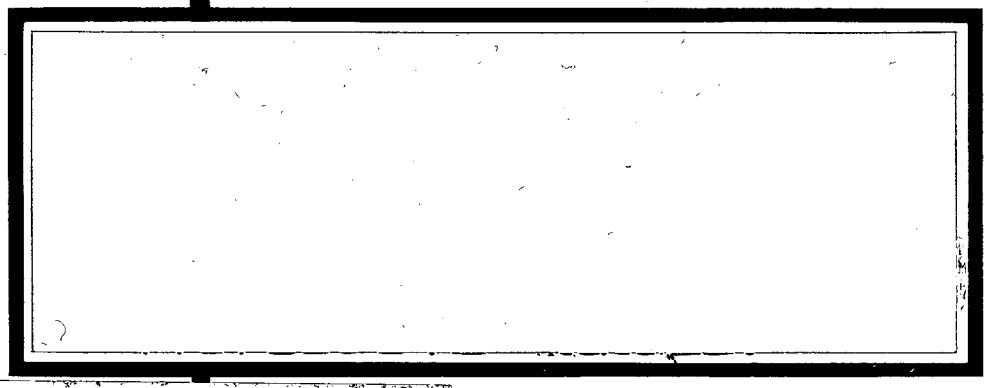

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EFFICIENCY OF A 100-FT BEACH SEINE FOR ESTIMATING SHORE ZONE DENSITIES AT NIGHT OF JUVENILE STRIPED BASS, JUVENILE WHITE PERCH, AND YEARLING AND OLDER (≤150mm) WHITE PERCH

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SECTION I

SUMMARY AND CONCLUSIONS

Estimates of the absolute abundance of young striped bass and white perch in the shore zone of the Hudson River estuary based on an area-density method have been underestimates except when the estimates were adjusted for the catch efficiency of the sampling gear.[1] The Day Beach Seine Efficiency Study conducted in the Croton-Haverstraw region from mid-September through mid-November, 1977, yielded weighted mean catch efficiencies of 0.39 for juvenile striped bass and 0.07 for juvenile white perch for the 100-ft seine used during the day (TI 1978a). Estimates of total absolute abundance in the estuary have been derived from the standing crops in the shore zone (catch data collected during the day) combined with standing crops in the shoal and bottom strata (catch data collected at night). Therefore, empirical estimates of catch efficiency for the 100-ft seine used at night were needed, rather than make the assumption of equal efficiencies during day and night.

This study was designed to obtain these night catch efficiency estimates for juvenile striped bass and juvenile white perch. Yearling and older ($\leq$150 mm) white perch were also caught in sufficient numbers to calculate night catch efficiency. The four sites used for the day efficiency study in 1977 were also sampled for the night efficiency study in 1978. The same methods used in 1977 (day) were repeated in 1978 (night), except that the night efficiency study was conducted from early September through early October, while sampling for the day efficiency study was done from mid-September to mid-November.

[1]Estimates of absolute abundance not adjusted for beach seine catch efficiency appeared in several previous reports, including TI (1975, 1977, 1978c, 1978d), McFadden (1977, 1977a), McFadden and Lawler (1977), and McFadden et al. (1978).

Juvenile Striped Bass

The night catch efficiency (weighted mean) was 0.255 (standard error: ± 0.002); efficiency estimates ranged from 0.024 to 0.840. Recapture rates during the efficiency study ranged from 0.308 to 0.962. Most escapement occurred as the 500-ft seine was hauled. Neither escapement nor catch efficiency was related to fish size, number of juvenile striped bass enclosed by the 500-ft seine, water temperature, conductivity, or turbidity.

The catch efficiency of the 100-ft seine was higher during the day (1977) for juvenile striped bass than at night (1978). Densities were similar in 1977 and 1978 in the time period and region where the efficiency studies were conducted. The night to day ratio of juvenile striped bass in the shore zone of the efficiency study area in 1978 unadjusted for catch efficiency was 2.63, indicating a higher density at night. Based on these day-night catch efficiency values and 1978 catch data collected during the night efficiency study, an estimate of the true abundance of juvenile striped bass in the shore zone at night can be obtained by multiplying the observed abundance in the shore zone during the day by an adjustment factor of 10.1.

Juvenile White Perch

The night catch efficiency (weighted mean) was 0.182 (standard error: ± 0.001); efficiency estimates ranged from 0.000 to 0.968. Recapture rates during the efficiency study ranged from 0.222 to 1.000. Most escapement occurred as the 500-ft seine was hauled. Neither escapement nor catch efficiency was related to fish size, number of juvenile white perch enclosed by the 500-ft seine, conductivity, or turbidity. Overall, water temperature did not appear to influence catch efficiency, but a decline in temperature between weeks 2 and 3 may have influenced the observed increase in catch efficiency.

The catch efficiency of the 100-ft seine was generally lower during the day (1977) for juvenile white perch than at night (1978).

Densities were similar in 1977 and 1978 in the time period and region where the efficiency studies were conducted. The night to day ratio of juvenile white perch in the shore zone of the efficiency study area in 1978 unadjusted for catch efficiency was 0.38, indicating a higher density during the day. Based on these day-night catch efficiency values and 1978 catch data collected during the night efficiency study, an estimate of the true abundance of juvenile white perch in the shore zone at night can be obtained by multiplying the observed abundance in the shore zone during the day by an adjustment factor of 2.1.

Yearling and Older ($\leq$150 mm) White Perch

The night catch efficiency (weighted mean) was 0.262 (standard error: $\pm$ 0.004); efficiency estimates ranged from 0.000 to 1.756. Recapture rates during the efficiency study ranged from 0.429 to 1.000. Most escapement occurred as the 500-ft seine was hauled. Catch efficiency was unrelated to the number of yearling and older ($\leq$150 mm) white perch enclosed by the 500-ft seine, water temperature, conductivity, or turbidity. Numbers caught were not sufficient to examine any effects of fish size on catch efficiency. No day efficiencies were available; therefore comparisons of day versus night efficiencies for the 100-ft seine were not possible. An estimate of the true abundance of yearling and older ($\leq$150 mm) white perch in the shore zone at night can be obtained by multiplying the observed abundance in the shore zone during the day by an adjustment factor of 3.4. This adjustment factor was based on the 1977 day juvenile white perch catch efficiency, the 1978 night yearling and older ($\leq$150 mm) white perch catch efficiency, and the catch data collected during the 1978 Night Beach Seine Efficiency Study.

SECTION II

INTRODUCTION

Since 1973, Texas Instruments (TI) has conducted a program designed to estimate the absolute abundance of juvenile striped bass and white perch in the Hudson River estuary through mark/recapture and area-density extrapolation methods. The area-density extrapolations were derived from stratified random sampling designs and were used to estimate the number of fish in various geographical regions and depth strata (TI 1975, 1977, 1978c; McFadden et al. 1977).

Density estimates of juvenile striped bass and white perch based on daytime sampling with a 100-ft (30m) beach seine were known to be underestimates of the true shore zone density when catch efficiency was assumed to be 100 percent (TI 1978a). Efficiency estimates from the 1977 day catch efficiency study and night to day catch ratios from sampling conducted in 1973 and 1974 were used to adjust beach seine data collected during the day to estimate standing crops in the shore zone at night. The shore zone estimates were then combined with the standing crop estimate for the shoal and bottom strata (from epibenthic sled samples taken at night) to obtain population estimates of juvenile striped bass and white perch. For recent estimates of population size for juvenile striped bass and white perch (McFadden et al. 1978), it was assumed that the day and night catch efficiences were equal, and that the observed higher densities in the shore zone at night were real and independent of catch efficiency. If, however, catch efficiency of the 100-ft seine at night were significantly different from day catch efficiency, revised adjustment factors should be calculated to convert observed day abundance in the shore zone to estimates of true abundance in the shore zone at night.

Some evidence in the literature suggested that catch efficiencies of sampling gear and shore zone densities for several fish species differed during day versus night. For example, Pennington and Grosslein (1978) reported diel differences in catchability of yellowtail flounders in trawls.

An inverse relationship between light intensity and tow net efficiency for sockeye salmon was observed by Robinson and Barraclough (1978). Kjelson and Colby (1977) found little difference in day and night efficiencies of a 6.1m otter trawl for estimating densities of pinfish and spot. Shore zone fish populations were observed to undergo diel changes in distribution and species composition (McCleave and Fried 1975). Although many of these observed changes were due to real differences in fish distribution, an unknown portion may be caused by changes in the fishes' behavior and ability to avoid the sampling gear used to assess diel changes. The degree to which the changes can be ascribed to increased vulnerability to the gear was dependent upon the species and sampling gear involved.

No data that compare day and night efficiency of a 100-ft seine in the capture of juvenile striped bass and white perch are currently available. This report presents the results of a study conducted in 1978 to acquire the necessary data and to meet the following primary objectives:

- Evaluate the catch efficiency of a 100-ft beach seine for estimating the densities of various sizes of striped bass and white perch in the shore zone at night.
- Compare catch efficiencies during day versus night.
- Provide additional data on night seine catches to enlarge the data base used to estimate the night to day catch ratio.
- Develop an updated set of adjustment factors which include both night catch efficiency and night to day differences in shore zone abundance and can be used to calculate estimates of population size in the shore zone at night for juvenile striped bass and juvenile white perch.

A secondary objective includes evaluation of any influences of fish density and water quality factors on night catch efficiency of the 100-ft seine.

SECTION III

METHODS

A. Data Collection

The four beach seine sites used for the 1977 day seine efficiency study (Figure III-1) were sampled for the 1978 night efficiency study. Night efficiency tests were conducted on four consecutive nights, every other week from 3 September through 7 October. All sites were relatively shallow with a gradually sloping bottom. Bottom types, depths, and vegetation varied somewhat among sites (Table III-1). Sampling commenced about one half hour after dark. The site selected for the efficiency test on a particular night was not sampled during the day of the test.

The general sampling procedures for this study were similar to those used for the day efficiency study (TI 1978a). At the beginning of each test, one end of the 500-ft seine (Table III-2) was secured on the shore line near the high water line. The boat was then backed from shore as the seine was payed out over the bow. When 167-ft (51m) of the net were set, an anchor was tied to the lead line to keep the seine in place. The boat was turned 90° to port and the next 167-ft of the seine were set parallel to the shore line. Another anchor was placed on the lead line, the boat was turned 90° to port, and the remaining seine was set toward the shore line. This procedure produced an approximately square enclosure large enough to permit use of the 100-ft seine (Table III-2) within the enclosure (Figure III-2).

After waiting 1 hour for the fish to recover from the disturbance caused by setting the 500-ft seine, the efficiency tests were begun. A 16-ft boat was drifted over the 500-ft seine and run to shore under power. One end of the 100-ft seine was secured on the shore line while the boat was backed away extending the seine perpendicular to the shore line. When the seine was fully extended, the boat was turned towards port and the seine was towed to shore forming an arc. The 100-ft seine was then hauled to shore.

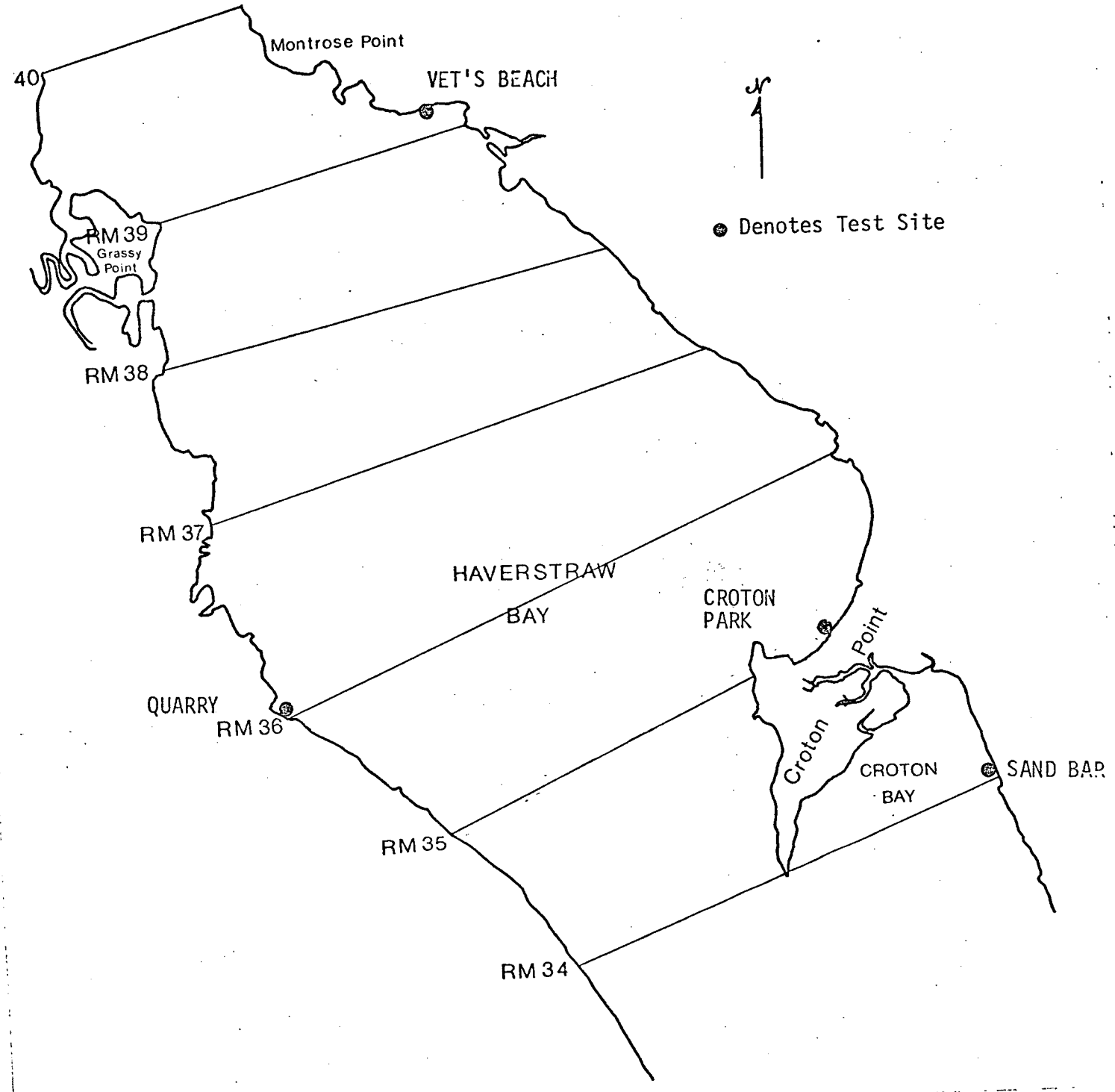

Figure III-1. Sampling Sites Used for Beach Seine Efficiency Studies in 1977 and 1978 (RM = River Mile)

Table III-1

Physical Characteristics of Sampling Sites Used in 1977 and 1978
Beach Seine Efficiency Studies

Site	Location		Bottom Type	Vegetation	Depth*
	River Mile	Site			
1) Sand Bar	34	East Shore	Sand	Sparse	2ft (0.6m)
2) Croton Park	35	East Shore	Sand	Sparse-Moderate	2ft (0.6m)
3) Quarry	36	West Shore	Fine Sand Changing to Mud	Moderate	4ft (1.2m)
4) Vet's Beach	39	East Shore	Coarse Sand and Gravel	Sparse	6ft (1.8m)

*at mean low water approximately 100 ft (30m) from shore.

Table III-2

Dimensions of Beach Seines Used in Catch Efficiency Studies in 1977 and 1978

Gear	Wings	Bag
100-ft (30m) Seine	2-40X8 ft (12X2.4m)	20X10 ft (6X3m)
	Mesh: 3/8 in (0.95cm)	Mesh: 3/16 in (0.48cm)
500-ft (152m) Seine	1-375X10 ft (114X3m)	50X12 ft (15X4m)
	Mesh: 3/8 in (0.95cm)	Mesh: 3/16 in (0.48cm)
	1-75X10 ft (23X3m)	
	Mesh: 3/8 in (0.95cm)	

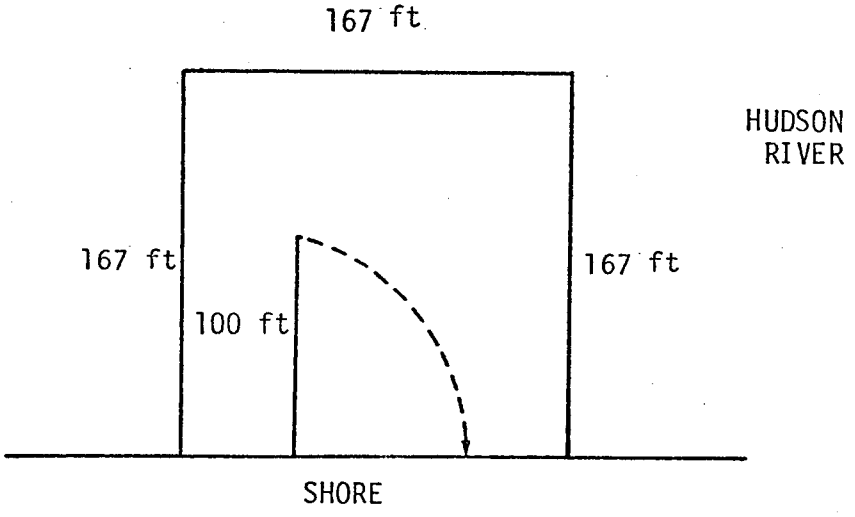

Figure III-2. Net Arrangement for Beach Seine Efficiency Studies

This procedure followed TI's standard sampling technique for the 100-ft beach seine described in TI (1975).

The fish collected from the first 100-ft seine were identified by species and counted by length class (0-Div, Div + 1 mm to 150 mm, 151 mm to 250 mm, 251 mm +).[1] Striped bass and white perch were marked by clipping the tip of the upper lobe of the caudal fin. Other species hardy enough to withstand clipping and handling (e.g. centrarchids and goldfish) were also marked. Test fish were anaesthetized with MS-222 prior to marking. After marking, fish were placed in a recovery bucket and released when equilibrium was regained. Marking mortality was not evaluated but was assumed to be negligible during the short time required for sample workup. Beginning during the first week of testing, combinations of operculum clips were used to help distinguish fish marked from previous tests and the few fish with fin rot. All fish in good condition were then released inside the enclosure.

An hour after the marked fish from the first 100-ft seine tow were released, a second tow was taken with the 100-ft seine. Striped bass, white perch, and other markable species were marked by clipping the operculum and tip of the lower caudal fin lobe. Again all fish in good condition were released inside the 500-ft seine enclosure. Previously marked fish were counted as part of the total catch but were not clipped again.

After the marked fish were allowed to disperse (15 to 30 min), the anchors were detached from the 500-ft seine and it was hauled to shore. All fish were counted and identified. Subsamples of juvenile white perch and striped bass were randomly selected for total length measurements to assess any size-related differences in catch efficiency. Up to 20 fish per species

[1]From 1 January until 1 June, the Div (division) represents the upper total length limit (mm) of yearling fish (except for Atlantic tomcod). On 1 June, the division becomes the upper limit of that year class (young-of-the-year). For Atlantic tomcod, the division represents the upper total length limit for yearling fish from 1 January - 31 March. On 1 April, the division applies to that year class. Since young fish grow rapidly through the sampling season, division limits are updated regularly.

of the test fish which were marked from each of the 100-ft tows and recaptured in the 500-ft seine were measured for total length. A subsample [up to 20 fish per species (same species as test fish)] of unmarked fish collected in the 500-ft seine were also measured. Marked fish were preserved in 10% formalin; all other fish were released.

Each night during the test week while an efficiency test was being conducted on a selected beach site, one sample (defined as supplementary night beach seines) was collected from each of the other three test sites with the 100-ft seine. These samples were collected to provide additional information on seine catches at night during the period of the night seine efficiency study. All fish from these samples were identified, counted by length class, and released.

Water quality factors were measured and a water sample was collected for each 500-ft seine enclosure, 100-ft test seine, and supplementary 100-ft seine sample. These water samples and water quality data were taken after each 100-ft test seine and after initially setting the 500-ft seine enclosure. The procedures used were standard for beach seine sampling and were described in TI (1978b).

B. Data Analysis

The catch efficiency for each of the 100-ft seine tows at night was calculated as the ratio of fish density determined from 100-ft seine samples to the density determined from a direct count of the 500-ft seine sample corrected for escapement:

$$E_{100i} = \left(\frac{C_{100i}}{A_{100}} \right) \Bigg/ \left(\frac{C_{500i}}{A_{500} \cdot e_{500i}} \right) \qquad (1)$$

where

E_{100i} = estimated catch efficiency of 100-ft seine for species i

C_{100i} = catch of species i in the 100-ft seine per individual tow

A_{100} = area swept by 100-ft seine

C_{500i} = catch of species i in the 500-ft seine

A_{500} = area enclosed by 500-ft seine

e_{500i} = fraction of marked fish of species i caught in 500-ft seine

Fish were assumed to be randomly distributed throughout the enclosure. Since A_{500} was approximately 27,900 ft^2 and A_{100} was estimated at 4,844 ft^2 (TI 1978a), equation (1) was rearranged to:

$$E_{100i} = \left(\frac{A_{500}}{A_{100}}\right) \cdot \left(C_{100i} \Big/ \frac{C_{500i}}{e_{500i}}\right) \qquad (2)$$

$$= \left(\frac{27{,}900\ ft^2}{4{,}844\ ft^2}\right) \cdot \left(C_{100i} \Big/ \frac{C_{500i}}{e_{500i}}\right) \qquad (3)$$

$$\approx \frac{6 \cdot C_{100i} \cdot e_{500i}}{C_{500i}} \qquad (4)$$

Equation (4) was used to calculate night efficiency values.

The weighted mean catch efficiency ($\bar{E}$) was calculated using the following equation:

$$\bar{E} = \frac{R}{2(\Sigma \hat{n}_i)} \quad (\Sigma \text{ catches } T_1 + T_2) \qquad (5)$$

where

$\bar{E}$ = weighted mean catch efficiency

R = ratio of the area swept by the 500-ft seine to the area swept by the 100-ft seine (~6)

$\hat{n}$ = estimated number of fish enclosed in the 500-ft seine after correcting for escapement

Catches $T_1 + T_2$ = Catches of 100-ft seine test tows 1 and 2 combined

The standard error of the weighted mean catch efficiency (S_m) was calculated using the following equation:

$$S_m = \sqrt{\frac{S^2}{n}}$$

where

S^2 = variance

n = number of observations

Adjustments to the shore zone densities to reflect seine catch efficiencies are applied to all of the sampling regions to estimate night standing crops (McFadden et al. 1978). Thus, in the practical application of catch efficiency adjustments, the data are pooled across sampling sites. Therefore, sites were used as replicates in all analyses for the 1978 night efficiency studies. This pooling was further justified because there were no significant differences in catch data among weeks or sites for juvenile striped bass and juvenile white perch (Appendix F, Table F-1).

Catch efficiency values were calculated for juvenile striped bass, juvenile white perch, and yearling and older ($\leq$150 mm) white perch. Escapement from the 500-ft seine ($1-e_{500i}$) was estimated from the fraction of marked fish which were recaptured when the 500-ft seine was hauled. The nature of the escapement, whether continuous or occurring when the 500-ft seine was hauled, was determined by comparing recapture rates for juvenile striped bass, juvenile white perch, and yearling and older ($\leq$150 mm) white perch marked in the first versus the second 100-ft seine sample with a Wilcoxon signed rank test (Hollander and Wolfe 1973). If escapement from the 500-ft seine was continuous, then the recapture rate for fish marked in the first tow should have been lower than for the second tow, since those marked fish caught in the first tow had more time to escape. If recapture rates from both tows were approximately equal, then most escapement probably occurred as the 500-ft seine was hauled. Additional analyses necessary to

evaluate some of the factors that could potentially influence the estimation of catch efficiency are described in the following paragraphs.

Analysis of variance (ANOVA) was used to test for any differences among test tows (the two 100-ft seine tows and the 500-ft seine tow), differences across weeks, differences between years for density and catch efficiency, and influences of fish length and water temperature on catch efficiency (Sokal and Rohlf 1969). To meet the assumption of homogeneity of variance, the catch, catch efficiency, and fish length data were transformed using $Z = X^P$ (Healy and Taylor 1962), square root, and Log_{10} x transformations, respectively. A priori orthogonal and non-orthogonal t-tests were used to detect differences in fish lengths between tows and differences in water temperature data among weeks (Kirk 1968).

Analysis of variance was conducted on mean total lengths (mm) from test tows 1 and 2 of the 100-ft seine for juvenile striped bass during weeks 1 and 2 and juvenile white perch during weeks 2 and 3 to assess any observed size-related differences in recapture rates between tows 1 and 2. These weeks were selected because of similarities in sample size (Appendix F, Table F-8). A priori orthogonal t-tests, by week, using a common error term were used on length data from test tows 1 and 2 versus the 500-ft seine tow to determine whether catch efficiency was related to fish size.

Scatter plots were generated to compare catch efficiency versus: the estimated number of the target species and age group enclosed, water temperature, conductivity, and turbidity for juvenile striped bass, juvenile white perch, and yearling and older ($\leq$150 mm) white perch (Appendix E, Figures E-1 to E-14).

Catch efficiencies during the day (1977 study) were compared with night catch efficiencies for juvenile striped bass and juvenile white perch via a 3-way (diel, week, and tow) analysis of variance to determine whether the catch efficiency of the 100-ft seine varied during the day and night. Day catch efficiences were not available for yearling and older ($\leq$150 mm) white perch. Day efficiency tests in 1977 were done weekly beginning 11 September through 19 November, and the night catch efficiency tests were

conducted biweekly beginning 3 September through 7 October; therefore, to directly compare catch efficiencies during day and night and catch data between the two years, the following weeks were selected:

	1977 (DAY)	1978 (NIGHT)
Week 1	09/11-17	09/03-09
Week 2	09/18-24	09/17-23
Week 3	10/02-08	10/01-07

To examine any differences in shore zone density of juvenile striped bass and juvenile white perch from 1977 to 1978, catch data collected during the routine Beach Seine Survey (100-ft seine) in each year were compared for the three selected weeks in September through early October (when the efficiency studies were conducted) using analysis of variance. Catches from the Beach Seine Survey (day) and supplementary night beach seines in 1978 were also examined by analysis of variance to detect any variations in day versus night densities for juvenile striped bass and add information to the existing data base on night to day catch ratios for juvenile striped bass and juvenile white perch.

Additional tests were conducted, where appropriate, to evaluate relevant hypotheses that were suggested as the results emerged. These tests are described in the Results and Discussion section.

SECTION IV

RESULTS AND DISCUSSION

The 1978 Night Beach Seine Efficiency study made it possible to calculate and evaluate catch efficiency estimates for the 100-ft seine used at night, compare day (1977) and night (1978) catch efficiencies, and generate 1978 night to day catch ratios for juvenile striped bass and juvenile white perch. Yearling and older ($\leq$150 mm) white perch were also collected in sufficient numbers to calculate catch efficiency for the 100-ft seine at night and a night to day catch ratio.

A. NIGHT CATCH EFFICIENCY ESTIMATES

1. Juvenile Striped Bass

Night catch efficiency estimates for juvenile striped bass ranged from 0.024 to 0.840, with an arithmetic mean of 0.259 (standard error: $\pm$0.040) (Table IV-1). Comparisons of catch efficiency with the estimated number of juvenile striped bass enclosed showed no clear association, but there were indications of increased variation in the efficiency estimates at densities falling near the low end of the observed range (Appendix E, Figure E-1). The absence of variation at the high end of the observed range was due to the fact that few samples containing large numbers of fish were collected. To compensate for any effects that relatively small catches may have on efficiency, a mean efficiency (from test tows 1 and 2 combined) weighted by the estimated number of juvenile striped bass enclosed (Appendix F, Table F-2) was used as a best estimate of night catch efficiency. The weighted mean catch efficiency (from test tows 1 and 2) was 0.255 ($\pm$ 0.002).

Recapture rates (number of marked fish recaptured in the 500-ft seine/number of fish marked) ranged from 0.308 to 0.962 for all tests that had marked fish (Table IV-2). Mark and recapture data are presented in Appendix F, Table F-9. Recapture rates for fish marked from test tows 1 and 2 with the 100-ft seine were not significantly different (Wilcoxon signed

Table IV-1

Night Catch Efficiencies for Juvenile Striped Bass
in 100-ft Beach Seines in 1978

Dates	Test Site							
	Sand Bar		Croton Park		Quarry		Vet's Beach	
	Tow 1	Tow 2	Tow 1	Tow 2	Tow 1	Tow 2	Tow 1	Tow 2
09/03-09	0.210	0.202	0.840	0.647	0.375	0.047	0.267	0.163
09/17-23	0.293	0.155	0.152	0.304	0.449	0.496	0.115	0.208
10/01-07	0.394	0.112	0.290	0.024	0.197	0.131	0.028	0.110

Grand Arithmetic Mean 0.259 ($\pm$0.040)*
Weighted Mean Catch Efficiency 0.255 ($\pm$0.002)*

*Standard Error

Table IV-2

Recapture Rates (Number Recaptured in 500-ft Seine Sample/Number Marked from 100-ft Seine Test Tows 1 and 2) for Juvenile Striped Bass during Night Beach Seine Efficiency Study, 1978

Dates	Test Site			
	Sand Bar	Croton Park	Quarry	Vet's Beach
09/03-09	0.551	0.889	0.857	0.680
09/17-23	0.885	0.516	0.862	0.308
10/01-07	0.962	0.500	0.600	0.400

rank test, Appendix F, Table F-7), which indicated that escapement from the enclosure was not a continuous process, but occurred primarily after the second 100-ft seine tow, probably when the 500-ft seine was hauled. Since recapture rates were not significantly different, fish marked in both 100-ft seine tows were pooled to calculated e_{500} in equation 1.

2. Juvenile White Perch

Night catch efficiencies for juvenile white perch ranged from 0.000 to 0.968, with an arithmetic mean of 0.260 (standard error: $\pm$0.052) (Table IV-3). The scatter plot of catch efficiency versus estimated number of juvenile white perch enclosed suggested no clear association, but an increase in the variation in catch efficiency estimates at low densities was observed (Appendix E, Figure E-4). The absence of variation at the high end of the observed range is due to the fact that few samples containing large numbers of fish were collected. Accordingly, a weighted mean (weighted by the estimated number of juvenile white perch enclosed [Appendix F, Table F-4]) was used as a best estimate of night catch efficiency. The weighted mean catch efficiency (from test tows 1 and 2) was 0.182 ($\pm$ 0.001).

Recapture rates for juvenile white perch ranged from 0.222 to 1.000 for all tests that had marked fish (Table IV-4). Mark and recapture data are presented in Appendix F, Table F-3. Recapture rates from test tows 1 and 2 were not significantly different (Wilcoxon signed rank test, Appendix F, Table F-7); thus most of the escapement occurred when the 500-ft seine was hauled. Since recapture rates were not significantly different, fish marked in both 100-ft seine tows were pooled to calculate e_{500}.

3. Yearling and Older ($\leq$150 mm) White Perch

Night catch efficiencies for yearling and older ($\leq$150 mm) white perch ranged from 0.000 to 1.756, with an arithmetic mean of 0.298 (standard error: $\pm$0.092) (Table IV-5). A scatter plot of catch efficiency versus the estimated number of yearling and older ($\leq$150 mm) white perch enclosed showed

Table IV-3

Night Catch Efficiencies for Juvenile White Perch
in 100-ft Beach Seines in 1978

Dates	Test Site							
	Sand Bar		Croton Park		Quarry		Vet's Beach	
	Tow 1	Tow 2	Tow 1	Tow 2	Tow 1	Tow 2	Tow 1	Tow 2
09/03-09	0.372	0.212	0.968	0.581	0.120	0.030	0.605	0.233
09/17-23	0.170	0.000	0.167	0.167	0.159	0.094	0.307	0.102
10/01-07	0.395	0.118	0.857	0.000	0.064	0.042	0.268	0.214

Grand Arithmetic Mean	0.260 ($\pm$0.052)*
Weighted Mean Catch Efficiency	0.182 ($\pm$0.001)*

*Standard Error

Table IV-4

Recapture Rates (Number Recaptured in 500-ft Seine Sample/Number Marked from 100-ft Seine Test Tows 1 and 2) for Juvenile White Perch during Night Beach Seine Study, 1978

Dates	Test Site			
	Sand Bar	Croton Park	Quarry	Vet's Beach
09/03-09	0.909	0.889	0.857	0.889
09/17-23	0.750	0.500	0.750	0.222
10/01-07	0.846	1.000	0.600	0.667

Table IV-5

Night Catch Efficiencies for Yearling and Older (≤150mm) White Perch in 100-ft Beach Seines in 1978

Dates	Test Site							
	Sand Bar		Croton Park		Quarry		Vet's Beach	
	Tow 1	Tow 2	Tow 1	Tow 2	Tow 1	Tow 2	Tow 1	Tow 2
09/03-09	0.351	0.146	1.756	0.439	0.250	0.000	0.324	0.000
09/17-23	0.138	0.000	0.000	0.522	0.462	0.000	0.590	0.098
10/01-07	0.162	0.162	1.500	0.000	0.000	0.000	0.088	0.176

Grand Arithmetic Mean 0.298 (±0.092)*
Weighted Mean Catch Efficiency 0.262 (±0.004)*

*Standard Error

no clear trend (Appendix E, Figure E-7). But catch efficiency estimates greater than 1.0 for individual samples indicated that the relatively small catches and/or a non-random spatial distribution of fish within the 500-ft seine were affecting the estimation of efficiency. For this reason, a weighted mean catch efficiency [weighted by the estimated number of yearling and older ($\leq$150 mm) white perch enclosed (Appendix F, Table F-6)] was used. The weighted mean catch efficiency (from test tows 1 and 2) was 0.262 ($\pm$ 0.004).

Recapture rates for yearling and older ($\leq$150 mm) white perch ranged from 0.429 to 1.000 for all tests that had marked fish (Table IV-6). Mark and recapture data are presented in Appendix F, Table F-5. Weighted site mean recapture rates were used to calculate the estimated number of fish enclosed in the 500-ft seine before escapement because several of the weekly site recapture rates were 1.000 due to small sample size. Recapture rates for fish marked from test tows 1 and 2 with the 100-ft seine were not significantly different (Wilcoxon signed rank test, Appendix F, Table F-7). This indicates that escapement from the enclosure was not continuous, but primarily occurred when the 500-ft seine was hauled. Since recapture rates were not significantly different, fish marked in both test tows with the 100-ft seine were pooled to calculate e_{500}.

4. Yearling and Older (>150 mm) White Perch

Yearling and older (>150 mm) white perch were caught infrequently and in small numbers (Appendix B). The data were thus insufficient to analyze for catch efficiency. The pooled recapture rate for yearling and older (>150 mm) white perch was 0.636.

B. ASSOCIATION BETWEEN FISH LENGTH AND NIGHT CATCH EFFICIENCY

There was no apparent relationship between fish length and night catch efficiency for juvenile striped bass and juvenile white perch. The only significant difference in total length was associated with sampling

Table IV-6

Recapture Rates (Number Recaptured in 500-ft Seine Sample/Number Marked from 100-ft Seine Test Tows 1 and 2) for Yearling and Older (≤150mm) White Perch during Night Beach Seine Efficiency Study, 1978. Tests with Zero Fish Marked Are Denoted by (*)

Dates	Test Site			
	Sand Bar	Croton Park	Quarry	Vet's Beach
09/03-09	0.765	0.846	1.000	0.500
09/17-23	1.000	0.500	1.000	0.429
10/01-07	0.500	1.000	*	1.000
Weighted Site Mean[1]	0.762	0.824	1.000	0.545

[1]Weighted site means were used to calculate the estimated number of fish ($\hat{n}$) in the 500-ft net before escapement.

weeks which simply reflected the growth of the fish over the course of the study (Tables IV-7 and IV-8). There were no differences in length between test tows 1 and 2. The numbers of yearling and older ($\leq$150 mm) white perch collected (See Appendix B) were not sufficient to examine any associations between fish length and catch efficiency.

To determine whether escapement during the efficiency tests was size related, the combined length data from the 100-ft seine tows were compared to length data from the 500-ft seine tows. No significant differences were observed for juvenile striped bass (Table IV-9). There was a significant difference observed for juvenile white perch in week 2 (Table IV-10). Smaller fish were caught in week 2, suggesting that the larger fish may have been avoiding the 100-ft seine. However, the absence of a consistent response over all 3 weeks suggests that this difference was probably due to chance variation. In general, escapement does not appear to be size related for juvenile striped bass or juvenile white perch.

C. ASSOCIATION BETWEEN SELECTED WATER QUALITY FACTORS AND NIGHT CATCH EFFICIENCY

Water temperature and turbidity were selected as two water quality factors which could directly affect night catch efficiency. Within a normal range of water temperatures, the activity of fish can be expected to decrease as water temperatures decrease. Hence, if gear avoidance is a function of activity level, then changes in water temperature may influence the calculated catch efficiency values. Changes in turbidity could also be important if the changes were of sufficient magnitude to interfere with the fishes' vision and reduce their ability to avoid the seine. Conductivity may influence the abundance of juvenile fishes present in the shore zone; hence potential effects of conductivity on catch efficiency were also examined.

Examination of scatter plots of night catch efficiency versus water temperature and turbidity showed no clear associations for juvenile striped bass (Appendix E, Figures E-2 and E-3), juvenile white perch (Appendix E, Figures E-5 and E-6), and yearling and older ($\leq$150 mm) white

Table IV-7

Analysis of Variance on Transformed†Length Data of 100-ft Seine Tows 1 and 2 (Night Beach Seine Efficiency Tests) for Juvenile Striped Bass during Weeks 1 and 2 in 1978

Source of Variation	df	SS	MS	F	p
Weeks (Random)	1	0.02589	0.02589	10.113	0.002*
Tows (Fixed)	1	0.00118	0.00118	4.069	0.340
Weeks x Tows	1	0.00029	0.00029	0.113	0.737
Error	174	0.44544	0.00256		
Total	177	0.47280			

df = degrees of freedom
SS = sum of the squares
MS = mean square
F = test statistic
p = probability of larger F
* = significant (α=0.05)
† = Log_{10} x transformation

Table IV-8

Analysis of Variance of Transformed†Length Data of 100-ft Seine Tows 1 and 2 (Night Beach Seine Efficiency Tests) for Juvenile White Perch during Weeks 2 and 3 in 1978

Source of Variation	df	SS	MS	F	p
Weeks (Random)	1	0.01539	0.01539	4.949	0.031*
Tows (Fixed)	1	0.00864	0.00864	13.500	0.216
Weeks x Tows	1	0.00064	0.00064	0.206	0.652
Error	44	0.13684	0.00311		
Total	47	0.16151			

df = degrees of freedom
SS = sum of the squares
MS = mean square
F = test statistic
p = probability of larger F
* = significant (α=0.05)
† = Log_{10} x transformation

Table IV-9

A Priori Orthogonal Tests using t Ratios for Transformed† Length Data of Test Tows 1 and 2 (100-ft Seines) vs 500-ft Seine, by Week, for Juvenile Striped Bass in 1978

Week	Transformed Length Mean for Tow 1 and Tow 2 Combined	Transformed Length Mean for 500-ft Tow	t	p
1	1.910	1.912	0.255	0.806
2	1.934	1.944	1.136	0.266
3	1.960	1.961	0.092	>0.900

df = degrees of freedom = 447
MS = mean square error (common) = 0.002846
α = 0.05
t = test statistic
p = probability of a larger t
† = Log_{10} x transformation

Table IV-10

A Priori Orthogonal Tests Using t Ratios for Transformed† Length Data of Test Tows 1 and 2 (100-ft Seines) vs 500-ft Seine, by Week, for Juvenile White Perch in 1978

Week	Transformed Length Mean for Tow 1 and Tow 2 Combined	Transformed Length Mean for 500-ft Tow	t	p
1	1.862	1.858	0.498	0.628
2	1.844	1.867	2.016	0.045*
3	1.892	1.886	0.508	0.621

df = degrees of freedom = 354
MS = mean square error (common) = 0.002580
* = significant (α=0.05)
t = test statistic
p = probability of a larger t
† = Log_{10} x transformation

perch (Appendix E, Figures E-8 and E-9). Plots of catch efficiency from 1977 and 1978 versus conductivity (Appendix E, Figures E-10 to E-14) indicated no clear associations for juvenile striped bass, juvenile white perch, and yearling and older ($\leq$150 mm) white perch. For the ranges of water temperature (approximately 17 to 27°C), turbidity [approximately 1 to 85 FTU (Formazin Turbity Unit)], and conductivity (approximately 6800 to 11500 in 1978 and 260 to 12900 in 1977) encountered during the night seine efficiency study, there were no discernable effects of these water quality factors on catch efficiency. However, temperature declines between weeks 2 and 3 may have influenced the observed increase in catch efficiency for juvenile white perch (Table IV-19). Colder water temperatures cause fish activity to decrease. This decrease in activity may also decrease the fishes' ability to avoid the seine causing catch efficiency to increase.

D. COMPARISON OF CATCH EFFICIENCIES DURING DAY (1977) AND NIGHT (1978)

1. Juvenile Striped Bass

The catch efficiencies of the 100-ft seine for juvenile striped bass during the day (1977) and night (1978) were significantly different (Table IV-11). Mean (arithmetic) catch efficiency was lower at night than during the day (0.259 versus 0.474). To determine whether this day-night difference could be confounded with differences in density of juvenile striped bass between years, since the day efficiency data were collected in 1977 and the night efficiency data were collected in 1978, day catches in Beach Seine Survey samples collected during the three selected weeks in 1977 and 1978 (see METHODS) and in the region of the beach seine efficiency tests (Croton-Haverstraw) were compared (Table IV-12). Yearly differences were not significant. Furthermore, catches of juvenile striped bass were significantly greater in the shore zone at night in 1978 during the time period (September through early October) and in the region (Croton-Haverstraw) where the night seine efficiency study was conducted (Tables IV-13 and IV-14). Therefore, the day versus night catch efficiency differences appear to reflect a diel difference in the behavior of juvenile

Table IV-11

Analysis of Variance of Transformed†Catch Efficiencies of 100-ft Beach Seine for Juvenile Striped Bass during Day (1977) and Night (1978)

Source of Variation	df	SS	MS	F	p
Diel (Fixed)	1	0.36825	0.36825	127.865	0.008*
Weeks (Random)	2	0.22151	0.11075	2.382	0.107
Diel x Weeks	2	0.00577	0.00288	0.062	0.940
Tows (Fixed)	1	0.04843	0.04843	1.208	0.386
Diel x Tows	1	0.00732	0.00732	0.456	0.569
Weeks x Tows	2	0.08021	0.04010	0.862	0.431
Diel x Weeks x Tows	2	0.03212	0.01606	0.345	0.710
Error	36	1.67386	0.04650		
Total	47	2.43747			

Diel = day vs night
df = degrees of freedom
SS = sum of squares
MS = mean square
F = test statistic
p = probability of larger F
* = significant (α=0.05)
† = square root transformation

Table IV-12

Analysis of Variance on Transformed† Catch Data from Day Beach Seine (100-ft) Survey Samples for Juvenile Striped Bass in 1977 and 1978

Source of Variation	df	SS	MS	F	p
Year	1	0.01974	0.01974	0.021	0.885
Error	98	93.23016	0.95133		
Total	99	93.24990			

df = degrees of freedom
SS = sum of the squares
MS = mean square
F = test statistic
p = probability of larger F
† = $Z = X^{-0.252}$ [based on previous Supplementary Night Beach Seine (SNBS) transformation]
$\alpha = 0.05$

Table IV-13

Analysis of Variance on Transformed† Catch Data of Day Beach Seine Survey (100-ft) and Supplementary Night Beach Seines (100-ft) for Juvenile Striped Bass in 1978

Source of Variation	df	SS	MS	F	p
Diel	1	6.33799	6.33799	12.743	<0.001*
Error	70	34.81485	0.49736		
Total	71	41.15284			

Diel = day vs night
df = degrees of freedom
SS = sum of the squares
MS = mean square
F = test statistic
p = probability of larger F
* = significant (α=0.05)
† = $Z = X^{-0.252}$ (based on previous SNBS transformation)

Table IV-14

Mean and Variance of Catch Data from Day Beach Seine Survey (BSS) and Supplementary Night Beach Seines (SNBS) for Juvenile Striped Bass in 1978

BSS (Day)			SNBS (Night)		
Mean	S^2	n	Mean	S^2	n
15.139	1,240.009	36	39.889	1,044.159	36

S^2 = variance
n = number of observations

striped bass. Studies of diel patterns in the behavior, distribution, and feeding of bluegills indicated that they moved onshore after sunset and offshore after sunrise (Baumann and Kitchell 1974). Emery (1973) found that the number of fish apparent at night in shallow water was greater than in the daytime primarily because of the influx of offshore species and the lack of cover for resting diurnal species.

2. Juvenile White Perch

Night catch efficiencies for juvenile white perch were significantly higher than day catch efficiencies for weeks 1 and 2, but similar for week 3. The analysis of variance on catch efficiencies showed a significant diel by weeks interaction (Table IV-15). Since the interaction was significant, mean catch efficiencies were pooled across diel and week effects to detect the weekly differences (Table IV-16).

To determine whether these day versus night differences in catch efficiency were associated with differences in density between 1977 and 1978, day Beach Seine Survey catch data collected from the same region (Croton-Haverstraw) and time period (September through early October) in 1977 and 1978 were compared. No significant yearly differences were detected (Table IV-17); thus, density differences between years do not appear to be the cause of the diel effect observed in the catch efficiency values.

Rather, the results suggest that there are diel differences in the behavior of juvenile white perch. This possibility was further examined by comparing day Beach Seine Survey catches with catches taken in the night supplementary beach seines in 1978 (Table IV-18). The variances of the mean day and night catches were not equal, so a statistical comparison of the means was not possible, but catches in the shore zone appeared to be greater during the day. The fact that the variances were different demonstrated an important aspect of the day versus night distributions of juvenile white perch in the shore zone. The observed differences between the means and the variances of day and night catches strongly suggest an aggregation of

Table IV-15.

Analysis of Variance of Transformed† Catch Efficiencies of 100-ft Beach Seine for Juvenile White Perch during Day (1977) and Night (1978)

Source of Variation	df	SS	MS	F	p
Diel (Fixed)	1	0.70988	0.70988	3.118	0.219
Weeks (Random)	2	0.34128	0.17064	3.392	0.045*
Diel x Weeks	2	0.45536	0.22768	4.526	0.018*
Tows (Fixed)	1	0.26001	0.26001	5.777	0.138
Diel x Tows	1	0.10567	0.10567	10.190	0.086
Weeks x Tows	2	0.09002	0.04501	0.895	0.418
Diel x Weeks x Tows	2	0.02075	0.01037	0.206	0.815
Error	36	1.81100	0.05031		
Total	47	3.79397			

Diel = day vs night
df = degrees of freedom
SS = sum of squares
MS = mean square
F = test statistic
p = probability of larger F
* = significant (α=0.05)
† = square root transformation

Table IV-16

Mean and Variance of Day vs Night Catch Efficiencies for 100-ft Seine for Juvenile White Perch in 1977 and 1978

Day (1977)				Night (1978)			
Weeks	Mean	S^2	n	Weeks	Mean	S^2	n
09/11-17	0.031	0.002	8	09/03-09	0.390	0.097	8
09/18-24	0.029	0.004	8	09/17-23	0.146	0.008	8
10/02-08	0.270	0.071	8	10/01-07	0.245	0.078	8

S^2 = variance
n = number of observations

Table IV-17

Analysis of Variance on Transformed† Catch Data from Day Beach Seine Survey (100-ft) Samples for Juvenile White Perch in 1977 and 1978

Source of Variation	df	SS	MS	F	p
Week (Random)	2	1.41000	0.70500	4.009	0.021*
Year (Fixed)	1	0.24300	0.24300	2.945	0.228
Week x Year	2	0.16500	0.08250	0.469	0.627
Error	94	16.53084	0.17586		
Total	99	18.34884			

df = degrees of freedom
SS = sum of the squares
MS = mean square
F = test statistic
p = probability of larger F
* = significant (α=0.05)
† = $Z = X^{-0.074}$ (based on 1977 and 1978 Beach Seine Survey data)

Table IV-18

Mean and Variance of Catch Data from Day Beach Seine Survey (BSS) and Supplementary Night Beach Seines (SNBS) for Juvenile White Perch in 1978

BSS (Day)			SNBS (Night)		
Mean	S^2	n	Mean	S^2	n
32.879	3,093.797	33	12.424	204.127	33

S^2 = variance
n = number of observations

juvenile white perch during the day, and a more uniform, dispersed distribution at night. Spatial distribution of juvenile white perch during the day was described as a case 2 [fish inside the 500-ft seine enclosure were aggregated to the same degree as those outside the enclosure (TI 1978a)]; while a case 1 disposition (fish inside the enclosure are randomly distributed) may have existed for white perch at night. In contrast, juvenile striped bass exhibited a more consistent level of aggregation during day and night [Table IV-14 (possibly a case 2)].

Thus, a summary of the observations is this: even though juvenile striped bass are more abundant in the shore zone at night while juvenile white perch appear to be more abundant in the shore zone during the day, seine catch efficiencies for the two species are similar at night but greater for striped bass than white perch during the day. While these differences are difficult to fully explain with the available data, several plausible explanations can be offered.

The differences in the apparent aggregation behavior of the two Morone species provided an opportunity to examine the relative effects of density-distribution and behavior on the catch efficiency of the 100-ft seine. For example, juvenile striped bass and juvenile white perch differed significantly in density-distribution in the shore zone at night (compare Table IV-14 with Table IV-18), but they had very similar mean (arithmetic) night catch efficiencies (0.259 for striped bass in weeks 1 through 3; and 0.268 for white perch in weeks 1 and 2 only, since the day-night difference in week 3 was inconsistent). These results suggest that density-distribution and behavior have less of an effect on night catch efficiency than on day catch efficiency. During the day, behavioral factors appear to be important influences on the observed differences in mean (arithmetic) catch efficiencies of 0.474 for striped bass (weeks 1 through 3) compared to 0.030 for white perch (weeks 1 and 2 only). Species specific habit preferences may also be involved.

Visual observations by TI's Beach Seine Survey crews and the results of analyses on data collected in the Indian Point Standard Stations

program (TI 1976, 1978b; McFadden et al. 1978) indicate that juvenile white perch abundance is generally greatest on those beaches that are sheltered and most heavily vegetated (and also more difficult to seine), while juvenile striped bass seem to prefer open, unvegetated beaches adjacent to deep water (where seining is relatively easy). Thus, the observed differences in the day catch efficiency estimates for the two species may partially reflect basic differences in the ease of seining the two general microhabitats that striped bass and white perch occupy.

If juvenile white perch do aggregate either in or near cover (vegetation) during the day (i.e., in areas difficult to seine), then even if they are most dense in the shore zone during the day, the relatively low day catch efficiency observed for the 100-ft seine was not surprising. Then, if they disperse more at night and move away from cover, catch efficiency at night should increase, as it generally did (Table IV-16).

The diel by weeks interaction for catch efficiency of juvenile white perch (Table IV-15) appeared to be associated with a decline in water temperature. An analysis of water temperature data collected concomittantly with the beach seine hauls demonstrated a significant change in temperature between weeks 2 and 3 (Table IV-19). The change in catch efficiency between weeks 2 and 3 associated with the observed change in temperature suggests that the vulnerability of juvenile white perch to the 100-ft seine increased as water temperatures decreased (Table IV-19), perhaps because they dispersed and moved away from cover.

An explanation of catch efficiency decreasing at night for juvenile striped bass is more difficult. One could hypothesize several patterns of diel differences in the density of young striped bass within the area sampled by the 100-ft seine versus the nearby offshore areas, e.g. Figure IV-1. Evaluations of this hypothesis and other alternative hypotheses were beyond the scope of this study.

In conclusion, the efficiency of the 100-ft seine varies significantly between day and night in collecting juvenile striped bass and juvenile white perch. These differences presumably reflect a number of

Table IV-19

Mean and Variance of Water Temperature during Catch Efficiency Tests in 1977 (Day) and 1978 (Night)

Day				Night			
Weeks	Mean	S^2	n	Weeks	Mean	S^2	n
Week 1 (09/11-17)	21.962	1.899	8	(09/03-09)	24.350	1.457	8
Week 2 (09/18-24)	22.637	3.233	8	(09/17-23)	21.237	1.850	8
Week 3 (10/02-08)	15.737	4.064	8	(10/01-07)	17.975	0.296	8

S^2 = variance
n = number of observations

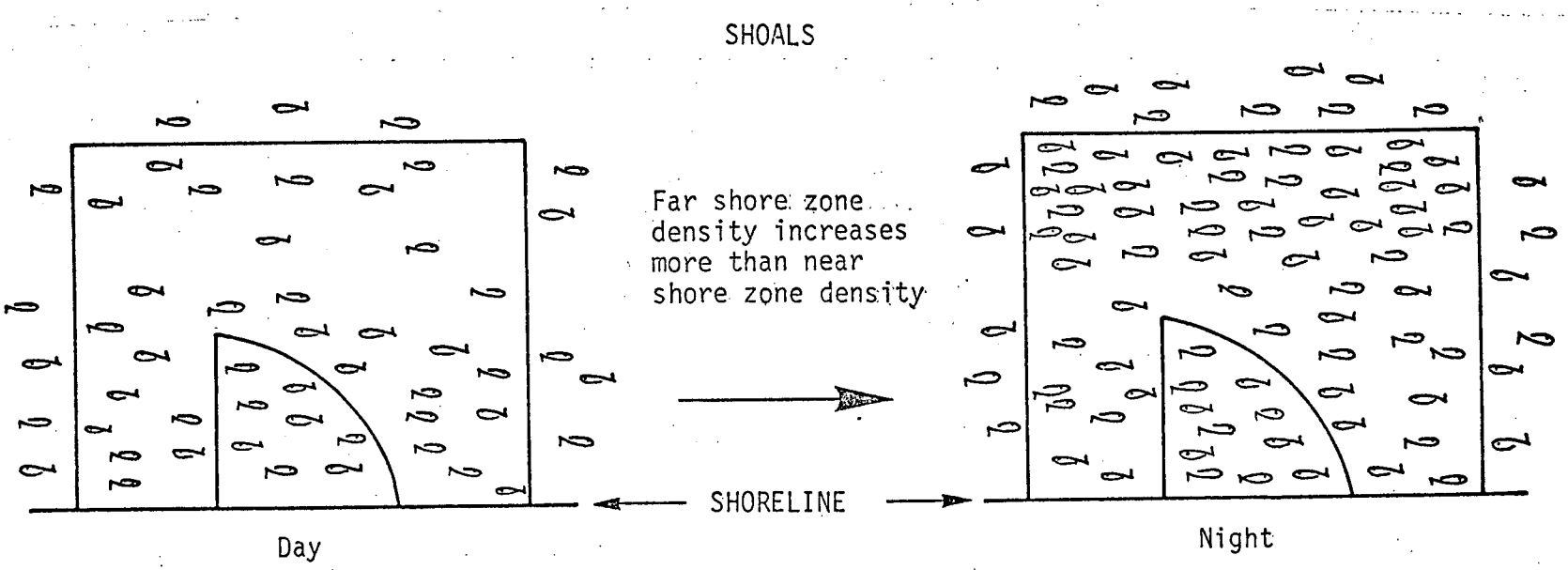

Figure IV-1. A Plausible Day-Night Distribution of Juvenile Striped Bass that Could Yield Decreased Catch Efficiency for 100-ft Seine at Night with Increased Night Abundances in Shore Zone

factors, including differences in habitat selection by the two species. Species differences in catch efficiency disappear at night when juvenile white perch apparently disperse from vegetative cover and become more uniformly distributed.

3. Yearling and Older ($\leq$150 mm) White Perch

Yearling and older ($\leq$150 mm) white perch seem to exhibit the same trends in behavior as juvenile white perch. Greater catches of yearling and older ($\leq$150 mm) white perch were collected in the shore zone during the day (Table IV-20). The observed differences in the variances of the means also suggests an aggregation of yearling and older ($\leq$150 mm) white perch during the day, and a more uniform dispersed distribution at night. Since yearling and older ($\leq$150 mm) white perch were not collected in substantial quantities during the 1977 day catch efficiency study, day and night catch efficiencies could not be compared.

E. ADJUSTMENT FACTORS FOR AREA-DENSITY EXTRAPOLATIONS OF ABSOLUTE ABUNDANCE IN THE SHORE ZONE

The estimates of catch efficiency for the 100 ft seine obtained from this study and a previous study (TI 1978a) can be used to estimate the absolute abundance of juvenile striped bass and juvenile white perch in the shore zone of the Hudson River estuary using an area-density method. The technique was succinctly stated by Kjelson (1977):

> The area-density method consists of randomly sampling a plot of known area or volume and capturing some or all of the fish present. The average number of fish per unit area or volume is then calculated and multiplied by the total area (volume) to obtain an estimate of the size of the entire population. The area-density method is a refinement over the general catch-per-unit-effort approach in that the area from which the sample is obtained is known, thus providing at least a minimal measure of absolute abundance, as opposed to relative abundance. By correcting for underestimation of abundance, due typically to

Table IV-20

Mean and Variance of Catch Data from Day Beach Seine Survey (BSS) and Supplementary Night Beach Seines (SNBS) for Yearling and Older (≤150mm) White Perch in 1978

BSS (Day)			SNBS (Night)		
Mean	S^2	n	Mean	S^2	n
6.028	677.742	36	5.333	30.000	36

S^2 = variance
n = number of observations

mesh selection or net avoidance, an estimate of absolute abundance is obtained.

The day versus night catch efficiencies (i.e. net avoidance) differed for striped bass and white perch, so the adjustment factors needed to convert day standing crops in the shore zone to night standing crops will also differ for the two species. The adjustment factors can be calculated from the generalized relationship:

$$TNA = ODA \cdot \frac{1}{DCE} \cdot \left(\frac{ONA \cdot \frac{1}{NCE}}{ODA \cdot \frac{1}{DCE}} \right)$$

where

TNA = estimate of true abundance in the shore zone at night

ODA = observed abundance in the shore zone during the day

DCE = catch efficiency of 100-ft seine (expressed as a proportion) during the day

ONA = observed abundance in the shore zone at night

NCE = catch efficiency of 100-ft seine (expressed as a proportion) at night

Based on the 1978 data discussed in this report (36 day tows and 36 night tows with the 100-ft seine, September through early October, Croton-Haverstraw region), an estimate of the true abundance of juvenile striped bass in the shore zone at night (TNA) could be obtained by multiplying the observed abundance in the shore zone during the day (ODA) by a factor of 10.1. This adjustment factor was calculated by the following equation:

$$TNA = ODA \cdot \frac{1}{0.39} \cdot \left(\frac{39.89 \cdot \frac{1}{0.26}}{15.14 \cdot \frac{1}{0.39}} \right)$$

or $TNA = ODA \cdot 10.1$

Based on similar 1978 data, an estimate of the true abundance of juvenile white perch in the shore zone at night (TNA) could be obtained by multiplying the observed abundance in the shore zone during the day (ODA) by a factor of at least 2.1. This adjustment factor was calculated by the following equation:

$$TNA = ODA \cdot \frac{1}{0.07} \cdot \left(\frac{12.42 \cdot \frac{1}{0.18}}{32.88 \cdot \frac{1}{0.07}} \right)$$

$$\text{or } TNA = ODA \cdot 2.1$$

Night to day ratios in shore zone abundance of juvenile white perch in previous years have been greater than 2.0 (TI 1975, 1977). If the pattern observed in 1978 (i.e. higher densities during the day) was atypical, then the adjustment factor would increase. For example, if juvenile white perch in 1978 had been 1.5 times more abundant in the shore zone at night than during the day, the adjustment factor would increase from 2.1 to approximately 8.

Yearling and older ($\leq$150 mm) white perch were not collected in sufficient numbers during the 1977 Day Beach Seine Efficiency Study to calculate day catch efficiency. Similar trends in night and day behavior patterns (Table IV-18 and IV-20) were observed during the 1978 Night Beach Seine Efficiency Study for both juvenile white perch and yearling and older ($\leq$150 mm) white perch. Night weighted mean catch efficiency values for juvenile white perch and yearling and older ($\leq$150 mm) white perch (0.182 and 0.262 respectively) are also similar. Thus, the 1977 day beach seine efficiency value for juvenile white perch can be used in the formula to estimate a gear efficiency adjustment factor for yearling and older ($\leq$150 mm) white perch catches. An estimate of the true abundance of yearling and older ($\leq$150 mm) white perch in the shore zone at night (TNA) could then be obtained by multiplying the observed abundance in the shore zone during the day (ODA) by a factor of 3.4. This adjustment was calculated from the

following equation:

$$TNA = ODA \cdot \left(\frac{1}{0.07}\right) \cdot \left(\frac{5.333 \cdot \frac{1}{0.26}}{6.028 \cdot \frac{1}{0.07}}\right)$$

or $TNA = ODA \cdot 3.4$

SECTION V

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APPENDIX A

ENVIRONMENTAL DATA FOR NIGHT BEACH SEINE EFFICIENCY TESTS AND SUPPLEMENTARY NIGHT BEACH SEINE TOWS

1978 NIGHT BEACH SEINE EFFICIENCY REPORT

WATER QUALITY DATA LEGEND

S_GROUP	: SPECIFIES A GROUP OF SAMPLES (THREE TEST AND THREE SUPPLEMENTARY) TAKEN ON THE SAME NIGHT
SAMPLE	: NIGHT BEACH SEINE EFFICIENCY TEST SAMPLES <= 240036 SUPPLEMENTARY NIGHT BEACH SEINE SAMPLES >= 240225
WEEK	: 1 = 09/03-09/09 2 = 09/17-09/23 3 = 10/01-10/07
DATE	: MONTH, DAY, AND YEAR THE SAMPLE WAS COLLECTED
TIME	: TIME OF DAY GEAR WAS DEPLOYED (USING 24 HOUR CLOCK)
RV_MILE	: RIVER MILE WHERE SAMPLE WAS TAKEN
SITE	: SIDE OF RIVER WHERE SAMPLE WAS TAKEN (1 = WEST, 3 = EAST)
TIDE	: TIDAL STAGE WHEN SAMPLE WAS TAKEN (1 = LOW SLACK, 2 = FLOOD, 3 = HIGH SLACK, 4 = EBB)
GEAR	: SAMPLING DEVICE (BEACH SEINES: 12 = 100FT 53 = 500FT)
TEMP	: TEMPERATURE (DEGREES CENTIGRADE)
DO	: DISSOLVED OXYGEN (PPM)
PH	: PH
COND	: CONDUCTIVITY (UMHOS/CM @ 25C)
TURB	: TURBIDITY (FTU)

1978 NIGHT BEACH SEINE EFFICIENCY REPORT
WATER QUALITY DATA FOR ALL SAMPLES

S_GROUP	SAMPLE	WEEK	DATE	TIME	RV_MILE	SITE	TIDE	GEAR	TEMP	DO	PH	COND	TURB
1	240001	1	09/05/78	2225	34	3	2	53	23.3	10.4	8.6	10500	4.0
1	240002	1	09/05/78	2340	34	3	2	12	23.4	11.4	8.7	11000	3.0
1	240003	1	09/06/78	100	34	3	2	12	23.3	11.0	8.7	10500	3.0
2	240004	1	09/06/78	2130	35	3	2	53	25.2	9.4	8.4	10500	7.0
2	240005	1	09/06/78	2235	35	3	2	12	25.0	8.8	8.2	10500	9.0
2	240006	1	09/06/78	2355	35	3	2	12	25.8	9.1	8.1	10500	7.0
3	240007	1	09/07/78	2200	36	1	2	53	25.0	7.2	7.8	9650	78.0
3	240008	1	09/07/78	2300	36	1	2	12	24.2	7.3	7.8	9500	85.0
3	240009	1	09/08/78	20	36	1	2	12	24.0	7.6	7.8	9500	39.0
4	240010	1	09/08/78	2150	39	3	2	53	23.1	7.7	.	9450	10.0
4	240011	1	09/08/78	2255	39	3	2	12	26.2	7.6	.	9400	7.0
4	240012	1	09/09/78	15	39	3	2	12	22.9	7.2	.	9400	5.0
5	240013	2	09/18/78	2145	34	3	2	53	20.1	6.9	7.6	11000	3.0
5	240014	2	09/18/78	2250	34	3	2	12	20.1	7.1	7.5	11000	3.0
5	240015	2	09/19/78	7	34	3	2	12	20.1	7.5	7.6	10500	2.0
6	240016	2	09/19/78	2230	35	3	2	53	19.7	8.0	7.6	9250	4.0
6	240017	2	09/19/78	2340	35	3	2	12	20.5	7.7	7.6	9350	4.0
6	240018	2	09/20/78	108	35	3	2	12	20.0	7.4	7.7	9250	4.0
7	240019	2	09/20/78	2110	36	1	2	53	22.0	6.9	7.7	8850	42.0
7	240020	2	09/20/78	2215	36	1	2	12	21.2	6.8	7.6	8750	14.0
7	240021	2	09/20/78	2338	36	1	2	12	21.5	7.0	7.6	8350	5.0
8	240022	2	09/21/78	2220	39	3	2	53	23.1	7.8	7.7	7100	26.0
8	240023	2	09/21/78	2332	39	3	2	12	23.5	7.8	7.6	6950	10.0
8	240024	2	09/22/78	53	39	3	2	12	23.0	7.7	7.8	7000	9.0
9	240025	3	10/02/78	2015	34	3	2	53	18.1	10.0	8.2	11000	5.0
9	240026	3	10/02/78	2122	34	3	2	12	18.2	10.8	8.6	11500	4.0
9	240027	3	10/02/78	2246	34	3	2	12	17.2	10.8	8.6	11500	3.0
10	240028	3	10/03/78	2025	35	3	2	53	17.7	9.8	8.0	11000	2.0
10	240029	3	10/03/78	2137	35	3	2	12	17.5	9.4	7.6	11000	2.0
10	240030	3	10/03/78	2307	35	3	2	12	17.5	8.2	7.7	11500	3.0
11	240031	3	10/04/78	2145	36	1	2	53	18.0	7.9	7.3	11000	8.0
11	240032	3	10/04/78	2250	36	1	2	12	18.0	7.8	7.6	11000	7.0
11	240033	3	10/05/78	5	36	1	2	12	18.1	7.6	7.6	11000	4.0
12	240034	3	10/05/78	2135	39	3	2	53	18.1	8.3	7.5	10000	7.0
12	240035	3	10/05/78	2243	39	3	2	12	18.8	7.9	7.8	10000	5.0
12	240036	3	10/06/78	6	39	3	2	12	18.5	7.7	7.7	10000	5.0
1	240225	1	09/05/78	2015	39	3	2	12	25.2	8.7	7.9	9550	4.0
1	240226	1	09/05/78	2120	36	1	2	12	24.8	6.6	7.6	10500	9.0
1	240227	1	09/05/78	2250	35	3	2	12	25.2	8.5	8.0	10500	7.0
2	240228	1	09/06/78	2010	39	3	4	12	25.6	8.3	8.0	9700	51.0
2	240229	1	09/06/78	2045	36	1	1	12	24.9	5.8	7.4	11000	98.0
2	240230	1	09/06/78	2150	34	3	2	12	24.2	9.3	8.8	11000	11.0
3	240231	1	09/07/78	2030	39	3	1	12	24.8	8.6	8.1	9600	10.0
3	240232	1	09/07/78	2105	35	3	2	12	23.8	8.5	8.2	10500	49.0
3	240233	1	09/07/78	2220	34	3	2	12	21.9	7.9	8.5	11000	14.0
4	240234	1	09/08/78	1940	36	1	4	12	24.2	7.0	.	11000	13.0
4	240235	1	09/08/78	2010	34	3	4	12	21.5	9.2	.	11500	6.0

1978 NIGHT BEACH SEINE EFFICIENCY REPORT
WATER QUALITY DATA FOR ALL SAMPLES

S_GROUP	SAMPLE	WEEK	DATE	TIME	RV_MILE	SITE	TIDE	GEAR	TEMP	DO	PH	COND	TURB
4	240236	1	09/08/78	2045	35	3	1	12	24.1	8.9	.	11000	2.0
5	240237	2	09/18/78	1949	39	3	1	12	21.8	7.5	7.4	8750	11.0
5	240238	2	09/18/78	2031	36	1	2	12	21.6	7.4	7.6	8550	33.0
5	240239	2	09/18/78	2057	35	3	2	12	20.9	7.7	7.4	9350	7.0
6	240240	2	09/19/78	1958	39	3	1	12	21.1	8.0	7.6	8650	4.0
6	240241	2	09/19/78	2036	36	1	2	12	21.0	7.4	7.7	8350	17.0
6	240242	2	09/19/78	2134	34	3	2	12	18.6	8.3	7.6	10500	3.0
7	240244	2	09/20/78	1951	39	3	4	12	21.7	7.9	7.8	8250	20.0
7	240245	2	09/20/78	2024	35	3	1	12	22.0	8.1	7.8	9100	5.0
7	240246	2	09/20/78	2138	34	3	2	12	20.4	8.3	7.8	10050	7.0
8	240247	2	09/21/78	1945	36	1	4	12	23.0	7.6	.	.	0.0
8	240248	2	09/21/78	2017	34	3	4	12	23.5	9.5	8.1	9550	9.0
8	240249	2	09/21/78	2056	35	3	1	12	21.9	7.6	7.3	8350	5.0
9	240250	3	10/02/78	1925	39	3	2	12	19.2	9.2	8.0	11000	8.0
9	240251	3	10/02/78	2033	35	3	2	12	18.0	9.4	8.1	11000	5.0
9	240252	3	10/03/78	134	36	1	4	12	18.2	7.9	7.8	10500	4.0
10	240253	3	10/03/78	1916	39	3	2	12	17.9	8.9	7.7	10500	14.0
10	240254	3	10/03/78	1943	36	1	2	12	18.2	8.2	7.7	11500	60.0
10	240255	3	10/03/78	2044	34	3	2	12	16.1	10.1	7.9	11500	2.0
11	240257	3	10/04/78	1916	39	3	1	12	17.7	9.0	7.5	10500	10.0
11	240258	3	10/04/78	1944	35	3	2	12	17.4	8.4	7.7	11000	2.0
11	240259	3	10/04/78	2020	34	3	2	12	16.5	9.0	7.6	11500	3.0
12	240261	3	10/05/78	1934	36	1	4	12	18.9	7.9	7.8	10500	55.0
12	240262	3	10/05/78	2010	34	3	1	12	16.5	9.3	7.8	11500	26.0
12	240263	3	10/05/78	2045	35	3	2	12	17.5	9.2	7.8	10500	5.0

APPENDIX B

FISH CATCH AND ENVIRONMENTAL DATA FOR NIGHT BEACH SEINE EFFICIENCY TESTS

1978 NIGHT BEACH SEINE EFFICIENCY REPORT

L E G E N D

S_GROUP : SPECIFIES A GROUP OF SAMPLES (THREE TEST AND THREE SUPPLEMENTARY) TAKEN ON THE SAME NIGHT

SAMPLE : NIGHT BEACH SEINE EFFICIENCY TEST SAMPLES <= 240036
SUPPLEMENTARY NIGHT BEACH SEINE SAMPLES >= 240225

WEEK : 1 = 09/03-09/09 2 = 09/17-09/23 3 = 10/01-10/07

DATE : MONTH, DAY, AND YEAR THE SAMPLE WAS COLLECTED

TIME : TIME OF DAY GEAR WAS DEPLOYED (USING 24 HOUR CLOCK)

RV_MILE : RIVER MILE WHERE SAMPLE WAS TAKEN

SITE : SIDE OF RIVER WHERE SAMPLE WAS TAKEN (1 = WEST, 3 = EAST)

TIDE : TIDAL STAGE WHEN SAMPLE WAS TAKEN (1 = LOW SLACK, 2 = FLOOD, 3 = HIGH SLACK, 4 = EBB)

GEAR : SAMPLING DEVICE (BEACH SEINES: 12 = 100FT 53 = 500FT)

LC_1 : TOTAL # CAUGHT IN LENGTH CLASS 1 (0 TO DIV.)

LC_2 : TOTAL # CAUGHT IN LENGTH CLASS 2 (DIV. + 1MM - 150MM)

LC_3 : TOTAL # CAUGHT IN LENGTH CLASS 3 (151MM - 250MM)

LC_4 : TOTAL # CAUGHT IN LENGTH CLASS 4 (251MM +)

TEMP : TEMPERATURE (DEGREES CENTIGRADE)

DO : DISSOLVED OXYGEN (PPM)

PH : PH

COND : CONDUCTIVITY (UMHOS/CM @ 25C)

TURB : TURBIDITY (FTU)

NOTE : ZERO CATCH SAMPLES ARE EXCLUDED,

ACTUAL EFFORT:

TEST = 36 TOTAL SAMPLES
(24 GEAR 12, 12 GEAR 53)

SUPPLEMENTARY = 36 TOTAL SAMPLES

1978 NIGHT BEACH SEINE EFFICIENCY REPORT
CATCH AND WATER QUALITY DATA FOR TEST SAMPLES
(ZERO CATCH SAMPLES ARE EXCLUDED)

SPECIES=ALEWIFE

S_GROUP	SAMPLE	WEEK	DATE	TIME	RV_MILE	SITE	TIDE	GEAR	LC_1	LC_2	LC_3	LC_4	TEMP	DO	PH	COND	TURB
1	240002	1	09/05/78	2340	34	3	2	12	7	0	0	0	23.4	11.4	8.7	11000	3.0
1	240003	1	09/06/78	100	34	3	2	12	16	0	0	0	23.3	11.0	8.7	10500	3.0
1	240001	1	09/05/78	2225	34	3	2	53	145	0	0	0	23.3	10.4	8.6	10500	4.0
2	240006	1	09/06/78	2355	35	3	2	12	1	0	0	0	25.8	9.1	8.1	10500	7.0
2	240004	1	09/06/78	2130	35	3	2	53	18	0	0	0	25.2	9.4	8.4	10500	7.0
3	240008	1	09/07/78	2300	36	1	2	12	3	0	0	0	24.2	7.3	7.8	9500	85.0
3	240007	1	09/07/78	2200	36	1	2	53	38	0	0	0	25.0	7.2	7.8	9650	78.0
4	240011	1	09/08/78	2255	39	3	2	12	5	0	0	0	26.2	7.6	.	9400	7.0
4	240012	1	09/09/78	15	39	3	2	12	4	0	0	0	22.9	7.2	.	9400	5.0
4	240010	1	09/08/78	2150	39	3	2	53	60	0	0	0	23.1	7.7	.	9450	10.0
5	240014	2	09/18/78	2250	34	3	2	12	14	0	0	0	20.1	7.1	7.5	11000	3.0
5	240015	2	09/19/78	7	34	3	2	12	7	0	0	0	20.1	7.5	7.6	10500	2.0
5	240013	2	09/18/78	2145	34	3	2	53	128	0	0	0	20.1	6.9	7.6	11000	3.0
6	240018	2	09/20/78	108	35	3	2	12	6	0	0	0	20.0	7.4	7.7	9250	4.0
6	240016	2	09/19/78	2230	35	3	2	53	30	0	0	0	19.7	8.0	7.6	9250	4.0
7	240020	2	09/20/78	2215	36	1	2	12	1	0	0	0	21.2	6.8	7.6	8750	14.0
7	240019	2	09/20/78	2110	36	1	2	53	9	0	0	0	22.0	6.9	7.7	8850	42.0
8	240023	2	09/21/78	2332	39	3	2	12	9	0	0	0	23.5	7.8	7.6	6950	10.0
8	240024	2	09/22/78	53	39	3	2	12	5	0	0	0	23.0	7.7	7.8	7000	9.0
8	240022	2	09/21/78	2220	39	3	2	53	43	0	0	0	23.1	7.8	7.7	7100	26.0
9	240026	3	10/02/78	2122	34	3	2	12	15	0	0	0	18.2	10.8	8.6	11500	4.0
9	240027	3	10/02/78	2246	34	3	2	12	5	0	0	0	17.2	10.8	8.6	11500	3.0
9	240025	3	10/02/78	2015	34	3	2	53	204	0	0	0	18.1	10.0	8.2	11000	5.0
10	240029	3	10/03/78	2137	35	3	2	12	4	0	0	0	17.5	9.4	7.6	11000	2.0
10	240028	3	10/03/78	2025	35	3	2	53	7	0	0	0	17.7	9.8	8.0	11000	2.0
11	240032	3	10/04/78	2250	36	1	2	12	1	0	0	0	18.0	7.8	7.6	11000	7.0
11	240033	3	10/05/78	5	36	1	2	12	1	0	0	0	18.1	7.6	7.6	11000	4.0
11	240031	3	10/04/78	2145	36	1	2	53	12	0	0	0	18.0	7.9	7.3	11000	8.0
12	240035	3	10/05/78	2243	39	3	2	12	2	0	0	0	18.8	7.9	7.8	10000	5.0
12	240036	3	10/06/78	6	39	3	2	12	1	0	0	0	18.5	7.7	7.7	10000	5.0
12	240034	3	10/05/78	2135	39	3	2	53	30	0	0	0	18.1	8.3	7.5	10000	7.0

SPECIES=BAY ANCHOVY

S_GROUP	SAMPLE	WEEK	DATE	TIME	RV_MILE	SITE	TIDE	GEAR	LC_1	LC_2	LC_3	LC_4	TEMP	DO	PH	COND	TURB
1	240002	1	09/05/78	2340	34	3	2	12	0	1	0	0	23.4	11.4	8.7	11000	3.0
1	240003	1	09/06/78	100	34	3	2	12	1	0	0	0	23.3	11.0	8.7	10500	3.0
1	240001	1	09/05/78	2225	34	3	2	53	9	0	0	0	23.3	10.4	8.6	10500	4.0
2	240005	1	09/06/78	2235	35	3	2	12	18	0	0	0	25.0	8.8	8.2	10500	9.0
2	240006	1	09/06/78	2355	35	3	2	12	11	1	0	0	25.8	9.1	8.1	10500	7.0
2	240004	1	09/06/78	2130	35	3	2	53	91	0	0	0	25.2	9.4	8.4	10500	7.0
3	240008	1	09/07/78	2300	36	1	2	12	4	0	0	0	24.2	7.3	7.8	9500	85.0

1978 NIGHT BEACH SEINE EFFICIENCY REPORT
CATCH AND WATER QUALITY DATA FOR TEST SAMPLES
(ZERO CATCH SAMPLES ARE EXCLUDED)

SPECIES=BAY ANCHOVY

S_GROUP	SAMPLE	WEEK	DATE	TIME	RV_MILE	SITE	TIDE	GEAR	LC_1	LC_2	LC_3	LC_4	TEMP	DO	PH	COND	TURB
3	240007	1	09/07/78	2200	36	1	2	53	42	1	0	0	25.0	7.2	7.8	9650	78.0
4	240011	1	09/08/78	2255	39	3	2	12	1	0	0	0	26.2	7.6	.	9400	7.0
4	240012	1	09/09/78	15	39	3	2	12	1	0	0	0	22.9	7.2	.	9400	5.0
4	240010	1	09/08/78	2150	39	3	2	53	8	0	0	0	23.1	7.7	.	9450	10.0
5	240014	2	09/18/78	2250	34	3	2	12	14	0	0	0	20.1	7.1	7.5	11000	3.0
5	240015	2	09/19/78	7	34	3	2	12	22	0	0	0	20.1	7.5	7.6	10500	2.0
5	240013	2	09/18/78	2145	34	3	2	53	11	0	0	0	20.1	6.9	7.6	11000	3.0
6	240017	2	09/19/78	2340	35	3	2	12	52	0	0	0	20.5	7.7	7.6	9350	4.0
6	240018	2	09/20/78	108	35	3	2	12	90	0	0	0	20.0	7.4	7.7	9250	4.0
6	240016	2	09/19/78	2230	35	3	2	53	249	0	0	0	19.7	8.0	7.6	9250	4.0
7	240020	2	09/20/78	2215	36	1	2	12	23	0	0	0	21.2	6.8	7.6	8750	14.0
7	240021	2	09/20/78	2338	36	1	2	12	4	0	0	0	21.5	7.0	7.6	8350	5.0
7	240019	2	09/20/78	2110	36	1	2	53	74	0	0	0	22.0	6.9	7.7	8850	42.0
8	240023	2	09/21/78	2332	39	3	2	12	67	0	0	0	23.5	7.8	7.6	6950	10.0
8	240024	2	09/22/78	53	39	3	2	12	57	0	0	0	23.0	7.7	7.8	7000	9.0
8	240022	2	09/21/78	2220	39	3	2	53	79	0	0	0	23.1	7.8	7.7	7100	26.0
9	240026	3	10/02/78	2122	34	3	2	12	40	0	0	0	18.2	10.8	8.6	11500	4.0
9	240027	3	10/02/78	2246	34	3	2	12	30	0	0	0	17.2	10.8	8.6	11500	3.0
9	240025	3	10/02/78	2015	34	3	2	53	62	1	0	0	18.1	10.0	8.2	11000	5.0
10	240029	3	10/03/78	2137	35	3	2	12	3	0	0	0	17.5	9.4	7.6	11000	2.0
10	240030	3	10/03/78	2307	35	3	2	12	1	0	0	0	17.5	8.2	7.7	11500	3.0
10	240028	3	10/03/78	2025	35	3	2	53	85	1	0	0	17.7	9.8	8.0	11000	2.0
11	240032	3	10/04/78	2250	36	1	2	12	5	0	0	0	18.0	7.8	7.6	11000	7.0
11	240033	3	10/05/78	5	36	1	2	12	2	0	0	0	18.1	7.6	7.6	11000	4.0
11	240031	3	10/04/78	2145	36	1	2	53	30	1	0	0	18.0	7.9	7.3	11000	8.0
12	240035	3	10/05/78	2243	39	3	2	12	1	0	0	0	18.8	7.9	7.8	10000	5.0
12	240034	3	10/05/78	2135	39	3	2	53	8	1	0	0	18.1	8.3	7.5	10000	7.0

SPECIES=AMERICAN SHAD

S_GROUP	SAMPLE	WEEK	DATE	TIME	RV_MILE	SITE	TIDE	GEAR	LC_1	LC_2	LC_3	LC_4	TEMP	DO	PH	COND	TURB
1	240001	1	09/05/78	2225	34	3	2	53	4	0	0	0	23.3	10.4	8.6	10500	4.0
2	240006	1	09/06/78	2355	35	3	2	12	1	0	0	0	25.8	9.1	8.1	10500	7.0
2	240004	1	09/06/78	2130	35	3	2	53	26	0	0	0	25.2	9.4	8.4	10500	7.0
3	240008	1	09/07/78	2300	36	1	2	12	3	0	0	0	24.2	7.3	7.8	9500	85.0
3	240007	1	09/07/78	2200	36	1	2	53	2	0	0	0	25.0	7.2	7.8	9650	78.0
4	240011	1	09/08/78	2255	39	3	2	12	1	0	0	0	26.2	7.6	.	9400	7.0
4	240012	1	09/09/78	15	39	3	2	12	2	0	0	0	22.9	7.2	.	9400	5.0
4	240010	1	09/08/78	2150	39	3	2	53	26	0	0	0	23.1	7.7	.	9450	10.0
5	240013	2	09/18/78	2145	34	3	2	53	1	0	0	0	20.1	6.9	7.6	11000	3.0
6	240017	2	09/19/78	2340	35	3	2	12	2	0	0	0	20.5	7.7	7.6	9350	4.0
6	240018	2	09/20/78	108	35	3	2	12	4	0	0	0	20.0	7.4	7.7	9250	4.0

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CATCH AND WATER QUALITY DATA FOR TEST SAMPLES
(ZERO CATCH SAMPLES ARE EXCLUDED)

SPECIES=AMERICAN SHAD

S_GROUP	SAMPLE	WEEK	DATE	TIME	RV_MILE	SITE	TIDE	GEAR	LC_1	LC_2	LC_3	LC_4	TEMP	DO	PH	COND	TURB
6	240016	2	09/19/78	2230	35	3	2	53	8	0	0	0	19.7	8.0	7.6	9250	4.0
7	240019	2	09/20/78	2110	36	1	2	53	1	0	0	0	22.0	6.9	7.7	8850	42.0
8	240022	2	09/21/78	2220	39	3	2	53	5	0	0	0	23.1	7.8	7.7	7100	26.0
9	240026	3	10/02/78	2122	34	3	2	12	1	0	0	0	18.2	10.8	8.6	11500	4.0
9	240025	3	10/02/78	2015	34	3	2	53	5	0	0	0	18.1	10.0	8.2	11000	5.0
10	240029	3	10/03/78	2137	35	3	2	12	4	0	0	0	17.5	9.4	7.6	11000	2.0
10	240028	3	10/03/78	2025	35	3	2	53	40	0	0	0	17.7	9.8	8.0	11000	2.0
11	240031	3	10/04/78	2145	36	1	2	53	3	0	0	0	18.0	7.9	7.3	11000	8.0
12	240034	3	10/05/78	2135	39	3	2	53	11	0	0	0	18.1	8.3	7.5	10000	7.0

SPECIES=BLUEFISH

S_GROUP	SAMPLE	WEEK	DATE	TIME	RV_MILE	SITE	TIDE	GEAR	LC_1	LC_2	LC_3	LC_4	TEMP	DO	PH	COND	TURB
1	240001	1	09/05/78	2225	34	3	2	53	1	0	0	0	23.3	10.4	8.6	10500	4.0
2	240004	1	09/06/78	2130	35	3	2	53	3	0	0	0	25.2	9.4	8.4	10500	7.0
4	240010	1	09/08/78	2150	39	3	2	53	0	1	11	0	23.1	7.7	.	9450	10.0
5	240014	2	09/18/78	2250	34	3	2	12	2	0	0	0	20.1	7.1	7.5	11000	3.0
5	240013	2	09/18/78	2145	34	3	2	53	5	0	0	0	20.1	6.9	7.6	11000	3.0
6	240018	2	09/20/78	108	35	3	2	12	1	0	0	0	20.0	7.4	7.7	9250	4.0
6	240016	2	09/19/78	2230	35	3	2	53	5	0	0	0	19.7	8.0	7.6	9250	4.0
7	240019	2	09/20/78	2110	36	1	2	53	1	0	0	0	22.0	6.9	7.7	8850	42.0
8	240022	2	09/21/78	2220	39	3	2	53	3	0	0	0	23.1	7.8	7.7	7100	26.0
9	240027	3	10/02/78	2246	34	3	2	12	1	0	0	0	17.2	10.8	8.6	11500	3.0
9	240025	3	10/02/78	2015	34	3	2	53	5	0	0	0	18.1	10.0	8.2	11000	5.0
10	240028	3	10/03/78	2025	35	3	2	53	1	0	0	0	17.7	9.8	8.0	11000	2.0
11	240031	3	10/04/78	2145	36	1	2	53	4	0	0	0	18.0	7.9	7.3	11000	8.0

SPECIES=BLUEGILL

S_GROUP	SAMPLE	WEEK	DATE	TIME	RV_MILE	SITE	TIDE	GEAR	LC_1	LC_2	LC_3	LC_4	TEMP	DO	PH	COND	TURB
7	240019	2	09/20/78	2110	36	1	2	53	0	1	0	0	22.0	6.9	7.7	8850	42.0
8	240022	2	09/21/78	2220	39	3	2	53	0	1	0	0	23.1	7.8	7.7	7100	26.0

SPECIES=BROWN BULLHEAD

S_GROUP	SAMPLE	WEEK	DATE	TIME	RV_MILE	SITE	TIDE	GEAR	LC_1	LC_2	LC_3	LC_4	TEMP	DO	PH	COND	TURB
3	240007	1	09/07/78	2200	36	1	2	53	1	2	9	0	25.0	7.2	7.8	9650	78.0
7	240019	2	09/20/78	2110	36	1	2	53	0	0	2	0	22.0	6.9	7.7	8850	42.0

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(ZERO CATCH SAMPLES ARE EXCLUDED)

SPECIES=PUMPKINSEED

S_GROUP	SAMPLE	WEEK	DATE	TIME	RV_MILE	SITE	TIDE	GEAR	LC_1	LC_2	LC_3	LC_4	TEMP	DO	PH	COND	TURB
1	240001	1	09/05/78	2225	34	3	2	53	2	0	0	0	23.3	10.4	8.6	10500	4.0
3	240009	1	09/08/78	20	36	1	2	12	0	0	1	0	24.0	7.6	7.8	9500	39.0
3	240007	1	09/07/78	2200	36	1	2	53	0	1	1	0	25.0	7.2	7.8	9650	78.0
4	240010	1	09/08/78	2150	39	3	2	53	0	1	17	0	23.1	7.7	.	9450	10.0
5	240013	2	09/18/78	2145	34	3	2	53	0	3	0	0	20.1	6.9	7.6	11000	3.0
6	240016	2	09/19/78	2230	35	3	2	53	0	1	1	0	19.7	8.0	7.6	9250	4.0
7	240019	2	09/20/78	2110	36	1	2	53	0	7	13	0	22.0	6.9	7.7	8850	42.0
8	240022	2	09/21/78	2220	39	3	2	53	0	5	2	0	23.1	7.8	7.7	7100	26.0
9	240025	3	10/02/78	2015	34	3	2	53	1	1	1	0	18.1	10.0	8.2	11000	5.0
11	240031	3	10/04/78	2145	36	1	2	53	3	7	5	0	18.0	7.9	7.3	11000	8.0
12	240034	3	10/05/78	2135	39	3	2	53	0	0	7	0	18.1	8.3	7.5	10000	7.0

SPECIES=CARP

S_GROUP	SAMPLE	WEEK	DATE	TIME	RV_MILE	SITE	TIDE	GEAR	LC_1	LC_2	LC_3	LC_4	TEMP	DO	PH	COND	TURB
1	240003	1	09/06/78	100	34	3	2	12	0	0	0	1	23.3	11.0	8.7	10500	3.0
1	240001	1	09/05/78	2225	34	3	2	53	0	0	0	6	23.3	10.4	8.6	10500	4.0
9	240025	3	10/02/78	2015	34	3	2	53	0	0	0	1	18.1	10.0	8.2	11000	5.0

SPECIES=AMERICAN EEL

S_GROUP	SAMPLE	WEEK	DATE	TIME	RV_MILE	SITE	TIDE	GEAR	LC_1	LC_2	LC_3	LC_4	TEMP	DO	PH	COND	TURB
1	240003	1	09/06/78	100	34	3	2	12	0	0	0	1	23.3	11.0	8.7	10500	3.0
1	240001	1	09/05/78	2225	34	3	2	53	0	0	1	3	23.3	10.4	8.6	10500	4.0
2	240005	1	09/06/78	2235	35	3	2	12	0	0	1	0	25.0	8.8	8.2	10500	9.0
3	240007	1	09/07/78	2200	36	1	2	53	0	0	4	4	25.0	7.2	7.8	9650	78.0
4	240011	1	09/08/78	2255	39	3	2	12	0	0	0	1	26.2	7.6	.	9400	7.0
4	240010	1	09/08/78	2150	39	3	2	53	0	0	0	5	23.1	7.7	.	9450	10.0
5	240014	2	09/18/78	2250	34	3	2	12	0	0	0	2	20.1	7.1	7.5	11000	3.0
5	240013	2	09/18/78	2145	34	3	2	53	0	0	1	9	20.1	6.9	7.6	11000	3.0
6	240018	2	09/20/78	108	35	3	2	12	0	0	0	1	20.0	7.4	7.7	9250	4.0
7	240019	2	09/20/78	2110	36	1	2	53	0	0	5	3	22.0	6.9	7.7	8850	42.0
8	240022	2	09/21/78	2220	39	3	2	53	0	0	1	1	23.1	7.8	7.7	7100	26.0
9	240025	3	10/02/78	2015	34	3	2	53	0	0	0	2	18.1	10.0	8.2	11000	5.0
10	240029	3	10/03/78	2137	35	3	2	12	0	1	0	0	17.5	9.4	7.6	11000	2.0
11	240032	3	10/04/78	2250	36	1	2	12	0	0	1	1	18.0	7.8	7.6	11000	7.0
11	240031	3	10/04/78	2145	36	1	2	53	0	0	2	4	18.0	7.9	7.3	11000	8.0
12	240035	3	10/05/78	2243	39	3	2	12	0	0	0	1	18.8	7.9	7.8	10000	5.0
12	240036	3	10/06/78	6	39	3	2	12	0	0	1	0	18.5	7.7	7.7	10000	5.0
12	240034	3	10/05/78	2135	39	3	2	53	0	0	1	5	18.1	8.3	7.5	10000	7.0

1978 NIGHT BEACH SEINE EFFICIENCY REPORT
CATCH AND WATER QUALITY DATA FOR TEST SAMPLES
(ZERO CATCH SAMPLES ARE EXCLUDED)

SPECIES=GOLDFISH

S_GROUP	SAMPLE	WEEK	DATE	TIME	RV_MILE	SITE	TIDE	GEAR	LC_1	LC_2	LC_3	LC_4	TEMP	DO	PH	COND	TURB
4	240010	1	09/08/78	2150	39	3	2	53	0	0	0	1	23.1	7.7	.	9450	10.0
7	240019	2	09/20/78	2110	36	1	2	53	0	0	1	1	22.0	6.9	7.7	8850	42.0
11	240031	3	10/04/78	2145	36	1	2	53	1	0	0	0	18.0	7.9	7.3	11000	8.0

SPECIES=GOLDEN SHINER

S_GROUP	SAMPLE	WEEK	DATE	TIME	RV_MILE	SITE	TIDE	GEAR	LC_1	LC_2	LC_3	LC_4	TEMP	DO	PH	COND	TURB
6	240016	2	09/19/78	2230	35	3	2	53	0	0	2	0	19.7	8.0	7.6	9250	4.0
10	240028	3	10/03/78	2025	35	3	2	53	0	0	1	0	17.7	9.8	8.0	11000	2.0
11	240031	3	10/04/78	2145	36	1	2	53	0	1	0	0	18.0	7.9	7.3	11000	8.0

SPECIES=HOGCHOKER

S_GROUP	SAMPLE	WEEK	DATE	TIME	RV_MILE	SITE	TIDE	GEAR	LC_1	LC_2	LC_3	LC_4	TEMP	DO	PH	COND	TURB
1	240001	1	09/05/78	2225	34	3	2	53	0	3	0	0	23.3	10.4	8.6	10500	4.0
2	240005	1	09/06/78	2235	35	3	2	12	1	0	0	0	25.0	8.8	8.2	10500	9.0
2	240004	1	09/06/78	2130	35	3	2	53	1	1	0	0	25.2	9.4	8.4	10500	7.0
3	240008	1	09/07/78	2300	36	1	2	12	0	1	0	0	24.2	7.3	7.8	9500	85.0
3	240007	1	09/07/78	2200	36	1	2	53	0	23	0	0	25.0	7.2	7.8	9650	78.0
4	240012	1	09/09/78	15	39	3	2	12	0	1	0	0	22.9	7.2	.	9400	5.0
4	240010	1	09/08/78	2150	39	3	2	53	0	7	1	0	23.1	7.7	.	9450	10.0
5	240015	2	09/19/78	7	34	3	2	12	1	0	0	0	20.1	7.5	7.6	10500	2.0
5	240013	2	09/18/78	2145	34	3	2	53	0	1	0	0	20.1	6.9	7.6	11000	3.0
6	240018	2	09/20/78	108	35	3	2	12	0	1	0	0	20.0	7.4	7.7	9250	4.0
7	240020	2	09/20/78	2215	36	1	2	12	0	3	0	0	21.2	6.8	7.6	8750	14.0
7	240019	2	09/20/78	2110	36	1	2	53	0	21	0	0	22.0	6.9	7.7	8850	42.0
8	240023	2	09/21/78	2332	39	3	2	12	0	1	1	0	23.5	7.8	7.6	6950	10.0
8	240022	2	09/21/78	2220	39	3	2	53	1	1	1	0	23.1	7.8	7.7	7100	26.0
9	240025	3	10/02/78	2015	34	3	2	53	0	1	0	0	18.1	10.0	8.2	11000	5.0
11	240031	3	10/04/78	2145	36	1	2	53	0	35	0	0	18.0	7.9	7.3	11000	8.0
12	240034	3	10/05/78	2135	39	3	2	53	0	13	0	0	18.1	8.3	7.5	10000	7.0

1978 NIGHT BEACH SEINE EFFICIENCY REPORT
CATCH AND WATER QUALITY DATA FOR TEST SAMPLES
(ZERO CATCH SAMPLES ARE EXCLUDED)

SPECIES=TESSEL. DARTER

S_GROUP	SAMPLE	WEEK	DATE	TIME	RV_MILE	SITE	TIDE	GEAR	LC_1	LC_2	LC_3	LC_4	TEMP	DO	PH	COND	TURB
1	240001	1	09/05/78	2225	34	3	2	53	0	10	0	0	23.3	10.4	8.6	10500	4.0
2	240005	1	09/06/78	2235	35	3	2	12	0	2	0	0	25.0	8.8	8.2	10500	9.0
2	240006	1	09/06/78	2355	35	3	2	12	0	2	0	0	25.8	9.1	8.1	10500	7.0
2	240004	1	09/06/78	2130	35	3	2	53	3	1	0	0	25.2	9.4	8.4	10500	7.0
3	240007	1	09/07/78	2200	36	1	2	53	3	5	0	0	25.0	7.2	7.8	9650	78.0
4	240011	1	09/08/78	2255	39	3	2	12	5	2	0	0	26.2	7.6	.	9400	7.0
4	240012	1	09/09/78	15	39	3	2	12	1	3	0	0	22.9	7.2	.	9400	5.0
4	240010	1	09/08/78	2150	39	3	2	53	7	6	0	0	23.1	7.7	.	9450	10.0
5	240013	2	09/18/78	2145	34	3	2	53	4	9	0	0	20.1	6.9	7.6	11000	3.0
6	240017	2	09/19/78	2340	35	3	2	12	1	0	0	0	20.5	7.7	7.6	9350	4.0
6	240018	2	09/20/78	108	35	3	2	12	0	1	0	0	20.0	7.4	7.7	9250	4.0
6	240016	2	09/19/78	2230	35	3	2	53	0	1	0	0	19.7	8.0	7.6	9250	4.0
7	240020	2	09/20/78	2215	36	1	2	12	1	1	0	0	21.2	6.8	7.6	8750	14.0
7	240021	2	09/20/78	2338	36	1	2	12	1	0	0	0	21.5	7.0	7.6	8350	5.0
7	240019	2	09/20/78	2110	36	1	2	53	5	6	0	0	22.0	6.9	7.7	8850	42.0
8	240022	2	09/21/78	2220	39	3	2	53	3	6	0	0	23.1	7.8	7.7	7100	26.0
9	240025	3	10/02/78	2015	34	3	2	53	1	15	0	0	18.1	10.0	8.2	11000	5.0
10	240029	3	10/03/78	2137	35	3	2	12	0	3	0	0	17.5	9.4	7.6	11000	2.0
10	240030	3	10/03/78	2307	35	3	2	12	0	2	0	0	17.5	8.2	7.7	11500	3.0
11	240031	3	10/04/78	2145	36	1	2	53	5	1	0	0	18.0	7.9	7.3	11000	8.0
12	240036	3	10/06/78	6	39	3	2	12	1	0	0	0	18.5	7.7	7.7	10000	5.0
12	240034	3	10/05/78	2135	39	3	2	53	1	3	0	0	18.1	8.3	7.5	10000	7.0

SPECIES=BANDED KILLIFISH

S_GROUP	SAMPLE	WEEK	DATE	TIME	RV_MILE	SITE	TIDE	GEAR	LC_1	LC_2	LC_3	LC_4	TEMP	DO	PH	COND	TURB
1	240001	1	09/05/78	2225	34	3	2	53	35	37	0	0	23.3	10.4	8.6	10500	4.0
2	240005	1	09/06/78	2235	35	3	2	12	1	0	0	0	25.0	8.8	8.2	10500	9.0
3	240008	1	09/07/78	2300	36	1	2	12	1	0	0	0	24.2	7.3	7.8	9500	85.0
3	240007	1	09/07/78	2200	36	1	2	53	11	3	0	0	25.0	7.2	7.8	9650	78.0
4	240011	1	09/08/78	2255	39	3	2	12	1	0	0	0	26.2	7.6	.	9400	7.0
4	240012	1	09/09/78	15	39	3	2	12	1	0	0	0	22.9	7.2	.	9400	5.0
4	240010	1	09/08/78	2150	39	3	2	53	1	0	0	0	23.1	7.7	.	9450	10.0
5	240013	2	09/18/78	2145	34	3	2	53	19	29	0	0	20.1	6.9	7.6	11000	3.0
6	240018	2	09/20/78	108	35	3	2	12	1	0	0	0	20.0	7.4	7.7	9250	4.0
6	240016	2	09/19/78	2230	35	3	2	53	1	0	0	0	19.7	8.0	7.6	9250	4.0
7	240020	2	09/20/78	2215	36	1	2	12	1	0	0	0	21.2	6.8	7.6	8750	14.0
7	240019	2	09/20/78	2110	36	1	2	53	9	0	0	0	22.0	6.9	7.7	8850	42.0
9	240025	3	10/02/78	2015	34	3	2	53	7	5	0	0	18.1	10.0	8.2	11000	5.0
11	240033	3	10/05/78	5	36	1	2	12	1	0	0	0	18.1	7.6	7.6	11000	4.0
11	240031	3	10/04/78	2145	36	1	2	53	13	6	0	0	18.0	7.9	7.3	11000	8.0

1978 NIGHT BEACH SEINE EFFICIENCY REPORT
CATCH AND WATER QUALITY DATA FOR TEST SAMPLES
(ZERO CATCH SAMPLES ARE EXCLUDED)

SPECIES=MUMMICHOG

S_GROUP	SAMPLE	WEEK	DATE	TIME	RV_MILE	SITE	TIDE	GEAR	LC_1	LC_2	LC_3	LC_4	TEMP	DO	PH	COND	TURB
1	240001	1	09/05/78	2225	34	3	2	53	11	3	0	0	23.3	10.4	8.6	10500	4.0
3	240007	1	09/07/78	2200	36	1	2	53	0	1	0	0	25.0	7.2	7.8	9650	78.0
5	240013	2	09/18/78	2145	34	3	2	53	8	5	0	0	20.1	6.9	7.6	11000	3.0
7	240020	2	09/20/78	2215	36	1	2	12	1	0	0	0	21.2	6.8	7.6	8750	14.0
7	240019	2	09/20/78	2110	36	1	2	53	0	1	0	0	22.0	6.9	7.7	8850	42.0
12	240036	3	10/06/78	6	39	3	2	12	1	1	0	0	18.5	7.7	7.7	10000	5.0

SPECIES=ATL. MENHADEN

S_GROUP	SAMPLE	WEEK	DATE	TIME	RV_MILE	SITE	TIDE	GEAR	LC_1	LC_2	LC_3	LC_4	TEMP	DO	PH	COND	TURB
1	240002	1	09/05/78	2340	34	3	2	12	0	0	3	0	23.4	11.4	8.7	11000	3.0
1	240001	1	09/05/78	2225	34	3	2	53	0	0	11	0	23.3	10.4	8.6	10500	4.0
2	240004	1	09/06/78	2130	35	3	2	53	0	0	3	1	25.2	9.4	8.4	10500	7.0
5	240013	2	09/18/78	2145	34	3	2	53	0	0	2	0	20.1	6.9	7.6	11000	3.0
6	240017	2	09/19/78	2340	35	3	2	12	0	0	10	0	20.5	7.7	7.6	9350	4.0
6	240018	2	09/20/78	108	35	3	2	12	0	0	14	2	20.0	7.4	7.7	9250	4.0
6	240016	2	09/19/78	2230	35	3	2	53	0	0	69	4	19.7	8.0	7.6	9250	4.0
10	240029	3	10/03/78	2137	35	3	2	12	0	0	0	1	17.5	9.4	7.6	11000	2.0
10	240028	3	10/03/78	2025	35	3	2	53	0	0	40	2	17.7	9.8	8.0	11000	2.0
11	240032	3	10/04/78	2250	36	1	2	12	1	0	0	0	18.0	7.8	7.6	11000	7.0

SPECIES=BLUEBACK HERRING

S_GROUP	SAMPLE	WEEK	DATE	TIME	RV_MILE	SITE	TIDE	GEAR	LC_1	LC_2	LC_3	LC_4	TEMP	DO	PH	COND	TURB
1	240002	1	09/05/78	2340	34	3	2	12	1	0	0	0	23.4	11.4	8.7	11000	3.0
1	240001	1	09/05/78	2225	34	3	2	53	2	0	0	0	23.3	10.4	8.6	10500	4.0
2	240006	1	09/06/78	2355	35	3	2	12	2	0	0	0	25.8	9.1	8.1	10500	7.0
2	240004	1	09/06/78	2130	35	3	2	53	9	0	0	1	25.2	9.4	8.4	10500	7.0
3	240007	1	09/07/78	2200	36	1	2	53	1	0	0	0	25.0	7.2	7.8	9650	78.0
4	240010	1	09/08/78	2150	39	3	2	53	1	0	0	0	23.1	7.7	.	9450	10.0
5	240013	2	09/18/78	2145	34	3	2	53	3	0	0	0	20.1	6.9	7.6	11000	3.0
10	240028	3	10/03/78	2025	35	3	2	53	1	0	0	0	17.7	9.8	8.0	11000	2.0

SPECIES=WHITE SUCKER

S_GROUP	SAMPLE	WEEK	DATE	TIME	RV_MILE	SITE	TIDE	GEAR	LC_1	LC_2	LC_3	LC_4	TEMP	DO	PH	COND	TURB
4	240010	1	09/08/78	2150	39	3	2	53	0	0	2	3	23.1	7.7	.	9450	10.0
8	240022	2	09/21/78	2220	39	3	2	53	0	0	0	2	23.1	7.8	7.7	7100	26.0

1978 NIGHT BEACH SEINE EFFICIENCY REPORT
CATCH AND WATER QUALITY DATA FOR TEST SAMPLES
(ZERO CATCH SAMPLES ARE EXCLUDED)

SPECIES=ATL. SILVERSIDE

S_GROUP	SAMPLE	WEEK	DATE	TIME	RV_MILE	SITE	TIDE	GEAR	LC_1	LC_2	LC_3	LC_4	TEMP	DO	PH	COND	TURB
1	240003	1	09/06/78	100	34	3	2	12	0	3	0	0	23.3	11.0	8.7	10500	3.0
3	240008	1	09/07/78	2300	36	1	2	12	0	2	0	0	24.2	7.3	7.8	9500	85.0
3	240007	1	09/07/78	2200	36	1	2	53	0	6	0	0	25.0	7.2	7.8	9650	78.0
5	240014	2	09/18/78	2250	34	3	2	12	1	7	0	0	20.1	7.1	7.5	11000	3.0
5	240013	2	09/18/78	2145	34	3	2	53	1	3	0	0	20.1	6.9	7.6	11000	3.0
6	240016	2	09/19/78	2230	35	3	2	53	0	2	0	0	19.7	8.0	7.6	9250	4.0
7	240019	2	09/20/78	2110	36	1	2	53	2	0	0	0	22.0	6.9	7.7	8850	42.0
9	240025	3	10/02/78	2015	34	3	2	53	0	1	0	0	18.1	10.0	8.2	11000	5.0
10	240029	3	10/03/78	2137	35	3	2	12	0	2	0	0	17.5	9.4	7.6	11000	2.0
10	240030	3	10/03/78	2307	35	3	2	12	0	1	0	0	17.5	8.2	7.7	11500	3.0
10	240028	3	10/03/78	2025	35	3	2	53	1	2	0	0	17.7	9.8	8.0	11000	2.0

SPECIES=SPOTTAIL SHINER

S_GROUP	SAMPLE	WEEK	DATE	TIME	RV_MILE	SITE	TIDE	GEAR	LC_1	LC_2	LC_3	LC_4	TEMP	DO	PH	COND	TURB
1	240001	1	09/05/78	2225	34	3	2	53	32	1	0	0	23.3	10.4	8.6	10500	4.0
2	240005	1	09/06/78	2235	35	3	2	12	1	0	0	0	25.0	8.8	8.2	10500	9.0
2	240004	1	09/06/78	2130	35	3	2	53	11	8	0	0	25.2	9.4	8.4	10500	7.0
3	240007	1	09/07/78	2200	36	1	2	53	1	13	0	0	25.0	7.2	7.8	9650	78.0
4	240010	1	09/08/78	2150	39	3	2	53	2	0	0	0	23.1	7.7	.	9450	10.0
5	240013	2	09/18/78	2145	34	3	2	53	1	1	0	0	20.1	6.9	7.6	11000	3.0
6	240016	2	09/19/78	2230	35	3	2	53	8	6	0	0	19.7	8.0	7.6	9250	4.0
7	240020	2	09/20/78	2215	36	1	2	12	1	3	0	0	21.2	6.8	7.6	8750	14.0
7	240019	2	09/20/78	2110	36	1	2	53	12	9	0	0	22.0	6.9	7.7	8850	42.0
8	240023	2	09/21/78	2332	39	3	2	12	0	1	0	0	23.5	7.8	7.6	6950	10.0
8	240022	2	09/21/78	2220	39	3	2	53	1	1	0	0	23.1	7.8	7.7	7100	26.0
9	240026	3	10/02/78	2122	34	3	2	12	1	1	0	0	18.2	10.8	8.6	11500	4.0
9	240025	3	10/02/78	2015	34	3	2	53	7	0	0	0	18.1	10.0	8.2	11000	5.0
10	240028	3	10/03/78	2025	35	3	2	53	3	0	0	0	17.7	9.8	8.0	11000	2.0
11	240032	3	10/04/78	2250	36	1	2	12	2	0	0	0	18.0	7.8	7.6	11000	7.0
11	240031	3	10/04/78	2145	36	1	2	53	13	3	0	0	18.0	7.9	7.3	11000	8.0
12	240034	3	10/05/78	2135	39	3	2	53	1	2	0	0	18.1	8.3	7.5	10000	7.0

1978 NIGHT BEACH SEINE EFFICIENCY REPORT
CATCH AND WATER QUALITY DATA FOR TEST SAMPLES
(ZERO CATCH SAMPLES ARE EXCLUDED)

SPECIES=STRIPED BASS

S_GROUP	SAMPLE	WEEK	DATE	TIME	RV_MILE	SITE	TIDE	GEAR	LC_1	LC_2	LC_3	LC_4	TEMP	DO	PH	COND	TURB
1	240002	1	09/05/78	2340	34	3	2	12	26	0	0	1	23.4	11.4	8.7	11000	3.0
1	240003	1	09/06/78	100	34	3	2	12	25	0	0	0	23.3	11.0	8.7	10500	3.0
1	240001	1	09/05/78	2225	34	3	2	53	410	0	3	0	23.3	10.4	8.6	10500	4.0
2	240005	1	09/06/78	2235	35	3	2	12	48	0	0	0	25.0	8.8	8.2	10500	9.0
2	240006	1	09/06/78	2355	35	3	2	12	37	0	0	0	25.8	9.1	8.1	10500	7.0
2	240004	1	09/06/78	2130	35	3	2	53	305	0	0	0	25.2	9.4	8.4	10500	7.0
3	240008	1	09/07/78	2300	36	1	2	12	16	0	0	0	24.2	7.3	7.8	9500	85.0
3	240009	1	09/08/78	20	36	1	2	12	2	0	0	0	24.0	7.6	7.8	9500	39.0
3	240007	1	09/07/78	2200	36	1	2	53	219	1	0	0	25.0	7.2	7.8	9650	78.0
4	240011	1	09/08/78	2255	39	3	2	12	51	0	0	0	26.2	7.6	.	9400	7.0
4	240012	1	09/09/78	15	39	3	2	12	31	1	0	0	22.9	7.2	.	9400	5.0
4	240010	1	09/08/78	2150	39	3	2	53	778	1	1	0	23.1	7.7	.	9450	10.0
5	240014	2	09/18/78	2250	34	3	2	12	17	0	0	0	20.1	7.1	7.5	11000	3.0
5	240015	2	09/19/78	7	34	3	2	12	9	0	0	0	20.1	7.5	7.6	10500	2.0
5	240013	2	09/18/78	2145	34	3	2	53	308	1	1	1	20.1	6.9	7.6	11000	3.0
6	240017	2	09/19/78	2340	35	3	2	12	11	0	0	0	20.5	7.7	7.6	9350	4.0
6	240018	2	09/20/78	108	35	3	2	12	22	1	0	0	20.0	7.4	7.7	9250	4.0
6	240016	2	09/19/78	2230	35	3	2	53	224	0	5	2	19.7	8.0	7.6	9250	4.0
7	240020	2	09/20/78	2215	36	1	2	12	19	0	0	0	21.2	6.8	7.6	8750	14.0
7	240021	2	09/20/78	2338	36	1	2	12	21	0	0	0	21.5	7.0	7.6	8350	5.0
7	240019	2	09/20/78	2110	36	1	2	53	219	1	1	0	22.0	6.9	7.7	8850	42.0
8	240023	2	09/21/78	2332	39	3	2	12	5	0	0	0	23.5	7.8	7.6	6950	10.0
8	240024	2	09/22/78	53	39	3	2	12	9	0	0	0	23.0	7.7	7.8	7000	9.0
8	240022	2	09/21/78	2220	39	3	2	53	80	1	0	0	23.1	7.8	7.7	7100	26.0
9	240026	3	10/02/78	2122	34	3	2	12	21	0	0	0	18.2	10.8	8.6	11500	4.0
9	240027	3	10/02/78	2246	34	3	2	12	6	0	1	0	17.2	10.8	8.6	11500	3.0
9	240025	3	10/02/78	2015	34	3	2	53	308	0	4	1	18.1	10.0	8.2	11000	5.0
10	240029	3	10/03/78	2137	35	3	2	12	12	0	0	0	17.5	9.4	7.6	11000	2.0
10	240030	3	10/03/78	2307	35	3	2	12	1	0	0	0	17.5	8.2	7.7	11500	3.0
10	240028	3	10/03/78	2025	35	3	2	53	124	2	7	4	17.7	9.8	8.0	11000	2.0
11	240032	3	10/04/78	2250	36	1	2	12	6	0	0	0	18.0	7.8	7.6	11000	7.0
11	240033	3	10/05/78	5	36	1	2	12	4	0	0	0	18.1	7.6	7.6	11000	4.0
11	240031	3	10/04/78	2145	36	1	2	53	110	0	1	0	18.0	7.9	7.3	11000	8.0
12	240035	3	10/05/78	2243	39	3	2	12	1	0	0	0	18.8	7.9	7.8	10000	5.0
12	240036	3	10/06/78	6	39	3	2	12	4	0	0	0	18.5	7.7	7.7	10000	5.0
12	240034	3	10/05/78	2135	39	3	2	53	87	0	0	0	18.1	8.3	7.5	10000	7.0

1978 NIGHT BEACH SEINE EFFICIENCY REPORT
CATCH AND WATER QUALITY DATA FOR TEST SAMPLES
(ZERO CATCH SAMPLES ARE EXCLUDED)

SPECIES=ATLANTIC TOMCOD

S_GROUP	SAMPLE	WEEK	DATE	TIME	RV_MILE	SITE	TIDE	GEAR	LC_1	LC_2	LC_3	LC_4	TEMP	DO	PH	COND	TURB
3	240007	1	09/07/78	2200	36	1	2	53	3	0	0	0	25.0	7.2	7.8	9650	78.0
5	240013	2	09/18/78	2145	34	3	2	53	3	0	0	0	20.1	6.9	7.6	11000	3.0
6	240016	2	09/19/78	2230	35	3	2	53	1	0	0	0	19.7	8.0	7.6	9250	4.0
7	240019	2	09/20/78	2110	36	1	2	53	37	0	0	0	22.0	6.9	7.7	8850	42.0
8	240022	2	09/21/78	2220	39	3	2	53	1	0	0	0	23.1	7.8	7.7	7100	26.0
9	240025	3	10/02/78	2015	34	3	2	53	1	0	0	0	18.1	10.0	8.2	11000	5.0
11	240032	3	10/04/78	2250	36	1	2	12	1	0	0	0	18.0	7.8	7.6	11000	7.0
11	240033	3	10/05/78	5	36	1	2	12	1	0	0	0	18.1	7.6	7.6	11000	4.0
11	240031	3	10/04/78	2145	36	1	2	53	49	0	0	0	18.0	7.9	7.3	11000	8.0
12	240035	3	10/05/78	2243	39	3	2	12	2	0	0	0	18.8	7.9	7.8	10000	5.0
12	240034	3	10/05/78	2135	39	3	2	53	2	0	0	0	18.1	8.3	7.5	10000	7.0

SPECIES=WHITE CATFISH

S_GROUP	SAMPLE	WEEK	DATE	TIME	RV_MILE	SITE	TIDE	GEAR	LC_1	LC_2	LC_3	LC_4	TEMP	DO	PH	COND	TURB
1	240002	1	09/05/78	2340	34	3	2	12	0	0	5	6	23.4	11.4	8.7	11000	3.0
1	240001	1	09/05/78	2225	34	3	2	53	0	0	17	109	23.3	10.4	8.6	10500	4.0
2	240004	1	09/06/78	2130	35	3	2	53	0	0	4	8	25.2	9.4	8.4	10500	7.0
4	240010	1	09/08/78	2150	39	3	2	53	0	0	7	15	23.1	7.7	.	9450	10.0
5	240013	2	09/18/78	2145	34	3	2	53	0	0	1	6	20.1	6.9	7.6	11000	3.0
6	240018	2	09/20/78	108	35	3	2	12	0	0	0	1	20.0	7.4	7.7	9250	4.0
6	240016	2	09/19/78	2230	35	3	2	53	0	0	4	34	19.7	8.0	7.6	9250	4.0
8	240022	2	09/21/78	2220	39	3	2	53	0	3	29	11	23.1	7.8	7.7	7100	26.0
9	240025	3	10/02/78	2015	34	3	2	53	0	0	2	2	18.1	10.0	8.2	11000	5.0
10	240028	3	10/03/78	2025	35	3	2	53	0	0	1	0	17.7	9.8	8.0	11000	2.0
11	240031	3	10/04/78	2145	36	1	2	53	0	0	1	3	18.0	7.9	7.3	11000	8.0
12	240034	3	10/05/78	2135	39	3	2	53	0	0	10	4	18.1	8.3	7.5	10000	7.0

SPECIES=WHITE PERCH

S_GROUP	SAMPLE	WEEK	DATE	TIME	RV_MILE	SITE	TIDE	GEAR	LC_1	LC_2	LC_3	LC_4	TEMP	DO	PH	COND	TURB
1	240002	1	09/05/78	2340	34	3	2	12	21	12	3	0	23.4	11.4	8.7	11000	3.0
1	240003	1	09/06/78	100	34	3	2	12	12	5	0	0	23.3	11.0	8.7	10500	3.0
1	240001	1	09/05/78	2225	34	3	2	53	308	156	52	0	23.3	10.4	8.6	10500	4.0
2	240005	1	09/06/78	2235	35	3	2	12	15	12	2	0	25.0	8.8	8.2	10500	9.0
2	240006	1	09/06/78	2355	35	3	2	12	9	3	0	0	25.8	9.1	8.1	10500	7.0
2	240004	1	09/06/78	2130	35	3	2	53	83	34	11	0	25.2	9.4	8.4	10500	7.0
3	240008	1	09/07/78	2300	36	1	2	12	12	2	0	0	24.2	7.3	7.8	9500	85.0
3	240009	1	09/08/78	20	36	1	2	12	3	0	0	0	24.0	7.6	7.8	9500	39.0
3	240007	1	09/07/78	2200	36	1	2	53	514	48	6	0	25.0	7.2	7.8	9650	78.0

1978 NIGHT BEACH SEINE EFFICIENCY REPORT
CATCH AND WATER QUALITY DATA FOR TEST SAMPLES
(ZERO CATCH SAMPLES ARE EXCLUDED)

SPECIES=WHITE PERCH

S_GROUP	SAMPLE	WEEK	DATE	TIME	RV_MILE	SITE	TIDE	GEAR	LC_1	LC_2	LC_3	LC_4	TEMP	DO	PH	COND	TURB
4	240011	1	09/08/78	2255	39	3	2	12	13	2	0	0	26.2	7.6	.	9400	7.0
4	240012	1	09/09/78	15	39	3	2	12	5	0	0	0	22.9	7.2	.	9400	5.0
4	240010	1	09/08/78	2150	39	3	2	53	115	20	7	0	23.1	7.7	.	9450	10.0
5	240014	2	09/18/78	2250	34	3	2	12	4	2	0	0	20.1	7.1	7.5	11000	3.0
5	240013	2	09/18/78	2145	34	3	2	53	106	66	33	0	20.1	6.9	7.6	11000	3.0
6	240017	2	09/19/78	2340	35	3	2	12	2	0	1	0	20.5	7.7	7.6	9350	4.0
6	240018	2	09/20/78	108	35	3	2	12	2	2	2	0	20.0	7.4	7.7	9250	4.0
6	240016	2	09/19/78	2230	35	3	2	53	36	19	40	1	19.7	8.0	7.6	9250	4.0
7	240020	2	09/20/78	2215	36	1	2	12	17	1	0	0	21.2	6.8	7.6	8750	14.0
7	240021	2	09/20/78	2338	36	1	2	12	10	0	0	0	21.5	7.0	7.6	8350	5.0
7	240019	2	09/20/78	2110	36	1	2	53	481	13	4	0	22.0	6.9	7.7	8850	42.0
8	240023	2	09/21/78	2332	39	3	2	12	9	6	2	0	23.5	7.8	7.6	6950	10.0
8	240024	2	09/22/78	53	39	3	2	12	3	1	0	0	23.0	7.7	7.8	7000	9.0
8	240022	2	09/21/78	2220	39	3	2	53	39	33	40	0	23.1	7.8	7.7	7100	26.0
9	240026	3	10/02/78	2122	34	3	2	12	10	1	1	0	18.2	10.8	8.6	11500	4.0
9	240027	3	10/02/78	2246	34	3	2	12	3	1	0	0	17.2	10.8	8.6	11500	3.0
9	240025	3	10/02/78	2015	34	3	2	53	129	28	34	1	18.1	10.0	8.2	11000	5.0
10	240029	3	10/03/78	2137	35	3	2	12	3	2	0	0	17.5	9.4	7.6	11000	2.0
10	240028	3	10/03/78	2025	35	3	2	53	21	7	5	0	17.7	9.8	8.0	11000	2.0
11	240032	3	10/04/78	2250	36	1	2	12	3	0	0	0	18.0	7.8	7.6	11000	7.0
11	240033	3	10/05/78	5	36	1	2	12	2	0	0	0	18.1	7.6	7.6	11000	4.0
11	240031	3	10/04/78	2145	36	1	2	53	170	2	1	0	18.0	7.9	7.3	11000	8.0
12	240035	3	10/05/78	2243	39	3	2	12	5	1	0	0	18.8	7.9	7.8	10000	5.0
12	240036	3	10/06/78	6	39	3	2	12	4	2	0	0	18.5	7.7	7.7	10000	5.0
12	240034	3	10/05/78	2135	39	3	2	53	75	37	9	0	18.1	8.3	7.5	10000	7.0

SPECIES=NORTH. PIPEFISH

S_GROUP	SAMPLE	WEEK	DATE	TIME	RV_MILE	SITE	TIDE	GEAR	LC_1	LC_2	LC_3	LC_4	TEMP	DO	PH	COND	TURB
2	240005	1	09/06/78	2235	35	3	2	12	0	1	0	0	25.0	8.8	8.2	10500	9.0
3	240007	1	09/07/78	2200	36	1	2	53	0	2	1	0	25.0	7.2	7.8	9650	78.0
5	240013	2	09/18/78	2145	34	3	2	53	0	1	0	0	20.1	6.9	7.6	11000	3.0
7	240020	2	09/20/78	2215	36	1	2	12	1	0	0	0	21.2	6.8	7.6	8750	14.0
7	240019	2	09/20/78	2110	36	1	2	53	0	2	3	0	22.0	6.9	7.7	8850	42.0
9	240025	3	10/02/78	2015	34	3	2	53	0	0	1	0	18.1	10.0	8.2	11000	5.0
10	240030	3	10/03/78	2307	35	3	2	12	0	1	0	0	17.5	8.2	7.7	11500	3.0
10	240028	3	10/03/78	2025	35	3	2	53	0	0	1	0	17.7	9.8	8.0	11000	2.0
11	240032	3	10/04/78	2250	36	1	2	12	0	0	1	0	18.0	7.8	7.6	11000	7.0
11	240031	3	10/04/78	2145	36	1	2	53	0	0	5	0	18.0	7.9	7.3	11000	8.0

1978 NIGHT BEACH SEINE EFFICIENCY REPORT
CATCH AND WATER QUALITY DATA FOR TEST SAMPLES
(ZERO CATCH SAMPLES ARE EXCLUDED)

SPECIES=REDBREAST SUNFSH

S_GROUP	SAMPLE	WEEK	DATE	TIME	RV_MILE	SITE	TIDE	GEAR	LC_1	LC_2	LC_3	LC_4	TEMP	DO	PH	COND	TURB
3	240007	1	09/07/78	2200	36	1	2	53	0	0	3	0	25.0	7.2	7.8	9650	78.0
7	240019	2	09/20/78	2110	36	1	2	53	0	0	4	0	22.0	6.9	7.7	8850	42.0

SPECIES=ATL. NEEDLEFISH

S_GROUP	SAMPLE	WEEK	DATE	TIME	RV_MILE	SITE	TIDE	GEAR	LC_1	LC_2	LC_3	LC_4	TEMP	DO	PH	COND	TURB
8	240024	2	09/22/78	53	39	3	2	12	0	3	0	0	23.0	7.7	7.8	7000	9.0
8	240022	2	09/21/78	2220	39	3	2	53	0	9	0	1	23.1	7.8	7.7	7100	26.0

SPECIES=CREVALLE JACK

S_GROUP	SAMPLE	WEEK	DATE	TIME	RV_MILE	SITE	TIDE	GEAR	LC_1	LC_2	LC_3	LC_4	TEMP	DO	PH	COND	TURB
7	240019	2	09/20/78	2110	36	1	2	53	2	0	0	0	22.0	6.9	7.7	8850	42.0

SPECIES=WEAKFISH

S_GROUP	SAMPLE	WEEK	DATE	TIME	RV_MILE	SITE	TIDE	GEAR	LC_1	LC_2	LC_3	LC_4	TEMP	DO	PH	COND	TURB
11	240031	3	10/04/78	2145	36	1	2	53	1	0	0	0	18.0	7.9	7.3	11000	8.0

SPECIES=CYPRINID UNID.

S_GROUP	SAMPLE	WEEK	DATE	TIME	RV_MILE	SITE	TIDE	GEAR	LC_1	LC_2	LC_3	LC_4	TEMP	DO	PH	COND	TURB
3	240007	1	09/07/78	2200	36	1	2	53	3	0	0	0	25.0	7.2	7.8	9650	78.0

SPECIES=KING FISH

S_GROUP	SAMPLE	WEEK	DATE	TIME	RV_MILE	SITE	TIDE	GEAR	LC_1	LC_2	LC_3	LC_4	TEMP	DO	PH	COND	TURB
10	240028	3	10/03/78	2025	35	3	2	53	0	1	0	0	17.7	9.8	8.0	11000	2.0

1978 NIGHT BEACH SEINE EFFICIENCY REPORT
CATCH AND WATER QUALITY DATA FOR TEST SAMPLES
(ZERO CATCH SAMPLES ARE EXCLUDED)

SPECIES=TIDEWATR SLVSIDE

S_GROUP	SAMPLE	WEEK	DATE	TIME	RV_MILE	SITE	TIDE	GEAR	LC_1	LC_2	LC_3	LC_4	TEMP	DO	PH	COND	TURB
1	240001	1	09/05/78	2225	34	3	2	53	0	15	0	0	23.3	10.4	8.6	10500	4.0
2	240005	1	09/06/78	2235	35	3	2	12	0	1	0	0	25.0	8.8	8.2	10500	9.0
2	240004	1	09/06/78	2130	35	3	2	53	1	0	0	0	25.2	9.4	8.4	10500	7.0
3	240007	1	09/07/78	2200	36	1	2	53	0	2	0	0	25.0	7.2	7.8	9650	78.0
5	240014	2	09/18/78	2250	34	3	2	12	1	0	0	0	20.1	7.1	7.5	11000	3.0
5	240013	2	09/18/78	2145	34	3	2	53	0	2	0	0	20.1	6.9	7.6	11000	3.0
7	240019	2	09/20/78	2110	36	1	2	53	0	1	0	0	22.0	6.9	7.7	8850	42.0
9	240025	3	10/02/78	2015	34	3	2	53	1	0	0	0	18.1	10.0	8.2	11000	5.0
10	240028	3	10/03/78	2025	35	3	2	53	0	1	0	0	17.7	9.8	8.0	11000	2.0
11	240031	3	10/04/78	2145	36	1	2	53	0	1	0	0	18.0	7.9	7.3	11000	8.0

SPECIES=ROUGH SILVERSIDE

S_GROUP	SAMPLE	WEEK	DATE	TIME	RV_MILE	SITE	TIDE	GEAR	LC_1	LC_2	LC_3	LC_4	TEMP	DO	PH	COND	TURB
2	240004	1	09/06/78	2130	35	3	2	53	0	4	0	0	25.2	9.4	8.4	10500	7.0
7	240019	2	09/20/78	2110	36	1	2	53	1	0	0	0	22.0	6.9	7.7	8850	42.0
10	240028	3	10/03/78	2025	35	3	2	53	0	1	0	0	17.7	9.8	8.0	11000	2.0

SPECIES=HICKORY SHAD

S_GROUP	SAMPLE	WEEK	DATE	TIME	RV_MILE	SITE	TIDE	GEAR	LC_1	LC_2	LC_3	LC_4	TEMP	DO	PH	COND	TURB
4	240010	1	09/08/78	2150	39	3	2	53	0	0	1	1	23.1	7.7	.	9450	10.0
6	240018	2	09/20/78	108	35	3	2	12	0	0	0	1	20.0	7.4	7.7	9250	4.0
6	240016	2	09/19/78	2230	35	3	2	53	0	0	0	1	19.7	8.0	7.6	9250	4.0

APPENDIX C

FISH CATCH AND ENVIRONMENTAL DATA FOR SUPPLEMENTARY NIGHT BEACH SEINE SAMPLES

1978 NIGHT BEACH SEINE EFFICIENCY REPORT

L E G E N D

S_GROUP : SPECIFIES A GROUP OF SAMPLES (THREE TEST AND THREE SUPPLEMENTARY) TAKEN ON THE SAME NIGHT

SAMPLE : NIGHT BEACH SEINE EFFICIENCY TEST SAMPLES <= 240036
SUPPLEMENTARY NIGHT BEACH SEINE SAMPLES >= 240225

WEEK : 1 = 09/03-09/09 2 = 09/17-09/23 3 = 10/01-10/07

DATE : MONTH, DAY, AND YEAR THE SAMPLE WAS COLLECTED

TIME : TIME OF DAY GEAR WAS DEPLOYED (USING 24 HOUR CLOCK)

RV_MILE : RIVER MILE WHERE SAMPLE WAS TAKEN

SITE : SIDE OF RIVER WHERE SAMPLE WAS TAKEN (1 = WEST, 3 = EAST)

TIDE : TIDAL STAGE WHEN SAMPLE WAS TAKEN (1 = LOW SLACK, 2 = FLOOD, 3 = HIGH SLACK, 4 = EBB)

GEAR : SAMPLING DEVICE (BEACH SEINES: 12 = 100FT 53 = 500FT)

LC_1 : TOTAL # CAUGHT IN LENGTH CLASS 1 (0 TO DIV.)

LC_2 : TOTAL # CAUGHT IN LENGTH CLASS 2 (DIV. + 1MM - 150MM)

LC_3 : TOTAL # CAUGHT IN LENGTH CLASS 3 (151MM - 250MM)

LC_4 : TOTAL # CAUGHT IN LENGTH CLASS 4 (251MM +)

TEMP : TEMPERATURE (DEGREES CENTIGRADE)

DO : DISSOLVED OXYGEN (PPM)

PH : PH

COND : CONDUCTIVITY (UMHOS/CM @ 25C)

TURB : TURBIDITY (FTU)

NOTE : ZERO CATCH SAMPLES ARE EXCLUDED.

ACTUAL EFFORT:

TEST = 36 TOTAL SAMPLES
(24 GEAR 12, 12 GEAR 53)

SUPPLEMENTARY = 36 TOTAL SAMPLES

1978 NIGHT BEACH SEINE EFFICIENCY REPORT
CATCH AND WATER QUALITY DATA FOR SUPPLEMENTARY SAMPLES
(ZERO CATCH SAMPLES ARE EXCLUDED)

SPECIES=ALEWIFE

S_GROUP	SAMPLE	WEEK	DATE	TIME	RV_MILE	SITE	TIDE	GEAR	LC_1	LC_2	LC_3	LC_4	TEMP	DO	PH	COND	TURB
1	240225	1	09/05/78	2015	39	3	2	12	5	0	0	0	25.2	8.7	7.9	9550	4.0
1	240226	1	09/05/78	2120	36	1	2	12	6	0	0	0	24.8	6.6	7.6	10500	9.0
1	240227	1	09/05/78	2250	35	3	2	12	1	0	0	0	25.2	8.5	8.0	10500	7.0
2	240228	1	09/06/78	2010	39	3	4	12	9	0	0	0	25.6	8.3	8.0	9700	51.0
2	240229	1	09/06/78	2045	36	1	1	12	4	0	0	0	24.9	5.8	7.4	11000	98.0
2	240230	1	09/06/78	2150	34	3	2	12	5	0	0	0	24.2	9.3	8.8	11000	11.0
3	240231	1	09/07/78	2030	39	3	1	12	9	0	0	0	24.8	8.6	8.1	9600	10.0
3	240232	1	09/07/78	2105	35	3	2	12	1	0	0	0	23.8	8.5	8.2	10500	49.0
3	240233	1	09/07/78	2220	34	3	2	12	24	0	0	0	21.9	7.9	8.5	11000	14.0
4	240234	1	09/08/78	1940	36	1	4	12	8	0	0	0	24.2	7.0	.	11000	13.0
4	240235	1	09/08/78	2010	34	3	4	12	49	0	0	0	21.5	9.2	.	11500	6.0
4	240236	1	09/08/78	2045	35	3	1	12	7	0	0	0	24.1	8.9	.	11000	2.0
5	240237	2	09/18/78	1949	39	3	1	12	16	3	0	0	21.8	7.5	7.4	8750	11.0
5	240238	2	09/18/78	2031	36	1	2	12	5	0	0	0	21.6	7.4	7.6	8550	33.0
5	240239	2	09/18/78	2057	35	3	2	12	2	0	0	0	20.9	7.7	7.4	9350	7.0
6	240240	2	09/19/78	1958	39	3	1	12	30	0	0	0	21.1	8.0	7.6	8650	4.0
6	240241	2	09/19/78	2036	36	1	2	12	2	0	0	0	21.0	7.4	7.7	8350	17.0
6	240242	2	09/19/78	2134	34	3	2	12	24	0	0	0	18.6	8.3	7.6	10500	3.0
7	240244	2	09/20/78	1951	39	3	4	12	19	0	0	0	21.7	7.9	7.8	8250	20.0
7	240245	2	09/20/78	2024	35	3	1	12	6	0	0	0	22.0	8.1	7.8	9100	5.0
7	240246	2	09/20/78	2138	34	3	2	12	18	0	0	0	20.4	8.3	7.8	10050	7.0
8	240248	2	09/21/78	2017	34	3	4	12	25	0	0	0	23.5	9.5	8.1	9550	9.0
9	240250	3	10/02/78	1925	39	3	2	12	3	0	0	0	19.2	9.2	8.0	11000	8.0
9	240251	3	10/02/78	2033	35	3	2	12	1	0	0	0	18.0	9.4	8.1	11000	5.0
10	240253	3	10/03/78	1916	39	3	2	12	6	0	0	0	17.9	8.9	7.7	10500	14.0
10	240255	3	10/03/78	2044	34	3	2	12	19	0	0	0	16.1	10.1	7.9	11500	2.0
11	240257	3	10/04/78	1916	39	3	1	12	12	0	0	0	17.7	9.0	7.5	10500	10.0
11	240258	3	10/04/78	1944	35	3	2	12	2	0	0	0	17.4	8.4	7.7	11000	2.0
11	240259	3	10/04/78	2020	34	3	2	12	13	0	0	0	16.5	9.0	7.6	11500	3.0
12	240262	3	10/05/78	2010	34	3	1	12	56	0	0	0	16.5	9.3	7.8	11500	26.0
12	240263	3	10/05/78	2045	35	3	2	12	2	0	0	0	17.5	9.2	7.8	10500	5.0

SPECIES=BAY ANCHOVY

S_GROUP	SAMPLE	WEEK	DATE	TIME	RV_MILE	SITE	TIDE	GEAR	LC_1	LC_2	LC_3	LC_4	TEMP	DO	PH	COND	TURB
1	240226	1	09/05/78	2120	36	1	2	12	10	1	0	0	24.8	6.6	7.6	10500	9.0
1	240227	1	09/05/78	2250	35	3	2	12	3	8	0	0	25.2	8.5	8.0	10500	7.0
2	240229	1	09/06/78	2045	36	1	1	12	5	1	0	0	24.9	5.8	7.4	11000	98.0
2	240230	1	09/06/78	2150	34	3	2	12	1	1	0	0	24.2	9.3	8.8	11000	11.0
3	240231	1	09/07/78	2030	39	3	1	12	2	0	0	0	24.8	8.6	8.1	9600	10.0
3	240233	1	09/07/78	2220	34	3	2	12	2	0	0	0	21.9	7.9	8.5	11000	14.0
4	240234	1	09/08/78	1940	36	1	4	12	33	4	0	0	24.2	7.0	.	11000	13.0

1978 NIGHT BEACH SEINE EFFICIENCY REPORT
CATCH AND WATER QUALITY DATA FOR SUPPLEMENTARY SAMPLES
(ZERO CATCH SAMPLES ARE EXCLUDED)

SPECIES=BAY ANCHOVY

S_GROUP	SAMPLE	WEEK	DATE	TIME	RV_MILE	SITE	TIDE	GEAR	LC_1	LC_2	LC_3	LC_4	TEMP	DO	PH	COND	TURB
4	240235	1	09/08/78	2010	34	3	4	12	33	0	0	0	21.5	9.2	.	11500	6.0
4	240236	1	09/08/78	2045	35	3	1	12	12	0	0	0	24.1	8.9	.	11000	2.0
5	240237	2	09/18/78	1949	39	3	1	12	11	0	0	0	21.8	7.5	7.4	8750	11.0
5	240238	2	09/18/78	2031	36	1	2	12	3	0	0	0	21.6	7.4	7.6	8550	33.0
5	240239	2	09/18/78	2057	35	3	2	12	105	0	0	0	20.9	7.7	7.4	9350	7.0
6	240240	2	09/19/78	1958	39	3	1	12	10	0	0	0	21.1	8.0	7.6	8650	4.0
6	240241	2	09/19/78	2036	36	1	2	12	60	0	0	0	21.0	7.4	7.7	8350	17.0
6	240242	2	09/19/78	2134	34	3	2	12	4	0	0	0	18.6	8.3	7.6	10500	3.0
7	240244	2	09/20/78	1951	39	3	4	12	28	1	0	0	21.7	7.9	7.8	8250	20.0
7	240245	2	09/20/78	2024	35	3	1	12	155	0	0	0	22.0	8.1	7.8	9100	5.0
7	240246	2	09/20/78	2138	34	3	2	12	2	0	0	0	20.4	8.3	7.8	10050	7.0
8	240247	2	09/21/78	1945	36	1	4	12	13	0	0	0	23.0	7.6	.	.	0.0
8	240249	2	09/21/78	2056	35	3	1	12	127	0	0	0	21.9	7.6	7.3	8350	5.0
9	240251	3	10/02/78	2033	35	3	2	12	39	0	0	0	18.0	9.4	8.1	11000	5.0
9	240252	3	10/03/78	134	36	1	4	12	3	0	0	0	18.2	7.9	7.8	10500	4.0
10	240253	3	10/03/78	1916	39	3	2	12	9	0	0	0	17.9	8.9	7.7	10500	14.0
10	240254	3	10/03/78	1943	36	1	2	12	4	0	0	0	18.2	8.2	7.7	11500	60.0
10	240255	3	10/03/78	2044	34	3	2	12	19	0	0	0	16.1	10.1	7.9	11500	2.0
11	240257	3	10/04/78	1916	39	3	1	12	11	1	0	0	17.7	9.0	7.5	10500	10.0
11	240258	3	10/04/78	1944	35	3	2	12	1	0	0	0	17.4	8.4	7.7	11000	2.0
11	240259	3	10/04/78	2020	34	3	2	12	3	0	0	0	16.5	9.0	7.6	11500	3.0
12	240261	3	10/05/78	1934	36	1	4	12	2	0	0	0	18.9	7.9	7.8	10500	55.0
12	240263	3	10/05/78	2045	35	3	2	12	1	0	0	0	17.5	9.2	7.8	10500	5.0

SPECIES=AMERICAN SHAD

S_GROUP	SAMPLE	WEEK	DATE	TIME	RV_MILE	SITE	TIDE	GEAR	LC_1	LC_2	LC_3	LC_4	TEMP	DO	PH	COND	TURB
1	240225	1	09/05/78	2015	39	3	2	12	5	0	0	0	25.2	8.7	7.9	9550	4.0
1	240226	1	09/05/78	2120	36	1	2	12	2	0	0	0	24.8	6.6	7.6	10500	9.0
1	240227	1	09/05/78	2250	35	3	2	12	1	0	1	0	25.2	8.5	8.0	10500	7.0
2	240229	1	09/06/78	2045	36	1	1	12	1	0	0	0	24.9	5.8	7.4	11000	98.0
3	240231	1	09/07/78	2030	39	3	1	12	3	0	0	0	24.8	8.6	8.1	9600	10.0
4	240235	1	09/08/78	2010	34	3	4	12	5	0	0	0	21.5	9.2	.	11500	6.0
5	240237	2	09/18/78	1949	39	3	1	12	5	0	0	0	21.8	7.5	7.4	8750	11.0
5	240239	2	09/18/78	2057	35	3	2	12	5	0	0	0	20.9	7.7	7.4	9350	7.0
6	240240	2	09/19/78	1958	39	3	1	12	1	0	0	0	21.1	8.0	7.6	8650	4.0
6	240241	2	09/19/78	2036	36	1	2	12	1	0	0	0	21.0	7.4	7.7	8350	17.0
6	240242	2	09/19/78	2134	34	3	2	12	1	0	0	0	18.6	8.3	7.6	10500	3.0
7	240245	2	09/20/78	2024	35	3	1	12	1	0	0	0	22.0	8.1	7.8	9100	5.0
7	240246	2	09/20/78	2138	34	3	2	12	1	0	0	0	20.4	8.3	7.8	10050	7.0
8	240249	2	09/21/78	2056	35	3	1	12	1	0	0	0	21.9	7.6	7.3	8350	5.0
9	240250	3	10/02/78	1925	39	3	2	12	2	0	0	0	19.2	9.2	8.0	11000	8.0

1978 NIGHT BEACH SEINE EFFICIENCY REPORT
CATCH AND WATER QUALITY DATA FOR SUPPLEMENTARY SAMPLES
(ZERO CATCH SAMPLES ARE EXCLUDED)

SPECIES=AMERICAN SHAD

S_GROUP	SAMPLE	WEEK	DATE	TIME	RV_MILE	SITE	TIDE	GEAR	LC_1	LC_2	LC_3	LC_4	TEMP	DO	PH	COND	TURB
9	240251	3	10/02/78	2033	35	3	2	12	1	0	0	0	18.0	9.4	8.1	11000	5.0
10	240253	3	10/03/78	1916	39	3	2	12	1	0	0	0	17.9	8.9	7.7	10500	14.0
10	240255	3	10/03/78	2044	34	3	2	12	1	0	0	0	16.1	10.1	7.9	11500	2.0
11	240257	3	10/04/78	1916	39	3	1	12	2	0	0	0	17.7	9.0	7.5	10500	10.0

SPECIES=BLUEFISH

S_GROUP	SAMPLE	WEEK	DATE	TIME	RV_MILE	SITE	TIDE	GEAR	LC_1	LC_2	LC_3	LC_4	TEMP	DO	PH	COND	TURB
4	240234	1	09/08/78	1940	36	1	4	12	2	0	0	0	24.2	7.0	.	11000	13.0
4	240235	1	09/08/78	2010	34	3	4	12	1	0	0	0	21.5	9.2	.	11500	6.0
5	240237	2	09/18/78	1949	39	3	1	12	1	0	0	0	21.8	7.5	7.4	8750	11.0
5	240239	2	09/18/78	2057	35	3	2	12	1	0	0	0	20.9	7.7	7.4	9350	7.0
9	240252	3	10/03/78	134	36	1	4	12	1	0	0	0	18.2	7.9	7.8	10500	4.0
11	240258	3	10/04/78	1944	35	3	2	12	2	0	0	0	17.4	8.4	7.7	11000	2.0
12	240262	3	10/05/78	2010	34	3	1	12	2	0	0	0	16.5	9.3	7.8	11500	26.0

SPECIES=PUMPKINSEED

S_GROUP	SAMPLE	WEEK	DATE	TIME	RV_MILE	SITE	TIDE	GEAR	LC_1	LC_2	LC_3	LC_4	TEMP	DO	PH	COND	TURB
1	240225	1	09/05/78	2015	39	3	2	12	0	0	1	0	25.2	8.7	7.9	9550	4.0
1	240226	1	09/05/78	2120	36	1	2	12	0	0	3	0	24.8	6.6	7.6	10500	9.0
1	240227	1	09/05/78	2250	35	3	2	12	1	0	0	0	25.2	8.5	8.0	10500	7.0
2	240229	1	09/06/78	2045	36	1	1	12	2	1	2	0	24.9	5.8	7.4	11000	98.0
3	240231	1	09/07/78	2030	39	3	1	12	0	0	1	0	24.8	8.6	8.1	9600	10.0
4	240234	1	09/08/78	1940	36	1	4	12	1	0	1	0	24.2	7.0	.	11000	13.0
5	240237	2	09/18/78	1949	39	3	1	12	0	0	2	0	21.8	7.5	7.4	8750	11.0
6	240240	2	09/19/78	1958	39	3	1	12	0	0	1	0	21.1	8.0	7.6	8650	4.0
6	240241	2	09/19/78	2036	36	1	2	12	0	0	2	0	21.0	7.4	7.7	8350	17.0
6	240242	2	09/19/78	2134	34	3	2	12	0	0	1	0	18.6	8.3	7.6	10500	3.0
7	240245	2	09/20/78	2024	35	3	1	12	0	0	2	0	22.0	8.1	7.8	9100	5.0
8	240247	2	09/21/78	1945	36	1	4	12	0	0	1	0	23.0	7.6	.	.	0.0
9	240250	3	10/02/78	1925	39	3	2	12	0	0	1	0	19.2	9.2	8.0	11000	8.0
9	240252	3	10/03/78	134	36	1	4	12	0	1	0	0	18.2	7.9	7.8	10500	4.0
10	240255	3	10/03/78	2044	34	3	2	12	0	0	2	0	16.1	10.1	7.9	11500	2.0
11	240258	3	10/04/78	1944	35	3	2	12	0	0	1	0	17.4	8.4	7.7	11000	2.0
12	240261	3	10/05/78	1934	36	1	4	12	0	1	1	0	18.9	7.9	7.8	10500	55.0
12	240263	3	10/05/78	2045	35	3	2	12	0	0	1	0	17.5	9.2	7.8	10500	5.0

1978 NIGHT BEACH SEINE EFFICIENCY REPORT
CATCH AND WATER QUALITY DATA FOR SUPPLEMENTARY SAMPLES
(ZERO CATCH SAMPLES ARE EXCLUDED)

SPECIES=CARP

S_GROUP	SAMPLE	WEEK	DATE	TIME	RV_MILE	SITE	TIDE	GEAR	LC_1	LC_2	LC_3	LC_4	TEMP	DO	PH	COND	TURB
1	240227	1	09/05/78	2250	35	3	2	12	0	0	0	2	25.2	8.5	8.0	10500	7.0

SPECIES=AMERICAN EEL

S_GROUP	SAMPLE	WEEK	DATE	TIME	RV_MILE	SITE	TIDE	GEAR	LC_1	LC_2	LC_3	LC_4	TEMP	DO	PH	COND	TURB
1	240227	1	09/05/78	2250	35	3	2	12	0	0	0	3	25.2	8.5	8.0	10500	7.0
2	240228	1	09/06/78	2010	39	3	4	12	0	0	0	1	25.6	8.3	8.0	9700	51.0
3	240232	1	09/07/78	2105	35	3	2	12	0	0	1	1	23.8	8.5	8.2	10500	49.0
3	240233	1	09/07/78	2220	34	3	2	12	0	0	1	1	21.9	7.9	8.5	11000	14.0
4	240236	1	09/08/78	2045	35	3	1	12	0	0	0	1	24.1	8.9	.	11000	2.0
5	240238	2	09/18/78	2031	36	1	2	12	0	0	0	2	21.6	7.4	7.6	8550	33.0
5	240239	2	09/18/78	2057	35	3	2	12	0	0	0	1	20.9	7.7	7.4	9350	7.0
6	240241	2	09/19/78	2036	36	1	2	12	0	0	0	3	21.0	7.4	7.7	8350	17.0
6	240242	2	09/19/78	2134	34	3	2	12	0	0	0	1	18.6	8.3	7.6	10500	3.0
7	240245	2	09/20/78	2024	35	3	1	12	0	0	1	2	22.0	8.1	7.8	9100	5.0
8	240249	2	09/21/78	2056	35	3	1	12	0	0	1	0	21.9	7.6	7.3	8350	5.0
9	240251	3	10/02/78	2033	35	3	2	12	0	0	4	1	18.0	9.4	8.1	11000	5.0
11	240257	3	10/04/78	1916	39	3	1	12	0	0	0	2	17.7	9.0	7.5	10500	10.0
12	240261	3	10/05/78	1934	36	1	4	12	0	0	0	2	18.9	7.9	7.8	10500	55.0

SPECIES=GOLDFISH

S_GROUP	SAMPLE	WEEK	DATE	TIME	RV_MILE	SITE	TIDE	GEAR	LC_1	LC_2	LC_3	LC_4	TEMP	DO	PH	COND	TI
8	240247	2	09/21/78	1945	36	1	4	12	0	0	1	0	23.0	7.6	.	.	0

SPECIES=GOLDEN SHINER

S_GROUP	SAMPLE	WEEK	DATE	TIME	RV_MILE	SITE	TIDE	GEAR	LC_1	LC_2	LC_3	LC_4	TEMP	DO	PH	COND	TURB
5	240239	2	09/18/78	2057	35	3	2	12	0	0	1	0	20.9	7.7	7.4	9350	7.0

1978 NIGHT BEACH SEINE EFFICIENCY REPORT
CATCH AND WATER QUALITY DATA FOR SUPPLEMENTARY SAMPLES
(ZERO CATCH SAMPLES ARE EXCLUDED)

SPECIES=HOGCHOKER

S_GROUP	SAMPLE	WEEK	DATE	TIME	RV_MILE	SITE	TIDE	GEAR	LC_1	LC_2	LC_3	LC_4	TEMP	DO	PH	COND	TURB
1	240225	1	09/05/78	2015	39	3	2	12	1	5	0	0	25.2	8.7	7.9	9550	4.0
1	240226	1	09/05/78	2120	36	1	2	12	0	1	0	0	24.8	6.6	7.6	10500	9.0
2	240228	1	09/06/78	2010	39	3	4	12	0	5	0	0	25.6	8.3	8.0	9700	51.0
2	240229	1	09/06/78	2045	36	1	1	12	0	13	0	0	24.9	5.8	7.4	11000	98.0
3	240231	1	09/07/78	2030	39	3	1	12	0	4	0	0	24.8	8.6	8.1	9600	10.0
3	240232	1	09/07/78	2105	35	3	2	12	0	3	0	0	23.8	8.5	8.2	10500	49.0
4	240236	1	09/08/78	2045	35	3	1	12	1	0	0	0	24.1	8.9	.	11000	2.0
5	240237	2	09/18/78	1949	39	3	1	12	3	0	0	0	21.8	7.5	7.4	8750	11.0
5	240238	2	09/18/78	2031	36	1	2	12	0	2	0	0	21.6	7.4	7.6	8550	33.0
5	240239	2	09/18/78	2057	35	3	2	12	1	1	0	0	20.9	7.7	7.4	9350	7.0
6	240240	2	09/19/78	1958	39	3	1	12	2	0	0	0	21.1	8.0	7.6	8650	4.0
6	240241	2	09/19/78	2036	36	1	2	12	0	8	0	0	21.0	7.4	7.7	8350	17.0
8	240249	2	09/21/78	2056	35	3	1	12	1	1	0	0	21.9	7.6	7.3	8350	5.0
9	240250	3	10/02/78	1925	39	3	2	12	1	1	0	0	19.2	9.2	8.0	11000	8.0
9	240251	3	10/02/78	2033	35	3	2	12	0	1	0	0	18.0	9.4	8.1	11000	5.0
9	240252	3	10/03/78	134	36	1	4	12	0	3	0	0	18.2	7.9	7.8	10500	4.0
10	240253	3	10/03/78	1916	39	3	2	12	1	0	0	0	17.9	8.9	7.7	10500	14.0
10	240254	3	10/03/78	1943	36	1	2	12	0	3	0	0	18.2	8.2	7.7	11500	60.0
11	240257	3	10/04/78	1916	39	3	1	12	0	2	0	0	17.7	9.0	7.5	10500	10.0
12	240261	3	10/05/78	1934	36	1	4	12	0	5	0	0	18.9	7.9	7.8	10500	55.0

SPECIES=TESSEL. DARTER

S_GROUP	SAMPLE	WEEK	DATE	TIME	RV_MILE	SITE	TIDE	GEAR	LC_1	LC_2	LC_3	LC_4	TEMP	DO	PH	COND	TURB
1	240225	1	09/05/78	2015	39	3	2	12	1	1	0	0	25.2	8.7	7.9	9550	4.0
2	240228	1	09/06/78	2010	39	3	4	12	3	4	0	0	25.6	8.3	8.0	9700	51.0
2	240229	1	09/06/78	2045	36	1	1	12	1	0	0	0	24.9	5.8	7.4	11000	98.0
2	240230	1	09/06/78	2150	34	3	2	12	0	2	0	0	24.2	9.3	8.8	11000	11.0
3	240231	1	09/07/78	2030	39	3	1	12	3	3	0	0	24.8	8.6	8.1	9600	10.0
3	240233	1	09/07/78	2220	34	3	2	12	1	0	0	0	21.9	7.9	8.5	11000	14.0
4	240234	1	09/08/78	1940	36	1	4	12	2	0	0	0	24.2	7.0	.	11000	13.0
4	240235	1	09/08/78	2010	34	3	4	12	1	1	0	0	21.5	9.2	.	11500	6.0
4	240236	1	09/08/78	2045	35	3	1	12	1	1	0	0	24.1	8.9	.	11000	2.0
5	240237	2	09/18/78	1949	39	3	1	12	1	9	0	0	21.8	7.5	7.4	8750	11.0
5	240238	2	09/18/78	2031	36	1	2	12	1	0	0	0	21.6	7.4	7.6	8550	33.0
6	240240	2	09/19/78	1958	39	3	1	12	0	1	0	0	21.1	8.0	7.6	8650	4.0
6	240241	2	09/19/78	2036	36	1	2	12	2	0	0	0	21.0	7.4	7.7	8350	17.0
7	240244	2	09/20/78	1951	39	3	4	12	0	1	0	0	21.7	7.9	7.8	8250	20.0
7	240245	2	09/20/78	2024	35	3	1	12	2	5	0	0	22.0	8.1	7.8	9100	5.0
8	240247	2	09/21/78	1945	36	1	4	12	2	1	0	0	23.0	7.6	.	.	0.0
8	240248	2	09/21/78	2017	34	3	4	12	1	0	0	0	23.5	9.5	8.1	9550	9.0
8	240249	2	09/21/78	2056	35	3	1	12	2	1	0	0	21.9	7.6	7.3	8350	5.0

1978 NIGHT BEACH SEINE EFFICIENCY REPORT
CATCH AND WATER QUALITY DATA FOR SUPPLEMENTARY SAMPLES
(ZERO CATCH SAMPLES ARE EXCLUDED)

SPECIES=TESSEL. DARTER

S_GROUP	SAMPLE	WEEK	DATE	TIME	RV_MILE	SITE	TIDE	GEAR	LC_1	LC_2	LC_3	LC_4	TEMP	DO	PH	COND	TURB
9	240250	3	10/02/78	1925	39	3	2	12	0	1	0	0	19.2	9.2	8.0	11000	8.0
11	240258	3	10/04/78	1944	35	3	2	12	2	3	0	0	17.4	8.4	7.7	11000	2.0
11	240259	3	10/04/78	2020	34	3	2	12	1	0	0	0	16.5	9.0	7.6	11500	3.0
12	240263	3	10/05/78	2045	35	3	2	12	3	2	0	0	17.5	9.2	7.8	10500	5.0

SPECIES=BANDED KILLIFISH

S_GROUP	SAMPLE	WEEK	DATE	TIME	RV_MILE	SITE	TIDE	GEAR	LC_1	LC_2	LC_3	LC_4	TEMP	DO	PH	COND	TURB
3	240233	1	09/07/78	2220	34	3	2	12	2	0	0	0	21.9	7.9	8.5	11000	14.0
4	240234	1	09/08/78	1940	36	1	4	12	2	1	0	0	24.2	7.0	.	11000	13.0
4	240235	1	09/08/78	2010	34	3	4	12	1	0	0	0	21.5	9.2	.	11500	6.0
6	240241	2	09/19/78	2036	36	1	2	12	1	0	0	0	21.0	7.4	7.7	8350	17.0
7	240245	2	09/20/78	2024	35	3	1	12	3	0	0	0	22.0	8.1	7.8	9100	5.0
7	240246	2	09/20/78	2138	34	3	2	12	4	0	0	0	20.4	8.3	7.8	10050	7.0
8	240248	2	09/21/78	2017	34	3	4	12	1	0	0	0	23.5	9.5	8.1	9550	9.0
10	240254	3	10/03/78	1943	36	1	2	12	1	0	0	0	18.2	8.2	7.7	11500	60.0
12	240261	3	10/05/78	1934	36	1	4	12	5	0	0	0	18.9	7.9	7.8	10500	55.0
12	240262	3	10/05/78	2010	34	3	1	12	1	0	0	0	16.5	9.3	7.8	11500	26.0
12	240263	3	10/05/78	2045	35	3	2	12	3	0	0	0	17.5	9.2	7.8	10500	5.0

SPECIES=LARGEMOUTH BASS

S_GROUP	SAMPLE	WEEK	DATE	TIME	RV_MILE	SITE	TIDE	GEAR	LC_1	LC_2	LC_3	LC_4	TEMP	DO	PH	COND	TURB
11	240257	3	10/04/78	1916	39	3	1	12	0	0	0	1	17.7	9.0	7.5	10500	10.0

SPECIES=MUMMICHOG

S_GROUP	SAMPLE	WEEK	DATE	TIME	RV_MILE	SITE	TIDE	GEAR	LC_1	LC_2	LC_3	LC_4	TEMP	DO	PH	COND	TURB
2	240230	1	09/06/78	2150	34	3	2	12	2	0	0	0	24.2	9.3	8.8	11000	11.0
3	240233	1	09/07/78	2220	34	3	2	12	0	1	0	0	21.9	7.9	8.5	11000	14.0
6	240241	2	09/19/78	2036	36	1	2	12	0	1	0	0	21.0	7.4	7.7	8350	17.0
7	240246	2	09/20/78	2138	34	3	2	12	3	0	0	0	20.4	8.3	7.8	10050	7.0

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CATCH AND WATER QUALITY DATA FOR SUPPLEMENTARY SAMPLES
(ZERO CATCH SAMPLES ARE EXCLUDED)

SPECIES=ATL. MENHADEN

S_GROUP	SAMPLE	WEEK	DATE	TIME	RV_MILE	SITE	TIDE	GEAR	LC_1	LC_2	LC_3	LC_4	TEMP	DO	PH	COND	TURB
4	240235	1	09/08/78	2010	34	3	4	12	0	0	1	0	21.5	9.2	.	11500	6.0
4	240236	1	09/08/78	2045	35	3	1	12	0	0	6	1	24.1	8.9	.	11000	2.0
5	240239	2	09/18/78	2057	35	3	2	12	0	0	47	0	20.9	7.7	7.4	9350	7.0
8	240249	2	09/21/78	2056	35	3	1	12	0	0	1	0	21.9	7.6	7.3	8350	5.0
9	240251	3	10/02/78	2033	35	3	2	12	0	0	2	0	18.0	9.4	8.1	11000	5.0

SPECIES=BLUEBACK HERRING

S_GROUP	SAMPLE	WEEK	DATE	TIME	RV_MILE	SITE	TIDE	GEAR	LC_1	LC_2	LC_3	LC_4	TEMP	DO	PH	COND	TURB
4	240234	1	09/08/78	1940	36	1	4	12	0	1	0	0	24.2	7.0	.	11000	13.0
4	240235	1	09/08/78	2010	34	3	4	12	5	0	0	0	21.5	9.2	.	11500	6.0
7	240245	2	09/20/78	2024	35	3	1	12	1	0	0	0	22.0	8.1	7.8	9100	5.0
8	240249	2	09/21/78	2056	35	3	1	12	1	0	0	0	21.9	7.6	7.3	8350	5.0
9	240250	3	10/02/78	1925	39	3	2	12	1	0	0	0	19.2	9.2	8.0	11000	8.0
9	240251	3	10/02/78	2033	35	3	2	12	5	0	0	0	18.0	9.4	8.1	11000	5.0
11	240259	3	10/04/78	2020	34	3	2	12	3	0	0	0	16.5	9.0	7.6	11500	3.0

SPECIES=ATL. SILVERSIDE

S_GROUP	SAMPLE	WEEK	DATE	TIME	RV_MILE	SITE	TIDE	GEAR	LC_1	LC_2	LC_3	LC_4	TEMP	DO	PH	COND	TURB
3	240232	1	09/07/78	2105	35	3	2	12	0	1	0	0	23.8	8.5	8.2	10500	49.0
3	240233	1	09/07/78	2220	34	3	2	12	0	7	0	0	21.9	7.9	8.5	11000	14.0
4	240234	1	09/08/78	1940	36	1	4	12	0	1	0	0	24.2	7.0	.	11000	13.0
4	240235	1	09/08/78	2010	34	3	4	12	0	8	0	0	21.5	9.2	.	11500	6.0
4	240236	1	09/08/78	2045	35	3	1	12	0	2	0	0	24.1	8.9	.	11000	2.0
5	240239	2	09/18/78	2057	35	3	2	12	0	3	0	0	20.9	7.7	7.4	9350	7.0
6	240242	2	09/19/78	2134	34	3	2	12	4	0	0	0	18.6	8.3	7.6	10500	3.0
7	240246	2	09/20/78	2138	34	3	2	12	11	2	0	0	20.4	8.3	7.8	10050	7.0
9	240251	3	10/02/78	2033	35	3	2	12	1	0	0	0	18.0	9.4	8.1	11000	5.0
10	240255	3	10/03/78	2044	34	3	2	12	3	1	0	0	16.1	10.1	7.9	11500	2.0
11	240258	3	10/04/78	1944	35	3	2	12	1	0	0	0	17.4	8.4	7.7	11000	2.0
12	240262	3	10/05/78	2010	34	3	1	12	2	1	0	0	16.5	9.3	7.8	11500	26.0
12	240263	3	10/05/78	2045	35	3	2	12	1	0	0	0	17.5	9.2	7.8	10500	5.0

1978 NIGHT BEACH SEINE EFFICIENCY REPORT
CATCH AND WATER QUALITY DATA FOR SUPPLEMENTARY SAMPLES
(ZERO CATCH SAMPLES ARE EXCLUDED)

SPECIES=SPOTTAIL SHINER

S_GROUP	SAMPLE	WEEK	DATE	TIME	RV_MILE	SITE	TIDE	GEAR	LC_1	LC_2	LC_3	LC_4	TEMP	DO	PH	COND	TURB
2	240230	1	09/06/78	2150	34	3	2	12	0	1	0	0	24.2	9.3	8.8	11000	11.0
3	240232	1	09/07/78	2105	35	3	2	12	1	0	0	0	23.8	8.5	8.2	10500	49.0
4	240235	1	09/08/78	2010	34	3	4	12	1	0	0	0	21.5	9.2	.	11500	6.0
4	240236	1	09/08/78	2045	35	3	1	12	2	0	0	0	24.1	8.9	.	11000	2.0
5	240237	2	09/18/78	1949	39	3	1	12	0	1	0	0	21.8	7.5	7.4	8750	11.0
5	240238	2	09/18/78	2031	36	1	2	12	0	1	0	0	21.6	7.4	7.6	8550	33.0
6	240241	2	09/19/78	2036	36	1	2	12	2	2	0	0	21.0	7.4	7.7	8350	17.0
7	240245	2	09/20/78	2024	35	3	1	12	2	0	0	0	22.0	8.1	7.8	9100	5.0
7	240246	2	09/20/78	2138	34	3	2	12	0	5	0	0	20.4	8.3	7.8	10050	7.0
8	240247	2	09/21/78	1945	36	1	4	12	3	6	0	0	23.0	7.6	.	.	0.0
8	240248	2	09/21/78	2017	34	3	4	12	2	0	0	0	23.5	9.5	8.1	9550	9.0
8	240249	2	09/21/78	2056	35	3	1	12	2	0	0	0	21.9	7.6	7.3	8350	5.0
10	240254	3	10/03/78	1943	36	1	2	12	1	0	0	0	18.2	8.2	7.7	11500	60.0
11	240259	3	10/04/78	2020	34	3	2	12	0	2	0	0	16.5	9.0	7.6	11500	3.0
12	240261	3	10/05/78	1934	36	1	4	12	0	1	0	0	18.9	7.9	7.8	10500	55.0
12	240262	3	10/05/78	2010	34	3	1	12	0	1	0	0	16.5	9.3	7.8	11500	26.0
12	240263	3	10/05/78	2045	35	3	2	12	1	0	0	0	17.5	9.2	7.8	10500	5.0

SPECIES=STRIPED BASS

S_GROUP	SAMPLE	WEEK	DATE	TIME	RV_MILE	SITE	TIDE	GEAR	LC_1	LC_2	LC_3	LC_4	TEMP	DO	PH	COND	TURB
1	240225	1	09/05/78	2015	39	3	2	12	109	1	0	0	25.2	8.7	7.9	9550	4.0
1	240226	1	09/05/78	2120	36	1	2	12	37	0	0	0	24.8	6.6	7.6	10500	9.0
1	240227	1	09/05/78	2250	35	3	2	12	27	0	0	0	25.2	8.5	8.0	10500	7.0
2	240228	1	09/06/78	2010	39	3	4	12	30	0	0	0	25.6	8.3	8.0	9700	51.0
2	240229	1	09/06/78	2045	36	1	1	12	13	0	0	0	24.9	5.8	7.4	11000	98.0
2	240230	1	09/06/78	2150	34	3	2	12	6	0	0	0	24.2	9.3	8.8	11000	11.0
3	240231	1	09/07/78	2030	39	3	1	12	89	0	0	0	24.8	8.6	8.1	9600	10.0
3	240232	1	09/07/78	2105	35	3	2	12	11	0	1	0	23.8	8.5	8.2	10500	49.0
3	240233	1	09/07/78	2220	34	3	2	12	31	0	0	0	21.9	7.9	8.5	11000	14.0
4	240234	1	09/08/78	1940	36	1	4	12	64	0	0	0	24.2	7.0	.	11000	13.0
4	240235	1	09/08/78	2010	34	3	4	12	87	0	0	0	21.5	9.2	.	11500	6.0
4	240236	1	09/08/78	2045	35	3	1	12	27	0	0	0	24.1	8.9	.	11000	2.0
5	240237	2	09/18/78	1949	39	3	1	12	157	0	0	0	21.8	7.5	7.4	8750	11.0
5	240238	2	09/18/78	2031	36	1	2	12	18	0	0	0	21.6	7.4	7.6	8550	33.0
5	240239	2	09/18/78	2057	35	3	2	12	39	1	0	0	20.9	7.7	7.4	9350	7.0
6	240240	2	09/19/78	1958	39	3	1	12	52	0	0	0	21.1	8.0	7.6	8650	4.0
6	240241	2	09/19/78	2036	36	1	2	12	43	0	0	0	21.0	7.4	7.7	8350	17.0
6	240242	2	09/19/78	2134	34	3	2	12	39	0	0	0	18.6	8.3	7.6	10500	3.0
7	240244	2	09/20/78	1951	39	3	4	12	31	0	0	0	21.7	7.9	7.8	8250	20.0
7	240245	2	09/20/78	2024	35	3	1	12	38	0	1	0	22.0	8.1	7.8	9100	5.0
7	240246	2	09/20/78	2138	34	3	2	12	61	1	2	0	20.4	8.3	7.8	10050	7.0

1978 NIGHT BEACH SEINE EFFICIENCY REPORT
CATCH AND WATER QUALITY DATA FOR SUPPLEMENTARY SAMPLES
(ZERO CATCH SAMPLES ARE EXCLUDED)

SPECIES=STRIPED BASS

S_GROUP	SAMPLE	WEEK	DATE	TIME	RV_MILE	SITE	TIDE	GEAR	LC_1	LC_2	LC_3	LC_4	TEMP	DO	PH	COND	TURB
8	240247	2	09/21/78	1945	36	1	4	12	18	0	0	0	23.0	7.6	.	.	0.0
8	240248	2	09/21/78	2017	34	3	4	12	49	0	1	0	23.5	9.5	8.1	9550	9.0
8	240249	2	09/21/78	2056	35	3	1	12	25	0	1	0	21.9	7.6	7.3	8350	5.0
9	240250	3	10/02/78	1925	39	3	2	12	61	1	0	0	19.2	9.2	8.0	11000	8.0
9	240251	3	10/02/78	2033	35	3	2	12	20	0	1	1	18.0	9.4	8.1	11000	5.0
9	240252	3	10/03/78	134	36	1	4	12	17	0	0	0	18.2	7.9	7.8	10500	4.0
10	240253	3	10/03/78	1916	39	3	2	12	16	0	0	0	17.9	8.9	7.7	10500	14.0
10	240254	3	10/03/78	1943	36	1	2	12	12	0	0	0	18.2	8.2	7.7	11500	60.0
10	240255	3	10/03/78	2044	34	3	2	12	38	0	0	0	16.1	10.1	7.9	11500	2.0
11	240257	3	10/04/78	1916	39	3	1	12	11	0	0	0	17.7	9.0	7.5	10500	10.0
11	240258	3	10/04/78	1944	35	3	2	12	11	0	0	0	17.4	8.4	7.7	11000	2.0
11	240259	3	10/04/78	2020	34	3	2	12	38	0	0	0	16.5	9.0	7.6	11500	3.0
12	240261	3	10/05/78	1934	36	1	4	12	7	0	0	0	18.9	7.9	7.8	10500	55.0
12	240262	3	10/05/78	2010	34	3	1	12	83	1	0	0	16.5	9.3	7.8	11500	26.0
12	240263	3	10/05/78	2045	35	3	2	12	20	0	0	0	17.5	9.2	7.8	10500	5.0

SPECIES=ATLANTIC TOMCOD

S_GROUP	SAMPLE	WEEK	DATE	TIME	RV_MILE	SITE	TIDE	GEAR	LC_1	LC_2	LC_3	LC_4	TEMP	DO	PH	COND	TURB
5	240238	2	09/18/78	2031	36	1	2	12	1	0	0	0	21.6	7.4	7.6	8550	33.0
5	240239	2	09/18/78	2057	35	3	2	12	1	0	0	0	20.9	7.7	7.4	9350	7.0
6	240241	2	09/19/78	2036	36	1	2	12	2	0	0	0	21.0	7.4	7.7	8350	17.0
8	240249	2	09/21/78	2056	35	3	1	12	1	0	0	0	21.9	7.6	7.3	8350	5.0
9	240252	3	10/03/78	134	36	1	4	12	2	0	0	0	18.2	7.9	7.8	10500	4.0
10	240254	3	10/03/78	1943	36	1	2	12	7	0	0	0	18.2	8.2	7.7	11500	60.0
11	240258	3	10/04/78	1944	35	3	2	12	1	0	0	0	17.4	8.4	7.7	11000	2.0
12	240261	3	10/05/78	1934	36	1	4	12	4	0	0	0	18.9	7.9	7.8	10500	55.0

SPECIES=WHITE CATFISH

S_GROUP	SAMPLE	WEEK	DATE	TIME	RV_MILE	SITE	TIDE	GEAR	LC_1	LC_2	LC_3	LC_4	TEMP	DO	PH	COND	TURB
1	240225	1	09/05/78	2015	39	3	2	12	0	0	1	3	25.2	8.7	7.9	9550	4.0
1	240226	1	09/05/78	2120	36	1	2	12	0	0	1	0	24.8	6.6	7.6	10500	9.0
1	240227	1	09/05/78	2250	35	3	2	12	0	0	9	12	25.2	8.5	8.0	10500	7.0
2	240228	1	09/06/78	2010	39	3	4	12	0	0	4	0	25.6	8.3	8.0	9700	51.0
2	240229	1	09/06/78	2045	36	1	1	12	0	0	0	1	24.9	5.8	7.4	11000	98.0
3	240231	1	09/07/78	2030	39	3	1	12	0	0	1	0	24.8	8.6	8.1	9600	10.0
3	240232	1	09/07/78	2105	35	3	2	12	0	0	1	1	23.8	8.5	8.2	10500	49.0
5	240239	2	09/18/78	2057	35	3	2	12	0	0	0	1	20.9	7.7	7.4	9350	7.0
7	240244	2	09/20/78	1951	39	3	4	12	0	0	0	2	21.7	7.9	7.8	8250	20.0

1978 NIGHT BEACH SEINE EFFICIENCY REPORT
CATCH AND WATER QUALITY DATA FOR SUPPLEMENTARY SAMPLES
(ZERO CATCH SAMPLES ARE EXCLUDED)

SPECIES=WHITE CATFISH

S_GROUP	SAMPLE	WEEK	DATE	TIME	RV_MILE	SITE	TIDE	GEAR	LC_1	LC_2	LC_3	LC_4	TEMP	DO	PH	COND	TURB
9	240251	3	10/02/78	2033	35	3	2	12	0	0	0	1	18.0	9.4	8.1	11000	5.0
9	240252	3	10/03/78	134	36	1	4	12	0	0	0	1	18.2	7.9	7.8	10500	4.0
10	240253	3	10/03/78	1916	39	3	2	12	0	0	1	0	17.9	8.9	7.7	10500	14.0

SPECIES=WHITE PERCH

S_GROUP	SAMPLE	WEEK	DATE	TIME	RV_MILE	SITE	TIDE	GEAR	LC_1	LC_2	LC_3	LC_4	TEMP	DO	PH	COND	TURB
1	240225	1	09/05/78	2015	39	3	2	12	35	17	4	0	25.2	8.7	7.9	9550	4.0
1	240226	1	09/05/78	2120	36	1	2	12	13	4	1	0	24.8	6.6	7.6	10500	9.0
1	240227	1	09/05/78	2250	35	3	2	12	4	13	15	0	25.2	8.5	8.0	10500	7.0
2	240228	1	09/06/78	2010	39	3	4	12	7	4	8	0	25.6	8.3	8.0	9700	51.0
2	240229	1	09/06/78	2045	36	1	1	12	9	1	2	0	24.9	5.8	7.4	11000	98.0
2	240230	1	09/06/78	2150	34	3	2	12	4	10	11	0	24.2	9.3	8.8	11000	11.0
3	240231	1	09/07/78	2030	39	3	1	12	23	7	1	0	24.8	8.6	8.1	9600	10.0
3	240232	1	09/07/78	2105	35	3	2	12	4	1	11	0	23.8	8.5	8.2	10500	49.0
3	240233	1	09/07/78	2220	34	3	2	12	0	11	10	0	21.9	7.9	8.5	11000	14.0
4	240234	1	09/08/78	1940	36	1	4	12	24	1	1	0	24.2	7.0	.	11000	13.0
4	240235	1	09/08/78	2010	34	3	4	12	10	16	18	1	21.5	9.2	.	11500	6.0
4	240236	1	09/08/78	2045	35	3	1	12	8	8	3	0	24.1	8.9	.	11000	2.0
5	240237	2	09/18/78	1949	39	3	1	12	75	11	3	0	21.8	7.5	7.4	8750	11.0
5	240238	2	09/18/78	2031	36	1	2	12	14	1	0	0	21.6	7.4	7.6	8550	33.0
5	240239	2	09/18/78	2057	35	3	2	12	7	7	11	0	20.9	7.7	7.4	9350	7.0
6	240240	2	09/19/78	1958	39	3	1	12	18	1	0	0	21.1	8.0	7.6	8650	4.0
6	240241	2	09/19/78	2036	36	1	2	12	35	1	0	0	21.0	7.4	7.7	8350	17.0
6	240242	2	09/19/78	2134	34	3	2	12	7	1	1	0	18.6	8.3	7.6	10500	3.0
7	240244	2	09/20/78	1951	39	3	4	12	7	3	0	0	21.7	7.9	7.8	8250	20.0
7	240245	2	09/20/78	2024	35	3	1	12	1	1	0	0	22.0	8.1	7.8	9100	5.0
7	240246	2	09/20/78	2138	34	3	2	12	4	1	1	2	20.4	8.3	7.8	10050	7.0
8	240247	2	09/21/78	1945	36	1	4	12	8	1	0	0	23.0	7.6	.	.	0.0
8	240248	2	09/21/78	2017	34	3	4	12	27	20	3	0	23.5	9.5	8.1	9550	9.0
8	240249	2	09/21/78	2056	35	3	1	12	5	7	17	0	21.9	7.6	7.3	8350	5.0
9	240250	3	10/02/78	1925	39	3	2	12	22	8	6	1	19.2	9.2	8.0	11000	8.0
9	240251	3	10/02/78	2033	35	3	2	12	5	8	5	0	18.0	9.4	8.1	11000	5.0
9	240252	3	10/03/78	134	36	1	4	12	7	0	0	0	18.2	7.9	7.8	10500	4.0
10	240253	3	10/03/78	1916	39	3	2	12	5	1	7	0	17.9	8.9	7.7	10500	14.0
10	240254	3	10/03/78	1943	36	1	2	12	6	0	0	0	18.2	8.2	7.7	11500	60.0
10	240255	3	10/03/78	2044	34	3	2	12	1	1	1	0	16.1	10.1	7.9	11500	2.0
11	240257	3	10/04/78	1916	39	3	1	12	10	4	1	0	17.7	9.0	7.5	10500	10.0
11	240258	3	10/04/78	1944	35	3	2	12	4	0	1	0	17.4	8.4	7.7	11000	2.0
11	240259	3	10/04/78	2020	34	3	2	12	5	4	3	0	16.5	9.0	7.6	11500	3.0
12	240261	3	10/05/78	1934	36	1	4	12	7	0	0	0	18.9	7.9	7.8	10500	55.0
12	240262	3	10/05/78	2010	34	3	1	12	18	13	14	0	16.5	9.3	7.8	11500	26.0

1978 NIGHT BEACH SEINE EFFICIENCY REPORT
CATCH AND WATER QUALITY DATA FOR SUPPLEMENTARY SAMPLES
(ZERO CATCH SAMPLES ARE EXCLUDED)

SPECIES=WHITE PERCH

S_GROUP	SAMPLE	WEEK	DATE	TIME	RV_MILE	SITE	TIDE	GEAR	LC_1	LC_2	LC_3	LC_4	TEMP	DO	PH	COND	TURB
12	240263	3	10/05/78	2045	35	3	2	12	10	5	5	0	17.5	9.2	7.8	10500	5.0

SPECIES=NORTH. PIPEFISH

S_GROUP	SAMPLE	WEEK	DATE	TIME	RV_MILE	SITE	TIDE	GEAR	LC_1	LC_2	LC_3	LC_4	TEMP	DO	PH	COND	TURB
1	240225	1	09/05/78	2015	39	3	2	12	0	1	0	0	25.2	8.7	7.9	9550	4.0
1	240226	1	09/05/78	2120	36	1	2	12	0	2	0	0	24.8	6.6	7.6	10500	9.0
2	240229	1	09/06/78	2045	36	1	1	12	0	0	1	0	24.9	5.8	7.4	11000	98.0
4	240234	1	09/08/78	1940	36	1	4	12	0	2	1	0	24.2	7.0	.	11000	13.0
4	240236	1	09/08/78	2045	35	3	1	12	0	1	1	0	24.1	8.9	.	11000	2.0
6	240241	2	09/19/78	2036	36	1	2	12	1	3	1	0	21.0	7.4	7.7	8350	17.0
7	240245	2	09/20/78	2024	35	3	1	12	0	1	1	0	22.0	8.1	7.8	9100	5.0
8	240247	2	09/21/78	1945	36	1	4	12	3	0	0	0	23.0	7.6	.	.	0.0
9	240252	3	10/03/78	134	36	1	4	12	0	1	0	0	18.2	7.9	7.8	10500	4.0
10	240254	3	10/03/78	1943	36	1	2	12	0	0	1	0	18.2	8.2	7.7	11500	60.0
11	240258	3	10/04/78	1944	35	3	2	12	0	3	1	0	17.4	8.4	7.7	11000	2.0
12	240261	3	10/05/78	1934	36	1	4	12	6	2	0	0	18.9	7.9	7.8	10500	55.0
12	240263	3	10/05/78	2045	35	3	2	12	1	0	0	0	17.5	9.2	7.8	10500	5.0

SPECIES=REDBREAST SUNFSH

S_GROUP	SAMPLE	WEEK	DATE	TIME	RV_MILE	SITE	TIDE	GEAR	LC_1	LC_2	LC_3	LC_4	TEMP	DO	PH	COND	TURB
1	240226	1	09/05/78	2120	36	1	2	12	0	0	1	0	24.8	6.6	7.6	10500	9.0
2	240229	1	09/06/78	2045	36	1	1	12	0	0	1	0	24.9	5.8	7.4	11000	98.0
5	240238	2	09/18/78	2031	36	1	2	12	0	0	1	0	21.6	7.4	7.6	8550	33.0
6	240241	2	09/19/78	2036	36	1	2	12	0	0	1	0	21.0	7.4	7.7	8350	17.0
9	240252	3	10/03/78	134	36	1	4	12	0	1	0	0	18.2	7.9	7.8	10500	4.0
12	240261	3	10/05/78	1934	36	1	4	12	0	0	1	0	18.9	7.9	7.8	10500	55.0

SPECIES=ATL. NEEDLEFISH

S_GROUP	SAMPLE	WEEK	DATE	TIME	RV_MILE	SITE	TIDE	GEAR	LC_1	LC_2	LC_3	LC_4	TEMP	DO	PH	COND	TURB
8	240248	2	09/21/78	2017	34	3	4	12	0	0	0	1	23.5	9.5	8.1	9550	9.0
9	240250	3	10/02/78	1925	39	3	2	12	0	0	1	0	19.2	9.2	8.0	11000	8.0

1978 NIGHT BEACH SEINE EFFICIENCY REPORT
CATCH AND WATER QUALITY DATA FOR SUPPLEMENTARY SAMPLES
(ZERO CATCH SAMPLES ARE EXCLUDED)

SPECIES=TIDEWATR SLVSIDE

S_GROUP	SAMPLE	WEEK	DATE	TIME	RV_MILE	SITE	TIDE	GEAR	LC_1	LC_2	LC_3	LC_4	TEMP	DO	PH	COND	TURB
1	240227	1	09/05/78	2250	35	3	2	12	0	1	0	0	25.2	8.5	8.0	10500	7.0
2	240230	1	09/06/78	2150	34	3	2	12	0	1	0	0	24.2	9.3	8.8	11000	11.0
6	240242	2	09/19/78	2134	34	3	2	12	1	4	0	0	18.6	8.3	7.6	10500	3.0
7	240245	2	09/20/78	2024	35	3	1	12	0	1	0	0	22.0	8.1	7.8	9100	5.0
10	240255	3	10/03/78	2044	34	3	2	12	3	0	0	0	16.1	10.1	7.9	11500	2.0
12	240262	3	10/05/78	2010	34	3	1	12	1	0	0	0	16.5	9.3	7.8	11500	26.0

SPECIES=ROUGH SILVERSIDE

S_GROUP	SAMPLE	WEEK	DATE	TIME	RV_MILE	SITE	TIDE	GEAR	LC_1	LC_2	LC_3	LC_4	TEMP	DO	PH	COND	TURB
3	240232	1	09/07/78	2105	35	3	2	12	0	1	0	0	23.8	8.5	8.2	10500	49.0
4	240235	1	09/08/78	2010	34	3	4	12	0	3	0	0	21.5	9.2	.	11500	6.0

APPENDIX D

FISH LENGTH DATA FOR NIGHT BEACH SEINE EFFICIENCY TESTS

1978 NIGHT BEACH SEINE EFFICIENCY REPORT

LENGTH DATA LEGEND

SAMPLE: NIGHT BEACH SEINE EFFICIENCY TEST SAMPLES <= 240036

GEAR : SAMPLING DEVICE (BEACH SEINES: 12 = 100 FT, 53 = 500 FT)

TOW : 0 = 500 FT BEACH SEINE TOW
1 = 1ST 100 FT BEACH SEINE TOW
2 = 2ND 100 FT BEACH SEINE TOW

SPEC : 30 = JUVENILE STRIPED BASS
35 = JUVENILE WHITE PERCH

LEN # : LENGTH OBSERVATION NUMBER

1978 NIGHT BEACH SEINE EFFICIENCY REPORT
LENGTH DATA

SAMPLE	GEAR	TOW	SPEC	LEN1	LEN2	LEN3	LEN4	LEN5	LEN6	LEN7	LEN8	LEN9	LEN10	LEN11	LEN12	LEN13	LEN14	LEN15	LEN16	LEN17	LEN18	LEN19	LEN20
240001	53	0	30	89	61	88	88	85	90	68	67	88	81	76	79	99	74	82	93	78	74	74	95
240001	53	0	35	75	77	74	85	81	81	72	69	78	70	73	81	83	82	79	78	77	88	74	77
240002	12	1	30	82	88	88	86	86	91	95	74	92	91	.	.	.	.	.	.	.	.	.	.
240002	12	1	35	78	84	82	80	78	88	74	77	74	80	75	86	85	79	78	76	78	85	.	.
240003	12	2	30	89	87	82	96	93	91	98	79	81	94	108	86	81	76	81	87	83	.	.	.
240003	12	2	35	82	81	76	75	85	80	76	76	74	73	76	75	.	.	.	.	.	.	.	.
240004	53	0	30	109	90	99	108	69	68	89	73	79	88	73	88	80	93	91	84	72	77	74	89
240004	53	0	35	65	73	76	65	54	68	61	70	63	66	70	75	75	84	73	67	66	76	65	64
240005	12	1	30	70	95	79	83	83	73	85	67	77	80	78	78	75	89	74	89	77	76	98	86
240005	12	1	35	76	63	80	65	80	73	67	68	64	75	67	70	69	.	.	.	.	.	.	.
240006	12	2	30	91	83	88	82	67	88	71	75	77	75	80	80	65	.	.	.	.	.	.	.
240006	12	2	35	69	34	59	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
240007	53	0	30	95	83	74	83	89	96	84	68	81	73	92	61	85	78	92	74	112	86	82	80
240007	53	0	35	67	68	77	75	75	72	66	69	73	83	68	70	76	75	69	75	73	72	75	76
240008	12	1	30	92	76	85	83	99	80	78	82	71	99	82	.	.	.	.	.	.	.	.	.
240008	12	1	35	72	67	70	68	71	65	76	64	73	66	65	.	.	.	.	.	.	.	.	.
240009	12	2	30	84	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
240009	12	2	35	75	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
240010	53	0	30	108	76	108	79	74	91	70	80	80	80	68	83	77	92	77	93	61	67	67	86
240010	53	0	35	72	75	80	74	65	63	60	66	75	67	66	73	75	81	66	73	62	79	76	67
240011	12	1	30	77	69	79	73	80	80	74	74	81	80	74	78	63	86	72	89	98	83	91	88
240011	12	1	35	76	74	72	65	76	84	67	61	67	75	76	70	.	.	.	.	.	.	.	.
240012	12	2	30	70	79	76	72	93	95	73	71	77	76	82	81	75	79	84	82	74	60	.	.
240012	12	2	35	79	72	72	63	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
240013	53	0	30	102	87	96	94	82	110	112	93	92	115	87	105	95	92	97	100	103	85	98	85
240013	53	0	35	80	81	84	85	80	90	86	91	70	81	82	84	85	82	84	75	81	80	83	86
240014	12	1	30	82	92	80	84	103	94	101	102	87	100	107	72	77	73	75	.	.	.	.	.
240014	12	1	35	90	80	81	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
240015	12	2	30	98	95	108	100	100	86	97	88	.	.	.	.	.	.	.	.	.	.	.	.
240016	53	0	30	98	103	85	90	89	85	101	77	90	88	80	80	95	95	85	88	88	80	87	112
240016	53	0	35	80	64	75	77	68	75	69	69	67	83	67	69	61	47	65	68	80	68	69	69
240017	12	1	30	74	102	100	103	98	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
240017	12	1	35	69	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
240018	12	2	30	82	89	80	98	80	85	89	82	78	96	87	.	.	.	.	.	.	.	.	.
240018	12	2	35	66	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
240019	53	0	30	84	110	75	83	89	85	112	78	83	114	76	71	75	88	105	88	80	73	93	85
240019	53	0	35	72	65	78	52	60	69	75	73	78	73	58	70	63	66	71	77	79	79	77	68
240020	12	1	30	85	94	77	104	85	80	70	80	91	69	87	78	.	.	.	.	.	.	.	.
240020	12	1	35	62	80	74	69	76	65	60	55	80	69	.	.	.	.	.	.	.	.	.	.
240021	12	2	30	72	75	90	94	98	85	83	74	77	82	80	65	57	.	.	.	.	.	.	.
240021	12	2	35	79	62	59	67	77	57	70	75	.	.	.	.	.	.	.	.	.	.	.	.
240022	53	0	30	77	75	79	90	85	78	73	84	84	100	85	76	78	77	77	95	76	75	85	78
240022	53	0	35	69	68	85	80	73	77	74	75	80	74	65	80	76	76	76	75	64	79	77	75

1978 NIGHT BEACH SEINE EFFICIENCY REPORT
LENGTH DATA

SAMPLE	GEAR	TOW	SPEC	LEN1	LEN2	LEN3	LEN4	LEN5	LEN6	LEN7	LEN8	LEN9	LEN10	LEN11	LEN12	LEN13	LEN14	LEN15	LEN16	LEN17	LEN18	LEN19	LEN20
240023	12	1	35	72	65	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
240024	12	2	30	98	84	89	76	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
240025	53	0	30	99	87	103	114	104	114	100	111	70	88	108	110	99	98	99	101	90	95	115	117
240025	53	0	35	83	92	94	85	88	86	78	94	79	85	87	85	88	87	96	94	92	84	93	86
240026	12	1	30	96	115	95	94	90	100	105	85	95	91	87	70	83	101	94	88	100	97	85	87
240026	12	1	35	90	90	90	92	86	85	85	82	84	.	.	.	.	.	.	.	.	.	.	.
240027	12	2	30	100	87	106	97	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
240027	12	2	35	61	85	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
240028	53	0	30	94	97	90	99	95	99	91	118	92	100	119	91	91	89	108	81	104	87	88	87
240028	53	0	35	74	65	67	75	85	78	65	78	83	75	74	70	68	68	61	77	77	73	.	.
240029	12	1	30	91	85	108	90	89	95	.	.	.	.	.	.	.	.	.	.	.	.	.	.
240029	12	1	35	74	56	70	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
240031	53	0	30	88	87	80	80	87	92	93	104	75	80	88	88	75	80	80	112	78	100	88	85
240031	53	0	35	78	79	85	70	83	64	77	78	59	79	73	75	69	75	75	66	74	85	84	75
240032	12	1	30	85	75	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
240032	12	1	35	67	71	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
240033	12	2	30	77	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
240033	12	2	35	81	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
240034	53	0	30	90	85	102	75	93	81	80	90	102	80	84	67	82	94	94	100	80	85	73	72
240034	53	0	35	72	81	88	87	72	67	66	62	69	67	76	81	80	74	72	77	78	73	70	66
240035	12	1	35	86	83	78	75	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
240036	12	2	30	90	78	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
240036	12	2	35	75	65	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

APPENDIX E

SCATTER PLOTS OF CATCH EFFICIENCY AND SELECTED ENVIRONMENTAL DATA FOR BEACH SEINE EFFICIENCY TESTS

KEY TO APPENDIX E

A = One Observation

B = Two Observations

C = Three Observations

1978 Plots Represent Combined Tows 1 and 2 of the 100-ft Seine.

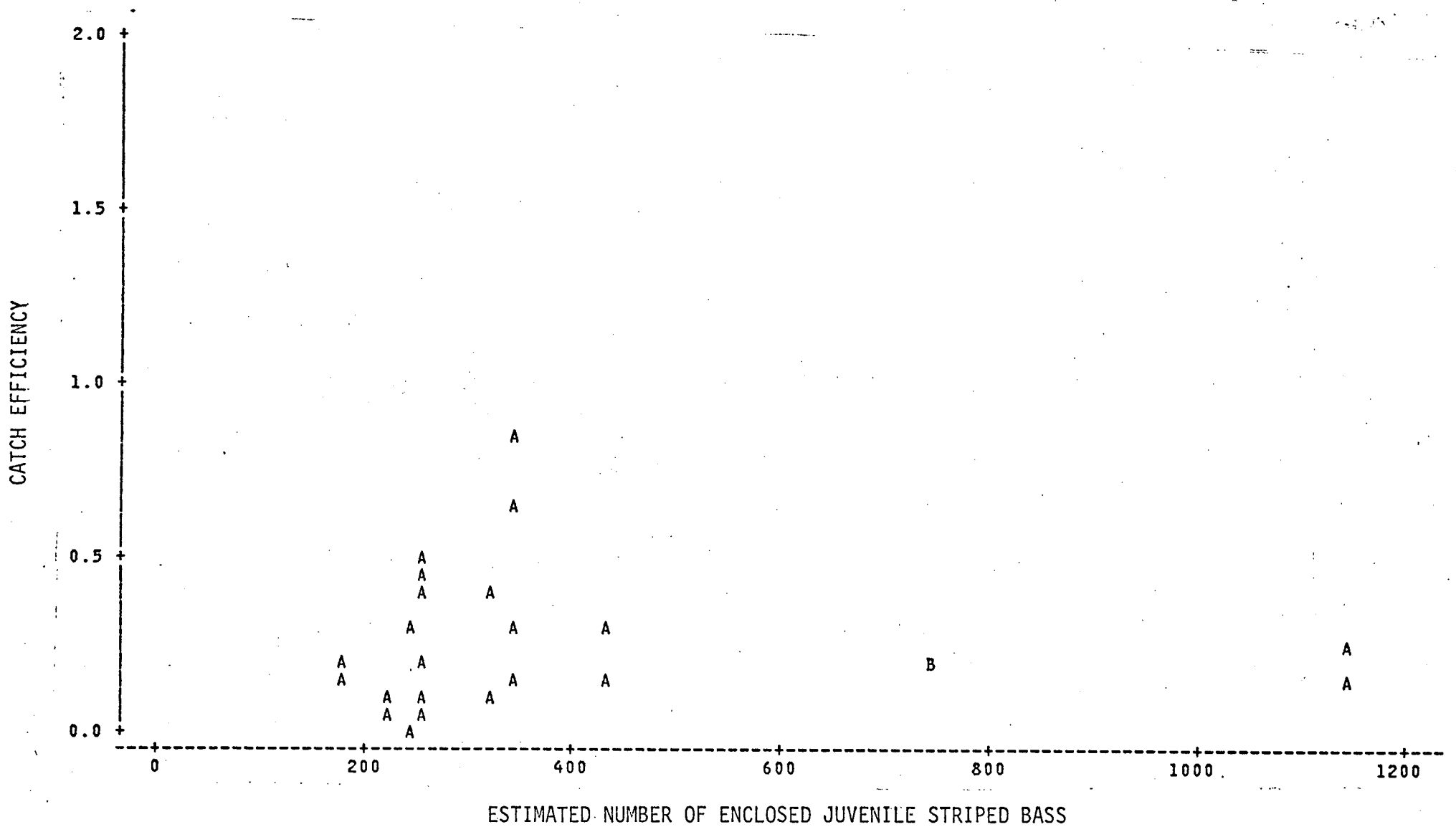


Figure E-1. Night Catch Efficiency for Juvenile Striped Bass in 100-ft Seine versus Estimated Number of Juvenile Striped Bass Enclosed in 500-ft Seine in 1978

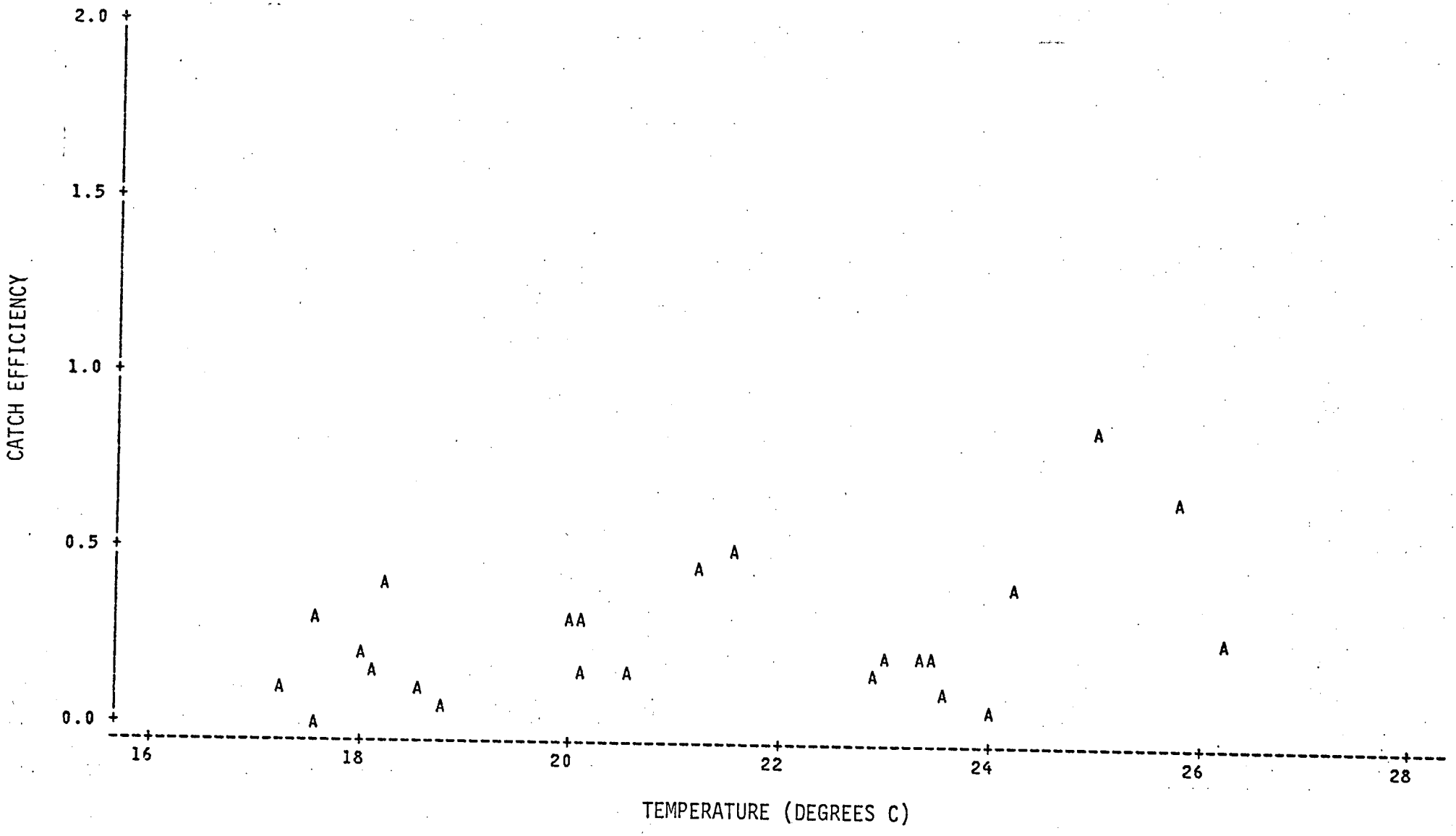


Figure E-2. Night Catch Efficiency for Juvenile Striped Bass in 100-ft Seine versus Water Temperatures in 1978

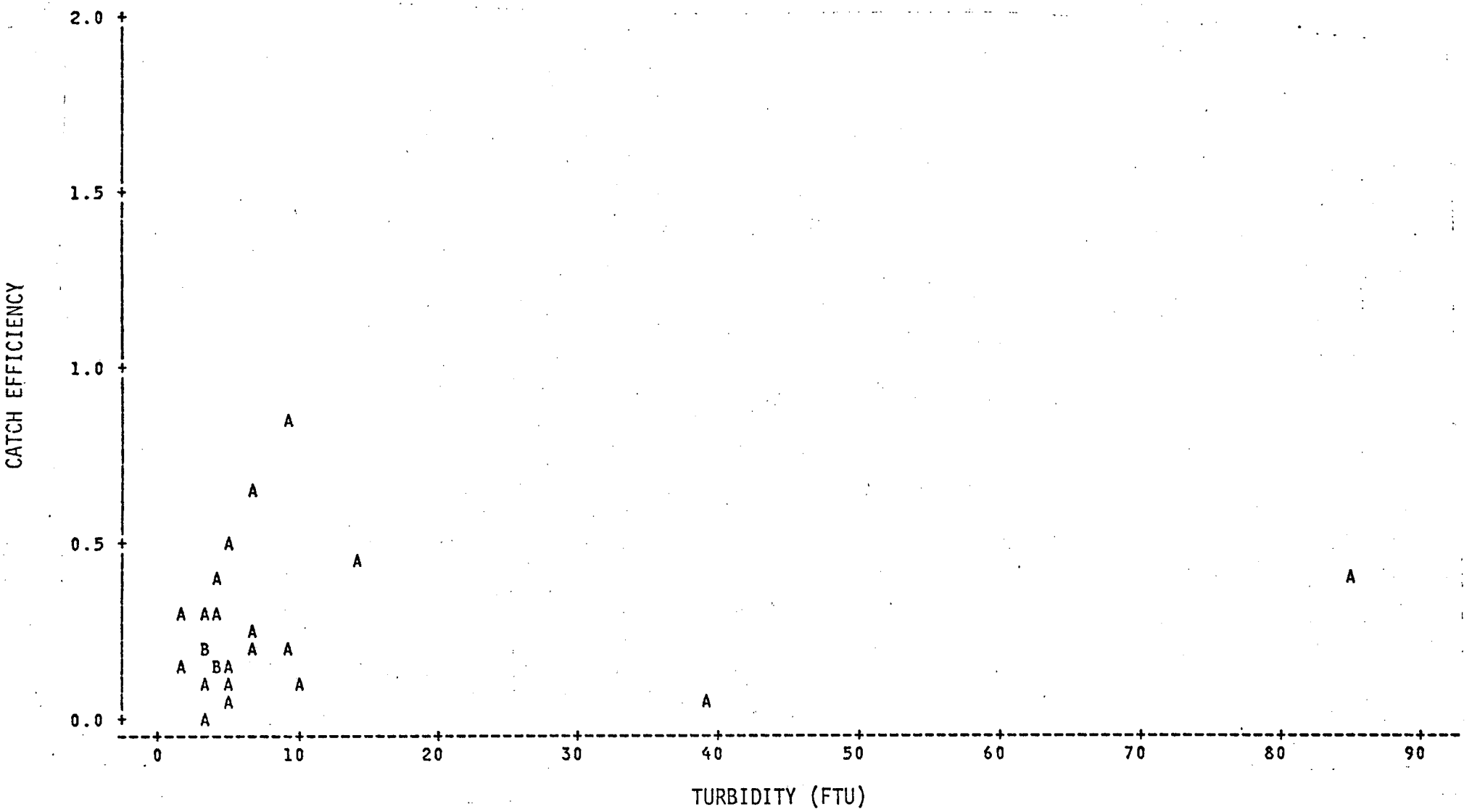


Figure E-3. Night Catch Efficiency for Juvenile Striped Bass in 100-ft Seine versus Turbidity in 1978

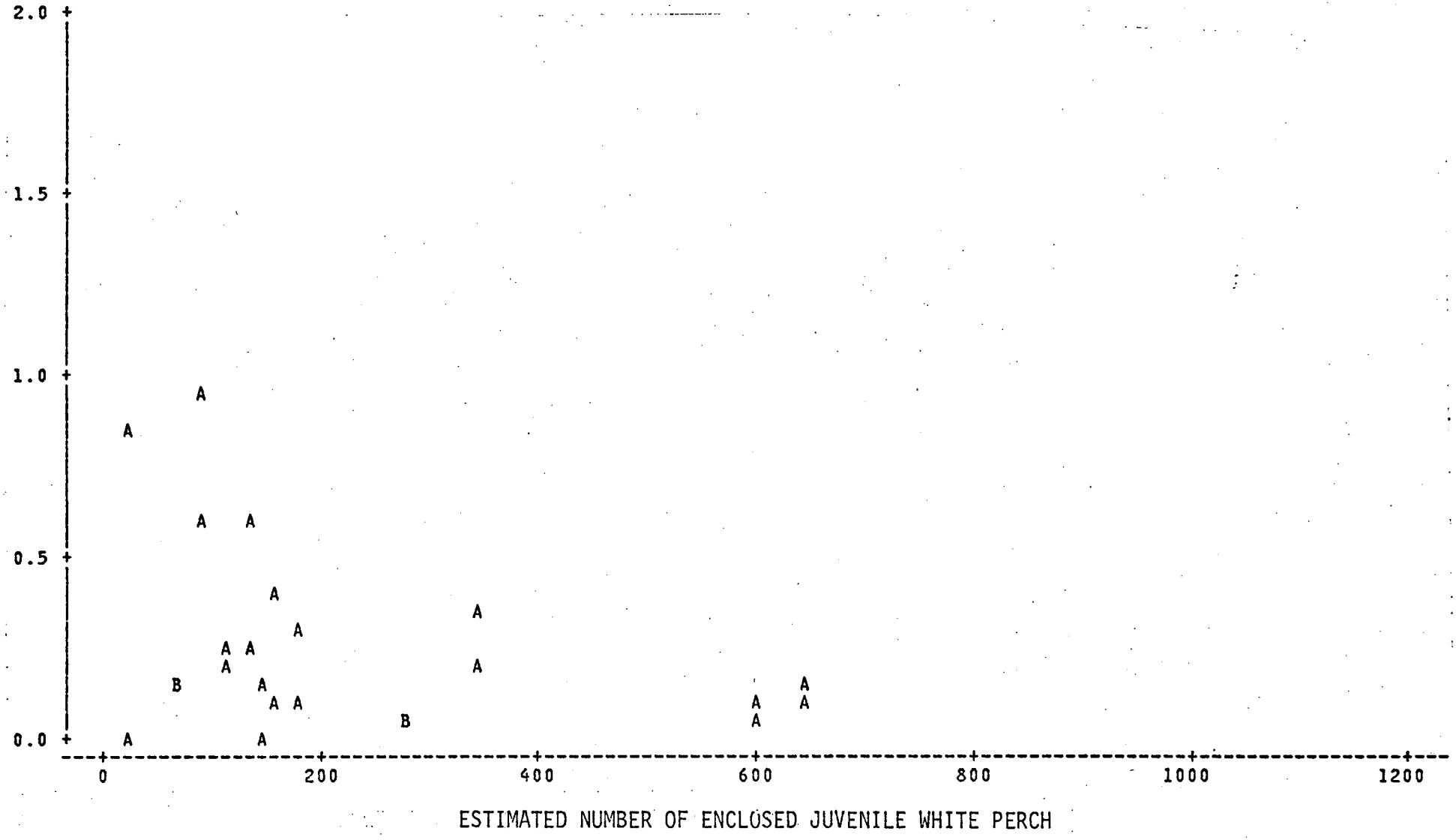


Figure E-4. Night Catch Efficiency for Juvenile White Perch in 100-ft Seine versus Estimated Number of Juvenile White Perch Enclosed in 500-ft Seine in 1978

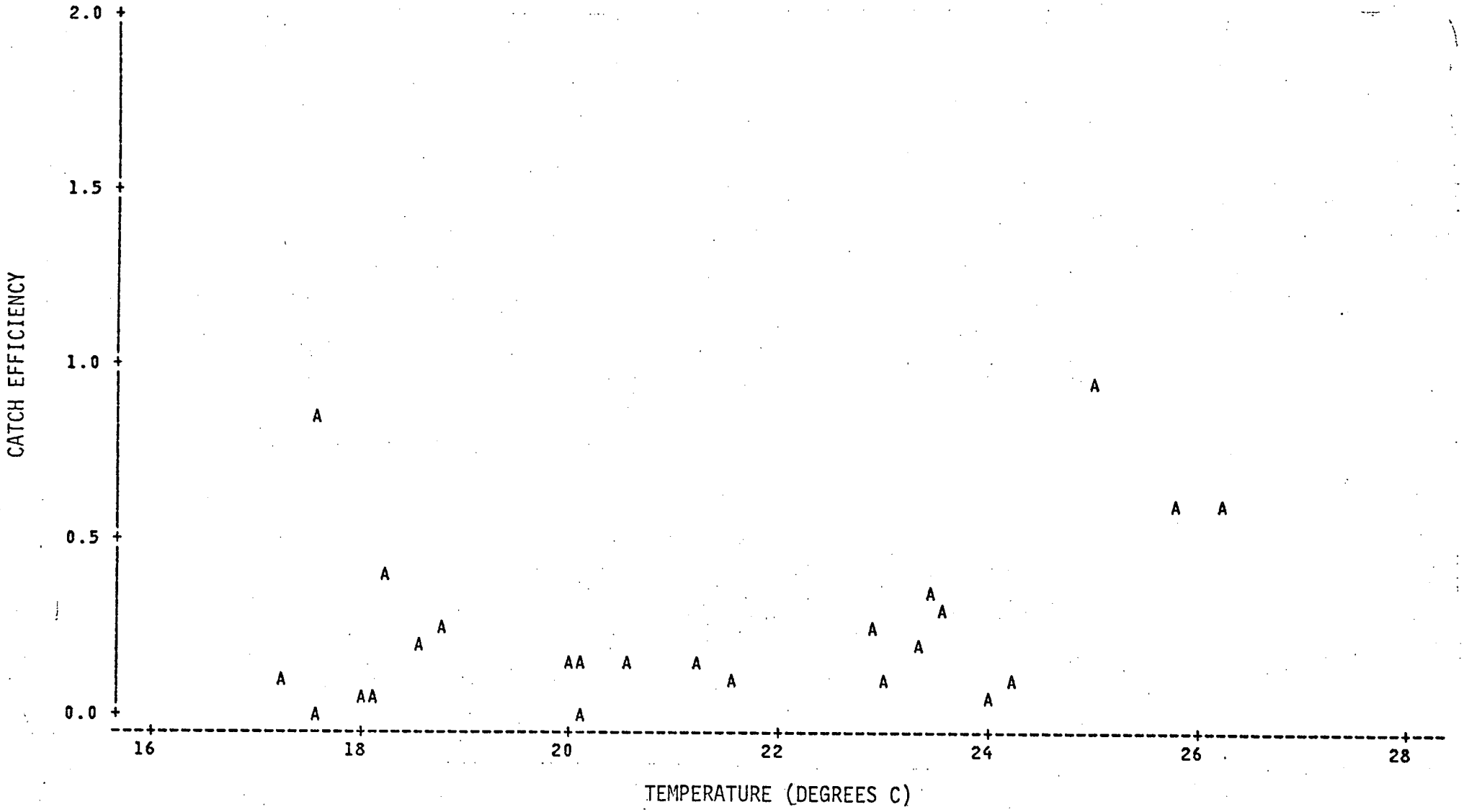


Figure E-5. Night Catch Efficiency of Juvenile White Perch in 100-ft Seine versus Water Temperature in 1978

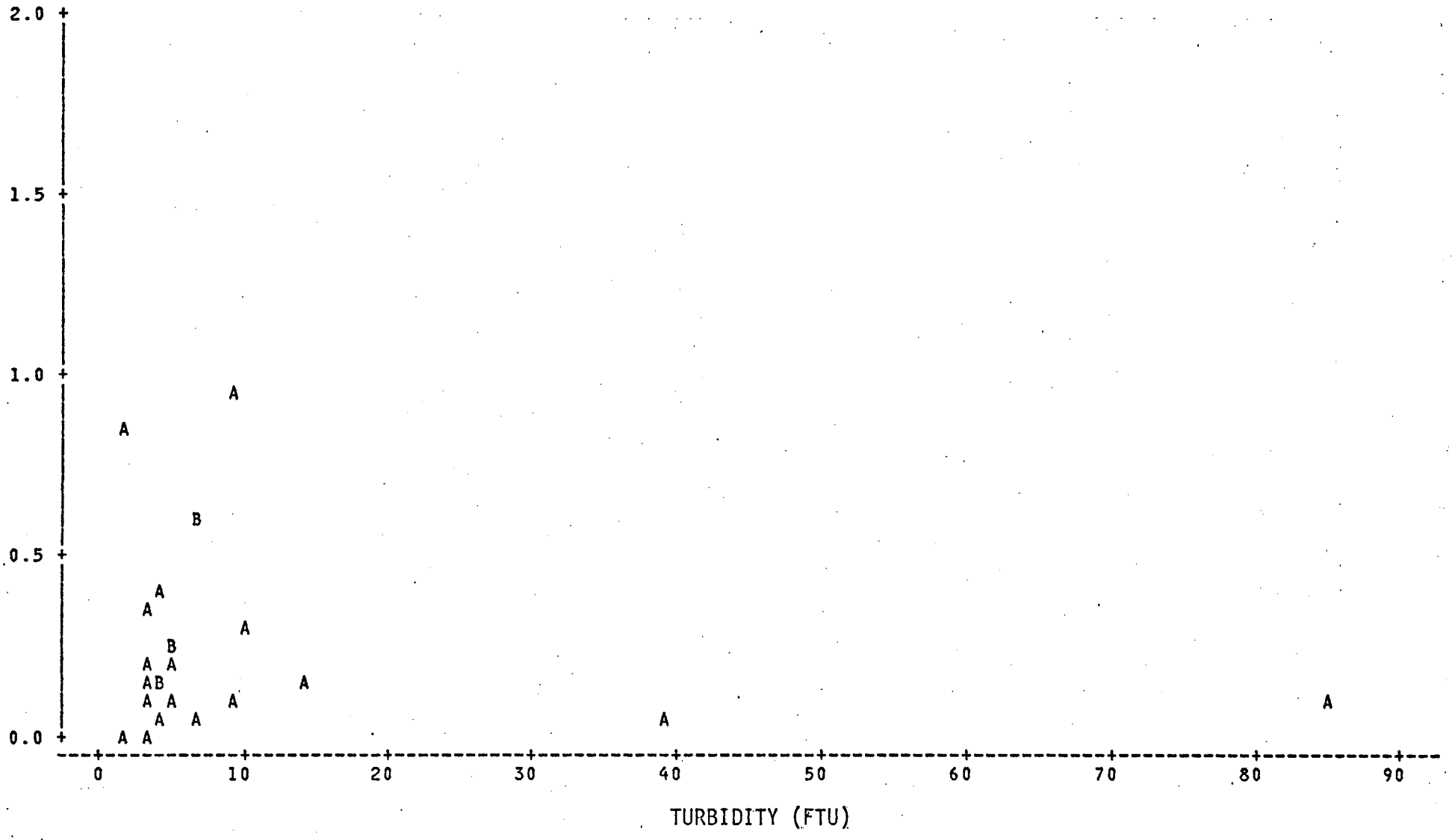


Figure E-6. Night Catch Efficiency of Juvenile White Perch in 100-ft Seine versus Turbidity in 1978

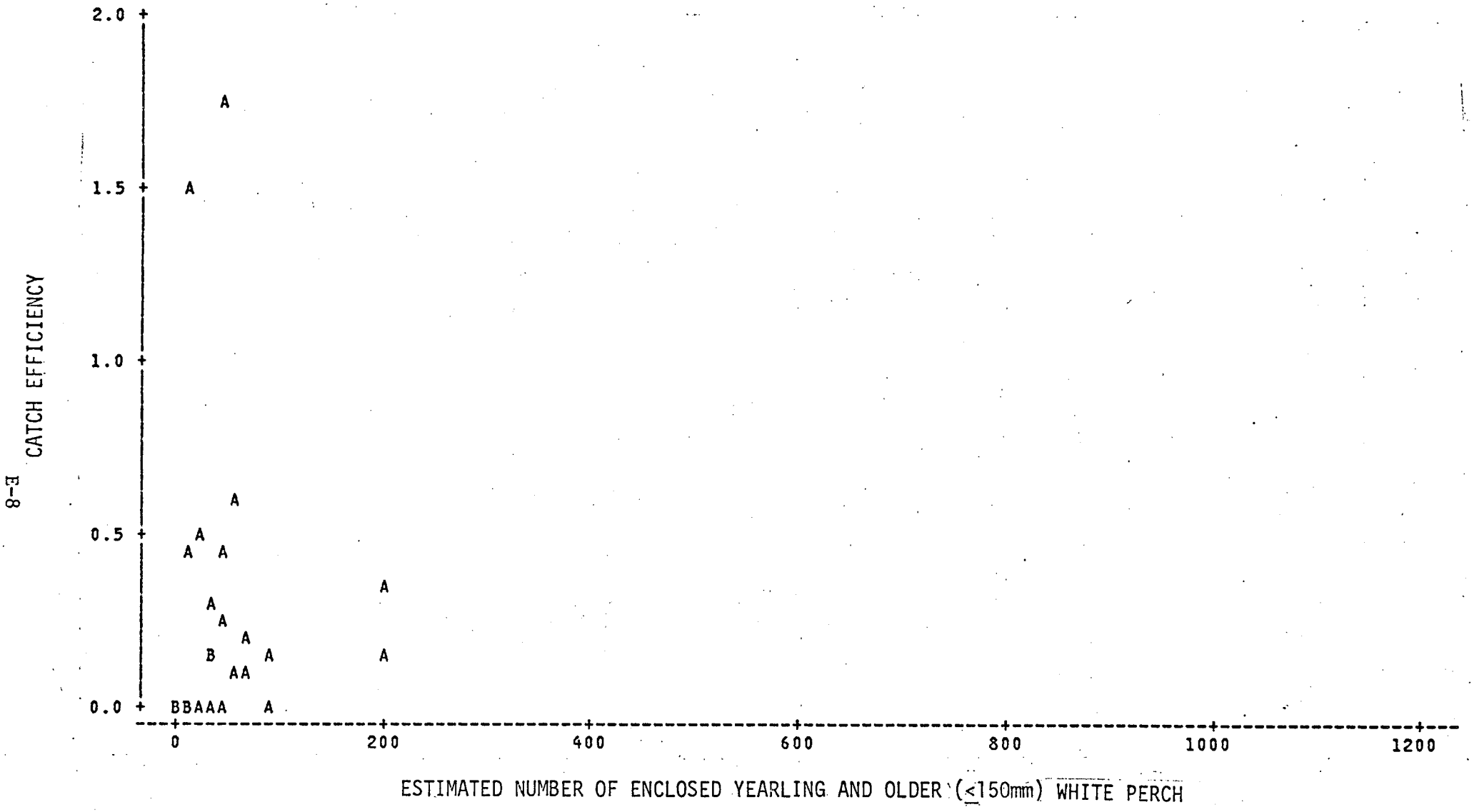


Figure E-7. Night Catch Efficiency for Yearling and Older (≤150mm) White Perch in 100-ft Seine versus Estimated Number of Yearling and Older (≤150mm) White Perch Enclosed in 500-ft Seine in 1978

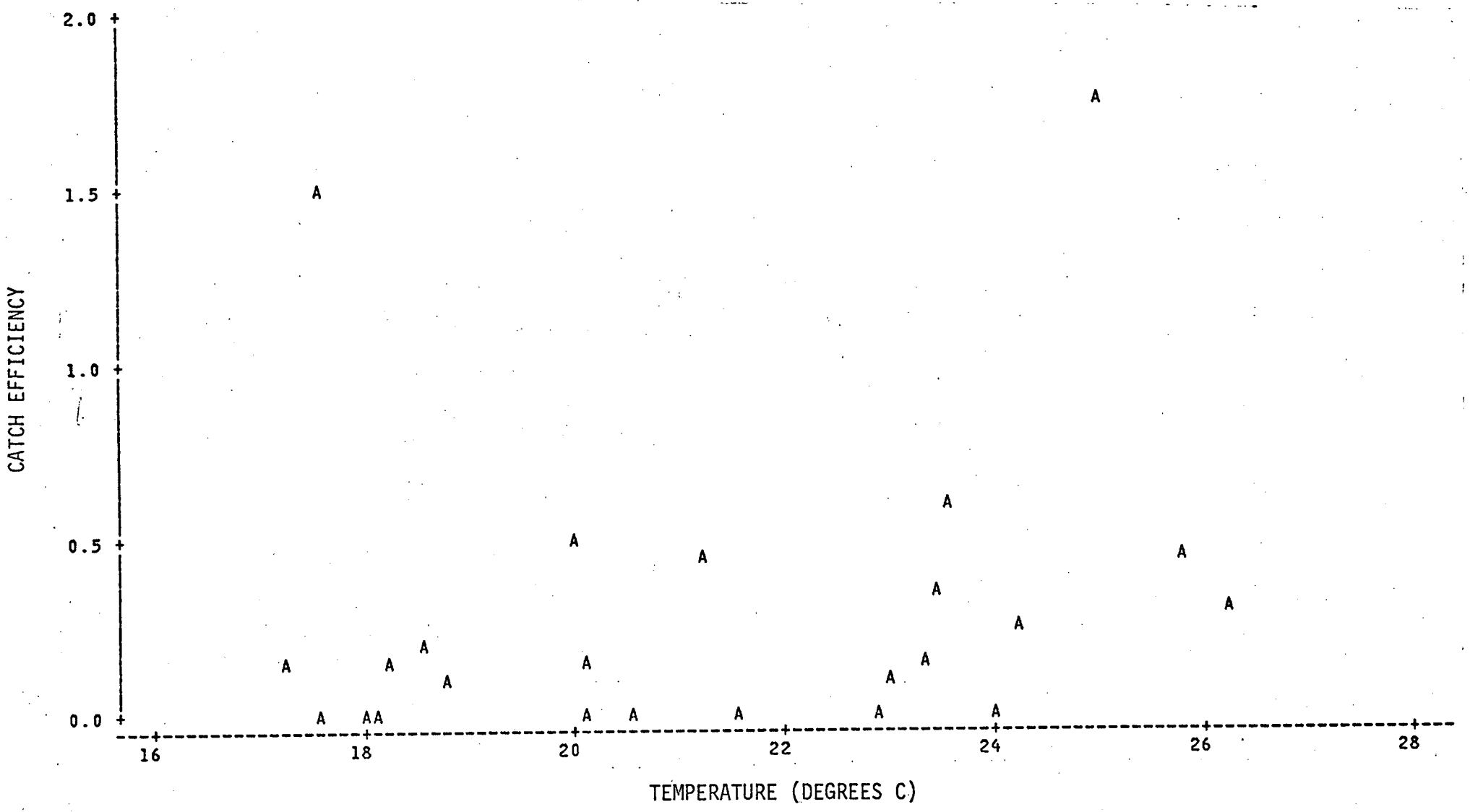


Figure E-8. Night Catch Efficiency of Yearling and Older (≤150mm) White Perch in 100-ft Seine versus Temperature in 1978

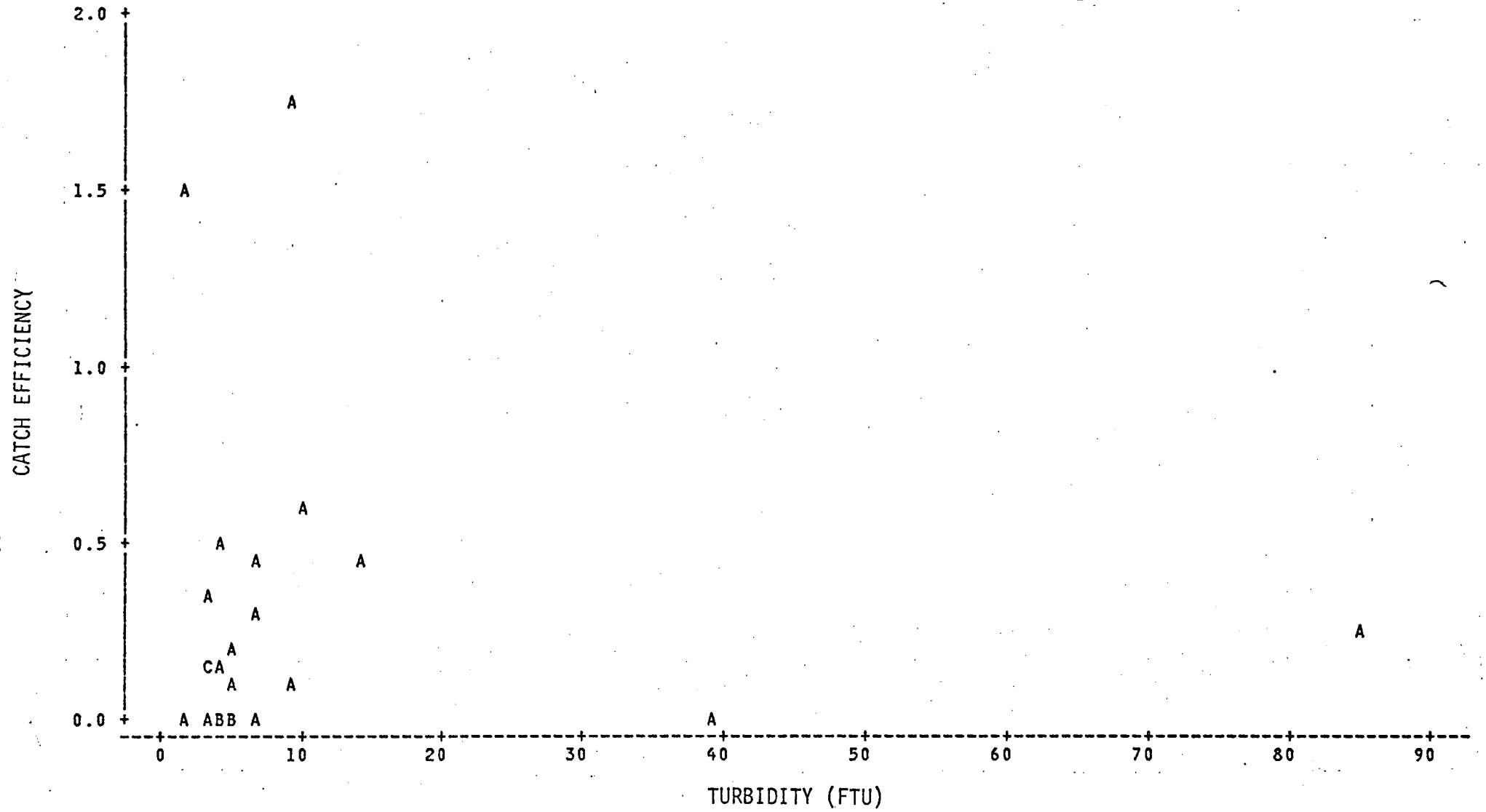


Figure E-9. Night Catch Efficiency of Yearling and Older (≤150mm) White Perch in 100-ft Seine versus Turbidity in 1978

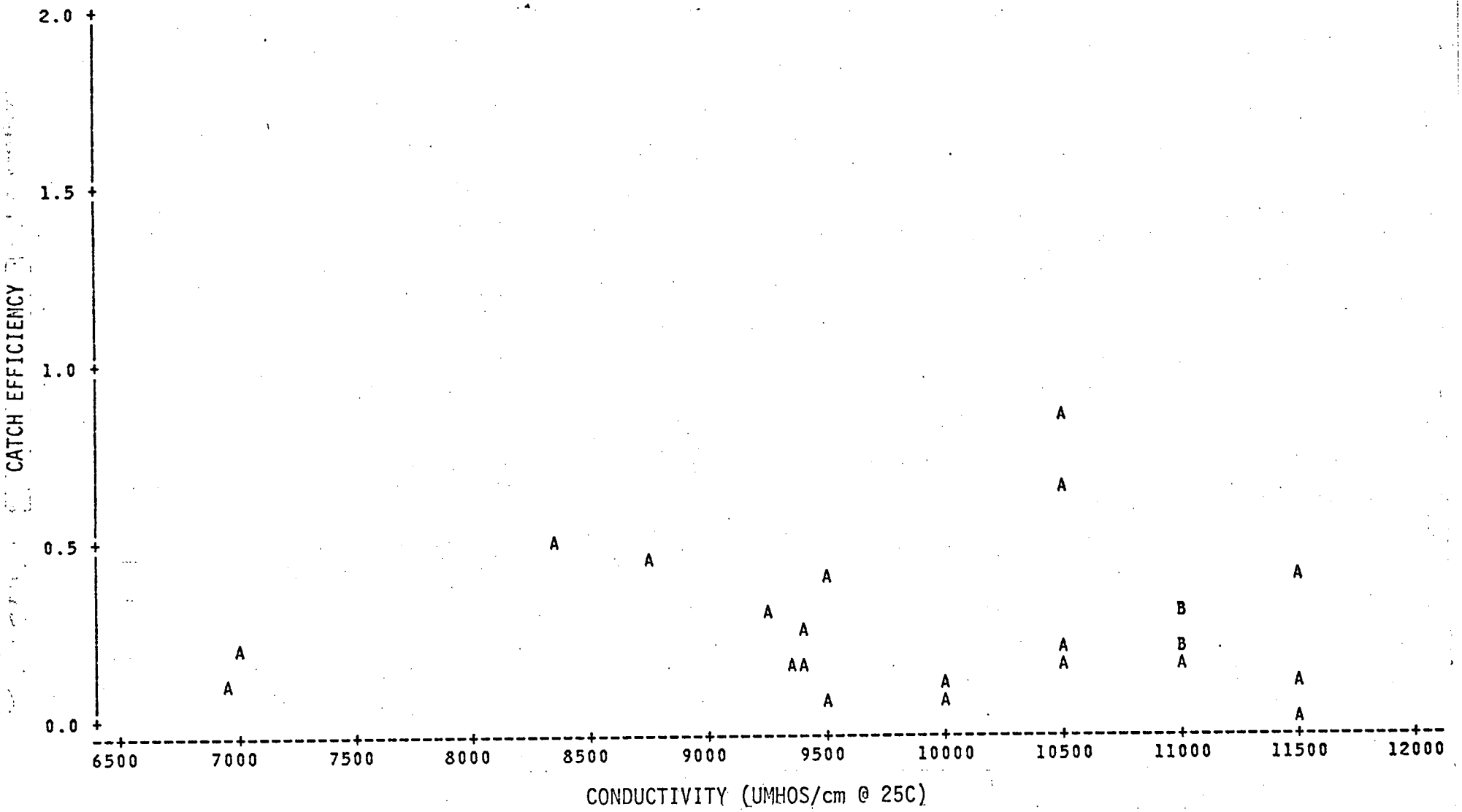


Figure E-10. Night Catch Efficiency of Juvenile Striped Bass in 100-ft Seine versus Conductivity in 1978

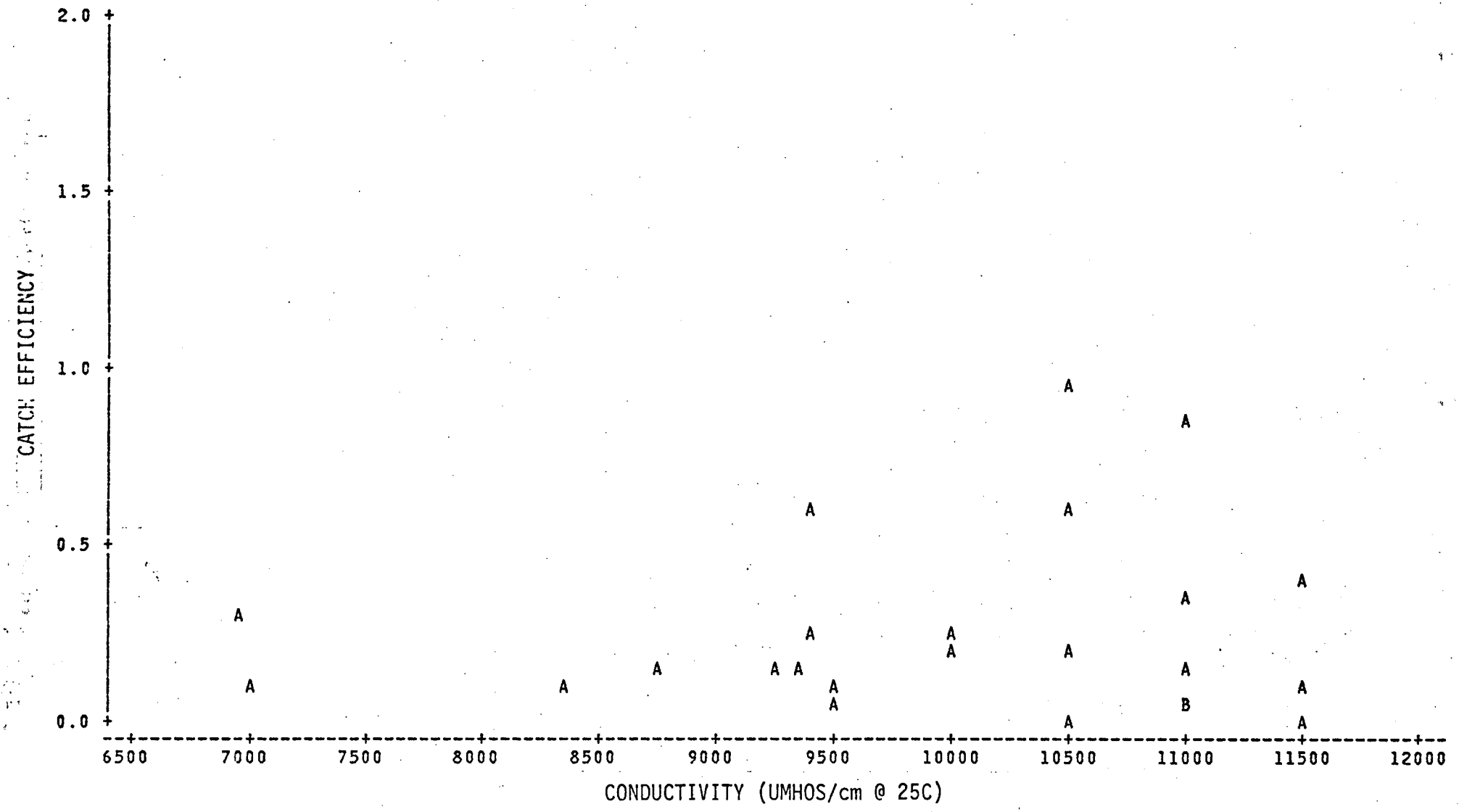


Figure E-11. Night Catch Efficiency of Juvenile White Perch in 100-ft Seine versus Conductivity in 1978

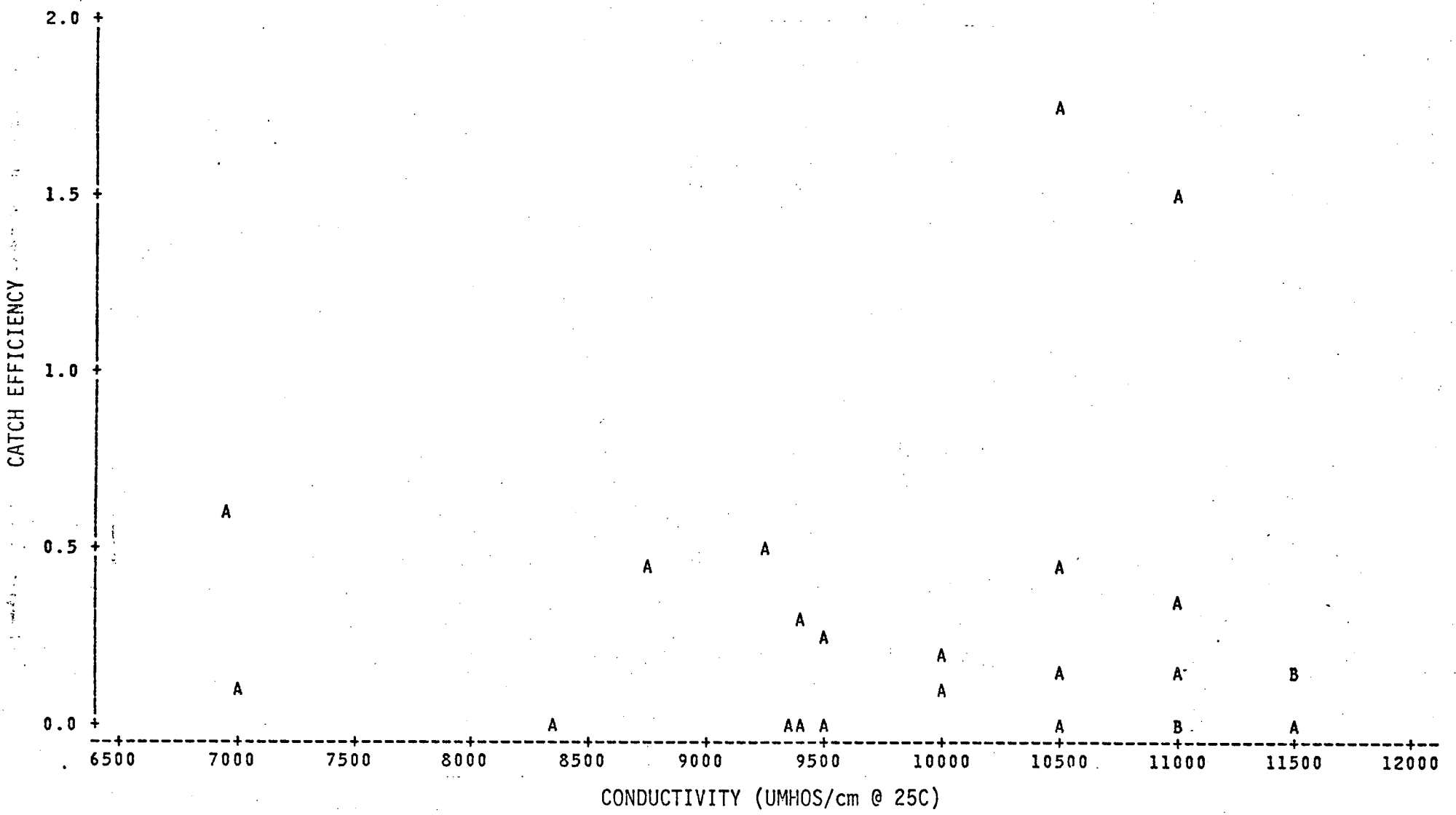


Figure E-12. Night Catch Efficiency of Yearling and Older (≤150mm) White Perch in 100-ft Seine versus Conductivity in 1978

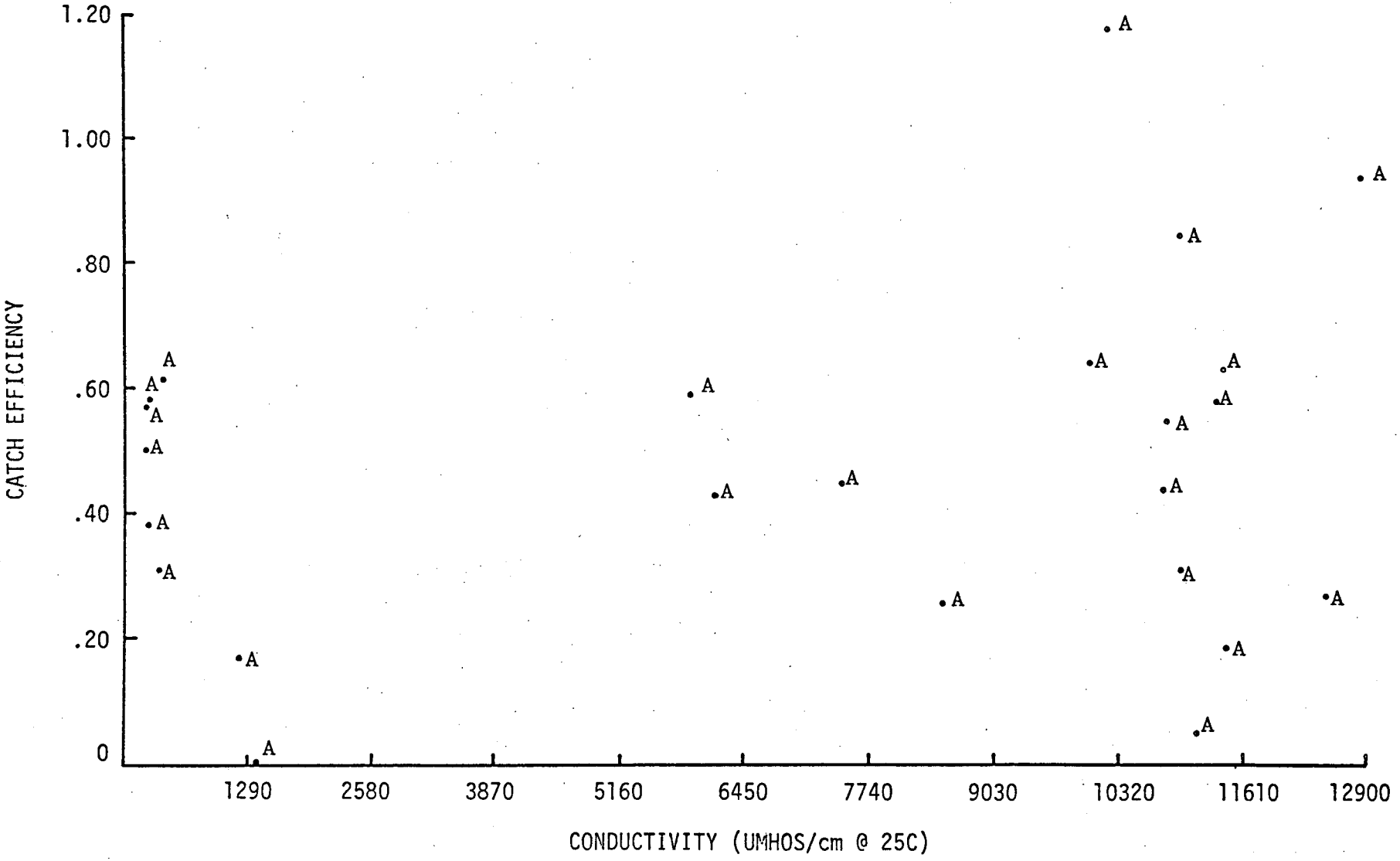


Figure E-13. Day Catch Efficiency of Juvenile Striped Bass in 100-ft Seine versus Conductivity in 1977

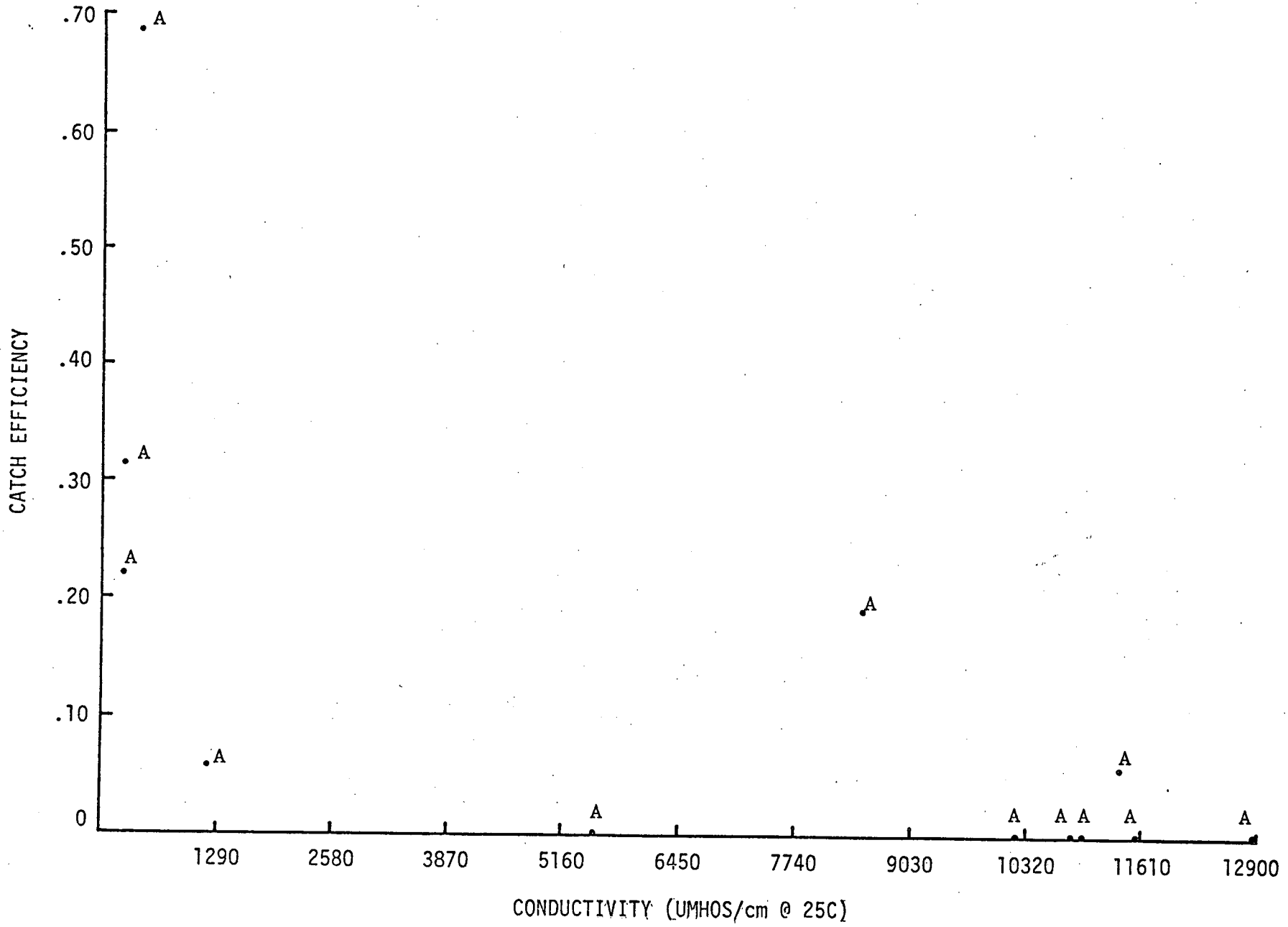


Figure E-14. Day Catch Efficiency of Juvenile White Perch in 100-ft Seine versus Conductivity in 1977

APPENDIX F

SUPPORTING DATA AND STATISTICAL TESTS

Table F-1

Analysis of Variance on Transformed†Catch Data of 100-ft Supplementary Night Beach Seines for Juvenile Striped Bass, Juvenile White Perch, and Yearling and Older (≤150mm) White Perch during 1978

Source of Variation	df	SS	MS	F	p
Juvenile Striped Bass:					
Weeks (Random)	2	0.03000	0.01500	2.669	0.090
Sites (Fixed)	3	0.04401	0.01467	2.046	0.209
Weeks x Sites	6	0.04302	0.00717	1.276	0.305
Error	24	0.13488	0.00562		
Total	35	0.25191			
Juvenile White Perch:					
Weeks (Random)	2	0.07900	0.03950	1.425	0.260
Sites (Fixed)	3	0.16701	0.05567	3.212	0.104
Weeks x Sites	6	0.10398	0.01733	0.625	0.708
Error	24	0.66504	0.02771		
Total	35	1.01503			
Yearling and Older(≤150mm) White Perch					
Weeks (Random)	2	4.28900	2.14450	3.704	0.040*
Sites (Fixed)	3	9.55299	3.18433	14.997	0.003*
Weeks x Sites	6	1.27398	0.21233	0.367	0.893
Error	24	13.89504	0.57896		
Total	35	29.01101			

df = degrees of freedom
SS = sum of the squares
MS = mean square
F = test statistic
p = probability of larger F
* = significant (α= 0.05)
†Z = $X^{-0.252}$: Juvenile Striped Bass
Z = $X^{-0.240}$: Juvenile White Perch
Z = $X^{-0.394}$: Yearling and Older (≤150mm) White Perch
(transformations were based on supplementary night beach seine catch data)

Table F-2

Estimated Number of Juvenile Striped Bass Enclosed in 500-ft Seine in 1978

Week	Test Sites				Week Totals
	Sand Bar	Croton Park	Quarry	Vet's Beach	
09/03-09	744	343	256	1144	2487
09/17-23	348	434	254	260	1296
10/01-07	320	248	183	218	969
Site Totals	1412	1025	693	1622	4752

Table F-3

Number of Marked Juvenile White Perch Recaptured in 500-ft Seine Sample/Number of Juvenile White Perch Marked from Each 100-ft Seine Sample in 1978

Week	Test Sites							
	Sand Bar		Croton Park		Quarry		Vet's Beach	
	Tow 1	Tow 2	Tow 1	Tow 2	Tow 1	Tow 2	Tow 1	Tow 2
09/03-09	18/21	12/12	13/15	03/03	11/12	01/02	12/13	04/05
09/17-23	03/04	00/00	01/02	01/02	10/15	08/09	02/06	00/03
10/01-07	09/10	02/03	03/03	00/00	02/03	01/02	04/05	02/04

Table F-4

Estimated Number of Juvenile White Perch Enclosed in 500-ft Seine in 1978

Week	Test Sites				Week Totals
	Sand Bar	Croton Park	Quarry	Vet's Beach	
09/03-09	339	93	600	129	1161
09/17-23	141	72	641	176	1030
10/01-07	152	21	283	112	568
Site Totals	632	186	1524	417	2759

Table F-5

Number of Marked Yearling and Older (≤150mm) White Perch Recaptured in 500-ft Seine Sample/Number of Yearling and Older (≤150mm) White Perch Marked from Each 100-ft Seine Sample in 1978

Week	Test Sites							
	Sand Bar		Croton Park		Quarry		Vet's Beach	
	Tow 1	Tow 2	Tow 1	Tow 2	Tow 1	Tow 2	Tow 1	Tow 2
09/03-09	09/12	04/05	11/12	00/01	02/02	00/00	01/02	00/00
09/17-23	02/02	00/00	00/00	01/02	01/01	00/00	03/06	00/01
10/01-07	01/01	00/01	02/02	00/00	00/00	00/00	01/01	01/01

Table F-6

Estimated Number of Yearling and Older (≤150mm) White Perch Enclosed in 500-ft Seine in 1978

Week	Test Sites				Week Totals
	Sand Bar	Croton Park	Quarry	Vet's Beach	
09/03-09	205	41	48	37	331
09/17-23	87	23	13	61	184
10/01-07	37	8	2	68	115
Site Totals	329	72	63	166	630

Table F-7

Results of Wilcoxon Signed Rank Test for Equality of Recapture Rates for Fish Marked in First and Second 100-ft Seine Tows in 1978

Equality of Recapture Rates			
Species	n	T^+	*p
Juvenile Striped Bass	12	41.5	>0.85
Juvenile White Perch	12	35.0	>0.16
Yearling and Older (≤150mm) White Perch	12	9.0	>0.25

n = the number of paired observations

T^+ = test statistic

$$T^+ = \sum_{i=1}^{n} R_i \Psi_i$$

$R_i \Psi_i$ = positive signed rank

p = probability of obtaining a larger T^+

α = 0.05

*Two tailed test (H_0:$Tow_1 = Tow_2$)

Table F-8

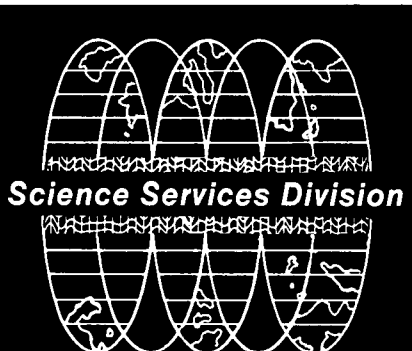
Number of Total Length Measurements Taken from Tow 1 and Tow 2 (Night Beach Seine Efficiency Tests) for Juvenile Striped Bass and White Perch in 1978

	Tow 1	Tow 2
Juvenile Striped Bass:		
09/03-09	61	49
09/17-23	32	36
10/01-07	28	7
Juvenile White Perch:		
09/03-09	54	20
09/17-23	16	9
10/01-07	18	5

Table F-9

Number of Marked Juvenile Striped Bass Recaptured in 500-ft Seine Sample/Number of Juvenile Striped Bass Marked from Each 100-ft Seine Sample in 1978

Week	Test Sites							
	Sand Bar		Croton Park		Quarry		Vet's Beach	
	Tow 1	Tow 2	Tow 1	Tow 2	Tow 1	Tow 2	Tow 1	Tow 2
09/03-09	10/26	17/23	43/47	13/16	11/13	01/01	33/48	18/27
09/17-23	15/17	08/09	05/10	11/21	12/13	13/16	00/05	04/08
10/01-07	21/21	04/05	06/11	00/01	02/02	01/03	00/01	02/04



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