-	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
25JUL	SE	0.00	0.00	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
05AUG-	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
08AUG	SE	0.00	0.00	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
20AUG-	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
23AUG	SE	0.00	0.00	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
03SEP-	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
06SEP	SE	0.00	0.00	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
16SEP-	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
19SEP	SE	0.00	0.00	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
30SEP-	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
04OCT	SE	0.00	0.00	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
15OCT-	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
18OCT	SE	0.00	0.00	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
28OCT-	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
01NOV	SE	0.00	0.00	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

able D-156 Regional Standing Crops (in Thousands) of Rainbow Smelt Young of Year
in Hudson River Estuary Determined From Beach Seine Survey, 1991

ATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
4JUN-	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
9JUN	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
8JUL-	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
2JUL	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
3JUL-	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
5JUL	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
5AUG-	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
8AUG	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
0AUG-	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
3AUG	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
3SEP-	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
6SEP	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
6SEP-	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
9SEP	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
0SEP-	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
4OCT	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
5OCT-	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
8OCT	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
8OCT-	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
1NOV	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 D-157 Regional Density (No./1,000m3) of Rainbow Smelt Yearling and Older in Hudson River Estuary Determined From Fall Juvenile Survey, 1991

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
15JUL-	DENSITY	0.00	0.00	0.00	0.00	2.22	1.64	0.03	0.00	0.00	0.00	0.00	0.00	0.32
20JUL	SE	0.00	0.00	0.00	0.00	2.07	0.69	0.03	0.00	0.00	0.00	0.00	0.00	2.18
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
29JUL-	DENSITY	0.00	0.00	0.00	0.02	6.52	0.19	0.06	0.00	0.00	0.00	0.00	0.00	0.57
03AUG	SE	0.00	0.00	0.00	0.02	3.38	0.12	0.06	0.00	0.00	0.00	0.00	0.00	3.39
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
12AUG-	DENSITY	0.00	0.00	0.00	0.00	0.07	0.67	0.03	0.00	0.09	0.00	0.00	0.00	0.07
17AUG	SE	0.00	0.00	0.00	0.00	0.04	0.43	0.03	0.00	0.06	0.00	0.00	0.00	0.44
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
26AUG-	DENSITY	0.00	0.00	0.00	0.00	0.14	0.70	0.07	0.00	0.00	0.00	0.00	0.00	0.08
30AUG	SE	0.00	0.00	0.00	0.00	0.10	0.39	0.07	0.00	0.00	0.00	0.00	0.00	0.41
	NO. TOWS	17	45	27	14	8	13	8	10	15	18	21	13	209
09SEP-	DENSITY	0.00	0.00	0.00	0.00	0.09	0.15	0.09	0.00	0.02	0.00	0.00	0.00	0.03
13SEP	SE	0.00	0.00	0.00	0.00	0.06	0.08	0.04	0.00	0.02	0.00	0.00	0.00	0.10
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
23SEP-	DENSITY	0.00	0.00	0.00	0.00	0.00	0.04	0.16	0.51	0.00	0.00	0.00	0.00	0.06
27SEP	SE	0.00	0.00	0.00	0.00	0.00	0.04	0.09	0.51	0.00	0.00	0.00	0.00	0.52
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
07OCT-	DENSITY	0.00	0.00	0.00	0.00	0.02	0.00	0.03	0.00	0.00	0.00	0.00	0.00	<0.005
11OCT	SE	0.00	0.00	0.00	0.00	0.02	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.04
	NO. TOWS	17	45	27	14	8	13	8	10	15	18	21	13	209
21OCT-	DENSITY	0.00	0.00	0.00	0.00	0.07	2.17	0.00	0.00	0.00	0.00	0.00	0.00	0.19
25OCT	SE	0.00	0.00	0.00	0.00	0.04	2.02	0.00	0.00	0.00	0.00	0.00	0.00	2.02
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210

Table D-158 Regional Standing Crops (in Thousands) of Rainbow Smelt Yearling and Older in Hudson River Estuary Determined From Fall Juvenile Survey, 1991

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
15JUL-	St. Crop	0	0	0	0	461	229	10	0	0	0	0	0	700
20JUL	SE	0	0	0	0	429	96	10	0	0	0	0	0	440
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
29JUL-	St. Crop	0	0	0	3	1354	26	18	0	0	0	0	0	1401
03AUG	SE	0	0	0	3	702	17	18	0	0	0	0	0	702
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
12AUG-	St. Crop	0	0	0	0	15	93	9	0	12	0	0	0	129
17AUG	SE	0	0	0	0	9	60	9	0	9	0	0	0	62
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
26AUG-	St. Crop	0	0	0	0	30	97	20	0	0	0	0	0	148
30AUG	SE	0	0	0	0	21	55	20	0	0	0	0	0	62
	NO. TOWS	17	45	27	14	8	13	8	10	15	18	21	13	209
09SEP-	St. Crop	0	0	0	0	19	21	28	0	4	0	0	0	72
13SEP	SE	0	0	0	0	12	11	11	0	4	0	0	0	20
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
23SEP-	St. Crop	0	0	0	0	0	5	48	85	0	0	0	0	139
27SEP	SE	0	0	0	0	0	5	26	85	0	0	0	0	89
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210
07OCT-	St. Crop	0	0	0	0	3	0	10	0	0	0	0	0	13
11OCT	SE	0	0	0	0	3	0	10	0	0	0	0	0	10
	NO. TOWS	17	45	27	14	8	13	8	10	15	18	21	13	209
21OCT-	St. Crop	0	0	0	0	15	303	0	0	0	0	0	0	318
25OCT	SE	0	0	0	0	9	283	0	0	0	0	0	0	283
	NO. TOWS	17	46	27	14	8	13	8	10	15	18	21	13	210

Table D-159 Regional Catch-Per-Unit-Effort (CPUE) of Rainbow Smelt Yearling and Older in Hudson River Estuary Determined From Beach Seine Survey, 1991

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
24JUN-	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
29JUN	SE	0.00	0.00	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
08JUL-	CPUE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.33	0.00	0.00	0.03
12JUL	SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.33	0.00	0.00	0.33
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
23JUL-	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
25JUL	SE	0.00	0.00	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
05AUG-	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
08AUG	SE	0.00	0.00	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
20AUG-	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
23AUG	SE	0.00	0.00	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
03SEP-	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
06SEP	SE	0.00	0.00	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
16SEP-	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
19SEP	SE	0.00	0.00	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
30SEP-	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
04OCT	SE	0.00	0.00	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
15OCT-	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
18OCT	SE	0.00	0.00	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
28OCT-	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
01NOV	SE	0.00	0.00	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 D-160 Regional Standing Crops (in Thousands) of Rainbow Smelt Yearling and Older in Hudson River Estuary Determined From Beach Seine Survey, 1991

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	Regions Combined
24JUN-	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
29JUN	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
08JUL-	St. Crop	0	0	0	0	0	0	0	0	0	6	0	0	6
12JUL	SE	0	0	0	0	0	0	0	0	0	6	0	0	6
	NO. TOWS	3	11	7	3	3	3	8	8	8	15	19	12	100
23JUL-	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
25JUL	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
05AUG-	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
08AUG	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
20AUG-	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
23AUG	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
03SEP-	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
06SEP	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
16SEP-	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
19SEP	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
30SEP-	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
04OCT	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
15OCT-	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
18OCT	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
28OCT-	St. Crop	0	0	0	0	0	0	0	0	0	0	0	0	0
01NOV	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 E

ABUNDANCE INDICES

APPENDIX E

LIST OF TABLES

Number	Title
E-1	Combined regional standing crop (in thousands) of striped bass young of year in the Hudson River estuary determined from the 1991 Fall Juvenile and Beach Seine surveys.
E-2	Combined regional standing crop (in thousands) of white perch young of year in the Hudson River estuary determined from the 1991 Fall Juvenile and Beach Seine surveys.
E-3	Univariate and bivariate indices of young-of-year abundance for striped bass in the Hudson River estuary, 1974-1991.
E-4	Univariate and bivariate indices of young-of-year abundance for white perch in the Hudson River estuary, 1974-1991.
E-5	Univariate and bivariate indices of young-of-year abundance for American shad in the Hudson River estuary, 1979-1991.

TABLE E-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, 1991

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	ALL REGIONS COMBINED
JUL-	ST. CROP	745	7936	14814	1431	447	1096	401	1493	1422	3036	6605	5429	44855
JUL	SE	314	2105	6772	1073	344	372	110	387	372	1105	2799	3127	8422
23JUL-	ST. CROP	404	7160	4471	2609	378	6802	840	883	1113	2216	1075	1938	29890
JUL	SE	350	2367	1365	1884	178	2640	364	205	285	580	263	1345	4540
30JUL-	ST. CROP	400	7007	4296	2450	220	6857	841	261	975	1906	828	1861	27902
01AUG	SE	350	2364	1424	1878	61	2641	364	51	238	411	250	1344	4525
AUG-	ST. CROP	165	8015	4278	602	784	3566	774	144	971	2036	2459	1146	24940
08AUG	SE	77	2004	1074	325	336	1935	301	37	264	500	986	497	3281
AUG-	ST. CROP	167	8035	3536	616	1015	3518	733	57	811	1771	2445	1159	23864
AUG	SE	77	2004	1028	325	433	1934	299	30	258	489	986	497	3275
AUG-	ST. CROP	203	3221	1823	242	492	1285	605	48	532	2940	2396	1375	15164
AUG	SE	86	827	495	114	196	594	185	14	219	978	823	519	1824
27AUG-	ST. CROP	202	3069	1847	254	243	1343	537	61	484	2884	2380	1298	14603
AUG	SE	85	826	494	114	115	597	178	17	214	977	823	518	1815
03SEP-	ST. CROP	13	2480	790	321	75	924	226	44	650	787	1223	427	7960
06SEP	SE	13	788	242	138	38	411	89	18	242	279	467	164	1122
SEP-	ST. CROP	13	2478	731	296	75	950	259	39	599	831	1219	434	7924
13SEP	SE	13	788	242	137	38	437	113	19	237	282	467	165	1133
SEP-	ST. CROP	0	1377	1051	372	297	861	536	29	258	1008	535	422	6746
SEP	SE	0	488	357	255	175	332	254	16	99	271	263	130	897
SEP-	ST. CROP	0	1339	1001	356	466	860	765	21	320	989	527	394	7039
SEP	SE	0	488	356	255	341	335	449	12	117	271	262	129	1016
30SEP-	ST. CROP	13	941	1586	424	399	510	561	32	138	666	326	184	5779
OCT	SE	13	367	714	172	181	200	284	12	52	421	164	87	1021
07OCT-	ST. CROP	13	956	1672	600	230	501	273	30	87	734	371	186	5653
11OCT	SE	13	367	716	300	64	188	183	11	33	432	175	87	1018
OCT-	ST. CROP	25	654	1465	1102	121	491	89	21	72	437	247	166	4890
18OCT	SE	26	174	493	376	82	193	85	11	31	137	86	96	709
OCT-	ST. CROP	25	733	1547	1018	123	421	94	23	58	352	206	163	4761
25OCT	SE	26	178	495	355	82	176	86	14	30	122	78	96	692
OCT-	ST. CROP	25	535	1747	3067	47	247	115	22	51	67	193	34	6151
NOV	SE	16	160	416	1882	17	96	71	13	44	38	139	22	1944

TABLE E-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, 1991

DATE		YK	TZ	CH	IP	WP	CW	PK	HP	KG	SG	CS	AL	ALL REGIONS COMBINED
15JUL-	ST. CROP	0	79	249	1278	260	231	1277	674	1046	555	2356	1474	9479
19JUL	SE	0	51	172	567	137	119	464	231	666	279	1824	854	2288
23JUL-	ST. CROP	0	460	107	170	65	2531	1319	465	533	1046	708	769	8173
25JUL	SE	0	244	107	143	53	1405	787	133	222	336	285	644	1834
30JUL-	ST. CROP	0	459	107	28	65	2531	1148	297	528	1038	700	766	7667
01AUG	SE	0	244	107	28	53	1405	786	85	222	336	285	644	1825
05AUG-	ST. CROP	0	841	302	102	137	2942	437	552	1132	2821	237	936	10440
08AUG	SE	0	372	111	42	119	1278	185	293	492	1762	198	857	2458
12AUG-	ST. CROP	0	841	302	102	137	2943	435	507	1128	2817	237	952	10401
15AUG	SE	0	372	111	42	119	1278	172	293	492	1762	198	857	2457
20AUG-	ST. CROP	0	210	124	205	142	825	1681	272	935	1086	441	396	6317
23AUG	SE	0	107	73	149	66	444	1259	78	468	564	437	320	1632
27AUG-	ST. CROP	0	210	124	205	142	827	1587	320	934	1088	445	378	6260
30AUG	SE	0	107	73	149	66	444	1257	92	468	564	437	320	1631
03SEP-	ST. CROP	0	911	53	68	88	1139	1032	244	1244	1681	61	25	6546
06SEP	SE	0	399	39	42	47	570	473	123	665	906	55	13	1412
10SEP-	ST. CROP	0	911	53	68	88	1139	1384	342	1268	1787	59	31	7130
13SEP	SE	0	399	39	42	47	570	616	210	666	922	55	13	1487
16SEP-	ST. CROP	0	508	124	120	102	1221	827	219	1493	996	39	60	5710
19SEP	SE	0	277	77	119	58	742	349	107	1411	363	36	38	1706
23SEP-	ST. CROP	0	508	124	121	102	1222	532	79	1478	893	36	54	5150
26SEP	SE	0	277	77	119	58	742	259	21	1411	349	36	39	1684
30SEP-	ST. CROP	0	298	249	18	24	272	219	187	152	2217	989	89	4714
04OCT	SE	0	176	179	17	15	169	93	106	81	1858	925	30	2104
07OCT-	ST. CROP	0	298	249	17	24	293	182	242	165	2295	995	142	4901
11OCT	SE	0	176	179	17	15	169	92	111	84	1860	925	38	2107
15OCT-	ST. CROP	0	247	36	122	97	208	66	111	287	86	50	135	1444
18OCT	SE	0	154	24	55	40	81	37	40	189	62	25	57	286
22OCT-	ST. CROP	0	248	36	159	106	272	81	69	297	8	51	75	1402
25OCT	SE	0	154	24	74	42	101	34	33	189	5	26	54	288
28OCT-	ST. CROP	0	265	36	90	23	224	73	67	164	83	32	34	1090
01NOV	SE	0	186	24	48	14	71	35	29	72	41	20	11	228

TABLE E-3 UNIVARIATE AND BIVARIATE INDICES OF YOUNG-OF-YEAR ABUNDANCE FOR STRIPED BASS IN THE HUDSON RIVER ESTUARY, 1974-1991

Year	Univariate Indices		Bivariate Indices	
	BSS	FJS	BSS	FJS
1974	5.65	1.70	44.33	40.12
1975	4.56	4.67	37.20	61.25
1976	3.45	8.21	24.67	71.5
1977	5.92	8.73	53.80	72.5
1978	9.11	2.21	63.60	43.25
1979	3.76	1.60	28.60	35.75
1980	5.60	1.02	47.00	29.0
1981	6.61	1.64	55.50	38.5
1982	3.82	1.97	28.00	37.6
1983	6.58	1.29	50.75	32.25
1984	5.14	2.35	38.75	49.25
1985	1.07	0.06	4.25	2.75
1986	1.62	0.28	7.25	11.75
1987	13.01	1.60	75.25	39.5
1988	4.91	3.81	40.75	61.75
1989	5.65	1.59	46.75	38.5
1990	6.42	0.88	55.75	25.25
1991	5.05	0.24	36.00	11.00

TABLE E-4 UNIVARIATE AND BIVARIATE INDICES OF YOUNG-OF-YEAR ABUNDANCE FOR WHITE PERCH IN THE HUDSON RIVER ESTUARY, 1974-1991

	Univariate Indices		Bivariate Indices	
Year	BSS	FJS	BSS	FJS
1974	4.09	1.32	18.00	47.62
1975	8.03	5.90	38.20	72.00
1976	9.53	3.92	53.83	68.00
1977	6.78	0.59	36.80	38.25
1978	13.92	1.09	62.20	45.75
1979	17.03	5.38	67.20	71.25
1980	10.66	2.52	56.20	61.50
1981	10.29	1.81	57.75	58.75
1982	10.00	0.82	57.50	44.40
1983	10.36	0.82	57.50	44.00
1984	4.20	0.37	21.00	31.75
1985	4.35	0.09	20.25	14.25
1986	5.60	0.17	28.25	18.25
1987	8.86	0.09	48.50	13.75
1988	7.55	0.33	42.25	30.50
1989	6.29	0.19	31.00	22.00
1990	3.86	0.02	17.25	4.00
1991	4.05	0.03	15.50	6.00

TABLE E-5 UNIVARIATE AND BIVARIATE INDICES OF YOUNG-OF-YEAR ABUNDANCE FOR AMERICAN SHAD IN THE HUDSON RIVER ESTUARY, 1979-1991

Year	Univariate Indices		Bivariate Indices	
	BSS	FJS	BSS	FJS
1979	11.65	0.53	22.20	15.25
1980	10.75	0.46	20.80	14.75
1981	17.62	0.89	36.00	27.25
1982	16.32	0.64	33.00	26.00
1983	19.68	1.59	36.00	22.25
1984	8.78	0.57	15.75	21.00
1985	8.07	0.91	13.75	29.25
1986	19.14	1.85	36.00	45.75
1987	13.60	0.50	28.25	15.50
1988	7.71	0.66	12.50	24.00
1989	22.12	1.44	44.0	44.25
1990	18.75	0.82	40.50	29.50
1991	12.02	0.75	21.75	29.75

APPENDIX F

LENGTH-FREQUENCY DISTRIBUTION

APPENDIX F

LIST OF TABLES

Number	Title
F-1	Length-frequency distribution (mm TL) of larval and young-of-year striped bass in the Hudson River estuary determined from the Longitudinal River Ichthyoplankton Survey, 1991.
F-2	Length-frequency distribution (mm TL) of young-of-year striped bass in the Hudson River estuary determined from the Fall Juvenile Survey, 1991.
F-3	Length-frequency distribution (mm TL) of young-of-year striped bass in the Hudson River estuary determined from the Beach Seine Survey, 1991.
F-4	Length-frequency distribution (mm TL) of larval and young-of-year white perch in the Hudson River estuary determined from the Longitudinal River Ichthyoplankton Survey, 1991.
F-5	Length-frequency distribution (mm TL) of young-of-year white perch in the Hudson River estuary determined from the Fall Juvenile Survey, 1991.
F-6	Length-frequency distribution (mm TL) of young-of-year white perch in the Hudson River estuary determined from the Beach Seine Survey, 1991.
F-7	Length-frequency distribution (mm TL) of larval and young-of-year American shad in the Hudson River estuary determined from the Longitudinal River Ichthyoplankton Survey, 1991.
F-8	Length-frequency distribution (mm TL) of young-of-year American shad in the Hudson River estuary determined from the Fall Juvenile Survey, 1991.
F-9	Length-frequency distribution (mm TL) of young-of-year American shad in the Hudson River estuary determined from the Beach Seine Survey, 1991.
F-10	Length-frequency distribution (mm TL) of young-of-year blueback herring in the Hudson River estuary determined from the Fall Juvenile Survey, 1991.
F-11	Length-frequency distribution (mm TL) of young-of-year blueback herring in the Hudson River estuary determined from the Beach Seine Survey, 1991.
F-12	Length-frequency distribution (mm TL) of young-of-year alewife in the Hudson River estuary determined from the Fall Juvenile Survey, 1991.
F-13	Length-frequency distribution (mm TL) of young-of-year alewife in the Hudson River estuary determined from the Beach Seine Survey, 1991.

APPENDIX F

LIST OF FIGURES

Number	Title
F-1	Length-frequency distribution (mm TL) of larval and young-of-year striped bass in the Hudson River estuary determined from the Longitudinal River Ichthyoplankton Survey, 1991.
F-2	Length-frequency distribution (mm TL) of young-of-year striped bass in the Hudson River estuary determined from the Fall Juvenile Survey, 1991.
F-3	Length-frequency distribution (mm TL) of young-of-year striped bass in the Hudson River estuary determined from the Beach Seine Survey, 1991.
F-4	Length-frequency distribution (mm TL) of larval and young-of-year white perch in the Hudson River estuary determined from the Longitudinal River Ichthyoplankton Survey, 1991.
F-5	Length-frequency distribution (mm TL) of young-of-year white perch in the Hudson River estuary determined from the Fall Juvenile Survey, 1991.
F-6	Length-frequency distribution (mm TL) of young-of-year white perch in the Hudson River estuary determined from the Beach Seine Survey, 1991.
F-7	Length-frequency distribution (mm TL) of larval and young-of-year American shad in the Hudson River estuary determined from the Longitudinal River Ichthyoplankton Survey, 1991.
F-8	Length-frequency distribution (mm TL) of young-of-year American shad in the Hudson River estuary determined from the Fall Juvenile Survey, 1991.
F-9	Length-frequency distribution (mm TL) of young-of-year American shad in the Hudson River estuary determined from the Beach Seine Survey, 1991.
F-10	Length-frequency distribution (mm TL) of young-of-year blueback herring in the Hudson River estuary determined from the Fall Juvenile Survey, 1991.
F-11	Length-frequency distribution (mm TL) of young-of-year blueback herring in the Hudson River estuary determined from the Beach Seine Survey, 1991.
F-12	Length-frequency distribution (mm TL) of young-of-year alewife in the Hudson River estuary determined from the Fall Juvenile Survey, 1991.
F-13	Length-frequency distribution (mm TL) of young-of-year alewife in the Hudson River estuary determined from the Beach Seine Survey, 1991.

TABLE F-1 LENGTH FREQUENCY DISTRIBUTION OF LARVAL AND YOUNG-OF-YEAR STRIPED BASS IN HUDSON RIVER ESTUARY DETERMINED FROM LONGITUDINAL RIVER ICHTHYOPLANKTON SURVEY, 1991

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
30JUN-05JUL	0	0	0	1	4	17	44	48	31	35	33	27	24	22	26	46
08JUL-13JUL	0	0	0	1	0	3	4	8	4	13	18	13	15	23	18	15
22JUL-25JUL	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
06AUG-08AUG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
20AUG-22AUG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03SEP-06SEP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16SEP-18SEP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01OCT-03OCT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15OCT-17OCT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	331	3109	3576	1778	1632	1128	577	339	260	188	115	100	96	81	90

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
30JUN-05JUL	36	29	16	23	27	16	12	5	6	3	2	2	1	0	0	0
08JUL-13JUL	11	11	7	11	8	14	12	13	13	10	9	14	4	6	5	5
22JUL-25JUL	5	0	0	2	2	2	2	1	1	2	0	2	0	1	1	3
06AUG-08AUG	2	1	0	0	0	0	0	1	0	0	0	0	0	1	0	1
20AUG-22AUG	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0
03SEP-06SEP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
16SEP-18SEP	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1
01OCT-03OCT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15OCT-17OCT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	79	61	38	52	53	44	31	26	27	19	14	20	5	8	8	10

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
30JUN-05JUL	0	0	0	0	0	0	0	0	0	0	536	26.4	7.0	26.0	57.0	10.6
08JUL-13JUL	6	2	1	1	0	0	0	0	0	0	298	36.4	6.4	35.0	70.0	14.3
22JUL-25JUL	3	0	1	0	1	0	1	0	0	2	33	52.0	21.0	50.0	95.0	16.6
06AUG-08AUG	0	0	0	0	0	0	0	0	0	0	7	42.0	29.0	34.0	63.0	13.8
20AUG-22AUG	0	0	0	0	0	1	0	0	0	3	6	75.8	55.0	78.0	96.5	15.6
03SEP-06SEP	0	0	0	0	0	1	0	1	1	3	7	80.0	60.0	80.0	94.0	10.9
16SEP-18SEP	0	0	0	0	0	0	0	0	0	1	3	67.7	53.0	62.0	88.0	18.2
01OCT-03OCT	0	0	0	0	0	0	0	0	1	3	4	83.7	81.0	83.5	87.0	2.8
15OCT-17OCT	0	0	0	0	0	0	0	0	0	2	2	101.0	92.0	101.0	110.0	12.7
	9	2	2	1	1	2	1	1	2	14	14019					

NOTE: N = Number of lengths, MEAN = Mean length, MIN = Minimum length, MED = Median length, MAX = Maximum length, SD = Standard deviation

TABLE F-1 LENGTH FREQUENCY DISTRIBUTION OF LARVAL AND YOUNG-OF-YEAR STRIPED BASS IN HUDSON RIVER ESTUARY DETERMINED FROM LONGITUDINAL RIVER ICHTHYOPLANKTON SURVEY, 1991

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
15APR-19APR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22APR-26APR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
29APR-03MAY	0	3	5	1	0	0	0	0	0	0	0	0	0	0	0	0
06MAY-10MAY	0	13	134	60	0	0	0	0	0	0	0	0	0	0	0	0
13MAY-18MAY	0	132	827	236	11	0	0	0	0	0	0	0	0	0	0	0
20MAY-24MAY	0	147	1031	1071	37	4	0	0	0	0	0	0	0	0	0	0
27MAY-01JUN	0	25	852	1174	344	25	6	0	0	0	0	0	0	0	0	0
03JUN-08JUN	0	8	224	807	655	414	131	38	14	4	1	0	0	0	0	0
10JUN-15JUN	0	3	20	149	577	732	436	164	36	12	9	9	4	3	2	0
17JUN-23JUN	0	0	16	71	124	375	375	221	159	122	60	35	19	19	11	4
24JUN-30JUN	0	0	0	5	26	62	132	98	95	74	66	31	38	29	23	25

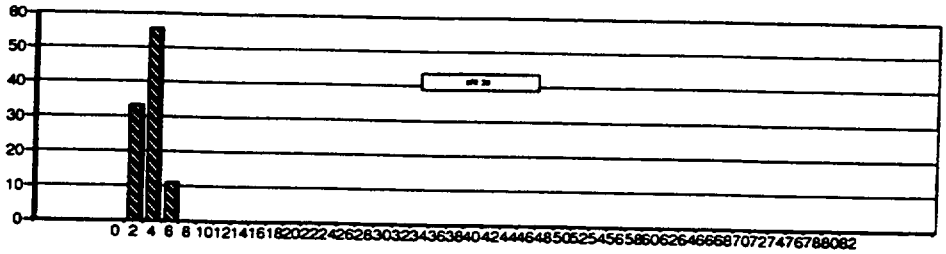
DATES	32.0-33.9	34.0-35.9	36.0-37.9	38.0-39.9	40.0-41.9	42.0-43.9	44.0-45.9	46.0-47.9	48.0-49.9	50.0-51.9	52.0-53.9	54.0-55.9	56.0-57.9	58.0-59.9	60.0-61.9	62.0-63.9
15APR-19APR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22APR-26APR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
29APR-03MAY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06MAY-10MAY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13MAY-18MAY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20MAY-24MAY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
27MAY-01JUN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03JUN-08JUN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10JUN-15JUN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17JUN-23JUN	1	1	3	0	1	0	0	0	0	0	0	0	0	0	0	0
24JUN-30JUN	24	19	12	16	15	12	5	6	7	4	2	1	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
15APR-19APR	0	0	0	0	0	0	0	0	0	0	0	.	.	.	.	.
22APR-26APR	0	0	0	0	0	0	0	0	0	0	0	.	.	.	.	.
29APR-03MAY	0	0	0	0	0	0	0	0	0	0	9	4.4	3.7	4.0	6.1	0.9
06MAY-10MAY	0	0	0	0	0	0	0	0	0	0	209	5.4	2.7	5.5	7.2	0.8
13MAY-18MAY	0	0	0	0	0	0	0	0	0	0	1233	5.0	2.2	4.9	8.7	1.0
20MAY-24MAY	0	0	0	0	0	0	0	0	0	0	2306	5.8	2.4	5.9	11.6	1.1
27MAY-01JUN	0	0	0	0	0	0	0	0	0	0	2429	6.5	2.4	6.4	13.2	1.4
03JUN-08JUN	0	0	0	0	0	0	0	0	0	0	2297	8.6	2.8	8.2	20.7	2.3
10JUN-15JUN	0	0	0	0	0	0	0	0	0	0	2157	11.1	3.3	10.8	28.8	2.7
17JUN-23JUN	0	0	0	0	0	0	0	0	0	0	1637	14.1	5.0	13.1	40.0	4.5
24JUN-30JUN	0	0	0	0	0	0	0	0	0	0	846	20.7	7.1	18.0	54.0	9.4

NOTE: N = Number of lengths, MEAN = Mean length, MIN = Minimum length, MED = Median length, MAX = Maximum length, SD = Standard deviation

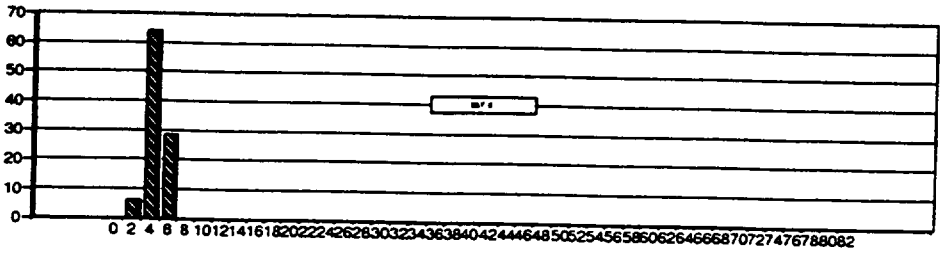
LRS- STRIPED BASS

APR 29-
MAY 3



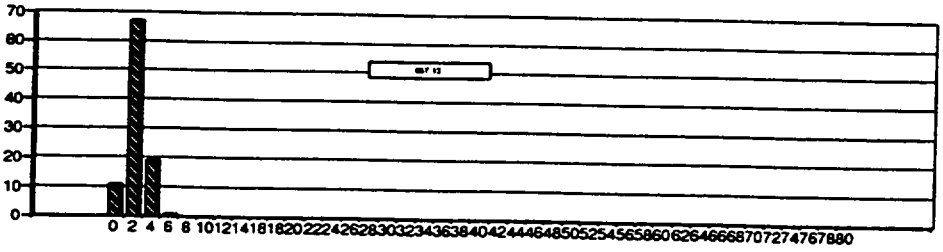
N=9

MAY 6-
MAY 10



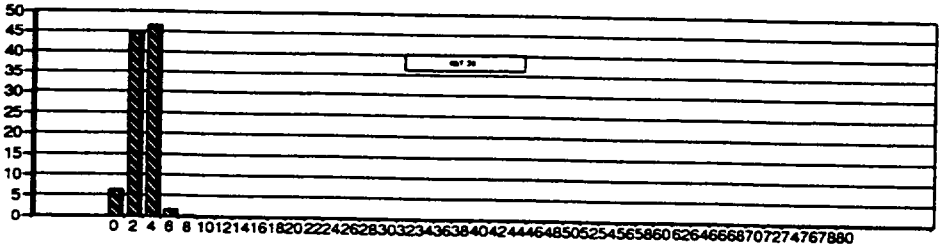
N=209

MAY 13-
MAY 18



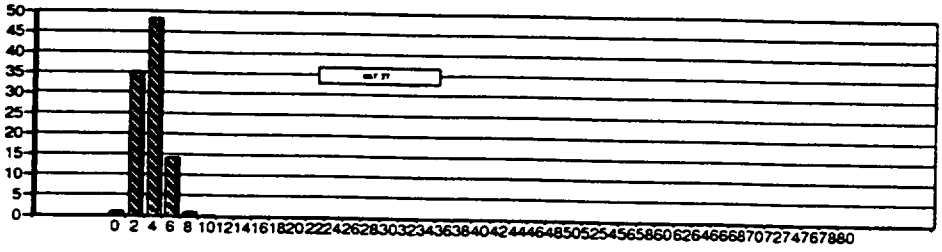
N=1233

MAY 20-
MAY 24



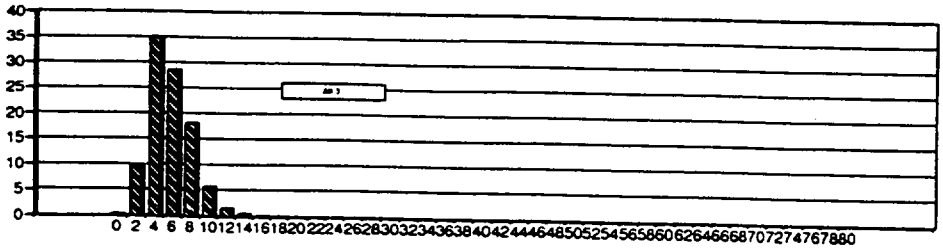
N=2306

MAY 27-
JUN 1



N=2429

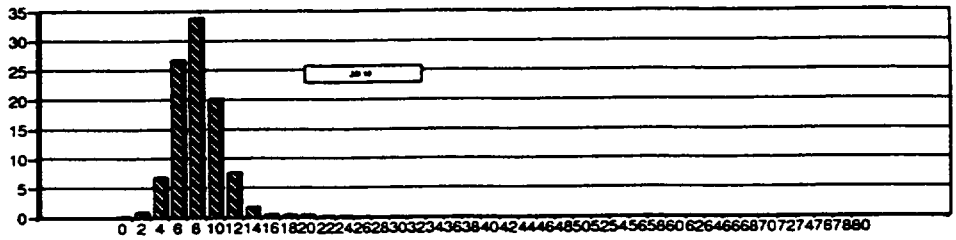
JUN 3-
JUN 8



N=2297

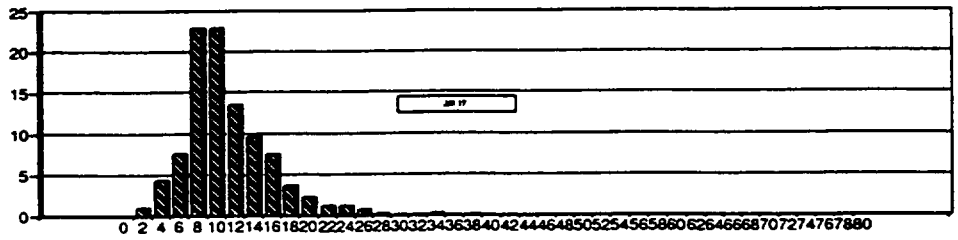
LRS- STRIPED BASS

JUN 10-
JUN 15



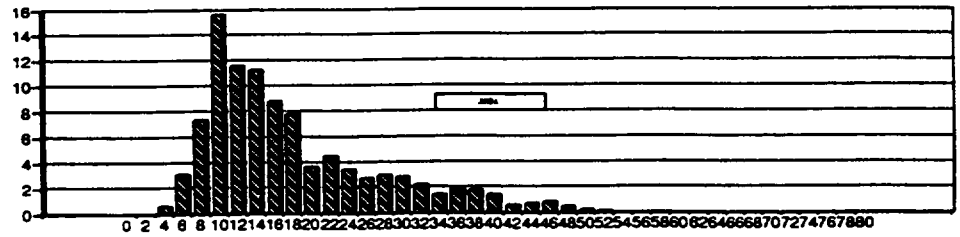
N=2157

JUN 17-
JUN 23



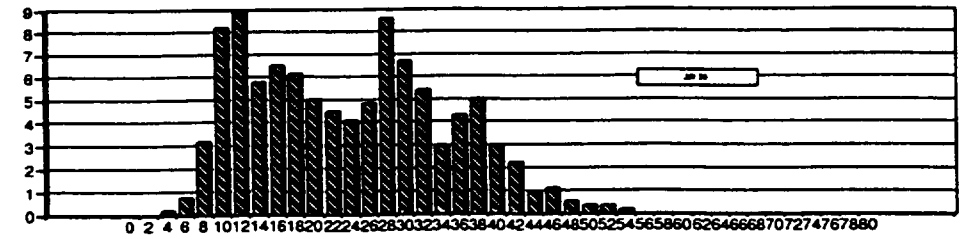
N=1637

JUN 24-
JUN 30



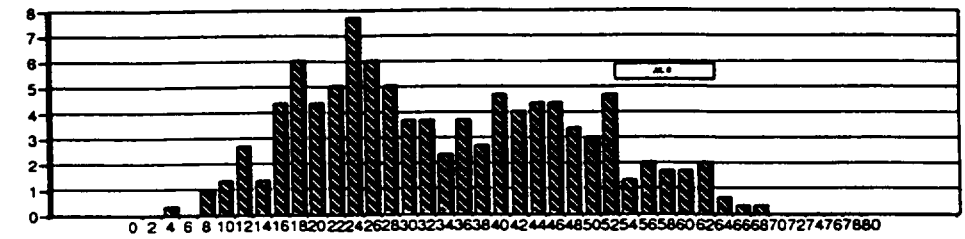
N=846

JUN 30-
JUL 5



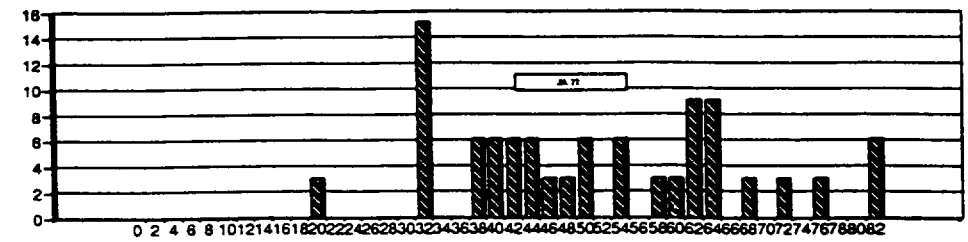
N=536

JUL 8-
JUL 13



N=298

JUL 22-
JUL 25



N=33

TABLE F-2 LENGTH FREQUENCY DISTRIBUTION OF STRIPED BASS IN HUDSON RIVER ESTUARY DETERMINED FROM FALL SHOALS SURVEY, 199

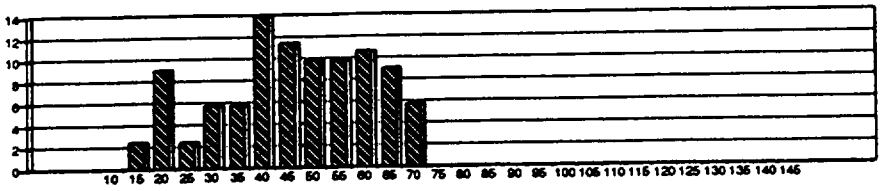
DATES	10.0-14.9	15.0-19.9	20.0-24.9	25.0-29.9	30.0-34.9	35.0-39.9	40.0-44.9	45.0-49.9	50.0-54.9	55.0-59.9	60.0-64.9	65.0-69.9	70.0-74.9	75.0-79.9	80.0-84.9	85.0-89.9	90.0-94.9
15JUL-20JUL	0	3	11	3	7	7	17	14	12	12	13	11	7	0	0	0	0
29JUL-03AUG	0	0	0	0	5	6	14	13	16	16	10	13	9	8	11	5	0
2AUG-17AUG	0	0	0	0	1	1	2	0	12	14	17	19	17	11	11	7	9
5AUG-30AUG	0	0	0	0	0	0	0	1	1	4	4	9	17	24	17	11	7
09SEP-13SEP	0	0	0	0	0	0	1	2	4	1	4	6	8	14	13	9	11
23SEP-27SEP	0	0	0	0	0	0	0	0	0	2	3	4	8	9	8	9	6
7OCT-11OCT	0	0	0	0	0	0	0	0	0	2	5	4	3	5	10	10	6
1OCT-25OCT	0	0	0	0	0	0	0	0	0	2	0	2	4	10	15	7	6
	0	3	11	3	13	14	34	30	45	53	56	68	73	81	85	58	45

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
5JUL-20JUL	0	0	0	0	0	0	0	0	0	0	0	122	48.3	17.0	49.0	74.0	15.2
29JUL-03AUG	1	1	0	0	0	0	0	0	0	0	0	128	59.5	30.0	57.0	101.0	15.7
12AUG-17AUG	3	0	1	0	0	0	0	0	0	0	0	130	69.1	31.0	67.0	106.0	13.8
5AUG-30AUG	10	5	3	0	0	0	0	0	0	0	0	114	79.4	48.0	78.0	108.0	12.4
9SEP-13SEP	8	6	3	6	5	1	0	0	0	0	0	106	83.6	41.0	82.5	120.0	18.3
23SEP-27SEP	6	6	4	7	3	1	2	0	0	0	0	79	88.9	56.0	88.0	128.0	17.5
7OCT-11OCT	7	7	9	10	3	12	3	2	1	0	0	102	95.6	57.0	96.5	136.0	20.5
1OCT-25OCT	8	4	5	5	6	6	3	3	2	2	5	96	99.5	57.0	96.5	150.0	22.9
	43	29	25	28	17	20	8	5	3	2	5	877					

NOTE: N = Number of lengths, MEAN = Mean length, MIN = Minimum length, MED = Median length, MAX = Maximum length, SD = Standard deviation

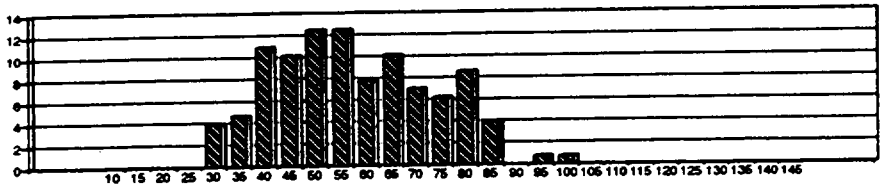
FS-STRIPED BASS

JUL 15-
JUL 20



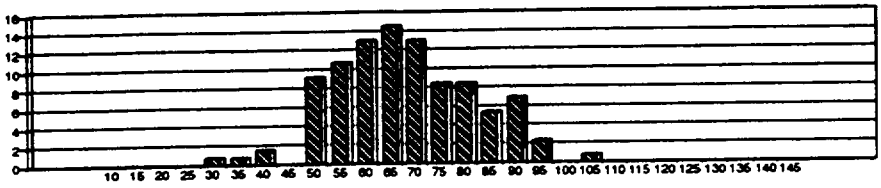
N=122

JUL 29-
AUG 3



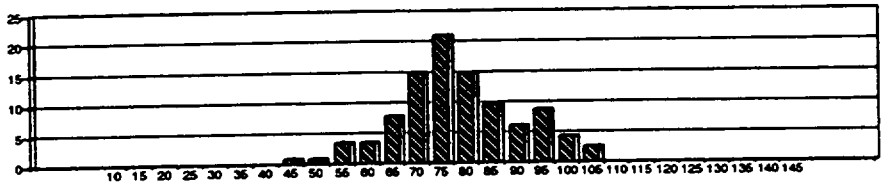
N=128

AUG 12-
AUG 17



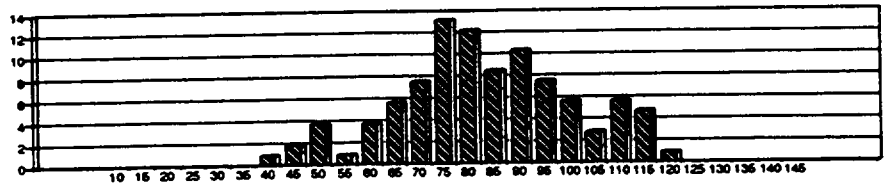
N=130

AUG 26-
AUG 30



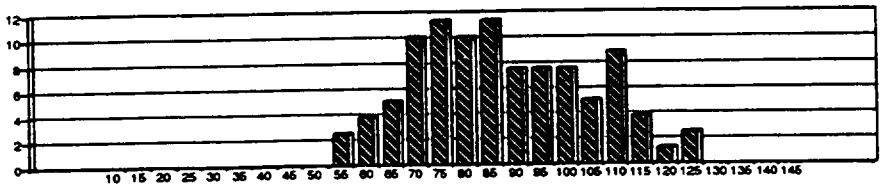
N=114

SEP 9-
SEP 13



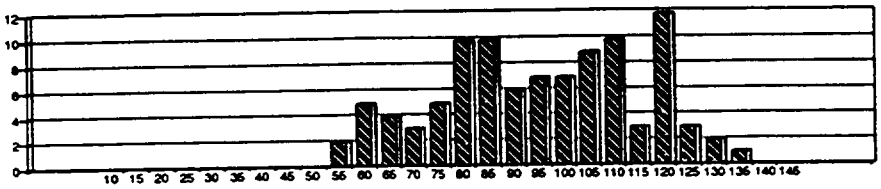
N=106

SEP 23-
SEP 27



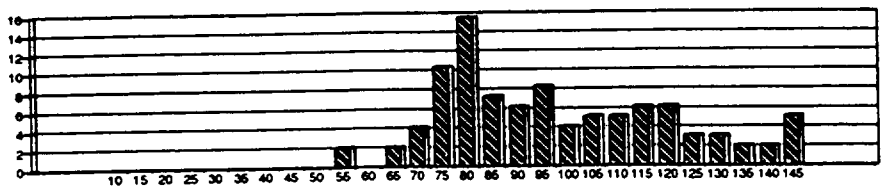
N=79

OCT 7-
OCT 11



N=102

OCT 21-
OCT 25



N=96

TABLE F-3 LENGTH FREQUENCY DISTRIBUTION OF STRIPED BASS IN HUDSON RIVER ESTUARY DETERMINED FROM BEACH SEINE SURVEY, 1991

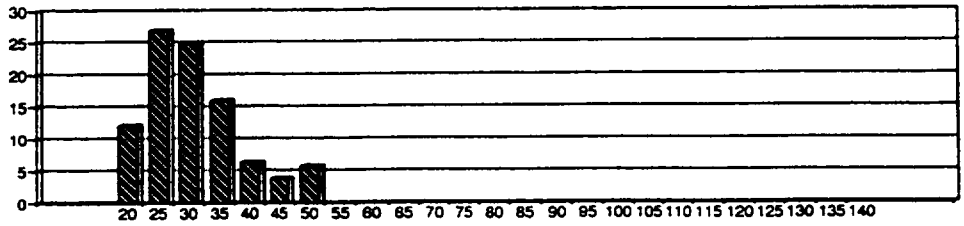
DATES	20.0-24.9	25.0-29.9	30.0-34.9	35.0-39.9	40.0-44.9	45.0-49.9	50.0-54.9	55.0-59.9	60.0-64.9	65.0-69.9	70.0-74.9	75.0-79.9	80.0-84.9	85.0-89.9	90.0-94.9	95.0-99.9
24JUN-29JUN	19	42	39	25	10	6	9	0	0	0	0	0	0	0	0	0
08JUL-12JUL	0	8	19	26	31	27	24	9	7	4	1	0	0	0	0	0
13JUL-25JUL	0	1	4	12	29	38	32	24	14	13	7	2	5	3	1	0
05AUG-08AUG	0	0	0	1	8	15	19	16	19	18	14	12	11	8	6	2
20AUG-23AUG	0	0	0	0	3	7	16	17	21	23	17	14	6	10	12	9
03SEP-06SEP	0	0	0	0	0	1	7	14	14	16	18	13	14	8	8	9
16SEP-19SEP	0	0	0	0	0	0	0	5	12	17	18	22	18	12	14	8
30SEP-04OCT	0	0	0	0	0	0	3	0	6	13	15	22	20	14	19	12
15OCT-18OCT	0	0	0	0	0	0	0	4	5	11	22	17	23	11	9	4
28OCT-01NOV	0	0	0	0	0	0	0	1	2	4	12	11	16	18	15	8
	19	51	62	64	81	94	110	90	100	119	124	113	113	84	84	52

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
24JUN-29JUN	0	0	0	0	0	0	0	0	0	156	31.8	6.0	31.0	54.0	8.6
08JUL-12JUL	0	0	0	0	0	0	0	0	0	156	44.1	25.0	43.0	71.0	9.9
13JUL-25JUL	0	0	0	0	0	0	0	0	0	186	52.9	28.0	50.0	92.0	12.2
05AUG-08AUG	1	0	0	0	0	0	0	0	0	158	64.6	38.0	63.0	100.0	13.9
20AUG-23AUG	4	2	0	0	0	0	0	0	0	164	70.4	42.0	67.0	107.0	15.5
03SEP-06SEP	10	6	1	0	0	0	0	0	0	145	76.1	49.0	73.0	110.0	15.8
16SEP-19SEP	8	7	4	1	0	0	0	0	0	150	80.4	55.0	77.5	115.0	14.5
30SEP-04OCT	8	10	6	5	2	1	2	1	0	161	86.8	53.0	84.0	135.0	17.0
15OCT-18OCT	3	0	5	2	3	7	2	2	5	135	87.5	55.0	81.0	149.0	21.9
28OCT-01NOV	2	3	5	2	1	3	4	1	2	110	90.2	55.0	87.0	143.0	18.3
	36	28	21	10	6	11	8	4	7	1521					

NOTE: N = Number of lengths, MEAN = Mean length, MIN = Minimum length, MED = Median length, MAX = Maximum length, SD = Standard deviation

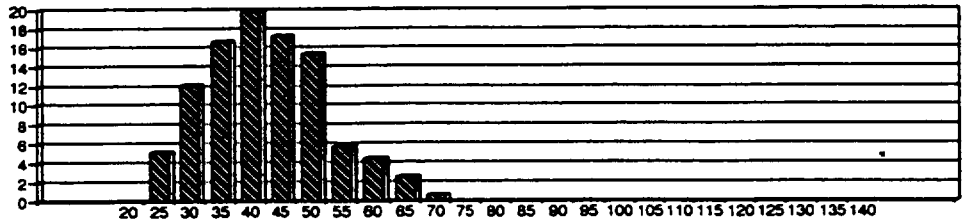
BS-STRIPED BASS

JUN 24-
JUN 29



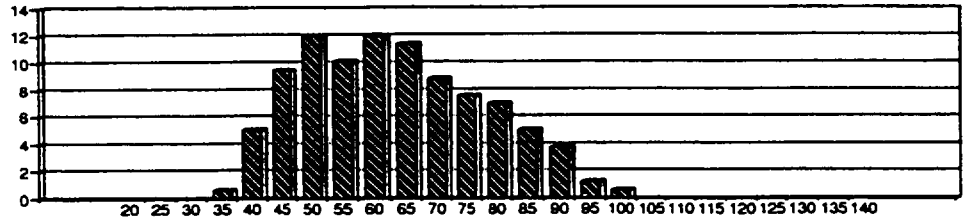
N=156

JUL 8-
JUL 12



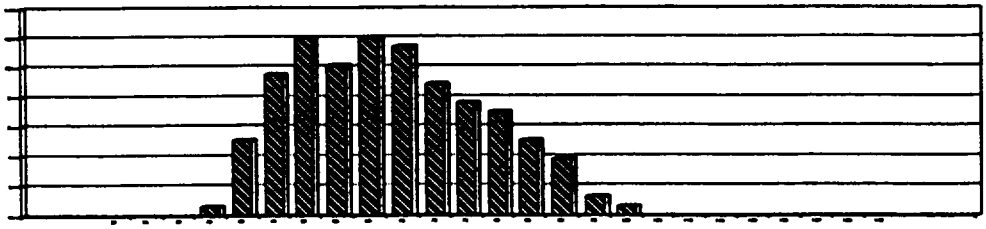
N=156

JUL 23-
JUL 25



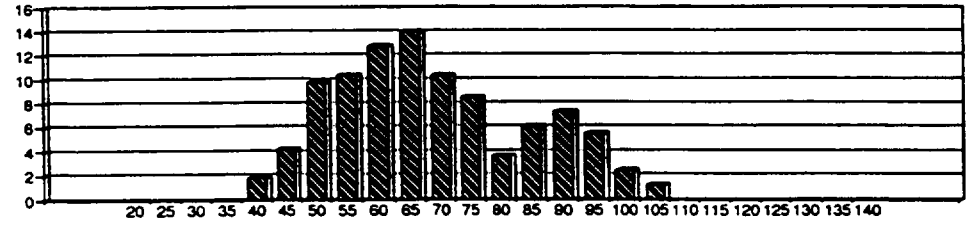
N=186

AUG 5-
AUG 8



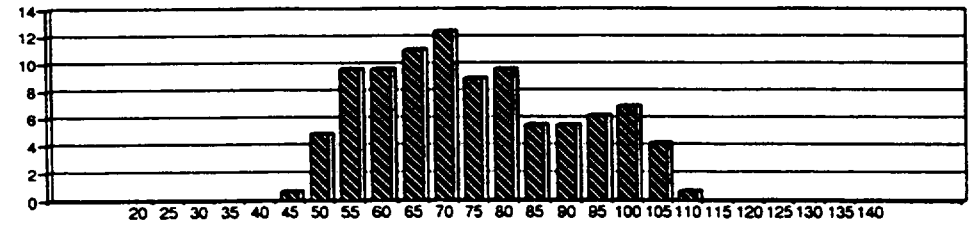
N=158

AUG 20-
AUG 23



N=164

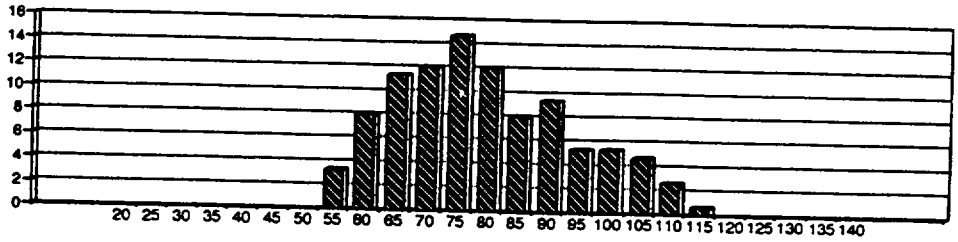
SEP 3-
SEP 6



N=145

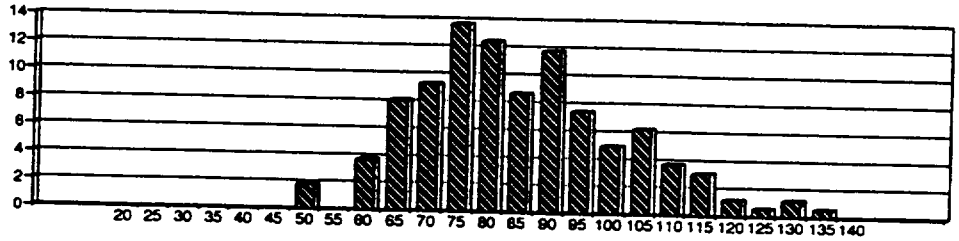
BS-STRIPED BASS

SEP 16-
SEP 19



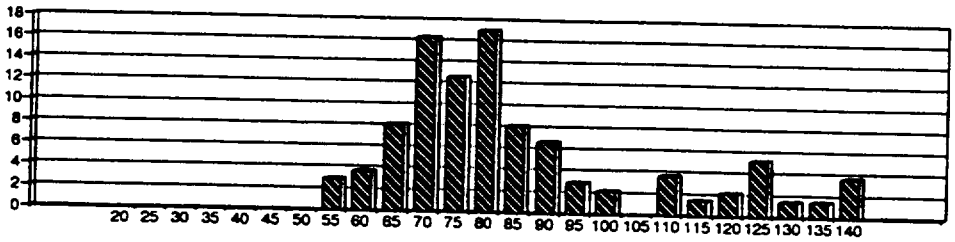
N=150

SEP 30-
OCT 4



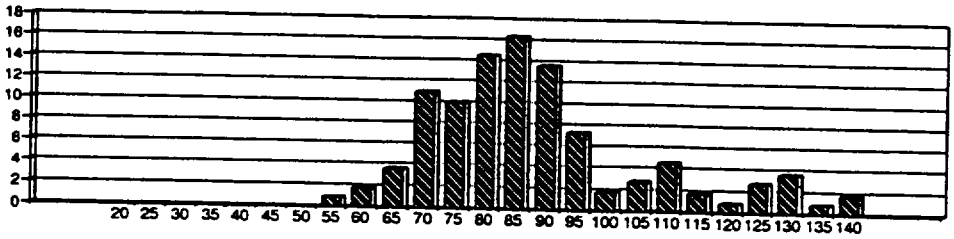
N=161

OCT 15-
OCT 18



N=135

OCT 28-
NOV 1



N=110

TABLE F-4 LENGTH FREQUENCY DISTRIBUTION OF LARVAL AND YOUNG-OF-YEAR WHITE PERCH IN HUDSON RIVER ESTUARY DETERMINED FROM LONGITUDINAL RIVER ICHTHYOPLANKTON SURVEY, 1991

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
15APR-19APR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22APR-26APR	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
29APR-03MAY	0	20	3	0	0	0	0	0	0	0	0	0	0	0	0
06MAY-10MAY	0	673	260	0	1	0	0	0	0	0	0	0	0	0	0
13MAY-18MAY	0	685	928	33	0	0	0	0	0	0	0	0	0	0	0
20MAY-24MAY	0	489	1109	492	13	3	0	0	0	0	0	0	0	0	0
27MAY-01JUN	0	280	707	878	289	25	0	0	0	0	0	0	0	0	0
03JUN-08JUN	0	212	411	664	549	272	44	7	1	0	0	0	0	0	0
10JUN-15JUN	0	72	222	482	527	239	73	32	12	5	0	0	0	0	0
17JUN-23JUN	0	29	98	265	557	440	127	57	32	23	7	3	0	1	0
24JUN-30JUN	0	0	3	30	62	112	104	32	25	10	15	5	9	6	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
15APR-19APR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22APR-26APR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
29APR-03MAY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06MAY-10MAY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13MAY-18MAY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20MAY-24MAY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
27MAY-01JUN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03JUN-08JUN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10JUN-15JUN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17JUN-23JUN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24JUN-30JUN	1	1	2	2	0	0	0	0	0	1	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
15APR-19APR	0	0	0	0	0	0	0	0	0	0	.	.	.	.	.
22APR-26APR	0	0	0	0	0	0	0	0	0	1	4.0	4.0	4.0	4.0	.
29APR-03MAY	0	0	0	0	0	0	0	0	0	25	3.4	2.8	3.3	4.1	0.4
06MAY-10MAY	0	0	0	0	0	0	0	0	0	984	3.7	2.1	3.7	8.3	0.5
13MAY-18MAY	0	0	0	0	0	0	0	0	0	1758	4.1	2.1	4.0	7.5	0.6
20MAY-24MAY	0	0	0	0	0	0	0	0	0	2191	4.9	1.9	4.7	10.4	1.2
27MAY-01JUN	0	0	0	0	0	0	0	0	0	2195	6.1	2.4	6.1	11.0	1.7
03JUN-08JUN	0	0	0	0	0	0	0	0	0	2171	7.3	2.3	7.3	16.9	2.4
10JUN-15JUN	0	0	0	0	0	0	0	0	0	1668	8.3	2.8	8.1	19.8	2.6
17JUN-23JUN	0	0	0	0	0	0	0	0	0	1645	9.7	3.0	9.5	26.4	3.0
24JUN-30JUN	0	0	0	0	0	0	0	0	0	423	13.1	5.0	12.0	49.0	5.3

NOTE: N = Number of lengths, MEAN = Mean length, MIN = Minimum length, MED = Median length, MAX = Maximum length, SD = Standard deviation

TABLE F-4 LENGTH FREQUENCY DISTRIBUTION OF LARVAL AND YOUNG-OF-YEAR WHITE PERCH IN HUDSON RIVER ESTUARY
DETERMINED FROM LONGITUDINAL RIVER ICHTHYOPLANKTON SURVEY, 1991

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
30JUN-05JUL	0	0	0	3	14	34	35	41	16	7	6	5	2	3	7
JUL-13JUL	0	0	0	0	0	2	6	7	8	11	7	7	1	2	2
22JUL-25JUL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
06AUG-08AUG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AUG-22AUG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SEP-06SEP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16SEP-18SEP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01OCT-03OCT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
OCT-17OCT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	2460	3742	2847	2012	1127	389	176	94	56	35	20	12	12	11

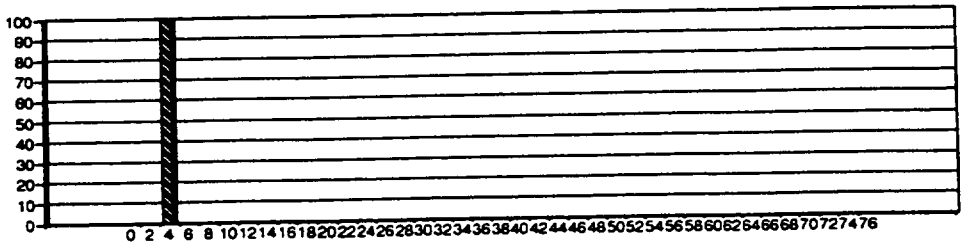
DATES	30.0-31.9	32.0-33.9	34.0-35.9	36.0-37.9	38.0-39.9	40.0-41.9	42.0-43.9	44.0-45.9	46.0-47.9	48.0-49.9	50.0-51.9	52.0-53.9	54.0-55.9	56.0-57.9	58.0-59.9
30JUN-05JUL	2	3	1	2	2	1	0	1	1	0	0	0	0	0	0
JUL-13JUL	1	2	1	1	4	2	1	1	0	0	1	1	0	0	0
22JUL-25JUL	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0
06AUG-08AUG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AUG-22AUG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SEP-06SEP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16SEP-18SEP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
01OCT-03OCT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
OCT-17OCT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	4	7	4	5	6	4	1	2	1	1	1	1	0	0	1

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
30JUN-05JUL	0	0	0	0	0	0	0	0	0	186	16.2	7.0	14.2	47.0	7.4
JUL-13JUL	0	0	0	0	0	0	0	0	0	68	23.2	10.2	20.1	52.0	9.9
22JUL-25JUL	0	0	0	0	0	0	0	0	0	3	34.0	29.0	33.0	40.0	5.6
06AUG-08AUG	0	1	0	0	0	0	0	0	0	1	62.0	62.0	62.0	62.0	.
AUG-22AUG	0	0	0	0	0	0	0	0	0	0	.	.	.	.	.
SEP-06SEP	0	0	0	0	0	1	0	1	0	3	67.7	58.0	70.0	75.0	8.7
16SEP-18SEP	0	0	0	0	0	0	0	0	1	1	80.0	80.0	80.0	80.0	.
01OCT-03OCT	0	0	0	0	0	0	0	0	0	0	.	.	.	.	.
OCT-17OCT	1	0	0	0	0	0	0	0	1	2	76.0	60.0	76.0	92.0	22.6
	1	1	0	0	0	1	0	1	2	13325					

NOTE: N = Number of lengths, MEAN = Mean length, MIN = Minimum length, MED = Median length, MAX = Maximum length, SD = Standard deviation

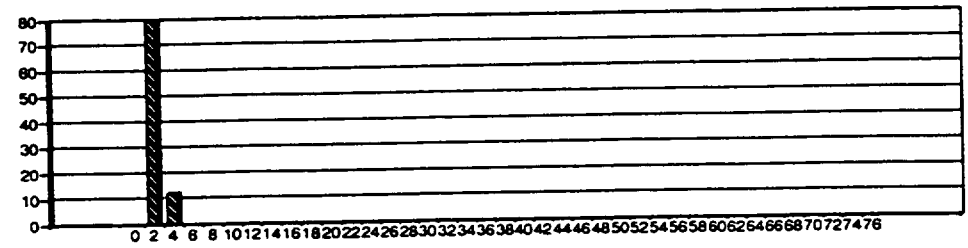
LRS- WHITE PERCH

APR 22-
APR 26



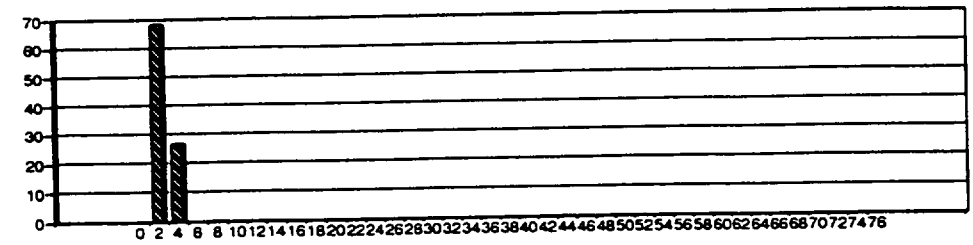
N=1

APR 29-
MAY 3



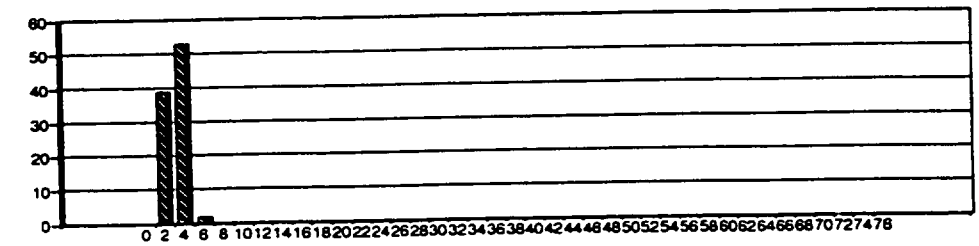
N=25

MAY 6-
MAY 10



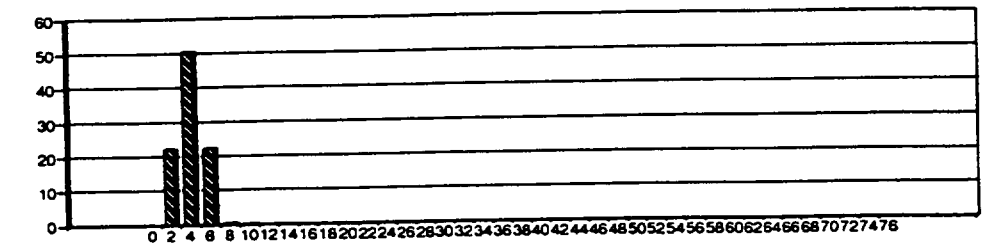
N=984

MAY 13-
MAY 18



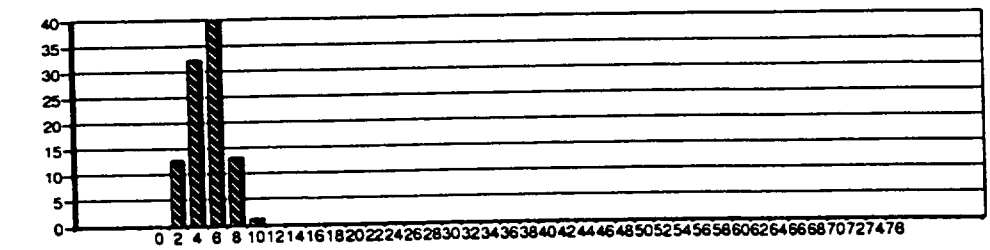
N=1758

MAY 20-
MAY 24



N=2191

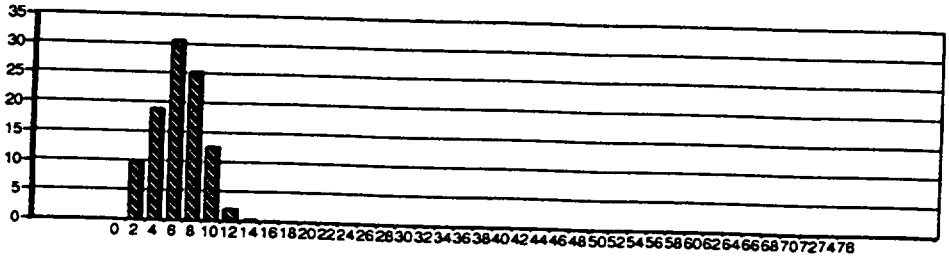
MAY 27-
JUN 1



N=2195

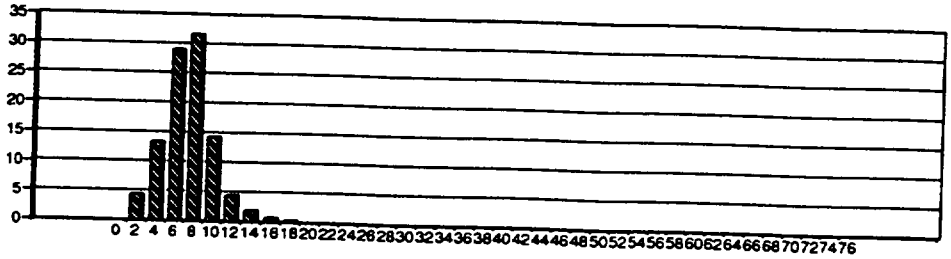
LRS- WHITE PERCH

JUN 3-
JUN 8



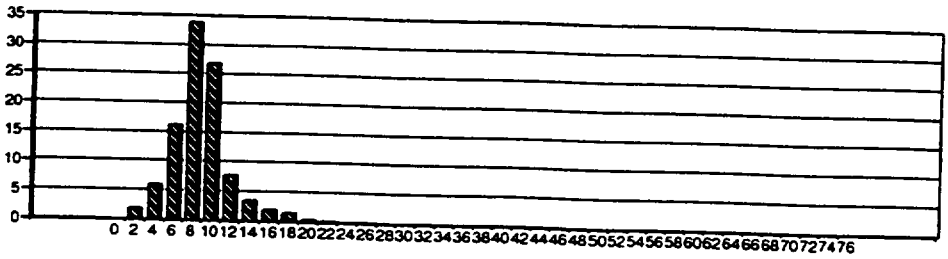
N=2171

JUN 10-
JUN 15



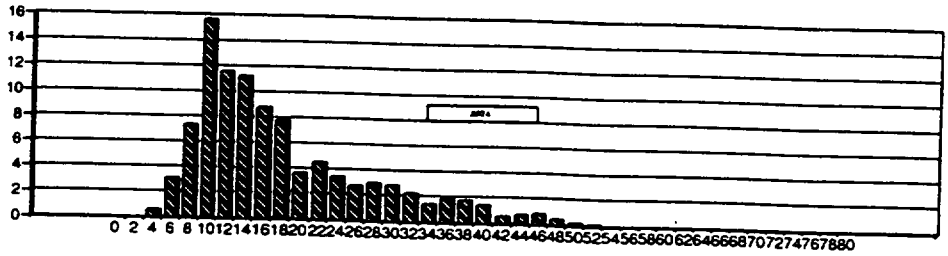
N=1668

JUN 17-
JUN 23



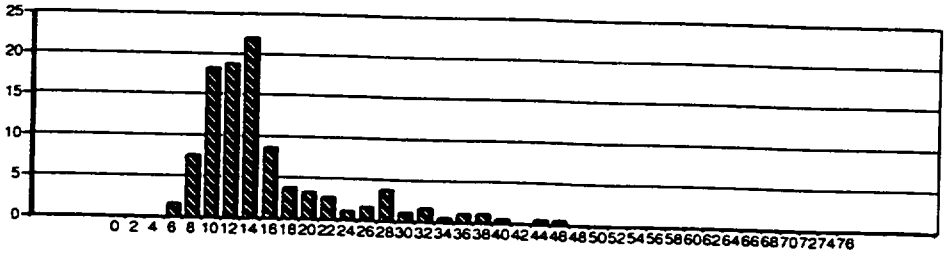
N=1645

JUN 24-
JUN 30



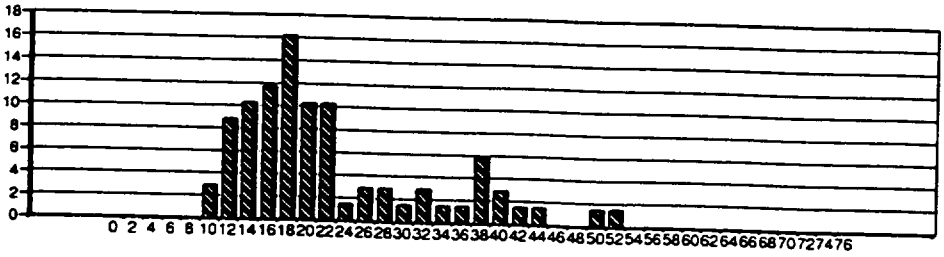
N=423

JUN 30-
JUL 5



N=186

JUL 8-
JUL 13



N=68

TABLE F-5 LENGTH FREQUENCY DISTRIBUTION OF WHITE PERCH IN HUDSON RIVER ESTUARY DETERMINED FROM FALL SHOALS SURVEY, 1991

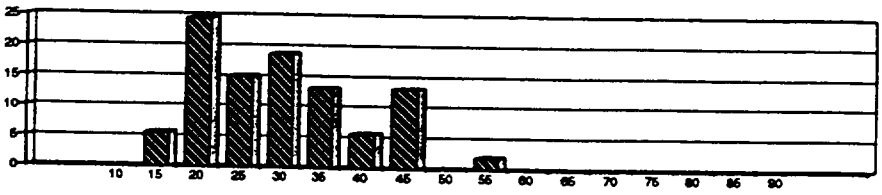
DATES	10.0-14.9	15.0-19.9	20.0-24.9	25.0-29.9	30.0-34.9	35.0-39.9	40.0-44.9	45.0-49.9	50.0-54.9	55.0-59.9	60.0-64.9	65.0-69.9
15JUL-20JUL	0	3	13	8	10	7	3	7	0	1	0	0
29JUL-03AUG	0	0	1	2	4	6	5	7	3	3	3	3
12AUG-17AUG	0	0	0	0	0	3	3	1	6	3	2	8
26AUG-30AUG	0	0	0	0	0	0	0	1	3	1	2	4
09SEP-13SEP	0	0	0	0	0	0	0	1	4	3	1	7
23SEP-27SEP	0	0	0	0	0	0	0	0	0	1	1	2
07OCT-11OCT	0	0	0	0	0	0	0	0	0	0	5	1
21OCT-25OCT	0	0	0	0	0	0	0	0	0	0	1	0
	0	3	14	10	14	16	11	17	16	12	15	25

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
15JUL-20JUL	0	0	0	0	0	53	32.1	17.0	30.0	60.0	10.4
29JUL-03AUG	0	0	0	0	0	37	45.5	24.0	45.0	66.0	11.5
12AUG-17AUG	6	1	0	0	0	35	58.5	37.0	60.0	75.0	11.4
26AUG-30AUG	2	6	7	0	0	26	70.3	46.0	74.5	83.0	11.2
09SEP-13SEP	4	7	9	7	0	43	72.6	46.0	77.0	89.0	11.8
23SEP-27SEP	4	4	8	11	2	33	80.0	55.0	81.0	90.0	8.7
07OCT-11OCT	3	11	8	12	10	50	81.2	61.0	82.0	94.0	9.0
21OCT-25OCT	3	5	12	12	35	68	88.3	63.0	90.0	100.0	8.1
	22	34	44	42	47	345					

NOTE: N = Number of lengths, MEAN = Mean length, MIN = Minimum length, MED = Median length, MAX = Maximum length, SD = Standard deviation

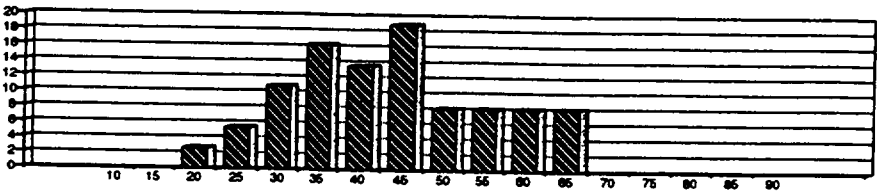
FS-WHITE PERCH

JUL 15-
JUL 20



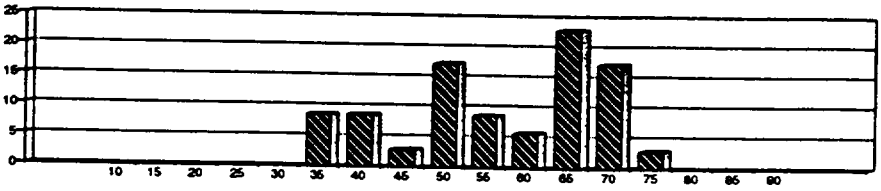
N=53

JUL 29-
AUG 3



N=37

AUG 12-
AUG 17

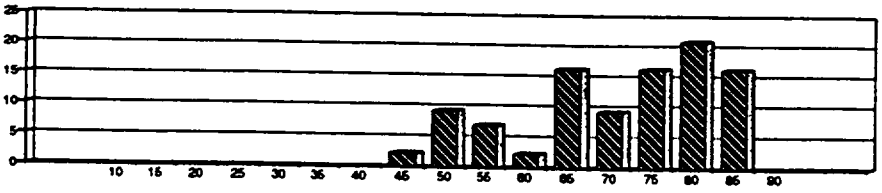


N=35

AUG 26-
AUG 30

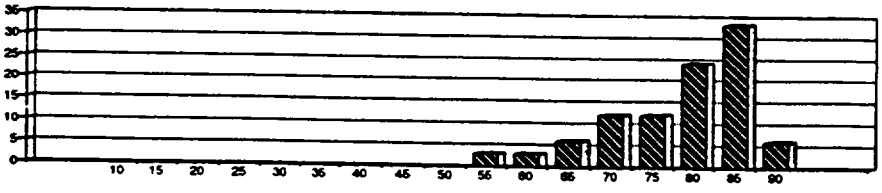
N=26

SEP 9-
SEP 13



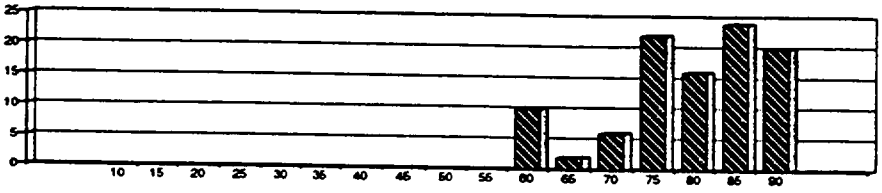
N=43

SEP 23-
SEP 27



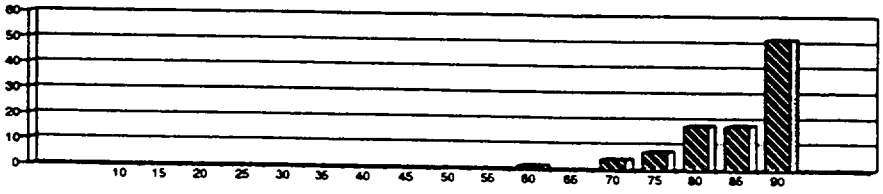
N=33

OCT 7-
OCT 11



N=50

OCT 21-
OCT 25



N=68

TABLE F-6 LENGTH FREQUENCY DISTRIBUTION OF WHITE PERCH IN HUDSON RIVER ESTUARY DETERMINED FROM BEACH SEINE SURVEY, 1991

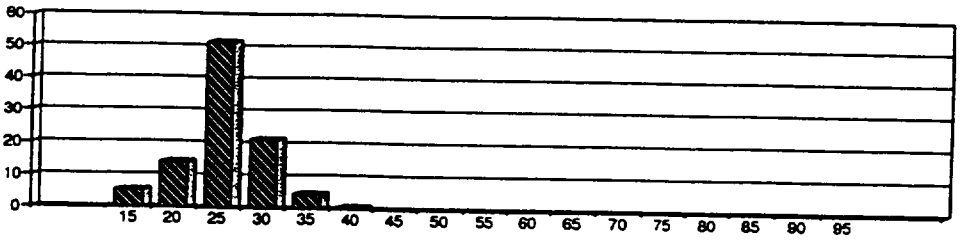
DATES	15.0-19.9	20.0-24.9	25.0-29.9	30.0-34.9	35.0-39.9	40.0-44.9	45.0-49.9	50.0-54.9	55.0-59.9	60.0-64.9	65.0-69.9	70.0-74.9
24JUN-29JUN	7	18	65	27	6	1	0	0	0	0	0	0
08JUL-12JUL	0	1	13	33	33	48	12	2	0	0	0	0
23JUL-25JUL	0	0	4	3	13	38	46	42	27	5	1	0
05AUG-08AUG	0	0	0	0	1	6	14	27	31	17	15	6
20AUG-23AUG	0	0	0	0	0	1	2	12	19	23	23	21
03SEP-06SEP	0	0	0	0	1	1	2	4	9	19	24	33
16SEP-19SEP	0	0	0	0	0	0	1	2	7	9	22	24
30SEP-04OCT	0	0	0	0	0	0	0	0	0	0	7	14
15OCT-18OCT	0	0	0	0	0	0	0	0	0	2	5	11
28OCT-01NOV	0	0	0	0	0	0	0	0	0	0	0	2
	7	19	82	63	54	95	77	89	93	75	97	111

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
24JUN-29JUN	0	0	0	0	0	126	26.9	1.0	27.0	40.0	5.4
08JUL-12JUL	0	0	0	0	0	142	37.3	24.0	38.0	50.0	5.8
23JUL-25JUL	0	0	0	0	0	181	47.8	26.0	48.0	65.0	7.4
05AUG-08AUG	2	0	0	0	0	128	57.3	39.0	57.0	78.0	7.9
20AUG-23AUG	12	4	0	0	0	120	64.7	43.0	64.5	82.0	8.5
03SEP-06SEP	11	7	1	0	0	117	67.2	39.0	68.0	85.0	8.2
16SEP-19SEP	22	15	11	2	0	118	72.6	48.0	72.0	90.0	9.3
30SEP-04OCT	14	16	16	3	0	70	79.0	65.0	79.5	90.0	6.9
15OCT-18OCT	11	13	8	6	0	59	77.9	60.0	77.0	92.0	8.8
28OCT-01NOV	8	5	4	5	7	31	86.1	73.0	85.0	100.0	8.6
	80	60	40	16	7	1092					

NOTE: N = Number of lengths, MEAN = Mean length, MIN = Minimum length, MED = Median length, MAX = Maximum length, SD = Standard deviation

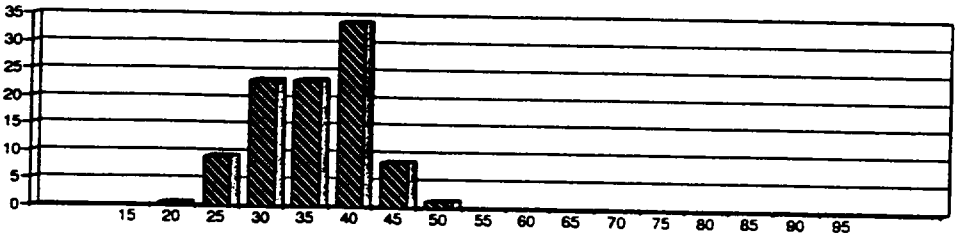
BS-WHITE PERCH

JUN 24-
JUN 29



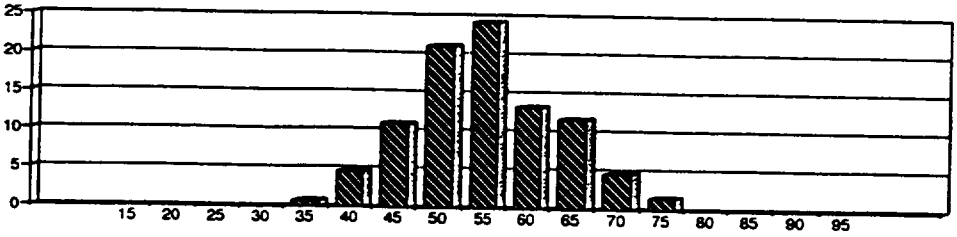
N=126

JUL 8-
JUL 12



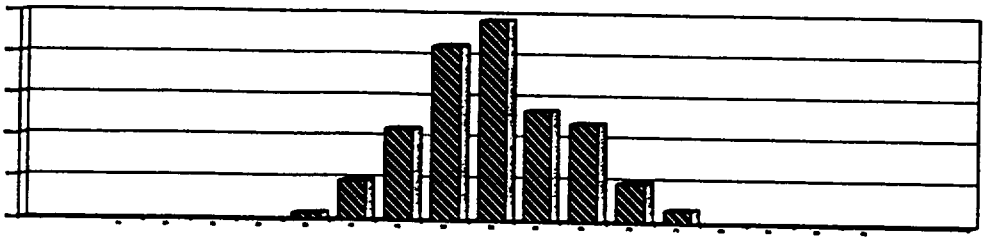
N=142

JUL 23-
JUL 25



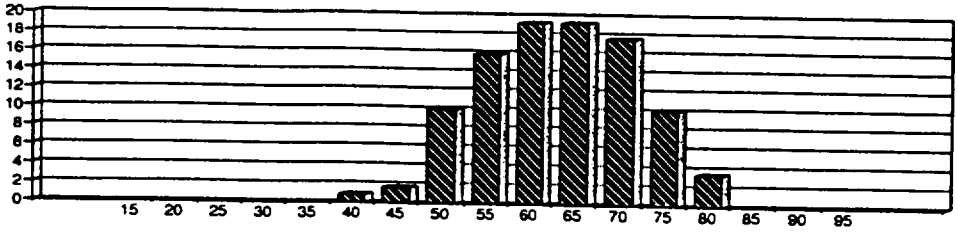
N=181

AUG 5-
AUG 8



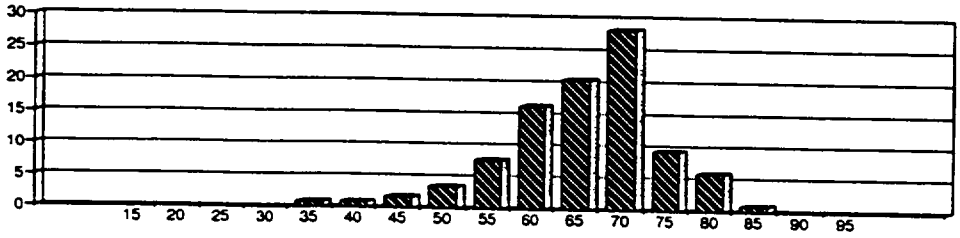
N=128

AUG 20-
AUG 23



N=120

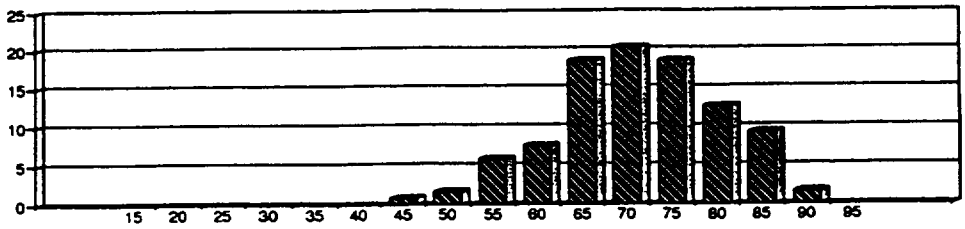
SEP 3-
SEP 6



N=117

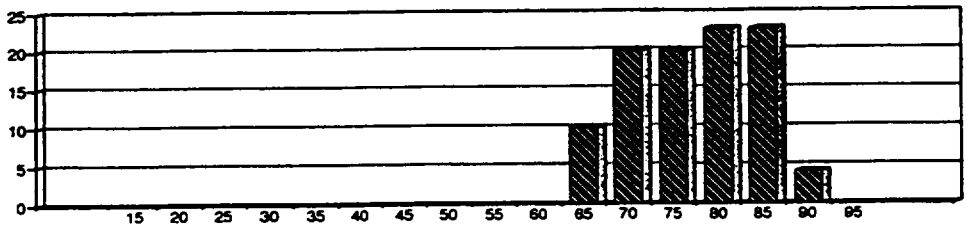
BS-WHITE PERCH

SEP 16-
SEP 19



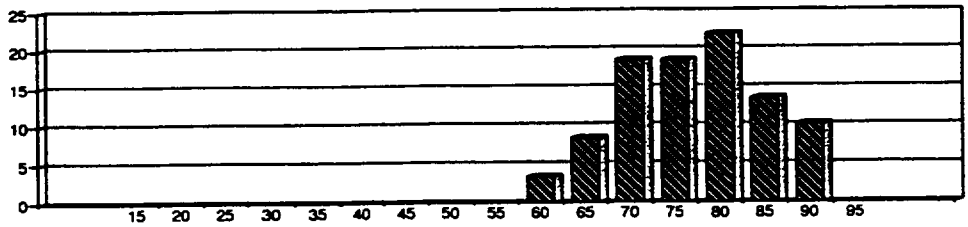
N=118

SEP 30-
OCT 4



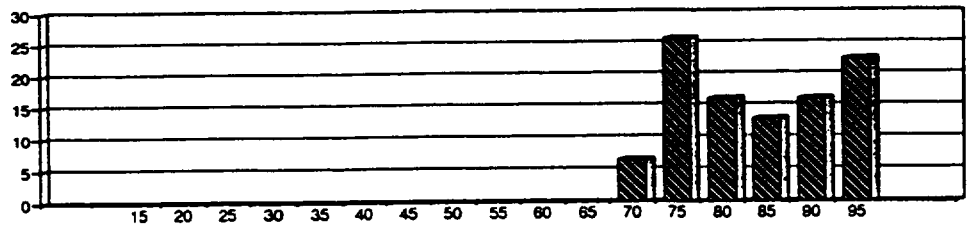
N=70

OCT 15-
OCT 18



N=59

OCT 28-
NOV 1



N=31

TABLE F-7 LENGTH FREQUENCY DISTRIBUTION OF LARVAL AND YOUNG-OF-YEAR AMERICAN SHAD IN HUDSON RIVER ESTUARY DETERMINED FROM LONGITUDINAL RIVER ICHTHYOPLANKTON SURVEY, 1991

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
5APR-19APR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2APR-26APR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
29APR-03MAY	0	4	15	7	0	0	0	0	0	0	0	0	0	0	0	0	0
06MAY-10MAY	0	4	72	178	33	0	0	0	0	0	0	0	0	0	0	0	0
3MAY-18MAY	0	8	59	193	24	0	0	0	0	0	0	0	0	0	0	0	0
MAY-24MAY	0	3	20	41	75	35	8	1	0	0	0	0	0	0	0	0	0
27MAY-01JUN	0	0	12	8	9	29	24	27	24	11	1	0	0	0	0	0	0
03JUN-08JUN	0	3	4	1	4	12	30	47	58	64	35	20	2	0	0	0	0
JUN-15JUN	0	0	2	3	4	4	15	34	64	44	46	38	45	35	56	49	23
.7JUN-23JUN	0	0	1	1	0	0	3	6	7	16	6	15	24	18	13	19	24
24JUN-30JUN	0	0	0	0	0	0	2	2	3	5	9	9	14	11	9	9	5

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
5APR-19APR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2APR-26APR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
29APR-03MAY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06MAY-10MAY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3MAY-18MAY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MAY-24MAY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
27MAY-01JUN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03JUN-08JUN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
JUN-15JUN	15	2	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0
.JUN-23JUN	15	15	16	17	20	18	23	11	6	6	0	0	1	0	0	0	0
24JUN-30JUN	11	6	9	10	10	5	24	23	41	25	17	22	5	9	1	1	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
APR-19APR	0	0	0	0	0	0	0	0	0	0	0	0	.	.	.	.	.
APR-26APR	0	0	0	0	0	0	0	0	0	0	0	0	.	.	.	.	.
29APR-03MAY	0	0	0	0	0	0	0	0	0	0	0	26	9.3	7.4	9.3	11.0	1.1
06MAY-10MAY	0	0	0	0	0	0	0	0	0	0	0	287	10.7	7.7	10.8	13.8	1.2
MAY-18MAY	0	0	0	0	0	0	0	0	0	0	0	284	10.6	6.2	10.8	13.6	1.2
MAY-24MAY	0	0	0	0	0	0	0	0	0	0	0	183	12.6	7.6	12.9	18.1	2.1
27MAY-01JUN	0	0	0	0	0	0	0	0	0	0	0	145	16.8	8.0	17.0	24.4	3.9
03JUN-08JUN	0	0	0	0	0	0	0	0	0	0	0	295	20.8	7.1	21.2	28.8	3.7
JUN-15JUN	0	0	0	0	0	0	0	0	0	0	0	499	27.1	8.0	27.1	62.5	6.6
.. JUN-23JUN	0	0	0	0	0	0	0	0	0	0	0	306	37.4	9.8	37.0	57.0	10.4
24JUN-30JUN	0	0	0	0	0	0	0	0	0	0	0	297	46.6	17.1	50.0	69.0	12.5

NOTE: N = Number of lengths, MEAN = Mean length, MIN = Minimum length, MED = Median length, MAX = Maximum length, SD = Standard deviation

TABLE F-7 LENGTH FREQUENCY DISTRIBUTION OF LARVAL AND YOUNG-OF-YEAR AMERICAN SHAD IN HUDSON RIVER ESTUARY DETERMINED FROM LONGITUDINAL RIVER ICHTHYOPLANKTON SURVEY, 1991

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
30JUN-05JUL	0	0	0	0	0	0	1	1	1	1	2	5	3	2	4	6	4
08JUL-13JUL	0	0	0	0	0	1	0	0	0	1	2	0	0	0	0	3	1
22JUL-25JUL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06AUG-08AUG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20AUG-22AUG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03SEP-06SEP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16SEP-18SEP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01OCT-03OCT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15OCT-17OCT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	22	185	432	149	81	83	118	157	142	101	87	88	66	82	86	57

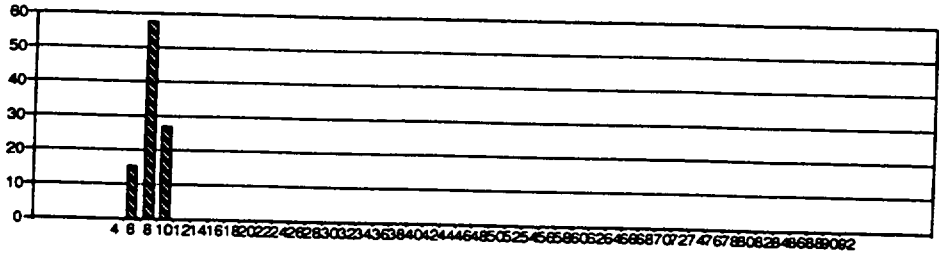
DATES	38.0-39.9	40.0-41.9	42.0-43.9	44.0-45.9	46.0-47.9	48.0-49.9	50.0-51.9	52.0-53.9	54.0-55.9	56.0-57.9	58.0-59.9	60.0-61.9	62.0-63.9	64.0-65.9	66.0-67.9	68.0-69.9	70.0-71.9
30JUN-05JUL	6	7	2	2	2	4	8	8	18	20	10	15	7	4	1	2	2
08JUL-13JUL	1	1	1	1	1	6	6	4	17	4	18	14	12	23	4	3	7
22JUL-25JUL	0	0	0	0	0	0	0	0	2	0	1	1	3	1	1	0	2
06AUG-08AUG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2
20AUG-22AUG	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
03SEP-06SEP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
16SEP-18SEP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01OCT-03OCT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15OCT-17OCT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	48	31	30	30	34	33	61	46	84	55	46	52	28	38	7	7	15

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
30JUN-05JUL	2	0	0	0	0	0	0	0	0	0	0	150	49.8	17.0	54.0	73.0	12.5
08JUL-13JUL	1	2	1	0	2	0	0	0	0	0	1	139	58.1	15.6	60.0	97.5	11.4
22JUL-25JUL	0	0	0	0	0	0	0	0	0	0	0	11	62.7	55.0	63.0	70.0	5.2
06AUG-08AUG	2	1	0	0	0	0	0	0	0	0	0	6	71.3	69.0	71.0	75.0	2.2
20AUG-22AUG	0	1	0	1	0	0	0	0	0	0	1	5	76.6	65.0	75.0	95.0	11.4
03SEP-06SEP	1	0	1	1	1	0	0	1	0	0	0	6	77.2	70.0	77.5	86.0	5.7
16SEP-18SEP	0	0	0	2	1	1	0	0	0	0	0	4	80.0	78.0	79.5	83.0	2.2
01OCT-03OCT	0	1	0	1	0	1	1	1	1	1	0	7	83.7	75.0	85.0	91.0	5.6
15OCT-17OCT	0	0	0	0	0	0	2	1	0	1	7	11	98.1	85.0	100.0	115.0	10.8
	6	5	2	5	4	2	3	3	1	2	9	2661					

NOTE: N = Number of lengths, MEAN = Mean length, MIN = Minimum length, MED = Median length, MAX = Maximum length, SD = Standard deviation

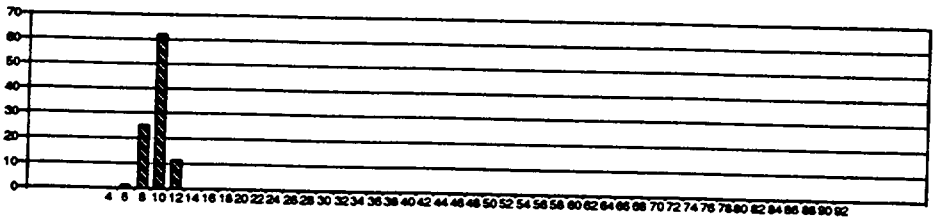
LRS- AMERICAN SHAD

APR 29-
MAY 3



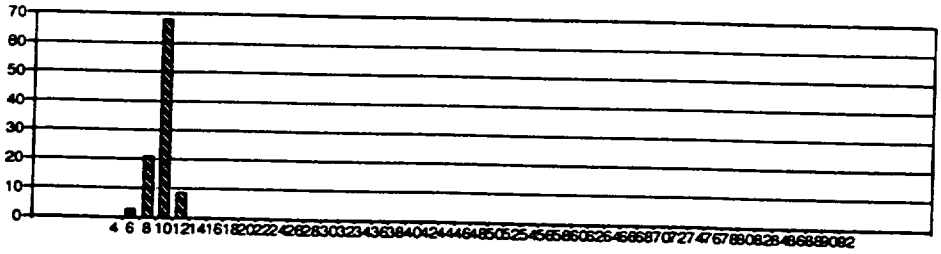
N=26

MAY 6-
MAY 10



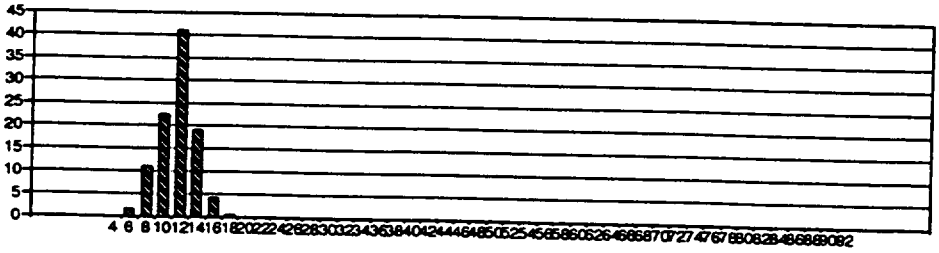
N=287

MAY 13-
MAY 18



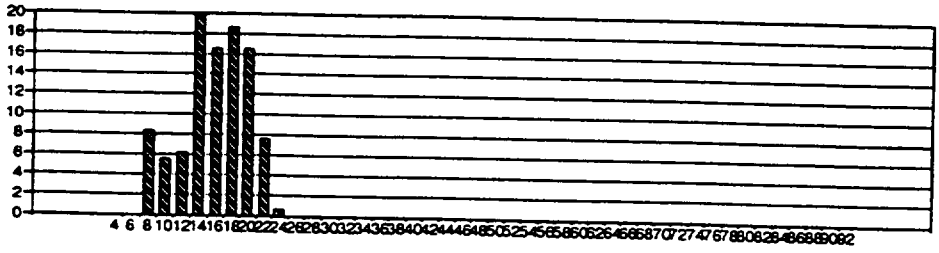
N=284

MAY 20-
MAY 24



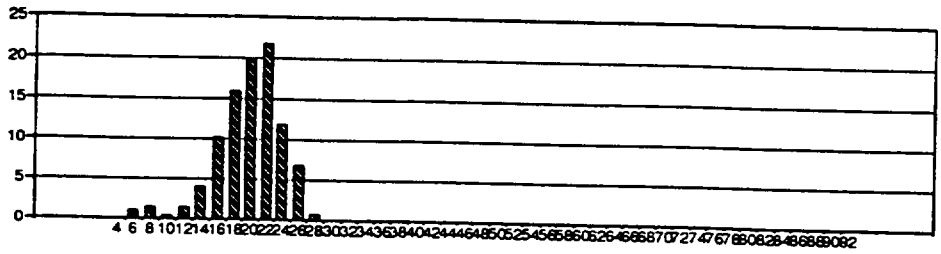
N=183

MAY 27-
JUN 1



N=145

JUN 3-
JUN 8



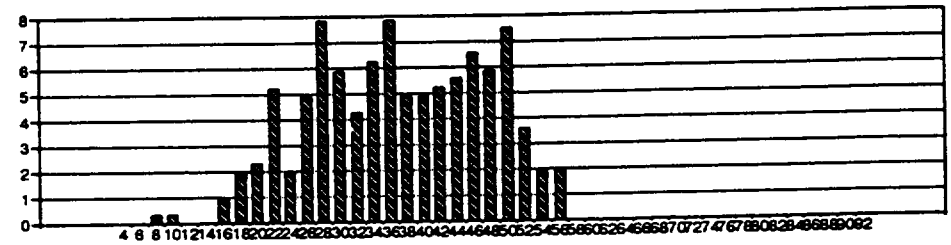
N=295

LRS- AMERICAN SHAD

JUN 10-
JUN 15

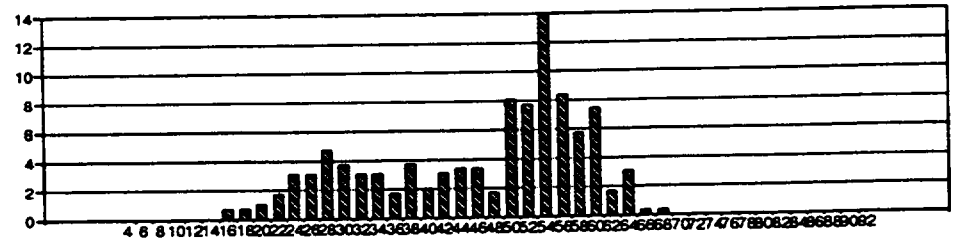
N=499

JUN 17-
JUN 23



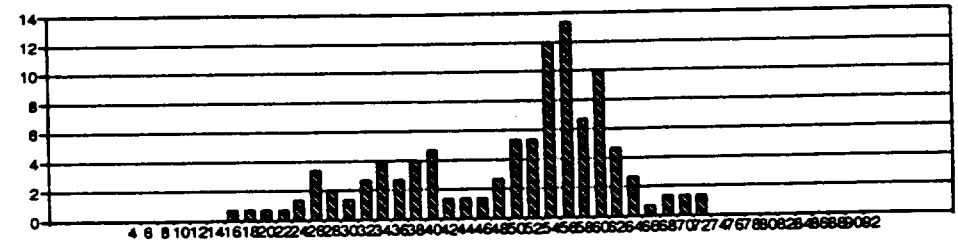
N=306

JUN24-
JUN 30



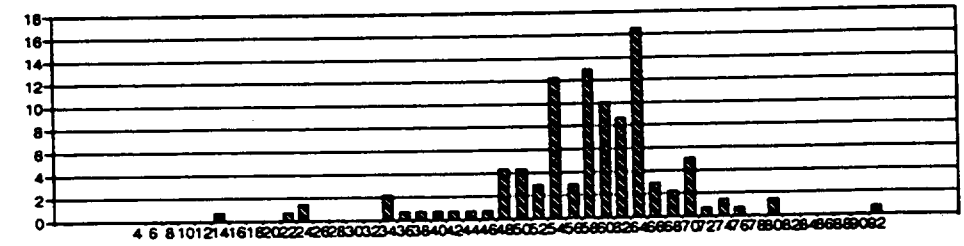
N=297

JUN 30-
JUL 5



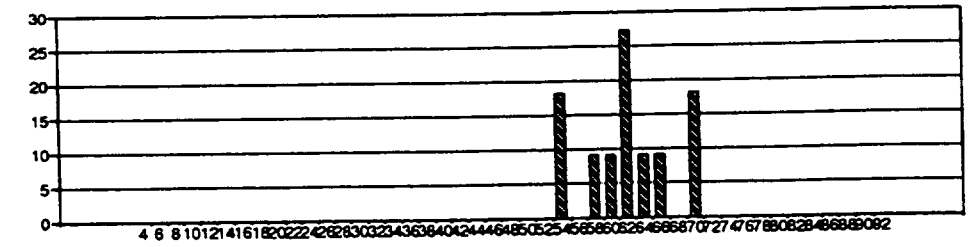
N=150

JUL 8-
JUL 13



N=139

JUL 22-
JUL 25



N=11

TABLE F-8 LENGTH FREQUENCY DISTRIBUTION OF AMERICAN SHAD IN HUDSON RIVER ESTUARY DETERMINED FROM FALL SHOALS SURVEY, 1991

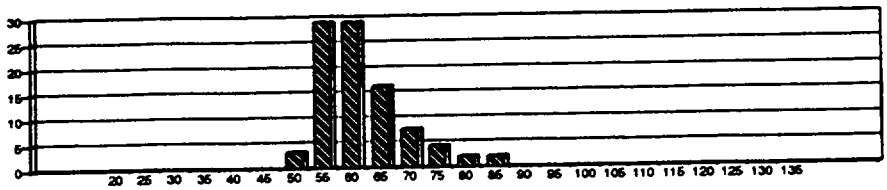
DATES	20.0-24.9	25.0-29.9	30.0-34.9	35.0-39.9	40.0-44.9	45.0-49.9	50.0-54.9	55.0-59.9	60.0-64.9	65.0-69.9	70.0-74.9	75.0-79.9	80.0-84.9	85.0-89.9	90.0-94.9
5JUL-20JUL	0	0	0	0	0	0	3	27	27	15	7	4	2	2	0
29JUL-03AUG	0	0	0	0	0	0	1	3	16	30	7	4	7	3	0
12AUG-17AUG	0	0	0	0	0	0	0	2	7	13	16	9	6	1	0
6AUG-30AUG	0	0	0	0	0	0	0	0	1	7	11	18	10	4	4
9SEP-13SEP	0	0	0	0	0	0	0	0	0	5	7	17	19	11	7
23SEP-27SEP	0	0	0	0	0	0	0	0	0	1	2	8	10	5	8
7OCT-11OCT	0	0	0	0	0	0	0	0	0	0	1	11	7	9	11
10CT-25OCT	0	0	0	0	0	0	0	0	0	0	0	3	6	2	7
	0	0	0	0	0	0	4	32	51	71	51	74	67	37	37

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
5JUL-20JUL	0	0	0	0	0	0	0	0	0	93	63.5	51.0	62.0	85.0	7.0
29JUL-03AUG	0	0	0	0	0	0	0	0	0	74	68.3	54.0	66.0	89.0	7.5
12AUG-17AUG	0	0	0	0	0	0	0	0	0	54	71.2	58.0	70.0	86.0	6.6
26AUG-30AUG	1	1	0	0	0	0	0	0	0	57	78.1	63.0	77.0	100.0	8.0
9SEP-13SEP	3	0	2	0	0	1	0	0	0	72	82.3	67.0	81.0	121.0	9.6
23SEP-27SEP	2	1	1	0	1	0	1	0	0	40	86.7	69.0	83.0	125.0	11.1
07OCT-11OCT	3	2	0	1	0	0	2	0	0	47	88.0	71.0	86.0	129.0	11.6
17OCT-25OCT	15	9	6	4	0	0	2	0	0	54	97.4	76.0	97.5	129.0	11.1
	24	13	9	5	1	1	5	0	0	491					

NOTE: N = Number of lengths, MEAN = Mean length, MIN = Minimum length, MED = Median length, MAX = Maximum length, SD = Standard deviation

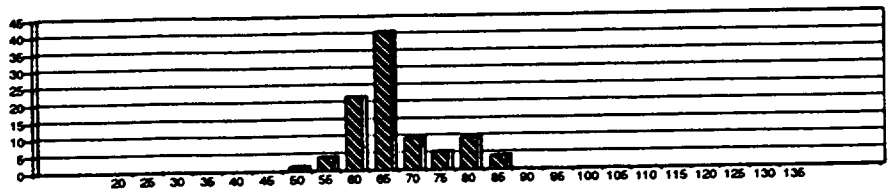
FS- AMERICAN SHAD

JUL 15-
JUL 20



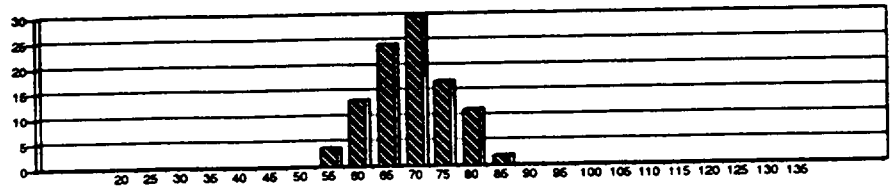
N=93

JUL 29-
AUG 3



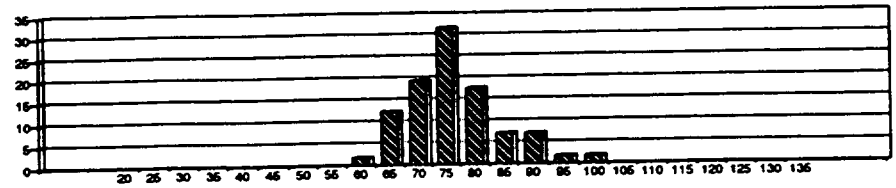
N=74

AUG 12-
AUG 17



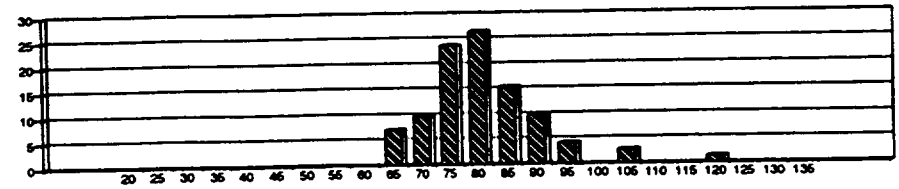
N=54

AUG 26-
AUG 30



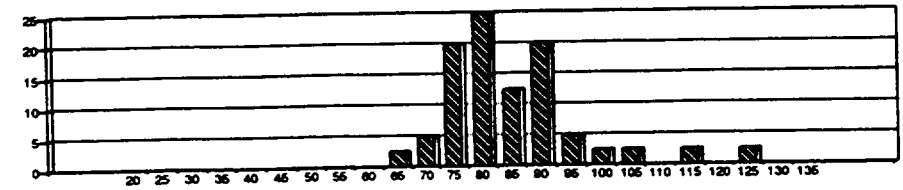
N=57

SEP 9-
SEP 13



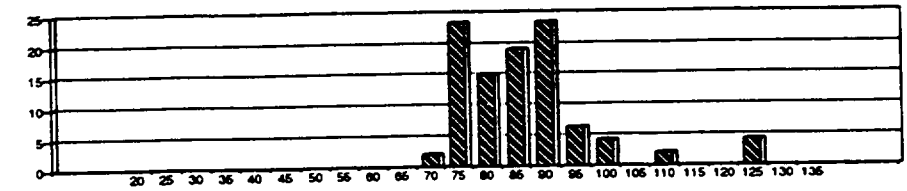
N=72

SEP 23-
SEP 27



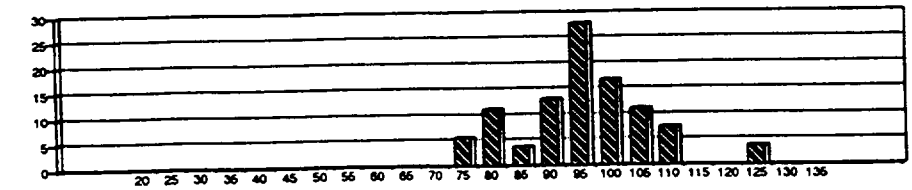
N=40

OCT 7-
OCT 11



N=47

OCT 21-
OCT 25



N=54

TABLE F-9 LENGTH FREQUENCY DISTRIBUTION OF AMERICAN SHAD IN HUDSON RIVER ESTUARY DETERMINED FROM BEACH SEINE SURVEY, 1991

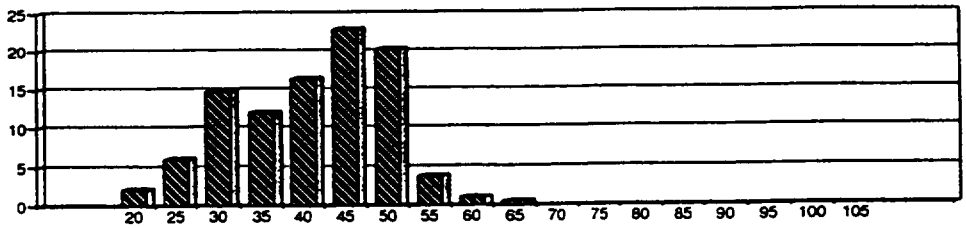
DATES	20.0-24.9	25.0-29.9	30.0-34.9	35.0-39.9	40.0-44.9	45.0-49.9	50.0-54.9	55.0-59.9	60.0-64.9	65.0-69.9	70.0-74.9	75.0-79.9
24JUN-29JUN	4	11	27	22	30	42	37	7	2	1	0	0
JUL-12JUL	0	0	0	4	11	26	46	42	15	9	5	0
JUL-25JUL	0	0	0	0	3	10	28	65	33	10	7	2
05AUG-08AUG	0	0	0	0	0	0	0	14	17	35	17	4
AUG-23AUG	0	0	0	0	0	0	2	3	5	24	25	14
SEP-06SEP	0	0	0	0	0	0	0	1	1	14	22	18
SEP-19SEP	0	0	0	0	0	0	0	0	1	1	13	23
30SEP-04OCT	0	0	0	0	0	0	0	0	0	1	4	17
OCT-18OCT	0	0	0	0	0	0	0	0	0	1	4	18
OCT-01NOV	0	0	0	0	0	0	0	0	0	0	4	14
	4	11	27	26	44	78	113	132	74	96	101	110

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
JUN-29JUN	0	0	0	0	0	0	183	42.5	20.0	44.0	69.0	9.1
JUL-12JUL	1	0	0	0	0	0	166	54.2	35.0	54.0	81.0	7.6
23JUL-25JUL	2	0	0	0	0	0	179	58.3	41.0	58.0	80.0	6.5
05AUG-08AUG	0	1	0	0	0	0	95	65.9	55.0	67.0	85.0	5.4
AUG-23AUG	1	0	0	0	0	0	74	69.6	53.0	70.5	80.0	5.7
SEP-06SEP	7	1	1	0	0	0	65	73.7	59.0	73.0	91.0	5.7
16SEP-19SEP	18	9	2	0	0	0	67	78.6	62.0	78.0	93.0	5.5
SEP-04OCT	21	15	3	0	0	0	61	81.3	68.0	81.0	93.0	5.1
OCT-18OCT	31	19	6	7	2	2	90	83.9	66.0	82.0	114.0	7.8
28OCT-01NOV	29	31	11	4	2	0	95	84.9	71.0	85.0	104.0	6.1
	110	76	23	11	4	2	1075					

NOTE: N = Number of lengths, MEAN = Mean length, MIN = Minimum length, MED = Median length, MAX = Maximum length, SD = Standard deviation

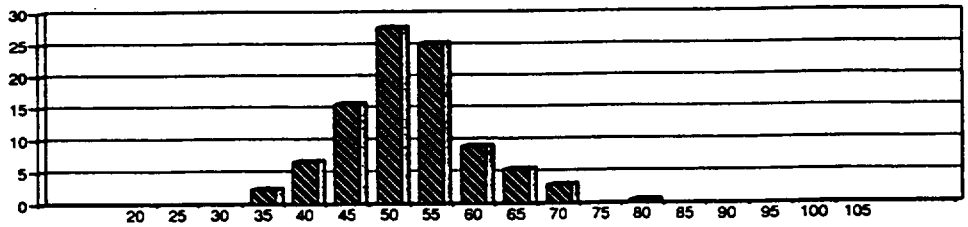
BS-AMERICAN SHAD

JUN 24-
JUN 29



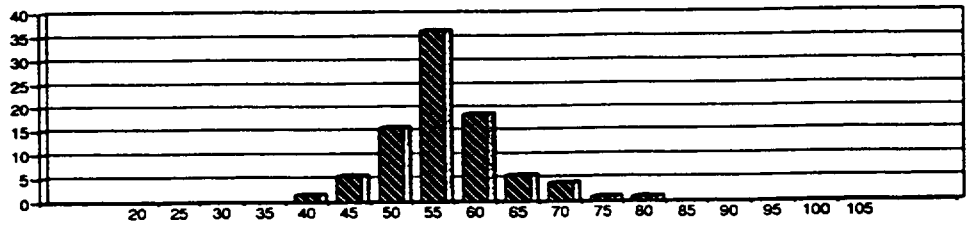
N=183

JUL 8-
JUL 12



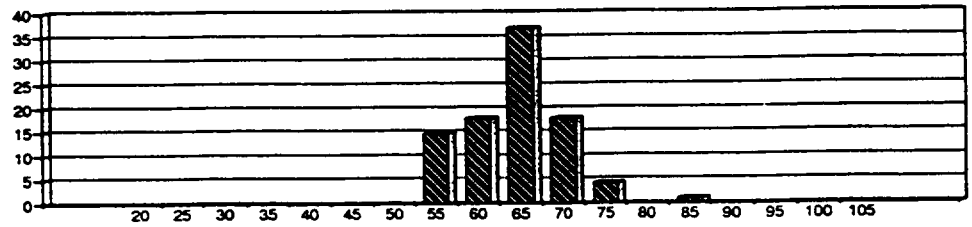
N=166

JUL 23-
JUL 25



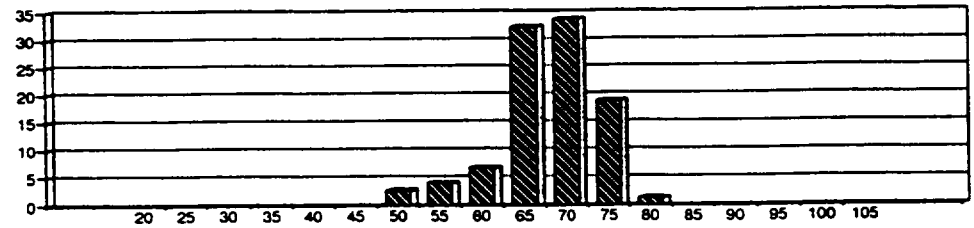
N=179

AUG 5-
AUG 8



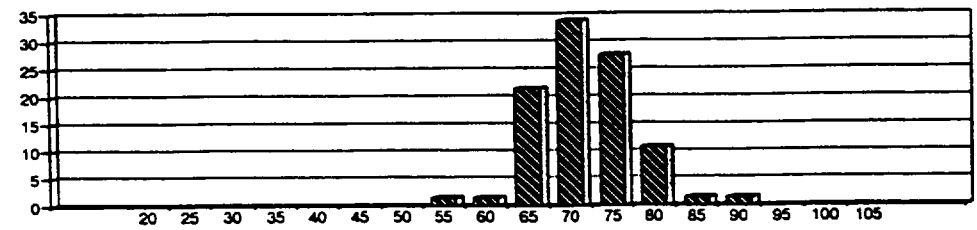
N=95

AUG 20-
AUG 23



N=74

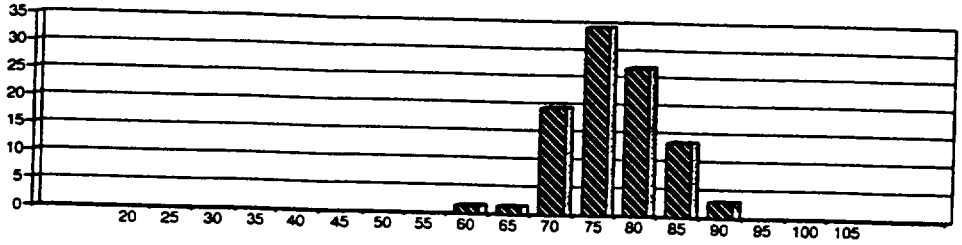
SEP 3-
SEP 6



N=65

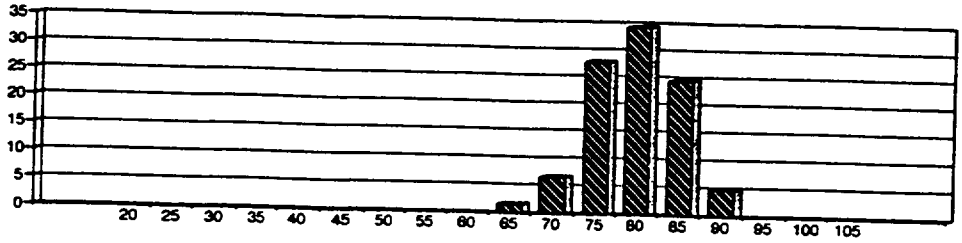
BS-AMERICAN SHAD

SEP 16-
SEP 19



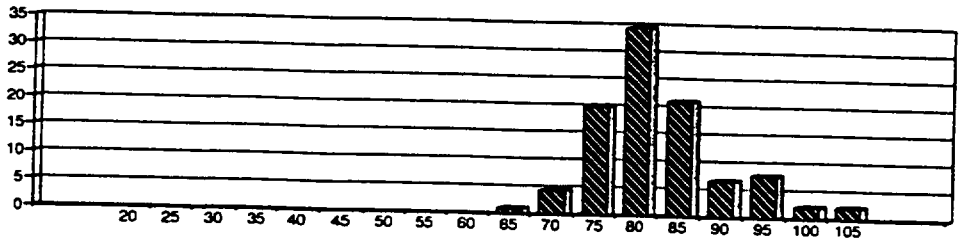
N=67

SEP 30-
OCT 4



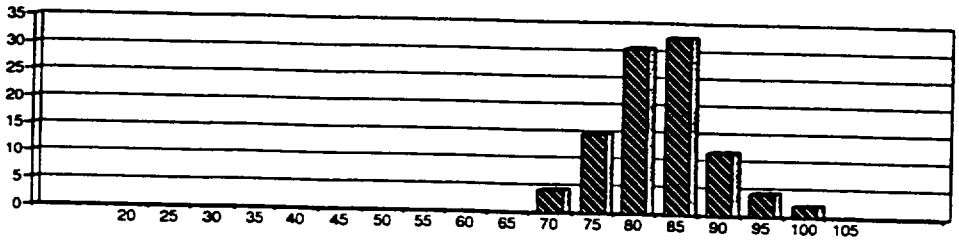
N=61

OCT 15-
OCT 18



N=90

OCT 28-
NOV 1



N=95

TABLE F-10 LENGTH FREQUENCY DISTRIBUTION OF BLUEBACK HERRING IN HUDSON RIVER ESTUARY DETERMINED FROM FALL SHOALS SURVEY, 1991

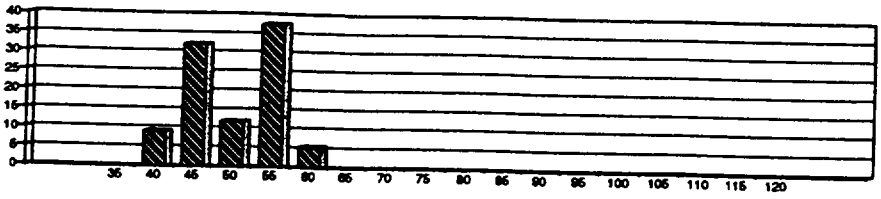
DATES	35.0-39.9	40.0-44.9	45.0-49.9	50.0-54.9	55.0-59.9	60.0-64.9	65.0-69.9	70.0-74.9	75.0-79.9	80.0-84.9	85.0-89.9	90.0-94.9
15JUL-20JUL	0	10	35	13	41	6	0	0	0	0	0	0
29JUL-03AUG	0	1	1	23	43	39	10	1	0	0	0	0
12AUG-17AUG	1	2	1	7	8	24	11	0	0	0	0	0
26AUG-30AUG	0	0	1	4	16	20	17	11	4	1	0	0
09SEP-13SEP	0	0	0	1	7	15	20	6	3	3	0	0
23SEP-27SEP	0	0	0	2	3	17	20	20	2	2	1	0
07OCT-11OCT	0	0	0	1	1	3	22	19	13	10	2	1
21OCT-25OCT	0	0	0	0	1	1	14	29	38	32	12	2
	1	13	38	51	120	125	114	86	60	48	15	3

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
15JUL-20JUL	0	0	0	0	0	0	109	52.3	40.0	53.0	63.0	5.9
29JUL-03AUG	0	0	0	0	0	0	135	58.5	42.0	59.0	72.0	4.6
12AUG-17AUG	0	0	0	0	0	0	60	59.5	37.0	61.5	68.0	6.6
26AUG-30AUG	0	0	0	0	0	0	76	63.7	47.0	63.0	80.0	6.7
09SEP-13SEP	0	0	0	0	0	0	57	66.0	51.0	66.0	81.0	6.2
23SEP-27SEP	0	0	0	0	0	0	68	67.4	52.0	68.0	89.0	6.3
07OCT-11OCT	0	0	0	0	0	0	72	72.5	54.0	71.0	90.0	6.7
21OCT-25OCT	0	0	0	0	0	0	129	76.8	55.0	77.0	91.0	6.2
	0	0	0	0	0	0	706					

NOTE: N = Number of lengths, MEAN = Mean length, MIN = Minimum length, MED = Median length, MAX = Maximum length, SD = Standard deviation

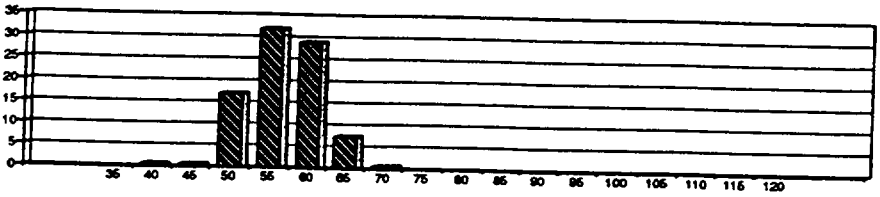
FS-BLUEBACK HERRING

JUL 15-
JUL 20



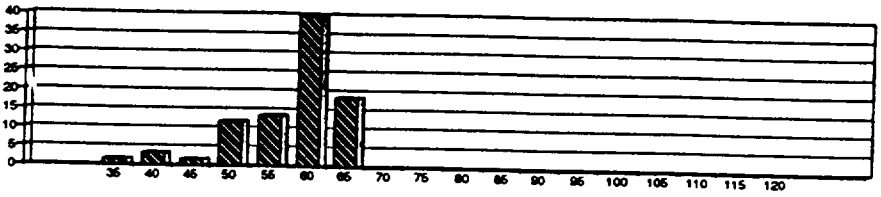
N=109

JUL 29-
AUG 3



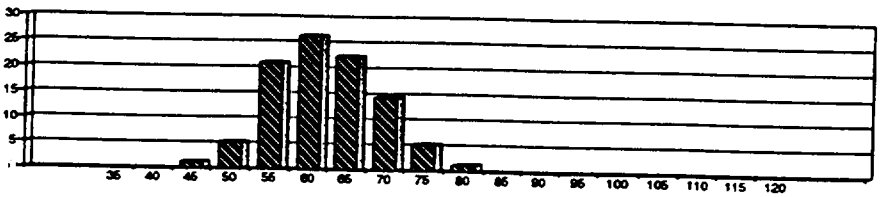
N=135

AUG 12-
AUG 17



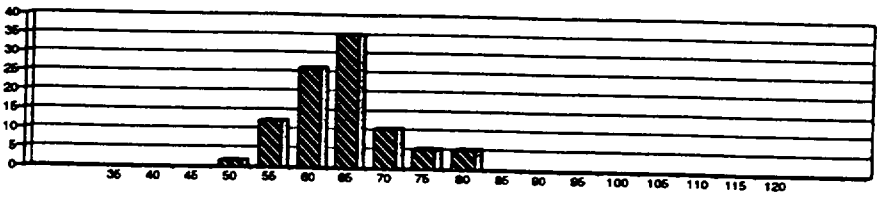
N=60

AUG 26-
AUG 30



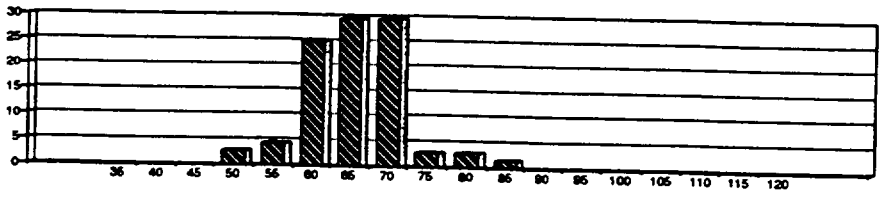
N=76

SEP 9-
SEP 13



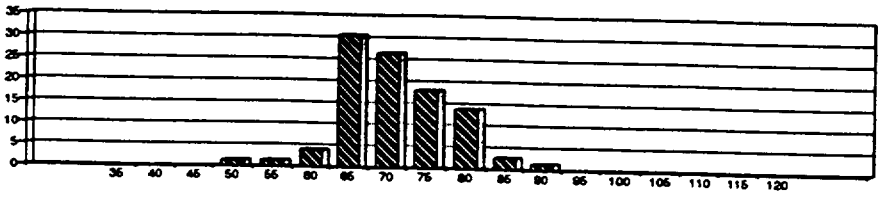
N=57

SEP 23-
SEP 27



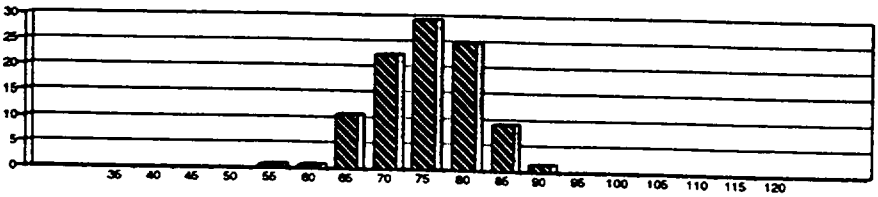
N=68

OCT 7-
OCT 11



N=72

OCT 21-
OCT 25



N=129

TABLE F-11 LENGTH FREQUENCY DISTRIBUTION OF BLUEBACK HERRING IN HUDSON RIVER ESTUARY DETERMINED FROM BEACH SEINE SURVEY, 1991

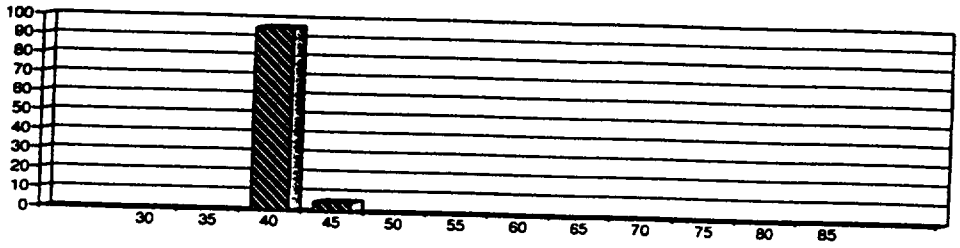
DATES	30.0-34.9	35.0-39.9	40.0-44.9	45.0-49.9	50.0-54.9	55.0-59.9	60.0-64.9	65.0-69.9	70.0-74.9
24JUN-29JUN	0	0	58	3	0	0	0	0	0
08JUL-12JUL	0	4	80	37	25	33	5	0	0
23JUL-25JUL	0	0	55	60	27	13	0	0	0
05AUG-08AUG	0	0	5	13	14	13	13	9	0
20AUG-23AUG	0	0	0	6	11	12	17	4	0
03SEP-06SEP	0	0	5	4	7	19	6	9	1
16SEP-19SEP	0	0	0	0	0	4	15	14	8
30SEP-04OCT	0	0	0	1	0	3	3	7	8
15OCT-18OCT	0	0	0	0	0	2	2	14	21
28OCT-01NOV	0	0	0	0	1	4	6	22	38
	0	4	203	124	85	103	67	79	76

DATES	75.0-79.9	80.0-84.9	85.0-89.9+	N	MEAN	MIN	MED	MAX	SD
24JUN-29JUN	0	0	0	61	42.4	41.0	42.0	45.0	1.2
08JUL-12JUL	0	0	0	186	47.5	36.0	45.0	62.0	6.5
23JUL-25JUL	0	0	0	155	46.9	40.0	46.0	58.0	4.5
05AUG-08AUG	0	0	0	73	55.6	42.0	56.0	68.0	7.2
20AUG-23AUG	0	0	0	54	57.4	45.0	58.0	68.0	6.0
03SEP-06SEP	0	0	0	52	56.7	42.0	57.0	70.0	7.3
16SEP-19SEP	3	0	0	47	65.8	56.0	65.0	79.0	5.3
30SEP-04OCT	5	0	0	31	67.3	49.0	67.0	79.0	7.5
15OCT-18OCT	10	5	3	57	72.1	55.0	71.0	88.0	6.8
28OCT-01NOV	37	15	4	127	73.0	52.0	73.0	95.0	6.8
	55	20	7	843					

NOTE: N = Number of lengths, MEAN = Mean length, MIN = Minimum length, MED = Median length, MAX = Maximum length, SD = Standard deviation

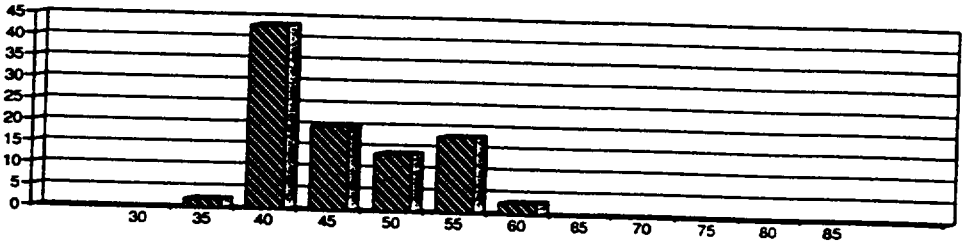
BS-BLUEBACK HERRING

JUN 24-
JUN 29



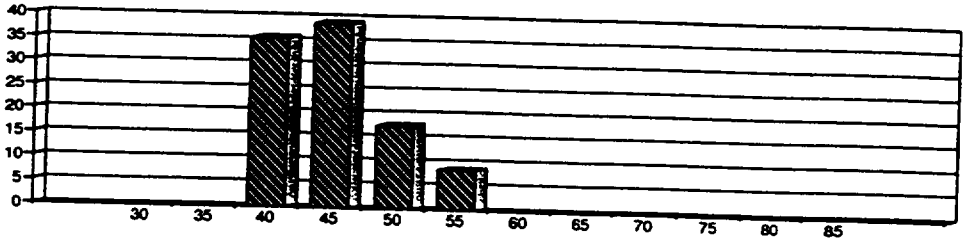
N=61

JUL 8-
JUL 12



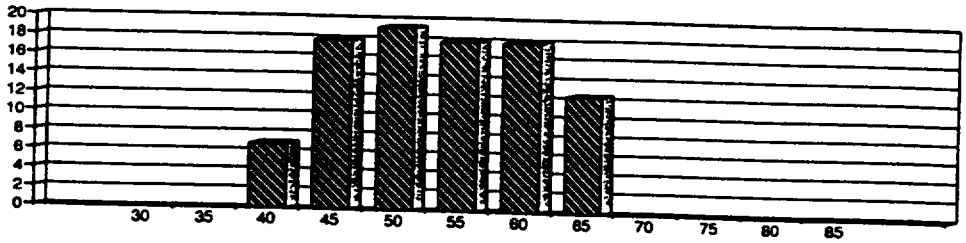
N=186

JUL 23-
JUL 25



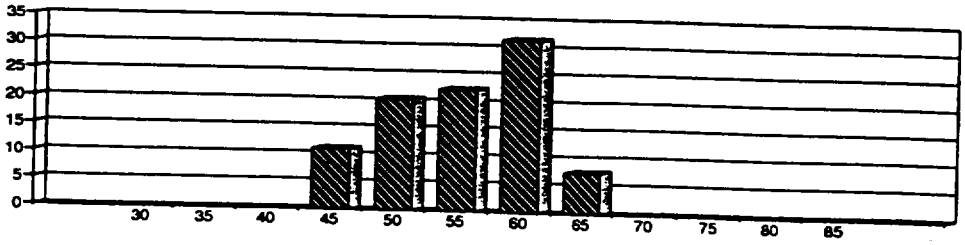
N=155

AUG 5-
AUG 8



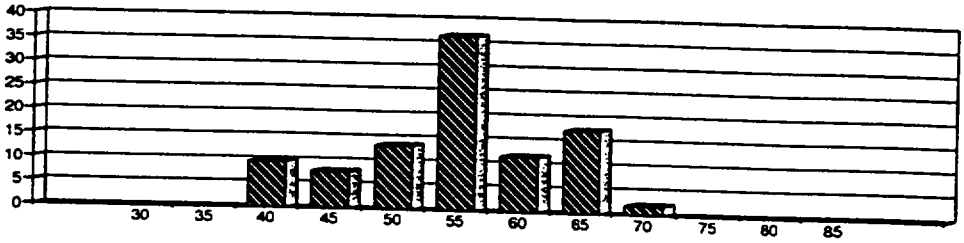
N=73

AUG 20-
AUG 23



N=54

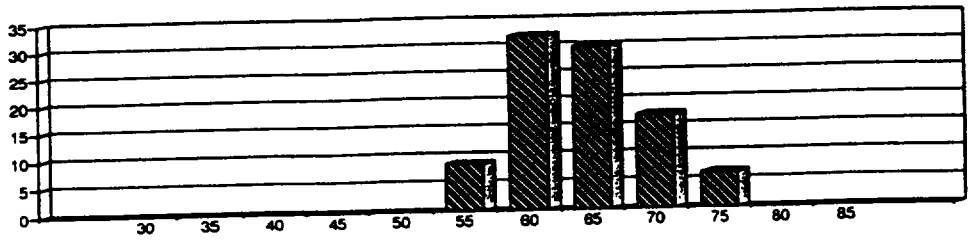
SEP 3-
SEP 6



N=52

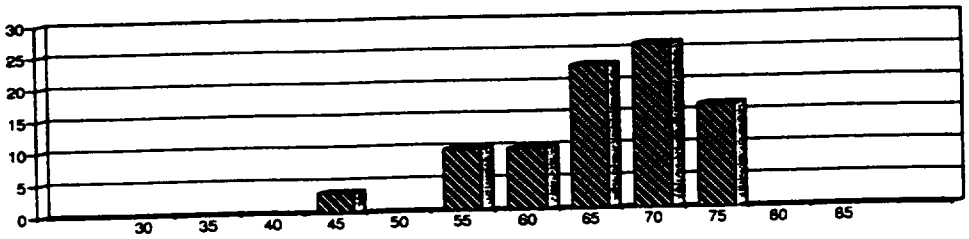
BS-BLUEBACK HERRING

SEP 16-
SEP 19



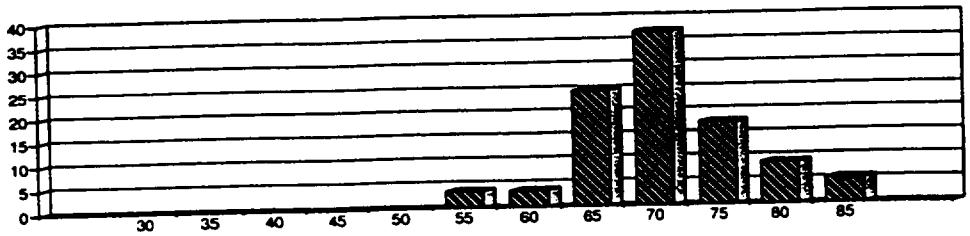
N=47

SEP 30-
OCT 4



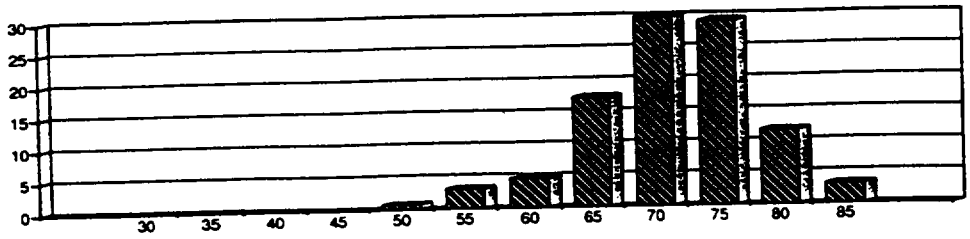
N=31

OCT 15-
OCT 18



N=57

OCT 28-
NOV 1



N=127

TABLE F-12 LENGTH FREQUENCY DISTRIBUTION OF ALEWIFE IN HUDSON RIVER ESTUARY DETERMINED FROM FALL SHOALS SURVEY, 1991

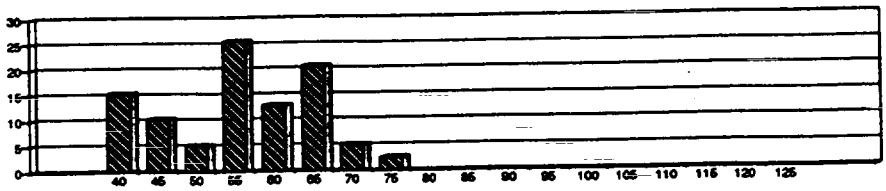
DATES	40.0-44.9	45.0-49.9	50.0-54.9	55.0-59.9	60.0-64.9	65.0-69.9	70.0-74.9	75.0-79.9	80.0-84.9	85.0-89.9	90.0-94.9	95.0-99.9
13JUL-20JUL	6	4	2	10	5	8	2	1	0	0	0	0
29JUL-03AUG	1	5	4	5	12	8	4	2	0	0	0	0
'AUG-17AUG	0	0	0	0	3	6	13	8	5	5	1	0
AUG-30AUG	0	1	0	0	0	4	3	4	5	4	2	1
09SEP-13SEP	0	0	0	0	0	1	5	8	6	8	10	1
23SEP-27SEP	0	0	0	0	0	0	1	3	11	2	6	4
'OCT-11OCT	0	0	0	0	0	1	5	7	6	7	8	9
OCT-25OCT	0	0	0	0	0	0	0	4	3	4	7	4
	7	10	6	15	20	28	33	37	36	30	34	19

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
JUL-20JUL	0	0	0	0	0	0	39	57.6	41.0	59.0	76.0	9.8
27JUL-03AUG	0	0	0	0	0	0	44	60.8	43.0	62.0	79.0	8.6
12AUG-17AUG	1	0	0	0	0	0	42	75.6	62.0	74.0	101.0	8.7
AUG-30AUG	0	0	0	0	0	0	24	78.6	46.0	80.0	97.0	10.8
SEP-13SEP	0	1	0	0	0	0	40	83.7	69.0	84.0	106.0	8.0
23SEP-27SEP	1	0	0	0	0	0	28	86.0	74.0	82.5	103.0	7.6
07OCT-11OCT	4	1	0	0	0	0	48	87.0	69.0	88.0	107.0	10.0
OCT-25OCT	2	1	0	0	0	0	25	89.8	75.0	91.0	106.0	8.3
	8	3	0	0	0	0	290					

NOTE: N = Number of lengths, MEAN = Mean length, MIN = Minimum length, MED = Median length, MAX = Maximum length, SD = Standard deviation

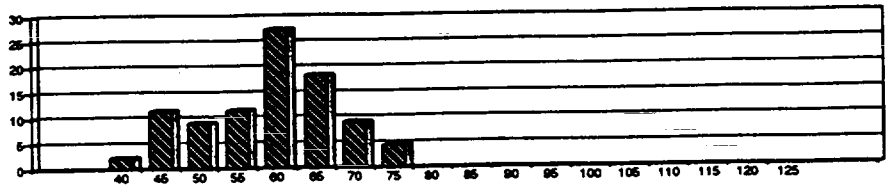
FS-ALEWIFE

JUL 15-
JUL 20



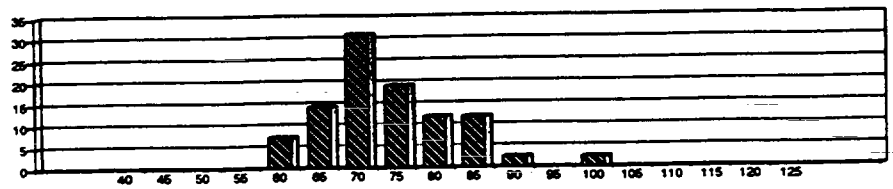
N=122

JUL 29-
AUG 3



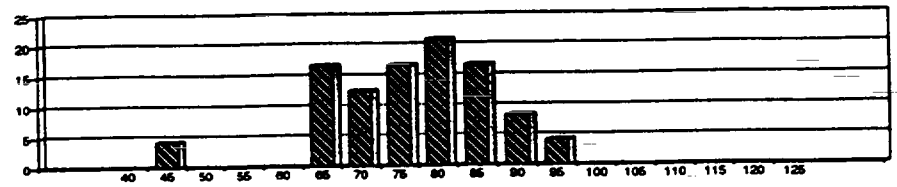
N=128

AUG 12-
AUG 17



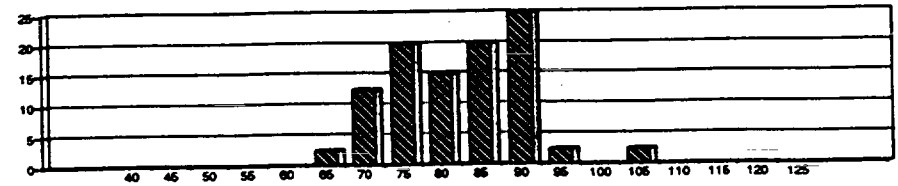
N=130

AUG 26-
AUG 30



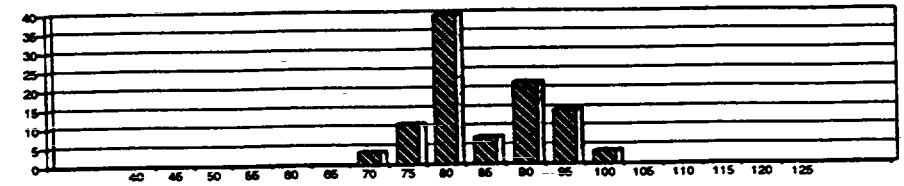
N=114

SEP 9-
SEP 13



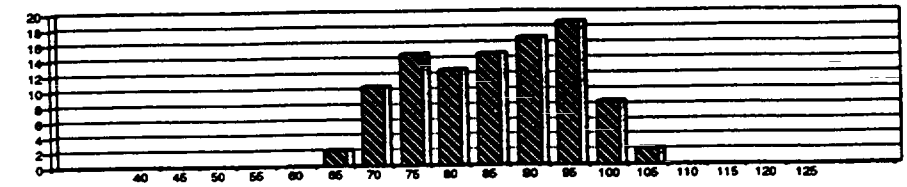
N=106

SEP 23-
SEP 27



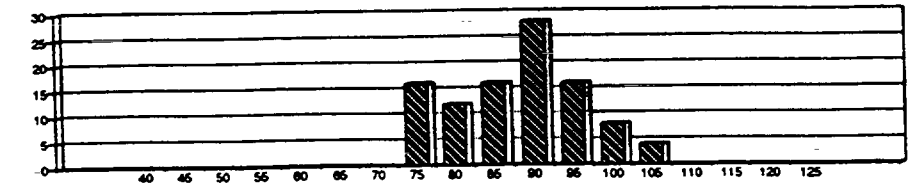
N=79

OCT 7-
OCT 11



N=102

OCT 21-
OCT 25



N=96

TABLE F-13 LENGTH FREQUENCY DISTRIBUTION OF ALEWIFE IN HUDSON RIVER ESTUARY DETERMINED FROM BEACH SEINE SURVEY, 1991

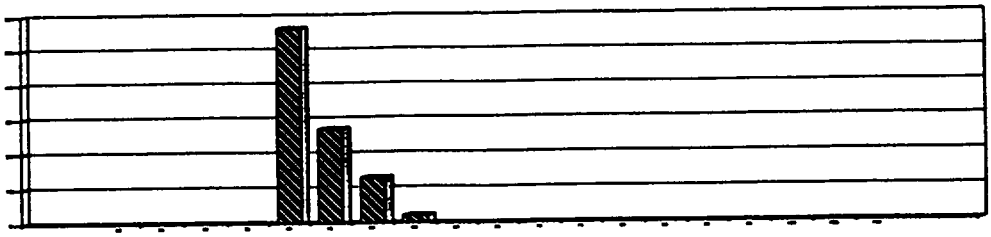
DATES	20.0-24.9	25.0-29.9	30.0-34.9	35.0-39.9	40.0-44.9	45.0-49.9	50.0-54.9	55.0-59.9	60.0-64.9	65.0-69.9	70.0-74.9	75.0-79.9	80.0-84.9
24JUN-29JUN	0	0	0	0	52	25	12	2	0	0	0	0	0
3JUL-12JUL	0	0	0	5	47	40	21	16	6	1	0	0	0
3JUL-25JUL	0	0	0	0	2	16	37	22	9	3	1	0	0
05AUG-08AUG	0	0	0	0	0	0	3	14	17	7	9	2	1
20AUG-23AUG	0	0	0	0	0	0	0	2	7	15	17	7	1
3SEP-06SEP	0	0	0	0	0	0	0	0	2	9	20	7	2
.3SEP-19SEP	0	0	0	0	0	0	0	0	0	1	16	10	3
30SEP-04OCT	0	0	0	0	0	0	0	0	0	1	4	4	5
5OCT-18OCT	0	0	0	0	0	0	0	0	0	3	6	5	2
0OCT-01NOV	0	0	0	0	0	0	0	0	0	1	1	1	3
	0	0	0	5	101	81	73	56	41	41	74	36	17

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
JUN-29JUN	0	0	0	0	0	0	92	45.2	40.0	44.0	60.0	4.2
JUL-12JUL	0	0	0	0	0	0	137	47.8	35.0	46.0	66.0	6.2
23JUL-25JUL	0	0	0	0	0	0	92	54.0	44.0	53.0	70.0	5.7
05AUG-08AUG	0	0	0	0	0	0	57	63.1	51.0	62.0	81.0	6.3
AUG-23AUG	0	0	0	0	0	0	49	69.5	58.0	70.0	80.0	5.3
SEP-06SEP	0	0	0	0	0	0	40	71.7	62.0	71.5	84.0	4.4
16SEP-19SEP	3	1	0	0	0	0	34	75.9	66.0	74.5	92.0	5.5
SEP-04OCT	5	3	1	0	0	0	24	80.6	60.0	82.5	96.0	8.5
OCT-18OCT	1	1	0	0	1	0	19	76.8	67,0	75.0	108.0	9.5
28OCT-01NOV	2	3	1	0	0	0	12	83.7	65.0	84.5	95.0	9.1
	11	8	2	0	1	0	556					

NOTE: N = Number of lengths, MEAN = Mean length, MIN = Minimum length, MED = Median length, MAX = Maximum length, SD = Standard deviation

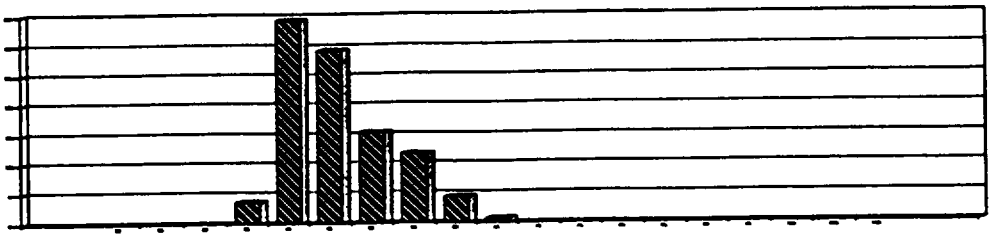
BS-ALEWIFE

JUN 24-
JUN 29



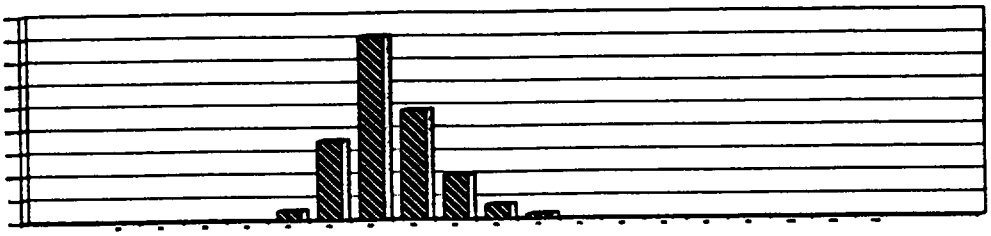
N=92

JUL 8-
JUL 12



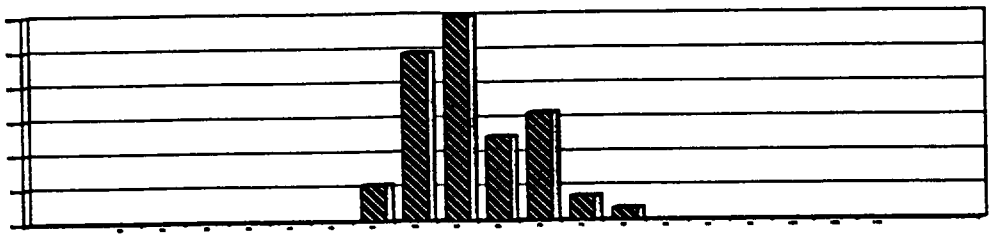
N=137

JUL 23-
JUL 25



N=92

AUG 5-
AUG 8

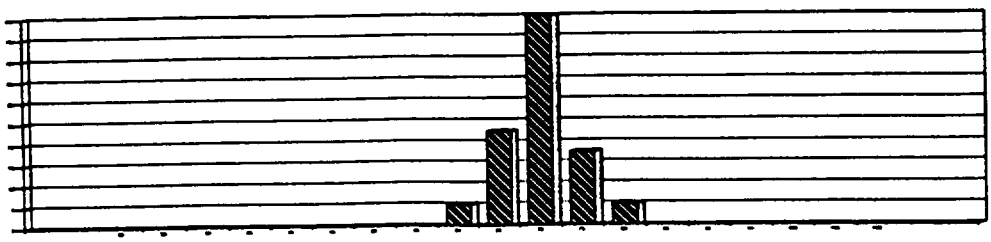


N=57

AUG 20-
AUG 23

N=49

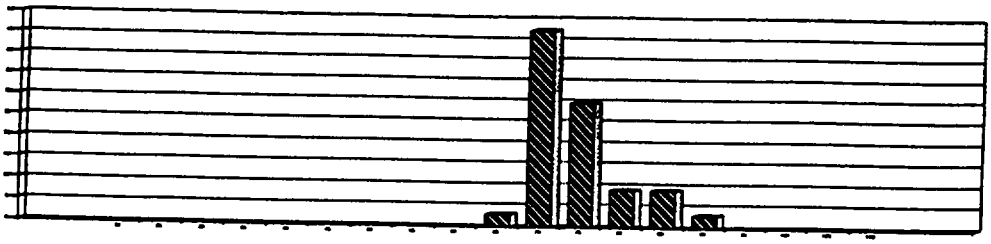
SEP 3-
SEP 6



N=40

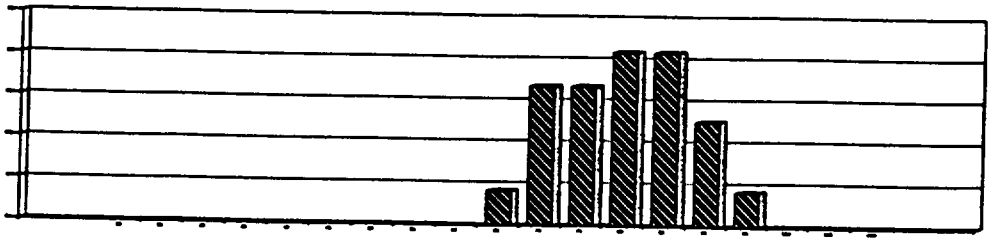
BS-ALEWIFE

SEP 16-
SEP 19



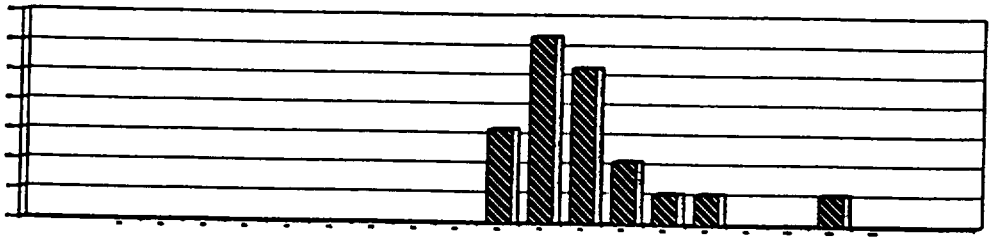
N=34

SEP 30-
OCT 4



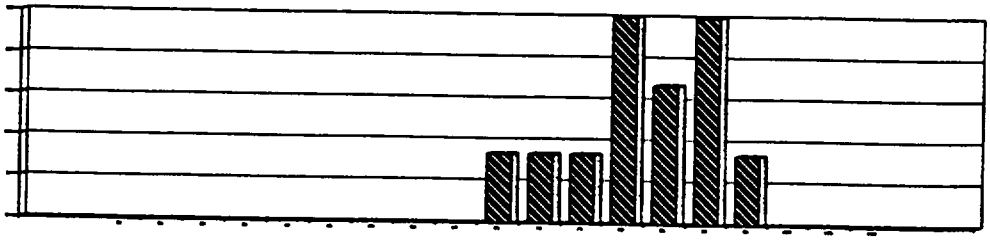
N=24

OCT 15-
OCT 18



N=19

OCT 28-
NOV 1



N=12

APPENDIX G

HISTORIC CHANGES IN UTILITY SAMPLING PROGRAMS

CHANGES IN UTILITY SAMPLING PROGRAMS
Ichthyoplankton, Fall Shoals, Beach Seine

1974-1991

Ichthyoplankton

1975	Eliminated bottom sampling in Yonkers region, channel sampling in Albany region, and shoal sampling in Cornwall region.
1976	Added shoal sampling in Cornwall region. Increased sample effort to approximately 215 samples during April through August. Added late-winter sampling for Atlantic tomcod.
1977	Reduced sampling to 200 samples per river run. Reduced sample analysis to approximately 157 samples per river run.
1978	Dropped February sampling for Atlantic tomcod.
1980	Shortened program to end in early July.
1981	Eliminated March and April sampling.
1983	Changed water quality sampling to fixed station design with samples approximately every 3 miles. Previously, water quality samples were taken with each biological sample.
1986	Began collection of additional samples for potential analysis of daily otolith increments. Approximately 140 samples per year are collected from regions and river runs which have highest densities of striped bass larvae.
	Added bottom sampling in Yonkers region and channel sampling in Albany region.
1987	Expanded sampling to begin in mid-April. Instituted nighttime only sampling. (In previous years samples were collected in daytime until the initial appearance of *Morone* larvae.)
	Extended Yonkers region sampling to RM 12. Extended Albany region sampling to RM 152.
1988	Added additional sampling in Battery Region (RM 0-11) to provide additional distribution information. Extended ichthyoplankton sampling to late August.
	Reduced the number of ichthyoplankton samples analyzed per river run to approximately 110 to 120 for complete river sampling weeks, 83 for late-season lower-river sampling weeks.

1988 Changed laboratory procedures to allow subsampling for all ichthyoplankton. Previous procedures allowed subsampling only for anchovy.

Changed laboratory procedures for subsampling for lengths: 30 randomly chosen individuals (non-egg) per species (striped bass, white perch, American shad) per sample. Previous design was 30 individuals but to take 10 per life stage per species per sample.

Beach Seine Survey

1980 Eliminated spring beach seine sampling. Changed summer fall program to alternate week survey with each effort covering RM 12-152.

Fall Juvenile Survey

1979 Added Tucker trawl sampling in channel stratum. Extended sampling to RM 140.

1985 Replaced epibenthic sled with 3-m beam trawl.

1987 Extended Yonkers region sampling to RM 12. Extended Albany region sampling to RM 152.

Summary of Beach Seine Survey Sampling Program, 1974-1991

YEAR	SAMPLE BI-WEEKS*		DESIGN		
	FIRST	LAST	# Col.	Dist.	Freq.
1974	4:7-4:20	9:22-10:5	150	12-152	W-A
1975	3:23-4:5	11:30-12:13	200	12-152	W-A
1976	3:21-4:3	11:28-12:11	200	12-152	W-A
1977	4:3-16	12:11-24	200	12-152	W-A
1978	3:26-4:8	12:17-30	200	12-152	W-A
1979	3:23-4:7	12:2-15	200	12-152	W-A
1980	3:25-4:7 8:26-9:8	8:12-25 12:2-15	200 100	12-152 12-152	W-A B
1981	7:29-8:11	10:21-11:3	100	12-152	B
1982	8:16	10:11	100	12-152	B
1983	8:1	10:23	100	12-152	B
1984	7:24	11:1	100	12-152	B
1985	7:16	11:21	100	12-152	B
1986	7:15	11:21	100	12-152	B
1987	6:24	11:13	100	12-152	B
1988	6:14	11:3	100	12-152	B
1989	6:13	10:26	100	12-152	B
1990	6:18	10:24	100	12-152	B
1991	6:24	11:1	100	12-152	B

W-A = Weekly with allocation changing on alternate weeks
B = Bi-weekly

* Date format is 6(month): 24(day)

Summary of Fall Shoals Survey Sampling Program, 1974-1991

YEAR	SAMPLE WEEKS*		DESIGN		
	FIRST	LAST	# Col.	Dist.	Freq.
1974	9:3-6	12:9-12	100	14-77	W
1975	8:18-21	12:8-11	100	14-76	B
1976	8:16-20	12:6-8	100	14-76	B
1977	8:15-19	12:5-6	100	14-76	B
1978	8:21-24	12:12-14	100	14-76	B
1979	7:9-12	12:10-13	200	14-140	B
1980	7:7-11	12:8-10	200+	14-140	B
1981	8:10-14	10:19-23	200+	14-140	B
1982	8:12	10:9	200	14-140	B
1983	8:8	10:30	200	14-140	B
1984	7:16	10:25	200	14-140	B
1985	7:22	11:14	200	14-140	B
1986	7:21	12:2	200	14-140	B
1987	7:13	11:5	200	14-140	B
1988	7:18	10:28	210	12-152	B
1989	7:17	10:26	210	12-152	B
1990	7:9	10:17	210	12-152	B
1991	7:15	10:25	210	12-152	B

W = Weekly
B = Bi-weekly

* Date format is 6(month): 24(day)

Summary of Ichthyoplankton Sampling Program, 1974-1991

YEAR	SAMPLE WEEKS*		DESIGN		
	FIRST	LAST	# Col./ # Analyzed	RM Dist.	Freq.
1974	4:16-17	8:12-15	80-164	14-140	W
1975	3:11-14	4:7-9	80/80	14-76	B
	4:21-26	8:11-14	155/155	14-140	W
1976	2:23-27	3:8-11	100/100	14-76	W
	3:22-25	4:5-8	100/100	14-76	B
	4:19-21	7:12-15	215/215	14-140	W
	7:26-29	8:10-13	215/215	14-140	B
1977	2:21-25	4:4-7	100/100	14-76	B
	4:18-20	7:11-15	200/157	14-140	W
	7:25-29	8:8-12	200/157	14-140	B
1978	3:28-4:1	4:10-14	100/100	14-76	B
	4:17-21	7:5-7	200/157	14-140	W
	7:17-20	8:14-18	200/157	14-140	B
1979	3:19-24	4:2-6	100/100	14-76	B
	4:16-21	7:2-6	200/157	14-140	W
	7:16-20	8:13-17	200/157	14-140	B
1980	3:17-28	4:28-5:2	100/100	14-76	B
	5:5-8	6:30-7:4	200/157	14-140	W
1981	5:4-9	7:6-10	200/157	14-140	W
1982	5:10-14	7:6-9	190/190	14-140	W
1983	5:2-8	7:3-9	190/190	14-140	W
1984	5:8-13	7:9-12	190/190	14-140	W
1985	4:29-5:3	7:8-11	190/190	14-140	W
1986	4:29-5:2	7:7-10	200/200	14-140	W
1987	4:14-18	7:6-9	200/200	12-152	W
1988	4:18-23	7:5-8	200/110	1-152	W
	7:11-14	8:23-25	88/73	1-75	B
1989	4:17-20	7:10-12	200/110	1-152	W
	7:24-26	8:21-23	88/73	1-76	B
1990	4:19-23	7:2-6	200/110	1-152	W
	7:16-19	8:14-16	88/73	1-76	B
1991	4:15-19	7:8-13	200/110	1-152	W
	7:22-25	10:15-17	88/73	1-76	B

W = Weekly
B = Bi-weekly

* Date format is 6(month): 24(day)