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A REPORT ON
THE SALEM NUCLEAR GENERATING STATION
ARTIFICIAL ISLAND, SALEM COUNTY, NEW JERSEY

Second Supplement to
Section 316(a) Demonstration, Type 3
(Dated September 18, 1974)

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PUBLIC SERVICE ELECTRIC AND GAS COMPANY
80 Park Place
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February 3, 1978

A REPORT ON
THE SALEM NUCLEAR GENERATING STATION,
ARTIFICIAL ISLAND, SALEM COUNTY, NEW JERSEY

Second Supplement to Section 316(a), Demonstration Type 3
(dated September 18, 1974)

Presented in response to comments by
the U.S. Environmental Protection Agency, Region II
(dated March 3, 1976)

Public Service Electric and Gas Company
80 Park Place
Newark, New Jersey 07101

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ARTIFICIAL ISLAND, SALEM COUNTY, NEW JERSEY

Concern A

Response to EPA Region II concern regarding attraction of fishes to the S.N.G.S. thermal plume and the potential for cold shock.

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CONCERN A

Both the F&WS and EPA have expressed concern regarding the attraction of fish to the thermal plume and the potential for cold shock resulting from station outage during winter months.

It is anticipated that Salem, Unit 1 will operate continuously through the remaining portion of the winter of 1977-78, and through most of the winter of 1978-79. The next scheduled outage is February 19, 1979 for maintenance or fuel reloading of Unit 1. Unit 2 is expected to have its initial core loading in February 1979, with commercial service anticipated in May 1979.

Based on the requirements of the Environmental Technical Specification 2.1.3.1., during normal shutdown, the rate of discharge temperature change shall not exceed 8 F per hour. If this specification is exceeded, the rate of reduction of plant power level shall be reduced such that the rate of change of discharge temperature is within this specification. This limitation may be exceeded for a brief period as necessary to protect plant equipment and for certain safeguard operations which cannot be limited or negated by plant operation. The safeguard operations include the automatic plant trips and compliance with the Safety Technical Specifications.

When both units are operational they shall not intentionally be shutdown concurrently during the period of November through April. This specification is not applicable if the shutdown is required to protect the health and safety of the public or for compliance with the Safety Technical Specifications.

The information found below relates directly to one unit operation. It is expected that when Unit 2 becomes operational the effects of

cold shock will be absent or negligible since the probability of simultaneous two unit shutdown is low.

Particular concern has been expressed for white perch, Morone americana, and striped bass, Morone saxatilis. EPA has also requested that consideration be given to other fishes which may be attracted to the plume as a result of their preference for temperatures above ambient during fall, winter, and spring. In previous submittals the mummichog, Fundulus heteroclitus; Atlantic silverside, Menidia menidia; and the hogchoker, Trinectes maculatus; were identified as fishes which would be expected near S.N.G.S. during the winter (Schuler et al. 1975). Other fishes which may be present during spring and/or fall include blueback herring, Alosa aestivalis; alewife, Alosa pseudoharengus; American shad, Alosa sapidissima; Atlantic menhaden, Brevoortia tyrannus; bay anchovy, Anchoa mitchilli; weakfish, Cynoscion regalis; and spot, Leiostomus xanthurus.

The incidence of cold shock is dependent upon occurrence (and, practically, abundance) of fishes near the plant during low ambient temperatures, and their ability to remain in the plume long enough to acclimate. Ecological studies indicate that abundance of fishes near Artificial Island is lowest during winter, the period of lowest ambient water temperatures (Tables 1-7). It is probable that the area in the vicinity of the discharge jet will be physically denied to fishes as the velocities encountered will exceed their maximum sustained swim speed. For the purposes of this document, maximum sustained swim speed for the size classes of the species considered is 1.5 fps (Tatham 1971). It is doubtful that fishes would be able to maintain themselves inside the 8 F (4 C) isotherm where discharge velocity ranges from 1.5 fps to

a maximum of 10.0 fps at the point of discharge (ARL 1977). Tidal currents will further limit the time fishes will be able to remain in the warmest portion of the plume. Twice during each tidal cycle ambient current exceeds 1.5 fps for about 1.5 hours and reaches velocities greater than 3.0 fps (Table 8) for short periods (EG&G 1976a, 1976b, 1976c). Additionally, maximum sustained swim speed is reduced at low water temperatures, further reducing the ability of fishes to remain in the warmest areas of the plume (which have the highest discharge velocity) and become vulnerable to cold shock. Considering the low abundance of fishes during winter and probable physical exclusion from the warmest areas of the plume, the potential for cold shock is expected to be low.

Cold shock studies have been conducted since 1970 at salinities and acclimation temperatures pertinent to the S.N.G.S. area and plume. Procedures for collection and maintenance of these fishes and those employed in the cold shock tests are given in Appendix A.

Cold shock studies show that, with the possible exception of the Atlantic silverside, a sudden decrease to ambient from the maximum penetrable plume temperature ($\Delta T \geq 8$ F) will not result in significant mortality for any of these fishes. Cold shock might be expected for Atlantic silverside acclimated to the maximum penetrable plume ΔT when ambient temperature is 5 C (41 F) or lower. However, Atlantic silverside are generally not present in the study area at low temperatures as a result of seasonally low salinity (Tables 1-7). Additionally, it is an inshore species that, based on seine and trawl data, is taken infrequently and in relatively low numbers in the offshore area of the plume (Schuler 1971; Rhode and Schuler 1974a, 1974b, 1974c; Schuler and

Spangler 1976; Grieve, Beck, and Schuler 1977; Beck and Grieve 1978).

A problem common to all tolerance studies is utilizing the results to determine safe exposure levels. Although zero mortality is desirable, a small percentage in test situations can be tolerated considering the extrapolation from a small laboratory population to "real world" conditions. For purposes of this discussion cumulative mortalities of less than 30% in the test population over a 96-hour exposure are considered acceptable. Such levels do not exceed the maximum acceptable level of control mortality (20%) by more than 10%. Tests in which control mortality exceeded 20% were not considered in the evaluation. Based on test sample size (some tests had fewer than 10 fish) a 20% level was considered more appropriate than the arbitrary 10% control mortality exclusion level specified by Standard Methods (APHA 1975).

Species Discussion

Blueback herring: Temperature, salinity, and catch per unit effort data by month of capture for blueback herring near Artificial Island are presented in Tables 1 through 7, and Figure 1. It is potentially present during most of the year and has been collected during months when mean temperature ranged from 2.0 C (35.6 F, February 1974) to 26.8 C (80.2 F, August 1970). Abundance is generally greatest in spring (March-May) and again in late fall (November) over a temperature range of 5 C (41 F) to 20 C (68 F) (Fig. 1), the period when probability of cold shock is low.

The results of cold shock tests on blueback herring are given in Table 9. Tests were conducted at acclimation temperatures of 5.0 C (41.0 F) to 26.0 C (78.8 F). Cumulative mortalities over the 4-, 24-, 48-, 72-, and 96-hour periods are given in Table 10. Test Δ temperatures which resulted in 30% or greater cumulative mortality after a 96-hour exposure are plotted against respective acclimation temperatures in Figure 2. The relationship of these temperatures to a decrease from the maximum penetrable plume ΔT (8 F (4 C)) is also shown. Some mortality may occur should blueback herring experience a sudden 4 C decrease to ambients below 2 C (36 F). Any mortality as a result of cold shock would be expected only at ambient temperatures of or below 2 C. Hourly temperature data collected by the U.S.G.S. at Reedy Island from 1969 through 1976 show that mean daily temperatures of or below 2 C occurred periodically from December through March (Table 11). Within this period ambient temperature fluctuations of 0.5 C to 2.0 C were recorded regularly. Experimental results indicate that an increase in ambient temperature to 3 C (38 F) at the time of station outage would reduce potential for cold shock mortality of blueback herring.

Alewife: Temperature, salinity, and catch per unit effort data by month of capture for alewife near Artificial Island are presented in Tables 1 through 7, and Figure 3. It is potentially present during most of the year and has been collected during months when temperature ranged from 2.6 C (36.7 F; February 1972, January 1974) to 26.8 C (80.2 F, August 1970). Abundance is generally greatest in spring and early summer (March-June) and again in fall (November) over a temperature range of 5 C (41 F) to 24 C (75 F) (Fig. 3), the period when probability of cold shock is low.

The results of cold shock tests with alewife are given in Table 12. Tests were conducted at acclimation temperatures of 16.0 C (60.8 F) to 30.0 C (86.0 F). Cumulative mortalities over the 4-, 24-, 48-, 72-, and 96-hour test periods are given in Table 13. Test Δ temperatures which resulted in 30% or greater cumulative mortality over a 96-hour exposure are plotted against respective acclimation temperatures in Figure 4. Of 24 tests conducted with alewife, 7 resulted in greater than 30% mortality at 96 hours. Results at these temperatures relative to a 4 C (8 F) decrease from acclimation (also shown) indicate that no mortality will occur should alewife experience a sudden decrease from the maximum penetrable plume Δ T to ambient at any season.

American shad: Temperature, salinity, and catch per unit effort data by month of capture for American shad near Artificial Island are presented in Tables 1 through 7, and Figure 5. It is potentially present during much of the year (March-December) and has been collected during months when mean temperature ranged from 4.3 C (39.7 F, December 1974) to 26.8 C (80.2 F, August 1970). Abundance is generally greatest in spring

and early summer (March-June) and again in fall (October-November) over a temperature range of 6 C (43 F) to 15 C (59 F) (Fig. 5), the period when probability of cold shock is low. No American shad were taken in sampling during January or February from 1970 through 1976.

The results of cold shock tests with American shad are given in Table 14. Tests were conducted at acclimation temperatures of 5.0 C (41.0 F) to 25.0 C (77.0 F). Cumulative mortalities over the 4-, 24-, 48-, 72-, and 96-hour periods are given in Table 15. Test Δ temperatures which resulted in 30% or greater cumulative mortality over a 96-hour exposure are plotted against respective acclimation temperatures in Figure 6. Of 17 tests, 10 resulted in greater than 30% mortality at 96 hours. The results of these tests indicate that some mortality may occur should American shad experience a sudden 4 C decrease to ambients of or below 2 C (36 F). These conditions (ambient $\leq$ 2 C) may occur periodically from December through March (Table 11), a period when abundance is usually low.

Atlantic menhaden: Temperature, salinity, and catch per unit effort data by month of capture for Atlantic menhaden near Artificial Island are presented in Tables 1 through 7, and Figure 7. It is potentially present during much of the year (March-December) and has been collected during months when mean temperature ranged from 4.3 C (39.7 F, December 1974) to 26.8 C (80.2 F, August 1970). Abundance is generally greatest from spring (April) through fall (November) over a temperature range of 15 C (59 F) to 27 C (80 F) and salinity range of 4 to 10 ppt (Fig. 7), the period when probability of cold shock is low.

The results of cold shock tests with Atlantic menhaden are given in Table 16. Tests were conducted at acclimation temperatures of 5.0 C (41.0 F) to 27.5 C (81.5 F). Cumulative mortalities over the 4-, 24-, 48-, 72-, and 96-hour periods are given in Table 17. Test Δ temperatures which resulted in 30% or greater cumulative mortality over a 96-hour exposure are plotted against respective acclimation temperatures in Figure 8. Of 62 tests, 33 resulted in mortalities of 30% or more at 96 hours. The results of these tests indicate that some mortality may occur should Atlantic menhaden experience a sudden decrease from the maximum penetrable Δ T to ambients of or below 2 C (36 F). The one data point above the Δ 4 C line represents a test on 12 November 1974 in which Atlantic menhaden acclimated to 12 C (54 F) experienced 30% mortality after 72 hours when exposed to an average temperature of 9.9 C (50.0 F). However, in another test on the same group of fish beginning on the same date Atlantic menhaden experienced only 20% mortality after 72 hours when tested at an average temperature of 7.6 C (46.0 F). The 30% mortality at 9.9 C is assumed to be experimental error. Mortality of Atlantic menhaden would be expected only at ambient temperatures of or below 2 C (36 F). These conditions (ambient $\leq$ 2 C) may occur periodically from December through March (Table 11), a period when abundance is usually low. Should ambient temperature fluctuate to 4 C (39 F) or above during the exposure period the potential for cold shock mortality of Atlantic menhaden would be reduced.

Bay anchovy: Temperature, salinity, and catch per unit effort data by month of capture for bay anchovy near Artificial Island are presented

in Tables 1 through 7, and Figure 9. It is potentially present during most of the year and has been collected during months when mean temperature ranged from 1.4 C (34.5 F, January 1976) to 26.8 C (80.2 F, August 1970). Abundance is generally greatest from spring (April) through fall (November) when temperatures are greater than 10 C (50 F) (Fig. 9), the period when probability of cold shock is low.

The results of cold shock tests with bay anchovy are given in Table 18. Tests were conducted at acclimation temperatures of 5.0 C (41.0 F) to 29.0 C (84.2 F). Cumulative mortalities over the 4-, 24-, 48-, 72-, and 96-hour periods are given in Table 19. Test Δ temperatures which resulted in 30% or greater cumulative mortality over a 96-hour exposure are plotted against respective acclimation temperatures in Figure 10. Of 79 tests, 51 resulted in 30% or greater mortality at 96 hours. The results of these tests indicate that some mortality may occur should bay anchovy experience a sudden 4 C decrease to ambients of or below 4 C (39 F). These conditions ($\text{ambient} \leq 4 \text{ C}$) may occur periodically from December through March (Table 11), a period when abundance of bay anchovy is usually low.

Mummichog: Temperature, salinity, and catch per unit effort data by month of capture for mummichog near Artificial Island are presented in Tables 1 through 7. Only one specimen has been taken by trawl (May 1971) from 1970 through 1976. Mummichog is an inshore species taken principally by seine and is not expected to occur in the offshore area of the plume (Schuler 1971; Rhode and Schuler 1974a, 1974b, 1974c; Schuler and Spangler 1976; Grieve, Beck, and Schuler 1977; Beck and Grieve 1978).

The results of cold shock tests with mummichog are given in Table 20. Tests were conducted at acclimation temperatures of 2.0 C (36.0 F) to 27.0 C (81.0 F). Cumulative mortalities over the 4-, 24-, 48-, 72-, and 96-hour periods are given in Table 21. Cumulative mortality of 30% or greater over a 96-hour exposure occurred only when mummichog was suddenly exposed to 3.0 C (37.4 F) when acclimated to 27.0 C (80.6 F) (Fig. 11). Test results indicate that no cold shock mortality will occur with mummichog at any season.

Atlantic silverside: Temperature, salinity, and catch per unit effort data by month of capture for Atlantic silverside near Artificial Island are presented in Tables 1 through 7. From 1970 through 1976 abundance in offshore areas was low. Annually, more than 99% of the catch of this fish near S.N.G.S. was taken with beach seines (Schuler 1971; Rhode and Schuler 1974a, 1974b, 1974c; Schuler and Spangler 1976; Grieve, Beck, and Schuler 1977; Beck and Grieve 1978). It is principally associated with the shore zone and is taken infrequently and in low numbers in the offshore area of the plume. It has been collected offshore during months when mean temperature ranged from 2.0 C (35.6 F, February 1974) to 26.8 C (80.2 F, August 1970).

The results of cold shock tests with Atlantic silverside are given in Table 22. Tests were conducted at acclimation temperatures of 5.0 C (41.0 F) to 30.0 C (86.0 F). Cumulative mortalities over the 4-, 24-, 48-, 72-, and 96-hour periods are given in Table 23. Test Δ temperatures which resulted in 30% or greater cumulative mortality over a 96-hour exposure are plotted against respective acclimation temperatures in Figure 12. Of 166 tests, 86 resulted in greater than

30% mortality at 96 hours. The results of these tests indicate that some mortality of Atlantic silverside may occur at a sudden 4 C decrease to ambients below 8 C (46 F) and at a sudden 3 C decrease to ambients below 6 C (43 F). However, a decrease of more than 4 C to ambients of or below 2 C (36 F) did not always result in mortality. In one test, a sudden decrease from 8 C (46 F) to 2 C resulted in zero mortality. In another, a sudden decrease from 9.0 C (48.2 F) to 1.5 C (34.7 F) also resulted in no mortality. It is likely that a sudden 4 C decrease to ambients of 2 C and below would be detrimental to Atlantic silverside, but test results do not uniformly support this conclusion. Perhaps of more importance, results of salinity tolerance tests with Atlantic silverside (Fig. 13) show that salinities below 4 ppt would not be tolerated when ambients are 8 C (46 F) or lower. Since salinities near Artificial Island average 2.3 ppt when river temperatures are 8 C or below, Atlantic silverside would not be abundant either inshore or offshore during such periods and hence not exposed to the S.N.G.S. plume.

White perch: Temperature, salinity, and catch per unit effort data by month of capture for white perch near Artificial Island are presented in Tables 1 through 7, and Figure 14. It has been collected throughout the year over the range of ambient temperature. Abundance is generally greatest in spring and early summer (March-June) and again in fall (September-November) over a temperature range of 5 C (41 F) to 24 C (75 F) (Fig. 14), the period when potential for cold shock is low.

The results of cold shock tests with white perch are given in Table 24. Tests were conducted at acclimation temperatures of 5.0 C

(41.0 F) to 30.0 C (86.0 F). Cumulative mortalities over the 4-, 24-, 48-, 72-, and 96-hour periods are given in Table 25. Test Δ temperatures which resulted in 30% or greater cumulative mortality over a 96-hour exposure are plotted against respective acclimation temperatures in Figure 15. Of 59 tests, 4 resulted in greater than 30% mortality at 96 hours. The results of these tests indicate that no cold shock mortality would occur should white perch experience a sudden decrease from the maximum penetrable plume Δ T to ambient at any season.

Striped bass: Temperature, salinity, and catch per unit effort data by month of capture for striped bass near Artificial Island are presented in Tables 1 through 7, and Figure 16. It is potentially present during most of the year and has been collected during months when mean temperature ranged from 1.9 C (35.4 F, March 1971) to 26.8 C (80.2 F, August 1970). However, striped bass catch has regularly been low during December through April.

The results of cold shock tests with striped bass are given in Table 26. Tests were conducted at acclimation temperatures of 4.0 C (39.2 F) to 28.0 C (82.4 F). Cumulative mortalities over the 4-, 24-, 48-, 72-, and 96-hour periods are given in Table 27. Test Δ temperatures which resulted in 30% or greater cumulative mortality over a 96-hour exposure are plotted against respective acclimation temperatures in Figure 17. Of 17 tests, two resulted in greater than 30% mortality at 96 hours. The results of these tests indicate that no cold shock mortality would occur should striped bass experience a sudden decrease from the maximum penetrable plume Δ T to ambient at any season.

Weakfish: Temperature, salinity, and catch per unit effort data by month of capture for weakfish near Artificial Island are presented in Tables 1 through 7, and Figure 18. It has been captured from April through November when mean monthly temperature ranged from 7.8 C (46.0 F, April 1975) to 26.8 C (80.2 F, August 1970). Abundance is generally greatest from early summer (June) through fall (November) over a temperature range of 10 C (50 F) to 26 C (79 F) (Fig. 18), the period when potential for cold shock is low. No weakfish were taken in sampling during December through March from 1970 through 1976.

The results of cold shock tests with weakfish are given in Table 28. Tests were conducted at acclimation temperatures of 16.0 C (60.8 F) to 30.0 C (86.0 F). Cumulative mortalities over the 4-, 24-, 48-, 72-, and 96-hour periods are given in Table 29. Test Δ temperatures which resulted in 30% or greater cumulative mortality over a 96-hour exposure are plotted against respective acclimation temperatures in Figure 19. Of 26 tests, 22 resulted in greater than 30% mortality at 96 hours. The results of these tests indicate that no cold shock mortality would occur should weakfish experience a sudden decrease from the maximum penetrable plume Δ T to ambient at any season.

Spot: Temperature, salinity, and catch per unit effort data by month of capture for spot near Artificial Island are presented in Tables 1 through 7, and Figure 20. It is potentially present during much of the year (March-December) and has been collected during months when mean temperature ranged from 5.1 C (41.2 F, December 1973) to 26.8 C (80.2 F, August 1970). Abundance is generally greatest from early summer (June) through fall (November) over a temperature range of

10 C (50 F) to 24 C (75 F) (Fig. 20), the period when potential for cold shock is low.

The results of cold shock tests with spot are given in Table 30. Tests were conducted at acclimation temperatures of 6.0 C (42.8 F) to 28.0 C (82.4 F). Cumulative mortalities over the 4-, 24-, 48-, 72-, and 96-hour periods are given in Table 31. Test Δ temperatures which resulted in 30% or greater cumulative mortality over a 96-hour exposure are plotted against respective acclimation temperatures in Figure 21. Of 66 tests on spot, 34 resulted in greater than 30% mortality at 96 hours. The results of these tests indicate that some cold shock mortality may occur should spot experience a sudden 4 C decrease to an ambient of 2 C (36 F). These conditions (ambient $\leq$ 2 C) may occur periodically from December through March (Table 11), a period when abundance is usually low. Experimental results indicate that a fluctuation in river temperature to 3 C (37 F) will reduce potential for cold shock mortality of spot.

Hogchoker: Temperature, salinity, and catch per unit effort data by month of capture for hogchoker near Artificial Island are presented in Tables 1 through 7, and Figure 22. It is present throughout the year and has been collected during months when mean temperature ranged from 1.4 C (34.5 F, January 1976) to 26.8 C (80.2 F, August 1970). Abundance is generally greatest from spring (April) through fall (November) over a temperature range of 5 C (41 F) to 24 C (75 F) (Fig. 22), the period when probability of cold shock is low.

The results of cold shock tests with hogchoker are given in Table 32. Tests were conducted at acclimation temperatures of 6.5 C

(43.7 F) to 26.0 C (78.8 F). Cumulative mortalities over the 4-, 24-, 48-, 72-, and 96-hour periods are given in Table 33. Test Δ temperatures which resulted in 30% or greater cumulative mortality over a 96-hour exposure are plotted against respective acclimation temperatures in Figure 23. In only one test, which featured a temperature drop from 26.0 C (78.8 F) to ambient of 2.0 C (35.6 F), did hogchoker experience greater than 30% mortality at 96 hours. Test results indicate that no mortality will occur should hogchoker experience a sudden decrease from the maximum penetrable plume Δ T to ambient at any season.

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Table 1. - Monthly mean catch per unit effort of fishes taken by 16-ft trawl¹ in zones east and west of the shipping channel and in all zones (total) near the Salem Nuclear Generating Station, New Jersey, 1970.

		Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Temp. (C)	max.			7.0	14.5	19.8	24.6	29.5	28.0	26.5	20.0	11.0	10.0
	min.			3.5	5.0	14.5	22.2	24.5	25.5	23.5	16.5	10.3	9.0
	$\bar{X}$			5.9	10.1	16.1	23.1	26.3	26.8	24.6	18.0	10.6	9.4
Salinity (ppt)	max.			9.0	6.5	5.0	9.3	11.3	11.6	14.5	10.5	11.0	4.0
	min.			5.0	0.0	0.0	1.0	1.0	2.5	4.2	2.5	1.0	0.0
	$\bar{X}$			7.4	1.3	2.0	3.7	5.1	6.1	7.1	5.7	4.6	1.0
Blueback herring	west			NS	0.7	0.6	0.2	1.8	0.9	0.0	*	NS	1.1
	east			0.2	0.3	0.1	5.2	0.1	*	0.0	0.0	10.5	2.5
	total			0.2	0.6	0.3	3.5	0.6	0.1	0.0	*	10.5	1.4
Alewife	west			NS	0.6	0.0	12.7	4.1	7.7	0.6	1.5	NS	3.3
	east			0.6	0.3	0.4	2.1	2.2	0.4	1.3	0.8	7.4	1.5
	total			0.6	0.5	0.2	5.7	2.7	2.5	1.0	1.1	7.4	2.8
American shad	west			NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	0.0
	east			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	total			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Atlantic menhaden	west			NS	0.0	0.0	0.0	0.1	*	0.0	0.1	NS	0.1
	east			0.0	0.0	0.0	*	0.1	*	*	0.1	0.1	0.0
	total			0.0	0.0	0.0	*	0.1	*	*	0.1	0.1	0.1
Bay anchovy	west			NS	0.0	3.5	25.3	54.8	39.3	66.6	25.7	NS	0.3
	east			0.0	0.0	12.5	8.9	88.4	21.1	29.3	34.3	10.9	7.5
	total			0.0	0.0	9.0	14.4	78.7	26.4	40.7	30.7	10.9	1.9
Mummichog	west			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	east			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	total			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Atlantic silverside	west	No Sample	No Sample	NS	0.0	0.0	*	0.0	0.0	0.1	0.0	NS	0.0
	east			0.0	0.0	0.0	*	0.0	0.2	0.0	0.0	0.0	0.0
	total			0.0	0.0	0.0	*	0.0	0.1	*	0.0	0.0	0.0
White perch	west			NS	14.5	9.7	24.1	14.9	1.9	0.4	25.6	NS	34.9
	east			2.6	5.0	7.2	24.8	6.0	0.3	0.1	0.8	13.1	2.0
	total			2.6	12.2	8.2	24.6	10.3	0.7	0.2	11.1	13.1	27.6
Striped bass	west			NS	0.2	0.2	1.1	0.5	1.5	0.0	0.3	NS	1.0
	east			0.2	0.0	0.0	0.3	0.1	0.1	0.9	0.2	0.3	0.5
	total			0.2	0.2	0.1	0.5	0.3	0.5	0.3	0.2	0.3	0.9
Weakfish	west			NS	0.0	0.0	15.1	67.3	14.5	5.2	4.7	NS	0.0
	east			0.0	0.0	0.0	10.2	86.8	11.6	3.6	2.6	0.1	0.0
	total			0.0	0.0	0.0	11.9	91.1	12.4	3.9	3.5	0.1	0.0
spot	west			NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	0.0
	east			0.0	0.0	0.0	0.0	0.8	*	0.0	0.0	0.0	0.0
	total			0.0	0.0	0.0	0.0	0.0	*	0.0	0.0	0.0	0.0
Hogchoker	west			NS	19.3	10.2	2.8	14.9	14.9	1.7	5.1	NS	85.7
	east			0.0	4.3	19.1	6.2	4.9	2.5	3.6	3.3	1.4	0.0
	total			0.0	15.9	25.6	5.1	7.7	6.1	2.7	4.0	1.4	66.7

¹ 10-minute haul

* 0.0 < n/T ≤ 0.05

Table 2. - Monthly mean catch per unit effort of fishes taken by 16-ft trawl¹ in zones east and west of the shipping channel and in all zones (total) near the Salem Nuclear Generating Station, New Jersey, 1971.

		Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Temp. (C)	max.		3.0	6.0	11.7	16.2	27.0	27.0	28.2	25.8	20.5	12.8	7.0
	min.		1.0	4.5	9.0	12.0	19.3	25.6	25.7	22.1	17.5	7.5	4.8
	X		1.9	5.2	9.9	14.0	22.1	26.4	26.6	23.9	18.9	10.6	5.8
Salinity (ppt)	max.		2.5	4.0	8.7	8.4	10.0	12.5	13.3	9.6	5.4	6.7	5.0
	min.		0.0	0.0	0.3	0.9	1.3	3.0	1.5	0.0	0.0	1.0	0.0
	X		0.3	0.3	3.4	4.1	4.7	7.2	5.9	2.5	2.8	3.8	0.8
Blueback herring	west		0.0	0.8	1.4	0.2	0.3	0.1	*	*	*	5.2	0.0
	east		0.0	4.2	4.9	0.2	2.5	0.2	*	0.1	*	1.6	0.2
	total		0.0	3.0	3.7	0.2	1.7	0.1	*	0.1	*	2.8	0.1
Alewife	west		0.0	0.6	2.7	0.3	1.2	1.2	0.7	1.0	0.6	8.0	0.0
	east		0.0	0.4	0.7	1.7	4.3	0.2	0.2	0.5	0.1	3.3	*
	total		0.0	0.5	1.4	1.2	3.2	0.5	0.4	0.7	0.5	4.9	*
American shad	west		0.0	0.0	0.1	0.0	*	0.0	0.0	0.0	0.0	0.0	0.0
	east		0.0	0.0	0.0	*	*	0.0	0.0	0.0	0.0	0.0	0.0
	total		0.0	0.0	0.1	*	*	0.0	0.0	0.0	0.0	0.0	0.0
Atlantic menhaden	west		0.0	0.0	0.0	0.0	5.7	2.0	1.1	3.8	3.6	7.0	*
	east		0.0	0.0	0.0	0.0	13.5	2.2	0.4	2.7	1.9	4.7	0.0
	total		0.0	0.0	0.0	0.0	10.7	2.1	0.7	3.0	2.5	5.5	*
Bay anchovy	west		0.0	0.1	1.6	13.8	7.7	43.2	84.6	22.8	35.0	42.0	0.0
	east		0.0	*	1.8	24.5	8.4	19.2	80.6	67.2	38.0	63.6	0.0
	total		0.0	0.1	1.7	20.7	8.1	27.7	82.1	55.5	36.9	56.4	0.0
Mummichog	west		0.0	0.0	0.0	*	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	east		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	total		0.0	0.0	0.0	*	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Atlantic silverside	west	No Sample	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	*	0.0
	east		0.0	0.0	0.0	0.0	0.0	0.0	0.0	*	*	*	0.0
	total		0.0	0.0	0.0	0.0	0.0	0.0	*	*	*	*	0.0
White perch	west		11.3	11.4	22.2	25.5	27.9	2.8	15.6	22.9	39.0	65.3	0.0
	east		2.6	3.8	6.4	13.2	25.9	7.9	1.5	24.3	10.1	21.2	0.0
	total		5.9	6.5	12.0	17.5	26.6	6.1	6.8	23.9	20.6	35.9	0.0
Striped bass	west		0.3	0.0	0.3	0.6	4.2	0.6	1.8	2.7	2.2	1.3	0.0
	east		0.0	0.1	0.3	1.1	1.3	0.7	0.4	1.1	0.5	0.7	0.0
	total		0.1	0.1	0.3	0.9	2.4	0.6	0.9	1.5	1.2	0.9	0.0
Weakfish	west		0.0	0.0	0.0	0.0	23.0	59.6	32.4	8.0	9.3	0.3	0.0
	east		0.0	0.0	0.0	0.0	13.7	50.1	28.5	6.5	2.3	0.5	0.0
	total		0.0	0.0	0.0	0.0	17.1	53.4	30.0	6.9	4.5	0.4	0.0
spot	west		0.0	0.0	0.0	0.0	6.6	2.7	13.4	7.4	1.6	17.6	*
	east		0.0	0.0	0.0	0.0	3.9	3.8	4.5	8.9	5.1	5.4	0.0
	total		0.0	0.0	0.0	0.0	4.9	4.5	7.8	8.4	4.4	9.5	*
Hogchoker	west		0.0	2.3	4.6	10.5	15.5	10.2	16.3	30.0	15.1	14.1	3.9
	east		0.0	0.2	2.8	10.1	6.3	4.6	2.9	3.6	6.5	4.8	0.4
	total		0.0	0.9	3.4	10.2	9.6	6.6	7.9	10.5	9.6	7.9	1.5

¹10-minute haul

* $0.0 < n/T \leq 0.05$

Table 3. - Monthly mean catch per unit effort of fishes taken by 16-ft trawl¹ in zones east and west of the shipping channel and in all zones (total) near the Salem Nuclear Generating Station, New Jersey, 1972.

		Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Temp. (C)	max.	5.2	3.6	8.5	12.0	19.4	23.0	27.2	26.0	25.1	19.0	13.0	6.0
	min.	3.0	1.6	4.4	6.0	14.8	20.0	18.8	22.8	17.9	13.6	10.1	3.2
	X	4.4	2.6	5.7	8.3	17.0	21.4	24.5	24.7	21.8	15.6	11.8	4.6
Salinity (ppt)	max.	5.0	8.0	5.0	6.9	5.5	6.8	5.9	10.5	18.3	14.6	15.8	1.0
	min.	0.0	4.6	0.8	0.0	0.0	0.0	0.0	2.2	3.2	7.1	5.0	0.0
	X	1.0	6.6	2.8	2.7	1.6	1.7	1.7	5.9	9.6	10.3	9.8	0.1
Blueback herring	west	0.3	0.5	0.0	5.7	2.9	0.1	0.0	0.0	0.0	0.0	0.0	0.0
	east	0.2	0.0	9.8	4.2	0.1	0.4	0.0	0.0	*	0.0	0.1	0.0
	total	0.2	*	1.4	4.7	1.0	0.3	0.1	0.0	*	0.0	*	0.0
Alewife	west	0.0	0.0	0.0	1.5	1.1	0.9	2.1	0.0	*	0.3	0.6	0.8
	east	0.0	0.3	0.2	0.8	0.2	0.1	0.5	0.0	0.0	0.1	0.3	0.0
	total	0.0	0.2	0.1	1.0	0.5	0.4	1.0	0.0	*	0.1	0.4	0.4
American shad	west	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	east	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	total	0.0	0.0	0.0	0.3	*	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Atlantic menhaden	west	0.0	0.0	0.0	29.2	2.3	1.4	5.1	0.2	0.5	0.3	0.1	0.0
	east	0.0	0.0	0.0	0.4	0.4	2.8	0.5	0.2	0.0	*	0.8	0.0
	total	0.0	0.0	0.0	10.0	1.0	2.3	2.1	0.2	0.2	0.1	0.6	0.0
Bay anchovy	west	0.0	0.5	0.0	5.7	62.1	5.5	1.3	73.0	134.7	88.6	21.3	0.0
	east	0.0	0.0	0.4	42.5	51.2	20.6	5.0	45.2	48.9	154.7	35.6	0.0
	total	0.0	0.2	0.3	30.2	54.9	15.4	3.8	53.8	80.4	132.1	31.9	0.0
Mummichog	west	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	east	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	total	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Atlantic silverside	west	0.3	0.0	0.0	0.0	0.0	0.0	*	0.0	0.0	0.3	0.0	0.0
	east	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	*	0.1	0.0
	total	0.3	0.0	0.0	0.0	0.0	0.0	*	0.0	0.0	0.1	0.1	0.0
White perch	west	9.0	16.5	18.5	27.0	33.5	34.7	49.4	5.4	1.5	7.1	20.2	4.2
	east	7.7	6.0	2.4	18.3	12.0	29.1	27.4	2.4	3.1	8.0	3.7	0.8
	total	8.3	9.5	7.0	21.2	19.4	31.1	34.7	3.3	2.5	7.7	7.9	2.4
Striped bass	west	0.3	0.0	0.0	0.7	1.8	2.1	1.9	0.8	0.5	0.7	0.5	0.0
	east	0.0	0.3	0.0	0.6	0.1	0.4	0.6	*	0.3	0.3	0.1	0.0
	total	0.2	0.2	0.0	0.6	0.7	1.0	1.0	0.3	0.4	0.4	0.2	0.0
Weakfish	west	0.0	0.0	0.0	0.0	0.0	0.1	4.7	48.4	13.4	2.4	0.0	0.0
	east	0.0	0.0	0.0	0.0	*	0.2	2.9	18.1	16.2	1.6	*	0.0
	total	0.0	0.0	0.0	0.0	*	0.1	3.5	27.5	15.2	1.9	*	0.0
spot	west	0.0	0.0	0.0	0.0	0.0	11.2	47.9	2.5	2.7	6.4	1.7	0.0
	east	0.0	0.0	0.0	0.0	*	24.9	21.3	7.4	2.7	4.7	2.0	0.0
	total	0.0	0.0	0.0	0.0	*	20.1	30.2	5.9	2.7	5.3	1.9	0.0
Hogchoker	west	4.7	0.0	1.0	0.7	14.5	5.4	9.1	17.1	1.1	4.4	7.0	3.1
	east	0.2	0.0	0.0	0.7	2.4	2.1	1.5	1.2	1.4	1.7	0.6	0.4
	total	2.4	0.0	0.3	0.7	6.5	3.2	4.1	6.2	1.3	2.6	2.2	1.6

¹10-minute haul

* 0.0 < n/T ≤ 0.05

Table 4. - Monthly mean catch per unit effort of fishes taken by 16-ft trawl¹ in zones east and west of the shipping channel and in all zones (total) near the Salem Nuclear Generating Station, New Jersey, 1973.

		Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Temp. (C)	max.			8.8	11.0	17.5	24.4	27.0	27.1	29.0	20.0	11.8	10.3
	min.			2.5	6.1	13.5	21.7	24.0	24.1	21.0	14.5	8.5	2.4
	$\bar{X}$			6.2	9.1	15.3	23.2	26.0	25.9	24.5	17.8	10.3	5.1
Salinity (ppt)	max.			7.4	6.0	6.4	6.5	6.0	7.6	9.0	9.5	13.0	4.0
	min.			2.1	0.0	0.0	0.1	0.0	0.5	2.8	3.0	0.0	0.0
	$\bar{X}$			5.0	1.5	1.6	1.8	2.5	3.8	5.6	6.0	5.1	0.8
Blueback herring	west			0.0	0.3	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.0
	east			0.0	0.7	0.1	0.0	0.4	0.0	0.0	0.0	1.4	2.1
	total			0.0	0.5	0.1	0.0	0.3	0.0	0.0	0.0	1.0	1.6
Alewife	west			0.0	0.3	0.0	0.0	0.3	0.0	0.0	0.0	1.0	0.0
	east			0.0	0.3	0.1	*	*	0.0	0.0	0.0	0.7	0.2
	total			0.0	0.3	0.1	*	0.1	0.0	0.0	0.0	0.8	0.2
American shad	west			0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	east			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	total			0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Atlantic menhaden	west			0.0	0.0	0.1	0.7	0.3	1.5	0.7	11.1	23.8	0.0
	east			0.1	0.0	*	0.5	0.4	0.5	0.2	0.9	2.6	0.6
	total			*	0.0	*	0.6	0.3	0.8	0.3	4.3	9.1	0.5
Bay anchovy	west			0.0	0.1	20.4	7.9	19.9	63.8	688.1	72.4	18.1	0.0
	east			0.0	0.3	59.6	6.7	19.6	33.0	79.1	28.7	12.7	0.1
	total			0.0	0.2	46.5	6.2	19.7	42.1	271.8	43.3	14.3	0.1
Mummichog	west			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	east			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	total			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Atlantic silverside	west	No Sample	No sample	0.0	0.0	0.0	*	0.0	0.0	0.0	0.0	0.0	0.0
	east			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	total			0.0	0.0	0.0	*	0.0	0.0	0.0	0.0	0.0	0.0
White perch	west			34.8	12.9	11.5	20.4	17.8	0.9	0.2	0.7	13.8	4.1
	east			7.1	7.0	7.5	12.1	4.1	0.4	0.2	0.4	7.8	10.3
	total			17.2	9.0	8.7	14.8	8.4	0.5	0.2	0.5	9.7	8.8
Striped bass	west			0.4	0.2	0.3	0.5	1.3	1.5	0.0	0.1	0.1	0.0
	east			0.6	0.1	0.3	0.2	0.4	0.2	*	0.0	0.0	0.1
	total			0.5	0.1	0.3	0.3	0.7	0.6	*	*	0.1	0.1
Weakfish	west			0.0	0.0	0.0	0.2	8.4	6.0	5.8	3.7	0.2	0.0
	east			0.0	0.0	0.0	8.7	9.1	11.7	4.3	1.5	0.3	0.0
	total			0.0	0.0	0.0	5.9	8.9	10.0	4.8	2.3	0.2	0.0
spot	west			0.0	0.0	0.0	19.5	11.3	10.6	3.8	2.7	30.7	0.0
	east			0.0	0.0	0.0	39.2	24.4	12.0	3.3	1.3	5.5	5.3
	total			0.0	0.0	0.0	32.7	20.2	11.6	3.4	1.8	13.3	4.0
Hogchoker	west			0.0	0.7	8.0	5.3	3.5	2.6	2.5	3.1	15.5	1.5
	east			0.0	0.2	2.1	1.2	1.0	3.4	0.9	0.6	3.9	1.4
	total			0.0	0.4	4.0	2.6	1.8	3.1	1.4	1.4	7.5	1.4

¹ 10-minute haul

* 0.0 < n/T ≤ 0.05

Table 5. - Monthly mean catch per unit effort of fishes taken by 16-ft trawl in zones east and west of the shipping channel and in all zones (total) near the Salem Nuclear Generating Station, New Jersey, 1974.

		Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Temp. (C)	max.	6.0	3.1	7.5	12.5	20.5	26.2	26.2	30.0	24.8	16.5	15.0	6.9
	min.	1.8	0.0	4.2	8.5	13.7	19.5	23.9	25.2	20.8	12.6	5.1	3.7
	X	2.6	2.0	6.0	10.7	17.7	22.2	25.1	26.2	23.1	14.7	11.0	4.3
Salinity (ppt)	max.	5.5	8.0	8.0	3.5	4.0	10.0	12.6	11.8	10.0	10.8	15.0	4.0
	min.	0.0	1.8	0.0	0.0	0.0	0.9	4.8	3.5	2.0	1.5	0.0	0.0
	X	1.0	4.2	1.7	0.7	4.0	3.7	7.1	5.9	4.3	5.2	6.3	0.9
Blueback herring	west	*	0.2	0.5	2.2	*	0.0	0.0	0.0	0.0	0.2	0.3	0.1
	east	0.0	0.5	3.0	3.4	0.1	0.0	0.0	0.0	0.0	0.1	7.4	0.2
	total	*	0.4	1.9	3.1	*	0.0	0.0	0.0	0.0	0.1	6.2	0.1
Alewife	west	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	*	0.1	0.0
	east	*	0.0	0.5	0.3	*	0.0	*	0.0	0.0	0.1	0.1	0.0
	total	*	0.0	0.3	0.3	*	0.0	*	0.0	0.0	0.1	0.1	0.0
American shad	west	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	east	0.0	0.0	0.1	0.2	0.0	0.0	0.0	0.0	0.0	0.0	*	0.0
	total	0.0	0.0	0.1	0.2	0.0	0.0	0.0	0.0	0.0	0.0	*	0.0
Atlantic menhaden	west	0.0	0.0	0.0	0.1	0.1	1.6	8.1	23.6	6.7	5.9	7.6	0.0
	east	0.0	0.0	*	*	1.0	0.5	6.9	6.3	3.1	1.9	1.6	*
	total	0.0	0.0	*	*	0.7	0.7	7.1	10.6	3.8	2.9	2.6	*
Bay anchovy	west	0.0	0.4	19.4	31.1	23.6	92.5	221.3	51.5	1.0	132.5	36.3	0.1
	east	0.0	0.1	9.0	35.0	34.8	53.1	353.4	113.8	74.1	41.0	35.5	0.2
	total	0.0	0.2	13.4	33.9	31.2	62.1	327.8	98.2	59.4	64.1	35.6	0.1
Mummichog	west	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	east	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	total	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Atlantic silverside	west	0.0	0.0	0.0	0.0	0.0	*	0.0	0.0	0.0	0.0	0.0	0.0
	east	*	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	*	*
	total	*	*	0.0	0.0	0.0	*	0.0	0.0	0.0	0.0	*	*
White perch	west	28.7	21.3	19.5	15.0	9.9	2.4	0.5	0.1	0.1	6.5	19.8	10.5
	east	5.8	6.6	4.1	8.0	3.0	1.0	0.2	*	0.1	3.1	5.0	3.0
	total	12.8	11.6	10.6	10.0	5.1	1.3	0.3	*	0.1	4.0	7.5	4.6
Striped bass	west	0.0	0.0	0.1	*	0.1	0.4	0.1	*	*	*	0.1	0.0
	east	0.0	0.0	*	0.1	0.2	0.1	*	0.0	0.0	0.1	*	0.0
	total	0.0	0.0	0.1	0.1	0.2	0.2	*	*	*	0.1	*	0.0
Weakfish	west	0.0	0.0	0.0	0.0	0.0	0.1	8.2	6.9	8.9	2.6	0.0	0.0
	east	0.0	0.0	0.0	0.0	*	0.2	11.0	4.8	4.2	1.5	1.0	0.0
	total	0.0	0.0	0.0	0.0	*	0.2	10.7	5.3	5.4	1.7	0.8	0.0
Spot	west	0.0	0.0	0.1	0.0	6.4	32.0	48.7	8.9	4.5	10.4	10.6	0.0
	east	0.0	0.0	0.1	0.0	5.1	10.0	11.5	3.2	5.7	5.5	6.0	0.0
	total	0.0	0.0	0.1	0.0	5.5	15.0	18.9	4.6	5.4	6.7	6.8	0.0
Hogchoker	west	0.6	0.1	0.9	0.2	23.7	6.8	8.7	8.0	8.0	15.3	18.5	1.5
	east	0.6	0.1	0.9	3.3	8.3	4.0	5.9	2.1	3.8	6.1	2.5	0.4
	total	0.6	0.1	0.9	2.9	13.2	4.6	6.4	3.6	4.7	8.4	5.2	0.9

¹10-minute haul

* 0.0 < n/T ≤ 0.05

Table 6. - Monthly mean catch per unit effort of fishes taken by 16-ft trawl¹ in zones east and west of the shipping channel and in all zones (total) near the Salem Nuclear Generating Station, New Jersey, 1975.

		Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Temp. (C)	max.	7.5	6.2	7.9	13.2	29.0	26.5	29.0	30.0	24.5	20.0	15.8	8.8
	min.	0.5	1.0	1.0	2.7	10.0	19.5	23.2	21.5	18.0	13.0	9.1	0.2
	$\bar{X}$	4.0	4.1	3.7	7.8	18.2	22.9	25.6	26.3	20.7	17.1	12.6	6.0
Salinity (ppt)	max.	3.0	0.0	5.5	12.0	7.0	10.0	14.0	14.0	12.0	5.0	5.0	6.0
	min.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	$\bar{X}$	0.8	0.0	0.5	5.0	1.8	2.4	3.5	5.8	6.6	2.4	2.3	3.0
Blueback herring	west	0.0	0.0	2.0	1.2	0.2	1.3	0.0	0.0	0.0	0.2	2.1	0.2
	east	0.0	0.0	4.9	3.0	0.1	0.8	*	0.0	0.0	0.0	0.9	0.2
	total	0.0	0.0	4.2	2.4	0.1	0.9	*	0.0	0.0	0.1	1.4	0.2
Alewife	west	0.0	0.0	2.0	0.2	0.0	0.0	0.1	0.0	0.0	0.7	0.8	1.1
	east	0.0	0.1	4.8	0.5	*	0.0	*	*	0.0	0.2	1.3	0.8
	total	0.0	*	4.2	0.4	*	0.0	0.1	*	0.0	0.4	1.1	0.9
American shad	west	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	east	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	*
	total	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	*
Atlantic menhaden	west	0.0	0.0	0.0	0.0	0.0	1.3	1.7	1.0	0.4	2.1	1.6	0.0
	east	0.0	0.0	0.0	*	0.0	0.8	0.3	0.5	0.1	1.6	0.6	0.1
	total	0.0	0.0	0.0	*	0.0	0.9	0.6	0.6	0.2	1.8	1.0	*
Bay anchovy	west	0.0	0.2	0.0	27.2	37.3	68.4	68.9	77.2	33.6	43.2	23.4	1.6
	east	0.0	0.2	0.6	40.1	174.7	47.6	39.2	93.8	116.5	68.3	43.5	2.1
	total	0.0	0.2	0.5	35.4	138.3	52.0	45.3	90.2	87.2	58.6	35.8	1.9
Mummichog	west	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	east	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	total	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Atlantic silverside	west	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
	east	0.0	*	0.0	0.0	0.1	*	0.0	0.0	0.0	0.0	0.1	0.1
	total	0.0	*	0.0	0.0	*	*	0.0	0.0	0.0	0.0	*	0.1
White perch	west	2.5	6.2	32.4	18.0	25.5	1.9	0.5	0.2	1.0	13.6	31.5	27.4
	east	0.6	1.9	4.6	7.5	8.0	1.1	0.9	0.1	0.1	3.9	26.4	24.3
	total	1.3	2.9	11.2	11.3	12.6	1.2	0.8	0.1	0.4	7.6	28.3	25.3
Striped bass	west	0.0	0.0	0.1	0.1	0.2	0.0	0.1	0.0	0.0	0.3	0.1	0.1
	east	0.0	0.0	*	*	*	0.2	0.0	0.0	0.0	*	0.1	0.0
	total	0.0	0.0	*	*	0.1	*	*	0.0	0.0	0.1	0.1	*
Weakfish	west	0.0	0.0	0.0	0.0	0.0	7.8	33.9	16.9	8.9	2.7	0.1	0.0
	east	0.0	0.0	0.0	0.1	0.1	46.6	26.7	12.8	9.5	1.9	0.1	0.0
	total	0.0	0.0	0.0	*	*	38.4	27.8	14.2	9.3	2.2	0.1	0.0
Spot	west	0.0	0.0	0.0	0.0	0.0	12.8	11.9	8.3	3.7	18.7	14.2	1.5
	east	0.0	0.0	0.0	*	0.1	18.5	6.5	7.1	4.9	19.8	26.8	2.7
	total	0.0	0.0	0.0	*	0.1	17.3	7.6	7.4	4.5	19.4	22.0	2.3
Hogchoker	west	0.1	0.1	1.3	3.9	16.1	7.3	16.4	9.3	33.5	31.0	19.8	10.1
	east	0.1	0.1	0.3	1.1	8.0	9.9	6.6	2.2	6.4	11.9	5.3	0.6
	total	0.1	0.1	0.5	2.1	10.3	9.3	8.6	3.8	16.0	19.2	10.8	3.7

¹10-minute haul

* 0.0 < n/T ≤ 0.05

Table 7. - Monthly mean catch per unit effort of fishes taken by 16-ft trawl¹ in zones east and west of the shipping channel and in all zones (total) near the Salem Nuclear Generating Station, New Jersey, 1976.

		Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Temp. (C)	max.	4.0	8.0	11.0	18.3	19.4	27.8	27.2	27.0	23.9	18.3	10.1	4.9
	min.	0.1	0.0	4.4	7.8	14.1	18.1	22.8	22.6	18.8	14.0	5.1	0.7
	$\bar{X}$	1.4	3.9	7.7	12.6	17.3	22.2	25.5	25.0	21.9	16.2	8.0	2.8
Salinity (ppt)	max.	9.0	8.0	7.0	12.8	8.0	12.0	14.0	15.0	15.0	17.0	14.0	9.0
	min.	0.0	0.0	0.0	0.0	0.0	0.0	1.0	1.0	0.0	0.0	0.0	1.0
	$\bar{X}$	2.5	1.9	1.4	3.5	3.0	4.0	5.9	5.6	7.1	4.7	4.5	4.4
Blueback herring	west	0.0	*	2.2	0.3	0.1	0.0	*	0.0	0.0	0.7	1.1	0.0
	east	0.0	0.3	3.9	0.1	*	0.0	0.0	0.0	0.0	0.6	4.4	0.0
	total	0.0	0.3	3.3	0.2	0.1	0.0	*	0.0	0.0	0.7	3.5	0.0
Alewife	west	0.0	0.0	0.3	0.3	0.0	0.0	0.0	0.0	0.0	0.6	2.6	0.0
	east	0.0	0.0	0.1	0.5	0.1	0.0	*	*	0.0	0.7	1.2	0.0
	total	0.0	0.0	0.3	0.5	*	0.0	*	*	0.0	0.6	1.6	0.0
American shad	west	0.0	0.0	*	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0
	east	0.0	0.0	0.1	*	0.0	0.0	0.0	0.0	0.0	*	0.0	0.0
	total	0.0	0.0	*	*	0.0	0.0	0.0	0.0	0.0	*	0.0	0.0
Atlantic menhaden	west	0.0	0.0	0.0	0.1	0.1	5.1	5.3	4.6	1.1	4.6	0.3	0.0
	east	0.0	0.0	0.1	0.2	*	0.6	2.0	1.4	0.6	1.6	4.0	0.0
	total	0.0	0.0	*	0.2	0.1	1.9	3.1	2.4	0.7	2.6	2.9	0.0
Bay anchovy	west	0.0	0.0	16.2	254.3	41.1	71.9	49.7	128.7	280.0	101.2	0.8	0.0
	east	0.1	0.0	62.2	298.5	34.0	62.3	89.8	61.2	123.6	61.7	3.1	0.0
	total	*	0.0	48.2	285.1	36.5	65.0	76.9	82.2	168.4	74.2	2.5	0.0
Mummichog	west	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0
	east	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	total	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Atlantic silverside	west	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	east	0.0	0.0	0.0	*	0.0	*	0.0	0.0	0.0	*	*	0.0
	total	0.0	0.0	0.0	*	0.0	*	0.0	0.0	0.0	*	*	0.0
White perch	west	7.8	27.7	39.0	12.3	7.1	12.7	0.2	0.1	*	4.1	30.3	6.1
	east	3.7	4.8	12.5	7.0	4.0	5.8	0.1	0.1	*	2.5	7.8	2.0
	total	0.5	12.9	20.5	8.6	5.1	7.7	0.1	0.1	*	3.0	14.3	3.3
Striped bass	west	0.0	0.1	0.0	0.0	0.0	0.0	*	0.0	0.0	*	0.0	0.1
	east	0.0	0.0	0.0	*	0.0	*	*	0.0	0.0	0.1	0.0	0.0
	total	0.0	*	0.0	*	0.0	*	*	0.0	0.0	*	0.0	*
Weakfish	west	0.0	0.0	0.0	0.0	*	0.0	15.7	12.1	5.0	1.6	0.0	0.0
	east	0.0	0.0	0.0	*	*	0.0	11.3	8.5	2.0	0.8	*	0.0
	total	0.0	0.0	0.0	*	*	0.0	12.7	9.6	2.9	1.0	*	0.0
Spot	west	0.0	0.0	0.0	0.8	26.8	72.3	38.4	3.0	2.8	10.1	10.9	0.0
	east	0.0	0.0	0.0	0.3	29.8	146.4	55.9	5.7	2.6	5.8	5.9	0.0
	total	0.0	0.0	0.0	0.5	28.7	125.5	50.3	4.9	2.6	7.4	7.1	0.0
Hogchoker	west	1.6	0.0	3.2	22.8	36.8	8.5	10.7	8.8	6.6	3.9	5.7	0.3
	east	0.1	0.0	1.2	3.1	9.8	5.6	3.4	4.2	2.6	3.2	1.4	0.1
	total	0.5	0.0	1.8	9.1	19.4	6.4	5.7	5.6	3.7	3.4	2.6	0.2

¹ 10-minute haul

* 0.0 < n/T ≤ 0.05

Table 8. - Periodicity of tidal currents (fps) during average tide (6 hrs, 12 min) near S.N.G.S., June-October, 1976.*

Tide velocity (fps)	0.0-0.5	0.6-1.0	1.1-1.5	1.6-2.0	2.1-2.5	2.6-3.0	3.0+
Frequency (%)	4.6	35.2	34.1	17.8	4.8	2.7	0.8
hrs:min/tide	0:17	2:11	2:07	1:06	0:18	0:10	0:03
Cumulative % $\longrightarrow$	4.6	39.8	73.9	91.7	96.5	99.2	100.0
$\longleftarrow$	100.0	95.4	60.2	26.1	8.3	3.5	0.8
Cumulative $\longrightarrow$	0:17	2:28	4:35	5:41	5:59	6:09	6:12
hrs:min $\longleftarrow$	6:12	5:55	3:44	1:37	0:31	0:13	0:03

*From EG&G 1976a, 1976b, 1976c.

Table 9 . - A chronological summary of cold shock experiments on blueback herring, Alosa aestivalis. All tests were conducted at near air saturated levels of dissolved oxygen and pH of 7 to 8.

DATE	SIZE RANGE (TL IN MM)		SALINITY (PPT)	ACCLIM. TEMP(C)	CONTROL TEMP(C)	EXPER. TEMP(C)	TIME(HRS.)		CONTROL			EXPERIMENTAL		
	MIN.	MAX.					FROM START OF TEST	NO. ALIVE	NO. DEAD	NO. WITH L.O.E.*	NO. ALIVE	NO. DEAD	NO. WITH L.O.E.	
ALOSA AESTIVALIS														
16 MAR 76	75	132	3.5	10	9	3	0	5	-	-	5	-	-	
							0.1	5	0	1	5	0	1	
							2	4	1	0	5	0	4	
							4.5	4	1	0	4	1	2	
							5	4	1	0	3	2	2	
						22	4	1	2	0	5	0		
11 MAY 76	96	115	8.8	19	19	10	0	5	-	-	5	-	-	
							96	4	1	0	5	0	2	
11 MAY 76	96	113	8.8	19	19	10	0	5	-	-	5	-	-	
							96	4	1	0	5	0	3	
11 MAY 76	94	116	4	19	20	6	0	5	-	-	5	-	-	
							2	5	0	0	5	0	1	
							5.5	5	0	0	4	1	0	
							21	5	0	0	2	3	1	
							26	5	0	0	1	4	1	
							28	5	0	0	0	5	0	
11 MAY 76	96	123	4	19	20	6	0	5	-	-	5	-	-	
							5.5	5	0	0	5	0	1	
							21	5	0	0	2	3	1	
							26	5	0	0	1	4	1	
							46	5	0	1	0	5	0	
29 APR 77	82	102	6.5	16	16.5	10	0	10	-	-	10	-	-	
							26	8	2	1	10	0	2	
29 APR 77	82	97	6	16	16.5	8	0	10	-	-	10	-	-	
							26	8	2	1	10	0	2	

* = Loss of equilibrium

Table 9 . - Continued.

DATE	SIZE RANGE (TL IN MM)		SALINITY (PPT)	ACCLIM. TEMP(C)	CONTROL TEMP(C)	EXPER. TEMP(C)	TIME(HRS.) FROM START NO.		CONTROL		EXPERIMENTAL		
	MIN.	MAX.					OF TEST	ALIVE	NO. DEAD	NO. WITH L.O.E.	NO. ALIVE	NO. DEAD	NO. WITH L.O.E.
ALOSA AESTIVALIS													
29 APR 77	80	96	6	16	16.5	6	0	10	-	-	10	-	-
							5	10	0	0	9	1	2
							26	8	2	1	5	5	2
29 APR 77	82	107	6.5	16	16.5	4	0	10	-	-	10	-	-
							0.1	10	0	0	10	0	1
							8	10	0	0	10	0	7
							26	8	2	1	2	8	2
27 JUN 77	21	37	7	25	25	12	0	10	-	-	10	-	-
							96	10	0	0	10	0	0
27 JUN 77	21	38	7	25	25	10	0	10	-	-	10	-	-
							8.5	10	0	0	10	0	1
							23	10	0	0	7	3	6
							31	10	0	0	3	7	2
							47	10	0	0	1	9	1
							71	10	0	0	0	10	0
27 JUN 77	21	38	6.5	25	25	8.5	0	10	-	-	10	-	-
							0.1	10	0	0	10	0	5
							23	10	0	0	0	10	0
27 JUN 77	21	37	6.5	25	25	6	0	10	-	-	10	-	-
							0.1	10	0	0	10	0	10
							0.7	10	0	0	9	1	9
							1.5	10	0	0	6	4	6
							8.5	10	0	0	1	9	1
							23	10	0	0	0	10	0
1 JUL 77	24	45	7	26	27	13	0	8	-	-	10	-	-
							5.8	8	0	0	10	0	1
							23	8	0	0	9	1	0
							96	7	1	0	9	1	0
1 JUL 77	20	45	7	26	27	11	0	8	-	-	10	-	-
							5.8	8	0	0	10	0	2
							23	8	0	0	6	4	1
							59	7	1	0	5	5	0
							96	7	1	0	5	5	0

Table 9 . - Continued.

DATE	SIZE RANGE (TL IN MM)		SALINITY (PPT)	ACCLIM. TEMP(C)	CONTROL TEMP(C)	EXPER. TEMP(C)	TIME(HRS.) FROM START NO. OF TEST		CONTROL		EXPERIMENTAL		
	MIN.	MAX.					NO. DEAD	NO. WITH L.O.E.	NO. ALIVE	NO. DEAD	NO. WITH L.O.E.		
HLOSA AESTIVALIS													
1 JUL 77	24	45	6.5	26	27	9	0	8	-	-	10	-	-
							5.8	8	0	0	10	0	4
							23	8	0	0	3	7	0
							59	7	1	0	0	10	0
13 SEP 77	25	48	8.5	17.5	17.5	13	0	10	-	-	10	-	-
							96	10	0	0	10	0	0
13 SEP 77	23	44	7	17.5	17.5	11	0	10	-	-	10	-	-
							96	10	0	0	10	0	0
20 SEP 77	27	68	9.5	23	22	10	0	10	-	-	10	-	-
							96	10	0	0	10	0	0
20 SEP 77	27	68	7.5	23	22	8	0	10	-	-	10	-	-
							21	10	0	0	8	2	1
							46	10	0	0	7	3	3
							53	10	0	0	4	6	1
							69	10	0	0	3	7	2
							96	10	0	0	1	9	1
28 SEP 77	24	52	9	16	16	6.5	0	10	-	-	10	-	-
							25	10	0	0	6	4	0
							56	8	2	0	6	4	2
							79	8	2	0	4	6	0
							96	8	2	0	4	6	0
28 SEP 77	28	64	11.5	19	21.5	11	0	10	-	-	10	-	-
							96	10	0	0	10	0	0
28 SEP 77	28	71	7	19	21.5	9	0	10	-	-	10	-	-
							24	10	0	0	8	2	0
							56	10	0	0	8	2	1
							96	10	0	0	8	2	1

Table 9. . - Continued.

DATE	SIZE RANGE (TL IN MM)		SALINITY (PPT)	ACCLIM. TEMP(C)	CONTROL TEMP(C)	EXPER. TEMP(C)	TIME(HRS.) FROM START NO.		CONTROL		EXPERIMENTAL		
	MIN.	MAX.					OF TEST	ALIVE	NO. DEAD	NO. WITH L.O.E.	NO. ALIVE	NO. DEAD	NO. WITH L.O.E.
ALOSA AESTIVALIS													
28 SEP 77	28	61	9	19	21.5	6.5	0	10	-	-	10	-	-
							24	10	0	0	9	1	1
							48	10	0	0	8	2	0
							96	10	0	0	8	2	1
6 OCT 77	26	60	8	15	15	7	0	10	-	-	10	-	-
							19	10	0	0	10	0	1
							33	10	0	0	9	1	1
							49	10	0	0	8	2	0
							73	10	0	0	7	3	1
							96	10	0	0	6	4	0
6 OCT 77	29	69	7	15	15	5	0	10	-	-	10	-	-
							49	10	0	0	10	0	1
							101	10	0	0	3	7	1
26 OCT 77	37	75	8	10.5	11	9	0	10	-	-	10	-	-
							96	10	0	0	10	0	0
26 OCT 77	37	70	10	10.5	11	7	0	10	-	-	10	-	-
							96	10	0	0	10	0	0
26 OCT 77	37	70	7.5	10.5	11	5	0	10	-	-	10	-	-
							31	10	0	0	10	0	1
							48	10	0	0	9	1	0
							73	10	0	0	8	2	0
							96	10	0	0	8	2	0
26 OCT 77	36	71	6	10.5	11	3	0	10	-	-	10	-	-
							24	10	0	0	9	1	0
							52	10	0	0	8	2	0
							73	10	0	0	4	6	3
							96	10	0	0	0	10	0

Table 9 . - Continued.

DATE	SIZE RANGE (TL IN MM)		SALINITY (PPT)	ACCLIM. TEMP(C)	CONTROL TEMP(C)	EXPER. TEMP(C)	TIME(HRS.)		CONTROL		EXPERIMENTAL		
	MIN.	MAX.					FROM START OF TEST	NO. ALIVE	NO. DEAD	NO. WITH L.O.E.	NO. ALIVE	NO. DEAD	NO. WITH L.O.E.
ALGSA AESTIVALIS													
8 NOV 77	36	87	10	8	7	5	0	10	-	-	10	-	-
							73	10	0	0	10	0	1
							79	10	0	0	9	1	0
							96	10	0	0	9	1	0
8 NOV 77	36	77	7.5	8	7	3	0	10	-	-	10	-	-
							96	10	0	0	10	0	3
8 NOV 77	32	80	4.5	8	7	1	0	10	-	-	10	-	-
							0.1	10	0	0	10	0	8
							23	10	0	0	2	8	2
							30	10	0	0	0	10	0
15 NOV 77	45	77	7.5	6	6.5	2	0	10	-	-	10	-	-
							31	10	0	1	10	0	2
							47	10	0	1	8	2	0
							71	10	0	1	7	3	3
							79	10	0	1	5	5	1
							96	10	0	1	3	7	0
15 NOV 77	42	79	8.5	6	6.5	1	0	10	-	-	10	-	-
							0.4	10	0	0	10	0	4
							23	10	0	0	9	1	9
							31	10	0	1	8	2	8
							47	10	0	1	1	9	1
							96	10	0	1	0	10	0
15 NOV 77	70	90	9	10	9.5	4	0	10	-	-	10	-	-
							23	10	0	0	9	1	1
							71	9	1	0	9	1	3
							79	9	1	0	7	3	2
							96	9	1	0	5	5	0
15 NOV 77	67	86	7.5	10	9.5	2	0	10	-	-	10	-	-
							23	10	0	0	9	1	1
							47	9	1	0	8	2	3
							55	9	1	0	5	5	1
							79	9	1	0	5	5	3
							96	9	1	0	2	8	2

Table 9 . - Continued.

DATE	SIZE RANGE (TL IN MM)		SALINITY (PPT)	ACCLIM. TEMP(C)	CONTROL TEMP(C)	EXPER. TEMP(C)	TIME(HRS.) FROM START NO.		CONTROL		EXPERIMENTAL		
	MIN.	MAX.					OF TEST	ALIVE	NO. DEAD	NO. WITH L.O.E.	NO. ALIVE	NO. DEAD	NO. WITH L.O.E.
ALOSA AESTIVALIS													
23 NOV 77	39	78	10	5	4	2	0	10	-	-	9	-	-
							96	10	0	0	9	0	1
23 NOV 77	43	78	8.5	5	4	1	0	10	-	-	10	-	-
							0.1	10	0	0	10	0	1
							7.5	10	0	0	9	1	0
							48	10	0	0	7	3	0
							79	10	0	0	6	4	4
							96	10	0	0	3	7	2
23 NOV 77	52	78	10	5	4	0.2	0	10	-	-	10	-	-
							0.1	10	0	0	10	0	5
							7.5	10	0	0	9	1	6
							28	10	0	0	6	4	5
							48	10	0	0	1	9	1
							54	10	0	0	0	10	0

Table 10. - Summary of all cold shock tests on blueback herring, Alosa aestivalis, after 4-, 24-, 48-, 72-, and 96-hour exposure times over a range of acclimation temperatures.

DATE	TOTAL LENGTH (MM)			SALINITY	ACCLIM. TEMP.	EXPER. TEMP.	NO. OF	4 HOUR	24 HOUR	48 HOUR	72 HOUR	96 HOUR	
	MIN.	MAX.	MEAN	(PPT)	(C)	(F)	EXP. ORG.	% MORT.	% MORT.	% MORT.	% MORT.	% MORT.	
ALOSA AESTIVALIS													
16 MAR 76	75	132	94.8	3.5	10	50	3	37	5	0	100	100	100
11 MAY 76	100	115	108.6	8.8	19	66	10	50	5	0	0	0	0
11 MAY 76	100	112	106	8.8	19	66	10	50	5	0	0	0	0
11 MAY 76	94	116	106.8	4	19	66	6	43	5	0	60	100	100
11 MAY 76	108	123	112.8	4	19	66	6	43	5	0	60	100	100
29 APR 77	89	102	95.8	6.5	16	61	10	50	10	0	0	-	-
29 APR 77	92	97	94.5	6	16	61	8	46	10	0	0	-	-
29 APR 77	80	96	87.6	6	16	61	6	43	10	0	10	-	-
29 APR 77	87	107	94.7	6.5	16	61	4	39	10	0	0	-	-
27 JUN 77	21	37	35.4	7	25	77	12	54	10	0	0	0	0
27 JUN 77	21	38	40.3	7	25	77	10	50	10	0	30	90	100
27 JUN 77	25	38	29.8	6.5	25	77	8.5	47	10	0	100	100	100
27 JUN 77	26	34	29.2	6.5	25	77	6	43	10	40	100	100	100
1 JUL 77	25	37	33.2	7	26	79	13	55	10	0	10	10	10
1 JUL 77	20	40	30.7	7	26	79	11	52	10	0	40	40	50
1 JUL 77	26	45	33.2	6.5	26	79	9	48	10	0	70	70	100
13 SEP 77	25	48	32.7	8.5	17.5	64	13	55	10	0	0	0	0
13 SEP 77	23	44	31.6	7	17.5	64	11	52	10	0	0	0	0
20 SEP 77	27	52	41.9	9.5	23	73	10	50	10	0	0	0	0
20 SEP 77	30	53	41.1	7.5	23	73	8	46	10	0	20	30	90

Table 10 . - Continued.

DATE	TOTAL LENGTH (MM)			SALINITY (PPT)	ACCLIM. (C)	TEMP. (F)	EXPER. (C)	TEMP. (F)	NO. OF EXP. ORG.	4 HOUR % MORT.	24 HOUR % MORT.	48 HOUR % MORT.	72 HOUR % MORT.	96 HOUR % MORT.
	MIN.	MAX.	MEAN											
ALOSA AESTIVALIS														
28 SEP 77	24	52	38.6	9	16	61	6.5	44	10	0	0	40	40	60
28 SEP 77	29	64	49.8	11.5	19	66	11	52	10	0	0	0	0	0
28 SEP 77	29	71	47.6	7	19	66	9	48	10	0	20	20	20	20
28 SEP 77	31	60	50.4	9	19	66	6.5	44	10	0	10	20	20	20
6 OCT 77	26	60	38.6	8	15	59	7	45	10	0	0	10	20	40
6 OCT 77	50	69	60.3	7	15	59	5	41	10	0	0	0	0	0
26 OCT 77	46	75	62	8	10.5	51	9	48	10	0	0	0	0	0
26 OCT 77	40	70	56.1	10	10.5	51	7	45	10	0	0	0	0	0
26 OCT 77	37	70	58.3	7.5	10.5	51	5	41	10	0	0	10	10	20
26 OCT 77	36	71	60.3	6	10.5	51	3	37	10	0	10	10	20	100
8 NOV 77	42	87	66.3	10	8	46	5	41	10	0	0	0	0	10
8 NOV 77	43	77	59.8	7.5	8	46	3	37	10	0	0	0	0	0
8 NOV 77	32	80	59.4	4.5	8	46	1	34	10	0	80	100	100	100
15 NOV 77	45	77	63.5	7.5	6	43	2	36	10	0	0	20	30	70
15 NOV 77	42	79	63.7	8.5	6	43	1	34	10	0	10	90	90	100
15 NOV 77	70	90	77.4	9	10	50	4	39	10	0	10	10	10	50
15 NOV 77	67	86	71.3	7.5	10	50	2	36	10	0	10	20	50	80
23 NOV 77	39	74	57.6	10	5	41	2	36	9	0	0	0	0	0
23 NOV 77	43	75	57.7	8.5	5	41	1	34	10	0	10	30	30	70
23 NOV 77	52	77	66.8	10	5	41	0.2	32	10	0	10	90	100	100

Table 11. - Percent occurrence by month of ambient water temperature of or below 5 C in the Delaware River near Artificial Island, 1969-76.¹

	≤ 2 C					≤ 3 C					≤ 4 C					≤ 5 C					
	Dec	Jan	Feb	Mar	% yr	Dec	Jan	Feb	Mar	% yr	Dec	Jan	Feb	Mar	% yr	Dec	Jan	Feb	Mar	Apr	% yr
1969-70	-	-	72.7	4.0		-	-	-	-		-	-	100.0	46.0		-	-	100.0	78.0	0.0	
1970-71	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1971-72	0.0	26.2	98.0	2.1	10.2	0.0	42.6	99.6	3.3	11.8	0.0	65.3	100.0	4.1	13.8	25.4	99.9	100.0	27.4	0.16	20.9
1972-73	0.8	37.1	58.9	1.9	7.9	2.7	52.0	70.2	9.3	10.8	30.2	78.1	82.6	20.3	17.3	62.2	99.2	100.0	20.6	0.0	23.1
1973-74	0.0	43.7	46.0	-		0.0	49.8	56.4	-		0.0	67.2	90.3	-		0.0	84.7	97.2	-	-	
1974-75	0.0	0.0	4.2	0.0	0.3	0.0	0.0	24.3	0.0	1.9	0.0	19.5	73.8	1.6	7.5	6.7	78.1	89.3	42.3	0.0	17.6
1975-76	1.9	8.14	63.7	0.0	12.1	11.1	99.6	73.0	0.0	15.2	22.9	100.0	82.9	0.0	17.0	30.8	100.0	88.6	0.0	0.0	18.1
Mean					7.6					9.9					13.9						19.9

¹Data from Reedy Island monitoring station, U.S.G.S. 1969-76.

Table 12. - A chronological summary of cold shock experiments on alewife, Alosa pseudoharengus, All tests were conducted at near air saturated levels of dissolved oxygen and pH of 7 to 8.

DATE	SIZE RANGE (TL IN MM)		SALINITY (PPT)	ACCLIM. TEMP(C)	CONTROL TEMP(C)	EXPER. TEMP(C)	TIME(HRS.) FROM START OF TEST	NO. ALIVE	CONTROL		EXPERIMENTAL		
	MIN.	MAX.							NO. DEAD	NO. WITH L.O.E.	NO. ALIVE	NO. DEAD	NO. WITH L.O.E.
ALOSA PSEUDOHARENGUS													
2 JUN 76	112	135	7	22	18	10	0	8	-	-	8	-	-
							24	8	0	1	8	0	1
8 JUN 76	117	130	4	19	19	16	0	5	-	-	5	-	-
							24	5	0	0	5	0	0
6 JUN 76	119	134	6	19	19	9	0	5	-	-	4	-	-
							24	5	0	0	4	0	0
3 JUN 77	44	63	5.5	20	20	12	0	10	-	-	10	-	-
							96	10	0	0	10	0	0
8 JUN 77	36	51	5.5	20	20	11	0	10	-	-	10	-	-
							96	10	0	0	10	0	0
8 JUN 77	35	51	5.5	20	20	9	0	10	-	-	10	-	-
							96	10	0	0	10	0	0
8 JUN 77	36	50	5.5	20	20	7	0	10	-	-	10	-	-
							0.1	10	0	0	10	0	4
							0.9	10	0	0	9	1	0
							47	10	0	0	7	3	0
							74	10	0	0	5	5	1
							96	10	0	0	4	6	0
10 JUN 77	41	54	5	20	20.5	7	0	11	-	-	11	-	-
							0.2	11	0	0	9	2	0
							77	11	0	0	9	2	1
							96	11	0	0	8	3	0
14 JUN 77	44	62	6	23	21	11	0	9	-	-	8	-	-
							96	9	0	0	7	1	0

Table 12 . - Continued.

DATE	SIZE RANGE (TL IN MM)		SALINITY (PPT)	ACCLIM. TEMP(C)	CONTROL TEMP(C)	EXPER. TEMP(C)	TIME(HRS.)		CONTROL		EXPERIMENTAL		
	MIN.	MAX.					FROM START	NO. ALIVE	NO. DEAD	NO. WITH L.O.E.	NO. ALIVE	NO. DEAD	NO. WITH L.O.E.
ALOSA PSEUDOHARENGUS													
14 JUN 77	45	62	5	23	21	9	0 96	9 9	- 0	- 0	9 5	- 4	- 2
14 JUN 77	44	64	5	23	21	7	0 19 27 43	9 9 9 9	- 0 0 0	- 0 0 0	8 6 1 0	- 2 7 8	- 3 1 0
17 JUN 77	40	58	6	22	22.5	9.5	0 96	10 10	- 0	- 0	10 10	- 0	- 0
17 JUN 77	42	58	5	22	22.5	7.5	0 29 48 70 96	10 10 10 10 10	- 0 0 0 0	- 0 0 0 0	10 9 8 7 7	- 1 2 3 3	- 0 0 0 0
13 JUL 77	61	87	6.5	27.5	28.5	12.5	0 96	10 10	- 0	- 0	10 10	- 0	- 0
13 JUL 77	58	83	5.5	29	28.5	10	0 5 7 13.5 96	10 10 10 10 10	- 0 0 0 0	- 0 0 0 0	10 10 10 1 1	- 0 0 9 9	- 5 9 0 0
19 JUL 77	63	79	6	30	29	13	0 96	5 5	- 0	- 0	6 6	- 0	- 0
27 JUL 77	61	92	6	25	25.5	12.5	0 96	10 10	- 0	- 0	10 10	- 0	- 0
27 JUL 77	64	92	5	25	25.5	10	0 96	10 10	- 0	- 0	10 10	- 0	- 0

Table 12 . - Continued.

DATE	SIZE RANGE (TL IN MM)		SALINITY (PPT)	ACCLIM. TEMP(C)	CONTROL TEMP(C)	EXPER. TEMP(C)	TIME(HRS.)		CONTROL		EXPERIMENTAL		
	MIN.	MAX.					FROM START OF TEST	NO. ALIVE	NO. DEAD	NO. WITH L.O.E.	NO. ALIVE	NO. DEAD	NO. WITH L.O.E.
ALOSA PSEUDOHARENGUS													
13 SEP 77	60	101	9	21.5	22	15	0	10	-	-	10	-	-
							96	10	0	0	10	0	0
13 SEP 77	60	119	8.5	21.5	22	13	0	10	-	-	10	-	-
							96	10	0	0	10	0	0
13 SEP 77	60	94	7	21.5	22	11	0	10	-	-	10	-	-
							71	10	0	0	10	0	1
							96	10	0	0	10	0	1
20 SEP 77	73	94	9.5	25.5	22	10	0	10	-	-	10	-	-
							78	10	0	0	10	0	1
							96	9	1	0	10	0	1
20 SEP 77	73	94	7.5	25.5	22	8	0	10	-	-	10	-	-
							22	10	0	0	9	1	1
							30	10	0	0	8	2	3
							46	10	0	0	5	5	2
							70	10	0	0	3	7	1
							96	9	1	0	2	8	1
13 OCT 77	78	85	7	16	16.5	4	0	3	-	-	4	-	-
							22	3	0	0	4	0	2
							30	3	0	0	3	1	3
							50	3	0	0	1	3	1
							77	3	0	0	0	4	0

Table 13 . - Summary of all cold shock tests on alewife, Alosa pseudoharengus, after 4-, 24-, 48-, 72-, and 96-hour exposure times over a range of acclimation temperatures.

DATE	TOTAL LENGTH (MM)			SALINITY	ACCLIM. TEMP.	EXPER. TEMP.	NO. OF	4 HOUR	24 HOUR	48 HOUR	72 HOUR	96 HOUR
	MIN.	MAX.	MEAN	(PPT)	(C)	(F)	EXP. ORG.	% MORT.	% MORT.	% MORT.	% MORT.	% MORT.
ALOSA PSEUDOHARENGUS												
2 JUN 76	116	128	124	7	22	72	10	50	8	0	0	-
8 JUN 76	117	130	124.2	4	19	66	16	61	5	0	0	-
8 JUN 76	122	134	127.5	6	19	66	9	48	4	0	0	-
3 JUN 77	45	63	50.4	5.5	20	68	12	54	10	0	0	0
8 JUN 77	44	51	48.6	5.5	20	68	11	52	10	0	0	0
8 JUN 77	35	51	44.7	5.5	20	68	9	48	10	0	0	0
8 JUN 77	39	50	44.3	5.5	20	68	7	45	10	10	10	30
10 JUN 77	41	54	46.7	5	20	68	7	45	11	18	18	18
14 JUN 77	44	57	52.9	6	23	73	11	52	8	0	0	0
14 JUN 77	45	60	53.7	5	23	73	9	48	9	0	0	0
14 JUN 77	44	64	50.9	5	23	73	7	45	8	0	25	100
17 JUN 77	40	54	49.9	6	22	72	9.5	49	10	0	0	0
17 JUN 77	42	55	50.4	5	22	72	7.5	46	10	0	0	20
13 JUL 77	61	87	71.4	6.5	27.5	82	12.5	55	10	0	0	0
13 JUL 77	58	73	66	5.5	29	84	10	50	10	0	90	90
19 JUL 77	64	79	71.8	6	30	86	13	55	6	0	0	0
27 JUL 77	61	71	65	6	25	77	12.5	55	10	0	0	0
27 JUL 77	65	72	68.2	5	25	77	10	50	10	0	0	0
13 SEP 77	71	101	79.1	9	21.5	71	15	59	10	0	0	0
13 SEP 77	71	119	88.8	8.5	21.5	71	13	55	10	0	0	0

Table 13 . - Continued.

DATE	TOTAL LENGTH (MM)			SALINITY (PPT)	ACCLIM. TEMP.		EXPER. TEMP.		NO. OF EXP. ORG.	4 HOUR	24 HOUR	48 HOUR	72 HOUR	96 HOUR
	MIN.	MAX.	MEAN		(C)	(F)	(C)	(F)		% MORT.	% MORT.	% MORT.	% MORT.	% MORT.
ALOSA PSEUDOHARENGUS														
13 SEP 77	70	94	77.5	7	21.5	71	11	52	10	0	0	0	0	0
20 SEP 77	75	82	77.9	9.5	25.5	78	10	50	10	0	0	0	0	0
20 SEP 77	75	83	78.4	7.5	25.5	78	8	46	10	0	10	50	70	80
13 OCT 77	78	85	82.5	7	16	61	4	39	4	0	0	25	75	100

Table 14 . - A chronological summary of cold shock experiments on American shad, Alosa sapidissima, All tests were conducted at near air saturated levels of dissolved oxygen and pH of 7 to 8.

DATE	SIZE RANGE (TL IN MM)		SALINITY (PPT)	ACCLIM. TEMP(C)	CONTROL TEMP(C)	EXPER. TEMP(C)	TIME(HRS.) FROM START NO.		CONTROL		EXPERIMENTAL		
	MIN.	MAX.					OF TEST	ALIVE	NO. DEAD	NO. WITH L.O.E.	NO. ALIVE	NO. DEAD	NO. WITH L.O.E.
ALUSA SAPIDISSIMA													
27 JUN 77	31	42	7	25	24.5	12	0	10	-	-	10	-	-
							96	10	0	0	10	0	0
27 JUN 77	31	42	7	25	24.5	10	0	10	-	-	10	-	-
							22	10	0	0	9	1	0
							46	10	0	0	7	3	1
							70	10	0	0	5	5	0
							78	10	0	0	4	6	0
							96	10	0	0	3	7	1
27 JUN 77	31	42	6.5	25	24	8.5	0	10	-	-	9	-	-
							0.1	10	0	0	9	0	4
							1	10	0	0	9	0	0
							22	10	0	0	4	5	4
							30	10	0	0	1	8	1
							46	10	0	0	0	9	0
27 JUN 77	29	42	6.5	25	24	6	0	10	-	-	10	-	-
							0.1	10	0	0	10	0	10
							0.25	10	0	0	8	2	8
							8	10	0	0	3	7	3
							23	10	0	0	0	10	0
27 JUL 77	36	50	6	25	25	12.5	0	9	-	-	9	-	-
							49	9	0	0	9	0	1
							56	9	0	0	8	1	0
							96	9	0	0	8	1	0
27 JUL 77	41	49	5	25	25	10	0	9	-	-	9	-	-
							25	9	0	0	8	1	1
							31	9	0	0	0	9	0
6 OCT 77	45	70	10	15	15	10	0	10	-	-	9	-	-
							96	10	0	0	9	0	0

Table 14 . - Continued.

DATE	SIZE RANGE (TL IN MM)		SALINITY (PPT)	ACCLIM. TEMP(C)	CONTROL TEMP(C)	EXPER. TEMP(C)	TIME(HRS.)		CONTROL		EXPERIMENTAL		
	MIN.	MAX.					FROM START OF TEST	NO. ALIVE	NO. DEAD	NO. WITH L.O.E.	NO. ALIVE	NO. DEAD	NO. WITH L.O.E.
ALOSA SAPIDISSIMA													
6 OCT 77	45	70	8	15	15	7	0	10	-	-	9	-	-
							96	10	0	0	9	0	0
6 OCT 77	37	72	7	15	15	5	0	10	-	-	10	-	-
							20	10	0	0	10	0	1
							33	10	0	0	10	0	5
							50	10	0	0	5	5	5
							74	10	0	0	0	10	0
26 OCT 77	49	69	10	11	11.5	7	0	10	-	-	10	-	-
							96	10	0	0	10	0	0
26 OCT 77	50	71	7.5	11	11.5	5	0	10	-	-	10	-	-
							56	10	0	0	10	0	1
							96	10	0	0	9	1	0
26 OCT 77	50	75	6	11	11.5	3	0	10	-	-	10	-	-
							24	10	0	0	10	0	5
							31	10	0	0	9	1	5
							48	10	0	0	3	7	3
							52	10	0	0	1	9	1
							73	10	0	0	0	10	0
8 NOV 77	52	80	10	7	7	5	0	10	-	-	10	-	-
							73	10	0	0	10	0	1
							80	10	0	0	10	0	2
							96	10	0	0	10	0	3
8 NOV 77	52	75	7.5	7	7	3	0	10	-	-	10	-	-
							32	10	0	0	10	0	1
							48	10	0	0	10	0	3
							73	10	0	0	7	3	3
							96	10	0	0	3	7	2
8 NOV 77	52	75	4.5	7	7	1	0	10	-	-	10	-	-
							0.1	10	0	0	10	0	9
							5.5	10	0	0	8	2	8
							8	10	0	0	7	3	7
							24	10	0	0	1	9	1
							30	10	0	0	0	10	0

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Table 14 . - Continued.

DATE	SIZE RANGE (TL IN MM)		SALINITY (PPT)	ACCLIM. TEMP(C)	CONTROL TEMP(C)	EXPER. TEMP(C)	TIME(HRS.)		CONTROL		EXPERIMENTAL		
	MIN.	MAX.					FROM START	NO. ALIVE	NO. DEAD	NO. WITH L.O.E.	NO. ALIVE	NO. DEAD	NO. WITH L.O.E.
ALOSA SAPIDISSIMA													
23 NOV 77	56	74	10	5	4.5	2	0	10	-	-	10	-	-
							4	10	0	0	10	0	1
							28	10	0	0	9	1	2
							79	10	0	0	6	4	4
							96	10	0	0	2	8	2
23 NOV 77	60	75	8.5	5	4.5	1	0	10	-	-	10	-	-
							28	10	0	0	7	3	4
							48	10	0	0	4	6	4
							54	10	0	0	2	8	2
							79	10	0	0	1	9	1
							96	10	0	0	0	10	0

Table 15. - Summary of all cold shock tests on American shad, Alosa sapidissima, after 4-, 24-, 48-, 72-, and 96-hour exposure times over a range of acclimation temperatures.

DATE	TOTAL LENGTH (MM)			SALINITY	ACCLIM. TEMP.	EXPER. TEMP.	NO. OF	4 HOUR	24 HOUR	48 HOUR	72 HOUR	96 HOUR
	MIN.	MAX.	MEAN	(PPT)	(C)	(F)	EXP. ORG.	% MORT.	% MORT.	% MORT.	% MORT.	% MORT.
ALOSA SAPIDISSIMA												
27 JUN 77	34	41	36.5	7	25	77	12	54	10	0	0	0
27 JUN 77	32	42	35.4	7	25	77	10	50	10	0	10	30
27 JUN 77	32	38	31.9	6.5	25	77	8.5	47	9	0	56	100
27 JUN 77	29	36	34.3	6.5	25	77	6	43	10	20	100	100
27 JUL 77	36	50	37.9	6	25	77	12.5	55	9	0	0	0
27 JUL 77	41	49	44.3	5	25	77	10	50	9	0	0	100
6 OCT 77	55	65	60.1	10	15	59	10	50	9	0	0	0
6 OCT 77	53	65	60.5	8	15	59	7	45	9	0	0	0
6 OCT 77	37	72	59.6	7	15	59	5	41	10	0	0	50
26 OCT 77	49	69	60.6	10	11	52	7	45	10	0	0	0
26 OCT 77	60	71	66.5	7.5	11	52	5	41	10	0	0	0
26 OCT 77	59	75	65.4	6	11	52	3	37	10	0	0	70
8 NOV 77	56	80	67.5	10	7	45	5	41	10	0	0	0
8 NOV 77	57	72	64.2	7.5	7	45	3	37	10	0	0	0
8 NOV 77	62	72	66.4	4.5	7	45	1	34	10	0	90	100
23 NOV 77	56	69	63.3	10	5	41	2	36	10	0	0	10
23 NOV 77	60	75	67.8	8.5	5	41	1	34	10	0	0	60

Table 16 . - A chronological summary of cold shock experiments on Atlantic menhaden, Brevoortia tyrannus.
All tests were conducted at near air saturated levels of dissolved oxygen and pH of 7 to 8,

DATE	SIZE RANGE (TL IN MM)		SALINITY (PPT)	ACCLIM. TEMP(C)	CONTROL TEMP(C)	EXPER. TEMP(C)	TIME(HRS.)		CONTROL		EXPERIMENTAL		
	MIN.	MAX.					FROM START	NO. ALIVE	NO. DEAD	NO. WITH L.O.E.	NO. ALIVE	NO. DEAD	NO. WITH L.O.E.
BREVOORTIA TYRANNUS													
10 JUL 74	50	65	4	26	26.2	14	0	10	-	-	10	-	-
							17.8	10	0	0	6	4	1
							24.2	10	0	0	5	5	0
							41.8	10	0	0	4	6	0
							96	10	0	0	2	8	0
17 JUL 74	53	63	4	25	24.4	12.4	0	6	-	-	6	-	-
							1	6	0	0	6	0	1
							20.5	6	0	0	3	3	1
							44.5	6	0	0	1	5	0
							72	6	0	0	0	6	0
23 JUL 74	53	76	6	27	27	17.5	0	10	-	-	10	-	-
							52.5	10	0	0	10	0	1
							69.5	10	0	0	9	1	0
							96	10	0	0	9	1	0
25 SEP 74	70	97	7.5	22	22.4	16.3	0	10	-	-	10	-	-
							96	10	0	0	10	0	0
25 SEP 74	70	97	7.5	22	22.4	12.3	0	10	-	-	10	-	-
							96	10	0	0	10	0	0
30 OCT 74	69	127	6.5	14	14	5.8	0	5	-	-	5	-	-
							0.08	5	0	0	5	0	2
							25.75	4	1	0	4	1	2
							45.75	4	1	0	4	1	3
							71.75	4	1	0	1	4	1
							96	4	1	0	0	5	0
12 NOV 74	70	102	6.3	12	11.9	9.9	0	10	-	-	10	-	-
							24	10	0	0	9	1	0
							45	10	0	1	9	1	1
							69	8	2	0	7	3	0
							96	8	2	0	7	3	1

Table 16 . - Continued.

DATE	SIZE RANGE (TL IN MM)		SALINITY (PPT)	ACCLIM. TEMP(C)	CONTROL TEMP(C)	EXPER. TEMP(C)	TIME(HRS.) FROM START NO.		CONTROL		EXPERIMENTAL		
	MIN.	MAX.					OF TEST	ALIVE	NO. DEAD	NO. WITH L.O.E.	NO. ALIVE	NO. DEAD	NO. WITH L.O.E.
BREVORTIA TYRANNUS													
12 NOV 74	71	104	6.3	12	11.9	7.6	0	10	-	-	10	-	-
							45	10	0	1	10	0	2
							69	8	2	0	8	2	3
							96	8	2	0	8	2	3
12 NOV 74	71	102	6.3	12	11.9	5.5	0	10	-	-	10	-	-
							21	10	0	0	10	0	6
							28	10	0	0	9	1	3
							45	10	0	1	8	2	5
							69	8	2	0	5	5	3
							96	8	2	0	2	8	1
9 JUN 75	38	53	5	20	20	14	0	10	-	-	10	-	-
							5	10	0	0	9	1	4
							22	10	0	0	5	5	0
							46	10	0	0	1	9	0
							70	10	0	0	0	10	0
14 JUN 75	40	52	5	22	22	16	0	10	-	-	10	-	-
							24	10	0	0	6	4	0
							48.5	10	0	0	5	5	0
							96	10	0	0	5	5	0
4 NOV 75	83	121	8	17	20.4	8.4	0	10	-	-	9	-	-
							1.5	10	0	0	9	0	2
							17.5	10	0	0	0	9	0
4 NOV 75	60	137	8	17	21.2	8.4	0	10	-	-	10	-	-
							2.2	10	0	0	10	0	3
							17.5	10	0	0	0	10	0
25 MAY 76	38	54	3	17	18.6	6.6	0	10	-	-	10	-	-
							5.25	10	0	0	4	6	4
							7.75	10	0	0	1	9	1
							10	10	0	0	0	10	0
7 JUL 76	54	64	6.5	27	26.2	22	0	10	-	-	9	-	-
							69	10	0	0	8	1	0
							96	10	0	0	8	1	0

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Table 16 . - Continued.

DATE	SIZE RANGE (TL IN MM)		SALINITY (PPT)	ACCLIM. TEMP(C)	CONTROL TEMP(C)	EXPER. TEMP(C)	TIME(HRS.) FROM START OF TEST	NO. ALIVE	CONTROL NO. DEAD	NO. WITH L.O.E.	EXPERIMENTAL		
	MIN.	MAX.									NO. ALIVE	NO. DEAD	NO. WITH L.O.E.
BREVORTIA TYRANNUS													
7 JUL 76	55	64	6	27	26.2	16.3	0	10	-	-	10	-	-
							96	10	0	0	10	0	0
20 JUL 76	63	95	6	27	27.1	16.4	0	10	-	-	10	-	-
							45	9	1	0	10	0	0
							68.5	8	2	0	10	0	0
							96	8	2	0	10	0	0
21 JUL 76	72	95	6.5	26	26.9	20.9	0	10	-	-	10	-	-
							23	9	1	0	10	0	0
							47.75	8	2	0	10	0	0
							96	8	2	0	10	0	0
22 JUL 76	71	87	6	27	26.6	16.6	0	10	-	-	10	-	-
							27.25	9	1	0	10	0	0
							96	9	1	0	10	0	0
3 AUG 76	67	77	7.5	27	26.4	21.9	0	9	-	-	10	-	-
							96	9	0	0	10	0	0
3 AUG 76	60	84	5.5	27	26.4	16.4	0	9	-	-	10	-	-
							96	9	0	0	10	0	0
17 MAY 77	32	43	6.5	20.5	19.5	10	0	10	-	-	10	-	-
							28	10	0	0	10	0	1
							45	10	0	0	9	1	0
							80	10	0	0	9	1	1
							96	10	0	0	8	2	0
17 MAY 77	32	47	6	20.5	19.5	8	0	10	-	-	10	-	-
							45	10	0	0	9	1	0
							96	10	0	0	9	1	1
17 MAY 77	32	44	6	20.5	19.5	6	0	10	-	-	10	-	-
							4.3	10	0	0	7	3	0
							21	10	0	0	6	4	0
							45	10	0	0	4	6	0
							67	10	0	0	3	7	0
							96	10	0	0	2	8	0

Table 16 . - Continued.

DATE	SIZE RANGE (TL IN MM)		SALINITY (PPT)	ACCLIM. TEMP(C)	CONTROL TEMP(C)	EXPER. TEMP(C)	TIME(HRS.) FROM START NO.		CONTROL		EXPERIMENTAL		
	MIN.	MAX.					OF TEST	ALIVE	NO. DEAD	NO. WITH L.O.E.	NO. ALIVE	NO. DEAD	NO. WITH L.O.E.
BREVOORTIA TYRANNUS													
26 MAY 77	35	52	5.5	24	22	12	0	10	-	-	10	-	-
							24	9	1	0	7	3	0
							96	9	1	0	7	3	0
26 MAY 77	36	51	6	24	22	9	0	10	-	-	10	-	-
							1.3	10	0	0	9	1	1
							7.5	9	1	0	7	3	0
							24	9	1	0	4	6	0
							78	9	1	0	2	8	0
							96	9	1	0	1	9	0
26 MAY 77	36	51	5.5	24	22	6	0	10	-	-	10	-	-
							0.1	10	0	0	6	4	6
							0.2	10	0	0	2	8	2
							0.25	10	0	0	1	9	1
							1	10	0	0	0	10	0
3 JUN 77	35	49	5.5	21	20	12	0	10	-	-	10	-	-
							96	10	0	0	10	0	0
3 JUN 77	37	49	5.5	21	20	8	0	10	-	-	10	-	-
							30	10	0	0	6	4	2
							49	10	0	0	2	8	1
							73	10	0	0	0	10	0
17 JUN 77	40	48	6	22	21.5	11.5	0	10	-	-	10	-	-
							68	9	1	0	8	2	0
							76	9	1	0	7	3	0
							96	9	1	0	7	3	0
17 JUN 77	40	48	6	22	21.5	9.5	0	10	-	-	10	-	-
							44	9	1	0	9	1	0
							67	9	1	0	5	5	2
							76	9	1	0	3	7	2
							91	9	1	0	2	8	1
							96	9	1	0	1	9	0

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Table 16 . - Continued.

DATE	SIZE RANGE (TL IN MM)		SALINITY (PPT)	ACCLIM. TEMP(C)	CONTROL TEMP(C)	EXPER. TEMP(C)	TIME (HRS.) FROM START		CONTROL			EXPERIMENTAL		
	MIN.	MAX.					NO. ALIVE	NO. DEAD	NO. WITH L.O.E.	NO. ALIVE	NO. DEAD	NO. WITH L.O.E.		
BREVORTIA TYRANNUS														
17 JUN 77	40	48	6	22	21.5	9	0	10	-	-	10	-	-	
							44	9	1	0	9	1	0	
							67	9	1	0	5	5	1	
							91	9	1	0	4	6	2	
							96	9	1	0	3	7	1	
17 JUN 77	39	48	5	22	21.5	7	0	10	-	-	10	-	-	
							26	9	1	0	5	5	2	
							44	9	1	0	0	10	0	
17 JUN 77	40	48	5	22	21.5	7	0	10	-	-	10	-	-	
							0.1	10	0	0	10	0	3	
							26	9	1	0	0	10	0	
6 JUL 77	57	67	7	27.5	27.5	18	0	10	-	-	9	-	-	
							96	10	0	0	9	0	0	
6 JUL 77	57	67	6	27.5	27.5	14.5	0	10	-	-	9	-	-	
							46	10	0	0	8	1	0	
							96	10	0	0	8	1	0	
6 JUL 77	53	73	6.5	27.5	27.5	12	0	10	-	-	10	-	-	
							71	10	0	0	9	1	0	
							96	10	0	0	8	2	1	
6 JUL 77	57	68	6	27.5	27.5	10	0	10	-	-	10	-	-	
							0.1	10	0	0	10	0	1	
							0.2	10	0	0	9	1	1	
							22	10	0	0	3	7	3	
							29	10	0	0	0	10	0	
13 JUL 77	43	73	7	27.5	28	18	0	10	-	-	8	-	-	
							96	10	0	0	8	0	0	
13 JUL 77	43	73	6	27.5	28	14	0	10	-	-	10	-	-	
							96	10	0	0	10	0	0	

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Table 16 . - Continued.

DATE	SIZE RANGE (TL IN MM)		SALINITY (PPT)	ACCLIM. TEMP(C)	CONTROL TEMP(C)	EXPER. TEMP(C)	TIME(HRS.) FROM START NO.		CONTROL		EXPERIMENTAL		
	MIN.	MAX.					ALIVE	NO. DEAD	NO. WITH L.O.E.	NO. ALIVE	NO. DEAD	NO. WITH L.O.E.	
BREVORTIA TYRANNUS													
13 JUL 77	43	73	6.5	27.5	28	12.5	0	10	-	-	10	-	-
							24	10	0	0	9	1	0
							96	10	0	0	7	3	2
13 JUL 77	43	72	5.5	27.5	28	9.5	0	10	-	-	10	-	-
							3.5	10	0	0	10	0	5
							6	10	0	0	9	1	4
							13.5	10	0	0	0	10	0
24 AUG 77	44	65	6.5	25	24.5	17	0	10	-	-	10	-	-
							96	10	0	0	10	0	0
24 AUG 77	44	65	4.5	25	24.5	12.5	0	10	-	-	10	-	-
							22	10	0	0	6	4	1
							47	10	0	0	2	8	1
							54	10	0	0	2	8	2
							75	10	0	0	0	10	0
31 AUG 77	61	82	8	26	26	17.5	0	10	-	-	10	-	-
							56	9	1	0	10	0	1
							80	9	1	0	9	1	0
							96	8	2	0	9	1	0
31 AUG 77	61	80	7.5	26	26	16	0	10	-	-	10	-	-
							96	8	2	0	10	0	0
31 AUG 77	61	78	8.5	26	26	13.5	0	10	-	-	10	-	-
							48	9	1	0	10	0	1
							56	9	1	0	9	1	0
							96	8	2	0	9	1	0
31 AUG 77	61	80	7.5	26	26	11	0	10	-	-	10	-	-
							24	9	1	0	9	1	0
							48	9	1	0	6	4	2
							56	9	1	0	5	5	1
							80	9	1	0	4	6	0
							96	8	2	0	4	6	1

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Table 16 .- Continued.

DATE	SIZE RANGE (TL IN MM)		SALINITY (PPT)	ACCLIM. TEMP(C)	CONTROL TEMP(C)	EXPER. TEMP(C)	TIME(HRS.) FROM START OF TEST	NO. ALIVE	CONTROL		EXPERIMENTAL		
	MIN.	MAX.							NO. DEAD	NO. WITH L.O.E.	NO. ALIVE	NO. DEAD	NO. WITH L.O.E.
BREVORTIA TYRANNUS													
14 SEP 77	68	84	9	19.5	22	15	0 96	10 9	- 1	- 0	10 10	- 0	- 0
14 SEP 77	68	88	8.5	19.5	22	13	0 96	10 9	- 1	- 0	10 10	- 0	- 0
14 SEP 77	68	88	7	19.5	22	11	0 76 96	10 9 9	- 1 1	- 0 0	10 10 10	- 0 0	- 1 1
26 OCT 77	66	95	8	11.5	11	9	0 96	10 10	- 0	- 0	10 10	- 0	- 0
26 OCT 77	66	91	10	11.5	11	7	0 48 56 73 96	10 10 10 10 10	- 0 0 0 0	- 0 0 0 0	10 10 9 9 9	- 0 1 1 1	- 1 0 2 6
26 OCT 77	67	92	7.5	11.5	11	5	0 48 52 73 96	10 10 10 10 10	- 0 0 0 0	- 0 0 0 0	10 10 8 8 6	- 0 2 2 4	- 3 2 4 3
26 OCT 77	63	96	6	11.5	11	3	0 4.2 24 26 32 48	10 10 10 10 10 10	- 0 0 0 0 0	- 0 0 0 0 0	10 8 5 4 2 0	- 2 5 6 8 10	- 8 5 4 2 0
15 NOV 77	67	82	9	6	6.5	4	0 30 71 78 96	10 10 10 10 10	- 0 0 0 0	- 0 0 0 0	10 9 5 4 0	- 1 5 6 10	- 5 5 4 0

Table 16 . - Continued.

DATE	SIZE RANGE (TL IN MM)		SALINITY (PPT)	ACCLIM. TEMP(C)	CONTROL TEMP(C)	EXPER. TEMP(C)	TIME(HRS.) FROM START NO.		CONTROL		EXPERIMENTAL		
	MIN.	MAX.					OF TEST	ALIVE	NO. DEAD	NO. WITH L.O.E.	NO. ALIVE	NO. DEAD	NO. WITH L.O.E.
BREVOORTIA TYRANNUS													
15 NOV 77	66	87	7.5	6	6.5	2	0	10	-	-	10	-	-
							0.1	10	0	0	10	0	8
							23	10	0	0	8	2	8
							30	10	0	0	5	5	5
							54	10	0	0	0	10	0
15 NOV 77	65	91	8.5	6	6	1	0	10	-	-	10	-	-
							0.1	10	0	0	10	0	10
							5.8	10	0	0	8	2	8
							7.1	10	0	0	5	5	5
							22	10	0	0	0	10	0
23 NOV 77	66	108	10	5	4	2	0	10	-	-	10	-	-
							0.1	10	0	0	10	0	7
							28	10	0	0	9	1	5
							48	10	0	0	6	4	6
							54	10	0	0	5	5	5
79	10	0	0	0	10	0							
23 NOV 77	66	109	8.5	5	4	1	0	10	-	-	10	-	-
							0.1	10	0	0	10	0	10
							28	10	0	0	7	3	7
							48	10	0	0	5	5	5
							54	10	0	0	4	6	4
79	10	0	0	0	10	0							
23 NOV 77	66	100	10	5	4	0.2	0	10	-	-	10	-	-
							0.1	10	0	0	10	0	10
							7.2	10	0	0	5	5	5
							28	10	0	0	0	10	0
29 NOV 77	68	103	10	6	5.5	3	0	8	-	-	8	-	-
							47	8	0	0	8	0	6
							71	8	0	0	7	1	7
							79	8	0	0	6	2	6
							96	8	0	0	4	4	4

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Table 17 . Summary of all cold shock tests on Atlantic menhaden, Brevoortia tyrannus, after 4-, 24-, 48-, 72-, and 96-hour exposure times over a range of acclimation temperatures.

DATE	TOTAL LENGTH (MM)			SALINITY (PPT)	ACCLIM. TEMP.		EXPER. TEMP. (C)	TEMP. (F)	NO. OF EXP. ORG.	4 HOUR % MORT.	24 HOUR % MORT.	48 HOUR % MORT.	72 HOUR % MORT.	96 HOUR % MORT.
	MIN.	MAX.	MEAN		(C)	(F)								
BREVOORTIA TYRANNUS														
10 JUL 74	50	65	54.7	4	26	79	14	57	10	0	40	60	60	80
17 JUL 74	53	63	57	4	25	77	12.4	54	6	0	50	83	100	100
23 JUL 74	57	75	59.5	6	27	81	17.5	64	10	0	0	0	10	10
25 SEP 74	80	94	88.3	7.5	22	72	16.3	61	10	0	0	0	0	0
25 SEP 74	77	94	83.2	7.5	22	72	12.3	54	10	0	0	0	0	0
30 OCT 74	78	127	98	6.5	14	57	5.8	42	5	0	0	20	80	100
12 NOV 74	70	94	83.5	6.3	12	54	9.9	50	10	0	10	10	30	30
12 NOV 74	71	104	86.1	6.3	12	54	7.6	46	10	0	0	0	20	20
12 NOV 74	71	99	85.3	6.3	12	54	5.5	42	10	0	0	20	50	80
9 JUN 75	38	53	48	5	20	68	14	57	10	0	50	90	100	100
14 JUN 75	40	52	45.6	5	22	72	16	61	10	0	40	40	50	50
4 NOV 75	83	120	101.6	8	17	63	8.4	47	9	0	100	100	100	100
4 NOV 75	83	137	97.3	8	17	63	8.4	47	10	0	100	100	100	100
25 MAY 76	38	54	47.4	3	17	63	6.6	44	10	0	100	100	100	100
7 JUL 76	54	63	57.3	6.5	27	81	22	72	9	0	0	0	11	11
7 JUL 76	55	61	58.5	6	27	81	16.3	61	10	0	0	0	0	0
20 JUL 76	63	95	82.2	6	27	81	16.4	62	10	0	0	0	0	0
21 JUL 76	83	95	89.4	6.5	26	79	20.9	70	10	0	0	0	0	0
22 JUL 76	71	87	77.4	6	27	81	16.6	62	10	0	0	0	0	0
3 AUG 76	67	77	71	7.5	27	81	21.9	71	10	0	0	0	0	0

Table 17. -- Continued.

DATE	TOTAL LENGTH (MM)			SALINITY (PPT)	ACCLIM. (C)	TEMP. (F)	EXPER. (C)	TEMP. (F)	NO. OF EXP.	OF ORG.	4 HOUR	24 HOUR	48 HOUR	72 HOUR	96 HOUR
	MIN.	MAX.	MEAN								% MORT.	% MORT.	% MORT.	% MORT.	% MORT.
BREVOORTIA TYRANNUS															
3 AUG 76	60	75	69.7	5.5	27	81	16.4	62	10		0	0	0	0	0
17 MAY 77	33	43	40	6.5	20.5	69	10	50	10		0	0	10	10	20
17 MAY 77	33	47	39.5	6	20.5	69	8	46	10		0	0	10	10	10
17 MAY 77	35	44	38.5	6	20.5	69	6	43	10		0	40	60	70	80
26 MAY 77	35	52	42.2	5.5	24	75	12	54	10		0	30	30	30	30
26 MAY 77	36	51	44.8	6	24	75	9	48	10		10	60	60	60	90
26 MAY 77	42	49	45	5.5	24	75	6	43	10		100	100	100	100	100
3 JUN 77	35	42	39.6	5.5	21	70	12	54	10		0	0	0	0	0
3 JUN 77	38	47	42.4	5.5	21	70	8	46	10		0	0	40	80	100
17 JUN 77	41	45	42.9	6	22	72	11.5	53	10		0	0	0	20	30
17 JUN 77	40	46	43	6	22	72	9.5	49	10		0	0	10	50	90
17 JUN 77	40	45	41.9	6	22	72	9	48	10		0	0	10	50	70
17 JUN 77	39	47	43	5	22	72	7	45	10		0	0	100	100	100
17 JUN 77	40	45	42.8	5	22	72	7	45	10		0	0	100	100	100
6 JUL 77	61	66	63	7	27.5	82	18	64	9		0	0	0	0	0
6 JUL 77	60	65	62.3	6	27.5	82	14.5	58	9		0	0	11	11	11
6 JUL 77	53	73	62.7	6.5	27.5	82	12	54	10		0	0	0	10	20
6 JUL 77	59	68	63.4	6	27.5	82	10	50	10		10	70	100	100	100
13 JUL 77	50	73	60.1	7	27.5	82	18	64	8		0	0	0	0	0
13 JUL 77	46	73	62	6	27.5	82	14	57	10		0	0	0	0	0

Table 17.- Continued.

DATE	TOTAL LENGTH (MM)			SALINITY (PPT)	ACCLIM. (C)	TEMP. (F)	EXPER. (C)	TEMP. (F)	NO. OF EXP. ORG.	4 HOUR	24 HOUR	48 HOUR	72 HOUR	96 HOUR
	MIN.	MAX.	MEAN							% MORT.	% MORT.	% MORT.	% MORT.	% MORT.
BREVOORTIA TYRANNUS														
13 JUL 77	45	73	57.8	6.5	27.5	82	12.5	55	10	0	10	10	10	30
13 JUL 77	57	72	65.1	5.5	27.5	82	9.5	49	10	0	100	100	100	100
24 AUG 77	50	65	60.6	6.5	25	77	17	63	10	0	0	0	0	0
24 AUG 77	53	65	58.1	4.5	25	77	12.5	55	10	0	40	80	80	100
31 AUG 77	68	82	74.5	8	26	79	17.5	64	10	0	0	0	0	10
31 AUG 77	70	80	73.6	7.5	26	79	16	61	10	0	0	0	0	0
31 AUG 77	68	76	73.2	8.5	26	79	13.5	56	10	0	0	0	10	10
31 AUG 77	69	80	73	7.5	26	79	11	52	10	0	10	40	50	60
14 SEP 77	71	84	78.1	9	19.5	67	15	59	10	0	0	0	0	0
14 SEP 77	69	88	77.5	8.5	19.5	67	13	55	10	0	0	0	0	0
14 SEP 77	71	88	78.4	7	19.5	67	11	52	10	0	0	0	0	0
26 OCT 77	66	95	76.6	8	11.5	53	9	48	10	0	0	0	0	0
26 OCT 77	66	80	72.7	10	11.5	53	7	45	10	0	0	0	10	10
26 OCT 77	69	92	77.1	7.5	11.5	53	5	41	10	0	0	0	20	40
26 OCT 77	63	96	75.5	6	11.5	53	3	37	10	0	50	100	100	100
15 NOV 77	67	81	74.4	9	6	43	4	39	10	0	0	10	50	100
15 NOV 77	66	87	75.7	7.5	6	43	2	36	10	0	20	50	100	100
15 NOV 77	65	91	76.9	8.5	6	43	1	34	10	0	100	100	100	100
23 NOV 77	68	108	82.3	10	5	41	2	36	10	0	0	40	50	100
23 NOV 77	70	109	77.7	8.5	5	41	1	34	10	0	0	50	60	100

Table 17 . - Continued.

DATE	TOTAL LENGTH (MM)			SALINITY (PPT)	ACCLIM. TEMP. (C)		EXPER. TEMP. (C)		NO. OF EXP. ORG.	4 HOUR	24 HOUR	48 HOUR	72 HOUR	96 HOUR
	MIN.	MAX.	MEAN		(F)	(F)	% MORT.	% MORT.		% MORT.	% MORT.	% MORT.		
BREVOORTIA TYRANNUS														
23 NOV 77	67	100	80.6	10	5	41	0.2	32	10	0	50	100	100	100
29 NOV 77	68	78	74	10	6	43	3	37	8	0	0	0	12.5	50

Table 18 . - A chronological summary of cold shock experiments on bay anchovy, Anchoa mitchilli. All tests were conducted at near air saturated levels of dissolved oxygen and pH of 7 to 8.

DATE	SIZE RANGE (TL IN MM)		SALINITY (PPT)	ACCLIM. TEMP(C)	CONTROL TEMP(C)	EXPER. TEMP(C)	TIME(HRS.)		CONTROL		EXPERIMENTAL		
	MIN.	MAX.					FROM START	NO. ALIVE	NO. DEAD	NO. WITH L.O.E.	NO. ALIVE	NO. DEAD	NO. WITH L.O.E.
ANCHOA MITCHILLI													
26 JUN 74	52	66	4	21	21	8	0	10	-	-	10	-	-
							1	10	0	0	10	0	9
							21	10	0	0	1	9	1
							24	10	0	0	0	10	0
3 JUL 74	54	64	4	24	24	10	0	10	-	-	10	-	-
							2	10	0	0	10	0	9
							18	10	0	0	0	10	0
17 JUL 74	50	66	4	25	24.5	12.5	0	10	-	-	10	-	-
							20.5	10	0	0	4	6	3
							24	10	0	0	3	7	3
							28	9	1	0	2	8	2
							44.5	8	2	0	1	9	0
							48	8	2	0	0	10	0
23 JUL 74	47	62	6	27	27	17.5	0	10	-	-	10	-	-
							20	10	0	0	9	1	0
							24	10	0	0	8	2	0
							96	10	0	0	8	2	0
22 AUG 74	25	70	8	24	24	17	0	5	-	-	9	-	-
							19	5	0	0	9	0	1
							24	5	0	0	8	1	0
							48	5	0	0	7	2	0
							91	5	0	0	3	6	0
							96	5	0	0	3	6	0
22 AUG 74	35	72	8	24	24	15	0	5	-	-	9	-	-
							19	5	0	0	8	1	1
							48	5	0	0	5	4	1
							91	5	0	0	3	6	1
							96	5	0	0	2	7	0

Table 18 . - Continued.

DATE	SIZE RANGE (TL IN MM)		SALINITY (PPT)	ACCLIM. TEMP(C)	CONTROL TEMP(C)	EXPER. TEMP(C)	TIME(HRS.)		CONTROL		EXPERIMENTAL		
	MIN.	MAX.					FROM START OF TEST	NO. ALIVE	NO. DEAD	NO. WITH L.O.E.	NO. ALIVE	NO. DEAD	NO. WITH L.O.E.
ANCHOVA MITCHILLI													
2 OCT 74	28	52	7.2	20	20	14.5	0	10	-	-	10	-	-
							21.5	10	0	0	9	1	1
							49	10	0	0	6	4	1
							75.5	10	0	0	5	5	3
							96	9	1	0	2	8	0
2 OCT 74	26	55	7.2	20	20	10	0	10	-	-	10	-	-
							20.5	10	0	0	8	2	7
							29	10	0	0	7	3	7
							49	10	0	0	0	10	0
30 OCT 74	25	36	6.5	14	14	10	0	10	-	-	10	-	-
							96	10	0	0	10	0	0
30 OCT 74	26	37	6.5	14	14	9	0	10	-	-	10	-	-
							26	10	0	0	10	0	1
							72	10	0	0	9	1	0
							96	10	0	0	9	1	0
30 OCT 74	23	36	6.5	14	14	6	0	10	-	-	10	-	-
							0.1	10	0	0	10	0	2
							46	10	0	0	9	1	4
							53	10	0	0	8	2	5
							72	10	0	0	4	6	2
							96	10	0	0	1	9	0
20 OCT 75	44	74	6	17	18.5	10	0	10	-	-	5	-	-
							6.5	10	0	0	3	2	1
							22	10	0	3	0	5	0
27 APR 76	45	56	4	15	15	3	0	10	-	-	10	-	-
							0.1	10	0	0	0	10	0
4 JUN 76	41	74	4	18	18	6	0	5	-	-	5	-	-
							1.3	5	0	0	0	5	0

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Table 18 . - Continued.

DATE	SIZE RANGE (TL IN MM)		SALINITY (PPT)	ACCLIM. TEMP(C)	CONTROL TEMP(C)	EXPER. TEMP(C)	TIME(HRS.)		CONTROL		EXPERIMENTAL		
	MIN.	MAX.					FROM START OF TEST	NO. ALIVE	NO. DEAD	NO. WITH L.O.E.	NO. ALIVE	NO. DEAD	NO. WITH L.O.E.
ANCHOA MITCHILLI													
14 JUL 76	51	68	6.5	25	26	16.5	0	9	-	-	9	-	-
							17	8	1	0	9	0	1
							18.5	8	1	0	8	1	0
							50	8	1	0	6	3	0
							65	8	1	0	5	4	1
						96	8	1	0	4	5	0	
20 JUL 76	22	39	6	27	27	16.5	0	10	-	-	10	-	-
							96	10	0	0	10	0	0
21 JUL 76	22	29	6.5	26	27	21	0	10	-	-	10	-	-
							96	10	0	0	10	0	0
27 JUL 76	25	47	6.5	27	26.5	22	0	10	-	-	9	-	-
							29	9	1	1	8	1	0
							96	9	1	0	8	1	0
27 JUL 76	25	47	6	27	26.5	16.5	0	10	-	-	10	-	-
							0.1	10	0	0	10	0	2
							4.8	10	0	0	9	1	0
							29	9	1	0	8	2	0
							96	9	1	0	8	2	0
3 AUG 76	22	35	7.5	25	26.5	22	0	10	-	-	10	-	-
							25.3	10	0	0	10	0	1
							41	9	1	0	9	1	0
							96	9	1	0	9	1	0
3 AUG 76	25	34	5.5	25	26.5	16.5	0	10	-	-	10	-	-
							18	10	0	0	9	1	0
							96	10	0	0	8	2	0
1 SEP 76	20	47	6	25	25	14	0	10	-	-	10	-	-
							54	9	1	0	9	1	0
							96	8	2	0	9	1	0

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Table 18. - Continued.

DATE	SIZE RANGE (TL IN MM) MIN. MAX.	SALINITY (PPT)	ACCLIM. TEMP(C)	CONTROL TEMP(C)	EXPER. TEMP(C)	TIME(HRS.) FROM START OF TEST	CONTROL		EXPERIMENTAL		
							NO. ALIVE	NO. DEAD	NO. L.O.E.	NO. ALIVE	NO. DEAD
ANCHUA MITCHILLI											
26 OCT 76	28	55	8	16	12	3	0	10	10	10	10
						0.1	10	0	10	5	5
						3	10	0	10	8	2
						8	10	0	0	9	1
						23	10	0	0	10	0
						25	10	0	0	10	0
27 OCT 76	28	55	8	12	12	5	0	10	20	10	17
						6	10	0	20	0	13
						22	10	0	13	7	13
						46	9	1	5	15	5
						50.5	9	1	1	19	1
						53.5	9	1	0	20	0
3 MAY 77	47	85	6	17	17	4	0	10	10	10	10
						0.5	10	0	10	0	0
						4	10	0	0	10	0
4 MAY 77	48	68	6.5	16.5	18	10	0	10	10	10	0
						96	10	0	10	0	0
4 MAY 77	46	68	6	16.5	18	8	0	10	10	10	2
						0.5	10	0	10	0	1
						56	10	0	9	1	1
						80	10	0	8	2	0
						96	10	0	7	3	0
4 MAY 77	47	68	6	16.5	18	6	0	10	10	10	7
						0.1	10	0	10	0	7
						24	10	0	5	5	2
						31	10	0	3	7	1
						47	10	0	2	8	0
						96	10	0	1	9	0
4 MAY 77	47	68	6	16.5	18	4	0	10	9	10	9
						0.1	10	0	9	0	9
						6.8	10	0	7	2	7
						23	10	0	2	7	2
						47	10	0	1	8	1
						79	10	0	0	9	0

Table 18. - Continued.

DATE	SIZE RANGE (TL IN MM)		SALINITY (PPT)	ACCLIM. TEMP(C)	CONTROL TEMP(C)	EXPER. TEMP(C)	TIME(HRS.) FROM START NO.		CONTROL		EXPERIMENTAL		
	MIN.	MAX.					OF TEST	ALIVE	NO. DEAD	NO. WITH L.O.E.	NO. ALIVE	NO. DEAD	NO. WITH L.O.E.
ANCHOA MITCHILLI													
17 MAY 77	45	69	5.5	21	19.5	12	0	10	-	-	10	-	-
							28	9	1	0	10	0	1
							44	9	1	1	9	1	0
							66	8	2	0	9	1	0
							96	8	2	1	9	1	0
17 MAY 77	45	73	6.5	21	19.5	10	0	10	-	-	10	-	-
							20	9	1	0	10	0	0
							46	8	2	0	9	1	0
							96	8	2	1	9	1	1
17 MAY 77	45	75	6	21	19.5	8	0	10	-	-	10	-	-
							0.25	10	0	0	10	0	2
							20	9	1	0	9	1	3
							44	9	1	1	6	4	0
							80	8	2	0	4	6	1
							96	8	2	1	4	6	1
17 MAY 77	45	66	6	21	19	6.5	0	10	-	-	10	-	-
							0.25	10	0	0	10	0	10
							3.8	10	0	0	8	2	8
							20	9	1	0	0	10	0
26 MAY 77	44	65	5.5	24	23.5	12.5	0	10	-	-	10	-	-
							0.1	10	0	0	10	0	1
							30	10	0	1	9	1	1
							51	10	0	3	7	3	0
							96	10	0	0	7	3	0
26 MAY 77	44	65	6	24	23.5	9	0	10	-	-	10	-	-
							0.1	10	0	0	10	0	3
							23	10	0	0	9	1	2
							51	10	0	3	5	5	2
							78	10	0	0	1	9	1
							96	10	0	0	1	9	1
1 JUN 77	42	77	5.5	21	21	12	0	10	-	-	10	-	-
							54	10	0	0	10	0	1
							77	10	0	0	9	1	0
							96	10	0	0	9	1	0

Table 18. - Continued.

DATE	SIZE RANGE (TL IN MM)		SALINITY (PPT)	ACCLIM. TEMP(C)	CONTROL TEMP(C)	EXPER. TEMP(C)	TIME(HRS.) FROM START NO.		CONTROL		EXPERIMENTAL		
	MIN.	MAX.					OF TEST	ALIVE	NO. DEAD	NO. WITH L.O.E.	NO. ALIVE	NO. DEAD	NO. WITH L.O.E.
ANCHOA MITCHILLI													
1 JUN 77	42	71	5.5	21	21	8	0	10	-	-	10	-	-
							0.1	10	0	0	10	0	10
							20	10	0	0	6	4	3
							30	10	0	0	3	7	0
							46	10	0	0	2	8	2
						54	10	0	0	0	10	0	
22 JUN 77	58	71	7.5	25	23.5	12	0	10	-	-	10	-	-
							78	10	0	1	9	1	0
							96	10	0	1	9	1	1
22 JUN 77	58	70	5.5	25	23.5	10	0	10	-	-	10	-	-
							0.1	10	0	0	10	0	2
							24	10	0	1	6	4	4
							32	10	0	1	3	7	3
							48	10	0	1	0	10	0
22 JUN 77	57	72	5.5	25	23.5	8	0	10	-	-	9	-	-
							6.3	10	0	0	8	1	8
							7.8	10	0	0	5	4	6
							24	10	0	1	2	7	2
							32	10	0	1	1	8	1
						48	10	0	1	0	9	0	
22 JUN 77	56	76	5	25	23	6	0	10	-	-	10	-	-
							0.1	10	0	0	10	0	10
							0.5	10	0	0	6	4	6
							1	10	0	0	0	10	0
6 JUL 77	55	74	7	27.5	27.5	18	0	10	-	-	10	-	-
							96	10	0	0	10	0	0
6 JUL 77	55	75	6	27.5	27.5	14.5	0	10	-	-	10	-	-
							71	10	0	0	9	1	0
							96	10	0	0	9	1	0

Table 18. - Continued.

DATE	SIZE RANGE (TL IN MM)		SALINITY (PPT)	ACCLIM. TEMP(C)	CONTROL TEMP(C)	EXPER. TEMP(C)	TIME(HRS.)		CONTROL		EXPERIMENTAL		
	MIN.	MAX.					FROM START OF TEST	NO. ALIVE	NO. DEAD	NO. WITH L.O.E.	NO. ALIVE	NO. DEAD	NO. WITH L.O.E.
ANCHOA MITCHILLI													
6 JUL 77	55	75	6.5	29	27.5	12	0	10	-	-	9	-	-
							21	10	0	0	8	1	1
							28	10	0	0	6	3	1
							45	10	0	0	4	5	1
							70	10	0	0	3	6	0
							96	10	0	0	1	8	1
6 JUL 77	55	76	6	29	27.5	10	0	10	-	-	10	-	-
							0.1	10	0	0	10	0	10
							5.5	10	0	0	9	1	8
							21	10	0	0	0	10	0
21 JUL 77	34	68	7	28	29	20	0	10	-	-	10	-	-
							23	10	0	0	7	3	0
							48	10	0	0	5	5	0
							96	9	1	0	5	5	0
21 JUL 77	34	45	5.5	28	29	16	0	10	-	-	10	-	-
							23	10	0	0	8	2	1
							31	10	0	0	6	4	0
							76	9	1	0	5	5	0
							96	9	1	0	4	6	0
21 JUL 77	34	45	6	28	29	13	0	10	-	-	10	-	-
							0.1	10	0	0	10	0	10
							1	10	0	0	9	1	9
							4	10	0	0	6	4	6
							7	10	0	0	3	7	3
							23	10	0	0	0	10	0
21 JUL 77	32	45	5	28	29	10	0	10	-	-	10	-	-
							0.1	10	0	0	10	0	10
							0.2	10	0	0	4	6	4
							1	10	0	0	2	8	2
							4	10	0	0	0	10	0

Table 18 . - Continued.

DATE	SIZE RANGE (TL IN MM)		SALINITY (PPT)	ACCLIM. TEMP(C)	CONTROL TEMP(C)	EXPER. TEMP(C)	TIME(HRS.)		CONTROL		EXPERIMENTAL		
	MIN.	MAX.					FROM START OF TEST	NO. ALIVE	NO. DEAD	NO. WITH L.O.E.	NO. ALIVE	NO. DEAD	NO. WITH L.O.E.
ANCHOGA MITCHILLI													
2 AUG 77	22	44	7.5	26.5	26	13	0	10	-	-	10	-	-
							0.2	10	0	0	10	0	3
							2.6	10	0	0	10	0	0
							6.6	10	0	0	10	0	4
							10.6	10	0	0	10	0	7
							22	9	1	1	0	10	0
2 AUG 77	25	47	5	26.5	26	10	0	10	-	-	10	-	-
							0.1	10	0	0	10	0	10
							2.6	10	0	0	8	2	8
							5.6	10	0	0	0	10	0
18 AUG 77	28	51	4.5	27	26.5	11.5	0	20	-	-	20	-	-
							0.1	20	0	0	20	0	16
							0.2	20	0	0	18	2	15
							3.1	20	0	0	14	6	12
							5.6	20	0	0	5	15	5
							7	20	0	0	0	20	0
1 SEP 77	36	76	8	25	26	17.5	0	8	-	-	10	-	-
							23	8	0	0	9	1	0
							96	8	0	0	9	1	0
1 SEP 77	31	79	7.5	25	26	16	0	8	-	-	10	-	-
							56	8	0	0	9	1	0
							96	8	0	0	8	2	0
1 SEP 77	32	76	8.5	25	26	13.5	0	8	-	-	10	-	-
							7	8	0	0	10	0	2
							23	8	0	0	8	2	4
							31	8	0	0	6	4	3
							55	8	0	0	1	9	1
							76	8	0	0	0	10	0
1 SEP 77	39	81	7.5	25	26	11	0	8	-	-	10	-	-
							0.1	8	0	0	10	0	2
							2.8	8	0	0	9	1	1
							23	8	0	0	6	4	6
							31	8	0	0	4	6	4
							56	8	0	0	0	10	0

Table 18 . - Continued.

DATE	SIZE RANGE (TL IN MM)		SALINITY (PPT)	ACCLIM. TEMP(C)	CONTROL TEMP(C)	EXPER. TEMP(C)	TIME(HRS.)		CONTROL		EXPERIMENTAL		
	MIN.	MAX.					FROM START OF TEST	NO. ALIVE	NO. DEAD	NO. WITH L.O.E.	NO. ALIVE	NO. DEAD	NO. WITH L.O.E.
ANCHOA MITCHILLI													
8 SEP 77	35	46	7	24	24.5	17.5	0	10	-	-	10	-	-
							50	10	0	0	9	1	0
							72	10	0	0	8	2	0
							96	10	0	0	8	2	0
8 SEP 77	33	50	7	24	24.5	16	0	10	-	-	10	-	-
							8	10	0	0	9	1	0
							24	10	0	0	8	2	0
							28	10	0	0	8	2	1
							48	10	0	0	6	4	0
8 SEP 77	33	44	5.5	24	24	14	0	10	-	-	10	-	-
							24	10	0	0	9	1	3
							32	10	0	0	6	4	3
							50	10	0	0	1	9	0
							72	10	0	0	0	10	0
8 SEP 77	35	44	6.5	24	24.5	12.5	0	10	-	-	9	-	-
							8	10	0	0	9	0	3
							24	10	0	0	2	7	2
							28	10	0	0	1	8	1
							30	10	0	0	0	9	0
13 SEP 77	27	59	9	21	22	17.5	0	20	-	-	20	-	-
							7	20	0	0	20	0	1
							24	20	0	0	19	1	1
							47	19	1	0	18	2	2
							72	19	1	0	17	3	1
							96	19	1	0	17	3	1
13 SEP 77	27	67	9	21	22	15	0	20	-	-	20	-	-
							24	20	0	0	19	1	2
							31	20	0	0	18	2	2
							72	19	1	0	16	4	0
							96	19	1	0	15	5	2
13 SEP 77	27	52	8.5	21	22	13	0	20	-	-	20	-	-
							24	20	0	0	19	2	4
							47	19	1	0	14	6	5
							54	19	1	0	11	9	2
							72	19	1	0	9	11	0
							96	19	1	0	8	12	1

Table 18. - Continued.

DATE	SIZE RANGE (TL IN MM)		SALINITY (PPT)	ACCLIM. TEMP(C)	CONTROL TEMP(C)	EXPER. TEMP(C)	TIME(HRS.)		CONTROL		EXPERIMENTAL		
	MIN.	MAX.					FROM START OF TEST	NO. ALIVE	NO. DEAD	NO. WITH L.O.E.	NO. ALIVE	NO. DEAD	NO. WITH L.O.E.
ANCHOA MITCHILLI													
13 SEP 77	27	52	7	21	22	11	0	20	-	-	18	-	-
							24	20	0	0	16	2	14
							31	20	0	0	12	6	10
							47	19	1	0	10	8	9
							72	19	1	0	3	15	3
							96	19	1	0	2	16	2
21 SEP 77	33	50	10.5	25	23	16	0	10	-	-	10	-	-
							23	10	0	0	10	0	4
							31	10	0	0	9	1	2
							47	10	0	0	7	3	1
							56	10	0	0	6	4	0
							96	8	2	0	6	4	0
21 SEP 77	32	50	11	25	23	12	0	10	-	-	10	-	-
							7	10	0	0	10	0	6
							23	10	0	0	6	4	3
							47	10	0	0	4	6	4
							56	10	0	0	3	7	3
							72	8	2	0	0	10	0
21 SEP 77	31	50	9.5	25	23	10	0	10	-	-	8	-	-
							7	10	0	0	8	0	6
							23	10	0	0	3	5	3
							31	10	0	0	0	8	0
27 SEP 77	30	48	10	22.5	22	16	0	10	-	-	10	-	-
							69	10	0	0	9	1	0
							76	10	0	0	9	1	1
							96	10	0	0	8	2	1
13 OCT 77	32	56	10.5	16	16.5	14	0	10	-	-	10	-	-
							96	10	0	0	10	0	0
13 OCT 77	31	51	10	16	16.5	9	0	10	-	-	10	-	-
							13.8	10	0	0	10	0	3
							30	10	0	0	10	0	8
							51	10	0	0	2	8	1
							77	10	0	0	0	10	0

Table 18 . - Continued.

DATE	SIZE RANGE (TL IN MM)		SALINITY (PPT)	ACCLIM. TEMP(C)	CONTROL TEMP(C)	EXPER. TEMP(C)	TIME(HRS.)		CONTROL		EXPERIMENTAL		
	MIN.	MAX.					FROM START OF TEST	NO. ALIVE	NO. DEAD	NO. WITH L.O.E.	NO. ALIVE	NO. DEAD	NO. WITH L.O.E.
ANCHOA MITCHILLI													
13 OCT 77	33	57	8	16	16.5	7	0	10	-	-	10	-	-
							6.3	10	0	0	10	0	5
							22	10	0	0	8	2	7
							30	10	0	0	6	4	5
							51	10	0	0	1	9	1
							77	10	0	0	0	10	0
26 OCT 77	32	55	8	11	11	9	0	10	-	-	10	-	-
							6.8	10	0	1	10	0	1
							54	8	2	0	9	1	0
							96	8	2	1	8	2	0
26 OCT 77	29	53	10	11	11	7	0	10	-	-	10	-	-
							22	10	0	1	10	0	2
							47	8	2	0	8	2	3
							52	8	2	0	7	3	2
							72	8	2	0	5	5	0
							96	8	2	1	5	5	0
26 OCT 77	36	53	7.5	11	11	5	0	10	-	-	10	-	-
							25	10	0	2	9	1	2
							31	9	1	1	8	2	1
							47	8	2	0	7	3	2
							72	8	2	0	6	4	3
							96	8	2	1	3	7	3
26 OCT 77	35	54	6	11	11	3	0	10	-	-	10	-	-
							0.1	10	0	0	10	0	10
							5.2	10	0	0	8	2	8
							22	10	0	1	2	8	2
							31	9	1	1	0	10	0
8 NOV 77	41	58	10	8	7	5	0	10	-	-	10	-	-
							32	10	0	0	9	1	4
							47	10	0	0	8	2	1
							56	10	0	0	5	5	2
							73	10	0	0	4	6	1
							96	10	0	0	3	7	2

Table 18. - Continued.

DATE	SIZE RANGE (TL IN MM)		SALINITY (PPT)	ACCLIM. TEMP(C)	CONTROL TEMP(C)	EXPER. TEMP(C)	TIME(HRS.)		CONTROL		EXPERIMENTAL		
	MIN.	MAX.					FROM START OF TEST	NO. ALIVE	NO. DEAD	NO. WITH L.O.E.	NO. ALIVE	NO. DEAD	NO. WITH L.O.E.
ANCHOA MITCHILLI													
8 NOV 77	39	53	7.5	8	7	3	0	10	-	-	10	-	-
							0.1	10	0	0	10	0	8
							23	10	0	0	5	5	3
							30	10	0	0	2	8	1
							56	10	0	0	1	9	1
							80	10	0	1	0	10	0
15 NOV 77	32	52	9	6	6.5	4	0	10	-	-	10	-	-
							24	10	0	0	9	1	2
							32	10	0	0	8	2	2
							48	10	0	0	7	3	3
							72	10	0	0	4	6	3
							96	9	1	0	1	9	0
22 NOV 77	36	55	10	5	5.5	2	0	10	-	-	10	-	-
							0.1	10	0	0	10	0	4
							22	10	0	3	9	1	7
							24	10	0	3	9	1	7

Table 19 . - Summary of all cold shock tests on bay anchovy, Anchoa mitchilli, after 4-, 24-, 48-, 72-, and 96-hour exposure times over a range of acclimation temperatures.

DATE	TOTAL MIN.	LENGTH (MM) MAX.	MEAN	SALINITY (PPT)	ACCLIM. (C)	TEMP. (F)	EXPER. (C)	TEMP. (F)	NO. OF EXP. ORG.	4 HOUR % MORT.	24 HOUR % MORT.	48 HOUR % MORT.	72 HOUR % MORT.	96 HOUR % MORT.
ANCHOA MITCHILLI														
26 JUN 74	52	66	58.4	4	21	70	8	46	10	0	100	100	100	100
3 JUL 74	67	54	64.4	4	24	75	10	50	10	0	100	100	100	100
17 JUL 74	52	66	56.2	4	25	77	12.5	55	10	0	70	100	100	100
23 JUL 74	50	62	55.7	6	27	81	17.5	64	10	0	20	20	20	20
22 AUG 74	25	70	43.6	8	24	75	17	63	9	0	11.1	22.2	22.2	66.6
22 AUG 74	36	72	45.3	8	24	75	15	59	9	0	11.1	44.4	44.4	77.7
2 OCT 74	28	52	36.9	7.2	20	68	14.5	58	10	0	10	10	40	80
2 OCT 74	26	55	40.4	7.2	20	68	10	50	10	0	20	30	100	100
30 OCT 74	25	36	31.9	6.5	14	57	10	50	10	0	0	0	0	0
30 OCT 74	27	37	31.1	6.5	14	57	9	48	10	0	0	0	10	10
30 OCT 74	23	34	27.8	6.5	14	57	6	43	10	0	0	10	60	90
20 OCT 75	47	74	54	6	17	63	10	50	5	0	100	100	100	100
27 APR 76	45	56	50.3	4	15	59	3	37	10	100	100	100	100	100
4 JUN 76	41	74	53.6	4	18	64	6	43	5	100	100	100	100	100
14 JUL 76	51	68	58.4	6.5	25	77	16.5	62	9	0	11.1	11.1	44.4	55.5
20 JUL 76	22	39	29.8	6	27	81	16.5	62	10	0	0	0	0	0
21 JUL 76	22	29	24.5	6.5	26	79	21	70	10	0	0	0	0	0
27 JUL 76	27	41	32.7	6.5	27	81	22	72	9	0	0	11.1	11.1	11.1
27 JUL 76	28	37	33.3	6	27	81	16.5	62	10	0	10	20	20	20
3 AUG 76	22	35	28.3	7.5	25	77	22	72	10	0	0	10	10	10

Table 19. - Continued.

DATE	TOTAL MIN.	LENGTH (MM) MAX.	MEAN	SALINITY (PPT)	ACCLIM. (C)	TEMP. (F)	EXPER. (C)	TEMP. (F)	NO. OF EXP. ORG.	4 HOUR % MORT.	24 HOUR % MORT.	48 HOUR % MORT.	72 HOUR % MORT.	96 HOUR % MORT.
ANCHOA MITCHILLI														
3 AUG 76	25	31	28	5.5	25	77	16.5	62	10	0	10	10	10	20
1 SEP 76	20	47	31.7	6	25	77	14	57	10	0	0	0	10	10
26 OCT 76	30	49	41.1	8	16	61	3	37	10	50	90	100	100	100
27 OCT 76	40	50	45.1	8	12	54	5	41	20	0	35	75	100	100
3 MAY 77	50	73	64.9	6	17	63	4	39	10	100	100	100	100	100
4 MAY 77	48	61	54.9	6.5	16.5	62	10	50	10	0	0	0	0	0
4 MAY 77	46	68	55.9	6	16.5	62	8	46	10	0	0	0	10	30
4 MAY 77	47	67	57	6	16.5	62	6	43	10	0	50	80	80	90
4 MAY 77	47	65	55.2	6	16.5	62	4	39	9	0	78	89	89	100
17 MAY 77	53	69	58.8	5.5	21	70	12	54	10	0	0	10	10	10
17 MAY 77	47	73	57	6.5	21	70	10	50	10	0	0	0	10	10
17 MAY 77	50	75	59.3	6	21	70	8	46	10	0	10	40	40	60
17 MAY 77	45	60	50.7	6	21	70	6.5	44	10	20	100	100	100	100
26 MAY 77	45	59	52.9	5.5	24	75	12.5	55	10	0	0	10	30	30
26 MAY 77	44	63	53.7	6	24	75	9	48	10	0	10	10	50	90
1 JUN 77	56	77	62.6	5.5	21	70	12	54	10	0	0	0	0	10
1 JUN 77	48	71	61.1	5.5	21	70	8	46	10	0	40	80	100	100
22 JUN 77	58	71	65.5	7.5	25	77	12	54	10	0	0	0	0	10
22 JUN 77	58	66	62.5	5.5	25	77	10	50	10	0	40	100	100	100
22 JUN 77	57	72	64.9	5.5	25	77	8	46	9	0	78	100	100	100

Table 19. - Continued.

DATE	TOTAL LENGTH (MM) MIN. MAX.	SALINITY (PPT)	ACCLIM. TEMP. (C)	TEMP. (F)	EXPER. TEMP. (C)	TEMP. (F)	NO. OF EXP. ORG.	4 HOUR % MORT.	24 HOUR % MORT.	48 HOUR % MORT.	72 HOUR % MORT.	96 HOUR % MORT.
ANCHOA MITCHILLI												
22 JUN 77	56 76	67.7	5	25	77	6	43	10	100	100	100	100
6 JUL 77	64 76	70.1	7	27.5	82	18	64	10	0	0	0	0
6 JUL 77	63 69	66.8	6	27.5	82	14.5	58	10	0	0	10	10
6 JUL 77	59 72	65.8	6.5	29	84	12	54	9	0	11	56	67
6 JUL 77	59 76	66.9	6	29	84	10	50	10	0	100	100	100
21 JUL 77	35 68	43.9	7	28	82	20	68	10	0	30	50	50
21 JUL 77	35 45	39.3	5.5	28	82	16	61	10	0	20	40	40
21 JUL 77	34 41	38.3	6	28	82	13	55	10	40	100	100	100
21 JUL 77	32 44	37.8	5	28	82	10	50	10	100	100	100	100
2 AUG 77	22 44	30.7	7.5	26.5	80	13	55	10	0	100	100	100
2 AUG 77	27 47	34.1	5	26.5	80	10	50	10	20	-	-	-
18 AUG 77	28 48	38.5	4.5	27	81	11.5	53	20	30	100	100	100
1 SEP 77	36 75	58	8	25	77	17.5	64	10	0	10	10	10
1 SEP 77	31 79	57.8	7.5	25	77	16	61	10	0	0	10	20
1 SEP 77	32 73	52.7	8.5	25	77	13.5	56	10	0	20	40	90
1 SEP 77	39 81	63.2	7.5	25	77	11	52	10	10	40	60	100
8 SEP 77	35 46	41.1	7	24	75	17.5	64	10	0	0	0	20
8 SEP 77	33 50	39	7	24	75	16	61	10	0	20	40	-
8 SEP 77	33 42	38.4	5.5	24	75	14	57	10	0	10	40	100
8 SEP 77	35 44	40.6	6.5	24	75	12.5	55	9	0	78	100	100

Table 19 . - Continued.

DATE	TOTAL MIN.	LENGTH (MM) MAX.	MEAN	SALINITY (PPT)	ACCLIM. (C)	TEMP. (F)	EXPER. (C)	TEMP. (F)	NO. OF EXP. ORG.	4 HOUR % MORT.	24 HOUR % MORT.	48 HOUR % MORT.	72 HOUR % MORT.	96 HOUR % MORT.
ANCHOA MITCHILLI														
13 SEP 77	31	59	41	9	21	70	17.5	64	20	0	5	10	15	15
13 SEP 77	31	67	40.5	9	21	70	15	59	20	0	5	10	20	25
13 SEP 77	32	52	41.6	8.5	21	70	13	55	20	0	10	30	55	60
13 SEP 77	33	52	40.8	7	21	70	11	52	18	0	11	44	83	89
21 SEP 77	34	46	39.5	10.5	25	77	16	61	10	0	0	30	40	40
21 SEP 77	32	49	39.6	11	25	77	12	54	10	0	40	60	100	100
21 SEP 77	31	50	42.6	9.5	25	77	10	50	8	0	62.5	100	100	100
27 SEP 77	38	48	43.4	10	22.5	73	16	61	10	0	0	0	10	20
13 OCT 77	32	56	43.5	10.5	16	61	14	57	10	0	0	0	0	0
13 OCT 77	31	47	39.2	10	16	61	9	48	10	0	0	0	80	100
13 OCT 77	34	57	45.5	8	16	61	7	45	10	0	20	40	90	100
26 OCT 77	32	55	47.3	8	11	52	9	48	10	0	0	0	10	20
26 OCT 77	29	50	41.2	10	11	52	7	45	10	0	0	20	50	50
26 OCT 77	36	51	45.4	7.5	11	52	5	41	10	0	0	30	40	70
26 OCT 77	35	54	45.2	6	11	52	3	37	10	0	80	100	100	100
8 NOV 77	45	58	52	10	8	46	5	41	10	0	0	20	50	70
8 NOV 77	39	53	44.7	7.5	8	46	3	37	10	0	50	80	90	100
15 NOV 77	32	52	45.1	9	6	43	4	39	10	0	10	30	60	90
22 NOV 77	40	55	44.1	10	5	41	2	36	10	0	10	-	-	-

Table 20. - A chronological summary of cold shock experiments on mummichog, Fundulus heteroclitus. All tests were conducted at near air saturated levels of dissolved oxygen and pH of 7 to 8.

DATE	SIZE RANGE (TL IN MM)		SALINITY (PPT)	ACCLIM. TEMP(C)	CONTROL TEMP(C)	EXPER. TEMP(C)	TIME(HRS.)	NO. ALIVE	CONTROL		EXPERIMENTAL		
	MIN.	MAX.					FROM START OF TEST		NO. DEAD	NO. WITH L.O.E.	NO. ALIVE	NO. DEAD	NO. WITH L.O.E.
FUNDULUS HETEROCLITUS													
2 JUL 74	51	97	4	23.5	25	10	0	6	-	-	6	-	-
							96	6	0	0	6	0	0
28 AUG 74	43	82	6.5	27	27	3	0	3	-	-	5	-	-
							0.1	3	0	0	5	0	5
							18	3	0	0	4	1	4
							26	3	0	0	2	3	2
							73	3	0	0	1	4	1
							96	3	0	0	0	5	0
9 MAY 75	32	60	5.5	15	15	2	0	10	-	-	10	-	-
							0.1	10	0	0	10	0	4
							0.5	10	0	0	10	0	0
							96	10	0	0	10	0	0
12 AUG 75	43	90	5	27	27	16	0	6	-	-	6	-	-
							96	6	0	0	6	0	0
27 JAN 76	37	80	5	9	6	3	0	10	-	-	10	-	-
							74	10	0	0	10	0	0
28 JAN 76	40	82	5	9	6	2.5	0	10	-	-	10	-	-
							96	10	0	0	10	0	0
5 FEB 76	49	65	2.5	5	8	3	0	10	-	-	10	-	-
							96	10	0	0	10	0	0
5 FEB 76	39	61	2.5	5	8.5	3	0	10	-	-	10	-	-
							96	10	0	0	10	0	0
11 FEB 76	31	62	4	6	7	2.5	0	10	-	-	10	-	-
							96	10	0	0	10	0	0

Table 20. - Continued.

DATE	SIZE RANGE (TL IN MM)		SALINITY (PPT)	ACCLIM. TEMP(C)	CONTROL TEMP(C)	EXPER. TEMP(C)	TIME(HRS.)		CONTROL		EXPERIMENTAL		
	MIN.	MAX.					FROM START OF TEST	NO. ALIVE	NO. DEAD	NO. WITH L.O.E.	NO. ALIVE	NO. DEAD	NO. WITH L.O.E.
FUNDULUS HETEROCALYTUS													
17 FEB 76	27	70	10	6	8.5	3.5	0 96	10 10	- 0	- 0	14 14	- 0	- 0
19 FEB 76	31	46	10	9	11	3	0 96	10 10	- 0	- 0	10 10	- 0	- 0
18 MAY 76	55	107	7	18	18	9	0 96	10 10	- 0	- 0	10 10	- 0	- 0
19 MAY 76	62	107	3	18	18	6	0 96	10 10	- 0	- 0	10 10	- 0	- 0
2 NOV 76	40	91	8.5	11	11	5.5	0 96	10 10	- 0	- 0	10 10	- 0	- 0
10 NOV 76	22	50	7	9	12.5	2	0 96	10 10	- 0	- 0	10 10	- 0	- 0
10 NOV 76	25	95	7	9	12.5	2	0 96	10 10	- 0	- 0	10 10	- 0	- 0
16 NOV 76	30	63	6.5	6	5.5	2.5	0 96	20 20	- 0	- 0	20 20	- 0	- 0
23 NOV 76	24	47	3.5	9.5	11	2	0 96	20 20	- 0	- 0	20 20	- 0	- 0
23 NOV 76	22	47	3.5	9.5	11	2	0 96	20 20	- 0	- 0	20 20	- 0	- 0
30 NOV 76	28	94	3.5	2	8	2	0 96	20 20	- 0	- 0	20 20	- 0	- 0

Table 20 . - Continued.

DATE	SIZE RANGE (TL IN MM)		SALINITY (PPT)	ACCLIM. TEMP(C)	CONTROL TEMP(C)	EXPER. TEMP(C)	TIME(HRS.)		CONTROL		EXPERIMENTAL		
	MIN.	MAX.					FROM START OF TEST	NO. ALIVE	NO. DEAD	NO. WITH L.O.E.	NO. ALIVE	NO. DEAD	NO. WITH L.O.E.
FUNDULUS HETEROCLITUS													
29 DEC 76	35	65	8	7.5	5.5	1.5	0	10	-	-	10	-	-
							96	10	0	0	10	0	0
29 DEC 76	35	60	8	7.5	5.5	1.5	0	10	-	-	10	-	-
							96	10	0	0	10	0	0
29 DEC 76	35	60	8	7.5	5.5	1.5	0	10	-	-	10	-	-
							96	10	0	0	10	0	0
23 MAR 77	48	90	3.5	8.5	8.5	2	0	25	-	-	25	-	-
							29	25	0	0	24	1	0
							96	25	0	0	22	3	0
23 MAR 77	50	90	7	8.5	8.5	2	0	25	-	-	25	-	-
							54	25	0	0	24	1	0
							96	25	0	0	24	1	0
4 DEC 77	33	97	10	10	9.5	0.1	0	10	-	-	10	-	-
							96	10	0	0	10	0	0

Table 21 . - Summary of all cold shock tests on mummichog, Fundulus heteroclitus, after 4-, 24-, 48-, 72-, and 96-hour exposure times over a range of acclimation temperatures.

DATE	TOTAL LENGTH (MM) MIN. MAX. MEAN	SALINITY (PPT)	ACCLIM. TEMP. (C)	TEMP. (F)	EXPER. TEMP. (C)	TEMP. (F)	NO. OF EXP. ORG.	4 HOUR % MORT.	24 HOUR % MORT.	48 HOUR % MORT.	72 HOUR % MORT.	96 HOUR % MORT.
FUNDULUS HETEROCLITUS												
2 JUL 74	92 53 70.3	4	23.5	74	10	50	6	0	0	0	0	0
28 AUG 74	46 82 67	6.5	27	81	3	37	5	0	20	60	60	100
9 MAY 75	37 60 44	5.5	15	59	2	36	10	0	0	0	0	0
12 AUG 75	43 72 57	5	27	81	16	61	6	0	0	0	0	0
27 JAN 76	37 80 51	5	9	48	3	37	10	0	0	0	0	-
28 JAN 76	40 82 60	5	9	48	2.5	37	10	0	0	0	0	0
5 FEB 76	49 65 55	2.5	5	41	3	37	10	0	0	0	0	0
5 FEB 76	39 61 51	2.5	5	41	3	37	10	0	0	0	0	0
11 FEB 76	35 55 41.6	4	6	43	2.5	37	10	0	0	0	0	0
17 FEB 76	31 55 39	10	6	43	3.5	38	14	0	0	0	0	0
19 FEB 76	31 46 37.6	10	9	48	3	37	10	0	0	0	0	0
18 MAY 76	55 88 69	7	18	64	9	48	10	0	0	0	0	0
19 MAY 76	64 103 67.7	3	18	64	6	43	10	0	0	0	0	0
2 NOV 76	40 91 59	8.5	11	52	5.5	42	10	0	0	0	0	0
10 NOV 76	22 50 36	7	9	48	2	36	10	0	0	0	0	0
10 NOV 76	59 95 76.5	7	9	48	2	36	10	0	0	0	0	0
16 NOV 76	30 63 43.3	6.5	6	43	2.5	37	20	0	0	0	0	0
23 NOV 76	24 47 36	3.5	9.5	49	2	36	20	0	0	0	0	0
23 NOV 76	22 47 34	3.5	9.5	49	2	36	20	0	0	0	0	0
30 NOV 76	28 77 46	3.5	2	36	2	36	20	0	0	0	0	0

Table 21. - Continued.

DATE	TOTAL LENGTH (MM)			SALINITY	ACCLIM. TEMP.	EXPER. TEMP.	NO. OF	4 HOUR	24 HOUR	48 HOUR	72 HOUR	96 HOUR
	MIN.	MAX.	MEAN	(PPT)	(C)	(F)	EXP. ORG.	% MORT.	% MORT.	% MORT.	% MORT.	% MORT.
FUNDULUS HETERODCLITUS												
29 DEC 76	39	65	52.1	8	7.5	46	1.5	35	10	0	0	0
29 DEC 76	38	53	46.1	8	7.5	46	1.5	35	10	0	0	0
29 DEC 76	35	55	46.8	8	7.5	46	1.5	35	10	0	0	0
23 MAR 77	48	84	68.6	3.5	8.5	47	2	34	25	0	0	4
23 MAR 77	50	89	70.1	7	8.5	47	2	36	25	0	0	4
4 DEC 77	33	97	70.2	10	10	50	0.1	32	10	0	0	0

Table 22. - A chronological summary of cold shock experiments on Atlantic silverside, Menidia menidia. All tests were conducted at near air saturated levels of dissolved oxygen and pH of 7 to 8.

DATE	SIZE RANGE (TL IN MM)		SALINITY (PPT)	ACCLIM. TEMP(C)	CONTROL TEMP(C)	EXPER. TEMP(C)	TIME(HRS.) FROM START NO.		CONTROL		EXPERIMENTAL		
	MIN.	MAX.					OF TEST	ALIVE	NO. DEAD	NO. WITH L.O.E.	NO. ALIVE	NO. DEAD	NO. WITH L.O.E.
MENIDIA MENIDIA													
6 NOV 73	52	93	6	13.9	14	5.6	0	10	-	-	10	-	-
							72	9	1	0	10	0	0
							96	9	1	0	10	0	0
13 NOV 73	56	107	6	8	8	2.2	0	10	-	-	10	-	-
							0.1	10	0	0	10	0	3
							24	10	0	0	7	3	2
							48	10	0	0	5	5	0
							96	10	0	0	4	6	2
5 DEC 73	51	107	7	10	10	5	0	10	-	-	10	-	-
							72	10	0	0	10	0	1
							96	10	0	0	9	1	0
5 DEC 73	67	118	15	10	10	5	0	10	-	-	10	-	-
							96	10	0	0	10	0	0
12 DEC 73	71	125	15	8	8	2.2	0	10	-	-	10	-	-
							0.5	10	0	0	10	0	2
							24	10	0	0	10	0	4
							48	10	0	0	8	2	2
							72	10	0	0	7	3	2
							96	10	0	0	5	5	0
12 DEC 73	71	102	7	8	8	2.2	0	10	-	-	10	-	-
							0.25	10	0	0	10	0	2
							24	10	0	0	10	0	3
							48	10	0	0	9	1	1
							72	10	0	0	6	4	2
							96	10	0	0	5	5	1
28 DEC 73	46	82	7	5	5	2.2	0	10	-	-	10	-	-
							96	10	0	0	8	2	2

Table 22 . - Continued.

DATE	SIZE RANGE (TL IN MM)		SALINITY (PPT)	ACCLIM. TEMP(C)	CONTROL TEMP(C)	EXPER. TEMP(C)	TIME(HRS.)		CONTROL		EXPERIMENTAL		
	MIN.	MAX.					FROM START OF TEST	NO. ALIVE	NO. DEAD	NO. WITH L.O.E.	NO. ALIVE	NO. DEAD	NO. WITH L.O.E.
MENIDIA MENIDIA													
28 DEC 73	57	101	15	8	8	2	0	10	-	-	10	-	-
							0.5	10	0	0	10	0	0
							5.5	10	0	0	10	0	4
							24	10	0	0	9	1	4
							48	10	0	0	5	5	1
							96	10	0	0	4	6	0
25 JAN 74	48	102	12	9	8.5	2.5	0	15	-	-	16	-	-
							0	15	0	0	16	0	4
							6	15	0	1	16	0	10
							24	13	2	0	9	7	2
							72	13	2	0	7	9	1
							96	13	2	0	6	10	2
1 FEB 74	51	93	12	8	8	4	0	10	-	-	10	-	-
							96	10	0	0	10	0	0
5 MAR 74	67	115	12	6	6	2	0	10	-	-	10	-	-
							0.5	10	0	0	10	0	1
							3	10	0	0	10	0	2
							24	10	0	0	9	1	3
							68	10	0	0	7	3	3
							96	10	0	0	4	6	0
2 APR 74	62	125	6	6	6	3	0	10	-	-	10	-	-
							5	10	0	0	10	0	0
							21	10	0	0	8	2	2
							45	10	0	0	4	6	0
							72	10	0	0	3	7	0
							96	10	0	0	2	8	0
2 APR 74	55	93	12	6	6	3	0	10	-	-	10	-	-
							21	10	0	0	10	0	1
							24	10	0	0	9	1	0
							96	10	0	0	6	4	0
9 APR 74	39	98	12	9.5	9.5	3.5	0	10	-	-	10	-	-
							0	10	0	0	10	0	2
							19.2	10	0	0	9	1	2
							42.7	10	0	0	7	3	0
							72	10	0	0	6	4	0
							96	10	0	0	6	4	0

Table 22 . - Continued.

DATE	SIZE RANGE (TL IN MM)		SALINITY (PPT)	ACCLIM. TEMP(C)	CONTROL TEMP(C)	EXPER. TEMP(C)	TIME(HRS.)		CONTROL		EXPERIMENTAL		
	MIN.	MAX.					FROM START OF TEST	NO. ALIVE	NO. DEAD	NO. WITH L.O.E.	NO. ALIVE	NO. DEAD	NO. WITH L.O.E.
MENIDIA MENIDIA													
9 APR 74	60	113	6	9.5	9.5	3.1	0	10	-	-	10	-	-
							0	10	0	0	10	0	2
							2	10	0	0	10	0	1
							19	10	0	0	7	3	0
							96	9	1	0	7	3	0
17 APR 74	67	114	12	15	15	5	0	10	-	-	10	-	-
							96	10	0	0	10	0	0
23 APR 74	74	109	6	15	15	4	0	10	-	-	10	-	-
							0.1	10	0	0	10	0	8
							0.25	10	0	0	10	0	7
							24	10	0	0	9	1	1
							48	10	0	0	8	2	0
							96	10	0	0	7	3	2
23 APR 74	71	114	12	15	15	4	0	10	-	-	10	-	-
							0.1	10	0	0	10	0	6
							24	10	0	0	9	1	0
							48	10	0	0	8	2	0
							72	10	0	0	7	3	0
							96	10	0	0	7	3	0
30 APR 74	62	103	6	15	15	3	0	10	-	-	10	-	-
							0.1	10	0	0	10	0	10
							0.25	10	0	0	10	0	1
							17.5	10	0	0	8	2	0
							48	10	0	0	7	3	0
							96	10	0	0	5	5	0
30 APR 74	66	112	12	18	15	3	0	10	-	-	10	-	-
							24	10	0	0	10	0	1
							48	10	0	0	10	0	3
							65.5	10	0	0	7	3	3
							96	10	0	0	4	6	0
7 MAY 74	62	116	12	15	15	2	0	20	-	-	20	-	-
							5	20	0	0	13	7	6
							24	20	0	0	12	8	2
							48	20	0	0	11	9	7
							72	20	0	0	6	14	6
							96	20	0	0	1	19	1

Table 22 . - Continued.

DATE	SIZE RANGE (TL IN MM)		SALINITY (PPT)	ACCLIM. TEMP(C)	CONTROL TEMP(C)	EXPER. TEMP(C)	TIME(HRS.)		CONTROL		EXPERIMENTAL		
	MIN.	MAX.					FROM START OF TEST	NO. ALIVE	NO. DEAD	NO. WITH L.O.E.	NO. ALIVE	NO. DEAD	NO. WITH L.O.E.
MENIDIA MENIDIA													
7 MAY 74	66	106	6	15	15	2	0	20	-	-	20	-	-
							5	20	0	0	12	8	11
							24	20	0	0	7	13	2
							48	20	0	0	5	15	3
							72	20	0	0	3	17	1
							96	20	0	0	0	20	0
21 MAY 74	76	90	6	18	18	5	0	10	-	-	10	-	-
							0.1	10	0	0	10	0	10
							19	10	0	0	7	3	3
							24	10	0	0	6	4	1
							43	10	0	0	5	5	3
							96	10	0	0	0	10	0
4 JUN 74	63	100	6	18	18	8	0	10	-	-	10	-	-
							0.02	10	0	0	10	0	5
							4	10	0	0	9	1	0
							48	10	0	0	8	2	0
							96	10	0	0	7	3	0
26 JUN 74	27	54	4	21	21	8	0	10	-	-	10	-	-
							0.02	10	0	0	10	0	10
							1	10	0	0	10	0	7
							21	10	0	0	1	9	1
							24	10	0	0	0	10	0
2 JUL 74	43	63	4	23.5	25	10	0	5	-	-	5	-	-
							0	5	0	0	5	0	3
							48	5	0	0	4	1	0
							96	5	0	0	2	3	1
10 JUL 74	37	57	4	25	26	14	0	10	-	-	10	-	-
							96	10	0	0	10	0	0
17 JUL 74	37	72	4	25	24.5	12.5	0	10	-	-	10	-	-
							28	10	0	0	10	0	1
							72	9	1	0	9	1	0
							96	9	1	0	9	1	0

Table 22 . - Continued.

DATE	SIZE RANGE (TL IN MM)		SALINITY (PPT)	ACCLIM. TEMP(C)	CONTROL TEMP(C)	EXPER. TEMP(C)	TIME(HRS.)		CONTROL		EXPERIMENTAL		
	MIN.	MAX.					FROM START OF TEST	NO. ALIVE	NO. DEAD	NO. WITH L.O.E.	NO. ALIVE	NO. DEAD	NO. WITH L.O.E.
MENIDIA MENIDIA													
8 AUG 74	30	73	8	25	24.5	12	0	5	-	-	10	-	-
							19	5	0	0	6	4	1
							21	5	0	0	5	5	0
							24	5	0	0	4	6	0
							72	5	0	0	3	7	1
							96	4	1	0	2	8	1
19 SEP 74	57	96	7.5	22	21.5	9	0	10	-	-	10	-	-
							20	10	0	0	9	1	1
							24	10	0	0	8	2	2
							48	10	0	0	7	3	2
							72	10	0	0	5	5	0
							96	10	0	0	3	7	0
25 SEP 74	58	89	7.5	22	22	12	0	9	-	-	10	-	-
							72	9	0	0	9	1	0
							96	9	0	0	9	1	3
15 OCT 74	42	92	8.8	16	16	6	0	10	-	-	10	-	-
							0.01	10	0	0	10	0	10
							24	10	0	0	9	1	1
							48	10	0	0	8	2	1
							72	9	1	4	7	3	1
							96	9	1	0	6	4	0
21 OCT 74	49	83	6	12	12.5	4.5	0	10	-	-	28	-	-
							24	10	0	0	28	0	11
							43	10	0	0	24	4	12
							48	10	0	0	21	7	14
							65	10	0	0	13	15	2
							96	9	1	1	9	19	3
23 OCT 74	47	82	6	13	12	5	0	10	-	-	10	-	-
							16	10	0	0	10	0	3
							40	10	0	2	9	1	3
							72	10	0	1	5	5	1
							96	9	1	0	5	5	1

Table 22 . - Continued.

DATE	SIZE RANGE (TL IN MM)		SALINITY (PPT)	ACCLIM. TEMP(C)	CONTROL TEMP(C)	EXPER. TEMP(C)	TIME (HRS.) FROM START OF TEST	NO. ALIVE	CONTROL		EXPERIMENTAL		
	MIN.	MAX.							NO. DEAD	NO. WITH L.O.E.	NO. ALIVE	NO. DEAD	NO. WITH L.O.E.
MENIDIA MENIDIA													
8 NOV 74	55	111	6	15	15	0.5	0	10	-	-	10	-	-
							0.1	10	0	0	10	0	10
							24	10	0	0	1	9	1
							48	10	0	0	0	10	0
12 NOV 74	62	103	6.3	12	12	5.5	0	10	-	-	10	-	-
							21	10	0	0	10	0	3
							45	9	1	0	9	1	3
							52	9	1	0	8	2	2
							69	8	2	2	7	3	3
							96	8	2	0	3	7	1
4 DEC 74	48	105	6.6	6	6	2	0	10	-	-	10	-	-
							0.1	10	0	0	10	0	2
							22	10	0	3	5	5	3
							29.5	9	1	2	4	6	2
							45	9	1	2	3	7	1
							96	9	1	1	3	7	2
9 DEC 74	63	110	6.6	6	6	4	0	10	-	-	10	-	-
							24	10	0	1	10	0	0
							30.5	10	0	1	10	0	2
							56	9	1	0	9	1	2
							96	9	1	0	8	2	4
7 MAR 75	52	112	6	6	6	3	0	6	-	-	10	-	-
							24	6	0	0	10	0	1
							42	6	0	0	9	1	1
							72	6	0	0	5	5	1
							96	5	1	0	4	6	1
10 MAR 75	31	63	6	8	8	4.5	0	7	-	-	10	-	-
							24	7	0	0	10	0	1
							40	7	0	0	9	1	0
							96	7	0	0	9	1	0

Table 22 . - Continued.

DATE	SIZE RANGE (TL IN MM)		SALINITY (PPT)	ACCLIM. TEMP(C)	CONTROL TEMP(C)	EXPER. TEMP(C)	TIME (HRS.)		CONTROL		EXPERIMENTAL		
	MIN.	MAX.					FROM START OF TEST	NO. ALIVE	NO. DEAD	NO. WITH L.O.E.	NO. ALIVE	NO. DEAD	NO. WITH L.O.E.
MENIDIA MENIDIA													
18 MAR 75	62	117	6.2	7	7	3	0	10	-	-	10	-	-
							24	10	0	0	9	1	3
							42	10	0	0	5	5	1
							66	9	1	0	3	7	1
							72	9	1	0	2	8	0
							96	9	1	0	2	8	0
26 MAR 75	53	116	5.2	10	10.5	5.5	0	10	-	-	10	-	-
							17	10	0	0	10	0	3
							41	10	0	3	6	4	2
							48	9	1	3	5	5	2
							72	9	1	3	3	7	0
							96	9	1	3	2	8	0
26 MAR 75	63	116	5.2	10	10	4.5	0	10	-	-	10	-	-
							17	10	0	0	9	1	5
							24	10	0	0	8	2	5
							41	10	0	3	4	6	4
							48	9	1	3	3	7	3
							72	9	1	3	0	10	0
31 MAR 75	64	113	5.1	8	8.5	5.5	0	10	-	-	10	-	-
							24	10	0	1	9	1	1
							48	9	1	0	6	4	1
							72	9	1	0	5	5	3
							96	9	1	0	4	6	3
31 MAR 75	67	113	5.1	8	9	4	0	10	-	-	10	-	-
							24	10	0	1	10	0	1
							64.5	9	1	0	6	4	1
							72	9	1	0	5	5	1
							89	9	1	0	3	7	1
							96	9	1	0	3	7	1

Table 22. - Continued.

DATE	SIZE RANGE (TL IN MM)		SALINITY (PPT)	ACCLIM. TEMP(C)	CONTROL TEMP(C)	EXPER. TEMP(C)	TIME(HRS.)		CONTROL		EXPERIMENTAL		
	MIN.	MAX.					FROM START OF TEST	NO. ALIVE	NO. DEAD	NO. L.O.E.	NO. ALIVE	NO. DEAD	NO. L.O.E.
MENIDIA MENIDIA													
16 APR 75	63	106	5.4	8.5	8.5	5	0	10	-	-	10	-	-
							0.01	10	0	0	10	0	1
							96	10	0	0	9	1	0
16 APR 75	61	106	5.4	8.5	8.5	3.5	0	10	-	-	10	-	-
							0.01	10	0	0	10	0	2
							43	10	0	0	9	1	1
							96	10	0	0	8	2	0
23 APR 75	57	99	3.2	11	11	8	0	10	-	-	10	-	-
							18	10	0	0	10	0	2
							41	10	0	0	9	1	1
							48	10	0	0	8	2	0
							72	10	0	0	7	3	0
							96	10	0	0	7	3	0
23 APR 75	57	109	3.2	11	11	5.5	0	10	-	-	10	-	-
							0.1	10	0	0	10	0	2
							72	10	0	0	7	3	0
							96	10	0	0	6	4	0
6 MAY 75	64	107	5	14	14	8	0	10	-	-	10	-	-
							2.5	10	0	0	10	0	1
							8.5	10	0	0	9	1	0
							24	10	0	0	7	3	0
							72	10	0	0	5	5	0
							96	10	0	0	5	5	0
21 MAY 75	65	111	5	19	19	10	0	10	-	-	10	-	-
							96	10	0	0	10	0	0
16 JUL 75	38	67	5	24	24	15	0	10	-	-	10	-	-
							96	10	0	0	10	0	0
5 AUG 75	46	69	5	27	27	18	0	10	-	-	10	-	-
							96	10	0	0	10	0	0

Table 22 . - Continued.

DATE	SIZE RANGE (TL IN MM)		SALINITY (PPT)	ACCLIM. TEMP(C)	CONTROL TEMP(C)	EXPER. TEMP(C)	TIME(HRS.) FROM START NO.		CONTROL		EXPERIMENTAL		
	MIN.	MAX.					OF TEST	ALIVE	NO. DEAD	NO. WITH L.O.E.	NO. ALIVE	NO. DEAD	NO. WITH L.O.E.
MENIDIA MENIDIA													
12 AUG 75	50	72	5	27	27	16	0	12	-	-	13	-	-
							0	12	0	0	13	0	2
							24	12	0	0	12	1	0
							96	12	0	0	12	1	0
19 AUG 75	42	68	5.5	30	27	15	0	10	-	-	10	-	-
							72	10	0	0	9	1	0
							96	10	0	0	9	1	0
27 AUG 75	50	71	-	28	27	15	0	5	-	-	5	-	-
							72	5	0	0	5	0	1
							96	5	0	0	5	0	1
8 SEP 75	38	90	-	24	26	14.5	0	10	-	-	10	-	-
							62.5	10	0	1	10	0	0
							96	10	0	0	10	0	1
19 SEP 75	51	92	5	22	22	14	0	10	-	-	10	-	-
							96	10	0	0	10	0	0
30 SEP 75	45	89	3.5	21	23	10.5	0	10	-	-	10	-	-
							24	10	0	0	9	1	0
							96	10	0	0	8	2	0
20 OCT 75	60	93	5	20	19	10	0	10	-	-	10	-	-
							21.5	10	0	0	6	4	0
							45.5	10	0	0	5	5	0
							72	10	0	0	5	5	0
22 OCT 75	60	92	5	19	19.5	10	0	10	-	-	10	-	-
							0.1	10	0	0	10	0	2
							48	9	1	0	7	3	1
							72	9	1	0	6	4	0
							96	9	1	0	5	5	2

Table 22 . - Continued.

DATE	SIZE RANGE (TL IN MM)		SALINITY (PPT)	ACCLIM. TEMP(C)	CONTROL TEMP(C)	EXPER. TEMP(C)	TIME(HRS.)		CONTROL		EXPERIMENTAL		
	MIN.	MAX.					FROM START OF TEST	NO. ALIVE	NO. DEAD	NO. WITH L.O.E.	NO. ALIVE	NO. DEAD	NO. WITH L.O.E.
MENIDIA MENIDIA													
30 OCT 75	39	92	4	20	18.5	10	0	10	-	-	9	-	-
							0.3	10	0	0	9	0	1
							24	10	0	0	8	1	0
							48	10	0	0	7	2	0
							96	9	1	0	7	2	1
4 NOV 75	54	106	8	17	21.5	8.5	0	10	-	-	13	-	-
							0.1	10	0	0	13	0	3
							1.5	10	0	0	12	1	0
							24	10	0	0	7	6	1
							48	10	0	0	2	11	1
						96	10	0	0	2	11	0	
4 NOV 75	46	112	8	17	21.5	8	0	10	-	-	10	-	-
							0.1	10	0	0	10	0	6
							0.3	10	0	0	9	1	3
							1.5	10	0	0	10	0	0
							24	10	0	0	6	4	2
						96	10	0	0	1	9	0	
22 NOV 75	42	94	5	14	14	10	0	10	-	-	10	-	-
							72	10	0	0	10	0	0
2 DEC 75	49	100	5	9	9	5.5	0	10	-	-	10	-	-
							24	10	0	0	9	1	0
							56	10	0	0	7	3	2
							72	10	0	0	6	4	2
							96	10	0	0	2	8	0
2 FEB 76	58	90	2	6	8	2.5	0	10	-	-	10	-	-
							24	10	0	0	4	6	2
							41	10	0	0	3	7	3
							43.5	10	0	0	2	8	2
							48	10	0	0	1	9	1
						96	10	0	0	0	10	0	

Table 22 . - Continued.

DATE	SIZE RANGE (TL IN MM)		SALINITY (PPT)	ACCLIM. TEMP(C)	CONTROL TEMP(C)	EXPER. TEMP(C)	TIME(HRS.)		CONTROL		EXPERIMENTAL		
	MIN.	MAX.					FROM START OF TEST	NO. ALIVE	NO. DEAD	NO. WITH L.O.E.	NO. ALIVE	NO. DEAD	NO. WITH L.O.E.
NENIDIA MENIDIA													
13 FEB 76	42	103	4	5	7.5	2.5	0	10	-	-	10	-	-
							0.2	10	0	0	10	0	2
							5	9	1	0	10	0	4
							24	9	1	6	0	10	0
2 MAR 76	45	104	5	10	10	3.5	0	10	-	-	11	-	-
							18.5	10	0	0	10	1	5
							24	10	0	0	7	4	3
							39.5	10	0	1	4	7	0
							63.5	10	0	1	3	8	1
							96	9	1	0	2	9	0
23 MAR 76	49	106	6	10	10	7.3	0	10	-	-	10	-	-
							72	10	0	0	9	1	0
							96	10	0	0	7	3	0
23 MAR 76	67	112	45	10	10	2	0	10	-	-	10	-	-
							7	10	0	0	10	0	4
							22	10	0	0	0	10	0
30 MAR 76	66	104	7	12	12	3	0	10	-	-	10	-	-
							0.1	10	0	0	10	0	2
							24	10	0	0	8	2	0
							48	10	0	0	7	3	1
							72	10	0	0	5	5	0
							96	10	0	0	4	6	0
30 MAR 76	67	106	7	12	12	3	0	10	-	-	10	-	-
							0.1	10	0	0	10	0	4
							24	10	0	0	8	2	1
							32	10	0	0	7	3	0
							72	10	0	0	6	4	0
							96	10	0	0	5	5	1
30 MAR 76	67	98	7	12	12	2.5	0	10	-	-	10	-	-
							0.1	10	0	0	10	0	9
							24	10	0	0	10	0	1
							32	10	0	0	7	3	2
							48	10	0	0	0	10	0

Table 22 . - Continued.

DATE	SIZE RANGE (TL IN MM)		SALINITY (PPT)	ACCLIM. TEMP(C)	CONTROL TEMP(C)	EXPER. TEMP(C)	TIME(HRS.)		CONTROL		EXPERIMENTAL		
	MIN.	MAX.					FROM START	NO.	NO.	NO. WITH	NO.	NO.	NO. WITH
							OF TEST	ALIVE	DEAD	L.O.E.	ALIVE	DEAD	L.O.E.
MENIDIA MENIDIA													
6 APR 76	66	116	7	12	12	6	0 96	10 10	- 0	- 0	10 10	- 0	- 0
6 APR 76	65	97	4	12	12	3	0 44 72	10 10 10	- 0 0	- 0 0	10 3 0	- 7 10	- 0 0
14 APR 76	65	102	7.2	11	11	8	0 96	10 10	- 0	- 0	10 10	- 0	- 0
14 APR 76	65	93	4.5	11	11	2	0 23 31 47 55	10 10 10 10 10	- 0 0 0 0	- 0 0 0 0	10 6 5 1 1	- 4 5 9 9	- 2 4 0 0
30 JUN 76	31	51	6	25	28	21	0 23.2 96	10 9 9	- 1 1	- 0 0	10 10 10	- 0 0	- 0 0
30 JUN 76	20	26	6	25	28	21	0 96	9 9	- 0	- 0	10 10	- 0	- 0
30 JUN 76	18	26	5.5	25	28	15.5	0 96	9 9	- 0	- 0	9 6	- 3	- 1
30 JUN 76	30	49	5.5	25	27.5	15	0 23.2 96	10 9 9	- 1 1	- 0 0	10 10 10	- 0 0	- 0 0
7 JUL 76	43	70	6.5	27	26.5	22	0 96	10 10	- 0	- 0	10 10	- 0	- 0

Table 22. - Continued.

DATE	SIZE RANGE (TL IN MM)		SALINITY (PPT)	ACCLIM. TEMP(C)	CONTROL TEMP(C)	EXPER. TEMP(C)	TIME(HRS.) FROM START NO.		CONTROL		EXPERIMENTAL		
	MIN.	MAX.					OF TEST	ALIVE	NO. DEAD	NO. WITH L.O.E.	NO. ALIVE	NO. DEAD	NO. WITH L.O.E.
MENIDIA MENIDIA													
7 JUL 76	41	70	6	27	26	16.5	0	10	-	-	10	-	-
							96	10	0	0	10	0	0
3 AUG 76	36	57	7.5	25	26.5	22	0	10	-	-	10	-	-
							96	10	0	0	10	0	0
3 AUG 76	43	63	5.5	25	26.5	16.5	0	10	-	-	10	-	-
							96	10	0	0	10	0	0
10 AUG 76	30	70	5	28	28	17	0	10	-	-	10	-	-
							24	9	1	0	10	0	0
							96	9	1	0	10	0	0
17 AUG 76	33	71	6	25	27	16.5	0	10	-	-	10	-	-
							24	9	1	0	10	0	0
							71.5	8	2	0	10	0	0
							96	8	2	0	9	1	0
30 AUG 76	53	91	5.5	24	25	14	0	10	-	-	9	-	-
							96	10	0	0	9	0	0
30 AUG 76	53	91	5.5	24	25	14	0	10	-	-	10	-	-
							96	10	0	0	10	0	0
5 OCT 76	32	89	7	20	18	14	0	10	-	-	10	-	-
							96	10	0	0	10	0	0
14 OCT 76	57	100	7	17	17	12.5	0	10	-	-	10	-	-
							24	10	0	0	10	0	0
							48	10	0	0	9	1	0
							96	10	0	0	9	1	0
14 OCT 76	61	105	7	17	17	7	0	10	-	-	10	-	-
							0.1	10	0	0	10	0	6
							0.2	10	0	0	10	0	4
							0.5	10	0	0	10	0	2
							72	10	0	0	9	1	0
							96	10	0	0	9	1	1

Table 22. - Continued.

DATE	SIZE RANGE (TL IN MM)		SALINITY (PPT)	ACCLIM. TEMP(C)	CONTROL TEMP(C)	EXPER. TEMP(C)	TIME (HRS.) FROM START OF TEST	NO. ALIVE	CONTROL		EXPERIMENTAL			
	MIN.	MAX.							NO. DEAD	NO. WITH L.O.E.	NO. ALIVE	NO. DEAD	NO. WITH L.O.E.	
MENIDIA MENIDIA														
19 OCT 76	27	90	8	14.5	12	3.5	0	10	-	-	10	-	-	
							19	10	0	0	9	1	4	
							48	10	0	0	8	2	5	
							67	10	0	0	7	3	4	
							72	10	0	0	5	5	3	
							96	10	0	0	3	7	1	
28 OCT 76	56	93	8	12.5	12	5	0	10	-	-	10	-	-	
							24	10	0	0	10	0	2	
							48	10	0	0	7	3	1	
							75	10	0	0	3	7	0	
							96	10	0	0	3	7	1	
10 NOV 76	55	121	5	9	11	5	0	10	-	-	10	-	-	
							96	10	0	0	10	0	0	
10 NOV 76	68	121	5	9	11.5	4	0	10	-	-	10	-	-	
							72	10	0	0	9	1	0	
							96	10	0	0	9	1	0	
10 NOV 76	73	122	7	9	12	1.5	0	10	-	-	10	-	-	
							72	10	0	0	10	0	1	
							96	10	0	0	10	0	1	
8 DEC 76	60	94	4	12	10.5	2	0	10	-	-	10	-	-	
							0.02	10	0	0	10	0	10	
							10.5	10	0	1	7	3	5	
							24	10	0	1	4	6	3	
							48	9	1	0	2	8	2	
							74	9	1	0	0	10	0	
23 MAR 77	78	120	6.5	8	8	2	0	10	-	-	10	-	-	
							24	10	0	0	9	1	3	
							53	10	0	0	6	2	2	
							72	10	0	0	6	4	1	
							96	10	0	0	5	5	2	

Table 22 . - Continued.

DATE	SIZE RANGE (TL IN MM)		SALINITY (PPT)	ACCLIM. TEMP(C)	CONTROL TEMP(C)	EXPER. TEMP(C)	TIME(HRS.)		CONTROL		EXPERIMENTAL			
	MIN.	MAX.					FROM START	NO. ALIVE	NO. DEAD	NO. WITH L.O.E.	NO. ALIVE	NO. DEAD	NO. WITH L.O.E.	
MENIDIA MENIDIA														
23 MAR 77	73	120	7	8	8	2	0	10	-	-	10	-	-	
							96	10	0	0	10	0	0	
6 APR 77	65	103	7	12	12	2	0	10	-	-	10	-	-	
							0.02	10	0	0	10	0	10	
							17	10	0	0	7	3	4	
							67	10	0	0	5	5	1	
							96	10	0	0	4	6	0	
20 APR 77	78	122	5.5	15	14.5	7.5	0	10	-	-	10	-	-	
							48	9	1	0	10	0	0	
							77	9	1	0	9	1	0	
							96	8	2	0	8	2	0	
20 APR 77	75	122	6.5	15	15	3.5	0	9	-	-	10	-	-	
							0.03	9	0	0	10	0	10	
							24	9	0	0	9	1	0	
							48	8	1	0	9	1	0	
							77.5	8	1	0	8	2	1	
							96	7	2	0	6	4	0	
20 APR 77	78	122	6	15	15	2	0	10	-	-	10	-	-	
							8	10	0	0	9	1	9	
							24	10	0	0	7	3	1	
							48	9	1	0	3	7	2	
							56	9	1	0	2	8	1	
							72	8	2	0	0	10	0	
26 APR 77	79	108	6.5	18	17	10	0	10	-	-	10	-	-	
							96	10	0	0	10	0	0	
26 APR 77	74	115	6	18	17	8	0	10	-	-	10	-	-	
							96	10	0	0	10	0	0	
26 APR 77	79	110	6	18	17	6	0	10	-	-	10	-	-	
							0.1	10	0	0	10	0	6	
							96	9	1	0	9	1	0	

Table 22. - Continued.

DATE	SIZE RANGE (TL IN MM)		SALINITY (PPT)	ACCLIM. TEMP(C)	CONTROL TEMP(C)	EXPER. TEMP(C)	TIME(HRS.)		CONTROL		EXPERIMENTAL		
	MIN.	MAX.					FROM START OF TEST	NO. ALIVE	NO. DEAD	NO. WITH L.O.E.	NO. ALIVE	NO. DEAD	NO. WITH L.O.E.
MENIDIA MENIDIA													
26 APR 77	78	123	6.5	18	17	4	0	10	-	-	10	-	-
							0.1	10	0	0	10	0	10
							20	10	0	0	8	2	1
							27.5	10	0	0	7	3	1
							47.5	10	0	0	5	5	1
						96	10	0	0	3	7	1	
4 MAY 77	78	123	6	19	18	8	0	10	-	-	10	-	-
							96	10	0	0	10	0	0
4 MAY 77	85	119	6	19	18	6	0	10	-	-	10	-	-
							0.1	10	0	0	10	0	4
							1	10	0	0	10	0	0
							96	10	0	0	10	0	1
4 MAY 77	78	123	6	19	18	4	0	10	-	-	10	-	-
							22	10	0	0	9	1	3
							46	10	0	0	8	2	6
							55	10	0	0	5	5	1
							79	10	0	0	1	9	1
							96	10	0	0	0	10	0
17 MAY 77	80	118	5.5	21	19.5	12	0	10	-	-	10	-	-
							96	10	0	0	10	0	0
17 MAY 77	80	125	6.5	21	19.5	10	0	9	-	-	8	-	-
							96	9	0	0	8	0	0
17 MAY 77	79	118	6	21	19.5	8	0	9	-	-	10	-	-
							96	9	0	0	10	0	0
17 MAY 77	74	119	6	21	19.5	6	0	9	-	-	10	-	-
							21	9	0	0	9	1	0
							45	9	0	0	8	2	1
							67	9	0	0	7	3	1
							80	9	0	0	6	4	0
							96	9	0	0	6	4	0

Table 22. - Continued.

DATE	SIZE RANGE (TL IN MM)		SALINITY (PPT)	ACCLIM. TEMP(C)	CONTROL TEMP(C)	EXPER. TEMP(C)	TIME(HRS.)		CONTROL		EXPERIMENTAL		
	MIN.	MAX.					FROM START OF TEST	NO. ALIVE	NO. DEAD	NO. WITH L.O.E.	NO. ALIVE	NO. DEAD	NO. WITH L.O.E.
MENIDIA MENIDIA													
24 MAY 77	62	117	5.5	24	23.5	12.5	0	10	-	-	10	-	-
							96	10	0	0	10	0	0
24 MAY 77	62	116	6	24	23.5	9	0	10	-	-	10	-	-
							0.1	10	0	0	10	0	7
							0.3	10	0	0	10	0	0
							48	10	0	0	9	1	0
							96	10	0	0	9	1	0
24 MAY 77	68	122	5.5	24	23.5	6	0	10	-	-	10	-	-
							24	10	0	0	8	2	7
							31	10	0	0	6	4	4
							48	10	0	0	2	8	2
							72	10	0	0	1	9	1
							96	10	0	0	0	10	0
1 JUN 77	86	122	5.5	21	21	12	0	10	-	-	9	-	-
							96	9	1	0	9	0	0
1 JUN 77	86	123	5.5	21	21	8	0	10	-	-	9	-	-
							77	10	0	0	8	1	0
							96	9	1	0	8	1	0
1 JUN 77	86	123	6	21	21	6	0	10	-	-	10	-	-
							20	10	0	0	8	2	3
							46	10	0	0	7	3	6
							54	10	0	0	5	5	3
							77	10	0	0	2	8	2
							96	9	1	0	1	9	1
28 JUN 77	29	57	6.5	25.5	24	6	0	20	-	-	20	-	-
							0.1	20	0	0	20	0	20
							0.25	20	0	0	11	9	11
							0.75	20	0	0	0	20	0
6 JUL 77	46	61	7	29	28	18	0	10	-	-	9	-	-
							5.8	10	0	0	9	0	1
							22	10	0	0	8	1	0
							96	10	0	0	6	3	0

Table 22 . - Continued.

DATE	SIZE RANGE (TL IN MM)		SALINITY (PPT)	ACCLIM. TEMP(C)	CONTROL TEMP(C)	EXPER. TEMP(C)	TIME(HRS.) FROM START NO.		CONTROL		EXPERIMENTAL		
	MIN.	MAX.					OF TEST	ALIVE	NO. DEAD	NO. WITH L.O.E.	NO. ALIVE	NO. DEAD	NO. WITH L.O.E.
MENIDIA MENIDIA													
6 JUL 77	40	100	6	29	28	14.5	0	10	-	-	10	-	-
							96	10	0	0	10	0	0
6 JUL 77	46	106	6.5	29	28	12.5	0	10	-	-	11	-	-
							46	10	0	0	11	0	3
							54	10	0	0	9	2	3
							71	10	0	0	8	3	2
							96	10	0	0	5	6	0
6 JUL 77	43	67	6	29	28.5	10.5	0	10	-	-	11	-	-
							0.1	10	0	0	11	0	11
							3	10	0	0	11	0	4
							6	10	0	0	11	0	9
							21	10	0	0	2	9	2
							28	10	0	0	0	11	0
13 JUL 77	45	68	7	30	28.5	18	0	10	-	-	10	-	-
							96	10	0	0	10	0	0
13 JUL 77	41	67	6	30	28.5	14	0	10	-	-	10	-	-
							23	10	0	0	9	1	0
							96	10	0	0	9	1	0
13 JUL 77	47	74	6.5	30	28.5	12	0	10	-	-	10	-	-
							3	10	0	0	9	1	0
							23	10	0	0	4	6	4
							28	10	0	0	2	8	2
							47	10	0	0	1	9	1
							72	10	0	0	0	10	0
13 JUL 77	50	67	5.5	30	28.5	9.5	0	10	-	-	10	-	-
							3	10	0	0	9	1	9
							4	10	0	0	6	4	6
							6.3	10	0	0	5	5	5
							13	10	0	0	1	9	1
							23	10	0	0	0	10	0

Table 22. - Continued.

DATE	SIZE RANGE (TL IN MM)		SALINITY (PPT)	ACCLIM. TEMP(C)	CONTROL TEMP(C)	EXPER. TEMP(C)	TIME(HRS.) FROM START NO.		CONTROL		EXPERIMENTAL		
	MIN.	MAX.					OF TEST	ALIVE	NO. DEAD	NO. WITH L.O.E.	NO. ALIVE	NO. DEAD	NO. WITH L.O.E.
MENIDIA MENIDIA													
19 JUL 77	59	103	7	28	29	20	0	10	-	-	10	-	-
							46	10	0	0	9	1	0
							96	10	0	0	9	1	0
19 JUL 77	59	103	5.5	28	29	16	0	10	-	-	10	-	-
							30	10	0	0	9	1	0
							96	10	0	0	9	1	0
19 JUL 77	53	103	6	28	29	13	0	10	-	-	10	-	-
							70	10	0	0	9	1	1
							78	10	0	0	8	2	0
							96	10	0	0	8	2	0
19 JUL 77	49	103	5	28	29	10.5	0	10	-	-	10	-	-
							0.1	10	0	0	10	0	9
							2.5	10	0	0	9	1	6
							22	10	0	0	1	9	0
							46	10	0	0	0	10	0
2 AUG 77	63	105	6	26	26	18	0	10	-	-	10	-	-
							96	9	1	0	10	0	0
2 AUG 77	62	80	5.5	26	26	15	0	10	-	-	10	-	-
							96	9	1	0	10	0	0
2 AUG 77	61	80	7.5	26	26	13	0	10	-	-	9	-	-
							28	9	1	0	9	0	1
							30	9	1	0	8	1	0
							96	9	1	0	7	2	0
2 AUG 77	46	80	5	26	26	10	0	10	-	-	10	-	-
							0.1	10	0	0	10	0	5
							10.3	10	0	0	8	2	4
							22	10	0	0	2	8	0
							56	9	1	0	1	9	1
							71	9	1	0	0	10	0

Table 22 . - Continued.

DATE	SIZE RANGE (TL IN MM)		SALINITY (PPT)	ACCLIM. TEMP(C)	CONTROL TEMP(C)	EXPER. TEMP(C)	TIME(HRS.) FROM START		CONTROL			EXPERIMENTAL		
	MIN.	MAX.					NO.	NO.	NO.	NO.	NO.	NO.	NO.	NO.
							OF TEST	ALIVE	DEAD	WITH L.O.E.	ALIVE	DEAD	WITH L.O.E.	
MENIDIA MENIDIA														
16 AUG 77	53	85	7	27	27	15	0	10	-	-	10	-	-	
							96	10	0	0	10	0	0	
16 AUG 77	49	86	5	27	27	13	0	10	-	-	10	-	-	
							23	10	0	0	10	0	2	
							31	10	0	0	9	1	2	
							47	10	0	0	6	4	0	
							78	10	0	0	5	5	0	
							96	10	0	0	5	5	0	
16 AUG 77	61	85	4.5	27	27	11.5	0	10	-	-	10	-	-	
							7	10	0	0	9	1	0	
							23	10	0	0	4	6	2	
							25	10	0	0	2	8	0	
							47	10	0	0	1	9	0	
							71	10	0	0	0	10	0	
24 AUG 77	63	83	4.5	25	25	17	0	10	-	-	10	-	-	
							96	10	0	0	10	0	0	
24 AUG 77	63	83	7.5	25	25	16	0	10	-	-	10	-	-	
							96	10	0	0	10	0	0	
24 AUG 77	50	83	5	25	25	13.5	0	10	-	-	10	-	-	
							23	10	0	0	9	1	0	
							96	10	0	0	9	1	0	
24 AUG 77	63	83	4.5	25	25	12.5	0	10	-	-	10	-	-	
							31	10	0	0	10	0	2	
							48	10	0	0	8	2	1	
							76	10	0	0	6	4	0	
							96	10	0	0	5	5	0	
7 SEP 77	55	78	7	23.5	23.5	16	0	10	-	-	10	-	-	
							96	10	0	0	10	0	0	

Table 22. - Continued.

DATE	SIZE RANGE (TL IN MM)		SALINITY (PPT)	ACCLIM. TEMP(C)	CONTROL TEMP(C)	EXPER. TEMP(C)	TIME(HRS.)		CONTROL		EXPERIMENTAL		
	MIN.	MAX.					FROM START	NO. ALIVE	NO. DEAD	NO. WITH L.O.E.	NO. ALIVE	NO. DEAD	NO. WITH L.O.E.
MENIDIA MENIDIA													
7 SEP 77	55	79	7.5	23.5	23.5	14	0	10	-	-	10	-	-
							96	10	0	0	10	0	0
7 SEP 77	55	80	6.5	23.5	23.5	12.5	0	10	-	-	10	-	-
							9.5	10	0	0	9	1	0
							51	10	0	0	9	1	2
							74	10	0	0	8	2	4
							96	10	0	0	6	4	4
13 OCT 77	48	104	10	16	16	9	0	10	-	-	10	-	-
							96	10	0	0	10	0	0
13 OCT 77	50	104	8	16	16	7	0	10	-	-	10	-	-
							0.1	10	0	0	10	0	10
							0.3	10	0	0	10	0	1
							51	10	0	0	9	1	0
							96	10	0	0	9	1	0
13 OCT 77	50	104	7	16	16	4	0	10	-	-	10	-	-
							4.2	10	0	0	10	0	5
							13.4	10	0	0	7	3	4
							22	10	0	0	2	8	2
							30	10	0	0	1	9	1
							50	10	0	0	0	10	0
19 OCT 77	47	87	7.5	14	13	5.5	0	9	-	-	9	-	-
							83	9	0	0	9	0	1
							96	9	0	0	8	1	0
20 OCT 77	54	99	7.5	13	12	5.5	0	10	-	-	10	-	-
							24	10	0	0	10	0	1
							32	10	0	0	9	1	1
							59	10	0	0	6	4	0
							75	10	0	0	5	5	2
							96	10	0	0	3	7	3
20 OCT 77	50	100	6.5	13	12	4	0	10	-	-	10	-	-
							0.2	10	0	0	10	0	1
							4.2	10	0	0	9	1	0
							24	10	0	0	6	4	4
							32	10	0	0	3	7	2
							59	10	0	0	0	10	0

Table 22. - Continued.

DATE	SIZE RANGE (TL IN MM)		SALINITY (PPT)	ACCLIM. TEMP(C)	CONTROL TEMP(C)	EXPER. TEMP(C)	TIME(HRS.)		CONTROL		EXPERIMENTAL		
	MIN.	MAX.					FROM START OF TEST	NO. ALIVE	NO. DEAD	NO. WITH L.O.E.	NO. ALIVE	NO. DEAD	NO. WITH L.O.E.
MENIDIA MENIDIA													
1 NOV 77	59	98	10	10	10	6	0	10	-	-	10	-	-
							48	10	0	0	10	0	1
							80	10	0	0	9	1	0
							96	10	0	0	9	1	1
1 NOV 77	63	168	7.5	10	10	4	0	10	-	-	10	-	-
							56	10	0	0	10	0	1
							72	10	0	0	9	1	0
							96	10	0	0	7	3	0
1 NOV 77	62	103	6.5	10	9.5	2	0	10	-	-	10	-	-
							6.8	10	0	0	9	1	2
							8.1	10	0	0	7	3	1
							13.1	10	0	0	5	5	2
							24	10	0	0	1	9	1
							28	10	0	0	0	10	0
8 NOV 77	69	105	10	7	7.5	5	0	10	-	-	10	-	-
							96	10	0	1	10	0	0
8 NOV 77	66	105	7.5	7	7.5	3	0	10	-	-	10	-	-
							23	10	0	0	9	1	2
							31	10	0	0	7	3	1
							47	10	0	0	6	4	1
							73	10	0	0	5	5	0
							96	10	0	0	5	5	0
8 NOV 77	62	105	4.5	7	7.5	1	0	10	-	-	10	-	-
							0.1	10	0	0	10	0	9
							7.4	10	0	0	9	1	3
							23	10	0	0	2	8	1
							30	10	0	0	1	9	1
							47	10	0	0	0	10	0
22 NOV 77	62	115	10	5	5.5	2	0	10	-	-	10	-	-
							51	10	0	0	9	1	0
							70	10	0	0	8	2	5
							96	10	0	0	4	6	2

Table 22 . - Continued.

DATE	SIZE RANGE (TL IN MM)		SALINITY (PPT)	ACCLIM. TEMP(C)	CONTROL TEMP(C)	EXPER. TEMP(C)	TIME (HRS.)		CONTROL		EXPERIMENTAL		
	MIN.	MAX.					FROM START OF TEST	NO. ALIVE	NO. DEAD	NO. WITH L.O.E.	NO. ALIVE	NO. DEAD	NO. WITH L.O.E.
MENIDIA MENIDIA													
22 NOV 77	46	113	8.5	5	5.5	1	0	10	-	-	10	-	-
							0.1	10	0	0	10	0	4
							30	10	0	0	9	1	1
							77	10	0	0	8	2	2
							96	10	0	0	5	5	0
22 NOV 77	75	106	10	5	5.5	0.2	0	10	-	-	10	-	-
							0.1	10	0	0	10	0	10
							30	10	0	0	8	2	8
							50	10	0	0	2	8	2
							70	10	0	0	0	10	0
29 NOV 77	65	101	10	6.5	6	3	0	10	-	-	10	-	-
							47	10	0	0	10	0	7
							71	10	0	0	6	4	6
							79	10	0	0	3	7	3
							96	10	0	1	0	10	0
29 NOV 77	65	105	8.5	6.5	6	1	0	10	-	-	10	-	-
							23	10	0	0	8	2	5
							31	10	0	0	6	4	5
							47	10	0	0	4	6	4
							52	10	0	0	1	9	1
							96	10	0	0	0	10	0

Table 23. - Summary of all cold shock tests on Atlantic silverside, Menidia menidia, after 4-, 24-, 48-, 72-, and 96-hour exposure times over a range of acclimation temperatures.

DATE	TOTAL LENGTH (MM)			SALINITY (PPT)	ACCLIM. TEMP.		EXPER. TEMP. (C)	TEMP. (F)	NO. OF EXP. ORG.	4 HOUR % MORT.	24 HOUR % MORT.	48 HOUR % MORT.	72 HOUR % MORT.	96 HOUR % MORT.
	MIN.	MAX.	MEAN		(C)	(F)								
MENIDIA MENIDIA														
6 NOV 73	55	93	62.1	6	13.9	57	5.6	42	10	0	0	0	0	0
13 NOV 73	56	89	75.3	6	8	46	2.2	36	10	0	30	50	50	60
5 DEC 73	55	107	85.4	7	10	50	5	41	10	0	0	0	0	10
5 DEC 73	77	116	94.4	15	10	50	5	41	10	0	0	0	0	0
12 DEC 73	71	125	97.8	15	8	46	2.2	36	10	0	0	20	30	50
12 DEC 73	71	102	88.8	7	8	46	2.2	36	10	0	0	10	40	50
28 DEC 73	46	82	55.3	7	5	41	2.2	36	10	0	0	0	0	20
28 DEC 73	62	101	76.4	15	8	46	2	36	10	0	10	50	50	60
25 JAN 74	48	95	70	12	9	48	2.5	37	16	0	47	47	60	67
1 FEB 74	61	83	67.4	12	8	46	4	39	10	0	0	0	0	0
5 MAR 74	67	96	79.9	12	6	43	2	36	10	0	10	10	30	60
2 APR 74	68	125	89.8	6	6	43	3	37	10	0	20	60	70	80
2 APR 74	55	78	66.9	12	6	43	3	37	10	0	10	10	10	40
9 APR 74	58	98	70.4	12	9.5	49	3.5	38	10	0	10	30	40	40
9 APR 74	60	113	86	6	9.5	49	3.1	38	10	0	30	30	30	30
17 APR 74	82	114	87.5	12	15	59	5	41	10	0	0	0	0	0
23 APR 74	74	100	88.4	6	15	59	4	39	10	0	10	20	20	30
23 APR 74	71	114	85.1	12	15	59	4	39	10	0	10	20	30	30
30 APR 74	76	95	86.8	6	15	59	3	37	10	0	20	30	30	50
30 APR 74	74	112	96.4	12	18	64	3	37	10	0	0	0	30	60

Table 23. - Continued.

DATE	TOTAL LENGTH (MM)			SALINITY (PPT)	ACCLIM. TEMP.		EXPER. TEMP.		NO. OF EXP. ORG.	4 HOUR % MORT.	24 HOUR % MORT.	48 HOUR % MORT.	72 HOUR % MORT.	96 HOUR % MORT.
	MIN.	MAX.	MEAN		(C)	(F)	(C)	(F)						
MENIDIA MENIDIA														
7 MAY 74	76	114	95.2	12	15	59	2	36	20	0	40	45	70	95
7 MAY 74	66	106	84.8	6	15	59	2	36	20	0	65	75	85	100
21 MAY 74	76	90	83.1	6	18	64	5	41	10	0	40	50	50	100
4 JUN 74	67	100	79.9	6	18	64	8	46	10	10	10	20	20	30
26 JUN 74	27	40	33.8	4	21	70	8	46	10	0	100	100	100	100
2 JUL 74	53	63	57.8	4	23.5	74	10	50	5	0	0	20	20	60
10 JUL 74	38	57	46	4	25	77	14	57	10	0	0	0	0	0
17 JUL 74	42	60	50.8	4	25	77	12.5	55	10	0	0	0	10	10
8 AUG 74	30	73	51.6	8	25	77	12	54	10	0	60	60	70	80
19 SEP 74	62	96	73.8	7.5	22	72	9	48	10	0	20	30	50	70
25 SEP 74	58	89	76.2	7.5	22	72	12	54	10	0	0	0	10	10
15 OCT 74	42	88	66.4	8.8	16	61	6	43	10	0	10	20	30	40
21 OCT 74	49	83	68.2	6	12	54	4.5	40	28	0	0	25	54	68
23 OCT 74	47	73	60.4	6	13	55	5	41	10	0	0	10	50	50
8 NOV 74	55	111	75	6	15	59	0.5	33	10	0	90	100	100	100
12 NOV 74	62	96	78.2	6.3	12	54	5.5	42	10	0	0	10	30	70
4 DEC 74	48	105	79.7	6.6	6	43	2	36	10	0	50	70	70	70
9 DEC 74	87	109	94.6	6.6	6	43	4	39	10	0	0	0	10	20
7 MAR 75	52	112	87.4	6	6	43	3	37	10	0	0	10	50	60
10 MAR 75	31	57	50.6	6	8	46	4.5	40	10	0	0	10	10	10

Table 23. - Continued.

DATE	TOTAL LENGTH (MM)			SALINITY (PPT)	ACCLIM. TEMP.		EXPER. TEMP. (C)	TEMP. (F)	NO. OF EXP. ORG.	4 HOUR % MORT.	24 HOUR % MORT.	48 HOUR % MORT.	72 HOUR % MORT.	96 HOUR % MORT.
	MIN.	MAX.	MEAN		(C)	(F)								
MENIDIA MENIDIA														
18 MAR 75	66	106	88.2	6.2	7	45	3	37	10	0	10	50	80	80
26 MAR 75	53	104	83.3	5.2	10	50	5.5	42	10	0	0	50	70	80
26 MAR 75	70	113	87.2	5.2	10	50	4.5	40	10	0	20	70	100	100
31 MAR 75	64	102	79.9	5.1	8	46	5.5	42	10	0	10	40	50	60
31 MAR 75	71	110	85	5.1	8	46	4	39	10	0	0	0	50	70
16 APR 75	63	105	81.7	5.4	8.5	47	5	41	10	10	10	10	10	10
16 APR 75	61	101	82.7	5.4	8.5	47	3.5	38	10	0	0	10	10	20
23 APR 75	61	99	78.5	3.2	11	52	8	46	10	0	0	20	30	30
23 APR 75	67	109	81.4	3.2	11	52	5.5	42	10	0	0	0	30	40
6 MAY 75	64	107	83.4	5	14	57	8	46	10	0	30	30	50	50
21 MAY 75	72	102	88.2	5	19	66	10	50	10	0	0	0	0	0
16 JUL 75	42	67	55.2	5	24	75	15	59	10	0	0	0	0	0
5 AUG 75	46	69	57	5	27	81	18	64	10	0	0	0	0	0
12 AUG 75	50	72	65.1	5	27	81	16	61	13	0	8	8	8	8
19 AUG 75	50	68	57.2	5.5	30	86	15	59	10	0	0	0	10	10
27 AUG 75	50	71	58.2	-	28	82	15	59	5	0	0	0	0	0
8 SEP 75	56	77	66.9	-	24	75	14.5	58	10	0	0	0	0	0
19 SEP 75	51	71	59.5	5	22	72	14	57	10	0	0	0	0	0
30 SEP 75	45	82	67.3	3.5	21	70	10.5	51	10	0	10	10	10	20
20 OCT 75	60	93	78.3	5	20	68	10	50	10	0	40	50	50	-

Table 23 . - Continued.

DATE	TOTAL LENGTH (MM)			SALINITY (PPT)	ACCLIM. TEMP.		EXPER. TEMP. (C)	TEMP. (F)	NO. OF EXP. ORG.	4 HOUR % MORT.	24 HOUR % MORT.	48 HOUR % MORT.	72 HOUR % MORT.	96 HOUR % MORT.
	MIN.	MAX.	MEAN		(C)	(F)								
MENIDIA MENIDIA														
22 OCT 75	60	85	74.1	5	19	66	10	50	10	0	0	30	40	50
30 OCT 75	39	53	47.1	4	20	68	10	50	9	0	11	22	22	22
4 NOV 75	54	106	83.4	8	17	63	8.5	47	13	7	46	85	85	85
4 NOV 75	46	112	83	8	17	63	8	46	10	10	40	40	40	90
22 NOV 75	42	74	53	5	14	57	10	50	10	0	0	0	0	-
2 DEC 75	63	99	74.2	5	9	48	5.5	42	10	0	10	10	40	80
2 FEB 76	60	90	73.1	2	6	43	2.5	37	10	0	60	90	90	100
13 FEB 76	45	103	83.1	4	5	41	2.5	37	10	0	100	100	100	100
2 MAR 76	65	104	78.9	5	10	50	3.5	38	11	0	36	64	73	82
23 MAR 76	69	106	90.2	6	10	50	7.3	45	10	0	0	0	10	30
23 MAR 76	67	112	99.3	45	10	50	2	36	10	0	100	100	100	100
30 MAR 76	66	104	86.6	7	12	54	3	37	10	0	20	30	50	60
30 MAR 76	67	106	88.1	7	12	54	3	37	10	0	20	30	40	50
30 MAR 76	67	98	90.3	7	12	54	2.5	37	10	0	0	100	100	100
6 APR 76	66	116	84	7	12	54	6	43	10	0	0	0	0	0
6 APR 76	65	97	75.3	4	12	54	3	37	10	0	0	0	100	100
14 APR 76	65	102	86.2	7.2	11	52	8	46	10	0	0	0	0	0
14 APR 76	67	93	82.6	4.5	11	52	2	36	10	0	40	90	-	-
30 JUN 76	37	51	41.9	6	25	77	21	70	10	0	0	0	0	0
30 JUN 76	20	26	23	6	25	77	21	70	10	0	0	0	0	0

Table 23 . - Continued.

DATE	TOTAL LENGTH (MM)			SALINITY (PPT)	ACCLIM. (C)	TEMP. (F)	EXPER. (C)	TEMP. (F)	NO. OF EXP. ORG.	4 HOUR % MORT.	24 HOUR % MORT.	48 HOUR % MORT.	72 HOUR % MORT.	96 HOUR % MORT.	
	MIN.	MAX.	MEAN												
MENIDIA MENIDIA															
30 JUN 76	19	24	21.7	5.5	25	77	15.5	60	9	0	0	0	0	33	
30 JUN 76	30	43	37.8	5.5	25	77	15	59	10	0	0	0	0	0	
7 JUL 76	43	70	56.3	6.5	27	81	22	72	10	0	0	0	0	0	
7 JUL 76	41	70	58.4	6	27	81	16.5	62	10	0	0	0	0	0	
3 AUG 76	36	57	50.3	7.5	25	77	22	72	10	0	0	0	0	0	
3 AUG 76	43	54	51	5.5	25	77	16.5	62	10	0	0	0	0	0	
10 AUG 76	30	66	57.8	5	28	82	17	63	10	0	0	0	0	0	
17 AUG 76	34	71	46.4	6	25	77	16.5	62	10	0	0	0	0	10	
30 AUG 76	57	88	66.4	5.5	24	75	14	57	9	0	0	0	0	0	
30 AUG 76	53	77	65	5.5	24	75	14	57	10	0	0	0	0	0	
5 OCT 76	32	89	54.7	7	20	68	14	57	10	0	0	0	0	0	
14 OCT 76	57	89	73	7	17	63	12.5	55	10	0	0	10	10	10	
14 OCT 76	61	105	75.7	7	17	63	7	45	10	0	0	0	10	10	
19 OCT 76	50	86	65.7	8	14.5	58	3.5	38	10	0	10	20	50	70	
28 OCT 76	56	90	69.4	8	12.5	55	5	41	10	0	0	30	30	70	
10 NOV 76	55	93	78.5	5	9	48	5	41	10	0	0	0	0	0	
10 NOV 76	68	102	83.7	5	9	48	4	39	10	0	0	0	10	10	
10 NOV 76	75	122	91.4	7	9	48	1.5	35	10	0	0	0	0	0	
8 DEC 76	60	78	66.4	4	12	54	2	36	10	0	60	80	80	100	
23 MAR 77	78	115	100.7	6.5	8	46	2	36	10	0	10	10	40	50	

Table 23. - Continued.

DATE	TOTAL LENGTH (MM)			SALINITY (PPT)	ACCLIM. (C)	TEMP. (F)	EXPER. (C)	TEMP. (F)	NO. OF EXP. ORG.	4 HOUR % MORT.	24 HOUR % MORT.	48 HOUR % MORT.	72 HOUR % MORT.	96 HOUR % MORT.
	MIN.	MAX.	MEAN											
MENIDIA MENIDIA														
23 MAR 77	73	103	86.9	7	8	46	2	36	10	0	0	0	0	0
6 APR 77	65	103	76.3	7	12	54	2	36	10	0	30	30	50	60
20 APR 77	82	105	94.5	5.5	15	59	7.5	46	10	0	0	0	0	20
20 APR 77	75	108	90.9	6.5	15	59	3.5	38	10	0	10	10	10	40
20 APR 77	79	116	91.1	6	15	59	2	36	10	0	30	70	100	100
26 APR 77	85	108	84.8	6.5	18	64	10	50	10	0	0	0	0	0
26 APR 77	74	115	93.8	6	18	64	8	46	10	0	0	0	0	0
26 APR 77	81	110	98.9	6	18	64	6	43	10	0	0	0	0	10
26 APR 77	78	123	95	6.5	18	64	4	39	10	0	20	30	50	70
4 MAY 77	78	123	107.1	6	19	66	8	46	10	0	0	0	0	0
4 MAY 77	85	115	101.5	6	19	66	6	43	10	0	0	0	0	0
4 MAY 77	78	123	103	6	19	66	4	39	10	0	10	20	50	100
17 MAY 77	80	107	90.9	5.5	21	70	12	54	10	0	0	0	0	0
17 MAY 77	80	125	100.3	6.5	21	70	10	50	8	0	0	0	0	0
17 MAY 77	79	106	95.8	6	21	70	8	46	10	0	0	0	0	0
17 MAY 77	74	119	101.4	6	21	70	6	43	10	0	10	20	30	40
24 MAY 77	62	117	95.2	5.5	24	75	12.5	55	10	0	0	0	0	0
24 MAY 77	62	116	98.1	6	24	75	9	48	10	0	0	10	10	10
24 MAY 77	68	122	99.7	5.5	24	75	6	43	10	0	20	80	90	100
1 JUN 77	88	113	100	5.5	21	70	12	54	9	0	0	0	0	0

Table 23. - Continued.

DATE	TOTAL LENGTH (MM)			SALINITY (PPT)	ACCLIM. TEMP.		EXPER. TEMP. (C)	TEMP. NO. OF EXP. ORG.	4 HOUR % MORT.	24 HOUR % MORT.	48 HOUR % MORT.	72 HOUR % MORT.	96 HOUR % MORT.	
	MIN.	MAX.	MEAN		(C)	(F)								
MENIDIA MENIDIA														
1 JUN 77	94	123	107.1	5.5	21	70	8	46	9	0	0	0	0	11
1 JUN 77	94	123	107.8	6	21	70	6	43	10	0	20	30	50	90
28 JUN 77	30	47	37.3	6.5	25.5	78	6	43	20	100	100	100	100	100
6 JUL 77	49	61	53.8	7	29	84	18	64	9	0	11	11	11	33
6 JUL 77	40	100	56.1	6	29	84	14.5	58	10	0	0	0	0	0
6 JUL 77	47	106	60.5	6.5	29	84	12.5	55	11	0	0	0	27	55
6 JUL 77	43	67	55.1	6	29	84	10.5	51	11	0	82	100	100	100
13 JUL 77	45	68	55.8	7	30	86	18	64	10	0	0	0	0	0
13 JUL 77	41	67	55.8	6	30	86	14	57	10	0	10	10	10	10
13 JUL 77	53	74	60.7	6.5	30	86	12	54	10	10	60	90	100	100
13 JUL 77	50	67	58.6	5.5	30	86	9.5	49	10	40	100	100	100	100
19 JUL 77	64	100	73.2	7	28	82	20	68	10	0	0	10	10	10
19 JUL 77	61	80	69.3	5.5	28	82	16	61	10	0	0	10	10	10
19 JUL 77	53	102	71.2	6	28	82	13	55	10	0	0	0	10	20
19 JUL 77	49	103	68.3	5	28	82	10.5	51	10	10	90	100	100	100
2 AUG 77	64	105	74.9	6	26	79	18	64	10	0	0	0	0	0
2 AUG 77	62	77	68.4	5.5	26	79	15	59	10	0	0	0	0	0
2 AUG 77	61	73	65.6	7.5	26	79	13	55	9	0	0	11.1	11.1	22.2
2 AUG 77	46	75	68.5	5	26	79	10	50	10	0	80	80	100	100
16 AUG 77	53	82	70.4	7	27	81	15	59	10	0	0	0	0	0

Table 23. - Continued.

DATE	TOTAL LENGTH (MM)			SALINITY (PPT)	ACCLIM. (C)	TEMP. (F)	EXPER. (C)	TEMP. (F)	NO. OF EXP. ORG.	4 HOUR	24 HOUR	48 HOUR	72 HOUR	96 HOUR	
	MIN.	MAX.	MEAN							% MORT.	% MORT.	% MORT.	% MORT.	% MORT.	
MENIDIA MENIDIA															
16 AUG 77	49	76	67.5	5	27	81	13	55	10	0	0	40	40	50	
16 AUG 77	61	83	73.4	4.5	27	81	11.5	53	10	0	60	90	100	100	
24 AUG 77	63	75	68.1	6.5	25	77	17	63	10	0	0	0	0	0	
24 AUG 77	63	78	69.5	7.5	25	77	16	61	10	0	0	0	0	0	
24 AUG 77	50	76	65.5	5	25	77	13.5	56	10	0	10	10	10	10	
24 AUG 77	63	83	67	4.5	25	77	12.5	55	10	0	0	20	20	50	
7 SEP 77	60	78	68	7	23.5	74	16	61	10	0	0	0	0	0	
7 SEP 77	62	79	68	7.5	23.5	74	14	57	10	0	0	0	0	0	
7 SEP 77	61	80	66.8	6.5	23.5	74	12.5	55	10	0	10	10	10	40	
13 OCT 77	48	71	61.8	10	16	61	9	48	10	0	0	0	0	0	
13 OCT 77	53	87	66.6	8	16	61	7	45	10	0	0	0	10	10	
13 OCT 77	57	91	72.4	7	16	61	4	39	10	0	80	90	100	100	
19 OCT 77	55	87	76.9	7.5	14	57	5.5	42	9	0	0	0	0	11.1	
20 OCT 77	58	97	81.2	7.5	13	55	5.5	42	10	0	0	10	40	70	
20 OCT 77	50	100	83.6	6.5	13	55	4	39	10	0	40	70	100	100	
1 NOV 77	59	95	78.3	10	10	50	6	43	10	0	0	0	0	10	
1 NOV 77	63	168	78	7.5	10	50	4	39	10	0	0	0	10	30	
1 NOV 77	62	103	80.7	6.5	10	50	2	36	10	0	90	100	100	100	
8 NOV 77	69	94	82.6	10	7	45	5	41	10	0	0	0	0	0	
8 NOV 77	66	93	81.3	7.5	7	45	3	37	10	0	10	40	40	50	

Table 23 . - Continued.

DATE	TOTAL LENGTH (MM)			SALINITY (PPT)	ACCLIM. (C)	TEMP. (F)	EXPER. (C)	TEMP. (F)	NO. OF EXP. ORG.	4 HOUR % MORT.	24 HOUR % MORT.	48 HOUR % MORT.	72 HOUR % MORT.	96 HOUR % MORT.
	MIN.	MAX.	MEAN											
MENIDIA MENIDIA														
8 NOV 77	62	102	83.1	4.5	7	45	1	34	10	0	80	100	100	100
22 NOV 77	62	115	89.3	10	5	41	2	36	10	0	0	0	20	60
22 NOV 77	46	113	83.6	8.5	5	41	1	34	10	0	0	10	10	50
22 NOV 77	82	106	93.1	10	5	41	0.2	32	10	0	0	20	100	100
29 NOV 77	77	101	88	10	6.5	44	3	37	10	0	0	0	40	100
29 NOV 77	78	105	84.6	8.5	6.5	44	1	34	10	0	20	60	90	100

Table 24 . - A chronological summary of cold shock experiments on white perch, Morone americana. All tests were conducted at near air saturated levels of dissolved oxygen and pH of 7 to 8.

DATE	SIZE RANGE (TL IN MM)		SALINITY (PPT)	ACCLIM. TEMP(C)	CONTROL TEMP(C)	EXPER. TEMP(C)	TIME(HRS.) FROM START		CONTROL		EXPERIMENTAL		
	MIN.	MAX.					NO. OF TEST	NO. ALIVE	NO. DEAD	NO. WITH L.O.E.	NO. ALIVE	NO. DEAD	NO. WITH L.O.E.
MORONE AMERICANA													
3 DEC 71	132	150	4.5	6.5	6.5	1	0	2	-	-	4	-	-
							0.5	2	0	0	4	0	3
							3.5	2	0	0	4	0	4
							24.3	2	0	0	4	0	2
							75.5	2	0	0	4	0	2
10 DEC 71	81	90	4.5	5	5	0	0	2	-	-	2	-	-
							1	2	0	0	2	0	2
							96	2	0	0	2	0	0
4 JAN 72	-	-	4.5	6	6	-0.5	0	2	-	-	4	-	-
							0.5	2	0	0	4	0	4
							96	2	0	0	4	0	3
28 APR 72	135	157	2.5	13	13	7	0	2	-	-	4	-	-
							96	2	0	0	4	0	0
28 APR 72	132	157	2.5	13	13	4	0	2	-	-	4	-	-
							96	2	0	0	4	0	0
5 NOV 73	122	156	6	14	14	6.5	0	10	-	-	10	-	-
							96	10	0	0	10	0	0
25 JAN 74	65	95	6	9	8.7	2.3	0	5	-	-	10	-	-
							26	5	0	0	10	0	1
							96	5	0	0	10	0	1
8 MAR 74	65	156	6	6	6	2	0	10	-	-	10	-	-
							96	10	0	0	10	0	0
2 MAY 74	100	155	6	15	15	2	0	10	-	-	10	-	-
							0.1	10	0	0	9	1	7
							24	10	0	0	8	2	2
							48	10	0	0	4	6	0
							96	10	0	0	4	6	2

Table 24 . - Continued.

DATE	SIZE RANGE (TL IN MM)		SALINITY (PPT)	ACCLIM. TEMP(C)	CONTROL TEMP(C)	EXPER. TEMP(C)	TIME(HRS.)		CONTROL		EXPERIMENTAL		
	MIN.	MAX.					FROM START OF TEST	NO. ALIVE	NO. DEAD	NO. WITH L.O.E.	NO. ALIVE	NO. DEAD	NO. WITH L.O.E.
MORONE AMERICANA													
23 MAY 74	105	150	0	19	18	5	0	10	-	-	10	-	-
							24	10	0	0	10	0	3
							48	10	0	0	8	2	3
							72	10	0	0	7	3	2
							96	10	0	0	5	5	0
4 JUN 74	112	160	0	20	19.8	7.9	0	10	-	-	10	-	-
							1.1	10	0	0	9	1	2
							24.25	10	0	0	8	2	0
							96	10	0	0	8	2	0
8 AUG 74	71	145	8	25	24.7	10.8	0	10	-	-	10	-	-
							0.1	10	0	0	10	0	3
							96	10	0	0	9	1	0
14 AUG 74	65	170	6	26	26	6	0	5	-	-	5	-	-
							0.1	5	0	0	5	0	5
							18	5	0	0	0	5	0
14 AUG 74	65	170	6	26	26	2	0	10	-	-	10	-	-
							0.1	10	0	0	10	0	10
							1	10	0	0	0	10	0
15 OCT 74	96	190	8.8	16	14.6	6	0	6	-	-	5	-	-
							0.01	6	0	0	5	0	2
							96	6	0	0	14	-	-
23 OCT 74	78	90	6	13	12.25	5.5	0	10	-	-	10	-	-
							96	10	0	0	10	0	0
8 NOV 74	95	154	6	15	14.1	0.5	0	10	-	-	10	-	-
							0.1	10	0	0	10	0	10
							3.5	10	0	0	10	0	5
							48	10	0	0	10	0	2
							68	10	0	0	10	0	6
							96	10	0	0	10	0	10

Table 24 . - Continued.

DATE	SIZE RANGE (TL IN MM)		SALINITY (PPT)	ACCLIM. TEMP(C)	CONTROL TEMP(C)	EXPER. TEMP(C)	TIME(HRS.)		CONTROL		EXPERIMENTAL		
	MIN.	MAX.					FROM START OF TEST	NO. ALIVE	NO. DEAD	NO. WITH L.O.E.	NO. ALIVE	NO. DEAD	NO. WITH L.O.E.
MORONE AMERICANA													
16 DEC 74	114	176	6.6	6.5	6.4	2.5	0 96	10 10	- 0	- 0	10 10	- 0	- 0
18 MAR 75	65	181	6.2	7.5	7	2.9	0 96	5 5	- 0	- 0	5 5	- 0	- 0
26 MAR 75	116	162	5.2	10	10.1	4.4	0 96	5 5	- 0	- 0	5 5	- 0	- 0
16 APR 75	138	164	5.4	14	8.6	3.6	0 96	10 10	- 0	- 0	10 10	- 0	- 0
22 APR 75	111	149	3.2	11	11.1	5	0 96	10 10	- 0	- 0	10 10	- 0	- 0
29 APR 75	117	152	5	18	14.3	6.1	0 96	10 10	- 0	- 0	10 10	- 0	- 0
7 MAY 75	118	167	5	14	14	7.7	0 96	10 10	- 0	- 0	10 10	- 0	- 0
12 MAY 75	120	157	5	20	14.2	7.4	0 96	10 10	- 0	- 0	10 10	- 0	- 0
5 AUG 75	51	75	5	27	26.8	15.5	0 96	5 5	- 0	- 0	5 5	- 0	- 0
26 AUG 75	76	87	5.5	30	27.5	15.2	0 96	10 10	- 0	- 0	10 10	- 0	- 0

Table 24 . - Continued.

DATE	SIZE RANGE (TL IN MM)		SALINITY (PPT)	ACCLIM. TEMP(C)	CONTROL TEMP(C)	EXPER. TEMP(C)	TIME(HRS.)		CONTROL			EXPERIMENTAL		
	MIN.	MAX.					FROM START OF TEST	NO. ALIVE	NO. DEAD	NO. WITH L.O.E.	NO. ALIVE	NO. DEAD	NO. WITH L.O.E.	
MORONE AMERICANA														
30 SEP 75	80	96	3.5	21	23	10.5	0 96	10 10	- 0	- 0	10 10	- 0	- 0	
14 OCT 75	77	96	6	19	18.4	10.5	0 96	5 5	- 0	- 0	5 5	- 0	- 0	
14 DEC 75	60	152	6	6	6	2.7	0 96	10 10	- 0	- 0	10 10	- 0	- 0	
16 DEC 75	66	95	6	6	6	2.9	0 96	10 10	- 0	- 0	10 10	- 0	- 1	
17 FEB 76	69	163	10	6	8.5	3.3	0 20 46 71 74 96	8 8 8 7 7 7	- 0 0 1 1 1	- 0 2 1 1 1	8 8 8 8 7 7	- 0 0 0 1 1	- 1 1 1 0 0	
13 MAR 76	66	86	3.5	9	9	2	0 45 93	5 5 5	- 0 0	- 0 0	5 5 4	- 0 1	- 2 1	
24 MAR 76	127	165	4	10	9.6	8	0 96	5 5	- 0	- 0	5 5	- 0	- 0	
24 MAR 76	120	153	4	10	9.6	3.5	0 96	5 5	- 0	- 0	5 5	- 0	- 0	
24 MAR 76	127	157	4	10	9.6	3.5	0 96	5 5	- 0	- 0	5 5	- 0	- 0	

Table 24 . - Continued.

DATE	SIZE RANGE (TL IN MM)		SALINITY (PPT)	ACCLIM. TEMP(C)	CONTROL TEMP(C)	EXPER. TEMP(C)	TIME(HRS.)		CONTROL		EXPERIMENTAL		
	MIN.	MAX.					FROM START- OF TEST	NO. ALIVE	NO. DEAD	NO. WITH L.O.E.	NO. ALIVE	NO. DEAD	NO. WITH L.O.E.
MORONE AMERICANA													
6 APR 76	129	158	4	12	12	2.7	0 96	5 5	- 0	- 0	5 5	- 0	- 0
14 MAY 76	97	160	2.8	20	17.5	8.7	0 96	9 9	- 0	- 0	10 10	- 0	- 0
2 NOV 76	64	127	8	10	10.7	5.1	0 22 53.5 69.7 77.5 96	10 10 10 10 9 9	- 0 0 0 1 1	- 0 0 1 0 0	10 10 10 9 9 9	- 0 0 1 1 1	- 1 2 0 0 1
2 NOV 76	103	134	6	10	10.6	4	0 71.7 94.2	10 9 9	- 1 1	- 0 0	10 10 10	- 0 0	- 0 0
10 NOV 76	127	189	6	9	11	3.7	0 96	5 5	- 0	- 0	5 5	- 0	- 0
10 NOV 76	115	164	7	9	11	2	0 96	5 5	- 0	- 0	6 6	- 0	- 0
23 NOV 76	55	115	3.5	9	11.8	2	0 71 96	12 11 11	- 1 1	- 0 0	12 12 12	- 0 0	- 0 0
30 NOV 76	68	137	3.5	5.5	7.5	2	0 23.2 79.75 96	10 10 10 10	- 0 0 0	- 0 0 0	10 10 9 9	- 0 1 1	- 3 5 5

Table 24 . - Continued.

DATE	SIZE RANGE (TL IN MM)		SALINITY (PPT)	ACCLIM. TEMP(C)	CONTROL TEMP(C)	EXPER. TEMP(C)	TIME(HRS.)		CONTROL		EXPERIMENTAL		
	MIN.	MAX.					FROM START OF TEST	NO. ALIVE	NO. DEAD	NO. WITH L.O.E.	NO. ALIVE	NO. DEAD	NO. WITH L.O.E.
MORONE AMERICANA													
30 MAR 77	134	185	6	9	9	4	0	10	-	-	10	-	-
							96	10	0	0	10	0	0
30 MAR 77	132	188	7	9	9	2	0	10	-	-	10	-	-
							96	10	0	0	10	0	0
30 MAR 77	121	185	6.5	9	9	1.5	0	10	-	-	10	-	-
							48	10	0	0	9	1	1
							72	10	0	0	8	2	0
							96	10	0	0	8	2	0
5 APR 77	123	175	6	14	12	6.5	0	10	-	-	10	-	-
							96	10	0	0	10	0	0
5 APR 77	123	175	6	14	12	3.5	0	10	-	-	10	-	-
							96	10	0	0	10	0	0
5 APR 77	123	193	7	14	12	2	0	10	-	-	10	-	-
							0.5	10	0	0	10	0	5
							1	10	0	0	10	0	1
							96	10	0	0	10	0	0
13 APR 77	125	163	6	14	14	6	0	10	-	-	10	-	-
							96	10	0	0	10	0	0
13 APR 77	117	163	7	14	14	2.5	0	10	-	-	10	-	-
							96	10	0	0	10	0	0
13 APR 77	115	163	6	14	14	2.5	0	10	-	-	10	-	-
							96	10	0	0	10	0	0

Table 24 . - Continued.

DATE	SIZE RANGE (TL IN MM)		SALINITY (PPT)	ACCLIM. TEMP(C)	CONTROL TEMP(C)	EXPER. TEMP(C)	TIME(HRS.) FROM START OF TEST	NO. ALIVE	CONTROL		EXPERIMENTAL		
	MIN.	MAX.							NO. DEAD	NO. WITH L.O.E.	NO. ALIVE	NO. DEAD	NO. WITH L.O.E.
MORONE AMERICANA													
13 APR 77	118	163	6	14	14	2	0 96	10 10	- 0	- 0	10 10	- 0	- 0
26 APR 77	119	176	6.5	18	17	10	0 96	10 10	- 0	- 0	10 10	- 0	- 0
26 APR 77	125	185	6	18	17	8	0 96	10 10	- 0	- 0	10 10	- 0	- 0
26 APR 77	120	176	6	18	17	6	0 96	10 10	- 0	- 0	10 10	- 0	- 0
26 APR 77	125	176	6.5	18	17	4	0 96	10 10	- 0	- 0	10 10	- 0	- 0
15 NOV 77	64	100	8.5	6	6	1	0 96	10 10	- 0	- 0	10 10	- 0	- 0

Table 25 . - Summary of all cold shock tests on white perch, Morone americana, after 4-, 24-, 48-, 72-, and 96-hour exposure times over a range of acclimation temperatures.

DATE	TOTAL LENGTH (MM)			SALINITY	ACCLIM. TEMP.	TEMP.	EXPER. TEMP.	NO. OF	4 HOUR	24 HOUR	48 HOUR	72 HOUR	96 HOUR
	MIN.	MAX.	MEAN	(PPT)	(C)	(F)	(C)	(F)	EXP. ORG.	% MORT.	% MORT.	% MORT.	% MORT.
MORONE AMERICANA													
3 DEC 71	144	150	146	4.5	6.5	44	1	34	4	0	0	0	-
10 DEC 71	81	82	81.5	4.5	5	41	0	32	2	0	0	0	0
4 JAN 72	-	-	-	4.5	6	43	-0.5	31	4	0	0	0	0
28 APR 72	135	155	144	2.5	13	55	7	45	4	0	0	0	0
28 APR 72	132	148	140	2.5	13	55	4	39	4	0	0	0	0
5 NOV 73	122	156	144.2	6	14	57	6.5	44	10	0	0	0	0
25 JAN 74	70	95	80.1	6	9	48	2.3	36	10	0	0	0	0
8 MAR 74	65	137	95.8	6	6	43	2	36	10	0	0	0	0
8 MAY 74	101	153	124.3	0	15	59	2	36	10	10	20	60	60
23 MAY 74	114	150	134.6	0	19	66	5	41	10	0	0	20	30
4 JUN 74	112	145	132.4	0	20	68	7.9	46	10	10	10	20	20
8 AUG 74	71	145	121	8	25	77	10.8	51	10	0	0	0	10
14 AUG 74	65	130	97.8	6	26	79	6	43	5	0	100	100	100
14 AUG 74	71	127	98.2	6	26	79	2	36	10	100	100	100	100
15 OCT 74	110	190	154	8.8	16	61	6	43	5	0	0	0	-
23 OCT 74	78	90	83.9	6	13	55	5.5	42	10	0	0	0	0
8 NOV 74	95	135	120.1	6	15	59	0.5	33	10	0	0	0	0
16 DEC 74	114	176	146.4	6.6	6.5	44	2.5	37	10	0	0	0	0
18 MAR 75	65	177	107.2	6.2	7.5	46	2.9	37	5	0	0	0	0
26 MAR 75	116	162	136.8	5.2	10	50	4.4	40	5	0	0	0	0

Table 25 . - Continued.

DATE	TOTAL MIN.	LENGTH (MM) MAX.	MEAN	SALINITY (PPT)	ACCLIM. (C)	TEMP. (F)	EXPER. (C)	TEMP. (F)	NO. OF EXP. ORG.	4 HOUR % MORT.	24 HOUR % MORT.	48 HOUR % MORT.	72 HOUR % MORT.	96 HOUR % MORT.
MORONE AMERICANA														
16 APR 75	170	127	152.2	5.4	14	57	3.6	38	10	0	0	0	0	0
22 APR 75	122	148	137.2	3.2	11	52	5	41	10	0	0	0	0	0
29 APR 75	128	152	136.6	5	18	64	6.1	43	10	0	0	0	0	0
7 MAY 75	127	160	138.3	5	14	57	7.7	46	10	0	0	0	0	0
12 MAY 75	126	146	133.3	5	20	68	7.4	45	10	0	0	0	0	0
5 AUG 75	51	75	63.8	5	27	81	15.5	60	5	0	0	0	0	0
26 AUG 75	78	87	83.2	5.5	30	86	15.2	59	10	0	0	0	0	0
30 SEP 75	85	93	89	3.5	21	70	10.5	51	10	0	0	0	0	0
14 OCT 75	77	88	83	6	19	66	10.5	51	5	0	0	0	0	0
14 DEC 75	61	152	101.8	6	6	43	2.7	37	10	0	0	0	0	0
16 DEC 75	67	95	75.3	6	6	43	2.9	37	10	0	0	0	0	0
17 FEB 76	81	158	108	10	6	43	3.3	38	8	0	0	0	0	13
13 MAR 76	66	86	78.8	3.5	9	48	2	36	5	0	0	0	0	-
24 MAR 76	127	165	144.2	4	10	50	8	46	5	0	0	0	0	0
24 MAR 76	120	153	141.2	4	10	50	3.5	38	5	0	0	0	0	0
24 MAR 76	127	157	145.6	4	10	50	3.5	38	5	0	0	0	0	0
6 APR 76	129	158	27.4	4	12	54	2.7	37	5	0	0	0	0	0
14 MAY 76	97	160	134.8	2.8	20	68	8.7	48	10	0	0	0	0	0
2 NOV 76	64	127	102.3	8	10	50	5.1	41	10	0	0	0	10	10
2 NOV 76	103	134	115.7	6	10	50	4	39	10	0	0	0	0	-

Table 25. - Continued.

DATE	TOTAL LENGTH (MM)			SALINITY	ACCLIN.	TEMP.	EXPER.	TEMP.	NO. OF	4 HOUR	24 HOUR	48 HOUR	72 HOUR	96 HOUR
	MIN.	MAX.	MEAN	(PPT)	(C)	(F)	(C)	(F)	EXP. ORG.	% MORT.	% MORT.	% MORT.	% MORT.	% MORT.
MORONE AMERICANA														
10 NOV 76	134	189	158.2	6	9	48	3.7	39	5	0	0	0	0	0
10 NOV 76	115	149	128.8	7	9	48	2	36	6	0	0	0	0	0
23 NOV 76	68	115	80.1	3.5	9	48	2	36	12	0	0	0	0	0
30 NOV 76	70	128	92.3	3.5	5.5	42	2	36	10	0	0	0	0	10
30 MAR 77	134	181	159.1	6	9	48	4	39	10	0	0	0	0	0
30 MAR 77	132	188	151.7	7	9	48	2	36	10	0	0	0	0	0
30 MAR 77	121	185	148.1	6.5	9	48	1.5	35	10	0	0	10	20	20
5 APR 77	125	173	153.1	6	14	57	6.5	44	10	0	0	0	0	0
5 APR 77	127	170	153.3	6	14	57	3.5	38	10	0	0	0	0	0
5 APR 77	133	193	157.1	7	14	57	2	36	10	0	0	0	0	0
13 APR 77	129	140	135.3	6	14	57	6	43	10	0	0	0	0	0
13 APR 77	125	163	130.8	7	14	57	2.5	37	10	0	0	0	0	0
13 APR 77	115	147	135.5	6	14	57	2.5	37	10	0	0	0	0	0
13 APR 77	118	156	142.1	6	14	57	2	36	10	0	0	0	0	0
26 APR 77	119	161	141.3	6.5	18	64	10	50	10	0	0	0	0	0
26 APR 77	141	185	158.3	6	18	64	8	46	10	0	0	0	0	0
26 APR 77	120	161	139.3	6	18	64	6	43	10	0	0	0	0	0
26 APR 77	128	169	149.6	6.5	18	64	4	39	10	0	0	0	0	0
15 NOV 77	65	98	81.7	8.5	6	43	1	34	10	0	0	0	0	0

Table 26 . - A chronological summary of cold shock experiments on striped bass, Morone saxatilis. All tests were conducted at near air saturated levels of dissolved oxygen and pH of 7 to 8.

DATE	SIZE RANGE (TL IN MM)		SALINITY (PPT)	ACCLIM. TEMP(C)	CONTROL TEMP(C)	EXPER. TEMP(C)	TIME(HRS.)		CONTROL		EXPERIMENTAL		
	MIN.	MAX.					FROM START OF TEST	NO. ALIVE	NO. DEAD	NO. WITH L.O.E.	NO. ALIVE	NO. DEAD	NO. WITH L.O.E.
MORONE SAXATILIS													
14 DEC 71	-	-	4.5	4.5	4.5	0	0	2	-	-	2	-	-
							26	2	0	0	2	0	2
							96	2	0	0	2	0	2
11 JAN 72	87	106	4.5	6	6	-0.5	0	2	-	-	4	-	-
							24	2	0	0	3	1	3
							48	2	0	0	0	4	0
15 OCT 74	79	138	9	16	16	5.5	0	2	-	-	2	-	-
							96	2	0	0	2	0	0
30 NOV 76	108	148	5.5	9	8	3.5	0	8	-	-	9	-	-
							96	8	0	0	9	0	0
30 NOV 76	102	147	3.5	9	8	2	0	8	-	-	10	-	-
							0.1	8	0	1	10	0	1
							7.3	8	0	0	10	0	0
							96	8	0	0	10	0	0
7 DEC 76	115	148	4	7	7.5	2	0	10	-	-	10	-	-
							93	10	0	0	10	0	0
1 JUL 77	42	58	4.5	28	25	15	0	10	-	-	10	-	-
							96	10	0	0	10	0	0
1 JUL 77	42	62	8	28	25	12.5	0	10	-	-	10	-	-
							96	10	0	0	10	0	0
1 JUL 77	42	66	7	28	25	11	0	10	-	-	10	-	-
							0.2	10	0	0	10	0	2
							75	10	0	0	8	2	3
							96	10	0	0	8	2	0

Table 26. - Continued.

DATE	SIZE RANGE (TL IN MM)		SALINITY (PPT)	ACCLIM. TEMP(C)	CONTROL TEMP(C)	EXPER. TEMP(C)	TIME (HRS.) FROM START NO.		CONTROL		EXPERIMENTAL		
	MIN.	MAX.					OF TEST	ALIVE	NO. DEAD	NO. WITH L.O.E.	NO. ALIVE	NO. DEAD	NO. WITH L.O.E.
MORONE SAXATILIS													
1 JUL 77	42	62	6.5	28	25	9	0	10	-	-	10	-	-
							0.1	10	0	0	10	0	10
							2.3	10	0	0	9	1	3
							23	10	0	0	5	5	5
							59	10	0	0	0	10	0
26 OCT 77	71	99	10	11	11.5	7	0	10	-	-	10	-	-
							96	10	0	0	10	0	0
26 OCT 77	71	90	7.5	11	11.5	5	0	10	-	-	10	-	-
							96	10	0	0	10	0	0
26 OCT 77	71	103	6.5	11	11.5	3	0	10	-	-	10	-	-
							96	10	0	0	10	0	0
1 NOV 77	78	154	6.5	10	10	2	0	10	-	-	10	-	-
							48	10	0	0	10	0	1
							56	10	0	0	9	1	0
							96	10	0	0	8	2	0
8 NOV 77	68	121	4.5	8	7	1	0	10	-	-	10	-	-
							96	10	0	0	10	0	0
22 NOV 77	67	130	10	5	5.5	0.2	0	10	-	-	10	-	-
							96	10	0	0	10	0	0
28 NOV 77	67	106	10	4	5	0.2	0	10	-	-	10	-	-
							96	10	0	0	10	0	0

Table 27 . - Summary of all cold shock tests on striped bass, Morone saxatilis, after 4-, 24-, 48-, 72-, and 96-hour exposure times over a range of acclimation temperatures.

DATE	TOTAL MIN.	LENGTH (MM) MAX.	MEAN	SALINITY (PPT)	ACCLIM. (C)	TEMP. (F)	EXPER. (C)	TEMP. (F)	NO. OF EXP. ORG.	4 HOUR % MORT.	24 HOUR % MORT.	48 HOUR % MORT.	72 HOUR % MORT.	96 HOUR % MORT.
MORONE SAXATILIS														
14 DEC 71	-	-	-	4.5	4.5	40	0	32	2	0	0	0	0	0
11 JAN 72	97	79	86	4.5	6	43	-0.5	31	4	0	25	100	100	100
15 OCT 74	79	138	109	9	16	61	5.5	42	2	0	0	0	0	0
30 NOV 76	108	148	129	5.5	9	48	3.5	38	9	0	0	0	0	0
30 NOV 76	102	147	125	3.5	9	48	2	36	10	0	0	0	0	0
7 DEC 76	115	145	127	4	7	45	2	36	10	0	0	0	0	-
1 JUL 77	45	58	50.4	6.5	28	82	15	59	10	0	0	0	0	0
1 JUL 77	47	62	54.3	8	28	82	12.5	55	10	0	0	0	0	0
1 JUL 77	46	66	54.6	7	28	82	11	52	10	0	0	0	0	20
1 JUL 77	49	62	55.3	6.5	28	82	9	48	10	0	50	50	100	100
26 OCT 77	73	99	80.1	10	11	52	7	45	10	0	0	0	0	0
26 OCT 77	74	84	79.5	7.5	11	52	5	41	10	0	0	0	0	0
26 OCT 77	77	103	86	6.5	11	52	3	37	10	0	0	0	0	0
1 NOV 77	85	114	99.2	6.5	10	50	2	36	10	0	0	0	10	20
8 NOV 77	68	108	85.5	4.5	8	46	1	34	10	0	0	0	0	0
22 NOV 77	67	122	84.9	10	5	41	0.2	32	10	0	0	0	0	0
28 NOV 77	67	106	82.8	10	4	39	0.2	32	10	0	0	0	0	0

Table 28 . - A chronological summary of cold shock experiments on weakfish, Cynoscion regalis. All tests were conducted at near air saturated levels of dissolved oxygen and pH of 7 to 8.

DATE	SIZE RANGE (TL IN MM)		SALINITY (PPT)	ACCLIM. TEMP(C)	CONTROL TEMP(C)	EXPER. TEMP(C)	TIME(HRS.)		CONTROL		EXPERIMENTAL		
	MIN.	MAX.					FROM START OF TEST	NO. ALIVE	NO. DEAD	NO. WITH L.O.E.	NO. ALIVE	NO. DEAD	NO. WITH L.O.E.
CYNOSCIION REGALIS													
8 AUG 74	53	101	8	25	24.5	15	0	5	-	-	5	-	-
							0.02	5	0	0	5	0	1
							48	5	0	0	5	0	2
							72	5	0	0	1	4	0
							96	5	0	0	1	4	0
15 AUG 74	48	91	8	24	24	18	0	3	-	-	5	-	-
							0.5	3	0	0	5	0	1
							21	2	1	0	3	2	0
							24	2	1	0	3	2	1
							91	2	1	0	3	2	3
96	2	1	0	2	3	2							
10 JUL 75	44	94	5	22	22	18	0	10	-	-	10	-	-
							96	10	0	0	10	0	0
21 JUL 75	66	100	5	24	24	16.5	0	6	-	-	5	-	-
							16.5	6	0	1	5	0	0
							96	6	0	0	5	0	0
19 AUG 75	100	115	5.5	30	28.5	15	0	5	-	-	5	-	-
							0.1	5	0	0	5	0	5
							24	5	0	0	3	2	3
							27	5	0	0	0	5	0
29 JUL 76	44	90	6	27	26.5	16.5	0	10	-	-	10	-	-
							0.1	10	0	0	10	0	5
							23.5	10	0	0	9	1	0
							50	10	0	0	8	2	1
							81.5	10	0	0	7	3	0
							96	10	0	0	7	3	0
17 AUG 76	67	98	6	25	26.5	16.5	0	5	-	-	5	-	-
							7	5	0	1	5	0	1
							24	4	1	0	4	1	0
							78	4	1	0	4	1	1
							96	4	1	0	3	2	0

Table 28 . - Continued.

DATE	SIZE RANGE (TL IN MM)		SALINITY (PPT)	ACCLIM. TEMP(C)	CONTROL TEMP(C)	EXPER. TEMP(C)	TIME(HRS.)		CONTROL		EXPERIMENTAL		
	MIN.	MAX.					FROM START OF TEST	NO. ALIVE	NO. DEAD	NO. WITH L.O.E.	NO. ALIVE	NO. DEAD	NO. WITH L.O.E.
CYNOSCIION REGALIS													
24 AUG 76	42	113	5	27	27	14	0	10	-	-	10	-	-
							0.03	10	0	0	9	1	2
							22	10	0	0	8	2	2
							45	10	0	0	5	5	1
							70	10	0	0	3	7	0
							96	10	0	0	1	9	0
22 JUN 77	20	58	7.5	25	23.5	12	0	18	-	-	20	-	-
							24	18	0	0	18	2	7
							31	18	0	0	15	5	6
							48	17	1	0	7	13	6
							56	17	1	0	4	16	3
							96	17	1	0	1	19	0
22 JUN 77	21	58	5.5	25	23	10	0	20	-	-	20	-	-
							0.1	20	0	0	20	0	20
							0.25	20	0	0	19	1	19
							4	20	0	0	8	12	8
							5.5	20	0	0	3	17	3
							6.5	20	0	0	0	20	0
22 JUN 77	17	58	5.5	25	23	8	0	20	-	-	20	-	-
							0.2	20	0	0	3	17	3
							0.7	20	0	0	0	20	0
22 JUN 77	19	58	5	25	23	6	0	20	-	-	20	-	-
							0.1	20	0	0	1	19	1
							3	20	0	0	0	20	0
28 JUN 77	35	58	7	29	24	12	0	20	-	-	20	-	-
							0.1	20	0	0	19	1	19
							1.3	20	0	0	11	9	11
							3.5	20	0	0	2	18	2
							5.5	20	0	0	1	19	1
							24	20	0	0	0	20	0
28 JUN 77	35	56	7	29	24	10	0	20	-	-	20	-	-
							0.1	20	0	0	16	4	16
							1	20	0	0	12	8	12
							1.5	20	0	0	5	15	5
							2	20	0	0	1	19	1
							2.5	20	0	0	0	20	0

Table 28 . - Continued.

DATE	SIZE RANGE (TL IN MM)		SALINITY (PPT)	ACCLIM. TEMP(C)	CONTROL TEMP(C)	EXPER. TEMP(C)	TIME(HRS.)		CONTROL		EXPERIMENTAL		
	MIN.	MAX.					FROM START	NO. ALIVE	NO. DEAD	NO. WITH L.O.E.	NO. ALIVE	NO. DEAD	NO. WITH L.O.E.
CYNOSCION REGALIS													
28 JUN 77	35	59	6.5	29	24	8	0	20	-	-	20	-	-
							0.1	20	0	0	8	12	8
							0.5	20	0	0	0	20	0
1 JUL 77	36	65	6.5	27.5	27	15	0	10	-	-	10	-	-
							3.5	10	0	0	9	1	1
							4.5	10	0	0	8	2	1
							24	10	0	0	6	4	0
							60	10	0	0	2	8	0
							96	10	0	0	2	8	0
1 JUL 77	38	52	7	27.5	26.5	13	0	10	-	-	10	-	-
							2.5	10	0	0	6	4	6
							3.5	10	0	0	4	6	4
							4.5	10	0	0	2	8	2
							6.3	10	0	0	1	9	1
							24	10	0	0	0	10	0
1 JUL 77	38	52	7	27.5	26.5	11	0	10	-	-	10	-	-
							0.1	10	0	10	10	0	10
							0.6	10	0	0	9	1	9
							2	10	0	0	1	9	1
							3	10	0	0	0	10	0
13 JUL 77	57	94	7	29	28	18	0	7	-	-	7	-	-
							71	7	0	0	3	4	0
							96	7	0	0	0	7	0
19 JUL 77	62	105	7	29.5	29	20	0	7	-	-	7	-	-
							78	7	0	0	7	0	1
							96	7	0	0	3	4	0
27 JUL 77	50	89	7	26	25	20	0	9	-	-	9	-	-
							24	8	1	0	8	1	0
							31	8	1	0	6	3	2
							48	8	1	0	4	5	1
							56	8	1	0	3	6	0
							96	8	1	0	3	6	0

Table 28 . - Continued.

DATE	SIZE RANGE (TL IN MM)		SALINITY (PPT)	ACCLIM. TEMP(C)	CONTROL TEMP(C)	EXPER. TEMP(C)	TIME(HRS.) FROM START NO.		CONTROL		EXPERIMENTAL		
	MIN.	MAX.					OF TEST	NO. ALIVE	NO. DEAD	NO. WITH L.O.E.	NO. ALIVE	NO. DEAD	NO. WITH L.O.E.
CYNOSCIION REGALIS													
7 SEP 77	78	144	7	24	23.5	17.5	0	10	-	-	10	-	-
							96	9	1	1	10	0	0
7 SEP 77	78	126	7	24	23.5	16	0	10	-	-	10	-	-
							96	9	1	1	10	0	0
7 SEP 77	78	147	7.5	24	23.5	14	0	10	-	-	10	-	-
							48	10	0	0	8	2	0
							52	10	0	0	7	3	0
							74	10	0	0	5	5	0
							96	9	1	1	4	6	0
7 SEP 77	68	126	6.5	24	23.5	12.5	0	10	-	-	10	-	-
							24	10	0	0	9	1	2
							48	10	0	0	8	2	3
							56	10	0	0	4	4	3
							74	10	0	0	2	6	0
96	9	1	1	2	8	2							
28 SEP 77	93	149	7	16	16	9	0	5	-	-	6	-	-
							0.1	5	0	0	6	0	1
							25	5	0	0	5	1	0
							49	5	0	1	4	2	0
							79	4	1	0	3	3	1
96	4	1	0	2	4	0							

Table 29 . - Summary of all cold shock tests on weakfish, Cynoscion regalis, after 4-, 24-, 48-, 72-, and 96-hour exposure times over a range of acclimation temperatures.

DATE	TOTAL LENGTH (MM)			SALINITY	ACCLIM.	TEMP.	EXPER.	TEMP.	NO. OF	4 HOUR	24 HOUR	48 HOUR	72 HOUR	96 HOUR
	MIN.	MAX.	MEAN	(PPT)	(C)	(F)	(C)	(F)	EXP. ORG.	% MORT.	% MORT.	% MORT.	% MORT.	% MORT.
CYNOSCIION REGALIS														
8 AUG 74	53	94	82.5	8	25	77	15	59	5	0	0	0	80	80
15 AUG 74	53	76	33	8	24	75	18	64	5	0	40	40	40	60
10 JUL 75	44	73	61.5	5	22	72	18	64	10	0	0	0	0	0
21 JUL 75	68	85	76	5	24	75	16.5	62	5	0	0	0	0	0
19 AUG 75	102	123	112	5.5	30	86	15	59	5	0	60	100	100	100
29 JUL 76	50	90	67.5	6	27	81	16.5	62	10	0	10	10	20	30
17 AUG 76	67	98	86	6	25	77	16.5	62	5	0	20	20	20	40
24 AUG 76	42	102	77	5	27	81	14	57	10	10	20	50	70	90
22 JUN 77	20	37	26.4	7.5	25	77	12	54	20	0	10	65	80	95
22 JUN 77	21	45	27.3	5.5	25	77	10	50	20	60	100	100	100	100
22 JUN 77	17	43	26.6	5.5	25	77	8	46	20	100	100	100	100	100
22 JUN 77	19	34	24	5	25	77	6	43	20	100	100	100	100	100
28 JUN 77	37	58	47.4	7	29	84	12	54	20	90	100	100	100	100
28 JUN 77	36	56	42.4	7	29	84	10	50	20	100	100	100	100	100
28 JUN 77	35	59	46.3	6.5	29	84	8	46	20	100	100	100	100	100
1 JUL 77	36	65	49.2	6.5	27.5	82	15	59	10	10	40	40	80	80
1 JUL 77	41	50	44.6	7	27.5	82	13	55	10	60	100	100	100	100
1 JUL 77	38	48	43.8	7	27.5	82	11	52	10	100	100	100	100	100
13 JUL 77	68	94	80.1	7	29	84	18	64	7	0	0	0	57	100
19 JUL 77	62	72	67.3	7	29.5	85	20	68	7	0	0	0	0	57

Table 29. - Continued.

DATE	TOTAL LENGTH (MM)			SALINITY	ACCLIM.	TEMP.	EXPER.	TEMP.	NO. OF	4 HOUR	24 HOUR	48 HOUR	72 HOUR	96 HOUR
	MIN.	MAX.	MEAN	(PPT)	(C)	(F)	(C)	(F)	EXP. ORG.	% MORT.	% MORT.	% MORT.	% MORT.	% MORT.
CYNOSCION REGALIS														
27 JUL 77	69	89	80.7	7	26	79	20	68	9	0	11	56	67	67
7 SEP 77	90	144	115.3	7	24	75	17.5	64	10	0	0	0	0	0
7 SEP 77	93	120	104.4	7	24	75	16	61	10	0	0	0	0	0
7 SEP 77	93	147	118.3	7.5	24	75	14	57	10	0	0	20	30	60
7 SEP 77	68	85	78	6.5	24	75	12.5	55	10	0	10	20	40	80
28 SEP 77	103	145	123.2	7	16	61	9	48	6	0	0	16.7	33.3	66.7

Table 30 . - A chronological summary of cold shock experiments on spot, Leiostomus xanthurus. All tests were conducted at near air saturated levels of dissolved oxygen and pH of 7 to 8.

DATE	SIZE RANGE (TL IN MM)		SALINITY (PPT)	ACCLIM. TEMP(C)	CONTROL TEMP(C)	EXPER. TEMP(C)	TIME(HRS.)		CONTROL		EXPERIMENTAL		
	MIN.	MAX.					FROM START	NO. ALIVE	NO. DEAD	NO. WITH L.O.E.	NO. ALIVE	NO. DEAD	NO. WITH L.O.E.
LEIOSTOMUS XANTHURUS													
8 AUG 74	74	113	8	25	24.5	11	0	10	-	-	10	-	-
							0.1	10	0	0	10	0	4
							1	10	0	0	10	0	1
							72	10	0	0	9	1	1
							96	10	0	0	9	1	1
14 AUG 74	67	121	6	26	26	6	0	5	-	-	5	-	-
							0.1	5	0	0	5	0	5
							18	5	0	0	0	5	0
14 AUG 74	74	117	6	26	26	2	0	5	-	-	5	-	-
							0.1	5	0	0	5	0	5
							1	5	0	0	0	5	0
7 OCT 74	86	128	6.5	20	20	2	0	10	-	-	10	-	-
							0.1	10	0	0	10	0	10
							1	10	0	0	0	10	0
8 OCT 74	95	136	7.2	20	20.5	5	0	10	-	-	10	-	-
							0.1	10	0	0	10	0	10
							3.5	10	0	0	4	6	4
							20	10	0	0	1	9	1
							24	10	0	0	0	10	0
15 OCT 74	109	167	8.8	16	15.5	5.5	0	3	-	-	4	-	-
							0.1	3	0	0	4	0	4
							24	3	0	0	4	0	2
							48	3	0	0	2	2	2
							72	3	0	0	1	3	1
							96	3	0	0	1	3	1
30 OCT 74	96	144	6.5	14	14	6	0	10	-	-	10	-	-
							0.1	10	0	0	10	0	8
							20	10	0	1	8	2	6
							45	9	1	2	5	5	3
							53	8	2	2	3	7	1
							96	8	2	2	0	10	0

Table 30. - Continued.

DATE	SIZE RANGE (TL IN MM)		SALINITY (PPT)	ACCLIM. TEMP(C)	CONTROL TEMP(C)	EXPER. TEMP(C)	TIME(HRS.) FROM START OF TEST	NO. ALIVE	CONTROL		EXPERIMENTAL			
	MIN.	MAX.							NO. DEAD	NO. WITH L.O.E.	NO. ALIVE	NO. DEAD	NO. WITH L.O.E.	
LEIDOSTOMUS XANTHURUS														
12 AUG 75	96	118	5	27	28	16	0	5	-	-	5	-	-	
							0.3	5	0	0	5	0	1	
							24	5	0	0	4	1	1	
							31	5	0	0	3	2	0	
							96	5	0	0	3	2	0	
4 OCT 75	75	103	6	19.5	20	10.5	0	10	-	-	10	-	-	
							96	10	0	0	10	0	0	
17 OCT 75	70	96	6	19	19	10.5	0	5	-	-	5	-	-	
							96	5	0	0	5	0	0	
22 NOV 75	72	90	5	14	13.5	10	0	10	-	-	10	-	-	
							96	10	0	0	10	0	0	
4 MAY 76	32	45	4	16	17	8	0	10	-	-	10	-	-	
							52	10	0	0	9	1	1	
							96	10	0	0	8	2	0	
4 MAY 76	32	45	4	16	17	6	0	10	-	-	10	-	-	
							0.1	10	0	0	10	0	8	
							20	10	0	0	9	1	4	
							26	10	0	0	6	4	2	
							43.5	10	0	0	4	6	2	
							96	10	0	0	2	8	0	
4 MAY 76	32	46	8.2	16	16	3	0	5	-	-	5	-	-	
							0.1	5	0	0	0	5	0	
14 MAY 76	24	38	2.8	18	17.5	8.3	0	11	-	-	10	-	-	
							0.3	11	0	0	10	0	2	
							22	11	0	0	10	0	1	
							96	10	1	0	9	1	4	

Table 30. - Continued.

DATE	SIZE RANGE (TL IN MM)		SALINITY (PPT)	ACCLIM. TEMP(C)	CONTROL TEMP(C)	EXPER. TEMP(C)	TIME(HRS.)		CONTROL		EXPERIMENTAL		
	MIN.	MAX.					FROM START OF TEST	NO. ALIVE	NO. DEAD	NO. WITH L.O.E.	NO. ALIVE	NO. DEAD	NO. WITH L.O.E.
LEIOSTOMUS XANTHURUS													
26 MAY 76	46	72	7.1	18	18	9.5	0	10	-	-	10	-	-
							96	10	0	0	10	0	0
17 JUL 76	80	119	6	26	26	21	0	10	-	-	10	-	-
							96	10	0	0	10	0	0
17 JUL 76	74	119	6	26	26	21	0	10	-	-	10	-	-
							96	10	0	0	10	0	0
17 JUL 76	80	119	6	26	26	21	0	10	-	-	10	-	-
							96	10	0	0	10	0	0
17 JUL 76	75	119	6	26	26	16.5	0	10	-	-	10	-	-
							0.3	10	0	0	10	0	2
							96	10	0	0	10	0	0
5 OCT 76	85	124	5.5	20	18.5	14	0	10	-	-	10	-	-
							22	9	1	0	10	0	0
							96	10	0	0	10	0	0
29 OCT 76	84	131	8	12	12	5	0	10	-	-	10	-	-
							0.5	10	0	0	8	2	7
							48	10	0	2	6	4	6
							68	10	0	0	4	6	4
							74.5	10	0	2	3	7	3
							96	8	2	0	2	8	2
20 APR 77	22	33	6	15	15	2	0	12	-	-	10	-	-
							0.2	12	0	0	10	0	10
							1.5	12	0	0	10	0	10
							7.5	12	0	1	0	10	0

Table 30 . - Continued.

DATE	SIZE RANGE (TL IN MM)		SALINITY (PPT)	ACCLIM. TEMP(C)	CONTROL TEMP(C)	EXPER. TEMP(C)	TIME(HRS.)		CONTROL		EXPERIMENTAL		
	MIN.	MAX.					FROM START OF TEST	NO. ALIVE	NO. DEAD	NO. WITH L.O.E.	NO. ALIVE	NO. DEAD	NO. WITH L.O.E.
LEIOSTOMUS XANTHURUS													
3 MAY 77	37	60	6.5	17	18	10	0	10	-	-	9	-	-
							96	10	0	0	9	0	0
3 MAY 77	36	60	6	17	18	8	0	10	-	-	10	-	-
							72	10	0	0	7	3	1
							96	10	0	0	6	4	0
3 MAY 77	34	60	6	17	17	6	0	10	-	-	10	-	-
							0.1	10	0	0	10	0	10
							8.3	10	0	0	9	1	3
							48	10	0	0	5	5	3
							72	10	0	0	3	7	1
							96	10	0	0	3	7	2
3 MAY 77	40	60	6	17	17.5	4	0	10	-	-	10	-	-
							0.1	10	0	0	10	0	10
							1	10	0	0	9	1	9
							8.3	10	0	0	5	5	5
							23	10	0	0	3	7	3
							31	10	0	0	0	10	0
13 MAY 77	41	71	6.5	18	18	10	0	10	-	-	10	-	-
							51	10	0	0	8	2	0
							96	10	0	0	8	2	0
13 MAY 77	41	74	5.5	18	18	8	0	10	-	-	10	-	-
							72	10	0	0	8	2	2
							80	10	0	0	7	3	1
							96	10	0	0	7	3	2
13 MAY 77	41	70	6	18	18	6	0	10	-	-	10	-	-
							0.1	10	0	0	10	0	10
							51	10	0	0	9	1	6
							72	10	0	0	7	3	6
							80	10	0	0	4	6	3
							96	10	0	0	3	7	2

Table 30. - Continued.

DATE	SIZE RANGE (TL IN MM)		SALINITY (PPT)	ACCLIM. TEMP(C)	CONTROL TEMP(C)	EXPER. TEMP(C)	TIME(HRS.)		CONTROL		EXPERIMENTAL		
	MIN.	MAX.					FROM START OF TEST	NO. ALIVE	NO. DEAD	NO. WITH L.O.E.	NO. ALIVE	NO. DEAD	NO. WITH L.O.E.
LEIOSTOMUS XANTHURUS													
13 MAY 77	41	70	6	18	17.5	4	0	10	-	-	10	-	-
							0.1	10	0	0	4	6	4
							4	10	0	0	0	10	0
17 MAY 77	34	68	5.5	22	20	12	0	10	-	-	10	-	-
							54	9	1	0	10	0	0
							96	9	1	0	10	0	0
17 MAY 77	34	68	6.5	22	20	10	0	10	-	-	10	-	-
							54	9	1	0	10	0	0
							96	9	1	0	9	1	1
17 MAY 77	34	78	6	22	20	8	0	10	-	-	10	-	-
							0.1	10	0	0	10	0	10
							54	9	1	0	9	1	4
							67	9	1	0	7	3	2
							80	9	1	0	6	4	2
							96	9	1	0	5	5	1
17 MAY 77	34	68	6	22	20	6	0	10	-	-	10	-	-
							0.1	10	0	0	10	0	10
							22	10	0	0	6	4	6
							48	10	0	0	0	10	0
26 MAY 77	28	44	5.5	24	23.5	12	0	10	-	-	10	-	-
							6.5	9	1	0	10	0	0
							96	9	1	0	10	0	0
26 MAY 77	22	46	6	24	23.5	9	0	10	-	-	10	-	-
							2	10	0	0	9	1	0
							23	9	1	0	8	2	0
							30	9	1	0	7	3	2
							50	9	1	0	2	8	0
							96	9	1	0	1	9	0

Table 30. - Continued.

DATE	SIZE RANGE (TL IN MM)		SALINITY (PPT)	ACCLIM. TEMP(C)	CONTROL TEMP(C)	EXPER. TEMP(C)	TIME(HRS.)		CONTROL		EXPERIMENTAL		
	MIN.	MAX.					FROM START OF TEST	NO. ALIVE	NO. DEAD	NO. WITH L.O.E.	NO. ALIVE	NO. DEAD	NO. WITH L.O.E.
LEIOSTOMUS XANTHURUS													
26 MAY 77	28	40	5.5	24	23.5	6	0	10	-	-	10	-	-
							2	10	0	0	8	2	8
							6.5	9	1	0	7	3	4
							23	9	1	0	6	4	6
							50	9	1	0	1	9	0
							72	9	1	0	0	10	0
8 JUN 77	44	65	5.5	20.5	20	11	0	10	-	-	10	-	-
							26	10	0	0	9	1	0
							42	10	0	0	5	5	0
							72	10	0	0	4	6	0
							96	10	0	0	4	6	0
8 JUN 77	39	70	5.5	20.5	20	9	0	10	-	-	10	-	-
							96	10	0	0	9	1	1
8 JUN 77	40	63	5.5	20.5	20	7	0	10	-	-	10	-	-
							0.1	10	0	0	9	1	9
							18	10	0	0	7	3	2
							26	10	0	0	3	7	0
							74	10	0	0	1	9	0
							96	10	0	0	0	10	0
15 JUN 77	43	72	6	23.5	21	11	0	10	-	-	10	-	-
							96	10	0	0	10	0	0
15 JUN 77	43	72	6	23.5	21	9	0	10	-	-	10	-	-
							29	10	0	0	8	2	1
							46	10	0	0	6	4	2
							53	10	0	0	4	6	2
							75	10	0	0	2	8	0
							96	10	0	0	2	8	1

Table 30 . - Continued.

DATE	SIZE RANGE (TL IN MM)		SALINITY (PPT)	ACCLIM. TEMP(C)	CONTROL TEMP(C)	EXPER. TEMP(C)	TIME(HRS.)		CONTROL		EXPERIMENTAL		
	MIN.	MAX.					FROM START OF TEST	NO. ALIVE	NO. DEAD	NO. WITH L.O.E.	NO. ALIVE	NO. DEAD	NO. WITH L.O.E.
LEIOSTOMUS XANTHURUS													
15 JUN 77	43	86	5	23.5	21	7	0	10	-	-	10	-	-
							0.1	10	0	0	10	0	10
							21	10	0	0	9	1	9
							28	10	0	0	3	7	3
							46	10	0	0	0	10	0
22 JUN 77	36	77	7	25	24	12	0	10	-	-	10	-	-
							96	10	0	0	10	0	0
22 JUN 77	36	71	5.5	25	24	10	0	10	-	-	10	-	-
							24	10	0	0	8	2	0
							96	10	0	0	8	2	0
22 JUN 77	36	85	5.5	25	24	8	0	10	-	-	10	-	-
							0.1	10	0	0	10	0	10
							6.5	10	0	0	9	1	9
							24	10	0	0	1	9	1
							32	10	0	0	0	10	0
22 JUN 77	36	72	5	25	23	6	0	10	-	-	10	-	-
							0.1	10	0	0	10	0	10
							1.5	10	0	0	4	6	4
							2.75	10	0	0	3	7	3
							4.75	10	0	0	0	10	0
28 JUN 77	40	101	7	25.5	25	10.5	0	20	-	-	20	-	-
							0.1	20	0	0	20	0	20
							24	20	0	0	17	3	3
							40	20	0	0	16	4	2
							48	20	0	0	14	6	2
							96	20	0	0	12	8	1
28 JUN 77	40	82	6.5	25.5	25	8	0	20	-	-	20	-	-
							0.2	20	0	0	19	1	19
							16	20	0	0	18	2	18
							24	20	0	0	13	7	13
							40	20	0	0	0	20	0

Table 30 . - Continued.

DATE	SIZE RANGE (TL IN MM)		SALINITY (PPT)	ACCLIM. TEMP(C)	CONTROL TEMP(C)	EXPER. TEMP(C)	TIME(HRS.) FROM START NO.		CONTROL		EXPERIMENTAL		
	MIN.	MAX.					OF TEST	ALIVE	NO. DEAD	NO. WITH L.O.E.	NO. ALIVE	NO. DEAD	NO. WITH L.O.E.
LEIOSTOMUS XANTHURUS													
19 JUL 77	80	118	5.5	28	28	16	0	10	-	-	9	-	-
							96	10	0	0	9	0	0
19 JUL 77	71	128	6	28	28	13	0	10	-	-	10	-	-
							96	10	0	0	10	0	0
19 JUL 77	89	122	5	28	28	10.5	0	10	-	-	10	-	-
							0.25	10	0	0	10	0	8
							30	10	0	0	9	1	8
							54	10	0	0	5	5	5
							78	10	0	0	0	10	0
27 JUL 77	84	107	5.5	25	25	15	0	10	-	-	10	-	-
							96	10	0	0	10	0	0
27 JUL 77	88	127	6	25	25	12.5	0	10	-	-	7	-	-
							96	10	0	0	7	0	0
27 JUL 77	88	128	5	25	25	10	0	10	-	-	10	-	-
							48	10	0	0	5	5	3
							56	10	0	0	3	7	1
							96	10	0	0	3	7	1
24 AUG 77	73	141	6.5	25	24	16.5	0	5	-	-	5	-	-
							96	5	0	0	5	0	0
24 AUG 77	73	141	7.5	25	24	16	0	5	-	-	5	-	-
							96	5	0	0	5	0	0
24 AUG 77	73	141	4.5	25	24	12.5	0	5	-	-	5	-	-
							75	5	0	0	4	1	0
							96	5	0	0	4	1	0

Table 30 . - Continued.

DATE	SIZE RANGE (TL IN MM)		SALINITY (PPT)	ACCLIM. TEMP(C)	CONTROL TEMP(C)	EXPER. TEMP(C)	TIME(HRS.)		CONTROL		EXPERIMENTAL		
	MIN.	MAX.					FROM START OF TEST	NO. ALIVE	NO. DEAD	NO. WITH L.O.E.	NO. ALIVE	NO. DEAD	NO. WITH L.O.E.
LEIOSTOMUS XANTHURUS													
1 SEP 77	92	138	7.5	26	25	11	0	6	-	-	3	-	-
							96	6	0	0	3	0	0
6 OCT 77	81	116	10	19.5	19	10	0	10	-	-	9	-	-
							20	10	0	0	9	0	3
							33	10	0	0	9	0	6
							50	10	0	0	7	2	7
							74	10	0	2	4	5	2
							96	8	2	0	3	6	1
6 OCT 77	81	116	7	19.5	19	5	0	10	-	-	10	-	-
							0.6	10	0	0	10	0	10
							6.2	10	0	0	9	1	9
							10	10	0	0	4	6	4
							19	10	0	0	1	9	1
							33	10	0	1	0	10	0
13 OCT 77	111	178	10	17	16	9	0	9	-	-	8	-	-
							96	9	0	0	8	0	0
15 NOV 77	80	127	9	6	6	4	0	10	-	-	10	-	-
							96	10	0	0	10	0	0
15 NOV 77	80	172	7.5	6	6	2	0	10	-	-	10	-	-
							32	10	0	0	8	2	8
							48	10	0	0	6	4	6
							56	10	0	0	5	5	5
							72	10	0	0	2	8	2
							80	10	0	0	0	10	0
29 NOV 77	97	124	10	6	5	3	0	10	-	-	10	-	-
							56	10	0	0	10	0	4
							71	10	0	0	10	0	10
							96	10	0	0	9	1	9

Table 31. - Summary of all cold shock tests on spot, Leiostomus xanthurus, after 4-, 24-, 48-, 72-, and 96-hour exposure times over a range of acclimation temperatures.

DATE	TOTAL LENGTH (MM)			SALINITY	ACCLIM.	TEMP.	EXPER.	TEMP.	NO. OF	4 HOUR	24 HOUR	48 HOUR	72 HOUR	96 HOUR
	MIN.	MAX.	MEAN	(PPT)	(C)	(F)	(C)	(F)	EXP. ORG.	% MORT.	% MORT.	% MORT.	% MORT.	% MORT.
LEIOSTOMUS XANTHURUS														
8 AUG 74	74	109	96.6	8	25	77	11	52	10	0	0	0	10	10
14 AUG 74	67	121	107.8	6	26	79	6	43	5	0	100	100	100	100
14 AUG 74	74	117	96.2	6	26	79	2	36	5	100	100	100	100	100
7 OCT 74	86	127	110.2	6.5	20	68	2	36	10	100	100	100	100	100
8 OCT 74	95	128	110.2	7.2	20	68	5	41	10	60	100	100	100	100
15 OCT 74	132	167	150.3	8.8	16	61	5.5	42	4	0	0	50	75	75
30 OCT 74	96	135	114.5	6.5	14	57	6	43	10	0	20	50	70	100
12 AUG 75	96	118	104.2	5	27	81	16	61	5	0	20	40	40	40
4 OCT 75	75	89	80.8	6	19.5	67	10.5	51	10	0	0	0	0	0
17 OCT 75	70	96	82.4	6	19	66	10.5	51	5	0	0	0	0	0
22 NOV 75	72	90	79.2	5	14	57	10	50	10	0	0	0	0	0
4 MAY 76	35	42	38.3	4	16	61	8	46	10	0	0	0	10	20
4 MAY 76	33	45	38.9	4	16	61	6	43	10	0	10	60	60	80
4 MAY 76	35	46	39.8	8.2	16	61	3	37	5	100	100	100	100	100
14 MAY 76	27	37	31.6	2.8	18	64	8.3	47	10	0	0	0	0	10
26 MAY 76	46	64	57	7.1	18	64	9.5	49	10	0	0	0	0	0
17 JUL 76	81	114	93.4	6	26	79	21	70	10	0	0	0	0	0
17 JUL 76	74	98	87.5	6	26	79	21	70	10	0	0	0	0	0
17 JUL 76	84	108	91.1	6	26	79	21	70	10	0	0	0	0	0
17 JUL 76	75	101	92.2	6	26	79	16.5	62	10	0	0	0	0	0

Table 31. - Continued.

DATE	TOTAL LENGTH (MM)			SALINITY	ACCLIM. TEMP.		EXPER. TEMP.	NO. OF	4 HOUR	24 HOUR	48 HOUR	72 HOUR	96 HOUR
	MIN.	MAX.	MEAN	(PPT)	(C)	(F)	(C)	(F)	EXP. ORG.	% MORT.	% MORT.	% MORT.	% MORT.
LEIOSTOMUS XANTHURUS													
5 OCT 76	85	124	97.2	5.5	20	68	14	57	10	0	0	0	0
29 OCT 76	85	112	99	8	12	54	5	41	10	20	20	40	80
20 APR 77	23	33	26.3	6	15	59	2	36	10	0	100	100	100
3 MAY 77	37	47	40.4	6.5	17	63	10	50	9	0	0	0	0
3 MAY 77	36	48	43.1	6	17	63	8	46	10	0	0	0	30
3 MAY 77	34	52	41	6	17	63	6	43	10	0	10	50	70
3 MAY 77	40	50	44.2	6	17	63	4	39	10	10	70	100	100
13 MAY 77	46	71	56.4	6.5	18	64	10	50	10	0	0	0	20
13 MAY 77	45	74	57.8	5.5	18	64	8	46	10	0	0	0	80
13 MAY 77	42	70	56	6	18	64	6	43	10	0	0	0	30
13 MAY 77	43	70	52.8	6	18	64	4	39	10	100	100	100	100
17 MAY 77	34	60	43	5.5	22	72	12	54	10	0	0	0	0
17 MAY 77	34	54	42.6	6.5	22	72	10	50	10	0	0	0	0
17 MAY 77	36	78	53.2	6	22	72	8	46	10	0	0	0	30
17 MAY 77	36	67	44.6	6	22	72	6	43	10	0	40	100	100
26 MAY 77	29	44	37.3	5.5	24	75	12	54	10	0	0	0	0
26 MAY 77	22	46	33.6	6	24	75	9	48	10	10	20	30	80
26 MAY 77	31	40	34.3	5.5	24	75	6	43	10	20	40	40	100
8 JUN 77	52	65	55.5	5.5	20.5	69	11	52	10	0	0	50	60
8 JUN 77	39	70	53.3	5.5	20.5	69	9	48	10	0	0	0	0

Table 31 . - Continued.

DATE	TOTAL LENGTH (MM)			SALINITY (PPT)	ACCLIM. (C)	TEMP. (F)	EXPER. (C)	TEMP. (F)	NO. OF EXP. ORG.	4 HOUR % MORT.	24 HOUR % MORT.	48 HOUR % MORT.	72 HOUR % MORT.	96 HOUR % MORT.
	MIN.	MAX.	MEAN											
LEIOSTOMUS XANTHURUS														
8 JUN 77	40	63	52.8	5.5	20.5	69	7	45	10	10	30	70	70	100
15 JUN 77	43	72	53.9	6	23.5	74	11	52	10	0	0	0	0	0
15 JUN 77	46	66	52.7	6	23.5	74	9	48	10	0	0	40	60	80
15 JUN 77	55	86	63.6	5	23.5	74	7	45	10	0	10	100	100	100
22 JUN 77	43	77	63.8	7	25	77	12	54	10	0	0	0	0	0
22 JUN 77	43	71	57.8	5.5	25	77	10	50	10	0	20	20	20	20
22 JUN 77	45	85	62.2	5.5	25	77	8	46	10	0	90	100	100	100
22 JUN 77	38	72	52.5	5	25	77	6	43	10	70	100	100	100	100
28 JUN 77	45	101	61.4	7	25.5	78	10.5	51	20	0	15	30	30	40
28 JUN 77	49	82	58.3	6.5	25.5	78	8	46	20	5	35	100	100	100
19 JUL 77	80	112	90.9	5.5	28	82	16	61	9	0	0	0	0	0
19 JUL 77	71	128	101.6	6	28	82	13	55	10	0	0	0	0	0
19 JUL 77	89	122	102.8	5	28	82	10.5	51	10	0	0	10	50	100
27 JUL 77	87	105	97.1	5.5	25	77	15	59	10	0	0	0	0	0
27 JUL 77	88	127	104.2	6	25	77	12.5	55	7	0	0	0	0	0
27 JUL 77	92	128	104.1	5	25	77	10	50	10	0	0	50	70	70
24 AUG 77	75	91	82.8	6.5	25	77	16.5	62	5	0	0	0	0	0
24 AUG 77	73	90	81	7.5	25	77	16	61	5	0	0	0	0	0
24 AUG 77	78	93	84	4.5	25	77	12.5	55	5	0	0	0	0	20
1 SEP 77	113	120	117	7.5	26	79	11	52	3	0	0	0	0	0

Table 31. - Continued.

DATE	TOTAL LENGTH (MM)			SALINITY ACCLIM. TEMP.			EXPER. TEMP.		NO. OF EXP. ORG.	4 HOUR	24 HOUR	48 HOUR	72 HOUR	96 HOUR
	MIN.	MAX.	MEAN	(PPT)	(C)	(F)	(C)	(F)		% MORT.	% MORT.	% MORT.	% MORT.	% MORT.
LEIOSTOMUS XANTHURUS														
6 OCT 77	89	108	101.1	10	19.5	67	10	50	9	0	0	0	20	60
6 OCT 77	86	106	93	7	19.5	67	5	41	10	0	90	100	100	100
13 OCT 77	134	178	148.8	10	17	63	9	48	8	0	0	0	0	0
15 NOV 77	88	122	100.8	9	6	43	4	39	10	0	0	0	0	0
15 NOV 77	87	172	105.5	7.5	6	43	2	36	10	0	0	40	80	100
29 NOV 77	100	120	111.7	10	6	43	3	37	10	0	0	0	0	10

Table 32 . - A chronological summary of cold shock experiments on hogchoker, Trinectes maculatus. All tests were conducted at near air saturated levels of dissolved oxygen and pH of 7 to 8.

DATE	SIZE RANGE (TL IN MM)		SALINITY (PPT)	ACCLIM. TEMP(C)	CONTROL TEMP(C)	EXPER. TEMP(C)	TIME(HRS.) FROM START NO.		CONTROL		EXPERIMENTAL		
	MIN.	MAX.					OF TEST	NO. ALIVE	NO. DEAD	NO. WITH L.O.E.	NO. ALIVE	NO. DEAD	NO. WITH L.O.E.
TRINECTES MACULATUS													
13 AUG 74	64	150	8	25	24.5	11	0 96	6 6	- 0	- 0	6 6	- 0	- 0
14 AUG 74	64	95	6	26	26	6	0 18 24 96	5 5 5 5	- 0 0 0	- 0 0 0	5 5 5 5	- 0 0 0	- 3 2 2
14 AUG 74	67	125	6	26	26	2	0 0.5 1	5 5 5	- 0 0	- 0 0	5 5 0	- 0 5	- 5 0
19 SEP 74	77	125	7.5	22	21.5	9	0 96	8 8	- 0	- 0	8 8	- 0	- 0
7 OCT 74	67	141	6.5	20	20	2	0 0.01 96	10 10 10	- 0 0	- 0 0	10 10 10	- 0 0	- 10 10
3 APR 76	46	90	-	12	12	2.5	0 96	9 9	- 0	- 0	9 9	- 0	- 0
23 APR 76	40	85	7.2	15	15	9.5	0 96	6 6	- 0	- 0	7 7	- 0	- 0
27 APR 76	68	125	4	15	15	3	0 0.2 96	8 8 8	- 0 0	- 0 0	8 8 8	- 0 0	- 8 0
6 MAY 76	66	105	8	18	19	8.5	0 96	20 20	- 0	- 0	20 20	- 0	- 0

Table 32. - Continued.

DATE	SIZE RANGE (TL IN MM)		SALINITY (PPT)	ACCLIM. TEMP(C)	CONTROL TEMP(C)	EXPER. TEMP(C)	TIME(HRS.) FROM START NO.		CONTROL		EXPERIMENTAL		
	MIN.	MAX.					OF TEST	ALIVE	NO. DEAD	NO. WITH L.O.E.	NO. ALIVE	NO. DEAD	NO. WITH L.O.E.
TRINECTES MACULATUS													
11 NOV 76	74	122	6	9	12	4	0	5	-	-	5	-	-
							23.5	5	0	0	5	0	1
							53	5	0	0	5	0	2
							77	5	0	0	5	0	1
11 NOV 76	74	122	7	9	12	2	0	5	-	-	5	-	-
							23.5	5	0	0	5	0	1
							96	5	0	0	5	0	0
19 NOV 76	45	111	3.5	8	11.5	2	0	9	-	-	10	-	-
							22	9	0	0	10	0	1
							96	9	0	0	10	0	0
6 APR 77	40	121	7	11.5	12	2	0	4	-	-	5	-	-
							78	4	0	0	5	0	0
13 SEP 77	28	49	8.5	21.5	22	13	0	20	-	-	20	-	-
							96	20	0	0	20	0	0
13 SEP 77	27	42	7	21.5	22	11	0	20	-	-	20	-	-
							96	20	0	0	20	0	0
28 SEP 77	27	47	9	22	21.5	6.5	0	10	-	-	10	-	-
							96	10	0	0	10	0	0
13 OCT 77	30	42	7	17	16	4	0	8	-	-	8	-	-
							0.1	8	0	0	8	0	8
							7	8	0	0	8	0	2
							23	8	0	0	8	0	0
							96	8	0	0	8	0	0

Table 32. - Continued.

DATE	SIZE RANGE (TL IN MM)		SALINITY (PPT)	ACCLIM. TEMP(C)	CONTROL TEMP(C)	EXPER. TEMP(C)	TIME(HRS.)		CONTROL			EXPERIMENTAL		
	MIN.	MAX.					FROM START OF TEST	NO. ALIVE	NO. DEAD	NO. WITH L.O.E.	NO. ALIVE	NO. DEAD	NO. WITH L.O.E.	
TRINECTES MACULATUS														
29 NOV 77	34	61	8.5	6.5	5.5	1	0	10	-	-	10	-	-	
							96	10	0	0	10	0	0	
29 NOV 77	33	56	10	6.5	5.5	0.2	0	10	-	-	10	-	-	
							96	10	0	0	10	0	0	

Table 33. - Summary of all cold shock tests on hogchoker, Trinectes maculatus, after 4-, 24-, 48-, 72-, and 96-hour exposure times over a range of acclimation temperatures.

DATE	TOTAL LENGTH (MM) MIN. MAX. MEAN	SALINITY (PPT)	ACCLIM. TEMP. (C)	TEMP. (F)	EXPER. TEMP. (C)	NO. OF EXP. ORG.	4 HOUR % MORT.	24 HOUR % MORT.	48 HOUR % MORT.	72 HOUR % MORT.	96 HOUR % MORT.
TRINECTES MACULATUS											
8 AUG 74	70 121 95.5	8	25	77	11	52	6	0	0	0	0
14 AUG 74	64 78 71.4	6	26	79	6	43	5	0	0	0	0
14 AUG 74	70 125 91.4	6	26	79	2	36	5	100	100	100	100
19 SEP 74	77 125 106.4	7.5	22	72	9	48	8	0	0	0	0
7 OCT 74	67 141 95	6.5	20	68	2	36	10	0	0	0	0
3 APR 76	46 90 77	-	12	54	2.5	37	9	0	0	0	0
23 APR 76	40 85 -	7.2	15	59	9.5	49	7	0	0	0	0
27 APR 76	80 125 94.5	4	15	59	3	37	8	0	0	0	0
6 MAY 76	66 105 81.8	8	18	64	8.5	47	20	0	0	0	0
11 NOV 76	74 122 -	6	9	48	4	39	5	0	0	0	-
11 NOV 76	74 122 100.4	7	9	48	2	36	5	0	0	0	0
19 NOV 76	52 111 92.2	3.5	8	46	2	36	10	0	0	0	0
6 APR 77	40 121 77.2	7	11.5	53	2	36	5	0	0	0	-
13 SEP 77	28 49 34.6	8.5	21.5	71	13	55	20	0	0	0	0
13 SEP 77	27 41 34.2	7	21.5	71	11	52	20	0	0	0	0
28 SEP 77	36 47 39.7	9	22	72	6.5	44	10	0	0	0	0
13 OCT 77	30 42 35.9	7	17	63	4	39	8	0	0	0	0
29 NOV 77	34 51 41.4	8.5	6.5	44	1	34	10	0	0	0	0
29 NOV 77	34 54 42.5	10	6.5	44	0.2	32	10	0	0	0	0

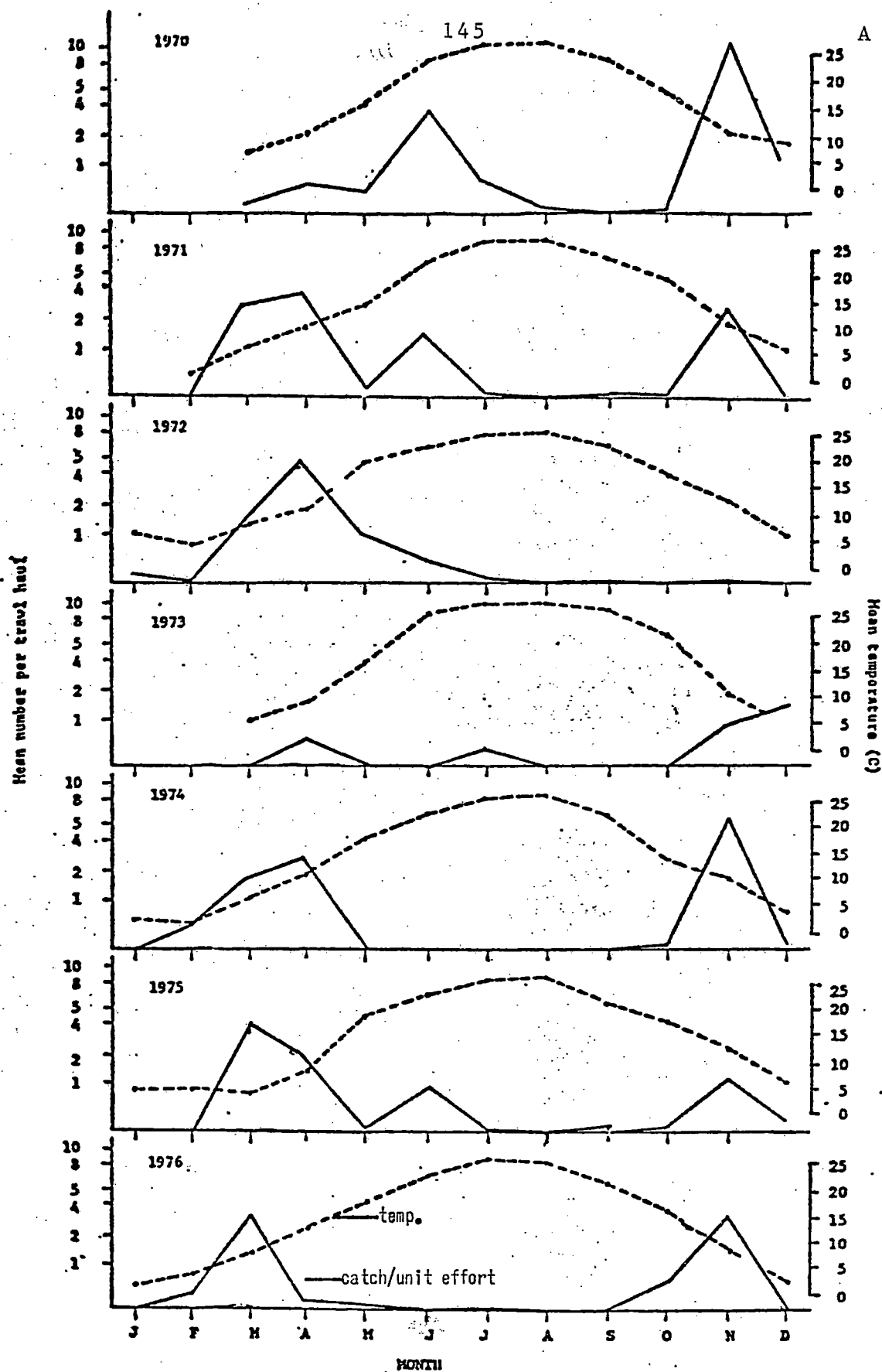


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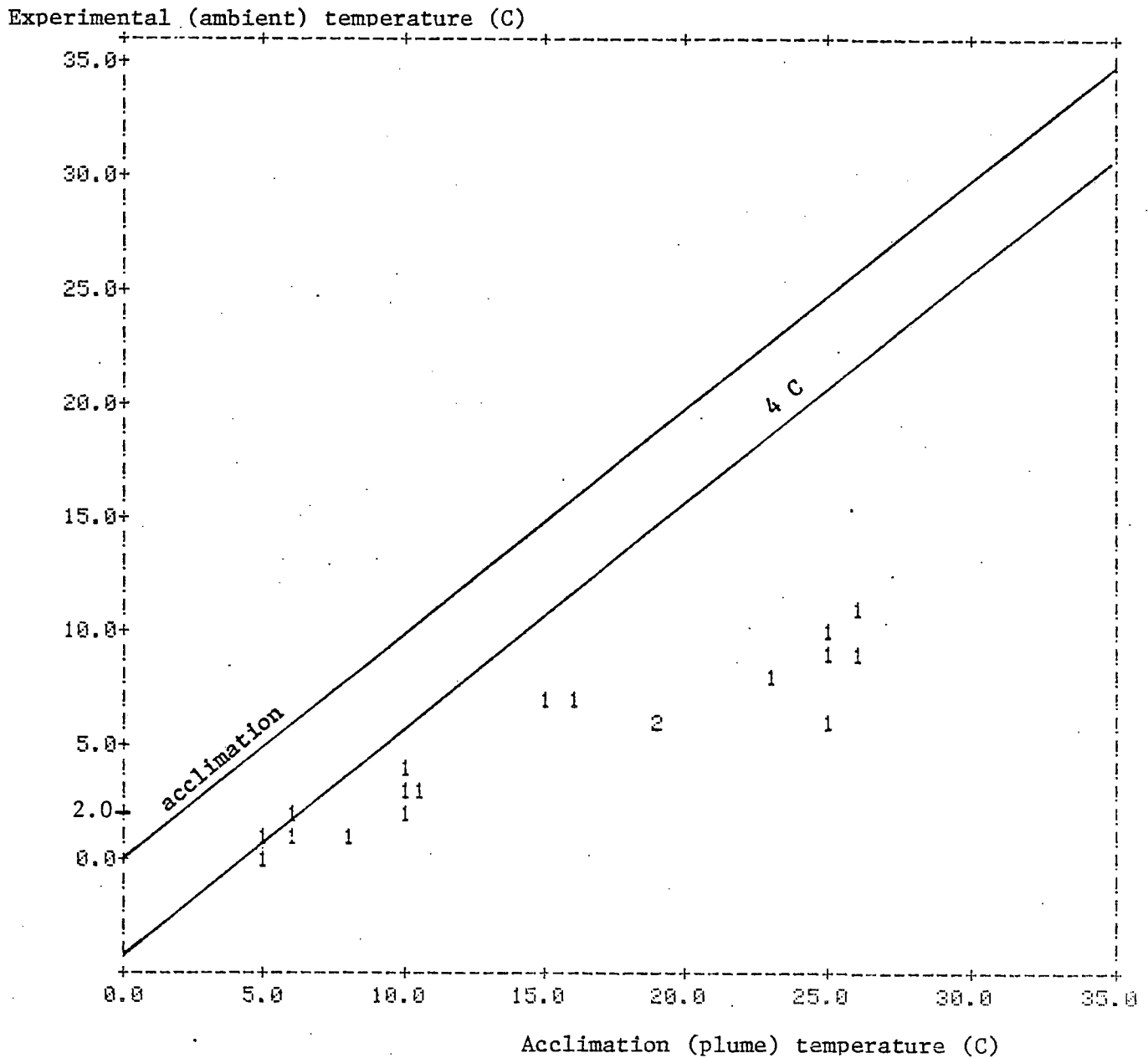


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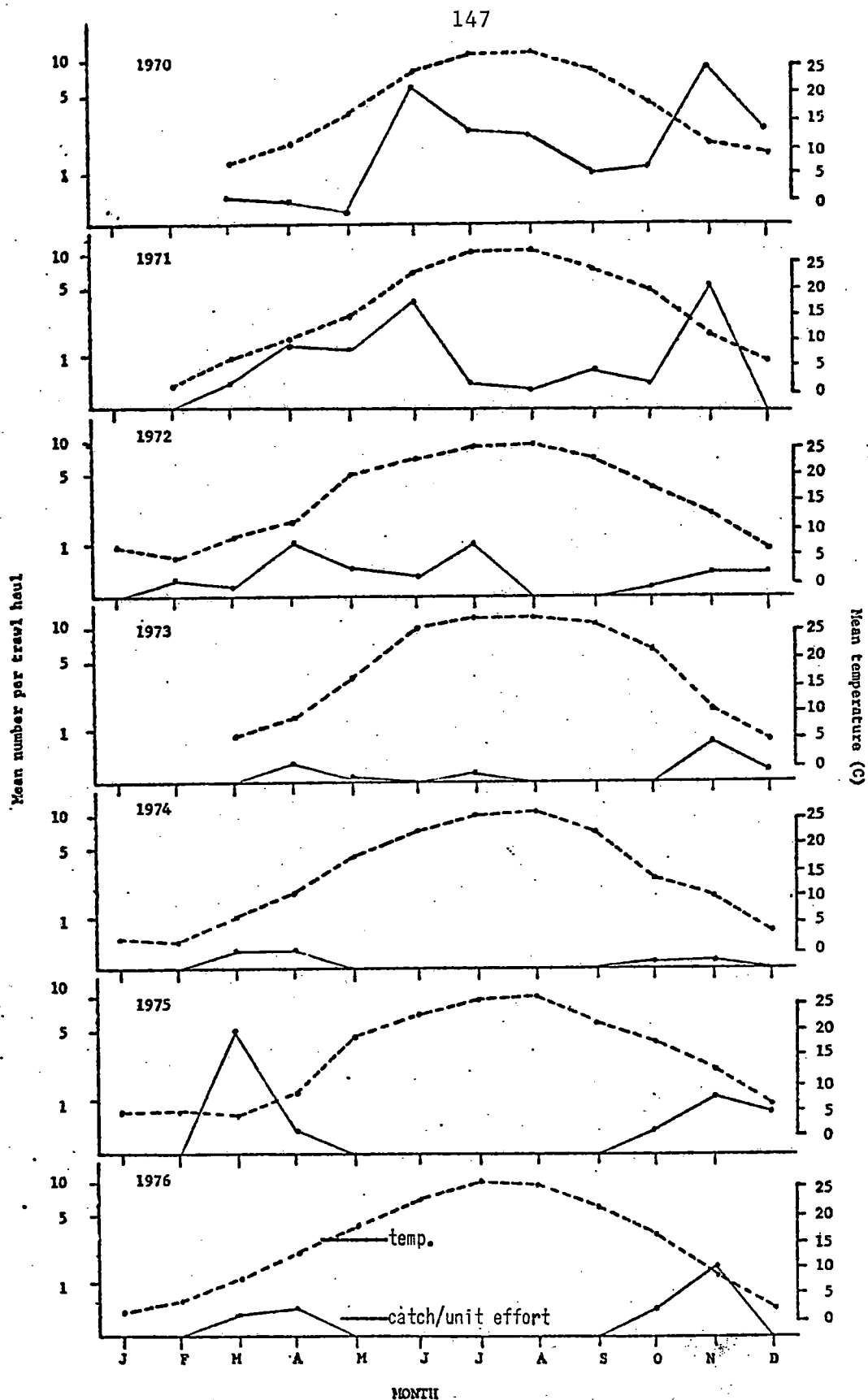


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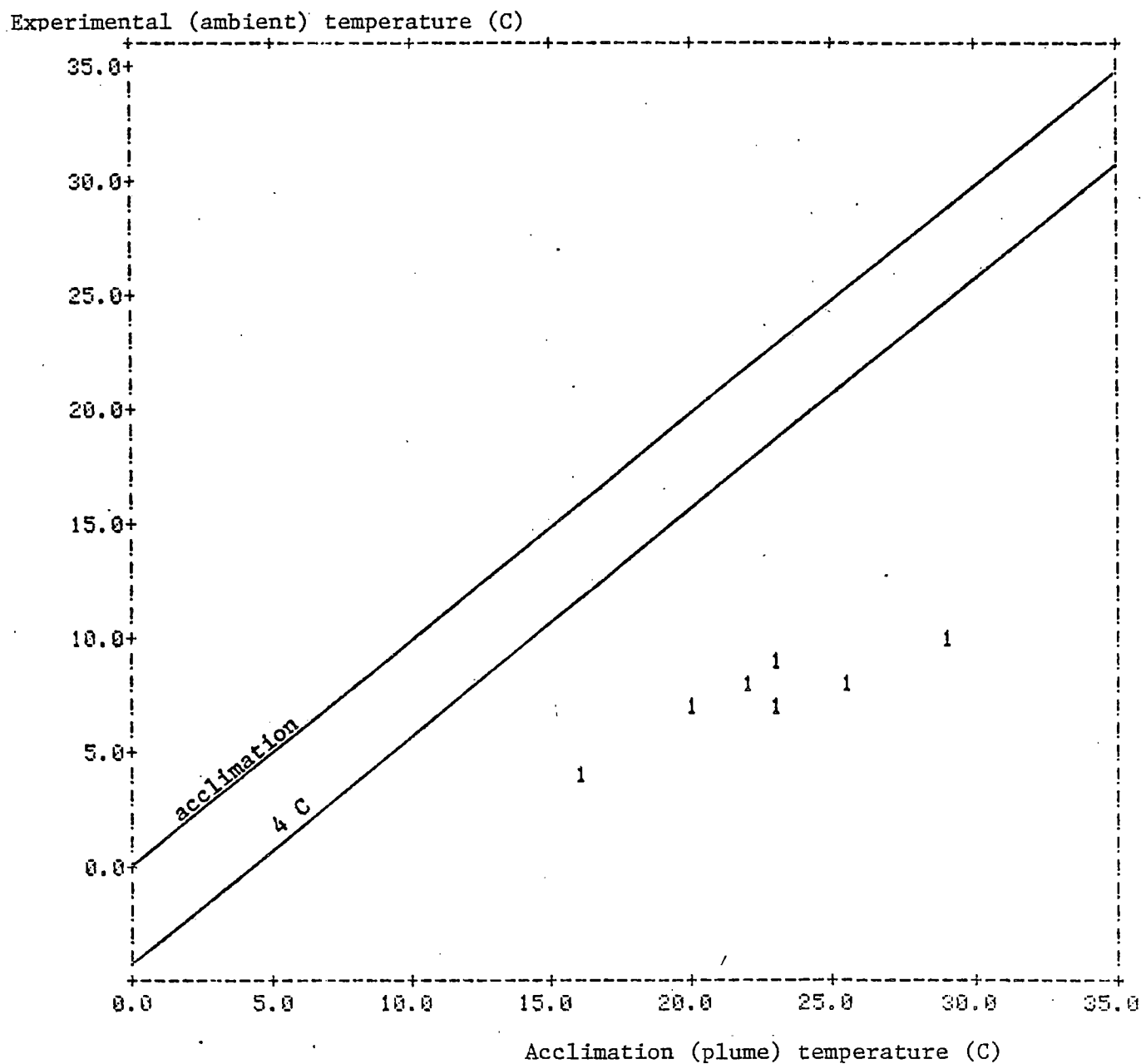


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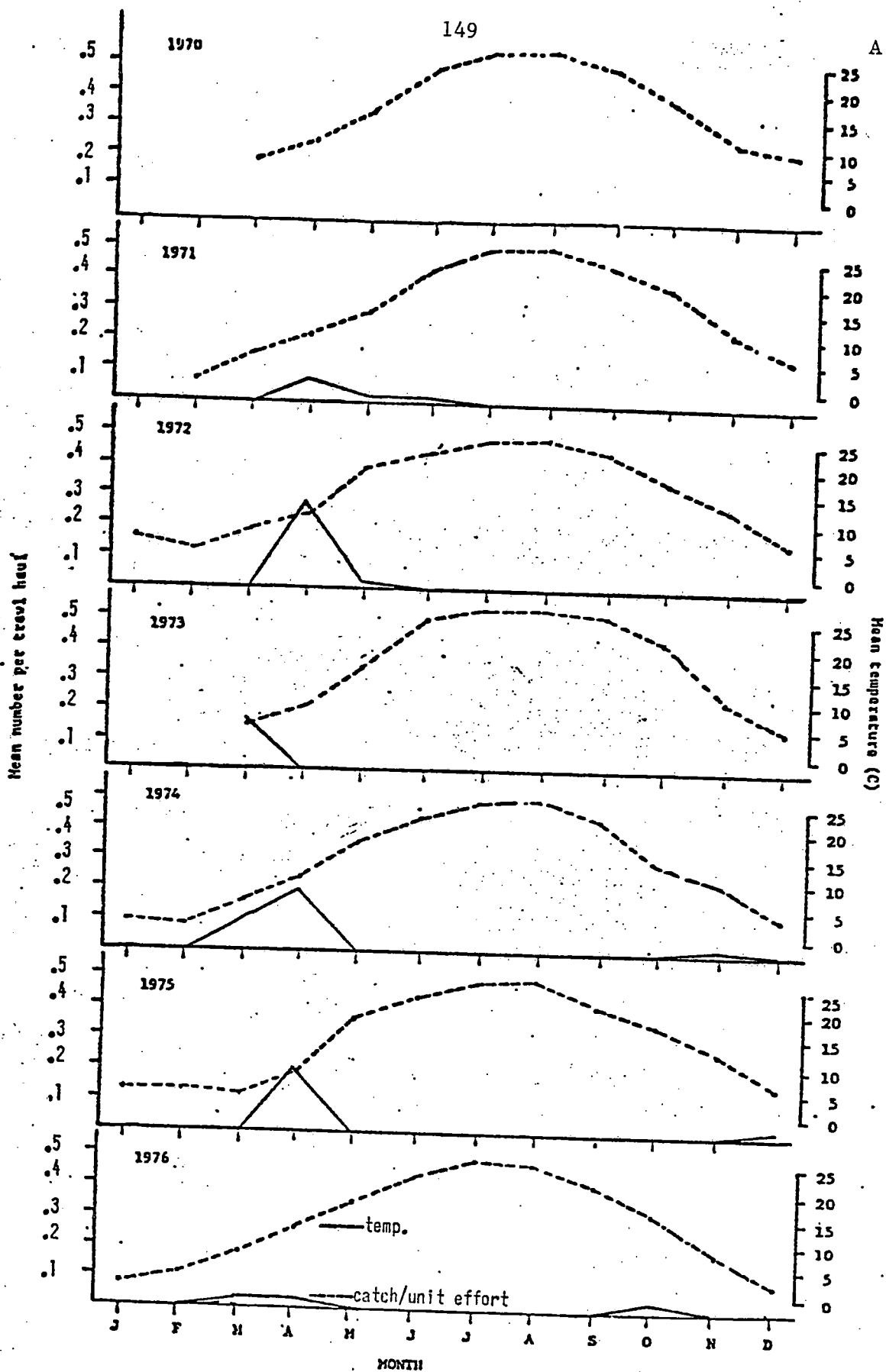


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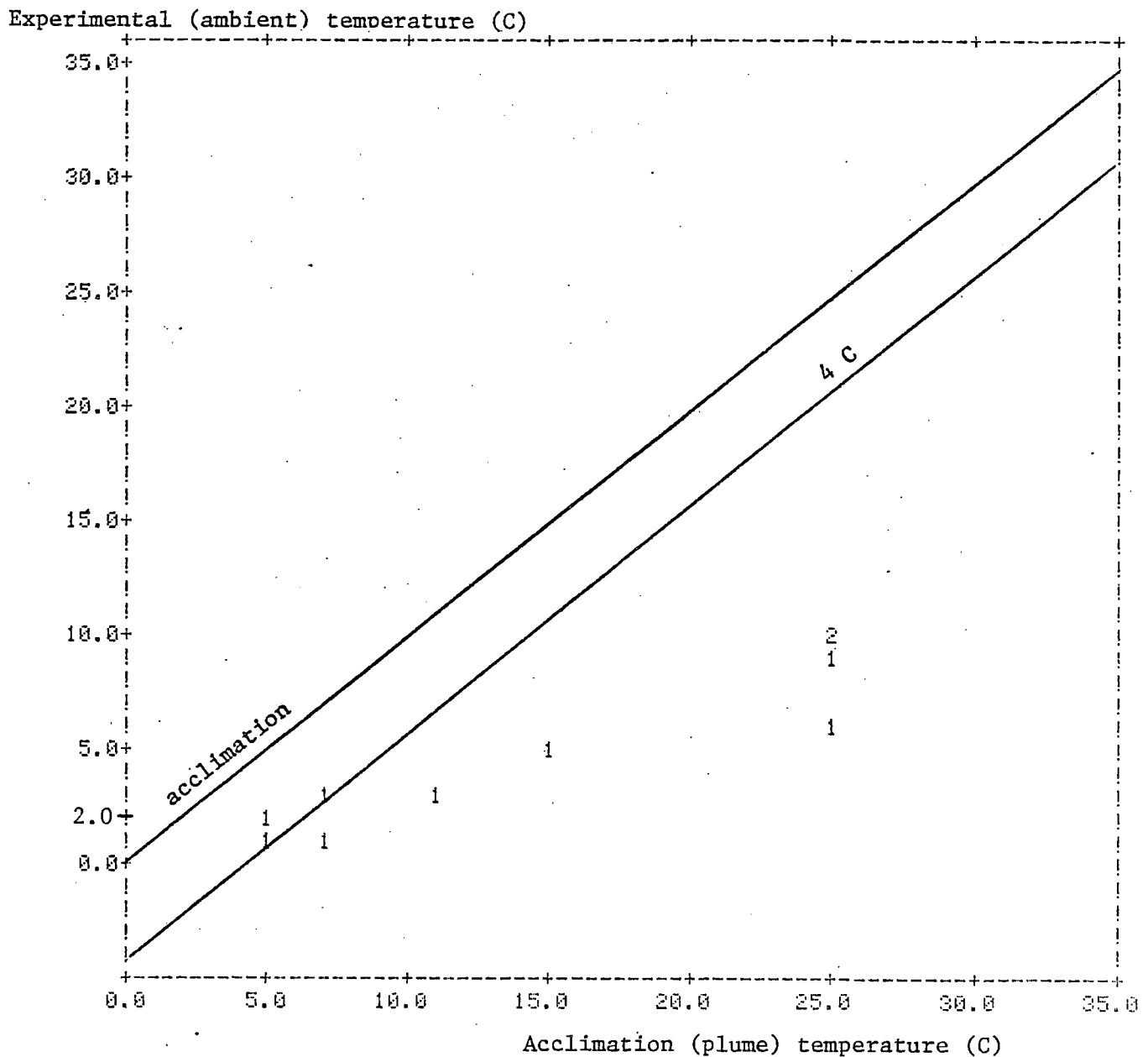


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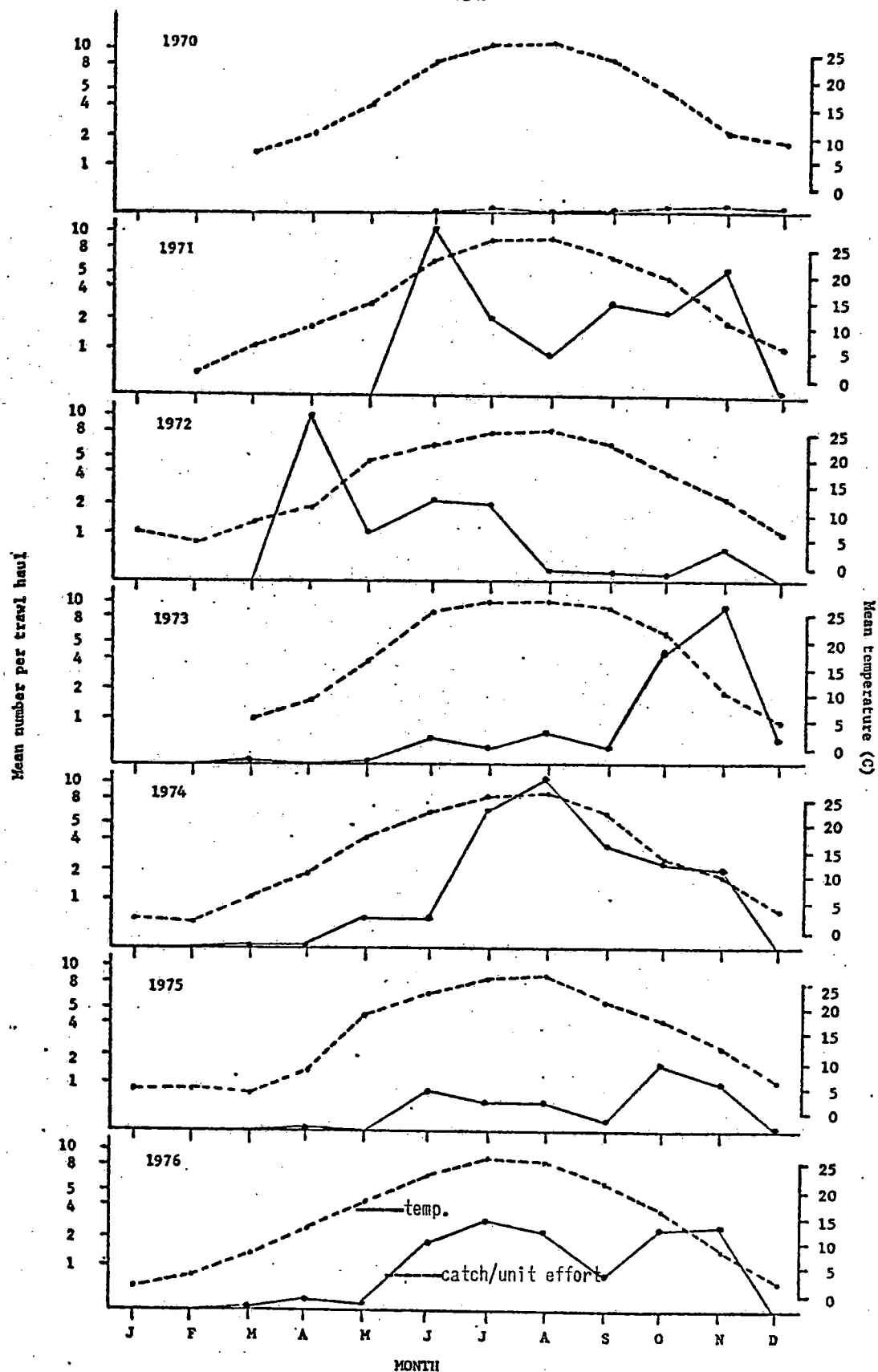


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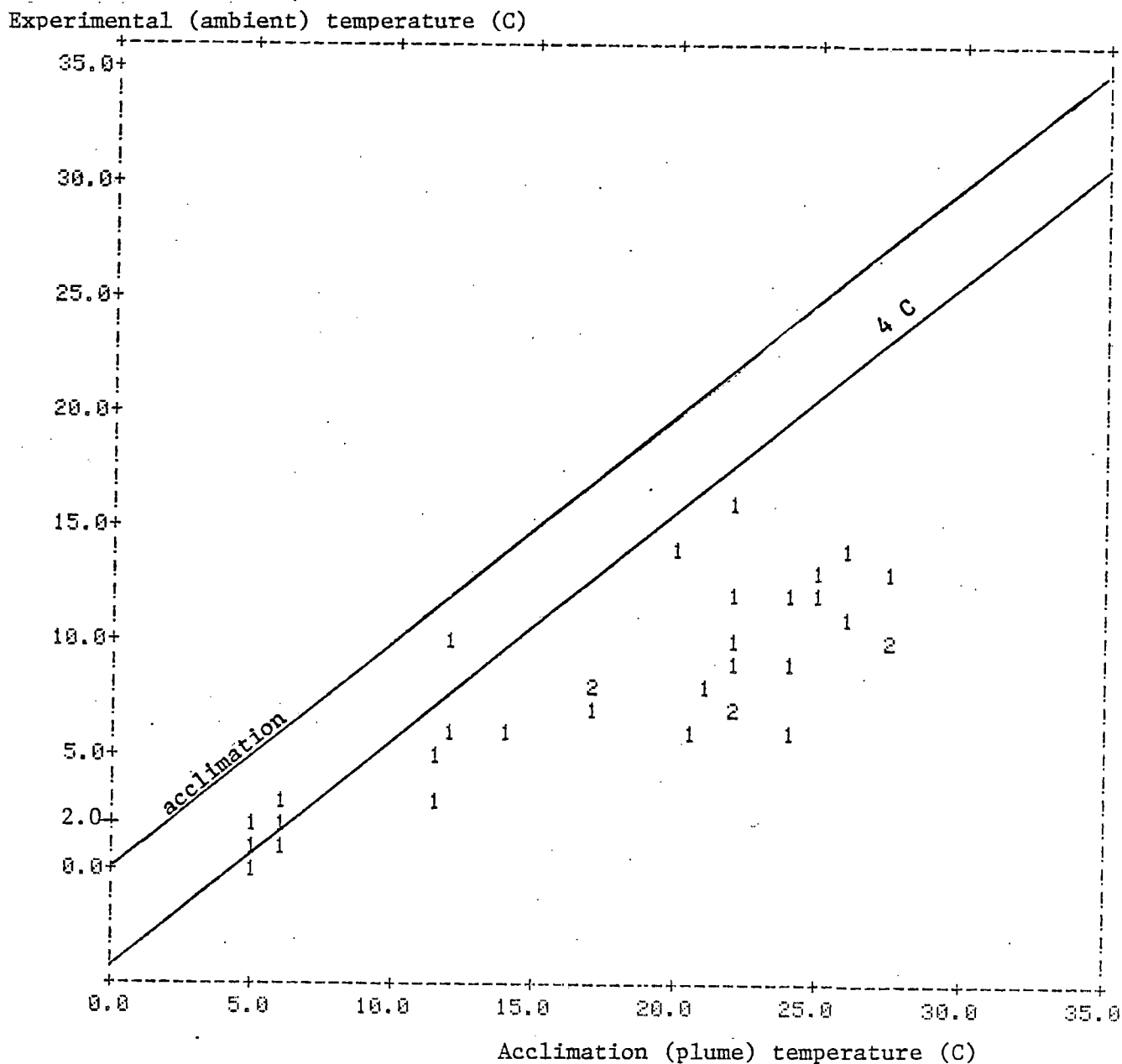


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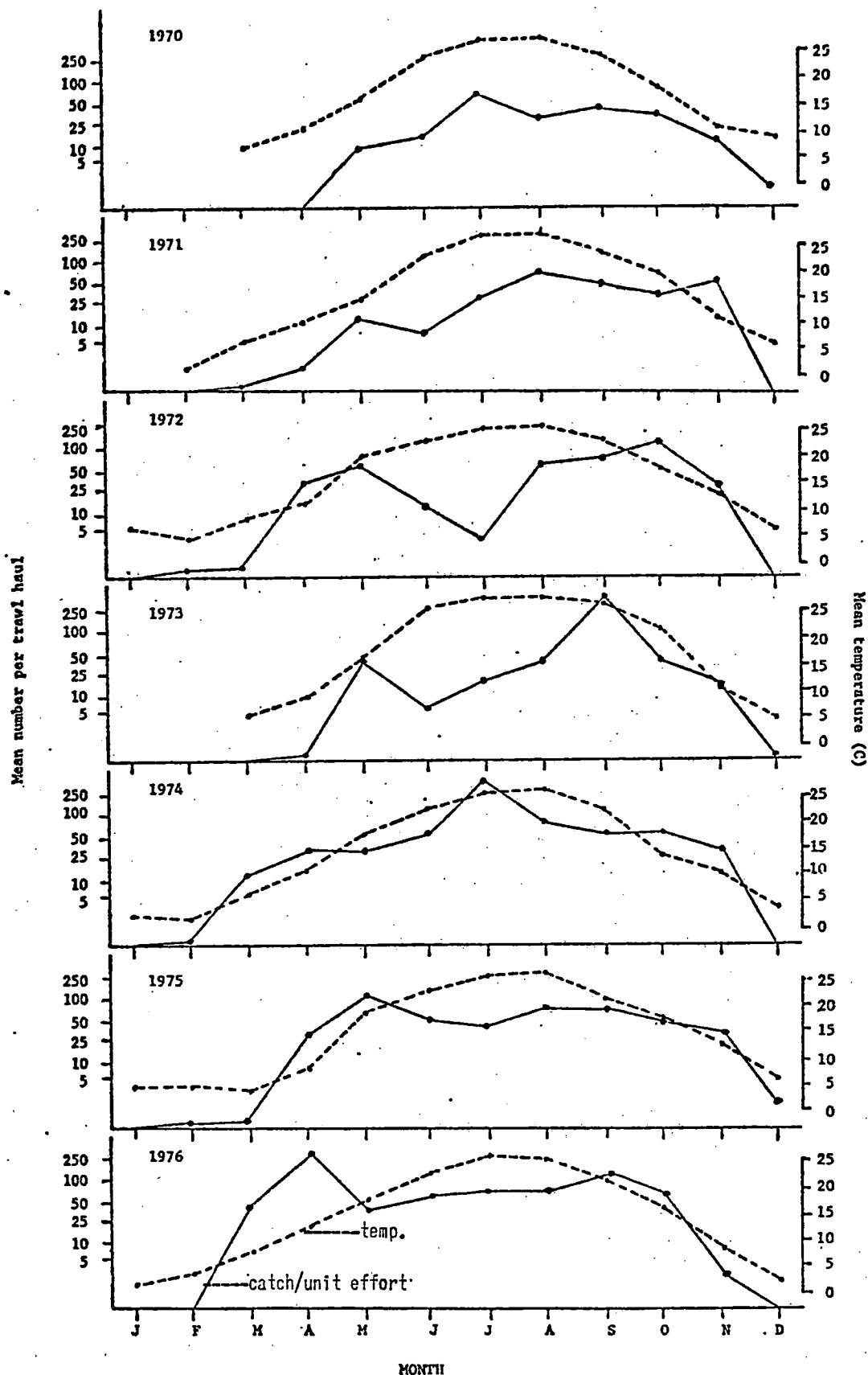


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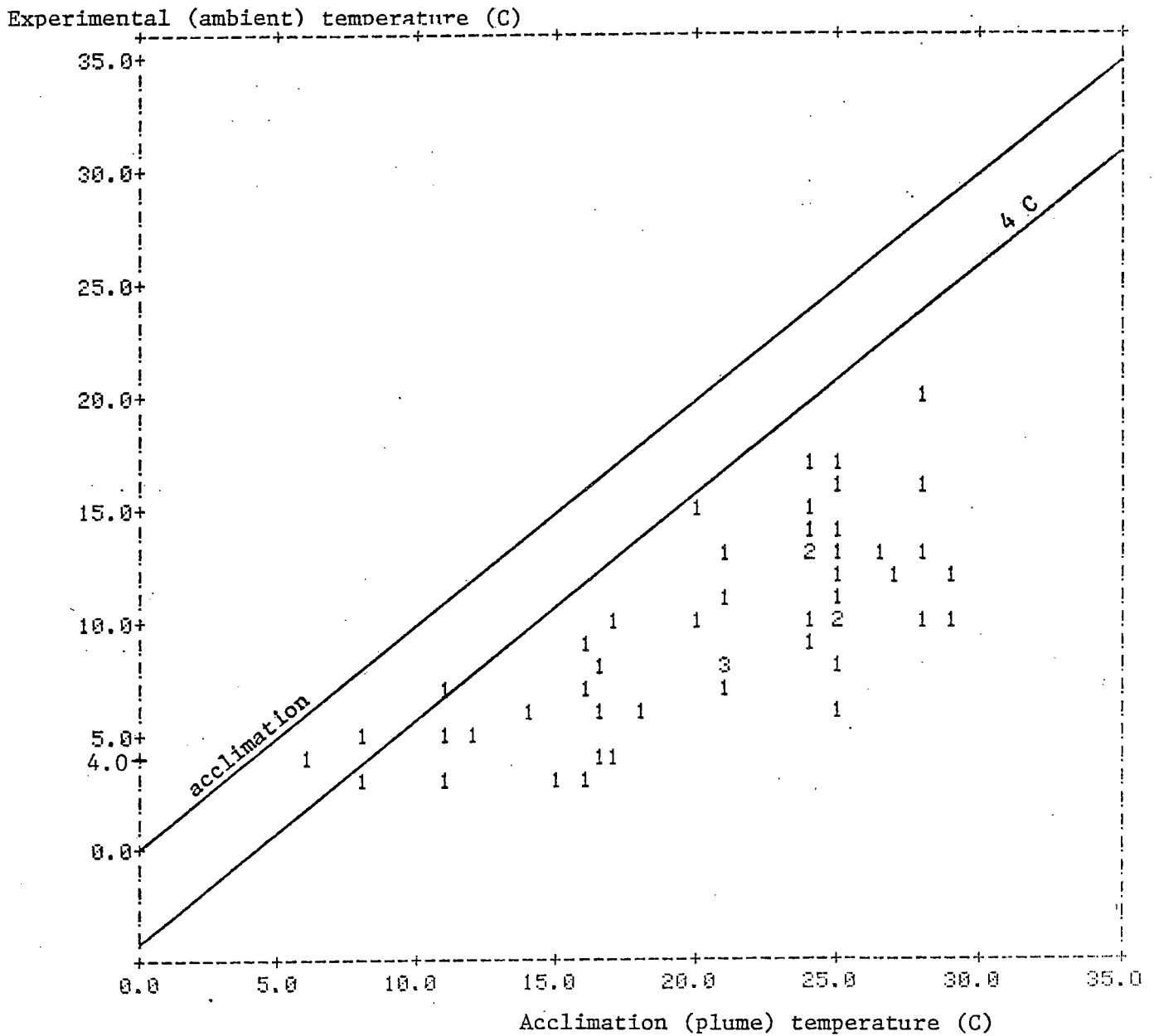


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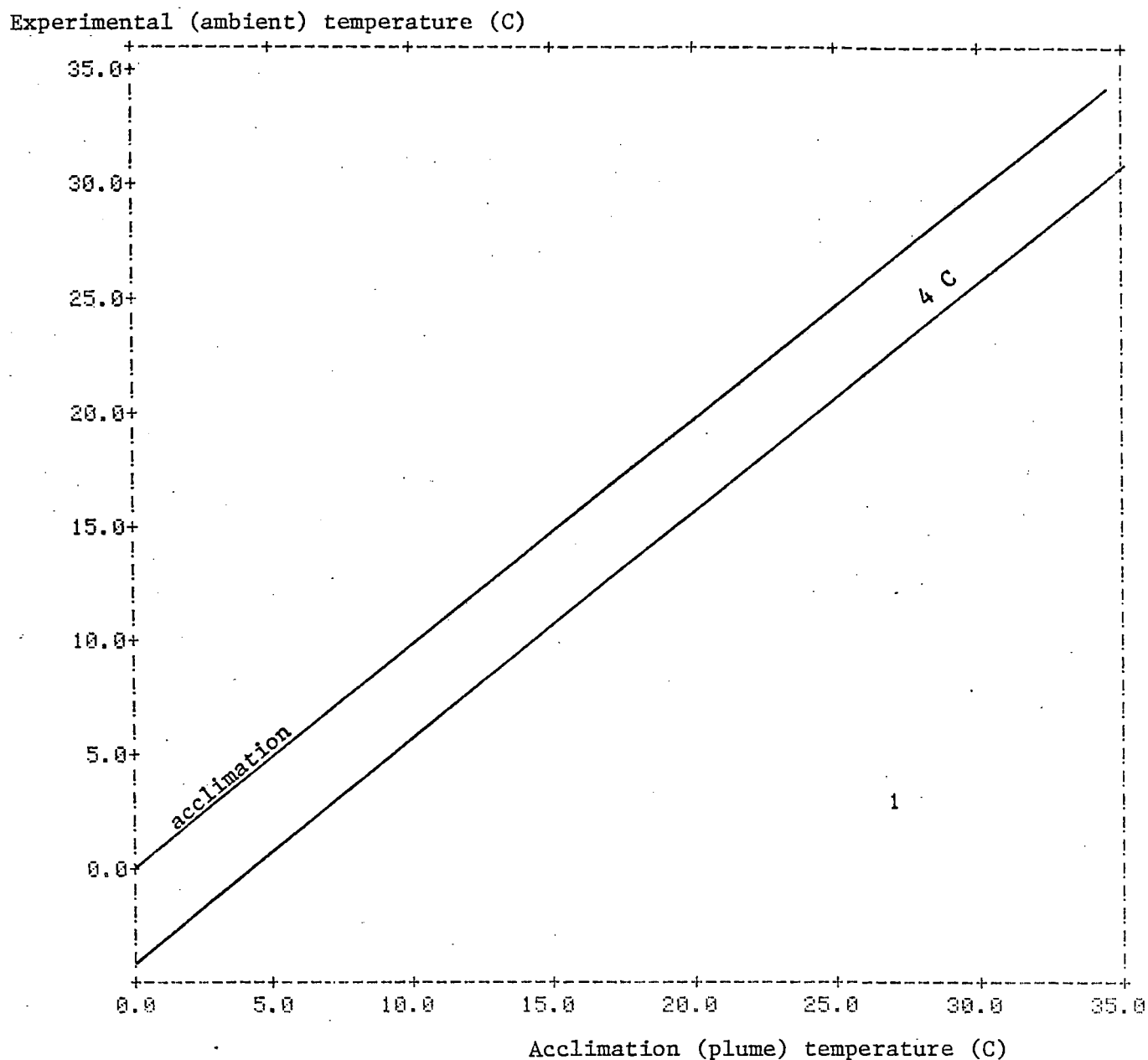


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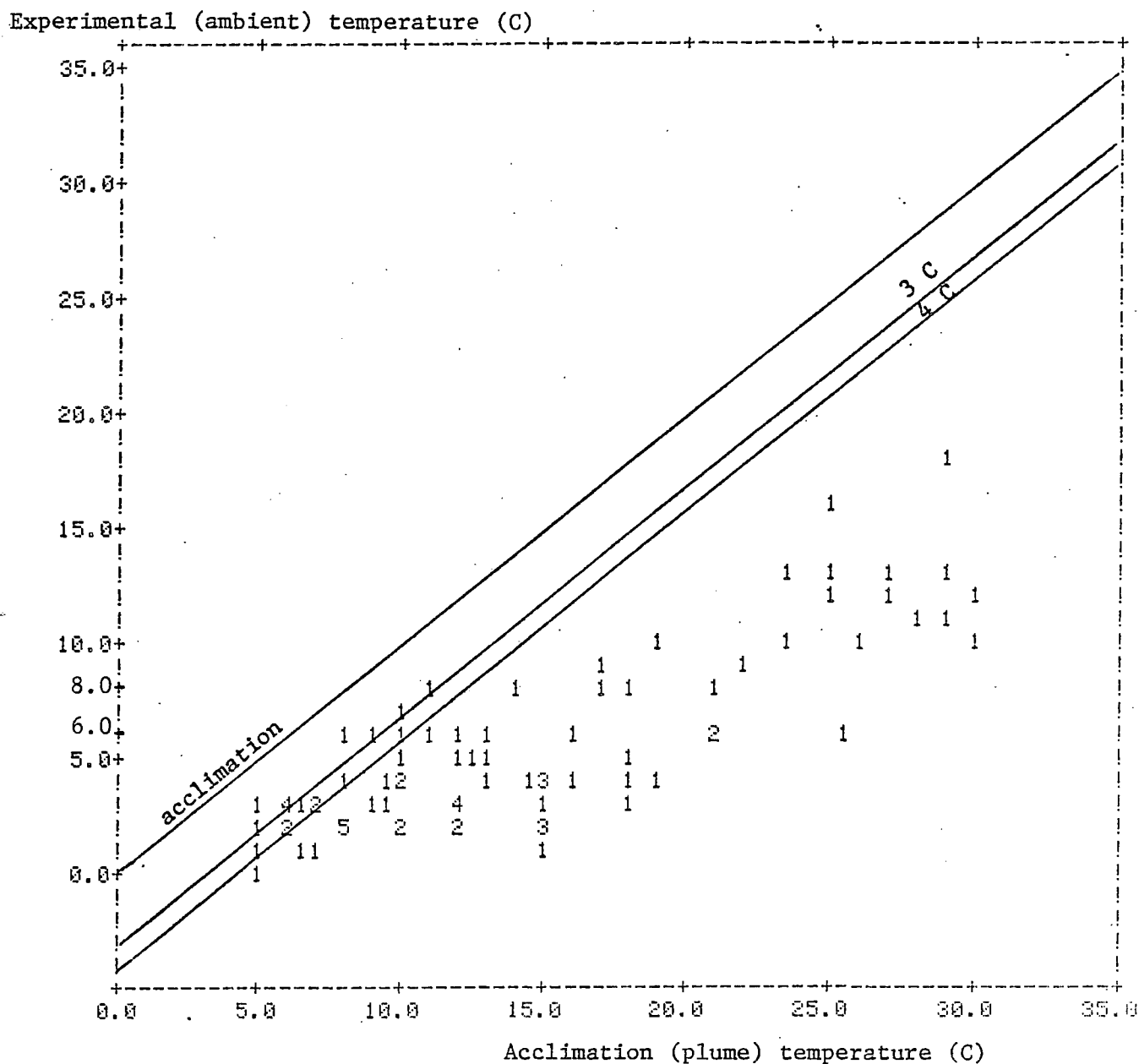


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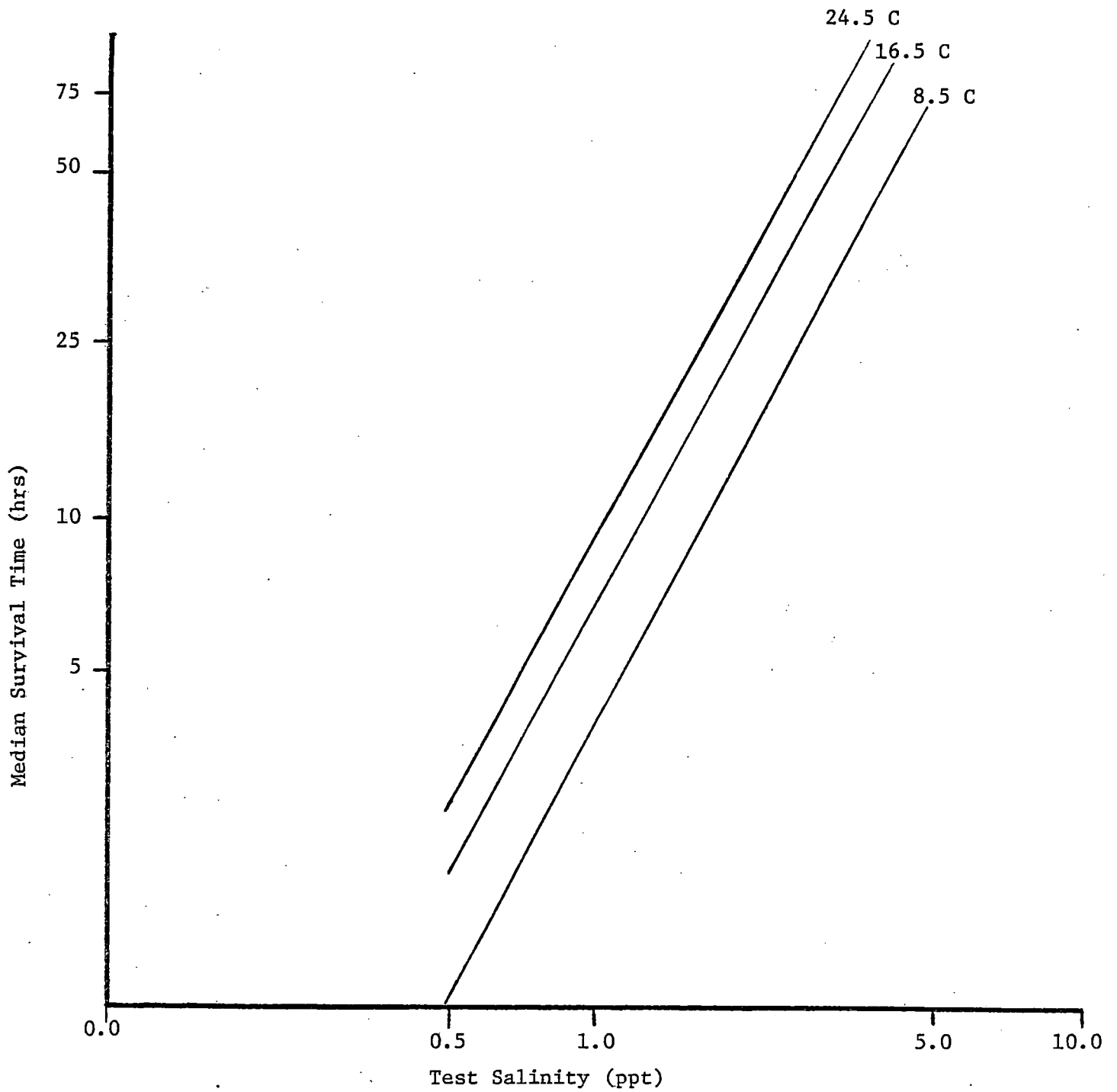


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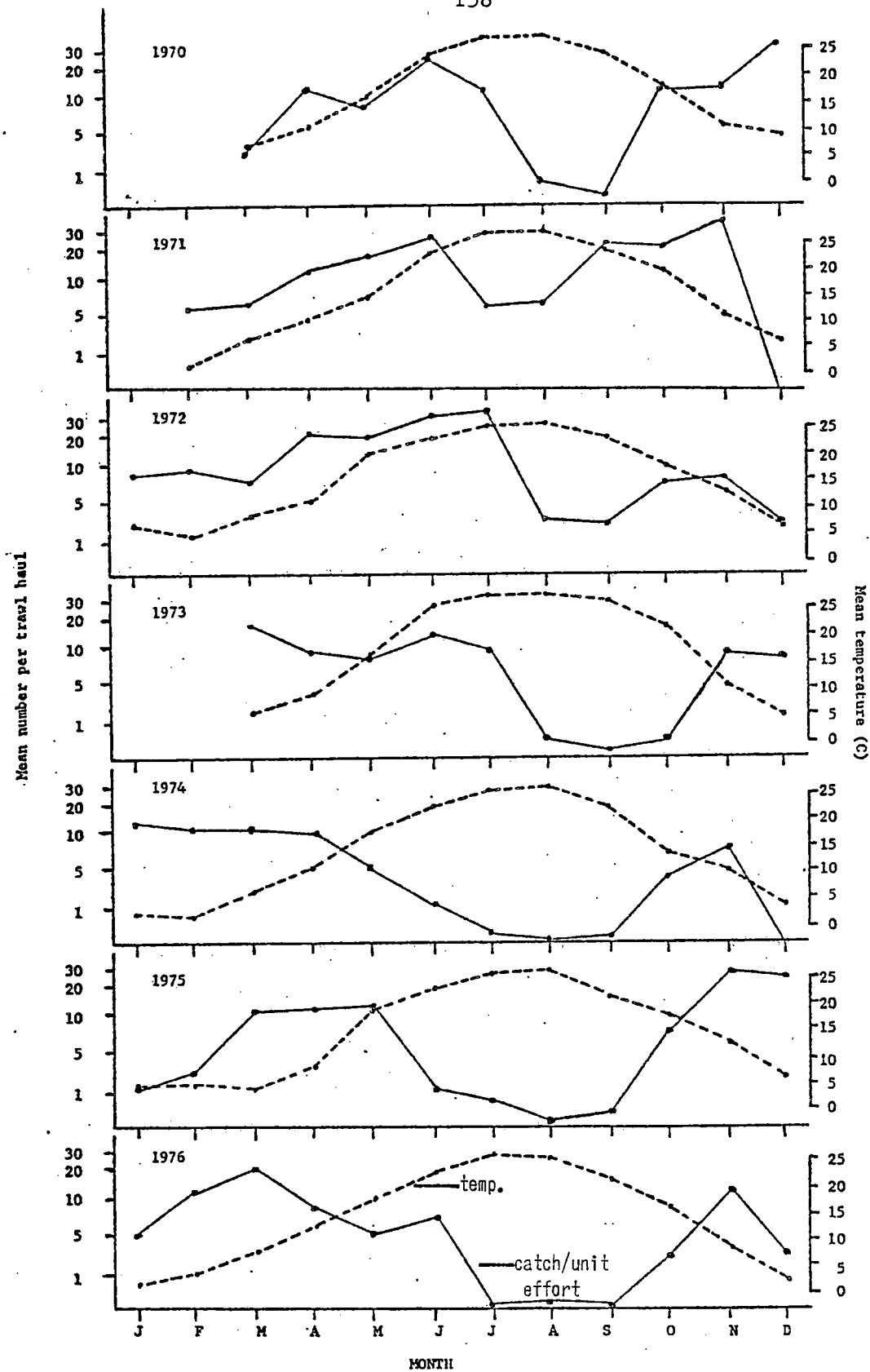


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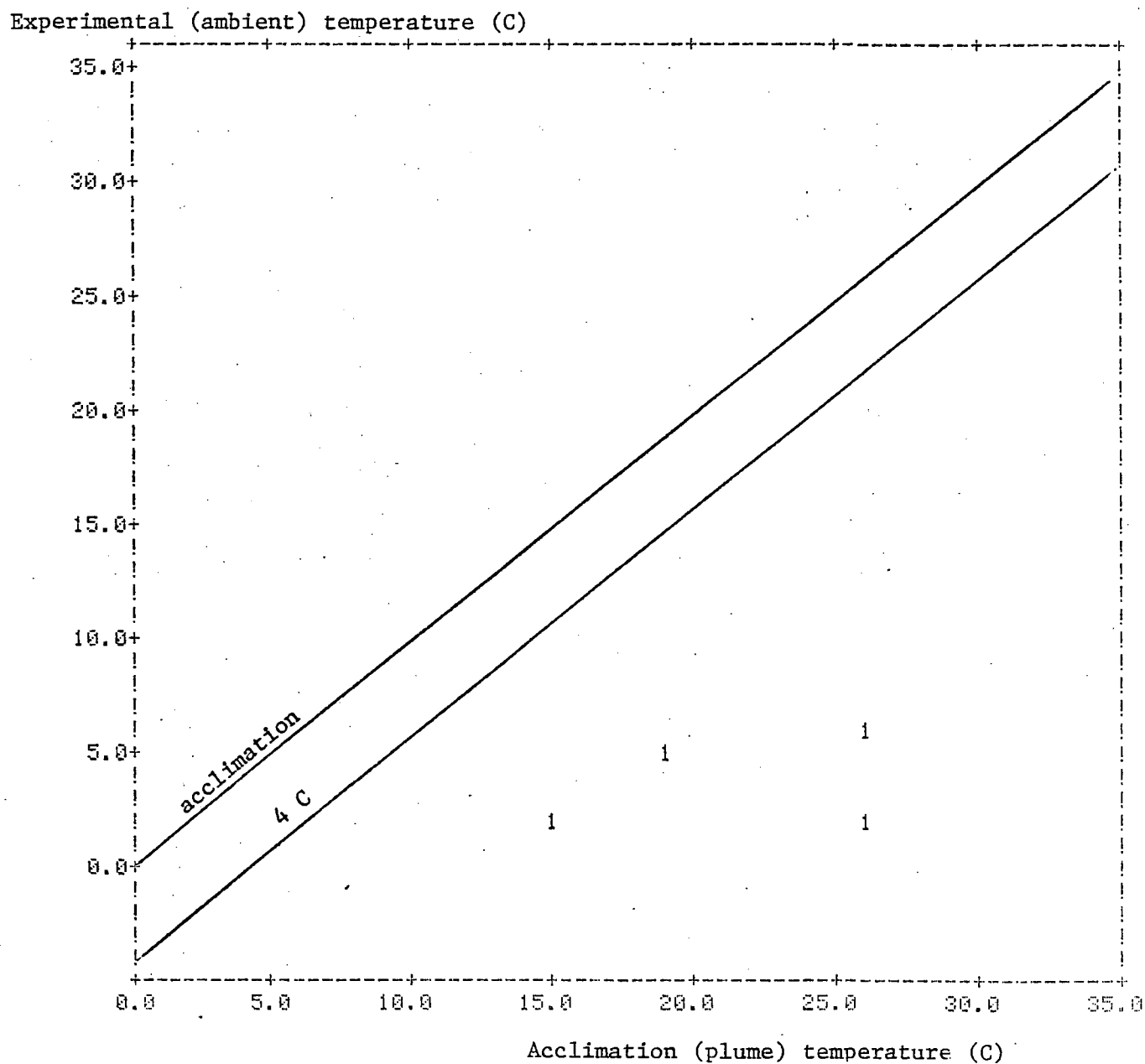


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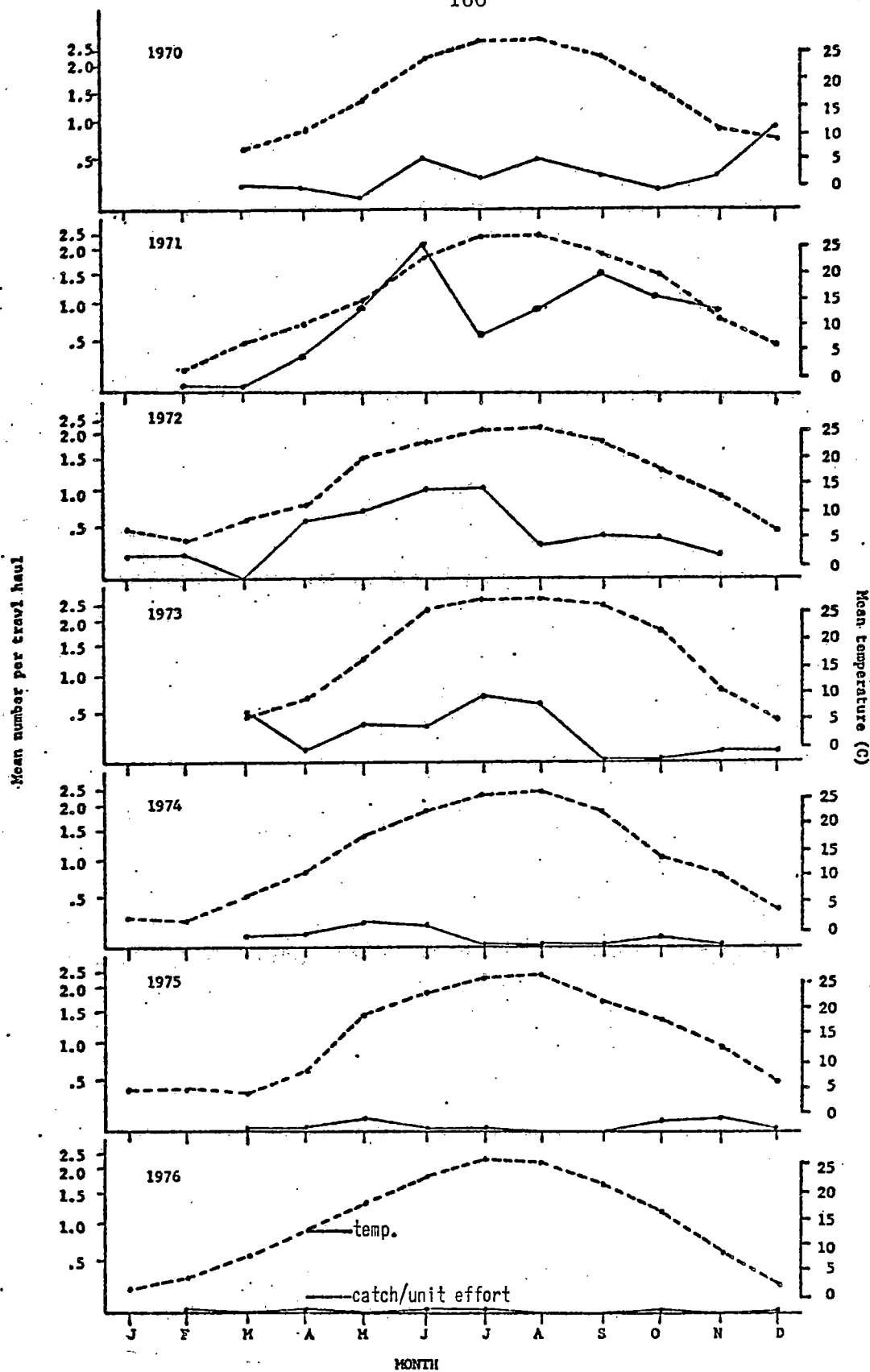


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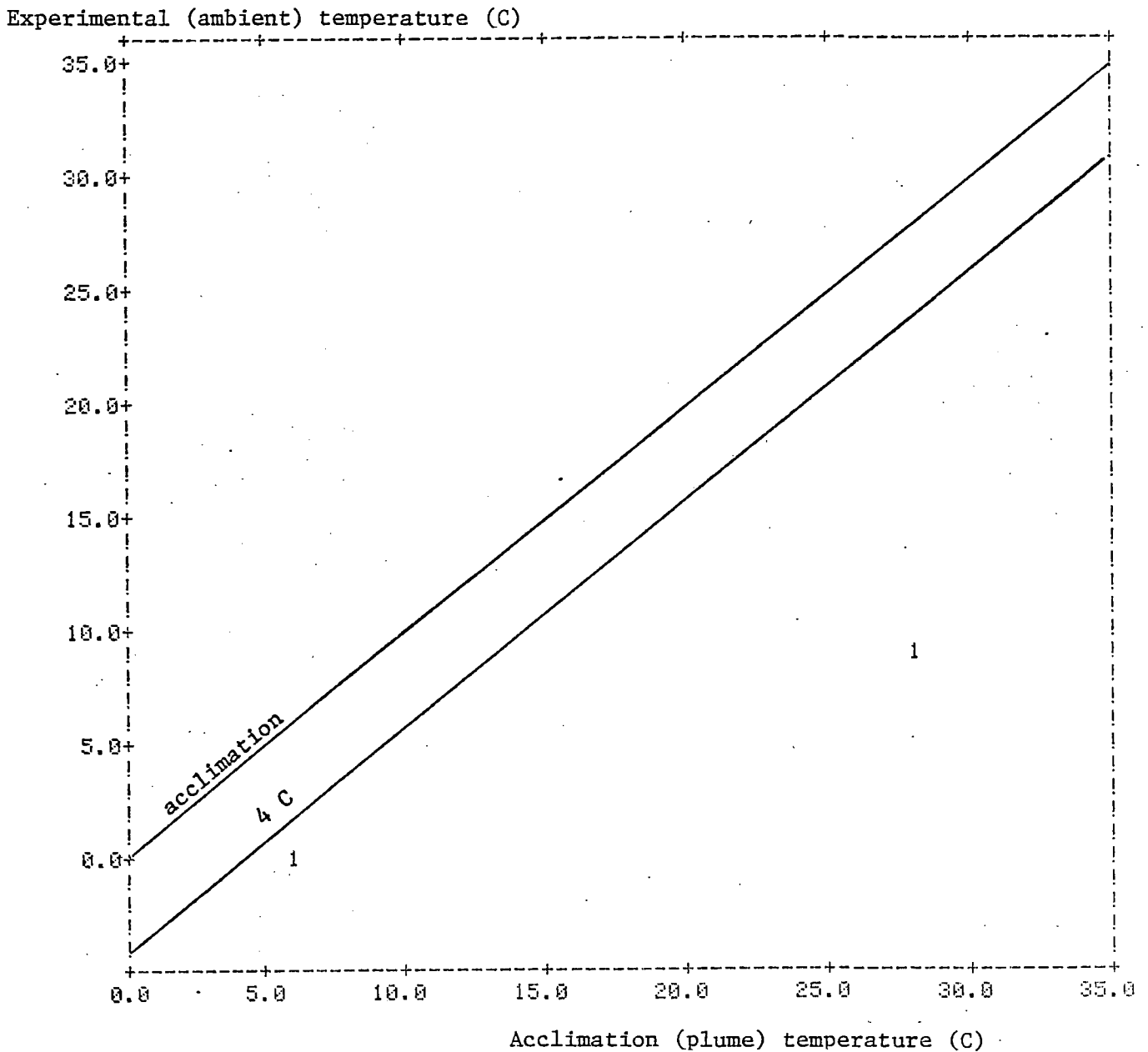


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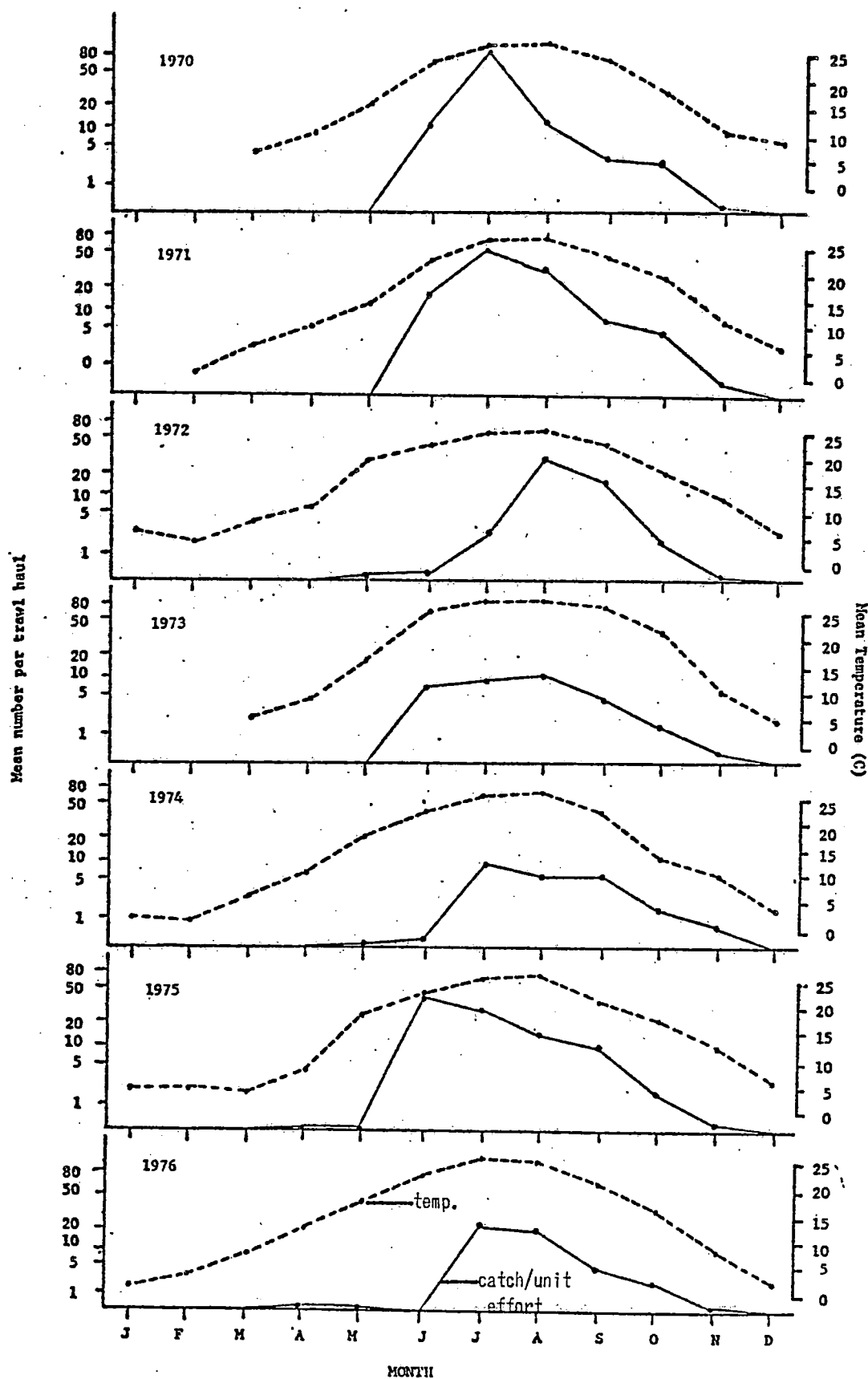


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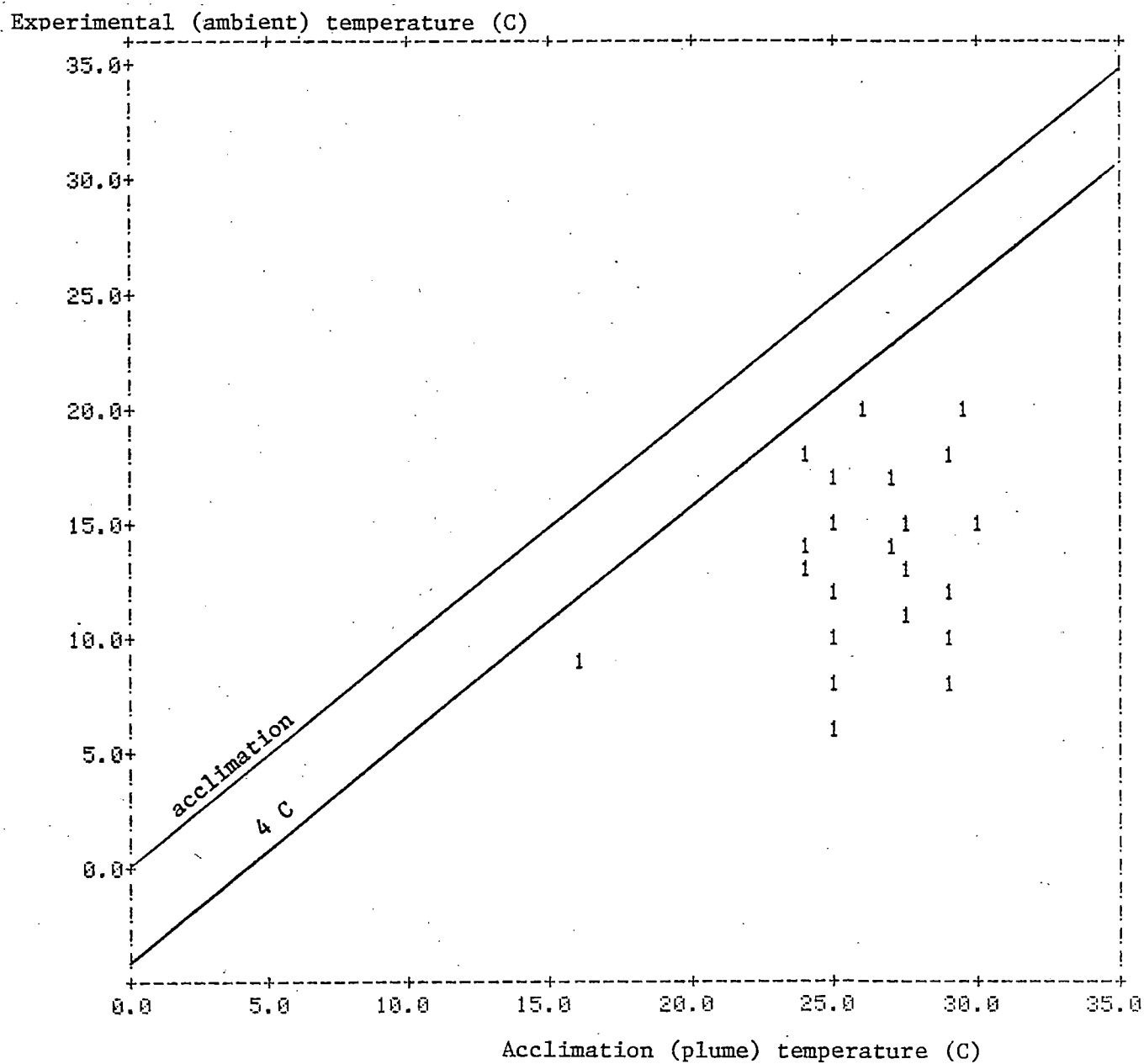


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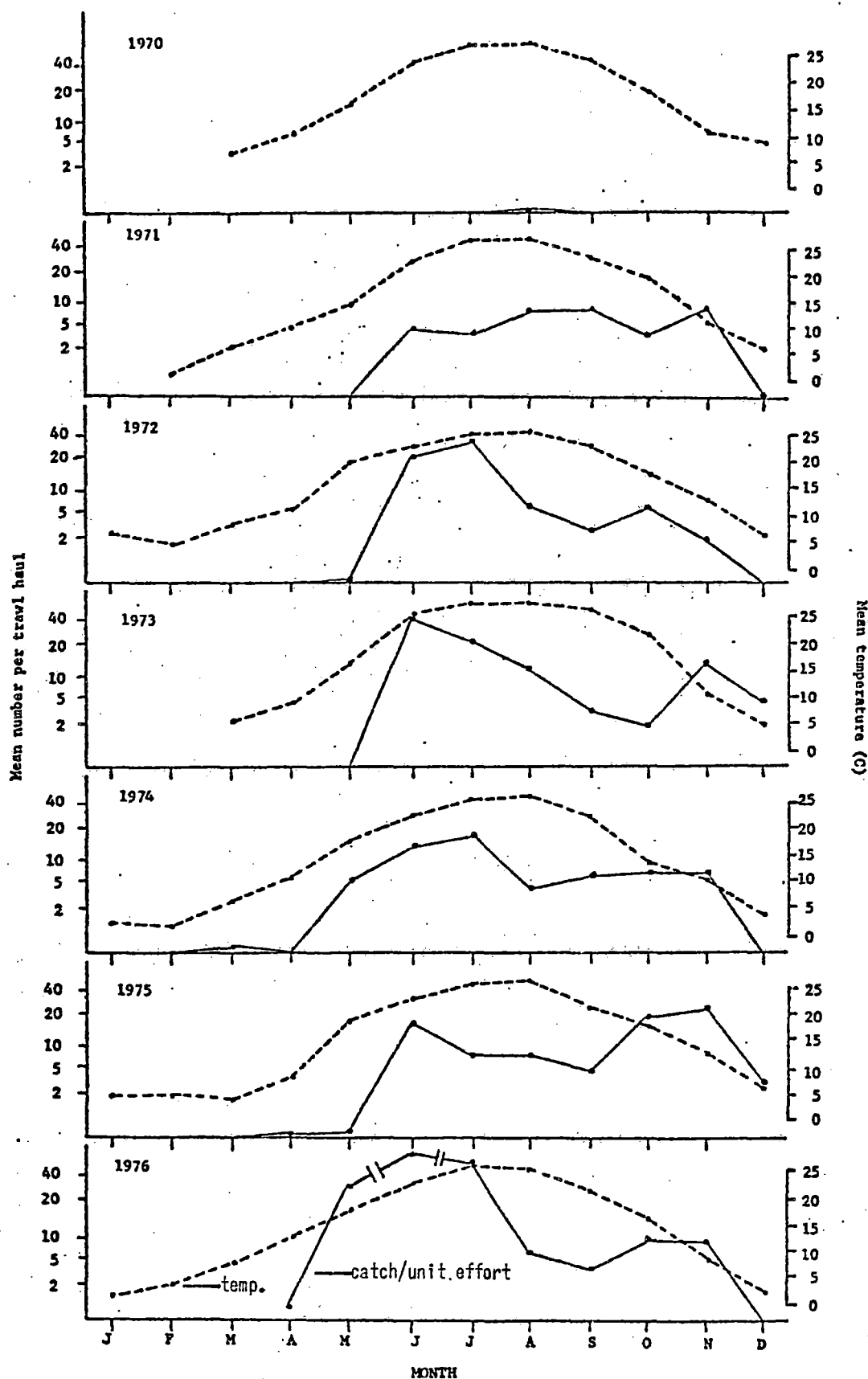


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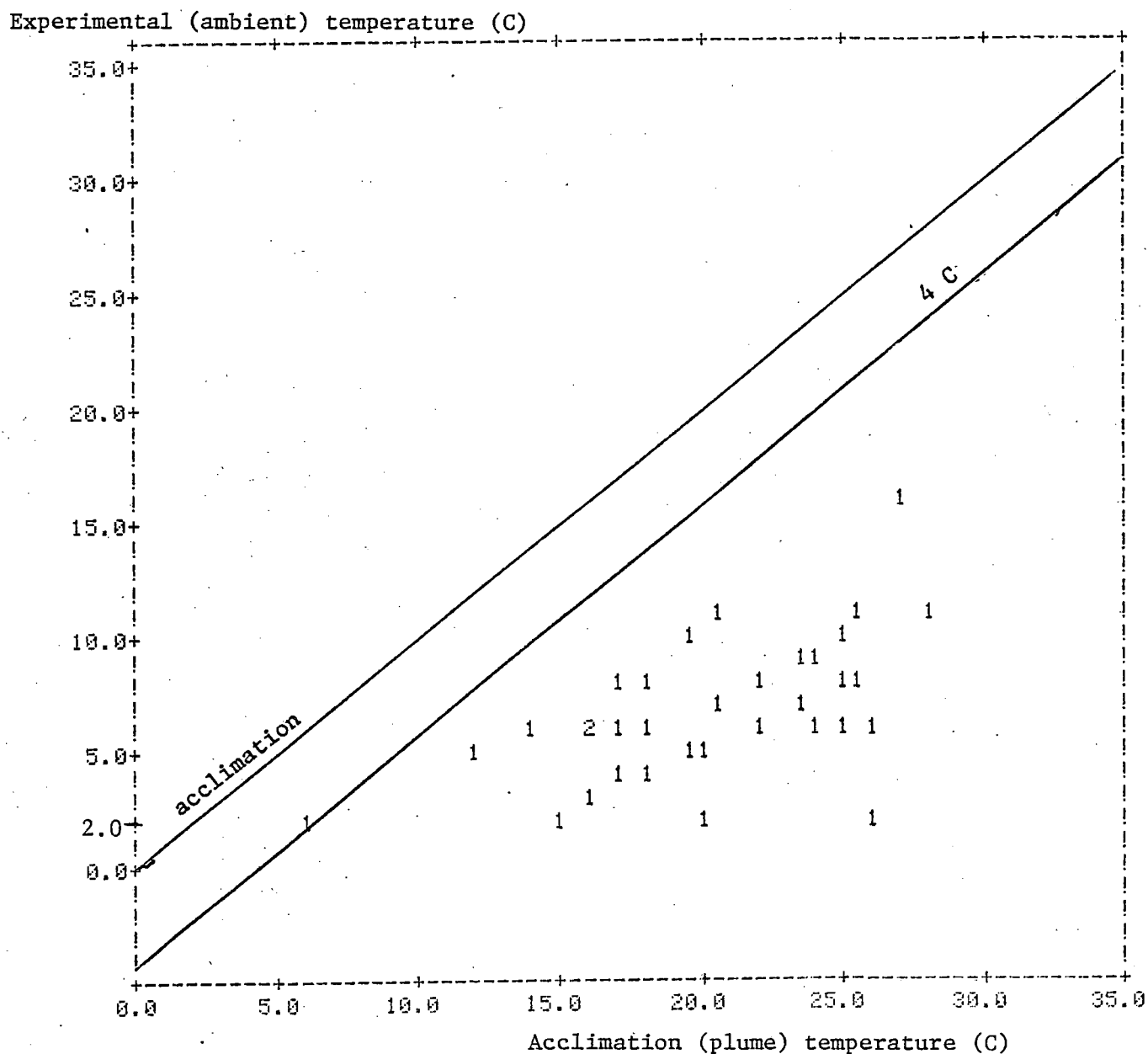


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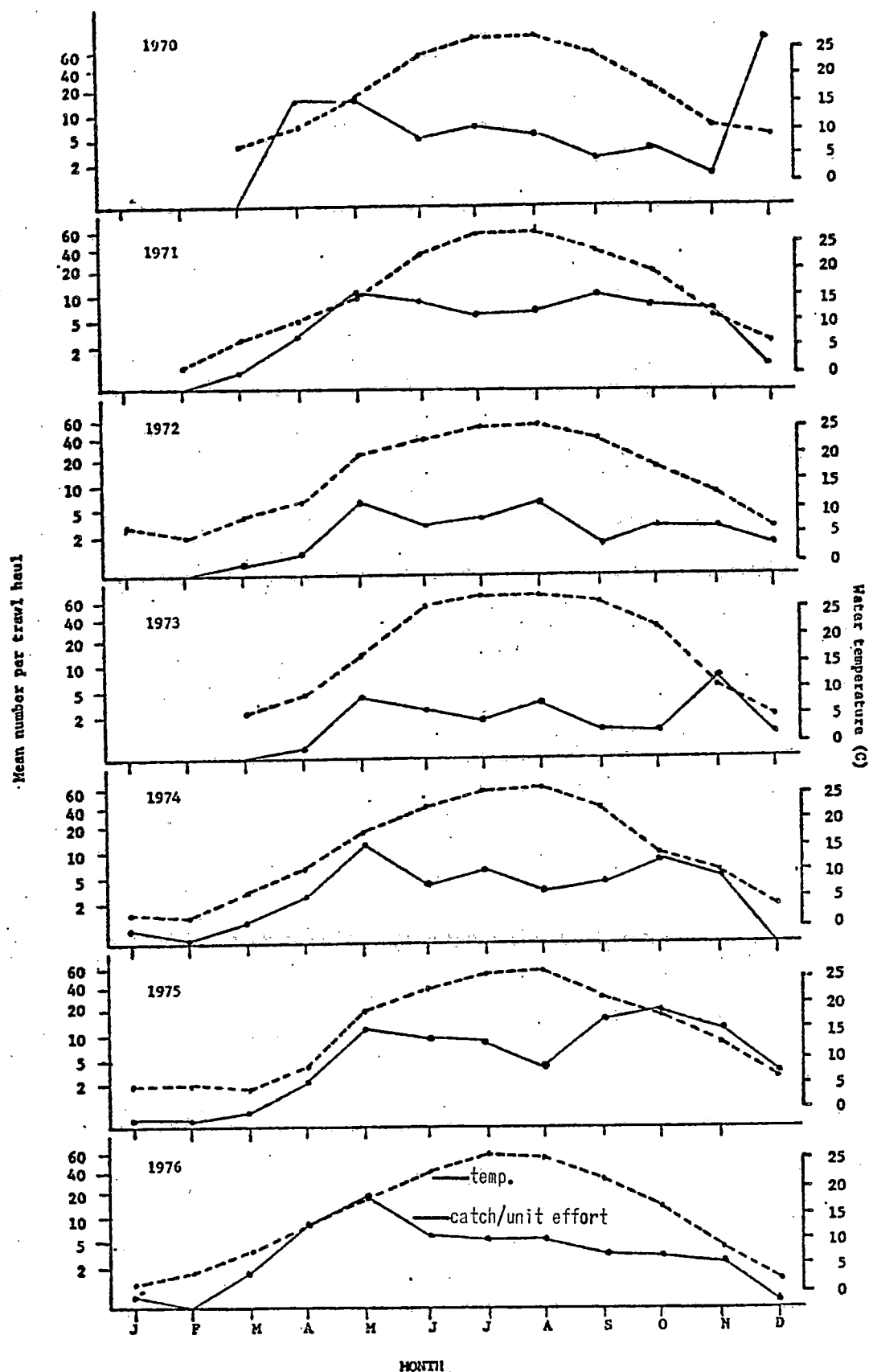


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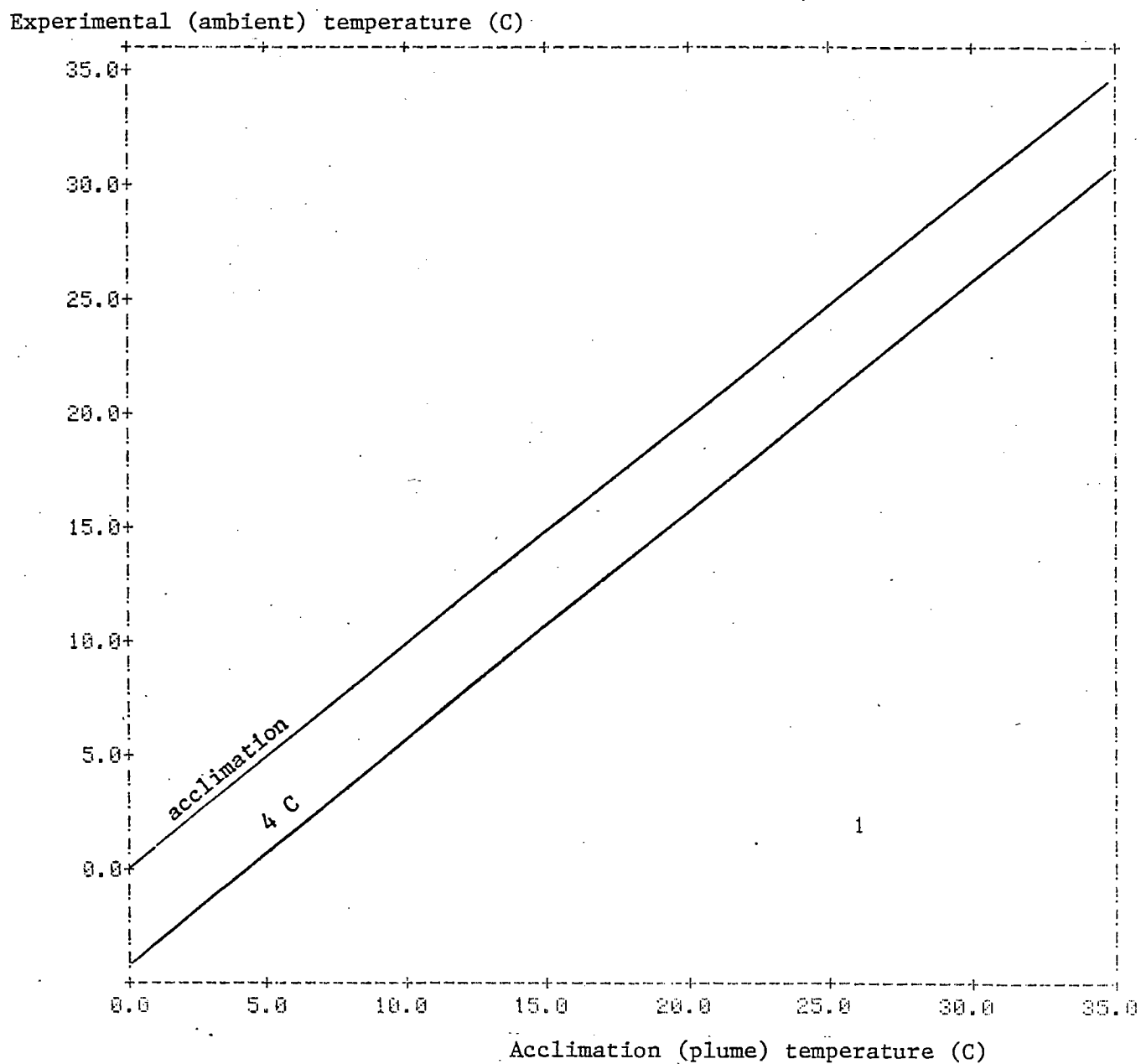


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A REPORT ON
THE SALEM NUCLEAR GENERATING STATION,
ARTIFICIAL ISLAND, SALEM COUNTY, NEW JERSEY

Concern B

Response to EPA Region II concern regarding the impact of the S.N.G.S. thermal plume on utilization of the area as a nursery by juvenile fishes.

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CONCERN B

EPA Region II has expressed concern regarding the effect of the S.N.G.S. thermal plume on juvenile fishes near Artificial Island. They have requested quantification of the portion of nursery habitat potentially removed by the plume for alewife, Alosa pseudoharengus; Atlantic menhaden, Brevoortia tyrannus; bay anchovy, Anchoa mitchilli; Atlantic silverside, Menidia menidia; white perch, Morone americana; striped bass, Morone saxatilis; weakfish, Cynoscion regalis; spot, Leiostomus xanthurus; and hogchoker, Trinectes maculatus. This discussion presents this quantification on the basis of distributions within the study area (Fig. 1) and laboratory experiments on the specific avoidance temperatures of these fishes.

Temperature avoidance studies have been conducted since 1969 at salinities and acclimation (ambient) temperatures pertinent to the S.N.G.S. area and plume. As of 30 September 1977 a total of 16 temperature avoidance tests had been conducted on alewife, 53 on Atlantic menhaden, 76 on bay anchovy, 88 on Atlantic silverside, 145 on white perch, 40 on striped bass, 62 on weakfish, 65 on spot, and 15 on hogchoker. The procedures for collection and maintenance of these fishes and those employed in the temperature avoidance tests are given in Appendix A. There are sufficient data for most fishes to permit statistical (regression) analysis of test results. Analysis procedure and the regression model are discussed in Appendix B.

Experimental results demonstrate that Atlantic menhaden, weakfish, spot, and bay anchovy will avoid the portion of the plume heated to $\Delta 4$ F or greater only during the warmest period of the year (Table 1). However, this area represents, at most, 3% of the estimated total volume of the

river segment to 5,000 ft north and south of the discharge, the maximum extent of the $\Delta 2.0$ F isotherm (Table 2). All other species tested showed no avoidance response until temperatures reached or exceeded $\Delta 8$ F. It is probable that the region of the plume within the 8 F isotherm will be physically denied to fishes, regardless of temperature, since velocities encountered will exceed their maximum sustained swim speed. For the purposes of this document, maximum sustained swim speed for the size classes of the species considered is 1.5 fps (Tatham 1971). Velocities within the maximum penetrable plume Δ temperature (8 F) range from 1.5 fps to a maximum of 10 fps at the point of discharge (ARL 1977). The temperature of the S.N.G.S. plume during normal operating conditions is not expected to have a detrimental effect on fishes in its vicinity.

The EPA has also expressed concern over potential impact of the S.N.G.S. thermal plume on the region known as "Sunken Ship Cove" and the inshore area immediately south. Ecological data demonstrate that these areas are utilized as nursery by bay anchovy, spot, weakfish, and hogchoker. The thermal plume prediction (ARL 1977) indicates that the plume will extend offshore away from the cove and the nearshore area immediately south. It appears unlikely that enough excess heat (greater than $\Delta 8$ F) will occur within these areas to affect fish abundance.

Species Discussion

Alewife: Temperature, salinity, and catch per unit effort data by month of capture for alewife near Artificial Island are presented in Tables 3 through 9, and Figure 2. Alewife is potentially present during most of the year and has been collected during months when mean temperature ranged from 2.6 C (36.7 F, February 1972, January 1974) to 26.8 C (80.2 F, August 1970). During the period of occurrence instantaneous readings ranged from 0.2 C (32.4 F) to 29.5 C (85.1 F). However, abundance has been generally greatest in spring and early summer (March-June) and again in fall (November) over a temperature range of 5 C (41 F) to 24 C (75 F) (Fig. 2). Alewife abundance has regularly been low when ambient temperatures were high, usually July and August.

Spatially, the alewife occurs throughout the study area, but lowest catch is regularly recorded in the immediate area of the discharge. Annual distribution patterns in 1970 through 1974 (Fig. 3), 1975 (Table 10), and 1976 (Table 11) demonstrate that alewife utilization of the Artificial Island region is not limited to or especially associated with the predicted area of the thermal plume.

The results of temperature avoidance tests with alewife are given in Table 12. These tests were conducted at acclimation (ambient) temperatures of 10.0 C (50.0 F) to 28.0 C (82.4 F); the mean acclimation temperature was 20.4 C (68.7 F). Alewife acclimated to 10.0 C (50.0 F) were observed to avoid 18.0 C (64.4 F). Alewife acclimated to 28.0 C (82.4 F) were observed to avoid 30.0 C (86.0 F). The highest observed avoidance temperature was 34.0 C (93.2 F) at an acclimation temperature of 26.0 C (78.8 F). Although relatively few data points (16) were available for analysis, temperature was found to account for about 89%

of the variation (Table 13). The regression of estimated avoidance temperatures is shown in Figure 4.

The maximum Δ temperature of the S.N.G.S. plume outside the discharge jet is 8 F (4 C) (ARL 1977). The regression analysis indicates that alewife acclimated at 0.2 C (32.4 F) will not avoid the maximum penetrable Δ temperature (8 F). However, access will be denied to this region of the plume because anticipated discharge velocities exceed maximum sustained swim speed. Fish acclimated to 29.5 C (85.1 F) may avoid this portion of the plume because of temperature as well as velocity. Volume within the 8 F isotherm represents less than 0.1% of the estimated total volume of the river segment to 5,000 ft north and south of the discharge when the ambient current is 0.5 fps with one unit operating, and 0.1% of this segment with two units operating (Table 2). When the ambient current is 2.5 fps this volume represents less than 0.1% of this segment when one unit is operating, and 0.1% of this segment when two units are operating.

The avoidance temperatures of the alewife are plotted against acclimation temperature in Figure 4. Most of the avoidance temperatures are above the maximum penetrable plume Δ temperature (also shown). Consequently, only the discharge jet itself is expected to be unavailable to alewife.

Atlantic menhaden: Temperature, salinity, and catch per unit effort data by month of capture for menhaden near Artificial Island are presented in Tables 3 through 9, and Figure 5. It is potentially present during much of the year (March-December) and has been collected during months when mean temperature ranged from 4.2 C (39.7 F, December 1974) to 26.8 C

(80.2 F, August 1970). During the period of occurrence instantaneous readings ranged from 0.2 C (32.4 F) to 30.0 C (86.0 F). However, abundance has been generally greatest from spring (April) through fall (November) over a temperature range of 15 C (59 F) to 27 C (81 F) and salinity range of 4 to 10 ppt (Fig. 5). Menhaden abundance has regularly been low when ambient temperature and salinity were lowest (December-March).

Spatially, the menhaden occurs throughout the study area. From 1970 through 1976 seasonal catch in the immediate area of the discharge was similar to that in areas to the north and west. Catch in areas to the south has generally been greater and reflects the downbay origin of this fish. Annual distribution patterns (Fig. 6, Tables 14, 15) demonstrate that menhaden utilization of the Artificial Island region is not limited to or especially associated with the predicted area of the thermal plume.

The results of temperature avoidance tests with Atlantic menhaden are given in Table 16. Tests were conducted at acclimation (ambient) temperatures of 15.0 C (59.0 F) to 27.0 C (80.6 F); mean acclimation temperature was 21.2 C (70.2 F). Menhaden demonstrated an avoidance temperature of 27.0 C (80.6 F) when acclimated to 15.0 C (59.0 F). The highest observed avoidance temperature, 32.0 C (89.6 F), was observed at an acclimation of 27 C (81 F). Among the components of the regression analysis (Table 17) only acclimation temperature and total length were significant ($P \leq 0.5$); together they accounted for 56% of the variation. The standardized regression coefficients show both variables to be of almost equal importance. Tests were conducted with groups of Atlantic menhaden averaging 36-126 mm (TL). The mean length of all test groups

was 73.6 mm (TL). Avoidance temperature was related directly to acclimation temperature but inversely to size, i.e. larger Atlantic menhaden avoided lower temperatures than did smaller specimens. The regression of estimated avoidance temperatures for average size Atlantic menhaden is shown in Figure 7.

The regression analysis indicates that Atlantic menhaden would avoid 16.7 C (62.1 F) when acclimated to 0.2 C (32.4 F) and 32.3 C (90.1 F) when acclimated to 30.0 C (86.0 F). The maximum penetrable plume Δ temperature (4 C, 8 F) would not likely be avoided at an ambient of 0.2 C (32.4 F). However, at an ambient of 30.0 C (86.0 F) plume temperatures above Δ 2.0 C (4.0 F) would likely be avoided. No temperatures above 29.5 C (85.1 F) were recorded at Reedy Island from 1970 through 1976 (Table 18). Volume within the 4 F isotherm represents 0.6% of the estimated total volume of the river segment to 5,000 ft north and south of the discharge when the ambient current is 0.5 fps with one unit operating and 3.0% of this segment with two units operating (Table 2). When the ambient current is 2.5 fps this volume represents 0.1% of this segment when one unit is operating, and 0.4% of this segment when two units are operating.

The avoidance temperatures of the Atlantic menhaden are plotted against acclimation temperature in Figure 7. Most of the avoidance temperatures are above the maximum penetrable plume Δ temperature (also shown). Avoidance of temperatures less than Δ 4 C (8 F) might occur under some conditions when ambient temperature is above 17 C (63 F). At temperatures below 16 C (61 F) only the discharge jet itself is expected to be unavailable to Atlantic menhaden.

Bay anchovy: Temperature, salinity, and catch per unit effort data by month of capture for anchovy near Artificial Island are presented in Tables 3 through 9, and Figure 8. Bay anchovy is potentially present during most of the year and has been collected during months when mean temperature ranged from 1.4 C (34.5 F, January 1976) to 26.8 C (80.2 F, August 1970). During the period of occurrence instantaneous temperature readings ranged from 0.0 C (32.0 F) to 30.0 C (86.0 F). However, abundance has been generally greatest from spring (April) through fall (November) when temperatures are greater than 10 C (50 F) and salinities are greater than 9.0 ppt (Fig. 8). Bay anchovy abundance has regularly been low when ambient temperature and salinity were low (December-March).

When abundant, bay anchovy occurs throughout the study area (Tables 19, 20, Fig. 9). Seasonal abundance near the S.N.G.S. discharge is similar to that observed in areas to the north and west. Seasonal abundance was usually greater to the south reflecting the downbay source of this fish. Annual distribution patterns in 1972 through 1974 (Fig. 9), 1975 (Table 19), and 1976 (Table 20) demonstrate that bay anchovy utilization of the Artificial Island region is not limited to or especially associated with the predicted area of the thermal plume.

The results of temperature avoidance tests with bay anchovy are given in Table 21. These tests were conducted at acclimation (ambient) temperatures of 12.0 C (53.6 F) to 28.0 C (82.4 F); mean acclimation temperature was 22.2 C (72.0 F). Bay anchovy acclimated to 12.0 C (53.6 F) were observed to avoid 21.0 C (69.8 F) to 22.0 C (71.6 F). The highest observed avoidance temperatures were 29.0 C (84.2 F) to 35.0 C (95.0 F) at an acclimation temperature of 28.0 C (82.4 F). Among the components of the regression analysis (Table 22) only acclimation temperature and

salinity were significant ($P \leq 0.5$); together they accounted for 63% of the variation. Acclimation temperature was three times as important as salinity in estimating the avoidance temperature. Both variables are related directly to avoidance temperature. Salinities employed in testing ranged from 3.5 to 10.5 ppt; mean salinity was 6.4 ppt. The regression of estimated avoidance temperatures is shown in Figure 10.

The regression analysis indicates that bay anchovy acclimated at 10.0 C (50.0 F) will not avoid the maximum penetrable plume Δ temperature (8 F). Fish acclimated to 26.0 C (78.8 F) may avoid this portion of the plume because of temperature as well as velocity. The maximum temperature in the plume that anchovy would be expected to avoid (Δ 3.4 C, 6.1 F) was calculated using the components of the multiple regression equation given in Table 22 and the maximum temperature (30.0 C) at which anchovy was observed to occur. Volume within the 6 F isotherm represents 0.1% of the estimated total volume of the river segment to 5,000 ft north and south of the discharge when the ambient current is 0.5 fps with one unit operating, and 0.6% of this segment with two units operating (Table 2). When the ambient current is 2.5 fps this volume represents less than 0.1% of this segment when one unit is operating, and 0.2% of this segment when two units are operating.

The avoidance temperatures of bay anchovy are plotted against acclimation temperature in Figure 10. Most of the avoidance temperatures are above the maximum penetrable plume Δ temperature. Avoidance of Δ 3 C (6 F) and above could occur under some conditions when ambient river temperatures are above 27.0 C (80.6 F). For most of the year only the discharge jet itself is expected to be unavailable to bay anchovy.

Atlantic silverside: Temperature, salinity, and catch per unit effort data by month of capture for Atlantic silverside near Artificial Island are presented in Tables 3 through 9. From 1970 through 1976 abundance in offshore areas was low. Annually, more than 99% of the catch of this fish near S.N.G.S. was taken with beach seines (Schuler 1971; Rhode and Schuler 1974a, 1974b, 1974c; Schuler and Spangler 1976; Grieve, Beck, and Schuler 1977; Beck and Grieve 1978). It is principally associated with the shore zone and is taken infrequently and in low numbers in the offshore area of the plume. It has been collected offshore during months when mean temperature ranged from 2.0 C (35.6 F) to 26.8 C (80.2 F). During periods of offshore occurrence, instantaneous temperature readings ranged from 0.2 C (32.4 F) to 29.5 C (85.1 F).

Spatially, the Atlantic silverside occurs throughout the study area; however, seasonal abundance is low and occurrence sporadic. Annual distribution patterns in 1972 through 1974 (Fig. 11), and 1975 (Table 23), 1976 (Table 24) demonstrate that Atlantic silverside utilization of the Artificial Island region is not limited to or especially associated with the predicted area of the thermal plume.

The results of temperature avoidance tests with Atlantic silverside are given in Table 25. These tests were conducted at acclimation (ambient) temperatures of 2.0 C (35.6 F) to 30.0 C (86.0 F) and salinities of 1.0 to 10.0 ppt; the mean acclimation temperature and salinity were 15.1 C (59.2 F) and 5.5 ppt, respectively. Atlantic silverside acclimated to 2.0 C (35.6 F) were observed to avoid 16.0 C (60.8 F). When acclimated to 30.0 C (86.0 F) Atlantic silverside were observed to avoid 33.0 C (91.4 F) and 35.0 C (95.0 F). The highest observed avoidance temperature was 36.0 C (96.8 F) at acclimation temperatures of 26.0 C (78.8 F) and

27.0 C (80.6 F). Among the components of the regression analysis (Table 26) only acclimation temperature and salinity were significant ($P \leq 0.5$); together they accounted for 62% of the variation. Both were related directly to the avoidance temperature. Acclimation temperature was five times as important as salinity in estimating the avoidance temperature. Light level influenced the avoidance temperature but was significant only at the $P = .10$ level and was deleted. The regression of estimated avoidance temperatures at the mean salinity (5.5 ppt) is shown in Figure 12.

The regression analysis indicates that Atlantic silverside at the mean test salinity would avoid 19.7 C (67.5 F) when acclimated to 30.0 C (86.0 F). The maximum penetrable plume Δ temperature, 8 F (4.4 C), would not likely be avoided when the ambient is less than 31.0 C (87.8 F).

The avoidance temperatures of the Atlantic silverside are plotted against acclimation temperature in Figure 12. Nearly all avoidance temperatures are greater than the maximum penetrable plume ΔT (4 C). Consequently, only the discharge jet itself is expected to be unavailable to Atlantic silverside.

White perch: Temperature, salinity, and catch per unit effort data by month of capture for white perch near Artificial Island are presented in Tables 3 through 9, and Figure 13. White perch has been present throughout the year and was collected during months when mean temperature ranged from 1.4 C (34.5 F, January 1976) to 26.8 C (80.2 F, August 1970). During the period of occurrence instantaneous readings ranged from 0.0 C (32.0 F) to 30.0 C (86.0 F). However, abundance is generally greatest in spring (March-June) and again in fall (September-November) over a

temperature range of 5 C (41 F) to 24 C (75 F) (Fig. 13). White perch abundance has regularly been low when ambient temperatures were high, usually July and August, and again when temperatures were low, usually January and February.

Spatially, the white perch occurs throughout the study area, but lowest catch is regularly recorded in the immediate area of the discharge. Annual distribution patterns in 1972 through 1974 (Fig. 14), and 1975 (Table 27), and 1976 (Table 28) demonstrate that white perch utilization of the Artificial Island region is not limited to or especially associated with the predicted area of the thermal plume.

The results of temperature avoidance tests with white perch are given in Table 29. These results were previously analyzed and extensively discussed by Meldrim et al. (1974). Tests were conducted at acclimation (ambient) temperatures of 6.0 C (42.8 F) to 26.0 C (78.8 F) for rising, and from 1.0 C (33.8 F) to 18.0 C (64.4 F) for falling acclimation temperatures. Although the rising and falling acclimation temperatures do not totally overlap, separate regression equations should be obtained for biological reasons. Rates of acclimation in fishes are faster for rising temperatures than for falling temperatures. When acclimation temperature was rising, white perch acclimated to 6.0 C (42.8 F) were observed to avoid 12.0 C (53.6 F); those acclimated to 26.0 C (78.8 F) were observed to avoid 29.0 C (84.2 F) and 34.0 C (93.2 F). When acclimation temperature was falling, white perch acclimated to 1.0 C (33.8 F) were observed to avoid 7.0 C (44.6 F) and 9.0 C (48.2 F). Observed avoidance temperature varied between 21.0 C (69.8 F) and 31.0 C (87.8 F) for white perch acclimated to 18.0 C (64.4 F) under falling acclimation temperature. Variability in results was dependent on light

level, salinity, and size of fish. The highest observed avoidance temperature was 37.0 C (98.6 F) at an acclimation temperature of 25.0 C (77.0 F). Nearly all variables under study and several of their interactions significantly ($P \leq .05$) affected the avoidance temperature of white perch. A significant ($P \leq .05$) seasonal difference was also found. However, regardless of season acclimation temperature was the dominant variable, accounting for about 80% of the variation. All other variables combined accounted for only about 10%, and could thus be reasonably excluded from the equations for general estimations. Components for the linear regression equation when ambient river temperature is rising, falling, and without regard to season, are given in Tables 30, 31, and 32, respectively. The regression of estimated avoidance temperatures is shown in Figure 15.

The regression analysis indicates that white perch would avoid 13.1 C (55.6 F) when acclimated to 4.0 C (39.2 F), and 34.6 C (94.3 F) when acclimated to 26.0 C (78.8 F). Extending the regression, white perch may avoid 38.3 C (100.9 F) when acclimated to 30.0 C (86.0 F). In all cases the estimated avoidance temperatures exceed the maximum plume Δ temperature (8 F). Therefore, only the discharge jet should be avoided by white perch. Volume within the 8 F isotherm represents less 0.1% of the estimated total volume of the river segment to 5,000 ft north and south of the discharge when the ambient current is 0.5 fps with one unit operating, and 0.1% of this segment with two units operating (Table 2). When the ambient current is 2.5 fps this volume represents less than 0.1% of this segment when one unit is operating, and 0.1% of this segment when two units are operating.

The avoidance temperatures of the white perch are plotted against acclimation temperature in Figure 15. Most of the avoidance temperatures are above the maximum penetrable plume Δ temperature (also shown). Consequently, only the discharge jet itself is expected to be unavailable to white perch.

Striped bass: Temperature, salinity, and catch per unit effort by month of capture for striped bass near Artificial Island are presented in Tables 3 through 9, and Figure 16. Striped bass is potentially present during most of the year and has been collected during months when mean temperature ranged from 1.9 C (35.4 F, March 1971) to 26.8 C (80.2 F, August 1970). During the period of occurrence instantaneous readings ranged from 1.0 C (33.8 F) to 30.0 C (86.0 F). No period of consistent abundance was observed within years. However, abundance has been generally greatest from May through December over a temperature range of 10 C (50 F) to 26 C (79 F) (Fig. 16).

Spatially, the striped bass occurs throughout the study area; catch from the immediate area of discharge is similar to that in other areas sampled. Annual distribution patterns in 1970 through 1974 (Fig. 17) and 1975 (Table 33), 1976 (Table 34) demonstrate that striped bass utilization of the Artificial Island region is not limited to or especially associated with the predicted area of the thermal plume.

The results of temperature avoidance tests with striped bass are given in Table 35. These tests were conducted at acclimation (ambient) temperatures of 3.0 C (37.4 F) to 29.0 C (84.2 F) and salinities from 0.0 to 10.5 ppt; mean acclimation temperature was 16.8 C (62.2 F), mean salinity was 4.9 ppt. Striped bass acclimated to 3.0 C (37.4 F) were

observed to avoid 16.0 C (60.8 F). The highest observed avoidance temperature was from 35.0 C (95.0 F) to 37.0 C (98.6 F) at an acclimation of 29.0 C (84.2 F). Among the components of the regression analysis (Table 36) only acclimation temperature and salinity were significant ($P \leq .05$); together they accounted for about 85% of the variability. Both variables were related directly to avoidance temperature. Acclimation temperature was over five times as important as salinity in estimating the avoidance temperature. The regression of estimated avoidance temperatures at the mean salinity is shown in Figure 18.

The regression analysis indicates that striped bass at a mean salinity of 4.9 ppt would avoid 11.8 C (53.2 F) when acclimated to 1.0 C (33.8 F), and 37.7 C (99.9 F) when acclimated to 30.0 C (86.0 F). The maximum penetrable plume Δ temperature (4 C, 8 F) is lower than these avoidance temperatures and would likely not be avoided. Under some conditions, at specific ambient temperatures (5 C, 10 C, and 25 C) fish may avoid the maximum penetrable plume Δ temperature (8 F). Volume within the 8 F isotherm represents less than 0.1% of the estimated total volume of the river segment to 5,000 ft north and south of the discharge when the ambient current is 0.5 fps with one unit operating, and 0.1% of this segment with two units operating (Table 2). When ambient current is 2.5 fps this volume represents less than 0.1% of this segment when one unit is operating, and 0.1% of this segment when two units are operating.

The avoidance temperatures of the striped bass are plotted against acclimation temperature in Figure 18. Most of the avoidance temperatures are above the maximum penetrable plume Δ temperature (also shown). Consequently, only the discharge jet itself is expected to be unavailable to striped bass.

Weakfish: Temperature, salinity, and catch per unit effort data by month of capture for weakfish near Artificial Island are presented in Tables 3 through 9, and Figure 19. Weakfish has been captured from April through November when mean monthly temperature ranged from 7.8 C (46.0 F, April 1975) to 26.8 C (80.2 F, August 1970). During the period of occurrence instantaneous readings ranged from 1.8 C (35.2 F) to 30.0 C (86.0 F). However, abundance is generally greatest from early summer (June) through fall (November) over a temperature range of 10 C (50 F) to 26 C (47 F) (Fig. 19). Weakfish abundance has regularly been low when ambient temperatures were less than 10 C and salinity was less than 3 ppt.

When abundant weakfish occurs throughout the study area. Annual distribution patterns in 1970 through 1974 (Fig. 20), 1975 (Table 37), and 1976 (Table 38) demonstrate that weakfish utilization of the Artificial Island region is not limited to or especially associated with the predicted area of the thermal plume.

The results of temperature avoidance tests with weakfish are given in Table 39. These tests were conducted on groups of weakfish of mean total lengths of 26.7 to 131.5 mm at acclimation (ambient) temperatures of 16.0 C (60.8 F) to 31.0 C (87.8 F) and salinities of 3.5 to 10.5 ppt. Mean acclimation temperature was 24.9 C (76.8 F) and mean salinity was 7.1 ppt. A significant ($P \leq .05$) negative correlation existed between total length and acclimation temperature, indicating that the smaller fish were tested at the higher temperatures. Since the 0+ age group only occurs at the higher ambient temperatures, this correlation is expected. Weakfish acclimated to 16.0 C (60.8 F) were observed to avoid temperatures between 24.0 C (75.2 F) and 25.0 C (77.0 F). Weakfish

acclimated to 31.0 C (87.8 F) were observed to avoid 34.0 C (93.2 F). The highest observed avoidance temperature was 37.0 C (98.6 F) at an acclimation temperature of 30.0 C (86.0 F). Among the components of the regression analysis (Table 40) only acclimation temperature, salinity, and total length were significant ($P \leq .05$); together they accounted for about 65% of the variation. Acclimation temperature and salinity were related directly to the avoidance temperature; total length was related inversely. Acclimation temperature was about three times as important as salinity or total length in estimating the avoidance temperature. Salinity and total length were of about equal importance. The regression of estimated avoidance temperatures for average size weakfish at the mean salinity is shown in Figure 21.

The regression analysis indicates that weakfish of mean total length 74.0 mm would, at the mean test salinity of 7.1 ppt, avoid 22.1 C (71.8 F) when acclimated to 10.0 C (50.0 F) and 32.4 C (90.3 F) when acclimated to 30.0 C (86.0 F). The maximum penetrable plume Δ temperature (4 C, 8 F) would not likely be avoided at an ambient of 10.0 C (50.0 F). However, at an ambient of 30.0 C (86.0 F) plume temperatures above Δ 2.4 C (4.3 F) would likely be avoided. Volume within the 4 F isotherm represents 0.6% of the estimated total volume of the river segment to 5,000 ft north and south of the discharge when the ambient current is 0.5 fps with one unit operating, and 3.0% of this segment with two units operating (Table 2). When the ambient current is 2.5 fps this volume represents 0.1% of this segment when one unit is operating, and 0.4% of this segment when two units are operating.

The avoidance temperatures of weakfish are plotted against acclimation temperature in Figure 21. Most of the avoidance temperatures are above the maximum penetrable plume Δ temperature (8 F). Avoidance of Δ 3 C (6 F) and above could occur under some conditions when ambient river temperatures are above 25.0 C (77.0 F). For most of the year only the discharge jet itself is expected to be unavailable to weakfish.

Spot: Temperature, salinity, and catch per unit effort data by month of capture for spot near Artificial Island are presented in Tables 3 through 9, and Figure 22. Spot is potentially present during much of the year (March-December) and has been collected during months when mean temperature ranged from 5.1 C (41.2 F, December 1973) to 26.8 C (80.2 F, August 1970). During the period of occurrence instantaneous readings ranged from 0.2 C (32.4 F) to 29.5 C (85.1 F). However, abundance has been generally greatest from early summer (June) through fall (November) over a temperature range of 10 C (50 F) to 24 C (75 F) (Fig. 22). Spot abundance has regularly been low when ambient temperature and salinity were less than 10 C and 3 ppt, respectively.

When abundant the spot occurs throughout the study area. Annual distribution patterns in 1970 through 1974 (Fig. 23), 1975 (Table 41), and 1976 (Table 42) demonstrate that spot utilization of the Artificial Island region is not limited to or especially associated with the predicted area of the thermal plume.

The results of temperature avoidance tests conducted with spot are given in Table 43. Tests were conducted at acclimation (ambient) temperatures of 10.0 C (50.0 F) to 30.0 C (86.0 F); the mean acclimation temperature was 21.0 C (69.8 F). Spot acclimated to 10.0 C (50.0 F)

were observed to avoid temperatures between 19.0 C (66.2 F) and 24.0 C (75.2 F). Fish acclimated to 30.0 C (86.0 F) avoided 34.0 C (93.0 F). The highest observed avoidance temperature was 34.0 C (93.0 F) at an acclimation of 24.0 C (75.2 F) and 30.0 C (86.0 F). Among the components of the regression analysis (Table 44) only acclimation temperature and light level were significant ($P \leq .05$); together they accounted for about 65% of the variation. Acclimation temperature was related directly to the avoidance temperature; light level was related inversely. Acclimation temperature was about five times as important as light level in estimating the avoidance temperature of spot. The regression of estimated avoidance temperatures at the mean light level is shown in Figure 24.

The regression analysis indicates that spot would avoid 17.8 C (64.0 F) when acclimated to 0.2 C (32.4 F) and 32.9 C (91.2 F) when acclimated to 30.0 C (86.0 F). The maximum penetrable plume Δ temperature (4.4 C, 8 F) would not likely be avoided at an ambient of 0.2 C (32.4 F). However, at an ambient of 30.0 C (86.0 F) plume temperatures above Δ 2.9 C (5.0 F) would likely be avoided. Volume within the 4 F isotherm represents 0.6% of the estimated total volume of the river segment to 5,000 ft north and south of the discharge when the ambient current is 0.5 fps with one unit operating, and 3.0% of this segment with two units operating (Table 2). When the ambient current is 2.5 fps this volume represents 0.1% of this segment when one unit is operating, and 0.4% of this segment when two units are operating.

The avoidance temperature of spot are plotted against acclimation temperature in Figure 24. Most of the avoidance temperatures are above the maximum penetrable plume Δ temperature (8 F). Avoidance of Δ 3 C (6 F) and above could occur under some conditions when ambient river

temperatures are above 25.0 C (77.0 F). For most of the year only the discharge jet itself is expected to be unavailable to spot.

Hogchoker: Temperature, salinity, and catch per unit effort data by month of capture for hogchoker near Artificial Island are presented in Tables 3 through 9, and Figure 25. Hogchoker is present during the entire year and has been collected during months when mean temperature ranged from 1.4 C (34.5 F, January 1976) to 26.8 C (80.2 F, August 1970). Abundance has been generally greatest from spring (April) through fall (November) over a temperature range of 5 C (41 F) to 24 C (75 F) (Fig. 25). Hogchoker abundance has regularly been low when ambient temperatures were low, usually December through March.

Spatially, the hogchoker occurs throughout the study area, but lowest catch is regularly recorded in the immediate area of discharge. Annual distribution patterns in 1970 through 1974 (Fig. 26), 1975 (Table 45), and 1976 (Table 46) demonstrate that hogchoker utilization of the Artificial Island region is not limited to or especially associated with the predicted area of the thermal plume.

The results of temperature avoidance tests with hogchoker are given in Table 47. The tests were conducted at acclimation (ambient) temperatures of 10.0 C (50.0 F) to 26.0 C (78.8 F); the mean acclimation temperature was 18.5 C (65.3 F). Nearly all the avoidance temperatures exceed the maximum penetrable plume Δ temperature, 8 F (4 C). Among the components of the regression analysis (Table 48) only acclimation temperature and salinity were significant ($P \leq .05$); together they accounted for only 38% of the variation, and the standard error was 4.75. Both were related directly to avoidance temperature and were of about equal importance

in determining the avoidance temperature. It is apparent that the linear model does not fit the data very well. With only 13 data points a more rigorous analysis is not warranted. The responses to the thermal plume can be better evaluated using the actual data than the regression estimates. Therefore, no regression is given in Figure 27.

The avoidance temperatures of the hogchoker are plotted against acclimation temperature in Figure 27. Most of the avoidance temperatures are above the maximum penetrable plume Δ temperature. Consequently, only the discharge jet itself is expected to be unavailable to the hogchoker.

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Table 1 . - Estimated percent of the river segment within 5,000 ft north to 5,000 ft south of the S.N.G.S. discharge potentially avoided by nine fishes at maximum acclimation temperature, for one and two unit operation during 0.5 and 2.5 fps river flow conditions. Periods and temperatures of occurrence and abundance for each species are also shown.

	Month	Temperature Range (F)	Avoidance Temperature at Maximum Acclimation Temperature (F)	Percent River Segment Volume Avoided			
				One Unit Operation		Two Unit Operation	
				0.5 fps	2.5 fps	0.5 fps	2.5 fps
Alewife							
Period of occurrence	All	32 - 85	$\geq \Delta 8^*$	<0.11	<0.11	0.14	0.07
Period of abundance	March - June and November	41 - 75					
Atlantic menhaden							
Period of occurrence	March - December	32 - 86	$\geq \Delta 4$	0.59	0.11	2.97	0.37
Period of abundance	April - November	59 - 80					
Bay anchovy							
Period of occurrence	All	32 - 86	$> \Delta 6$	0.10	<0.11	0.58	0.15
Period of abundance	April - November	> 50					
Atlantic silverside							
Period of occurrence	All	32 - 85	$> \Delta 8^*$	<0.11	<0.11	0.14	0.07
Period of abundance	None						
White perch							
Period of occurrence	All	32 - 86	$> \Delta 8^*$	<0.11	<0.11	0.14	0.07
Period of abundance	March - June September - November	41 - 75					
Striped bass							
Period of occurrence	All	34 - 86	$> \Delta 8^*$	<0.11	<0.11	0.14	0.07
Period of abundance	May - December	50 - 79					
Weakfish							
Period of occurrence	April - November	35 - 86	$> \Delta 4$	0.59	0.11	2.97	0.37
Period of abundance	June - November	50 - 79					
Spot							
Period of occurrence	March - December	32 - 85	$> \Delta 4$	0.59	0.11	2.97	0.37
Period of abundance	June - November	50 - 77					
Hogchoker							
Period of occurrence	All	32 - 86	$> \Delta 8^*$	<0.11	<0.11	0.14	0.07
Period of abundance	April - November	41 - 75					

¹ = Estimated volume of river segment equals $26.8 \times 10^8 \text{ ft}^3$.

* = $\Delta 8 \text{ F}$ is the maximum penetrable plume ΔT .

Table 2. - Estimated¹ areas (10^5 ft^2) and volumes (10^6 ft^3) enclosed by isotherms of the S.N.G.S. thermal plume for one and two unit operation at a Δ temperature of 16.2 F during 0.5 and 2.5 fps river flow conditions. Estimated area² and volume of river segment 5,000 ft north and south of the discharge equals $1.4 \times 10^8 \text{ ft}^2$ and $26.8 \times 10^8 \text{ ft}^3$.

No. of Units in Operation	Discharge Rate (GPM/Unit)	Ambient Current fps	Δ T of Isotherm F	Surface Area 10^5 ft^2	Volume 10^6 ft^3	% of Affected River Segment Volume
1	1,110,000	0.5	2	78.3	142.2	5.31
			4	7.9	15.8	0.59
			6	1.4	2.8	0.11
		2.5	2	9.4	18.8	0.70
			4	1.4	2.8	0.11
2	1,110,000	0.5	2	258.5	458.2	17.09
			4	39.8	79.6	2.97
			6	7.8	15.6	0.58
			8	1.9	3.8	0.14
		2.5	2	31.7	61.9	2.31
			4	5.9	9.9	0.37
			6	2.1	4.0	0.15
			8	0.9	1.8	0.07

¹ = ARL 1977

² = Calculated with Lietz polar planimeter.

Table 3 . . Monthly mean catch per unit effort of fishes taken by 16-foot trawl¹ in zones east and west of the shipping channel and in all zones (total) near the Salem Nuclear Generating Station, New Jersey, 1970.

		Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Temp. (C)	max.			7.0	14.5	19.8	24.6	29.5	28.0	26.5	20.0	11.0	10.0
	min.			3.5	5.0	14.5	22.2	24.5	25.5	23.5	16.5	10.3	9.0
	$\bar{X}$			5.9	10.1	16.1	23.1	26.3	26.8	24.6	18.0	10.6	9.4
Salinity (ppt)	max.			9.0	6.5	5.0	9.3	11.3	11.6	14.5	10.5	11.0	4.0
	min.			5.0	0.0	0.0	1.0	1.0	2.5	4.2	2.5	1.5	0.0
	$\bar{X}$			7.4	1.3	2.0	3.7	5.1	6.1	7.1	5.7	4.6	1.0
Alewife	west			NS	0.6	0.0	12.7	4.1	7.7	0.6	1.5	NS	3.3
	east			0.6	0.3	0.4	2.1	2.2	0.4	1.3	0.8	7.4	1.5
	Total			0.6	0.5	0.2	5.7	2.7	2.5	1.0	1.1	7.4	2.8
Atlantic menhaden	west			NS	0.0	0.0	0.0	0.1	*	0.0	0.1	NS	0.1
	east			0.0	0.0	0.0	*	0.1	*	*	0.1	0.1	0.0
	Total			0.0	0.0	0.0	*	0.1	*	*	0.1	0.1	0.1
Bay anchovy	west			NS	0.0	3.5	25.3	54.8	39.3	66.6	25.7	NS	0.3
	east			0.0	0.0	12.5	8.9	88.4	21.1	29.3	34.3	10.9	7.5
	Total			0.0	0.0	9.0	14.4	78.7	26.4	40.7	30.7	10.9	1.9
Atlantic silverside	west	No Sample	No Sample	NS	0.0	0.0	*	0.0	0.0	0.1	0.0	0.0	0.0
	east			0.0	0.0	0.0	*	0.0	0.2	0.0	0.0	0.0	0.0
	Total			0.0	0.0	0.0	*	0.0	0.1	*	0.0	0.0	0.0
White perch	west			NS	14.5	9.7	24.1	14.9	1.9	0.4	25.6	NS	34.9
	east			2.6	5.0	7.2	24.8	6.0	0.3	0.1	0.8	13.1	2.0
	Total			2.6	12.2	8.2	24.6	10.3	0.7	0.2	11.1	13.1	27.6
Striped bass	west			NS	0.2	0.2	1.1	0.5	1.5	0.0	0.3	NS	1.0
	east			0.2	0.0	0.0	0.3	0.1	0.1	0.9	0.2	0.3	0.5
	Total			0.2	0.2	0.1	0.5	0.3	0.5	0.3	0.2	0.3	0.9
Spot	west			NS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	0.0
	east			0.0	0.0	0.0	0.0	0.8	*	0.0	0.0	0.0	0.0
	Total			0.0	0.0	0.0	0.0	0.0	*	0.0	0.0	0.0	0.0
Weakfish	west			NS	0.0	0.0	15.1	67.3	14.5	5.2	4.7	NS	0.0
	east			0.0	0.0	0.0	10.2	86.8	11.6	3.6	2.6	0.1	0.0
	Total			0.0	0.0	0.0	11.9	81.1	12.4	3.9	3.5	0.1	0.0
Hogchoker	west			NS	19.3	10.2	2.8	14.9	14.9	1.7	5.1	NS	85.7
	east			0.0	4.3	19.1	6.2	4.9	2.5	3.6	3.3	1.4	0.0
	Total			0.0	15.9	25.6	5.1	7.7	6.1	2.7	4.0	1.4	66.7

¹10-minute haul

*0.0 < n/T ≤ 0.05

Table 4 . - Monthly mean catch per unit effort of fishes taken by 16-foot trawl¹ in zones east and west of the shipping channel and in all zones (total) near the Salem Nuclear Generating Station, New Jersey, 1971.

		Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Temp. (C)	max.		3.0	6.0	11.7	16.2	27.0	27.0	28.2	25.8	20.5	12.8	7.0
	min.		1.0	4.5	9.0	12.0	19.3	25.6	25.7	22.1	17.5	7.5	4.8
	$\bar{X}$		1.9	5.2	9.9	14.0	22.1	26.4	26.6	23.9	18.9	10.6	5.8
Salinity (ppt)	max.		2.5	4.0	8.7	8.4	10.0	12.5	13.3	9.6	5.4	6.7	5.0
	min.		0.0	0.0	0.3	0.9	1.3	3.0	1.6	0.0	0.0	1.0	0.0
	$\bar{X}$		0.3	0.3	3.4	4.1	4.7	7.2	5.9	2.5	2.8	3.8	0.8
Alewife	west		0.0	0.6	2.7	0.3	1.2	1.2	0.7	1.0	0.6	8.0	0.0
	east		0.0	0.4	0.7	1.7	4.3	0.2	0.2	0.5	0.1	3.3	*
	Total		0.0	0.5	1.4	1.2	3.2	0.5	0.4	0.7	0.5	4.9	*
Atlantic menhaden	west		0.0	0.0	0.0	0.0	5.7	2.0	1.1	3.8	3.6	7.0	*
	east		0.0	0.0	0.0	0.0	13.5	2.2	0.4	2.7	1.9	4.7	0.0
	Total		0.0	0.0	0.0	0.0	10.7	2.1	0.7	3.0	2.5	5.5	*
Bay anchovy	west		0.0	0.1	1.6	13.8	7.7	43.2	84.6	22.8	35.0	42.0	0.0
	east		0.0	*	1.8	24.5	8.4	19.2	80.6	67.2	38.0	63.6	0.0
	Total		0.0	0.1	1.7	20.7	8.1	27.7	82.1	55.5	36.9	56.4	0.0
Atlantic silverside	west		0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	*	0.0
	east		0.0	0.0	0.0	0.0	0.0	0.0	0.0	*	*	*	0.0
	Total		0.0	0.0	0.0	0.0	0.0	0.0	*	*	*	*	0.0
White perch	west		11.3	11.4	22.2	25.5	27.9	2.8	15.6	22.9	39.0	65.3	0.0
	east		2.6	3.8	6.4	13.2	25.9	7.9	1.5	24.3	10.1	21.2	0.0
	Total		5.9	6.5	12.0	17.5	26.6	6.1	6.8	23.9	20.6	35.9	0.0
Striped bass	west		0.3	0.0	0.3	0.6	4.2	0.6	1.8	2.7	2.2	1.3	0.0
	east		0.0	0.1	0.3	1.1	1.3	0.7	0.4	1.1	0.5	0.7	0.0
	Total		0.1	0.1	0.3	0.9	2.4	0.6	0.9	1.5	1.2	0.9	0.0
Weakfish	west		0.0	0.0	0.0	0.0	23.0	59.6	32.4	8.0	9.3	0.3	0.0
	east		0.0	0.0	0.0	0.0	13.7	50.1	28.5	6.5	2.3	0.5	0.0
	Total		0.0	0.0	0.0	0.0	17.1	53.4	30.0	6.9	4.5	0.4	0.0
Spot	west		0.0	0.0	0.0	0.0	6.6	2.7	13.4	7.4	1.6	17.6	*
	east		0.0	0.0	0.0	0.0	3.9	3.8	4.5	8.9	5.1	5.4	0.0
	Total		0.0	0.0	0.0	0.0	4.9	4.5	7.8	8.4	4.4	9.5	*
Hogchoker	west		0.0	2.3	4.6	10.5	15.5	10.2	16.3	30.0	15.1	14.1	3.9
	east		0.0	0.2	2.8	10.1	6.3	4.6	2.9	3.6	6.5	4.8	0.4
	Total		0.0	0.9	3.4	10.2	9.6	6.6	7.9	10.5	9.6	7.9	1.5

¹10-minute haul

* 0.0 < n/T ≤ 0.05

Table 5. Monthly mean catch per unit effort¹ of fishes taken by 16-foot trawl in zones east and west of the shipping channel and in all zones (total) near the Salem Nuclear Generating Station, New Jersey, 1972.

		Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Temp. (C)	max.	5.2	3.6	8.5	12.0	19.4	23.0	27.2	26.0	25.1	19.0	13.0	6.0
	min.	3.0	1.6	4.4	6.0	14.8	20.0	18.8	22.8	17.9	13.6	10.1	3.2
	$\bar{X}$	4.4	2.6	5.7	8.3	17.0	21.4	24.5	24.7	21.8	15.6	11.8	4.6
Salinity (ppt)	max.	5.0	8.0	5.0	6.9	5.5	6.8	5.9	10.5	18.3	14.6	15.0	1.0
	min.	0.0	4.6	0.8	0.0	0.0	0.0	0.0	2.2	3.2	7.1	5.0	0.0
	$\bar{X}$	1.0	6.6	2.8	2.7	1.6	1.7	1.7	5.9	9.6	10.3	9.8	0.1
Alewife	west	0.0	0.0	0.0	1.5	1.1	0.9	2.1	0.0	*	0.3	0.6	0.8
	east	0.0	0.3	0.2	0.8	0.2	0.1	0.5	0.0	0.0	0.1	0.3	0.0
	Total	0.0	0.2	0.1	1.0	0.5	0.4	1.0	0.0	*	0.1	0.4	0.4
Atlantic menhaden	west	0.0	0.0	0.0	29.2	2.3	1.4	5.1	0.2	0.5	0.3	0.1	0.0
	east	0.0	0.0	0.0	0.4	0.4	2.8	0.5	0.2	2.1	*	0.8	0.0
	Total	0.0	0.0	0.0	10.0	1.0	2.3	2.1	0.2	0.2	0.1	0.6	0.0
Bay anchovy	west	0.0	0.5	0.0	5.7	62.1	5.5	1.3	73.0	134.7	88.6	21.3	0.0
	east	0.0	0.0	0.4	42.5	51.2	20.6	5.0	45.2	48.9	154.7	35.6	0.0
	Total	0.0	0.2	0.3	30.2	54.9	15.4	3.8	53.8	80.4	132.1	31.9	0.0
Atlantic silverside	west	0.3	0.0	0.0	0.0	0.0	0.0	*	0.0	0.0	0.3	0.0	0.0
	east	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	*	0.1	0.0
	Total	0.3	0.0	0.0	0.0	0.0	0.0	*	0.0	0.0	0.1	0.1	0.0
White perch	west	9.0	16.5	18.5	27.0	33.5	34.7	49.4	5.4	1.5	7.1	20.2	4.2
	east	7.7	6.0	2.4	18.3	12.0	29.1	27.4	2.4	3.1	8.0	3.7	0.8
	Total	8.3	9.5	7.0	21.2	19.4	31.1	34.7	3.3	2.5	7.7	7.9	2.4
Striped bass	west	0.3	0.0	0.0	0.7	1.8	2.1	1.9	0.8	0.5	0.7	0.5	0.0
	east	0.0	0.3	0.0	0.6	0.1	0.4	0.6	*	0.3	0.3	0.1	0.0
	Total	0.2	0.2	0.0	0.6	0.7	1.0	1.0	0.3	0.4	0.4	0.2	0.0
Weakfish	west	0.0	0.0	0.0	0.0	0.0	0.1	4.7	48.4	13.4	2.4	0.0	0.0
	east	0.0	0.0	0.0	0.0	*	0.2	2.9	18.1	16.2	1.6	*	0.0
	Total	0.0	0.0	0.0	0.0	*	0.1	3.5	27.5	15.2	1.9	*	0.0
Spot	west	0.0	0.0	0.0	0.0	0.0	11.2	47.9	2.5	2.7	6.4	1.7	0.0
	east	0.0	0.0	0.0	0.0	*	24.9	21.3	7.4	2.7	4.7	2.0	0.0
	Total	0.0	0.0	0.0	0.0	*	20.1	30.2	5.9	2.7	5.3	1.9	0.0
Hogchoker	west	4.7	0.0	1.0	0.7	14.5	5.4	9.1	17.1	1.1	4.4	7.0	3.1
	east	0.2	0.0	0.0	0.7	2.4	2.1	1.5	1.2	1.4	1.7	0.6	0.4
	Total	2.4	0.0	0.3	0.7	6.5	3.2	4.1	6.2	1.3	2.6	2.2	1.6

¹10-minute haul

*0.0 < n/T ≤ 0.05

Table 6 . - Monthly mean catch per unit effort of fishes taken by 16-foot trawl¹ in zones east and west of the shipping channel and in all zones (total) near the Salem Nuclear Generating Station, New Jersey, 1973.

		Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Temp. (C) max.				8.8	11.0	17.5	24.4	27.0	27.1	29.0	20.0	11.8	10.3
min.				2.5	6.1	13.5	21.7	24.0	24.1	21.0	14.5	8.5	2.4
$\bar{X}$				6.2	9.1	15.3	23.2	26.0	25.9	24.5	17.8	10.3	5.1
Salinity (ppt) max.				7.4	6.0	6.4	6.5	6.0	7.6	9.0	9.5	13.0	4.0
min.				2.1	0.0	0.0	0.1	0.0	0.5	2.8	3.0	0.0	0.0
$\bar{X}$				5.0	1.5	1.6	1.8	2.5	3.8	5.6	6.0	5.1	0.8
Alewife	west			0.0	0.3	0.0	0.0	0.3	0.0	0.0	0.0	1.0	0.0
	east			0.0	0.3	0.1	*	*	0.0	0.0	0.0	0.7	0.2
	Total			0.0	0.3	0.1	*	0.1	0.0	0.0	0.0	0.8	0.2
Atlantic menhaden	west			0.0	0.0	0.1	0.7	0.3	1.5	0.7	11.1	23.8	0.0
	east			0.1	0.0	*	0.5	0.4	0.5	0.2	0.9	2.6	0.6
	Total			*	0.0	*	0.6	0.3	0.8	0.3	4.3	9.1	0.5
Bay anchovy	west			0.0	0.1	20.4	7.9	19.9	63.8	688.1	72.4	18.1	0.0
	east			0.0	0.3	59.6	6.7	19.6	33.0	79.7	28.7	12.7	0.1
	Total			0.0	0.2	46.5	6.2	19.7	42.1	271.8	43.3	14.3	0.1
Atlantic silverside	west	No Sample	No Sample	0.0	0.0	0.0	*	0.0	0.0	0.0	0.0	0.0	0.0
	east			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total			0.0	0.0	0.0	*	0.0	0.0	0.0	0.0	0.0	0.0
White perch	west			34.8	12.9	11.5	20.4	17.8	0.9	0.2	0.7	13.8	4.1
	east			7.1	7.0	7.5	12.1	4.1	0.4	0.2	0.4	7.8	10.3
	Total			17.2	9.0	8.7	14.8	8.4	0.5	0.2	0.5	9.7	8.8
Striped bass	west			0.4	0.2	0.3	0.5	1.3	1.5	0.0	0.1	0.1	0.0
	east			0.6	0.1	0.3	0.2	0.4	0.2	*	0.0	*	0.1
	Total			0.5	0.1	0.3	0.3	0.7	0.6	*	*	0.1	0.1
Weakfish	west			0.0	0.0	0.0	0.2	8.4	6.0	5.8	3.7	0.2	0.0
	east			0.0	0.0	0.0	8.7	9.1	11.7	4.3	1.5	0.3	0.0
	Total			0.0	0.0	0.0	5.9	8.9	10.0	4.8	2.3	0.2	0.0
Spot	west			0.0	0.0	0.0	19.5	11.3	10.6	3.8	2.7	30.7	0.0
	east			0.0	0.0	0.0	39.2	24.4	12.0	3.3	1.3	5.5	5.3
	Total			0.0	0.0	0.0	32.7	20.2	11.6	3.4	1.8	13.3	4.0
Hogchoker	west			0.0	0.7	8.0	5.3	3.5	2.6	2.5	3.1	15.5	1.5
	east			0.0	0.2	2.1	1.2	1.0	3.4	0.9	0.6	3.9	1.4
	Total			0.0	0.4	4.0	2.6	1.8	3.1	1.4	1.4	7.5	1.4

¹10-minute haul

*0.0 < n/T ≤ 0.05

Table 7 . - Monthly mean catch per unit effort of fishes taken by 16-foot trawl¹ in zones east and west of the shipping channel and in all zones (total) near the Salem Nuclear Generating Station, New Jersey, 1974.

		Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov.	Dec
Temp. (C) max.		6.0	3.1	7.5	12.5	20.5	26.2	26.2	30.0	24.8	16.5	15.0	6.9
min.		1.8	0.0	4.2	8.5	13.7	19.5	23.9	25.2	20.8	12.6	5.1	3.7
$\bar{X}$		2.6	2.0	6.0	10.7	17.7	22.2	25.1	26.2	23.1	14.7	11.0	4.3
Salinity (ppt) max.		5.5	8.0	8.0	3.5	4.0	10.0	12.6	11.8	10.0	10.8	15.0	4.0
min.		0.0	1.8	0.0	0.0	0.0	0.9	4.8	3.5	2.0	1.5	0.0	0.0
$\bar{X}$		1.0	4.2	1.7	0.7	4.0	3.7	7.1	5.9	4.3	5.2	5.3	0.9
Alewife	west	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	*	0.1	0.0
	east	*	0.0	0.5	0.3	*	0.0	*	0.0	0.0	0.1	0.1	0.0
	Total	*	0.0	0.3	0.3	*	0.0	*	0.0	0.0	0.1	0.1	0.0
Atlantic menhaden	west	0.0	0.0	0.0	0.1	0.1	1.6	8.1	23.6	6.7	5.9	7.6	0.0
	east	0.0	0.0	*	*	1.0	0.5	6.9	6.3	3.1	1.9	1.6	*
	Total	0.0	0.0	*	*	0.7	0.7	7.1	10.6	3.8	2.9	2.6	*
Bay anchovy	west	0.0	0.4	19.4	31.1	23.6	92.5	221.3	51.5	1.0	132.5	36.3	0.1
	east	0.0	0.1	9.0	35.0	34.8	53.1	353.4	113.8	74.1	41.0	35.5	0.2
	Total	0.0	0.2	13.4	33.9	31.2	62.1	327.8	98.2	59.4	64.1	35.6	0.1
Atlantic silverside	west	0.0	0.0	0.0	0.0	0.0	*	0.0	0.0	0.0	0.0	0.0	0.0
	east	*	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	*	*
	Total	*	*	0.0	0.0	0.0	*	0.0	0.0	0.0	0.0	*	*
White perch	west	28.7	21.3	19.5	15.0	9.9	2.4	0.5	0.1	0.1	6.5	19.8	10.3
	east	5.8	6.6	4.1	8.0	3.0	1.0	0.2	*	0.1	3.1	5.0	3.0
	Total	12.8	11.6	10.6	10.0	5.1	1.3	0.3	*	0.1	4.0	7.5	4.6
Striped bass	west	0.0	0.0	0.1	*	0.1	0.4	0.1	*	*	*	0.1	0.0
	east	0.0	0.0	*	0.1	0.2	0.1	*	0.0	0.0	0.1	*	0.0
	Total	0.0	0.0	0.1	0.1	0.2	0.2	*	*	*	0.1	*	0.0
Weakfish	west	0.0	0.0	0.0	0.0	0.0	0.1	8.2	6.9	8.9	2.6	0.0	0.0
	east	0.0	0.0	0.0	0.0	*	0.2	11.0	4.8	4.2	1.5	1.0	0.0
	Total	0.0	0.0	0.0	0.0	*	0.2	10.7	5.3	5.4	1.7	0.8	0.0
Spot	west	0.0	0.0	0.1	0.0	6.4	32.0	48.7	8.9	4.5	10.4	10.6	0.0
	east	0.0	0.0	0.1	0.0	5.1	10.0	11.5	3.2	5.7	5.5	6.0	0.0
	Total	0.0	0.0	0.1	0.0	5.5	15.0	18.9	4.6	5.4	6.7	6.8	0.0
Hogchoker	west	0.6	0.1	0.9	0.2	23.7	6.8	8.7	8.0	8.0	15.3	18.5	1.5
	east	0.6	0.1	0.9	3.3	8.3	4.0	5.9	2.1	3.8	6.1	2.5	0.4
	Total	0.6	0.1	0.9	2.9	13.2	4.6	6.4	3.6	4.7	8.4	5.2	0.9

¹10-minute haul

*0.0 < n/T ≤ 0.05

Table 8 . - Monthly mean catch per unit effort of fishes taken by 16-foot trawl¹ in zones east and west of the shipping channel and in all zones (total) near the Salem Nuclear Generating Station, New Jersey, 1975.

		Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Temp. (C) max.		7.5	6.2	7.9	13.2	29.0	26.5	29.0	30.0	24.5	20.0	15.8	8.8
min.		0.5	1.0	1.0	2.7	10.0	19.5	23.2	21.5	18.0	13.0	9.1	0.2
$\bar{X}$		4.0	4.1	3.7	7.8	18.2	22.9	25.6	26.3	20.7	17.1	12.6	6.0
Salinity (ppt) max.		3.0	0.0	5.5	12.0	7.0	10.0	14.0	14.0	12.0	5.0	5.0	6.0
min.		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0	0.0
$\bar{X}$		0.8	0.0	0.5	5.0	1.8	2.4	3.5	5.8	6.6	2.4	2.3	3.0
Alewife	west	0.0	0.0	2.0	0.2	0.0	0.0	0.1	0.0	0.0	0.7	0.8	1.1
	east	0.0	0.1	4.8	0.5	*	0.0	*	*	0.0	0.2	1.3	0.8
	Total	0.0	*	4.2	0.4	*	0.0	*	*	0.0	0.4	1.1	0.9
Atlantic menhaden	west	0.0	0.0	0.0	0.0	0.0	1.3	1.7	1.0	0.4	2.1	1.6	0.0
	east	0.0	0.0	0.0	*	0.0	0.8	0.3	0.5	0.1	1.6	0.6	0.1
	Total	0.0	0.0	0.0	*	0.0	0.9	0.6	0.6	0.2	1.8	1.0	*
Bay anchovy	west	0.0	0.2	0.0	27.2	37.3	68.4	68.9	77.2	33.6	43.2	23.4	1.6
	east	0.0	0.2	0.6	40.1	174.7	47.6	39.2	93.8	116.5	68.3	43.5	2.1
	Total	0.0	0.2	0.5	35.4	138.3	52.0	45.3	90.2	87.2	58.6	35.8	1.9
Atlantic silverside	west	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
	east	0.0	*	0.0	0.0	0.1	*	0.0	*	0.0	0.0	0.1	0.1
	Total	0.0	*	0.0	0.0	*	*	0.0	*	0.0	0.0	0.1	0.1
White perch	west	2.5	6.2	32.4	18.0	25.5	1.9	0.5	0.2	1.0	13.6	31.5	27.4
	east	0.6	1.9	4.6	7.5	8.0	1.1	0.9	0.1	0.1	3.9	26.4	24.3
	Total	1.3	2.9	11.2	11.3	12.6	1.2	0.8	0.1	0.4	7.6	28.3	25.3
Striped bass	west	0.0	0.0	0.1	0.1	0.2	0.0	0.1	0.0	0.0	0.3	0.1	0.1
	east	0.0	0.0	*	*	*	0.2	0.0	0.0	0.0	*	0.1	0.0
	Total	0.0	0.0	*	*	0.1	*	*	0.0	0.0	0.1	0.1	*
Weakfish	west	0.0	0.0	0.0	0.0	0.0	7.8	33.9	18.9	8.9	2.7	0.1	0.0
	east	0.0	0.0	0.0	0.1	0.1	46.6	26.7	12.8	9.5	1.9	0.1	0.0
	Total	0.0	0.0	0.0	*	*	38.4	27.8	14.2	9.3	2.2	0.1	0.0
Spot	west	0.0	0.0	0.0	0.0	0.0	12.8	11.9	8.3	3.7	18.7	14.2	1.5
	east	0.0	0.0	0.0	*	0.1	18.5	6.5	7.1	4.9	19.8	26.8	2.7
	Total	0.0	0.0	0.0	*	0.1	17.3	7.6	7.4	4.5	19.4	22.0	2.3
Hogchoker	west	0.1	0.1	1.3	3.9	16.1	7.3	16.4	9.3	33.5	31.0	19.8	10.1
	east	0.1	0.1	0.3	1.1	8.0	9.9	6.6	2.2	6.4	11.9	5.3	0.6
	Total	0.1	0.1	0.5	2.1	10.3	9.3	8.6	3.8	16.0	19.2	10.8	3.7

¹10-minute haul

*0.0 < n/T ≤ 0.05

Table 9 . - Monthly mean catch per unit effort of fishes taken by 16-foot trawl¹ in zones east and west of the shipping channel and in all zones (total) near the Salem Nuclear Generating Station, New Jersey, 1976.

		Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Temp. (C) max.		4.0	8.0	11.0	18.3	19.4	27.8	27.2	27.0	23.9	18.3	10.1	4.9
min.		0.1	0.0	4.4	7.8	14.1	18.1	22.8	22.6	18.8	14.0	5.1	0.7
$\bar{X}$		1.4	3.9	7.7	12.6	17.3	22.2	25.5	25.0	21.9	16.2	8.0	2.8
Salinity (ppt) max.		9.0	8.0	7.0	12.0	8.0	12.0	14.0	15.0	15.0	17.0	14.0	9.0
min.		0.0	0.0	0.0	0.0	0.0	0.0	1.0	1.0	0.0	0.0	0.0	1.0
$\bar{X}$		2.5	1.9	1.4	3.5	3.0	4.0	5.9	5.6	7.1	4.7	4.5	4.4
Alewife	west	0.0	0.0	0.3	0.3	0.0	0.0	0.0	0.0	0.0	0.6	2.6	0.0
	east	0.0	0.0	0.1	0.5	0.1	0.0	*	*	0.0	0.7	1.2	0.0
	Total	0.0	0.0	0.3	0.5	*	0.0	*	*	0.0	0.6	1.6	0.0
Atlantic menhaden	west	0.0	0.0	0.0	0.1	0.1	5.1	5.3	4.6	1.1	4.6	0.3	0.0
	east	0.0	0.0	0.1	0.2	*	0.6	2.0	1.4	0.6	1.6	4.0	0.0
	Total	0.0	0.0	*	0.2	0.1	1.9	3.1	2.4	0.7	2.6	2.9	0.0
Bay anchovy	west	0.0	0.0	16.2	254.3	41.1	71.9	49.7	128.7	280.0	101.2	0.8	0.0
	east	0.1	0.0	62.2	298.5	34.0	62.3	89.8	61.2	123.6	61.7	3.1	0.0
	Total	*	0.0	48.2	285.1	36.5	65.0	76.9	82.2	168.4	74.2	2.5	0.0
Atlantic silverside	west	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	east	0.0	0.0	0.0	*	0.0	*	0.0	0.0	0.0	*	*	0.0
	Total	0.0	0.0	0.0	*	0.0	*	0.0	0.0	0.0	*	*	0.0
White perch	west	7.8	27.7	39.0	12.3	7.1	12.7	0.2	0.1	*	4.1	30.3	6.1
	east	3.7	4.8	12.5	7.0	4.0	5.8	0.1	0.1	*	2.5	7.8	2.0
	Total	0.5	12.9	20.5	8.6	5.1	7.7	0.1	0.1	*	3.0	14.3	3.3
Striped bass	west	0.0	0.1	0.0	0.0	0.0	0.0	*	0.0	0.0	*	0.0	0.1
	east	0.0	0.0	0.0	*	0.0	*	*	0.0	0.0	0.1	0.0	0.0
	Total	0.0	*	0.0	*	0.0	*	*	0.0	0.0	*	0.0	*
Weakfish	west	0.0	0.0	0.0	0.0	*	0.0	15.7	12.1	5.0	1.6	0.0	0.0
	east	0.0	0.0	0.0	*	*	0.0	11.3	8.5	2.0	0.8	*	0.0
	Total	0.0	0.0	0.0	*	*	0.0	12.7	9.6	2.9	1.0	*	0.0
Spot	west	0.0	0.0	0.0	0.8	26.8	72.3	38.4	3.0	2.8	10.1	10.9	0.0
	east	0.0	0.0	0.0	0.3	29.8	146.4	55.9	5.7	2.6	5.8	5.9	0.0
	Total	0.0	0.0	0.0	0.5	28.7	125.5	50.3	4.9	2.6	7.4	7.1	0.0
Hogchoker	west	1.6	0.0	3.2	22.8	36.8	8.5	10.7	8.8	6.6	3.9	5.7	0.3
	east	0.1	0.0	1.2	3.1	9.8	5.6	3.4	4.2	2.6	3.2	1.4	0.1
	Total	0.5	0.0	1.8	9.1	19.4	6.4	5.7	5.6	3.7	3.4	2.6	0.2

¹10-minute haul

*0.0 < n/T ≤ 0.05

Table 10. A. PSEUDOHARENGUS SEASONAL MEAN CATCH PER UNIT EFFORT (M/T)-1975.

LOCATION	SEASON	OBS	MEAN	MIN	MAX	CATCH/UNIT EFFORT	MEAN	MIN	MAX	TEMPERATURE (C)	MIN	MAX	MEAN	MIN	MAX	SALINITY (PPT)	MIN	MAX
CHAI	SPRING	3	0.00000	0	0	13.0500	3.0	22.8	5.86667	1.0	12.0	9.0	5.20000	2.0	9.0	1.5	1.0	12.0
CHAI	SUMMER	5	0.00000	0	0	24.7500	22.0	26.1	22.8	2.0	9.0	9.0	4.00000	0.0	9.0	1.5	1.0	12.0
CHAI	FALL	2	0.00000	0	0	15.3250	10.3	20.0	20.0	0.0	9.0	9.0	5.75000	5.5	6.0	1.5	1.0	12.0
CHAI	WINTER	1	0.00000	0	0	6.0000	6.0	6.0	5.75000	5.5	6.0	6.0	5.05495	0.0	10.0	1.5	1.0	12.0
CHAI	SUMMER	5	0.00000	0	0	12.3000	3.0	22.8	22.8	0.0	10.0	10.0	2.04968	0.0	5.0	1.5	1.0	12.0
CHAI	FALL	8	0.37500	0	0	14.8062	10.0	19.0	2.50000	0.5	5.0	5.0	0.83333	0.0	4.0	1.5	1.0	12.0
CHAI	SUMMER	13	0.00000	0	0	25.6577	20.1	28.2	2.04968	0.0	5.0	5.0	0.00000	0.0	4.0	1.5	1.0	12.0
CHAI	WINTER	1	0.00000	0	0	14.2333	11.2	16.5	2.25000	1.0	3.0	3.0	0.00000	0.0	4.0	1.5	1.0	12.0
CHAI	SPRING	3	0.00000	0	0	12.1833	4.0	23.0	1.83333	0.0	6.0	6.0	0.00000	0.0	4.0	1.5	1.0	12.0
CHAI	FALL	3	0.33333	0	0	14.2333	11.2	16.5	2.25000	1.0	3.0	3.0	0.00000	0.0	4.0	1.5	1.0	12.0
CHAI	SUMMER	4	0.00000	0	0	25.3250	24.2	26.2	2.00000	0.0	6.0	6.0	0.00000	0.0	4.0	1.5	1.0	12.0
CHAI	WINTER	1	0.00000	0	0	7.6500	7.4	7.9	4.00000	4.0	4.0	4.0	0.00000	0.0	4.0	1.5	1.0	12.0
CHAI	SPRING	3	0.00000	0	0	13.6667	4.0	22.8	2.00000	0.0	6.0	6.0	0.00000	0.0	4.0	1.5	1.0	12.0
CHAI	SUMMER	4	0.00000	0	0	25.3250	24.2	26.2	2.00000	0.0	6.0	6.0	0.00000	0.0	4.0	1.5	1.0	12.0
CHAI	FALL	1	0.00000	0	0	14.5000	9.5	20.0	3.75000	1.0	10.0	10.0	0.00000	0.0	4.0	1.5	1.0	12.0
CHAI	WINTER	7	0.00000	0	0	14.5000	9.5	20.0	3.75000	1.0	10.0	10.0	0.00000	0.0	4.0	1.5	1.0	12.0
CHAI	SPRING	14	0.00000	0	0	24.5429	21.0	26.9	5.05495	0.0	10.0	10.0	0.00000	0.0	4.0	1.5	1.0	12.0
CHAI	FALL	7	0.00000	0	0	14.5000	9.5	20.0	3.75000	1.0	10.0	10.0	0.00000	0.0	4.0	1.5	1.0	12.0
CHAI	SUMMER	3	0.00000	0	0	12.6500	5.0	23.0	0.83333	0.0	3.0	3.0	0.83333	0.0	3.0	3.0	3.0	3.0
CHAI	WINTER	5	0.00000	0	0	25.2350	21.8	27.0	1.23750	0.0	3.0	3.0	0.00000	0.0	3.0	3.0	3.0	3.0
CHAI	SPRING	2	0.00000	0	0	17.4750	15.9	19.0	0.00000	0.0	3.0	3.0	0.00000	0.0	3.0	3.0	3.0	3.0
CHAI	FALL	4	0.00000	0	0	4.0625	1.8	6.0	0.65633	0.0	3.0	3.0	0.65633	0.0	3.0	3.0	3.0	3.0
CHAI	SUMMER	8	5.62500	0	0	11.7562	1.0	23.5	3.65625	0.0	3.0	3.0	3.65625	0.0	3.0	3.0	3.0	3.0
CHAI	WINTER	11	0.00000	0	0	25.9192	23.0	30.0	4.68687	0.0	3.0	3.0	4.68687	0.0	3.0	3.0	3.0	3.0
CHAI	SPRING	5	0.00000	0	0	15.5900	11.3	19.0	4.40000	2.0	3.0	3.0	4.40000	2.0	3.0	3.0	3.0	3.0
CHAI	FALL	5	0.00000	0	0	15.5900	11.3	19.0	4.40000	2.0	3.0	3.0	4.40000	2.0	3.0	3.0	3.0	3.0
CHAI	SUMMER	4	0.00000	0	0	4.7300	1.8	7.7	2.45000	0.0	3.0	3.0	2.45000	0.0	3.0	3.0	3.0	3.0
CHAI	WINTER	5	0.00000	0	0	11.8312	1.3	23.5	2.65625	0.0	3.0	3.0	2.65625	0.0	3.0	3.0	3.0	3.0
CHAI	SPRING	8	1.87500	0	0	4.7300	1.8	7.7	2.45000	0.0	3.0	3.0	2.45000	0.0	3.0	3.0	3.0	3.0
CHAI	FALL	8	0.87500	0	0	11.8312	1.3	23.5	2.65625	0.0	3.0	3.0	2.65625	0.0	3.0	3.0	3.0	3.0
CHAI	SUMMER	22	0.04545	0	0	25.6500	20.9	29.0	4.21591	0.0	3.0	3.0	4.21591	0.0	3.0	3.0	3.0	3.0
CHAI	WINTER	16	7.81250	0	0	16.1544	9.3	19.6	3.14231	0.0	3.0	3.0	3.14231	0.0	3.0	3.0	3.0	3.0
CHAI	SPRING	5	0.80000	0	0	4.7300	1.8	7.7	2.45000	0.0	3.0	3.0	2.45000	0.0	3.0	3.0	3.0	3.0
CHAI	FALL	7	0.57143	0	0	11.1929	2.0	22.8	2.67857	0.0	3.0	3.0	2.67857	0.0	3.0	3.0	3.0	3.0
CHAI	SUMMER	6	0.00000	0	0	24.9583	23.0	26.4	2.41667	0.0	3.0	3.0	2.41667	0.0	3.0	3.0	3.0	3.0
CHAI	WINTER	4	0.00000	0	0	3.3292	2.0	5.1	0.66667	0.0	3.0	3.0	0.66667	0.0	3.0	3.0	3.0	3.0
CHAI	SPRING	13	0.00000	0	0	10.9357	2.0	22.8	1.96429	0.0	3.0	3.0	1.96429	0.0	3.0	3.0	3.0	3.0
CHAI	FALL	4	0.00000	0	0	15.6125	11.4	19.6	3.18750	1.0	3.0	3.0	3.18750	1.0	3.0	3.0	3.0	3.0
CHAI	SUMMER	6	0.00000	0	0	24.9583	23.0	26.4	2.41667	0.0	3.0	3.0	2.41667	0.0	3.0	3.0	3.0	3.0
CHAI	WINTER	4	0.00000	0	0	3.3292	2.0	5.1	0.66667	0.0	3.0	3.0	0.66667	0.0	3.0	3.0	3.0	3.0
CHAI	SPRING	7	2.57143	0	0	11.1929	2.0	22.8	2.67857	0.0	3.0	3.0	2.67857	0.0	3.0	3.0	3.0	3.0
CHAI	FALL	4	0.50000	0	0	3.3292	2.0	5.1	0.66667	0.0	3.0	3.0	0.66667	0.0	3.0	3.0	3.0	3.0
CHAI	SUMMER	4	0.00000	0	0	10.9357	2.0	22.8	1.96429	0.0	3.0	3.0	1.96429	0.0	3.0	3.0	3.0	3.0
CHAI	WINTER	4	0.00000	0	0	14.5000	9.5	20.0	3.75000	1.0	10.0	10.0	0.00000	0.0	4.0	1.5	1.0	12.0
CHAI	SPRING	4	0.00000	0	0	12.3000	3.0	22.8	2.00000	0.0	6.0	6.0	0.00000	0.0	4.0	1.5	1.0	12.0
CHAI	FALL	9	0.00000	0	0	14.5000	9.5	20.0	3.75000	1.0	10.0	10.0	0.00000	0.0	4.0	1.5	1.0	12.0
CHAI	SUMMER	4	0.00000	0	0	12.6500	5.0	23.0	0.83333	0.0	3.0	3.0	0.83333	0.0	3.0	3.0	3.0	3.0
CHAI	WINTER	4	0.00000	0	0	3.3000	1.8	7.7	2.37500	0.0	3.0	3.0	2.37500	0.0	3.0	3.0	3.0	3.0
CHAI	SPRING	7	0.00000	0	0	11.8312	1.3	23.5	2.65625	0.0	3.0	3.0	2.65625	0.0	3.0	3.0	3.0	3.0
CHAI	FALL	14	1.85714	0	0	25.2786	19.1	28.0	2.16071	0.0	3.0	3.0	2.16071	0.0	3.0	3.0	3.0	3.0
CHAI	SUMMER	14	0.00000	0	0	25.2786	19.1	28.0	2.16071	0.0	3.0	3.0	2.16071	0.0	3.0	3.0	3.0	3.0
CHAI	WINTER	9	0.00000	0	0	14.5000	9.5	20.0	3.75000	1.0	10.0	10.0	0.00000	0.0	4.0	1.5	1.0	12.0
CHAI	SPRING	4	0.00000	0	0	12.3000	3.0	22.8	2.00000	0.0	6.0	6.0	0.00000	0.0	4.0	1.5	1.0	12.0
CHAI	FALL	9	0.00000	0	0	14.5000	9.5	20.0	3.75000	1.0	10.0	10.0	0.00000	0.0	4.0	1.5	1.0	12.0
CHAI	SUMMER	5	0.00000	0	0	12.6500	5.0	23.0	0.83333	0.0	3.0	3.0	0.83333	0.0	3.0	3.0	3.0	3.0
CHAI	WINTER	4	0.00000	0	0	3.3000	1.8	7.7	2.37500	0.0	3.0	3.0	2.37500	0.0	3.0	3.0	3.0	3.0
CHAI	SPRING	4	0.00000	0	0	11.8312	1.3	23.5	2.65625	0.0	3.0	3.0	2.65625	0.0	3.0	3.0	3.0	3.0
CHAI	FALL	14	1.85714	0	0	25.2786	19.1	28.0	2.16071	0.0	3.0	3.0	2.16071	0.0	3.0	3.0	3.0	3.0
CHAI	SUMMER	14	0.00000	0	0	25.2786	19.1	28.0	2.16071	0.0	3.0	3.0	2.16071	0.0	3.0	3.0	3.0	3.0
CHAI	WINTER	9	0.00000	0	0	14.5000	9.5	20.0	3.75000	1.0	10.0	10.0	0.00000	0.0	4.0	1.5	1.0	12.0
CHAI	SPRING	4	0.00000	0	0	12.3000	3.0	22.8	2.00000	0.0	6.0	6.0	0.00000	0.0	4.0	1.5	1.0	12.0
CHAI	FALL	9	0.00000	0	0	14.5000	9.5	20.0	3.75000	1.0	10.0	10.0	0.00000	0.0	4.0	1.5	1.0	12.0
CHAI	SUMMER	5	0.00000	0	0	12.6500	5.0	23.0	0.83333	0.0	3.0	3.0	0.83333	0.0	3.0	3.0	3.0	3.0
CHAI	WINTER	4	0.00000	0	0	3.3000	1.8	7.7	2.37500	0.0	3.0	3.0	2.37500	0.0	3.0	3.0	3.0	3.0
CHAI	SPRING	4	0.00000	0	0	11.8312	1.3	23.5	2.65625	0.0	3.0	3.0	2.65625	0.0	3.0	3.0	3.0	3.0
CHAI	FALL	14	1.85714	0	0	25.2786	19.1	28.0	2.16071	0.0	3.0	3.0	2.16071	0.0	3.0	3.0	3.0	3.0
CHAI	SUMMER	14	0.00000	0	0	25.2786	19.1	28.0	2.16071	0.0	3.0	3.0	2.16071	0.0	3.0	3.0	3.0	3.0
CHAI	WINTER	9	0.00000	0	0	14.5000	9.5	20.0	3.75000	1.0	10.0	10.0	0.00000	0.0	4.0	1.5	1.0	12.0
CHAI	SPRING	4	0.00000	0	0	12.3000	3.0	22.8	2.00000	0.0	6.0	6.0	0.00000	0.0	4.0	1.5	1.0	12.0
CHAI	FALL	9	0.00000	0	0	14.5000	9.5	20.0	3.75000	1.0	10.0	10.0	0.00000	0.0	4.0	1.5	1.0	12.0
CHAI	SUMMER	5	0.00000	0	0	12.6500	5.0	23.0	0.83333	0.0	3.0	3.0	0.83333	0.0	3.0	3.0	3.0	3.0
CHAI	WINTER	4	0.00000	0	0	3.3000	1.8	7.7	2.37500	0.0	3.0	3.0	2.37500	0.0	3.0	3.0	3.0	3.0
CHAI	SPRING	4	0.00000	0	0	11.8312	1.3	23.5	2.65625									

Table 10 . - Continued.

A. PSEUDOHARENGUS SEASONAL MEAN CATCH PER UNIT EFFORT (N/T)-1975.

LOCATION	SEASON	OBS	CATCH/UNIT EFFORT			TEMPERATURE (C)			SALINITY (PPT)		
			MEAN	MIN	MAX	MEAN	MIN	MAX	MEAN	MIN	MAX
E-52	WINTER	4	0.00000	0	0	3.3000	1.0	5.3	0.00000	0.0	0.0
E-52	SPRING	5	1.80000	0	6	12.1000	2.0	21.6	0.65000	0.0	3.5
E-52	SUMMER	7	0.00000	0	0	25.7214	23.5	28.9	1.29167	0.0	4.0
E-52	FALL	1	0.00000	0	0	16.2500	16.0	16.5	1.25000	1.0	1.5
E-61	WINTER	4	0.00000	0	0	3.3000	1.0	5.3	0.00000	0.0	0.0
E-61	SPRING	5	3.20000	0	11	12.1100	2.0	21.6	0.65000	0.0	3.5
E-61	SUMMER	7	0.00000	0	0	25.4821	21.8	28.9	1.07738	0.0	4.0
E-61	FALL	2	0.00000	0	0	17.3750	15.5	19.0	0.00000	0.0	0.0
E-62	WINTER	4	0.00000	0	0	3.3000	1.0	5.3	0.00000	0.0	0.0
E-62	SPRING	5	3.00000	0	11	12.1100	2.0	21.6	0.65000	0.0	3.5
E-62	SUMMER	7	0.00000	0	0	25.4821	21.8	28.9	1.07738	0.0	4.0
E-62	FALL	2	0.00000	0	0	17.3750	15.5	19.0	0.00000	0.0	0.0
NE11	SPRING	3	5.00000	0	15	18.3667	9.9	24.3	1.08333	0.0	3.5
NE11	SUMMER	6	0.33333	0	2	25.5667	22.8	27.5	0.75000	0.0	3.0
NE12	SPRING	3	0.66667	0	2	18.3667	9.9	24.3	1.08333	0.0	3.5
NE12	SUMMER	6	0.33333	0	2	25.5667	22.8	27.5	0.75000	0.0	3.0
NE12	FALL	1	0.00000	0	0	16.8500	16.7	17.0	0.50000	0.0	1.0
NW11	WINTER	2	0.00000	0	0	5.9500	5.3	7.5	0.00000	0.0	0.0
NW11	SPRING	7	0.71429	0	3	12.9786	3.0	23.0	1.07143	0.0	4.5
NW11	SUMMER	5	0.00000	0	0	25.3625	23.0	26.8	1.76250	0.0	3.5
NW11	FALL	2	0.50000	0	1	18.3500	16.5	20.0	0.00000	0.0	0.0
NW12	WINTER	2	0.00000	0	0	5.9500	5.3	7.5	0.00000	0.0	0.0
NW12	SPRING	5	0.40000	0	2	13.4600	3.0	23.0	1.20000	0.0	4.5
NW12	SUMMER	4	0.00000	0	0	24.9958	23.0	26.5	1.39583	0.0	3.5
NW12	FALL	2	1.00000	0	2	18.3500	16.5	20.0	0.25000	0.0	1.0
RI11	SPRING	2	0.00000	0	0	18.1750	13.8	23.0	2.25000	1.5	3.0
RI11	SUMMER	3	0.00000	0	0	26.4167	24.5	28.5	3.08333	0.0	6.5
RI12	SPRING	2	1.00000	0	2	18.1750	13.8	23.0	2.25000	1.5	3.0
RI12	SUMMER	3	0.00000	0	0	26.4167	24.5	28.5	3.08333	0.0	6.5
RI21	SPRING	1	0.00000	0	0	22.5000	22.0	23.0	2.75000	2.5	3.0
RI21	SUMMER	3	0.00000	0	0	26.0333	24.5	27.0	2.16667	0.0	3.5
RI22	SPRING	1	0.00000	0	0	22.5000	22.0	23.0	2.75000	2.5	3.0
RI22	SUMMER	3	0.00000	0	0	26.0333	24.5	27.0	2.16667	0.0	3.5
SE01	SPRING	5	0.20000	0	1	16.9400	9.4	21.8	8.70000	6.5	12.0
SE01	SUMMER	8	0.00000	0	0	25.5875	23.8	29.5	8.65625	0.0	14.0
SE02	SPRING	5	0.00000	0	0	17.5400	9.4	21.8	8.78000	6.5	12.0
SE02	SUMMER	9	0.00000	0	0	25.5222	23.8	29.5	8.69444	0.0	14.0
SE11	SPRING	5	0.00000	0	0	16.5500	9.4	21.0	6.80000	3.5	12.0
SE11	SUMMER	11	0.00000	0	0	25.3636	22.3	28.0	8.00273	0.0	14.0
SE11	FALL	3	0.00000	0	0	16.3500	10.0	20.5	6.25000	3.5	11.0
SE12	SPRING	5	0.20000	0	1	16.5500	9.5	21.0	6.60000	3.5	10.0
SE12	SUMMER	11	0.00000	0	0	25.3636	22.3	28.0	8.00273	0.0	14.0
SE12	FALL	3	0.00000	0	0	16.3500	10.0	20.5	6.25000	3.5	11.0
SE21	SPRING	5	0.00000	0	0	16.4600	9.9	21.0	5.10000	3.0	8.0
SE21	SUMMER	9	0.00000	0	0	25.2889	23.5	27.5	5.39236	0.0	10.5
SE21	FALL	2	0.00000	0	0	20.1250	20.0	20.5	6.87500	3.5	9.0
SE22	SPRING	5	0.20000	0	1	16.4600	9.9	21.0	5.10000	3.0	8.0
SE22	SUMMER	9	0.00000	0	0	25.2889	23.5	27.5	5.39236	0.0	10.5
SE22	FALL	2	0.00000	0	0	20.1250	20.0	20.5	6.87500	3.5	9.0
SE31	WINTER	3	0.00000	0	0	5.5333	4.2	6.0	2.16667	0.0	5.5
SE31	SPRING	8	0.62500	0	2	11.2071	1.0	23.0	4.50000	0.0	11.0
SE31	SUMMER	19	0.00000	0	0	24.6030	20.1	28.1	5.30186	0.0	10.5
SE31	FALL	10	0.00000	0	0	15.4200	8.9	20.0	4.50000	1.0	9.0
SE32	WINTER	3	0.00000	0	0	5.5333	4.2	6.0	2.16667	0.0	5.5

Table 10. - Continued.

A. PSEUDOHARENGUS SEASONAL MEAN CATCH PER UNIT EFFORT (N/T)-1975.

LOCATION	SEASON	OBS	CATCH/UNIT EFFORT			TEMPERATURE (C)			SALINITY (PPT)		
			MEAN	MIN	MAX	MEAN	MIN	MAX	MEAN	MIN	MAX
SE32	SPRING	8	1.62500	0	12	11.2071	1.0	23.0	4.50000	0.0	11.0
SE32	SUMMER	18	0.00000	0	0	24.7172	20.1	28.1	5.57663	2.0	10.5
SE32	FALL	9	0.00000	0	0	15.9444	11.0	20.0	4.75000	1.0	9.0
SSC1	WINTER	8	0.00000	0	0	4.9271	0.2	12.0	3.72857	0.0	6.0
SSC1	SPRING	11	0.36364	0	2	12.7295	1.3	21.9	2.02597	0.0	9.0
SSC1	SUMMER	25	0.00000	0	0	25.2775	20.3	29.8	5.67708	0.0	9.0
SSC1	FALL	20	0.20000	0	2	16.2408	9.8	20.0	4.04500	1.0	9.0
SSC2	WINTER	8	0.00000	0	0	5.0521	0.2	12.0	3.72857	0.0	6.0
SSC2	SPRING	11	5.09091	0	46	12.7295	1.3	21.9	2.02597	0.0	9.0
SSC2	SUMMER	24	0.08333	0	2	25.1286	20.3	29.8	5.65465	0.0	9.0
SSC2	FALL	21	3.04762	0	42	16.2918	9.8	20.0	3.91465	1.0	9.0
SW11	SUMMER	4	0.00000	0	0	24.7292	22.0	27.8	6.37500	2.0	9.0
SW11	FALL	3	0.00000	0	0	17.8167	10.6	23.8	3.58333	0.0	8.0
SW12	SUMMER	1	0.00000	0	0	22.2500	22.0	22.5	9.00000	9.0	9.0
SW12	FALL	2	0.00000	0	0	15.2750	10.6	20.0	1.50000	0.0	3.0
SW21	WINTER	3	0.00000	0	0	5.5000	5.0	6.0	1.75000	0.0	5.0
SW21	SPRING	6	0.33333	0	1	11.5917	3.2	21.0	1.87500	0.0	7.0
SW21	SUMMER	16	0.00000	0	0	25.2175	21.0	29.5	4.67292	0.0	10.0
SW21	FALL	10	0.40000	0	4	14.0854	8.7	18.5	3.56250	0.0	10.0
SW22	WINTER	3	0.00000	0	0	5.5000	5.0	6.0	2.08333	0.0	6.0
SW22	SPRING	6	0.50000	0	2	11.3500	3.2	21.0	2.20833	0.0	7.0
SW22	SUMMER	15	0.00000	0	0	25.0933	21.0	29.5	4.75714	0.0	9.5
SW22	FALL	9	0.22222	0	2	14.7875	8.7	20.0	3.06250	0.0	10.0
W-11	WINTER	4	0.00000	0	0	6.2125	4.0	8.2	1.12500	0.0	3.0
W-11	SPRING	6	0.00000	0	0	11.4667	3.2	21.0	2.83333	0.0	7.0
W-11	SUMMER	18	0.00000	0	0	25.1004	19.9	28.5	2.73646	0.0	8.0
W-11	FALL	16	0.87500	0	12	16.3027	9.1	20.0	1.92009	0.0	6.0
W-12	WINTER	4	0.25000	0	1	6.2125	4.0	8.2	1.12500	0.0	3.0
W-12	SPRING	6	2.00000	0	10	13.5750	3.2	21.0	2.37500	0.0	7.0
W-12	SUMMER	20	0.00000	0	0	25.1113	19.9	28.5	3.07353	0.0	8.0
W-12	FALL	17	0.05882	0	1	15.4251	9.1	20.0	1.81078	0.0	6.0
W-21	WINTER	2	0.00000	0	0	5.4500	4.0	6.2	0.00000	0.0	0.0
W-21	SPRING	6	1.33333	0	7	12.2167	2.6	21.0	1.62500	0.0	4.5
W-21	SUMMER	3	0.00000	0	0	25.5167	24.7	26.9	1.50000	0.0	4.0
W-21	FALL	3	0.33333	0	1	13.9583	11.0	16.5	1.41667	0.0	2.0
W-22	WINTER	2	0.00000	0	0	5.4500	4.0	6.2	0.00000	0.0	0.0
W-22	SPRING	6	0.66667	0	2	12.2167	2.6	21.0	1.62500	0.0	4.5
W-22	SUMMER	3	0.00000	0	0	25.5167	24.7	26.9	1.50000	0.0	4.0
W-22	FALL	3	3.66667	0	11	13.9583	11.0	16.5	1.41667	0.0	2.0
W-31	WINTER	4	0.25000	0	1	6.6500	5.3	8.8	0.29167	0.0	1.0
W-31	SPRING	5	1.60000	0	6	11.3700	2.8	21.0	1.70000	0.0	4.5
W-31	SUMMER	15	0.00000	0	0	25.8567	20.9	29.0	2.31333	0.0	8.0
W-31	FALL	7	1.14286	0	7	15.2286	10.0	18.9	1.87500	0.5	4.0
W-32	WINTER	4	0.25000	0	1	6.6500	5.3	8.8	0.29167	0.0	1.0
W-32	SPRING	5	0.80000	0	1	11.3700	2.8	21.0	1.70000	0.0	4.5
W-32	SUMMER	13	0.00000	0	0	25.8500	20.9	29.0	1.86538	0.0	5.0
W-32	FALL	7	1.85714	0	11	15.2286	10.0	18.9	1.89286	0.5	4.0

Table 11. -A. PSEUDOHARENGUS SEASONAL MEAN CATCH PER UNIT EFFORT (N/T)-1976.

LOCATION	SEASON	OBS	CATCH/UNIT EFFORT			TEMPERATURE (C)			SALINITY (PPT)		
			MEAN	MIN	MAX	MEAN	MIN	MAX	MEAN	MIN	MAX
CHA1	WINTER	1	0.00000	0	0	1.7300	1.5	2.0	9.0000	8	10
CHA1	SPRING	6	0.00000	0	0	15.2800	10.1	19.9	6.0167	1	8
CHA1	SUMMER	8	0.00000	0	0	24.6812	23.5	26.0	11.0625	6	15
CHA1	FALL	6	1.00000	0	5	12.0750	6.0	20.9	10.4167	4	16
CHA2	WINTER	5	0.00000	0	0	2.9500	1.7	6.5	3.6500	0	8
CHA2	SPRING	6	0.16667	0	1	12.6000	7.0	17.4	3.9167	0	10
CHA2	SUMMER	14	0.00000	0	0	25.1071	22.8	28.0	8.2679	4	13
CHA2	FALL	8	0.25000	0	1	15.2437	5.0	20.8	8.3750	3	14
CHA3	WINTER	3	0.00000	0	0	3.8500	2.0	5.3	1.0000	0	2
CHA3	SPRING	6	0.00000	0	0	14.6083	6.6	21.2	3.3333	1	6
CHA3	SUMMER	7	0.00000	0	0	25.2000	24.0	26.5	5.5357	2	10
CHA3	FALL	6	0.16667	0	1	14.4583	7.0	20.1	4.0833	0	9
CHA4	WINTER	3	0.00000	0	0	3.8000	1.0	6.3	0.6667	0	2
CHA4	SPRING	7	0.57143	0	3	13.3274	6.5	21.3	2.0714	0	8
CHA4	SUMMER	12	0.00000	0	0	24.5708	23.2	26.0	4.5000	1	7
CHA4	FALL	10	0.30000	0	2	15.1650	6.5	21.2	4.3500	0	10
CHA5	WINTER	2	0.00000	0	0	2.5000	2.0	3.0	2.5000	2	3
CHA5	SPRING	5	0.00000	0	0	12.9367	7.5	20.0	1.2667	0	3
CHA5	SUMMER	10	0.00000	0	0	24.7672	23.0	26.5	3.2111	1	5
CHA5	FALL	7	0.28571	0	2	13.8500	6.1	22.5	2.4286	0	8
E-11	WINTER	4	0.00000	0	0	2.1958	1.5	5.1	4.0833	0	8
E-11	SPRING	7	0.14286	0	1	13.7833	7.0	20.1	4.6667	2	8
E-11	SUMMER	9	0.00000	0	0	24.6556	22.9	26.9	7.0556	5	9
E-11	FALL	6	0.16667	0	1	13.4000	5.0	22.2	6.9167	3	11
E-12	WINTER	4	0.25000	0	1	2.1958	1.5	5.1	4.0833	0	8
E-12	SPRING	7	0.57143	0	4	13.7833	7.0	20.1	4.0000	0	8
E-12	SUMMER	9	0.00000	0	0	24.6778	22.9	26.9	7.0556	5	9
E-12	FALL	6	0.66667	0	4	13.4417	5.0	22.2	6.9167	3	11
E-21	WINTER	5	0.00000	0	0	2.8200	1.0	4.8	4.1000	0	9
E-21	SPRING	10	4.50000	0	37	12.5911	7.1	22.8	2.8144	0	8
E-21	SUMMER	21	0.00000	0	0	24.6738	22.5	28.8	6.8333	2	10
E-21	FALL	15	0.13333	0	1	16.6200	6.0	24.1	6.8000	0	12
E-22	WINTER	5	0.00000	0	0	2.8200	1.0	4.8	4.1000	0	9
E-22	SPRING	9	2.11111	0	15	13.2354	7.5	22.8	3.1250	0	8
E-22	SUMMER	21	0.00000	0	0	24.6738	22.5	28.8	6.8333	2	10
E-22	FALL	14	0.28571	0	3	17.1000	6.0	24.1	7.2500	0	12
E-31	WINTER	2	0.00000	0	0	2.7000	1.8	3.0	1.5000	1	2
E-31	SPRING	7	1.00000	0	7	13.0167	6.5	22.0	3.6429	0	8
E-31	SUMMER	9	0.00000	0	0	25.0556	22.5	27.5	4.4722	2	7
E-31	FALL	6	1.00000	0	6	12.2083	5.0	19.5	4.1667	0	9
E-32	WINTER	2	0.00000	0	0	2.7000	1.8	3.0	1.5000	1	2
E-32	SPRING	7	0.42857	0	2	13.0167	6.5	22.0	3.3571	0	6
E-32	SUMMER	9	0.00000	0	0	25.0556	22.5	27.5	4.4722	2	7
E-32	FALL	6	1.33333	0	7	12.2083	5.0	19.5	4.1667	0	9
E-41	WINTER	5	0.00000	0	0	3.7800	0.5	7.9	1.7000	0	6
E-41	SPRING	8	0.00000	0	0	13.2786	6.5	21.5	2.5476	0	8
E-41	SUMMER	12	0.00000	0	0	24.5083	23.2	26.0	4.5000	1	7
E-41	FALL	11	0.27273	0	1	15.6000	6.1	21.5	4.8182	0	9
E-42	WINTER	5	0.00000	0	0	3.7800	0.5	7.9	1.7000	0	6
E-42	SPRING	7	0.14286	0	1	13.2786	6.5	21.5	2.9762	1	8
E-42	SUMMER	12	0.00000	0	0	24.4330	23.2	26.0	4.5000	1	7
E-42	FALL	11	1.09091	0	7	15.6000	6.1	21.5	4.8182	0	9
E-51	WINTER	2	0.00000	0	0	3.2750	3.0	3.8	2.0000	2	2
E-51	SPRING	5	0.20000	0	1	14.4125	7.5	22.0	2.3000	0	5

Table 11 . - Continued.

A. PSEUDOHARENGUS SEASONAL MEAN CATCH PER UNIT EFFORT (N/T)-1976.

LOCATION	SEASON	OBS	CATCH/UNIT EFFORT			TEMPERATURE (C)			SALINITY (PPT)		
			MEAN	MIN	MAX	MEAN	MIN	MAX	MEAN	MIN	MAX
E-51	SUMMER	7	0.0000	0	0	24.8214	23.0	26.8	3.50000	2	5
E-51	FALL	6	0.8333	0	4	12.6667	5.0	22.9	3.15000	0	8
E-52	WINTER	2	0.0000	0	0	3.2750	3.0	3.8	2.00000	2	2
E-52	SPRING	5	0.0000	0	0	14.4125	7.5	22.0	2.30000	0	5
E-52	SUMMER	7	0.0000	0	0	24.8405	23.0	26.8	3.50000	2	5
E-52	FALL	6	1.5000	0	5	12.6667	5.0	22.9	3.08333	0	8
E-61	WINTER	2	0.0000	0	0	2.6750	2.2	3.0	3.75000	3	4
E-61	SPRING	5	0.0000	0	0	12.9300	7.0	19.8	1.80000	0	4
E-61	SUMMER	10	0.0000	0	0	24.5000	22.6	26.1	3.85000	1	6
E-61	FALL	7	7.4286	0	50	13.7143	6.0	22.2	2.50000	0	8
E-62	WINTER	2	0.0000	0	0	2.6750	2.2	3.0	3.75000	3	4
E-62	SPRING	5	0.0000	0	0	12.9300	7.0	19.8	1.80000	0	4
E-62	SUMMER	10	0.0000	0	0	24.5000	22.6	26.1	3.85000	1	6
E-62	FALL	7	0.2857	0	2	13.7143	6.0	22.2	2.50000	0	8
NE11	SPRING	4	0.5000	0	1	14.4750	7.2	22.1	0.87500	0	2
NE11	SUMMER	6	0.0000	0	0	24.6833	23.3	26.0	2.83333	1	4
NE11	FALL	5	33.6000	0	168	13.3400	5.9	21.0	1.00000	0	5
NE12	SPRING	4	0.2500	0	1	14.4750	7.2	22.1	0.87500	0	2
NE12	SUMMER	5	0.0000	0	0	24.5950	23.3	26.0	2.80000	1	4
NE12	FALL	5	0.8000	0	2	13.3400	5.9	21.0	1.00000	0	5
NE21	SPRING	1	0.0000	0	0	14.5000	14.5	14.5	1.00000	1	1
NE21	SUMMER	1	0.0000	0	0	25.0000	25.0	25.0	1.00000	1	1
NE21	FALL	1	12.0000	12	12	7.5000	7.0	8.0	0.00000	0	0
NE22	SPRING	1	0.0000	0	0	14.5000	14.5	14.5	1.00000	1	1
NE22	SUMMER	1	0.0000	0	0	25.0000	25.0	25.0	1.00000	1	1
NE22	FALL	1	6.0000	6	6	7.5000	7.0	8.0	0.00000	0	0
NW11	WINTER	3	0.0000	0	0	3.4167	2.0	5.5	1.83333	0	3
NW11	SPRING	6	0.0000	0	0	12.0583	6.7	20.2	1.01667	0	2
NW11	SUMMER	10	0.0000	0	0	24.9700	23.5	26.2	3.72056	1	6
NW11	FALL	7	0.4286	0	3	14.1143	6.8	23.1	2.50000	0	7
NW12	WINTER	3	0.0000	0	0	3.4167	2.0	5.5	1.83333	0	3
NW12	SPRING	6	1.6667	0	9	12.0583	6.7	20.2	1.01667	0	2
NW12	SUMMER	10	0.0000	0	0	24.9650	23.5	26.2	3.68056	1	6
NW12	FALL	7	0.4286	0	3	14.1214	6.8	23.2	2.50000	0	7
NW21	SPRING	1	0.0000	0	0	14.2500	14.1	14.4	0.00000	0	0
NW21	SUMMER	3	0.0000	0	0	24.9167	24.4	25.5	3.83333	3	4
NW21	FALL	1	1.0000	1	1	8.0000	8.0	8.0	1.00000	1	1
NW22	SPRING	1	0.0000	0	0	14.2500	14.1	14.4	0.00000	0	0
NW22	SUMMER	3	0.0000	0	0	24.9167	24.4	25.5	3.83333	3	4
NW22	FALL	1	6.0000	6	6	8.0000	8.0	8.0	1.00000	1	1
RI11	WINTER	3	0.0000	0	0	4.3333	2.0	7.0	1.33333	0	2
RI11	SPRING	7	0.8571	0	4	14.3200	6.2	19.7	2.10000	2	3
RI11	SUMMER	9	0.0000	0	0	24.9944	23.1	26.8	5.02778	2	9
RI11	FALL	6	0.3333	0	1	13.8950	7.0	22.5	4.70000	0	8
RI12	WINTER	3	0.6667	0	2	4.3333	2.0	7.0	1.33333	0	2
RI12	SPRING	6	0.3333	0	2	14.3200	6.2	19.7	2.10000	2	3
RI12	SUMMER	9	0.0000	0	0	24.9944	23.1	26.8	5.10069	2	9
RI12	FALL	6	1.3333	0	5	13.8950	7.0	22.5	4.78333	0	8
RI21	WINTER	3	0.0000	0	0	4.5000	2.0	7.0	0.83333	0	2
RI21	SPRING	7	1.5714	0	11	15.7250	6.2	22.3	2.00000	0	4
RI21	SUMMER	11	0.0000	0	0	24.9864	23.0	26.6	4.75000	1	8
RI21	FALL	6	0.3333	0	2	14.3667	6.0	23.9	4.41667	0	8
RI22	WINTER	3	0.0000	0	0	4.5000	2.0	7.0	0.83333	0	2
RI22	SPRING	7	0.1429	0	1	15.7250	6.2	22.3	2.00000	0	4

Table 11 . - Continued.

A. PSEUDOHARENGUS SEASONAL MEAN CATCH PER UNIT EFFORT (N/T)-1976.

LOCATION	SEASON	OBS	CATCH/UNIT EFFORT			TEMPERATURE (C)			SALINITY (PPT)		
			MEAN	MIN	MAX	MEAN	MIN	MAX	MEAN	MIN	MAX
RI22	SUMMER	12	0.00000	0	0	25.0063	23.0	24.5	5.0625	1.0	9.5
RI22	FALL	6	0.83333	0	3	14.3667	6.0	23.9	4.4167	0.0	8.0
SE01	WINTER	1	0.00000	0	0	5.5000	5.0	6.0	2.0000	2.0	2.0
SE01	SPRING	6	0.16667	0	1	13.5250	9.2	19.1	8.5000	4.0	12.0
SE01	SUMMER	5	0.00000	0	0	24.4500	23.0	25.0	12.4500	10.0	14.0
SE01	FALL	7	1.00000	0	4	10.8143	5.9	19.7	11.2857	6.0	17.0
SE02	WINTER	1	0.00000	0	0	5.5000	5.0	6.0	2.0000	2.0	2.0
SE02	SPRING	5	0.00000	0	0	14.3000	10.0	19.1	8.5000	4.0	12.0
SE02	SUMMER	5	0.00000	0	0	24.4500	23.0	25.0	12.4500	10.0	14.0
SE02	FALL	6	1.00000	0	4	9.3417	5.9	17.8	10.8333	6.0	17.0
SE11	WINTER	2	0.00000	0	0	3.7000	2.0	5.5	4.7500	2.0	8.0
SE11	SPRING	7	0.71429	0	2	13.6000	6.2	19.8	6.5000	5.0	11.0
SE11	SUMMER	8	0.00000	0	0	24.6562	23.0	27.0	11.2813	9.0	13.0
SE11	FALL	8	3.12500	0	20	12.0562	5.0	20.7	10.8750	7.0	15.0
SE12	WINTER	2	0.00000	0	0	3.7000	2.0	5.5	4.7500	2.0	8.0
SE12	SPRING	5	5.20000	0	26	14.4700	6.2	19.0	6.8750	5.0	11.0
SE12	SUMMER	8	0.00000	0	0	24.5196	23.0	27.0	11.2813	9.0	13.0
SE12	FALL	7	4.14286	0	28	10.8357	5.0	20.0	10.2857	7.0	15.0
SE21	SPRING	4	0.50000	0	2	14.8958	10.2	18.5	5.5000	4.0	7.0
SE21	SUMMER	6	0.00000	0	0	24.8667	23.4	26.5	9.6417	8.0	12.0
SE21	FALL	4	1.50000	0	6	13.5750	5.5	20.5	9.5000	6.0	13.0
SE22	SPRING	4	0.25000	0	1	14.8958	10.2	18.5	5.5000	4.0	7.0
SE22	SUMMER	6	0.00000	0	0	24.8667	23.4	26.5	9.7250	8.0	12.0
SE22	FALL	4	0.00000	0	0	13.5750	5.5	20.5	9.5000	6.0	13.0
SE31	WINTER	5	2.20000	0	11	3.7200	1.0	6.8	1.3000	0.0	7.0
SE31	SPRING	8	1.12500	0	8	13.1937	7.0	19.8	4.5714	0.0	8.0
SE31	SUMMER	16	0.00000	0	0	24.7594	22.9	28.0	8.6438	5.0	11.0
SE31	FALL	11	0.45455	0	5	14.5182	4.0	20.8	8.1364	3.0	13.0
SE32	WINTER	5	0.40000	0	2	3.7200	1.0	6.8	1.3000	0.0	7.0
SE32	SPRING	6	0.83333	0	5	14.1833	7.0	19.8	5.0000	0.0	8.0
SE32	SUMMER	16	0.00000	0	0	24.7312	22.9	28.0	8.6438	5.0	11.0
SE32	FALL	11	1.18182	0	6	14.5182	4.0	20.8	8.1364	3.0	13.0
SSC1	WINTER	9	0.00000	0	0	3.1083	0.2	6.0	3.2292	0.0	9.0
SSC1	SPRING	16	3.75000	0	58	13.1980	4.6	22.9	3.1844	0.0	8.0
SSC1	SUMMER	29	0.00000	0	0	24.6603	22.3	29.0	7.6652	3.0	10.0
SSC1	FALL	20	0.50000	0	4	16.2975	6.0	22.5	7.3000	0.0	11.0
SSC2	WINTER	9	0.00000	0	0	3.1905	0.2	6.0	3.2292	0.0	9.0
SSC2	SPRING	16	0.12500	0	2	13.2250	4.6	22.9	3.3344	0.0	8.0
SSC2	SUMMER	29	0.06897	0	2	24.6603	22.3	29.0	7.6652	3.0	10.0
SSC2	FALL	20	0.40000	0	4	16.2975	6.0	22.5	7.3000	0.0	11.0
SW11	WINTER	1	0.00000	0	0	3.0000	2.5	3.5	5.7500	5.5	6.0
SW11	SPRING	4	0.00000	0	0	15.0750	10.8	17.8	4.2500	2.0	6.0
SW11	SUMMER	7	0.00000	0	0	25.0500	23.5	26.0	10.6429	6.0	15.0
SW11	FALL	4	0.50000	0	2	11.1750	6.0	18.2	8.0000	4.0	13.0
SW12	WINTER	1	0.00000	0	0	3.0000	2.5	3.5	5.7500	5.5	6.0
SW12	SPRING	5	0.40000	0	1	14.2500	10.8	17.8	4.4500	2.0	6.0
SW12	SUMMER	8	0.00000	0	0	25.0312	23.5	26.0	10.1563	6.0	15.0
SW12	FALL	5	2.20000	0	6	13.0600	6.0	20.7	9.4000	4.0	15.0
SW21	WINTER	6	0.00000	0	0	3.5583	1.0	6.5	2.5000	0.0	9.0
SW21	SPRING	8	0.12500	0	1	14.1375	7.0	20.5	3.0000	0.0	7.0
SW21	SUMMER	15	0.00000	0	0	25.0900	23.3	28.0	7.6667	3.0	12.0
SW21	FALL	11	0.18182	0	2	14.5409	4.9	21.1	7.6818	3.0	14.0
SW22	WINTER	6	0.16667	0	1	3.5583	1.0	6.5	2.5000	0.0	9.0
SW22	SPRING	8	1.50000	0	7	14.1375	7.0	20.5	3.0000	0.0	7.0

Table 11 . - Continued.

A. PSEUDOHARENGUS SEASONAL MEAN CATCH PER UNIT EFFORT (N/T)-1976.

LOCATION	SEASON	OBS	CATCH/UNIT EFFORT			TEMPERATURE (C)			SALINITY (FPT)		
			MEAN	MIN	MAX	MEAN	MIN	MAX	MEAN	MIN	MAX
SW22	SUMMER	15	0.00000	0	0	25.0900	23.3	28.0	7.76667	3	14
SW22	FALL	11	0.54545	0	5	14.5409	4.9	21.1	7.63636	3	14
W-11	WINTER	5	0.00000	0	0	2.9200	0.5	4.9	3.57500	0	8
W-11	SPRING	12	0.00000	0	0	15.0767	7.1	23.0	1.56667	0	8
W-11	SUMMER	21	0.00000	0	0	24.9786	23.3	28.0	5.73690	2	10
W-11	FALL	15	0.20000	0	2	17.0133	5.9	23.0	5.80000	0	13
W-12	WINTER	5	0.00000	0	0	2.9200	0.5	4.9	3.57500	0	8
W-12	SPRING	11	0.18182	0	1	14.5864	7.1	23.0	1.70707	0	8
W-12	SUMMER	21	0.00000	0	0	25.0000	23.3	28.0	5.73690	2	10
W-12	FALL	16	0.62500	0	9	16.5594	5.9	23.0	5.43750	0	13
W-21	WINTER	2	0.00000	0	0	2.1750	1.8	3.0	2.50000	2	4
W-21	SPRING	5	0.40000	0	2	13.1000	6.5	17.5	0.75000	0	2
W-21	SUMMER	9	0.00000	0	0	25.7722	24.1	27.0	3.80556	2	5
W-21	FALL	7	0.14286	0	1	16.1357	6.0	23.0	4.44048	0	7
W-22	WINTER	2	0.00000	0	0	2.1750	1.8	3.0	2.50000	2	4
W-22	SPRING	5	3.40000	0	16	13.1000	6.5	17.5	0.75000	0	2
W-22	SUMMER	9	0.00000	0	0	25.7167	24.1	27.0	3.80556	2	5
W-22	FALL	7	0.28571	0	2	16.1357	6.0	23.0	4.44048	0	7
W-31	WINTER	5	0.00000	0	0	3.6175	1.2	7.0	1.02500	0	4
W-31	SPRING	8	0.25000	0	1	14.0312	6.5	21.3	0.78571	0	4
W-31	SUMMER	12	0.00000	0	0	24.6792	23.2	26.1	4.12500	2	6
W-31	FALL	10	0.30000	0	2	15.6467	6.5	21.4	4.38333	0	7
W-32	WINTER	5	0.00000	0	0	3.6175	1.2	7.0	1.02500	0	4
W-32	SPRING	8	0.62500	0	4	14.0312	6.5	21.3	0.82143	0	4
W-32	SUMMER	12	0.00000	0	0	24.7000	23.2	26.1	4.12500	2	6
W-32	FALL	10	0.40000	0	2	15.6467	6.5	21.4	4.38333	0	7

Table 12. - A chronological summary of temperature avoidance studies on alewife, Alosa pseudoharengus. All tests were conducted at near air-saturated levels of dissolved oxygen and pH of 7 to 8.

DATE	REPLICATE NO. OF FISH PER TEST		SIZE RANGE (TL IN MM)		SALINITY (PPT)	LIGHT LEVEL (FOOT (LUX) CANDLES)		ACCLIMATION TEMPERATURE (C) (F)		AVOIDANCE TEMPERATURE (C) (F)	
			MIN.	MAX.							
ALOSA PSEUDOHARENGUS											
5 AUG 70	1	3	79	80	4	215	20.0	25	77	30	86
21 OCT 71	1	4	125	131	4.5	215	20.0	18	64	-	-
3 NOV 71	1	4	132	145	4.5	215	20.0	17	62	24	75
30 SEP 75	1	3	128	140	6	215	20.0	21	69	27	80
	2	2	124	135	6	215	20.0	21	69	24	75
25 MAR 76	1	4	92	130	4	215	20.0	10	50	18	64
30 MAR 76	1	4	115	127	4	215	20.0	12	53	19	66
14 APR 77	1	4	80	100	6.5	215	20.0	12	53	20	68
2 AUG 77	1	4	68	74	9	215	20.0	26	78	34	93
9 AUG 77	1	4	72	80	10.5	215	20.0	27	80	33	91

Table 12. - Continued.

DATE	REPLICATE NO. OF FISH PER TEST		SIZE RANGE (TL IN MM)		SALINITY (PPT)	LIGHT LEVEL (FOOT (LUX) CANDLES)		ACCLIMATION TEMPERATURE		AVOIDANCE TEMPERATURE	
			MIN.	MAX.				(C)	(F)	(C)	(F)
ALOSA PSEUDOHARENGUS											
16 AUG 77	1	4	69	75	10.5	215	20.0	28	82	30	86
31 AUG 77	1	4	69	71	8.5	215	20.0	26	78	32	89
14 SEP 77	1	4	75	82	6	215	20.0	20	68	26	78
	2	4	75	79	6	215	20.0	20	68	25	77
21 SEP 77	1	3	70	82	10	21.5	2.0	22	71	31	87
	2	3	75	80	10	21.5	2.0	22	71	28	82

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Table 13. - Components for the linear regression equation to estimate avoidance temperatures (C) for the alewife, Alosa pseudoharengus.

* = Significant at P.05 or greater; and ** = significant at P.01 or greater.

Constant (a) = 9.243		F(1, 14) = 117.783 **		N = 16
Standard Error of Estimate = 1.671		R = 0.945 **		R ² = 0.894
<u>Variable (Xi)</u>	<u>Mean ($\bar{X}_i$)</u>	<u>Correlation (r) With Y</u>	<u>Regression Coefficient (bi)</u>	<u>Standard Error of bi</u>
Acclimation Temperature (C)	20.4	0.945**	0.847**	0.078

Table 14. - B. TYRANNUS SEASONAL MEAN CATCH PER UNIT EFFORT (N/T)-1975.

LOCATION	SEASON	OBS	CATCH/UNIT EFFORT			TEMPERATURE (C)			SALINITY (PPT)		
			MEAN	MIN	MAX	MEAN	MIN	MAX	MEAN	MIN	MAX
CHA1	SPRING	3	0.00000	0	0	13.0500	3.0	22.8	5.86667	1.0	12.0
CHA1	SUMMER	5	0.00000	0	0	24.7500	22.0	26.1	5.20000	2.0	9.0
CHA1	FALL	2	0.00000	0	0	15.3250	10.3	20.0	4.00000	0.0	9.0
CHA2	WINTER	1	0.00000	0	0	6.0000	6.0	6.0	5.75000	5.5	6.0
CHA2	SPRING	3	0.33333	0	1	12.3000	3.0	22.8	4.03333	0.0	12.0
CHA2	SUMMER	14	0.21429	0	1	24.5429	21.0	28.9	5.05495	0.0	10.0
CHA2	FALL	7	0.14286	0	1	14.5000	9.9	20.0	3.75000	1.0	10.0
CHA3	WINTER	1	0.00000	0	0	7.6500	7.4	7.9	4.00000	4.0	4.0
CHA3	SPRING	3	0.33333	0	1	12.6667	4.0	22.8	2.00000	0.0	6.0
CHA3	SUMMER	4	0.75000	0	2	25.3250	24.2	26.2	2.00000	0.0	4.0
CHA3	FALL	3	2.33333	1	3	14.2333	11.2	16.5	2.25000	1.0	3.0
CHA4	WINTER	1	0.00000	0	0	.	.	5.3	.	.	0.0
CHA4	SPRING	3	0.00000	0	0	12.1833	4.0	23.0	1.83333	0.0	6.0
CHA4	SUMMER	13	0.00000	0	0	25.6377	20.1	28.2	2.04968	0.0	5.5
CHA4	FALL	8	0.62500	0	3	14.8062	10.0	19.0	2.50000	0.5	5.0
CHA5	SPRING	3	0.00000	0	0	12.6500	5.0	23.0	0.83333	0.0	3.0
CHA5	SUMMER	5	0.00000	0	0	25.2350	21.8	27.0	1.23750	0.0	3.5
CHA5	FALL	2	0.50000	0	1	17.4750	15.9	19.0	0.00000	0.0	0.0
E-11	WINTER	4	0.00000	0	0	4.0625	1.8	6.0	0.65833	0.0	1.5
E-11	SPRING	8	0.25000	0	1	11.7562	1.0	23.5	3.65625	0.0	11.0
E-11	SUMMER	11	2.27273	0	12	25.9192	23.0	30.0	4.68687	0.0	9.5
E-11	FALL	5	3.40000	0	12	15.5900	11.3	19.0	4.40000	2.0	9.0
E-12	WINTER	4	0.00000	0	0	4.0625	1.8	6.0	0.28333	0.0	1.5
E-12	SPRING	8	0.00000	0	0	11.9812	1.0	23.5	3.87500	0.0	11.0
E-12	SUMMER	11	0.18182	0	1	26.0364	23.0	30.0	4.39773	0.0	9.5
E-12	FALL	4	0.50000	0	2	15.2500	11.3	19.0	4.75000	2.0	9.0
E-21	WINTER	5	0.20000	0	1	4.7300	1.8	7.7	2.45000	0.0	4.5
E-21	SPRING	8	0.25000	0	2	11.8312	1.3	23.5	2.65625	0.0	9.5
E-21	SUMMER	22	1.54545	0	21	25.6500	20.9	29.0	4.21591	0.0	9.5
E-21	FALL	16	0.93750	0	5	16.1544	9.3	19.6	3.14231	0.0	3.0
E-22	WINTER	5	0.00000	0	0	4.7300	1.8	7.7	2.37500	0.0	4.5
E-22	SPRING	7	0.14286	0	1	12.9500	1.3	23.5	1.92857	0.0	5.0
E-22	SUMMER	21	0.23810	0	2	25.5690	20.9	31.3	4.14286	0.0	9.5
E-22	FALL	13	0.61538	0	3	15.9958	9.3	19.6	3.39583	0.0	8.0
E-31	WINTER	4	0.00000	0	0	3.3917	2.0	5.5	0.83333	0.0	2.0
E-31	SPRING	7	0.00000	0	0	11.1929	2.0	22.8	2.47857	0.0	9.0
E-31	SUMMER	6	0.66667	0	3	24.9583	23.0	26.4	2.41667	0.0	7.0
E-31	FALL	4	1.25000	1	2	15.6125	11.4	19.6	3.18750	1.0	8.0
E-32	WINTER	4	0.00000	0	0	3.3917	2.0	5.5	0.83333	0.0	2.0
E-32	SPRING	7	0.00000	0	0	11.1929	2.0	22.8	2.67857	0.0	9.0
E-32	SUMMER	6	0.16667	0	1	24.9583	23.0	26.4	2.41667	0.0	7.0
E-32	FALL	4	2.25000	0	4	15.6125	11.4	19.6	3.18750	1.0	8.0
E-41	WINTER	4	0.00000	0	0	3.3292	2.0	5.1	0.66667	0.0	2.0
E-41	SPRING	7	0.00000	0	0	10.9357	2.0	22.8	1.96429	0.0	9.0
E-41	SUMMER	13	0.92308	0	4	25.0692	19.1	28.0	2.36533	0.0	6.0
E-41	FALL	9	3.44444	0	20	14.5000	9.9	19.0	3.08333	0.5	5.0
E-42	WINTER	4	0.00000	0	0	3.3292	2.0	5.1	0.66667	0.0	2.0
E-42	SPRING	7	0.14286	0	1	10.9357	2.0	22.8	1.96429	0.0	9.0
E-42	SUMMER	14	0.57143	0	6	25.2786	19.1	28.0	2.16071	0.0	6.0
E-42	FALL	9	2.00000	0	15	14.5000	9.9	19.0	3.08333	0.5	5.0
E-51	WINTER	4	0.00000	0	0	3.3000	1.0	5.3	0.00000	0.0	0.0
E-51	SPRING	5	0.00000	0	0	12.6400	2.0	21.6	1.25000	0.0	3.5
E-51	SUMMER	6	0.50000	0	1	26.0500	23.9	28.9	1.29167	0.0	4.0
E-51	FALL	1	1.00000	1	1	16.2500	16.0	16.5	1.25000	1.0	1.5

Table 14 . - Continued.

B. TYRANNUS SEASONAL MEAN CATCH PER UNIT EFFORT (N/T)-1975.

LOCATION	SEASON	OBS	CATCH/UNIT EFFORT			TEMPERATURE (C)			SALINITY (PPT)		
			MEAN	MIN	MAX	MEAN	MIN	MAX	MEAN	MIN	MAX
E-52	WINTER	4	0.00000	0	0	3.3000	1.0	5.3	0.00000	0.0	0.0
E-52	SPRING	5	0.20000	0	1	12.1800	2.0	21.6	0.65000	0.0	3.5
E-52	SUMMER	7	0.42857	0	2	25.7214	23.5	28.9	1.29167	0.0	4.0
E-52	FALL	1	4.00000	4	4	16.2500	16.0	16.5	1.25000	1.0	1.5
E-61	WINTER	4	0.00000	0	0	3.3000	1.0	5.3	0.00000	0.0	0.0
E-61	SPRING	5	0.00000	0	0	12.1100	2.0	21.6	0.65000	0.0	3.5
E-61	SUMMER	7	1.42857	0	8	25.4821	21.8	28.9	1.07738	0.0	4.0
E-61	FALL	2	2.50000	2	3	17.3750	15.5	19.0	0.00000	0.0	0.0
E-62	WINTER	4	0.00000	0	0	3.3000	1.0	5.3	0.00000	0.0	0.0
E-62	SPRING	5	0.00000	0	0	12.1100	2.0	21.6	0.65000	0.0	3.5
E-62	SUMMER	7	0.85714	0	3	25.4821	21.8	28.9	1.07738	0.0	4.0
E-62	FALL	2	5.50000	4	7	17.3750	15.5	19.0	0.00000	0.0	0.0
NE11	SPRING	3	0.00000	0	0	18.3667	9.9	24.3	1.08333	0.0	3.5
NE11	SUMMER	6	1.33333	0	6	25.5667	22.8	27.5	0.75000	0.0	3.0
NE12	SPRING	3	0.00000	0	0	18.3667	9.9	24.3	1.08333	0.0	3.5
NE12	SUMMER	6	0.50000	0	2	25.5667	22.8	27.5	0.75000	0.0	3.0
NE12	FALL	1	0.00000	0	0	16.8500	16.7	17.0	0.50000	0.0	1.0
NW11	WINTER	2	0.00000	0	0	5.9500	5.3	7.5	0.00000	0.0	0.0
NW11	SPRING	7	0.00000	0	0	12.9786	3.0	23.0	1.07143	0.0	4.5
NW11	SUMMER	5	1.80000	0	5	25.3625	23.0	26.8	1.76250	0.0	3.5
NW11	FALL	2	2.00000	1	3	18.3500	16.5	20.0	0.00000	0.0	0.0
NW12	WINTER	2	0.00000	0	0	5.9500	5.3	7.5	0.00000	0.0	0.0
NW12	SPRING	5	0.00000	0	0	13.4600	3.0	23.0	1.20000	0.0	4.5
NW12	SUMMER	4	0.00000	0	0	24.9958	23.0	26.5	1.39583	0.0	3.5
NW12	FALL	2	1.00000	0	2	18.3500	16.5	20.0	0.25000	0.0	1.0
RI11	SPRING	2	0.50000	0	1	18.1750	13.8	23.0	2.25000	1.5	3.0
RI11	SUMMER	3	1.00000	0	2	26.4167	24.5	28.5	3.08333	0.0	6.5
RI12	SPRING	2	0.00000	0	0	18.1750	13.8	23.0	2.25000	1.5	3.0
RI12	SUMMER	3	0.00000	0	0	26.4167	24.5	28.5	3.08333	0.0	6.5
RI21	SPRING	1	1.00000	1	1	22.5000	22.0	23.0	2.75000	2.5	3.0
RI21	SUMMER	3	0.33333	0	1	26.0333	24.5	27.0	2.16667	0.0	3.5
RI22	SPRING	1	0.00000	0	0	22.5000	22.0	23.0	2.75000	2.5	3.0
RI22	SUMMER	3	0.33333	0	1	26.0333	24.5	27.0	2.16667	0.0	3.5
SE01	SPRING	5	0.00000	0	0	16.9400	9.4	21.8	8.70000	6.5	12.0
SE01	SUMMER	8	0.37500	0	3	25.5875	23.8	29.5	8.65625	0.0	14.0
SE02	SPRING	5	0.00000	0	0	17.5400	9.4	21.8	8.78000	6.5	12.0
SE02	SUMMER	9	0.00000	0	0	25.5222	23.8	29.5	8.69444	0.0	14.0
SE11	SPRING	5	0.20000	0	1	16.5500	9.4	21.0	6.80000	3.5	12.0
SE11	SUMMER	11	1.27273	0	13	25.3636	22.3	28.0	8.00273	0.0	14.0
SE11	FALL	3	0.00000	0	0	16.3500	10.0	20.5	6.25000	3.5	11.0
SE12	SPRING	5	0.00000	0	0	16.5500	9.5	21.0	6.60000	3.5	10.0
SE12	SUMMER	11	0.00000	0	0	25.3636	22.3	28.0	8.02273	0.0	14.0
SE12	FALL	3	0.33333	0	1	16.3500	10.0	20.5	6.25000	3.5	11.0
SE21	SPRING	5	0.00000	0	0	16.4600	9.9	21.0	5.10000	3.0	8.0
SE21	SUMMER	9	0.11111	0	1	25.2889	23.5	27.5	5.39236	0.0	10.5
SE21	FALL	2	0.00000	0	0	20.1250	20.0	20.5	6.87500	3.5	9.0
SE22	SPRING	5	0.00000	0	0	16.4600	9.9	21.0	5.10000	3.0	8.0
SE22	SUMMER	9	0.00000	0	0	25.2889	23.5	27.5	5.39236	0.0	10.5
SE22	FALL	2	0.00000	0	0	20.1250	20.0	20.5	6.87500	3.5	9.0
SE31	WINTER	3	0.00000	0	0	5.5333	4.2	6.0	2.16667	0.0	5.5
SE31	SPRING	8	0.37500	0	2	11.2071	1.0	23.0	4.50000	0.0	11.0
SE31	SUMMER	19	0.21053	0	2	24.6830	20.1	28.1	5.30186	0.0	10.5
SE31	FALL	10	0.10000	0	1	15.4200	8.9	20.0	4.50000	1.0	9.0
SE32	WINTER	3	0.00000	0	0	5.5333	4.2	6.0	2.16667	0.0	5.5

Table 14 . - Continued.

B. TYRANNUS SEASONAL MEAN CATCH PER UNIT EFFORT (N/T)-1975.

LOCATION	SEASON	OBS	CATCH/UNIT EFFORT			TEMPERATURE (C)			SALINITY (PPT)		
			MEAN	MIN	MAX	MEAN	MIN	MAX	MEAN	MIN	MAX
SE32	SPRING	8	0.00000	0	0	11.2071	1.0	23.0	4.50000	0.0	11.0
SE32	SUMMER	18	0.05556	0	1	24.7172	20.1	28.1	5.57668	2.0	10.5
SE32	FALL	9	0.33333	0	3	15.9444	11.0	20.0	4.75000	1.0	9.0
SSC1	WINTER	8	0.00000	0	0	4.9271	0.2	12.0	3.72857	0.0	6.0
SSC1	SPRING	11	0.90909	0	10	12.7295	1.3	21.9	2.02597	0.0	9.0
SSC1	SUMMER	25	2.04000	0	38	25.2775	20.3	29.8	5.67708	0.0	9.0
SSC1	FALL	20	3.30000	0	22	16.2408	9.8	20.0	4.04500	1.0	9.0
SSC2	WINTER	8	0.00000	0	0	5.0521	0.2	12.0	3.72857	0.0	6.0
SSC2	SPRING	11	0.54545	0	6	12.7275	1.3	21.9	2.02597	0.0	9.0
SSC2	SUMMER	24	0.41667	0	4	25.1286	20.3	29.8	5.65465	0.0	9.0
SSC2	FALL	21	0.42857	0	4	16.2918	9.8	20.0	3.91465	1.0	9.0
SW11	SUMMER	4	0.25000	0	1	24.7292	22.0	27.8	6.37500	2.0	9.0
SW11	FALL	3	0.66667	0	1	17.8167	10.6	23.8	3.58333	0.0	8.0
SW12	SUMMER	1	0.00000	0	0	22.2500	22.0	22.5	9.00000	9.0	9.0
SW12	FALL	2	3.00000	0	6	15.2750	10.6	20.0	1.50000	0.0	3.0
SW21	WINTER	3	0.00000	0	0	5.5000	5.0	6.0	1.75000	0.0	5.0
SW21	SPRING	6	0.16667	0	1	11.5917	3.2	21.0	1.87500	0.0	7.0
SW21	SUMMER	16	1.43750	0	14	25.2175	21.0	29.5	4.67292	0.0	10.0
SW21	FALL	10	1.30000	0	9	14.0854	8.7	18.5	3.56250	0.0	10.0
SW22	WINTER	3	0.00000	0	0	5.5000	5.0	6.0	2.08333	0.0	6.0
SW22	SPRING	6	0.00000	0	0	11.3500	3.2	21.0	2.20833	0.0	7.0
SW22	SUMMER	15	0.33333	0	2	25.0933	21.0	29.5	4.75714	0.0	9.5
SW22	FALL	9	1.00000	0	3	14.7875	8.7	20.0	3.06250	0.0	10.0
W-11	WINTER	4	0.00000	0	0	6.2125	4.0	8.2	1.12500	0.0	3.0
W-11	SPRING	6	0.33333	0	2	11.4667	3.2	21.0	2.83333	0.0	7.0
W-11	SUMMER	18	2.50000	0	36	25.1004	19.9	28.5	2.73646	0.0	8.0
W-11	FALL	16	1.43750	0	4	16.3027	9.1	20.0	1.92009	0.0	6.0
W-12	WINTER	4	0.00000	0	0	6.2125	4.0	8.2	1.12500	0.0	3.0
W-12	SPRING	6	0.16667	0	1	13.5750	3.2	21.0	2.37500	0.0	7.0
W-12	SUMMER	20	1.25000	0	9	25.1113	19.9	28.5	3.07353	0.0	8.0
W-12	FALL	17	3.58824	0	13	15.4251	9.1	20.0	1.81078	0.0	6.0
W-21	WINTER	2	0.00000	0	0	5.4500	4.0	6.2	0.00000	0.0	0.0
W-21	SPRING	6	0.16667	0	1	12.2167	2.6	21.0	1.62500	0.0	4.5
W-21	SUMMER	3	1.00000	0	2	25.5167	24.7	26.9	1.50000	0.0	4.0
W-21	FALL	3	3.00000	0	6	13.9593	11.0	16.5	1.41667	0.0	2.0
W-22	WINTER	2	0.00000	0	0	5.4500	4.0	6.2	0.00000	0.0	0.0
W-22	SPRING	6	0.33333	0	2	12.2167	2.6	21.0	1.62500	0.0	4.5
W-22	SUMMER	3	7.33333	0	19	25.5167	24.7	26.9	1.50000	0.0	4.0
W-22	FALL	3	0.66667	0	2	13.9583	11.0	16.5	1.41667	0.0	2.0
W-31	WINTER	4	0.00000	0	0	6.6500	5.3	8.8	0.29167	0.0	1.0
W-31	SPRING	5	0.40000	0	2	11.3700	2.8	21.0	1.70000	0.0	4.5
W-31	SUMMER	15	1.40000	0	6	25.8567	20.9	29.0	2.31333	0.0	8.0
W-31	FALL	7	1.85714	0	7	15.2286	10.0	18.9	1.87500	0.5	4.0
W-32	WINTER	4	0.00000	0	0	6.6500	5.3	8.8	0.29167	0.0	1.0
W-32	SPRING	5	0.00000	0	0	11.3700	2.8	21.0	1.70000	0.0	4.5
W-32	SUMMER	13	0.30769	0	3	25.8500	20.9	29.0	1.86538	0.0	5.0
W-32	FALL	7	4.14286	1	17	15.2286	10.0	18.9	1.89286	0.5	4.0

Table 15.

B. TYRANNUS SEASONAL MEAN CATCH PER UNIT EFFORT (N/T)-1976.

LOCATION	SEASON	OBS	CATCH/UNIT EFFORT			TEMPERATURE (C)			SALINITY (PPT)		
			MEAN	MIN	MAX	MEAN	MIN	MAX	MEAN	MIN	MAX
CHA1	WINTER	1	0.0000	0	0	1.7500	1.5	2.0	9.0000	8	10
CHA1	SPRING	6	0.3333	0	2	15.2800	10.1	19.9	6.0167	1	8
CHA1	SUMMER	8	0.0000	0	0	24.6812	23.5	26.0	11.0625	6	15
CHA1	FALL	6	0.0000	0	0	12.0750	6.0	20.9	10.4167	4	16
CHA2	WINTER	5	0.0000	0	0	2.9500	1.7	6.5	3.6500	0	8
CHA2	SPRING	6	0.1667	0	1	12.6000	7.0	17.4	3.9167	0	10
CHA2	SUMMER	14	0.0000	0	0	25.1071	22.8	28.0	8.2679	4	13
CHA2	FALL	8	0.3750	0	3	15.2437	5.0	20.8	8.3750	3	14
CHA3	WINTER	3	0.0000	0	0	3.8500	2.0	5.3	1.0000	0	2
CHA3	SPRING	6	0.5000	0	3	14.6083	6.6	21.2	3.3333	1	6
CHA3	SUMMER	7	0.1429	0	1	25.2000	24.0	26.5	5.5357	2	10
CHA3	FALL	6	1.5000	0	6	14.4583	7.0	20.1	4.0833	0	9
CHA4	WINTER	3	0.0000	0	0	3.8000	1.0	6.3	0.6667	0	2
CHA4	SPRING	7	0.5714	0	2	13.3274	6.5	21.3	2.0714	0	8
CHA4	SUMMER	12	0.5833	0	4	24.5708	23.2	26.0	4.5000	1	7
CHA4	FALL	10	1.2000	0	8	15.1650	6.5	21.2	4.3500	0	10
CHA5	WINTER	2	0.0000	0	0	2.5000	2.0	3.0	2.5000	2	3
CHA5	SPRING	5	0.2000	0	1	12.9367	7.5	20.0	1.2667	0	3
CHA5	SUMMER	10	1.3000	0	8	24.7672	23.0	26.5	3.2111	1	5
CHA5	FALL	7	2.0000	0	14	13.8500	6.1	22.5	2.4286	0	8
E-11	WINTER	4	0.0000	0	0	2.1958	1.5	5.1	4.0833	0	8
E-11	SPRING	7	0.2857	0	1	13.7833	7.0	20.1	4.6667	2	8
E-11	SUMMER	9	0.8889	0	5	24.6556	22.9	26.9	7.0556	5	9
E-11	FALL	6	0.5000	0	1	13.4000	5.0	22.2	6.9167	3	11
E-12	WINTER	4	0.0000	0	0	2.1958	1.5	5.1	4.0833	0	8
E-12	SPRING	7	0.1429	0	1	13.7833	7.0	20.1	4.0000	0	8
E-12	SUMMER	9	0.1111	0	1	24.6778	22.9	26.9	7.0556	5	9
E-12	FALL	6	0.6667	0	2	13.4417	5.0	22.2	6.9167	3	11
E-21	WINTER	5	0.0000	0	0	2.8200	1.0	4.8	4.1000	0	9
E-21	SPRING	10	0.2000	0	2	12.5911	7.1	22.8	2.8144	0	8
E-21	SUMMER	21	0.8095	0	6	24.6738	22.5	28.8	6.8333	2	10
E-21	FALL	15	0.1333	0	1	16.6200	6.0	24.1	6.8000	0	12
E-22	WINTER	5	0.0000	0	0	2.8200	1.0	4.8	4.1000	0	9
E-22	SPRING	9	0.4444	0	3	13.2354	7.5	22.8	3.1250	0	8
E-22	SUMMER	21	0.2281	0	3	24.6738	22.5	28.8	6.8333	2	10
E-22	FALL	14	0.3571	0	2	17.1000	6.0	24.1	7.2500	0	12
E-31	WINTER	2	0.0000	0	0	2.7000	1.8	3.0	1.5000	1	2
E-31	SPRING	7	0.4286	0	2	13.0167	6.5	22.0	3.6429	0	8
E-31	SUMMER	9	0.6667	0	3	25.0556	22.5	27.5	4.4722	2	7
E-31	FALL	6	0.6667	0	4	12.2083	5.0	19.5	4.1667	0	9
E-32	WINTER	2	0.0000	0	0	2.7000	1.8	3.0	1.5000	1	2
E-32	SPRING	7	0.2857	0	1	13.0167	6.5	22.0	3.3571	0	6
E-32	SUMMER	9	0.3333	0	1	25.0556	22.5	27.5	4.4722	2	7
E-32	FALL	6	1.0000	0	3	12.2083	5.0	19.5	4.1667	0	9
E-41	WINTER	5	0.0000	0	0	3.7800	0.5	7.9	1.7000	0	6
E-41	SPRING	8	0.2500	0	2	13.2786	6.5	21.5	2.5476	0	8
E-41	SUMMER	12	10.0833	0	98	24.5083	23.2	26.0	4.5000	1	7
E-41	FALL	11	1.0000	0	7	15.6000	6.1	21.5	4.8182	0	9
E-42	WINTER	5	0.0000	0	0	3.7800	0.5	7.9	1.7000	0	6
E-42	SPRING	7	0.2857	0	2	13.2786	6.5	21.5	2.9762	1	8
E-42	SUMMER	12	0.5833	0	5	24.4330	23.2	26.0	4.5000	1	7
E-42	FALL	11	0.5455	0	4	15.6000	6.1	21.5	4.8182	0	9
E-51	WINTER	2	0.0000	0	0	3.2750	3.0	3.8	2.0000	2	2
E-51	SPRING	5	0.0000	0	0	14.4125	7.5	22.0	2.3000	0	5

Table 15 . - Continued.

B. TYRANNUS SEASONAL MEAN CATCH PER UNIT EFFORT (N/T)-1976.

LOCATION	SEASON	OBS	CATCH/UNIT EFFORT			TEMPERATURE (C)			SALINITY (PPT)		
			MEAN	MIN	MAX	MEAN	MIN	MAX	MEAN	MIN	MAX
E-51	SUMMER	7	1.5714	0	4	24.8214	23.0	26.8	3.50000	2	5
E-51	FALL	4	0.6667	0	1	12.6667	5.0	22.9	3.15000	0	8
E-52	WINTER	2	0.0000	0	0	3.2750	3.0	3.8	2.00000	2	2
E-52	SPRING	5	0.0000	0	0	14.4125	7.5	22.0	2.30000	0	5
E-52	SUMMER	7	1.4286	0	5	24.8405	23.0	26.8	3.50000	2	5
E-52	FALL	6	0.1667	0	1	12.6667	5.0	22.9	3.08333	0	8
E-61	WINTER	2	0.0000	0	0	2.6750	2.2	3.0	3.75000	3	4
E-61	SPRING	5	0.2000	0	1	12.9300	7.0	19.8	1.80000	0	4
E-61	SUMMER	10	2.2000	0	7	24.5000	22.6	26.1	3.85000	1	6
E-61	FALL	7	15.1429	0	67	13.7143	6.0	22.2	2.50000	0	8
E-62	WINTER	2	0.0000	0	0	2.6750	2.2	3.0	3.75000	3	4
E-62	SPRING	5	0.6000	0	2	12.9300	7.0	19.8	1.80000	0	4
E-62	SUMMER	10	2.1000	0	8	24.5000	22.6	26.1	3.85000	1	6
E-62	FALL	7	2.4286	0	16	13.7143	6.0	22.2	2.50000	0	8
NE11	SPRING	4	0.2500	0	1	14.4750	7.2	22.1	0.87500	0	2
NE11	SUMMER	6	4.1667	1	18	24.6833	23.3	26.0	2.83333	1	4
NE11	FALL	5	50.2000	0	222	13.3400	5.9	21.0	1.00000	0	5
NE12	SPRING	4	0.5000	0	2	14.4750	7.2	22.1	0.87500	0	2
NE12	SUMMER	5	1.4000	0	2	24.5950	23.3	26.0	2.80000	1	4
NE12	FALL	5	1.6000	0	6	13.3400	5.9	21.0	1.00000	0	5
NE21	SPRING	1	1.0000	1	1	14.5000	14.5	14.5	1.00000	1	1
NE21	SUMMER	1	5.0000	5	5	25.0000	25.0	25.0	1.00000	1	1
NE21	FALL	1	1.0000	1	1	7.5000	7.0	8.0	0.00000	0	0
NE22	SPRING	1	0.0000	0	0	14.5000	14.5	14.5	1.00000	1	1
NE22	SUMMER	1	9.0000	9	9	25.0000	25.0	25.0	1.00000	1	1
NE22	FALL	1	0.0000	0	0	7.5000	7.0	8.0	0.00000	0	0
NW11	WINTER	3	0.0000	0	0	3.4167	2.0	5.5	1.83333	0	3
NW11	SPRING	6	0.3333	0	2	12.0583	6.7	20.2	1.01667	0	2
NW11	SUMMER	10	18.9000	0	89	24.9700	23.5	26.2	3.72056	1	6
NW11	FALL	7	2.5714	0	15	14.1143	6.8	23.1	2.50000	0	7
NW12	WINTER	3	0.0000	0	0	3.4167	2.0	5.5	1.83333	0	3
NW12	SPRING	6	0.3333	0	2	12.0583	6.7	20.2	1.01667	0	2
NW12	SUMMER	10	6.9000	0	42	24.9650	23.5	26.2	3.68056	1	6
NW12	FALL	7	1.2857	0	6	14.1214	6.8	23.2	2.50000	0	7
NW21	SPRING	1	0.0000	0	0	14.2500	14.1	14.4	0.00000	0	0
NW21	SUMMER	3	7.6667	0	20	24.9167	24.4	25.5	3.83333	3	4
NW21	FALL	1	0.0000	0	0	8.0000	8.0	8.0	1.00000	1	1
NW22	SPRING	1	0.0000	0	0	14.2500	14.1	14.4	0.00000	0	0
NW22	SUMMER	3	4.3333	2	9	24.9167	24.4	25.5	3.83333	3	4
NW22	FALL	1	0.0000	0	0	8.0000	8.0	8.0	1.00000	1	1
RI11	WINTER	3	0.0000	0	0	4.3333	2.0	7.0	1.33333	0	2
RI11	SPRING	7	0.7143	0	3	14.3200	6.2	19.7	2.10000	2	3
RI11	SUMMER	9	0.4444	0	3	24.9944	23.1	26.8	5.02778	2	9
RI11	FALL	6	3.3333	0	19	13.8950	7.0	22.5	4.70000	0	8
RI12	WINTER	3	0.0000	0	0	4.3333	2.0	7.0	1.33333	0	2
RI12	SPRING	6	0.1667	0	1	14.3200	6.2	19.7	2.10000	2	3
RI12	SUMMER	9	0.3333	0	1	24.9944	23.1	26.8	5.10069	2	9
RI12	FALL	6	1.5000	0	6	13.8950	7.0	22.5	4.78333	0	8
RI21	WINTER	3	0.0000	0	0	4.5000	2.0	7.0	0.83333	0	2
RI21	SPRING	7	0.7143	0	3	15.7250	6.2	22.3	2.00000	0	4
RI21	SUMMER	11	2.6364	0	12	24.9864	23.0	26.6	4.75000	1	8
RI21	FALL	6	0.6667	0	3	14.3667	6.0	23.9	4.41667	0	8
RI22	WINTER	3	0.0000	0	0	4.5000	2.0	7.0	0.83333	0	2
RI22	SPRING	7	0.5714	0	2	15.7250	6.2	22.3	2.00000	0	4

Table 15 . - Continued.

B. TYRANNUS SEASONAL MEAN CATCH PER UNIT EFFORT (N/T)-1976.

LOCATION	SEASON	OBS	CATCH/UNIT EFFORT			TEMPERATURE (C)			SALINITY (PPT)		
			MEAN	MIN	MAX	MEAN	MIN	MAX	MEAN	MIN	MAX
RI22	SUMMER	12	0.41667	0	3	25.0083	23.0	26.5	5.0625	1.0	9.5
RI22	FALL	6	1.50000	0	7	14.3667	6.0	23.9	4.4167	0.0	8.0
SE01	WINTER	1	0.00000	0	0	5.5000	5.0	6.0	2.0000	2.0	2.0
SE01	SPRING	6	0.83333	0	3	13.5250	9.2	19.1	8.5000	4.0	12.0
SE01	SUMMER	5	0.00000	0	0	24.4500	23.0	25.0	12.4500	10.0	14.0
SE01	FALL	7	0.14286	0	1	10.8143	5.9	19.7	11.2857	6.0	17.0
SE02	WINTER	1	0.00000	0	0	5.5000	5.0	6.0	2.0000	2.0	2.0
SE02	SPRING	5	0.00000	0	0	14.3000	10.0	19.1	8.5000	4.0	12.0
SE02	SUMMER	5	0.00000	0	0	24.4500	23.0	25.0	12.4500	10.0	14.0
SE02	FALL	6	0.00000	0	0	9.3417	5.9	17.8	10.8333	6.0	17.0
SE11	WINTER	2	0.00000	0	0	3.7000	2.0	5.5	4.7500	2.0	8.0
SE11	SPRING	6	0.00000	0	0	14.8333	6.2	19.8	6.5000	5.0	11.0
SE11	SUMMER	8	0.12500	0	1	24.6562	23.0	27.0	11.2813	9.0	13.0
SE11	FALL	8	0.00000	0	0	12.0562	5.0	20.7	10.8750	7.0	15.0
SE12	WINTER	2	0.00000	0	0	3.7000	2.0	5.5	4.7500	2.0	8.0
SE12	SPRING	5	0.00000	0	0	14.4700	6.2	19.0	6.8750	5.0	11.0
SE12	SUMMER	8	0.00000	0	0	24.5196	23.0	27.0	11.2813	9.0	13.0
SE12	FALL	7	0.57143	0	2	10.8357	5.0	20.0	10.2857	7.0	15.0
SE21	SPRING	4	0.00000	0	0	14.8958	10.2	18.5	5.5000	4.0	7.0
SE21	SUMMER	6	0.00000	0	0	24.8667	23.4	26.5	9.6417	8.0	12.0
SE21	FALL	4	0.00000	0	0	13.5750	5.5	20.5	9.5000	6.0	13.0
SE22	SPRING	4	0.00000	0	0	14.8958	10.2	18.5	5.5000	4.0	7.0
SE22	SUMMER	6	0.00000	0	0	24.8667	23.4	26.5	9.7250	8.0	12.0
SE22	FALL	4	0.00000	0	0	13.5750	5.5	20.5	9.5000	6.0	13.0
SE31	WINTER	5	0.00000	0	0	3.7200	1.0	6.8	1.3000	0.0	7.0
SE31	SPRING	8	0.87500	0	7	13.1937	7.0	19.8	4.5714	0.0	8.0
SE31	SUMMER	16	0.31250	0	2	24.7594	22.9	28.0	8.8438	5.0	11.0
SE31	FALL	11	0.09091	0	1	14.5182	4.0	20.8	8.1364	3.0	13.0
SE32	WINTER	5	0.00000	0	0	3.7200	1.0	6.8	1.3000	0.0	7.0
SE32	SPRING	6	0.16667	0	1	14.1833	7.0	19.8	5.0000	0.0	8.0
SE32	SUMMER	16	0.00000	0	0	24.7312	22.9	28.0	8.8438	5.0	11.0
SE32	FALL	11	0.18182	0	1	14.5182	4.0	20.8	8.1364	3.0	13.0
SSC1	WINTER	9	0.00000	0	0	3.1083	0.2	6.0	3.2292	0.0	9.0
SSC1	SPRING	16	0.25000	0	2	13.1980	4.6	22.9	3.1844	0.0	8.0
SSC1	SUMMER	29	0.55172	0	6	24.6603	22.3	29.0	7.6652	3.0	10.0
SSC1	FALL	20	0.90000	0	4	16.2975	6.0	22.5	7.3000	0.0	11.0
SSC2	WINTER	9	0.00000	0	0	3.1905	0.2	6.0	3.2292	0.0	9.0
SSC2	SPRING	16	0.12500	0	2	13.2250	4.6	22.9	3.3344	0.0	8.0
SSC2	SUMMER	29	0.55172	0	4	24.6603	22.3	29.0	7.6652	3.0	10.0
SSC2	FALL	20	0.30000	0	2	16.2975	6.0	22.5	7.3000	0.0	11.0
SW11	WINTER	1	0.00000	0	0	3.0000	2.5	3.5	5.7500	5.5	6.0
SW11	SPRING	4	0.00000	0	0	15.0750	10.8	17.8	4.2500	2.0	6.0
SW11	SUMMER	7	0.57143	0	2	25.0500	23.5	26.0	10.6429	6.0	15.0
SW11	FALL	4	4.75000	0	19	11.1750	6.0	18.2	8.0000	4.0	13.0
SW12	WINTER	1	0.00000	0	0	3.0000	2.5	3.5	5.7500	5.5	6.0
SW12	SPRING	5	0.00000	0	0	14.2500	10.8	17.8	4.4500	2.0	6.0
SW12	SUMMER	8	1.00000	0	4	25.0312	23.5	26.0	10.1563	6.0	15.0
SW12	FALL	5	1.20000	0	5	13.0600	6.0	20.7	9.4000	4.0	15.0
SW21	WINTER	6	0.00000	0	0	3.5583	1.0	4.5	2.5000	0.0	9.0
SW21	SPRING	8	0.12500	0	1	14.1375	7.0	20.5	3.0000	0.0	7.0
SW21	SUMMER	15	1.40000	0	9	25.0900	23.3	28.0	7.6667	3.0	12.0

Table 15 . - Continued.

B. TYRANNUS SEASONAL MEAN CATCH PER UNIT EFFORT (N/T)-1976.

LOCATION	SEASON	OBS	CATCH/UNIT EFFORT			TEMPERATURE (C)			SALINITY (PPT)		
			MEAN	MIN	MAX	MEAN	MIN	MAX	MEAN	MIN	MAX
SW22	SUMMER	15	0.00000	0	0	25.0900	23.3	28.0	7.76667	3	14
SW22	FALL	11	0.63636	0	3	14.5409	4.9	21.1	7.63636	3	14
W-11	WINTER	5	0.00000	0	0	2.9200	0.5	4.9	3.57500	0	8
W-11	SPRING	12	0.25000	0	2	15.0767	7.1	23.0	1.56667	0	8
W-11	SUMMER	21	1.90476	0	9	24.9786	23.3	28.0	5.73690	2	10
W-11	FALL	15	2.46667	0	11	17.0133	5.9	23.0	5.80000	0	13
W-12	WINTER	5	0.00000	0	0	2.9200	0.5	4.9	3.57500	0	8
W-12	SPRING	11	0.81818	0	3	14.5864	7.1	23.0	1.70707	0	8
W-12	SUMMER	21	0.80952	0	4	25.0000	23.3	28.0	5.73690	2	10
W-12	FALL	16	4.12500	0	49	16.5594	5.9	23.0	5.43750	0	13
W-21	WINTER	2	0.00000	0	0	2.1750	1.8	3.0	2.50000	2	4
W-21	SPRING	5	0.00000	0	0	13.1000	6.5	17.5	0.75000	0	2
W-21	SUMMER	9	9.55556	0	73	25.7722	24.1	27.0	3.80556	2	5
W-21	FALL	7	2.28571	0	10	16.1357	6.0	23.0	4.44048	0	7
W-22	WINTER	2	0.00000	0	0	2.1750	1.8	3.0	2.50000	2	4
W-22	SPRING	5	1.80000	0	6	13.1000	6.5	17.5	0.75000	0	2
W-22	SUMMER	9	1.77778	0	12	25.7167	24.1	27.0	3.80556	2	5
W-22	FALL	7	0.71429	0	4	16.1357	6.0	23.0	4.44048	0	7
W-31	WINTER	5	0.00000	0	0	3.6175	1.2	7.0	1.02500	0	4
W-31	SPRING	8	0.87500	0	4	14.0312	6.5	21.3	0.78571	0	4
W-31	SUMMER	12	3.58333	0	14	24.6792	23.2	26.1	4.12500	2	6
W-31	FALL	10	1.10000	0	4	15.6467	6.5	21.4	4.38333	0	7
W-32	WINTER	5	0.00000	0	0	3.6175	1.2	7.0	1.02500	0	4
W-32	SPRING	8	1.00000	0	8	14.0312	6.5	21.3	0.82143	0	4
W-32	SUMMER	12	0.91667	0	7	24.7000	23.2	26.1	4.12500	2	6
W-32	FALL	10	0.20000	0	1	15.6467	6.5	21.4	4.38333	0	7

Table 16. - A chronological summary of temperature avoidance studies on Atlantic menhaden, Brevoortia tyrannus.
All tests were conducted at near air-saturated levels of dissolved oxygen and pH of 7 to 8.

DATE	REPLICATE	NO. OF FISH PER TEST	SIZE RANGE (TL IN MM) MIN. - MAX.	SALINITY (PPT)	LIGHT LEVEL (FOOT CANDLE) (LUX)	ACCLIMATION TEMPERATURE (C) (F)	AVOIDANCE TEMPERATURE (C) (F)
BREVOORTIA TYRANNUS							
22 JUN 70	1	1	- -	4	21.5 2.0	22.5 72	28 82
3 AUG 71	1	4	61 66	3.2	215 20.0	27 80	32 89
	2	4	67 70	3.2	215 20.0	27 80	32 89
4 AUG 71	1	4	61 70	3	21.5 2.0	25 77	29 84
	2	3	59 72	3	21.5 2.0	25 77	29 84
25 SEP 74	1	4	80 110	6	215 20.0	21 69	26 78
	2	4	78 95	6	215 20.0	21 69	31 87
7 NOV 74	1	4	74 81	6	215 20.0	15 59	27 80
	2	4	70 79	6	215 20.0	15 59	27 80
20 JUN 75	1	4	49 52	5.5	215 20.0	22 71	31 87
	2	4	42 46	5.5	215 20.0	22 71	31 87
11 JUL 75	1	4	68 80	5.5	215 20.0	23 73	31.1 87
	2	3	64 76	5.5	215 20.0	23 73	31.1 87
23 JUL 75	1	2	86 90	5.5	21.5 2.0	24 75	27 80
7 AUG 75	1	4	89 94	5.5	215 20.0	26 78	31 87
	2	4	70 96	5.5	215 20.0	26 78	31 87

Table 16. - Continued.

DATE	REPLICATE	NO. OF FISH PER TEST	SIZE RANGE (TL IN MM)		SALINITY (PPT)	LIGHT LEVEL (FOOT (LUX) CANDLES)		ACCLIMATION TEMPERATURE		AVOIDANCE TEMPERATURE		
			MIN.	MAX.		(C)	(F)	(C)	(F)			
BREVDORTIA TYRANNUS												
24 SEP 75	1	3	83	104	6.5	215	20.0	22	71	27	80	
	2	2	94	101	6.5	215	20.0	22	71	27	80	
1 OCT 75	1	4	102	132	6	215	20.0	22	71	25	77	
	2	4	104	144	6	215	20.0	22	71	25	77	
21 OCT 75	1	4	78	110	6	215	20.0	19	66	23	73	
	2	4	70	106	6	215	20.0	19	66	23	73	
4 NOV 75	1	4	90	115	6	215	20.0	16	60	24	75	
	2	4	89	114	6	215	20.0	16	60	22	71	
6 NOV 75	1	3	91	108	6	21.5	2.0	18	64	21	69	
	2	3	92	102	6	21.5	2.0	18	64	24	75	
7 NOV 75	1	4	96	102	6	215	20.0	18	64	21	69	
	2	4	86	99	6	215	20.0	18	64	25	77	
14 MAY 76	1	4	31	40	5	215	20.0	18	64	26	78	
	2	4	35	37	5	215	20.0	18	64	29	84	
26 MAY 76	1	4	45	50	6	215	20.0	18	64	27	80	
	2	4	41	53	6	215	20.0	18	64	27	80	
8 JUN 76	1	4	130	141	5.5	215	20.0	19	66	26	78	
	2	4	128	138	5.5	215	20.0	19	66	26	78	

Table 16. - Continued.

DATE	REPLICATE	NO. OF FISH PER TEST	SIZE RANGE (TL IN MM)		SALINITY (PPT)	LIGHT LEVEL (FOOT (LUX) CANDLES)		ACCLIMATION TEMPERATURE (C) (F)		AVOIDANCE TEMPERATURE (C) (F)		
			MIN.	MAX.								
BREVOORTIA TYRANNUS												
16 JUN 76	1	4	38	50	5.5	215	20.0	21	69	28	82	
	2	4	40	51	5.5	215	20.0	21	69	28	82	
1 JUL 76	1	4	51	61	6	215	20.0	24	75	27	80	
	2	3	57	68	6	215	20.0	24	75	28	82	
2 JUL 76	1	4	61	89	3	215	20.0	23	73	28	82	
	2	4	66	71	3	215	20.0	23	73	28	82	
8 JUL 76	1	4	59	61	3.5	215	20.0	26	78	28	82	
	2	4	55	65	3.5	215	20.0	26	78	28	82	
3 AUG 76	1	4	78	88	4.5	215	20.0	26	78	30.6	87	
	2	4	72	86	4.5	215	20.0	26	78	30.6	87	
8 SEP 76	1	4	79	85	4	215	20.0	22	71	30	86	
	2	4	84	91	4	215	20.0	22	71	30	86	
5 OCT 76	1	4	75	93	5	215	20.0	20	68	27.2	80	
	2	4	80	83	5	215	20.0	20	68	27.2	80	
15 OCT 76	1	4	60	73	10	215	20.0	17	62	23.9	75	
	2	4	60	73	10	215	20.0	17	62	26.7	80	
2 JUN 77	1	4	37	55	7	21.5	2.0	21	69	31	87	
	2	4	39	45	7	21.5	2.0	21	69	29	84	

Table 16. - Continued.

DATE	REPLICATE	NO. OF FISH PER TEST	SIZE RANGE (TL IN MM)		SALINITY (PPT)	LIGHT LEVEL (FOOT (LUX) CANDLES)		ACCLIMATION TEMPERATURE		AVOIDANCE TEMPERATURE	
			MIN.	MAX.				(C)	(F)	(C)	(F)
BREVOORTIA TYRANNUS											
2 JUN 77	1	4	34	46	7	215	20.0	21	69	27	80
	2	4	33	45	7	215	20.0	21	69	29	84
8 JUN 77	1	4	43	55	7	215	20.0	20	68	27	80
	2	4	42	53	7	215	20.0	20	68	32	89
16 SEP 77	1	4	68	76	6	215	20.0	20	68	27	80
	2	4	71	80	6	215	20.0	20	68	30	86

Table 17. - Components for the multiple linear regression equation to estimate avoidance temperatures (C) for the Atlantic menhaden, Brevoortia tyrannus.

* = Significant at P.05 or greater; and ** = significant at P.01 or greater.

Constant (a) = 20.692		F(2, 50) = 31.699**			N = 53
Standard Error of Estimate = 1.943		R = 0.748**			R ² = 0.559
Variable	Mean ($\bar{X}_i$)	Correlation (r) With Y	Regression Coefficient (b _i)	Standard Error of b _i	Standardized Reg. Coef.
Acclimation Temperature (C)	21.2	0.616**	0.523**	0.084	0.589
Total Length (mm)	73.6	-0.462**	-0.056**	0.012	-0.426

Table 18. - Percent occurrence by month of ambient water temperature of or above 25 C in the Delaware River near Artificial Island, 1970-1976.¹

	≥ 25 C					≥ 26 C					≥ 27 C				
	Jun	July	Aug	Sep	% yr	Jun	Jul	Aug	Sep	% yr	Jun	Jul	Aug	Sep	% yr
1970	0.0	58.0	100.0	12.8	14.5	0.0	21.2	79.0	0.0	8.5	0.0	0.2	15.8	0.0	1.5
1971	-	90.0	57.7	29.2		-	39.1	33.4	0.3		-	0.0	1.0	0.0	
1972	0.0	43.1	41.6	11.6	8.1	0.0	29.5	7.9	0.7	3.2	0.0	13.9	0.0	0.0	1.2
1973	27.8	99.9	90.3	19.9	20.1	4.4	51.6	75.9	19.9	12.8	0.0	7.0	46.5	19.3	6.1
1974	0.0	82.1	98.1	7.4	15.9	0.0	23.4	43.8	6.4	6.2	0.0	0.2	1.0	1.0	0.2
1975	0.3	82.5	97.1	0.0	15.3	0.0	42.0	77.3	0.0	10.1	0.0	9.4	9.3	0.0	1.6
1976	25.4	82.0	84.4	0.0	16.2	7.7	11.6	8.2	0.0	2.3	0.0	0.0	0.0	0.0	0.0
Mean					15.0					7.2					1.8

Table 18 - Continued.

	≥ 28 C					≥ 30 C					No observations of or above 30 C
	Jun	Jul	Aug	Sep	% yr	Jun	Jul	Aug	Sep	% yr	
1970	0.0	0.0	5.3	0.0	0.4	0.0	0.0	0.0	0.0	0.0	
1971	-	0.0	0.0	0.0		-	0.0	0.0	0.0		
1972	0.0	5.8	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	
1973	0.0	0.7	19.9	13.5	2.8	0.0	0.0	0.5	0.6	0.0	
1974	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
1975	0.0	0.9	6.8	0.0	0.7	0.0	0.0	1.2	0.0	0.1	
1976	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Mean					0.7					*	

*Less than 0.05

¹Data from Reedy Island monitoring station, U.S.G.S. 1970-76.

Table 19. - A. MITCHILLI SEASONAL MEAN CATCH PER UNIT EFFORT (N/T)-1975.

LOCATION	SEASON	OBS	CATCH/UNIT EFFORT			TEMPERATURE (C)			SALINITY (PPT)		
			MEAN	MIN	MAX	MEAN	MIN	MAX	MEAN	MIN	MAX
CHA1	SPRING	3	48.000	0	121	13.0500	3.0	22.8	5.86667	1.0	12.0
CHA1	SUMMER	5	4.800	0	13	24.7500	22.0	26.1	5.20000	2.0	9.0
CHA1	FALL	2	16.500	4	29	15.3250	10.3	20.0	4.00000	0.0	9.0
CHA2	WINTER	1	1.000	1	1	6.0000	6.0	6.0	5.75000	5.5	6.0
CHA2	SPRING	3	25.000	7	55	12.3000	3.0	22.8	4.03333	0.0	12.0
CHA2	SUMMER	14	3.929	0	7	24.5429	21.0	28.9	5.05495	0.0	10.0
CHA2	FALL	7	13.857	6	25	14.5000	9.9	20.0	3.75000	1.0	10.0
CHA3	WINTER	1	2.000	2	2	7.6500	7.4	7.9	4.00000	4.0	4.0
CHA3	SPRING	3	13.333	0	28	12.6667	4.0	22.8	2.00000	0.0	6.0
CHA3	SUMMER	4	5.500	0	12	25.3250	24.2	26.2	2.00000	0.0	4.0
CHA3	FALL	3	21.000	1	34	14.2333	11.2	16.5	2.25000	1.0	3.0
CHA4	WINTER	1	0.000	0	0	.	.	5.3	.	.	0.0
CHA4	SPRING	3	12.000	2	19	12.1833	4.0	23.0	1.83333	0.0	6.0
CHA4	SUMMER	13	3.231	0	7	25.6577	20.1	28.2	2.04968	0.0	5.5
CHA4	FALL	9	21.554	0	122	14.3000	10.0	19.0	2.58333	0.5	5.0
CHA5	SPRING	3	4.000	0	11	12.6500	5.0	23.0	0.83333	0.0	3.0
CHA5	SUMMER	5	4.600	1	8	25.2350	21.8	27.0	1.23750	0.0	3.5
CHA5	FALL	2	25.000	7	43	17.4750	15.9	19.0	0.00000	0.0	0.0
E-11	WINTER	4	0.250	0	1	4.0625	1.8	6.0	0.65833	0.0	1.5
E-11	SPRING	8	578.250	0	2530	11.7562	1.0	23.5	3.65625	0.0	11.0
E-11	SUMMER	11	289.455	0	1302	25.9192	23.0	30.0	4.68687	0.0	9.5
E-11	FALL	5	131.400	24	450	15.5900	11.3	19.0	4.40000	2.0	9.0
E-12	WINTER	4	0.500	0	2	4.0625	1.8	6.0	0.28333	0.0	1.5
E-12	SPRING	8	59.875	0	316	11.9812	1.0	23.5	3.87500	0.0	11.0
E-12	SUMMER	11	10.909	0	54	26.0364	23.0	30.0	4.39773	0.0	9.5
E-12	FALL	4	41.000	5	112	15.2500	11.3	19.0	4.75000	2.0	9.0
E-21	WINTER	5	3.400	0	17	4.7300	1.8	7.7	2.45000	0.0	4.5
E-21	SPRING	8	9.000	0	30	11.8312	1.3	23.5	2.65625	0.0	9.5
E-21	SUMMER	22	20.136	0	210	25.6500	20.9	29.0	4.21591	0.0	9.5
E-21	FALL	16	8.750	0	28	16.1544	9.3	19.6	3.14231	0.0	8.0
E-22	WINTER	5	2.000	0	9	4.7300	1.8	7.7	2.37500	0.0	4.5
E-22	SPRING	7	35.286	0	135	12.9500	1.3	23.5	1.92857	0.0	5.0
E-22	SUMMER	21	11.905	1	55	25.5690	20.9	31.3	4.14286	0.0	9.5
E-22	FALL	13	19.154	0	60	15.9958	9.3	19.6	3.39583	0.0	8.0
E-31	WINTER	4	0.250	0	1	3.3917	2.0	5.5	0.83333	0.0	2.0
E-31	SPRING	7	6.857	0	28	11.1929	2.0	22.8	2.67857	0.0	9.0
E-31	SUMMER	6	3.333	1	6	24.9583	23.0	26.4	2.41667	0.0	7.0
E-31	FALL	4	1.750	0	5	15.6125	11.4	19.6	3.18750	1.0	8.0
E-32	WINTER	4	0.250	0	1	3.3917	2.0	5.5	0.83333	0.0	2.0
E-32	SPRING	7	42.857	0	186	11.1929	2.0	22.8	2.67857	0.0	9.0
E-32	SUMMER	6	4.667	0	21	24.9583	23.0	26.4	2.41667	0.0	7.0
E-32	FALL	4	6.000	1	16	15.6125	11.4	19.6	3.18750	1.0	8.0
E-41	WINTER	4	0.500	0	2	3.3292	2.0	5.1	0.66667	0.0	2.0
E-41	SPRING	7	26.000	0	168	10.9357	2.0	22.8	1.96429	0.0	9.0
E-41	SUMMER	13	9.000	0	38	25.0692	19.1	28.0	2.36538	0.0	6.0
E-41	FALL	9	15.667	2	38	14.5000	9.9	19.0	3.08333	0.5	5.0
E-42	WINTER	4	0.250	0	1	3.3292	2.0	5.1	0.66667	0.0	2.0
E-42	SPRING	7	15.571	0	91	10.9357	2.0	22.8	1.96429	0.0	9.0
E-42	SUMMER	14	8.857	0	57	25.2786	19.1	28.0	2.16071	0.0	6.0
E-42	FALL	9	28.889	3	59	14.5000	9.9	19.0	3.08333	0.5	5.0
E-51	WINTER	4	0.000	0	0	3.2000	1.0	5.3	0.00000	0.0	0.0
E-51	SPRING	5	50.200	1	216	12.6400	2.0	21.6	1.25000	0.0	3.5
E-51	SUMMER	6	160.500	8	545	24.0500	23.9	28.9	1.29167	0.0	4.0
E-51	FALL	1	4.000	4	4	16.2500	16.0	16.5	1.25000	1.0	1.5

Table 19 . - Continued.

A. MITCHILLI SEASONAL MEAN CATCH PER UNIT EFFORT (N/T)-1975.

LOCATION	SEASON	OBS	CATCH/UNIT EFFORT			TEMPERATURE (C)			SALINITY (PPT)		
			MEAN	MIN	MAX	MEAN	MIN	MAX	MEAN	MIN	MAX
E-52	WINTER	4	0.250	0	1	3.3000	1.0	5.3	0.00000	0.0	0.0
E-52	SPRING	5	1.600	0	3	12.1800	2.0	21.6	0.65000	0.0	3.5
E-52	SUMMER	7	4.143	0	25	25.7214	23.5	28.9	1.29167	0.0	4.0
E-52	FALL	1	25.000	25	25	16.2500	16.0	16.5	1.25000	1.0	1.5
E-61	WINTER	4	0.000	0	0	3.3000	1.0	5.3	0.00000	0.0	0.0
E-61	SPRING	5	74.400	0	350	12.1100	2.0	21.6	0.65000	0.0	3.5
E-61	SUMMER	7	76.857	0	156	25.4821	21.8	28.9	1.07738	0.0	4.0
E-61	FALL	2	476.000	2	950	17.3750	15.5	19.0	0.00000	0.0	0.0
E-62	WINTER	4	0.000	0	0	3.3000	1.0	5.3	0.00000	0.0	0.0
E-62	SPRING	5	3.400	0	9	12.1100	2.0	21.6	0.65000	0.0	3.5
E-62	SUMMER	7	3.571	0	13	25.4821	21.8	28.9	1.07738	0.0	4.0
E-62	FALL	2	20.500	11	30	17.3750	15.5	19.0	0.00000	0.0	0.0
NE11	SPRING	3	31.000	3	84	18.3667	9.9	24.3	1.08333	0.0	3.5
NE11	SUMMER	6	82.667	3	227	25.5667	22.8	27.5	0.75000	0.0	3.0
NE12	SPRING	3	6.667	1	18	18.3667	9.9	24.3	1.08333	0.0	3.5
NE12	SUMMER	6	3.500	1	8	25.5667	22.8	27.5	0.75000	0.0	3.0
NE12	FALL	1	12.000	12	12	16.8500	16.7	17.0	0.50000	0.0	1.0
NW11	WINTER	2	0.000	0	0	5.9500	5.3	7.5	0.00000	0.0	0.0
NW11	SPRING	7	3.000	0	17	12.9786	3.0	23.0	1.07143	0.0	4.5
NW11	SUMMER	5	3.000	1	5	25.3625	23.0	26.8	1.76250	0.0	3.5
NW11	FALL	2	5.000	2	8	18.3500	16.5	20.0	0.00000	0.0	0.0
NW12	WINTER	2	0.000	0	0	5.9500	5.3	7.5	0.00000	0.0	0.0
NW12	SPRING	5	4.000	0	7	13.4600	3.0	23.0	1.20000	0.0	4.5
NW12	SUMMER	4	29.750	0	109	24.9958	23.0	26.5	1.39583	0.0	3.5
NW12	FALL	2	49.500	2	97	18.3500	16.5	20.0	0.25000	0.0	1.0
RI11	SPRING	2	14.500	14	15	18.1750	13.8	23.0	2.25000	1.5	3.0
RI11	SUMMER	3	7.000	1	19	26.4167	24.5	28.5	3.08333	0.0	6.5
RI12	SPRING	2	48.500	41	56	18.1750	13.8	23.0	2.25000	1.5	3.0
RI12	SUMMER	3	0.667	0	1	26.4167	24.5	28.5	3.08333	0.0	6.5
RI21	SPRING	1	9.000	9	9	22.5000	22.0	23.0	2.75000	2.5	3.0
RI21	SUMMER	3	10.667	0	23	26.0333	24.5	27.0	2.16667	0.0	3.5
RI22	SPRING	1	13.000	13	13	22.5000	22.0	23.0	2.75000	2.5	3.0
RI22	SUMMER	3	10.667	2	25	26.0333	24.5	27.0	2.16667	0.0	3.5
SE01	SPRING	5	210.800	10	634	16.9400	9.4	21.8	8.70000	6.5	12.0
SE01	SUMMER	8	76.875	2	540	25.5875	23.8	29.5	8.65625	0.0	14.0
SE02	SPRING	5	14.000	2	31	17.5400	9.4	21.8	8.78000	6.5	12.0
SE02	SUMMER	9	14.667	0	71	25.5222	23.8	29.5	8.69444	0.0	14.0
SE11	SPRING	5	43.400	13	97	16.5500	9.4	21.0	6.80000	3.5	12.0
SE11	SUMMER	11	29.182	2	106	25.3636	22.3	28.0	8.00273	0.0	14.0
SE11	FALL	3	143.333	19	366	16.3500	10.0	20.5	6.25000	3.5	11.0
SE12	SPRING	5	19.400	1	48	16.5300	9.5	21.0	6.30000	3.5	10.0
SE12	SUMMER	11	11.091	0	33	25.3636	22.3	28.0	8.02273	0.0	14.0
SE12	FALL	3	64.000	14	162	16.3500	10.0	20.5	6.25000	3.5	11.0
SE21	SPRING	5	51.800	4	97	16.4600	9.9	21.0	5.10000	3.0	8.0
SE21	SUMMER	9	176.556	7	1270	25.2889	23.5	27.5	5.39236	0.0	10.5
SE21	FALL	2	518.500	299	733	20.1250	20.0	20.5	6.87500	3.5	9.0
SE22	SPRING	5	53.400	10	192	16.4600	9.9	21.0	5.10000	3.0	8.0
SE22	SUMMER	9	8.222	2	24	25.2889	23.5	27.5	5.39236	0.0	10.5
SE22	FALL	2	62.000	56	68	20.1250	20.0	20.5	6.87500	3.5	9.0
SE31	WINTER	3	0.000	0	0	5.5333	4.2	6.0	2.16667	0.0	5.5
SE31	SPRING	8	124.250	0	348	11.2071	1.0	23.0	4.50000	0.0	11.0
SE31	SUMMER	19	178.053	28	455	24.6830	20.1	28.1	5.30186	0.0	10.5
SE31	FALL	10	209.000	3	982	15.4200	8.9	20.0	4.50000	1.0	9.0
SE32	WINTER	3	0.333	0	1	5.5333	4.2	6.0	2.16667	0.0	5.5

Table 19 . - Continued.

A. MITCHILLI SEASONAL MEAN CATCH PER UNIT EFFORT (N/T)-1975.

LOCATION	SEASON	OBS	CATCH/UNIT EFFORT			TEMPERATURE (C)			SALINITY (PPT)		
			MEAN	MIN	MAX	MEAN	MIN	MAX	MEAN	MIN	MAX
SE32	SPRING	8	28.250	0	130	11.2071	1.0	23.0	4.50000	0.0	11.0
SE32	SUMMER	18	21.833	0	109	24.7172	20.1	28.1	5.57668	2.0	10.5
SE32	FALL	9	24.778	3	64	15.9444	11.0	20.0	4.75000	1.0	9.0
SSC1	WINTER	8	0.000	0	0	4.9271	0.2	12.0	3.72857	0.0	6.0
SSC1	SPRING	11	129.636	0	660	12.7295	1.3	21.9	2.02597	0.0	9.0
SSC1	SUMMER	25	292.280	0	1542	25.2775	20.3	29.8	5.67708	0.0	9.0
SSC1	FALL	20	96.300	0	360	16.2408	9.8	20.0	4.04500	1.0	9.0
SSC2	WINTER	8	2.750	0	20	5.0521	0.2	12.0	3.72857	0.0	6.0
SSC2	SPRING	11	194.909	0	860	12.7295	1.3	21.9	2.02597	0.0	9.0
SSC2	SUMMER	24	284.750	0	990	25.1286	20.3	29.8	5.65465	0.0	9.0
SSC2	FALL	21	105.286	0	402	16.2918	9.8	20.0	3.91465	1.0	9.0
SW11	SUMMER	4	51.000	1	162	24.7292	22.0	27.8	6.37500	2.0	9.0
SW11	FALL	3	101.667	14	276	17.8167	10.6	23.8	3.58333	0.0	8.0
SW12	SUMMER	1	1.000	1	1	22.2500	22.0	22.5	9.00000	9.0	9.0
SW12	FALL	2	16.500	13	20	15.2750	10.6	20.0	1.50000	0.0	3.0
SW21	WINTER	3	0.000	0	0	5.5000	5.0	6.0	1.75000	0.0	5.0
SW21	SPRING	6	14.500	0	30	11.5917	3.2	21.0	1.87500	0.0	7.0
SW21	SUMMER	16	65.313	0	340	25.2175	21.0	29.5	4.67292	0.0	10.0
SW21	FALL	10	14.100	0	90	14.0854	8.7	18.5	3.56250	0.0	10.0
SW22	WINTER	3	1.333	0	3	5.5000	5.0	6.0	2.08333	0.0	6.0
SW22	SPRING	6	26.500	0	92	11.3500	3.2	21.0	2.20833	0.0	7.0
SW22	SUMMER	15	8.667	0	40	25.0933	21.0	29.5	4.75714	0.0	9.5
SW22	FALL	9	17.333	0	90	14.7875	8.7	20.0	3.06250	0.0	10.0
W-11	WINTER	4	0.250	0	1	6.2125	4.0	8.2	1.12500	0.0	3.0
W-11	SPRING	6	56.500	0	280	11.4667	3.2	21.0	2.83333	0.0	7.0
W-11	SUMMER	18	94.278	1	616	25.1004	19.9	28.5	2.73646	0.0	8.0
W-11	FALL	18	49.222	0	307	16.5792	9.1	20.0	1.92674	0.0	6.0
W-12	WINTER	4	3.250	0	13	6.2125	4.0	8.2	1.12500	0.0	3.0
W-12	SPRING	6	61.167	0	197	13.5750	3.2	21.0	2.37500	0.0	7.0
W-12	SUMMER	20	102.300	0	706	25.1113	19.9	28.5	3.07353	0.0	8.0
W-12	FALL	17	19.529	5	67	15.4251	9.1	20.0	1.81078	0.0	6.0
W-21	WINTER	2	0.000	0	0	5.4500	4.0	6.2	0.00000	0.0	0.0
W-21	SPRING	6	106.333	0	452	12.2167	2.6	21.0	1.62500	0.0	4.5
W-21	SUMMER	3	185.667	75	320	25.5167	24.7	26.9	1.50000	0.0	4.0
W-21	FALL	3	103.667	1	205	13.9583	11.0	16.5	1.41667	0.0	2.0
W-22	WINTER	2	0.000	0	0	5.4500	4.0	6.2	0.00000	0.0	0.0
W-22	SPRING	6	19.667	0	88	12.2167	2.6	21.0	1.62500	0.0	4.5
W-22	SUMMER	3	4.000	0	10	25.5167	24.7	26.9	1.50000	0.0	4.0
W-22	FALL	3	99.000	1	230	13.9583	11.0	16.5	1.41667	0.0	2.0
W-31	WINTER	4	0.000	0	0	6.6500	5.3	8.8	0.29167	0.0	1.0
W-31	SPRING	5	33.600	0	101	11.3700	2.8	21.0	1.70000	0.0	4.5
W-31	SUMMER	15	121.600	0	698	25.8567	20.9	29.0	2.31333	0.0	8.0
W-31	FALL	7	53.000	2	146	15.2286	10.0	18.9	1.87500	0.5	4.0
W-32	WINTER	4	0.000	0	0	6.6500	5.3	8.8	0.29167	0.0	1.0
W-32	SPRING	5	36.200	0	150	11.3700	2.8	21.0	1.70000	0.0	4.5
W-32	SUMMER	13	18.923	0	96	25.8500	20.9	29.0	1.86538	0.0	5.0
W-32	FALL	7	23.286	5	52	15.2286	10.0	18.9	1.89286	0.5	4.0

Table 20. - A. NITCHILLI SEASONAL MEAN CATCH PER UNIT EFFORT (N/T)-1976.

LOCATION	SEASON	OBS	CATCH/UNIT EFFORT			TEMPERATURE (C)			SALINITY (PPT)		
			MEAN	MIN	MAX	MEAN	MIN	MAX	MEAN	MIN	MAX
CHA1	WINTER	1	0.000	0	0	1.7500	1.5	2.0	9.0000	8	10
CHA1	SPRING	6	40.667	2	139	15.2800	10.1	19.9	6.0167	1	8
CHA1	SUMMER	8	3.875	0	9	24.6812	23.5	26.0	11.0625	6	15
CHA1	FALL	6	12.500	0	70	12.0750	6.0	20.9	10.4167	4	16
CHA2	WINTER	5	0.000	0	0	2.9500	1.7	6.5	3.6500	0	8
CHA2	SPRING	6	56.833	9	149	12.6000	7.0	17.4	3.9167	0	10
CHA2	SUMMER	14	2.286	0	17	25.1071	22.8	28.0	8.2679	4	13
CHA2	FALL	8	9.000	0	33	15.2437	5.0	20.8	8.3750	3	14
CHA3	WINTER	3	0.000	0	0	3.8500	2.0	5.3	1.0000	0	2
CHA3	SPRING	6	21.833	0	100	14.6083	6.6	21.2	3.3333	1	6
CHA3	SUMMER	7	11.000	0	63	25.2000	24.0	26.5	5.5357	2	10
CHA3	FALL	6	27.167	0	97	14.4583	7.0	20.1	4.0833	0	9
CHA4	WINTER	3	0.000	0	0	3.8000	1.0	6.3	0.6667	0	2
CHA4	SPRING	7	21.143	1	70	13.3274	6.5	21.3	2.0714	0	8
CHA4	SUMMER	12	15.833	0	80	24.5708	23.2	26.0	4.5000	1	7
CHA4	FALL	10	7.100	0	35	15.1650	6.5	21.2	4.3500	0	10
CHA5	WINTER	2	0.000	0	0	2.5000	2.0	3.0	2.5000	2	3
CHA5	SPRING	5	25.000	0	52	12.9367	7.5	20.0	1.2667	0	3
CHA5	SUMMER	10	5.600	0	35	24.7672	23.0	26.5	3.2111	1	5
CHA5	FALL	7	5.000	0	27	13.8500	6.1	22.5	2.4286	0	8
E-11	WINTER	4	0.000	0	0	2.1958	1.5	5.1	4.0833	0	8
E-11	SPRING	7	307.000	0	1790	13.7833	7.0	20.1	4.6667	2	8
E-11	SUMMER	9	223.889	46	507	24.6556	22.9	26.9	7.0556	5	9
E-11	FALL	6	209.667	0	652	13.4000	5.0	22.2	6.9167	3	11
E-12	WINTER	4	0.000	0	0	2.1958	1.5	5.1	4.0833	0	8
E-12	SPRING	7	74.429	0	262	13.7833	7.0	20.1	4.0000	0	8
E-12	SUMMER	9	29.667	1	129	24.6778	22.9	26.9	7.0556	5	9
E-12	FALL	6	6.833	0	17	13.4417	5.0	22.2	6.9167	3	11
E-21	WINTER	5	0.000	0	0	2.8200	1.0	4.8	4.1000	0	7
E-21	SPRING	10	24.700	0	194	12.5911	7.1	22.8	2.8144	0	8
E-21	SUMMER	21	35.619	0	434	24.6738	22.5	28.8	6.8333	2	10
E-21	FALL	15	67.200	0	605	16.6200	6.0	24.1	6.8000	0	12
E-22	WINTER	5	0.200	0	1	2.8200	1.0	4.8	4.1000	0	9
E-22	SPRING	9	43.000	0	146	13.2354	7.5	22.8	3.1250	0	8
E-22	SUMMER	21	25.571	0	266	24.6738	22.5	28.8	6.8333	2	10
E-22	FALL	14	28.643	0	86	17.1000	6.0	24.1	7.2500	0	12
E-31	WINTER	2	0.000	0	0	2.7000	1.8	3.0	1.5000	1	2
E-31	SPRING	7	49.286	0	178	13.0167	6.5	22.0	3.6429	0	8
E-31	SUMMER	9	6.778	0	21	25.0556	22.5	27.5	4.4722	2	7
E-31	FALL	6	11.833	0	38	12.2083	5.0	19.5	4.1667	0	9
E-32	WINTER	2	0.000	0	0	2.7000	1.8	3.0	1.5000	1	2
E-32	SPRING	7	31.429	0	102	13.0167	6.5	22.0	3.3571	0	6
E-32	SUMMER	9	8.222	0	30	25.0556	22.5	27.5	4.4722	2	7
E-32	FALL	6	48.667	0	222	12.2083	5.0	19.5	4.1667	0	9
E-41	WINTER	5	0.000	0	0	3.7800	0.5	7.9	1.7000	0	6
E-41	SPRING	8	16.375	0	85	13.2786	6.5	21.5	2.5476	0	8
E-41	SUMMER	12	12.667	0	51	24.5083	23.2	26.0	4.5000	1	7
E-41	FALL	11	5.545	0	23	15.6000	6.1	21.5	4.8192	0	9
E-42	WINTER	5	0.000	0	0	3.7800	0.5	7.9	1.7000	0	6
E-42	SPRING	7	26.571	0	74	13.2786	6.5	21.5	2.9762	1	8
E-42	SUMMER	12	28.750	2	99	24.4330	23.2	26.0	4.5000	1	7
E-42	FALL	11	47.091	0	263	15.6000	6.1	21.5	4.8192	0	9
E-51	WINTER	2	0.000	0	0	3.2750	3.0	3.8	2.0000	2	2
E-51	SPRING	5	79.000	0	243	14.4125	7.5	22.0	2.3000	0	5

Table 20 . - Continued.

A. MITCHILLI SEASONAL MEAN CATCH PER UNIT EFFORT (N/T)-1976.

LOCATION	SEASON	OBS	CATCH/UNIT EFFORT			TEMPERATURE (C)			SALINITY (PPT)		
			MEAN	MIN	MAX	MEAN	MIN	MAX	MEAN	MIN	MAX
E-51	SUMMER	7	140.571	0	367	24.8214	23.0	26.8	3.50000	2	5
E-51	FALL	6	69.833	0	306	12.6667	5.0	22.9	3.15000	0	8
E-52	WINTER	2	0.000	0	0	3.2750	3.0	3.8	2.00000	2	2
E-52	SPRING	5	21.600	0	42	14.4125	7.5	22.0	2.30000	0	5
E-52	SUMMER	7	5.571	2	12	24.8405	23.0	26.8	3.30000	2	5
E-52	FALL	6	27.000	0	121	12.6667	5.0	22.9	3.08333	0	8
E-61	WINTER	2	0.000	0	0	2.6750	2.2	3.0	3.75000	3	4
E-61	SPRING	5	128.200	1	380	12.9300	7.0	19.8	1.80000	0	4
E-61	SUMMER	10	103.100	0	293	24.5000	22.6	26.1	3.85000	1	6
E-61	FALL	7	50.429	0	140	13.7143	6.0	22.2	2.50000	0	8
E-62	WINTER	2	0.000	0	0	2.6750	2.2	3.0	3.75000	3	4
E-62	SPRING	5	27.200	0	85	12.9300	7.0	19.8	1.80000	0	4
E-62	SUMMER	10	20.200	0	108	24.5000	22.6	26.1	3.85000	1	6
E-62	FALL	7	21.143	0	123	13.7143	6.0	22.2	2.50000	0	8
NE11	SPRING	4	63.750	0	215	14.4750	7.2	22.1	0.87500	0	2
NE11	SUMMER	6	224.833	28	876	24.6833	23.3	26.0	2.83333	1	4
NE11	FALL	5	31.400	0	76	13.3400	5.9	21.0	1.00000	0	5
NE12	SPRING	4	2.250	0	5	14.4750	7.2	22.1	0.87500	0	2
NE12	SUMMER	5	40.200	0	105	24.5950	23.3	26.0	2.80000	1	4
NE12	FALL	5	3.600	0	11	13.3400	5.9	21.0	1.00000	0	5
NE21	SPRING	1	19.000	19	19	14.5000	14.5	14.5	1.00000	1	1
NE21	SUMMER	1	34.000	34	34	25.0000	25.0	25.0	1.00000	1	1
NE21	FALL	1	0.000	0	0	7.5000	7.0	8.0	0.00000	0	0
NE22	SPRING	1	30.000	30	30	14.5000	14.5	14.5	1.00000	1	1
NE22	SUMMER	1	2.000	2	2	25.0000	25.0	25.0	1.00000	1	1
NE22	FALL	1	0.000	0	0	7.5000	7.0	8.0	0.00000	0	0
NW11	WINTER	3	0.000	0	0	3.4167	2.0	5.5	1.83333	0	3
NW11	SPRING	6	29.500	0	97	12.0583	6.7	20.2	1.01667	0	2
NW11	SUMMER	10	63.100	0	313	24.9700	23.5	26.2	3.72056	1	6
NW11	FALL	7	10.429	0	54	14.1143	6.8	23.1	2.50000	0	7
NW12	WINTER	3	0.000	0	0	3.4167	2.0	5.5	1.83333	0	3
NW12	SPRING	6	40.667	0	111	12.0583	6.7	20.2	1.01667	0	2
NW12	SUMMER	10	87.200	0	393	24.9650	23.5	26.2	3.68056	1	6
NW12	FALL	7	27.286	0	146	14.1214	6.8	23.2	2.50000	0	7
NW21	SPRING	1	35.000	35	35	14.2500	14.1	14.4	0.00000	0	0
NW21	SUMMER	3	6.333	1	17	24.9167	24.4	25.5	3.83333	3	4
NW21	FALL	1	0.000	0	0	8.0000	8.0	8.0	1.00000	1	1
NW22	SPRING	1	20.000	20	20	14.2500	14.1	14.4	0.00000	0	0
NW22	SUMMER	3	36.667	3	103	24.9167	24.4	25.5	3.83333	3	4
NW22	FALL	1	0.000	0	0	8.0000	8.0	8.0	1.00000	1	1
RI11	WINTER	3	0.000	0	0	4.3333	2.0	7.0	1.33333	0	2
RI11	SPRING	7	287.857	0	1465	14.3200	6.2	19.7	2.10000	2	3
RI11	SUMMER	9	11.667	0	62	24.9944	23.1	26.8	5.02778	2	9
RI11	FALL	6	26.000	0	114	13.8950	7.0	22.5	4.70000	0	8
RI12	WINTER	3	0.000	0	0	4.3333	2.0	7.0	1.33333	0	2
RI12	SPRING	6	55.333	0	255	14.3200	6.2	19.7	2.10000	2	3
RI12	SUMMER	9	23.556	0	144	24.9944	23.1	26.8	5.10069	2	9
RI12	FALL	6	15.333	0	59	13.8950	7.0	22.5	4.78333	0	8
RI21	WINTER	3	0.000	0	0	4.5000	2.0	7.0	0.83333	0	2
RI21	SPRING	7	119.000	3	635	15.7250	6.2	22.3	2.00000	0	4
RI21	SUMMER	11	47.455	0	176	24.9864	23.0	26.6	4.75000	1	8
RI21	FALL	6	32.667	0	113	14.3667	6.0	23.9	4.41667	0	8
RI22	WINTER	3	0.000	0	0	4.5000	2.0	7.0	0.83333	0	2
RI22	SPRING	7	16.143	0	34	15.7250	6.2	22.3	2.00000	0	4

Table 20 . - Continued.

A. MITCHILLI SEASONAL MEAN CATCH PER UNIT EFFORT (N/T)-1976.

LOCATION	SEASON	OBS	CATCH/UNIT EFFORT			TEMPERATURE (C)			SALINITY (PPT)		
			MEAN	MIN	MAX	MEAN	MIN	MAX	MEAN	MIN	MAX
RI22	SUMMER	12	21.167	0	185	25.0083	23.0	26.5	5.0625	1.0	9.5
RI22	FALL	6	13.167	0	47	14.3667	6.0	23.9	4.4167	0.0	8.0
SE01	WINTER	1	0.000	0	0	5.5000	5.0	6.0	2.0000	2.0	2.0
SE01	SPRING	6	656.167	6	1530	13.5250	9.2	19.1	8.5000	4.0	12.0
SE01	SUMMER	5	16.600	0	74	24.4500	23.0	25.0	12.4500	10.0	14.0
SE01	FALL	7	25.571	0	97	10.8143	5.9	19.7	11.2857	6.0	17.0
SE02	WINTER	1	0.000	0	0	5.5000	5.0	6.0	2.0000	2.0	2.0
SE02	SPRING	5	70.600	3	278	14.3000	10.0	19.1	8.5000	4.0	12.0
SE02	SUMMER	5	8.200	0	38	24.4500	23.0	25.0	12.4500	10.0	14.0
SE02	FALL	6	21.333	0	95	9.3417	5.9	17.8	10.8333	6.0	17.0
SE11	WINTER	2	0.000	0	0	3.7000	2.0	5.5	4.7500	2.0	8.0
SE11	SPRING	6	201.667	4	730	14.8333	6.2	19.8	6.5000	5.0	11.0
SE11	SUMMER	8	37.500	0	228	24.6562	23.0	27.0	11.2813	9.0	13.0
SE11	FALL	8	81.500	0	578	12.0562	5.0	20.7	10.8750	7.0	15.0
SE12	WINTER	2	0.000	0	0	3.7000	2.0	5.5	4.7500	2.0	8.0
SE12	SPRING	5	31.000	3	128	14.4700	6.2	19.0	6.8750	5.0	11.0
SE12	SUMMER	8	10.000	0	23	24.5196	23.0	27.0	11.2813	9.0	13.0
SE12	FALL	7	33.000	0	131	10.8357	5.0	20.0	10.2857	7.0	15.0
SE21	SPRING	4	89.000	8	217	14.8958	10.2	18.5	5.5000	4.0	7.0
SE21	SUMMER	6	18.167	0	64	24.8667	23.4	26.5	9.6417	8.0	12.0
SE21	FALL	4	18.250	0	43	13.5750	5.5	20.5	9.5000	6.0	13.0
SE22	SPRING	4	51.750	9	150	14.8958	10.2	18.5	5.5000	4.0	7.0
SE22	SUMMER	6	9.000	0	30	24.8667	23.4	26.5	9.7250	8.0	12.0
SE22	FALL	4	5.000	0	19	13.5750	5.5	20.5	9.5000	6.0	13.0
SE31	WINTER	5	0.000	0	0	3.7200	1.0	6.8	1.3000	0.0	7.0
SE31	SPRING	8	988.250	0	3380	13.1937	7.0	19.8	4.5714	0.0	8.0
SE31	SUMMER	16	58.250	0	389	24.7594	22.9	28.0	9.8438	5.0	11.0
SE31	FALL	11	55.273	0	178	14.5182	4.0	20.8	8.1364	3.0	13.0
SE32	WINTER	5	0.000	0	0	3.7200	1.0	6.8	1.3000	0.0	7.0
SE32	SPRING	6	43.000	3	151	14.1833	7.0	19.8	5.0000	0.0	8.0
SE32	SUMMER	16	10.563	0	74	24.7312	22.9	28.0	8.8438	5.0	11.0
SE32	FALL	11	15.636	0	71	14.5182	4.0	20.8	8.1364	3.0	13.0
SSC1	WINTER	9	0.000	0	0	3.1083	0.2	6.0	3.2292	0.0	9.0
SSC1	SPRING	16	80.875	0	628	13.1980	4.6	22.9	3.1844	0.0	8.0
SSC1	SUMMER	29	282.345	0	1696	24.6603	22.3	29.0	7.6652	3.0	10.0
SSC1	FALL	20	304.000	0	4100	16.2975	6.0	22.5	7.3000	0.0	11.0
SSC2	WINTER	9	0.000	0	0	3.1905	0.2	6.0	3.2292	0.0	9.0
SSC2	SPRING	16	138.625	0	652	13.2250	4.6	22.9	3.3344	0.0	8.0
SSC2	SUMMER	29	301.586	0	1514	24.6603	22.3	29.0	7.6652	3.0	10.0
SSC2	FALL	20	401.200	0	5782	16.2975	6.0	22.5	7.3000	0.0	11.0
SW11	WINTER	1	0.000	0	0	3.0000	2.5	3.5	5.7500	5.5	6.0
SW11	SPRING	4	213.000	2	780	15.0750	10.8	17.8	4.2500	2.0	6.0
SW11	SUMMER	7	116.000	0	344	25.0500	23.5	26.0	10.6429	6.0	15.0
SW11	FALL	4	286.250	0	1141	11.1750	6.0	18.2	8.0000	4.0	13.0
SW12	WINTER	1	0.000	0	0	3.0000	2.5	3.5	5.7500	5.5	6.0
SW12	SPRING	5	92.400	18	298	14.2500	10.8	17.8	4.4500	2.0	6.0
SW12	SUMMER	8	31.125	0	132	25.0312	23.5	26.0	10.1563	6.0	15.0
SW12	FALL	5	14.000	0	39	13.0600	6.0	20.7	9.4000	4.0	15.0
SW21	WINTER	6	0.000	0	0	3.5583	1.0	6.5	2.5000	0.0	9.0
SW21	SPRING	8	49.125	1	254	14.1375	7.0	20.5	3.0000	0.0	7.0
SW21	SUMMER	15	6.400	0	55	25.0900	23.3	28.0	7.6667	3.0	12.0
SW21	FALL	11	42.364	0	320	14.5409	4.9	21.1	7.6818	3.0	14.0
SW22	WINTER	6	0.000	0	0	3.5583	1.0	6.5	2.5000	0.0	9.0
SW22	SPRING	8	117.625	3	630	14.1375	7.0	20.5	3.0000	0.0	7.0

Table 20 . - Continued.

A. HITCHILLI SEASONAL MEAN CATCH PER UNIT EFFORT (N/T)--1976.

LOCATION	SEASON	OBS	CATCH/UNIT EFFORT			TEMPERATURE (C)			SALINITY (PPT)		
			MEAN	MIN	MAX	MEAN	MIN	MAX	MEAN	MIN	MAX
SW22	SUMMER	15	15.333	0	112	25.0900	23.3	28.0	7.76667	3	14
SW22	FALL	11	37.364	0	244	14.5409	4.9	21.1	7.63636	3	14
W-11	WINTER	5	0.000	0	0	2.9200	0.5	4.9	3.57500	0	8
W-11	SPRING	12	55.167	0	300	15.0767	7.1	23.0	1.56667	0	8
W-11	SUMMER	21	120.476	0	598	24.9786	23.3	28.0	5.73690	2	10
W-11	FALL	15	63.067	0	211	17.0133	5.9	23.0	5.80000	0	13
W-12	WINTER	5	0.000	0	0	2.9200	0.5	4.9	3.57500	0	8
W-12	SPRING	11	181.727	0	1715	14.5864	7.1	23.0	1.70707	0	8
W-12	SUMMER	21	59.286	0	281	25.0000	23.3	28.0	5.73690	2	10
W-12	FALL	16	84.438	0	380	16.5594	5.9	23.0	5.43750	0	13
W-21	WINTER	2	0.000	0	0	2.1750	1.8	3.0	2.50000	2	4
W-21	SPRING	5	166.000	0	360	13.1000	6.5	17.5	0.75000	0	2
W-21	SUMMER	9	235.000	5	655	25.7722	24.1	27.0	3.80556	2	5
W-21	FALL	7	837.857	0	3198	16.1357	6.0	23.0	4.44048	0	7
W-22	WINTER	2	0.000	0	0	2.1750	1.8	3.0	2.50000	2	4
W-22	SPRING	5	27.200	0	54	13.1000	6.5	17.5	0.75000	0	2
W-22	SUMMER	9	56.111	2	158	25.7167	24.1	27.0	3.80556	2	5
W-22	FALL	7	149.286	0	795	16.1357	6.0	23.0	4.44048	0	7
W-31	WINTER	5	0.000	0	0	3.6175	1.2	7.0	1.02500	0	4
W-31	SPRING	8	121.625	0	854	14.0312	6.5	21.3	0.78571	0	4
W-31	SUMMER	12	175.583	1	571	24.6792	23.2	26.1	4.12500	2	6
W-31	FALL	10	147.300	0	1432	15.6467	6.5	21.4	4.38333	0	7
W-32	WINTER	5	0.000	0	0	3.6175	1.2	7.0	1.02500	0	4
W-32	SPRING	8	112.875	1	801	14.0312	6.5	21.3	0.82143	0	4
W-32	SUMMER	12	28.250	1	107	24.7000	23.2	26.1	4.12500	2	6
W-32	FALL	10	14.700	0	118	15.6467	6.5	21.4	4.38333	0	7

Table 21 . - A chronological summary of temperature avoidance studies on bay anchovy, Anchoa mitchilli. All tests were conducted at near air-saturated levels of dissolved oxygen and pH of 7 to 8.

DATE	REPLICATE NO. OF FISH PER TEST		SIZE RANGE (TL IN MM) MIN. MAX.		SALINITY (PPT)	LIGHT LEVEL (FOOT (LUX) CANDLES)		ACCLIMATION TEMPERATURE (C) (F)		AVOIDANCE TEMPERATURE (C) (F)	
ANCHOA MITCHILLI											
14 MAY 70	1	1	-	-	4	215	20.0	18	64	27	80
29 OCT 71	1	5	57	68	4.5	215	20.0	16	60	24	75
8 MAY 74	1	4	55	65	7	215	20.0	15	59	27	80
	2	4	48	96	7	215	20.0	15	59	28	82
10 MAY 74	1	4	52	62	7	21.5	2.0	15	59	27	80
	2	4	55	62	7	21.5	2.0	15	59	23	73
5 JUN 74	1	4	53	65	6.5	215	20.0	18	64	27	80
	2	4	57	63	6.5	215	20.0	18	64	27	80
18 JUN 74	1	4	55	63	6.5	215	20.0	20	68	31	87
	2	4	57	62	6.5	215	20.0	20	68	31	87
19 JUN 74	1	4	58	71	6.5	21.5	2.0	20	68	31	87
	2	4	53	68	6.5	21.5	2.0	20	68	31	87
4 JUL 74	1	3	57	60	6.5	215	20.0	24	75	30	86
	2	3	65	70	6.5	215	20.0	24	75	32	89
1 AUG 74	1	4	60	63	7	215	20.0	27	80	30	86
	2	1	65	65	7	215	20.0	27	80	30	86

Table 21 . - Continued.

DATE	REPLICATE	NO. OF FISH PER TEST	SIZE RANGE (TL IN MM)		SALINITY (PPT)	LIGHT LEVEL (FOOT (LUX) CANDLES)		ACCLIMATION TEMPERATURE (C) (F)		AVOIDANCE TEMPERATURE (C) (F)	
ANCHOA MITCHILLI											
6 NOV 74	1	4	38	52	6	215	20.0	15	59	27	80
	2	4	38	42	6	215	20.0	15	59	27	80
11 JUN 75	1	4	44	50	5.5	215	20.0	20	68	28	82
5 SEP 75	1	4	22	30	7	215	20.0	27	80	32	89
	2	4	23	44	7	215	20.0	27	80	32	89
26 SEP 75	1	4	42	53	6.5	215	20.0	22	71	29	84
	2	4	32	45	6.5	215	20.0	22	71	29	84
22 OCT 75	1	4	47	66	6	215	20.0	19	66	28	82
	2	3	44	53	6	215	20.0	19	66	27	80
30 MAR 76	1	3	53	64	4	215	20.0	12	53	22	71
31 MAR 76	1	3	61	88	4	215	20.0	12	53	21.1	69
11 MAY 76	1	4	59	75	5.5	215	20.0	20	68	24	75
	2	4	48	67	5.5	215	20.0	20	68	24	75
4 JUN 76	1	4	47	74	5.5	215	20.0	19	66	27	80
	2	4	43	57	5.5	215	20.0	19	66	26	78

Table 21 . - Continued.

DATE	REPLICATE	NO. OF FISH PER TEST	SIZE RANGE (TL IN MM)		SALINITY (PPT)	LIGHT LEVEL (FOOT (LUX) CANDLES)		ACCLIMATION TEMPERATURE (C) (F)		AVOIDANCE TEMPERATURE (C) (F)	
			MIN.	MAX.							
ANCHOA MITCHILLI											
9 JUN 76	1	4	65	69	5.5	215	20.0	19	66	27	80
	2	4	53	72	5.5	215	20.0	19	66	28	82
18 JUN 76	1	4	52	60	5.5	215	20.0	21	69	29	84
	2	4	51	64	5.5	215	20.0	21	69	28	82
25 JUN 76	1	4	48	64	5.5	215	20.0	24	75	27	80
	2	4	45	52	5.5	215	20.0	24	75	32	89
15 JUL 76	1	4	53	64	4	215	20.0	27	80	28	82
	2	4	55	63	4	215	20.0	27	80	33	91
21 JUL 76	1	4	23	26	3.5	215	20.0	28	82	32	89
	2	4	24	26	3.5	215	20.0	28	82	29	84
29 JUL 76	1	4	31	42	3.5	215	20.0	26	78	33	91
	2	4	28	38	3.5	215	20.0	26	78	31	87
25 AUG 76	1	4	42	46	4	215	20.0	27	80	28.9	84
	2	3	40	43	4	215	20.0	27	80	30.6	87
2 SEP 76	1	3	23	33	4	215	20.0	25	77	28.9	84
	2	4	23	48	4	215	20.0	25	77	30.6	87
14 SEP 76	1	4	33	47	4.5	215	20.0	25	77	30	86
	2	4	36	42	4.5	215	20.0	25	77	30	86

Table 21 . - Continued.

DATE	REPLICATE	NO. OF FISH PER TEST	SIZE RANGE (TL IN MM) MIN. MAX.		SALINITY (PPT)	LIGHT LEVEL (FOOT (LUX) CANDLES)		ACCLIMATION TEMPERATURE (C) (F)		AVOIDANCE TEMPERATURE (C) (F)	
ANCHOA MITCHILLI											
17 SEP 76	1	4	25	36	5	215	20.0	23	73	29.4	84
	2	4	37	51	5	215	20.0	23	73	31.1	87
22 SEP 76	1	4	36	42	5	215	20.0	22	71	28.3	82
	2	4	39	42	5	215	20.0	22	71	28.3	82
23 SEP 76	1	4	40	49	5	21.5	2.0	22.5	72	28.3	82
	2	4	33	42	5	21.5	2.0	22.5	72	30.6	87
26 OCT 76	1	4	42	44	6	215	20.0	15	59	26.7	80
	2	4	42	47	6	215	20.0	15	59	20	68
3 MAY 77	1	4	56	71	7	215	20.0	18	64	27	80
	2	4	70	88	7	215	20.0	18	64	27	80
1 JUN 77	1	4	56	72	7	215	20.0	21	69	32	89
	2	4	57	61	7	215	20.0	21	69	31	87
3 JUN 77	1	3	57	63	7	215	20.0	21	69	29	84
	2	3	54	62	7	215	20.0	21	69	30	86
10 JUN 77	1	4	62	71	7	215	20.0	21	69	31	87
	2	4	58	67	7	215	20.0	21	69	31	87
21 JUN 77	1	4	66	75	7	215	20.0	25	77	31	87
	2	4	58	85	7	215	20.0	25	77	29	84

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Table 21. - Continued.

DATE	REPLICATE	NO. OF FISH PER TEST	SIZE RANGE (TL IN MM)		SALINITY (PPT)	LIGHT LEVEL (FOOT (LUX) CANDLES)		ACCLIMATION TEMPERATURE		AVOIDANCE TEMPERATURE	
			MIN.	MAX.		(C)	(F)	(C)	(F)		
ANCHOA MITCHILLI											
7 JUL 77	1	3	59	71	7	215	20.0	28	82	35	95
	2	3	60	72	7	215	20.0	28	82	35	95
12 JUL 77	1	4	61	71	7	215	20.0	28	82	33	91
	2	4	64	67	7	215	20.0	28	82	33	91
17 AUG 77	1	4	24	39	10.5	21.5	2.0	27	80	33	91
	2	4	32	39	10.5	21.5	2.0	27	80	32	89
18 AUG 77	1	4	27	43	10.5	21.5	2.0	26	78	32	89
	2	4	25	44	10.5	21.5	2.0	26	78	32	89
18 AUG 77	1	4	33	45	10.5	215	20.0	26	78	32	89
	2	4	34	38	10.5	215	20.0	26	78	33	91
1 SEP 77	1	3	36	73	8.5	215	20.0	26	78	30	86
	2	4	35	45	8.5	215	20.0	26	78	28	82
9 SEP 77	1	3	32	38	6	215	20.0	23	73	32	89
	2	3	34	42	6	215	20.0	23	73	32	89
16 SEP 77	1	4	31	40	6	215	20.0	21	69	28	82
	2	4	30	38	6	215	20.0	21	69	28	82
22 SEP 77	1	4	41	52	10	215	20.0	22	71	32	89
	2	4	35	45	10	215	20.0	22	71	32	89

Table 22 . - Components for the multiple linear regression equation to estimate avoidance temperatures (C) for the bay anchovy, Anchoa mitchilli.

* = Significant at P.05 or greater; and ** = significant at P.01 or greater.

Constant (a) = 15.628		F(2, 73) = 62.025**			N = 76
Standard Error of Estimate = 1.857		R = 0.793**			R ² = 0.630
<u>Variable (Xi)</u>	<u>Mean (Xi)</u>	<u>Correlation (f) With Y</u>	<u>Regression Coefficient (bi)</u>	<u>Standard Error of bi</u>	<u>Standardized Reg. Coef.</u>
Acclimation Temperature (C)	22.2	0.757**	0.508**	0.050	0.730
Salinity (ppt)	6.4	0.325**	0.394**	0.118	0.239

Table 23. + M. MENIDIA SEASONAL MEAN CATCH PER UNIT EFFORT (N/T)-1975.

LOCATION	SEASON	OBS	CATCH/UNIT EFFORT			TEMPERATURE (C)			SALINITY (PPT)		
			MEAN	MIN	MAX	MEAN	MIN	MAX	MEAN	MIN	MAX
CHA1	SPRING	3	0.000000	0	0	13.0500	3.0	22.8	5.84667	1.0	12.0
CHA1	SUMMER	5	0.000000	0	0	24.7500	22.0	26.1	5.20000	2.0	9.0
CHA1	FALL	2	0.000000	0	0	15.3250	10.3	20.0	4.00000	0.0	9.0
CHA2	WINTER	1	0.000000	0	0	6.0000	6.0	6.0	5.75000	5.5	6.0
CHA2	SPRING	3	0.000000	0	0	12.3000	3.0	22.8	4.03333	0.0	12.0
CHA2	SUMMER	14	0.000000	0	0	24.5429	21.0	28.9	5.05495	0.0	10.0
CHA2	FALL	7	0.000000	0	0	14.5000	9.9	20.0	3.75000	1.0	10.0
CHA3	WINTER	1	0.000000	0	0	7.6500	7.4	7.9	4.00000	4.0	4.0
CHA3	SPRING	3	0.000000	0	0	12.6667	4.0	22.8	2.00000	0.0	6.0
CHA3	SUMMER	4	0.000000	0	0	25.3250	24.2	26.2	2.00000	0.0	4.0
CHA3	FALL	3	0.000000	0	0	14.2333	11.2	16.5	2.25000	1.0	3.0
CHA4	WINTER	1	0.000000	0	0	.	.	5.3	.	.	0.0
CHA4	SPRING	3	0.000000	0	0	12.1833	4.0	23.0	1.83333	0.0	6.0
CHA4	SUMMER	13	0.000000	0	0	25.6577	20.1	28.2	2.04968	0.0	5.5
CHA4	FALL	8	0.000000	0	0	14.8062	10.0	19.0	2.50000	0.5	5.0
CHA5	SPRING	3	0.000000	0	0	12.6500	5.0	23.0	0.83333	0.0	3.0
CHA5	SUMMER	5	0.000000	0	0	25.2350	21.8	27.0	1.23750	0.0	3.5
CHA5	FALL	2	0.000000	0	0	17.4750	15.9	19.0	0.00000	0.0	0.0
E-11	WINTER	4	0.000000	0	0	4.0625	1.8	6.0	0.65833	0.0	1.5
E-11	SPRING	8	0.125000	0	1	11.7562	1.0	23.5	3.65625	0.0	11.0
E-11	SUMMER	11	0.000000	0	0	25.9192	23.0	30.0	4.68687	0.0	9.5
E-11	FALL	5	0.400000	0	2	15.5900	11.3	19.0	4.40000	2.0	9.0
E-12	WINTER	4	0.000000	0	0	4.0625	1.8	6.0	0.26333	0.0	1.5
E-12	SPRING	8	0.000000	0	0	11.9812	1.0	23.5	3.87500	0.0	11.0
E-12	SUMMER	11	0.000000	0	0	26.0364	23.0	30.0	4.39773	0.0	9.5
E-12	FALL	4	0.000000	0	0	15.2500	11.3	19.0	4.75000	2.0	9.0
E-21	WINTER	5	0.000000	0	0	4.7300	1.8	7.7	2.45000	0.0	4.5
E-21	SPRING	8	0.000000	0	0	11.8312	1.3	23.5	2.65625	0.0	9.5
E-21	SUMMER	22	0.000000	0	0	25.6500	20.9	29.0	4.21591	0.0	9.5
E-21	FALL	16	0.000000	0	0	16.1544	9.3	19.6	3.14231	0.0	8.0
E-22	WINTER	5	0.000000	0	0	4.7300	1.8	7.7	2.37500	0.0	4.5
E-22	SPRING	7	0.000000	0	0	12.9500	1.3	23.5	1.92057	0.0	5.0
E-22	SUMMER	21	0.000000	0	0	25.5690	20.9	31.3	4.14286	0.0	9.5
E-22	FALL	13	0.000000	0	0	15.9958	9.3	19.6	3.39583	0.0	8.0
E-31	WINTER	4	0.250000	0	1	3.3917	2.0	5.5	0.83333	0.0	2.0
E-31	SPRING	7	0.000000	0	0	11.1929	2.0	22.8	2.67857	0.0	9.0
E-31	SUMMER	6	0.000000	0	0	24.9583	23.0	26.4	2.41667	0.0	7.0
E-31	FALL	4	0.000000	0	0	15.6125	11.4	19.6	3.18750	1.0	8.0
E-32	WINTER	4	0.000000	0	0	3.3917	2.0	5.5	0.83333	0.0	2.0
E-32	SPRING	7	0.000000	0	0	11.1929	2.0	22.8	2.67857	0.0	9.0
E-32	SUMMER	6	0.000000	0	0	24.9583	23.0	26.4	2.41667	0.0	7.0
E-32	FALL	4	0.250000	0	1	15.6125	11.4	19.6	3.18750	1.0	8.0
E-41	WINTER	4	0.000000	0	0	3.3292	2.0	5.1	0.66667	0.0	2.0
E-41	SPRING	7	0.000000	0	0	10.9357	2.0	22.8	1.96429	0.0	9.0
E-41	SUMMER	13	0.076923	0	1	25.0692	19.1	28.0	2.36538	0.0	6.0
E-41	FALL	9	0.000000	0	0	14.5000	9.9	19.0	3.08333	0.5	5.0
E-42	WINTER	4	0.000000	0	0	3.3292	2.0	5.1	0.66667	0.0	2.0
E-42	SPRING	7	0.000000	0	0	10.9357	2.0	22.8	1.96429	0.0	9.0
E-42	SUMMER	14	0.000000	0	0	25.2786	19.1	28.0	2.16071	0.0	6.0
E-42	FALL	9	0.000000	0	0	14.5000	9.9	19.0	3.08333	0.5	5.0
E-51	WINTER	4	0.000000	0	0	3.3000	1.0	5.3	0.00000	0.0	0.0
E-51	SPRING	5	0.000000	0	0	12.6400	2.0	21.6	1.25000	0.0	3.5
E-51	SUMMER	6	0.000000	0	0	26.0500	23.9	28.9	1.29167	0.0	4.0
E-51	FALL	1	0.000000	0	0	16.2500	16.0	16.5	1.25000	1.0	1.5

Table 23 . - Continued.

M. MENIDIA SEASONAL MEAN CATCH PER UNIT EFFORT (N/T)-1975.

LOCATION	SEASON	OBS	CATCH/UNIT EFFORT			TEMPERATURE (C)			SALINITY (PPT)		
			MEAN	MIN	MAX	MEAN	MIN	MAX	MEAN	MIN	MAX
E-52	WINTER	4	0.00	0	0	3.3000	1.0	5.3	0.00000	0.0	0.0
E-52	SPRING	5	0.00	0	0	12.1800	2.0	21.6	0.65000	0.0	3.5
E-52	SUMMER	7	0.00	0	0	25.7214	23.5	28.9	1.29167	0.0	4.0
E-52	FALL	1	0.00	0	0	16.2500	16.0	16.5	1.25000	1.0	1.5
E-61	WINTER	4	0.00	0	0	3.3000	1.0	5.3	0.00000	0.0	0.0
E-61	SPRING	5	0.00	0	0	12.1100	2.0	21.6	0.65000	0.0	3.5
E-61	SUMMER	7	0.00	0	0	25.4821	21.8	28.9	1.07738	0.0	4.0
E-61	FALL	2	0.00	0	0	17.3750	15.5	19.0	0.00000	0.0	0.0
E-62	WINTER	4	0.00	0	0	3.3000	1.0	5.3	0.00000	0.0	0.0
E-62	SPRING	5	0.00	0	0	12.1100	2.0	21.6	0.65000	0.0	3.5
E-62	SUMMER	7	0.00	0	0	25.4821	21.8	28.9	1.07738	0.0	4.0
E-62	FALL	2	0.00	0	0	17.3750	15.5	19.0	0.00000	0.0	0.0
NE11	SPRING	3	0.00	0	0	18.3667	9.9	24.3	1.08333	0.0	3.5
NE11	SUMMER	6	0.00	0	0	25.5667	22.8	27.5	0.75000	0.0	3.0
NE12	SPRING	3	0.00	0	0	18.3667	9.9	24.3	1.08333	0.0	3.5
NE12	SUMMER	6	0.00	0	0	25.5667	22.8	27.5	0.75000	0.0	3.0
NE12	FALL	1	0.00	0	0	16.8500	16.7	17.0	0.50000	0.0	1.0
NW11	WINTER	2	0.00	0	0	5.9500	5.3	7.5	0.00000	0.0	0.0
NW11	SPRING	7	0.00	0	0	12.9786	3.0	23.0	1.07143	0.0	4.5
NW11	SUMMER	5	0.00	0	0	25.3625	23.0	26.8	1.76250	0.0	3.5
NW11	FALL	2	0.00	0	0	18.3500	16.5	20.0	0.00000	0.0	0.0
NW12	WINTER	2	0.00	0	0	5.9500	5.3	7.5	0.00000	0.0	0.0
NW12	SPRING	5	0.00	0	0	13.4600	3.0	23.0	1.20000	0.0	4.5
NW12	SUMMER	4	0.00	0	0	24.9958	23.0	26.5	1.39583	0.0	3.5
NW12	FALL	2	0.00	0	0	18.3500	16.5	20.0	0.25000	0.0	1.0
RI11	SPRING	2	0.00	0	0	18.1750	13.8	23.0	2.25000	1.5	3.0
RI11	SUMMER	3	0.00	0	0	26.4167	24.5	28.5	3.08333	0.0	6.5
RI12	SPRING	2	0.00	0	0	18.1750	13.8	23.0	2.25000	1.5	3.0
RI12	SUMMER	3	0.00	0	0	26.4167	24.5	28.5	3.08333	0.0	6.5
RI21	SPRING	1	0.00	0	0	22.5000	22.0	23.0	2.75000	2.5	3.0
RI21	SUMMER	3	0.00	0	0	26.0333	24.5	27.0	2.16667	0.0	3.5
RI22	SPRING	1	0.00	0	0	22.5000	22.0	23.0	2.75000	2.5	3.0
RI22	SUMMER	3	0.00	0	0	26.0333	24.5	27.0	2.16667	0.0	3.5
SE01	SPRING	5	0.40	0	3	16.9400	9.4	21.8	8.70000	6.5	12.0
SE01	SUMMER	8	0.25	0	2	25.5875	23.8	29.5	8.65625	0.0	14.0
SE02	SPRING	5	0.00	0	0	17.5400	9.4	21.8	8.78000	6.5	12.0
SE02	SUMMER	9	0.00	0	0	25.5222	23.8	29.5	8.69444	0.0	14.0
SE11	SPRING	5	0.00	0	0	16.5500	9.4	21.0	6.80000	3.5	12.0
SE11	SUMMER	11	0.00	0	0	25.3636	22.3	28.0	8.00273	0.0	14.0
SE11	FALL	3	0.00	0	0	16.3500	10.0	20.5	6.25000	3.5	11.0
SE12	SPRING	5	0.00	0	0	16.5500	9.5	21.0	6.60000	3.5	10.0
SE12	SUMMER	11	0.00	0	0	25.3636	22.3	28.0	8.02273	0.0	14.0
SE12	FALL	3	0.00	0	0	16.3500	10.0	20.5	6.25000	3.5	11.0
SE21	SPRING	5	0.00	0	0	16.4600	9.9	21.0	5.10000	3.0	8.0
SE21	SUMMER	9	0.00	0	0	25.2889	23.5	27.5	5.39234	0.0	10.5
SE21	FALL	2	0.00	0	0	20.1250	20.0	20.5	6.87500	3.5	9.0
SE22	SPRING	5	0.00	0	0	16.4600	9.9	21.0	5.10000	3.0	8.0
SE22	SUMMER	9	0.00	0	0	25.2889	23.5	27.5	5.39234	0.0	10.5
SE22	FALL	2	0.00	0	0	20.1250	20.0	20.5	6.87500	3.5	9.0
SE31	WINTER	3	0.00	0	0	5.5333	4.2	6.0	2.16667	0.0	5.5
SE31	SPRING	8	0.00	0	0	11.2071	1.0	23.0	4.50000	0.0	11.0
SE31	SUMMER	19	0.00	0	0	24.6830	20.1	28.1	5.30186	0.0	10.5
SE31	FALL	10	0.00	0	0	15.4200	8.9	20.0	4.50000	1.0	9.0
SE32	WINTER	3	0.00	0	0	5.5333	4.2	6.0	2.16667	0.0	5.5

Table 23. - Continued.

M. MENIDIA SEASONAL MEAN CATCH PER UNIT EFFORT (N/T)-1975.

LOCATION	SEASON	OBS	CATCH/UNIT EFFORT			TEMPERATURE (C)			SALINITY (PPT)		
			MEAN	MIN	MAX	MEAN	MIN	MAX	MEAN	MIN	MAX
SE32	SPRING	8	0.000000	0	0	11.2071	1.0	23.0	4.50000	0.0	11.0
SE32	SUMMER	18	0.000000	0	0	24.7172	20.1	28.1	5.57668	2.0	10.5
SE32	FALL	9	0.000000	0	0	15.9444	11.0	20.0	4.75000	1.0	9.0
SSC1	WINTER	8	0.000000	0	0	4.9271	0.2	12.0	3.72857	0.0	6.0
SSC1	SPRING	11	0.363636	0	4	12.7295	1.3	21.9	2.02597	0.0	9.0
SSC1	SUMMER	25	0.000000	0	0	25.2775	20.3	29.8	5.67708	0.0	9.0
SSC1	FALL	20	0.000000	0	0	16.2408	9.8	20.0	4.04500	1.0	9.0
SSC2	WINTER	8	0.500000	0	2	5.0521	0.2	12.0	3.72857	0.0	6.0
SSC2	SPRING	11	0.000000	0	0	12.7295	1.3	21.9	2.02597	0.0	9.0
SSC2	SUMMER	24	0.000000	0	0	25.1284	20.3	29.8	5.65465	0.0	9.0
SSC2	FALL	21	0.000000	0	0	16.2918	9.8	20.0	3.91465	1.0	9.0
SW11	SUMMER	4	0.000000	0	0	24.7292	22.0	27.8	6.37500	2.0	9.0
SW11	FALL	3	0.000000	0	0	17.8167	10.6	23.8	3.58333	0.0	8.0
SW12	SUMMER	1	0.000000	0	0	22.2500	22.0	22.5	9.00000	9.0	9.0
SW12	FALL	2	0.000000	0	0	15.2750	10.6	20.0	1.50000	0.0	3.0
SW21	WINTER	3	0.000000	0	0	5.5000	5.0	6.0	1.75000	0.0	5.0
SW21	SPRING	6	0.000000	0	0	11.5917	3.2	21.0	1.87500	0.0	7.0
SW21	SUMMER	16	0.000000	0	0	25.2175	21.0	29.5	4.67292	0.0	10.0
SW21	FALL	10	0.000000	0	0	14.0854	8.7	18.5	3.56250	0.0	10.0
SW22	WINTER	3	0.000000	0	0	5.5000	5.0	6.0	2.08333	0.0	6.0
SW22	SPRING	6	0.000000	0	0	11.3500	3.2	21.0	2.20833	0.0	7.0
SW22	SUMMER	15	0.000000	0	0	25.0933	21.0	29.5	4.75714	0.0	9.5
SW22	FALL	9	0.000000	0	0	14.7875	8.7	20.0	3.06250	0.0	10.0
W-11	WINTER	4	0.000000	0	0	6.2125	4.0	8.2	1.12500	0.0	3.0
W-11	SPRING	6	0.000000	0	0	11.4667	3.2	21.0	2.83333	0.0	7.0
W-11	SUMMER	18	0.000000	0	0	25.1004	19.9	28.5	2.73646	0.0	8.0
W-11	FALL	16	0.000000	0	0	16.3027	9.1	20.0	1.92009	0.0	6.0
W-12	WINTER	4	0.000000	0	0	6.2125	4.0	8.2	1.12500	0.0	3.0
W-12	SPRING	6	0.000000	0	0	13.5750	3.2	21.0	2.37500	0.0	7.0
W-12	SUMMER	20	0.000000	0	0	25.1113	19.9	28.5	3.07353	0.0	8.0
W-12	FALL	17	0.000000	0	0	15.4251	9.1	20.0	1.81078	0.0	6.0
W-21	WINTER	2	0.000000	0	0	5.4500	4.0	6.2	0.00000	0.0	0.0
W-21	SPRING	6	0.000000	0	0	12.2167	2.6	21.0	1.62500	0.0	4.5
W-21	SUMMER	3	0.000000	0	0	25.5167	24.7	26.9	1.50000	0.0	4.0
W-21	FALL	3	0.000000	0	0	13.9583	11.0	16.5	1.41667	0.0	2.0
W-22	WINTER	2	0.000000	0	0	5.4500	4.0	6.2	0.00000	0.0	0.0
W-22	SPRING	6	0.000000	0	0	12.2167	2.6	21.0	1.62500	0.0	4.5
W-22	SUMMER	3	0.000000	0	0	25.5167	24.7	26.9	1.50000	0.0	4.0
W-22	FALL	3	0.000000	0	0	13.9583	11.0	16.5	1.41667	0.0	2.0
W-31	WINTER	4	0.000000	0	0	6.6500	5.3	8.8	0.29167	0.0	1.0
W-31	SPRING	5	0.000000	0	0	11.3700	2.8	21.0	1.70000	0.0	4.5
W-31	SUMMER	15	0.000000	0	0	25.8567	20.9	29.0	2.31333	0.0	8.0
W-31	FALL	7	0.000000	0	0	15.2286	10.0	18.9	1.67500	0.5	4.0
W-32	WINTER	4	0.250000	0	1	6.6500	5.3	8.8	0.29167	0.0	1.0
W-32	SPRING	5	0.000000	0	0	11.3700	2.8	21.0	1.70000	0.0	4.5
W-32	SUMMER	13	0.000000	0	0	25.8500	20.9	29.0	1.86538	0.0	5.0
W-32	FALL	7	0.000000	0	0	15.2286	10.0	18.9	1.89286	0.5	4.0

Table 24 .-M. MENIDIA SEASONAL MEAN CATCH PER UNIT EFFORT (N/T)-1976.

LOCATION	SEASON	OBS	CATCH/UNIT EFFORT			TEMPERATURE (C)			SALINITY (PPT)		
			MEAN	MIN	MAX	MEAN	MIN	MAX	MEAN	MIN	MAX
CHA1	WINTER	1	0.000000	0	0	1.7500	1.5	2.0	9.0000	8	10
CHA1	SPRING	4	0.000000	0	0	15.2800	10.1	19.9	6.0167	1	8
CHA1	SUMMER	8	0.000000	0	0	24.6812	23.5	26.0	11.0625	6	15
CHA1	FALL	6	0.000000	0	0	12.0750	6.0	20.9	10.4167	4	16
CHA2	WINTER	5	0.000000	0	0	2.9300	1.7	6.5	3.6500	0	8
CHA2	SPRING	6	0.000000	0	0	12.6000	7.0	17.4	3.9167	0	10
CHA2	SUMMER	14	0.000000	0	0	25.1071	22.8	28.0	8.2679	4	13
CHA2	FALL	8	0.000000	0	0	15.2437	5.0	20.8	8.3750	3	14
CHA3	WINTER	3	0.000000	0	0	3.8500	2.0	5.3	1.0000	0	2
CHA3	SPRING	6	0.000000	0	0	14.6083	6.6	21.2	3.3333	1	6
CHA3	SUMMER	7	0.000000	0	0	25.2000	24.0	26.5	5.5357	2	10
CHA3	FALL	6	0.000000	0	0	14.4583	7.0	20.1	4.0833	0	9
CHA4	WINTER	3	0.000000	0	0	3.8000	1.0	6.3	0.6667	0	2
CHA4	SPRING	7	0.000000	0	0	13.3274	6.5	21.3	2.0714	0	8
CHA4	SUMMER	12	0.000000	0	0	24.5708	23.2	26.0	4.5000	1	7
CHA4	FALL	10	0.000000	0	0	15.1650	6.5	21.2	4.3500	0	10
CHA5	WINTER	2	0.000000	0	0	2.5000	2.0	3.0	2.5000	2	3
CHA5	SPRING	5	0.000000	0	0	12.9367	7.5	20.0	1.2667	0	3
CHA5	SUMMER	10	0.000000	0	0	24.7672	23.0	26.5	3.2111	1	5
CHA5	FALL	7	0.000000	0	0	13.8500	6.1	22.5	2.4286	0	8
E-11	WINTER	4	0.000000	0	0	2.1958	1.5	5.1	4.0833	0	8
E-11	SPRING	7	0.142857	0	1	13.7833	7.0	20.1	4.6667	2	8
E-11	SUMMER	9	0.000000	0	0	24.6556	22.9	26.9	7.0556	5	9
E-11	FALL	6	0.000000	0	0	13.4000	5.0	22.2	6.9167	3	11
E-12	WINTER	4	0.000000	0	0	2.1958	1.5	5.1	4.0833	0	8
E-12	SPRING	7	0.000000	0	0	13.7833	7.0	20.1	4.0000	0	8
E-12	SUMMER	9	0.000000	0	0	24.6778	22.9	26.9	7.0556	5	9
E-12	FALL	6	0.000000	0	0	13.4417	5.0	22.2	6.9167	3	11
E-21	WINTER	5	0.000000	0	0	2.8200	1.0	4.8	4.1000	0	9
E-21	SPRING	10	0.000000	0	0	12.5911	7.1	22.8	2.8144	0	8
E-21	SUMMER	21	0.000000	0	0	24.6738	22.5	28.8	6.8333	2	10
E-21	FALL	15	0.000000	0	0	16.6200	6.0	24.1	6.8000	0	12
E-22	WINTER	5	0.000000	0	0	2.8200	1.0	4.8	4.1000	0	9
E-22	SPRING	9	0.000000	0	0	13.2354	7.5	22.8	3.1250	0	8
E-22	SUMMER	21	0.000000	0	0	24.6738	22.5	28.8	6.8333	2	10
E-22	FALL	14	0.071429	0	1	17.1000	6.0	24.1	7.2500	0	12
E-31	WINTER	2	0.000000	0	0	2.7000	1.8	3.0	1.5000	1	2
E-31	SPRING	7	0.000000	0	0	13.0167	6.5	22.0	3.6429	0	8
E-31	SUMMER	9	0.000000	0	0	25.0556	22.5	27.5	4.4722	2	7
E-31	FALL	6	0.000000	0	0	12.2083	5.0	19.5	4.1667	0	9
E-32	WINTER	2	0.000000	0	0	2.7000	1.8	3.0	1.5000	1	2
E-32	SPRING	7	0.000000	0	0	13.0167	6.5	22.0	3.3571	0	6
E-32	SUMMER	9	0.000000	0	0	25.0556	22.5	27.5	4.4722	2	7
E-32	FALL	6	0.000000	0	0	12.2083	5.0	19.5	4.1667	0	9
E-41	WINTER	5	0.000000	0	0	3.7800	0.5	7.9	1.7000	0	6
E-41	SPRING	8	0.000000	0	0	13.2786	6.5	21.5	2.5476	0	8
E-41	SUMMER	12	0.000000	0	0	24.5083	23.2	26.0	4.5000	1	7
E-41	FALL	11	0.000000	0	0	15.6000	6.1	21.5	4.8182	0	9
E-42	WINTER	5	0.000000	0	0	3.7800	0.5	7.9	1.7000	0	6
E-42	SPRING	7	0.000000	0	0	13.2786	6.5	21.5	2.9762	1	8
E-42	SUMMER	12	0.000000	0	0	24.4330	23.2	26.0	4.5000	1	7
E-42	FALL	11	0.000000	0	0	15.6000	6.1	21.5	4.8182	0	9
E-51	WINTER	2	0.000000	0	0	3.2750	3.0	3.8	2.0000	2	2
E-51	SPRING	5	0.000000	0	0	14.4125	7.5	22.0	2.3000	0	5

Table 24. - Continued.

M. MENIDIA SEASONAL MEAN CATCH PER UNIT EFFORT (N/T)-1976.

LOCATION	SEASON	OBS	CATCH/UNIT EFFORT			TEMPERATURE (C)			SALINITY (PPT)		
			MEAN	MIN	MAX	MEAN	MIN	MAX	MEAN	MIN	MAX
E-51	SUMMER	7	0	0	0	24.8214	23.0	26.8	3.50000	2	5
E-51	FALL	6	0	0	0	12.6667	5.0	22.9	3.15000	0	8
E-52	WINTER	2	0	0	0	3.2750	3.0	3.8	2.00000	2	2
E-52	SPRING	5	0	0	0	14.4125	7.5	22.0	2.30000	0	5
E-52	SUMMER	7	0	0	0	24.8405	23.0	26.8	3.50000	2	5
E-52	FALL	6	0	0	0	12.6667	5.0	22.9	3.08333	0	8
E-61.	WINTER	2	0	0	0	2.6750	2.2	3.0	3.75000	3	4
E-61	SPRING	5	0	0	0	12.9300	7.0	19.8	1.80000	0	4
E-61	SUMMER	10	0	0	0	24.5000	22.6	26.1	3.85000	1	6
E-61	FALL	7	0	0	0	13.7143	6.0	22.2	2.50000	0	8
E-62	WINTER	2	0	0	0	2.6750	2.2	3.0	3.75000	3	4
E-62	SPRING	5	0	0	0	12.9300	7.0	19.8	1.80000	0	4
E-62	SUMMER	10	0	0	0	24.5000	22.6	26.1	3.85000	1	6
E-62	FALL	7	0	0	0	13.7143	6.0	22.2	2.50000	0	8
NE11	SPRING	4	0	0	0	14.4750	7.2	22.1	0.87500	0	2
NE11	SUMMER	6	0	0	0	24.6833	23.3	26.0	2.83333	1	4
NE11	FALL	5	0	0	0	13.3400	5.9	21.0	1.00000	0	5
NE12	SPRING	4	0	0	0	14.4750	7.2	22.1	0.87500	0	2
NE12	SUMMER	5	0	0	0	24.5950	23.3	26.0	2.80000	1	4
NE12	FALL	5	0	0	0	13.3400	5.9	21.0	1.00000	0	5
NE21	SPRING	1	0	0	0	14.5000	14.5	14.5	1.00000	1	1
NE21	SUMMER	1	0	0	0	25.0000	25.0	25.0	1.00000	1	1
NE21	FALL	1	0	0	0	7.5000	7.0	8.0	0.00000	0	0
NE22	SPRING	1	0	0	0	14.5000	14.5	14.5	1.00000	1	1
NE22	SUMMER	1	0	0	0	25.0000	25.0	25.0	1.00000	1	1
NE22	FALL	1	0	0	0	7.5000	7.0	8.0	0.00000	0	0
NW11	WINTER	3	0	0	0	3.4167	2.0	5.5	1.83333	0	3
NW11	SPRING	6	0	0	0	12.0583	6.7	20.2	1.01667	0	2
NW11	SUMMER	10	0	0	0	24.9700	23.5	26.2	3.72056	1	6
NW11	FALL	7	0	0	0	14.1143	6.8	23.1	2.50000	0	7
NW12	WINTER	3	0	0	0	3.4167	2.0	5.5	1.83333	0	3
NW12	SPRING	6	0	0	0	12.0583	6.7	20.2	1.01667	0	2
NW12	SUMMER	10	0	0	0	24.9650	23.5	26.2	3.68056	1	6
NW12	FALL	7	0	0	0	14.1214	6.8	23.2	2.50000	0	7
NW21	SPRING	1	0	0	0	14.2500	14.1	14.4	0.00000	0	0
NW21	SUMMER	3	0	0	0	24.9167	24.4	25.5	3.83333	3	4
NW21	FALL	1	0	0	0	8.0000	8.0	8.0	1.00000	1	1
NW22	SPRING	1	0	0	0	14.2500	14.1	14.4	0.00000	0	0
NW22	SUMMER	3	0	0	0	24.9167	24.4	25.5	3.85333	3	4
NW22	FALL	1	0	0	0	8.0000	8.0	8.0	1.00000	1	1
RI11	WINTER	3	0	0	0	4.3333	2.0	7.0	1.33333	0	2
RI11	SPRING	7	0	0	0	14.3200	6.2	19.7	2.10000	2	3
RI11	SUMMER	9	0	0	0	24.9744	23.1	26.8	5.02778	2	9
RI11	FALL	6	0	0	0	13.8950	7.0	22.5	4.70000	0	8
RI12	WINTER	3	0	0	0	4.3333	2.0	7.0	1.33333	0	2
RI12	SPRING	6	0	0	0	14.3200	6.2	19.7	2.10000	2	3
RI12	SUMMER	9	0	0	0	24.9744	23.1	26.8	5.10069	2	9
RI12	FALL	6	0	0	0	13.8950	7.0	22.5	4.78333	0	8
RI21	WINTER	3	0	0	0	4.5000	2.0	7.0	0.83333	0	2
RI21	SPRING	7	0	0	0	15.7250	6.2	22.3	2.00000	0	4
RI21	SUMMER	11	0	0	0	24.9864	23.0	26.6	4.75000	1	6
RI21	FALL	6	0	0	0	14.3667	6.0	23.9	4.41667	0	8
RI22	WINTER	3	0	0	0	4.5000	2.0	7.0	0.83333	0	2
RI22	SPRING	7	0	0	0	15.7250	6.2	22.3	2.00000	0	4

Table 24 . - Continued.

H. MENIDIA SEASONAL MEAN CATCH PER UNIT EFFORT (N/T)-1976.

LOCATION	SEASON	OBS	CATCH/UNIT EFFORT			TEMPERATURE (C)			SALINITY (PPT)		
			MEAN	MIN	MAX	MEAN	MIN	MAX	MEAN	MIN	MAX
RI22	SUMMER	12	0.000000	0	0	25.0083	23.0	26.5	5.0625	1.0	9.5
RI22	FALL	6	0.000000	0	0	14.3667	6.0	23.9	4.4167	0.0	8.0
SE01	WINTER	1	0.000000	0	0	5.5000	5.0	6.0	2.0000	2.0	2.0
SE01	SPRING	6	0.000000	0	0	13.5250	9.2	19.1	8.5000	4.0	12.0
SE01	SUMMER	5	0.000000	0	0	24.4500	23.0	25.0	12.4500	10.0	14.0
SE01	FALL	7	0.000000	0	0	10.8143	5.9	19.7	11.2857	6.0	17.0
SE02	WINTER	1	0.000000	0	0	5.5000	5.0	6.0	2.0000	2.0	2.0
SE02	SPRING	5	0.000000	0	0	14.3000	10.0	19.1	8.5000	4.0	12.0
SE02	SUMMER	5	0.000000	0	0	24.4500	23.0	25.0	12.4500	10.0	14.0
SE02	FALL	6	0.000000	0	0	9.3417	5.9	17.8	10.8333	6.0	17.0
SE11	WINTER	2	0.000000	0	0	3.7000	2.0	5.5	4.7500	2.0	8.0
SE11	SPRING	6	0.000000	0	0	14.8333	6.2	19.8	6.5000	5.0	11.0
SE11	SUMMER	8	0.000000	0	0	24.6562	23.0	27.0	11.2813	9.0	13.0
SE11	FALL	8	0.000000	0	0	12.0562	5.0	20.7	10.8750	7.0	15.0
SE12	WINTER	2	0.000000	0	0	3.7000	2.0	5.5	4.7500	2.0	8.0
SE12	SPRING	5	0.000000	0	0	14.4700	6.2	19.0	6.8750	5.0	11.0
SE12	SUMMER	8	0.000000	0	0	24.5196	23.0	27.0	11.2813	9.0	13.0
SE12	FALL	7	0.000000	0	0	10.8357	5.0	20.0	10.2857	7.0	15.0
SE21	SPRING	4	0.000000	0	0	14.8958	10.2	18.5	5.5000	4.0	7.0
SE21	SUMMER	6	0.000000	0	0	24.8667	23.4	26.5	9.6417	8.0	12.0
SE21	FALL	4	0.000000	0	0	13.5750	5.5	20.5	9.5000	6.0	13.0
SE22	SPRING	4	0.000000	0	0	14.8958	10.2	18.5	5.5000	4.0	7.0
SE22	SUMMER	6	0.000000	0	0	24.8667	23.4	26.5	9.7250	8.0	12.0
SE22	FALL	4	0.000000	0	0	13.5750	5.5	20.5	9.5000	6.0	13.0
SE31	WINTER	5	0.000000	0	0	3.7200	1.0	6.8	1.3000	0.0	7.0
SE31	SPRING	8	0.000000	0	0	13.1937	7.0	19.8	4.5714	0.0	8.0
SE31	SUMMER	16	0.000000	0	0	24.7594	22.9	28.0	8.8438	5.0	11.0
SE31	FALL	11	0.000000	0	0	14.5182	4.0	20.8	8.1364	3.0	13.0
SE32	WINTER	5	0.000000	0	0	3.7200	1.0	6.8	1.3000	0.0	7.0
SE32	SPRING	6	0.000000	0	0	14.1833	7.0	19.8	5.0000	0.0	8.0
SE32	SUMMER	16	0.000000	0	0	24.7312	22.9	28.0	8.8438	5.0	11.0
SE32	FALL	11	0.000000	0	0	14.5182	4.0	20.8	8.1364	3.0	13.0
SSC1	WINTER	9	0.000000	0	0	3.1083	0.2	6.0	3.2292	0.0	9.0
SSC1	SPRING	16	0.000000	0	0	13.1980	4.6	22.9	3.1844	0.0	8.0
SSC1	SUMMER	29	0.000000	0	0	24.6603	22.3	29.0	7.6652	3.0	10.0
SSC1	FALL	20	0.000000	0	0	16.2975	6.0	22.5	7.3000	0.0	11.0
SSC2	WINTER	9	0.000000	0	0	3.1905	0.2	6.0	3.2292	0.0	9.0
SSC2	SPRING	16	0.000000	0	0	13.2250	4.6	22.9	3.3344	0.0	8.0
SSC2	SUMMER	29	0.068966	0	2	24.6603	22.3	29.0	7.6652	3.0	10.0
SSC2	FALL	20	0.100000	0	2	16.2975	6.0	22.5	7.3000	0.0	11.0
SW11	WINTER	1	0.000000	0	0	3.0000	2.5	3.5	5.7500	5.5	6.0
SW11	SPRING	4	0.000000	0	0	15.0750	10.8	17.8	4.2500	2.0	6.0
SW11	SUMMER	7	0.000000	0	0	25.0500	23.5	26.0	10.6429	6.0	15.0
SW11	FALL	4	0.000000	0	0	11.1750	6.0	18.2	8.0000	4.0	13.0
SW12	WINTER	1	0.000000	0	0	3.0000	2.5	3.5	5.7500	5.5	6.0
SW12	SPRING	5	0.000000	0	0	14.2500	10.8	17.8	4.4500	2.0	6.0
SW12	SUMMER	8	0.000000	0	0	25.0312	23.5	26.0	10.1563	6.0	15.0
SW12	FALL	5	0.000000	0	0	13.0600	6.0	20.7	9.4000	4.0	15.0
SW21	WINTER	6	0.000000	0	0	3.5583	1.0	6.5	2.5000	0.0	9.0
SW21	SPRING	8	0.000000	0	0	14.1375	7.0	20.5	3.0000	0.0	7.0
SW21	SUMMER	15	0.000000	0	0	25.0900	23.3	28.0	7.6667	3.0	12.0
SW21	FALL	11	0.000000	0	0	14.5409	4.9	21.1	7.6818	3.0	14.0
SW22	WINTER	6	0.000000	0	0	3.5583	1.0	6.5	2.5000	0.0	9.0
SW22	SPRING	8	0.000000	0	0	14.1375	7.0	20.5	3.0000	0.0	7.0

Table 24 . - Continued.

N. MENIDJA SEASONAL MEAN CATCH PER UNIT EFFORT (N/T)-1974.

LOCATION	SEASON	OBS	CATCH/UNIT EFFORT			TEMPERATURE (C)			SALINITY (PPT)		
			MEAN	MIN	MAX	MEAN	MIN	MAX	MEAN	MIN	MAX
SW22	SUMMER	15	0	0	0	25.0900	23.3	28.0	7.76667	3	14
SW22	FALL	11	0	0	0	14.5409	4.9	21.1	7.63636	3	14
W-11	WINTER	5	0	0	0	2.9200	0.5	4.9	3.57500	0	8
W-11	SPRING	12	0	0	0	15.0767	7.1	23.0	1.56667	0	8
W-11	SUMMER	21	0	0	0	24.9786	23.3	28.0	5.73690	2	10
W-11	FALL	15	0	0	0	17.0133	5.9	23.0	5.80000	0	13
W-12	WINTER	5	0	0	0	2.9200	0.5	4.9	3.57500	0	8
W-12	SPRING	11	0	0	0	14.5864	7.1	23.0	1.70707	0	8
W-12	SUMMER	21	0	0	0	25.0000	23.3	28.0	5.73690	2	10
W-12	FALL	16	0	0	0	16.5594	5.9	23.0	5.43750	0	13
W-21	WINTER	2	0	0	0	2.1750	1.8	3.0	2.50000	2	4
W-21	SPRING	5	0	0	0	13.1000	6.5	17.5	0.75000	0	2
W-21	SUMMER	9	0	0	0	25.7722	24.1	27.0	3.80556	2	5
W-21	FALL	7	0	0	0	16.1357	6.0	23.0	4.44048	0	7
W-22	WINTER	2	0	0	0	2.1750	1.8	3.0	2.50000	2	4
W-22	SPRING	5	0	0	0	13.1000	6.5	17.5	0.75000	0	2
W-22	SUMMER	9	0	0	0	25.7167	24.1	27.0	3.80556	2	5
W-22	FALL	7	0	0	0	16.1357	6.0	23.0	4.44048	0	7
W-31	WINTER	5	0	0	0	3.6175	1.2	7.0	1.02500	0	4
W-31	SPRING	8	0	0	0	14.0312	6.5	21.3	0.78571	0	4
W-31	SUMMER	12	0	0	0	24.6792	23.2	26.1	4.12500	2	6
W-31	FALL	10	0	0	0	15.6467	6.5	21.4	4.38333	0	7
W-32	WINTER	5	0	0	0	3.6175	1.2	7.0	1.02500	0	4
W-32	SPRING	8	0	0	0	14.0312	6.5	21.3	0.82143	0	4
W-32	SUMMER	12	0	0	0	24.7000	23.2	26.1	4.12500	2	6
W-32	FALL	10	0	0	0	15.6467	6.5	21.4	4.38333	0	7

Table 25 . - A chronological summary of temperature avoidance studies on Atlantic silverside, Menidia menidia. All tests were conducted at near air-saturated levels of dissolved oxygen and pH of 7 to 8.

DATE	REPLICATE NO. OF FISH PER TEST		SIZE RANGE (TL IN MM)		SALINITY (PPT)	LIGHT LEVEL (FOOT (LUX) CANDLES)		ACCLIMATION TEMPERATURE (C) (F)		AVOIDANCE TEMPERATURE (C) (F)	
			MIN.	MAX.							
MENIDIA MENIDIA											
20 MAY 70	1	1	-	-	4	215	20.0	15	59	30	86
16 JUN 70	1	6	24	32	4	215	20.0	20	68	31	87
18 JUN 70	1	4	30	38	4	21.5	2.0	20	68	33	91
27 JUL 70	1	4	52	68	1	215	20.0	27	80	36	96
28 JUL 70	1	4	56	61	1	54	5.0	26	78	36	96
4 AUG 70	1	4	58	72	4	215	20.0	25	77	33	91
10 NOV 70	1	1	-	-	4.5	215	20.0	14	57	27	80
5 AUG 71	1	4	51	63	3	215	20.0	25	77	33	91
	2	4	59	70	3	215	20.0	25	77	33	91
20 OCT 71	1	4	83	104	4.5	215	20.0	17	62	26	78
	2	4	71	86	4.5	215	20.0	17	62	28	82

Table 25 . - Continued.

DATE	REPLICATE	NO. OF FISH PER TEST	SIZE RANGE (TL IN MM)		SALINITY (PPT)	LIGHT LEVEL (FOOT (LUX) CANDLES)		ACCLIMATION TEMPERATURE (C) (F)		AVOIDANCE TEMPERATURE (C) (F)	
			MIN.	MAX.							
MENIDIA MENIDIA											
26 JUL 72	1	4	48	67	5	215	20.0	26	78	34	93
2 AUG 72	1	4	65	85	5	21.5	2.0	26	78	28	82
	2	4	65	90	5	21.5	2.0	26	78	35	95
6 SEP 72	1	4	79	85	5	215	20.0	22	71	28	82
	2	4	77	87	5	215	20.0	22	71	32	89
25 OCT 72	1	4	76	96	7	215	20.0	13	55	23	73
	2	4	73	98	7	215	20.0	13	55	20	68
16 JAN 73	1	4	52	84	5	215	20.0	5	41	25	77
12 APR 73	1	4	57	92	3.5	215	20.0	12	53	23	73
	2	4	94	123	3.5	215	20.0	12	53	23	73
17 AUG 73	1	4	66	82	10	215	20.0	27	80	30	86
	2	4	70	75	10	215	20.0	27	80	28	82
21 AUG 73	1	4	57	62	10	21.5	2.0	25	77	34	93
	2	4	77	90	10	21.5	2.0	25	77	34	93
23 OCT 73	1	4	74	107	10	215	20.0	16	60	27	80
	2	4	51	90	10	215	20.0	16	60	27	80

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Table 25. - Continued.

DATE	REPLICATE	NO. OF FISH PER TEST	SIZE RANGE (TL IN MM)		SALINITY (PPT)	LIGHT LEVEL (FOOT (LUX) CANDLES)		ACCLIMATION TEMPERATURE		AVOIDANCE TEMPERATURE	
			MIN.	MAX.		(C)	(F)	(C)	(F)		
MENIDIA MENIDIA											
15 NOV 73	1	4	60	92	10	215	20.0	8	46	23	73
	2	4	62	85	10	215	20.0	8	46	23	73
5 APR 74	1	4	84	100	6	215	20.0	6	42	20	68
	2	4	90	105	6	215	20.0	6	42	20	68
10 APR 74	1	4	100	108	5	215	20.0	9.5	49	25	77
	2	4	84	107	5	215	20.0	9.5	49	25	77
11 APR 74	1	4	94	115	5	21.5	2.0	9.5	49	27	80
	2	3	80	95	5	21.5	2.0	9.5	49	27	80
23 APR 74	1	4	100	106	5	21.5	2.0	15	59	31	87
	2	4	74	115	5	21.5	2.0	15	59	31	87
24 APR 74	1	4	82	112	5	215	20.0	15	59	27	80
	2	4	71	94	5	215	20.0	15	59	29	84
2 MAY 74	1	4	70	87	4	21.5	2.0	15	59	28	82
	2	4	78	87	4	21.5	2.0	15	59	28	82
22 MAY 74	1	4	71	86	6.5	215	20.0	18	64	30	86
	2	4	78	108	6.5	215	20.0	18	64	30	86
24 MAY 74	1	4	80	95	6.5	21.5	2.0	18	64	25	77
	2	3	70	87	6.5	21.5	2.0	18	64	31	87

Table 25 . - Continued.

DATE	REPLICATE	NO. OF FISH PER TEST	SIZE RANGE (TL IN MM)		SALINITY (PPT)	LIGHT LEVEL (FOOT (LUX) CANDLES)		ACCLIMATION TEMPERATURE		AVOIDANCE TEMPERATURE	
			MIN.	MAX.		(C)	(F)	(C)	(F)		
MENIDIA MENIDIA											
20 FEB 75	1	3	44	60	3	215	20.0	3	37	25	77
	2	3	59	84	3	215	20.0	3	37	25	77
11 MAR 75	1	3	87	88	4	215	20.0	3	37	22	71
	2	3	64	87	4	215	20.0	3	37	22	71
14 MAR 75	1	3	85	107	4	21.5	2.0	3	37	18	64
	2	3	77	121	4	21.5	2.0	3	37	15	59
26 MAR 75	1	4	57	104	4	215	20.0	10	50	27	80
	2	4	54	112	4	215	20.0	10	50	27	80
16 APR 75	1	4	73	122	5.5	215	20.0	8	46	25	77
	2	4	90	107	5.5	215	20.0	8	46	25	77
18 APR 75	1	4	84	115	5.5	21.5	2.0	8	46	27	80
	2	4	83	112	5.5	21.5	2.0	8	46	27	80
21 MAY 75	1	4	71	74	5.5	215	20.0	19	66	32	89
	2	4	86	102	5.5	215	20.0	19	66	30	86
19 SEP 75	1	4	62	75	6.5	215	20.0	22	71	32	89
	2	4	63	76	6.5	215	20.0	22	71	32	89
24 OCT 75	1	4	58	77	6	215	20.0	19	66	25	77

Table 25 . - Continued.

DATE	REPLICATE	NO. OF FISH PER TEST	SIZE RANGE (TL IN MM)		SALINITY (PPT)	LIGHT LEVEL (FOOT (LUX) CANDLES)		ACCLIMATION TEMPERATURE (C) (F)		AVOIDANCE TEMPERATURE (C) (F)	
MENIDIA MENIDIA											
12 NOV 75	1	4	63	97	4.5	215	20.0	16	60	17	62
	2	4	77	103	4.5	215	20.0	16	60	29	84
2 DEC 75	1	4	68	86	3.5	215	20.0	9	48	24	75
	2	4	56	83	3.5	215	20.0	9	48	26	78
5 DEC 75	1	4	48	63	4.5	21.5	2.0	8	46	31	87
	2	4	53	66	4.5	21.5	2.0	8	46	31	87
31 DEC 75	1	4	74	94	4.5	215	20.0	2	35	16	60
	2	4	63	86	4.5	215	20.0	2	35	16	60
25 MAR 76	1	4	72	110	4	215	20.0	10	50	26	78
2 APR 76	1	4	74	80	4.5	215	20.0	12	53	28	82
	2	4	87	107	4.5	215	20.0	12	53	26	78
29 APR 76	1	4	85	110	5.2	215	20.0	15	59	28	82
	2	4	90	103	5.2	215	20.0	15	59	29	84
3 SEP 76	1	4	50	71	4	21.5	2.0	24	75	32.2	89
	2	4	61	70	4	21.5	2.0	24	75	32.2	89
19 OCT 76	1	4	68	93	6	215	20.0	14.5	58	27.8	82
	2	4	54	78	6	215	20.0	14.5	58	27.8	82

Table 25 . - Continued.

DATE	REPLICATE	NO. OF FISH PER TEST	SIZE RANGE (TL IN MM)		SALINITY (PPT)	LIGHT LEVEL (FOOT (LUX) CANDLES)		ACCLIMATION TEMPERATURE (C) (F)		AVOIDANCE TEMPERATURE (C) (F)	
			MIN.	MAX.							
MENIDIA MENIDIA											
7 APR 77	1	4	83	96	6.5	215	20.0	12	53	23	73
	2	4	78	110	6.5	215	20.0	12	53	23	73
22 APR 77	1	4	100	112	6	215	20.0	15	59	32	89
	2	4	90	115	6	215	20.0	15	59	32	89
27 APR 77	1	4	73	103	6	21.5	2.0	15	59	26	78
	2	4	86	113	6	21.5	2.0	15	59	28	82
6 MAY 77	1	4	102	110	7	215	20.0	17	62	26	78
	2	4	78	112	7	215	20.0	17	62	33	91
26 MAY 77	1	3	115	120	7	215	20.0	23	73	34	93
13 JUL 77	1	4	44	65	8.5	215	20.0	30	86	33	91
	2	4	61	70	8.5	215	20.0	30	86	35	95

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Table 26 . - Components for the multiple linear regression equation to estimate avoidance temperatures (C) for the Atlantic silverside, Menidia menidia,

* = Significant at P.05 or greater; and ** = significant at P.01 or greater.

Constant (a) = 21.832

F(2, 85) = 68.782**

N = 88

Standard Error of Estimate = 2.965

R = 0.786**

 $R^2 = 0.618$

Variable (Xi)	Mean (Xi)	Correlation (r) With Y	Regression Coefficient (bi)	Standard Error of bi	Standardized Reg. Coef.
Acclimation Temperature (C)	15.1	0.771**	0.524**	0.048	0.806
Salinity (ppt)	5.5	0.021	-0.389**	0.168	0.159

Table 27. - M. AMERICANA SEASONAL MEAN CATCH PER UNIT EFFORT (N/T)-1975.

LOCATION	SEASON	OBS	CATCH/UNIT EFFORT			TEMPERATURE (C)			SALINITY (PPT)		
			MEAN	MIN	MAX	MEAN	MIN	MAX	MEAN	MIN	MAX
CHA1	SPRING	3	0.0000	0	0	13.0500	3.0	22.8	5.86667	1.0	12.0
CHA1	SUMMER	5	0.0000	0	0	24.7500	22.0	26.1	5.20000	2.0	9.0
CHA1	FALL	2	0.0000	0	0	15.3250	10.3	20.0	4.00000	0.0	9.0
CHA2	WINTER	1	0.0000	0	0	6.0000	6.0	6.0	5.75000	5.5	6.0
CHA2	SPRING	3	0.0000	0	0	12.3000	3.0	22.8	4.03333	0.0	12.0
CHA2	SUMMER	14	0.0000	0	0	24.5429	21.0	28.9	5.05495	0.0	10.0
CHA2	FALL	7	0.0000	0	0	14.5000	9.9	20.0	3.75000	1.0	10.0
CHA3	WINTER	1	0.0000	0	0	7.6500	7.4	7.9	4.00000	4.0	4.0
CHA3	SPRING	3	0.3333	0	1	12.6667	4.0	22.8	2.00000	0.0	6.0
CHA3	SUMMER	4	0.0000	0	0	25.3250	24.2	26.2	2.00000	0.0	4.0
CHA3	FALL	3	0.0000	0	0	14.2333	11.2	16.5	2.25000	1.0	3.0
CHA4	WINTER	1	11.0000	11	11	.	.	5.3	.	.	0.0
CHA4	SPRING	3	0.0000	0	0	12.1833	4.0	23.0	1.83333	0.0	6.0
CHA4	SUMMER	13	0.0000	0	0	25.4577	20.1	28.2	2.04968	0.0	5.5
CHA4	FALL	8	0.0000	0	0	14.8062	10.0	19.0	2.50000	0.5	5.0
CHA5	SPRING	3	0.3333	0	1	12.6500	5.0	23.0	0.83333	0.0	3.0
CHA5	SUMMER	5	0.0000	0	0	25.2350	21.8	27.0	1.23750	0.0	3.5
CHA5	FALL	2	0.5000	0	1	17.4750	15.9	19.0	0.00000	0.0	0.0
E-11	WINTER	4	5.0000	1	17	4.0625	1.8	6.0	0.65833	0.0	1.5
E-11	SPRING	8	8.7500	0	35	11.7562	1.0	23.5	3.65625	0.0	11.0
E-11	SUMMER	11	0.0000	0	0	25.9192	23.0	30.0	4.68687	0.0	9.5
E-11	FALL	5	4.6000	0	14	15.5900	11.3	19.0	4.40000	2.0	9.0
E-12	WINTER	4	8.0000	0	31	4.0625	1.8	6.0	0.20333	0.0	1.5
E-12	SPRING	8	1.6250	0	7	11.9812	1.0	23.5	3.87500	0.0	11.0
E-12	SUMMER	11	0.0909	0	1	26.0364	23.0	30.0	4.39773	0.0	9.5
E-12	FALL	4	1.7500	0	4	15.2500	11.3	19.0	4.75000	2.0	9.0
E-21	WINTER	5	2.6000	0	7	4.7300	1.8	7.7	2.45000	0.0	4.5
E-21	SPRING	8	1.3750	0	4	11.8312	1.3	23.5	2.65625	0.0	9.5
E-21	SUMMER	22	0.0455	0	1	25.6500	20.9	29.0	4.21591	0.0	9.5
E-21	FALL	16	2.8750	0	34	16.1544	9.3	19.6	3.14231	0.0	8.0
E-22	WINTER	5	2.0000	0	5	4.7300	1.8	7.7	2.37500	0.0	4.5
E-22	SPRING	7	0.7143	0	4	12.9500	1.3	23.5	1.92857	0.0	5.0
E-22	SUMMER	21	0.1429	0	2	25.5690	20.9	31.3	4.14286	0.0	9.5
E-22	FALL	13	0.0769	0	1	15.9958	9.3	19.6	3.39583	0.0	8.0
E-31	WINTER	4	17.0000	0	66	3.3917	2.0	5.5	0.83333	0.0	2.0
E-31	SPRING	7	5.0000	0	30	11.1929	2.0	22.8	2.67857	0.0	9.0
E-31	SUMMER	6	1.0000	0	6	24.9583	23.0	26.4	2.41667	0.0	7.0
E-31	FALL	4	19.7500	0	48	15.6125	11.4	19.6	3.16750	1.0	8.0
E-32	WINTER	4	7.5000	1	23	3.3917	2.0	5.5	0.83333	0.0	2.0
E-32	SPRING	7	0.5714	0	2	11.1929	2.0	22.8	2.67857	0.0	9.0
E-32	SUMMER	6	0.3333	0	1	24.9583	23.0	26.4	2.41667	0.0	7.0
E-32	FALL	4	2.7500	0	10	15.6125	11.4	19.6	3.18750	1.0	8.0
E-41	WINTER	4	12.7500	0	40	3.3292	2.0	5.1	0.66667	0.0	2.0
E-41	SPRING	7	5.0000	0	10	10.9357	2.0	22.8	1.96429	0.0	9.0
E-41	SUMMER	13	2.0000	0	21	25.0692	19.1	28.0	2.36538	0.0	6.0
E-41	FALL	9	14.6667	0	82	14.5000	9.9	19.0	3.08333	0.5	5.0
E-42	WINTER	4	1.0000	0	2	3.3292	2.0	5.1	0.66667	0.0	2.0
E-42	SPRING	7	0.2857	0	1	10.9357	2.0	22.8	1.96429	0.0	9.0
E-42	SUMMER	14	0.0714	0	1	25.2786	19.1	28.0	2.16071	0.0	6.0
E-42	FALL	9	0.1111	0	1	14.5000	9.9	19.0	3.08333	0.5	5.0
E-51	WINTER	4	1.0000	0	3	3.3000	1.0	5.3	0.00000	0.0	0.0
E-51	SPRING	5	33.4000	1	76	12.6400	2.0	21.6	1.25000	0.0	3.5
E-51	SUMMER	6	0.8333	0	2	26.0500	23.9	28.9	1.29167	0.0	4.0
E-51	FALL	1	42.0000	42	42	16.2500	14.0	16.5	1.25000	1.0	1.5

Table 27 . - Continued.

M. AMERICANA SEASONAL MEAN CATCH PER UNIT EFFORT (N/T)-1975.

LOCATION	SEASON	OBS	CATCH/UNIT EFFORT			TEMPERATURE (C)			SALINITY (PPT)		
			MEAN	MIN	MAX	MEAN	MIN	MAX	MEAN	MIN	MAX
E-52	WINTER	4	1.0000	0	2	3.3000	1.0	5.3	0.00000	0.0	0.0
E-52	SPRING	5	4.0000	0	16	12.1800	2.0	21.6	0.65000	0.0	3.5
E-52	SUMMER	7	2.2857	0	14	25.7214	23.5	28.9	1.29167	0.0	4.0
E-52	FALL	1	0.0000	0	0	16.2500	16.0	16.5	1.25000	1.0	1.5
E-61	WINTER	4	1.7500	1	4	3.3000	1.0	5.3	0.00000	0.0	0.0
E-61	SPRING	5	16.2000	4	33	12.1100	2.0	21.6	0.65000	0.0	3.5
E-61	SUMMER	7	2.4286	0	7	25.4821	21.8	28.9	1.07738	0.0	4.0
E-61	FALL	2	23.0000	7	39	17.3750	15.5	19.0	0.00000	0.0	0.0
E-62	WINTER	4	0.7500	0	2	3.3000	1.0	5.3	0.00000	0.0	0.0
E-62	SPRING	5	2.4000	0	9	12.1100	2.0	21.6	0.65000	0.0	3.5
E-62	SUMMER	7	0.5714	0	4	25.4821	21.8	28.9	1.07738	0.0	4.0
E-62	FALL	2	1.0000	1	1	17.3750	15.5	19.0	0.00000	0.0	0.0
NE11	SPRING	3	15.0000	0	24	18.3667	9.9	24.3	1.08333	0.0	3.5
NE11	SUMMER	6	1.0000	0	3	25.5667	22.8	27.5	0.75000	0.0	3.0
NE12	SPRING	3	20.6667	8	37	18.3667	9.9	24.3	1.08333	0.0	3.5
NE12	SUMMER	6	5.3333	0	22	25.5667	22.8	27.5	0.75000	0.0	3.0
NE12	FALL	1	7.0000	7	7	16.8500	16.7	17.0	0.50000	0.0	1.0
NW11	WINTER	2	4.5000	0	9	5.9500	5.3	7.5	0.00000	0.0	0.0
NW11	SPRING	7	13.0000	1	48	12.9786	3.0	23.0	1.07143	0.0	4.5
NW11	SUMMER	5	0.4000	0	1	25.3625	23.0	26.8	1.76250	0.0	3.5
NW11	FALL	2	22.0000	16	28	18.3500	16.5	20.0	0.00000	0.0	0.0
NW12	WINTER	2	5.5000	2	9	5.9500	5.3	7.5	0.00000	0.0	0.0
NW12	SPRING	5	7.8000	2	25	13.4600	3.0	23.0	1.20000	0.0	4.5
NW12	SUMMER	4	0.7500	0	2	24.9958	23.0	26.5	1.39583	0.0	3.5
NW12	FALL	2	12.0000	1	23	18.3500	16.5	20.0	0.25000	0.0	1.0
RI11	SPRING	2	1.0000	0	2	18.1750	13.8	23.0	2.25000	1.5	3.0
RI11	SUMMER	3	3.0000	0	9	26.4167	24.5	28.5	3.08333	0.0	6.5
RI12	SPRING	2	2.0000	0	4	18.1750	13.8	23.0	2.25000	1.5	3.0
RI12	SUMMER	3	0.0000	0	0	26.4167	24.5	28.5	3.08333	0.0	6.5
RI21	SPRING	1	1.0000	1	1	22.5000	22.0	23.0	2.75000	2.5	3.0
RI21	SUMMER	3	2.6667	0	8	26.0333	24.5	27.0	2.16667	0.0	3.5
RI22	SPRING	1	0.0000	0	0	22.5000	22.0	23.0	2.75000	2.5	3.0
RI22	SUMMER	3	0.6667	0	2	26.0333	24.5	27.0	2.16667	0.0	3.5
SE01	SPRING	5	0.8000	0	2	16.9400	9.4	21.8	8.70000	6.5	12.0
SE01	SUMMER	8	0.0000	0	0	25.5875	23.8	29.5	8.65625	0.0	14.0
SE02	SPRING	5	0.0000	0	0	17.5400	9.4	21.8	8.78000	6.5	12.0
SE02	SUMMER	9	0.0000	0	0	25.5222	23.8	29.5	8.69444	0.0	14.0
SE11	SPRING	5	3.6000	0	15	16.5500	9.4	21.0	6.80000	3.5	12.0
SE11	SUMMER	11	0.0000	0	0	25.3636	22.3	28.0	8.00273	0.0	14.0
SE11	FALL	3	0.3333	0	1	16.3500	10.0	20.5	6.25000	3.5	11.0
SE12	SPRING	5	0.2000	0	1	16.5500	9.5	21.0	6.60000	3.5	10.0
SE12	SUMMER	11	0.0000	0	0	25.3636	22.3	28.0	8.02273	0.0	14.0
SE12	FALL	3	0.0000	0	0	16.3500	10.0	20.5	6.25000	3.5	11.0
SE21	SPRING	5	1.4000	0	4	16.4600	9.9	21.0	5.10000	3.0	8.0
SE21	SUMMER	9	0.1111	0	1	25.2889	23.5	27.5	5.39236	0.0	10.5
SE21	FALL	2	0.0000	0	0	20.1250	20.0	20.5	6.87500	3.5	9.0
SE22	SPRING	5	0.2000	0	1	16.4600	9.9	21.0	5.10000	3.0	8.0
SE22	SUMMER	9	0.0000	0	0	25.2889	23.5	27.5	5.39236	0.0	10.5
SE22	FALL	2	0.0000	0	0	20.1250	20.0	20.5	6.87500	3.5	9.0
SE31	WINTER	3	29.3333	1	85	5.5333	4.2	6.0	2.16667	0.0	5.5
SE31	SPRING	8	5.2500	0	14	11.2071	1.0	23.0	4.50000	0.0	11.0
SE31	SUMMER	19	0.0526	0	1	24.6830	20.1	28.1	5.30186	0.0	10.5
SE31	FALL	10	19.7000	0	101	15.4200	8.9	20.0	4.50000	1.0	9.0
SE32	WINTER	3	3.6667	0	9	5.5333	4.2	6.0	2.16667	0.0	5.5

Table 27 . - Continued.

M. AMERICANA SEASONAL MEAN CATCH PER UNIT EFFORT (N/T)-1975.

LOCATION	SEASON	OBS	CATCH/UNIT EFFORT			TEMPERATURE (C)			SALINITY (PPT)		
			MEAN	MIN	MAX	MEAN	MIN	MAX	MEAN	MIN	MAX
SE32	SPRING	8	0.6250	0	3	11.2071	1.0	23.0	4.50000	0.0	11.0
SE32	SUMMER	18	0.0536	0	1	24.7172	20.1	28.1	5.57668	2.0	10.5
SE32	FALL	9	2.6667	0	15	15.9444	11.0	20.0	4.75000	1.0	9.0
SSC1	WINTER	8	15.2500	0	78	4.9271	0.2	12.0	3.72857	0.0	6.0
SSC1	SPRING	11	16.1818	0	62	12.7295	1.3	21.9	2.02597	0.0	9.0
SSC1	SUMMER	25	0.0800	0	2	25.2775	20.3	29.8	5.67708	0.0	9.0
SSC1	FALL	20	8.3000	0	72	16.2408	9.8	20.0	4.04500	1.0	9.0
SSC2	WINTER	8	39.0000	0	130	5.0521	0.2	12.0	3.72857	0.0	6.0
SSC2	SPRING	11	18.7273	0	60	12.7295	1.3	21.9	2.02597	0.0	9.0
SSC2	SUMMER	24	0.1667	0	2	25.1286	20.3	29.8	5.65465	0.0	9.0
SSC2	FALL	21	64.4286	0	802	16.2918	9.8	20.0	3.91465	1.0	9.0
SW11	SUMMER	4	0.2500	0	1	24.7292	22.0	27.8	6.37500	2.0	9.0
SW11	FALL	3	18.3333	1	47	17.8167	10.6	23.8	3.58333	0.0	8.0
SW12	SUMMER	1	0.0000	0	0	22.2500	22.0	22.5	9.00000	9.0	9.0
SW12	FALL	2	4.0000	1	7	15.2750	10.6	20.0	1.50000	0.0	3.0
SW21	WINTER	3	22.0000	3	49	5.5000	5.0	6.0	1.75000	0.0	5.0
SW21	SPRING	6	35.6667	2	78	11.5917	3.2	21.0	1.87500	0.0	7.0
SW21	SUMMER	16	0.4375	0	3	25.2175	21.0	29.5	4.67292	0.0	10.0
SW21	FALL	10	19.5000	0	48	14.0854	8.7	18.5	3.56250	0.0	10.0
SW22	WINTER	3	0.0000	0	0	5.5000	5.0	6.0	2.08333	0.0	6.0
SW22	SPRING	6	5.0000	0	15	11.3500	3.2	21.0	2.20833	0.0	7.0
SW22	SUMMER	15	0.0000	0	0	25.0933	21.0	29.5	4.75714	0.0	9.5
SW22	FALL	9	0.7778	0	2	14.7875	8.7	20.0	3.06250	0.0	10.0
W-11	WINTER	4	25.0000	0	48	6.2125	4.0	8.2	1.12500	0.0	3.0
W-11	SPRING	6	42.0000	0	99	11.4667	3.2	21.0	2.83333	0.0	7.0
W-11	SUMMER	18	1.6667	0	14	25.1004	19.9	28.5	2.73646	0.0	8.0
W-11	FALL	16	10.7500	0	49	16.3027	9.1	20.0	1.92009	0.0	6.0
W-12	WINTER	4	17.2500	3	47	6.2125	4.0	8.2	1.12500	0.0	3.0
W-12	SPRING	6	25.0000	0	79	13.5750	3.2	21.0	2.37500	0.0	7.0
W-12	SUMMER	20	0.5500	0	6	25.1113	19.9	28.5	3.07353	0.0	8.0
W-12	FALL	17	11.8824	0	62	15.4251	9.1	20.0	1.81078	0.0	6.0
W-21	WINTER	2	5.0000	2	8	5.4500	4.0	6.2	0.00000	0.0	0.0
W-21	SPRING	6	23.6667	1	57	12.2167	2.6	21.0	1.62500	0.0	4.5
W-21	SUMMER	3	1.0000	0	3	25.5167	24.7	26.9	1.50000	0.0	4.0
W-21	FALL	3	56.6667	30	110	13.9583	11.0	16.5	1.41667	0.0	2.0
W-22	WINTER	2	1.5000	0	3	5.4500	4.0	6.2	0.00000	0.0	0.0
W-22	SPRING	6	15.3333	1	31	12.2167	2.6	21.0	1.62500	0.0	4.5
W-22	SUMMER	3	0.0000	0	0	25.5167	24.7	26.9	1.50000	0.0	4.0
W-22	FALL	3	40.0000	27	52	13.9583	11.0	16.5	1.41667	0.0	2.0
W-31	WINTER	4	19.5000	4	41	6.6500	5.3	8.8	0.29167	0.0	1.0
W-31	SPRING	5	30.2000	2	72	11.3700	2.8	21.0	1.70000	0.0	4.5
W-31	SUMMER	15	0.4000	0	2	25.8567	20.9	29.0	2.31333	0.0	8.0
W-31	FALL	7	21.8571	1	56	15.2286	10.0	18.9	1.87500	0.5	4.0
W-32	WINTER	4	3.7500	2	6	6.6500	5.3	8.8	0.29167	0.0	1.0
W-32	SPRING	5	1.6000	0	4	11.3700	2.8	21.0	1.70000	0.0	4.5
W-32	SUMMER	13	0.3843	0	3	25.8500	20.9	29.0	1.86538	0.0	5.0
W-32	FALL	7	11.8571	0	42	15.2286	10.0	18.9	1.89286	0.5	4.0

Table 28. - N. AMERICANA SEASONAL MEAN CATCH PER UNIT EFFORT (N/T)-1976.

LOCATION	SEASON	OBS	CATCH/UNIT EFFORT			TEMPERATURE (C)			SALINITY (PPT)		
			MEAN	MIN	MAX	MEAN	MIN	MAX	MEAN	MIN	MAX
CHA1	WINTER	1	0.0000	0	0	1.7500	1.5	2.0	9.0000	8	10
CHA1	SPRING	4	0.0000	0	0	15.2300	10.1	19.9	6.0167	1	8
CHA1	SUMMER	8	0.0000	0	0	24.4812	23.5	26.0	11.0625	6	15
CHA1	FALL	4	0.3333	0	2	12.0750	6.0	20.9	10.4167	4	14
CHA2	WINTER	5	2.6000	0	5	2.9500	1.7	6.5	3.6500	0	8
CHA2	SPRING	4	0.0000	0	0	12.6000	7.0	17.4	3.9167	0	10
CHA2	SUMMER	14	0.0000	0	0	25.1071	22.8	28.0	8.2679	4	13
CHA2	FALL	8	0.1250	0	1	15.2437	5.0	20.8	8.3750	3	14
CHA3	WINTER	3	1.0000	0	2	3.8500	2.0	5.3	1.0000	0	2
CHA3	SPRING	4	0.0000	0	0	14.6083	6.6	21.2	3.3333	1	6
CHA3	SUMMER	7	0.0000	0	0	25.2000	24.0	26.5	5.5357	2	10
CHA3	FALL	4	0.3333	0	2	14.4583	7.0	20.1	4.0833	0	9
CHA4	WINTER	3	0.6667	0	1	3.8000	1.0	6.3	0.6667	0	2
CHA4	SPRING	7	0.4286	0	3	13.3274	6.5	21.3	2.0714	0	8
CHA4	SUMMER	12	0.0000	0	0	24.5708	23.2	26.0	4.5000	1	7
CHA4	FALL	10	0.5000	0	3	15.1650	6.5	21.2	4.3500	0	10
CHA5	WINTER	2	2.0000	0	4	2.5000	2.0	3.0	2.5000	2	3
CHA5	SPRING	5	0.0000	0	0	12.9367	7.5	20.0	1.2667	0	3
CHA5	SUMMER	10	0.0000	0	0	24.7672	23.0	26.5	3.2111	1	5
CHA5	FALL	7	0.5714	0	2	13.8500	6.1	22.5	2.4286	0	8
E-11	WINTER	4	1.7500	0	4	2.1958	1.5	5.1	4.0833	0	8
E-11	SPRING	7	10.4286	0	23	13.7833	7.0	20.1	4.6667	2	8
E-11	SUMMER	9	0.0000	0	0	24.6556	22.9	26.9	7.0556	5	9
E-11	FALL	6	3.1667	0	18	13.4000	5.0	22.2	6.9167	3	11
E-12	WINTER	4	13.5000	5	22	2.1958	1.5	5.1	4.0833	0	8
E-12	SPRING	7	3.7143	0	16	13.7833	7.0	20.1	4.0000	0	8
E-12	SUMMER	9	0.1111	0	1	24.6778	22.9	26.9	7.0556	5	9
E-12	FALL	6	1.5000	0	5	13.4417	5.0	22.2	6.9167	3	11
E-21	WINTER	5	5.0000	0	10	2.8200	1.0	4.8	4.1000	0	9
E-21	SPRING	10	4.5000	0	22	12.5911	7.1	22.8	2.8144	0	8
E-21	SUMMER	21	0.1429	0	3	24.6738	22.5	28.8	6.8333	2	10
E-21	FALL	15	1.5333	0	12	16.6200	6.0	24.1	6.8000	0	12
E-22	WINTER	5	2.4000	1	5	2.8200	1.0	4.8	4.1000	0	9
E-22	SPRING	9	3.0000	0	20	13.2354	7.5	22.8	3.1250	0	8
E-22	SUMMER	21	0.0000	0	0	24.6738	22.5	28.8	6.8333	2	10
E-22	FALL	14	0.3571	0	5	17.1000	6.0	24.1	7.2500	0	12
E-31	WINTER	2	3.0000	0	6	2.7000	1.8	3.0	1.5000	1	2
E-31	SPRING	7	5.2857	0	23	13.0167	6.5	22.0	3.6429	0	8
E-31	SUMMER	9	0.3333	0	3	25.0556	22.5	27.5	4.4722	2	7
E-31	FALL	6	1.6667	0	8	12.2083	5.0	19.5	4.1667	0	9
E-32	WINTER	2	2.0000	0	4	2.7000	1.8	3.0	1.5000	1	2
E-32	SPRING	7	4.2857	0	29	13.0167	6.5	22.0	3.3571	0	6
E-32	SUMMER	9	0.0000	0	0	25.0556	22.5	27.5	4.4722	2	7
E-32	FALL	6	2.0000	0	10	12.2083	5.0	19.5	4.1667	0	9
E-41	WINTER	5	3.2000	0	13	3.7800	0.5	7.9	1.7000	0	6
E-41	SPRING	8	5.2500	0	19	13.2786	6.5	21.5	2.5476	0	8
E-41	SUMMER	12	0.0000	0	0	24.5083	23.2	26.0	4.5000	1	7
E-41	FALL	11	1.5455	0	10	15.6000	6.1	21.5	4.8182	0	9
E-42	WINTER	5	3.2000	1	8	3.7800	0.5	7.9	1.7000	0	6
E-42	SPRING	7	0.5714	0	3	13.2786	6.5	21.5	2.9762	1	8
E-42	SUMMER	12	0.0000	0	0	24.4330	23.2	26.0	4.5000	1	7
E-42	FALL	11	0.6364	0	4	15.6000	6.1	21.5	4.8182	0	9
E-51	WINTER	2	1.5000	0	3	3.2750	3.0	3.8	2.0000	2	2
E-51	SPRING	5	23.4000	1	53	14.4125	7.5	22.0	2.3000	0	5

Table 28 . - Continued.

M. AMERICANA SEASONAL MEAN CATCH PER UNIT EFFORT (N/T)-1976.

LOCATION	SEASON	OBS	CATCH/UNIT EFFORT			TEMPERATURE (C)			SALINITY (PPT)		
			MEAN	MIN	MAX	MEAN	MIN	MAX	MEAN	MIN	MAX
E-51	SUMMER	7	0.0000	0	0	24.8214	23.0	26.8	3.50000	2	5
E-51	FALL	6	12.0000	0	43	12.6667	5.0	22.9	3.15000	0	8
E-52	WINTER	2	3.0000	1	5	3.2750	3.0	3.8	2.00000	2	2
E-52	SPRING	5	9.0000	0	28	14.4125	7.5	22.0	2.30000	0	5
E-52	SUMMER	7	0.1429	0	1	24.8405	23.0	26.8	3.50000	2	5
E-52	FALL	6	0.5000	0	2	12.6667	5.0	22.9	3.08333	0	8
E-61	WINTER	2	2.5000	1	4	2.6750	2.2	3.0	3.75000	3	4
E-61	SPRING	5	58.4000	28	135	12.9300	7.0	19.8	1.80000	0	4
E-61	SUMMER	10	3.0000	0	27	24.5000	22.6	26.1	3.85000	1	6
E-61	FALL	7	19.8571	0	60	13.7143	6.0	22.2	2.50000	0	8
E-62	WINTER	2	0.5000	0	1	2.6750	2.2	3.0	3.75000	3	4
E-62	SPRING	5	2.2000	0	8	12.9300	7.0	19.8	1.80000	0	4
E-62	SUMMER	10	0.2000	0	2	24.5000	22.6	26.1	3.85000	1	6
E-62	FALL	7	1.7143	0	6	13.7143	6.0	22.2	2.50000	0	8
NE11	SPRING	4	34.7500	20	47	14.4750	7.2	22.1	0.87500	0	2
NE11	SUMMER	6	0.6667	0	3	24.6833	23.3	26.0	2.83333	1	4
NE11	FALL	5	6.6000	0	22	13.3400	5.9	21.0	1.00000	0	5
NE12	SPRING	4	16.2500	6	31	14.4750	7.2	22.1	0.87500	0	2
NE12	SUMMER	5	0.2000	0	1	24.5950	23.3	26.0	2.80000	1	4
NE12	FALL	5	3.2000	0	9	13.3400	5.9	21.0	1.00000	0	5
NE21	SPRING	1	60.0000	60	60	14.5000	14.5	14.5	1.00000	1	1
NE21	SUMMER	1	2.0000	2	2	25.0000	25.0	25.0	1.00000	1	1
NE21	FALL	1	5.0000	5	5	7.5000	7.0	8.0	0.00000	0	0
NE22	SPRING	1	0.0000	0	0	14.5000	14.5	14.5	1.00000	1	1
NE22	SUMMER	1	0.0000	0	0	25.0000	25.0	25.0	1.00000	1	1
NE22	FALL	1	8.0000	8	8	7.5000	7.0	8.0	0.00000	0	0
NW11	WINTER	3	15.0000	1	26	3.4167	2.0	5.5	1.83333	0	3
NW11	SPRING	6	7.1667	0	18	12.0583	6.7	20.2	1.01667	0	2
NW11	SUMMER	10	0.5000	0	3	24.9700	23.5	26.2	3.72056	1	6
NW11	FALL	7	5.8571	0	31	14.1143	6.8	23.1	2.50000	0	7
NW12	WINTER	3	6.6667	3	12	3.4167	2.0	5.5	1.83333	0	3
NW12	SPRING	6	37.5000	0	149	12.0583	6.7	20.2	1.01667	0	2
NW12	SUMMER	10	7.9000	0	77	24.9650	23.5	26.2	3.68056	1	6
NW12	FALL	7	11.4286	0	48	14.1214	6.8	23.2	2.50000	0	7
NW21	SPRING	1	6.0000	6	6	14.2500	14.1	14.4	0.00000	0	0
NW21	SUMMER	3	0.6667	0	2	24.9167	24.4	25.5	3.83333	3	4
NW21	FALL	1	3.0000	3	3	8.0000	8.0	8.0	1.00000	1	1
NW22	SPRING	1	2.0000	2	2	14.2500	14.1	14.4	0.00000	0	0
NW22	SUMMER	3	0.0000	0	0	24.9167	24.4	25.5	3.83333	3	4
NW22	FALL	1	2.0000	2	2	8.0000	8.0	8.0	1.00000	1	1
RI11	WINTER	3	1.6667	1	2	4.3333	2.0	7.0	1.33333	0	2
RI11	SPRING	7	8.8571	0	51	14.3200	6.2	19.7	2.10000	2	3
RI11	SUMMER	9	0.1111	0	1	24.9944	23.1	26.8	5.02778	2	9
RI11	FALL	6	3.0000	0	16	13.8950	7.0	22.5	4.70000	0	8
RI12	WINTER	3	0.6667	0	1	4.3333	2.0	7.0	1.33333	0	2
RI12	SPRING	6	2.0000	0	12	14.3200	6.2	19.7	2.10000	2	3
RI12	SUMMER	9	0.0000	0	0	24.9944	23.1	26.8	5.10069	2	9
RI12	FALL	6	0.3333	0	2	13.8950	7.0	22.5	4.78333	0	8
RI21	WINTER	3	2.6667	0	4	4.5000	2.0	7.0	0.83333	0	2
RI21	SPRING	7	3.7143	0	12	15.7250	6.2	22.3	2.00000	0	4
RI21	SUMMER	11	3.5455	0	39	24.9664	23.0	26.6	4.75000	1	8
RI21	FALL	6	2.6667	0	6	14.3667	6.0	23.9	4.41667	0	8
RI22	WINTER	3	0.6667	0	1	4.5000	2.0	7.0	0.83333	0	2
RI22	SPRING	7	0.2857	0	2	15.7250	6.2	22.3	2.00000	0	4

Table 28 . - Continued.

M. AMERICANA SEASONAL MEAN CATCH PER UNIT EFFORT (N/T)-1976.

LOCATION	SEASON	OBS	CATCH/UNIT EFFORT			TEMPERATURE (C)			SALINITY (PPT)		
			MEAN	MIN	MAX	MEAN	MIN	MAX	MEAN	MIN	MAX
RI22	SUMMER	12	0.000	0	0	25.0083	23.0	26.5	5.0625	1.0	9.5
RI22	FALL	6	3.167	0	10	14.3667	6.0	23.9	4.4167	0.0	8.0
SE01	WINTER	1	16.000	16	16	5.5000	5.0	6.0	2.0000	2.0	2.0
SE01	SPRING	6	4.333	0	14	13.5250	9.2	19.1	8.5000	4.0	12.0
SE01	SUMMER	5	0.000	0	0	24.4500	23.0	25.0	12.4500	10.0	14.0
SE01	FALL	7	4.857	0	14	10.8143	5.9	19.7	11.2857	6.0	17.0
SE02	WINTER	1	1.000	1	1	5.5000	5.0	6.0	2.0000	2.0	2.0
SE02	SPRING	5	0.200	0	1	14.3000	10.0	19.1	9.5000	4.0	12.0
SE02	SUMMER	5	0.000	0	0	24.4500	23.0	25.0	12.4500	10.0	14.0
SE02	FALL	6	2.667	0	9	9.3417	5.9	17.8	10.8333	6.0	17.0
SE11	WINTER	2	5.000	5	5	3.7000	2.0	5.5	4.7500	2.0	8.0
SE11	SPRING	6	7.000	0	35	14.8333	6.2	19.8	6.5000	5.0	11.0
SE11	SUMMER	8	0.000	0	0	24.6562	23.0	27.0	11.2913	9.0	13.0
SE11	FALL	8	5.250	0	25	12.0562	5.0	20.7	10.8750	7.0	15.0
SE12	WINTER	2	8.000	0	16	3.7000	2.0	5.5	4.7500	2.0	8.0
SE12	SPRING	5	6.200	0	31	14.4700	6.2	19.0	6.8750	5.0	11.0
SE12	SUMMER	8	0.000	0	0	24.5194	23.0	27.0	11.2813	9.0	13.0
SE12	FALL	7	1.000	0	4	10.8357	5.0	20.0	10.2857	7.0	15.0
SE21	SPRING	4	4.750	0	13	14.8958	10.2	18.5	5.5000	4.0	7.0
SE21	SUMMER	6	0.000	0	0	24.8667	23.4	26.5	9.6417	8.0	12.0
SE21	FALL	4	13.750	0	47	13.5750	5.5	20.5	9.5000	6.0	13.0
SE22	SPRING	4	0.750	0	2	14.8958	10.2	18.5	5.5000	4.0	7.0
SE22	SUMMER	6	0.000	0	0	24.8667	23.4	26.5	9.7250	8.0	12.0
SE22	FALL	4	2.500	0	8	13.5750	5.5	20.5	9.5000	6.0	13.0
SE31	WINTER	5	7.400	0	20	3.7200	1.0	6.8	1.3000	0.0	7.0
SE31	SPRING	8	7.500	0	21	15.1937	7.0	19.8	4.5714	0.0	8.0
SE31	SUMMER	16	0.063	0	1	24.7594	22.9	28.0	8.8438	5.0	11.0
SE31	FALL	11	2.909	0	12	14.5182	4.0	20.8	8.1364	3.0	13.0
SE32	WINTER	5	4.800	2	7	3.7200	1.0	6.8	1.3000	0.0	7.0
SE32	SPRING	6	3.500	0	20	14.1833	7.0	19.8	5.0000	0.0	8.0
SE32	SUMMER	16	0.063	0	1	24.7312	22.9	28.0	8.8438	5.0	11.0
SE32	FALL	11	1.182	0	8	14.5182	4.0	20.8	8.1364	3.0	13.0
SSC1	WINTER	9	4.667	0	22	3.1083	0.2	6.0	3.2292	0.0	9.0
SSC1	SPRING	16	5.625	0	18	13.1980	4.6	22.9	3.1844	0.0	8.0
SSC1	SUMMER	29	0.138	0	2	24.6603	22.3	29.0	7.6652	3.0	10.0
SSC1	FALL	20	5.300	0	30	16.2975	6.0	22.5	7.3000	0.0	11.0
SSC2	WINTER	9	9.111	0	24	3.1905	0.2	6.0	3.2292	0.0	9.0
SSC2	SPRING	16	14.500	0	44	13.2250	4.6	22.9	3.3344	0.0	8.0
SSC2	SUMMER	29	0.069	0	2	24.6603	22.3	29.0	7.6652	3.0	10.0
SSC2	FALL	20	11.600	0	88	16.2975	6.0	22.5	7.3000	0.0	11.0
SW11	WINTER	1	104.000	104	104	3.0000	2.5	3.5	5.7500	5.5	6.0
SW11	SPRING	4	33.750	0	126	15.0750	10.8	17.8	4.2500	2.0	6.0
SW11	SUMMER	7	0.000	0	0	25.0500	23.5	26.0	10.6429	6.0	15.0
SW11	FALL	4	17.750	1	31	11.1750	6.0	18.2	8.0000	4.0	13.0
SW12	WINTER	1	17.000	17	17	3.0000	2.5	3.5	5.7500	5.5	6.0
SW12	SPRING	5	5.600	0	26	14.2500	10.8	17.8	4.4500	2.0	6.0
SW12	SUMMER	8	0.000	0	0	25.0312	23.5	26.0	10.1563	6.0	15.0
SW12	FALL	5	15.600	0	76	13.0600	6.0	20.7	9.4000	4.0	15.0
SW21	WINTER	6	39.500	2	86	3.5583	1.0	6.5	2.5000	0.0	9.0
SW21	SPRING	8	29.875	0	101	14.1375	7.0	20.5	3.0000	0.0	7.0
SW21	SUMMER	15	0.133	0	1	25.0900	23.3	28.0	7.6667	3.0	12.0
SW21	FALL	11	20.455	0	81	14.5409	4.9	21.1	7.6818	3.0	14.0
SW22	WINTER	6	13.000	0	60	3.5583	1.0	6.5	2.5000	0.0	9.0
SW22	SPRING	8	14.250	0	112	14.1375	7.0	20.5	3.0000	0.0	7.0

Table 28 . - Continued.

M. AMERICANA SEASONAL MEAN CATCH PER UNIT EFFORT (N/T)-1976.

LOCATION	SEASON	OBS	CATCH/UNIT EFFORT			TEMPERATURE (C)			SALINITY (PPT)		
			MEAN	MIN	MAX	MEAN	MIN	MAX	MEAN	MIN	MAX
SW22	SUMMER	15	0.0000	0	0	25.0900	23.3	28.0	7.76667	3	14
SW22	FALL	11	5.1818	0	24	14.5409	4.9	21.1	7.63636	3	14
W-11	WINTER	5	6.6000	0	21	2.9200	0.5	4.9	3.57500	0	8
W-11	SPRING	12	15.9167	0	62	15.0767	7.1	23.0	1.56667	0	8
W-11	SUMMER	21	0.0952	0	1	24.9786	23.3	28.0	5.73690	2	10
W-11	FALL	15	6.2000	0	37	17.0133	5.9	23.0	5.80000	0	13
W-12	WINTER	5	20.0000	7	37	2.9200	0.5	4.9	3.57500	0	8
W-12	SPRING	11	18.6364	0	103	14.5864	7.1	23.0	1.70707	0	8
W-12	SUMMER	21	1.2857	0	22	25.0000	23.3	28.0	5.73690	2	10
W-12	FALL	16	10.0625	0	61	16.5594	5.9	23.0	5.43750	0	13
W-21	WINTER	2	16.0000	0	32	2.1750	1.8	3.0	2.50000	2	4
W-21	SPRING	5	25.2000	8	82	13.1000	6.5	17.5	0.75000	0	2
W-21	SUMMER	9	0.1111	0	1	25.7722	24.1	27.0	3.80556	2	5
W-21	FALL	7	14.0000	0	57	16.1357	6.0	23.0	4.44048	0	7
W-22	WINTER	2	11.5000	0	23	2.1750	1.8	3.0	2.50000	2	4
W-22	SPRING	5	2.4000	0	4	13.1000	6.5	17.5	0.75000	0	2
W-22	SUMMER	9	0.0000	0	0	25.7167	24.1	27.0	3.80556	2	5
W-22	FALL	7	25.8571	0	127	16.1357	6.0	23.0	4.44048	0	7
W-31	WINTER	5	17.4000	0	65	3.6175	1.2	7.0	1.02500	0	4
W-31	SPRING	8	12.2500	0	52	14.0312	6.5	21.3	0.78571	0	4
W-31	SUMMER	12	0.0833	0	1	24.6792	23.2	26.1	4.12500	2	6
W-31	FALL	10	10.2000	0	30	15.6467	6.5	21.4	4.38333	0	7
W-32	WINTER	5	4.0000	1	10	3.6175	1.2	7.0	1.02500	0	4
W-32	SPRING	8	10.2500	0	71	14.0312	6.5	21.3	0.82143	0	4
W-32	SUMMER	12	0.0000	0	0	24.7000	23.2	26.1	4.12500	2	6
W-32	FALL	10	0.6000	0	3	15.6467	6.5	21.4	4.38333	0	7

Table 29 . - A chronological summary of temperature avoidance studies on white perch, Morone americana. All tests were conducted at near air-saturated levels of dissolved oxygen and pH of 7 to 8.

DATE	REPLICATE	NO. OF FISH PER TEST	SIZE RANGE (TL IN MM) MIN. MAX.		SALINITY (PPT)	LIGHT LEVEL (FOOT (LUX) CANDLES)		ACCLIMATION TEMPERATURE (C) (F)		AVOIDANCE TEMPERATURE (C) (F)	
MORONE AMERICANA											
25 FEB 70	1	4	72	97	4	215	20.0	3.9	39	12.2	53
26 FEB 70	1	4	72	97	4	21.5	2.0	6	42	11	51
18 MAR 70	1	4	87	144	4	215	20.0	6	42	12	53
	2	4	87	144	4	215	20.0	6	42	12	53
19 MAR 70	1	4	87	144	4	215	20.0	6	42	8	46
15 MAY 70	1	4	82	102	4	215	20.0	18	64	28	82
26 MAY 70	1	4	87	125	4	21.5	2.0	18	64	22	71
3 JUN 70	1	4	95	103	6	215	20.0	20	68	29	84
26 JUN 70	1	4	44	49	4	215	20.0	22	71	32	89
14 JUL 70	1	6	62	70	1	215	20.0	24	75	34	93

Table 29 . - Continued.

DATE	REPLICATE	NO. OF FISH PER TEST	SIZE RANGE (TL IN MM) MIN. MAX.		SALINITY (PPT)	LIGHT LEVEL (FOOT (LUX) CANDLES)		ACCLIMATION TEMPERATURE (C) (F)		AVOIDANCE TEMPERATURE (C) (F)	
MORONE AMERICANA											
31 JUL 70	1	4	55	67	1	21.5	2.0	25	77	33	91
5 AUG 70	1	4	67	78	4	215	20.0	25	77	35	95
11 AUG 70	1	4	81	85	4	21.5	2.0	25	77	35	95
27 AUG 70	1	4	69	76	4	215	20.0	26	78	31	87
21 OCT 70	1	4	96	134	7	215	20.0	18	64	21	69
27 OCT 70	1	4	93	117	7	215	20.0	16	60	28	82
	2	4	105	119	7	215	20.0	16	60	28	82
28 OCT 70	1	4	91	117	7	21.5	2.0	16	60	28	82
	2	4	97	114	7	21.5	2.0	16	60	28	82
29 OCT 70	1	4	94	121	4.5	21.5	2.0	16	60	31	87
	2	4	91	117	4.5	21.5	2.0	16	60	32	89
30 OCT 70	1	4	85	103	4.5	215	20.0	16	60	29	84
	2	4	88	96	4.5	215	20.0	16	60	24	75

Table 29. - Continued.

DATE	REPLICATE	NO. OF FISH PER TEST	SIZE RANGE (TL IN MM)		SALINITY (PPT)	LIGHT LEVEL (FOOT (LUX) CANDLES)		ACCLIMATION TEMPERATURE (C) (F)		AVOIDANCE TEMPERATURE (C) (F)	
			MIN.	MAX.							
MORONE AMERICANA											
4 NOV 70	1	5	72	95	4.5	215	20.0	14	57	28	82
	2	3	77	91	4.5	215	20.0	14	57	28	82
11 NOV 70	1	4	72	103	1	215	20.0	14	57	23	73
	2	4	85	93	1	215	20.0	14	57	23	73
17 NOV 70	1	4	63	90	1	215	20.0	11	51	27	80
	2	4	71	93	1	215	20.0	11	51	27	80
19 NOV 70	1	4	80	93	1	215	20.0	11	51	27	80
	2	4	66	91	1	215	20.0	11	51	27	80
1 DEC 70	1	4	84	92	4	215	20.0	10	50	25	77
	2	4	88	100	4	215	20.0	10	50	18	64
2 DEC 70	1	4	85	92	4	21.5	2.0	10	50	25	77
	2	4	77	100	4	21.5	2.0	10	50	22	71
10 DEC 70	1	4	53	82	4	215	20.0	6	42	13	55
	2	4	61	68	4	215	20.0	6	42	13	55
15 DEC 70	1	4	68	78	4	215	20.0	5	41	13	55
	2	4	71	80	4	215	20.0	5	41	10	50
16 DEC 70	1	4	58	69	4	215	20.0	5	41	16	60

Table 29 . - Continued.

DATE	REPLICATE	NO. OF FISH PER TEST	SIZE RANGE (TL IN MM)		SALINITY (PPT)	LIGHT LEVEL (FOOT (LUX) CANDLES)		ACCLIMATION TEMPERATURE (C) (F)		AVOIDANCE TEMPERATURE (C) (F)	
MORONE AMERICANA											
26 JAN 71	1	4	142	169	3	215	20.0	4	39	13	55
27 JAN 71	1	4	150	177	3	215	20.0	2	35	7	44
1 FEB 71	1	4	147	175	3	215	20.0	2	35	7	44
8 FEB 71	1	4	137	163	3	215	20.0	1	33	9	48
9 FEB 71	1	4	137	178	3	21.5	2.0	1	33	7	44
10 FEB 71	1	4	177	203	9	215	20.0	1	33	7	44
16 FEB 71	1	4	94	110	9	215	20.0	2	35	3	37
	2	4	97	108	9	215	20.0	2	35	8	46
19 FEB 71	1	4	96	112	0.1	215	20.0	4	39	14	57
	2	4	93	108	0.1	215	20.0	4	39	12	53
16 MAR 71	1	4	89	105	0.1	215	20.0	7	44	18	64
	2	4	63	91	0.1	215	20.0	7	44	20	68

Table 29. - Continued.

DATE	REPLICATE	NO. OF FISH PER TEST	SIZE RANGE (TL IN MM)		SALINITY (PPT)	LIGHT LEVEL (FOOT (LUX) CANDLES)		ACCLIMATION TEMPERATURE (C) (F)		AVOIDANCE TEMPERATURE (C) (F)	
			MIN.	MAX.							
MORONE AMERICANA											
17 MAR 71	1	4	90	104	0.1	21.5	2.0	7	44	16	60
	2	4	86	106	0.1	21.5	2.0	7	44	13	55
25 MAR 71	1	4	92	99	6	215	20.0	7	44	18	64
	2	4	77	101	6	215	20.0	7	44	13	55
26 MAR 71	1	4	94	104	6	21.5	2.0	7	44	17	62
	2	4	77	97	6	21.5	2.0	7	44	17	62
31 MAR 71	1	4	80	99	0.5	215	20.0	7	44	17	62
	2	4	90	106	0.5	215	20.0	7	44	20	68
1 APR 71	1	4	81	102	0.5	21.5	2.0	7	44	14	57
	2	4	89	100	0.5	21.5	2.0	7	44	11	51
7 APR 71	1	4	153	171	0.5	215	20.0	11	51	21	69
	2	4	167	203	0.5	215	20.0	11	51	14	57
20 APR 71	1	4	126	144	0.5	215	20.0	12	53	24	75
	2	4	100	110	0.5	215	20.0	12	53	23	73
21 APR 71	1	4	143	160	0.5	215	20.0	16	60	26	78
	2	4	131	138	0.5	215	20.0	16	60	26	78
22 APR 71	1	4	127	151	0.5	21.5	2.0	16	60	26	78
	2	4	141	147	0.5	21.5	2.0	16	60	19	66

Table 29. - Continued.

DATE	REPLICATE	NO. OF FISH PER TEST	SIZE RANGE (TL IN MM)		SALINITY (PPT)	LIGHT LEVEL (FOOT (LUX) CANDLES)		ACCLIMATION TEMPERATURE		AVOIDANCE TEMPERATURE	
			MIN.	MAX.				(C)	(F)	(C)	(F)
MORONE AMERICANA											
4 MAY 71	1	4	139	153	6	215	20.0	15	59	28	82
	2	4	137	149	6	215	20.0	15	59	26	78
5 MAY 71	1	4	133	159	6	21.5	2.0	15	59	27	80
	2	4	149	158	6	21.5	2.0	15	59	27	80
6 MAY 71	1	4	142	158	6	215	20.0	15	59	29	84
	2	4	138	151	6	215	20.0	15	59	29	84
20 MAY 71	1	4	143	171	0	215	20.0	16	60	29	84
	2	4	139	158	0	215	20.0	16	60	29	84
21 MAY 71	1	4	146	169	0	21.5	2.0	16	60	27	80
	2	4	128	172	0	21.5	2.0	16	60	27	80
2 JUN 71	1	4	132	164	0	215	20.0	18.5	65	29	84
	2	4	139	162	0	215	20.0	18.5	65	29	84
3 JUN 71	1	4	131	145	0.1	21.5	2.0	18.5	65	28	82
	2	4	115	162	0.1	21.5	2.0	18.5	65	28	82
13 JUN 71	1	5	112	134	0	215	20.0	25	77	33	91
	2	3	135	146	0	215	20.0	25	77	28	82
14 JUL 71	1	4	142	162	0	21.5	2.0	25	77	32	89
	2	4	112	127	0	21.5	2.0	25	77	32	89

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Table 29. - Continued.

DATE	REPLICATE NO. OF FISH PER TEST		SIZE RANGE		SALINITY (PPT)	LIGHT LEVEL		ACCLIMATION		AVOIDANCE		
			(TL IN MM) MIN. MAX.			(FOOT (LUX) CANDLES)		TEMPERATURE (C) (F)	TEMPERATURE (C) (F)			
MORONE AMERICANA												
14 JUL 71	1	4	51	65	0	215	20.0	26	78	34	93	
	2	4	43	62	0	215	20.0	26	78	29	84	
12 AUG 71	1	4	69	76	3.2	215	20.0	22.2	71	28.3	82	
	2	4	77	81	3.2	215	20.0	22.2	71	34.4	93	
13 AUG 71	1	4	65	74	3.2	21.5	2.0	24.75	76	26.1	78	
	2	4	74	81	3.2	21.5	2.0	24.75	76	36.7	98	
26 AUG 71	1	4	126	136	4.5	215	20.0	25	77	33	91	
	2	4	140	168	4.5	215	20.0	25	77	33	91	
27 AUG 71	1	4	129	156	4.5	21.5	2.0	23.5	74	31	87	
1 SEP 71	1	4	72	88	4.5	215	20.0	22	71	32	89	
	2	4	77	87	4.5	215	20.0	22	71	29	84	
2 SEP 71	1	4	79	91	4.5	21.5	2.0	22	71	34	93	
	2	4	78	92	4.5	21.5	2.0	22	71	34	93	
8 SEP 71	1	4	81	87	4.5	21.5	2.0	24	75	34	93	
	2	4	87	92	4.5	21.5	2.0	24	75	34	93	
10 SEP 71	1	4	76	85	4.5	215	20.0	24	75	34	93	
	2	4	76	89	4.5	215	20.0	24	75	34	93	

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Table 29. - Continued.

DATE	REPLICATE	NO. OF FISH PER TEST	SIZE RANGE (TL IN MM)		SALINITY (PPT)	LIGHT LEVEL (FOOT (LUX) CANDLES)		ACCLIMATION TEMPERATURE (C) (F)		AVOIDANCE TEMPERATURE (C) (F)	
			MIN.	MAX.							
MORONE AMERICANA											
29 SEP 71	1	4	88	97	4.5	215	20.0	18	64	27	80
30 SEP 71	1	4	76	84	4.5	21.5	2.0	18	64	30	86
14 OCT 71	1	4	138	157	4.5	215	20.0	18	64	27	80
	2	4	111	136	4.5	215	20.0	18	64	31	87
15 OCT 71	1	4	135	153	4.5	21.5	2.0	18	64	25	77
7 JAN 72	1	4	66	89	4.5	215	20.0	6	42	18	64
	2	4	66	78	4.5	215	20.0	6	42	18	64
21 JAN 72	1	4	62	98	4.5	215	20.0	5	41	14	57
	2	4	69	104	4.5	215	20.0	5	41	14	57
3 MAR 72	1	4	85	115	2.6	215	20.0	6	42	17	62
	2	4	75	97	2.6	215	20.0	6	42	14	57
4 MAY 72	1	4	133	145	2.5	215	20.0	17	62	28	82
	2	4	135	144	2.5	215	20.0	17	62	28	82
9 MAY 72	1	4	97	109	2.5	215	20.0	18	64	29	84
	2	4	93	112	2.5	215	20.0	18	64	29	84

Table 29 . - Continued.

DATE	REPLICATE	NO. OF FISH PER TEST	SIZE RANGE (TL IN MM) MIN. MAX.		SALINITY (PPT)	LIGHT LEVEL (FOOT (LUX) CANDLES)		ACCLIMATION TEMPERATURE (C) (F)		AVOIDANCE TEMPERATURE (C) (F)	
MORONE AMERICANA											
29 JUN 72	1	4	114	118	2.5	21.5	2.0	22.8	73	29	84
	2	4	112	132	2.5	21.5	2.0	22.8	73	32	89
30 JUN 72	1	4	114	116	2.6	215	20.0	22.8	73	27	80
	2	4	113	119	2.6	215	20.0	22.8	73	32	89
14 NOV 72	1	3	135	140	0	215	20.0	10	50	26	78
	2	3	145	150	0	215	20.0	10	50	26	78
28 NOV 72	1	4	114	152	0	215	20.0	7	44	18	64
	2	4	142	158	0	215	20.0	7	44	20	68
1 DEC 72	1	4	135	155	0	21.5	2.0	7	44	24	75
	2	4	152	158	0	21.5	2.0	7	44	13	55
14 DEC 72	1	4	151	179	0	21.5	2.0	7	44	20	68
	2	4	138	168	0	21.5	2.0	7	44	20	68
28 DEC 72	1	4	118	130	5	215	20.0	5	41	21	69
	2	4	85	129	5	215	20.0	5	41	21	69
15 MAR 73	1	4	141	151	5	21.5	2.0	12	53	21	69
	2	4	151	165	5	21.5	2.0	12	53	27	80
16 MAR 73	1	4	114	164	5	215	20.0	12	53	21	69
	2	4	122	142	5	215	20.0	12	53	21	69

Table 29. - Continued.

DATE	REPLICATE NO. OF FISH PER TEST		SIZE RANGE		SALINITY (PPT)	LIGHT LEVEL		ACCLIMATION		AVOIDANCE		
			(TL IN MM) MIN. MAX.			(FOOT (LUX) CANDLES)	TEMPERATURE (C) (F)	TEMPERATURE (C) (F)				
MORONE AMERICANA												
3 APR 73	1	4	145	150	3.5	215	20.0	12	53	20	68	
	2	4	138	144	3.5	215	20.0	12	53	26	78	
11 APR 73	1	4	143	151	3.5	21.5	2.0	12	53	19.4	66	
	2	4	134	142	3.5	21.5	2.0	12	53	15.6	60	
25 MAY 73	1	4	135	147	0.5	21.5	2.0	17	62	32	89	
	2	4	122	135	0.5	21.5	2.0	17	62	32	89	
15 JUN 73	1	4	71	96	7	215	20.0	25	77	31	87	

Table 30. - Components for the linear regression equation to estimate avoidance temperatures (C) for the white perch, Morone americana, when field temperatures were rising. * = Significant at P.05 or greater; and ** = significant at P.01 or greater.

Constant (a) = 10.829		F(1, 81) = 354.411 **		N = 84
Standard Error of Estimate = 2.852		R = 0.902 **		R ² = 0.814
<u>Variable (Xi)</u>	<u>Mean (Xi)</u>	<u>Correlation With Y</u>	<u>Regression Coefficient (bi)</u>	<u>Standard Error of bi</u>
Acclimation Temperature (C)	17.3	0.902 **	0.915 **	0.049

Table 31. - Components for the linear regression equation to estimate avoidance temperatures (C) for the white perch, Morone americana, when field temperatures were falling. * = Significant at P.05 or greater; and ** = significant at P.01 or greater.

Constant (a) = 8.107		F(1, 59) = 189.201 **		N = 61
Standard Error of Estimate = 3.762		R = 0.873 **		R ² = 0.762
<u>Variable (Xi)</u>	<u>Mean (Xi)</u>	<u>Correlation (r) With Y</u>	<u>Regression Coefficient (bi)</u>	<u>Standard Error of bi</u>
Acclimation Temperature (C)	9.1	0.873 **	1.260 **	0.092

Table 32. - Components for the linear regression equation to estimate avoidance temperatures (C) for the white perch, Morone americana. * = Significant at P.05 or greater; and ** = significant at P.01 or greater.

Constant (a) = 10.046		F(1,143) = 559.590**		N = 145
Standard Error of Estimate = 3.554		R = 0.892**		R ² = 0.796
<u>Variable (Xi)</u>	<u>Mean (Xi)</u>	<u>Correlation (r) With Y</u>	<u>Regression Coefficient (bi)</u>	<u>Standard Error of bi</u>
Acclimation Temperature (C)	13.8	0.892**	0.979	0.041

Table 33. - M. SAXATILIS SEASONAL MEAN CATCH PER UNIT EFFORT (N/T)-1975.

LOCATION	SEASON	OBS	CATCH/UNIT EFFORT			TEMPERATURE (C)			SALINITY (PPT)		
			MEAN	MIN	MAX	MEAN	MIN	MAX	MEAN	MIN	MAX
CHA1	SPRING	3	0.000000	0	0	13.0500	3.0	22.8	5.86667	1.0	12.0
CHA1	SUMMER	5	0.000000	0	0	24.7500	22.0	26.1	5.20000	2.0	9.0
CHA1	FALL	2	0.000000	0	0	15.3250	10.3	20.0	4.00000	0.0	9.0
CHA2	WINTER	1	0.000000	0	0	6.0000	6.0	6.0	5.75000	5.5	6.0
CHA2	SPRING	3	0.000000	0	0	12.3000	3.0	22.8	4.03333	0.0	12.0
CHA2	SUMMER	14	0.000000	0	0	24.5429	21.0	28.9	5.05495	0.0	10.0
CHA2	FALL	7	0.000000	0	0	14.5000	9.9	20.0	3.75000	1.0	10.0
CHA3	WINTER	1	0.000000	0	0	7.6500	7.4	7.9	4.00000	4.0	4.0
CHA3	SPRING	3	0.000000	0	0	12.6667	4.0	22.8	2.00000	0.0	6.0
CHA3	SUMMER	4	0.000000	0	0	25.3250	24.2	26.2	2.00000	0.0	4.0
CHA3	FALL	3	0.000000	0	0	14.2333	11.2	16.5	2.25000	1.0	3.0
CHA4	WINTER	1	0.000000	0	0	.	.	5.3	.	.	0.0
CHA4	SPRING	3	0.000000	0	0	12.1833	4.0	23.0	1.83333	0.0	6.0
CHA4	SUMMER	13	0.000000	0	0	25.6577	20.1	28.2	2.04968	0.0	5.5
CHA4	FALL	8	0.000000	0	0	14.8062	10.0	19.0	2.50000	0.5	5.0
CHA5	SPRING	3	0.000000	0	0	12.6500	5.0	23.0	0.83333	0.0	3.0
CHA5	SUMMER	5	0.000000	0	0	25.2350	21.8	27.0	1.23750	0.0	3.5
CHA5	FALL	2	0.000000	0	0	17.4750	15.9	19.0	0.00000	0.0	0.0
E-11	WINTER	4	0.000000	0	0	4.0625	1.8	6.0	0.85633	0.0	1.5
E-11	SPRING	8	0.000000	0	0	11.7562	1.0	23.5	3.65625	0.0	11.0
E-11	SUMMER	11	0.000000	0	0	25.9192	23.0	30.0	4.68687	0.0	9.5
E-11	FALL	5	0.000000	0	0	15.5900	11.3	19.0	4.40000	2.0	9.0
E-12	WINTER	4	0.000000	0	0	4.0625	1.8	6.0	0.28333	0.0	1.5
E-12	SPRING	8	0.000000	0	0	11.9812	1.0	23.5	3.87500	0.0	11.0
E-12	SUMMER	11	0.000000	0	0	26.0364	23.0	30.0	4.39773	0.0	9.5
E-12	FALL	4	0.000000	0	0	15.2500	11.3	19.0	4.75000	2.0	9.0
E-21	WINTER	5	0.000000	0	0	4.7300	1.8	7.7	2.45000	0.0	4.5
E-21	SPRING	8	0.125000	0	1	11.8312	1.3	23.5	2.65625	0.0	9.5
E-21	SUMMER	22	0.045455	0	1	25.6500	20.9	29.0	4.21591	0.0	9.5
E-21	FALL	16	0.000000	0	0	16.1544	9.3	19.6	3.14231	0.0	8.0
E-22	WINTER	5	0.000000	0	0	4.7300	1.8	7.7	2.37500	0.0	4.5
E-22	SPRING	7	0.000000	0	0	12.9500	1.3	23.5	1.92857	0.0	5.0
E-22	SUMMER	21	0.000000	0	0	25.5690	20.9	31.3	4.14286	0.0	9.5
E-22	FALL	13	0.000000	0	0	15.9958	9.3	19.6	3.39583	0.0	8.0
E-31	WINTER	4	0.000000	0	0	3.3917	2.0	5.5	0.83333	0.0	2.0
E-31	SPRING	7	0.000000	0	0	11.1929	2.0	22.8	2.67857	0.0	9.0
E-31	SUMMER	6	0.000000	0	0	24.9583	23.0	26.4	2.41667	0.0	7.0
E-31	FALL	4	0.000000	0	0	15.6125	11.4	19.6	3.18750	1.0	8.0
E-32	WINTER	4	0.000000	0	0	3.3917	2.0	5.5	0.83333	0.0	2.0
E-32	SPRING	7	0.000000	0	0	11.1929	2.0	22.8	2.67857	0.0	9.0
E-32	SUMMER	6	0.000000	0	0	24.9583	23.0	26.4	2.41667	0.0	7.0
E-32	FALL	4	0.000000	0	0	15.6125	11.4	19.6	3.18750	1.0	8.0
E-41	WINTER	4	0.000000	0	0	3.3292	2.0	5.1	0.66667	0.0	2.0
E-41	SPRING	7	0.000000	0	0	10.9357	2.0	22.8	1.96429	0.0	9.0
E-41	SUMMER	13	0.000000	0	0	25.0692	19.1	28.0	2.36538	0.0	6.0
E-41	FALL	9	0.000000	0	0	14.5000	9.9	19.0	3.08333	0.5	5.0
E-42	WINTER	4	0.000000	0	0	3.3292	2.0	5.1	0.66667	0.0	2.0
E-42	SPRING	7	0.000000	0	0	10.9357	2.0	22.8	1.96429	0.0	9.0
E-42	SUMMER	14	0.000000	0	0	25.2786	19.1	28.0	2.16071	0.0	6.0
E-42	FALL	9	0.000000	0	0	14.5000	9.9	19.0	3.08333	0.5	5.0
E-51	WINTER	4	0.000000	0	0	3.3000	1.0	5.3	0.00000	0.0	0.0
E-51	SPRING	5	0.200000	0	1	12.6400	2.0	21.6	1.25000	0.0	3.5
E-51	SUMMER	6	0.000000	0	0	26.0500	23.9	28.9	1.29167	0.0	4.0
E-51	FALL	1	0.000000	0	0	16.2500	16.0	16.5	1.25000	1.0	1.5

Table 33. - Continued.
M. SAXATILIS SEASONAL MEAN CATCH PER UNIT EFFORT (N/T)-1975.

LOCATION	SEASON	OBS	CATCH/UNIT EFFORT			TEMPERATURE (C)			SALINITY (PPT)		
			MEAN	MIN	MAX	MEAN	MIN	MAX	MEAN	MIN	MAX
E-52	WINTER	4	0.00000	0	0	3.3000	1.0	5.3	0.00000	0.0	0.0
E-52	SPRING	5	0.00000	0	0	12.1800	2.0	21.6	0.65000	0.0	3.5
E-52	SUMMER	7	0.00000	0	0	25.7214	23.5	28.9	1.29167	0.0	4.0
E-52	FALL	1	0.00000	0	0	16.2500	16.0	16.5	1.25000	1.0	1.5
E-61	WINTER	4	0.00000	0	0	3.3000	1.0	5.3	0.00000	0.0	0.0
E-61	SPRING	5	0.20000	0	1	12.1100	2.0	21.6	0.65000	0.0	3.5
E-61	SUMMER	7	0.00000	0	0	25.4821	21.8	28.9	1.07738	0.0	4.0
E-61	FALL	2	0.00000	0	0	17.3750	15.5	19.0	0.00000	0.0	0.0
E-62	WINTER	4	0.00000	0	0	3.3000	1.0	5.3	0.00000	0.0	0.0
E-62	SPRING	5	0.00000	0	0	12.1100	2.0	21.6	0.65000	0.0	3.5
E-62	SUMMER	7	0.00000	0	0	25.4821	21.8	28.9	1.07738	0.0	4.0
E-62	FALL	2	0.00000	0	0	17.3750	15.5	19.0	0.00000	0.0	0.0
NE11	SPRING	3	0.00000	0	0	18.3667	9.9	24.3	1.08333	0.0	3.5
NE11	SUMMER	6	0.00000	0	0	25.5667	22.8	27.5	0.75000	0.0	3.0
NE12	SPRING	3	0.00000	0	0	18.3667	9.9	24.3	1.08333	0.0	3.5
NE12	SUMMER	6	0.00000	0	0	25.5667	22.8	27.5	0.75000	0.0	3.0
NE12	FALL	1	0.00000	0	0	16.6500	16.7	17.0	0.50000	0.0	1.0
NW11	WINTER	2	0.00000	0	0	5.9500	5.3	7.5	0.00000	0.0	0.0
NW11	SPRING	7	0.28571	0	2	12.9783	3.0	23.0	1.07143	0.0	4.5
NW11	SUMMER	5	0.20000	0	1	25.3625	23.0	26.8	1.76250	0.0	3.5
NW11	FALL	2	2.00000	1	3	18.3500	16.5	20.0	0.00000	0.0	0.0
NW12	WINTER	2	0.00000	0	0	5.9500	5.3	7.5	0.00000	0.0	0.0
NW12	SPRING	5	0.00000	0	0	13.4600	3.0	23.0	1.20000	0.0	4.5
NW12	SUMMER	4	0.00000	0	0	24.9958	23.0	26.5	1.39583	0.0	3.5
NW12	FALL	2	0.00000	0	0	18.3500	16.5	20.0	0.25000	0.0	1.0
RI11	SPRING	2	0.00000	0	0	18.1750	13.8	23.0	2.25000	1.5	3.0
RI11	SUMMER	3	0.00000	0	0	26.4167	24.5	28.5	3.08333	0.0	6.5
RI12	SPRING	2	0.00000	0	0	18.1750	13.8	23.0	2.25000	1.5	3.0
RI12	SUMMER	3	0.00000	0	0	26.4167	24.5	28.5	3.08333	0.0	6.5
RI21	SPRING	1	0.00000	0	0	22.5000	22.0	23.0	2.75000	2.5	3.0
RI21	SUMMER	3	0.00000	0	0	26.0333	24.5	27.0	2.16667	0.0	3.5
RI22	SPRING	1	0.00000	0	0	22.5000	22.0	23.0	2.75000	2.5	3.0
RI22	SUMMER	3	0.00000	0	0	26.0333	24.5	27.0	2.16667	0.0	3.5
SE01	SPRING	5	0.00000	0	0	16.9400	9.4	21.8	8.70000	6.5	12.0
SE01	SUMMER	8	0.00000	0	0	25.5875	23.8	29.5	8.65625	0.0	14.0
SE02	SPRING	5	0.00000	0	0	17.5400	9.4	21.8	8.78000	6.5	12.0
SE02	SUMMER	9	0.00000	0	0	25.5222	23.8	29.5	8.69444	0.0	14.0
SE11	SPRING	5	0.00000	0	0	16.5500	9.4	21.0	6.80000	3.5	12.0
SE11	SUMMER	11	0.00000	0	0	25.3636	22.3	28.0	8.00273	0.0	14.0
SE11	FALL	3	0.00000	0	0	16.3500	10.0	20.5	6.25000	3.5	11.0
SE12	SPRING	5	0.00000	0	0	16.5500	9.5	21.0	6.60000	3.5	10.0
SE12	SUMMER	11	0.00000	0	0	25.3636	22.3	28.0	8.02273	0.0	14.0
SE12	FALL	3	0.00000	0	0	16.3500	10.0	20.5	6.25000	3.5	11.0
SE21	SPRING	5	0.00000	0	0	16.4300	9.9	21.0	5.10000	3.0	8.0
SE21	SUMMER	9	0.00000	0	0	25.2889	23.5	27.5	5.39236	0.0	10.5
SE21	FALL	2	0.00000	0	0	20.1250	20.0	20.5	6.87500	3.5	9.0
SE22	SPRING	5	0.00000	0	0	16.4600	9.9	21.0	5.10000	3.0	8.0
SE22	SUMMER	9	0.00000	0	0	25.2889	23.5	27.5	5.39236	0.0	10.5
SE22	FALL	2	0.00000	0	0	20.1250	20.0	20.5	6.87500	3.5	9.0
SE31	WINTER	3	0.00000	0	0	5.5333	4.2	6.0	2.16667	0.0	5.5
SE31	SPRING	8	0.00000	0	0	11.2071	1.0	23.0	4.50000	0.0	11.0
SE31	SUMMER	19	0.00000	0	0	24.6830	20.1	28.1	5.30186	0.0	10.5
SE31	FALL	10	0.00000	0	0	15.4200	8.9	20.0	4.50000	1.0	9.0
SE32	WINTER	3	0.00000	0	0	5.5333	4.2	6.0	2.16667	0.0	5.5

Table 33. - Continued.

M. SAXATILIS SEASONAL MEAN CATCH PER UNIT EFFORT (N/T)-1975.

LOCATION	SEASON	OBS	CATCH/UNIT EFFORT			TEMPERATURE (C)			SALINITY (PPT)		
			MEAN	MIN	MAX	MEAN	MIN	MAX	MEAN	MIN	MAX
SE32	SPRING	8	0.000000	0	0	11.2071	1.0	23.0	4.50000	0.0	11.0
SE32	SUMMER	18	0.000000	0	0	24.7172	20.1	28.1	5.57468	2.0	10.5
SE32	FALL	9	0.000000	0	0	15.9444	11.0	20.0	4.75000	1.0	9.0
SSC1	WINTER	8	0.000000	0	0	4.9271	0.2	12.0	3.72857	0.0	6.0
SSC1	SPRING	11	0.181818	0	2	12.7295	1.3	21.9	2.02597	0.0	9.0
SSC1	SUMMER	25	0.000000	0	0	25.2775	20.3	29.8	5.67708	0.0	9.0
SSC1	FALL	20	0.000000	0	0	16.2408	9.8	20.0	4.04500	1.0	9.0
SSC2	WINTER	8	0.000000	0	0	5.0521	0.2	12.0	3.72857	0.0	6.0
SSC2	SPRING	11	0.181818	0	2	12.7295	1.3	21.9	2.02597	0.0	9.0
SSC2	SUMMER	24	0.000000	0	0	25.1284	20.3	29.8	5.65465	0.0	9.0
SSC2	FALL	21	0.285714	0	4	16.2918	9.8	20.0	3.91465	1.0	9.0
SW11	SUMMER	4	0.000000	0	0	24.7292	22.0	27.8	6.37500	2.0	9.0
SW11	FALL	3	0.000000	0	0	17.8167	10.6	23.8	3.58333	0.0	8.0
SW12	SUMMER	1	0.000000	0	0	22.2500	22.0	22.5	9.00000	9.0	9.0
SW12	FALL	2	0.000000	0	0	15.2750	10.6	20.0	1.50000	0.0	3.0
SW21	WINTER	3	0.000000	0	0	5.5000	5.0	6.0	1.75000	0.0	5.0
SW21	SPRING	6	0.000000	0	0	11.5917	3.2	21.0	1.87500	0.0	7.0
SW21	SUMMER	16	0.000000	0	0	25.2175	21.0	29.5	4.67292	0.0	10.0
SW21	FALL	10	0.000000	0	0	14.0854	8.7	18.5	3.56250	0.0	10.0
SW22	WINTER	3	0.000000	0	0	5.5000	5.0	6.0	2.08333	0.0	6.0
SW22	SPRING	6	0.166667	0	1	11.3500	3.2	21.0	2.20833	0.0	7.0
SW22	SUMMER	15	0.000000	0	0	25.0933	21.0	29.5	4.75714	0.0	9.5
SW22	FALL	9	0.000000	0	0	14.7875	8.7	20.0	3.06250	0.0	10.0
W-11	WINTER	4	0.250000	0	1	6.2125	4.0	8.2	1.12500	0.0	3.0
W-11	SPRING	6	0.333333	0	1	11.4667	3.2	21.0	2.83333	0.0	7.0
W-11	SUMMER	18	0.000000	0	0	25.1004	19.9	28.5	2.73646	0.0	8.0
W-11	FALL	16	0.062500	0	1	16.3027	9.1	20.0	1.92009	0.0	6.0
W-12	WINTER	4	0.000000	0	0	6.2125	4.0	8.2	1.12500	0.0	3.0
W-12	SPRING	6	0.166667	0	1	13.5750	3.2	21.0	2.37500	0.0	7.0
W-12	SUMMER	20	0.000000	0	0	25.1113	19.9	28.5	3.07353	0.0	8.0
W-12	FALL	17	0.058824	0	1	15.4251	9.1	20.0	1.91078	0.0	6.0
W-21	WINTER	2	0.000000	0	0	5.4500	4.0	6.2	0.00000	0.0	0.0
W-21	SPRING	6	0.666667	0	3	12.2167	2.6	21.0	1.62500	0.0	4.5
W-21	SUMMER	3	0.000000	0	0	25.5167	24.7	26.9	1.50000	0.0	4.0
W-21	FALL	3	0.666667	0	2	13.9583	11.0	16.5	1.41667	0.0	2.0
W-22	WINTER	2	0.000000	0	0	5.4500	4.0	6.2	0.00000	0.0	0.0
W-22	SPRING	6	0.000000	0	0	12.2167	2.6	21.0	1.62500	0.0	4.5
W-22	SUMMER	3	0.000000	0	0	25.5167	24.7	26.9	1.50000	0.0	4.0
W-22	FALL	3	0.333333	0	1	13.9583	11.0	16.5	1.41667	0.0	2.0
W-31	WINTER	4	0.000000	0	0	6.6500	5.3	8.8	0.29167	0.0	1.0
W-31	SPRING	5	0.000000	0	0	11.3700	2.8	21.0	1.70000	0.0	4.5
W-31	SUMMER	15	0.066667	0	1	25.8567	20.9	29.0	2.31333	0.0	8.0
W-31	FALL	7	0.000000	0	0	15.2286	10.0	18.9	1.87500	0.5	4.0
W-32	WINTER	4	0.000000	0	0	6.6500	5.3	8.8	0.29167	0.0	1.0
W-32	SPRING	5	0.000000	0	0	11.3700	2.8	21.0	1.70000	0.0	4.5
W-32	SUMMER	13	0.000000	0	0	25.8500	20.9	29.0	1.86538	0.0	5.0
W-32	FALL	7	0.142857	0	1	15.2286	10.0	18.9	1.89286	0.5	4.0

Table 34. - M. SAXATILIS SEASONAL MEAN CATCH PER UNIT EFFORT (N/T)-1976.

LOCATION	SEASON	OBS	CATCH/UNIT EFFORT			TEMPERATURE (C)			SALINITY (PPT)		
			MEAN	MIN	MAX	MEAN	MIN	MAX	MEAN	MIN	MAX
CHA1	WINTER	1	0.000000	0	0	1.7500	1.5	2.0	9.0000	8	10
CHA1	SPRING	6	0.000000	0	0	15.2900	10.1	19.9	6.0167	1	8
CHA1	SUMMER	8	0.000000	0	0	24.6912	23.5	24.0	11.0625	6	15
CHA1	FALL	6	0.000000	0	0	12.0750	6.0	20.9	10.4167	4	16
CHA2	WINTER	5	0.000000	0	0	2.9500	1.7	6.5	3.6500	0	8
CHA2	SPRING	6	0.000000	0	0	12.6000	7.0	17.4	3.9167	0	10
CHA2	SUMMER	14	0.000000	0	0	25.1071	22.8	28.0	8.2679	4	13
CHA2	FALL	8	0.000000	0	0	15.2437	5.0	20.8	8.3750	3	14
CHA3	WINTER	3	0.000000	0	0	3.8500	2.0	5.3	1.0000	0	2
CHA3	SPRING	6	0.000000	0	0	14.6083	6.6	21.2	3.3333	1	6
CHA3	SUMMER	7	0.000000	0	0	25.2000	24.0	26.5	5.5357	2	10
CHA3	FALL	6	0.000000	0	0	14.4583	7.0	20.1	4.0833	0	9
CHA4	WINTER	3	0.000000	0	0	3.8000	1.0	6.3	0.6667	0	2
CHA4	SPRING	7	0.000000	0	0	13.3274	6.5	21.3	2.0714	0	8
CHA4	SUMMER	12	0.000000	0	0	24.5708	23.2	26.0	4.5000	1	7
CHA4	FALL	10	0.000000	0	0	15.1450	6.5	21.2	4.3500	0	10
CHA5	WINTER	2	0.000000	0	0	2.5000	2.0	3.0	2.5000	2	3
CHA5	SPRING	5	0.000000	0	0	12.9367	7.5	20.0	1.2667	0	3
CHA5	SUMMER	10	0.000000	0	0	24.7672	23.0	26.5	3.2111	1	5
CHA5	FALL	7	0.000000	0	0	13.8500	6.1	22.5	2.4286	0	8
E-11	WINTER	4	0.000000	0	0	2.1958	1.5	5.1	4.0833	0	8
E-11	SPRING	7	0.000000	0	0	13.7833	7.0	20.1	4.6667	2	8
E-11	SUMMER	9	0.000000	0	0	24.6556	22.9	26.9	7.0556	5	9
E-11	FALL	6	0.000000	0	0	13.4000	5.0	22.2	6.9167	3	11
E-12	WINTER	4	0.000000	0	0	2.1958	1.5	5.1	4.0833	0	8
E-12	SPRING	7	0.000000	0	0	13.7833	7.0	20.1	4.0000	0	8
E-12	SUMMER	9	0.000000	0	0	24.6778	22.9	26.9	7.0556	5	9
E-12	FALL	6	0.000000	0	0	13.4417	5.0	22.2	6.9167	3	11
E-21	WINTER	5	0.000000	0	0	2.8200	1.0	4.8	4.1000	0	9
E-21	SPRING	10	0.000000	0	0	12.5911	7.1	22.8	2.8144	0	8
E-21	SUMMER	21	0.000000	0	0	24.6738	22.5	28.8	6.8333	2	10
E-21	FALL	15	0.000000	0	0	16.6200	6.0	24.1	6.8000	0	12
E-22	WINTER	5	0.000000	0	0	2.8200	1.0	4.8	4.1000	0	9
E-22	SPRING	9	0.000000	0	0	13.2354	7.5	22.8	3.1250	0	8
E-22	SUMMER	21	0.000000	0	0	24.6738	22.5	28.8	6.8333	2	10
E-22	FALL	14	0.000000	0	0	17.1000	6.0	24.1	7.2500	0	12
E-31	WINTER	2	0.000000	0	0	2.7000	1.8	3.0	1.5000	1	2
E-31	SPRING	7	0.000000	0	0	13.0167	6.5	22.0	3.6429	0	8
E-31	SUMMER	9	0.111111	0	1	25.0556	22.5	27.5	4.4722	2	7
E-31	FALL	6	0.000000	0	0	12.2083	5.0	19.5	4.1667	0	9
E-32	WINTER	2	0.000000	0	0	2.7000	1.8	3.0	1.5000	1	2
E-32	SPRING	7	0.000000	0	0	13.0167	6.5	22.0	3.3571	0	6
E-32	SUMMER	9	0.000000	0	0	25.0556	22.5	27.5	4.4722	2	7
E-32	FALL	6	0.000000	0	0	12.2083	5.0	19.5	4.1667	0	9
E-41	WINTER	5	0.000000	0	0	3.7800	0.5	7.9	1.7000	0	6
E-41	SPRING	8	0.000000	0	0	13.2786	6.5	21.5	2.5476	0	8
E-41	SUMMER	12	0.000000	0	0	24.5083	23.2	26.0	4.5000	1	7
E-41	FALL	11	0.000000	0	0	15.6000	6.1	21.5	4.8182	0	9
E-42	WINTER	5	0.000000	0	0	3.7800	0.5	7.9	1.7000	0	6
E-42	SPRING	7	0.000000	0	0	13.2786	6.5	21.5	2.9762	1	8
E-42	SUMMER	12	0.000000	0	0	24.4330	23.2	26.0	4.5000	1	7
E-42	FALL	11	0.000000	0	0	15.6000	6.1	21.5	4.8182	0	9
E-51	WINTER	2	0.000000	0	0	3.2750	3.0	3.8	2.0000	2	2
E-51	SPRING	5	0.000000	0	0	14.4125	7.5	22.0	2.3000	0	5

Table 34. - Continued.

M. SAXATILIS SEASONAL MEAN CATCH PER UNIT EFFORT (N/T)-1976.

LOCATION	SEASON	OBS	CATCH/UNIT EFFORT			TEMPERATURE (C)			SALINITY (PPT)		
			MEAN	MIN	MAX	MEAN	MIN	MAX	MEAN	MIN	MAX
E-51	SUMMER	7	0.00000	0	0	24.8214	23.0	26.8	3.50000	2	5
E-51	FALL	6	0.00000	0	0	12.6667	5.0	22.9	3.15000	0	8
E-52	WINTER	2	0.00000	0	0	3.2750	3.0	3.8	2.00000	2	2
E-52	SPRING	5	0.00000	0	0	14.4125	7.5	22.0	2.30000	0	5
E-52	SUMMER	7	0.00000	0	0	24.8405	23.0	26.8	3.50000	2	5
E-52	FALL	6	0.00000	0	0	12.6667	5.0	22.9	3.06333	0	8
E-61	WINTER	2	0.00000	0	0	2.6750	2.2	3.0	3.75000	3	4
E-61	SPRING	5	0.20000	0	1	12.9300	7.0	19.8	1.80000	0	4
E-61	SUMMER	10	0.00000	0	0	24.5000	22.6	26.1	3.85000	1	6
E-61	FALL	7	1.14286	0	6	13.7143	6.0	22.2	2.50000	0	8
E-62	WINTER	2	0.00000	0	0	2.6750	2.2	3.0	3.75000	3	4
E-62	SPRING	5	0.00000	0	0	12.9300	7.0	19.8	1.80000	0	4
E-62	SUMMER	10	0.00000	0	0	24.5000	22.6	26.1	3.85000	1	6
E-62	FALL	7	0.00000	0	0	13.7143	6.0	22.2	2.50000	0	8
NE11	SPRING	4	0.25000	0	1	14.4750	7.2	22.1	0.87500	0	2
NE11	SUMMER	6	0.00000	0	0	24.6833	23.3	26.0	2.83333	1	4
NE11	FALL	5	0.40000	0	2	13.3400	5.9	21.0	1.00000	0	5
NE12	SPRING	4	0.00000	0	0	14.4750	7.2	22.1	0.87500	0	2
NE12	SUMMER	5	0.00000	0	0	24.5950	23.3	26.0	2.80000	1	4
NE12	FALL	5	0.00000	0	0	13.3400	5.9	21.0	1.00000	0	5
NE21	SPRING	1	0.00000	0	0	14.5000	14.5	14.5	1.00000	1	1
NE21	SUMMER	1	0.00000	0	0	25.0000	25.0	25.0	1.00000	1	1
NE21	FALL	1	0.00000	0	0	7.5000	7.0	8.0	0.00000	0	0
NE22	SPRING	1	0.00000	0	0	14.5000	14.5	14.5	1.00000	1	1
NE22	SUMMER	1	0.00000	0	0	25.0000	25.0	25.0	1.00000	1	1
NE22	FALL	1	1.00000	1	1	7.5000	7.0	8.0	0.00000	0	0
NW11	WINTER	3	0.00000	0	0	3.4167	2.0	5.5	1.83333	0	3
NW11	SPRING	6	0.00000	0	0	12.0583	6.7	20.2	1.01667	0	2
NW11	SUMMER	10	0.10000	0	1	24.9700	23.5	26.2	3.72056	1	6
NW11	FALL	7	0.00000	0	0	14.1143	6.8	23.1	2.50000	0	7
NW12	WINTER	3	0.00000	0	0	3.4167	2.0	5.5	1.83333	0	3
NW12	SPRING	6	0.00000	0	0	12.0583	6.7	20.2	1.01667	0	2
NW12	SUMMER	10	0.00000	0	0	24.9650	23.5	26.2	3.48056	1	6
NW12	FALL	7	0.00000	0	0	14.1214	6.8	23.2	2.50000	0	7
NW21	SPRING	1	0.00000	0	0	14.2500	14.1	14.4	0.00000	0	0
NW21	SUMMER	3	0.00000	0	0	24.9167	24.4	25.5	3.83333	3	4
NW21	FALL	1	0.00000	0	0	8.0000	8.0	8.0	1.00000	1	1
NW22	SPRING	1	0.00000	0	0	14.2500	14.1	14.4	0.00000	0	0
NW22	SUMMER	3	0.00000	0	0	24.9167	24.4	25.5	3.83333	3	4
NW22	FALL	1	0.00000	0	0	8.0000	8.0	8.0	1.00000	1	1
RI11	WINTER	3	0.00000	0	0	4.3333	2.0	7.0	1.33333	0	2
RI11	SPRING	7	0.00000	0	0	14.3200	6.2	19.7	2.10000	2	3
RI11	SUMMER	9	0.00000	0	0	24.9944	23.1	26.8	5.02778	2	9
RI11	FALL	6	0.00000	0	0	13.8950	7.0	22.5	4.70000	0	8
RI12	WINTER	3	0.00000	0	0	4.3333	2.0	7.0	1.33333	0	2
RI12	SPRING	6	0.00000	0	0	14.3200	6.2	19.7	2.10000	2	3
RI12	SUMMER	9	0.00000	0	0	24.9944	23.1	26.8	5.10069	2	9
RI12	FALL	6	0.00000	0	0	13.8950	7.0	22.5	4.78333	0	8
RI21	WINTER	3	0.00000	0	0	4.5000	2.0	7.0	0.83333	0	2
RI21	SPRING	7	0.00000	0	0	15.7250	6.2	22.3	2.00000	0	4
RI21	SUMMER	11	0.00000	0	0	24.9864	23.0	26.6	4.75000	1	8
RI21	FALL	6	0.00000	0	0	14.3667	6.0	23.9	4.41667	0	8
RI22	WINTER	3	0.00000	0	0	4.5000	2.0	7.0	0.83333	0	2
RI22	SPRING	7	0.00000	0	0	15.7250	6.2	22.3	2.00000	0	4

Table 34 . - Continued.

M. SAXATILIS SEASONAL MEAN CATCH PER UNIT EFFORT (N/T)-1976.

LOCATION	SEASON	OBS	CATCH/UNIT EFFORT			TEMPERATURE (C)			SALINITY (PPT)		
			MEAN	MIN	MAX	MEAN	MIN	MAX	MEAN	MIN	MAX
RI22	SUMMER	12	0.000000	0	0	25.0093	23.0	26.5	5.0625	1.0	9.5
RI22	FALL	3	0.000000	0	0	14.3667	6.0	23.9	4.4167	0.0	8.0
SE01	WINTER	1	0.000000	0	0	5.5000	5.0	6.0	2.0000	2.0	2.0
SE01	SPRING	6	0.000000	0	0	13.5250	9.2	19.1	8.5000	4.0	12.0
SE01	SUMMER	5	0.000000	0	0	24.4500	23.0	25.0	12.4500	10.0	14.0
SE01	FALL	7	0.000000	0	0	10.8143	5.9	19.7	11.2857	6.0	17.0
SE02	WINTER	1	0.000000	0	0	5.5000	5.0	6.0	2.0000	2.0	2.0
SE02	SPRING	5	0.000000	0	0	14.3000	10.0	19.1	8.5000	4.0	12.0
SE02	SUMMER	5	0.000000	0	0	24.4500	23.0	25.0	12.4500	10.0	14.0
SE02	FALL	6	0.000000	0	0	9.3417	5.9	17.8	10.8333	6.0	17.0
SE11	WINTER	2	0.000000	0	0	3.7000	2.0	5.5	4.7500	2.0	8.0
SE11	SPRING	6	0.000000	0	0	14.8333	6.2	19.8	6.5000	5.0	11.0
SE11	SUMMER	8	0.000000	0	0	24.6562	23.0	27.0	11.2813	9.0	13.0
SE11	FALL	8	0.000000	0	0	12.0562	5.0	20.7	10.8750	7.0	15.0
SE12	WINTER	2	0.000000	0	0	3.7000	2.0	5.5	4.7500	2.0	8.0
SE12	SPRING	5	0.000000	0	0	14.4700	6.2	19.0	6.8750	5.0	11.0
SE12	SUMMER	8	0.000000	0	0	24.5196	23.0	27.0	11.2813	9.0	13.0
SE12	FALL	7	0.000000	0	0	10.8357	5.0	20.0	10.2857	7.0	15.0
SE21	SPRING	4	0.000000	0	0	14.8958	10.2	18.5	5.5000	4.0	7.0
SE21	SUMMER	6	0.000000	0	0	24.8667	23.4	26.5	9.6417	8.0	12.0
SE21	FALL	4	0.000000	0	0	13.5750	5.5	20.5	9.5000	6.0	13.0
SE22	SPRING	4	0.000000	0	0	14.8958	10.2	18.5	5.5000	4.0	7.0
SE22	SUMMER	6	0.000000	0	0	24.8667	23.4	26.5	9.7250	8.0	12.0
SE22	FALL	4	0.000000	0	0	13.5750	5.5	20.5	9.5000	6.0	13.0
SE31	WINTER	5	0.000000	0	0	3.7200	1.0	6.8	1.3000	0.0	7.0
SE31	SPRING	8	0.000000	0	0	13.1937	7.0	19.8	4.5714	0.0	8.0
SE31	SUMMER	16	0.000000	0	0	24.7594	22.9	26.0	8.8438	5.0	11.0
SE31	FALL	11	0.000000	0	0	14.5182	4.0	20.8	8.1364	3.0	13.0
SE32	WINTER	5	0.000000	0	0	3.7200	1.0	6.8	1.3000	0.0	7.0
SE32	SPRING	6	0.000000	0	0	14.1833	7.0	19.8	5.0000	0.0	8.0
SE32	SUMMER	16	0.000000	0	0	24.7312	22.9	26.0	8.8438	5.0	11.0
SE32	FALL	11	0.000000	0	0	14.5182	4.0	20.8	8.1364	3.0	13.0
SSC1	WINTER	9	0.000000	0	0	3.1083	0.2	6.0	3.2292	0.0	9.0
SSC1	SPRING	16	0.000000	0	0	13.1980	4.6	22.9	3.1844	0.0	8.0
SSC1	SUMMER	29	0.000000	0	0	24.6603	22.3	29.0	7.6652	3.0	10.0
SSC1	FALL	20	0.100000	0	2	16.2975	6.0	22.5	7.3000	0.0	11.0
SSC2	WINTER	9	0.000000	0	0	3.1905	0.2	6.0	3.2292	0.0	9.0
SSC2	SPRING	16	0.125000	0	2	13.2250	4.6	22.9	3.3344	0.0	8.0
SSC2	SUMMER	29	0.000000	0	0	24.6603	22.3	29.0	7.6652	3.0	10.0
SSC2	FALL	20	0.300000	0	4	16.2975	6.0	22.5	7.3000	0.0	11.0
SW11	WINTER	1	0.000000	0	0	3.0000	2.5	3.5	5.7500	5.5	6.0
SW11	SPRING	4	0.000000	0	0	15.0750	10.8	17.8	4.2500	2.0	6.0
SW11	SUMMER	7	0.000000	0	0	25.0500	23.5	26.0	10.6429	6.0	15.0
SW11	FALL	4	0.000000	0	0	11.1750	6.0	18.2	8.0000	4.0	13.0
SW12	WINTER	1	0.000000	0	0	3.0000	2.5	3.5	5.7500	5.5	6.0
SW12	SPRING	5	0.000000	0	0	14.2500	10.8	17.8	4.4500	2.0	6.0
SW12	SUMMER	8	0.000000	0	0	25.0312	23.5	26.0	10.1563	6.0	15.0
SW12	FALL	5	0.000000	0	0	15.0300	6.0	20.7	9.4000	4.0	15.0
SW21	WINTER	6	0.166667	0	1	3.5583	1.0	6.5	2.5000	0.0	9.0
SW21	SPRING	8	0.000000	0	0	14.1375	7.0	20.5	3.0000	0.0	7.0
SW21	SUMMER	15	0.000000	0	0	25.0900	23.3	28.0	7.6667	3.0	12.0
SW21	FALL	11	0.090909	0	1	14.5407	4.9	21.1	7.6818	3.0	14.0
SW22	WINTER	6	0.166667	0	1	3.5583	1.0	6.5	2.5000	0.0	9.0
SW22	SPRING	8	0.000000	0	0	14.1375	7.0	20.5	3.0000	0.0	7.0

Table 34 . - Continued.

N. SAXATILIS SEASONAL MEAN CATCH PER UNIT EFFORT (N/T)-1976.

LOCATION	SEASON	OBS	CATCH/UNIT EFFORT			TEMPERATURE (C)			SALINITY (PPT)		
			MEAN	MIN	MAX	MEAN	MIN	MAX	MEAN	MIN	MAX
SW22	SUMMER	15	0.000000	0	0	25.0900	23.3	28.0	7.76667	3	14
SW22	FALL	11	0.000000	0	0	14.5409	4.9	21.1	7.63636	3	14
W-11	WINTER	5	0.000000	0	0	2.9200	0.5	4.9	3.57500	0	8
W-11	SPRING	12	0.000000	0	0	15.0767	7.1	23.0	1.56667	0	8
W-11	SUMMER	21	0.000000	0	0	24.9786	23.3	28.0	5.73690	2	10
W-11	FALL	15	0.200000	0	2	17.0133	5.9	23.0	5.80000	0	13
W-12	WINTER	5	0.000000	0	0	2.9200	0.5	4.9	3.57500	0	8
W-12	SPRING	11	0.000000	0	0	14.5864	7.1	23.0	1.70707	0	8
W-12	SUMMER	21	0.000000	0	0	25.0000	23.3	28.0	5.73690	2	10
W-12	FALL	16	0.062500	0	1	16.0594	5.9	23.0	5.43750	0	13
W-21	WINTER	2	0.000000	0	0	2.1750	1.8	3.0	2.50000	2	4
W-21	SPRING	5	0.000000	0	0	13.1000	6.5	17.5	0.75000	0	2
W-21	SUMMER	9	0.000000	0	0	25.7722	24.1	27.0	3.80556	2	5
W-21	FALL	7	0.285714	0	2	16.1357	6.0	23.0	4.44048	0	7
W-22	WINTER	2	0.500000	0	1	2.1750	1.8	3.0	2.50000	2	4
W-22	SPRING	5	0.000000	0	0	13.1000	6.5	17.5	0.75000	0	2
W-22	SUMMER	9	0.000000	0	0	25.7167	24.1	27.0	3.80556	2	5
W-22	FALL	7	0.000000	0	0	16.1357	6.0	23.0	4.44048	0	7
W-31	WINTER	5	0.000000	0	0	3.6175	1.2	7.0	1.02500	0	4
W-31	SPRING	8	0.000000	0	0	14.0312	6.5	21.3	0.78571	0	4
W-31	SUMMER	12	0.000000	0	0	24.6792	23.2	26.1	4.12500	2	6
W-31	FALL	10	0.000000	0	0	15.6467	6.5	21.4	4.38333	0	7
W-32	WINTER	5	0.000000	0	0	3.6175	1.2	7.0	1.02500	0	4
W-32	SPRING	8	0.000000	0	0	14.0312	6.5	21.3	0.82143	0	4
W-32	SUMMER	12	0.000000	0	0	24.7000	23.2	26.1	4.12500	2	6
W-32	FALL	10	0.000000	0	0	15.6467	6.5	21.4	4.38333	0	7

Table 35. - A chronological summary of temperature avoidance studies on striped bass, Morone saxatilis. All tests were conducted at near air-saturated levels of dissolved oxygen and pH of 7 to 8.

DATE	REPLICATE	NO. OF FISH PER TEST	SIZE RANGE (TL IN MM)		SALINITY (PPT)	LIGHT LEVEL (FOOT (LUX) CANDLES)		ACCLIMATION TEMPERATURE (C) (F)		AVOIDANCE TEMPERATURE (C) (F)	
			MIN.	MAX.							
MORONE SAXATILIS											
24 JUN 70	1	4	34	42	4	215	20.0	21	69	32	89
1 JUL 70	1	4	35	41	1	215	20.0	21	69	33	91
	2	4	34	41	1	215	20.0	21	69	33	91
21 AUG 70	1	3	69	102	4	215	20.0	27	80	34	93
24 AUG 70	1	1	-	-	4	21.5	2.0	27	80	34	93
21 OCT 70	1	4	105	126	7	215	20.0	16	60	26	78
	2	4	108	130	7	215	20.0	16	60	23	73
26 OCT 70	1	4	102	140	7	215	20.0	15	59	27	80
6 NOV 70	1	4	126	140	4.5	21.5	2.0	14	57	28	82
12 NOV 70	1	4	125	135	1	215	20.0	14	57	29	84
	2	4	122	140	1	215	20.0	14	57	29	84
3 DEC 70	1	4	104	120	4	215	20.0	11	51	24	75
	2	2	97	108	4	215	20.0	11	51	18	64

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Table 35. - Continued.

DATE	REPLICATE	NO. OF FISH PER TEST	SIZE RANGE (TL IN MM) MIN. MAX.		SALINITY (PPT)	LIGHT LEVEL (FOOT (LUX) CANDLES)		ACCLIMATION TEMPERATURE (C) (F)		AVOIDANCE TEMPERATURE (C) (F)	
MORONE SAXATILIS											
16 DEC 70	1	4	102	129	4	215	20.0	5	41	16	60
8 OCT 71	1	2	132	135	4.5	215	20.0	18	64	29.5	85
22 DEC 71	1	3	76	106	4.5	215	20.0	6	42	19	66
	2	3	87	98	4.5	215	20.0	6	42	19	66
14 MAR 72	1	4	82	201	2.6	215	20.0	5	41	18	64
	2	4	89	113	2.6	215	20.0	5	41	18	64
1 SEP 72	1	2	77	92	5	215	20.0	26	78	31	87
	2	2	142	173	5	215	20.0	26	78	33	91
8 NOV 72	1	4	87	126	0	215	20.0	10	50	21	69
	2	4	120	146	0	215	20.0	10	50	23	73
14 JUL 76	1	4	38	55	4	215	20.0	26	78	29	84
	2	4	43	56	4	215	20.0	26	78	32	89
10 SEP 76	1	4	90	105	4.5	21.5	2.0	24	75	28.9	84
2 DEC 76	1	4	116	145	3	21.5	2.0	3	37	15.6	60
	2	4	117	141	3	21.5	2.0	3	37	15.6	60

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Table 35. - Continued.

DATE	REPLICATE NO. OF FISH PER TEST		SIZE RANGE (TL IN MM) MIN. MAX.		SALINITY (PPT)	LIGHT LEVEL (FOOT (LUX) CANDLES)		ACCLIMATION TEMPERATURE (C) (F)		AVOIDANCE TEMPERATURE (C) (F)	
MORONE SAXATILIS											
7 DEC 76	1	4	110	147	3	215	20.0	7	44	11.1	51
	2	4	137	146	3	215	20.0	7	44	11.1	51
10 DEC 76	1	3	120	132	8	215	20.0	10	50	13.9	57
	2	3	116	130	8	215	20.0	10	50	13.9	57
6 JUL 77	1	3	42	62	7	215	20.0	23	73	32	89
	2	3	45	50	7	215	20.0	23	73	32	89
21 JUL 77	1	3	55	60	8.5	215	20.0	29	84	35	95
	2	4	46	55	8.5	215	20.0	29	84	37	98
2 AUG 77	1	4	50	61	9	215	20.0	26	78	33	91
11 AUG 77	1	4	49	74	10.5	21.5	2.0	29	84	37	98
	2	4	50	70	10.5	21.5	2.0	29	84	37	98
26 AUG 77	1	4	60	74	8.5	21.5	2.0	25	77	29	84
	2	3	63	65	8.5	21.5	2.0	25	77	29	84

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Table 36. - Components for the multiple linear regression equation to estimate avoidance temperatures (C) for the striped bass, Morone saxatilis.

* = Significant at P.05 or greater; and ** = significant at P.01 or greater.

Constant (a) = 13.375		F(2, 37) = 102.298**			N = 40
Standard Error of Estimate = 3.108		R = 0.920**			R ² = 0.847
<u>Variable (Xi)</u>	<u>Mean (Xi)</u>	<u>Correlation (r) With Y</u>	<u>Regression Coefficient (bi)</u>	<u>Standard Error of bi</u>	<u>Standardized Reg. Coef.</u>
Acclimation Temperature (C)	16.8	0.907**	0.892**	0.067	1.002
Salinity (ppt)	4.9	0.335*	-0.503*	0.205	-0.184

Table 37 . - C. REGALIS SEASONAL MEAN CATCH PER UNIT EFFORT (N/T)-1975.

LOCATION	SEASON	OBS	CATCH/UNIT EFFORT			TEMPERATURE (C)			SALINITY (PPT)		
			MEAN	MIN	MAX	MEAN	MIN	MAX	MEAN	MIN	MAX
CHA1	SPRING	3	0.000	0	0	13.0500	3.0	22.8	5.86667	1.0	12.0
CHA1	SUMMER	5	16.600	1	46	24.7500	22.0	26.1	5.20000	2.0	9.0
CHA1	FALL	2	1.000	0	2	15.3250	10.3	20.0	4.00000	0.0	9.0
CHA2	WINTER	1	0.000	0	0	6.0000	6.0	6.0	5.75000	5.5	6.0
CHA2	SPRING	3	0.000	0	0	12.3000	3.0	22.8	4.03333	0.0	12.0
CHA2	SUMMER	14	8.500	0	39	24.5429	21.0	28.9	5.05495	0.0	10.0
CHA2	FALL	7	0.000	0	0	14.5000	9.9	20.0	3.75000	1.0	10.0
CHA3	WINTER	1	0.000	0	0	7.6500	7.4	7.9	4.00000	4.0	4.0
CHA3	SPRING	3	0.000	0	0	12.6667	4.0	22.8	2.00000	0.0	6.0
CHA3	SUMMER	4	15.000	1	52	25.3250	24.2	26.2	2.00000	0.0	4.0
CHA3	FALL	3	0.000	0	0	14.2333	11.2	16.5	2.25000	1.0	3.0
CHA4	WINTER	1	0.000	0	0	.	.	5.3	.	.	0.0
CHA4	SPRING	3	0.000	0	0	12.1833	4.0	23.0	1.83333	0.0	6.0
CHA4	SUMMER	13	14.923	0	65	25.6577	20.1	28.2	2.04968	0.0	5.5
CHA4	FALL	8	0.625	0	4	14.8062	10.0	19.0	2.50000	0.5	5.0
CHA5	SPRING	3	0.000	0	0	12.6500	5.0	23.0	0.83333	0.0	3.0
CHA5	SUMMER	5	5.600	0	26	25.2350	21.8	27.0	1.23750	0.0	3.5
CHA5	FALL	2	0.000	0	0	17.4750	15.9	19.0	0.00000	0.0	0.0
E-11	WINTER	4	0.000	0	0	4.0625	1.8	6.0	0.65833	0.0	1.5
E-11	SPRING	8	0.000	0	0	11.7562	1.0	23.5	3.65625	0.0	11.0
E-11	SUMMER	11	23.818	0	91	25.9192	23.0	30.0	4.68667	0.0	9.5
E-11	FALL	5	10.000	0	39	15.5900	11.3	19.0	4.40000	2.0	9.0
E-12	WINTER	4	0.000	0	0	4.0625	1.8	6.0	0.28333	0.0	1.5
E-12	SPRING	8	0.000	0	0	11.9812	1.0	23.5	3.87500	0.0	11.0
E-12	SUMMER	11	104.727	0	915	26.0364	23.0	30.0	4.39773	0.0	9.5
E-12	FALL	4	2.250	0	5	15.2500	11.3	19.0	4.75000	2.0	9.0
E-21	WINTER	5	0.000	0	0	4.7300	1.8	7.7	2.45000	0.0	4.5
E-21	SPRING	8	0.000	0	0	11.8312	1.3	23.5	2.65625	0.0	9.5
E-21	SUMMER	22	31.273	1	142	25.6500	20.9	29.0	4.21591	0.0	9.5
E-21	FALL	16	0.563	0	4	16.1544	9.3	19.6	3.14231	0.0	8.0
E-22	WINTER	5	0.000	0	0	4.7300	1.8	7.7	2.37500	0.0	4.5
E-22	SPRING	7	0.000	0	0	12.9500	1.3	23.5	1.92857	0.0	5.0
E-22	SUMMER	21	14.286	0	193	25.5690	20.9	31.3	4.14286	0.0	9.5
E-22	FALL	13	0.077	0	1	15.9958	9.3	19.6	3.39583	0.0	8.0
E-31	WINTER	4	0.000	0	0	3.3917	2.0	5.5	0.83333	0.0	2.0
E-31	SPRING	7	0.000	0	0	11.1929	2.0	22.8	2.67857	0.0	9.0
E-31	SUMMER	6	23.667	0	101	24.9583	23.0	26.4	2.41667	0.0	7.0
E-31	FALL	4	0.750	0	3	15.6125	11.4	19.6	3.18750	1.0	8.0
E-32	WINTER	4	0.000	0	0	3.3917	2.0	5.5	0.83333	0.0	2.0
E-32	SPRING	7	0.000	0	0	11.1929	2.0	22.8	2.67857	0.0	9.0
E-32	SUMMER	6	15.667	0	74	24.9583	23.0	26.4	2.41667	0.0	7.0
E-32	FALL	4	0.250	0	1	15.6125	11.4	19.6	3.18750	1.0	8.0
E-41	WINTER	4	0.000	0	0	3.3292	2.0	5.1	0.66667	0.0	2.0
E-41	SPRING	7	0.000	0	0	10.9357	2.0	22.8	1.96429	0.0	9.0
E-41	SUMMER	13	6.154	0	24	25.0692	19.1	28.0	2.36538	0.0	6.0
E-41	FALL	9	0.444	0	2	14.5000	9.9	19.0	3.08333	0.5	5.0
E-42	WINTER	4	0.000	0	0	3.3292	2.0	5.1	0.66667	0.0	2.0
E-42	SPRING	7	0.000	0	0	10.9357	2.0	22.8	1.96429	0.0	9.0
E-42	SUMMER	14	14.000	0	94	25.2786	19.1	28.0	2.16071	0.0	6.0
E-42	FALL	9	0.111	0	1	14.5000	9.9	19.0	3.08333	0.5	5.0
E-51	WINTER	4	0.000	0	0	3.3000	1.0	5.3	0.00000	0.0	0.0
E-51	SPRING	5	0.000	0	0	12.6400	2.0	21.6	1.25000	0.0	3.5
E-51	SUMMER	6	2.500	0	8	26.0500	23.9	28.9	1.29167	0.0	4.0
E-51	FALL	1	1.000	1	1	16.2500	16.0	16.5	1.25000	1.0	1.5

Table 37. - Continued.

C. REGALIS SEASONAL MEAN CATCH PER UNIT EFFORT (N/T)-1975.

LOCATION	SEASON	OBS	CATCH/UNIT EFFORT			TEMPERATURE (C)			SALINITY (PPT)		
			MEAN	MIN	MAX	MEAN	MIN	MAX	MEAN	MIN	MAX
E-52	WINTER	4	0.0000	0	0	3.3000	1.0	5.3	0.00000	0.0	0.0
E-52	SPRING	5	0.0000	0	0	12.1800	2.0	21.6	0.65000	0.0	3.5
E-52	SUMMER	7	5.2857	0	28	25.7214	23.5	28.9	1.29167	0.0	4.0
E-52	FALL	1	0.0000	0	0	16.2500	16.0	16.5	1.25000	1.0	1.5
E-61	WINTER	4	0.0000	0	0	3.3000	1.0	5.3	0.00000	0.0	0.0
E-61	SPRING	5	0.0000	0	0	12.1100	2.0	21.6	0.65000	0.0	3.5
E-61	SUMMER	7	5.4286	0	19	25.4821	21.8	28.9	1.07738	0.0	4.0
E-61	FALL	2	0.5000	0	1	17.3750	15.5	19.0	0.00000	0.0	0.0
E-62	WINTER	4	0.0000	0	0	3.3000	1.0	5.3	0.00000	0.0	0.0
E-62	SPRING	5	0.0000	0	0	12.1100	2.0	21.6	0.65000	0.0	3.5
E-62	SUMMER	7	4.7143	0	17	25.4821	21.8	28.9	1.07738	0.0	4.0
E-62	FALL	2	0.0000	0	0	17.3750	15.5	19.0	0.00000	0.0	0.0
NE11	SPRING	3	0.0000	0	0	18.3667	9.9	24.3	1.08333	0.0	3.5
NE11	SUMMER	6	1.3333	0	7	25.5667	22.8	27.5	0.75000	0.0	3.0
NE12	SPRING	3	0.0000	0	0	18.3667	9.9	24.3	1.08333	0.0	3.5
NE12	SUMMER	6	5.6667	0	21	25.5667	22.8	27.5	0.75000	0.0	3.0
NE12	FALL	1	0.0000	0	0	16.8500	16.7	17.0	0.50000	0.0	1.0
NW11	WINTER	2	0.0000	0	0	5.9500	5.3	7.5	0.00000	0.0	0.0
NW11	SPRING	7	0.0000	0	0	12.9786	3.0	23.0	1.07143	0.0	4.5
NW11	SUMMER	5	0.4000	0	1	25.3625	23.0	26.8	1.76250	0.0	3.5
NW11	FALL	2	0.0000	0	0	18.3500	16.5	20.0	0.00000	0.0	0.0
NW12	WINTER	2	0.0000	0	0	5.9500	5.3	7.5	0.00000	0.0	0.0
NW12	SPRING	5	0.0000	0	0	13.4600	3.0	23.0	1.20000	0.0	4.5
NW12	SUMMER	4	5.5000	0	18	24.9958	23.0	26.5	1.39583	0.0	3.5
NW12	FALL	2	2.5000	0	5	18.3500	16.5	20.0	0.25000	0.0	1.0
RI11	SPRING	2	2.0000	0	4	18.1750	13.8	23.0	2.25000	1.5	3.0
RI11	SUMMER	3	2.3333	0	7	26.4167	24.5	28.5	3.08333	0.0	6.5
RI12	SPRING	2	0.0000	0	0	18.1750	13.8	23.0	2.25000	1.5	3.0
RI12	SUMMER	3	8.6667	0	24	26.4167	24.5	28.5	3.08333	0.0	6.5
RI21	SPRING	1	4.0000	4	4	22.5000	22.0	23.0	2.75000	2.5	3.0
RI21	SUMMER	3	3.0000	0	5	26.0333	24.5	27.0	2.16667	0.0	3.5
RI22	SPRING	1	2.0000	2	2	22.5000	22.0	23.0	2.75000	2.5	3.0
RI22	SUMMER	3	2.3333	0	5	26.0333	24.5	27.0	2.16667	0.0	3.5
SE01	SPRING	5	3.2000	0	15	16.9400	9.4	21.8	8.70000	6.5	12.0
SE01	SUMMER	8	59.1250	4	364	25.5875	23.8	29.5	8.65625	0.0	14.0
SE02	SPRING	5	0.2000	0	1	17.5400	9.4	21.8	8.78000	6.5	12.0
SE02	SUMMER	9	22.8889	1	95	25.5222	23.8	29.5	8.69444	0.0	14.0
SE11	SPRING	5	3.2000	0	15	16.5500	9.4	21.0	6.80000	3.5	12.0
SE11	SUMMER	11	34.0000	5	103	25.3636	22.3	28.0	8.00273	0.0	14.0
SE11	FALL	3	17.6667	0	48	16.3500	10.0	20.5	6.25000	3.5	11.0
SE12	SPRING	5	0.8000	0	4	16.5500	9.5	21.0	6.60000	3.5	10.0
SE12	SUMMER	11	34.2727	10	157	25.3636	22.3	28.0	8.02273	0.0	14.0
SE12	FALL	3	7.3333	0	18	16.3500	10.0	20.5	6.25000	3.5	11.0
SE21	SPRING	5	0.8000	0	4	16.4600	9.9	21.0	5.10000	3.0	8.0
SE21	SUMMER	9	29.3333	1	93	25.2889	23.5	27.5	5.39236	0.0	10.5
SE21	FALL	2	15.5000	10	21	20.1250	20.0	20.5	6.87500	3.5	9.0
SE22	SPRING	5	0.4000	0	2	16.4600	9.9	21.0	5.10000	3.0	8.0
SE22	SUMMER	9	27.0000	5	99	25.2889	23.5	27.5	5.39236	0.0	10.5
SE22	FALL	2	1.5000	1	2	20.1250	20.0	20.5	6.87500	3.5	9.0
SE31	WINTER	3	0.0000	0	0	5.5333	4.2	6.0	2.16667	0.0	5.5
SE31	SPRING	8	0.6250	0	5	11.2071	1.0	23.0	4.50000	0.0	11.0
SE31	SUMMER	19	39.6842	0	260	24.6830	20.1	28.1	5.30186	0.0	10.5
SE31	FALL	10	1.4000	0	5	15.4200	8.9	20.0	4.50000	1.0	9.0
SE32	WINTER	3	0.0000	0	0	5.5333	4.2	6.0	2.16667	0.0	5.5

Table 37. - Continued.

C. REGALIS SEASONAL MEAN CATCH PER UNIT EFFORT (N/T)-1975.

LOCATION	SEASON	OBS	CATCH/UNIT EFFORT			TEMPERATURE (C)			SALINITY (PPT)		
			MEAN	MIN	MAX	MEAN	MIN	MAX	MEAN	MIN	MAX
SE32	SPRING	8	0.250	0	2	11.2071	1.0	23.0	4.50000	0.0	11.0
SE32	SUMMER	18	31.554	0	151	24.7772	20.1	28.1	5.57668	2.0	10.5
SE32	FALL	9	3.778	0	13	15.9444	11.0	20.0	4.75000	1.0	9.0
SSC1	WINTER	8	0.000	0	0	4.9271	0.2	12.0	3.72857	0.0	6.0
SSC1	SPRING	11	0.000	0	0	12.7295	1.3	21.9	2.02597	0.0	9.0
SSC1	SUMMER	25	49.840	0	460	25.2775	20.3	29.8	5.67708	0.0	9.0
SSC1	FALL	20	6.500	0	44	16.2408	9.8	20.0	4.04500	1.0	9.0
SSC2	WINTER	8	0.000	0	0	5.0521	0.2	12.0	3.72857	0.0	6.0
SSC2	SPRING	11	0.000	0	0	12.7295	1.3	21.9	2.02597	0.0	9.0
SSC2	SUMMER	24	146.167	0	2218	25.1286	20.3	29.8	5.65465	0.0	9.0
SSC2	FALL	21	4.381	0	20	16.2918	9.8	20.0	3.91465	1.0	9.0
SW11	SUMMER	4	55.500	18	84	24.7292	22.0	27.8	6.37500	2.0	9.0
SW11	FALL	3	11.667	0	24	17.8167	10.6	23.8	3.58333	0.0	8.0
SW12	SUMMER	1	5.000	5	5	22.2500	22.0	22.5	9.00000	9.0	9.0
SW12	FALL	2	9.500	0	19	15.2750	10.6	20.0	1.50000	0.0	3.0
SW21	WINTER	3	0.000	0	0	5.5000	5.0	6.0	1.75000	0.0	5.0
SW21	SPRING	6	0.000	0	0	11.5917	3.2	21.0	1.87500	0.0	7.0
SW21	SUMMER	16	50.188	0	301	25.2175	21.0	29.5	4.67292	0.0	10.0
SW21	FALL	10	2.700	0	11	14.0854	8.7	18.5	3.56250	0.0	10.0
SW22	WINTER	3	0.000	0	0	5.5000	5.0	6.0	2.08333	0.0	6.0
SW22	SPRING	6	0.000	0	0	11.3500	3.2	21.0	2.20833	0.0	7.0
SW22	SUMMER	15	23.133	1	142	25.0933	21.0	29.5	4.75714	0.0	9.5
SW22	FALL	9	0.778	0	4	14.7875	8.7	20.0	3.06250	0.0	10.0
W-11	WINTER	4	0.000	0	0	6.2125	4.0	8.2	1.12500	0.0	3.0
W-11	SPRING	6	0.000	0	0	11.4667	3.2	21.0	2.83333	0.0	7.0
W-11	SUMMER	18	33.444	0	217	25.1004	19.9	28.5	2.73646	0.0	8.0
W-11	FALL	17	2.294	0	14	16.3959	9.1	20.0	1.92353	0.0	6.0
W-12	WINTER	4	0.000	0	0	6.2125	4.0	8.2	1.12500	0.0	3.0
W-12	SPRING	6	0.000	0	0	13.5750	3.2	21.0	2.37500	0.0	7.0
W-12	SUMMER	20	18.800	0	99	25.1113	19.9	28.5	3.07353	0.0	8.0
W-12	FALL	17	2.235	0	16	15.4251	9.1	20.0	1.81078	0.0	6.0
W-21	WINTER	2	0.000	0	0	5.4500	4.0	6.2	0.00000	0.0	0.0
W-21	SPRING	6	0.000	0	0	12.2167	2.6	21.0	1.62500	0.0	4.5
W-21	SUMMER	3	1.333	0	3	25.5167	24.7	26.9	1.50000	0.0	4.0
W-21	FALL	3	0.000	0	0	13.9583	11.0	16.5	1.41667	0.0	2.0
W-22	WINTER	2	0.000	0	0	5.4500	4.0	6.2	0.00000	0.0	0.0
W-22	SPRING	6	0.000	0	0	12.2167	2.6	21.0	1.62500	0.0	4.5
W-22	SUMMER	3	26.667	0	72	25.5167	24.7	26.9	1.50000	0.0	4.0
W-22	FALL	3	0.000	0	0	13.9583	11.0	16.5	1.41667	0.0	2.0
W-31	WINTER	4	0.000	0	0	6.6500	5.3	8.8	0.29167	0.0	1.0
W-31	SPRING	5	0.000	0	0	11.3700	2.8	21.0	1.70000	0.0	4.5
W-31	SUMMER	15	12.467	0	101	25.8567	20.9	29.0	2.31333	0.0	8.0
W-31	FALL	7	2.143	0	9	15.2286	10.0	18.9	1.87500	0.5	4.0
W-32	WINTER	4	0.000	0	0	6.6500	5.3	8.8	0.29167	0.0	1.0
W-32	SPRING	5	0.000	0	0	11.3700	2.8	21.0	1.70000	0.0	4.5
W-32	SUMMER	13	2.385	0	10	25.8500	20.9	29.0	1.86538	0.0	5.0
W-32	FALL	7	0.571	0	4	15.2286	10.0	18.9	1.89286	0.5	4.0

Table 37. - Continued.

C. REGALIS SEASONAL MEAN CATCH PER UNIT EFFORT (N/T)-1975.

LOCATION	SEASON	OBS	CATCH/UNIT EFFORT			TEMPERATURE (C)			SALINITY (PPT)		
			MEAN	MIN	MAX	MEAN	MIN	MAX	MEAN	MIN	MAX
CHA1	SPRING	3	0.000	0	0	13.0500	3.0	22.8	5.86667	1.0	12.0
CHA1	SUMMER	5	16.600	1	46	24.7500	22.0	26.1	5.20000	2.0	9.0
CHA1	FALL	2	1.000	0	2	15.3250	10.3	20.0	4.00000	0.0	9.0
CHA2	WINTER	1	0.000	0	0	6.0000	6.0	6.0	5.75000	5.5	6.0
CHA2	SPRING	3	0.000	0	0	12.3000	3.0	22.8	4.03333	0.0	12.0
CHA2	SUMMER	14	8.500	0	39	24.5429	21.0	28.9	5.05495	0.0	10.0
CHA2	FALL	7	0.000	0	0	14.5000	9.9	20.0	3.75000	1.0	10.0
CHA3	WINTER	1	0.000	0	0	7.6500	7.4	7.9	4.00000	4.0	4.0
CHA3	SPRING	3	0.000	0	0	12.6667	4.0	22.8	2.00000	0.0	6.0
CHA3	SUMMER	4	15.000	1	52	25.3250	24.2	26.2	2.00000	0.0	4.0
CHA3	FALL	3	0.000	0	0	14.2333	11.2	16.5	2.25000	1.0	3.0
CHA4	WINTER	1	0.000	0	0	.	.	5.3	.	.	0.0
CHA4	SPRING	3	0.000	0	0	12.1833	4.0	23.0	1.83333	0.0	6.0
CHA4	SUMMER	13	14.923	0	65	25.6577	20.1	28.2	2.04968	0.0	5.5
CHA4	FALL	8	0.625	0	4	14.8062	10.0	19.0	2.50000	0.5	5.0
CHA5	SPRING	3	0.000	0	0	12.6500	5.0	23.0	0.83333	0.0	3.0
CHA5	SUMMER	5	5.600	0	26	25.2350	21.8	27.0	1.23750	0.0	3.5
CHA5	FALL	2	0.000	0	0	17.4750	15.9	19.0	0.00000	0.0	0.0
E-11	WINTER	4	0.000	0	0	4.0625	1.8	6.0	0.65833	0.0	1.5
E-11	SPRING	8	0.000	0	0	11.7562	1.0	23.5	3.65625	0.0	11.0
E-11	SUMMER	11	23.818	0	91	25.9192	23.0	30.0	4.68687	0.0	9.5
E-11	FALL	5	10.000	0	39	15.5900	11.3	19.0	4.40000	2.0	9.0
E-12	WINTER	4	0.000	0	0	4.0625	1.8	6.0	0.28333	0.0	1.5
E-12	SPRING	8	0.000	0	0	11.9812	1.0	23.5	3.87500	0.0	11.0
E-12	SUMMER	11	104.727	0	915	26.0364	23.0	30.0	4.39773	0.0	9.5
E-12	FALL	4	2.250	0	5	15.2500	11.3	19.0	4.75000	2.0	9.0
E-21	WINTER	5	0.000	0	0	4.7300	1.8	7.7	2.45000	0.0	4.5
E-21	SPRING	8	0.000	0	0	11.8312	1.3	23.5	2.65625	0.0	9.5
E-21	SUMMER	22	31.273	1	142	25.6500	20.9	29.0	4.21591	0.0	9.5
E-21	FALL	16	0.563	0	4	16.1544	9.3	19.6	3.14231	0.0	8.0
E-22	WINTER	5	0.000	0	0	4.7300	1.8	7.7	2.37500	0.0	4.5
E-22	SPRING	7	0.000	0	0	12.9500	1.3	23.5	1.92857	0.0	5.0
E-22	SUMMER	21	14.286	0	193	25.5690	20.9	31.3	4.14286	0.0	9.5
E-22	FALL	13	0.077	0	1	15.9958	9.3	19.6	3.39583	0.0	8.0
E-31	WINTER	4	0.000	0	0	3.3917	2.0	5.5	0.83333	0.0	2.0
E-31	SPRING	7	0.000	0	0	11.1929	2.0	22.8	2.67857	0.0	9.0
E-31	SUMMER	6	23.667	0	101	24.9583	23.0	26.4	2.41667	0.0	7.0
E-31	FALL	4	0.750	0	3	15.6125	11.4	19.6	3.18750	1.0	8.0
E-32	WINTER	4	0.000	0	0	3.3917	2.0	5.5	0.83333	0.0	2.0
E-32	SPRING	7	0.000	0	0	11.1929	2.0	22.8	2.67857	0.0	9.0
E-32	SUMMER	6	15.667	0	74	24.9583	23.0	26.4	2.41667	0.0	7.0
E-32	FALL	4	0.250	0	1	15.6125	11.4	19.6	3.18750	1.0	8.0
E-41	WINTER	4	0.000	0	0	3.3292	2.0	5.1	0.66667	0.0	2.0
E-41	SPRING	7	0.000	0	0	10.9357	2.0	22.8	1.96429	0.0	9.0
E-41	SUMMER	13	6.154	0	24	25.0692	19.1	28.0	2.36538	0.0	6.0
E-41	FALL	9	0.444	0	2	14.5000	9.9	19.0	3.08333	0.5	5.0
E-42	WINTER	4	0.000	0	0	3.3292	2.0	5.1	0.66667	0.0	2.0
E-42	SPRING	7	0.000	0	0	10.9357	2.0	22.8	1.96429	0.0	9.0
E-42	SUMMER	14	14.000	0	94	25.2786	19.1	28.0	2.16071	0.0	6.0
E-42	FALL	9	0.111	0	1	14.5000	9.9	19.0	3.08333	0.5	5.0
E-51	WINTER	4	0.000	0	0	3.3000	1.0	5.3	0.00000	0.0	0.0
E-51	SPRING	5	0.000	0	0	12.6400	2.0	21.6	1.25000	0.0	3.5
E-51	SUMMER	6	2.500	0	8	26.0500	23.9	28.9	1.29167	0.0	4.0
E-51	FALL	1	1.000	1	1	16.2500	16.0	16.5	1.25000	1.0	1.5

Table 38.- C. REGALIS SEASONAL MEAN CATCH PER UNIT EFFORT (N/Y)-1976.

LOCATION	SEASON	GBS	CATCH/UNIT EFFORT			TEMPERATURE (C)			SALINITY (PPT)		
			MEAN	MIN	MAX	MEAN	MIN	MAX	MEAN	MIN	MAX
CHA1	WINTER	1	0.00000	0	0	1.7500	1.5	2.0	9.0000	8	10
CHA1	SPRING	6	0.00000	0	0	15.2800	10.1	19.9	6.0167	1	8
CHA1	SUMMER	8	2.00000	0	8	24.6812	23.5	26.0	11.0625	6	15
CHA1	FALL	6	0.00000	0	0	12.0750	6.0	20.9	10.4167	4	16
CHA2	WINTER	5	0.00000	0	0	2.9500	1.7	6.5	3.6500	0	8
CHA2	SPRING	6	0.00000	0	0	12.6000	7.0	17.4	3.9167	0	10
CHA2	SUMMER	14	3.00000	0	12	25.1071	22.8	28.0	8.2679	4	13
CHA2	FALL	8	0.12500	0	1	15.2437	5.0	20.8	8.3750	3	14
CHA3	WINTER	3	0.00000	0	0	3.8500	2.0	5.3	1.0000	0	2
CHA3	SPRING	6	0.00000	0	0	14.6083	6.6	21.2	3.3333	1	6
CHA3	SUMMER	7	3.14286	0	12	25.2000	24.0	26.5	5.5357	2	10
CHA3	FALL	6	0.33333	0	2	14.4583	7.0	20.1	4.0833	0	9
CHA4	WINTER	3	0.00000	0	0	3.8000	1.0	6.3	0.6667	0	2
CHA4	SPRING	7	0.00000	0	0	13.3274	6.5	21.3	2.0714	0	8
CHA4	SUMMER	12	6.91667	0	30	24.5708	23.2	26.0	4.5000	1	7
CHA4	FALL	10	0.50000	0	4	15.1650	6.5	21.2	4.3500	0	10
CHA5	WINTER	2	0.00000	0	0	2.5000	2.0	3.0	2.5000	2	3
CHA5	SPRING	5	0.00000	0	0	12.9367	7.5	20.0	1.2667	0	5
CHA5	SUMMER	10	1.90000	0	8	24.7672	23.0	26.5	3.2111	1	5
CHA5	FALL	7	0.14286	0	1	13.8500	6.1	22.5	2.4286	0	8
E-11	WINTER	4	0.00000	0	0	2.1958	1.5	5.1	4.0833	0	8
E-11	SPRING	7	0.00000	0	0	13.7833	7.0	20.1	4.6667	2	8
E-11	SUMMER	9	3.88889	0	16	24.6556	22.9	26.9	7.0556	5	9
E-11	FALL	6	0.33333	0	1	13.4000	5.0	22.2	6.9167	3	11
E-12	WINTER	4	0.00000	0	0	2.1958	1.5	5.1	4.0833	0	8
E-12	SPRING	7	0.00000	0	0	13.7833	7.0	20.1	4.0000	0	8
E-12	SUMMER	9	1.11111	0	4	24.6778	22.9	26.9	7.0556	5	9
E-12	FALL	6	0.50000	0	3	13.4417	5.0	22.2	6.9167	3	11
E-21	WINTER	5	0.00000	0	0	2.8200	1.0	4.8	4.1000	0	9
E-21	SPRING	10	0.00000	0	0	12.5911	7.1	22.8	2.8144	0	8
E-21	SUMMER	21	1.90476	0	10	24.6738	22.5	28.8	6.8333	2	10
E-21	FALL	15	0.13333	0	1	16.6200	6.0	24.1	6.8000	0	12
E-22	WINTER	5	0.00000	0	0	2.8200	1.0	4.8	4.1000	0	9
E-22	SPRING	9	0.00000	0	0	13.2354	7.5	22.8	3.1250	0	8
E-22	SUMMER	21	2.00000	0	24	24.6738	22.5	28.8	6.8333	2	10
E-22	FALL	14	0.50000	0	5	17.1000	6.0	24.1	7.2500	0	12
E-31	WINTER	2	0.00000	0	0	2.7000	1.8	3.0	1.5000	1	2
E-31	SPRING	7	0.14286	0	1	13.0167	6.5	22.0	3.6429	0	8
E-31	SUMMER	9	2.88889	0	12	25.0556	22.5	27.5	4.4722	2	7
E-31	FALL	6	0.33333	0	2	12.2083	5.0	19.5	4.1667	0	9
E-32	WINTER	2	0.00000	0	0	2.7000	1.8	3.0	1.5000	1	2
E-32	SPRING	7	0.00000	0	0	13.0167	6.5	22.0	3.3571	0	6
E-32	SUMMER	9	3.22222	0	16	25.0556	22.5	27.5	4.4722	2	7
E-32	FALL	6	0.00000	0	0	12.2083	5.0	19.5	4.1667	0	9
E-41	WINTER	5	0.00000	0	0	3.7800	0.5	7.9	1.7000	0	6
E-41	SPRING	8	0.00000	0	0	13.2786	6.5	21.5	2.5476	0	8
E-41	SUMMER	12	2.58333	0	6	24.5083	23.2	26.0	4.5000	1	7
E-41	FALL	11	0.45455	0	3	15.6000	6.1	21.5	4.8182	0	9
E-42	WINTER	5	0.00000	0	0	3.7800	0.5	7.9	1.7000	0	6
E-42	SPRING	7	0.00000	0	0	13.2786	6.5	21.5	2.9762	1	8
E-42	SUMMER	12	1.16667	0	5	24.4330	23.2	26.0	4.5000	1	7
E-42	FALL	11	0.18182	0	2	15.6000	6.1	21.5	4.8182	0	9
E-51	WINTER	2	0.00000	0	0	3.2750	3.0	3.8	2.0000	2	2
E-51	SPRING	5	0.00000	0	0	14.4125	7.5	22.0	2.3000	0	5

Table 38. - Continued.

C. REGALIS SEASONAL MEAN CATCH PER UNIT EFFORT (N/T)-1976.

LOCATION	SEASON	OBS	CATCH/UNIT EFFORT			TEMPERATURE (C)			SALINITY (PPT)		
			MEAN	MIN	MAX	MEAN	MIN	MAX	MEAN	MIN	MAX
E-51	SUMMER	7	9.0000	0	21	24.8214	23.0	26.8	3.50000	2	5
E-51	FALL	6	0.1667	0	1	12.6667	5.0	22.9	3.15000	0	8
E-52	WINTER	2	0.0000	0	0	3.2750	3.0	3.8	2.00000	2	2
E-52	SPRING	5	0.0000	0	0	14.4125	7.5	22.0	2.30000	0	5
E-52	SUMMER	7	9.8571	0	47	24.8405	23.0	26.8	3.50000	2	5
E-52	FALL	6	0.0000	0	0	12.6667	5.0	22.9	3.08333	0	8
E-61	WINTER	2	0.0000	0	0	2.6750	2.2	3.0	3.75000	3	4
E-61	SPRING	5	0.0000	0	0	12.9300	7.0	19.8	1.80000	0	4
E-61	SUMMER	10	9.5000	0	46	24.5000	22.6	26.1	3.85000	1	6
E-61	FALL	7	0.7143	0	4	13.7143	6.0	22.2	2.50000	0	8
E-62	WINTER	2	0.0000	0	0	2.6750	2.2	3.0	3.75000	3	4
E-62	SPRING	5	0.0000	0	0	12.9300	7.0	19.8	1.80000	0	4
E-62	SUMMER	10	6.5000	0	43	24.5000	22.6	26.1	3.85000	1	6
E-62	FALL	7	0.0000	0	0	13.7143	6.0	22.2	2.50000	0	8
NE11	SPRING	4	0.0000	0	0	14.4750	7.2	22.1	0.87500	0	2
NE11	SUMMER	6	5.6667	0	30	24.6833	23.3	26.0	2.83333	1	4
NE11	FALL	5	1.2000	0	5	13.3400	5.9	21.0	1.00000	0	5
NE12	SPRING	4	0.0000	0	0	14.4750	7.2	22.1	0.87500	0	2
NE12	SUMMER	5	8.2000	1	27	24.5950	23.3	26.0	2.80000	1	4
NE12	FALL	5	1.6000	0	8	13.3400	5.9	21.0	1.00000	0	5
NE21	SPRING	1	0.0000	0	0	14.5000	14.5	14.5	1.00000	1	1
NE21	SUMMER	1	5.0000	5	5	25.0000	25.0	25.0	1.00000	1	1
NE21	FALL	1	0.0000	0	0	7.5000	7.0	8.0	0.00000	0	0
NE22	SPRING	1	0.0000	0	0	14.5000	14.5	14.5	1.00000	1	1
NE22	SUMMER	1	1.0000	1	1	25.0000	25.0	25.0	1.00000	1	1
NE22	FALL	1	0.0000	0	0	7.5000	7.0	8.0	0.00000	0	0
NW11	WINTER	3	0.0000	0	0	3.4167	2.0	5.5	1.83333	0	3
NW11	SPRING	6	0.0000	0	0	12.0583	6.7	20.2	1.01667	0	2
NW11	SUMMER	10	5.0000	0	32	24.9700	23.5	26.2	3.72056	1	6
NW11	FALL	7	0.4286	0	2	14.1143	6.8	23.1	2.50000	0	7
NW12	WINTER	3	0.0000	0	0	3.4167	2.0	5.5	1.63333	0	3
NW12	SPRING	6	0.0000	0	0	12.0583	6.7	20.2	1.01667	0	2
NW12	SUMMER	10	26.0000	0	129	24.9650	23.5	26.2	3.68056	1	6
NW12	FALL	7	1.0000	0	6	14.1214	6.8	23.2	2.50000	0	7
NW21	SPRING	1	0.0000	0	0	14.2500	14.1	14.4	0.00000	0	0
NW21	SUMMER	3	10.6667	5	19	24.9167	24.4	25.5	3.83333	3	4
NW21	FALL	1	0.0000	0	0	8.0000	8.0	8.0	1.00000	1	1
NW22	SPRING	1	0.0000	0	0	14.2500	14.1	14.4	0.00000	0	0
NW22	SUMMER	3	63.6667	17	150	24.9167	24.4	25.5	3.83333	3	4
NW22	FALL	1	0.0000	0	0	8.0000	8.0	8.0	1.00000	1	1
RI11	WINTER	3	0.0000	0	0	4.3333	2.0	7.0	1.33333	0	2
RI11	SPRING	7	0.0000	0	0	14.3200	6.2	19.7	2.10000	2	3
RI11	SUMMER	9	5.0000	0	24	24.9944	23.1	26.8	5.02778	2	9
RI11	FALL	6	0.0000	0	0	13.8950	7.0	22.5	4.70000	0	8
RI12	WINTER	3	0.0000	0	0	4.3333	2.0	7.0	1.33333	0	2
RI12	SPRING	6	0.0000	0	0	14.3200	6.2	19.7	2.10000	2	3
RI12	SUMMER	9	1.8889	0	5	24.9944	23.1	26.8	5.10069	2	9
RI12	FALL	6	0.1667	0	1	13.8950	7.0	22.5	4.78333	0	8
RI21	WINTER	3	0.0000	0	0	4.5000	2.0	7.0	0.83333	0	2
RI21	SPRING	7	0.0000	0	0	15.7250	6.2	22.3	2.00000	0	4
RI21	SUMMER	11	6.8182	0	29	24.9864	23.0	26.6	4.75000	1	8
RI21	FALL	6	0.3333	0	2	14.3667	6.0	23.9	4.41667	0	8
RI22	WINTER	3	0.0000	0	0	4.5000	2.0	7.0	0.83333	0	2
RI22	SPRING	7	0.0000	0	0	15.7250	6.2	22.3	2.00000	0	4

Table 38 . - Continued.

C. REGALIS SEASONAL MEAN CATCH PER UNIT EFFORT (N/T)-1976.

LOCATION	SEASON	OBS	CATCH/UNIT EFFORT			TEMPERATURE (C)			SALINITY (PPT)		
			MEAN	MIN	MAX	MEAN	MIN	MAX	MEAN	MIN	MAX
R122	SUMMER	12	5.6667	0	21	25.0083	23.0	26.5	5.0625	1.0	9.5
R122	FALL	6	0.0000	0	0	14.3667	6.0	23.9	4.4167	0.0	8.0
SE01	WINTER	1	0.0000	0	0	5.5000	5.0	6.0	2.0000	2.0	2.0
SE01	SPRING	6	0.1367	0	1	13.5250	9.2	19.1	8.5000	4.0	12.0
SE01	SUMMER	5	19.2000	5	35	24.4500	23.0	25.0	12.4500	10.0	14.0
SE01	FALL	7	1.7143	0	10	10.8143	5.9	19.7	11.2857	6.0	17.0
SE02	WINTER	1	0.0000	0	0	5.5000	5.0	6.0	2.0000	2.0	2.0
SE02	SPRING	5	0.0000	0	0	14.3000	10.0	19.1	8.5000	4.0	12.0
SE02	SUMMER	5	8.2000	3	20	24.4500	23.0	25.0	12.4500	10.0	14.0
SE02	FALL	6	0.0000	0	0	9.3417	5.9	17.8	10.8333	6.0	17.0
SE11	WINTER	2	0.0000	0	0	3.7000	2.0	5.5	4.7500	2.0	8.0
SE11	SPRING	6	0.0000	0	0	14.8333	6.2	19.8	6.5000	5.0	11.0
SE11	SUMMER	8	38.2500	0	211	24.6542	23.0	27.0	11.2813	9.0	13.0
SE11	FALL	8	1.0000	0	5	12.0562	5.0	20.7	10.8750	7.0	15.0
SE12	WINTER	2	0.0000	0	0	3.7000	2.0	5.5	4.7500	2.0	8.0
SE12	SPRING	5	0.0000	0	0	14.4700	6.2	19.0	6.8750	5.0	11.0
SE12	SUMMER	8	4.3750	0	8	24.5196	23.0	27.0	11.2813	9.0	13.0
SE12	FALL	7	0.5714	0	2	10.8357	5.0	20.0	10.2857	7.0	15.0
SE21	SPRING	4	0.0000	0	0	14.8958	10.2	18.5	5.5000	4.0	7.0
SE21	SUMMER	6	30.6667	0	114	24.8667	23.4	26.5	9.6417	8.0	12.0
SE21	FALL	4	0.2500	0	1	13.5750	5.5	20.5	9.5000	6.0	13.0
SE22	SPRING	4	0.0000	0	0	14.8958	10.2	18.5	5.5000	4.0	7.0
SE22	SUMMER	6	3.3333	0	9	24.8667	23.4	26.5	9.7250	8.0	12.0
SE22	FALL	4	2.0000	0	4	13.5750	5.5	20.5	9.5000	6.0	13.0
SE31	WINTER	5	0.0000	0	0	3.7200	1.0	6.8	1.3000	0.0	7.0
SE31	SPRING	8	0.0000	0	0	13.1937	7.0	19.8	4.5714	0.0	8.0
SE31	SUMMER	16	6.0000	0	29	24.7594	22.9	28.0	8.8438	5.0	11.0
SE31	FALL	11	0.7273	0	5	14.5182	4.0	20.8	8.1364	3.0	13.0
SE32	WINTER	5	0.0000	0	0	3.7200	1.0	6.8	1.3000	0.0	7.0
SE32	SPRING	6	0.0000	0	0	14.1833	7.0	19.8	5.0000	0.0	8.0
SE32	SUMMER	16	3.6250	0	19	24.7312	22.9	28.0	8.8438	5.0	11.0
SE32	FALL	11	0.1818	0	2	14.5182	4.0	20.8	8.1364	3.0	13.0
SSC1	WINTER	9	0.0000	0	0	3.1083	0.2	6.0	3.2292	0.0	9.0
SSC1	SPRING	16	0.0000	0	0	13.1980	4.6	22.9	3.1844	0.0	8.0
SSC1	SUMMER	29	15.4483	0	248	24.6603	22.3	29.0	7.6652	3.0	10.0
SSC1	FALL	20	3.2000	0	20	16.2975	6.0	22.5	7.3000	0.0	11.0
SSC2	WINTER	9	0.0000	0	0	3.1905	0.2	6.0	3.2292	0.0	9.0
SSC2	SPRING	16	0.1250	0	2	13.2250	4.6	22.9	3.3344	0.0	8.0
SSC2	SUMMER	29	13.7931	0	176	24.6603	22.3	29.0	7.6652	3.0	10.0
SSC2	FALL	20	2.0000	0	12	16.2975	6.0	22.5	7.3000	0.0	11.0
SW11	WINTER	1	0.0000	0	0	3.0000	2.5	3.5	5.7500	5.5	6.0
SW11	SPRING	4	0.0000	0	0	15.0750	10.8	17.8	4.2500	2.0	6.0
SW11	SUMMER	7	14.4286	0	38	25.0500	23.5	26.0	10.6429	6.0	15.0
SW11	FALL	4	0.7500	0	3	11.1750	6.0	18.2	8.0000	4.0	13.0
SW12	WINTER	1	0.0000	0	0	3.0000	2.5	3.5	5.7500	5.5	6.0
SW12	SPRING	5	0.0000	0	0	14.2500	10.8	17.8	4.4500	2.0	6.0
SW12	SUMMER	8	7.2500	0	28	25.0312	23.5	26.0	10.1563	6.0	15.0
SW12	FALL	5	5.8000	0	18	13.0500	6.0	20.7	9.4000	4.0	15.0
SW21	WINTER	6	0.0000	0	0	3.5583	1.0	6.5	2.5000	0.0	9.0
SW21	SPRING	8	0.0000	0	0	14.1375	7.0	20.5	3.0000	0.0	7.0
SW21	SUMMER	15	12.0000	0	53	25.0900	23.3	28.0	7.6667	3.0	12.0
SW21	FALL	11	5.9091	0	42	14.5409	4.9	21.1	7.6813	3.0	14.0
SW22	WINTER	6	0.0000	0	0	3.5583	1.0	6.5	2.5000	0.0	9.0
SW22	SPRING	8	0.1250	0	1	14.1375	7.0	20.5	3.0000	0.0	7.0

Table 38 . - Continued.

C. REGALIS SEASONAL MEAN CATCH PER UNIT EFFORT (N/T)-1976.

LOCATION	SEASON	OBS	CATCH/UNIT EFFORT			TEMPERATURE (C)			SALINITY (PPT)		
			MEAN	MIN	MAX	MEAN	MIN	MAX	MEAN	MIN	MAX
SW22	SUMMER	15	4.6667	0	20	25.0900	23.3	28.0	7.76667	3	14
SW22	FALL	11	0.9091	0	5	14.5409	4.9	21.1	7.63636	3	14
W-11	WINTER	5	0.0000	0	0	2.9200	0.5	4.9	3.57500	0	8
W-11	SPRING	12	0.0000	0	0	15.0767	7.1	23.0	1.56667	0	8
W-11	SUMMER	21	11.1429	0	83	24.9786	23.3	28.0	5.73690	2	10
W-11	FALL	15	3.6667	0	22	17.0133	5.9	23.0	5.80000	0	13
W-12	WINTER	5	0.0000	0	0	2.9200	0.5	4.9	3.57500	0	8
W-12	SPRING	11	0.0000	0	0	14.5864	7.1	23.0	1.70707	0	8
W-12	SUMMER	21	4.5238	0	29	25.0000	23.3	28.0	5.73690	2	10
W-12	FALL	16	1.3125	0	7	16.5594	5.9	23.0	5.43750	0	13
W-21	WINTER	2	0.0000	0	0	2.1750	1.8	3.0	2.50000	2	4
W-21	SPRING	5	0.0000	0	0	13.1000	6.5	17.5	0.75000	0	2
W-21	SUMMER	9	5.2222	0	29	25.7722	24.1	27.0	3.80556	2	5
W-21	FALL	7	0.2857	0	2	16.1357	6.0	23.0	4.44048	0	7
W-22	WINTER	2	0.0000	0	0	2.1750	1.8	3.0	2.50000	2	4
W-22	SPRING	5	0.0000	0	0	13.1000	6.5	17.5	0.75000	0	2
W-22	SUMMER	9	7.5556	0	40	25.7167	24.1	27.0	3.80556	2	5
W-22	FALL	7	1.7143	0	10	16.1357	6.0	23.0	4.44048	0	7
W-31	WINTER	5	0.0000	0	0	3.6175	1.2	7.0	1.02500	0	4
W-31	SPRING	8	0.0000	0	0	14.0312	6.5	21.3	0.78571	0	4
W-31	SUMMER	12	5.5000	0	13	24.6792	23.2	26.1	4.12500	2	6
W-31	FALL	10	2.9000	0	14	15.6467	6.5	21.4	4.38333	0	7
W-32	WINTER	5	0.0000	0	0	3.6175	1.2	7.0	1.02500	0	4
W-32	SPRING	8	0.0000	0	0	14.0312	6.5	21.3	0.82143	0	4
W-32	SUMMER	12	5.2500	0	14	24.7000	23.2	26.1	4.12500	2	6
W-32	FALL	10	0.2000	0	1	15.6467	6.5	21.4	4.38333	0	7

Table 39 . - A chronological summary of temperature avoidance studies on weakfish, Cynoscion regalis. All tests were conducted at near air-saturated levels of dissolved oxygen and pH of 7 to 8.

DATE	REPLICATE	NO. OF FISH PER TEST	SIZE RANGE (TL IN MM)		SALINITY (PPT)	LIGHT LEVEL (FOOT (LUX) CANDLES)		ACCLIMATION TEMPERATURE (C) (F)		AVOIDANCE TEMPERATURE (C) (F)	
CYNOSCIION REGALIS											
30 JUN 70	1	4	41	63	4	215	20.0	21	69	24	75
6 OCT 71	1	3	120	134	4.5	215	20.0	21	69	24	75
	2	4	115	139	4.5	215	20.0	21	69	24	75
1 AUG 74	1	4	40	110	7	215	20.0	27	80	29	84
2 OCT 74	1	2	122	141	6.5	215	20.0	18	64	27	80
10 JUL 75	1	3	86	97	5.5	215	20.0	23	73	28	82
	2	4	63	75	5.5	215	20.0	23	73	28	82
21 JUL 75	1	3	90	100	5.5	215	20.0	24	75	29	84
	2	3	60	70	5.5	215	20.0	24	75	29	84
23 JUL 75	1	4	67	84	5.5	21.5	2.0	24	75	30	86
20 AUG 75	1	3	85	100	7	215	20.0	28	82	30	86
	2	3	97	111	7	215	20.0	28	82	29	84
22 JUL 76	1	4	36	60	3.5	215	20.0	27	80	30	86
	2	3	45	54	3.5	215	20.0	27	80	31	87

Table 39 . - Continued.

DATE	REPLICATE	NO. OF FISH PER TEST	SIZE RANGE (TL IN MM)		SALINITY (PPT)	LIGHT LEVEL (FOOT (LUX) CANDLES)		ACCLIMATION TEMPERATURE (C) (F)		AVOIDANCE TEMPERATURE (C) (F)	
			MIN.	MAX.							
CYNOSCIION REGALIS											
27 JUL 76	1	4	51	68	3.5	215	20.0	26	78	29	84
	2	4	67	94	3.5	215	20.0	26	78	30	86
30 JUL 76	1	4	60	74	4	215	20.0	28	82	28	82
	2	4	70	96	4	215	20.0	28	82	29	84
4 AUG 76	1	3	60	77	4.5	215	20.0	26	78	29.4	84
	2	4	66	90	4.5	215	20.0	26	78	31.7	89
5 AUG 76	1	3	63	78	4.5	21.5	2.0	26	78	31.1	87
	2	3	51	72	4.5	21.5	2.0	26	78	31.1	87
6 AUG 76	1	4	62	89	9.5	215	20.0	27	80	29.4	84
	2	4	60	79	9.5	215	20.0	27	80	30.6	87
12 AUG 76	1	4	75	92	9	215	20.0	27	80	30	86
	2	4	55	88	9	215	20.0	27	80	30	86
24 AUG 76	1	3	72	87	4	215	20.0	27	80	29.4	84
	2	3	86	90	4	215	20.0	27	80	29.4	84
16 SEP 76	1	4	110	118	5	215	20.0	23	73	28.3	82
24 SEP 76	1	3	80	136	5	215	20.0	23	73	27.8	82
	2	3	86	106	5	215	20.0	23	73	26.7	80

Table 39 . - Continued.

DATE	REPLICATE	NO. OF FISH PER TEST	SIZE RANGE (TL IN MM)		SALINITY (PPT)	LIGHT LEVEL (FOOT (LUX) CANDLES)		ACCLIMATION TEMPERATURE		AVOIDANCE TEMPERATURE	
			MIN.	MAX.				(C)	(F)	(C)	(F)
CYNOSCIION REGALIS											
1 OCT 76	1	4	102	135	5	21.5	2.0	20	68	25.6	78
7 OCT 76	1	3	99	114	10	215	20.0	22	71	28.9	84
	2	3	64	110	10	215	20.0	22	71	28.9	84
13 OCT 76	1	3	32	52	10	215	20.0	17	62	26.7	80
	2	4	104	146	10	215	20.0	17	62	26.7	80
22 JUN 77	1	4	28	36	7	215	20.0	25	77	33	91
	2	4	21	34	7	215	20.0	25	77	33	91
23 JUN 77	1	3	21	36	7	21.5	2.0	25	77	32	89
	2	3	24	30	7	21.5	2.0	25	77	32	89
30 JUN 77	1	4	33	44	7	21.5	2.0	27	80	32	89
	2	4	36	48	7	21.5	2.0	27	80	31	87
7 JUL 77	1	4	45	50	7	21.5	2.0	29	84	33	91
	2	4	35	44	7	21.5	2.0	29	84	33	91
12 JUL 77	1	3	53	76	7	215	20.0	30	86	34	93
	2	3	52	62	7	215	20.0	30	86	37	98
28 JUL 77	1	4	80	98	7.5	215	20.0	26	78	30	86
	2	4	75	102	7.5	215	20.0	26	78	33	91

Table 39. - Continued.

DATE.	REPLICATE	NO. OF FISH PER TEST	SIZE RANGE (TL IN MM)		SALINITY (PPT)	LIGHT LEVEL (FOOT (LUX) CANDLES)		ACCLIMATION TEMPERATURE		AVOIDANCE TEMPERATURE	
			MIN.	MAX.		(C)	(F)	(C)	(F)		
CYNOSCIION REGALIS											
10 AUG 77	1	4	80	106	10.5	215	20.0	31	87	34	93
	2	3	68	106	10.5	215	20.0	31	87	34	93
16 AUG 77	1	3	50	75	10.5	215	20.0	27	80	30	86
	2	3	47	61	10.5	215	20.0	27	80	32	89
24 AUG 77	1	3	32	36	10.5	215	20.0	25	77	29	84
	2	3	26	34	10.5	215	20.0	25	77	29	84
31 AUG 77	1	3	39	56	8.5	215	20.0	25	77	32	89
	2	3	38	48	8.5	215	20.0	25	77	33	91
22 SEP 77	1	3	109	142	10	215	20.0	16	60	25	77
	2	3	111	118	10	215	20.0	16	60	24	75
28 SEP 77	1	3	104	115	10	215	20.0	21	69	30	86
	2	3	124	140	10	215	20.0	21	69	30	86

Table 40. - Components for the multiple linear regression equation to estimate avoidance temperatures (C) for the weakfish, Cynoscion regalis.

* = Significant at P.05 or greater; and ** = significant at P.01 or greater.

Constant (a) = 16.560		F(3, 58) = 37.436**			N = 62
Standard Error of Estimate = 1.610		R = 0.812**			R ² = 0.659
<u>Variable (Xi)</u>	<u>Mean (Xi)</u>	<u>Correlation (r) With Y</u>	<u>Regression Coefficient (bi)</u>	<u>Standard Error of bi</u>	<u>Standardized Reg. Coef.</u>
Acclimation Temperature (C)	24.9	0.749**	0.514**	0.068	0.667
Salinity (ppt)	7.1	0.181	0.261**	0.086	0.234
Total Length (mm)	74.0	-0.545**	-0.020*	0.008	0.221

Table 41. - L. XANTHURUS SEASONAL MEAN CATCH PER UNIT EFFORT (N/T)-1975.

LOCATION	SEASON	OBS	CATCH/UNIT EFFORT			TEMPERATURE (C)			SALINITY (PPT)		
			MEAN	MIN	MAX	MEAN	MIN	MAX	MEAN	MIN	MAX
CHA1	SPRING	3	0.000	0	0	13.0500	3.0	22.8	5.86667	1.0	12.0
CHA1	SUMMER	5	0.000	0	0	24.7500	22.0	26.1	5.20000	2.0	9.0
CHA1	FALL	2	0.000	0	0	15.3250	10.3	20.0	4.00000	0.0	9.0
CHA2	WINTER	1	0.000	0	0	6.0000	6.0	6.0	5.75000	5.5	6.0
CHA2	SPRING	3	0.000	0	0	12.3000	3.0	22.8	4.03333	0.0	12.0
CHA2	SUMMER	14	0.284	0	4	24.5429	21.0	28.9	5.05495	0.0	10.0
CHA2	FALL	7	0.143	0	1	14.5000	9.9	20.0	3.75000	1.0	10.0
CHA3	WINTER	1	0.000	0	0	7.6500	7.4	7.9	4.00000	4.0	4.0
CHA3	SPRING	3	0.000	0	0	12.6667	4.0	22.8	2.00000	0.0	6.0
CHA3	SUMMER	4	0.500	0	2	25.3250	24.2	26.2	2.00000	0.0	4.0
CHA3	FALL	3	0.333	0	1	14.2333	11.2	16.5	2.25000	1.0	3.0
CHA4	WINTER	1	0.000	0	0	.	.	5.3	.	.	0.0
CHA4	SPRING	3	0.000	0	0	12.1833	4.0	23.0	1.83333	0.0	6.0
CHA4	SUMMER	13	0.538	0	4	25.6577	20.1	28.2	2.04968	0.0	5.5
CHA4	FALL	8	0.250	0	1	14.8062	10.0	19.0	2.50000	0.5	5.0
CHA5	SPRING	3	0.000	0	0	12.6500	5.0	23.0	0.83333	0.0	3.0
CHA5	SUMMER	5	0.600	0	3	25.2350	21.8	27.0	1.23750	0.0	3.5
CHA5	FALL	2	0.500	0	1	17.4750	15.9	19.0	0.00000	0.0	0.0
E-11	WINTER	4	0.250	0	1	4.0625	1.8	6.0	0.65833	0.0	1.5
E-11	SPRING	8	2.500	0	13	11.7562	1.0	23.5	3.65625	0.0	11.0
E-11	SUMMER	11	20.634	1	74	25.9192	23.0	30.0	4.68687	0.0	9.5
E-11	FALL	5	45.600	5	74	15.5900	11.3	19.0	4.40000	2.0	9.0
E-12	WINTER	4	1.000	0	4	4.0625	1.8	6.0	0.28333	0.0	1.5
E-12	SPRING	8	0.125	0	1	11.9812	1.0	23.5	3.87500	0.0	11.0
E-12	SUMMER	11	0.818	0	7	26.0364	23.0	30.0	4.39773	0.0	9.5
E-12	FALL	4	3.000	0	11	15.2500	11.3	19.0	4.75000	2.0	9.0
E-21	WINTER	5	0.000	0	0	4.7300	1.8	7.7	2.45000	0.0	4.5
E-21	SPRING	8	6.875	0	32	11.8312	1.3	23.5	2.65625	0.0	9.5
E-21	SUMMER	22	2.409	0	11	25.6500	20.9	29.0	4.21591	0.0	9.5
E-21	FALL	16	1.500	0	9	16.1544	9.3	19.6	3.14231	0.0	8.0
E-22	WINTER	5	0.000	0	0	4.7300	1.8	7.7	2.37500	0.0	4.5
E-22	SPRING	7	0.571	0	2	12.9500	1.3	23.5	1.92857	0.0	5.0
E-22	SUMMER	21	0.524	0	9	25.5690	20.9	31.3	4.14286	0.0	9.5
E-22	FALL	13	0.000	0	0	15.9958	9.3	19.6	3.39583	0.0	8.0
E-31	WINTER	4	0.000	0	0	3.3917	2.0	5.5	0.83333	0.0	2.0
E-31	SPRING	7	1.857	0	13	11.1929	2.0	22.8	2.67857	0.0	9.0
E-31	SUMMER	6	5.000	0	23	24.9583	23.0	26.4	2.41667	0.0	7.0
E-31	FALL	4	13.000	2	38	15.6125	11.4	19.6	3.18750	1.0	8.0
E-32	WINTER	4	0.000	0	0	3.3917	2.0	5.5	0.83333	0.0	2.0
E-32	SPRING	7	0.000	0	0	11.1929	2.0	22.8	2.67857	0.0	9.0
E-32	SUMMER	6	0.167	0	1	24.9583	23.0	26.4	2.41667	0.0	7.0
E-32	FALL	4	0.250	0	1	15.6125	11.4	19.6	3.18750	1.0	8.0
E-41	WINTER	4	0.000	0	0	3.3292	2.0	5.1	0.66667	0.0	2.0
E-41	SPRING	7	23.857	0	167	10.9357	2.0	22.8	1.96429	0.0	9.0
E-41	SUMMER	13	8.615	0	42	25.0692	19.1	28.0	2.36538	0.0	6.0
E-41	FALL	9	9.000	0	38	14.5000	9.9	19.0	3.08333	0.5	5.0
E-42	WINTER	4	0.000	0	0	3.3292	2.0	5.1	0.66667	0.0	2.0
E-42	SPRING	7	0.000	0	0	10.9357	2.0	22.8	1.96429	0.0	9.0
E-42	SUMMER	14	0.357	0	2	25.2784	19.1	28.0	2.16071	0.0	6.0
E-42	FALL	9	0.889	0	3	14.5000	9.9	19.0	3.08333	0.5	5.0
E-51	WINTER	4	0.000	0	0	3.3000	1.0	5.3	0.00000	0.0	0.0
E-51	SPRING	5	11.600	0	58	12.6400	2.0	21.6	1.25000	0.0	3.5
E-51	SUMMER	6	71.500	8	208	26.0500	23.9	28.9	1.29167	0.0	4.0
E-51	FALL	1	137.000	137	137	16.2500	16.0	16.5	1.25000	1.0	1.5

Table 41. - Continued.

L. XANTHURUS SEASONAL MEAN CATCH PER UNIT EFFORT (N/T)-1975.

LOCATION	SEASON	OBS	CATCH/UNIT EFFORT			TEMPERATURE (C)			SALINITY (PPT)		
			MEAN	MIN	MAX	MEAN	MIN	MAX	MEAN	MIN	MAX
E-52	WINTER	4	0.0000	0	0	3.3000	1.0	5.3	0.00000	0.0	0.0
E-52	SPRING	5	0.4000	0	2	12.1800	2.0	21.6	0.65000	0.0	3.5
E-52	SUMMER	7	0.8571	0	3	25.7214	23.5	28.9	1.29167	0.0	4.0
E-52	FALL	1	1.0000	1	1	16.2500	14.0	16.5	1.25000	1.0	1.5
E-61	WINTER	4	0.0000	0	0	3.3000	1.0	5.3	0.00000	0.0	0.0
E-61	SPRING	5	2.0000	0	10	12.1100	2.0	21.6	0.65000	0.0	3.5
E-61	SUMMER	7	34.2857	2	95	25.4821	21.8	28.9	1.07738	0.0	4.0
E-61	FALL	2	83.0000	61	105	17.3750	15.5	19.0	0.00000	0.0	0.0
E-62	WINTER	4	0.0000	0	0	3.3000	1.0	5.3	0.00000	0.0	0.0
E-62	SPRING	5	0.6000	0	3	12.1100	2.0	21.6	0.65000	0.0	3.5
E-62	SUMMER	7	0.4286	0	2	25.4821	21.8	28.9	1.07738	0.0	4.0
E-62	FALL	2	2.0000	2	2	17.3750	15.5	19.0	0.00000	0.0	0.0
NE11	SPRING	3	4.3333	0	13	18.3667	9.9	24.3	1.08333	0.0	3.5
NE11	SUMMER	6	65.1667	3	159	25.5667	22.8	27.5	0.75000	0.0	3.0
NE12	SPRING	3	3.0000	0	9	18.3667	9.9	24.3	1.08333	0.0	3.5
NE12	SUMMER	6	7.6667	0	15	25.5667	22.8	27.5	0.75000	0.0	3.0
NE12	FALL	1	20.0000	20	20	16.8500	14.7	17.0	0.50000	0.0	1.0
NW11	WINTER	2	0.0000	0	0	5.9500	5.3	7.5	0.00000	0.0	0.0
NW11	SPRING	7	0.5714	0	4	12.9786	3.0	23.0	1.07143	0.0	4.5
NW11	SUMMER	5	2.6000	0	11	25.3625	23.0	26.8	1.76250	0.0	3.5
NW11	FALL	2	5.0000	1	9	18.3500	14.5	20.0	0.00000	0.0	0.0
NW12	WINTER	2	0.0000	0	0	5.9500	5.3	7.5	0.00000	0.0	0.0
NW12	SPRING	5	0.0000	0	0	13.4600	3.0	23.0	1.20000	0.0	4.5
NW12	SUMMER	4	2.0000	0	8	24.9958	23.0	26.5	1.39583	0.0	3.5
NW12	FALL	2	8.0000	3	13	18.3500	14.5	20.0	0.25000	0.0	1.0
RI11	SPRING	2	3.5000	0	7	18.1750	13.8	23.0	2.25000	1.5	3.0
RI11	SUMMER	3	0.3333	0	1	26.4167	24.5	28.5	3.08333	0.0	6.5
RI12	SPRING	2	0.0000	0	0	18.1750	13.8	23.0	2.25000	1.5	3.0
RI12	SUMMER	3	0.3333	0	1	26.4167	24.5	28.5	3.08333	0.0	6.5
RI21	SPRING	1	3.0000	3	3	22.5000	22.0	23.0	2.75000	2.5	3.0
RI21	SUMMER	3	1.0000	0	3	26.0333	24.5	27.0	2.16667	0.0	3.5
RI22	SPRING	1	1.0000	1	1	22.5000	22.0	23.0	2.75000	2.5	3.0
RI22	SUMMER	3	0.0000	0	0	26.0333	24.5	27.0	2.16667	0.0	3.5
SE01	SPRING	5	0.0000	0	0	16.9400	9.4	21.8	8.70000	6.5	12.0
SE01	SUMMER	8	0.7500	0	3	25.5875	23.8	29.5	8.65625	0.0	14.0
SE02	SPRING	5	0.0000	0	0	17.5400	9.4	21.8	8.78000	6.5	12.0
SE02	SUMMER	9	0.3333	0	3	25.5222	23.8	29.5	8.69444	0.0	14.0
SE11	SPRING	5	0.2000	0	1	16.5500	9.4	21.0	6.80000	3.5	12.0
SE11	SUMMER	11	10.1818	0	92	25.3636	22.3	28.0	8.00273	0.0	14.0
SE11	FALL	3	1.6667	0	4	16.3500	10.0	20.5	6.25000	3.5	11.0
SE12	SPRING	5	0.6000	0	3	16.5500	9.5	21.0	6.60000	3.5	10.0
SE12	SUMMER	11	0.2727	0	3	25.3636	22.3	28.0	8.02273	0.0	14.0
SE12	FALL	3	0.0000	0	0	16.3500	10.0	20.5	6.25000	3.5	11.0
SE21	SPRING	5	0.6000	0	3	16.4600	9.9	21.0	5.10000	3.0	8.0
SE21	SUMMER	9	2.5556	0	18	25.2889	23.5	27.5	5.39236	0.0	10.5
SE21	FALL	2	7.0000	2	12	20.1250	20.0	20.5	6.87500	3.5	9.0
SE22	SPRING	5	0.0000	0	0	16.4600	9.9	21.0	5.10000	3.0	8.0
SE22	SUMMER	9	0.2222	0	2	25.2889	23.5	27.5	5.39236	0.0	10.5
SE22	FALL	2	0.5000	0	1	20.1250	20.0	20.5	6.87500	3.5	9.0
SE31	WINTER	3	0.0000	0	0	5.5333	4.2	6.0	2.16667	0.0	5.5
SE31	SPRING	8	1.3750	0	7	11.2071	1.0	23.0	4.50000	0.0	11.0
SE31	SUMMER	19	17.7895	0	117	24.6830	20.1	28.1	5.30186	0.0	10.5
SE31	FALL	10	18.0000	0	71	15.4200	8.9	20.0	4.50000	1.0	9.0
SE32	WINTER	3	0.0000	0	0	5.5333	4.2	6.0	2.16667	0.0	5.5

Table 41 . - Continued.

L. XANTHURUS SEASONAL MEAN CATCH PER UNIT EFFORT (N/T)-1975.

LOCATION	SEASON	OBS	CATCH/UNIT EFFORT			TEMPERATURE (C)			SALINITY (FPT)		
			MEAN	MIN	MAX	MEAN	MIN	MAX	MEAN	MIN	MAX
SE32	SPRING	8	0.2500	0	1	11.2071	1.0	23.0	4.50000	0.0	11.0
SE32	SUMMER	19	2.0554	0	25	24.7172	20.1	28.1	5.57668	2.0	10.5
SE32	FALL	9	0.8889	0	4	15.9444	11.0	20.0	4.75000	1.0	9.0
SSC1	WINTER	8	5.5000	0	44	4.9271	0.2	12.0	3.72857	0.0	6.0
SSC1	SPRING	11	27.2727	0	298	12.7295	1.3	21.9	2.02597	0.0	9.0
SSC1	SUMMER	25	25.6800	0	200	25.2775	20.3	29.8	5.67708	0.0	9.0
SSC1	FALL	20	49.3000	0	330	14.2408	9.8	20.0	4.04500	1.0	9.0
SSC2	WINTER	8	6.5000	0	46	5.0521	0.2	12.0	3.72857	0.0	6.0
SSC2	SPRING	11	16.5455	0	126	12.7295	1.3	21.9	2.02597	0.0	9.0
SSC2	SUMMER	24	44.5000	0	520	25.1286	20.3	29.8	5.65465	0.0	9.0
SSC2	FALL	21	56.4286	0	322	16.2918	9.8	20.0	3.91465	1.0	9.0
SW11	SUMMER	4	3.2500	0	11	24.7292	22.0	27.8	6.37500	2.0	9.0
SW11	FALL	3	8.6667	0	14	17.8167	10.6	23.8	3.58333	0.0	8.0
SW12	SUMMER	1	0.0000	0	0	22.2500	22.0	22.5	9.00000	9.0	9.0
SW12	FALL	2	8.0000	0	16	15.2750	10.6	20.0	1.50000	0.0	3.0
SW21	WINTER	3	0.3333	0	1	5.5000	5.0	6.0	1.75000	0.0	5.0
SW21	SPRING	6	6.6667	0	40	11.5917	3.2	21.0	1.87500	0.0	7.0
SW21	SUMMER	16	3.5000	0	35	25.2175	21.0	29.5	4.67292	0.0	10.0
SW21	FALL	10	9.2000	0	23	14.0854	8.7	18.5	3.56250	0.0	10.0
SW22	WINTER	3	0.0000	0	0	5.5000	5.0	6.0	2.08333	0.0	6.0
SW22	SPRING	6	0.0000	0	0	11.3500	3.2	21.0	2.20833	0.0	7.0
SW22	SUMMER	15	0.2667	0	2	25.0933	21.0	29.5	4.75714	0.0	9.5
SW22	FALL	9	1.4444	0	5	14.7875	8.7	20.0	3.06250	0.0	10.0
W-11	WINTER	4	2.0000	0	8	6.2125	4.0	8.2	1.12500	0.0	3.0
W-11	SPRING	6	0.3333	0	2	11.4667	3.2	21.0	2.83333	0.0	7.0
W-11	SUMMER	18	50.0554	2	272	25.1004	19.9	28.5	2.73646	0.0	8.0
W-11	FALL	17	16.7059	0	80	16.5033	9.1	20.0	1.92353	0.0	6.0
W-12	WINTER	4	0.2500	0	1	6.2125	4.0	8.2	1.12500	0.0	3.0
W-12	SPRING	6	0.3333	0	2	13.5750	3.2	21.0	2.37500	0.0	7.0
W-12	SUMMER	20	10.0000	0	66	25.1113	19.9	28.5	3.07353	0.0	8.0
W-12	FALL	17	6.5882	0	47	15.4251	9.1	20.0	1.81078	0.0	6.0
W-21	WINTER	2	0.0000	0	0	5.4500	4.0	6.2	0.00000	0.0	0.0
W-21	SPRING	6	0.0000	0	0	12.2167	2.6	21.0	1.62500	0.0	4.5
W-21	SUMMER	3	23.0000	3	34	25.5167	24.7	26.9	1.50000	0.0	4.0
W-21	FALL	3	26.6667	21	30	13.9583	11.0	16.5	1.41667	0.0	2.0
W-22	WINTER	2	0.0000	0	0	5.4500	4.0	6.2	0.00000	0.0	0.0
W-22	SPRING	6	0.0000	0	0	12.2167	2.6	21.0	1.62500	0.0	4.5
W-22	SUMMER	3	0.6667	0	2	25.5167	24.7	26.9	1.50000	0.0	4.0
W-22	FALL	3	11.6667	2	26	13.9583	11.0	16.5	1.41667	0.0	2.0
W-31	WINTER	4	1.2500	0	5	6.6500	5.3	8.8	0.29167	0.0	1.0
W-31	SPRING	5	0.0000	0	0	11.3700	2.8	21.0	1.70000	0.0	4.5
W-31	SUMMER	16	29.9375	1	132	25.9281	20.9	29.0	2.38125	0.0	8.0
W-31	FALL	7	32.8571	15	73	15.2286	10.0	18.9	1.87500	0.5	4.0
W-32	WINTER	4	0.0000	0	0	6.6500	5.3	8.8	0.29167	0.0	1.0
W-32	SPRING	5	0.0000	0	0	11.3700	2.8	21.0	1.70000	0.0	4.5
W-32	SUMMER	13	0.2308	0	3	25.8500	20.9	29.0	1.86538	0.0	5.0
W-32	FALL	7	8.4286	0	28	15.2286	10.0	18.9	1.89286	0.5	4.0

Table 42. - L. XANTHURUS SEASONAL MEAN CATCH PER UNIT EFFORT (N/T)-1976.

LOCATION	SEASON	OBS	CATCH/UNIT EFFORT			TEMPERATURE (C)			SALINITY (PPT)		
			MEAN	MIN	MAX	MEAN	MIN	MAX	MEAN	MIN	MAX
CHA1	WINTER	1	0.000	0	0	1.7500	1.5	2.0	9.0000	8	10
CHA1	SPRING	6	1.833	0	7	15.2800	10.1	19.9	6.0167	1	8
CHA1	SUMMER	8	0.000	0	0	24.6812	23.5	26.0	11.0625	6	15
CHA1	FALL	6	8.333	0	49	12.0750	6.0	20.9	10.4167	4	16
CHA2	WINTER	5	0.000	0	0	2.9500	1.7	6.5	3.6500	0	8
CHA2	SPRING	6	4.000	0	22	12.6000	7.0	17.4	3.9167	0	10
CHA2	SUMMER	14	0.071	0	1	25.1071	22.8	28.0	8.2679	4	13
CHA2	FALL	8	0.000	0	0	15.2437	5.0	20.8	8.3750	3	14
CHA3	WINTER	3	0.000	0	0	3.8500	2.0	5.3	1.0000	0	2
CHA3	SPRING	6	0.667	0	2	14.6083	6.6	21.2	3.3333	1	6
CHA3	SUMMER	7	0.286	0	2	25.2000	24.0	26.5	5.5357	2	10
CHA3	FALL	6	0.000	0	0	14.4583	7.0	20.1	4.0833	0	9
CHA4	WINTER	3	0.000	0	0	3.8000	1.0	6.3	0.6667	0	2
CHA4	SPRING	7	3.429	0	9	13.3274	6.5	21.3	2.0714	0	8
CHA4	SUMMER	12	0.250	0	3	24.5708	23.2	26.0	4.5000	1	7
CHA4	FALL	10	7.200	0	71	15.1650	6.5	21.2	4.3500	0	10
CHA5	WINTER	2	0.000	0	0	2.5000	2.0	3.0	2.5000	2	3
CHA5	SPRING	5	4.200	0	11	12.9367	7.5	20.0	1.2667	0	3
CHA5	SUMMER	10	1.400	0	8	24.7672	23.0	26.5	3.2111	1	5
CHA5	FALL	7	0.143	0	1	13.8500	6.1	22.5	2.4286	0	8
E-11	WINTER	4	0.000	0	0	2.1958	1.5	5.1	4.0833	0	8
E-11	SPRING	7	561.571	0	3780	13.7833	7.0	20.1	4.6667	2	8
E-11	SUMMER	9	177.111	0	599	24.6556	22.9	26.9	7.0556	5	9
E-11	FALL	6	5.333	0	16	13.4000	5.0	22.2	6.9167	3	11
E-12	WINTER	4	0.000	0	0	2.1958	1.5	5.1	4.0833	0	8
E-12	SPRING	7	4.714	0	22	13.7833	7.0	20.1	4.0000	0	8
E-12	SUMMER	10	3.100	0	20	24.6050	22.9	26.9	7.0500	5	9
E-12	FALL	6	0.333	0	1	13.4417	5.0	22.2	6.9167	3	11
E-21	WINTER	5	0.000	0	0	2.8200	1.0	4.8	4.1000	0	9
E-21	SPRING	10	15.200	0	70	12.5911	7.1	22.8	2.8144	0	8
E-21	SUMMER	21	7.619	0	123	24.6738	22.5	28.8	6.8333	2	10
E-21	FALL	16	0.563	0	3	16.2000	6.0	24.1	6.4063	0	12
E-22	WINTER	5	0.000	0	0	2.8200	1.0	4.8	4.1000	0	9
E-22	SPRING	9	3.556	0	10	13.2354	7.5	22.8	3.1250	0	8
E-22	SUMMER	21	0.571	0	9	24.6738	22.5	28.8	6.8333	2	10
E-22	FALL	14	0.286	0	4	17.1000	6.0	24.1	7.2500	0	12
E-31	WINTER	2	0.000	0	0	2.7000	1.8	3.0	1.5000	1	2
E-31	SPRING	7	12.286	0	67	13.0167	6.5	22.0	3.6429	0	8
E-31	SUMMER	9	19.111	0	141	25.0556	22.5	27.5	4.4722	2	7
E-31	FALL	6	0.833	0	3	12.2083	5.0	19.5	4.1667	0	9
E-32	WINTER	2	0.000	0	0	2.7000	1.8	3.0	1.5000	1	2
E-32	SPRING	7	11.143	0	38	13.0167	6.5	22.0	3.3571	0	6
E-32	SUMMER	9	1.776	0	13	25.0556	22.5	27.5	4.4722	2	7
E-32	FALL	6	0.667	0	2	12.2083	5.0	19.5	4.1667	0	9
E-41	WINTER	5	0.000	0	0	3.7800	0.5	7.9	1.7000	0	6
E-41	SPRING	8	12.000	0	36	13.2786	6.5	21.5	2.5476	0	8
E-41	SUMMER	12	3.750	0	32	24.5083	23.2	26.0	4.5000	1	7
E-41	FALL	11	1.000	0	8	15.6000	6.1	21.5	4.8182	0	9
E-42	WINTER	5	0.000	0	0	3.7800	0.5	7.9	1.7000	0	6
E-42	SPRING	7	6.286	0	25	13.2786	6.5	21.5	2.9762	1	8
E-42	SUMMER	12	0.000	0	0	24.4330	23.2	26.0	4.5000	1	7
E-42	FALL	11	1.000	0	10	15.6000	6.1	21.5	4.8182	0	9
E-51	WINTER	2	0.000	0	0	3.2750	3.0	3.8	2.0000	2	2
E-51	SPRING	5	34.400	0	151	14.4125	7.5	22.0	2.3000	0	5

Table 42 . - Continued.

L. XANTHURUS SEASONAL MEAN CATCH PER UNIT EFFORT (N/T)-1976.

LOCATION	SEASON	OBS	CATCH/UNIT EFFORT			TEMPERATURE (C)			SALINITY (PPT)		
			MEAN	MIN	MAX	MEAN	MIN	MAX	MEAN	MIN	MAX
E-51	SUMMER	7	69.429	2	172	24.8214	23.0	26.8	3.50000	2	5
E-51	FALL	6	10.333	0	47	12.6667	5.0	22.9	3.15000	0	8
E-52	WINTER	2	0.000	0	0	3.2750	3.0	3.8	2.00000	2	2
E-52	SPRING	5	43.200	0	213	14.4125	7.5	22.0	2.30000	0	5
E-52	SUMMER	7	1.143	0	5	24.8405	23.0	26.8	3.50000	2	5
E-52	FALL	6	0.500	0	3	12.6667	5.0	22.9	3.08333	0	8
E-61	WINTER	2	0.000	0	0	2.6750	2.2	3.0	3.75000	3	4
E-61	SPRING	5	28.600	0	101	12.9300	7.0	19.8	1.80000	0	4
E-61	SUMMER	10	67.600	0	252	24.5000	22.6	26.1	3.85000	1	6
E-61	FALL	7	29.714	0	101	13.7143	6.0	22.2	2.50000	0	8
E-62	WINTER	2	0.000	0	0	2.6750	2.2	3.0	3.75000	3	4
E-62	SPRING	5	5.800	0	16	12.9300	7.0	19.8	1.80000	0	4
E-62	SUMMER	10	30.500	0	278	24.5000	22.6	26.1	3.85000	1	6
E-62	FALL	7	1.429	0	9	13.7143	6.0	22.2	2.50000	0	8
NE11	SPRING	4	122.500	0	481	14.4750	7.2	22.1	0.87500	0	2
NE11	SUMMER	6	49.833	1	228	24.6833	23.3	26.0	2.83333	1	4
NE11	FALL	5	29.600	0	101	13.3400	5.9	21.0	1.00000	0	5
NE12	SPRING	4	80.750	0	300	14.4750	7.2	22.1	0.87500	0	2
NE12	SUMMER	5	41.400	0	166	24.5950	23.3	26.0	2.80000	1	4
NE12	FALL	5	7.400	0	21	13.3400	5.9	21.0	1.00000	0	5
NE21	SPRING	1	1.000	1	1	14.5000	14.5	14.5	1.00000	1	1
NE21	SUMMER	1	1.000	1	1	25.0000	25.0	25.0	1.00000	1	1
NE21	FALL	1	0.000	0	0	7.5000	7.0	8.0	0.00000	0	0
NE22	SPRING	1	0.000	0	0	14.5000	14.5	14.5	1.00000	1	1
NE22	SUMMER	1	1.000	1	1	25.0000	25.0	25.0	1.00000	1	1
NE22	FALL	1	1.000	1	1	7.5000	7.0	8.0	0.00000	0	0
NW11	WINTER	3	0.000	0	0	3.4167	2.0	5.5	1.83333	0	3
NW11	SPRING	6	2.833	0	13	12.0583	6.7	20.2	1.01667	0	2
NW11	SUMMER	10	19.100	0	147	24.9700	23.5	26.2	3.72056	1	6
NW11	FALL	7	0.429	0	1	14.1143	6.8	23.1	2.50000	0	7
NW12	WINTER	3	0.000	0	0	3.4167	2.0	5.5	1.83333	0	3
NW12	SPRING	6	31.000	0	176	12.0583	6.7	20.2	1.01667	0	2
NW12	SUMMER	10	62.900	0	545	24.9650	23.5	26.2	3.68056	1	6
NW12	FALL	7	9.000	0	57	14.1214	6.8	23.2	2.50000	0	7
NW21	SPRING	1	0.000	0	0	14.2500	14.1	14.4	0.00000	0	0
NW21	SUMMER	3	21.333	0	62	24.9167	24.4	25.5	3.83333	3	4
NW21	FALL	1	0.000	0	0	8.0000	8.0	8.0	1.00000	1	1
NW22	SPRING	1	18.000	18	18	14.2500	14.1	14.4	0.00000	0	0
NW22	SUMMER	3	63.000	0	182	24.9167	24.4	25.5	3.83333	3	4
NW22	FALL	1	2.000	2	2	8.0000	8.0	8.0	1.00000	1	1
RI11	WINTER	3	0.000	0	0	4.3333	2.0	7.0	1.33333	0	2
RI11	SPRING	7	11.429	0	46	14.3200	6.2	19.7	2.10000	2	3
RI11	SUMMER	9	0.333	0	3	24.9944	23.1	26.8	5.02778	2	9
RI11	FALL	6	0.833	0	3	13.8950	7.0	22.5	4.70000	0	8
RI12	WINTER	3	0.000	0	0	4.3333	2.0	7.0	1.33333	0	2
RI12	SPRING	6	4.500	0	14	14.3200	6.2	19.7	2.10000	2	3
RI12	SUMMER	9	0.000	0	0	24.9944	23.1	26.8	5.10069	2	9
RI12	FALL	6	0.167	0	1	13.8950	7.0	22.5	4.78333	0	8
RI21	WINTER	3	0.000	0	0	4.5000	2.0	7.0	0.83333	0	2
RI21	SPRING	7	17.429	0	61	15.7250	6.2	22.3	2.00000	0	4
RI21	SUMMER	11	27.455	0	231	24.9864	23.0	26.6	4.75000	1	8
RI21	FALL	6	0.333	0	1	14.3667	6.0	23.9	4.41667	0	8
RI22	WINTER	3	0.000	0	0	4.5000	2.0	7.0	0.83333	0	2
RI22	SPRING	7	10.000	0	58	15.7250	6.2	22.3	2.00000	0	4

Table 42 . - Continued.

L. XANTHURUS SEASONAL MEAN CATCH PER UNIT EFFORT (N/T)-1976.

LOCATION	SEASON	ODS	CATCH/UNIT EFFORT			TEMPERATURE (C)			SALINITY (PPT)		
			MEAN	NIN	MAX	MEAN	MIN	MAX	MEAN	MIN	MAX
RI22	SUMMER	12	0.167	0	1	25.0083	23.0	26.5	5.0625	1.0	9.5
RI22	FALL	6	0.000	0	0	14.3667	6.0	23.9	4.4167	0.0	8.0
SE01	WINTER	1	0.000	0	0	5.5000	5.0	6.0	2.0000	2.0	2.0
SE01	SPRING	6	12.833	0	55	13.5250	9.2	19.1	8.5000	4.0	12.0
SE01	SUMMER	5	2.400	0	7	24.4500	23.0	25.0	12.4500	10.0	14.0
SE01	FALL	7	1.286	0	2	10.8143	5.9	19.7	11.2857	6.0	17.0
SE02	WINTER	1	0.000	0	0	5.5000	5.0	6.0	2.0000	2.0	2.0
SE02	SPRING	5	14.200	0	69	14.3000	10.0	19.1	8.5000	4.0	12.0
SE02	SUMMER	5	0.200	0	1	24.4500	23.0	25.0	12.4500	10.0	14.0
SE02	FALL	6	0.833	0	4	9.3417	5.9	17.8	10.8333	6.0	17.0
SE11	WINTER	2	0.000	0	0	3.7000	2.0	5.5	4.7500	2.0	8.0
SE11	SPRING	6	50.500	0	230	14.8333	6.2	19.8	6.5000	5.0	11.0
SE11	SUMMER	8	12.625	0	61	24.6562	23.0	27.0	11.2813	9.0	13.0
SE11	FALL	8	0.500	0	2	12.0562	5.0	20.7	10.8750	7.0	15.0
SE12	WINTER	2	0.000	0	0	3.7000	2.0	5.5	4.7500	2.0	8.0
SE12	SPRING	5	3.000	0	8	14.4700	6.2	19.0	6.8750	5.0	11.0
SE12	SUMMER	8	0.250	0	1	24.5194	23.0	27.0	11.2813	9.0	13.0
SE12	FALL	7	0.000	0	0	10.8357	5.0	20.0	10.2857	7.0	15.0
SE21	SPRING	4	13.500	0	47	14.8958	10.2	18.5	5.5000	4.0	7.0
SE21	SUMMER	6	5.000	0	25	24.8667	23.4	26.5	9.6417	8.0	12.0
SE21	FALL	4	6.000	0	20	13.5750	5.5	20.5	9.5000	6.0	13.0
SE22	SPRING	4	7.750	0	27	14.8958	10.2	18.5	5.5000	4.0	7.0
SE22	SUMMER	6	0.500	0	1	24.8667	23.4	26.5	9.7250	8.0	12.0
SE22	FALL	4	0.250	0	1	13.5750	5.5	20.5	9.5000	6.0	13.0
SE31	WINTER	5	0.000	0	0	3.7200	1.0	6.8	1.3000	0.0	7.0
SE31	SPRING	8	7.750	0	30	13.1937	7.0	19.8	4.5714	0.0	8.0
SE31	SUMMER	16	10.813	0	66	24.7594	22.9	28.0	8.8438	5.0	11.0
SE31	FALL	11	4.091	0	13	14.5182	4.0	20.8	8.1364	3.0	13.0
SE32	WINTER	5	0.000	0	0	3.7200	1.0	6.8	1.3000	0.0	7.0
SE32	SPRING	6	7.333	0	33	14.1833	7.0	19.8	5.0000	0.0	8.0
SE32	SUMMER	16	0.250	0	2	24.7312	22.9	28.0	8.8438	5.0	11.0
SE32	FALL	11	0.273	0	2	14.5182	4.0	20.8	8.1364	3.0	13.0
SSC1	WINTER	9	0.000	0	0	3.1083	0.2	6.0	3.2292	0.0	9.0
SSC1	SPRING	16	156.625	0	1380	13.1980	4.6	22.9	3.1844	0.0	8.0
SSC1	SUMMER	29	73.241	0	730	24.6603	22.3	29.0	7.6652	3.0	10.0
SSC1	FALL	20	29.700	0	120	16.2975	6.0	22.5	7.3000	0.0	11.0
SSC2	WINTER	9	0.000	0	0	3.1905	0.2	6.0	3.2292	0.0	9.0
SSC2	SPRING	16	97.000	0	860	13.2250	4.6	22.9	3.3344	0.0	8.0
SSC2	SUMMER	29	68.690	0	786	24.6603	22.3	29.0	7.6652	3.0	10.0
SSC2	FALL	20	21.500	0	130	16.2975	6.0	22.5	7.3000	0.0	11.0
SW11	WINTER	1	0.000	0	0	3.0000	2.5	3.5	5.7500	5.5	6.0
SW11	SPRING	4	36.250	0	110	15.0750	10.8	17.8	4.2500	2.0	6.0
SW11	SUMMER	7	2.857	0	9	25.0500	23.5	26.0	10.6429	6.0	15.0
SW11	FALL	4	40.500	1	119	11.1750	6.0	18.2	8.0000	4.0	13.0
SW12	WINTER	1	0.000	0	0	3.0000	2.5	3.5	5.7500	5.5	6.0
SW12	SPRING	5	27.800	0	138	14.2500	10.8	17.8	4.4500	2.0	6.0
SW12	SUMMER	8	6.750	0	54	25.0312	23.5	26.0	10.1563	6.0	15.0
SW12	FALL	5	2.800	0	9	13.0600	6.0	20.7	9.4000	4.0	15.0
SW21	WINTER	6	0.000	0	0	3.5583	1.0	6.5	2.5000	0.0	9.0
SW21	SPRING	8	33.500	0	128	14.1375	7.0	20.5	3.0000	0.0	7.0
SW21	SUMMER	15	10.467	0	94	25.0900	23.3	28.0	7.6667	3.0	12.0
SW21	FALL	11	12.091	0	90	14.5409	4.9	21.1	7.6818	3.0	14.0
SW22	WINTER	6	0.000	0	0	3.5583	1.0	6.5	2.5000	0.0	9.0
SW22	SPRING	8	5.000	0	37	14.1375	7.0	20.5	3.0000	0.0	7.0

Table 42 . - Continued.

L. XANTHURUS SEASONAL MEAN CATCH PER UNIT EFFORT (N/T)-1976.

LOCATION	SEASON	OBS	CATCH/UNIT EFFORT			TEMPERATURE (C)			SALINITY (PPT)		
			MEAN	MIN	MAX	MEAN	MIN	MAX	MEAN	MIN	MAX
SW22	SUMMER	15	0.1333	0	1	25.0900	23.3	28.0	7.76667	3	14
SW22	FALL	11	0.6364	0	3	14.5409	4.9	21.1	7.63636	3	14
W-11	WINTER	5	0.0000	0	0	2.9200	0.5	4.9	3.57500	0	8
W-11	SPRING	12	10.2500	0	47	15.0767	7.1	23.0	1.56667	0	8
W-11	SUMMER	22	15.5455	0	90	24.9318	23.3	28.0	5.74892	2	10
W-11	FALL	15	9.0667	0	29	17.0133	5.9	23.0	5.80000	0	13
W-12	WINTER	5	0.0000	0	0	2.9200	0.5	4.9	3.57500	0	8
W-12	SPRING	11	19.0000	0	145	14.5864	7.1	23.0	1.70707	0	8
W-12	SUMMER	21	20.6667	0	188	25.0000	23.3	28.0	5.73690	2	10
W-12	FALL	16	4.8750	0	34	16.5594	5.9	23.0	5.43750	0	13
W-21	WINTER	2	0.0000	0	0	2.1750	1.8	3.0	2.50000	2	4
W-21	SPRING	5	1.0000	0	4	13.1000	6.5	17.5	0.75000	0	2
W-21	SUMMER	9	51.6667	1	120	25.7722	24.1	27.0	3.80556	2	5
W-21	FALL	7	6.8571	0	22	16.1357	6.0	23.0	4.44048	0	7
W-22	WINTER	2	0.0000	0	0	2.1750	1.8	3.0	2.50000	2	4
W-22	SPRING	5	10.0000	0	41	13.1000	6.5	17.5	0.75000	0	2
W-22	SUMMER	9	9.1111	0	56	25.7167	24.1	27.0	3.80556	2	5
W-22	FALL	7	7.5714	0	20	16.1357	6.0	23.0	4.44048	0	7
W-31	WINTER	5	0.0000	0	0	3.6175	1.2	7.0	1.02500	0	4
W-31	SPRING	8	18.5000	0	75	14.0312	6.5	21.3	0.78571	0	4
W-31	SUMMER	12	24.9167	1	73	24.6792	23.2	26.1	4.12500	2	6
W-31	FALL	10	13.6000	0	54	15.6467	6.5	21.4	4.38333	0	7
W-32	WINTER	5	0.0000	0	0	3.6175	1.2	7.0	1.02500	0	4
W-32	SPRING	8	12.2500	0	52	14.0312	6.5	21.3	0.82143	0	4
W-32	SUMMER	12	0.3333	0	4	24.7000	23.2	26.1	4.12500	2	6
W-32	FALL	10	0.4000	0	3	15.6467	6.5	21.4	4.38333	0	7

Table 43 . - A chronological summary of temperature avoidance studies on spot, Leiostomus xanthurus. All tests were conducted at near air-saturated levels of dissolved oxygen and pH of 7 to 8.

DATE	REPLICATE	NO. OF FISH PER TEST	SIZE RANGE (TL IN MM)		SALINITY (PPT)	LIGHT LEVEL (FOOT (LUX) CANDLES)		ACCLIMATION TEMPERATURE (C) (F)		AVOIDANCE TEMPERATURE (C) (F)	
LEIOSTOMUS XANTHURUS											
7 OCT 71	1	4	116	139	4.5	215	20.0	20	68	26	78
	2	4	112	136	4.5	215	20.0	20	68	26	78
2 AUG 74	1	4	58	71	7	215	20.0	27	80	30	86
	2	4	57	81	7	215	20.0	27	80	30	86
16 AUG 74	1	4	117	138	7	21.5	2.0	26	78	30	86
	2	4	98	120	7	21.5	2.0	26	78	33	91
31 OCT 74	1	4	102	120	6	215	20.0	13	55	22	71
	2	4	110	130	6	215	20.0	13	55	27	80
5 AUG 75	1	3	69	80	5.5	215	20.0	27	80	31	87
	2	3	74	79	5.5	215	20.0	27	80	30	86
26 AUG 75	1	3	110	120	7	215	20.0	28	82	31	87
	2	3	108	118	7	215	20.0	28	82	33	91
6 OCT 75	1	4	75	87	6	215	20.0	20	68	27	80
	2	4	75	102	6	215	20.0	20	68	27	80
7 OCT 75	1	3	76	103	6	215	20.0	20	68	26	78
	2	3	75	81	6	215	20.0	20	68	24	75
31 OCT 75	1	3	87	96	6	215	20.0	18	64	26	78
	2	3	82	87	6	215	20.0	18	64	28	82

Table 43. - Continued.

DATE	REPLICATE	NO. OF FISH PER TEST	SIZE RANGE (TL IN MM)		SALINITY (PPT)	LIGHT LEVEL (FOOT (LUX) CANDLES)		ACCLIMATION TEMPERATURE (C) (F)		AVOIDANCE TEMPERATURE (C) (F)	
			MIN.	MAX.							
LEIOSTOMUS XANTHURUS											
26 NOV 75	1	4	73	82	3.5	215	20.0	14	57	28	82
	2	4	84	93	3.5	215	20.0	14	57	22	71
4 MAY 76	1	4	42	47	4.5	215	20.0	16	60	27	80
	2	4	38	48	4.5	215	20.0	16	60	28	82
5 MAY 76	1	4	36	46	4.5	21.5	2.0	16	60	26	78
	2	4	36	44	4.5	21.5	2.0	16	60	26	78
27 MAY 76	1	4	46	69	6	215	20.0	16	60	31	87
	2	4	36	65	6	215	20.0	16	60	28	82
2 JUN 76	1	4	40	42	5.5	21.5	2.0	21	69	30	86
	2	4	44	60	5.5	21.5	2.0	21	69	30	86
13 AUG 76	1	4	81	89	9	215	20.0	28	82	30.6	87
	2	4	91	114	9	215	20.0	28	82	30.6	87
17 AUG 76	1	3	108	120	8	215	20.0	25	77	27.8	82
	2	3	82	86	8	215	20.0	25	77	27.8	82
18 AUG 76	1	4	84	108	8	21.5	2.0	25	77	31.7	89
	2	4	58	77	8	21.5	2.0	25	77	31.7	89
20 AUG 76	1	4	61	70	8.5	215	20.0	26	78	32.8	91
	2	4	75	93	8.5	215	20.0	26	78	32.8	91

Table 43. - Continued.

DATE	REPLICATE	NO. OF FISH PER TEST	SIZE RANGE (TL IN MM)		SALINITY (PPT)	LIGHT LEVEL (FOOT (LUX) CANDLES)		ACCLIMATION TEMPERATURE		AVOIDANCE TEMPERATURE	
			MIN.	MAX.				(C)	(F)	(C)	(F)
LEIDOSTOMUS XANTHURUS											
10 SEP 76	1	4	71	98	4.5	21.5	2.0	24	75	28.9	84
1 OCT 76	1	4	96	122	5	215	20.0	20	68	28.3	82
2 NOV 76	1	3	112	115	7	215	20.0	10	50	18.9	66
	2	3	92	111	7	215	20.0	10	50	18.9	66
4 NOV 76	1	4	101	121	7	215	20.0	10	50	23.9	75
6 APR 77	1	4	21	24	6.5	215	20.0	12	53	20	68
	2	4	23	29	6.5	215	20.0	12	53	20	68
20 APR 77	1	4	26	31	6	215	20.0	15	59	26	78
	2	4	27	30	6	215	20.0	15	59	28	82
4 MAY 77	1	4	36	50	7	215	20.0	19	66	22	71
	2	4	36	52	7	215	20.0	19	66	27	80
5 MAY 77	1	6	41	48	7	21.5	2.0	17	62	29	84
	2	4	41	53	7	21.5	2.0	17	62	29	84
13 MAY 77	1	4	41	57	7	215	20.0	18	64	30	86
	2	4	47	65	7	215	20.0	18	64	28	82

Table 43 . - Continued.

DATE	REPLICATE	NO. OF FISH PER TEST	SIZE RANGE (TL IN MM)		SALINITY (PPT)	LIGHT LEVEL (FOOT (LUX) CANDLES)		ACCLIMATION TEMPERATURE (C) (F)		AVOIDANCE TEMPERATURE (C) (F)	
LEIOSTOMUS XANTHURUS											
19 MAY 77	1	4	30	32	7	215	20.0	22	71	29	84
	2	4	33	58	7	215	20.0	22	71	28	82
24 MAY 77	1	4	25	31	7	215	20.0	24	75	27	80
	2	4	25	31	7	215	20.0	24	75	29	84
27 MAY 77	1	4	27	35	7	21.5	2.0	24	75	27	80
	2	4	34	42	7	21.5	2.0	24	75	28	82
9 JUN 77	1	3	46	55	7	21.5	2.0	21	69	31	87
	2	3	51	59	7	21.5	2.0	21	69	31	87
19 JUL 77	1	4	65	78	8.5	215	20.0	30	86	34	93
	2	4	61	78	8.5	215	20.0	30	86	34	93
26 JUL 77	1	4	92	102	8	215	20.0	27	80	30	86
	2	4	94	109	8	215	20.0	27	80	32	89
27 JUL 77	1	4	90	100	8	215	20.0	26	78	31.5	88
	2	4	104	122	8	215	20.0	26	78	31.5	88
25 AUG 77	1	3	70	106	8.5	21.5	2.0	24	75	34	93
	2	3	102	125	8.5	21.5	2.0	24	75	32	89

Table 44. - Components for the multiple linear regression equation to estimate avoidance temperatures (C) for the spot, Leiostomus xanthurus.

* = Significant at P.05 or greater; and ** = significant at P.01 or greater.

Constant (a) = 18.843

F(2, 62) = 56.270**

N = 65

Standard Error of Estimate = 2.195

R = 0.803**

R² = 0.645

<u>Variable (Xi)</u>	<u>Mean ($\bar{X}_i$)</u>	<u>Correlation (r) With Y</u>	<u>Regression Coefficient (bi)</u>	<u>Standard Error (bi)</u>	<u>Standardized Reg. Coef.</u>
Acclimation Temperature (C)	21.0	0.785**	0.509**	0.051	0.767
Light Level (lux)	170.3	-0.250*	-0.007*	0.003	-0.157

Table 45. - T. MACULATUS SEASONAL MEAN CATCH PER UNIT EFFORT (N/T)-1975.

LOCATION	SEASON	OBS	CATCH/UNIT EFFORT			TEMPERATURE (C)			SALINITY (PPT)		
			MEAN	MIN	MAX	MEAN	MIN	MAX	MEAN	MIN	MAX
CHA1	SPRING	3	0.0000	0	0	13.0500	3.0	22.8	5.86667	1.0	12.0
CHA1	SUMMER	5	0.0000	0	0	24.7500	22.0	26.1	5.20000	2.0	9.0
CHA1	FALL	2	0.0000	0	0	15.3250	10.3	20.0	4.00000	0.0	9.0
CHA2	WINTER	1	0.0000	0	0	6.0000	6.0	6.0	5.75000	5.5	6.0
CHA2	SPRING	3	0.0000	0	0	12.3000	3.0	22.8	4.03333	0.0	12.0
CHA2	SUMMER	14	0.0000	0	0	24.5429	21.0	28.9	5.05495	0.0	10.0
CHA2	FALL	7	0.4286	0	3	14.5000	9.9	20.0	3.75000	1.0	10.0
CHA3	WINTER	1	0.0000	0	0	7.6500	7.4	7.9	4.00000	4.0	4.0
CHA3	SPRING	3	0.0000	0	0	12.6667	4.0	22.8	2.00000	0.0	6.0
CHA3	SUMMER	4	0.0000	0	0	25.3250	24.2	26.2	2.00000	0.0	4.0
CHA3	FALL	3	0.0000	0	0	14.2333	11.2	16.5	2.25000	1.0	3.0
CHA4	WINTER	1	0.0000	0	0	.	.	5.3	.	.	0.0
CHA4	SPRING	3	0.0000	0	0	12.1833	4.0	23.0	1.83333	0.0	6.0
CHA4	SUMMER	13	0.0000	0	0	25.6577	20.1	28.2	2.04968	0.0	5.5
CHA4	FALL	8	0.0000	0	0	14.8062	10.0	19.0	2.50000	0.5	5.0
CHA5	SPRING	3	0.0000	0	0	12.6500	5.0	23.0	0.83333	0.0	3.0
CHA5	SUMMER	5	0.0000	0	0	25.2350	21.8	27.0	1.23750	0.0	3.5
CHA5	FALL	2	0.0000	0	0	17.4750	15.9	19.0	0.00000	0.0	0.0
E-11	WINTER	4	0.0000	0	0	4.0625	1.8	6.0	0.65833	0.0	1.5
E-11	SPRING	8	2.0000	0	13	11.7562	1.0	23.5	3.65625	0.0	11.0
E-11	SUMMER	11	11.1818	0	96	25.9192	23.0	30.0	4.68687	0.0	9.5
E-11	FALL	5	5.2000	0	14	15.5900	11.3	19.0	4.40000	2.0	9.0
E-12	WINTER	4	0.2500	0	1	4.0625	1.8	6.0	0.28333	0.0	1.5
E-12	SPRING	8	3.3750	0	19	11.9812	1.0	23.5	3.87500	0.0	11.0
E-12	SUMMER	11	2.0909	0	8	26.0364	23.0	30.0	4.39773	0.0	9.5
E-12	FALL	4	7.7500	1	17	15.2500	11.3	19.0	4.75000	2.0	9.0
E-21	WINTER	5	0.2000	0	1	4.7300	1.8	7.7	2.45000	0.0	4.5
E-21	SPRING	8	1.8750	0	7	11.8312	1.3	23.5	2.65625	0.0	9.5
E-21	SUMMER	22	1.1818	0	4	25.6500	20.9	29.0	4.21591	0.0	9.5
E-21	FALL	16	1.6250	0	7	16.1544	9.3	19.6	3.14231	0.0	8.0
E-22	WINTER	5	0.0000	0	0	4.7300	1.8	7.7	2.37500	0.0	4.5
E-22	SPRING	7	0.0000	0	0	12.9500	1.3	23.5	1.92857	0.0	5.0
E-22	SUMMER	21	0.0000	0	0	25.5690	20.9	31.3	4.14286	0.0	9.5
E-22	FALL	13	0.1538	0	1	15.9958	9.3	19.6	3.39583	0.0	8.0
E-31	WINTER	4	0.0000	0	0	3.3917	2.0	5.5	0.83333	0.0	2.0
E-31	SPRING	7	1.5714	0	7	11.1929	2.0	22.8	2.67857	0.0	9.0
E-31	SUMMER	6	1.1667	0	3	24.9583	23.0	26.4	2.41667	0.0	7.0
E-31	FALL	4	8.2500	0	13	15.6125	11.4	19.6	3.18750	1.0	8.0
E-32	WINTER	4	0.0000	0	0	3.3917	2.0	5.5	0.83333	0.0	2.0
E-32	SPRING	7	0.0000	0	0	11.1929	2.0	22.8	2.67857	0.0	9.0
E-32	SUMMER	6	0.0000	0	0	24.9583	23.0	26.4	2.41667	0.0	7.0
E-32	FALL	4	0.2500	0	1	15.6125	11.4	19.6	3.18750	1.0	8.0
E-41	WINTER	4	0.7500	0	2	3.3292	2.0	5.1	0.66667	0.0	2.0
E-41	SPRING	7	3.0000	0	13	10.9357	2.0	22.8	1.96429	0.0	9.0
E-41	SUMMER	13	1.1538	0	5	25.0692	19.1	28.0	2.36538	0.0	6.0
E-41	FALL	9	3.2222	0	7	14.5000	9.9	19.0	3.08333	0.5	5.0
E-42	WINTER	4	0.0000	0	0	3.3292	2.0	5.1	0.66667	0.0	2.0
E-42	SPRING	7	0.0000	0	0	10.9357	2.0	22.8	1.96429	0.0	9.0
E-42	SUMMER	14	0.1429	0	2	25.2786	19.1	28.0	2.16071	0.0	6.0
E-42	FALL	9	0.4444	0	2	14.5000	9.9	19.0	3.08333	0.5	5.0
E-51	WINTER	4	1.0000	0	4	3.3000	1.0	5.3	0.00000	0.0	0.0
E-51	SPRING	5	0.6000	0	2	12.6400	2.0	21.6	1.25000	0.0	3.5
E-51	SUMMER	6	18.0000	1	35	26.0500	23.9	28.9	1.29167	0.0	4.0
E-51	FALL	1	78.0000	78	78	16.2500	16.0	16.5	1.25000	1.0	1.5

Table 45 . - Continued.

T. MACULATUS SEASONAL MEAN CATCH PER UNIT EFFORT (N/T)-1975.

LOCATION	SEASON	OBS	CATCH/UNIT EFFORT			TEMPERATURE (C)			SALINITY (PPT)		
			MEAN	MIN	MAX	MEAN	MIN	MAX	MEAN	MIN	MAX
E-52	WINTER	4	0.0000	0	0	3.3000	1.0	5.3	0.00000	0.0	0.0
E-52	SPRING	5	2.4000	0	10	12.1800	2.0	21.6	0.65000	0.0	3.5
E-52	SUMMER	7	0.5714	0	4	25.7214	23.5	28.9	1.29167	0.0	4.0
E-52	FALL	1	3.0000	3	3	16.2500	16.0	16.5	1.25000	1.0	1.5
E-61	WINTER	4	0.0000	0	0	3.3000	1.0	5.3	0.00000	0.0	0.0
E-61	SPRING	5	0.2000	0	1	12.1100	2.0	21.6	0.65000	0.0	3.5
E-61	SUMMER	7	10.2857	1	26	25.4821	21.8	28.9	1.07738	0.0	4.0
E-61	FALL	2	30.5000	22	39	17.3750	15.5	19.0	0.00000	0.0	0.0
E-62	WINTER	4	0.0000	0	0	3.3000	1.0	5.3	0.00000	0.0	0.0
E-62	SPRING	5	2.4000	0	12	12.1100	2.0	21.6	0.65000	0.0	3.5
E-62	SUMMER	7	0.4286	0	2	25.4821	21.8	28.9	1.07738	0.0	4.0
E-62	FALL	2	1.5000	0	3	17.3750	15.5	19.0	0.00000	0.0	0.0
NE11	SPRING	3	2.0000	0	6	18.3667	9.9	24.3	1.08333	0.0	3.5
NE11	SUMMER	6	2.8333	0	6	25.5667	22.8	27.5	0.75000	0.0	3.0
NE12	SPRING	3	4.6667	0	8	18.3667	9.9	24.3	1.08333	0.0	3.5
NE12	SUMMER	6	7.8333	0	22	25.5667	22.8	27.5	0.75000	0.0	3.0
NE12	FALL	1	4.0000	4	4	16.8500	16.7	17.0	0.50000	0.0	1.0
NW11	WINTER	2	0.0000	0	0	5.9500	5.3	7.5	0.00000	0.0	0.0
NW11	SPRING	7	3.1429	0	7	12.9786	3.0	23.0	1.07143	0.0	4.5
NW11	SUMMER	5	3.8000	0	12	25.3625	23.0	26.8	1.76250	0.0	3.5
NW11	FALL	2	22.0000	16	28	18.3500	16.5	20.0	0.00000	0.0	0.0
NW12	WINTER	2	0.0000	0	0	5.9500	5.3	7.5	0.00000	0.0	0.0
NW12	SPRING	5	0.4000	0	1	13.4600	3.0	23.0	1.20000	0.0	4.5
NW12	SUMMER	4	0.0000	0	0	24.9958	23.0	26.5	1.39583	0.0	3.5
NW12	FALL	2	1.0000	0	2	18.3500	16.5	20.0	0.25000	0.0	1.0
RI11	SPRING	2	0.0000	0	0	18.1750	13.8	23.0	2.25000	1.5	3.0
RI11	SUMMER	3	0.3333	0	1	26.4167	24.5	28.5	3.08333	0.0	6.5
RI12	SPRING	2	0.0000	0	0	18.1750	13.8	23.0	2.25000	1.5	3.0
RI12	SUMMER	3	0.0000	0	0	26.4167	24.5	28.5	3.08333	0.0	6.5
RI21	SPRING	1	0.0000	0	0	22.5000	22.0	23.0	2.75000	2.5	3.0
RI21	SUMMER	3	0.3333	0	1	26.0333	24.5	27.0	2.16667	0.0	3.5
RI22	SPRING	1	0.0000	0	0	22.5000	22.0	23.0	2.75000	2.5	3.0
RI22	SUMMER	3	0.0000	0	0	26.0333	24.5	27.0	2.16667	0.0	3.5
SE01	SPRING	5	0.6000	0	1	16.9400	9.4	21.8	8.70000	6.5	12.0
SE01	SUMMER	8	2.3750	0	11	25.5875	23.8	29.5	8.65625	0.0	14.0
SE02	SPRING	5	1.0000	0	3	17.5400	9.4	21.8	8.78000	6.5	12.0
SE02	SUMMER	9	0.8889	0	5	25.5222	23.8	29.5	8.69444	0.0	14.0
SE11	SPRING	5	2.2000	0	4	16.5500	9.4	21.0	6.80000	3.5	12.0
SE11	SUMMER	11	3.1818	0	11	25.3636	22.3	28.0	8.00273	0.0	14.0
SE11	FALL	3	15.3333	0	27	16.3500	10.0	20.5	6.25000	3.5	11.0
SE12	SPRING	5	0.2000	0	1	16.5500	9.5	21.0	6.60000	3.5	10.0
SE12	SUMMER	11	1.6364	0	4	25.3636	22.3	28.0	8.02273	0.0	14.0
SE12	FALL	3	1.0000	0	2	16.3500	10.0	20.5	6.25000	3.5	11.0
SE21	SPRING	5	11.2000	0	45	16.4600	9.9	21.0	5.10000	3.0	8.0
SE21	SUMMER	9	1.1111	0	4	25.2889	23.5	27.5	5.39236	0.0	10.5
SE21	FALL	2	2.5000	0	5	20.1250	20.0	20.5	6.87500	3.5	9.0
SE22	SPRING	5	0.2000	0	1	16.4600	9.9	21.0	5.10000	3.0	8.0
SE22	SUMMER	9	0.5556	0	3	25.2889	23.5	27.5	5.39236	0.0	10.5
SE22	FALL	2	1.5000	1	2	20.1250	20.0	20.5	6.87500	3.5	9.0
SE31	WINTER	3	0.0000	0	0	5.5333	4.2	6.0	2.16667	0.0	5.5
SE31	SPRING	8	2.0000	0	6	11.2071	1.0	23.0	4.50000	0.0	11.0
SE31	SUMMER	19	4.7368	0	39	24.6830	20.1	28.1	5.30186	0.0	10.5
SE31	FALL	10	3.0000	0	10	15.4200	8.9	20.0	4.50000	1.0	9.0
SE32	WINTER	3	2.0000	0	4	5.5333	4.2	6.0	2.16667	0.0	5.5

Table 45 . - Continued.

T. MACULATUS SEASONAL MEAN CATCH PER UNIT EFFORT (N/T)-1975.

LOCATION	SEASON	OBS	CATCH/UNIT EFFORT			TEMPERATURE (C)			SALINITY (PPT)		
			MEAN	MIN	MAX	MEAN	MIN	MAX	MEAN	MIN	MAX
SE32	SPRING	8	3.000	0	19	11.2071	1.0	23.0	4.50000	0.0	11.0
SE32	SUMMER	18	1.889	0	14	24.7172	20.1	28.1	5.57668	2.0	10.5
SE32	FALL	9	41.111	0	140	15.9444	11.0	20.0	4.75000	1.0	9.0
SSC1	WINTER	8	0.250	0	2	4.9271	0.2	12.0	3.72857	0.0	6.0
SSC1	SPRING	11	17.818	0	48	12.7295	1.3	21.9	2.02597	0.0	9.0
SSC1	SUMMER	25	35.400	0	238	25.2775	20.3	29.8	5.67708	0.0	9.0
SSC1	FALL	20	12.600	0	50	16.2408	9.8	20.0	4.04500	1.0	9.0
SSC2	WINTER	8	0.750	0	4	5.0521	0.2	12.0	3.72857	0.0	6.0
SSC2	SPRING	11	48.909	0	180	12.7295	1.3	21.9	2.02597	0.0	9.0
SSC2	SUMMER	24	100.917	0	810	25.1286	20.3	29.8	5.65465	0.0	9.0
SSC2	FALL	21	34.714	0	102	16.2918	9.8	20.0	3.91465	1.0	9.0
SW11	SUMMER	4	63.250	31	88	24.7292	22.0	27.8	6.37500	2.0	9.0
SW11	FALL	3	36.333	3	55	17.8167	10.6	23.8	3.58333	0.0	8.0
SW12	SUMMER	1	35.000	35	35	22.2500	22.0	22.5	9.00000	9.0	9.0
SW12	FALL	2	9.000	3	15	15.2750	10.6	20.0	1.50000	0.0	3.0
SW21	WINTER	3	0.333	0	1	5.5000	5.0	6.0	1.75000	0.0	5.0
SW21	SPRING	6	12.167	0	30	11.5917	3.2	21.0	1.87500	0.0	7.0
SW21	SUMMER	16	19.313	0	112	25.2175	21.0	29.5	4.67292	0.0	10.0
SW21	FALL	10	5.200	0	26	14.0854	8.7	18.5	3.56250	0.0	10.0
SW22	WINTER	3	0.000	0	0	5.5000	5.0	6.0	2.08333	0.0	6.0
SW22	SPRING	6	3.167	0	19	11.3500	3.2	21.0	2.20833	0.0	7.0
SW22	SUMMER	15	0.400	0	3	25.0933	21.0	29.5	4.75714	0.0	9.5
SW22	FALL	9	2.889	0	25	14.7875	8.7	20.0	3.06250	0.0	10.0
W-11	WINTER	4	6.000	0	22	6.2125	4.0	8.2	1.12500	0.0	3.0
W-11	SPRING	6	8.500	0	45	11.4667	3.2	21.0	2.83333	0.0	7.0
W-11	SUMMER	18	32.778	0	132	25.1004	19.9	28.5	2.73646	0.0	8.0
W-11	FALL	17	59.000	0	162	16.5033	9.1	20.0	1.92353	0.0	6.0
W-12	WINTER	4	0.000	0	0	6.2125	4.0	8.2	1.12500	0.0	3.0
W-12	SPRING	6	21.000	0	90	13.5750	3.2	21.0	2.37500	0.0	7.0
W-12	SUMMER	20	5.600	0	35	25.1113	19.9	28.5	3.07353	0.0	8.0
W-12	FALL	17	10.529	0	32	15.4251	9.1	20.0	1.81078	0.0	6.0
W-21	WINTER	2	0.000	0	0	5.4500	4.0	6.2	0.00000	0.0	0.0
W-21	SPRING	6	1.500	0	3	12.2167	2.6	21.0	1.62500	0.0	4.5
W-21	SUMMER	3	12.333	0	19	25.5167	24.7	26.9	1.50000	0.0	4.0
W-21	FALL	3	22.333	10	39	13.9583	11.0	16.5	1.41667	0.0	2.0
W-22	WINTER	2	0.000	0	0	5.4500	4.0	6.2	0.00000	0.0	0.0
W-22	SPRING	6	20.167	0	72	12.2167	2.6	21.0	1.62500	0.0	4.5
W-22	SUMMER	3	0.000	0	0	25.5167	24.7	26.9	1.50000	0.0	4.0
W-22	FALL	3	54.000	0	132	13.9583	11.0	16.5	1.41667	0.0	2.0
W-31	WINTER	4	19.000	0	53	6.4500	5.3	8.8	0.29167	0.0	1.0
W-31	SPRING	5	2.600	0	6	11.3700	2.8	21.0	1.70000	0.0	4.5
W-31	SUMMER	15	15.000	0	67	25.8567	20.9	29.0	2.31333	0.0	8.0
W-31	FALL	7	62.143	3	167	15.2286	10.0	18.9	1.87500	0.5	4.0
W-32	WINTER	4	0.250	0	1	6.6500	5.3	8.8	0.29167	0.0	1.0
W-32	SPRING	5	0.200	0	1	11.3700	2.8	21.0	1.70000	0.0	4.5
W-32	SUMMER	13	0.692	0	6	25.8500	20.9	29.0	1.86538	0.0	5.0
W-32	FALL	7	18.143	0	62	15.2286	10.0	18.9	1.89286	0.5	4.0

EOF:

Table 46. - T. MACULATUS SEASONAL MEAN CATCH PER UNIT EFFORT (N/T)-1974.

LOCATION	SEASON	OBS	CATCH/UNIT EFFORT			TEMPERATURE (C)			SALINITY (PPT)		
			MEAN	MIN	MAX	MEAN	MIN	MAX	MEAN	MIN	MAX
CHA1	WINTER	1	0.0000	0	0	1.7500	1.5	2.0	9.0000	8	10
CHA1	SPRING	6	0.0000	0	0	15.2800	10.1	19.9	6.0167	1	8
CHA1	SUMMER	8	0.0000	0	0	24.6812	23.5	26.0	11.0625	6	15
CHA1	FALL	6	0.0000	0	0	12.0750	6.0	20.9	10.4167	4	16
CHA2	WINTER	5	0.0000	0	0	2.9500	1.7	6.5	3.6500	0	8
CHA2	SPRING	6	0.0000	0	0	12.6000	7.0	17.4	3.9167	0	10
CHA2	SUMMER	14	0.0000	0	0	25.1071	22.8	28.0	8.2679	4	13
CHA2	FALL	8	0.0000	0	0	15.2437	5.0	20.8	8.3750	3	14
CHA3	WINTER	3	0.0000	0	0	3.8500	2.0	5.3	1.0000	0	2
CHA3	SPRING	6	0.0000	0	0	14.6083	6.6	21.2	3.3333	1	6
CHA3	SUMMER	7	0.0000	0	0	25.2000	24.0	26.5	5.5357	2	10
CHA3	FALL	6	0.0000	0	0	14.4583	7.0	20.1	4.0833	0	9
CHA4	WINTER	3	0.0000	0	0	3.8000	1.0	6.3	0.6667	0	2
CHA4	SPRING	7	0.0000	0	0	13.3274	6.5	21.3	2.0714	0	8
CHA4	SUMMER	12	0.0000	0	0	24.5708	23.2	26.0	4.5000	1	7
CHA4	FALL	10	0.1000	0	1	15.1650	6.5	21.2	4.3500	0	10
CHA5	WINTER	2	0.0000	0	0	2.5000	2.0	3.0	2.5000	2	3
CHA5	SPRING	5	0.0000	0	0	12.9367	7.5	20.0	1.2667	0	3
CHA5	SUMMER	10	0.0000	0	0	24.7672	23.0	26.5	3.2111	1	5
CHA5	FALL	7	0.0000	0	0	13.8500	6.1	22.5	2.4286	0	8
E-11	WINTER	4	0.0000	0	0	2.1958	1.5	5.1	4.0833	0	8
E-11	SPRING	7	6.2857	0	25	13.7833	7.0	20.1	4.6667	2	8
E-11	SUMMER	9	2.3333	0	14	24.6556	22.9	26.9	7.0556	5	9
E-11	FALL	6	2.8333	0	13	13.4000	5.0	22.2	6.9167	3	11
E-12	WINTER	4	0.0000	0	0	2.1958	1.5	5.1	4.0833	0	8
E-12	SPRING	7	2.4286	0	7	13.7833	7.0	20.1	4.0000	0	8
E-12	SUMMER	9	1.7778	0	11	24.6778	22.9	26.9	7.0556	5	9
E-12	FALL	6	2.1667	0	11	13.4417	5.0	22.2	6.9167	3	11
E-21	WINTER	5	0.2000	0	1	2.8200	1.0	4.8	4.1000	0	9
E-21	SPRING	10	1.2000	0	5	12.5911	7.1	22.8	2.8144	0	8
E-21	SUMMER	21	0.7619	0	5	24.6738	22.5	28.8	6.8333	2	10
E-21	FALL	16	1.1250	0	7	16.2000	6.0	24.1	6.4063	0	12
E-22	WINTER	5	0.0000	0	0	2.8200	1.0	4.8	4.1000	0	9
E-22	SPRING	9	0.1111	0	1	13.2354	7.5	22.8	3.1250	0	8
E-22	SUMMER	21	0.0476	0	1	24.6738	22.5	28.8	6.8333	2	10
E-22	FALL	14	0.0714	0	1	17.1000	6.0	24.1	7.2500	0	12
E-31	WINTER	2	0.0000	0	0	2.7000	1.8	3.0	1.5000	1	2
E-31	SPRING	7	3.1429	0	8	13.0167	6.5	22.0	3.6429	0	8
E-31	SUMMER	9	1.1111	0	5	25.0556	22.5	27.5	4.4722	2	7
E-31	FALL	6	0.1667	0	1	12.2083	5.0	19.5	4.1667	0	9
E-32	WINTER	2	0.0000	0	0	2.7000	1.8	3.0	1.5000	1	2
E-32	SPRING	7	0.4286	0	3	13.0167	6.5	22.0	3.3571	0	6
E-32	SUMMER	9	0.2222	0	1	25.0556	22.5	27.5	4.4722	2	7
E-32	FALL	6	0.0000	0	0	12.2083	5.0	19.5	4.1667	0	9
E-41	WINTER	5	0.0000	0	0	3.7800	0.5	7.9	1.7000	0	6
E-41	SPRING	8	2.7500	0	10	13.2786	6.5	21.5	2.5476	0	8
E-41	SUMMER	12	1.3333	0	6	24.5083	23.2	26.0	4.5000	1	7
E-41	FALL	11	1.2727	0	5	15.6000	6.1	21.5	4.8182	0	9
E-42	WINTER	5	0.0000	0	0	3.7800	0.5	7.9	1.7000	0	6
E-42	SPRING	7	0.0000	0	0	13.2786	6.5	21.5	2.9762	1	8
E-42	SUMMER	12	0.2500	0	1	24.4330	23.2	26.0	4.5000	1	7
E-42	FALL	11	0.0000	0	0	15.6000	6.1	21.5	4.8182	0	9
E-51	WINTER	2	0.0000	0	0	3.2750	3.0	3.8	2.0000	2	2
E-51	SPRING	5	12.2000	0	37	14.4125	7.5	22.0	2.3000	0	5

Table 46. - Continued.

T. MACULATUS SEASONAL MEAN CATCH PER UNIT EFFORT (N/T)-1976.

LOCATION	SEASON	OBS	CATCH/UNIT EFFORT			TEMPERATURE (C)			SALINITY (PPT)		
			MEAN	MIN	MAX	MEAN	MIN	MAX	MEAN	MIN	MAX
E-51	SUMMER	7	12.4286	1	27	24.8214	23.0	26.8	3.50000	2	5
E-51	FALL	6	12.1667	0	47	12.6667	5.0	22.9	3.15000	0	8
E-52	WINTER	2	0.0000	0	0	3.2750	3.0	3.8	2.00000	2	2
E-52	SPRING	5	11.6000	0	43	14.4125	7.5	22.0	2.30000	0	5
E-52	SUMMER	7	2.7143	0	6	24.8405	23.0	26.8	3.50000	2	5
E-52	FALL	6	2.0000	0	8	12.6667	5.0	22.9	3.08333	0	8
E-61	WINTER	2	0.5000	0	1	2.6750	2.2	3.0	3.75000	3	4
E-61	SPRING	5	5.8000	0	18	12.9300	7.0	19.8	1.80000	0	4
E-61	SUMMER	10	6.6000	0	16	24.5000	22.6	26.1	3.85000	1	6
E-61	FALL	7	6.4286	0	29	13.7143	6.0	22.2	2.50000	0	8
E-62	WINTER	2	0.0000	0	0	2.6750	2.2	3.0	3.75000	3	4
E-62	SPRING	5	3.4000	0	14	12.9300	7.0	19.8	1.80000	0	4
E-62	SUMMER	10	1.6000	0	7	24.5000	22.6	26.1	3.85000	1	6
E-62	FALL	7	0.4286	0	2	13.7143	6.0	22.2	2.50000	0	8
NE11	SPRING	4	8.0000	1	15	14.4750	7.2	22.1	0.87500	0	2
NE11	SUMMER	6	0.8333	0	2	24.6833	23.3	26.0	2.83333	1	4
NE11	FALL	5	0.2000	0	1	13.3400	5.9	21.0	1.00000	0	5
NE12	SPRING	4	10.0000	0	15	14.4750	7.2	22.1	0.87500	0	2
NE12	SUMMER	5	1.4000	0	2	24.5950	23.3	26.0	2.80000	1	4
NE12	FALL	5	5.0000	2	8	13.3400	5.9	21.0	1.00000	0	5
NE21	SPRING	1	15.0000	15	15	14.5000	14.5	14.5	1.00000	1	1
NE21	SUMMER	1	0.0000	0	0	25.0000	25.0	25.0	1.00000	1	1
NE21	FALL	1	0.0000	0	0	7.5000	7.0	8.0	0.00000	0	0
NE22	SPRING	1	0.0000	0	0	14.5000	14.5	14.5	1.00000	1	1
NE22	SUMMER	1	0.0000	0	0	25.0000	25.0	25.0	1.00000	1	1
NE22	FALL	1	0.0000	0	0	7.5000	7.0	8.0	0.00000	0	0
NW11	WINTER	3	0.0000	0	0	3.4167	2.0	5.5	1.83333	0	3
NW11	SPRING	6	0.8333	0	3	12.0583	6.7	20.2	1.01667	0	2
NW11	SUMMER	10	1.7000	0	7	24.9700	23.5	26.2	3.72056	1	6
NW11	FALL	7	1.1429	0	4	14.1143	6.8	23.1	2.50000	0	7
NW12	WINTER	3	0.0000	0	0	3.4167	2.0	5.5	1.83333	0	3
NW12	SPRING	6	3.0000	0	11	12.0583	6.7	20.2	1.01667	0	2
NW12	SUMMER	10	1.6000	0	7	24.9650	23.5	26.2	3.68056	1	6
NW12	FALL	7	0.5714	0	2	14.1214	6.8	23.2	2.50000	0	7
NW21	SPRING	1	0.0000	0	0	14.2500	14.1	14.4	0.00000	0	0
NW21	SUMMER	3	0.3333	0	1	24.9167	24.4	25.5	3.83333	3	4
NW21	FALL	1	0.0000	0	0	8.0000	8.0	8.0	1.00000	1	1
NW22	SPRING	1	0.0000	0	0	14.2500	14.1	14.4	0.00000	0	0
NW22	SUMMER	3	4.3333	0	12	24.9167	24.4	25.5	3.83333	3	4
NW22	FALL	1	0.0000	0	0	8.0000	8.0	8.0	1.00000	1	1
RI11	WINTER	3	0.0000	0	0	4.3333	2.0	7.0	1.33333	0	2
RI11	SPRING	7	0.0000	0	0	14.3200	6.2	19.7	2.10000	2	3
RI11	SUMMER	9	0.0000	0	0	24.9944	23.1	26.8	5.02778	2	9
RI11	FALL	6	0.0000	0	0	13.8950	7.0	22.5	4.70000	0	8
RI12	WINTER	3	0.0000	0	0	4.3333	2.0	7.0	1.33333	0	2
RI12	SPRING	6	0.0000	0	0	14.3200	6.2	19.7	2.10000	2	3
RI12	SUMMER	9	0.0000	0	0	24.9944	23.1	26.8	5.10069	2	9
RI12	FALL	6	0.0000	0	0	13.8950	7.0	22.5	4.78333	0	8
RI21	WINTER	3	0.0000	0	0	4.5000	2.0	7.0	0.83333	0	2
RI21	SPRING	7	0.2857	0	2	15.7250	6.2	22.3	2.00000	0	4
RI21	SUMMER	11	0.5455	0	6	24.9864	23.0	26.6	4.75000	1	8
RI21	FALL	6	0.1667	0	1	14.3667	6.0	23.9	4.41667	0	8
RI22	WINTER	3	0.0000	0	0	4.5000	2.0	7.0	0.83333	0	2
RI22	SPRING	7	0.0000	0	0	15.7250	6.2	22.3	2.00000	0	4

Table 46 . - Continued.

T. MACULATUS SEASONAL MEAN CATCH PER UNIT EFFORT (N/T)-1975.

LOCATION	SEASON	OBS	CATCH/UNIT EFFORT			TEMPERATURE (C)			SALINITY (PPT)		
			MEAN	MIN	MAX	MEAN	MIN	MAX	MEAN	MIN	MAX
RI22	SUMMER	12	0.000	0	0	25.0083	23.0	26.5	5.0625	1.0	9.5
RI22	FALL	6	0.000	0	0	14.3667	6.0	23.9	4.4167	0.0	8.0
SE01	WINTER	1	0.000	0	0	5.5000	5.0	6.0	2.0000	2.0	2.0
SE01	SPRING	4	1.000	0	3	13.5250	9.2	19.1	8.5000	4.0	12.0
SE01	SUMMER	5	1.800	0	6	24.4500	23.0	25.0	12.4500	10.0	14.0
SE01	FALL	7	0.143	0	1	10.8143	5.9	19.7	11.2857	6.0	17.0
SE02	WINTER	1	0.000	0	0	5.5000	5.0	6.0	2.0000	2.0	2.0
SE02	SPRING	5	1.400	0	5	14.3000	10.0	19.1	8.5000	4.0	12.0
SE02	SUMMER	5	0.000	0	0	24.4500	23.0	25.0	12.4500	10.0	14.0
SE02	FALL	6	0.000	0	0	9.3417	5.9	17.8	10.8333	6.0	17.0
SE11	WINTER	2	0.000	0	0	3.7000	2.0	5.5	4.7500	2.0	9.0
SE11	SPRING	6	10.333	0	48	14.8333	6.2	19.8	6.5000	5.0	11.0
SE11	SUMMER	8	6.750	0	34	24.6562	23.0	27.0	11.2813	9.0	13.0
SE11	FALL	8	2.875	0	22	12.0562	5.0	20.7	10.8750	7.0	15.0
SE12	WINTER	2	0.000	0	0	3.7000	2.0	5.5	4.7500	2.0	8.0
SE12	SPRING	5	1.200	0	3	14.4700	6.2	19.0	6.8750	5.0	11.0
SE12	SUMMER	8	0.500	0	2	24.5194	23.0	27.0	11.2813	9.0	13.0
SE12	FALL	8	0.500	0	1	11.7125	5.0	20.0	10.8750	7.0	15.0
SE21	SPRING	4	28.500	0	57	14.8958	10.2	18.5	5.5000	4.0	7.0
SE21	SUMMER	6	15.000	0	80	24.8667	23.4	26.5	9.6417	8.0	12.0
SE21	FALL	4	12.250	0	48	13.5750	5.5	20.5	9.5000	6.0	13.0
SE22	SPRING	4	0.500	0	1	14.8958	10.2	18.5	5.5000	4.0	7.0
SE22	SUMMER	6	0.333	0	1	24.8667	23.4	26.5	9.7250	8.0	12.0
SE22	FALL	4	1.750	0	5	13.5750	5.5	20.5	9.5000	6.0	13.0
SE31	WINTER	5	0.000	0	0	3.7200	1.0	6.8	1.3000	0.0	7.0
SE31	SPRING	8	3.250	0	12	13.1937	7.0	19.8	4.5714	0.0	8.0
SE31	SUMMER	16	2.375	0	13	24.7594	22.9	28.0	8.8438	5.0	11.0
SE31	FALL	11	3.091	0	19	14.5182	4.0	20.8	8.1364	3.0	13.0
SE32	WINTER	5	0.200	0	1	3.7200	1.0	6.8	1.3000	0.0	7.0
SE32	SPRING	6	27.000	0	130	14.1833	7.0	19.8	5.0000	0.0	8.0
SE32	SUMMER	16	2.000	0	7	24.7312	22.9	28.0	8.8438	5.0	11.0
SE32	FALL	11	2.364	0	9	14.5182	4.0	20.8	8.1364	3.0	13.0
SSC1	WINTER	9	0.000	0	0	3.1083	0.2	6.0	3.2292	0.0	9.0
SSC1	SPRING	16	17.375	0	118	13.1980	4.6	22.9	3.1844	0.0	8.0
SSC1	SUMMER	29	12.759	0	90	24.6603	22.3	29.0	7.6652	3.0	10.0
SSC1	FALL	20	10.100	0	40	16.2975	6.0	22.5	7.3000	0.0	11.0
SSC2	WINTER	9	0.000	0	0	3.1905	0.2	6.0	3.2292	0.0	9.0
SSC2	SPRING	16	20.375	0	128	13.2250	4.6	22.9	3.3344	0.0	8.0
SSC2	SUMMER	29	33.379	0	182	24.6603	22.3	29.0	7.6652	3.0	10.0
SSC2	FALL	20	16.400	0	76	16.2975	6.0	22.5	7.3000	0.0	11.0
SW11	WINTER	1	0.000	0	0	3.0000	2.5	3.5	5.7500	5.5	6.0
SW11	SPRING	4	123.500	3	230	15.0750	10.8	17.8	4.2500	2.0	6.0
SW11	SUMMER	7	44.143	0	180	25.0500	23.5	26.0	10.6429	6.0	15.0
SW11	FALL	4	3.500	0	12	11.1750	6.0	18.2	8.0000	4.0	13.0
SW12	WINTER	1	0.000	0	0	3.0000	2.5	3.5	5.7500	5.5	6.0
SW12	SPRING	5	22.000	6	53	14.2500	10.8	17.8	4.4500	2.0	6.0
SW12	SUMMER	8	22.000	0	160	25.0312	23.5	26.0	10.1563	6.0	15.0
SW12	FALL	5	2.400	0	7	13.0600	6.0	20.7	9.4000	4.0	15.0
SW21	WINTER	6	0.000	0	0	3.5583	1.0	6.5	2.5000	0.0	9.0
SW21	SPRING	8	52.250	0	285	14.1375	7.0	20.5	3.0000	0.0	7.0
SW21	SUMMER	15	13.467	0	78	25.0900	23.3	28.0	7.6667	3.0	12.0
SW21	FALL	11	16.818	0	75	14.5409	4.9	21.1	7.6818	3.0	14.0
SW22	WINTER	6	0.000	0	0	3.5583	1.0	6.5	2.5000	0.0	9.0
SW22	SPRING	8	0.250	0	1	14.1375	7.0	20.5	3.0000	0.0	7.0

Table 46 . - Continued.

T. MACULATUS SEASONAL MEAN CATCH PER UNIT EFFORT (N/T)-1976.

LOCATION	SEASON	OBS	CATCH/UNIT EFFORT			TEMPERATURE (C)			SALINITY (PPT)		
			MEAN	MIN	MAX	MEAN	MIN	MAX	MEAN	MIN	MAX
SW22	SUMMER	15	0.0000	0	0	25.0900	23.3	28.0	7.76667	3	14
SW22	FALL	11	0.1818	0	1	14.5409	4.9	21.1	7.63636	3	14
W-11	WINTER	5	0.2000	0	1	2.9200	0.5	4.9	3.57500	0	8
W-11	SPRING	12	15.5833	0	41	15.0767	7.1	23.0	1.56667	0	8
W-11	SUMMER	21	10.5238	0	42	24.9786	23.3	28.0	5.73690	2	10
W-11	FALL	15	28.4667	0	122	17.0133	5.9	23.0	5.80000	0	13
W-12	WINTER	5	0.0000	0	0	2.9200	0.5	4.9	3.57500	0	8
W-12	SPRING	11	21.0000	0	94	14.5864	7.1	23.0	1.70707	0	8
W-12	SUMMER	21	2.2381	0	13	25.0000	23.3	28.0	5.73690	2	10
W-12	FALL	16	3.0000	0	28	16.5594	5.9	23.0	5.43750	0	13
W-21	WINTER	2	0.5000	0	1	2.1750	1.8	3.0	2.50000	2	4
W-21	SPRING	5	28.0000	0	95	13.1000	6.5	17.5	0.75000	0	2
W-21	SUMMER	9	3.8889	0	22	25.7722	24.1	27.0	3.80556	2	5
W-21	FALL	7	3.2857	0	10	16.1357	6.0	23.0	4.44048	0	7
W-22	WINTER	2	0.0000	0	0	2.1750	1.8	3.0	2.50000	2	4
W-22	SPRING	5	0.6000	0	2	13.1000	6.5	17.5	0.75000	0	2
W-22	SUMMER	9	0.0000	0	0	25.7167	24.1	27.0	3.80556	2	5
W-22	FALL	7	2.8571	0	11	16.1357	6.0	23.0	4.44048	0	7
W-31	WINTER	5	2.4000	0	7	3.6175	1.2	7.0	1.02500	0	4
W-31	SPRING	8	42.0000	0	211	14.0312	6.5	21.3	0.78571	0	4
W-31	SUMMER	12	11.1667	0	35	24.6792	23.2	26.1	4.12500	2	6
W-31	FALL	10	25.7000	0	60	15.6467	6.5	21.4	4.38333	0	7
W-32	WINTER	5	0.4000	0	2	3.6175	1.2	7.0	1.02500	0	4
W-32	SPRING	8	5.1250	0	37	14.0312	6.5	21.3	0.82143	0	4
W-32	SUMMER	12	0.5000	0	2	24.7000	23.2	26.1	4.12500	2	6
W-32	FALL	10	0.4000	0	3	15.6467	6.5	21.4	4.38333	0	7

Table 47 . - A chronological summary of temperature avoidance studies on hogchoker, Trinectes maculatus. All tests were conducted at near air-saturated levels of dissolved oxygen and pH of 7 to 8.

DATE	REPLICATE	NO. OF FISH PER TEST	SIZE RANGE (TL IN MM) MIN. MAX.		SALINITY (PPT)	LIGHT LEVEL (FOOT (LUX) CANDLES)		ACCLIMATION TEMPERATURE (C) (F)		AVOIDANCE TEMPERATURE (C) (F)	
TRINECTES MACULATUS											
13 MAY 70	1	1	-	-	6	21.5	2.0	15	59	20	68
13 MAY 70	1	1	-	-	4	215	20.0	15	59	18	64
13 AUG 70	1	5	21	24	4	215	20.0	26	78	33	91
26 SEP 74	1	4	106	114	6	215	20.0	21	69	29	84
	2	4	80	120	6	215	20.0	21	69	30	86
13 NOV 74	1	4	73	78	6	215	20.0	12	53	17	62
9 APR 76	1	4	79	87	4.5	215	20.0	12	53	19	66
6 OCT 76	1	4	112	122	5	215	20.0	19	66	28.3	82
	2	4	96	125	5	215	20.0	19	66	28.3	82
12 NOV 76	1	3	76	83	7	215	20.0	10	50	33.9	93
	2	3	45	93	7	215	20.0	10	50	33.9	93
8 SEP 77	1	3	37	66	6	215	20.0	24	75	29	84
	2	3	104	123	6	215	20.0	24	75	31	87

Table 47. - Continued.

DATE	REPLICATE	NO. OF FISH PER TEST	SIZE RANGE (TL IN MM) MIN. MAX.	SALINITY (PPT)	LIGHT LEVEL (FOOT (LUX) CANDLES)	ACCLIMATION TEMPERATURE (C) (F)	AVOIDANCE TEMPERATURE (C) (F)
TRINECTES MACULATUS							
15 SEP 77	1	4	35 37	6	21.5 2.0	21 69	34 93
	2	4	30 36	6	21.5 2.0	21 69	34 93

Table 48. - Components for the multiple linear regression equation to estimate avoidance temperatures (C) for the hogchoker, Trinectes maculatus.

* = Significant at P.05 or greater; and ** = significant at P.01 or greater.

Constant (a) = -0.979

F(2, 10) = 3.065

N = 13

Standard Error of Estimate = 4.745

R = 0.617*

 $R^2 = 0.380$

Variable (Xi)	Mean ($\bar{X}_i$)	Correlation (r) With Y	Regression Coefficient (bi)	Standard Error of bi	Standardized Reg. Coef.
Acclimation Temperature (C)	18.5	0.348	0.562*	0.268	0.568
Salinity (ppt)	5.7	0.329	3.466*	1.695	0.555

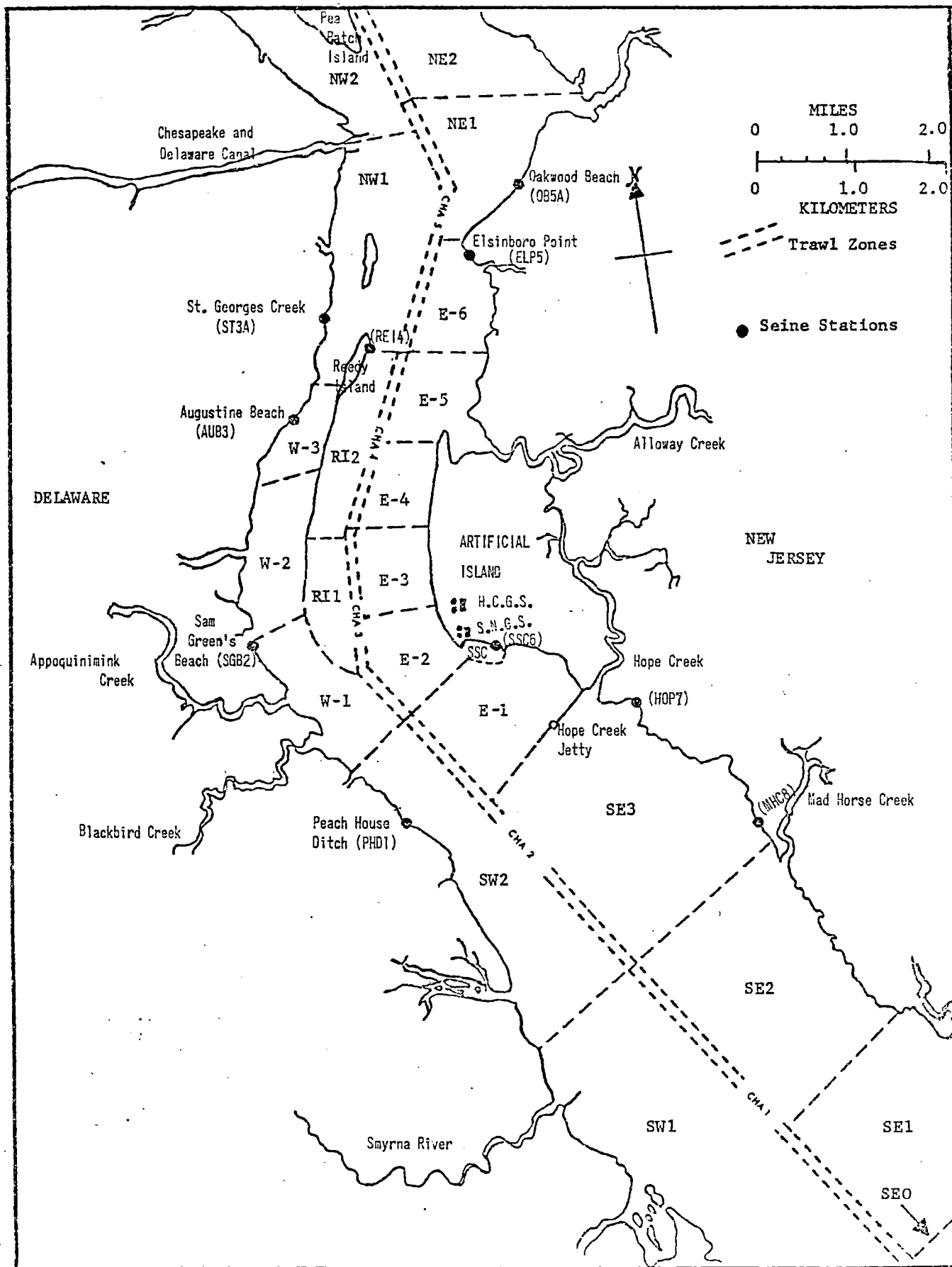


Figure 1. - Location of river trawl zones, channel trawl zones, and beach seine stations sampled in Artificial Island ecological studies.

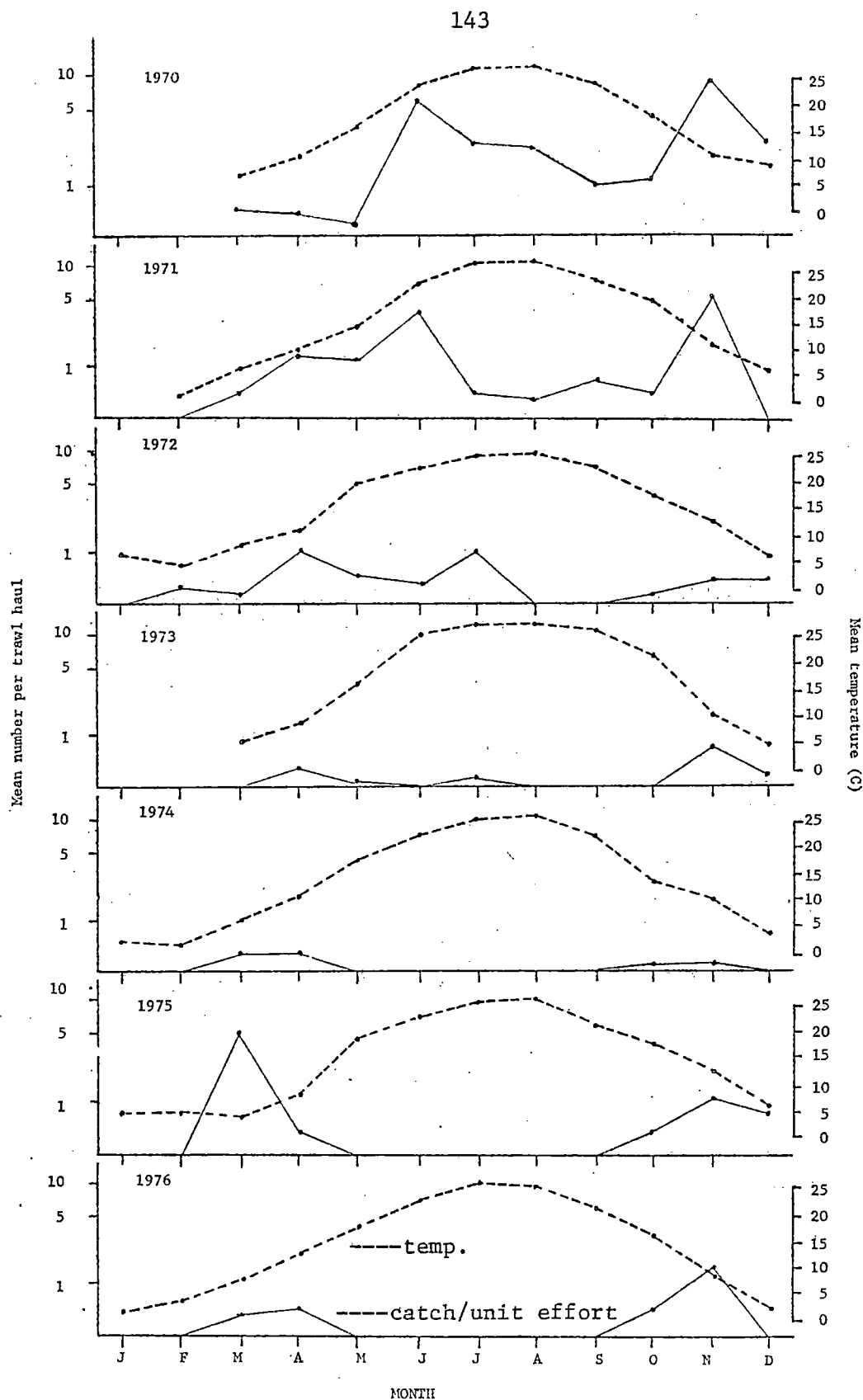
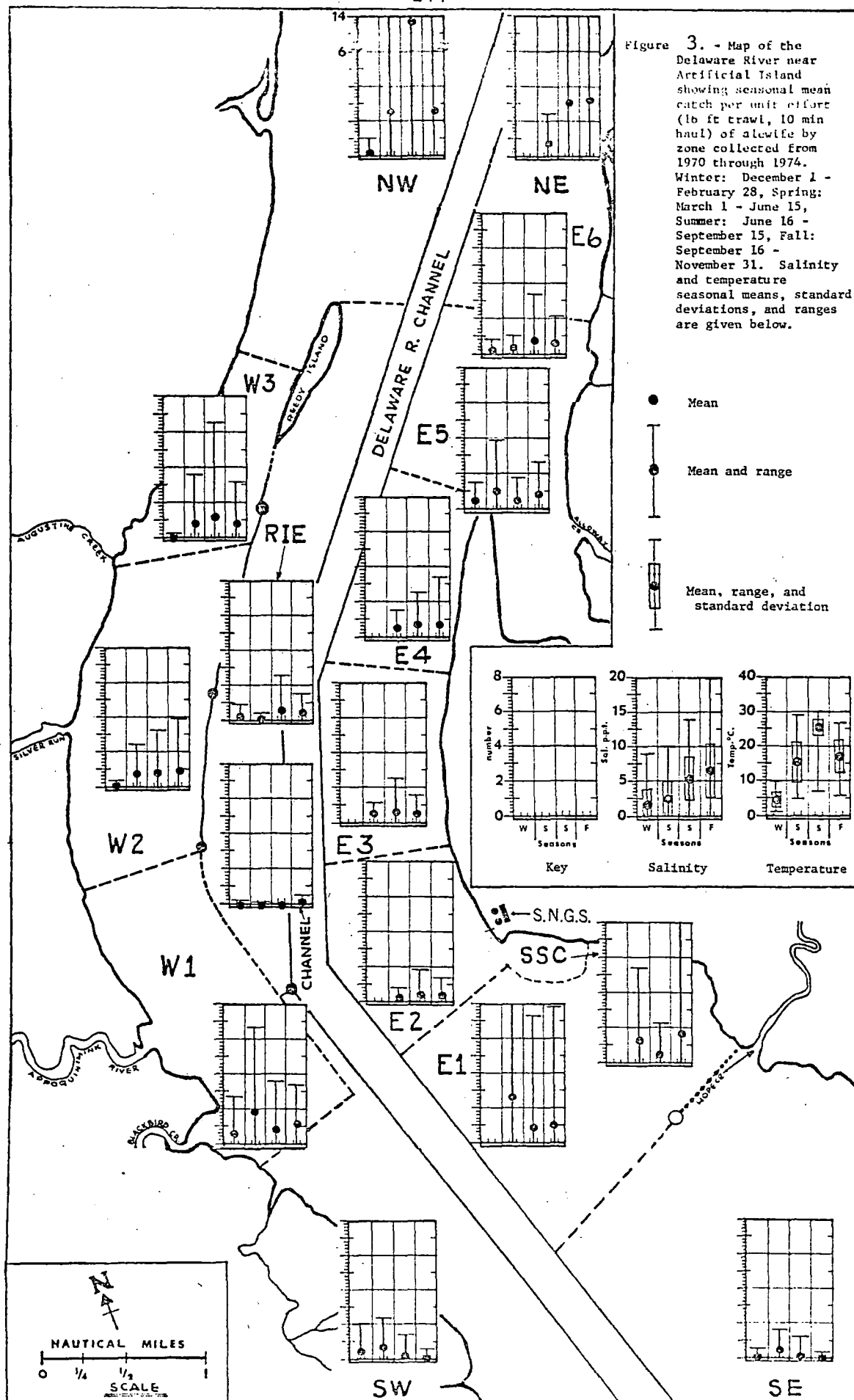


Figure 2. - Mean temperature (C) by year and monthly mean catch per unit effort (16-ft trawl, 10-min haul) of alewife, Alosa pseudoharengus, taken in the Delaware River near the Salem Nuclear Generating Station, 1970 through 1976.



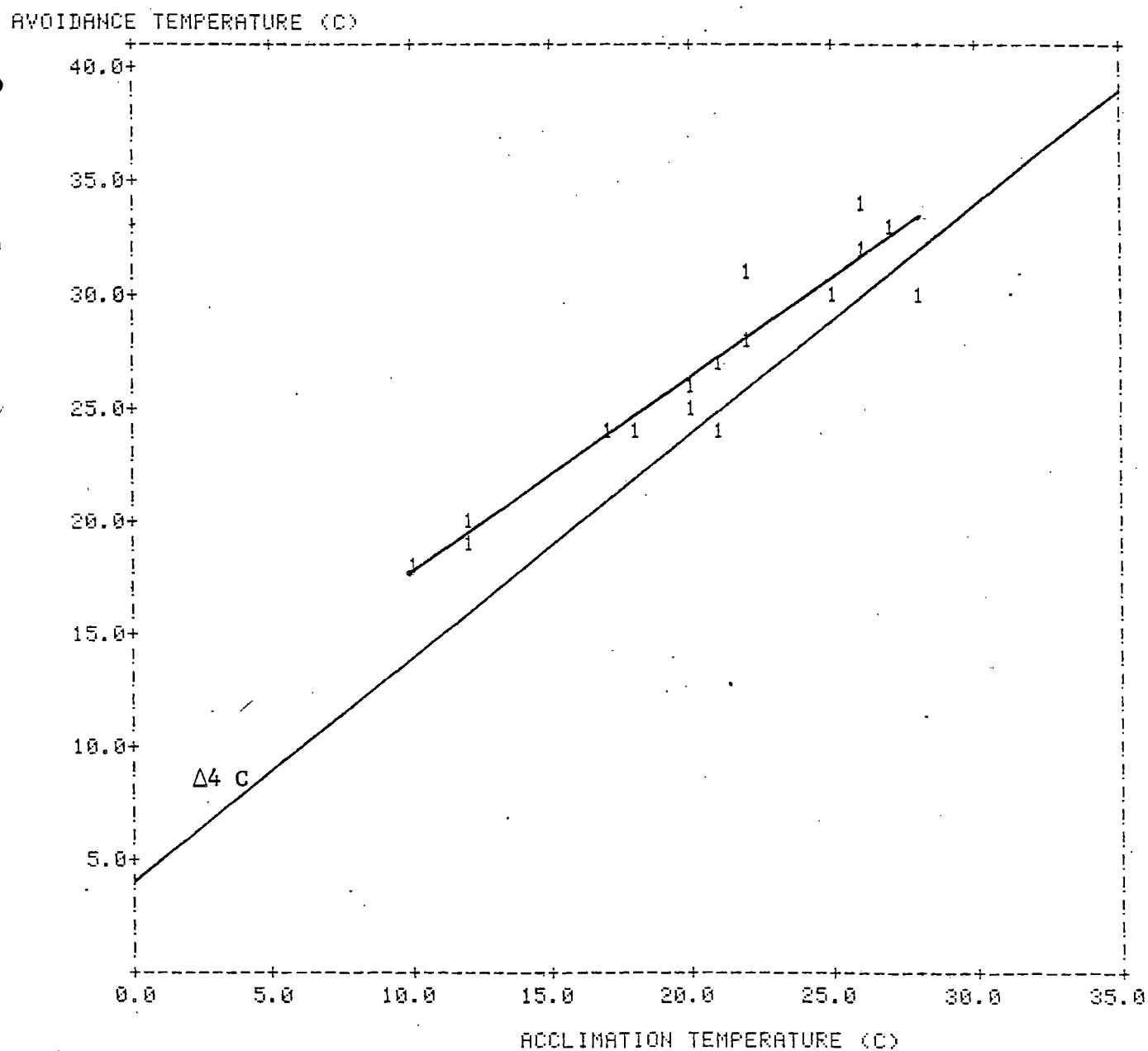


Figure 4. - The relationship of the temperature (4 C) of the maximum penetrable isotherm to avoidance temperatures of alewife, Alosa pseudoharengus, plotted against acclimation (ambient) temperatures. The number of data points occurring at a specific avoidance temperature is indicated numerically. The regression line of estimated avoidance temperature using the components in Table 13 is also shown.

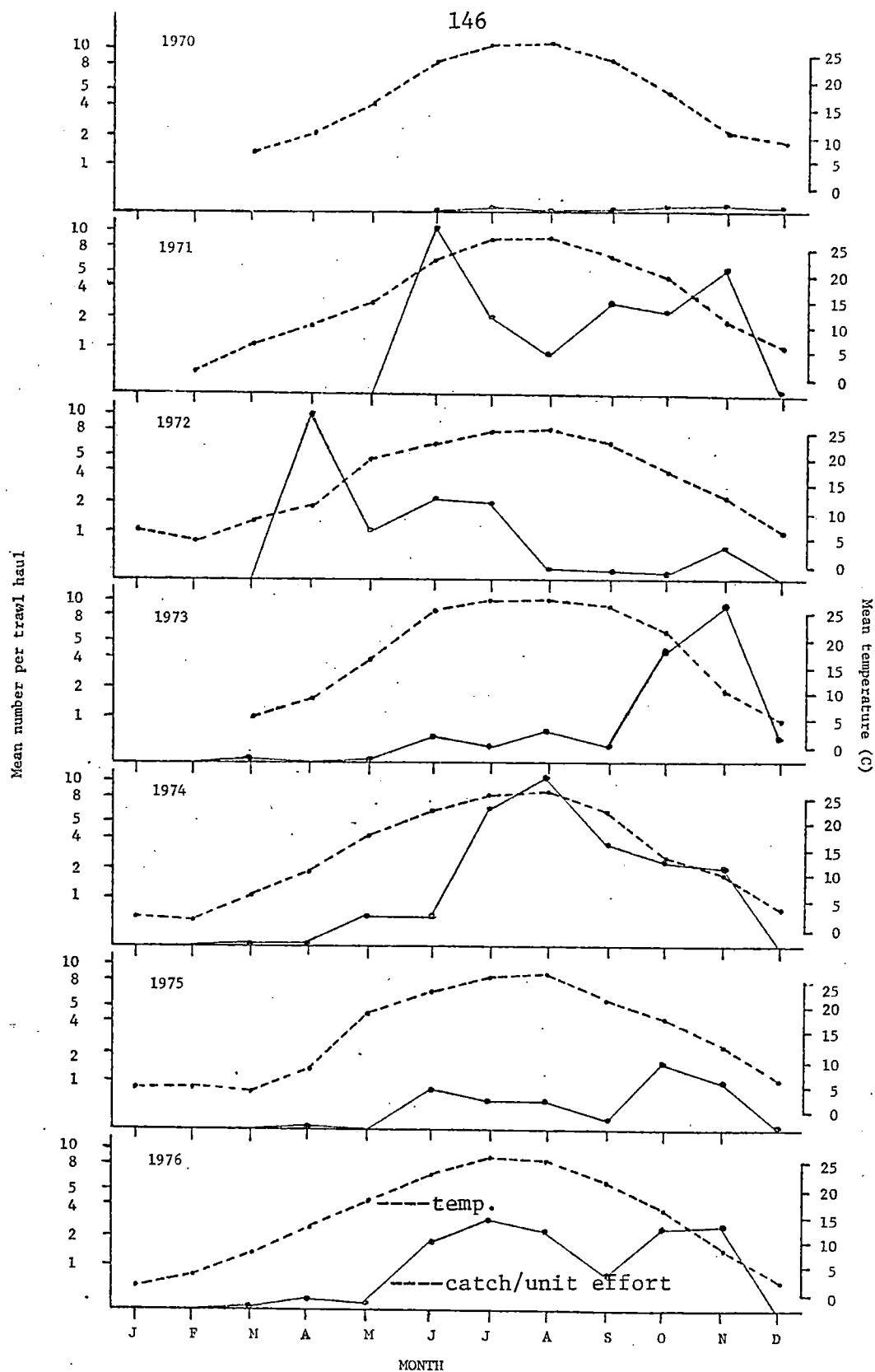
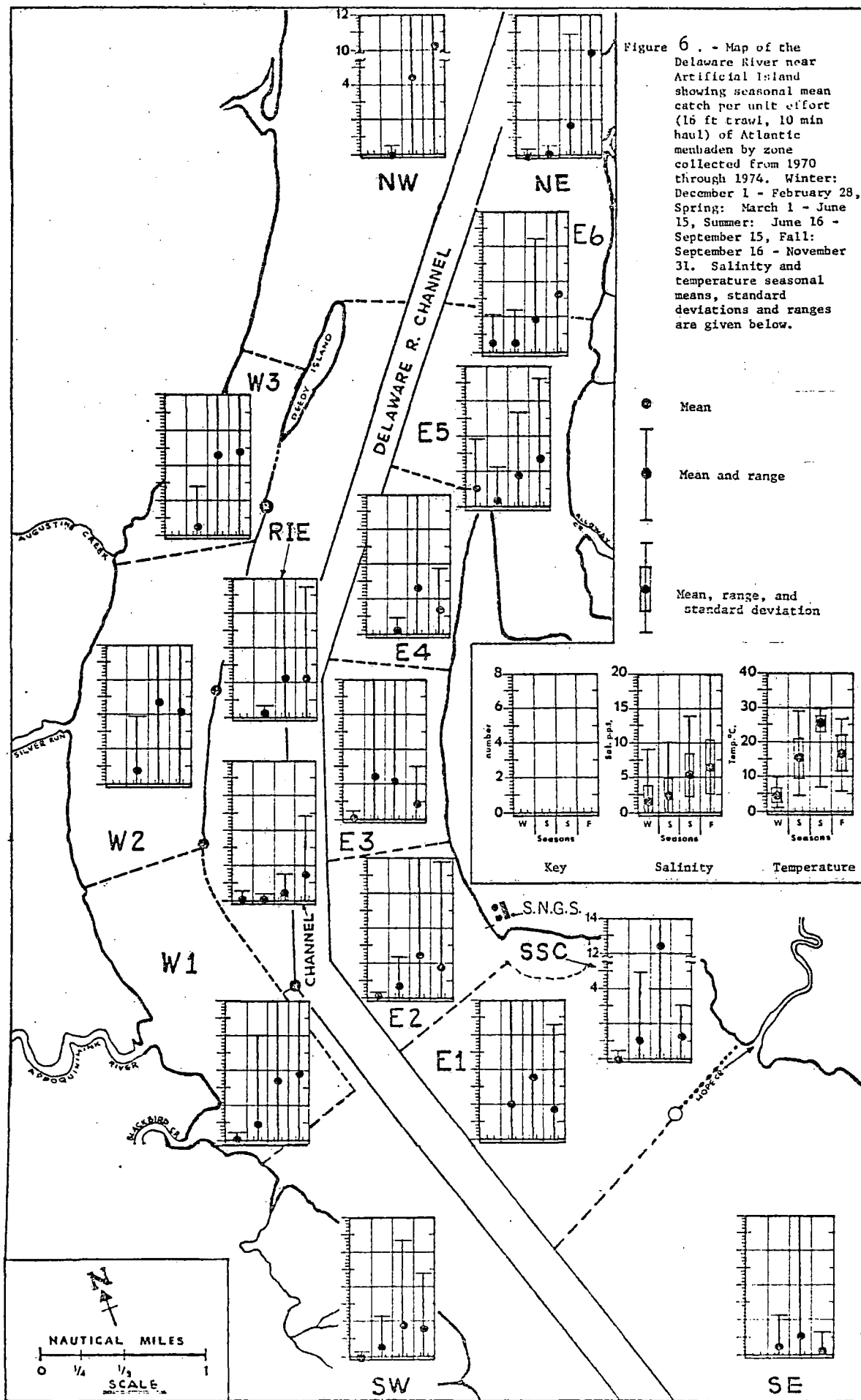


Figure 5 . - Mean temperature (C) by year and monthly mean catch per unit effort (16-ft trawl, 10-min haul) of Atlantic menhaden, Brevoortia tyrannus, taken in the Delaware River near the Salem Nuclear Generating Station, 1970 through 1976.



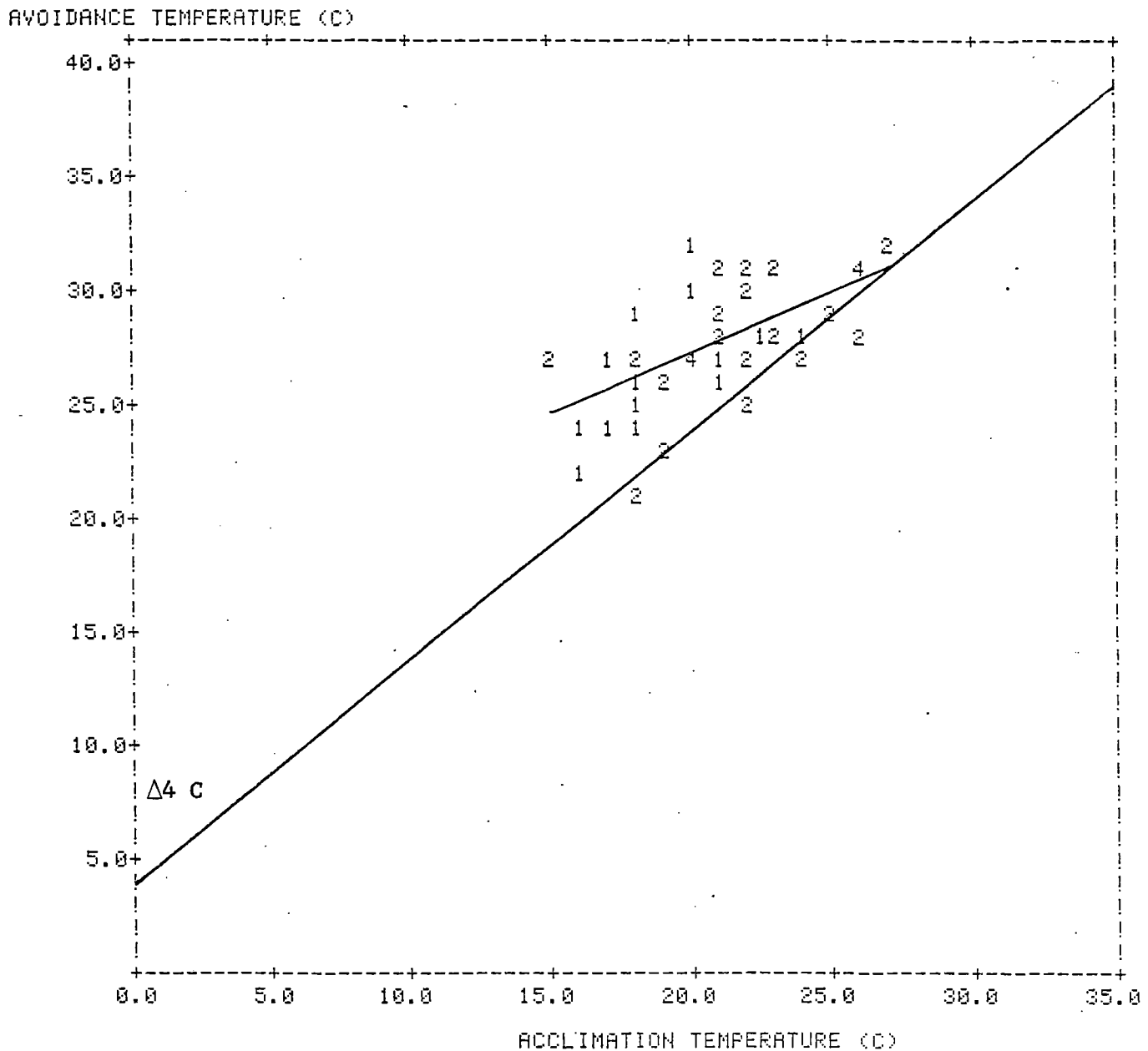


Figure 7 . - The relationship of the temperature (4 C) of the maximum penetrable isotherm to avoidance temperatures of Atlantic menhaden, Brevoortia tyrannus, plotted against acclimation (ambient) temperatures. The number of data points occurring at a specific avoidance temperature is indicated numerically. The regression line of estimated avoidance temperature using the components in Table 17 is also shown.

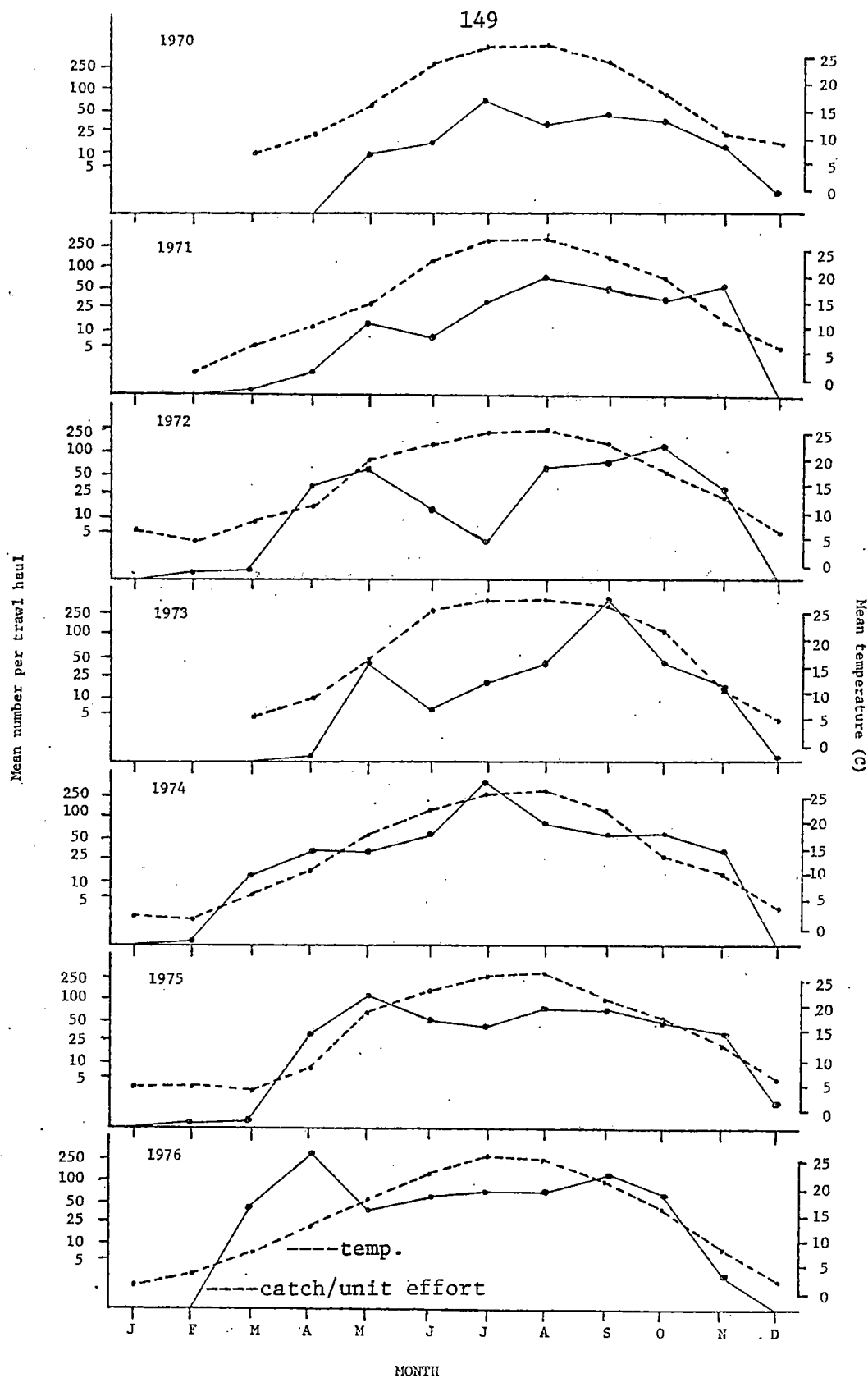
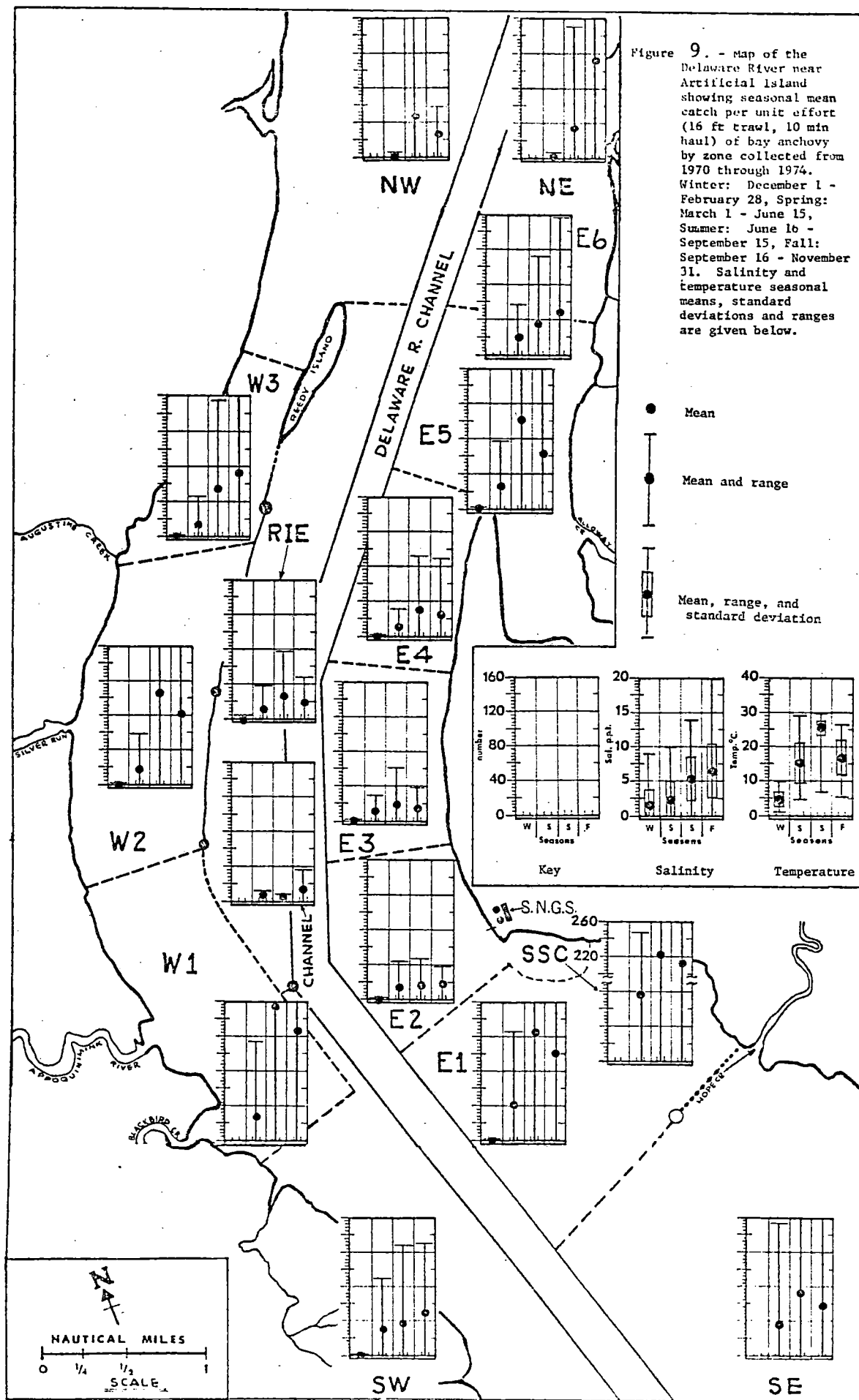


Figure 8. - Mean temperature (C) by year and monthly mean catch per unit effort (16-ft trawl, 10-min haul) of bay anchovy, Anchoa mitchilli, taken in the Delaware River near the Salem Nuclear Generating Station, 1970 through 1976.



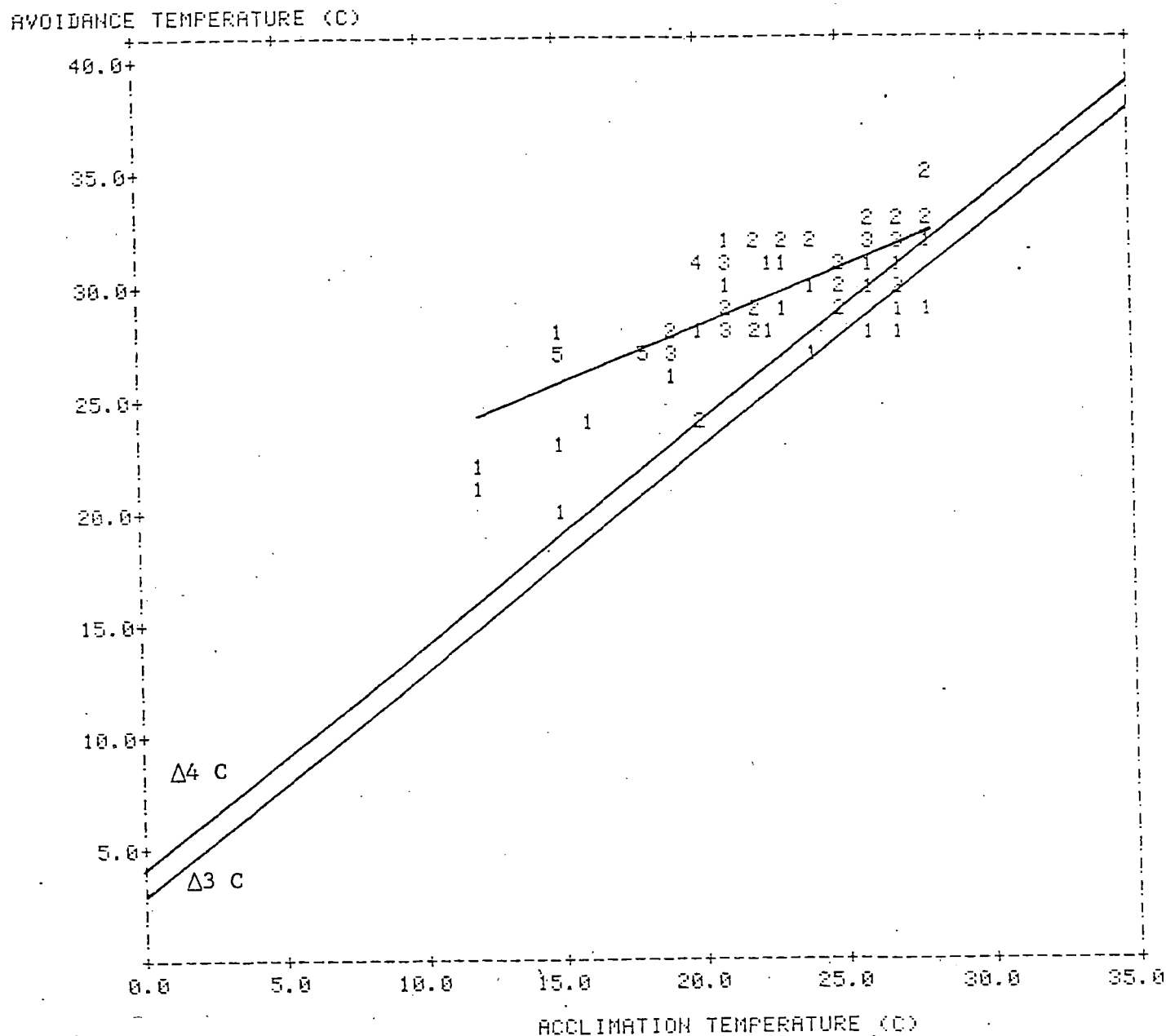
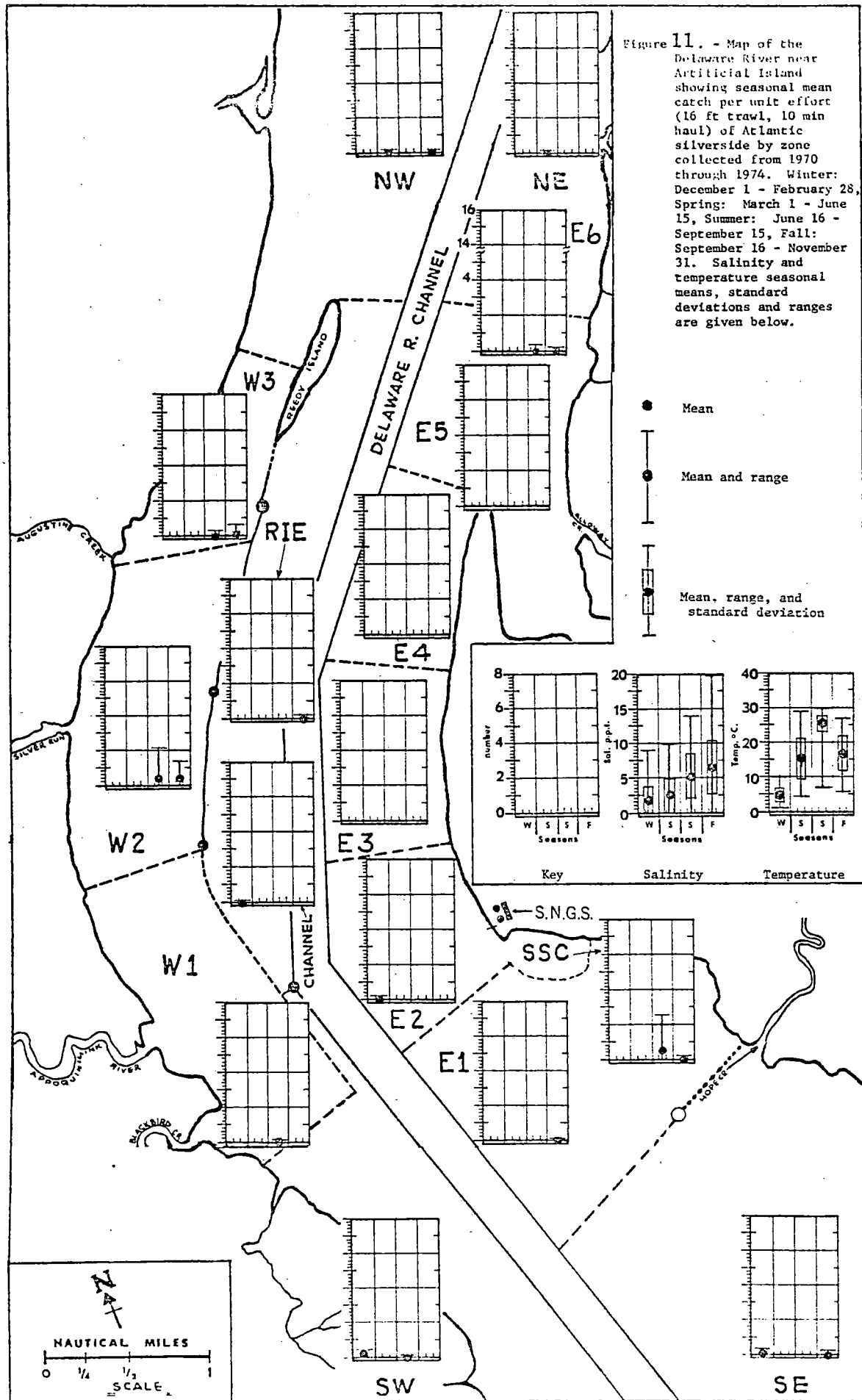


Figure 10 . - The relationship of the temperature (4 C) of the maximum penetrable isotherm to avoidance temperatures of bay anchovy, *Anchoa mitchilli*, plotted against acclimation (ambient) temperatures. The number of data points occurring at a specific avoidance temperature is indicated numerically. The regression line of estimated avoidance temperature using the components in Table 21 is also shown.



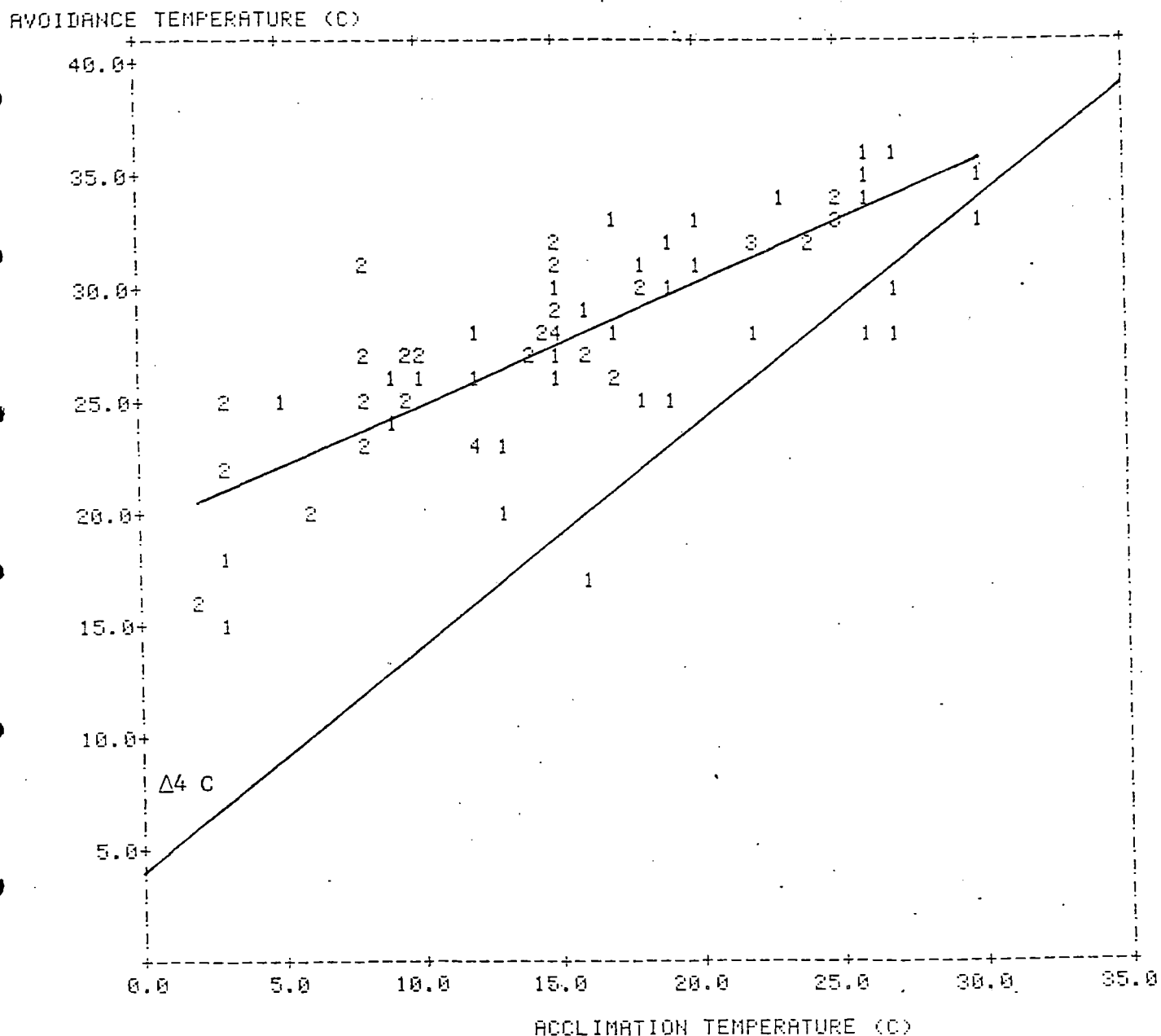


Figure. 12 . - The relationship of the temperature (4 C) of the maximum penetrable isotherm to avoidance temperatures of Atlantic silverside, *Menidia menidia*, plotted against acclimation (ambient) temperatures. The number of data points occurring at a specific avoidance temperature is indicated numerically. The regression line of estimated avoidance temperature using the components in Table 25 is also shown.

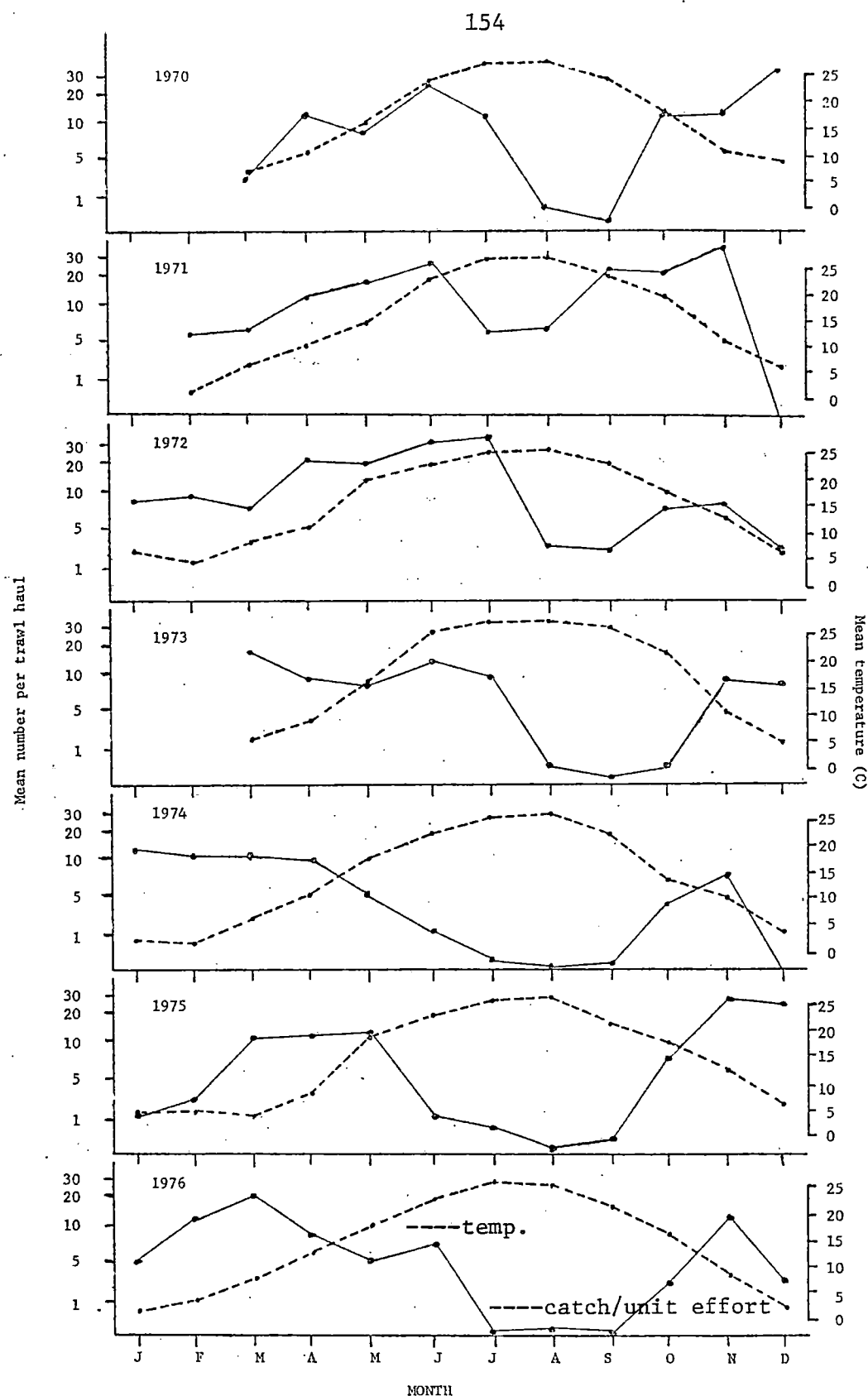


Figure 13. - Mean temperature (C) by year and monthly mean catch per unit effort (16-ft trawl, 10-min haul) of white perch, *Morone americana*, taken in the Delaware River near the Salem Nuclear Generating Station, 1970 through 1976.

AVOIDANCE TEMPERATURE (C)

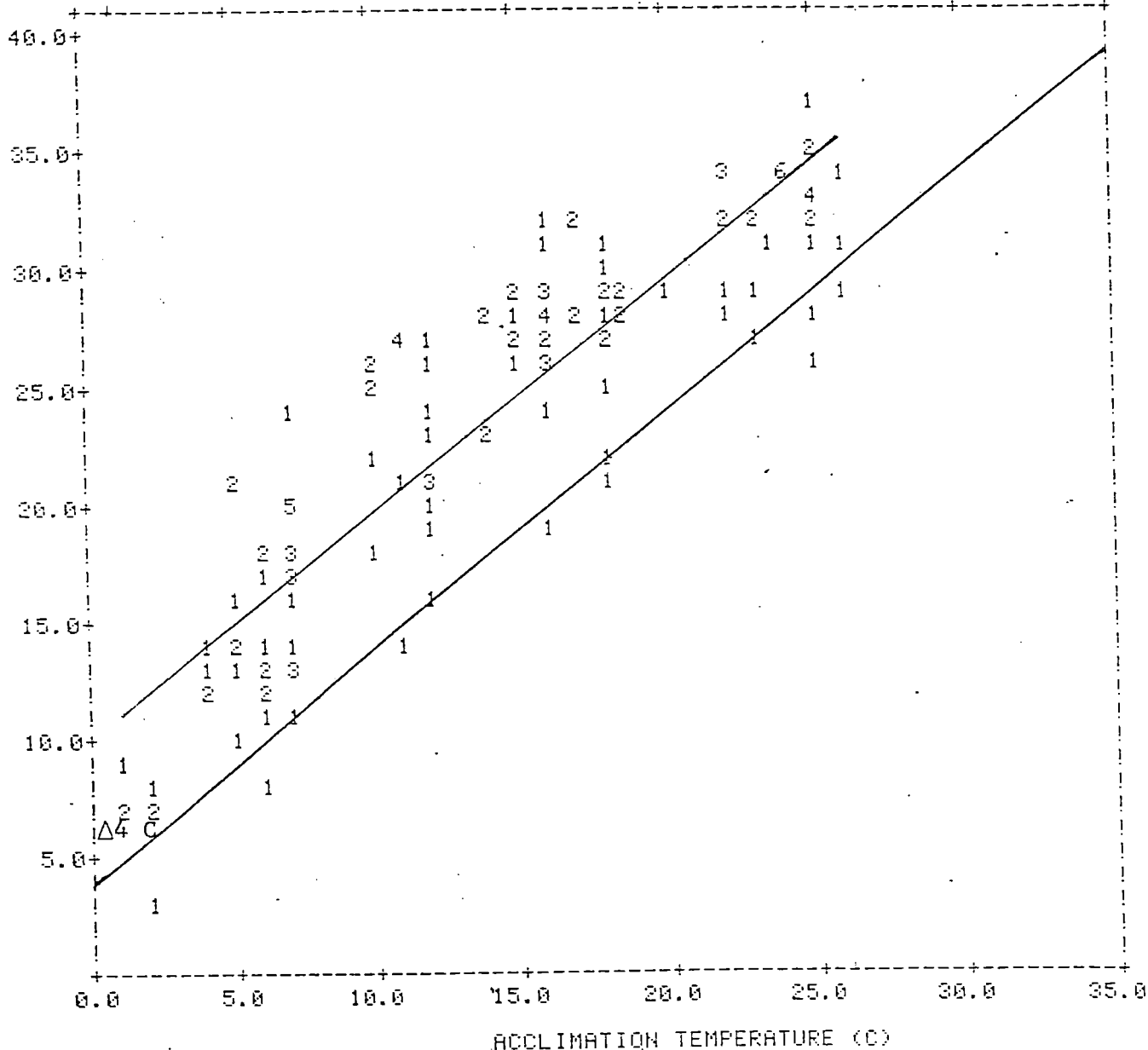


Figure 15. - The relationship of the temperature (4 C) of the maximum penetrable isotherm to avoidance temperatures of white perch, Morone americana, plotted against acclimation (ambient) temperatures. The number of data points occurring at a specific avoidance temperature is indicated numerically. The regression line of estimated avoidance temperature using the components in Table 31 is also shown.

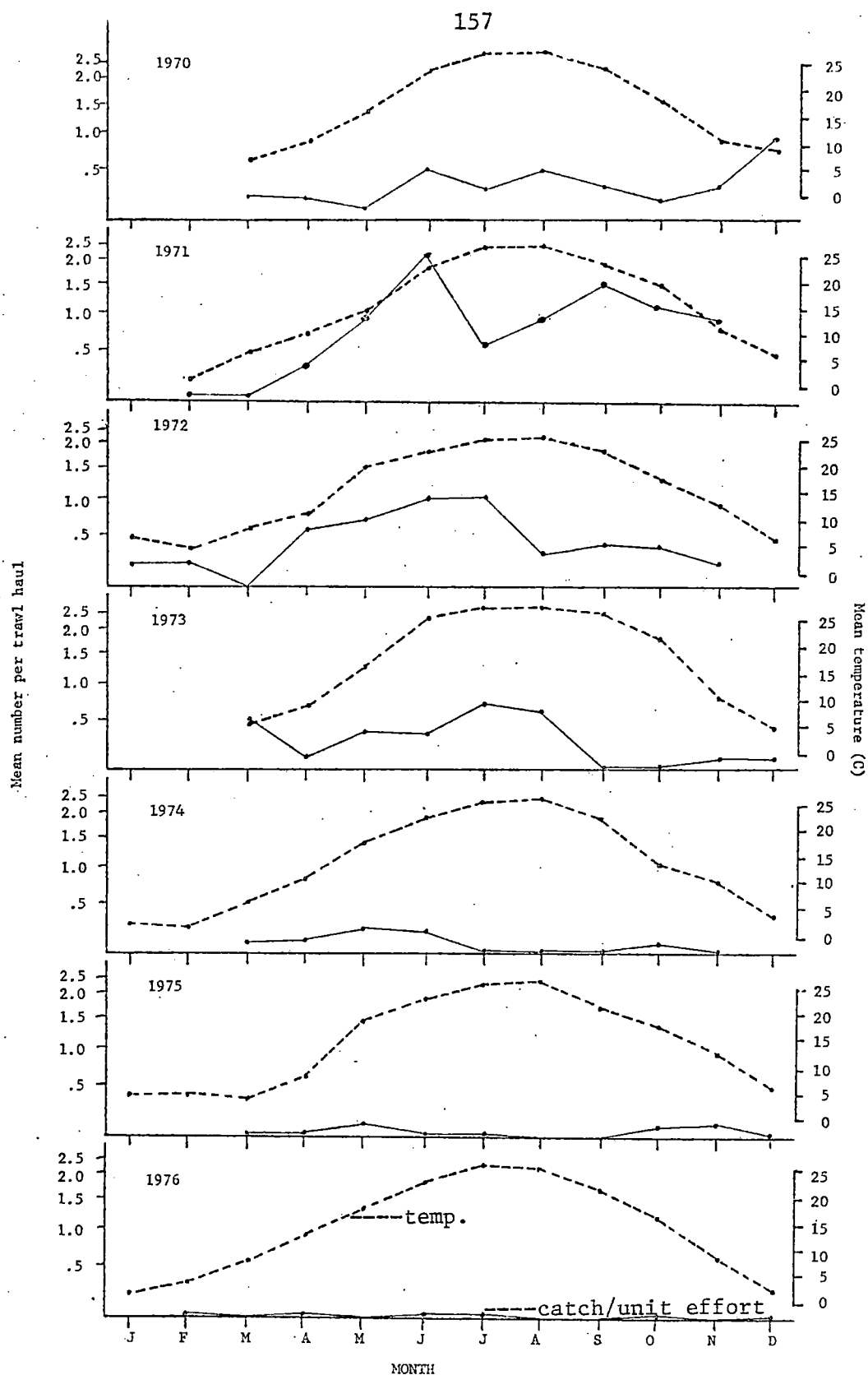
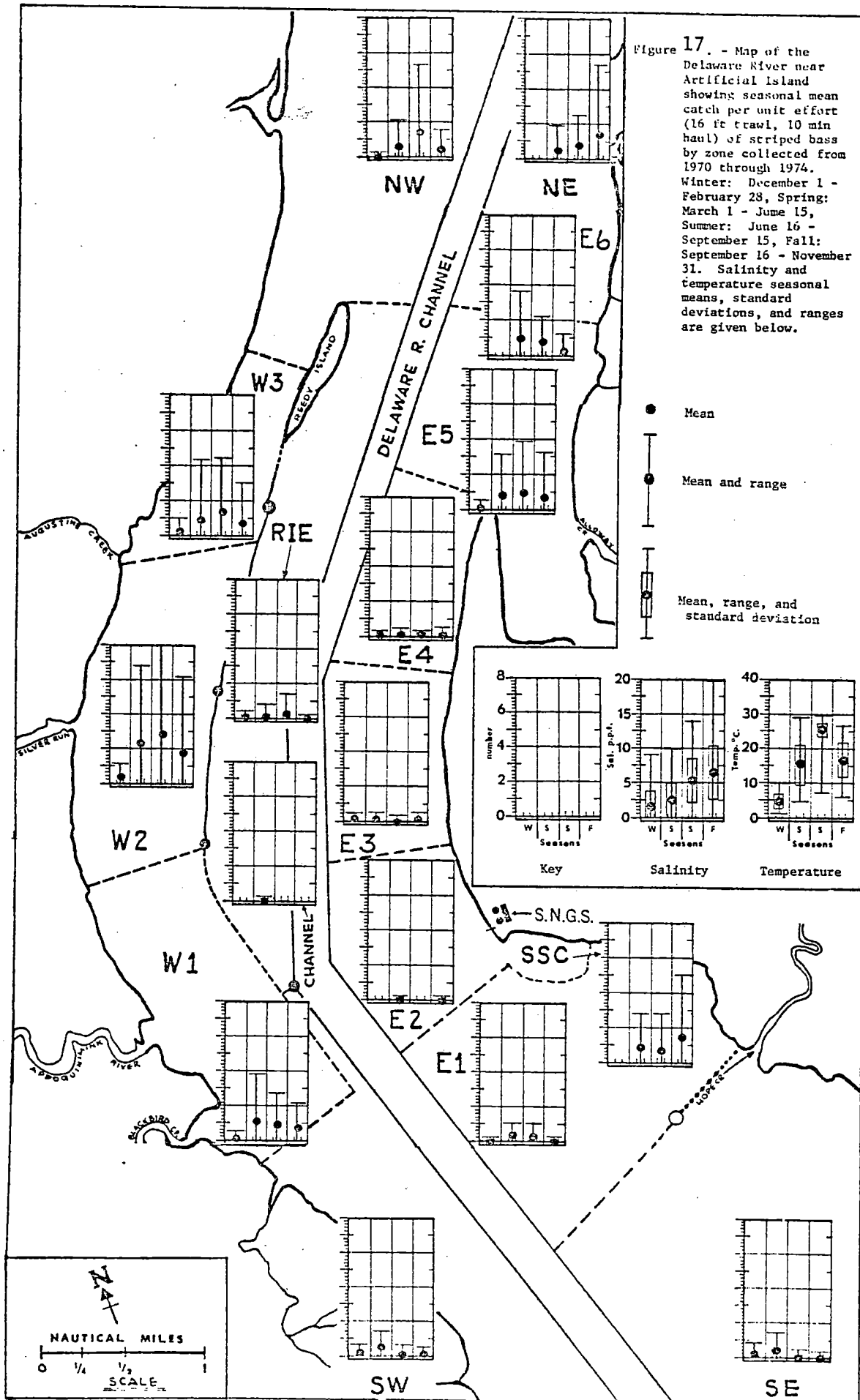


Figure 16 . - Mean temperature (C) by year and monthly mean catch per unit effort (16-ft trawl, 10-min haul) of striped bass, *Morone saxatilis*, taken in the Delaware River near the Salem Nuclear Generating Station, 1970 through 1976.



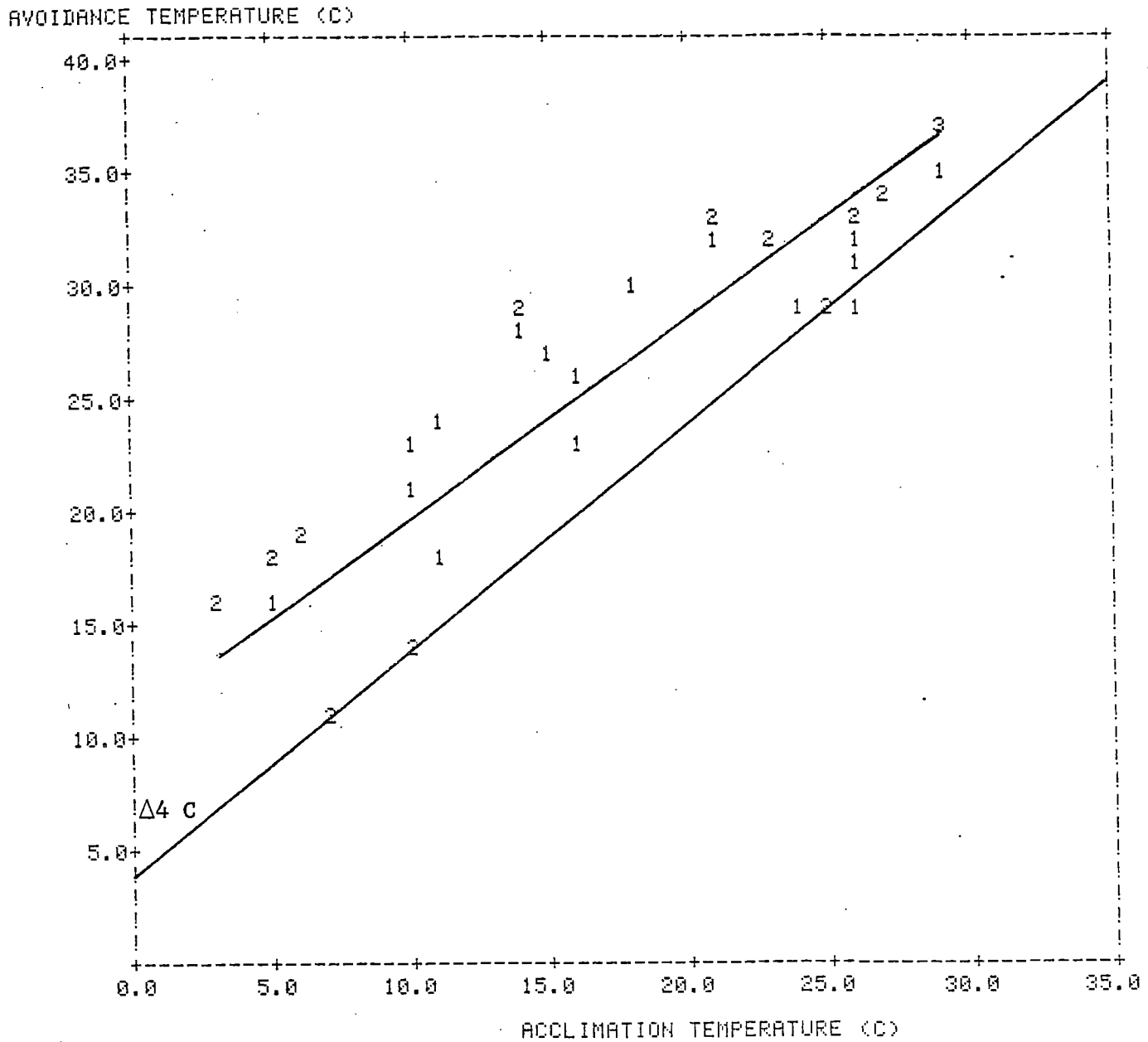


Figure 18 . - The relationship of the temperature (4 C) of the maximum penetrable isotherm to avoidance temperatures of striped bass, *Morone saxatilis*, plotted against acclimation (ambient) temperatures. The number of data points occurring at a specific avoidance temperature is indicated numerically. The regression line of estimated avoidance temperature using the components in Table 35 is also shown.

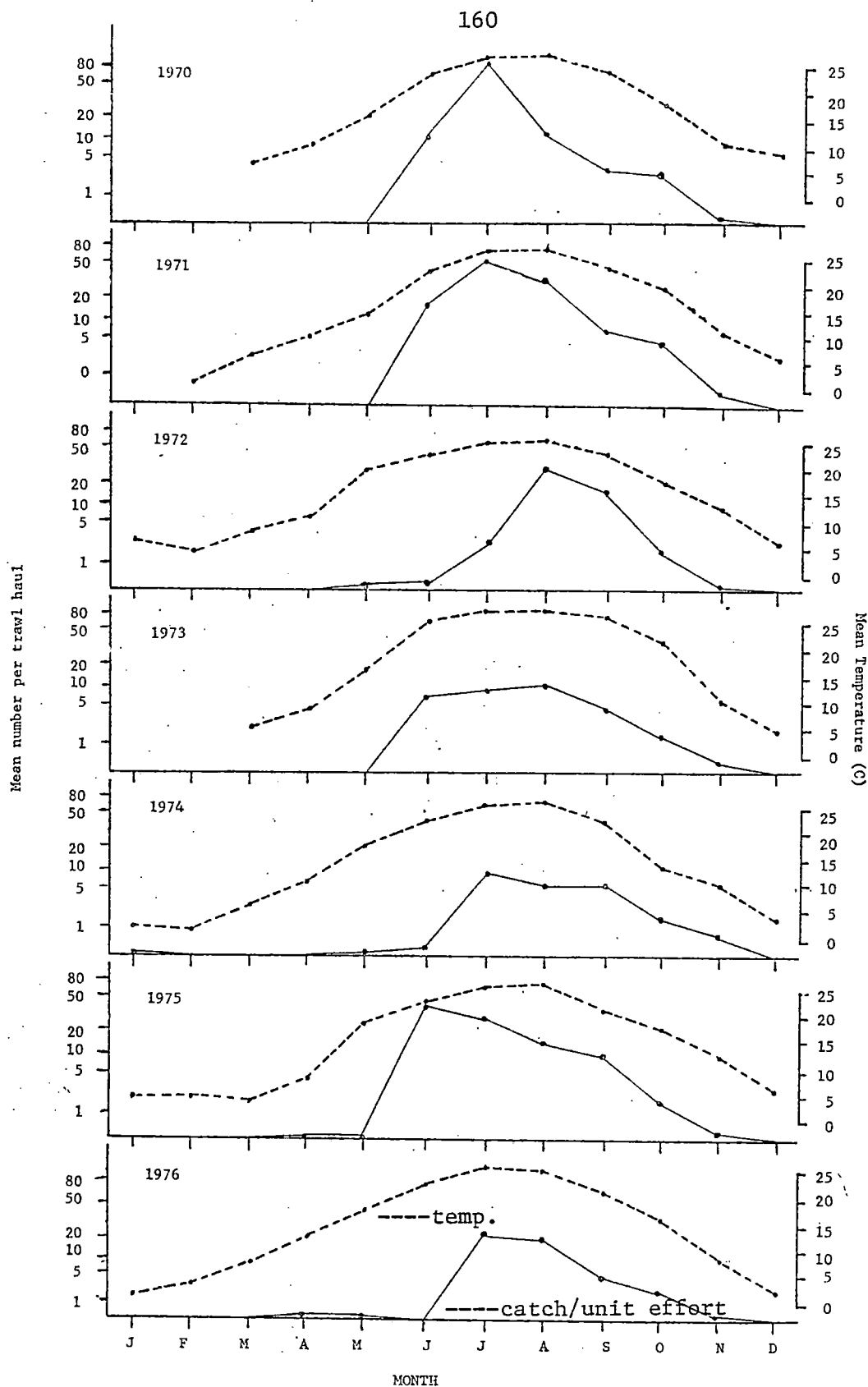
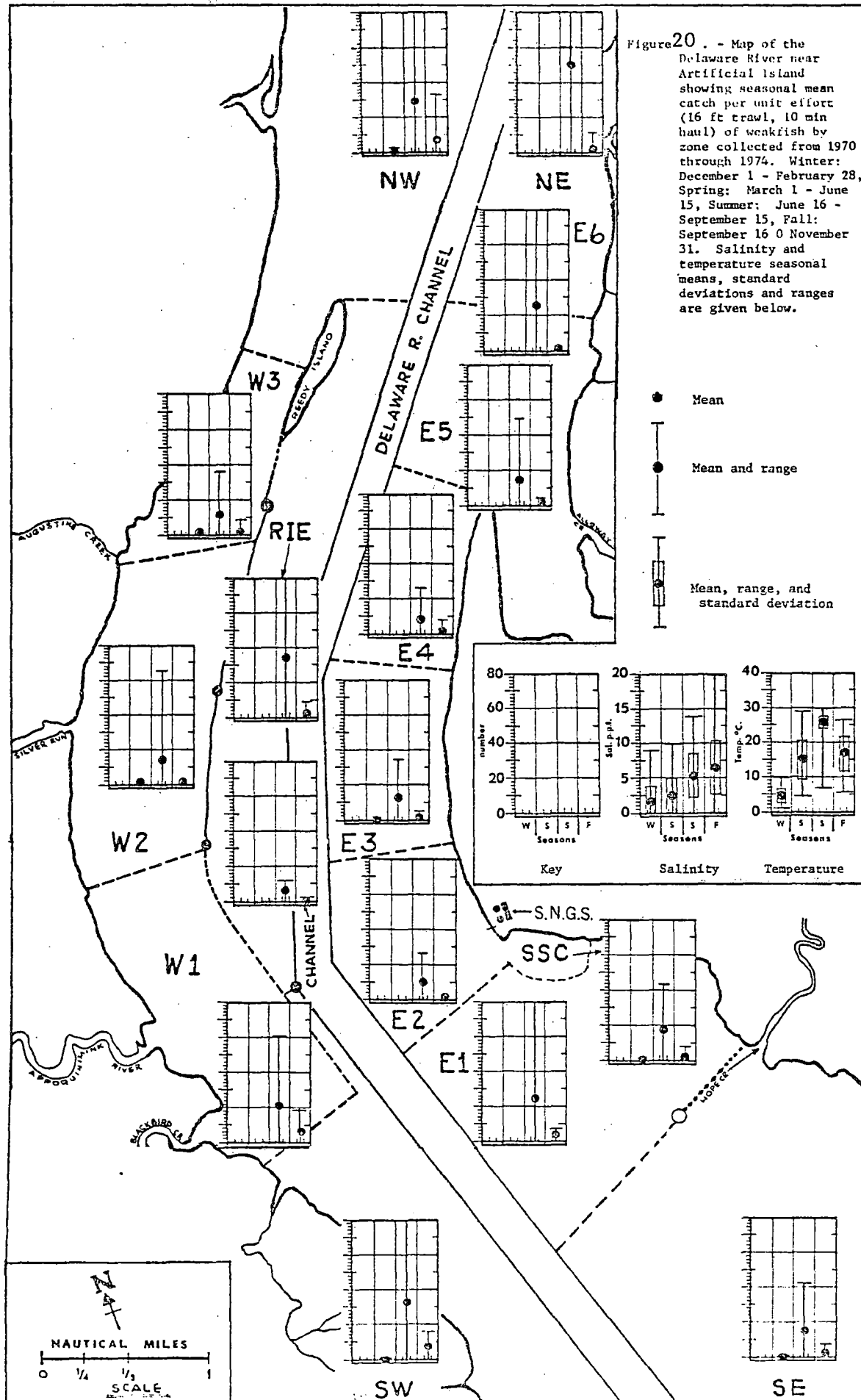


Figure 19. - Mean temperature (C) by year and monthly mean catch per unit effort (16-ft trawl, 10-min haul) of weakfish, *Cynoscion regalis*, taken in the Delaware River near the Salem Nuclear Generating Station, 1970 through 1976.



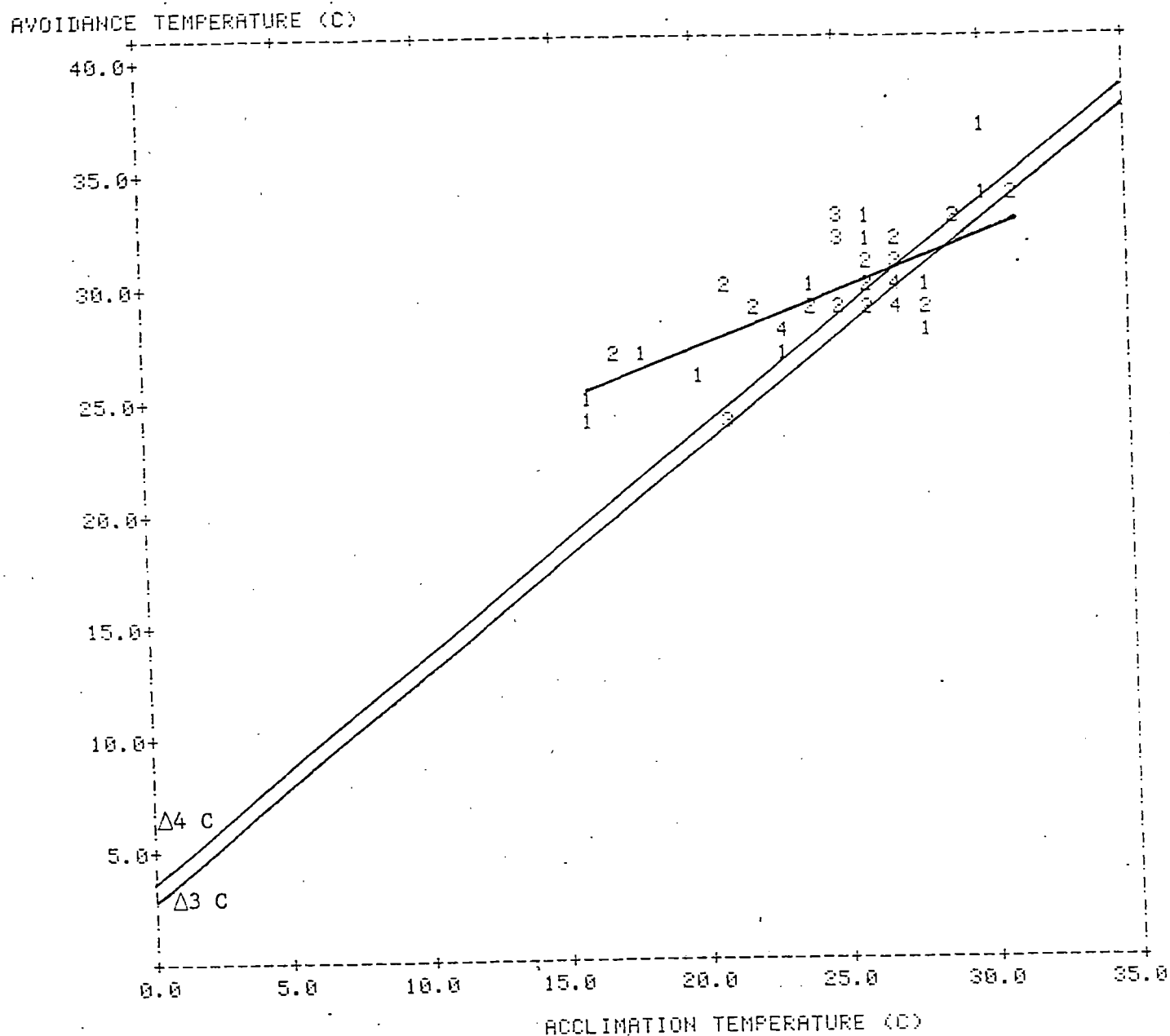


Figure 21 . - The relationship of the temperature (4 C) of the maximum penetrable isotherm to avoidance temperatures of weakfish, *Cynoscion regalis*, plotted against acclimation (ambient) temperatures. The number of data points occurring at a specific avoidance temperature is indicated numerically. The regression line of estimated avoidance temperature using the components in Table 39 is also shown.

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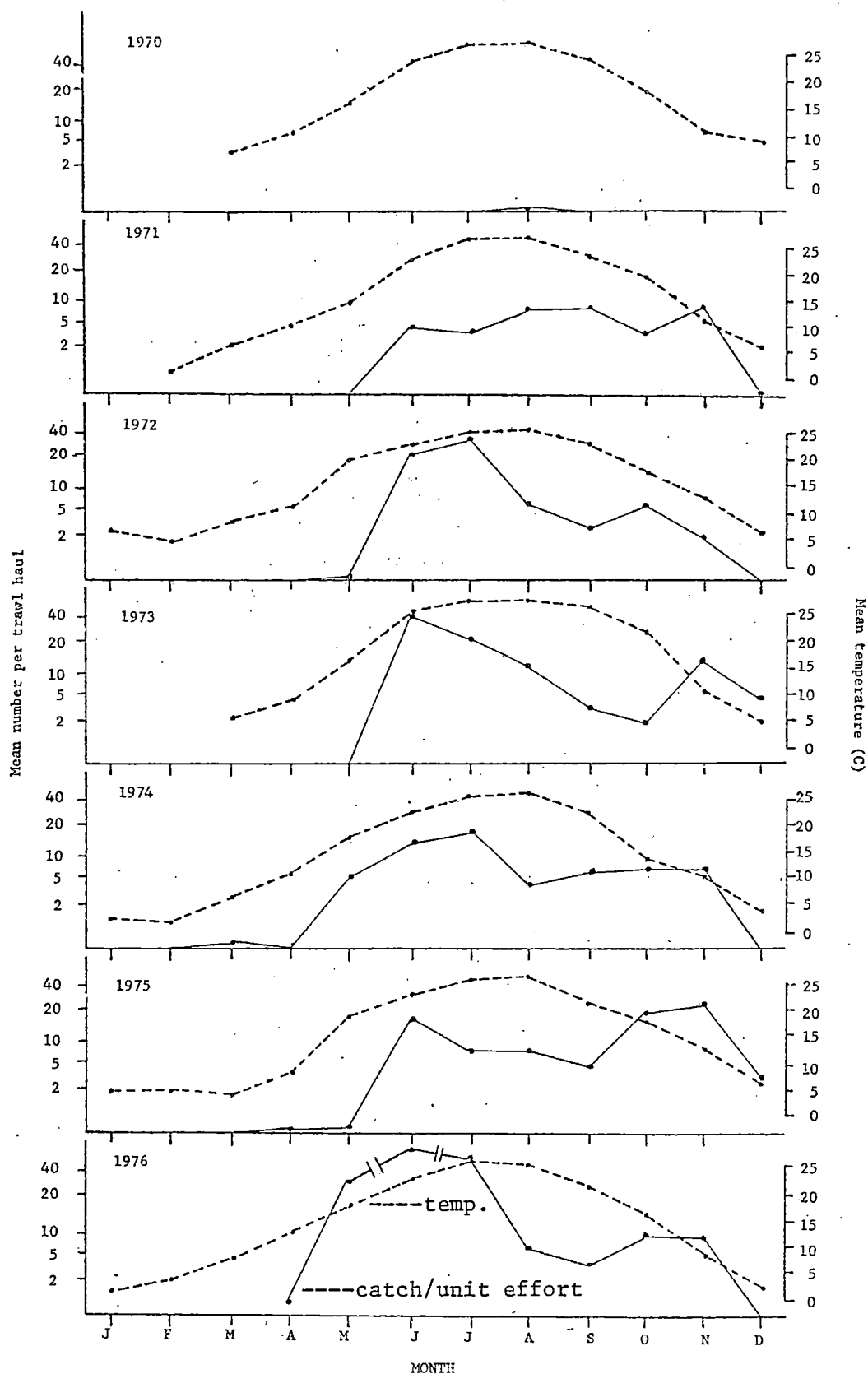
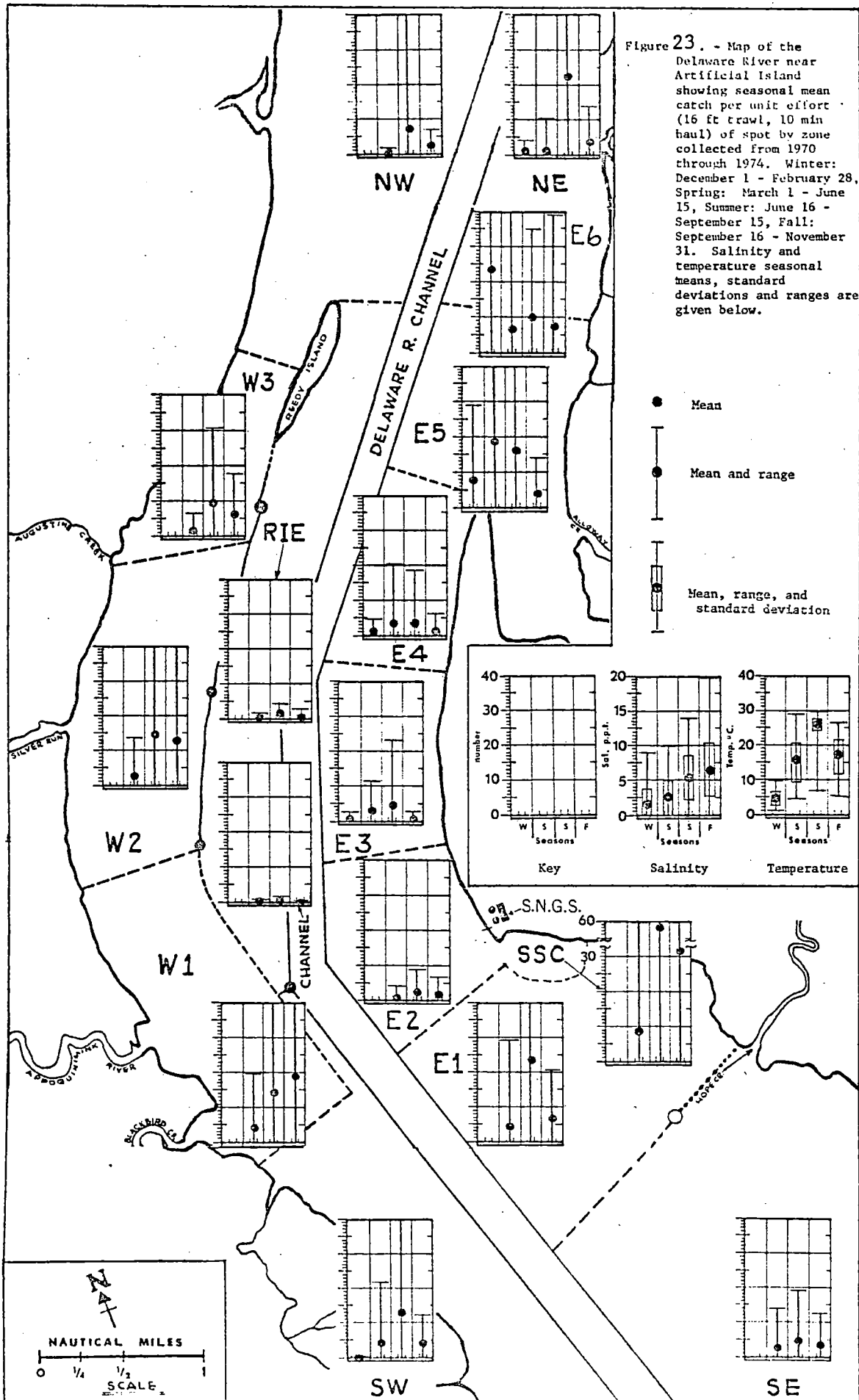


Figure 22. - Mean temperature (C) by year and monthly mean catch per unit effort (16-ft trawl, 10-min haul) of spot, Leiostomus xanthurus, taken in the Delaware River near the Salem Nuclear Generating Station, 1970 through 1976.



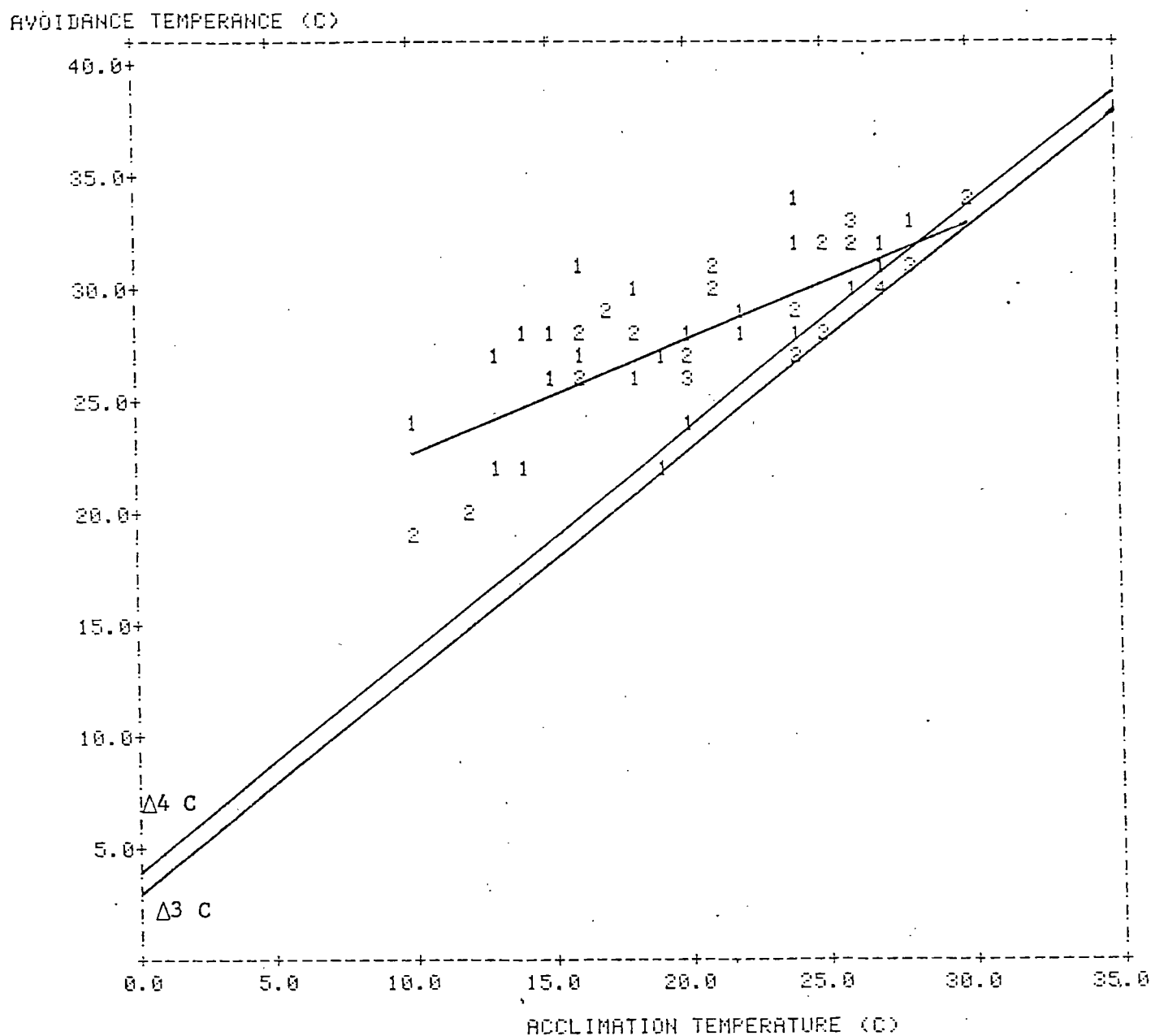


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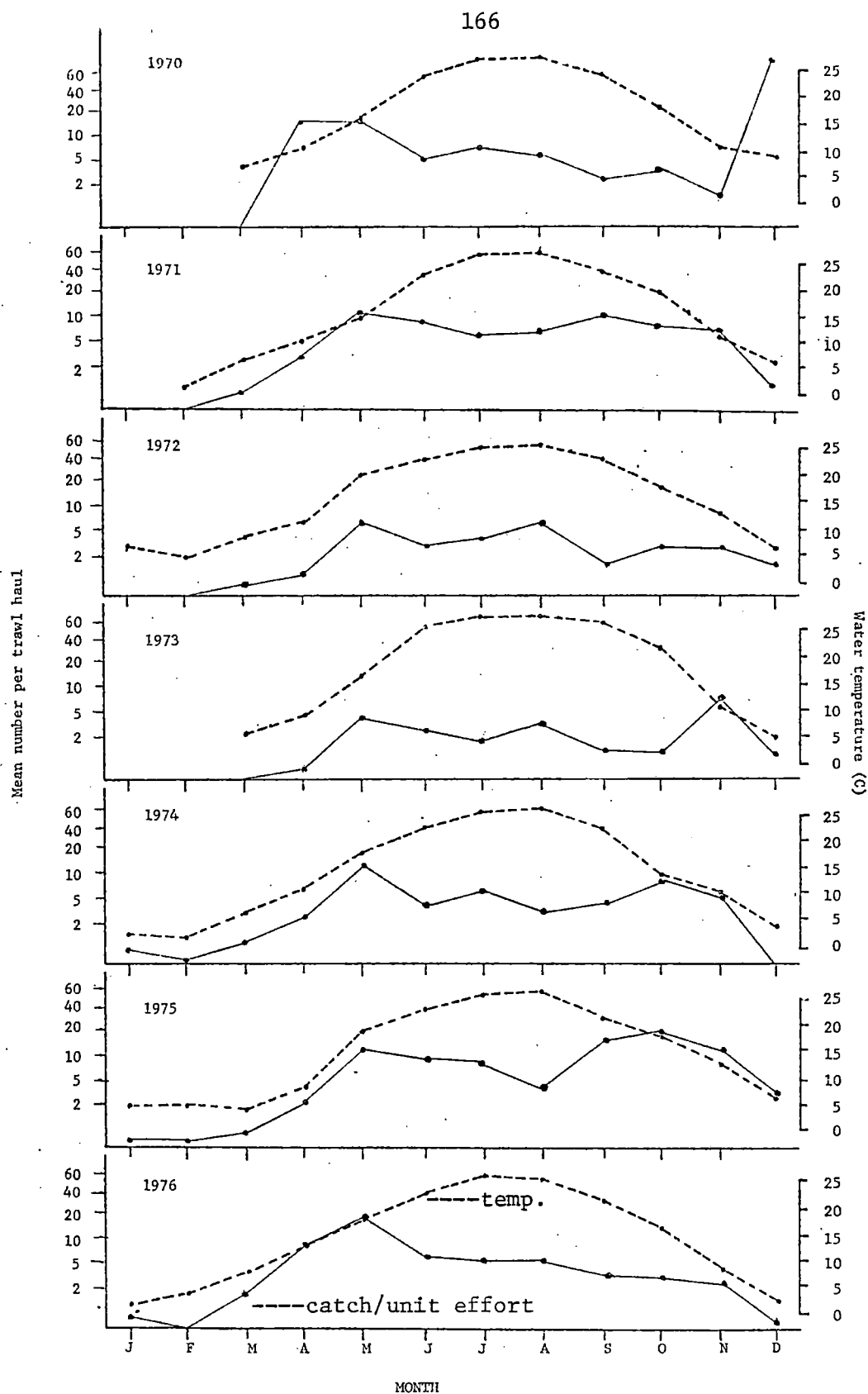
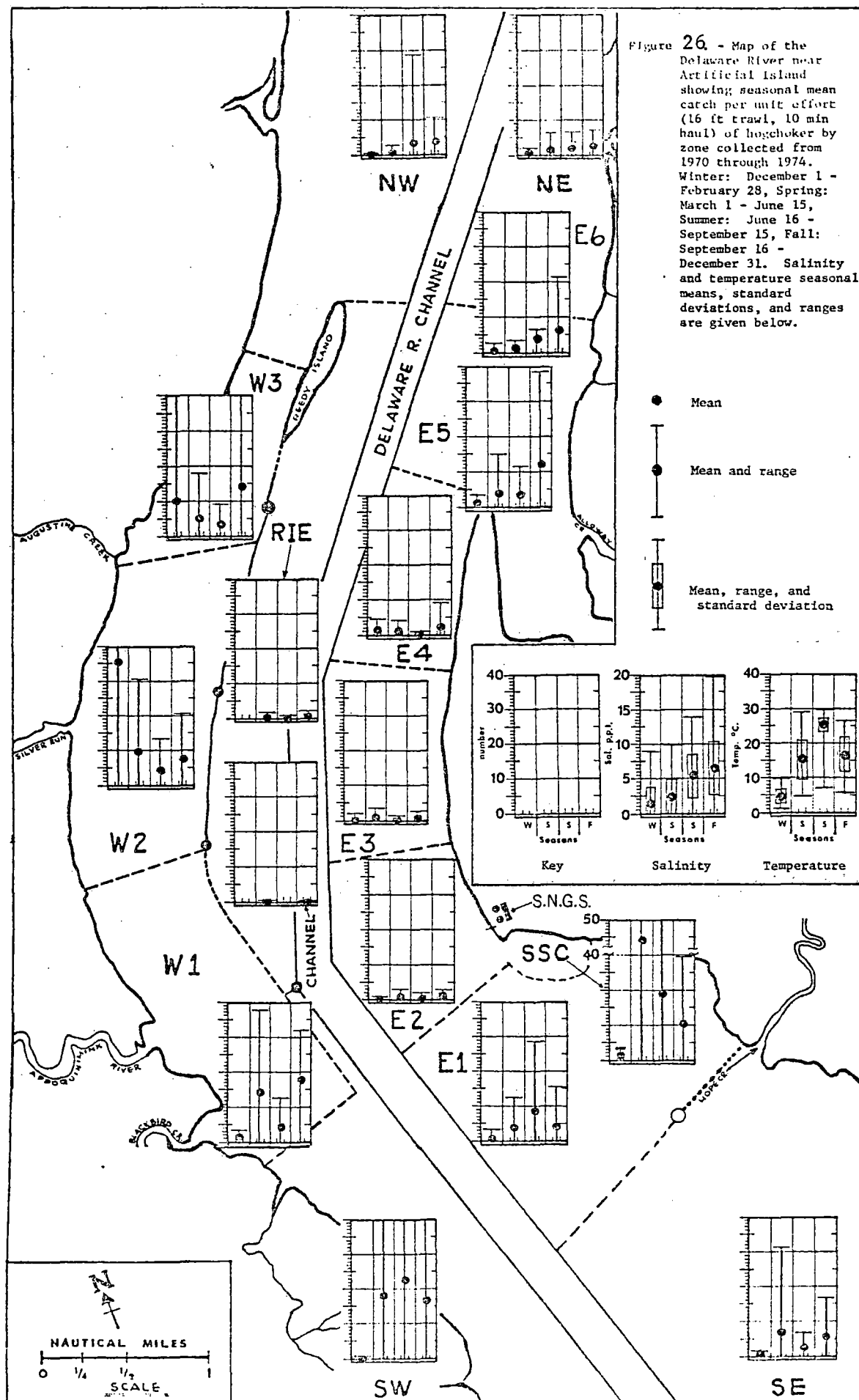


Figure 25. - Mean temperature (C) by year and monthly mean catch per unit effort (16-ft trawl, 10-min-haul) of hogchoker, *Trinectes maculatus*, taken in the Delaware River near the Salem Nuclear Generating Station, 1970 through 1976.



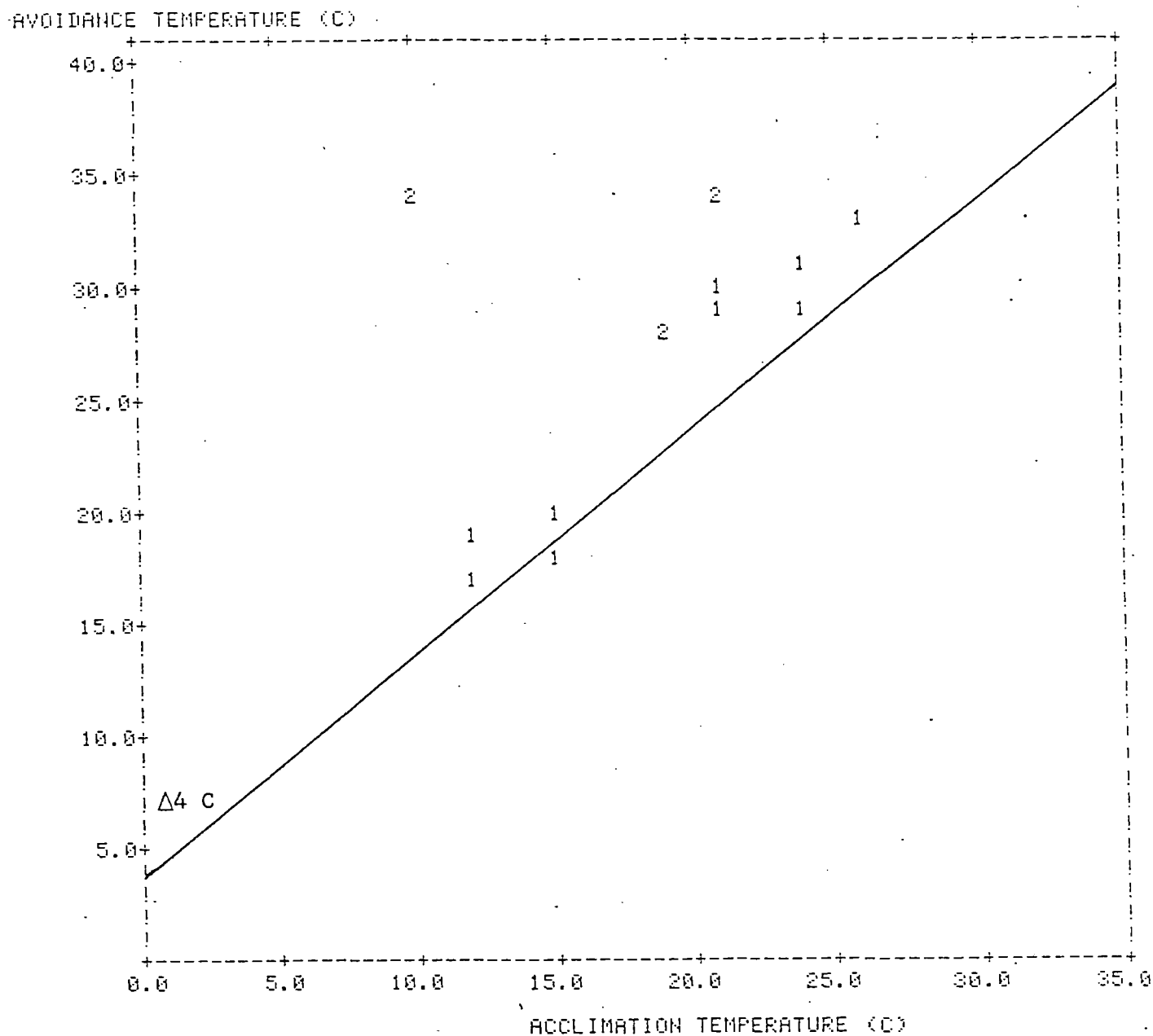


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A REPORT ON
THE SALEM NUCLEAR GENERATING STATION,
ARTIFICIAL ISLAND, SALEM COUNTY, NEW JERSEY

Concern C

Response to EPA Region II concern regarding the effect of plume entrainment on ichthyoplankton and macrozooplankton in the vicinity of Artificial Island.

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CONCERN C

EPA Region II has requested an evaluation of the effect of plume (secondary) entrainment on the major ichthyoplankters and macrozooplankters that occur near Artificial Island. This discussion presents this evaluation for bay anchovy eggs and larvae, Anchoa mitchilli; white perch larvae, Morone americana; weakfish larvae, Cynoscion regalis; and the invertebrates Gammarus spp. and Neomysis americana. It includes the results of laboratory experiments in which test specimens were exposed to time-temperature patterns expected to occur within the plume. In addition, ecological data from 1974 through 1976 are presented and impact on subject populations is assessed.

Experimental studies of secondary entrainment have been conducted since 1976. Generally, test salinity and acclimation temperature were within the range of those observed near S.N.G.S. As of September 1977 a total of 23 tests had been conducted with bay anchovy larvae, 7 with bay anchovy eggs, 17 with white perch larvae, 26 with weakfish larvae, 28 with Gammarus spp., and 58 with N. americana. Collection, holding, and experimental procedures are described in Appendix A. The result of each experimental treatment was analyzed by the Chi-square test ($P \leq .05$). Procedures for determination of secondary entrainment rate within the S.N.G.S. thermal plume are discussed in Appendix C.

The potential effect of secondary entrainment is related to both entrainment rate and exposure time (Figs. 1-4). During normal operation of S.N.G.S., the maximum temperature increase (ΔT) is 16.2 F (9.0 C) at the point of discharge. However, a relatively small portion of the water mass passing the station (and of the organisms contained) will be exposed to elevated temperatures. When two units are operating (1,110,000 gpm/unit) less than 8% of the average tidal flow (450,000

cfs, U.S.A.E. 1959) will be affected by the plume (Table 1). Of this portion, approximately 57% will be heated by less than 4.0 F (2 C) which is within the normal daily ambient range. Exposure time will be greatest during slack tide (current velocity 0.0-0.5 fps) which occurs for approximately 17 minutes per tide (Table 2, EG&G 1976a, 1976b, 1976c). During running tides ambient current minimizes extent and effect of exposure. Exposure time is further reduced at depth as a result of smaller plume volumes (ARL 1977).

No significant mortality or reduction of populations of these major components of the plankton community is expected because of secondary entrainment. Ecological data indicate that these species utilization of the region near Artificial Island is not limited to or especially associated with the area of the thermal plume. Less than 8% of the tidal flow past the station is expected to be secondarily entrained and of this, only a small fraction will be heated to a biologically detrimental degree. Under experimental conditions of elevated temperatures and varying exposure times, test groups usually experienced mortality no greater than did control groups.

Species Discussion

Bay anchovy: Experimental studies with bay anchovy eggs and larvae are difficult to pursue in that specimens are fragile and are difficult to collect and rear to a condition suitable for experimentation. Natural mortality rates are high. The generation of these data on bay anchovy eggs and larvae paralleled the continuing development of techniques for procuring and handling.

Temperature, salinity, and mean density ($\bar{n}/m^3$) data for eggs of the bay anchovy, Anchoa mitchilli, are presented in Tables 3 through 5, and Figure 5. Bay anchovy eggs were taken in collections from May through October, 1974 through 1976. Observed temperature during periods of occurrence ranged from 17.0 C (62.6 F) to 30.2 C (86.4 F). Greatest density has occurred from late June through early August when temperature exceeds 20.0 C (68.0 F).

Eggs of the bay anchovy occur throughout the region near Artificial Island; however, they are generally less abundant than further downbay (Schuler et al. 1975). Distribution data from the Artificial Island region from 1972 through 1976 demonstrate that high densities of bay anchovy eggs in this region are not limited to the area of the thermal plume (Schuler et al. 1975; Maiden et al. 1977; Maiden and Randle 1978).

Results of simulated secondary entrainment tests with bay anchovy eggs are given in Table 6. Seven experiments (20 treatments) were conducted at an acclimation temperature of 27.0 C (80.6 F). Eggs were exposed to Δ temperatures of 1.5 C (2.7 F) to 7.0 C (12.6 F) for 0.5, 1.0, and 4.0 hours. Observed hatching success within treatments ranged from 76% to 100% (Table 7). Chi-square analysis indicated no significant difference ($P \leq .05$) in hatching success between experimental treatments

and controls (Table 8); therefore, plume induced egg mortality is expected to be slight.

Temperature, salinity, and mean density ($\bar{n}/m^3$) data for larvae of the bay anchovy are presented in Tables 3 through 5. Bay anchovy larvae were taken in collections from May through December, 1974 through 1976. Observed temperature during periods of occurrence ranged from 6.0 C (42.8 F) to 30.1 C (86.2 F). Greatest density occurred from June through August when temperature exceeds 20.0 C (68.0 F).

Larvae of the bay anchovy occur throughout the region near Artificial Island (Schuler et al. 1975). High densities have been recorded throughout the study area; however, no pattern of abundance is apparent. Distribution data from the Artificial Island region from 1972 through 1976 demonstrate that high densities of bay anchovy larvae in this region are not limited to the area of the thermal plume (Schuler et al. 1975; Maiden et al. 1977; Maiden and Randle 1978).

Results of simulated secondary entrainment tests with bay anchovy larvae are given in Table 9, and Figures 7 through 10. Twenty-three experiments (68 treatments) were conducted at acclimation temperatures of 19.0 C (66.2 F) to 26.0 C (78.8 F). Four experiments were observed for initial effects only. Larvae were exposed to Δ temperatures of 2.0 C (3.6 F) to 8.0 C (14.4 F) for 0.5, 1.0, and 4.0 hours. Observed mortality within treatments ranged from zero to 89% (Tables 10-11). Nine of the 68 experimental treatments resulted in mortality significantly higher ($P \leq .05$) than controls. One exhibited mortality lower than the control. The observed mortality does not appear clearly related to acclimation temperature, experimental Δ temperature or exposure time (Table 12). Considering the low number of significant differences,

no pattern of mortality can be inferred for the time-temperature regimes employed in the experimental studies.

All available ecological and experimental data indicate that eggs and larvae of the bay anchovy will experience little or no mortality when exposed to the S.N.G.S. thermal plume under normal operating conditions. No adverse effect on the adult population is expected.

White perch: Temperature, salinity, and mean density ($\bar{n}/m^3$) data for larvae of the white perch, Morone americana, are presented in Tables 3 through 5, and Figure 11. White perch larvae were taken in collections during April through July, 1974 through 1976. Observed temperature during periods of occurrence ranged from 10.0 C (50.0 F) to 27.2 C (81.0 F). Greatest density occurred from April through May at a temperature range of approximately 10.0 C (50.0 F) to 20.0 C (68.0 F).

Larvae of the white perch occur throughout the region near Artificial Island (Schuler et al. 1975). Distribution data from the Artificial Island region from 1972 through 1976 demonstrate that high densities of white perch larvae in this region are not limited to the area of the thermal plume (Schuler et al. 1975; Maiden et al. 1977; Maiden and Randle 1978).

Results of simulated secondary entrainment tests with white perch larvae are given in Table 13, and Figures 12 through 15. Seventeen experiments (48 treatments) were conducted at acclimation temperatures of 15.0 C (59.0 F) to 18.0 C (64.4 F). Larvae were exposed to Δ temperatures of 2.0 C (3.6 F) to 8.0 C (14.4 F) for 0.5, 1.0, and 4.0 hours. Observed mortality within treatments ranged from zero to 55% (Table 14). However, Chi-square analysis indicated no significant difference ($P \leq .05$) in

mortality between experimental treatments and controls (Table 15).

No effect of simulated entrainment could be determined.

All available ecological and experimental data indicate that white perch larvae will experience little or no mortality when exposed to the S.N.G.S. thermal plume under normal operating conditions. No adverse effect on the adult population is expected.

Weakfish: Experimental studies with weakfish larvae are difficult to pursue in that specimens are fragile and are difficult to rear and maintain. Natural mortality rates are high. The generation of these data on weakfish larvae paralleled the continuing development of techniques for obtaining and handling.

Temperature, salinity, and mean density ($\bar{n}/m^3$) data for larvae of weakfish, Cynoscion regalis, are presented in Tables 3 through 5, and Figure 16. Weakfish larvae were taken in collections during May through September, 1974 through 1976. Observed temperature during periods of occurrence ranged from 20.0 C (68.0 F) to 28.0 C (82.4 F). Greatest density occurred from late May through early August when temperature exceeded 20.0 C (68.0 F).

Weakfish larvae occur throughout the region near Artificial Island. However, densities are somewhat greater in regions to the south, reflecting the downbay origin of this species (Schuler et al. 1975). Distribution data from Artificial Island region from 1972 through 1976 demonstrate that high densities of weakfish larvae in this region are not limited to the area of the thermal plume (Schuler et al. 1975; Maiden et al. 1977; Maiden and Randle 1978).

Results of simulated secondary entrainment tests with weakfish larvae are given in Table 16, and Figures 17 through 20. Twenty-six

experiments (77 treatments) were conducted at acclimation temperatures of 20.0 C (68.0 F) to 22.0 C (71.6 F). Larvae were exposed to Δ temperatures of 2.0 C (3.6 F) to 8.0 C (14.4 F) for 0.5, 1.0, and 3.5-4.0 hours.

Considering the high degree of mortality in weakfish larvae under holding conditions, 16 experiments were observed for initial effects only. Initial mortality, observed immediately after exposure, ranged from zero to 30% (Table 17). Latent mortality within treatments ranged from zero to 68% for larvae held for 24 hours after testing (Table 18). Chi-square indicated that four of the 77 experimental treatments resulted in mortality significantly higher ($P \leq .05$) than respective controls. The observed mortality does not appear clearly related to acclimation temperature, experimental Δ temperature or exposure time (Table 19). Considering the low number of significant differences, no pattern of mortality can be inferred for the time-temperature regimes employed in the experimental studies.

All available ecological and experimental data indicate that larvae of the weakfish will experience little or no mortality when exposed to the S.N.G.S. thermal plume under normal operating conditions. No adverse effect on the adult population is expected.

Gammarus spp: Temperature, salinity, and mean density ($\bar{n}/100m^3$) data for Gammarus spp. are presented in Table 20 through 22, and Figure 21. Gammarus spp. were taken throughout the year in 1974 through 1976. Observed temperatures during periods of occurrence ranged from 0.0 C (32.0 F) to 30.2 C (86.4 F). No pattern of seasonal abundance was apparent.

Gammarus spp. occur throughout the region near Artificial Island (Schuler et al. 1975). Cronin et al. (1962) report that most of the riverine population occurs in the low salinity region (1-4 ppt) north of Artificial Island. Distribution data from the Artificial Island region from 1972 through 1976 demonstrate that high densities of Gammarus spp. in this region are not limited to the area of the thermal plume (Schuler et al. 1975; Browne et al. 1977, 1978).

Results of simulated secondary entrainment tests with Gammarus spp. are given in Table 23, and Figures 22 through 25. Twenty-eight experiments (84 treatments) were conducted at acclimation temperatures of 7.0 C (44.6 F) to 25.0 C (77.0 F). Specimens were exposed to Δ temperatures of 2.0 C (3.6 F) to 8.0 C (14.4 F) for 0.5, 1.0, and 4.0 hours. Observed mortality within treatments ranged from zero to 30% (Table 24). Chi-square analysis indicated that six of the 84 treatments resulted in mortality higher ($P \leq .05$) than respective controls. Six resulted in mortality significantly lower than controls. The observed mortality did not appear clearly related to acclimation temperature, experimental Δ temperature, or exposure time (Table 25). Considering the low number of significant differences, no pattern of mortality can be inferred for the time-temperature regimes employed in the experimental studies. Thermal shock experiments indicate that Gammarus spp. can withstand elevated temperatures (up to 36 C) for periods longer than will occur under actual field conditions (Table 26).

All available ecological and experimental data indicate that Gammarus spp. will experience little or no mortality when exposed to the S.N.G.S. thermal plume under normal operating conditions. No adverse effect on densities of Gammarus spp. in the region of Artificial Island is expected.

Neomysis americana: Experimental studies with N. americana, opossum shrimp, are difficult to pursue at higher ambient (acclimation) temperatures. It is difficult to hold sufficient numbers of N. americana for testing at ambient temperatures above 25 C when natural mortality rates are high. Cannibalism further reduces potential holding time and hinders interpretation of experimental results. The generation of these data on N. americana paralleled the continuing development of techniques for procuring and handling.

Temperature, salinity, and mean density ($\bar{n}/100\text{m}^3$) data for Neomysis americana, are presented in Tables 20 through 22, and Figure 26. N. americana was taken in collections from January through December, 1974 to 1976. Observed temperature during periods of occurrence ranged from 0.0 C (32.0 F) to 27.2 C (81.0 F). Greatest density occurs during summer when salinities are relatively high.

Neomysis americana occurs throughout the region near Artificial Island (Schuler et al. 1975). Hulburt (1957) showed that greatest densities usually occur considerably south of Artificial Island (river mile 50) near the Cohansey River (river mile 35). Distribution data from the Artificial Island region from 1972 through 1976 demonstrate that high densities of N. americana in this region are not limited to the area of the thermal plume (Schuler et al. 1975; Browne et al. 1977, 1978).

Results of simulated secondary entrainment tests with N. americana are given in Table 27, and Figures 27 through 30. Fifty-eight experiments (170 treatments) were conducted at acclimation temperatures of 2.0 C (35.6 F) to 25.0 C (77.0 F). Specimens were exposed to Δ temperatures of 1.0 C (1.8 F) to 8.5 C (15.3 F) for 0.5, 1.0-1.5, and 4.0-4.5 hours.

Observed mortality within treatments ranged from zero to 100% (Table 28). Thirteen of the 170 experimental treatments resulted in mortality higher ($P \leq .05$) than respective controls (Table 29). One treatment resulted in mortality significantly lower than in the control. Seven of these occurred after 4.0 to 4.5 hour exposures. The highest mean treatment mortality (76%) occurred when acclimation temperature (20.0-25.9 C), exposure time (4-4.5 hours), and Δ temperature (7.0-8.5 C) were highest.

Though no precise estimate of mortality can be determined, test data indicate that some mortality can be expected if N. americana acclimated to 25 C are entrained for periods of 4 hours or more at highest plume temperatures. Actual exposure time to temperatures greater than Δ 4 C is estimated to be less than 15 minutes (Fig. 2).

In thermal shock experiments N. americana acclimated to near maximum ambient temperature (28-29 C) and exposed to temperature greater than 34.0 C (93.2 F) for 1 to 4 hours experienced significant ($P \leq .05$) mortality (Table 26). At maximum ambient temperature of 30.0 C (86.0 F) temperature within the 4 C (8 F) isotherm would be or exceed 34.0 C. However, Figure 2 shows maximum entrainment time at Δ temperatures higher than 4 C (8 F) to be less than 15 minutes. Entrainment rate within the 4 C (8 F) isotherm is, at most, 1.1% of the average tidal flow past S.N.G.S.

Mortality of N. americana as a result of secondary entrainment will be low and experienced by only a small fraction of the population in the region of S.N.G.S. No adverse effect on densities of N. americana in the region of Artificial Island is expected.

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Table 1 . - Estimated rate of secondary entrainment¹ within the S.N.G.S. thermal plume. Percent of average tidal flow entrained is also shown.

No. of Units in Operation	Discharge Rate (GPM/Unit)	Ambient current fps	ΔT of isotherm F	Secondary Entrainment Rate (fps)	Percent of Average ² Tidal Flow Entrained
1	1,110,000 (2,470 cfs)	0.5	2	17,537	3.90
			4	7,534	1.67
			6	4,200	0.93
			8	2,532	0.56
		2.5	2	17,537	3.90
			4	7,534	1.67
			6	4,200	0.93
			8	2,532	0.56
2	1,110,000 (4,946 cfs)	0.5	2	35,117	7.80
			4	15,085	3.35
			6	8,408	1.87
			8	5,070	1.13
		2.5	2	35,117	7.80
			4	15,085	3.35
			6	8,408	1.87
			8	5,070	1.13

¹ = Method of estimate given in Appendix C.

² = Average tidal flow = 450,000 cfs (U.S.A.E.).

Table 2. - Periodicity of tidal currents (fps) during average tide (6 hrs, 12 min) near S.N.G.S., June-October, 1976.*

Tide velocity (fps)	0.0-0.5	0.6-1.0	1.1-1.5	1.6-2.0	2.1-2.5	2.6-3.0	3.0+
Frequency (%)	4.6	35.2	34.1	17.8	4.8	2.7	0.8
hrs:min/tide	0:17	2:11	2:07	1:06	0:18	0:10	0:03
Cumulative % $\longrightarrow$	4.6	39.8	73.9	91.7	96.5	99.2	100.0
$\longleftarrow$	100.0	95.4	60.2	26.1	8.3	3.5	0.8
Cumulative $\longrightarrow$	0:17	2:28	4:35	5:41	5:59	6:09	6:12
hrs:min $\longleftarrow$	6:12	5:55	3:44	1:37	0:31	0:13	0:03

*From EG&G 1976a, 1976b, 1976c.

Table 3. - Mean densities ($\bar{n}/m^3$) by sampling date of Anchoa mitchilli eggs and larvae, Morone americana larvae, and Cynoscion regalis larvae taken during daylight in the Delaware River near Artificial Island, 1974. Observed temperatures (C) and salinities (ppt) by sampling date are included.

Date	23 Jan	13 Feb	12 Mar	26 Mar	11 Apr	23 Apr	7 May	21 May	3 Jun	13 Jun	27 Jun	9 Jul	18 Jul	30 Jul	8 Aug	20 Aug	30 Aug	10 Sep	25 Sep	9 Oct	22 Oct	6 Nov	20 Nov	18 Dec
Temp. °C																								
Max	3.5	4.0	6.0	6.9	9.0	13.0	15.3	22.0	20.6	23.6	24.2	28.0	26.8	27.5	26.5	28.0	29.0	27.0	21.0	17.0	13.4	15.3	15.5	5.2
Min	2.2	2.0	4.5	5.0	7.0	11.0	12.5	17.9	19.2	22.0	21.5	25.0	24.8	24.2	23.5	24.2	26.1	22.8	18.0	13.5	8.0	14.0	10.5	4.5
Sal. (ppt)																								
Max	4.0	5.0	0.0	0.0	0.0	0.0	3.0	4.0	5.0	8.0	6.0	7.0	12.5	13.0	9.0	6.0	10.0	7.0	9.5	6.5	7.0	6.0	7.0	0.0
Min	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.5	3.0	5.0	1.0	2.0	3.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0
Species																								
<u>A. mitchilli</u> (eggs)	-	-	-	-	-	-	-	0.014	0.168	0.262	2.856	15.339	64.552	12.494	4.072	0.184	<0.001	-	-	-	-	-	-	-
<u>A. mitchilli</u>	-	-	-	-	-	-	-	<0.001	0.225	0.037	1.168	6.674	4.519	5.026	4.818	0.341	0.123	0.030	0.019	0.007	-	-	<0.001	-
<u>M. americana</u>	-	-	-	-	-	0.172	-	<0.001	-	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<u>C. regalis</u>	-	-	-	-	-	-	-	0.001	0.003	0.023	0.007	0.015	0.005	0.005	0.005	<0.001	-	-	-	-	-	-	-	-

Table 4. - Mean densities ($\bar{n}/m^3$) by sampling date of Anchoa mitchilli eggs and larvae, Morone americana larvae, and Cynoscion regalis larvae taken during daylight in the Delaware River near Artificial Island, 1975. Observed temperatures (C) and salinities (ppt) by sampling date are included.

Date	30 Jan	20 Feb	17 Mar	31 Mar	14 Apr	28 Apr	13 May	27 May	9 Jun	19 Jun	2 Jul	22 Jul	31 Jul	27 Aug	24 Sep	16 Oct	19 Nov	4 Dec
Temp. °C																		
Max	6.8	6.5	8.0	7.0	11.0	15.5	20.0	22.2	22.2	29.0	30.0	29.0	28.0	30.2	22.5	20.0	17.0	7.2
Min	3.5	2.5	4.0	5.8	5.2	11.9	16.8	20.5	21.0	26.0	24.0	25.2	25.0	25.2	18.8	17.5	12.5	3.7
Sal. (ppt)																		
Max	0.0	7.0	1.0	0.0	7.0	4.0	4.0	6.0	9.0	3.0	6.0	4.0	4.0	8.0	9.0	10.0	6.0	5.0
Min	0.0	0.0	0.0	0.0	3.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0	4.0	4.0	2.0	0.0	0.0
Species																		
<u>A. mitchilli</u> (eggs)	-	-	-	-	-	-	-	0.015	0.396	-	2.254	0.188	0.557	0.128	0.001	-	-	-
<u>A. mitchilli</u>	-	-	-	-	-	-	-	0.003	1.171	0.309	3.373	1.392	0.776	0.339	0.145	0.002	0.001	<0.001
<u>M. americana</u>	-	-	-	-	-	-	0.001	<0.001	-	-	-	-	-	-	-	-	-	-
<u>C. regalis</u>	-	-	-	-	-	-	-	0.034	0.136	0.008	0.030	-	<0.001	<0.001	<0.001	-	-	-

Table 5. - Mean densities ($\bar{n}/m^3$) by sampling date of Anchoa mitchilli eggs and larvae, Morone americana larvae, and Cynoscion regalis larvae taken during daylight in the Delaware River near Artificial Island, 1976. Observed temperature (C) and salinities (ppt) by sampling date are included.

Date	16 Jan	12 Feb	16 Mar	21 Apr	20 May	15 Jun	24 Jun	7 Jul	20 Jul	12 Aug	9 Sep	13 Oct	10 Nov	18 Nov	15 Dec
Temp. °C															
Max	1.9	3.0	8.0	21.0	22.5	27.0	28.7	27.2	27.5	27.0	25.2	17.5	7.5	7.0	2.5
Min	0.5	0.0	6.8	17.0	16.5	22.5	25.2	24.9	25.0	25.8	23.0	16.5	7.0	6.5	1.5
Sal. (ppt)															
Max	6.0	8.0	5.0	7.0	5.0	8.0	8.0	8.0	9.0	10.0	12.0	9.0	2.0	10.0	5.0
Min	0.0	2.0	0.0	1.0	0.0	2.0	2.0	0.0	2.0	2.0	4.0	0.0	0.0	5.0	0.0
Species															
<u>A. mitchilli</u> (eggs)	-	-	-	-	0.093	0.371	1.382	2.378	8.252	1.555	0.030	0.005	-	-	-
<u>A. mitchilli</u>	-	-	-	-	0.003	0.328	1.234	8.208	9.185	0.877	0.013	0.002	-	-	-
<u>M. americana</u>	-	-	-	-	0.008	0.001	<0.001	0.001	-	-	-	-	-	-	-
<u>C. regalis</u>	-	-	-	-	-	<0.001	0.001	0.011	0.017	0.002	<0.001	-	-	-	-

Table 6. - Chronological summary of simulated secondary entrainment experiments on bay anchovy, Anchoa mitchilli eggs.
All tests conducted at saturated dissolved oxygen levels. Hat. = Hatched; Unhat. = unhatched.

DATE	SIZE RANGE (TL IN MM)		SALINITY (PPT)	TEMPERATURE		EXPOSURE TO HIGHER TEMP (HRS.)	TIME (HRS.) FROM START NO. OF TEST		CONTROL		PERCENT HAT.	EXPERIMENTAL		
	MIN.	MAX.		CONT.	EXP.		UNHAT.	NO. HAT.	NO. UNHAT.	NO. HAT.		PERCENT HAT.		
ANCHOA MITCHILLI														
3 AUG 77	-	-	12	27	28.5	0.5	0	25	-	-	20	-	-	-
							0.5	25	0	0		20	0	0
							18	2	23	92		0	20	100
3 AUG 77	-	-	12	27	28.5	1	0	25	-	-	25	-	-	-
							1	25	0	0		25	0	0
							18	2	23	92		1	24	96
3 AUG 77	-	-	12	27	28.5	4	0	25	-	-	21	-	-	-
							4	25	0	0		21	0	0
							18	2	23	92		0	21	100
3 AUG 77	-	-	12	27	31.5	0.5	0	25	-	-	21	-	-	-
							0.5	25	0	0		21	0	0
							17.5	2	23	92		0	21	100
3 AUG 77	-	-	12	27	31.5	1	0	25	-	-	23	-	-	-
							1	25	0	0		23	0	0
							17.5	2	23	92		2	21	91
3 AUG 77	-	-	12	27	31.5	4	0	25	-	-	23	-	-	-
							4	25	0	0		23	0	0
							18	2	23	92		0	23	100
3 AUG 77	-	-	12	27	33.5	0.5	0	25	-	-	19	-	-	-
							0.5	25	0	0		19	0	0
							17.5	2	23	92		3	16	84
3 AUG 77	-	-	12	27	33.5	1	0	25	-	-	15	-	-	-
							1	25	0	0		15	0	0
							17.5	2	23	92		2	13	87

Table 6. - Continued.

DATE	SIZE RANGE (TL IN MM)		SALINITY (PPT)	TEMPERATURE		EXPOSURE TO HIGHER TEMP (HRS.)	TIME (HRS.) FROM START NO.		CONTROL NO. HAT.	PERCENT HAT.	EXPERIMENTAL		
	MIN.	MAX.		CONT.	EXP.		UNHAT.	NO. UNHAT.			NO. HAT.	PERCENT HAT.	
ANCHOA MITCHILLI													
3 AUG 77	-	-	12	27	33.5	4	0	25	-	-	18	-	-
							4	25	0	0	18	0	0
							17.5	2	23	92	4	14	78
4 AUG 77	-	-	12	27	28.5	0.5	0	26	-	-	20	-	-
							0.5	26	0	0	20	0	0
							19	2.5	23.5	90	1	19	95
4 AUG 77	-	-	12	27	28.5	1	0	26	-	-	19	-	-
							1	26	0	0	19	0	0
							19.5	2.5	23.5	90	2	17	89
4 AUG 77	-	-	12	27	29	4	0	26	-	-	18	-	-
							4	26	0	0	18	0	0
							19	2.5	23.5	90	0	18	100
4 AUG 77	-	-	12	27	31.5	0.5	0	26	-	-	22	-	-
							0.5	26	0	0	22	0	0
							19.5	2.5	23.5	90	2	20	91
4 AUG 77	-	-	12	27	31.5	1	0	26	-	-	17	-	-
							1	26	0	0	17	0	0
							19.5	2.5	23.5	90	2	15	88
4 AUG 77	-	-	12	27	32.5	0.5	0	26	-	-	33	-	-
							0.5	26	0	0	33	0	0
							18.5	2.5	23.5	90	7	26	79
4 AUG 77	-	-	12	27	32.5	1	0	26	-	-	18	-	-
							1	26	0	0	18	0	0
							19	2.5	23.5	90	0	18	100
4 AUG 77	-	-	12	27	32.5	4	0	26	-	-	17	-	-
							4	26	0	0	17	0	0
							19	2.5	23.5	90	1	16	94

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Table 6. - Continued.

DATE	SIZE RANGE (TL IN MM)		SALINITY (PPT)	TEMPERATURE		EXPOSURE TO HIGHER TEMP(HRS.)	TIME(HRS.) FROM START NO.		CONTROL NO. HAT.	PERCENT HAT.	EXPERIMENTAL		
	MIN.	MAX.		CONT.	EXP.		UNHAT.	HAT.			NO. UNHAT.	NO. HAT.	PERCENT HAT.
ANCHOA MITCHILLI													
4 AUG 77	-	-	12	27	33.5	0.5	0	26	-	-	21	-	-
							0.5	26	0	0	21	0	0
							19	2.5	23.5	90	2	19	90
4 AUG 77	-	-	12	27	33.5	1	0	26	-	-	35	-	-
							1	26	0	0	35	0	0
							19.5	2.5	23.5	90	6	29	83
4 AUG 77	-	-	12	27	34	4	0	26	-	-	17	-	-
							4	26	0	0	17	0	0
							19	2.5	23.5	90	4	13	76

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Table 7. - Percent of Anchoa mitchilli eggs hatched after exposure to various temperature increases for three exposure times.

AMBIENT TEMP. RANGE (C)		TEMP. INCREASE (C)		CONTROL		EXPERIMENTAL EXPOSURE TIME (HRS.)									
MIN.	MAX.	MIN	MAX.	MEAN	MAX.	MIN.	MEAN	0.5		1.0		4.0		MIN.	MAX.
								MIN.	MAX.	MIN.	MAX.	MIN.	MAX.		
27	27	1	2.5	91	92	90	98	100	95	93	96	89	100	100	100
(80.6	80.7 F)	3	4.5	91	92	90	95	100	91	90	91	88	100	100	100
		5	6	90	90	90	79	79	79	100	100	100	94	94	94
		6.5	7	91	92	90	87	90	84	85	87	83	77	78	76

Table 8. - Number of secondary entrainment treatments with hatching success significantly different from control, based on Chi-square analysis (P.05 level), for eggs of the bay anchovy, Anchoa mitchilli.

Acclimation temp. (C)	Exposure Times (hours)					
	0.5		1.0		4.0	
	No. of Treatments	No. Sig.	No. of Treatments	No. Sig.	No. of Treatments	No. Sig.
Experimental increases in temp. (C)						
2.0-2.5	2	0	2	0	2	0
5.0-6.0	3	0	3	0	2	0
7.0-7.5	<u>2</u>	<u>0</u>	<u>2</u>	<u>0</u>	<u>2</u>	<u>0</u>
Total	7	0	7	0	6	0

Table 9. - Chronological summary of simulated secondary entrainment experiments on larval bay anchovy, Anchoa mitchilli. All tests conducted at saturated dissolved oxygen levels,

DATE	SIZE RANGE (TL IN MM)		SALINITY (PPT)	TEMPERATURE		EXPOSURE TO HIGHER EXP. TEMP(HRS.)	TIME(HRS.) FROM START		CONTROL NO. DEAD	PERCENT MORTALITY	EXPERIMENTAL		
	MIN.	MAX.		CONT.			NO. ALIVE				NO. ALIVE	NO. DEAD	PERCENT MORTALITY
ANCHOA MITCHILLI													
1 JUL 77	3	3	15	20	22	0.5	0	10	-	-	9	-	-
							0.5	10	0	0	9	0	0
							24	6.5	3.5	35	9	0	0
1 JUL 77	3	3	15	20	22	1	0	10	-	-	10	-	-
							1	10	0	0	10	0	0
							24	6.5	3.5	35	9	1	10
1 JUL 77	3	3	15	20	22	4	0	10	-	-	11	-	-
							4	10	0	0	11	0	0
							21	6.5	3.5	35	9	2	18
1 JUL 77	3	3	15	20	24.5	0.5	0	10	-	-	11	-	-
							0.5	10	0	0	11	0	0
							24	6.5	3.5	35	5	6	55
1 JUL 77	3	3	15	20	24.5	1	0	10	-	-	10	-	-
							1	10	0	0	10	0	0
							24	6.5	3.5	35	9	1	10
1 JUL 77	3	3	15	20	24.5	4	0	10	-	-	10	-	-
							4	10	0	0	9	1	10
							24	6.5	3.5	35	6	4	40
1 JUL 77	3	3	15	20	25.5	1	0	10	-	-	10	-	-
							1	10	0	0	10	0	0
							24	6.5	3.5	35	8	2	20
1 JUL 77	3	3	15	20	25.5	4	0	10	-	-	4	-	-
							4	10	0	0	4	0	0
							24	6.5	3.5	35	3	1	25

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Table 9. - Continued.

DATE	SIZE RANGE (TL IN MM)		SALINITY (PPT)	TEMPERATURE		EXPOSURE TO HIGHER TEMP (HRS.)	TIME (HRS.) FROM START OF TEST	NO. ALIVE	CONTROL		PERCENT MORTALITY	EXPERIMENTAL		
	MIN.	MAX.		CONT.	EXP.				NO. DEAD	NO. ALIVE		NO. DEAD	PERCENT MORTALITY	
ANCHOA MITCHILLI														
1 JUL 77	3	3	15	20	27.5	0.5	0	10	-	-	10	-	-	-
							0.5	10	0	0		10	0	0
							.24	6.5	3.5	35		8	2	20
1 JUL 77	3	3	15	20	27.5	1	0	10	-	-	10	-	-	-
							1	10	0	0		10	0	0
							24	6.5	3.5	35		9	1	10
1 JUL 77	3	3	15	20	27.5	3.7	0	10	-	-	10	-	-	-
							3.7	10	0	0		10	0	0
							24	6.5	3.5	35		9	1	10
6 JUL 77	2	3	16	19	21.5	0.5	0	10	-	-	10	-	-	-
							0.5	10	0	0		10	0	0
							24	7	3	30		6	4	40
6 JUL 77	2	3	16	19	21.5	1	0	10	-	-	13	-	-	-
							1	10	0	0		13	0	0
							24	7	3	30		9	4	31
6 JUL 77	2	3	16	19	21.5	4	0	10	-	-	10	-	-	-
							4	10	0	0		9	1	10
							24	7	3	30		6	4	40
6 JUL 77	2	3	16	19	24	0.5	0	10	-	-	13	-	-	-
							0.5	10	0	0		13	0	0
							24	7	3	30		8	5	38
6 JUL 77	2	3	16	19	24	1	0	10	-	-	11	-	-	-
							1	10	0	0		11	0	0
							24	7	3	30		7	4	36
6 JUL 77	2	3	16	19	24	4	0	10	-	-	12	-	-	-
							4	10	0	0		11	1	8
							24	7	3	30		5	7	58

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Table 9. - Continued.

DATE	SIZE RANGE (TL IN MM)		SALINITY (PPT)	TEMPERATURE		EXPOSURE TO HIGHER TEMP(HRS.)	TIME(HRS.) FROM START NO.		CONTROL NO. DEAD	PERCENT MORTALITY	EXPERIMENTAL		
	MIN.	MAX.		CONT.	EXP.		OF TEST	ALIVE			NO. ALIVE	NO. DEAD	PERCENT MORTALITY
ANCHOA MITCHILLI													
6 JUL 77	2	3	16	19	25.5	0.5	0	10	-	-	10	-	-
							0.5	10	0	0	10	0	0
							24	7	3	30	6	4	40
6 JUL 77	2	3	16	19	25.5	1	0	10	-	-	13	-	-
							1	10	0	0	13	0	0
							24	7	3	30	7	6	46
6 JUL 77	2	3	16	19	25.5	4	0	10	-	-	14	-	-
							4	10	0	0	14	0	0
							24	7	3	30	13	1	7
6 JUL 77	2	3	16	19	26.5	0.5	0	10	-	-	16	-	-
							0.5	10	0	0	16	0	0
							24	7	3	30	12	4	25
6 JUL 77	2	3	16	19	26.5	1	0	10	-	-	10	-	-
							1	10	0	0	10	0	0
							24	7	3	30	5	5	50
6 JUL 77	2	3	16	19	26.5	4	0	10	-	-	11	-	-
							4	10	0	0	10	1	9
							24	7	3	30	5	6	55
7 JUL 77	2	3	15	20	22	0.5	0	11	-	-	8	-	-
							0.5	11	0	0	7	1	13
							24	9.5	1.5	14	6	2	25
7 JUL 77	2	3	15	20	22	1	0	11	-	-	8	-	-
							1	11	0	0	8	0	0
							24	9.5	1.5	14	5	3	38
7 JUL 77	2	3	15	20	22	3	0	11	-	-	10	-	-
							3	11	0	0	10	0	0
							24	9.5	1.5	14	9	1	10

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Table 9. - Continued.

DATE	SIZE RANGE (TL IN MM)		SALINITY (PPT)	TEMPERATURE		EXPOSURE TO HIGHER TEMP(HRS.)	TIME(HRS.) FROM START NO. OF TEST ALIVE		CONTROL NO. DEAD	PERCENT MORTALITY	EXPERIMENTAL		
	MIN.	MAX.		CONT.	EXP.						NO. ALIVE	NO. DEAD	PERCENT MORTALITY
ANCHOA MITCHILLI													
7 JUL 77	2	3	15	20	24.5	0.5	0	11	-	-	11	-	-
							0.5	11	0	0	9	2	18
							24	9.5	1.5	14	7	4	36
7 JUL 77	2	3	15	20	24.5	1	0	11	-	-	9	-	-
							1	11	0	0	9	0	0
							24	9.5	1.5	14	8	1	11
7 JUL 77	2	3	15	20	24.5	4	0	11	-	-	9	-	-
							4	11	0	0	9	0	0
							24	9.5	1.5	14	6	3	33
7 JUL 77	2	3	15	20	25.5	0.5	0	11	-	-	9	-	-
							0.5	11	0	0	9	0	0
							24	9.5	1.5	14	1	8	89
7 JUL 77	2	3	15	20	25.5	1	0	11	-	-	11	-	-
							1	11	0	0	10	1	9
							24	9.5	1.5	14	6	5	45
7 JUL 77	2	3	15	20	25.5	4	0	11	-	-	9	-	-
							4	11	0	0	9	0	0
							24	9.5	1.5	14	8	1	11
7 JUL 77	2	3	15	20	27.5	0.5	0	11	-	-	11	-	-
							0.5	11	0	0	10	1	9
							24	9.5	1.5	14	6	5	45
7 JUL 77	2	3	15	20	27.5	1	0	11	-	-	10	-	-
							1	11	0	0	10	0	0
							24	9.5	1.5	14	7	3	30
7 JUL 77	2	3	15	20	27.5	4	0	11	-	-	10	-	-
							4	11	0	0	9	1	10
							24	9.5	1.5	14	7	3	30

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Table 9. - Continued.

DATE	SIZE RANGE (TL IN MM)		SALINITY (PPT)	TEMPERATURE		EXPOSURE TO HIGHER TEMP(HRS.)	TIME(HRS.) FROM START NO. OF TEST		CONTROL NO. DEAD	PERCENT MORTALITY	EXPERIMENTAL		
	MIN.	MAX.		CONT.	EXP.		ALIVE	NO. ALIVE			NO. DEAD	PERCENT MORTALITY	
ANCHOA MITCHILLI													
15 JUL 77	2	3	25	25	27.5	0.5	0	11	-	-	10	-	-
							0.5	11	0	0	10	0	0
							24	10.5	0.5	5	10	0	0
15 JUL 77	2	3	25	25	27.5	1	0	11	-	-	11	-	-
							1	11	0	0	11	0	0
							24	10.5	0.5	5	7	4	36
15 JUL 77	2	3	25	25	27.5	4	0	11	-	-	9	-	-
							4	11	0	0	9	0	0
							24	10.5	0.5	5	6	3	33
15 JUL 77	2	3	25	25	29	0.5	0	11	-	-	10	-	-
							0.5	11	0	0	10	0	0
							24	10.5	0.5	5	10	0	0
15 JUL 77	2	3	25	25	29	1	0	11	-	-	10	-	-
							1	11	0	0	8	2	20
							24	10.5	0.5	5	7	3	30
15 JUL 77	2	3	25	25	29	4	0	11	-	-	11	-	-
							4	11	0	0	11	0	0
							24	10.5	0.5	5	7	4	36
15 JUL 77	2	3	25	25	32	0.5	0	11	-	-	9	-	-
							0.5	11	0	0	9	0	0
							24	10.5	0.5	5	7	2	22
15 JUL 77	2	3	25	25	32	1	0	11	-	-	9	-	-
							1	11	0	0	9	0	0
							24	10.5	0.5	5	9	0	0
15 JUL 77	2	3	25	25	32	4	0	11	-	-	8	-	-
							4	11	0	0	8	0	0
							24	10.5	0.5	5	6	2	25

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Table 9. - Continued.

DATE	SIZE RANGE (TL IN MM)		SALINITY (PPT)	TEMPERATURE		EXPOSURE TO HIGHER TEMP(HRS.)	TIME(HRS.) FROM START OF TEST	NO. ALIVE	CONTROL NO. DEAD	PERCENT MORTALITY	EXPERIMENTAL			
	MIN.	MAX.		CONT.	EXP.						NO. ALIVE	NO. DEAD	PERCENT MORTALITY	
ANCHOA MITCHILLI														
20 JUL 77	2	3	14	23.5	26.5	0.5	0	9	-	-	9	-	-	
							0.5	9	0	0	9	0	0	
							24	8	1	11	8	1	11	
20 JUL 77	2	3	14	23.5	26.5	1	0	9	-	-	10	-	-	
							1	9	0	0	10	0	0	
							24	8	1	11	9	1	10	
20 JUL 77	2	3	14	23.5	26.5	4	0	9	-	-	12	-	-	
							4	9	0	0	11	1	8	
							24	8	1	11	10	2	17	
20 JUL 77	2	3	14	23.5	28	0.5	0	9	-	-	9	-	-	
							0.5	9	0	0	9	0	0	
							24	8	1	11	7	2	22	
20 JUL 77	2	3	14	23.5	28	1	0	9	-	-	10	-	-	
							1	9	0	0	9	1	10	
							24	8	1	11	7	3	30	
20 JUL 77	2	3	14	23.5	28	4	0	9	-	-	8	-	-	
							4	9	0	0	8	0	0	
							24	8	1	11	5	3	38	
20 JUL 77	2	3	14	23.5	29	0.5	0	9	-	-	8	-	-	
							0.5	9	0	0	8	0	0	
							24	8	1	11	6	2	25	
20 JUL 77	2	3	14	23.5	29	1	0	9	-	-	9	-	-	
							1	9	0	0	9	0	0	
							24	8	1	11	9	0	0	
20 JUL 77	2	3	14	23.5	29	4	0	9	-	-	6	-	-	
							4	9	0	0	6	0	0	
							24	8	1	11	6	0	0	

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Table 9. - Continued.

DATE	SIZE RANGE (TL IN MM)		SALINITY (PPT)	TEMPERATURE		EXPOSURE TO HIGHER TEMP (HRS.)	TIME (HRS.) FROM START OF TEST	NO. ALIVE	CONTROL		PERCENT MORTALITY	EXPERIMENTAL		
	MIN.	MAX.		CONT.	EXP.				NO. DEAD	NO. ALIVE		NO. DEAD	PERCENT MORTALITY	
ANCHOA MITCHILLI														
20 JUL 77	2	3	14	23.5	31.5	0.5	0	9	-	-	-	6	-	-
							0.5	9	0	0	-	6	0	0
							24	8	1	11	-	6	0	0
20 JUL 77	2	3	14	23.5	31.5	1	0	9	-	-	-	10	-	-
							1	9	0	0	-	10	0	0
							24	8	1	11	-	5	5	50
20 JUL 77	2	3	14	23.5	31.5	4	0	9	-	-	-	11	-	-
							4	9	0	0	-	11	0	0
							24	8	1	11	-	8	3	27
22 JUL 77	-	-	14	26	28.5	0.5	0	15	-	-	-	15	-	-
							0.5	15	0	0	-	15	0	0
							4	15	0	0	-	15	0	0
22 JUL 77	-	-	14	26	28.5	1	0	15	-	-	-	15	-	-
							1	15	0	0	-	15	0	0
							4	15	0	0	-	14	1	7
22 JUL 77	-	-	14	26	28.5	4	0	15	-	-	-	15	-	-
							4	15	0	0	-	11	4	27
22 JUL 77	-	-	14	26	29.5	0.5	0	15	-	-	-	15	-	-
							0.5	15	0	0	-	15	0	0
							4	15	0	0	-	15	0	0
22 JUL 77	-	-	14	26	29.5	1	0	15	-	-	-	15	-	-
							1	15	0	0	-	15	0	0
							4	15	0	0	-	15	0	0
22 JUL 77	-	-	14	26	29.5	4	0	15	-	-	-	15	-	-
							4	15	0	0	-	15	0	0
22 JUL 77	-	-	14	26	31.5	0.5	0	15	-	-	-	15	-	-
							0.5	15	0	0	-	15	0	0
							4	15	0	0	-	15	0	0

Table 9. - Continued.

DATE	SIZE RANGE (TL IN MM)		SALINITY (PPT)	TEMPERATURE		EXPOSURE TO HIGHER TEMP (HRS.)	TIME (HRS.) FROM START OF TEST		CONTROL		PERCENT MORTALITY	EXPERIMENTAL	
	MIN.	MAX.		CONT.	EXP.		NO.	NO.	NO.	DEAD		NO.	PERCENT
							ALIVE	ALIVE	DEAD	DEAD		ALIVE	MORTALITY
ANCHOA MITCHILLI													
22 JUL 77	-	-	14	26	31.5	1	0	15	-	-	-	15	-
							1	15	0	0		15	0
							4	15	0	0		15	0
22 JUL 77	-	-	14	26	31.5	4	0	15	-	-	-	15	-
							4	15	0	0		14	7
22 JUL 77	-	-	14	26	33	0.5	0	15	-	-	-	15	-
							0.5	15	0	0		15	0
							4	15	0	0		15	0
22 JUL 77	-	-	14	26	33	1	0	15	-	-	-	15	-
							1	15	0	0		15	0
							4	15	0	0		15	0
22 JUL 77	-	-	14	26	33	4	0	15	-	-	-	15	-
							4	15	0	0		15	0

Table 10.

INITIAL PERCENT MORTALITY OF ANCHOA MITCHILLI
EXPOSED TO VARIOUS TEMPERATURE
INCREASES FOR THREE EXPOSURE TIMES

AMBIENT TEMP. RANGE (C)		TEMP. INCREASE (C)		CONTROL		EXPERIMENTAL EXPOSURE TIME (HRS.)									
MIN.	MAX.	MIN	MAX.	MEAN	MAX.	MIN.	MEAN	0.5 MAX.	MIN.	MEAN	1.0 MAX.	MIN.	MEAN	4.0 MAX.	MIN.
23.5	26	1	2.5	0	0	0	0	0	0	7	7	7	27	27	27
(74.3	78.9 F)	3	4.5	0	0	0	0	0	0	0	0	0	0	0	0
		5	6.5	0	0	0	0	0	0	0	0	0	7	7	7
		7	8.5	0	0	0	0	0	0	0	0	0	0	0	0

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Table 11. - Latent percent mortality of Anchoa mitchilli exposed to various temperature increases for three exposure times.

AMBIENT TEMP. RANGE (C)		TEMP. INCREASE (C)		CONTROL		EXPERIMENTAL EXPOSURE TIME (HRS.)									
MIN.	MAX.	MIN	MAX.	MEAN	MAX.	MIN.	MEAN	0.5 MAX.	MIN.	MEAN	1.0 MAX.	MIN.	MEAN	3.0-4.0 MAX.	MIN.
19	20	1	2.5	26	35	14	22	40	0	26	38	10	23	40	10
(66.2	68.1 F)	3	4.5	24	35	14	45	55	36	11	11	10	37	40	33
		5	6.5	26	35	14	56	89	38	37	46	20	25	58	7
		7	8.5	26	35	14	30	45	20	30	50	10	32	55	10
23.5	26	1	2.5	8	11	5	6	11	0	23	36	10	25	33	17
(74.3	78.9 F)	3	4.5	8	11	5	11	22	0	30	30	30	37	38	36
		5	6.5	11	11	11	25	25	25	0	0	0	0	0	0
		7	8.5	8	11	5	11	22	0	25	50	0	26	27	25

Table 12. - Number of secondary entrainment treatments with mortality significantly different from control, based on Chi-square analysis (P.05 level), for larvae of the bay anchovy, Anchoa mitchilli.

Acclimation temp. (C) range	Exposure Times (hours)					
	0.5		1.0		3.0-4.0	
	No. of Treatments	No. Sig.	No. of Treatments	No. Sig.	No. of Treatments	No. Sig.
Experimental increases in temp. (C)						
2.0-2.5	3	1*	3	0	3	0
4.5	2	0	2	0	2	0
5.0-6.5	3	1	4	1	4	0
7.5	<u>3</u>	<u>1</u>	<u>3</u>	<u>0</u>	<u>3</u>	<u>0</u>
Total	11	3	12	1	12	0
Acclimation temp. (C) range 23.5-26.0						
Experimental increases in temp. (C)						
2.5	3	0	3	1	3	2
3.5-4.0	3	0	3	1	3	1
5.0-5.5	2	0	2	0	2	0
7.0-7.5	<u>3</u>	<u>0</u>	<u>3</u>	<u>0</u>	<u>3</u>	<u>0</u>
Total	11	0	11	2	11	3

*Mortality significantly greater in control.

Table 13. - Chronological summary of simulated secondary entrainment experiments on larval white perch, Morone americana. All tests conducted at saturated dissolved oxygen levels.

DATE	SIZE RANGE (TL IN MM)		SALINITY (PPT)	TEMPERATURE		EXPOSURE TO HIGHER TEMP (HRS.)	TIME (HRS.) FROM START NO.		CONTROL NO. DEAD	PERCENT MORTALITY	EXPERIMENTAL		
	MIN.	MAX.		CONT.	EXP.		ALIVE	NO. ALIVE			NO. DEAD	PERCENT MORTALITY	
MORONE AMERICANA													
2 JUN 76	3	5	0	18	24	1	0	17	-	-	28	-	-
							1	17	0	0	28	0	0
							48	15	2	12	27	1	4
7 APR 77	3	4	0	16.5	19	0.5	0	20	-	-	20	-	-
							0.5	20	0	0	20	0	0
							48	19.5	0.5	3	19	1	5
7 APR 77	3	4	0	16.5	19	1	0	20	-	-	20	-	-
							1	20	0	0	20	0	0
							48	19.5	0.5	3	19	1	5
7 APR 77	3	4	0	16.5	19	4	0	20	-	-	20	-	-
							4	20	0	0	20	0	0
							48	19.5	0.5	3	20	0	0
7 APR 77	3	4	0	16.5	21	0.5	0	20	-	-	20	-	-
							0.5	20	0	0	20	0	0
							48	19.5	0.5	3	19	1	5
7 APR 77	3	4	0	16.5	21	1	0	20	-	-	20	-	-
							1	20	0	0	20	0	0
							48	19.5	0.5	3	17	3	15
7 APR 77	3	4	0	16.5	21	4	0	20	-	-	20	-	-
							4	20	0	0	20	0	0
							48	19.5	0.5	3	20	0	0
7 APR 77	3	4	0	16.5	22.5	0.5	0	20	-	-	20	-	-
							0.5	20	0	0	20	0	0
							48	19.5	0.5	3	20	0	0
7 APR 77	3	4	0	16.5	22.5	1	0	20	-	-	20	-	-
							1	20	0	0	20	0	0
							48	19.5	0.5	3	20	0	0

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Table 13. - Continued.

DATE	SIZE RANGE (TL IN MM)		SALINITY (PPT)	TEMPERATURE		EXPOSURE TO HIGHER TEMP(HRS.)	TIME(HRS.) FROM START NO.		CONTROL NO. DEAD	PERCENT MORTALITY	EXPERIMENTAL		
	MIN.	MAX.		CONT.	EXP.		OF TEST	ALIVE			NO. ALIVE	NO. DEAD	PERCENT MORTALITY
MORONE AMERICANA													
7 APR 77	3	4	0	16.5	22.5	4	0	20	-	-	20	-	-
							4	20	0	0	20	0	0
							48	19.5	0.5	3	20	0	0
7 APR 77	3	4	0	16.5	24	0.5	0	20	-	-	20	-	-
							0.5	20	0	0	20	0	0
							48	19.5	0.5	3	20	0	0
7 APR 77	3	4	0	16.5	24	1	0	20	-	-	20	-	-
							1	20	0	0	20	0	0
							48	19.5	0.5	3	20	0	0
7 APR 77	3	4	0	16.5	24	4	0	20	-	-	20	-	-
							4	20	0	0	20	0	0
							48	19.5	0.5	3	20	0	0
11 APR 77	3	5	0	15	17.5	0.5	0	20	-	-	20	-	-
							0.5	20	0	0	20	0	0
							48	19	1	5	19	1	5
11 APR 77	3	5	0	15	17.5	1	0	20	-	-	20	-	-
							1	20	0	0	20	0	0
							48	19	1	5	20	0	0
11 APR 77	3	5	0	15	17.5	4	0	20	-	-	20	-	-
							4	20	0	0	20	0	0
							48	19	1	5	19	1	5
11 APR 77	3	5	0	15	19.5	0.5	0	20	-	-	20	-	-
							0.5	20	0	0	20	0	0
							48	19	1	5	20	0	0

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Table 13. - Continued.

DATE	SIZE RANGE (TL IN MM)		SALINITY (PPT)	TEMPERATURE		EXPOSURE TO HIGHER TEMP(HRS.)	TIME(HRS.) FROM START NO. OF TEST		CONTROL NO. DEAD	PERCENT MORTALITY	EXPERIMENTAL		
	MIN.	MAX.		CONT.	EXP.		ALIVE	NO. ALIVE			NO. DEAD	PERCENT MORTALITY	
MORONE AMERICANA													
11 APR 77	3	5	0	15	19.5	1	0	20	-	-	20	-	-
							1	20	0	0	20	0	0
							48	19	1	5	19	1	5
11 APR 77	3	5	0	15	19.5	4	0	20	-	-	20	-	-
							4	20	0	0	19	1	5
							48	19	1	5	19	1	5
11 APR 77	3	5	0	15	21.5	0.5	0	20	-	-	20	-	-
							0.5	20	0	0	20	0	0
							48	19	1	5	19	1	5
11 APR 77	3	5	0	15	21.5	1	0	20	-	-	20	-	-
							1	20	0	0	20	0	0
							48	19	1	5	20	0	0
11 APR 77	3	5	0	15	21.5	4	0	20	-	-	20	-	-
							4	20	0	0	20	0	0
							48	19	1	5	19	1	5
11 APR 77	3	5	0	15	23	0.5	0	20	-	-	20	-	-
							0.5	20	0	0	20	0	0
							48	19	1	5	19	1	5
11 APR 77	3	5	0	15	23	1	0	20	-	-	20	-	-
							1	20	0	0	19	1	5
							48	19	1	5	17	3	15
11 APR 77	3	5	0	15	23	4	0	20	-	-	20	-	-
							4	20	0	0	20	0	0
							48	19	1	5	19	1	5
18 APR 77	3	5	0	16.5	19	0.5	0	20	-	-	20	-	-
							0.5	20	0	0	20	0	0
							48	14	6	30	17	3	15

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Table 13 --- Continued.

DATE	SIZE RANGE (TL IN MM)		SALINITY (PPT)	TEMPERATURE		EXPOSURE TO HIGHER TEMP(HRS.)	TIME(HRS.) FROM START NO. OF TEST ALIVE		CONTROL NO. DEAD	PERCENT MORTALITY	EXPERIMENTAL		
	MIN.	MAX.		CONT.	EXP.		NO.	NO.			NO.	PERCENT MORTALITY	
MORONE AMERICANA													
18 APR 77	3	5	0	16.5	19	1	0	20	-	-	20	-	-
							1	20	0	0	20	0	0
							48	14	6	30	10	10	50
18 APR 77	3	5	0	16.5	19	4	0	20	-	-	20	-	-
							4	19	1	5	20	0	0
							48	14	6	30	13	7	35
18 APR 77	3	5	0	16.5	21	0.5	0	20	-	-	20	-	-
							0.5	20	0	0	20	0	0
							48	14	6	30	10	10	50
18 APR 77	3	5	0	16.5	21	1	0	20	-	-	20	-	-
							1	20	0	0	20	0	0
							48	14	6	30	16	4	20
18 APR 77	3	5	0	16.5	21	4	0	20	-	-	20	-	-
							4	19	1	5	20	0	0
							48	14	6	30	9	11	55
18 APR 77	3	5	0	16.5	22.5	0.5	0	20	-	-	20	-	-
							0.5	20	0	0	20	0	0
							48	14	6	30	17	3	15
18 APR 77	3	5	0	16.5	22.5	1	0	20	-	-	20	-	-
							1	20	0	0	20	0	0
							48	14	6	30	18	2	10
18 APR 77	3	5	0	16.5	22.5	4	0	20	-	-	20	-	-
							4	19	1	5	20	0	0
							48	14	6	30	15	5	25
18 APR 77	3	5	0	16.5	24	0.5	0	20	-	-	20	-	-
							0.5	20	0	0	20	0	0
							48	14	6	30	15	5	25

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Table 13. - Continued.

DATE	SIZE RANGE (TL IN MM)		SALINITY (PPT)	TEMPERATURE		EXPOSURE TO HIGHER EXP. TEMP(HRS.)	TIME(HRS.) FROM START NO.		CONTROL NO. DEAD	PERCENT MORTALITY	EXPERIMENTAL		
	MIN.	MAX.		CONT.			NO. ALIVE				NO. ALIVE	NO. DEAD	PERCENT MORTALITY
MORONE AMERICANA													
18 APR 77	3	5	0	16.5	24	1	0	20	-	-	20	-	-
							1	20	0	0	20	0	0
							48	14	6	30	17	3	15
18 APR 77	3	5	0	16.5	24	4	0	20	-	-	20	-	-
							4	19	1	5	18	2	10
							48	14	6	30	11	9	45
25 APR 77	3	5	0	16	18	0.5	0	20	-	-	19	-	-
							0.5	20	0	0	19	0	0
							48	17	3	15	17	2	11
25 APR 77	3	5	0	16	18	1	0	20	-	-	20	-	-
							1	20	0	0	20	0	0
							48	17	3	15	16	4	20
25 APR 77	3	5	0	16	18	4	0	20	-	-	20	-	-
							4	19	1	5	20	0	0
							48	17	3	15	16	4	20
25 APR 77	3	5	0	16	20	4	0	20	-	-	20	-	-
							4	19	1	5	18	2	10
							48	17	3	15	15	5	25
25 APR 77	3	5	0	16	20.5	0.5	0	20	-	-	20	-	-
							0.5	20	0	0	20	0	0
							48	17	3	15	19	1	5
25 APR 77	3	5	0	16	20.5	1	0	20	-	-	20	-	-
							1	20	0	0	20	0	0
							48	17	3	15	17	3	15
25 APR 77	3	5	0	16	22.5	0.5	0	20	-	-	20	-	-
							0.5	20	0	0	19	1	5
							48	17	3	15	14	6	30

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Table 13. - Continued.

DATE	SIZE RANGE (TL IN MM)		SALINITY (PPT)	TEMPERATURE		EXPOSURE TO HIGHER TEMP(HRS.)	TIME(HRS.) FROM START NO.		CONTROL NO. DEAD	PERCENT MORTALITY	EXPERIMENTAL		
	MIN.	MAX.		CONT.	EXP.		OF TEST	ALIVE			NO. ALIVE	NO. DEAD	PERCENT MORTALITY
MORONE AMERICANA													
25 APR 77	3	5	0	16	22.5	1	0	20	-	-	20	-	-
							1	20	0	0	20	0	0
							48	17	3	15	18	2	10
25 APR 77	3	5	0	16	22.5	4	0	20	-	-	20	-	-
							4	19	1	5	18	2	10
							48	17	3	15	15	5	25
25 APR 77	3	5	0	16	24	0.5	0	20	-	-	20	-	-
							0.5	20	0	0	20	0	0
							48	17	3	15	13	7	35
25 APR 77	3	5	0	16	24	1	0	20	-	-	20	-	-
							1	20	0	0	20	0	0
							48	17	3	15	17	3	15
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Table 13. --Continued.

DATE	SIZE RANGE (TL IN MM)		SALINITY (PPT)	TEMPERATURE		EXPOSURE TO HIGHER TEMP(HRS.)	TIME(HRS.) FROM START NO. OF TEST ALIVE		CONTROL NO. DEAD	PERCENT MORTALITY	EXPERIMENTAL		
	MIN.	MAX.		CONT.	EXP.		NO.	NO.			NO.	PERCENT MORTALITY	
MORONE AMERICANA													
25 APR 77	3	5	0	16	22.5	1	0	20	-	-	20	-	-
							1	20	0	0	20	0	0
							48	17	3	15	18	2	10
25 APR 77	3	5	0	16	22.5	4	0	20	-	-	20	-	-
							4	19	1	5	18	2	10
							48	17	3	15	15	5	25
25 APR 77	3	5	0	16	24	0.5	0	20	-	-	20	-	-
							0.5	20	0	0	20	0	0
							48	17	3	15	13	7	35
25 APR 77	3	5	0	16	24	1	0	20	-	-	20	-	-
							1	20	0	0	20	0	0
							48	17	3	15	17	3	15

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Table 14.

LATENT PERCENT MORTALITY OF MORONE AMERICANA
EXPOSED TO VARIOUS TEMPERATURE
INCREASES FOR THREE EXPOSURE TIMES

AMBIENT TEMP. RANGE (C)		TEMP. INCREASE (C)		CONTROL		EXPERIMENTAL EXPOSURE TIME (HRS.)										
MIN.	MAX.	MIN.	MAX.	MEAN	MAX.	MIN.	MEAN	MAX.	MIN.	MEAN	MAX.	MIN.	MEAN	MAX.	MIN.	
15	18	1	2.5	13	30	3	9	15	5	19	50	0	15	35	0	
(59.0	64.5 F)	3	4.5	13	30	3	15	50	0	14	20	5	21	55	0	
		5	6.5	13	30	3	13	30	0	5	10	0	14	25	0	
		7	8.5	13	30	3	16	35	0	11	15	0	17	45	0	

Table 15. - Number of secondary entrainment treatments with mortality significantly different from control, based on Chi-square analysis (P.05 level), for larvae of the white perch, Morone americana.

Acclimation temp. (C) 15.0-18.0	Exposure Times (hours)					
	0.5		1.0		4.0	
	No. of Treatments	No. Sig.	No. of Treatments	No. Sig.	No. of Treatments	No. Sig.
Experimental increases in temp. (C)						
2.0-2.5	4	0	4	0	4	0
4.0-4.5	4	0	4	0	4	0
6.0-6.5	4	0	5	0	4	0
7.5-8.0	<u>4</u>	<u>0</u>	<u>4</u>	<u>0</u>	<u>3</u>	<u>0</u>
Total	16	0	17	0	15	0

Table 16. - Chronological summary of simulated secondary entrainment experiments on larval weakfish, Cynoscion regalis.
All tests conducted at saturated dissolved oxygen levels.

DATE	SIZE RANGE (TL IN MM)		SALINITY (PPT)	TEMPERATURE		EXPOSURE TO HIGHER EXP. TEMP(HRS.)	TIME(HRS.) FROM START NO. OF TEST		CONTROL NO. DEAD	PERCENT MORTALITY	EXPERIMENTAL		
	MIN.	MAX.		CONT.	EXP.		ALIVE	NO. ALIVE			NO. DEAD	PERCENT MORTALITY	
CYNOSCIION REGALIS													
17 JUN 77	1	2	26	22	24.5	0.5	0	20	-	-	20	-	-
							0.5	20	0	0	20	0	0
							4	19.5	0.5	3	19	1	5
17 JUN 77	1	2	26	22	24.5	1	0	20	-	-	20	-	-
							1	20	0	0	20	0	0
							4	19.5	0.5	3	20	0	0
17 JUN 77	1	2	26	22	24.5	4	0	20	-	-	20	-	-
							4	19.5	0.5	3	19	1	5
17 JUN 77	1	2	26	22	26	0.5	0	20	-	-	20	-	-
							0.5	20	0	0	20	0	0
							4	19.5	0.5	3	20	0	0
17 JUN 77	1	2	26	22	26	1	0	20	-	-	20	-	-
							1	20	0	0	20	0	0
							4	19.5	0.5	3	20	0	0
17 JUN 77	1	2	26	22	26	4	0	20	-	-	20	-	-
							4	19.5	0.5	3	19	1	5
17 JUN 77	1	2	26	22	28	0.5	0	20	-	-	20	-	-
							0.5	20	0	0	20	0	0
							4	19.5	0.5	3	20	0	0
17 JUN 77	1	2	26	22	28	1	0	20	-	-	20	-	-
							1	20	0	0	20	0	0
							4	19.5	0.5	3	20	0	0
17 JUN 77	1	2	26	22	28	4	0	20	-	-	20	-	-
							4	19.5	0.5	3	20	0	0

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Table 16. - Continued.

DATE	SIZE RANGE (TL IN MM)		SALINITY (PPT)	TEMPERATURE		EXPOSURE TO HIGHER TEMP(HRS.)	TIME(HRS.) FROM START NO. OF TEST ALIVE		CONTROL NO. DEAD	PERCENT MORTALITY	EXPERIMENTAL		
	MIN.	MAX.		CONT.	EXP.						NO. ALIVE	NO. DEAD	PERCENT MORTALITY
CYNOSCION REGALIS													
17 JUN 77	1	2	26	22	29.5	0.5	0	20	-	-	20	-	-
							0.5	20	0	0	20	0	0
							4	19.5	0.5	3	20	0	0
17 JUN 77	1	2	26	22	29.5	1	0	20	-	-	20	-	-
							1	20	0	0	20	0	0
							4	19.5	0.5	3	20	0	0
17 JUN 77	1	2	26	22	29.5	4	0	20	-	-	20	-	-
							4	19.5	0.5	3	20	0	0
20 JUN 77	1	2	25	20	22	0.5	0	20	-	-	20	-	-
							0.5	20	0	0	20	0	0
							4	19.5	0.5	3	19	1	5
20 JUN 77	1	2	25	20	22	0.5	0	20	-	-	20	-	-
							0.5	20	0	0	20	0	0
							4	19.5	0.5	3	19	1	5
20 JUN 77	1	2	25	20	22	1	0	20	-	-	20	-	-
							1	19.5	0.5	3	19	1	5
							4	19.5	0.5	3	19	1	5
20 JUN 77	1	2	25	20	22	1	0	20	-	-	20	-	-
							1	19.5	0.5	3	20	0	0
							4	19.5	0.5	3	14	6	30
20 JUN 77	1	2	25	20	22	4	0	20	-	-	20	-	-
							4	19.5	0.5	3	19	1	5
20 JUN 77	1	2	25	20	22	4	0	20	-	-	20	-	-
							4	19.5	0.5	3	20	0	0
20 JUN 77	1	2	25	20	24	0.5	0	20	-	-	20	-	-
							0.5	20	0	0	20	0	0
							4	19.5	0.5	3	20	0	0

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Table 16. - Continued.

DATE	SIZE RANGE (TL IN MM)		SALINITY (PPT)	TEMPERATURE		EXPOSURE TO HIGHER TEMP(HRS.)	TIME(HRS.) FROM START OF TEST	NO. ALIVE	CONTROL NO. DEAD	PERCENT MORTALITY	EXPERIMENTAL		
	MIN.	MAX.		CONT.	EXP.						NO. ALIVE	NO. DEAD	PERCENT MORTALITY
CYNOSCION REGALIS													
20 JUN 77	1	2	25	20	24	0.5	0	20	-	-	20	-	-
							0.5	20	0	0	19	1	5
							4	19.5	0.5	3	19	1	5
20 JUN 77	1	2	25	20	24	1	0	20	-	-	20	-	-
							1	19.5	0.5	3	19	1	5
							4	19.5	0.5	3	19	1	5
20 JUN 77	1	2	25	20	24	1	0	20	-	-	20	-	-
							1	19.5	0.5	3	20	0	0
							4	19.5	0.5	3	20	0	0
20 JUN 77	1	2	25	20	24	4	0	20	-	-	20	-	-
							4	19.5	0.5	3	20	0	0
20 JUN 77	1	2	25	20	24	4	0	20	-	-	20	-	-
							4	19.5	0.5	3	19	1	5
20 JUN 77	1	2	25	20	26	0.5	0	20	-	-	20	-	-
							0.5	20	0	0	20	0	0
							4	19.5	0.5	3	20	0	0
20 JUN 77	1	2	25	20	26	0.5	0	20	-	-	20	-	-
							0.5	20	0	0	20	0	0
							4	19.5	0.5	3	18	2	10
20 JUN 77	1	2	25	20	26	1	0	20	-	-	20	-	-
							1	19.5	0.5	3	20	0	0
							4	19.5	0.5	3	19	1	5
20 JUN 77	1	2	25	20	26	1	0	20	-	-	20	-	-
							1	19.5	0.5	3	20	0	0
							4	19.5	0.5	3	20	0	0
20 JUN 77	1	2	25	20	26	4	0	20	-	-	20	-	-
							4	19.5	0.5	3	17	3	15

Table 16. - Continued.

DATE	SIZE RANGE (TL IN MM)		SALINITY (PPT)	TEMPERATURE		EXPOSURE TO HIGHER TEMP(HRS.)	TIME(HRS.) FROM START NO. OF TEST ALIVE		CONTROL NO. DEAD	PERCENT MORTALITY	EXPERIMENTAL		
	MIN.	MAX.		CONT.	EXP.						NO. ALIVE	NO. DEAD	PERCENT MORTALITY
CYNOSCIION REGALIS													
20 JUN 77	1	2	25	20	26	4	0	20	-	-	20	-	-
							4	19.5	0.5	3	19	1	5
20 JUN 77	1	2	25	20	27.5	0.5	0	20	-	-	20	-	-
							0.5	20	0	0	20	0	0
							4	19.5	0.5	3	17	3	15
20 JUN 77	1	2	25	20	27.5	0.5	0	20	-	-	20	-	-
							0.5	20	0	0	20	0	0
							4	19.5	0.5	3	20	0	0
20 JUN 77	1	2	25	20	27.5	1	0	20	-	-	20	-	-
							1	19.5	0.5	3	19	1	5
							4	19.5	0.5	3	18	2	10
20 JUN 77	1	2	25	20	27.5	1	0	20	-	-	20	-	-
							1	19.5	0.5	3	20	0	0
							4	19.5	0.5	3	17	3	15
20 JUN 77	1	2	25	20	27.5	4	0	20	-	-	20	-	-
							4	19.5	0.5	3	20	0	0
20 JUN 77	1	2	25	20	27.5	4	0	20	-	-	20	-	-
							4	19.5	0.5	3	19	1	5
22 JUN 77	1	3	23	20	24.5	0.5	0	18	-	-	19	-	-
							0.5	18	0	0	19	0	0
							21	13	5	28	11	8	42
22 JUN 77	1	3	23	20	24.5	1	0	18	-	-	20	-	-
							1	18	0	0	20	0	0
							21	13	5	28	7	13	65
22 JUN 77	1	3	23	20	24.5	4	0	18	-	-	19	-	-
							0	18	0	0	19	0	0
							21	13	5	28	7	13	65

Table 16. - Continued.

DATE	SIZE RANGE (TL IN MM)		SALINITY (PPT)	TEMPERATURE		EXPOSURE TO HIGHER TEMP(HRS.)	TIME(HRS.) FROM START OF TEST		CONTROL NO. DEAD	PERCENT MORTALITY	EXPERIMENTAL		
	MIN.	MAX.		CONT.	EXP.		NO. ALIVE	NO. ALIVE			NO. DEAD	PERCENT MORTALITY	
CYNOSCION REGALIS													
22 JUN 77	1	3	23	20	25.5	0.5	0	18	-	-	20	-	-
							0.5	18	0	0	19	1	5
							1	18	0	0	18	2	10
							21	13	5	28	10	10	50
22 JUN 77	1	3	23	20	25.5	1	0	18	-	-	23	-	-
							1	18	0	0	22	1	4
							21	13	5	28	10	13	57
22 JUN 77	1	3	23	20	25.5	4	0	18	-	-	13	-	-
							4	18	0	0	13	0	0
							21	13	5	28	11	2	15
23 JUN 77	1	3	23	20	22.5	0.5	0	15	-	-	17	-	-
							0.5	15	0	0	16	1	6
							4	15	0	0	16	1	6
23 JUN 77	1	3	23	20	22.5	1	0	15	-	-	18	-	-
							1	15	0	0	17	1	6
							4	15	0	0	17	1	6
23 JUN 77	1	3	23	20	22.5	4	0	15	-	-	17	-	-
							4	15	0	0	16	1	6
23 JUN 77	1	3	23	20	24	0.5	0	15	-	-	15	-	-
							0.5	15	0	0	15	0	0
							4	15	0	0	15	0	0
23 JUN 77	1	3	23	20	24	1	0	15	-	-	16	-	-
							1	15	0	0	16	0	0
							4	15	0	0	16	0	0

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Table 16. - Continued.

DATE	SIZE RANGE (TL IN MM)		SALINITY (PPT)	TEMPERATURE		EXPOSURE TO HIGHER TEMP(HRS.)	TIME(HRS.) FROM START NO. OF TEST		CONTROL NO. DEAD	PERCENT MORTALITY	EXPERIMENTAL		
	MIN.	MAX.		CONT.	EXP.		ALIVE	NO. ALIVE			NO. DEAD	PERCENT MORTALITY	
CYNOSCIION REGALIS													
23 JUN 77	1	3	23	20	24	4	0	15	-	-	24	-	-
							4	15	0	0	24	0	0
23 JUN 77	1	3	23	20	25	0.5	0	15	-	-	14	-	-
							0.5	15	0	0	14	0	0
							4	15	0	0	14	0	0
23 JUN 77	1	3	23	20	25	1	0	15	-	-	15	-	-
							1	15	0	0	13	2	13
23 JUN 77	1	3	23	20	25	4	0	15	-	-	14	-	-
							4	15	0	0	14	0	0
23 JUN 77	1	3	23	20	27.5	0.5	0	15	-	-	18	-	-
							0.5	15	0	0	17	1	6
							1	15	0	0	16	2	11
							4	15	0	0	16	2	11
23 JUN 77	1	3	23	20	27.5	1	0	15	-	-	16	-	-
							1	15	0	0	15	1	6
							4	15	0	0	15	1	6
23 JUN 77	1	3	23	20	27.5	4	0	15	-	-	19	-	-
							4	15	0	0	18	1	5
30 JUN 77	2	3	15	21	23.5	0.5	0	10	-	-	10	-	-
							0.5	10	0	0	10	0	0
							24	8	2	20	8	2	20
30 JUN 77	2	3	15	21	23.5	1	0	10	-	-	11	-	-
							1	10	0	0	11	0	0
							24	8	2	20	9	2	18
30 JUN 77	2	3	15	21	23.5	4	0	10	-	-	10	-	-
							4	10	0	0	10	0	0
							24	8	2	20	7	3	30

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Table 16. - Continued.

DATE	SIZE RANGE (TL IN MM)		SALINITY (PPT)	TEMPERATURE		EXPOSURE TO HIGHER TEMP(HRS.)	TIME(HRS.) FROM START OF TEST		CONTROL NO. DEAD	PERCENT MORTALITY	EXPERIMENTAL		
	MIN.	MAX.		CONT.	EXP.		NO. ALIVE	NO. ALIVE			NO. DEAD	PERCENT MORTALITY	
CYNOSCIION REGALIS													
30 JUN 77	2	3	15	21	25.5	0.5	0	10	-	-	8	-	-
							0.5	10	0	0	8	0	0
							24	8	2	20	4	4	50
30 JUN 77	2	3	15	21	25.5	1	0	10	-	-	9	-	-
							1	10	0	0	9	0	0
							24	8	2	20	6	3	33
30 JUN 77	2	3	15	21	25.5	4	0	10	-	-	10	-	-
							4	10	0	0	10	0	0
							24	8	2	20	9	1	10
30 JUN 77	2	3	15	21	27.5	0.5	0	10	-	-	10	-	-
							0.5	10	0	0	9	1	10
							24	8	2	20	9	1	10
30 JUN 77	2	3	15	21	27.5	1	0	10	-	-	9	-	-
							1	10	0	0	9	0	0
							24	8	2	20	8	1	11
30 JUN 77	2	3	15	21	27.5	4	0	10	-	-	11	-	-
							4	10	0	0	11	0	0
							24	8	2	20	8	3	27
30 JUN 77	2	3	15	21	28.5	0.5	0	10	-	-	12	-	-
							0.5	10	0	0	12	0	0
							24	8	2	20	10	2	17
30 JUN 77	2	3	15	21	28.5	1	0	10	-	-	11	-	-
							1	10	0	0	11	0	0
							24	8	2	20	9	2	18

Table 16. - Continued.

DATE	SIZE RANGE (TL IN MM)		SALINITY (PPT)	TEMPERATURE		EXPOSURE TO HIGHER TEMP(HRS.)	TIME(HRS.) FROM START NO.		CONTROL		PERCENT MORTALITY	EXPERIMENTAL	
	MIN.	MAX.		CONT.	EXP.		NO. ALIVE	NO. DEAD	NO. ALIVE	NO. DEAD		PERCENT MORTALITY	
CYNOSCION REGALIS													
30 JUN 77	2	3	15	21	28.5	4	0	10	-	-	13	-	-
							4	10	0	0	12	1	8
							24	8	2	20	8	5	38
1 JUL 77	2	3	15	20	22	0.5	0	9	-	-	10	-	-
							0.5	9	0	0	10	0	0
							24	8	1	11	10	0	0
1 JUL 77	2	3	15	20	22	1	0	9	-	-	10	-	-
							1	9	0	0	10	0	0
							24	8	1	11	8	2	20
1 JUL 77	2	3	15	20	22	4	0	9	-	-	10	-	-
							4	9	0	0	10	0	0
							21	8	1	11	9	1	10
1 JUL 77	2	3	15	20	24.5	0.5	0	9	-	-	10	-	-
							0.5	9	0	0	10	0	0
							24	8	1	11	10	0	0
1 JUL 77	2	3	15	20	24.5	1	0	9	-	-	9	-	-
							1	9	0	0	9	0	0
							24	8	1	11	8	1	11
1 JUL 77	2	3	15	20	24.5	4	0	9	-	-	10	-	-
							4	9	0	0	10	0	0
							24	8	1	11	5	5	50
1 JUL 77	2	3	15	20	25.5	1	0	9	-	-	10	-	-
							1	9	0	0	10	0	0
							24	8	1	11	6	4	40
1 JUL 77	2	3	15	20	25.5	4	0	9	-	-	8	-	-
							4	9	0	0	8	0	0
							24	8	1	11	6	2	25

Table 16. - Continued.

DATE	SIZE RANGE (TL IN MM)		SALINITY (PPT)	TEMPERATURE CONT.	EXPOSURE TO HIGHER TEMP(HRS.)	EXPOSURE TEMP(HRS.)	TIME(HRS.) FROM START OF TEST	NO. ALIVE	CONTROL		PERCENT MORTALITY	EXPERIMENTAL		
	MIN.	MAX.							NO. DEAD	NO. ALIVE		NO. DEAD	PERCENT MORTALITY	
CYNOSCION REGALIS														
1 JUL 77	2	3	15	20	27.5	0.5	0	9	-	-	-	10	-	-
							0.5	9	0	0	-	10	0	0
							24	8	1	11	-	4	6	60
1 JUL 77	2	3	15	20	27.5	1	0	9	-	-	-	6	-	-
							1	9	0	0	-	5	1	17
							24	8	1	11	-	4	2	33
1 JUL 77	2	3	15	20	27.5	3.5	0	9	-	-	-	8	-	-
							3.5	9	0	0	-	6	2	25
							24	8	1	11	-	5	3	38

Table 17. INITIAL PERCENT MORTALITY OF CYNOSCION REGALIS
EXPOSED TO VARIOUS TEMPERATURE
INCREASES FOR THREE EXPOSURE TIMES

AMBIENT		TEMP.		CONTROL				EXPERIMENTAL EXPOSURE TIME (HRS.)							
TEMP. RANGE (C)		INCREASE (C)						0.5		1.0			4.0		
MIN.	MAX.	MIN.	MAX.	MEAN	MAX.	MIN.	MEAN	MAX.	MIN.	MEAN	MAX.	MIN.	MEAN	MAX.	MIN.
20	22	1	2.5	2	3	0	5	6	5	10	30	0	4	6	0
(68.0 71.7 F)		3	4.5	2	3	0	1	5	0	2	5	0	3	5	0
		5	6.5	2	3	0	3	10	0	2	5	0	5	15	0
		7	8.5	2	3	0	7	15	0	8	15	0	3	5	0

Table 18. - Latent percent mortality of Cynoscion regalis exposed to various temperature
increases for three exposure times.

AMBIENT		TEMP.		CONTROL				EXPERIMENTAL EXPOSURE TIME (HRS.)							
TEMP. RANGE (C)		INCREASE (C)						0.5	1.0			3.5-4.0			
MIN.	MAX.	MIN	MAX.	MEAN	MAX.	MIN.	MEAN	MAX.	MIN.	MEAN	MAX.	MIN.	MEAN	MAX.	MIN.
20	22	1	2.5	16	20	11	10	20	0	19	20	18	20	30	10
(68.0	71.7 F)	3	4.5	20	28	11	31	50	0	36	65	11	43	68	10
		5	6.5	21	28	11	30	50	10	36	57	11	23	27	15
		7	8.5	16	20	11	38	60	17	26	33	18	38	38	38

Table 19. - Number of secondary entrainment treatments with mortality significantly different from control, based on Chi-square analysis (P.05 level), for larvae of the weakfish, Cynoscion regalis.

Acclimation temp. (C) 20.0-22.0	Exposure Times (hours)					
	0.5		1.0		3.5-4.0	
	No. of Treatments	No. Sig.	No. of Treatments	No. Sig.	No. of Treatments	No. Sig.
Experimental increases in temp. (C)						
2.0-2.5	6	0	6	1	6	0
4.0-4.5	7	0	7	1	7	1
5.0-6.5	6	0	7	0	7	0
7.0-7.5	<u>6</u>	<u>1</u>	<u>6</u>	<u>0</u>	<u>6</u>	<u>0</u>
Total	25	1	26	2	26	1

Table 20. - Mean density (N/100m³) by sampling date of Gammarus spp. and Neomysis americana taken during daylight in the Delaware River near Artificial Island, 1974. Observed temperatures (C) and salinities (ppt) by sampling date are included.

Date	23 Jan	13 Feb	12 Mar	26 Mar	11 Apr	23 Apr	7 May	21 May	3 Jun	13 Jun	27 Jun	9 Jul	18 Jul	30 Jul	8 Aug
Temp. range (C)	2.2-3.5	2.0-3.5	4.5-6.0	5.0-6.9	7.0-9.0	12.0-13.0	13.3-14.5	19.0-22.0	19.2-20.6	22.0-23.0	21.8-24.2	25.0-27.5	25.2-26.6	24.2-27.3	24.8-26.1
Sal. range (ppt)	1.0-2.5	0.0-2.0	0.0	0.0	0.0	0.0	0.0-1.0	0.0-4.0	0.5-4.5	0.8-8.0	2.0-6.0	2.0-6.0	4.5-12.5	6.0-13.0	2.0-6.0
<u>Gammarus</u> spp.	12	4	35	12	5	366	27	19	100	231	284	449	188	1,097	917
<u>Neomysis americana</u>	23	3	0	46	1	0	54	77	1,350	2,342	1,977	3,994	6,930	3,934	1,612

Table 20. - Continued.

Date	20 Aug	30 Aug	10 Sep	23 Sep	9 Oct	22 Oct	6 Nov	20 Nov	18 Dec
Temp. range (C)	25.5-28.0	26.1-30.0	22.8-26.0	20.0-21.0	14.5-16.5	10.8-12.8	14.0-14.8	12.0-15.5	5.0
Sal. range (ppt)	3.0-6.0	3.0-9.0	0.5-7.0	1.0-7.0	1.5-6.0	0.0-5.0	1.0-5.0	2.0-7.0	0.0
<u>Gammarus</u> spp.	311	739	1,008	2,117	160	165	342	338	16
<u>Neomysis americana</u>	3,391	3,381	4,792	5,105	2,354	1,848	2,543	2,745	226

Table 21. - Mean density (N/100m³) by sampling date of Gammarus spp. and Neomysis americana taken during daylight in the Delaware River near Artificial Island, 1975. Observed temperatures (C) and salinities (ppt) by sampling date are included.

Date	30 Jan	20 Feb	17 Mar	31 Mar	14 Apr	28 Apr	13 May	27 May	9 Jun	19 Jun	2 Jul	22 Jul	31 Jul	21 Aug	24 Sep	16 Oct	19 Oct	4 Dec
Temp. (C)																		
Max	6.8	6.5	8.0	6.9	10.8	14.5	18.0	22.2	22.2	29.0	30.0	29.0	28.0	30.2	22.0	18.8	17.0	7.2
Min	3.5	3.0	6.5	6.0	5.2	11.9	16.8	20.5	21.8	26.0	25.2	26.7	25.0	25.2	20.0	17.5	13.0	3.7
Sal. (ppt)																		
Max	0.0	5.0	1.0	5.0	7.0	4.0	4.0	6.0	7.0	3.0	6.0	3.0	4.0	8.0	7.0	10.0	5.0	5.0
Min	0.0	0.0	0.0	1.0	3.0	0.0	1.0	1.0	2.0	0.0	2.0	0.0	1.0	5.0	4.0	5.0	1.0	2.0
Species																		
<u>Gammarus</u> spp.	285	265	462	733	53	940	416	664	2	1,463	27	680	2,670	294	563	4	6	19
<u>Neomysis americana</u>	21	190	71	0	148	154	164	176	2,216	1,354	12,286	3,650	4,690	4,073	15,081	845	1,014	3,534

Table 22. - Mean density (N/100m³) by sampling date of Gammarus spp. and Neomysis americana taken during daylight in the Delaware River near Artificial Island, 1976. Observed temperatures (C) and salinities (ppt) by sampling date are included.

Date	16 Jan	12 Feb	16 Mar	21 Apr	20 May	15 Jun	24 Jun	7 Jul	20 Jul	12 Aug	9 Sep	13 Oct	10 Nov	18 Nov	15 Dec
Temp. (C)															
Max	1.9	3.0	8.0	21.0	22.5	27.0	28.7	27.2	27.5	27.0	25.2	17.5	7.5	7.0	2.5
Min	0.5	0.0	6.8	17.0	16.5	22.5	25.2	24.9	25.0	25.8	23.0	16.5	7.0	6.5	1.5
Sal. (ppt)															
Max	6.0	8.0	5.0	7.0	5.0	8.0	8.0	8.0	9.0	10.0	12.0	9.0	2.0	10.0	5.0
Min	0.0	2.0	1.0	1.0	0.0	2.0	2.0	0.0	2.0	2.0	4.0	0.0	0.0	5.0	0.0
<u>Gammarus</u> spp.	88	10	52	232	1,450	373	60	571	40	225	322	58	1,100	55	392
<u>Neomysis americana</u>	39	11	1,781	257	261	3,878	3,119	5,708	7,524	2,880	2,012	2,932	1,391	3,067	21

Table 23. Chronological summary of simulated secondary entrainment experiments on Gammarus spp.
All tests conducted at saturated dissolved oxygen levels.

DATE	SIZE RANGE (TL IN MM)		SALINITY (PPT)	TEMPERATURE		EXPOSURE TO HIGHER TEMP (HRS.)	TIME (HRS.) FROM START OF TEST		CONTROL		PERCENT MORTALITY	EXPERIMENTAL		
	MIN.	MAX.		CONT.	EXP.		NO.	NO.	NO.	DEAD		NO.	NO.	PERCENT
							ALIVE	ALIVE	DEAD			ALIVE	DEAD	MORTALITY
GAMMARUS SPP.														
15 OCT 76	3	11	2.5	18.5	20.5	0.5	0	30	-	-	-	30	-	-
							0.5	30	0	0	-	30	0	0
							48	26	4	13	-	26	4	13
15 OCT 76	3	11	2.5	18.5	20.5	1	0	30	-	-	-	30	-	-
							1	30	0	0	-	30	0	0
							48	26	4	13	-	27	3	10
15 OCT 76	3	11	2.5	18.5	20.5	4	0	30	-	-	-	30	-	-
							4	30	0	0	-	30	0	0
							48	26	4	13	-	29	1	3
15 OCT 76	3	11	2.5	18.5	22.5	0.5	0	30	-	-	-	30	-	-
							0.5	30	0	0	-	30	0	0
							48	26	4	13	-	26	4	13
15 OCT 76	3	11	2.5	18.5	22.5	1	0	30	-	-	-	30	-	-
							1	30	0	0	-	30	0	0
							48	26	4	13	-	23	7	23
15 OCT 76	3	11	2.5	18.5	22.5	4	0	30	-	-	-	30	-	-
							4	30	0	0	-	30	0	0
							48	26	4	13	-	24	6	20
15 OCT 76	3	11	2.5	18.5	23.5	0.5	0	30	-	-	-	30	-	-
							0.5	30	0	0	-	30	0	0
							48	26	4	13	-	24	6	20
15 OCT 76	3	11	2.5	18.5	23.5	1	0	30	-	-	-	30	-	-
							1	30	0	0	-	30	0	0
							48	26	4	13	-	25	5	17

Table 23. - Continued.

DATE	SIZE RANGE (TL IN MM)		SALINITY (PPT)	TEMPERATURE		EXPOSURE TO HIGHER TEMP (HRS.)	TIME (HRS.) FROM START OF TEST	NO. ALIVE	CONTROL NO. DEAD	PERCENT MORTALITY	EXPERIMENTAL		
	MIN.	MAX.		CONT.	EXP.						NO. ALIVE	NO. DEAD	PERCENT MORTALITY
GAMMARUS SPP.													
15 OCT 76	3	11	2.5	18.5	23.5	4	0	30	-	-	30	-	-
							4	30	0	0	30	0	0
							48	26	4	13	25	5	17
15 OCT 76	3	11	2.5	18.5	25	0.5	0	30	-	-	30	-	-
							0.5	30	0	0	30	0	0
							48	26	4	13	21	9	30
15 OCT 76	3	11	2.5	18.5	25.5	1	0	30	-	-	30	-	-
							1	30	0	0	30	0	0
							48	26	4	13	26	4	13
15 OCT 76	3	11	2.5	18.5	25.5	4	0	30	-	-	30	-	-
							4	30	0	0	30	0	0
							48	26	4	13	25	5	17
3 NOV 76	3	11	1	12.5	15	0.5	0	30	-	-	30	-	-
							0.5	30	0	0	30	0	0
							48	29.5	0.5	2	27	3	10
3 NOV 76	3	11	1	12.5	15	1	0	30	-	-	30	-	-
							1	30	0	0	30	0	0
							48	29.5	0.5	2	24	6	20
3 NOV 76	3	11	1	12.5	15	4	0	30	-	-	30	-	-
							4	30	0	0	30	0	0
							48	29.5	0.5	2	25	5	17
3 NOV 76	3	11	1	12.5	17	0.5	0	30	-	-	30	-	-
							0.5	30	0	0	30	0	0
							48	29.5	0.5	2	27	3	10
3 NOV 76	3	11	1	12.5	17	1	0	30	-	-	30	-	-
							1	30	0	0	30	0	0
							48	29.5	0.5	2	27	3	10

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Table 23. - Continued.

DATE	SIZE RANGE (TL IN MM)		SALINITY (PPT)	TEMPERATURE		EXPOSURE TO HIGHER EXP. TEMP (HRS.)	TIME (HRS.) FROM START NO. OF TEST		CONTROL		PERCENT MORTALITY	EXPERIMENTAL	
	MIN.	MAX.		CONT.	EXP.		ALIVE	NO. DEAD	NO. ALIVE	NO. DEAD		PERCENT MORTALITY	
GAMMARUS SPP.													
3 NOV 76	3	11	1	12.5	17	4	0	30	-	-	30	-	-
							4	30	0	0	30	0	0
							48	29.5	0.5	2	23	7	23
3 NOV 76	3	11	1	12.5	18	0.5	0	30	-	-	30	-	-
							0.5	30	0	0	30	0	0
							48	29.5	0.5	2	25	5	17
3 NOV 76	3	11	1	12.5	18	4	0	30	-	-	30	-	-
							4	30	0	0	30	0	0
							48	29.5	0.5	2	28	2	7
3 NOV 76	3	11	1	12.5	18.5	1	0	30	-	-	30	-	-
							1	30	0	0	30	0	0
							48	29.5	0.5	2	27	3	10
3 NOV 76	3	11	1	12.5	20.5	0.5	0	30	-	-	30	-	-
							0.5	30	0	0	30	0	0
							48	29.5	0.5	2	29	1	3
3 NOV 76	3	11	1	12.5	20.5	1	0	30	-	-	30	-	-
							1	30	0	0	30	0	0
							48	29.5	0.5	2	26	4	13
3 NOV 76	3	11	1	12.5	20.5	4	0	30	-	-	30	-	-
							4	30	0	0	30	0	0
							48	29.5	0.5	2	26	4	13
1 DEC 76	3	11	4	7	9	0.5	0	30	-	-	30	-	-
							0.5	30	0	0	30	0	0
							48	27.5	2.5	8	27	3	10
1 DEC 76	3	11	4	7	9	0.5	0	30	-	-	30	-	-
							0.5	30	0	0	30	0	0
							48	27.5	2.5	8	29	1	3

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Table 23. - Continued.

DATE	SIZE RANGE (TL IN MM)		SALINITY (PPT)	TEMPERATURE		EXPOSURE TO HIGHER TEMP (HRS.)	TIME (HRS.) FROM START NO. OF TEST ALIVE		CONTROL NO. DEAD	PERCENT MORTALITY	EXPERIMENTAL		
	MIN.	MAX.		CONT.	EXP.		NO.	NO.			NO.	PERCENT	
GAMMARUS SPP.													
1 DEC 76	3	11	0	7	9	1	0	30	-	-	30	-	-
							1	30	0	0	30	0	0
							48	27.5	2.5	8	26	4	13
1 DEC 76	3	11	0	7	9	1	0	30	-	-	30	-	-
							1	30	0	0	30	0	0
							48	27.5	2.5	8	28	2	7
1 DEC 76	3	11	4	7	9	4	0	30	-	-	30	-	-
							4	30	0	0	30	0	0
							48	27.5	2.5	8	28	2	7
1 DEC 76	3	11	4	7	9	4	0	30	-	-	30	-	-
							4	30	0	0	30	0	0
							48	27.5	2.5	8	29	1	3
1 DEC 76	3	11	4	7	11	0.5	0	30	-	-	30	-	-
							0.5	30	0	0	30	0	0
							48	27.5	2.5	8	30	0	0
1 DEC 76	3	11	4	7	11	0.5	0	30	-	-	30	-	-
							0.5	30	0	0	30	0	0
							48	27.5	2.5	8	29	1	3
1 DEC 76	3	11	4	7	11	1	0	30	-	-	30	-	-
							1	30	0	0	30	0	0
							48	27.5	2.5	8	30	0	0
1 DEC 76	3	11	4	7	11	1	0	30	-	-	30	-	-
							1	30	0	0	30	0	0
							48	27.5	2.5	8	30	0	0
1 DEC 76	3	11	4	7	11	4	0	30	-	-	30	-	-
							4	30	0	0	30	0	0
							48	27.5	2.5	8	29	1	3

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Table 23. - Continued.

DATE	SIZE RANGE (TL IN MM)		SALINITY (PPT)	TEMPERATURE		EXPOSURE TO HIGHER EXP. TEMP(HRS.)	TIME(HRS.) FROM START NO. OF TEST		CONTROL NO. DEAD	PERCENT MORTALITY	EXPERIMENTAL		
	MIN.	MAX..		CONT.	EXP.		ALIVE	NO. ALIVE			NO. DEAD	PERCENT MORTALITY	

GAMMARUS SPP.													
1 DEC 76	3	11	4	7	11	4	0	30	-	-	30	-	-
							4	30	0	0	30	0	0
							48	27.5	2.5	8	28	2	7
1 DEC 76	3	11	4	7	12.5	0.5	0	30	-	-	30	-	-
							0.5	30	0	0	30	0	0
							48	27.5	2.5	8	30	0	0
1 DEC 76	3	11	4	7	12.5	0.5	0	30	-	-	30	-	-
							0.5	30	0	0	30	0	0
							48	27.5	2.5	8	30	0	0
1 DEC 76	3	11	4	7	12.5	1	0	30	-	-	30	-	-
							1	30	0	0	30	0	0
							48	27.5	2.5	8	28	2	7
1 DEC 76	3	11	4	7	12.5	1	0	30	-	-	30	-	-
							1	30	0	0	30	0	0
							48	27.5	2.5	8	30	0	0
1 DEC 76	3	11	4	7	12.5	4	0	30	-	-	30	-	-
							4	30	0	0	30	0	0
							48	27.5	2.5	8	29	1	3
1 DEC 76	3	11	4	7	12.5	4	0	30	-	-	30	-	-
							4	30	0	0	30	0	0
							48	27.5	2.5	8	26	4	13
1 DEC 76	3	11	4	7	14	0.5	0	30	-	-	30	-	-
							0.5	30	0	0	30	0	0
							48	27.5	2.5	8	28	2	7
1 DEC 76	3	11	4	7	14	0.5	0	30	-	-	30	-	-
							0.5	30	0	0	30	0	0
							48	27.5	2.5	8	27	3	10

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C

Table 23.-- Continued.

DATE	SIZE RANGE (TL IN MM)		SALINITY (PPT)	TEMPERATURE		EXPOSURE TO HIGHER TEMP(HRS.)	TIME(HRS.) FROM START NO.		CONTROL NO. DEAD	PERCENT MORTALITY	EXPERIMENTAL		
	MIN.	MAX.		CONT.	EXP.		ALIVE	NO. ALIVE			NO. DEAD	PERCENT MORTALITY	
GAMMARUS SPP.													
1 DEC 76	3	11	4	7	14	1	0	30	-	-	30	-	-
							1	30	0	0	30	0	0
							48	27.5	2.5	8	28	2	7
1 DEC 76	3	11	4	7	14	1	0	30	-	-	30	-	-
							1	30	0	0	30	0	0
							48	27.5	2.5	8	30	0	0
1 DEC 76	3	11	4	7	14	4	0	30	-	-	30	-	-
							4	30	0	0	30	0	0
							48	27.5	2.5	8	28	2	7
1 DEC 76	3	11	4	7	14	4	0	30	-	-	30	-	-
							4	30	0	0	30	0	0
							48	27.5	2.5	8	28	2	7
24 DEC 76	3	11	0	7	9	0.5	0	30	-	-	30	-	-
							0.5	30	0	0	30	0	0
							48	25.5	4.5	15	27	3	10
24 DEC 76	3	11	0	7	9	0.5	0	30	-	-	30	-	-
							0.5	30	0	0	30	0	0
							48	25.5	4.5	15	24	6	20
24 DEC 76	3	11	4	7	9	1	0	30	-	-	30	-	-
							1	30	0	0	30	0	0
							48	25.5	4.5	15	29	1	3
24 DEC 76	3	11	4	7	9	1	0	30	-	-	30	-	-
							1	30	0	0	30	0	0
							48	25.5	4.5	15	30	0	0
24 DEC 76	3	11	0	7	9	4	0	30	-	-	30	-	-
							4	30	0	0	30	0	0
							48	25.5	4.5	15	26	4	13

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Table 23. - Continued.

DATE	SIZE RANGE (TL IN MM)		SALINITY (PPT)	TEMPERATURE		EXPOSURE TO HIGHER TEMP(HRS.)	TIME(HRS.) FROM START NO.		CONTROL NO. DEAD	PERCENT MORTALITY	EXPERIMENTAL		
	MIN.	MAX.		CONT.	EXP.		OF TEST	ALIVE			NO. ALIVE	NO. DEAD	PERCENT MORTALITY
GAMMARUS SPP.													
24 DEC 76	3	11	0	7	9	4	0	30	-	-	30	-	-
							4	30	0	0	30	0	0
							48	25.5	4.5	15	29	1	3
24 DEC 76	3	11	0	7	11	0.5	0	30	-	-	29	-	-
							0.5	30	0	0	29	0	0
							48	25.5	4.5	15	26	3	10
24 DEC 76	3	11	0	7	11	0.5	0	30	-	-	30	-	-
							0.5	30	0	0	30	0	0
							48	25.5	4.5	15	25	5	17
24 DEC 76	3	11	0	7	11	1	0	30	-	-	30	-	-
							1	30	0	0	30	0	0
							48	25.5	4.5	15	26	4	13
24 DEC 76	3	11	0	7	11	1	0	30	-	-	30	-	-
							1	30	0	0	30	0	0
							48	25.5	4.5	15	25	5	17
24 DEC 76	3	11	0	7	11	4	0	30	-	-	30	-	-
							4	30	0	0	30	0	0
							48	25.5	4.5	15	24	6	20
24 DEC 76	3	11	0	7	11	4	0	30	-	-	30	-	-
							4	30	0	0	30	0	0
							48	25.5	4.5	15	27	3	10
24 DEC 76	3	11	0	7	12.5	0.5	0	30	-	-	30	-	-
							0.5	30	0	0	30	0	0
							48	25.5	4.5	15	23	7	23
24 DEC 76	3	11	0	7	12.5	0.5	0	30	-	-	30	-	-
							0.5	30	0	0	30	0	0
							48	25.5	4.5	15	27	3	10

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Table 23. - Continued.

DATE	SIZE RANGE (TL IN MM)		SALINITY (PPT)	TEMPERATURE		EXPOSURE TO HIGHER TEMP (HRS.)	TIME (HRS.) FROM START		CONTROL NO. DEAD	PERCENT MORTALITY	EXPERIMENTAL		PERCENT MORTALITY
	MIN.	MAX.		CONT.	EXP.		NO. ALIVE	NO. ALIVE			NO. DEAD		
GAMMARUS SPP.													
24 DEC 76	3	11	0	7	12.5	1	0	30	-	-	30	-	-
							1	30	0	0	30	0	0
							48	25.5	4.5	15	23	7	23
24 DEC 76	3	11	0	7	12.5	1	0	30	-	-	30	-	-
							1	30	0	0	30	0	0
							48	25.5	4.5	15	28	2	7
24 DEC 76	3	11	0	7	12.5	4	0	30	-	-	30	-	-
							4	30	0	0	30	0	0
							48	25.5	4.5	15	23	7	23
24 DEC 76	3	11	0	7	12.5	4	0	30	-	-	30	-	-
							4	30	0	0	30	0	0
							48	25.5	4.5	15	27	3	10
24 DEC 76	3	11	0	7	14.5	0.5	0	30	-	-	30	-	-
							0.5	30	0	0	30	0	0
							48	25.5	4.5	15	27	3	10
24 DEC 76	3	11	0	7	14.5	0.5	0	30	-	-	30	-	-
							0.5	30	0	0	30	0	0
							48	25.5	4.5	15	26	4	13
24 DEC 76	3	11	0	7	14.5	1	0	30	-	-	30	-	-
							1	30	0	0	30	0	0
							48	25.5	4.5	15	24	6	20
24 DEC 76	3	11	0	7	14.5	1	0	30	-	-	30	-	-
							1	30	0	0	30	0	0
							48	25.5	4.5	15	26	4	13
24 DEC 76	3	11	0	7	14.5	4	0	30	-	-	30	-	-
							4	30	0	0	30	0	0
							48	25.5	4.5	15	28	2	7

Table 23. --Continued.

DATE	SIZE RANGE (TL IN MM)		SALINITY (PPT)	TEMPERATURE		EXPOSURE TO HIGHER TEMP (HRS.)	TIME (HRS.) FROM START OF TEST		CONTROL NO. DEAD	PERCENT MORTALITY	EXPERIMENTAL		
	MIN.	MAX.		CONT.	EXP.		NO. ALIVE	NO. ALIVE			NO. DEAD	PERCENT MORTALITY	
GAMMARUS SPP.													
24 DEC 76	3	11	0	7	14.5	4	0	30	-	-	30	-	-
							4	30	0	0	30	0	0
							48	25.5	4.5	15	25	5	17
9 SEP 77	3	9	6	25	27.5	0.5	0	20	-	-	20	-	-
							0.5	20	0	0	20	0	0
							48	19.5	0.5	3	19	1	5
9 SEP 77	3	9	6	25	27.5	1	0	20	-	-	20	-	-
							1	20	0	0	20	0	0
							48	19.5	0.5	3	19	1	5
9 SEP 77	3	9	6	25	27.5	4	0	20	-	-	20	-	-
							4	20	0	0	20	0	0
							48	19.5	0.5	3	19	1	5
9 SEP 77	3	9	6	25	29	0.5	0	20	-	-	20	-	-
							0.5	20	0	0	20	0	0
							48	19.5	0.5	3	18	2	10
9 SEP 77	3	9	6	25	29	1	0	20	-	-	20	-	-
							1	20	0	0	20	0	0
							48	19.5	0.5	3	19	1	5
9 SEP 77	3	9	6	25	29	4	0	20	-	-	20	-	-
							4	20	0	0	20	0	0
							48	19.5	0.5	3	20	0	0
9 SEP 77	3	9	6	25	31	0.5	0	20	-	-	20	-	-
							0.5	20	0	0	20	0	0
							48	19.5	0.5	3	18	2	10
9 SEP 77	3	9	6	25	31	1	0	20	-	-	20	-	-
							1	20	0	0	20	0	0
							48	19.5	0.5	3	20	0	0

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Table 23. - Continued.

DATE	SIZE RANGE (TL IN MM)		SALINITY (PPT)	TEMPERATURE		EXPOSURE TO HIGHER TEMP(HRS.)	TIME(HRS.) FROM START NO. OF TEST		CONTROL		PERCENT MORTALITY	EXPERIMENTAL		PERCENT MORTALITY	
	MIN.	MAX.		CONT.	EXP.		ALIVE	DEAD	NO. ALIVE	NO. DEAD					
GAMMARUS SPP.															
9 SEP 77	3	9	6	25	31	4	0	20	-	-	20	-	-	-	
							4	20	0	0		20	0		0
							48	19.5	0.5	3		19	1		5
9 SEP 77	3	9	6	25	32.5	0.5	0	20	-	-	20	-	-	-	
							0.5	20	0	0		20	0		0
							48	19.5	0.5	3		19	1		5
9 SEP 77	3	9	6	25	32.5	1	0	20	-	-	20	-	-	-	
							1	20	0	0		20	0		0
							48	19.5	0.5	3		16	4		20
9 SEP 77	3	9	6	25	32.5	4	0	20	-	-	20	-	-	-	
							4	20	0	0		20	0		0
							48	19.5	0.5	3		16	4		20

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Table 24.

LATENT PERCENT MORTALITY OF GAMMARUS SPP.
EXPOSED TO VARIOUS TEMPERATURE
INCREASES FOR THREE EXPOSURE TIMES

AMBIENT TEMP. RANGE (C)		TEMP. INCREASE (C)		CONTROL		EXPERIMENTAL EXPOSURE TIME (HRS.)									
						0.5		1.0		4.0					
MIN.	MAX.	MIN.	MAX.	MEAN	MAX.	MIN.	MEAN	MAX.	MIN.	MEAN	MAX.	MIN.	MEAN	MAX.	MIN.
7	7	1	2.5	12	15	8	11	20	3	6	13	0	7	13	3
(44.6	44.7 F)	3	4.5	12	15	8	8	17	0	7	17	0	10	20	3
		5	6	12	15	8	8	23	0	9	23	0	12	23	3
		6.5	8.5	12	15	8	10	13	7	10	20	0	9	17	7
12.5	12.5	1	2.5	2	2	2	10	10	10	20	20	20	17	17	17
(54.5	54.6 F)	3	4.5	2	2	2	10	10	10	10	10	10	23	23	23
		5	6	2	2	2	17	17	17	10	10	10	7	7	7
		6.5	8.5	2	2	2	3	3	3	13	13	13	13	13	13
18.5	18.5	1	2.5	13	13	13	13	13	13	10	10	10	3	3	3
(65.3	65.4 F)	3	4.5	13	13	13	13	13	13	23	23	23	20	20	20
		5	6	13	13	13	20	20	20	17	17	17	17	17	17
		6.5	8.5	13	13	13	30	30	30	13	13	13	17	17	17
25	25	1	2.5	3	3	3	5	5	5	5	5	5	5	5	5
(77.0	77.1 F)	3	4.5	3	3	3	10	10	10	5	5	5	0	0	0
		5	6	3	3	3	10	10	10	0	0	0	5	5	5
		6.5	8.5	3	3	3	5	5	5	20	20	20	20	20	20

Table 25. - Number of secondary entrainment treatments with mortality significantly different from control, based on Chi-square analysis (P .05 level), for Gammarus spp.

Acclimation temp. (C) 7.0	Exposure Time (hours)					
	0.5		1.0		4.0	
	No. of Treatments	No. Sig.	No. of Treatments	No. Sig.	No. of Treatments	No. Sig.
Experimental increases in temp. (C)						
2.0	4	0	4	2*	4	0
4.0	4	0	4	2*	4	0
5.5	4	2*	4	0	4	0
7.0-7.5	<u>4</u>	<u>0</u>	<u>4</u>	<u>0</u>	<u>4</u>	<u>0</u>
Total	16	2	16	4	16	0
Acclimation temp. (C) 12.5						
Experimental increases in temp. (C)						
2.5	1	0	1	1	1	1
4.5	1	0	1	0	1	1
5.5-6.0	1	1	1	0	1	0
8.0	<u>1</u>	<u>0</u>	<u>1</u>	<u>1</u>	<u>1</u>	<u>1</u>
Total	4	1	4	2	4	3

*Mortality significantly greater in control.

Table 25. - Continued.

Acclimation temp. (C) 18.5	Exposure Times (hours)					
	0.5		1.0		4.0	
	No. of Treatments	No. Sig.	No. of Treatments	No. Sig.	No. of Treatments	No. Sig.
Experimental increases in temp. (C)						
2.0	1	0	1	0	1	0
4.0	1	0	1	0	1	0
5.0-6.5	2	0	1	0	1	0
7.0	<u>0</u>	<u>0</u>	<u>1</u>	<u>0</u>	<u>1</u>	<u>0</u>
Total	4	0	4	0	4	0
Acclimation temp. (C) 25.0						
Experimental increases in temp. (C)						
2.5	1	0	1	0	1	0
4.0	1	0	1	0	1	0
6.0	1	0	1	0	1	0
7.5	<u>1</u>	<u>0</u>	<u>1</u>	<u>0</u>	<u>1</u>	<u>0</u>
Total	4	0	4	0	4	0

Table 26 . - Percent mortality of Gammarus spp. and Neomysis americana acclimated to 28-29 C (82-84 F) exposed to several elevated temperatures for varying durations. Mortality determined immediately after exposure.

Gammarus spp.

Test Temp. (C)	Exposure Time (hrs)									
	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>10</u>	<u>23</u>	<u>31</u>	<u>48</u>
32					0		10		13	47
33										
34						0	3	6	22	19
							3	50	67	70
35							3		64	100
36	3		6		13	50	77	100		
					10			100		

Neomysis americana

Test Temp. (C)	Exposure Time (hrs)											
	<u>0.25</u>	<u>0.5</u>	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>10</u>	<u>17</u>	<u>22</u>	<u>27</u>	<u>45</u>
30			3								90	100
31												
32			0	0			13	27	97	100		100
										100		
33			23	77	93	100	97	100				
				20	57	73						
34	52	3	64	100								
			100									
35		73	93	100								

Table 27. - Chronological summary of simulated secondary entrainment experiments on opossum shrimp, Neomysis americana.
All tests conducted at saturated dissolved oxygen levels.

DATE	SIZE RANGE (TL IN MM)		SALINITY (PPT)	TEMPERATURE		EXPOSURE TO HIGHER EXP. TEMP(HRS.)	TIME(HRS.) FROM START NO. OF TEST		CONTROL NO. DEAD	PERCENT MORTALITY	EXPERIMENTAL		
	MIN.	MAX.		CONT.				ALIVE			NO. ALIVE	NO. DEAD	PERCENT MORTALITY
NEOMYSIS AMERICANA													
5 OCT 76	7	10	6	19.5	22.5	4	0	47	-	-	49	-	-
							4	47	0	0	47	2	4
							48	44	3	6	39	10	20
5 OCT 76	7	10	6	19.5	23	4	0	47	-	-	47	-	-
							4	47	0	0	44	3	6
							48	44	3	6	37	10	21
5 OCT 76	7	10	6	19.5	24	4	0	47	-	-	48	-	-
							4	47	0	0	48	0	0
							48	44	3	6	40	8	17
5 OCT 76	7	10	6	19.5	25.5	4	0	47	-	-	46	-	-
							4	47	0	0	43	3	7
							48	44	3	6	41	5	11
7 OCT 76	7	10	6	19.5	24.5	0.5	0	50	-	-	49	-	-
							0.5	50	0	0	49	0	0
							48	43.5	6.5	13	42	7	14
7 OCT 76	7	10	6	19.5	24.5	1	0	50	-	-	50	-	-
							1	50	0	0	50	0	0
							48	43.5	6.5	13	43	7	14

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Table 27. - Continued.

DATE	SIZE RANGE (TL IN MM)		SALINITY (PPT)	TEMPERATURE		EXPOSURE TO HIGHER TEMP(HRS.)	TIME(HRS.) FROM START		CONTROL NO. DEAD	PERCENT MORTALITY	EXPERIMENTAL		
	MIN.	MAX.		CONT.	EXP.		NO. ALIVE	NO. ALIVE			NO. DEAD	PERCENT MORTALITY	
NEOMYSIS AMERICANA													
7 OCT 76	7	10	6	19.5	24.5	4	0	50	-	-	50	-	-
							4	50	0	0	48	2	4
							48	43.5	6.5	13	41	9	18
7 OCT 76	7	10	6	19.5	25.5	0.5	0	50	-	-	50	-	-
							0.5	50	0	0	50	0	0
							48	43.5	6.5	13	40	10	20
7 OCT 76	7	10	6	19.5	25.5	1	0	50	-	-	50	-	-
							1	50	0	0	50	0	0
							48	43.5	6.5	13	44	6	12
7 OCT 76	7	10	6	19.5	25.5	4.3	0	50	-	-	50	-	-
							4.3	50	0	0	50	0	0
							48	43.5	6.5	13	44	6	12
7 OCT 76	7	10	6	19.5	27.5	0.5	0	50	-	-	50	-	-
							0.5	50	0	0	50	0	0
							48	43.5	6.5	13	42	8	16
7 OCT 76	7	10	6	19.5	27.5	1	0	50	-	-	49	-	-
							1	50	0	0	49	0	0
							48	43.5	6.5	13	39	10	20

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Table 27. - Continued.

DATE	SIZE RANGE (TL IN MM)		SALINITY (PPT)	TEMPERATURE		EXPOSURE TO HIGHER TEMP(HRS.)	TIME(HRS.) FROM START NO. OF TEST		CONTROL		PERCENT MORTALITY	EXPERIMENTAL		PERCENT MORTALITY	
	MIN.	MAX.		CONT.	EXP.		ALIVE	NO. DEAD	NO. ALIVE	NO. DEAD					
NEOMYSIS AMERICANA															
7 OCT 76	7	10	6	19.5	27.5	4	0	50	-	-	49	-	-		
							4	50	0	0		1	2		
							48	43.5	6.5	13		38	11		22
22 OCT 76	7	10	4	13	15	0.5	0	47.5	-	-	49	-	-		
							0.5	47.5	0	0		0	0		
							48	45.5	2	4		45	4		8
22 OCT 76	7	10	4	13	15	1	0	47.5	-	-	49	-	-		
							1	47.5	0	0		48	1		2
							48	45.5	2	4		46	3		6
22 OCT 76	7	10	4	13	15.5	4.5	0	47.5	-	-	50	-	-	65	
							4.5	47.5	0	0		49	1		2
							48	45.5	2	4		46	4		8
22 OCT 76	7	10	4	13	16.5	0.5	0	47.5	-	-	50	-	-		
							0.5	47.5	0	0		50	0		0
							48	45.5	2	4		43	7		14
22 OCT 76	7	10	4	13	17	1	0	47.5	-	-	50	-	-		
							1	47.5	0	0		49	1		2
							48	45.5	2	4		45	5		10
22 OCT 76	7	10	4	13	17.5	4.5	0	47.5	-	-	50	-	-		
							4.5	47.5	0	0		47	3		6
							48	45.5	2	4		45	5		10
22 OCT 76	7	10	4	13	18.5	0.5	0	47.5	-	-	49	-	-		
							0.5	47.5	0	0		49	0		0
							48	45.5	2	4		43	6		12
22 OCT 76	7	10	4	13	18.5	1	0	47.5	-	-	50	-	-		
							1	47.5	0	0		49	1		2
							48	45.5	2	4		46	4		8

Table 27. - Continued.

DATE	SIZE RANGE (TL IN MM)		SALINITY (PPT)	TEMPERATURE		EXPOSURE TO HIGHER EXP. TEMP(HRS.)	TIME(HRS.) FROM START NO. OF TEST		CONTROL NO. DEAD	PERCENT MORTALITY	EXPERIMENTAL		
	MIN.	MAX.		CONT.	EXP.		ALIVE	NO. ALIVE			NO. DEAD	PERCENT MORTALITY	
NEOMYSIS AMERICANA													
22 OCT 76	7	10	4	13	18.5	4.5	0	47.5	-	-	49	-	-
							4.5	47.5	0	0	45	4	8
							48	45.5	2	4	42	7	14
22 OCT 76	7	10	4	13	20	0.5	0	47.5	-	-	50	-	-
							0.5	47.5	0	0	50	0	0
							48	45.5	2	4	47	3	6
22 OCT 76	7	10	4	13	20	1	0	47.5	-	-	50	-	-
							1	47.5	0	0	50	0	0
							48	45.5	2	4	49	1	2
22 OCT 76	7	10	4	13	20	4.5	0	47.5	-	-	50	-	-
							4.5	47.5	0	0	49	1	2
							48	45.5	2	4	45	5	10
26 OCT 76	3	7	4	12.5	13.5	0.5	0	49	-	-	50	-	-
							0.5	49	0	0	50	0	0
							48	34.5	14.5	30	31	19	38
26 OCT 76	3	7	4	12.5	13.5	1	0	49	-	-	41	-	-
							1	49	0	0	40	1	2
							48	34.5	14.5	30	28	13	32
26 OCT 76	3	7	4	12.5	13.5	4	0	49	-	-	49	-	-
							4	49	0	0	48	1	2
							48	34.5	14.5	30	38	11	22
26 OCT 76	3	7	4	12.5	15	1	0	49	-	-	49	-	-
							1	49	0	0	49	0	0
							48	34.5	14.5	30	14	35	71

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Table 27. - Continued.

DATE	SIZE RANGE (TL IN MM)		SALINITY (PPT)	TEMPERATURE		EXPOSURE TO HIGHER TEMP (HRS.)	TIME (HRS.) FROM START NO. OF TEST ALIVE		CONTROL NO. DEAD	PERCENT MORTALITY	EXPERIMENTAL		
	MIN.	MAX.		CONT.	EXP.						NO. ALIVE	NO. DEAD	PERCENT MORTALITY
NEOMYSIS AMERICANA													
26 OCT 76	3	7	4	12.5	15.5	4	0	49	-	-	49	-	-
							4	49	0	0	49	0	0
							48	34.5	14.5	30	34	15	31
26 OCT 76	3	7	4	12.5	17	0.5	0	49	-	-	48	-	-
							0.5	49	0	0	48	0	0
							48	34.5	14.5	30	38	10	21
26 OCT 76	3	7	4	12.5	17.5	1	0	49	-	-	45	-	-
							1	49	0	0	44	1	2
							48	34.5	14.5	30	25	20	44
26 OCT 76	3	7	4	12.5	17.5	4.5	0	49	-	-	49	-	-
							4.5	49	0	0	48	1	2
							48	34.5	14.5	30	24	25	51
26 OCT 76	3	7	4	12.5	19.5	0.5	0	49	-	-	48	-	-
							0.5	49	0	0	48	0	0
							48	34.5	14.5	30	35	13	27
26 OCT 76	3	7	4	12.5	19.5	4	0	49	-	-	47	-	-
							4	49	0	0	44	3	6
							48	34.5	14.5	30	35	12	26
26 OCT 76	3	7	4	12.5	20	1	0	49	-	-	48	-	-
							1	49	0	0	47	1	2
							48	34.5	14.5	30	29	19	40
5 NOV 76	3	7	5	11.5	13.5	0.5	0	49.5	-	-	49	-	-
							0.5	49.5	0	0	49	0	0
							48	37	12.5	25	41	8	16
5 NOV 76	3	7	5	11.5	13.5	1	0	49.5	-	-	50	-	-
							1	49.5	0	0	49	1	2
							48	37	12.5	25	41	9	18

Table 27. - Continued.

DATE	SIZE RANGE (TL IN MM)		SALINITY (PPT)	TEMPERATURE		EXPOSURE TO HIGHER EXP. TEMP(HRS.)	TIME(HRS.) FROM START NO. OF TEST		CONTROL NO. DEAD	PERCENT MORTALITY	EXPERIMENTAL		
	MIN.	MAX.		CONT.			ALIVE	NO. ALIVE			NO. DEAD	PERCENT MORTALITY	
NEOMYSIS AMERICANA													
5 NOV 76	3	7	5	11.5	13.5	4	0	49.5	-	-	50	-	-
							4	49.5	0	0	50	0	0
							48	37	12.5	25	33	17	34
5 NOV 76	3	7	5	11.5	14.5	0.5	0	49.5	-	-	50	-	-
							0.5	49.5	0	0	50	0	0
							48	37	12.5	25	35	15	30
5 NOV 76	3	7	5	11.5	15	1	0	49.5	-	-	49	-	-
							1	49.5	0	0	49	0	0
							48	37	12.5	25	30	19	39
5 NOV 76	3	7	5	11.5	15	4	0	49.5	-	-	50	-	-
							4	49.5	0	0	49	1	2
							48	37	12.5	25	38	12	24
5 NOV 76	3	7	5	11.5	17	0.5	0	49	-	-	49	-	-
							0.5	49.5	0	0	49	0	0
							48	37	12.5	26	35	14	29
5 NOV 76	3	7	5	11.5	17	1	0	49	-	-	49	-	-
							1	49.5	0	0	49	0	0
							48	37	12.5	26	32	17	35
5 NOV 76	3	7	5	11.5	17	4	0	49	-	-	50	-	-
							4	49.5	0	0	50	0	0
							48	37	12.5	26	38	12	24
5 NOV 76	3	7	5	11.5	18.5	0.5	0	49	-	-	50	-	-
							0.5	49.5	0	0	50	0	0
							48	37	12.5	26	34	16	32
5 NOV 76	3	7	5	11.5	18.5	1	0	49	-	-	50	-	-
							1	49.5	0	0	50	0	0
							48	37	12.5	26	38	12	24

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Table 27 . - Continued.

DATE	SIZE RANGE (TL IN MM)		SALINITY (PPT)	TEMPERATURE		EXPOSURE TO HIGHER TEMP(HRS.)	TIME(HRS.) FROM START NO. OF TEST ALIVE		CONTROL NO. DEAD	PERCENT MORTALITY	EXPERIMENTAL		
	MIN.	MAX.		CONT.	EXP.						NO. ALIVE	NO. DEAD	PERCENT MORTALITY
NEOMYSIS AMERICANA													
5 NOV 76	3	7	5	11.5	18.5	4	0	49	-	-	50	-	-
							4	49.5	0	0	50	0	0
							48	37	12.5	26	42	8	16
19 NOV 76	8	11	6	8	10	0.5	0	29.5	-	-	29	-	-
							0.5	29.5	0	0	29	0	0
							48	23	6.5	22	21	8	28
19 NOV 76	3	7	6	8	10	0.5	0	29.5	-	-	26	-	-
							0.5	29.5	0	0	26	0	0
							48	21	8.5	29	14	12	46
19 NOV 76	8	11	6	8	10	1	0	29.5	-	-	30	-	-
							1	29.5	0	0	30	0	0
							48	23	6.5	22	18	12	40
19 NOV 76	3	7	6	8	10	1	0	29.5	-	-	27	-	-
							1	29.5	0	0	27	0	0
							48	21	8.5	29	14	13	48
19 NOV 76	8	11	6	8	10	4	0	29.5	-	-	28	-	-
							4	29.5	0	0	28	0	0
							48	23	6.5	22	17	11	39
19 NOV 76	3	7	6	8	10	4	0	29.5	-	-	28	-	-
							4	29.5	0	0	28	0	0
							48	21	8.5	29	17	11	39
19 NOV 76	8	11	6	8	12	0.5	0	29.5	-	-	30	-	-
							0.5	29.5	0	0	30	0	0
							48	23	6.5	22	20	10	33
19 NOV 76	3	7	6	8	12	0.5	0	29.5	-	-	30	-	-
							0.5	29.5	0	0	30	0	0
							48	21	8.5	29	19	11	37

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Table 27. - Continued.

DATE	SIZE RANGE (TL IN MM)		SALINITY (PPT)	TEMPERATURE		EXPOSURE TO HIGHER TEMP(HRS.)	TIME(HRS.) FROM START NO. OF TEST		CONTROL		EXPERIMENTAL		
	MIN.	MAX.		CONT.	EXP.		NO. ALIVE	NO. DEAD	PERCENT MORTALITY	NO. ALIVE	NO. DEAD	PERCENT MORTALITY	
NEOMYSIS AMERICANA													
19 NOV 76	8	11	6	8	12	1	0	29.5	-	-	29	-	-
							1	29.5	0	0	29	0	0
							48	23	6.5	22	18	11	38
19 NOV 76	3	7	6	8	12	1	0	29.5	-	-	26	-	-
							1	29.5	0	0	26	0	0
							48	21	8.5	29	13	13	50
19 NOV 76	8	11	6	8	12	4	0	29.5	-	-	29	-	-
							4	29.5	0	0	28	1	3
							48	23	6.5	22	19	10	34
19 NOV 76	3	7	6	8	12	4	0	29.5	-	-	29	-	-
							4	29.5	0	0	28	1	3
							48	21	8.5	29	16	13	45
19 NOV 76	8	11	6	8	13.5	0.5	0	29.5	-	-	30	-	-
							0.5	29.5	0	0	30	0	0
							48	23	6.5	22	21	9	30
19 NOV 76	3	7	6	8	13.5	0.5	0	29.5	-	-	29	-	-
							0.5	29.5	0	0	28	1	3
							48	21	8.5	29	17	12	41
19 NOV 76	8	11	6	8	13.5	1	0	29.5	-	-	29	-	-
							1	29.5	0	0	29	0	0
							48	23	6.5	22	23	6	21
19 NOV 76	3	7	6	8	13.5	1	0	29.5	-	-	29	-	-
							1	29.5	0	0	29	0	0
							48	21	8.5	29	15	14	48
19 NOV 76	8	11	6	8	14	4	0	29.5	-	-	30	-	-
							4	29.5	0	0	30	0	0
							48	23	6.5	22	21	9	30

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Table 27. - Continued.

DATE	SIZE RANGE (TL IN MM)		SALINITY (PPT)	TEMPERATURE		EXPOSURE TO HIGHER EXP. TEMP(HRS.)	TIME(HRS.) FROM START NO. OF TEST		CONTROL NO. DEAD	PERCENT MORTALITY	EXPERIMENTAL		
	MIN.	MAX.		CONT.			ALIVE	NO. ALIVE			NO. DEAD	PERCENT MORTALITY	
NEOMYSIS AMERICANA													
19 NOV 76	3	7	6	8	14	4	0	29.5	-	-	30	-	-
							4	29.5	0	0	30	0	0
							48	21	8.5	29	21	9	30
19 NOV 76	8	11	6	8	14.5	0.5	0	29.5	-	-	29	-	-
							0.5	29.5	0	0	27	2	7
							48	23	6.5	22	17	12	41
19 NOV 76	3	7	6	8	14.5	0.5	0	29.5	-	-	27	-	-
							0.5	29.5	0	0	26	1	4
							48	21	8.5	29	10	17	63
19 NOV 76	8	11	6	8	15	1	0	29.5	-	-	28	-	-
							1	29.5	0	0	28	0	0
							48	23	6.5	22	15	13	46
19 NOV 76	3	7	6	8	15	1	0	29.5	-	-	30	-	-
							1	29.5	0	0	30	0	0
							48	21	8.5	29	11	19	63
19 NOV 76	8	11	6	8	15	4	0	29.5	-	-	30	-	-
							4	29.5	0	0	29	1	3
							48	23	6.5	22	21	9	30
19 NOV 76	3	7	6	8	15	4	0	29.5	-	-	30	-	-
							4	29.5	0	0	30	0	0
							48	21	8.5	29	16	14	47
8 DEC 76	8	12	3.5	5	8.5	0.5	0	30	-	-	30	-	-
							0.5	30	0	0	30	0	0
							48	29	1	3	30	0	0
8 DEC 76	3	7	3.5	5	8.5	0.5	0	30	-	-	30	-	-
							0.5	30	0	0	30	0	0
							48	30	0	0	30	0	0

Table 27. - Continued.

DATE	SIZE RANGE (TL IN MM)		SALINITY (PPT)	TEMPERATURE CONT.	EXPOSURE TO HIGHER EXP. TEMP(HRS.)	TIME(HRS.) FROM START	NO. ALIVE	CONTROL NO. DEAD	PERCENT MORTALITY	EXPERIMENTAL			
	MIN.	MAX.								NO. ALIVE	NO. DEAD	PERCENT MORTALITY	
NEOMYSIS AMERICANA													
8 DEC 76	8	12	3.5	5	8.5	1	0	30	-	-	30	-	-
							1	30	0	0	30	0	0
							48	29	1	3	30	0	0
8 DEC 76	3	7	3.5	5	8.5	1	0	30	-	-	30	-	-
							1	30	0	0	30	0	0
							48	30	0	0	30	0	0
8 DEC 76	8	12	3.5	5	8.5	4	0	30	-	-	30	-	-
							4	30	0	0	30	0	0
							48	29	1	3	29	1	3
8 DEC 76	3	7	3.5	5	8.5	4	0	30	-	-	30	-	-
							4	30	0	0	30	0	0
							48	30	0	0	29	1	3
8 DEC 76	8	12	3.5	5	13.5	0.5	0	30	-	-	30	-	-
							0.5	30	0	0	30	0	0
							48	29	1	3	27	3	10
8 DEC 76	3	7	3.5	5	13.5	0.5	0	30	-	-	28	-	-
							0.5	30	0	0	28	0	0
							48	30	0	0	28	0	0
8 DEC 76	8	12	3.5	5	13.5	1	0	30	-	-	30	-	-
							1	30	0	0	30	0	0
							48	29	1	3	30	0	0
8 DEC 76	3	7	3.5	5	13.5	1	0	30	-	-	30	-	-
							1	30	0	0	30	0	0
							48	30	0	0	30	0	0
8 DEC 76	8	12	3.5	5	13.5	4	0	30	-	-	30	-	-
							4	30	0	0	30	0	0
							48	29	1	3	30	0	0

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Table 27 . - Continued.

DATE	SIZE RANGE (TL IN MM)		SALINITY (PPT)	TEMPERATURE		EXPOSURE TO HIGHER TEMP(HRS.)	TIME(HRS.) FROM START NO.		CONTROL NO. DEAD	PERCENT MORTALITY	EXPERIMENTAL		
	MIN.	MAX.		CONT.	EXP.		OF TEST	ALIVE			NO. ALIVE	NO. DEAD	PERCENT MORTALITY
NEOMYSIS AMERICANA													
8 DEC 76	3	7	3.5	5	13.5	4	0	30	-	-	30	-	-
							4	30	0	0	30	0	0
							48	30	0	0	29	1	3
10 DEC 76	8	11	3.5	6.5	11	0.5	0	30	-	-	29	-	-
							0.5	30	0	0	29	0	0
							48	30	0	0	27	2	7
10 DEC 76	3	7	3.5	6.5	11	0.5	0	27	-	-	28	-	-
							0.5	27	0	0	28	0	0
							48	23	4	15	27	1	4
10 DEC 76	8	11	3.5	6.5	11	1	0	30	-	-	28	-	-
							1	30	0	0	28	0	0
							48	30	0	0	27	1	4
10 DEC 76	3	7	3.5	6.5	11	1	0	27	-	-	29	-	-
							1	27	0	0	29	0	0
							48	23	4	15	26	3	10
10 DEC 76	8	11	3.5	6.5	11	4	0	30	-	-	29	-	-
							4	30	0	0	29	0	0
							48	30	0	0	28	1	3
10 DEC 76	3	7	3.5	6.5	11	4	0	27	-	-	27	-	-
							4	27	0	0	27	0	0
							48	23	4	15	26	1	4
15 FEB 77	8	15	30	2	4	0.5	0	20	-	-	20	-	-
							0.5	20	0	0	20	0	0
							24	19	1	5	18	2	10
15 FEB 77	8	15	30	2	4	1	0	20	-	-	20	-	-
							1	20	0	0	19	1	5
							24	19	1	5	18	2	10

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Table 27. - Continued.

DATE	SIZE RANGE (TL IN MM)		SALINITY (PPT)	TEMPERATURE		EXPOSURE TO HIGHER TEMP(HRS.)	TIME(HRS.) FROM START NO.		CONTROL NO. DEAD	PERCENT MORTALITY	EXPERIMENTAL		
	MIN.	MAX.		CONT.	EXP.		OF TEST	ALIVE			NO. ALIVE	NO. DEAD	PERCENT MORTALITY
NEOMYSIS AMERICANA													
15 FEB 77	8	15	30	2	4	4	0	20	-	-	20	-	-
							4	20	0	0	20	0	0
							24	19	1	5	18	2	10
15 FEB 77	8	15	30	2	6	0.5	0	20	-	-	20	-	-
							0.5	20	0	0	20	0	0
							24	19	1	5	17	3	15
15 FEB 77	8	15	30	2	6	1	0	20	-	-	20	-	-
							1	20	0	0	20	0	0
							24	19	1	5	20	0	0
15 FEB 77	8	15	30	2	6	4	0	20	-	-	20	-	-
							4	20	0	0	20	0	0
							24	19	1	5	20	0	0
15 FEB 77	8	15	30	2	7.5	0.5	0	20	-	-	20	-	-
							0.5	20	0	0	20	0	0
							24	19	1	5	19	1	5
15 FEB 77	8	15	30	2	7.5	1.5	0	20	-	-	20	-	-
							1.5	20	0	0	20	0	0
							24	19	1	5	17	3	15
15 FEB 77	8	15	30	2	7.5	4	0	20	-	-	20	-	-
							4	20	0	0	20	0	0
							24	19	1	5	20	0	0
15 FEB 77	8	15	30	2	9	0.5	0	20	-	-	20	-	-
							0.5	20	0	0	20	0	0
							24	19	1	5	17	3	15
15 FEB 77	8	15	30	2	9	1	0	20	-	-	20	-	-
							1	20	0	0	19	1	5
							24	19	1	5	18	2	10

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Table 27 . - Continued.

DATE	SIZE RANGE (TL IN MM)		SALINITY (PPT)	TEMPERATURE		EXPOSURE TO HIGHER TEMP(HRS.)	TIME(HRS.) FROM START NO. OF TEST ALIVE		CONTROL NO. DEAD	PERCENT MORTALITY	EXPERIMENTAL		
	MIN.	MAX.		CONT.	EXP.						NO. ALIVE	NO. DEAD	PERCENT MORTALITY
NEOMYSIS AMERICANA													
15 FEB 77	8	15	30	2	9	4	0	20	-	-	20	-	-
							4	20	0	0	20	0	0
							24	19	1	5	20	0	0
9 MAR 77	8	15	28	7.5	11.5	0.5	0	30	-	-	30	-	-
							0.5	30	0	0	30	0	0
							48	28.5	1.5	5	29	1	3
9 MAR 77	8	15	28	7.5	11.5	1	0	30	-	-	30	-	-
							1	30	0	0	30	0	0
							48	28.5	1.5	5	30	0	0
9 MAR 77	8	15	28	7.5	11.5	4	0	30	-	-	30	-	-
							4	30	0	0	30	0	0
							48	28.5	1.5	5	27	3	10
9 MAR 77	8	15	28	7.5	13.5	1	0	30	-	-	30	-	-
							1	30	0	0	30	0	0
							48	28.5	1.5	5	30	0	0
9 MAR 77	8	15	28	7.5	13.5	4	0	30	-	-	29	-	-
							4	30	0	0	29	0	0
							48	28.5	1.5	5	29	0	0
9 MAR 77	8	15	28	7.5	15.5	0.5	0	30	-	-	30	-	-
							0.5	30	0	0	30	0	0
							48	28.5	1.5	5	26	4	13
9 MAR 77	8	15	28	7.5	15.5	1	0	30	-	-	30	-	-
							1	30	0	0	30	0	0
							48	28.5	1.5	5	29	1	3
9 MAR 77	8	15	28	7.5	15.5	4	0	30	-	-	30	-	-
							4	30	0	0	30	0	0
							48	28.5	1.5	5	30	0	0

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Table 27. - Continued.

DATE	SIZE RANGE (TL IN MM)		SALINITY (PPT)	TEMPERATURE		EXPOSURE TO HIGHER EXP. TEMP (HRS.)	TIME (HRS.) FROM START NO.		CONTROL NO. DEAD	PERCENT MORTALITY	EXPERIMENTAL		
	MIN.	MAX.		CONT: .			OF TEST	ALIVE			NO. ALIVE	NO. DEAD	PERCENT MORTALITY
NEOMYSIS AMERICANA													
17 MAR 77	8	15	28	10	12	0.5	0	25	-	-	28	-	-
							0.5	25	0	0	28	0	0
							48	20	5	20	24	4	14
17 MAR 77	8	15	28	10	12	1	0	25	-	-	28	-	-
							1	25	0	0	28	0	0
							48	20	5	20	28	0	0
17 MAR 77	8	15	28	10	12	4	0	25	-	-	25	-	-
							4	25	0	0	25	0	0
							48	20	5	20	24	1	4
17 MAR 77	8	15	28	10	13.5	0.5	0	25	-	-	24	-	-
							0.5	25	0	0	24	0	0
							48	20	5	20	20	4	17
17 MAR 77	8	15	28	10	13.5	1.5	0	25	-	-	28	-	-
							1.5	25	0	0	28	0	0
							48	20	5	20	26	2	7
17 MAR 77	8	15	28	10	13.5	4	0	25	-	-	28	-	-
							4	25	0	0	28	0	0
							48	20	5	20	25	3	11
17 MAR 77	8	15	28	10	15	0.5	0	25	-	-	28	-	-
							0.5	25	0	0	28	0	0
							48	20	5	20	26	2	7
17 MAR 77	8	15	28	10	15	1	0	25	-	-	29	-	-
							1	25	0	0	29	0	0
							48	20	5	20	24	5	17
17 MAR 77	8	15	28	10	15	4	0	25	-	-	29	-	-
							4	25	0	0	27	2	7
							48	20	5	20	25	4	14

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Table 27. - Continued.

DATE	SIZE RANGE (TL IN MM)		SALINITY (PPT)	TEMPERATURE		EXPOSURE TO HIGHER TEMP(HRS.)	TIME(HRS.) FROM START NO. OF TEST		CONTROL NO. DEAD	PERCENT MORTALITY	EXPERIMENTAL		
	MIN.	MAX.		CONT.	EXP.		ALIVE	NO. ALIVE			NO. DEAD	PERCENT MORTALITY	
NEOMYSIS AMERICANA													
17 MAR 77	8	15	28	10	18	0.5	0	25	-	-	27	-	-
							0.5	25	0	0	26	1	4
							48	20	5	20	23	4	15
17 MAR 77	8	15	28	10	18	1	0	25	-	-	27	-	-
							1	25	0	0	26	1	4
							48	20	5	20	25	2	7
17 MAR 77	8	15	28	10	18	4	0	25	-	-	27	-	-
							4	25	0	0	27	0	0
							48	20	5	20	26	1	4
24 MAR 77	8	15	20	9	11	0.5	0	30	-	-	29	-	-
							0.5	30	0	0	29	0	0
							48	28.5	1.5	5	28	1	3
24 MAR 77	8	15	20	9	11	1	0	30	-	-	30	-	-
							1	30	0	0	30	0	0
							48	28.5	1.5	5	30	0	0
24 MAR 77	8	15	20	9	11	4	0	30	-	-	30	-	-
							4	30	0	0	30	0	0
							48	28.5	1.5	5	28	2	7
24 MAR 77	8	15	20	9	13.5	0.5	0	30	-	-	26	-	-
							0.5	30	0	0	26	0	0
							48	28.5	1.5	5	26	0	0
24 MAR 77	8	15	20	9	13.5	1	0	30	-	-	30	-	-
							1	30	0	0	30	0	0
							48	28.5	1.5	5	30	0	0
24 MAR 77	8	15	20	9	13.5	4	0	30	-	-	30	-	-
							4	30	0	0	30	0	0
							48	28.5	1.5	5	26	4	13

Table 27. - Continued.

DATE	SIZE RANGE (TL IN MM)		SALINITY (PPT)	TEMPERATURE		EXPOSURE TO HIGHER TEMP (HRS.)	TIME (HRS.) FROM START NO. OF TEST		CONTROL NO. DEAD	PERCENT MORTALITY	EXPERIMENTAL		
	MIN.	MAX.		CONT.	EXP.		ALIVE	NO. ALIVE			NO. DEAD	PERCENT MORTALITY	
NEOMYSIS AMERICANA													
24 MAR 77	8	15	20	9	14.5	4	0	30	-	-	29	-	-
							4	30	0	0	29	0	0
							48	28.5	1.5	5	27	2	7
24 MAR 77	8	15	20	9	15	0.5	0	30	-	-	30	-	-
							0.5	30	0	0	30	0	0
							48	28.5	1.5	5	26	4	13
24 MAR 77	8	15	20	9	15	1	0	30	-	-	30	-	-
							1	30	0	0	30	0	0
							48	28.5	1.5	5	27	3	10
24 MAR 77	8	15	20	9	16.5	0.5	0	30	-	-	30	-	-
							0.5	30	0	0	30	0	0
							48	28.5	1.5	5	29	1	3
24 MAR 77	8	15	20	9	16.5	1	0	30	-	-	30	-	-
							1	30	0	0	30	0	0
							48	28.5	1.5	5	28	2	7
24 MAR 77	8	15	20	9	16.5	4	0	30	-	-	30	-	-
							4	30	0	0	30	0	0
							48	28.5	1.5	5	30	0	0
4 APR 77	8	14	20	11.5	14	0.5	0	19.5	-	-	19	-	-
							0.5	19.5	0	0	19	0	0
							48	16	3.5	18	15	4	21
4 APR 77	8	14	20	11.5	14	1	0	19.5	-	-	20	-	-
							1	19.5	0	0	20	0	0
							48	16	3.5	18	17	3	15
4 APR 77	8	14	20	11.5	14	4	0	19.5	-	-	20	-	-
							4	19.5	0	0	20	0	0
							48	16	3.5	18	17	3	15

Table 27. - Continued.

DATE	SIZE RANGE (TL IN MM)		SALINITY (PPT)	TEMPERATURE		EXPOSURE TO HIGHER TEMP(HRS.)	TIME(HRS.) FROM START NO.		CONTROL NO. DEAD	PERCENT MORTALITY	EXPERIMENTAL		
	MIN.	MAX.		CONT.	EXP.		OF TEST	ALIVE			NO. ALIVE	NO. DEAD	PERCENT MORTALITY
EDEMYSIS AMERICANA													
6 APR 77	8	14	20	11.5	15.5	0.5	0	19.5	-	-	18	-	-
							0.5	19.5	0	0	18	0	0
							48	16	3.5	18	16	2	11
6 APR 77	8	14	20	11.5	15.5	1	0	19.5	-	-	20	-	-
							1	19.5	0	0	20	0	0
							48	16	3.5	18	15	5	25
6 APR 77	8	14	20	11.5	15.5	4	0	19.5	-	-	20	-	-
							4	19.5	0	0	20	0	0
							48	16	3.5	18	13	7	35
6 APR 77	8	14	20	11.5	16.5	4	0	19.5	-	-	20	-	-
							4	19.5	0	0	20	0	0
							48	16	3.5	18	15	5	25
6 APR 77	8	14	20	11.5	17	0.5	0	19.5	-	-	19	-	-
							0.5	19.5	0	0	19	0	0
							48	16	3.5	18	17	2	11
6 APR 77	8	14	20	11.5	17	1	0	19.5	-	-	20	-	-
							1	19.5	0	0	20	0	0
							48	16	3.5	18	18	2	10
6 APR 77	8	14	20	11.5	18.5	0.5	0	19.5	-	-	18	-	-
							0.5	19.5	0	0	18	0	0
							48	16	3.5	18	11	7	39
6 APR 77	8	14	20	11.5	18.5	1	0	19.5	-	-	20	-	-
							1	19.5	0	0	20	0	0
							48	16	3.5	18	18	2	10
6 APR 77	8	14	20	11.5	18.5	4	0	19.5	-	-	20	-	-
							4	19.5	0	0	20	0	0
							48	16	3.5	18	9	11	55

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Table 27. - Continued.

DATE	SIZE RANGE (TL IN MM)		SALINITY (PPT)	TEMPERATURE		EXPOSURE TO HIGHER EXP. TEMP(HRS.)	TIME(HRS.) FROM START NO. OF TEST ALIVE		CONTROL NO. DEAD	PERCENT MORTALITY	EXPERIMENTAL		
	MIN.	MAX.		CONT.				NO. ALIVE			NO. DEAD	PERCENT MORTALITY	
NEOMYSIS AMERICANA													
8 SEP 77	5	10	7.5	25	27.5	0.5	0	17.5	-	-	11	-	-
							0.5	17.5	0	0	11	0	0
							24	15	2.5	14	10	1	9
8 SEP 77	5	10	7.5	25	27.5	1	0	17.5	-	-	11	-	-
							1	17.5	0	0	11	0	0
							24	15	2.5	14	9	2	18
8 SEP 77	5	10	7.5	25	27.5	4	0	17.5	-	-	15	-	-
							4	17.5	0	0	15	0	0
							24	15	2.5	14	12	3	20
8 SEP 77	5	10	7.5	25	29	0.5	0	17.5	-	-	20	-	-
							0.5	17.5	0	0	20	0	0
							24	15	2.5	14	16	4	20
8 SEP 77	5	10	7.5	25	29	1	0	17.5	-	-	20	-	-
							1	17.5	0	0	20	0	0
							24	15	2.5	14	15	5	25
8 SEP 77	5	10	7.5	25	29	4	0	17.5	-	-	18	-	-
							4	17.5	0	0	18	0	0
							24	15	2.5	14	15	3	17
8 SEP 77	5	10	7.5	25	31	0.5	0	17.5	-	-	14	-	-
							0.5	17.5	0	0	14	0	0
							24	15	2.5	14	14	0	0
8 SEP 77	5	10	7.5	25	31	1	0	17.5	-	-	10	-	-
							1	17.5	0	0	10	0	0
							24	15	2.5	14	10	0	0

Table 27. - Continued.

DATE	SIZE RANGE (TL IN MM)		SALINITY (PPT)	TEMPERATURE		EXPOSURE TO HIGHER TEMP (HRS.)	TIME (HRS.)		CONTROL		EXPERIMENTAL		
	MIN.	MAX.		CONT.	EXP.		FROM START OF TEST	NO. ALIVE	NO. DEAD	PERCENT MORTALITY	NO. ALIVE	NO. DEAD	PERCENT MORTALITY
NEOMYSIS AMERICANA													
8 SEP 77	5	10	7.5	25	31	4	0	17.5	-	-	20	-	-
							4	17.5	0	0	19	1	5
							24	15	2.5	14	13	7	35
8 SEP 77	5	10	7.5	25	32.5	0.5	0	17.5	-	-	16	-	-
							0.5	17.5	0	0	16	0	0
							24	15	2.5	14	12	4	25
8 SEP 77	5	10	7.5	25	32.5	1	0	17.5	-	-	19	-	-
							1	17.5	0	0	19	0	0
							24	15	2.5	14	13	6	32
8 SEP 77	5	10	7.5	25	32.5	4	0	17.5	-	-	20	-	-
							4	17.5	0	0	0	20	100
14 SEP 77	4	9	6	24	26.5	0.5	0	14.5	-	-	13	-	-
							0.5	14.5	0	0	13	0	0
							48	11	3.5	24	9	4	31
14 SEP 77	4	9	6	24	26.5	1	0	14.5	-	-	18	-	-
							1	14.5	0	0	18	0	0
							48	11	3.5	24	14	4	22
14 SEP 77	4	9	6	24	26.5	4	0	14.5	-	-	15	-	-
							4	14.5	0	0	15	0	0
							48	11	3.5	24	7	8	53
14 SEP 77	4	9	6	24	28.5	0.5	0	14.5	-	-	12	-	-
							0.5	14.5	0	0	12	0	0
							48	11	3.5	24	7	5	42
14 SEP 77	4	9	6	24	28.5	1	0	14.5	-	-	19	-	-
							1	14.5	0	0	19	0	0
							48	11	3.5	24	12	7	37

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Table 27. - Continued.

DATE	SIZE RANGE (TL IN MM)		SALINITY (PPT)	TEMPERATURE CONT.	EXPOSURE TO HIGHER EXP. TEMP(HRS.)	TIME(HRS.) FROM START OF TEST	NO. ALIVE	CONTROL NO. DEAD	PERCENT MORTALITY	EXPERIMENTAL			
	MIN.	MAX.								NO. ALIVE	NO. DEAD	PERCENT MORTALITY	
NEOMYSIS AMERICANA													
14 SEP 77	4	9	6	24	28.5	4	0	14.5	-	-	20	-	-
							4	14.5	0	0	20	0	0
							48	11	3.5	24	7	13	65
14 SEP 77	4	9	6	24	30	0.5	0	14.5	-	-	13	-	-
							0.5	14.5	0	0	13	0	0
							48	11	3.5	24	9	4	31
14 SEP 77	4	9	6	24	30	1	0	14.5	-	-	17	-	-
							1	14.5	0	0	17	0	0
							48	11	3.5	24	10	7	41
14 SEP 77	4	9	6	24	30	4	0	14.5	-	-	15	-	-
							4	14.5	0	0	15	0	0
							48	11	3.5	24	10	5	33
14 SEP 77	4	9	6	24	31.5	0.5	0	14.5	-	-	17	-	-
							0.5	14.5	0	0	17	0	0
							48	11	3.5	24	13	4	24
14 SEP 77	4	9	6	24	31.5	1	0	14.5	-	-	19	-	-
							1	14.5	0	0	19	0	0
							48	11	3.5	24	10	9	47
14 SEP 77	4	9	6	24	31.5	4	0	14.5	-	-	19	-	-
							4	14.5	0	0	19	0	0
							48	11	3.5	24	9	10	53

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Table 28.

LATENT PERCENT MORTALITY OF NEOMYSIS AMERICANA
EXPOSED TO VARIOUS TEMPERATURE
INCREASES FOR THREE EXPOSURE TIMES

AMBIENT TEMP. RANGE (C)		TEMP. INCREASE (C)		CONTROL		EXPERIMENTAL EXPOSURE TIME (HRS.)									
						0.5		1.0-1.5			4.0-4.5				
MIN.	MAX.	MIN	MAX.	MEAN	MAX.	MIN.	MEAN	MAX.	MIN.	MEAN	MAX.	MIN.	MEAN	MAX.	MIN.
2	7.9	1	2.5	5	5	5	10	10	10	10	10	10	10	10	10
(35.6	46.3 F)	3	4.5	5	15	0	5	15	0	2	10	0	4	10	0
		5	6.5	5	5	5	5	5	5	8	15	0	0	0	0
		7	8.5	3	5	0	10	15	0	3	10	0	1	3	0
8	13.9	1	2.5	20	30	4	22	46	3	26	71	0	21	39	4
(46.4	57.1 F)	3	4.5	19	30	4	20	37	0	24	50	0	25	45	10
		5	6.5	19	30	4	28	63	7	24	48	8	24	51	7
		7	8.5	19	30	4	20	39	3	25	63	2	23	55	0
14	19.9	1	2.5	-	-	-	-	-	-	-	-	-	-	-	-
(57.2	67.9 F)	3	4.5	4	6	0	-	-	-	-	-	-	19	21	17
		5	6.5	14	20	6	17	20	14	13	14	12	12	18	6
		7	8.5	14	20	10	16	16	16	29	38	20	22	22	22
20	25.9	1	2.5	19	24	14	20	31	9	20	22	18	37	53	20
(68.0	78.7 F)	3	4.5	19	24	14	31	42	20	31	37	25	41	65	17
		5	6.5	19	24	14	15	31	0	21	41	0	34	35	33
		7	8.5	20	27	14	24	25	23	39	47	32	76	100	53

Table 29. - Number of secondary entrainment treatments with mortality significantly different from control, based on Chi-square analysis (0.05 level), for the opossum shrimp, *Neomysis americana*.

Acclimation temp. (C) 2.0-7.9	Exposure Times (hours)					
	0.5		1.0-1.5		4.0-4.5	
	No. of Treatments	No. Sig.	No. of Treatments	No. Sig.	No. of Treatments	No. Sig.
Experimental increases in temp. (C)						
2.0	1	0	1	0	1	0
3.5-4.5	6	0	6	0	6	0
5.5-6.5	1	0	2	0	2	0
7.0-8.5	<u>4</u>	<u>0</u>	<u>4</u>	<u>0</u>	<u>4</u>	<u>0</u>
Total	12	0	13	0	13	0
Acclimation temp. (C) 8.0-13.9						
Experimental increases in temp. (C)						
1.0-2.5	8	0	9	2*	8	0
3.0-4.5	8	1	7	0	8	0
5.0-6.5	9	1	8	0	8	2
7.0-8.0	<u>6</u>	<u>0</u>	<u>8</u>	<u>2</u>	<u>8</u>	<u>1</u>
Total	31	2	32	4	32	3

*Mortality significantly greater in control (1 treatment).

Table 29. - Continued.

Acclimation temp. (C) 14.0-19.9	Exposure Times (hours)					
	0.5		1.0-1.5		4.0-4.5	
	No. of Treatments	No. Sig.	No. of Treatments	No. Sig.	No. of Treatments	No. Sig.
Experimental increases in temp. (C)						
1.0-2.5	0	0	0	0	0	0
3.0-4.5	0	0	0	0	3	2
5.0-6.0	2	0	2	0	3	0
8.0	<u>1</u>	<u>0</u>	<u>1</u>	<u>0</u>	<u>1</u>	<u>0</u>
Total	3	0	3	0	7	2
Acclimation temp. (C) 20.0-25.9						
Experimental increases in temp. (C)						
2.5	2	0	2	0	2	0
4.0-4.5	2	0	2	0	2	1
6.0	2	0	2	0	2	0
7.5	<u>2</u>	<u>0</u>	<u>2</u>	<u>0</u>	<u>2</u>	<u>2</u>
Total	8	0	8	0	8	3

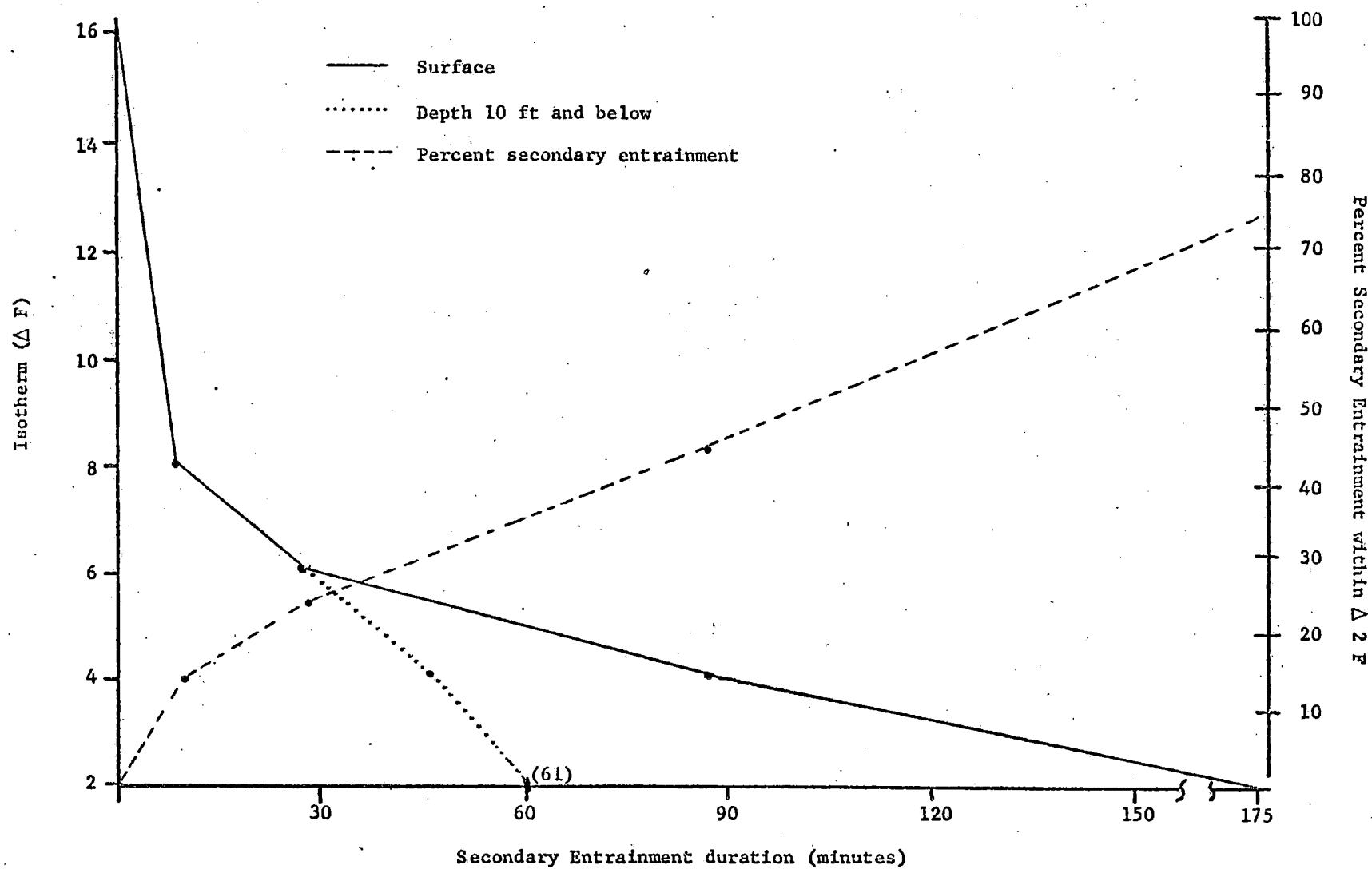


Figure 1 . - Estimated time-temperature history and cumulative percent of secondary entrainment within the predicted S.N.G.S. thermal plume during two unit operation (4,950 cfs) when ambient current is 0.5 fps. Method of estimation given in Appendix C.

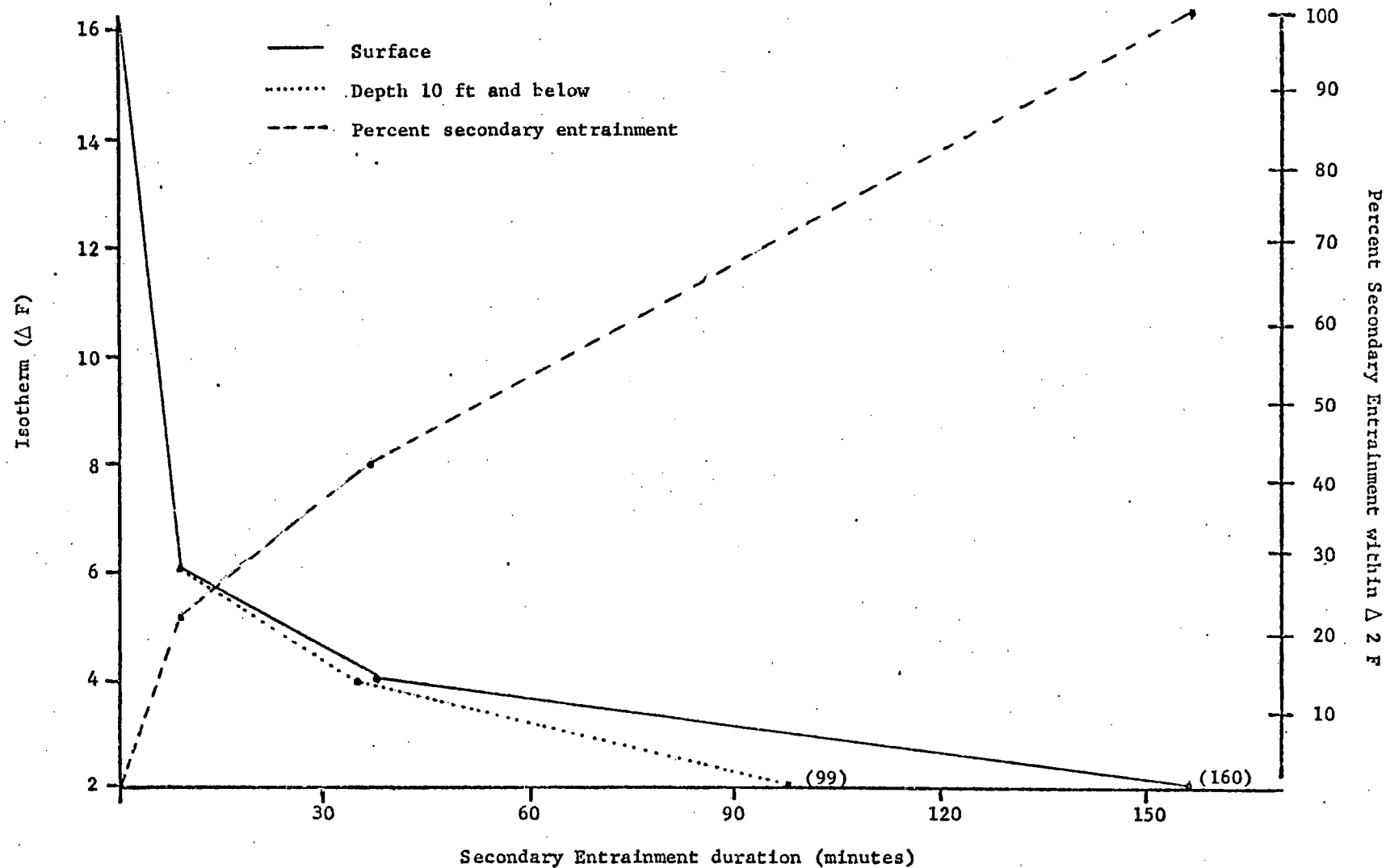


Figure 2 . - Estimated time-temperature history and cumulative percent of secondary entrainment within the predicted S.N.G.S. thermal plume during one unit operation (2,470 cfs) when ambient current is 2.5 fps. Method of estimation given in Appendix C.

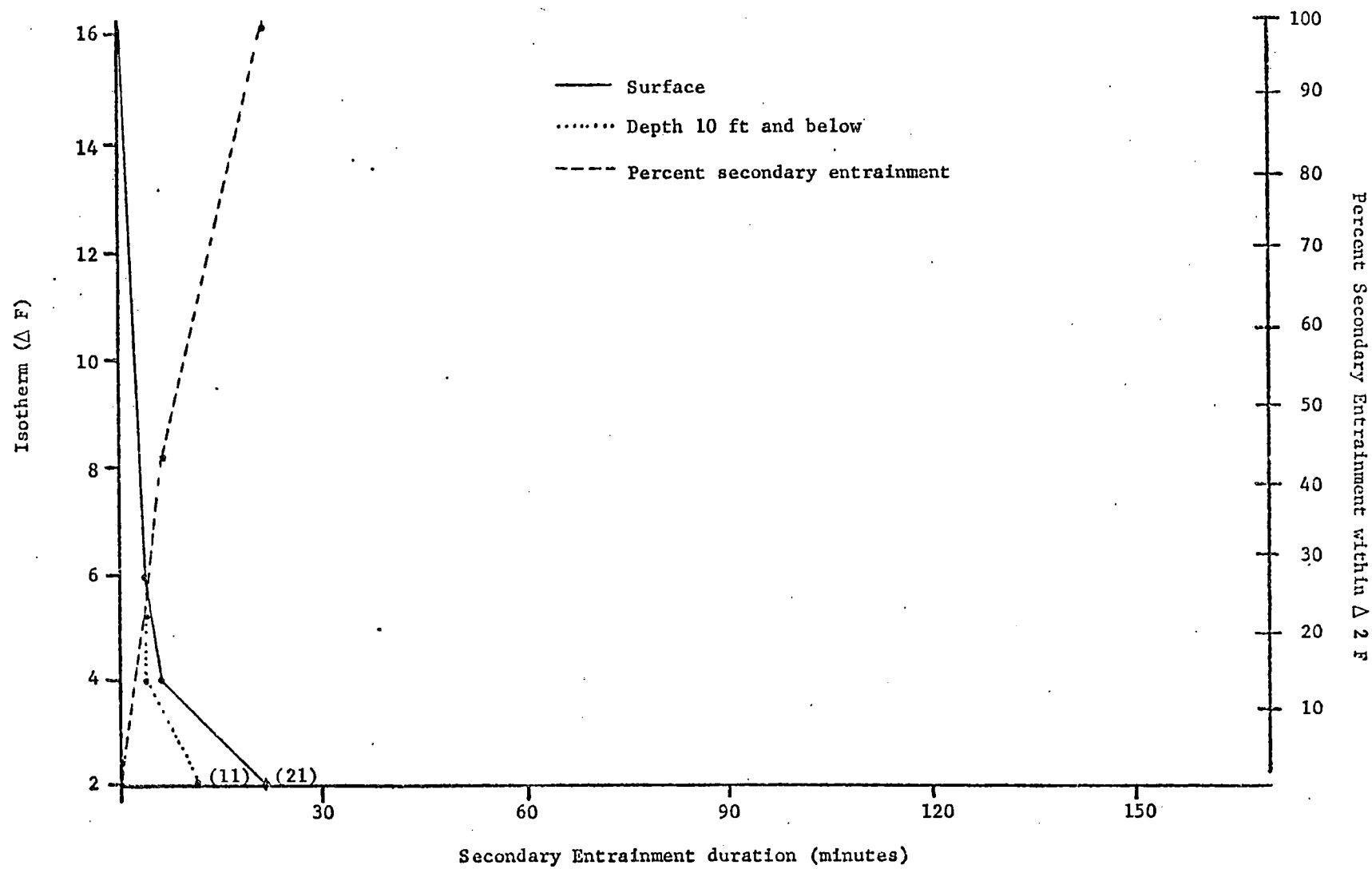


Figure 3. - Estimated time-temperature history and cumulative percent of secondary entrainment within the predicted S.N.G.S. thermal plume during one unit operation (2,470 cfs) when ambient current is 0.5 fps. Method of estimation given in Appendix C.

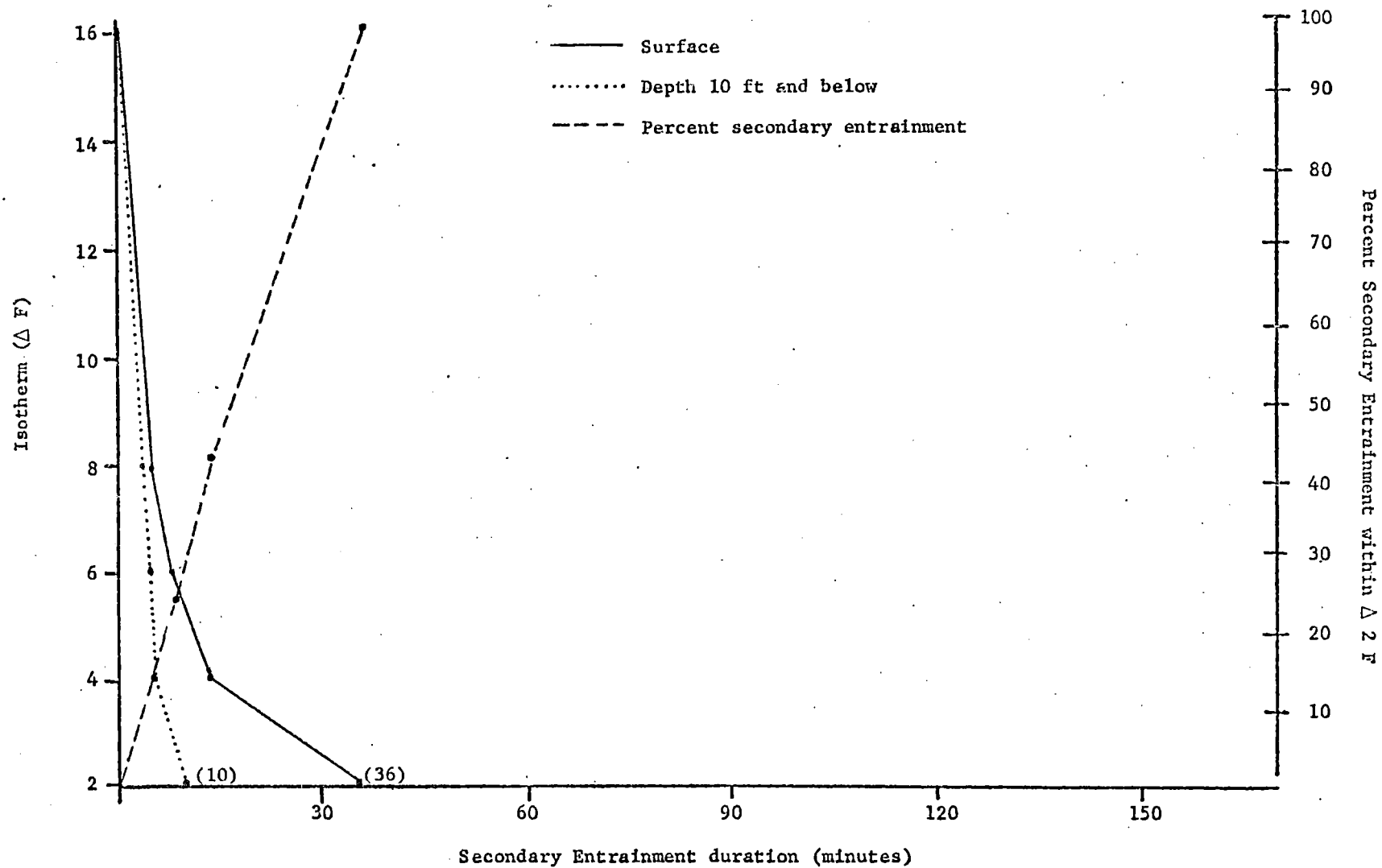


Figure 4 . - Estimated time-temperature history and cumulative percent of secondary entrainment within the predicted S.N.G.S. thermal plume during two unit operation (4,950 cfs) when ambient current is 2.5 fps. Method of estimation given in Appendix C.

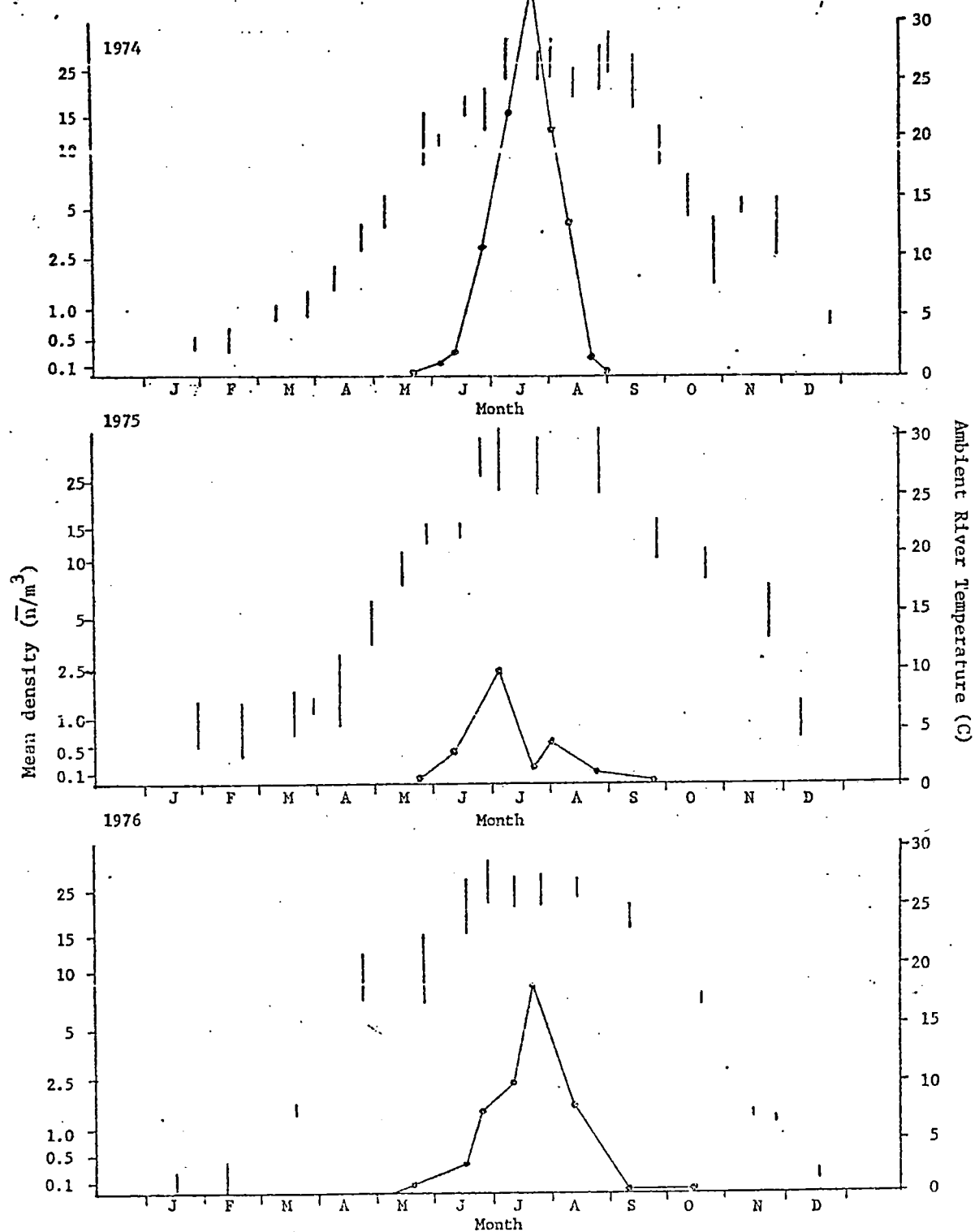


Fig. 5. - Daily mean density ($\bar{n}/m^3$) of *Anchoa mitchilli* eggs taken near Artificial Island, 1974 through 1976. Temperature range (verticle line) for each sampling date is included.

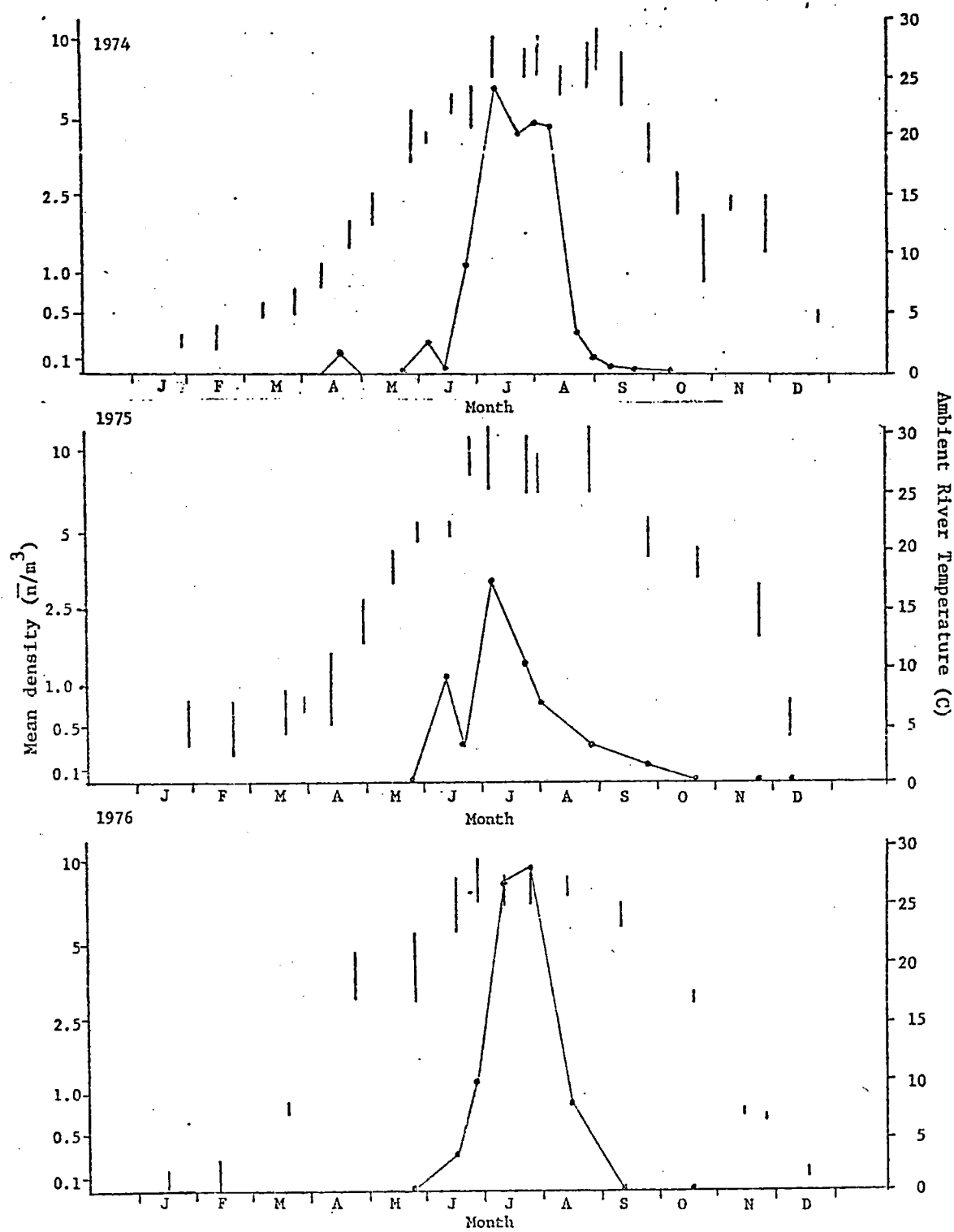
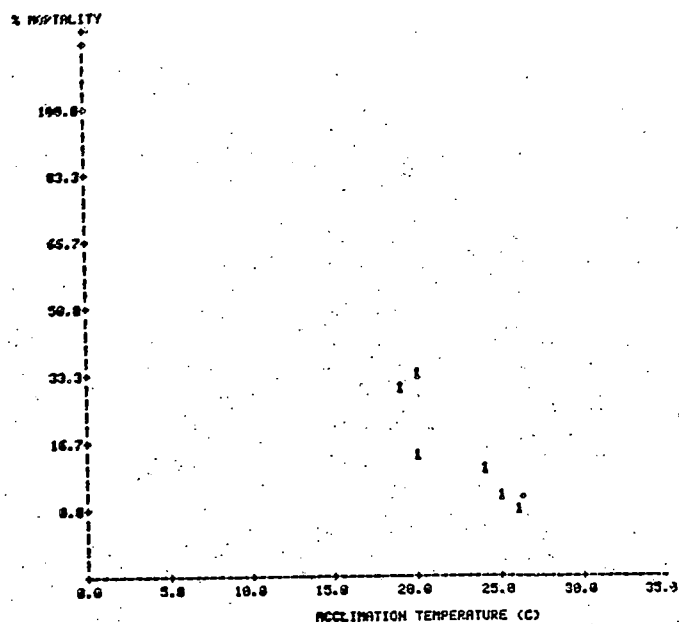
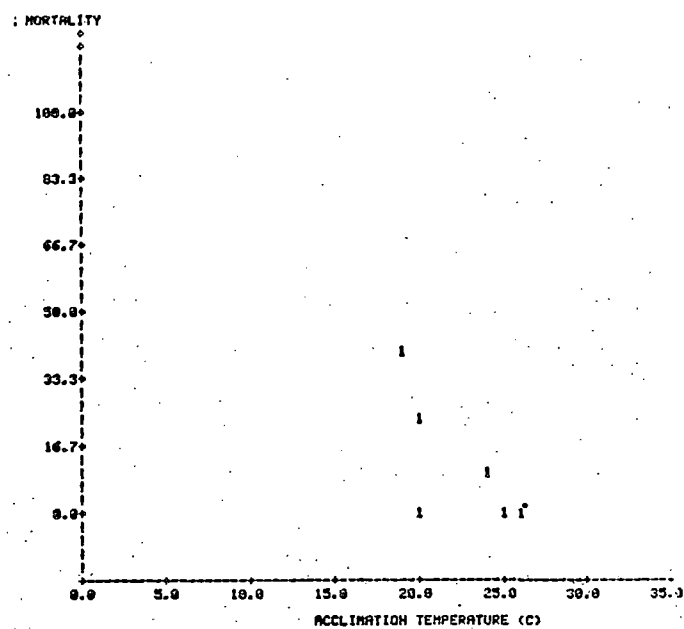


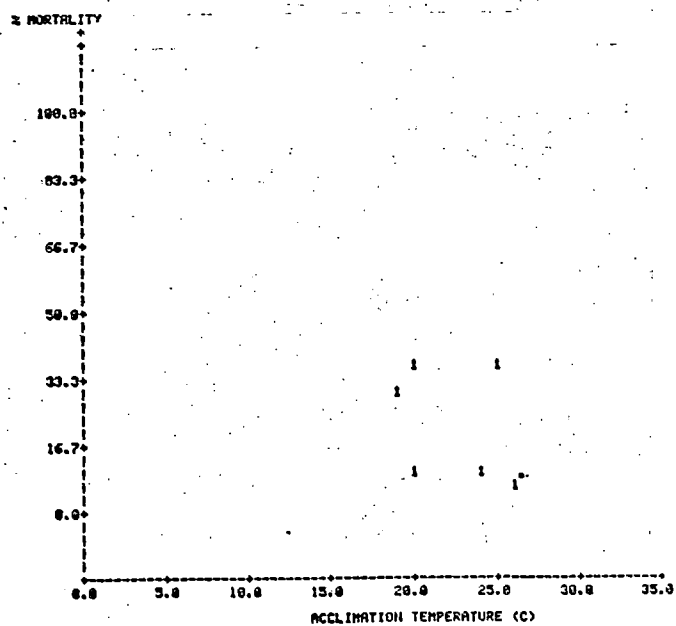
Fig. 6. - Daily mean density ($\bar{n}/m^3$) of Anchoa mitchilli larvae taken near Artificial Island, 1974 through 1976. Temperature range (vertical line) for each sampling date is included.



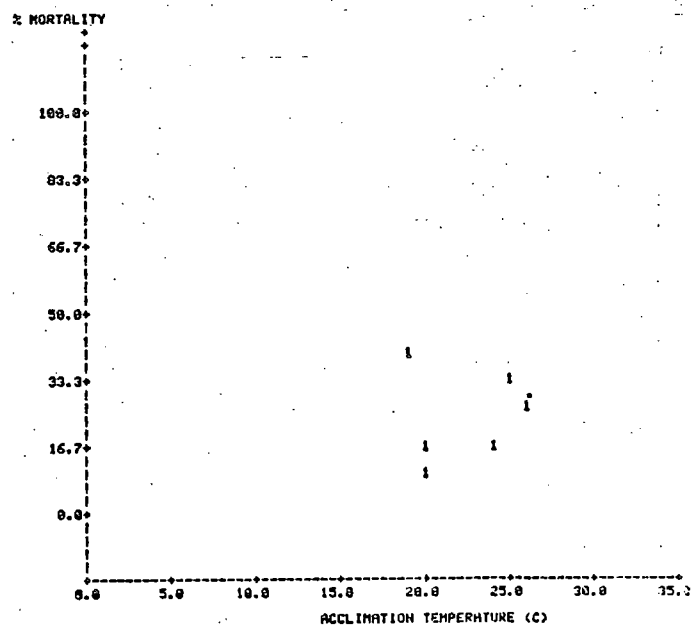
Control



0.5 Hour

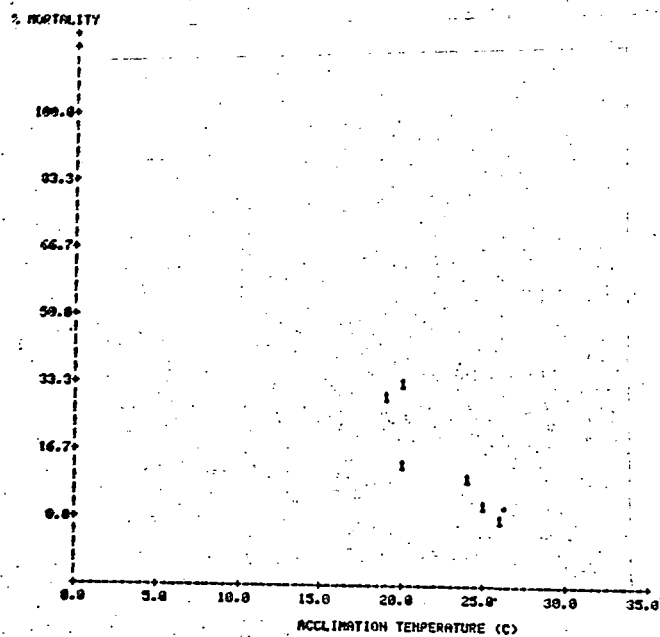


1.0 Hour

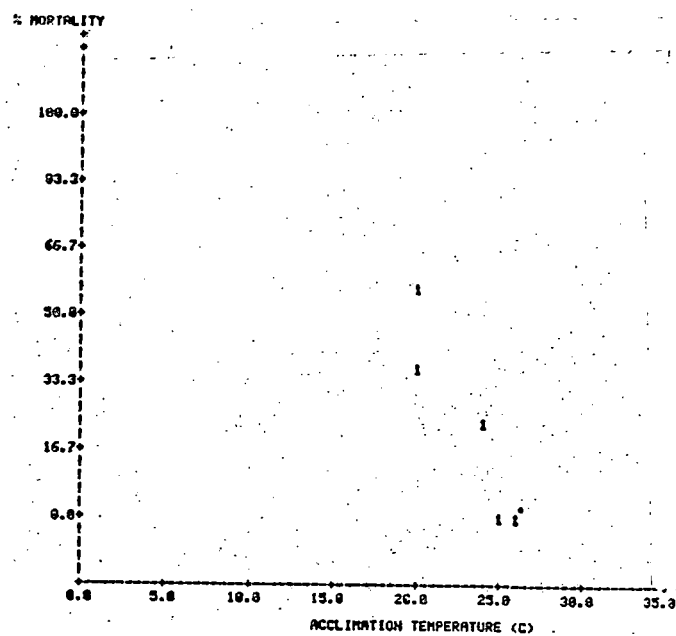


3.0-4.0 Hour

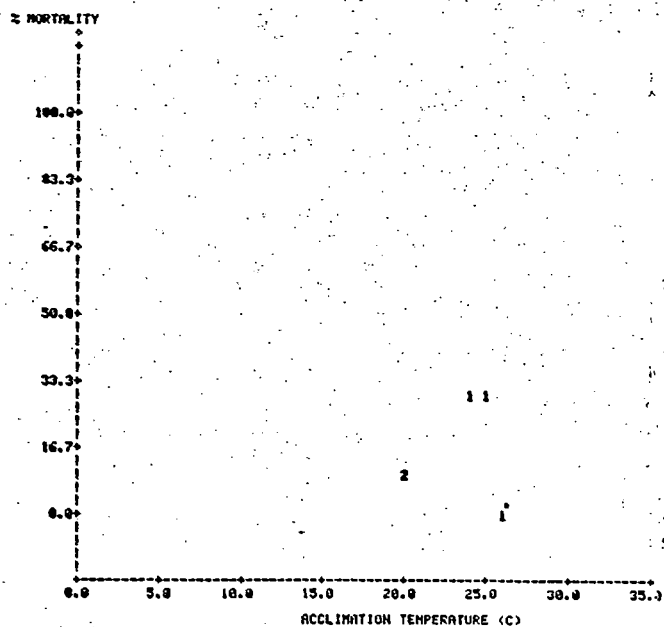
Figure 7 . - Percent mortality experienced by larvae of the bay anchovy, Anchoa mitchilli, in secondary entrainment studies conducted at Δ temperature of 2.0-2.5 C at three exposure times. * = test of four hour duration. Numeral on plot = number of tests.



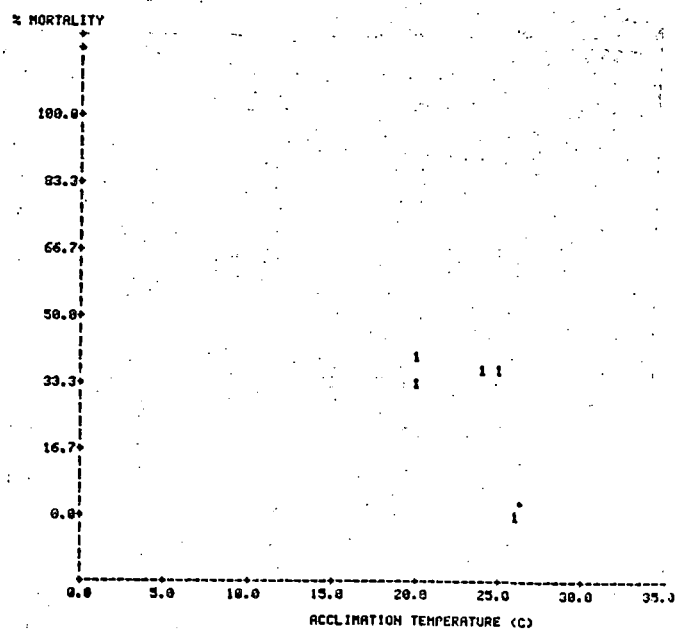
Control



0.5 Hour

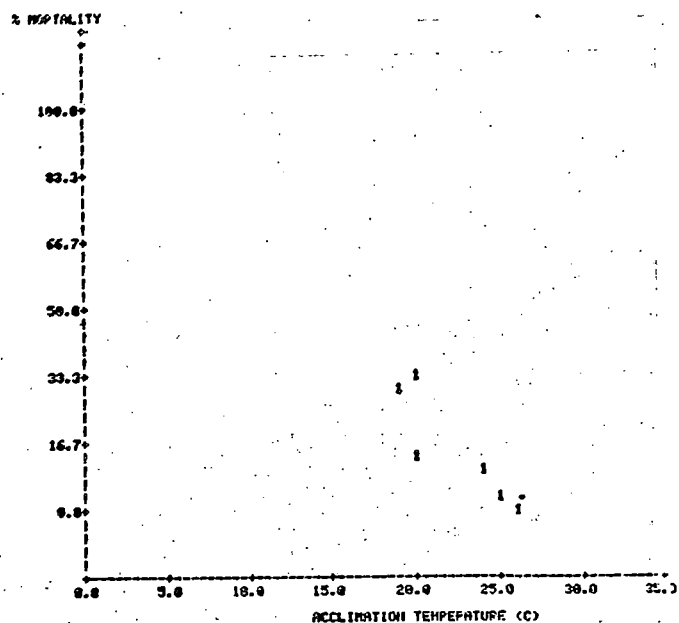


1.0 Hour

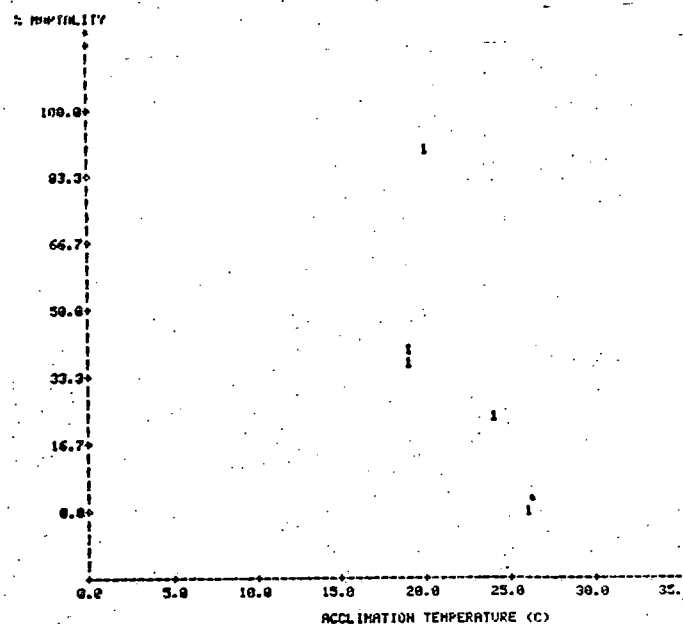


4.0 Hour

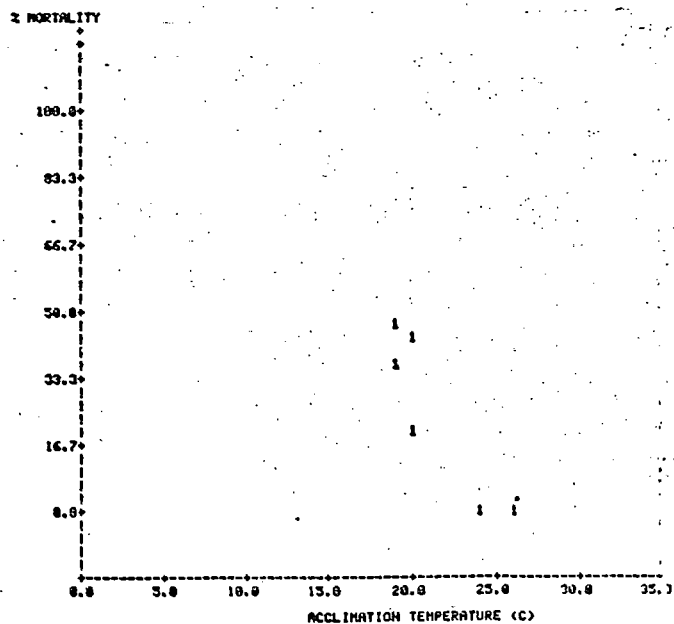
Figure 8. - Percent mortality experienced by larvae of the bay anchovy, Anchoa mitchilli, in secondary entrainment studies conducted at Δ temperature of 3.5-4.5 C at three exposure times. * = test of four hour duration. Numeral on plot = number of tests.



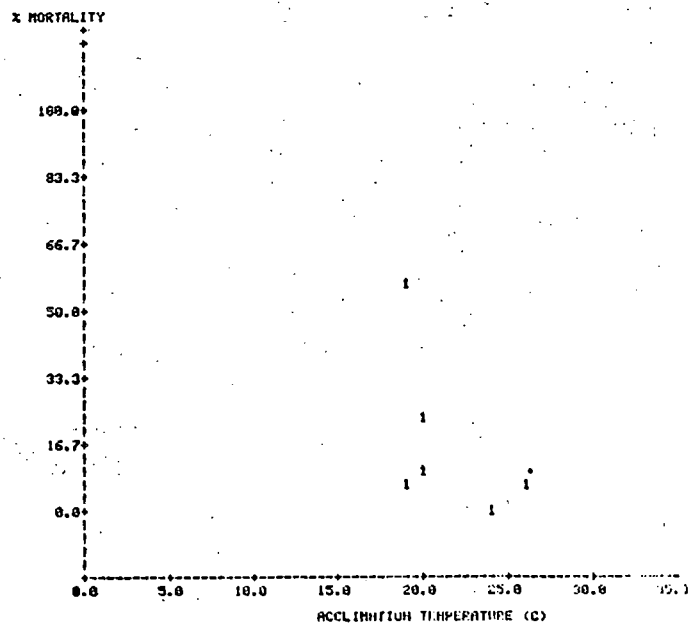
Control



0.5 Hour

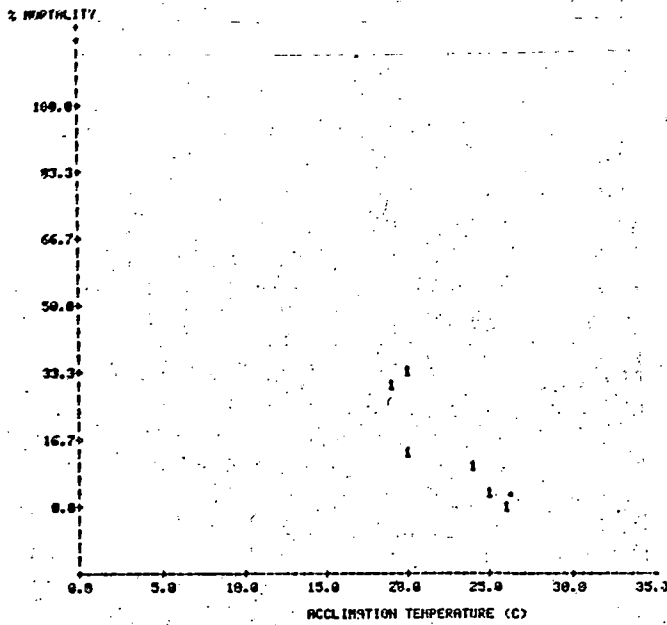


1.0 Hour

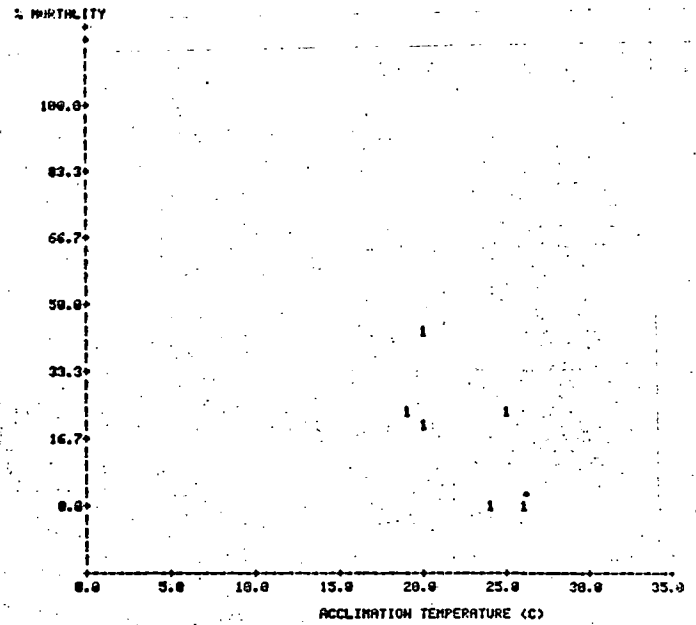


4.0 Hour

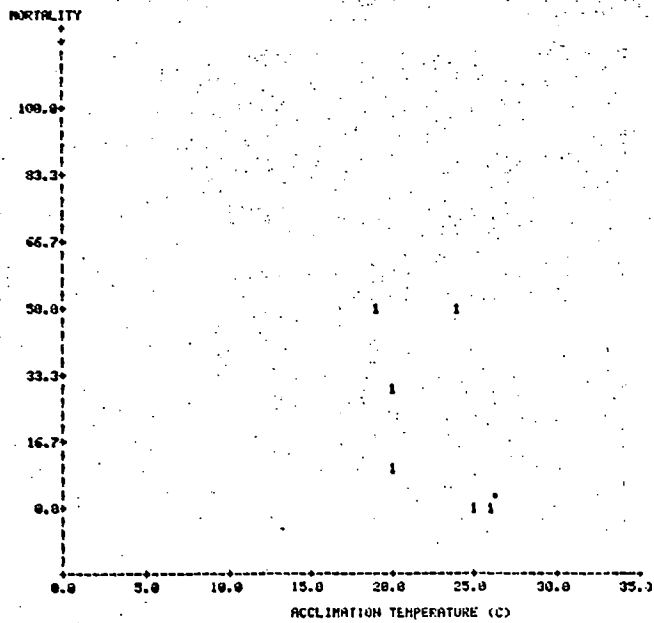
Figure 9 . - Percent mortality experienced by larvae of the bay anchovy, Anchoa mitchilli, in secondary entrainment studies conducted at Δ temperature of 5.0-6.5 C at three exposure times. * = test of four hour duration. Numeral on plot = number of tests.



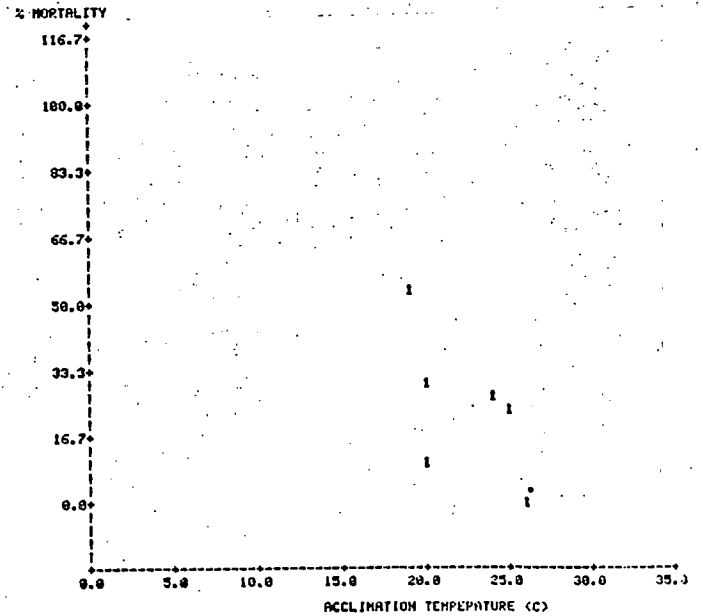
Control



0.5 Hour



1.0 Hour



3.5-4.0 Hour

Figure 10. - Percent mortality experienced by larvae of the bay anchovy, Anchoa mitchilli, in secondary entrainment studies conducted at Δ temperature of 7.0-7.5 C of three exposure times. * = test of four hour duration. Numeral on plot = number of tests.

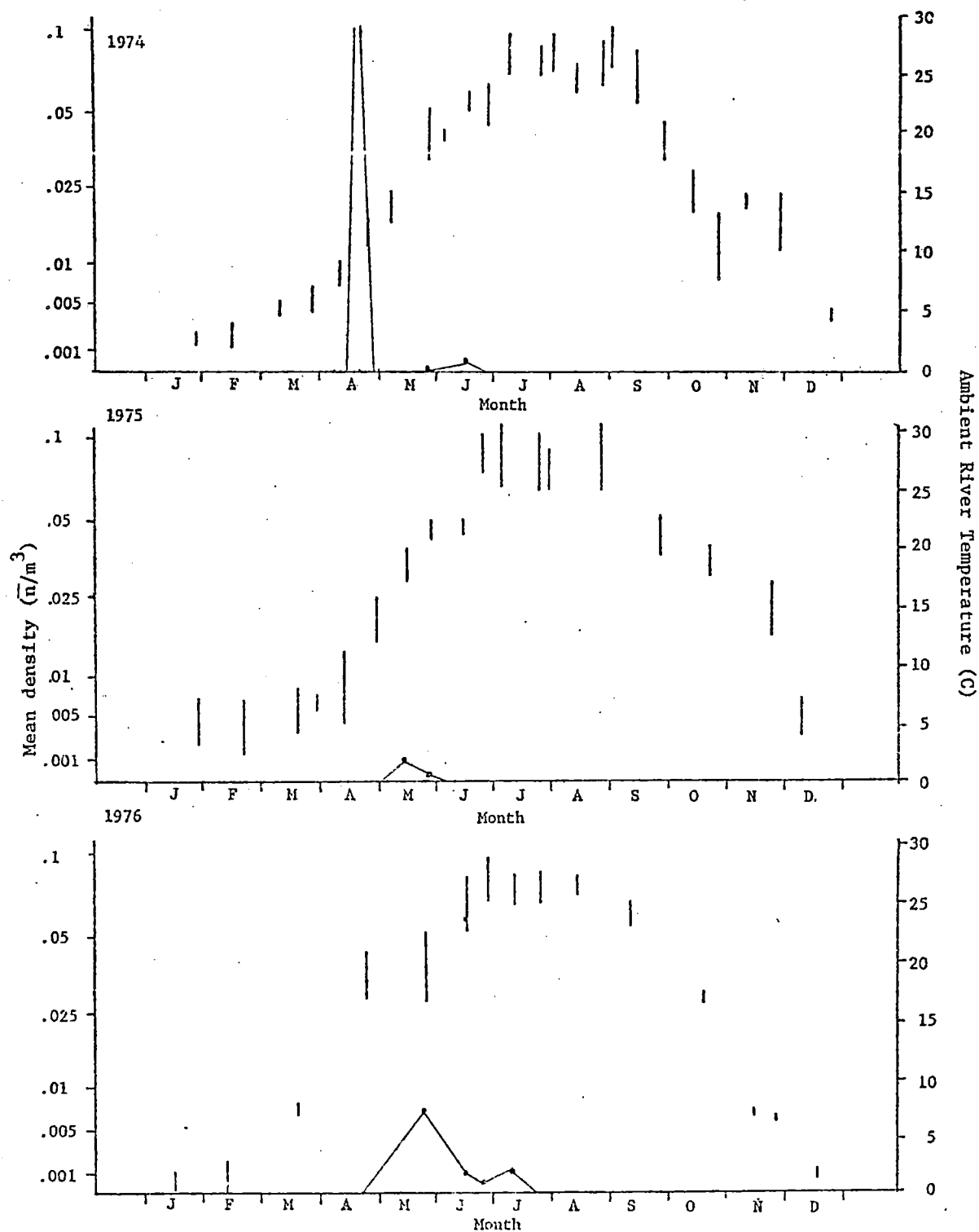
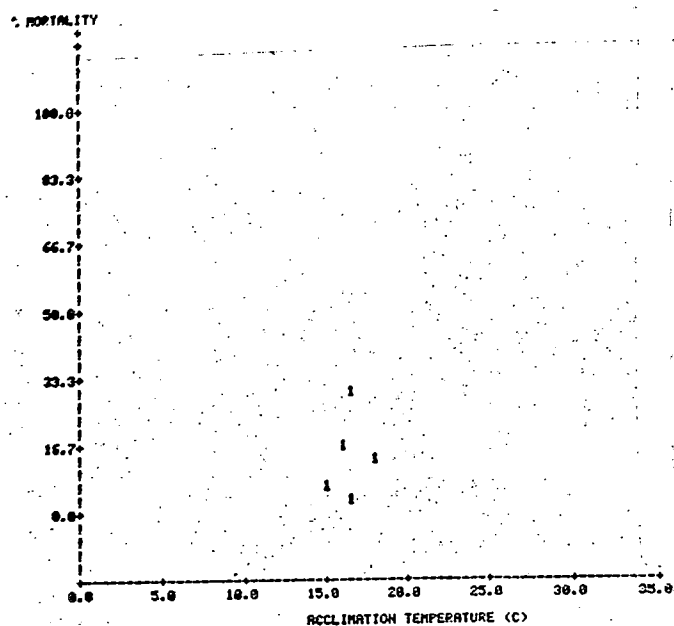
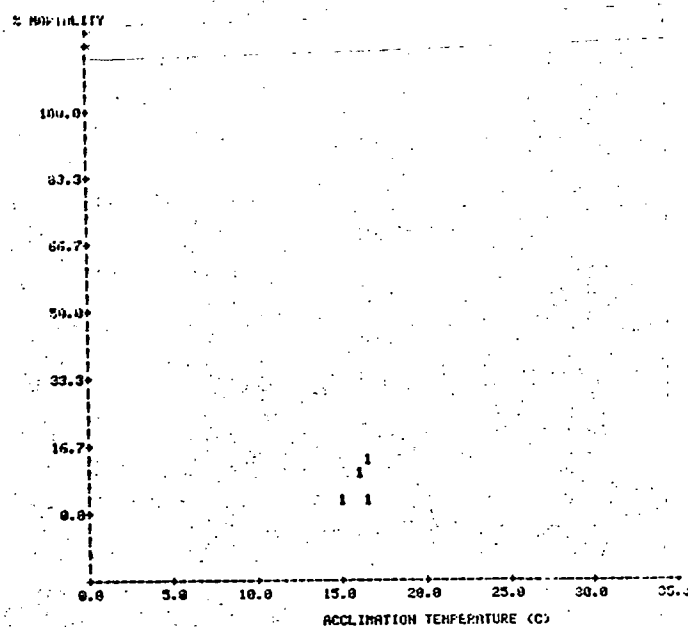


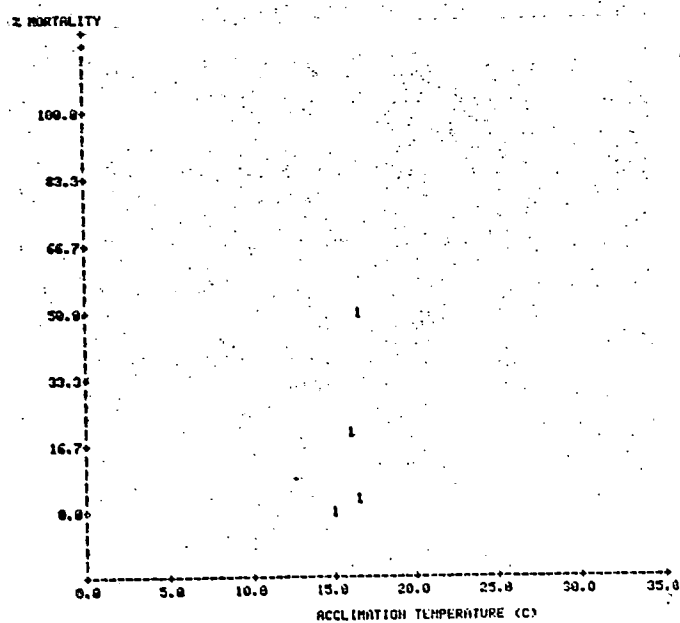
Fig. 11. - Daily mean density ($\bar{n}/m^3$) of *Morone americana* larvae near Artificial Island, 1974 through 1976. Temperature range (vertical line) for each sampling date is included.



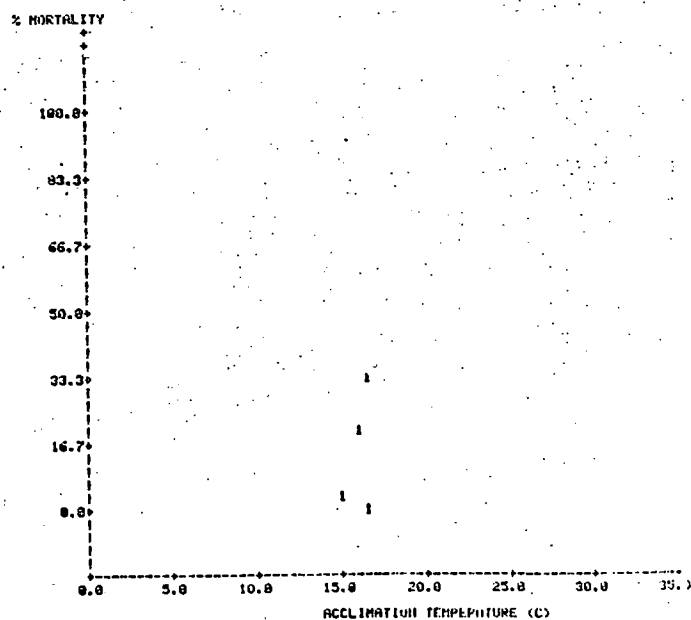
Control



0.5 Hour

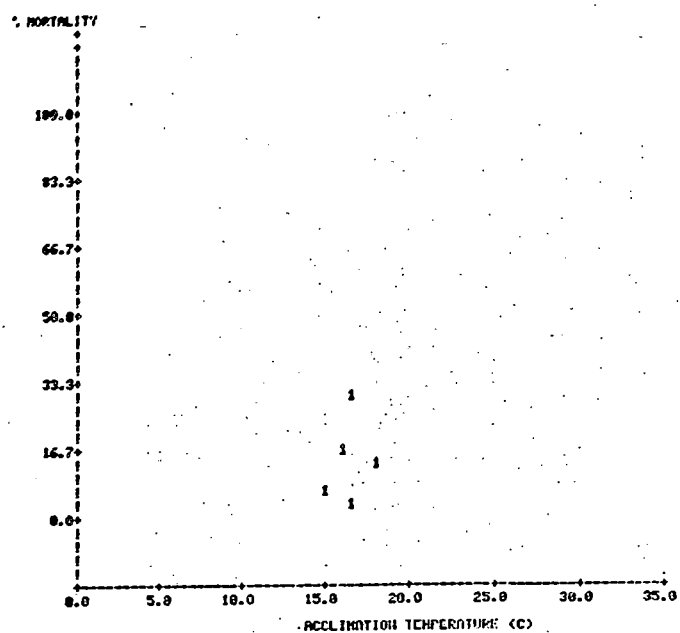


1.0 Hour

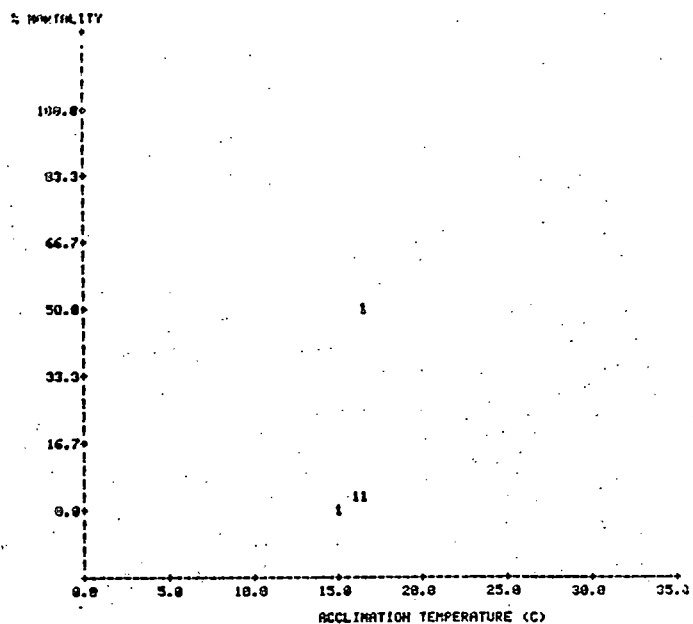


4.0 Hour

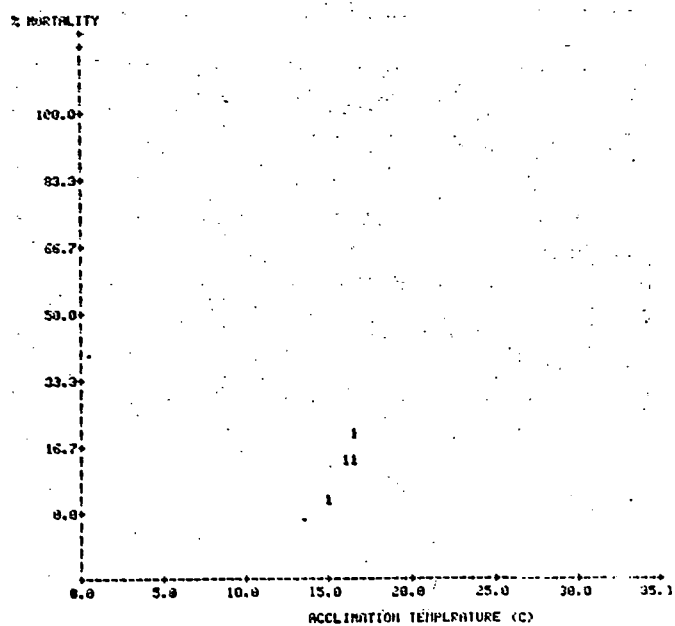
Figure 12. - Percent mortality experienced by larvae of the white perch, *Morone americana*, in secondary entrainment studies conducted at Δ temperature of 2.0-2.5 C at three exposure times. Numeral on plots = number of tests.



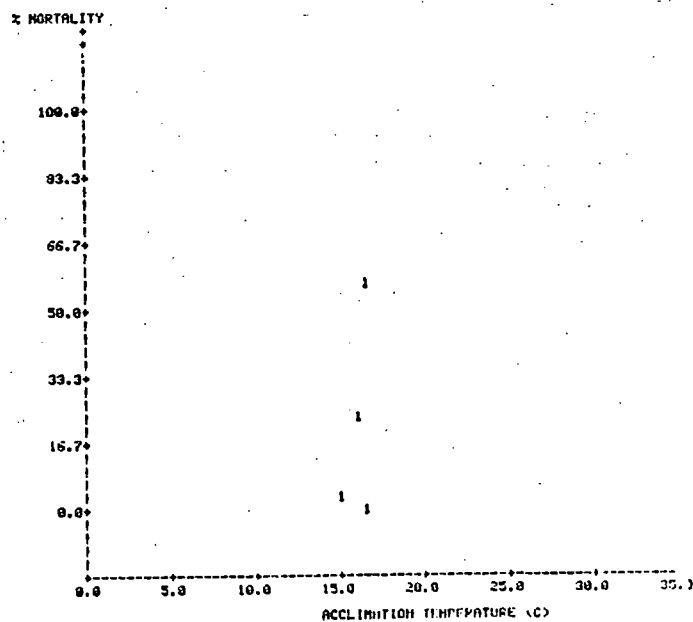
Control



0.5 Hour

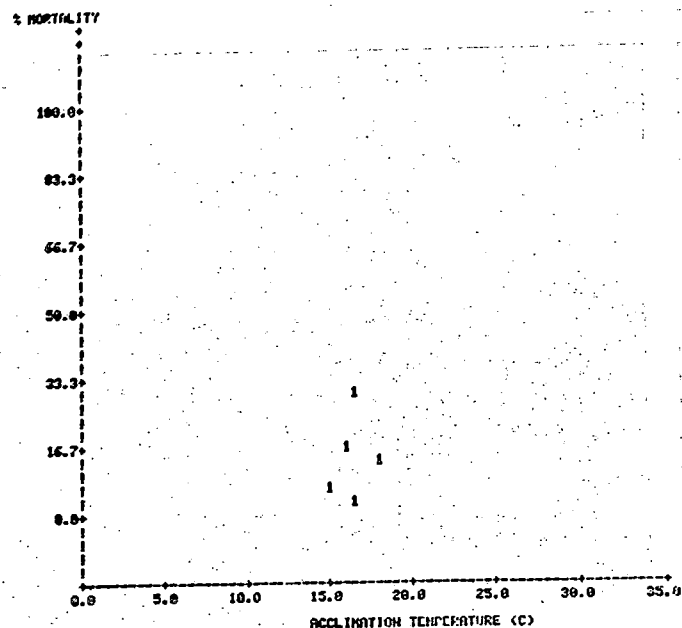


1.0 Hour

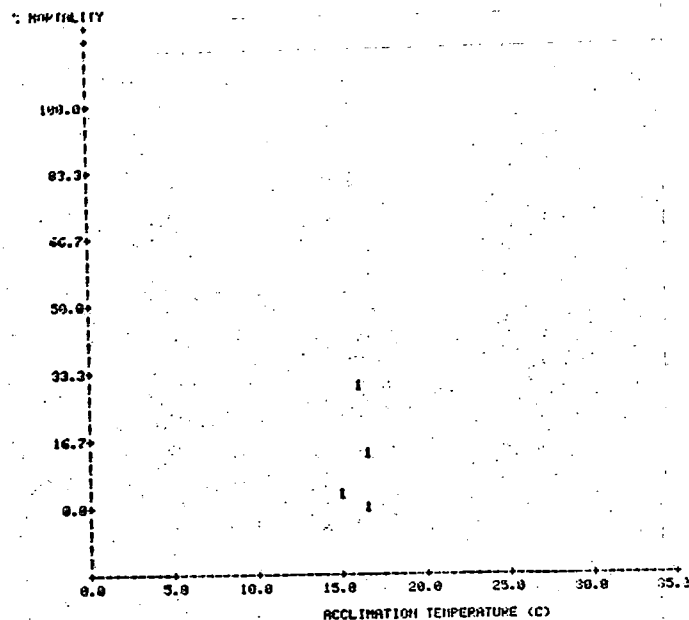


4.0 Hour

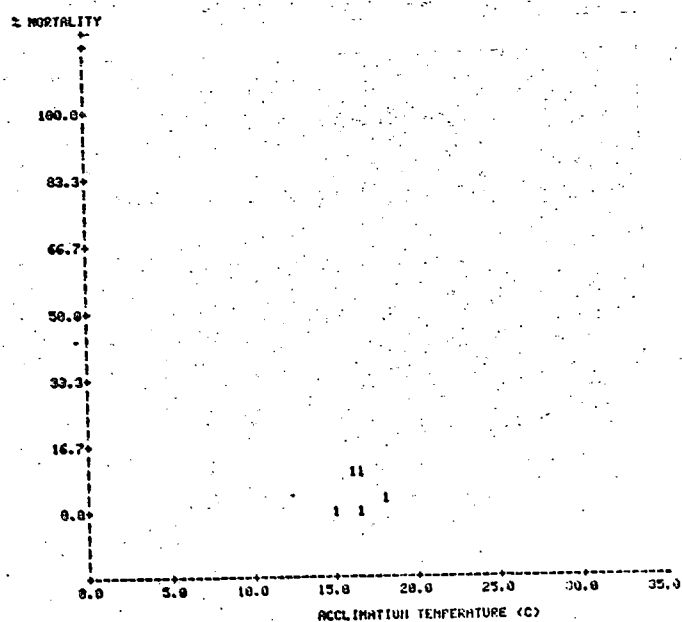
Figure 13. - Percent mortality experienced by larvae of the white perch, *Morone americana*, in secondary entrainment studies conducted at Δ temperature of 4.0-4.5 C at three exposure times. Numeral on plots = number of tests.



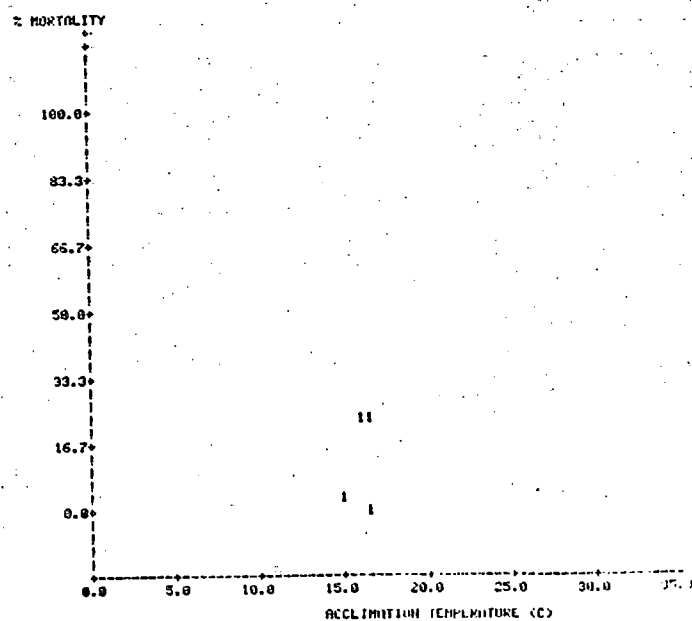
Control



0.5 Hour

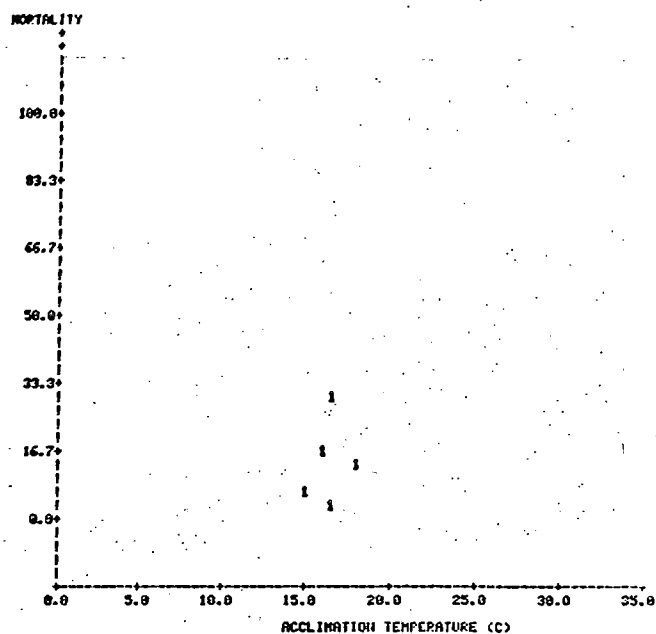


1.0 Hour

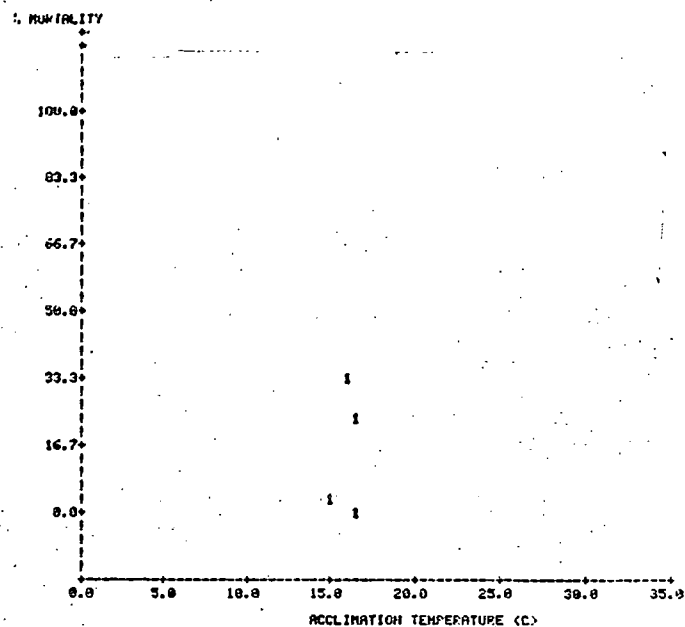


4.0 Hour

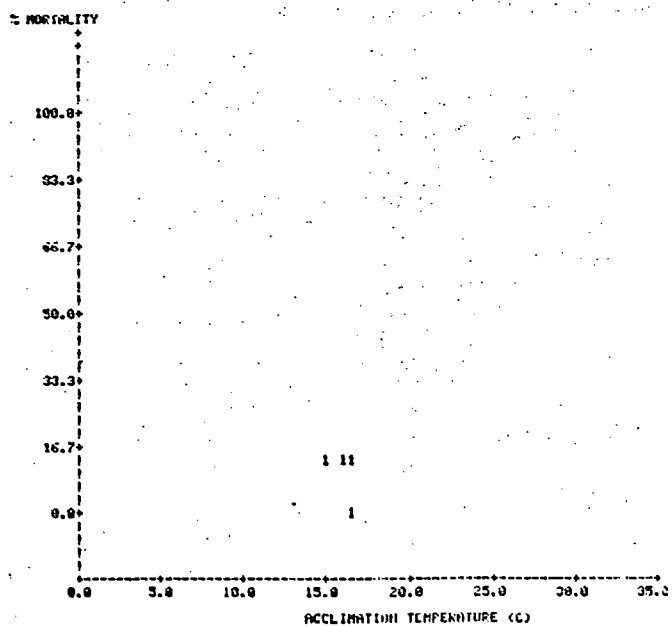
Figure 14. - Percent mortality experienced by larvae of the white perch, Morone americana, in secondary entrainment studies conducted at Δ temperature of 6.0-6.5 C at three exposure times. Numeral on plot = number of tests.



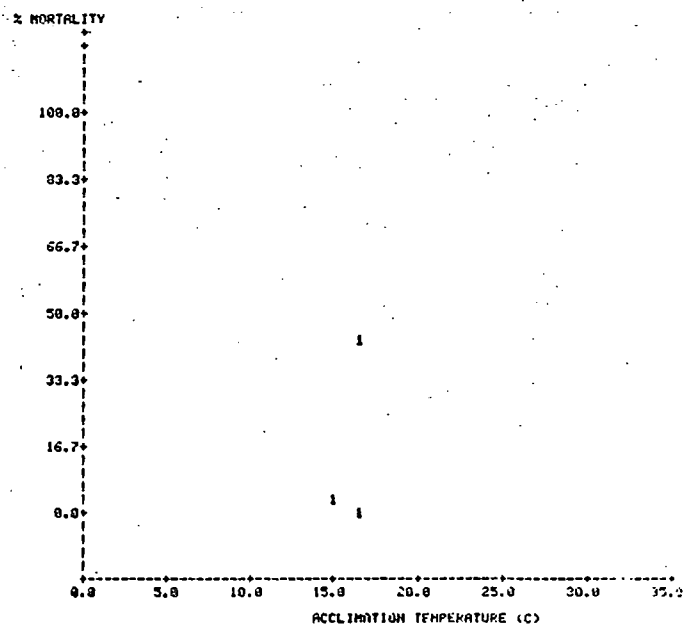
Control



0.5 Hour



1.0 Hour



4.0 Hour

Figure 15. - Percent mortality experienced by larvae of the white perch, *Morone americana*, in secondary entrainment studies conducted at Δ temperature of 7.5-8.0 C at three exposure times. Numeral on plot = number of tests.

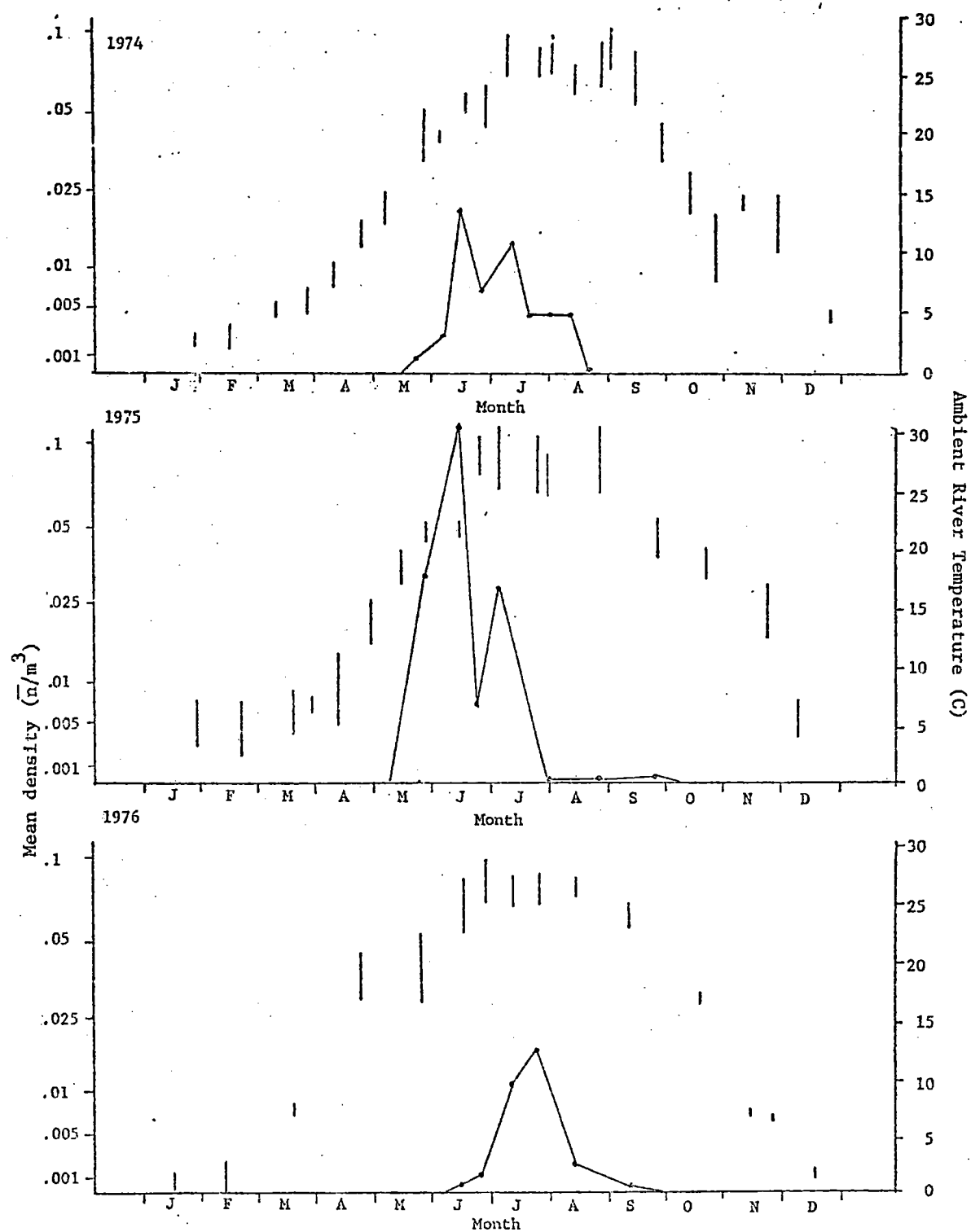
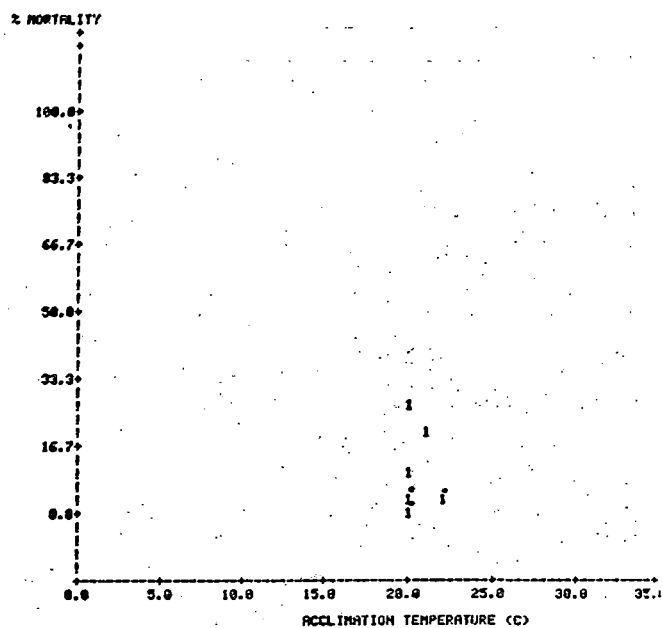
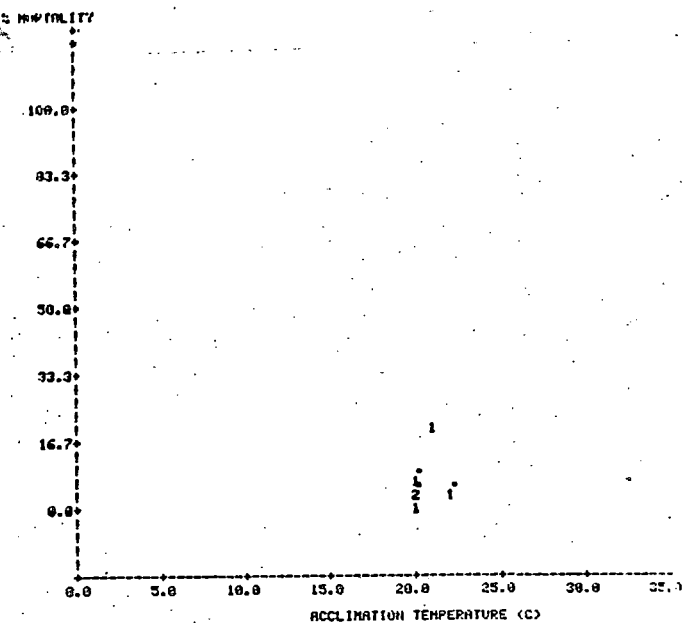


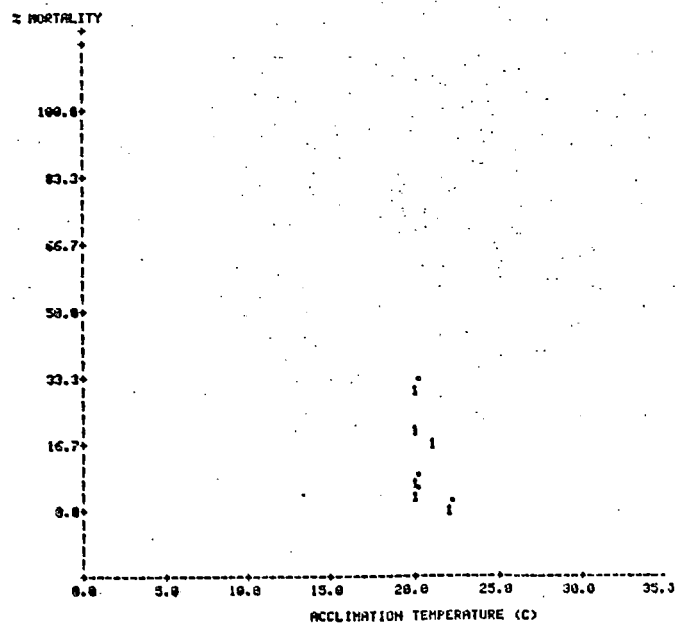
Fig. 16. - Daily mean density ($\bar{n}/m^3$) of Cynoscion regalis larvae taken near Artificial Island, 1974 through 1976. Temperature range (vertical line) for each sampling date is included.



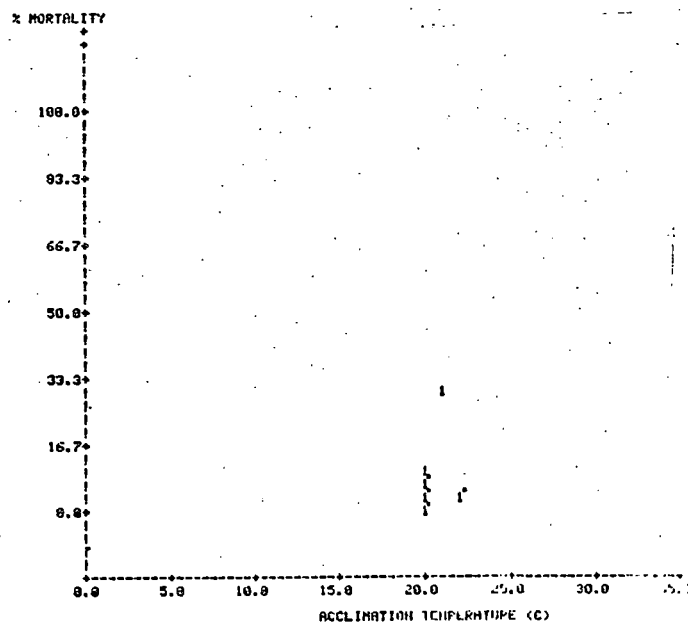
Control



0.5 Hour

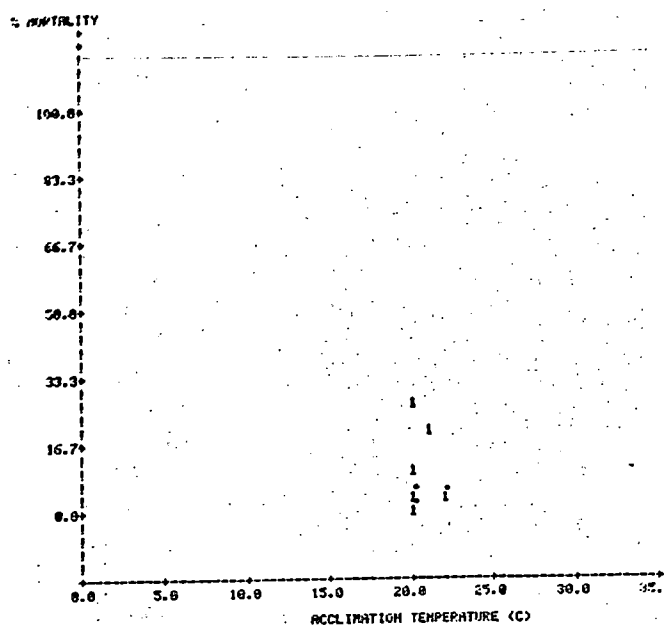


1.0 Hour

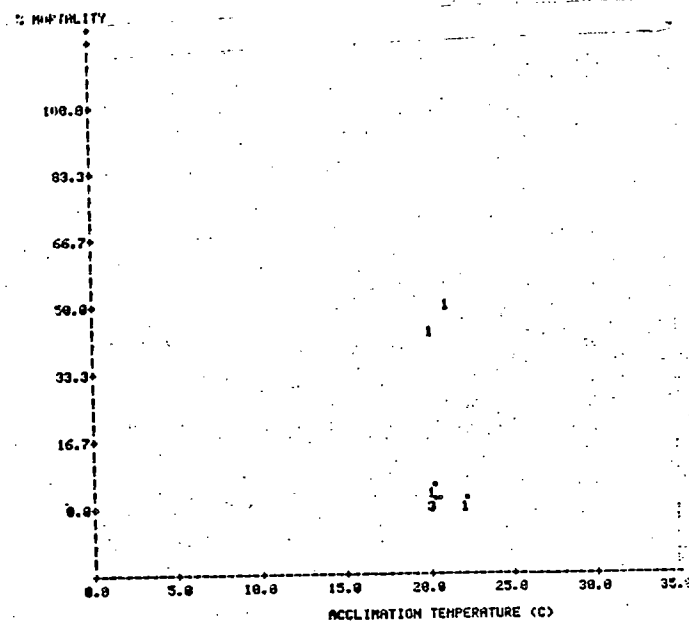


4.0 Hour

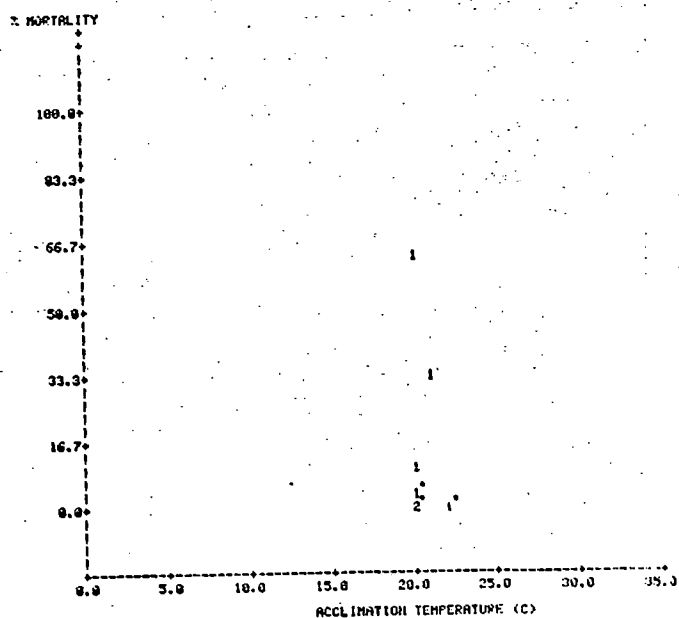
Figure 17. - Percent mortality experienced by larvae of the weakfish, *Cynoscion regalis*, in secondary entrainment studies conducted at Δ temperature of 2.0-2.5 C at three exposure times. * = test of four hour duration. Numeral on plot = number of tests.



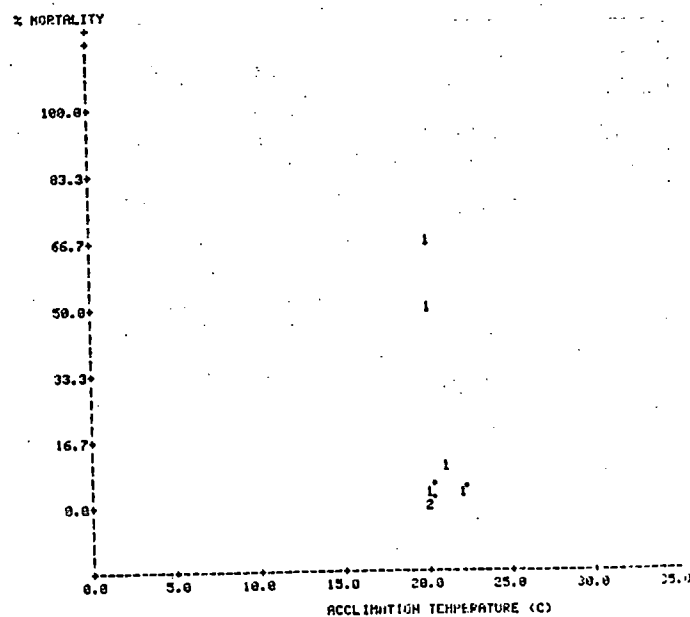
Control



0.5 Hour

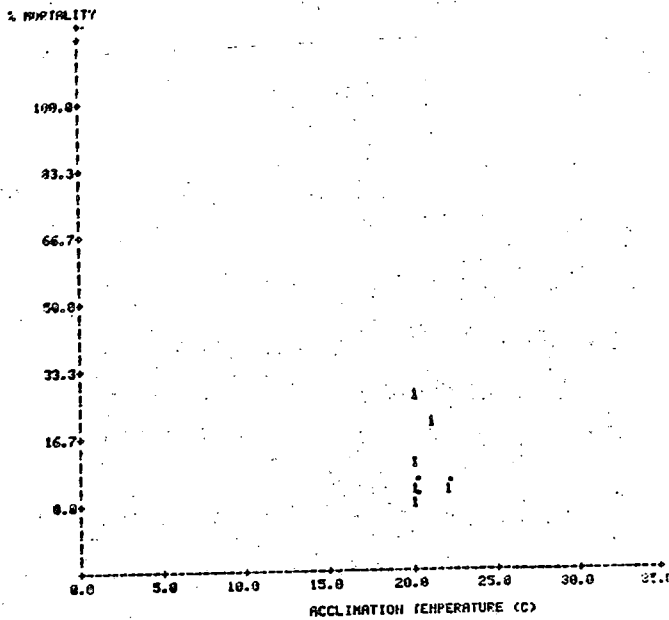


1.0 Hour

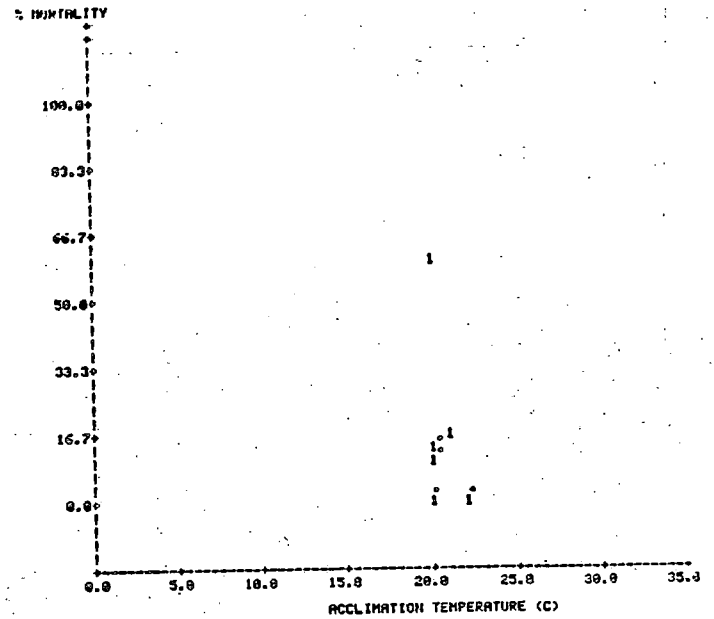


4.0 Hour

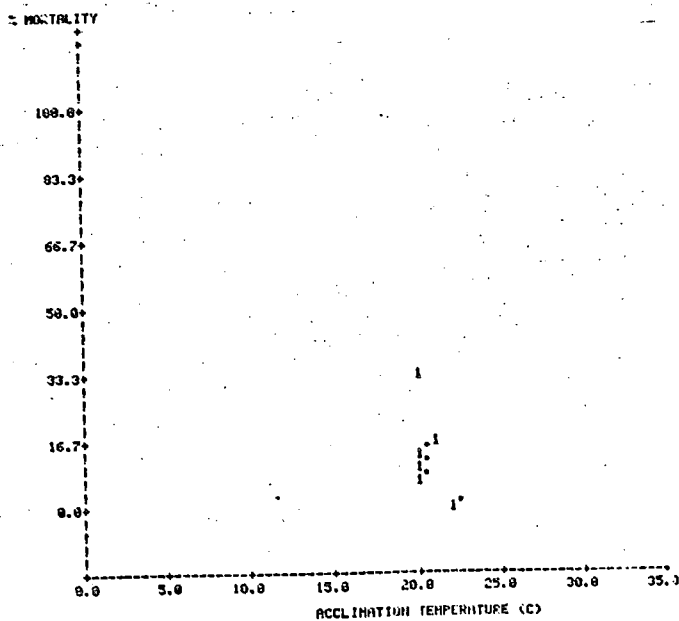
Figure 18. - Percent mortality experienced by larvae of the weakfish, *Cynoscion regalis*, in secondary entrainment studies conducted at Δ temperature of 4.0-4.5 C at three exposure times. * = test of four hour duration. ** = two out of three tests of four hour duration. Numeral on plot = number of tests.



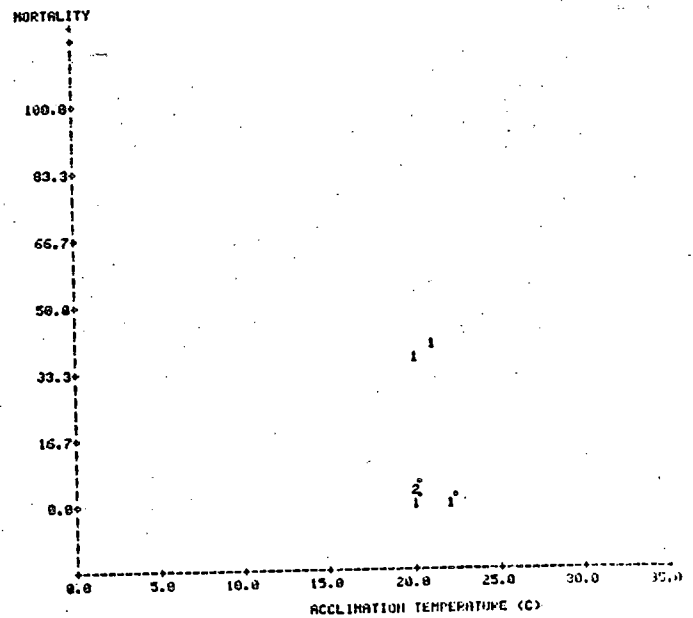
Control



0.5 Hour

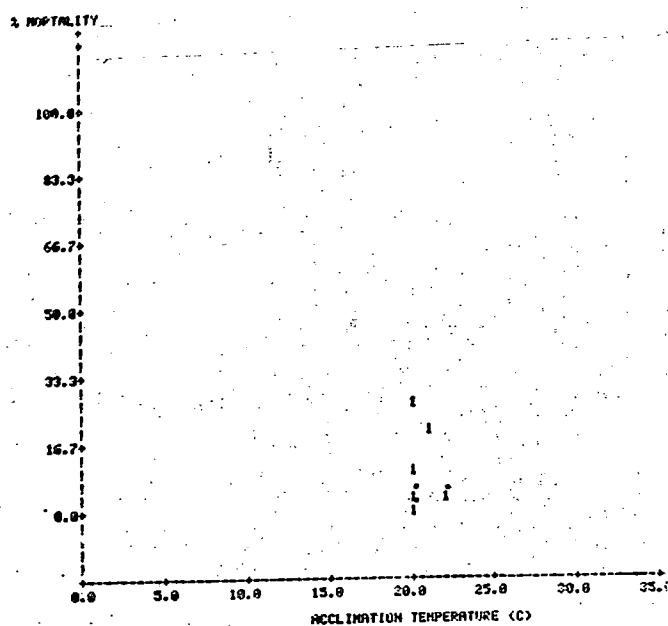


1.0 Hour

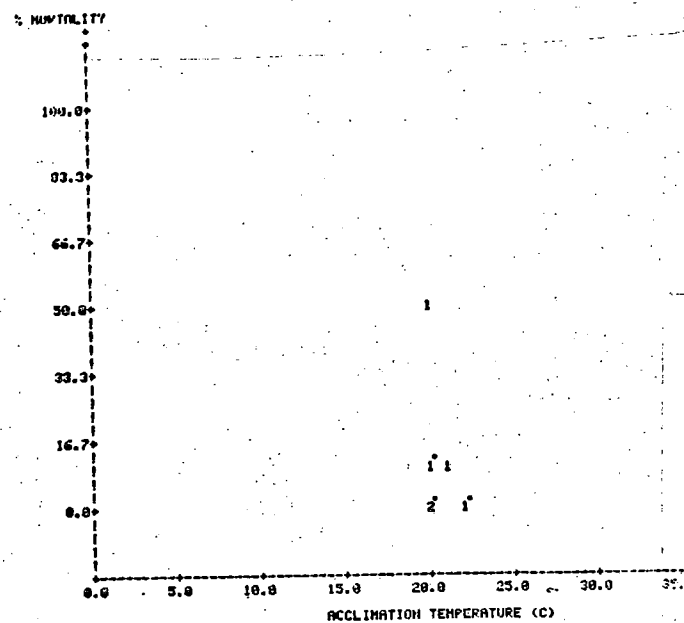


4.0 Hour

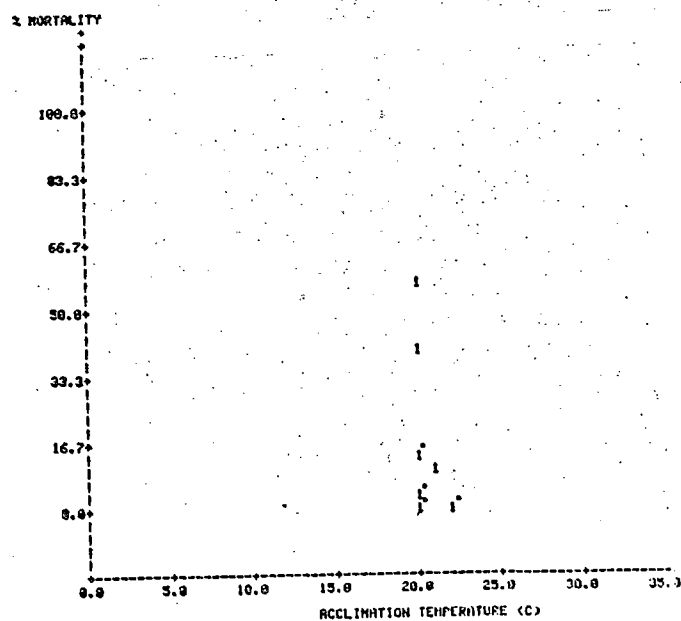
Figure 19. - Percent mortality experienced by larvae of the weakfish, *Cynoscion regalis*, in secondary entrainment studies conducted at Δ temperature of 5.0-6.5 C at three exposure times. * = test of four hour duration. Numeral on plot = number of tests.



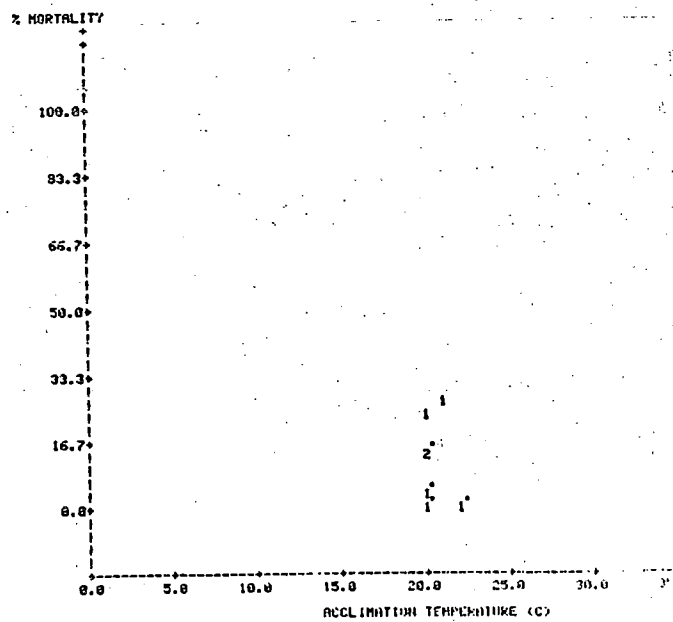
Control



0.5 Hour



1.0 Hour



3.5-4.0 Hour

Figure 20. - Percent mortality experienced by larvae of the weakfish, Cynoscion regalis, in secondary entrainment studies conducted at Δ temperature of 7.0-7.5 C at three exposure times. * = tests of four hour duration. Numeral on plot = number of tests.

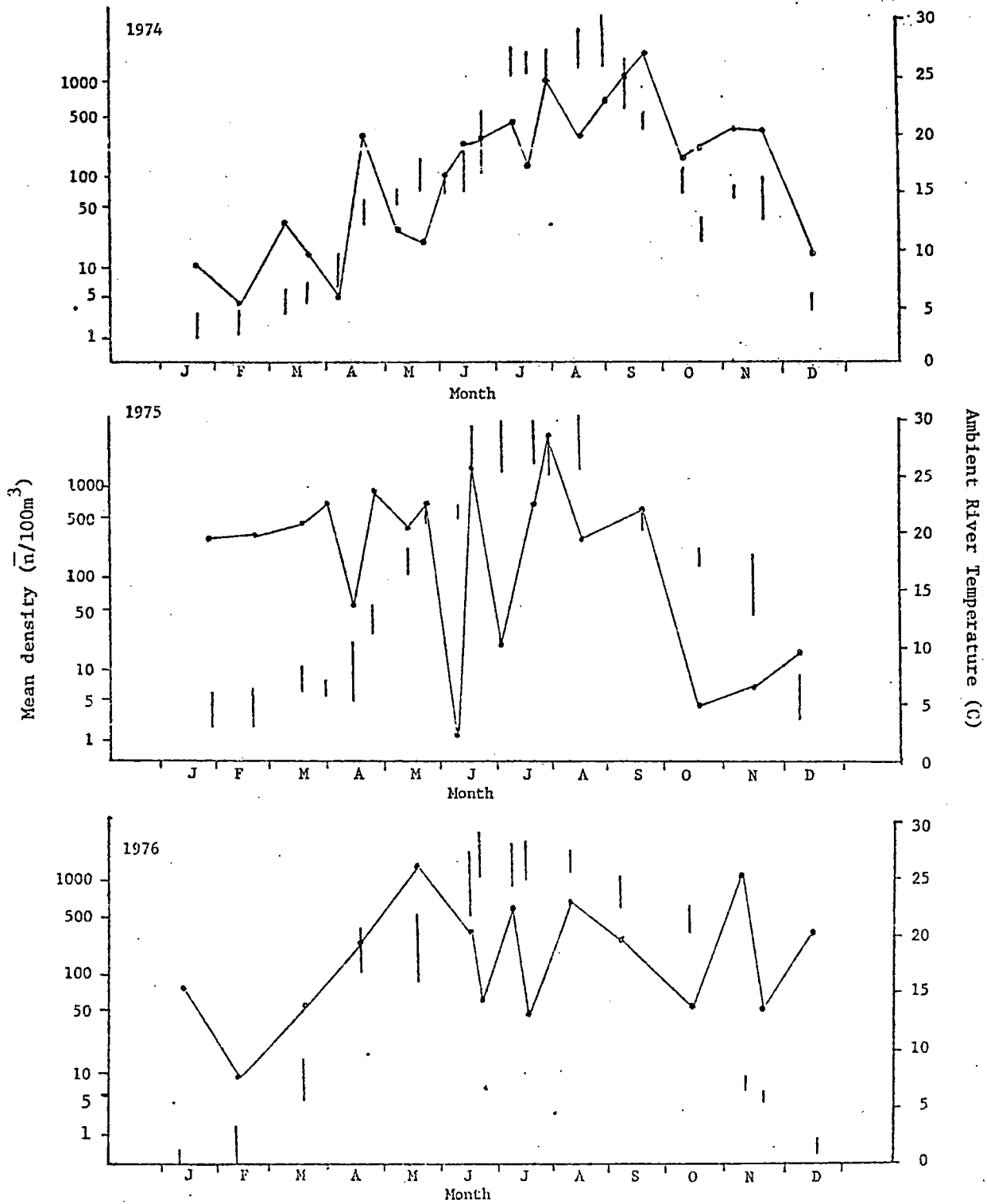
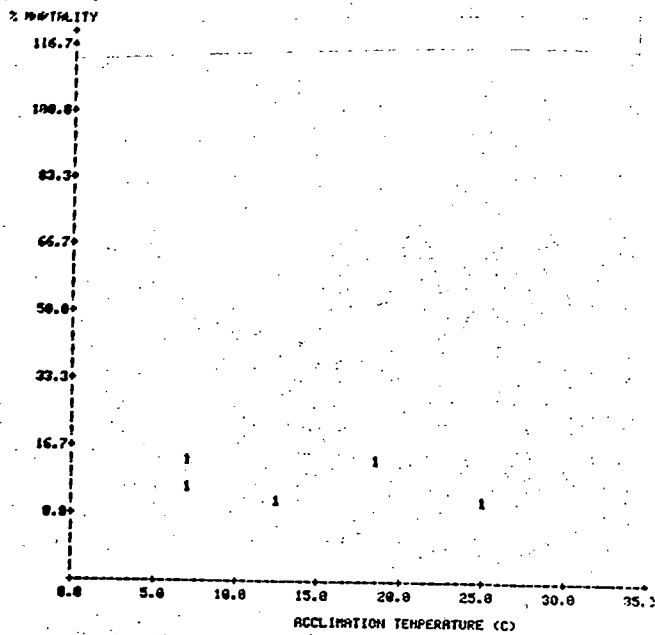
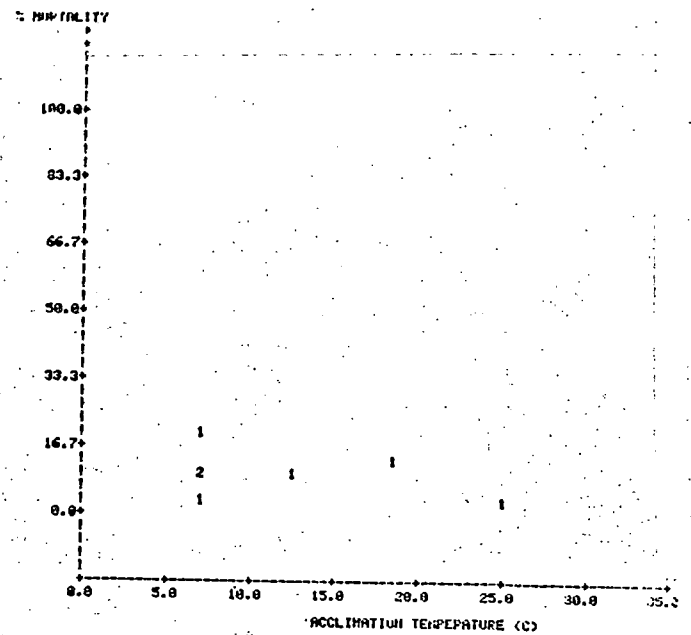


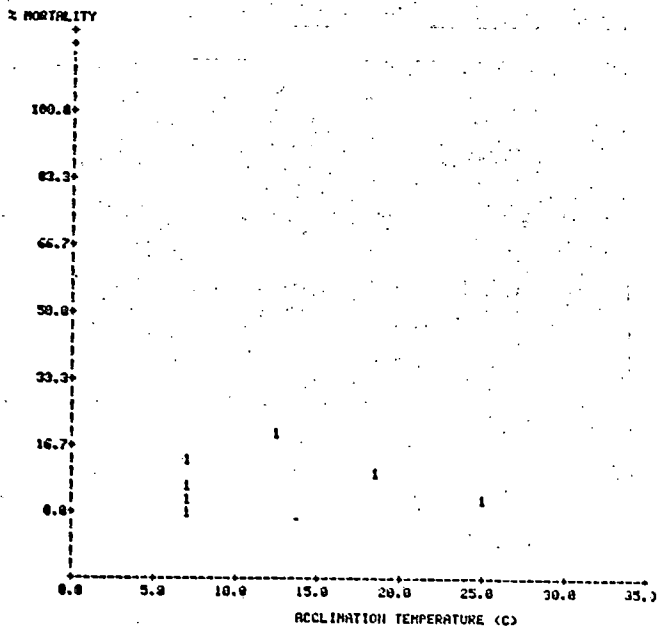
Fig. 21. - Daily mean density ($\bar{n}/m^3$) of *Gammarus* spp. taken near Artificial Island, 1974 through 1976. Temperature range (vertical line) for each sampling date is included.



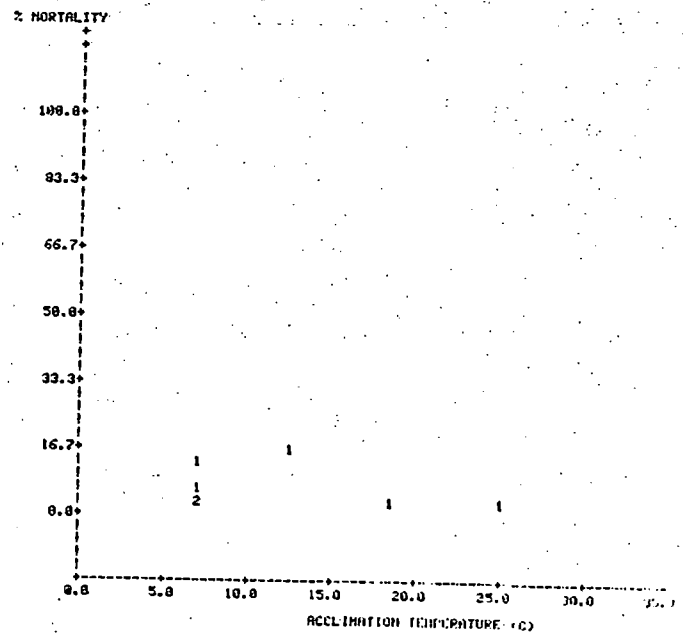
Control



0.5 Hour

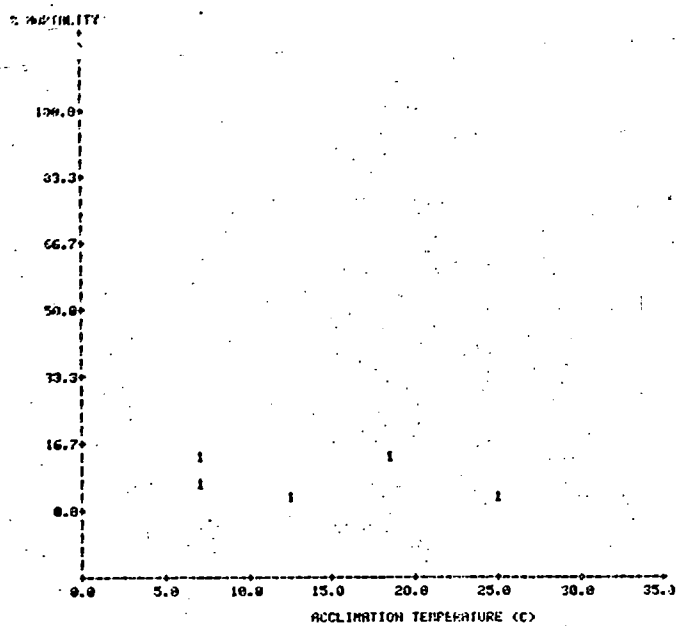


1.0 Hour

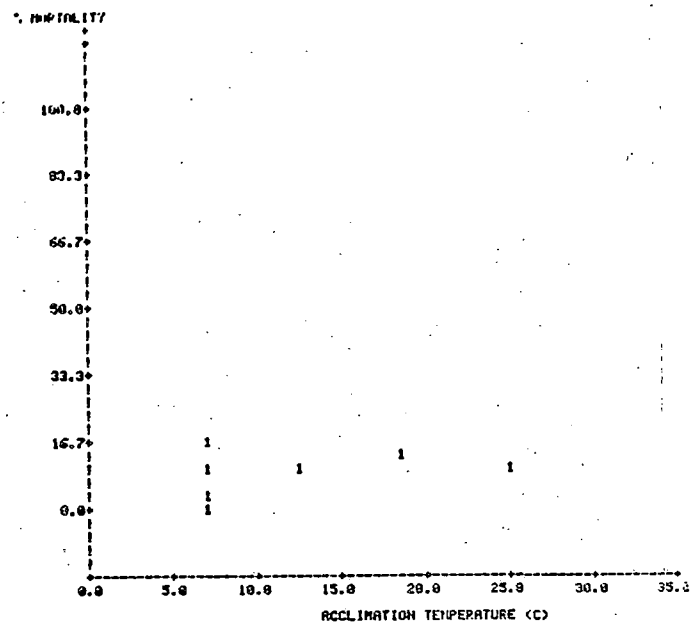


4.0 Hour

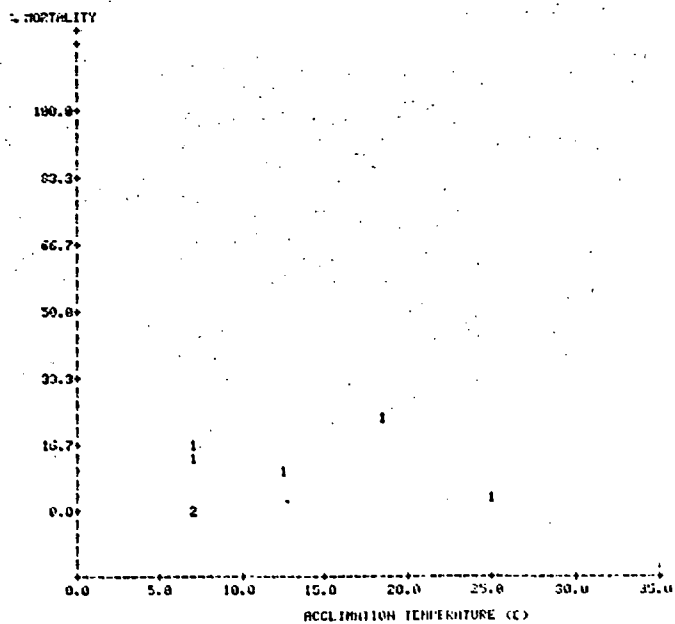
Figure 22. - Percent mortality experienced by Gammarus spp., in secondary entrainment studies conducted at Δ temperature of 2.0-2.5 C at three exposure times. Numeral on plot = number of tests.



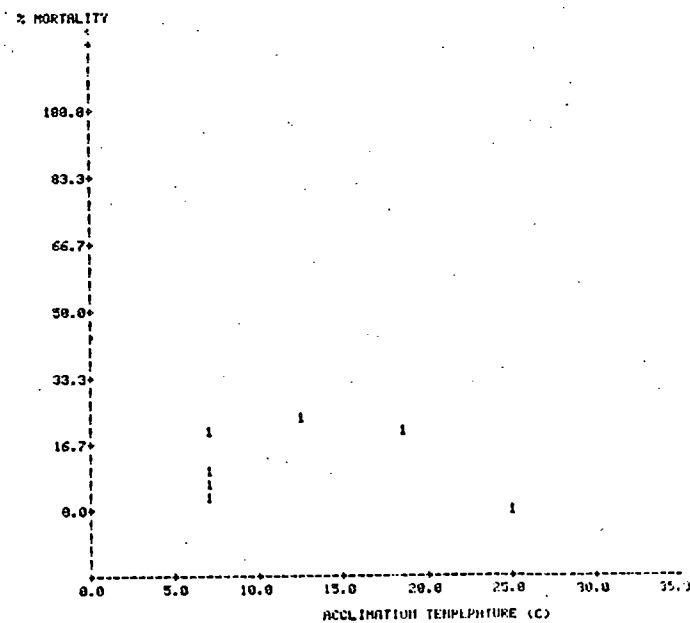
Control



0.5 Hour

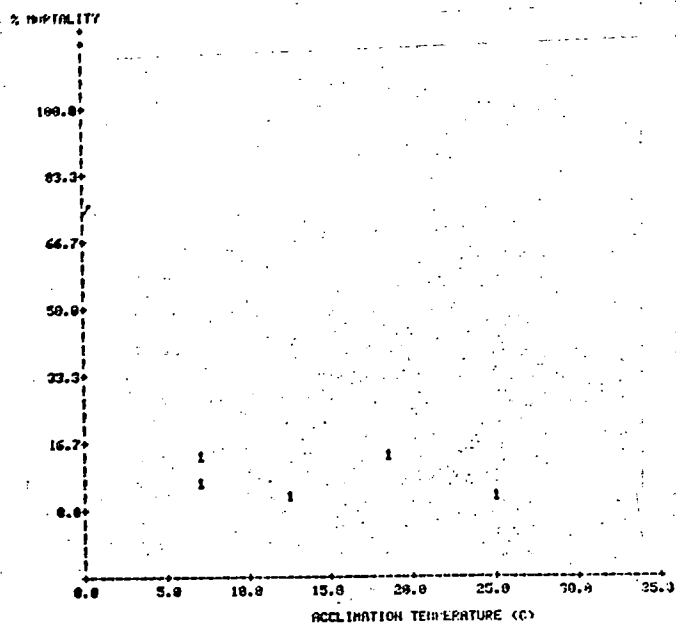


1.0 Hour

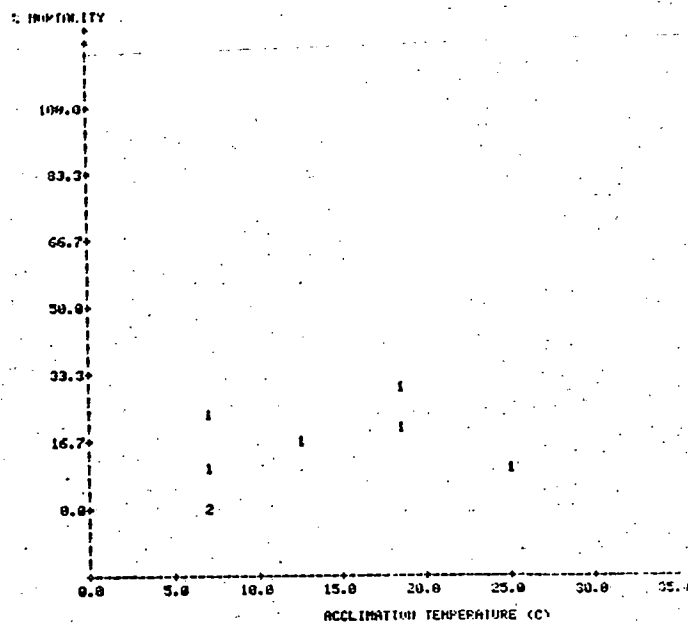


4.0 Hour

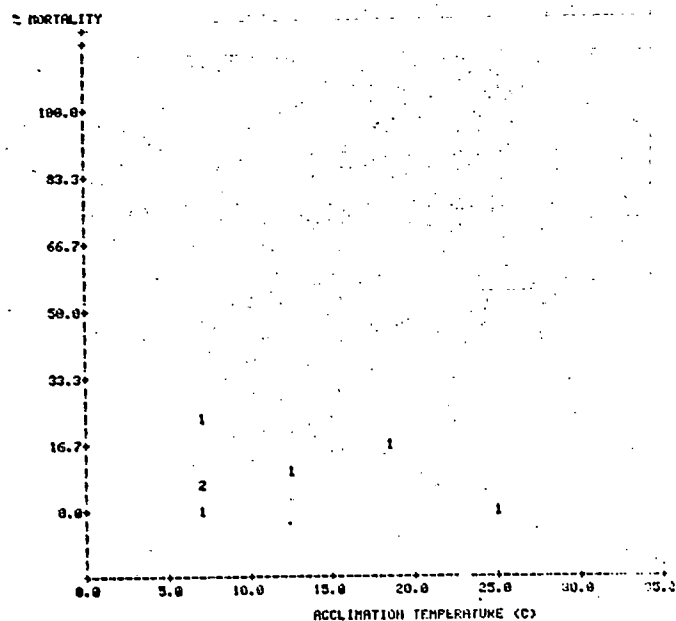
Figure 23. - Percent mortality experienced by *Gammarus* spp., in secondary entrainment studies conducted at Δ temperature of 4.0-4.5 C at three exposure times. Numeral on plot = number of tests.



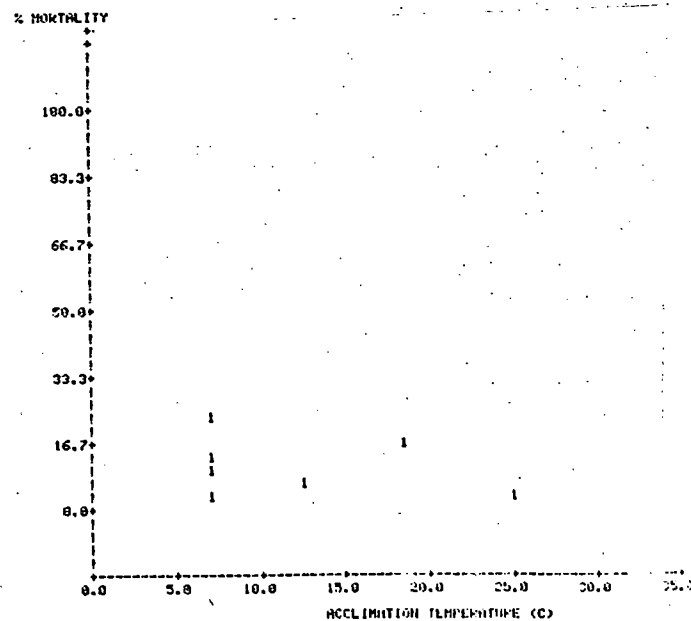
Control



0.5 Hour

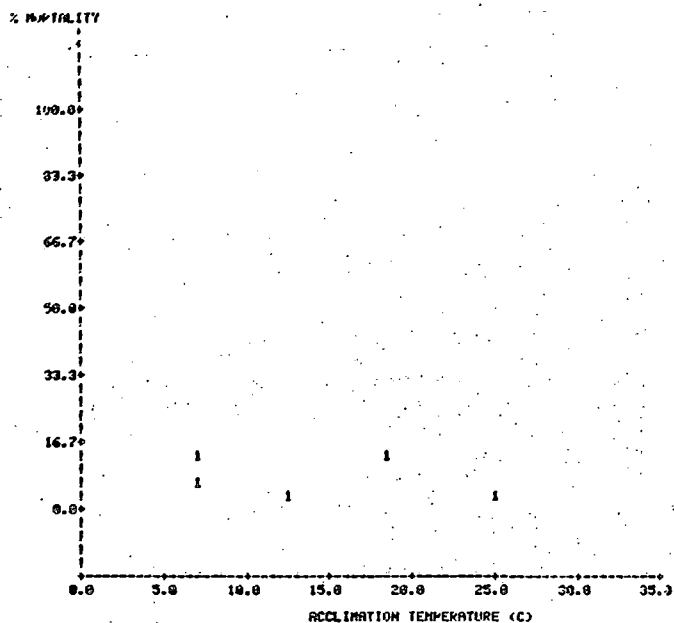


1.0 Hour

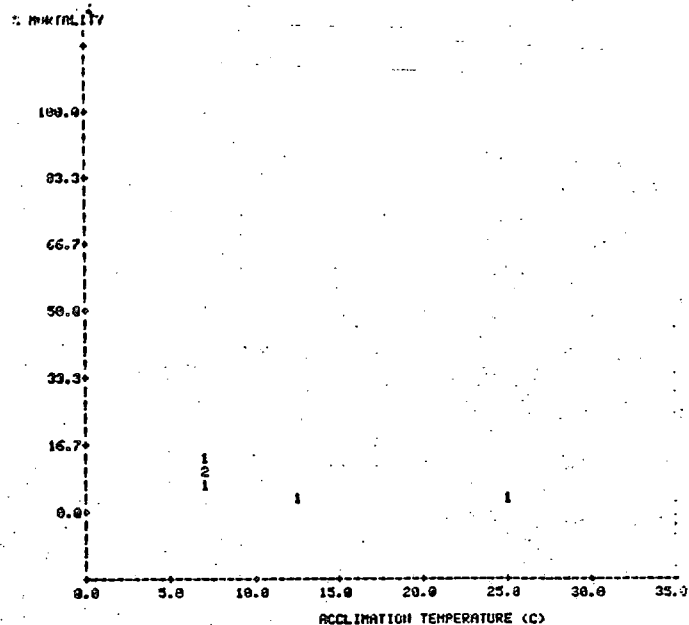


4.0 Hour

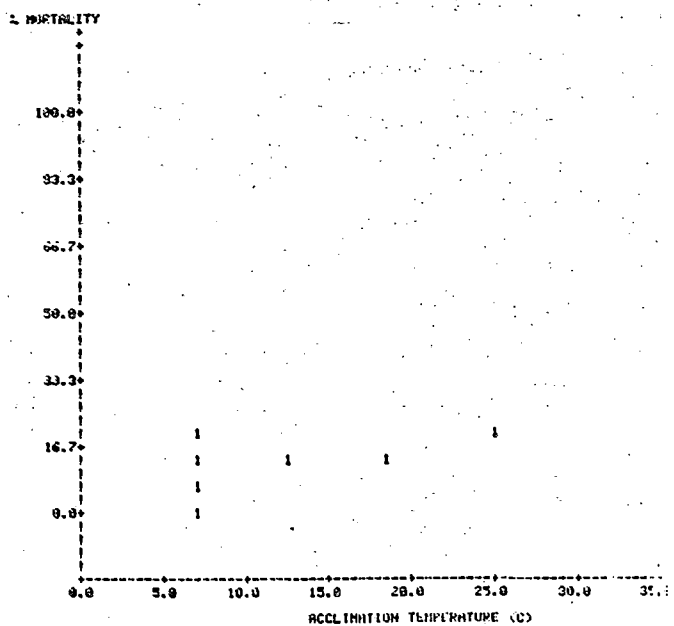
Figure 24. - Percent mortality experienced by Gammarus spp. in secondary entariment studies conducted at Δ temperature of 5.0-6.5 C at three exposure times. Numeral on plot = number of tests.



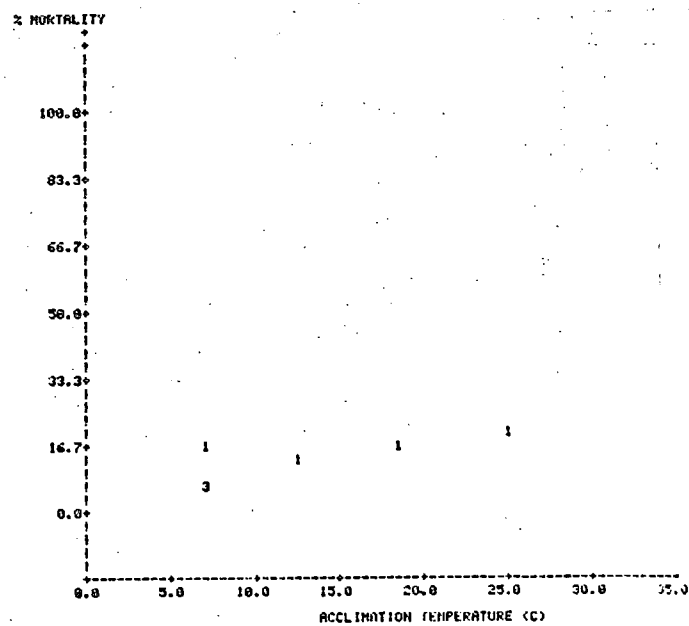
Control



0.5 Hour



1.0 Hour



4.0 Hour

Figure 25. - Percent mortality experienced by Gammarus spp. in secondary entrainment studies conducted at Δ temperature of 7.0-8.0 C at three exposure times. Numeral on plot = number of tests.

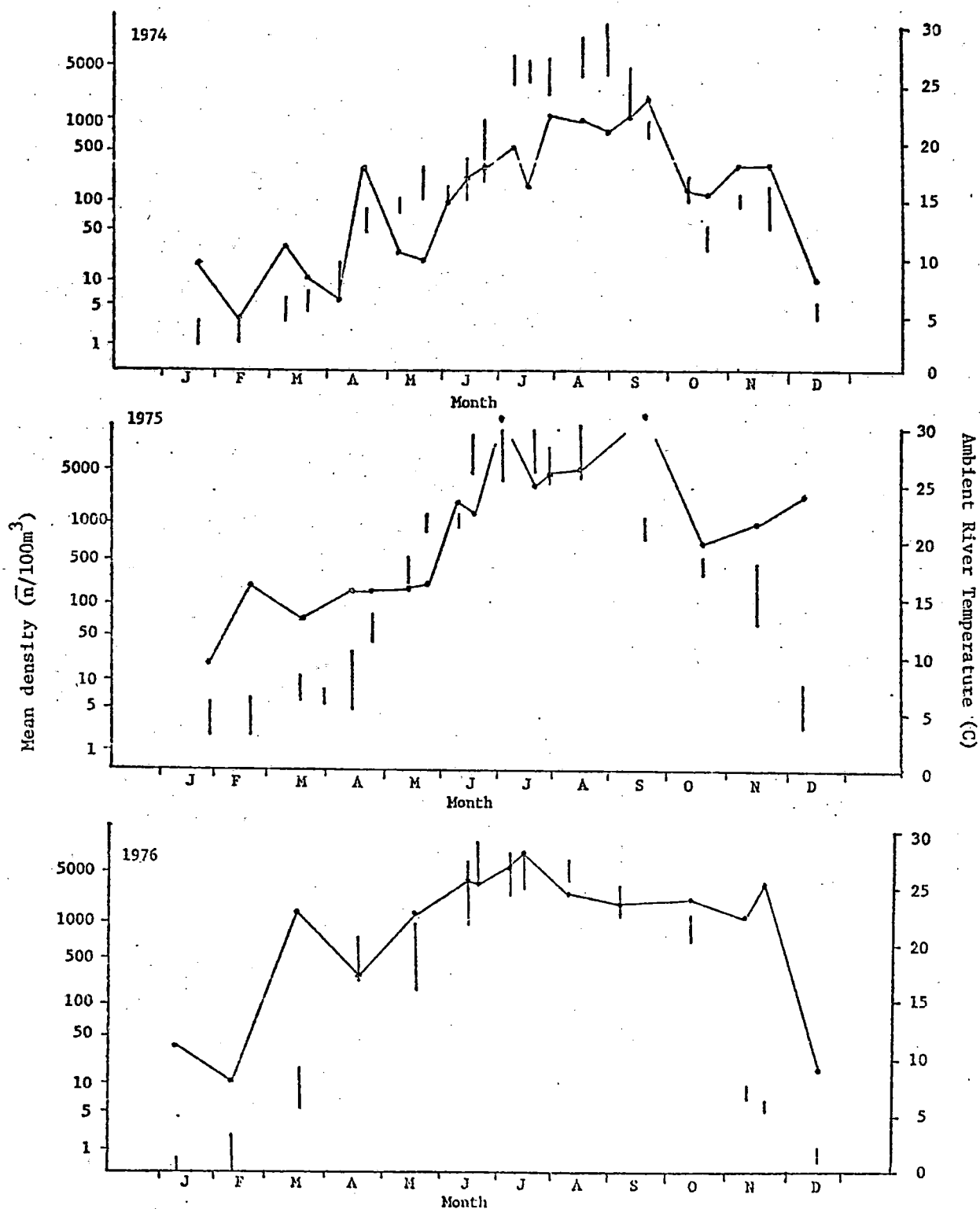
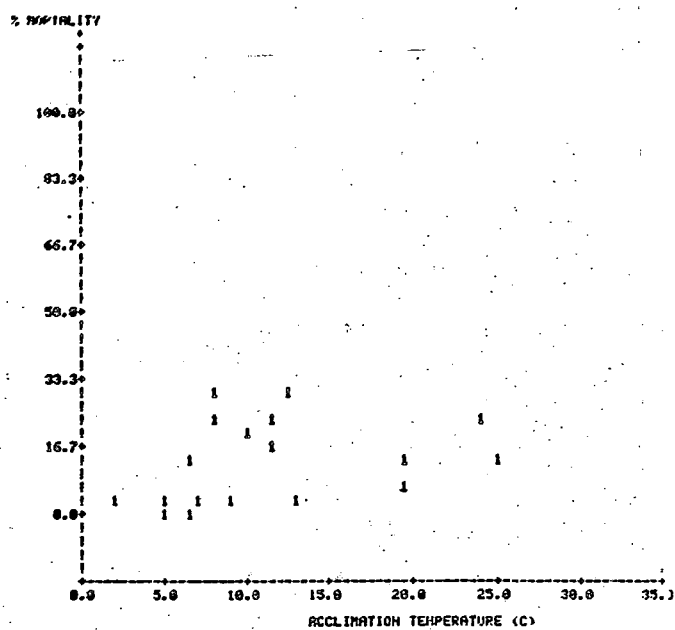
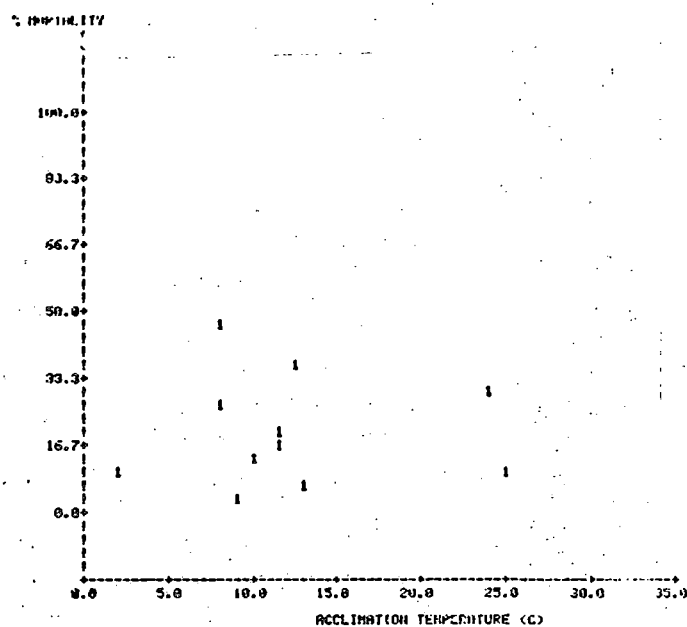


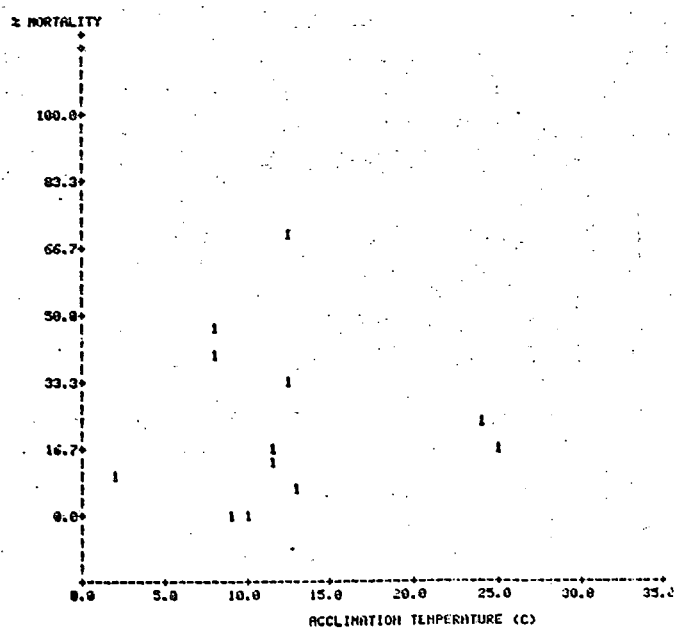
Fig. 26. - Daily mean density ($\bar{n}/\text{m}^3$) of *Neomysis americana* taken near Artificial Island, 1974 through 1976. Temperature range (vertical line) for each sampling data is included.



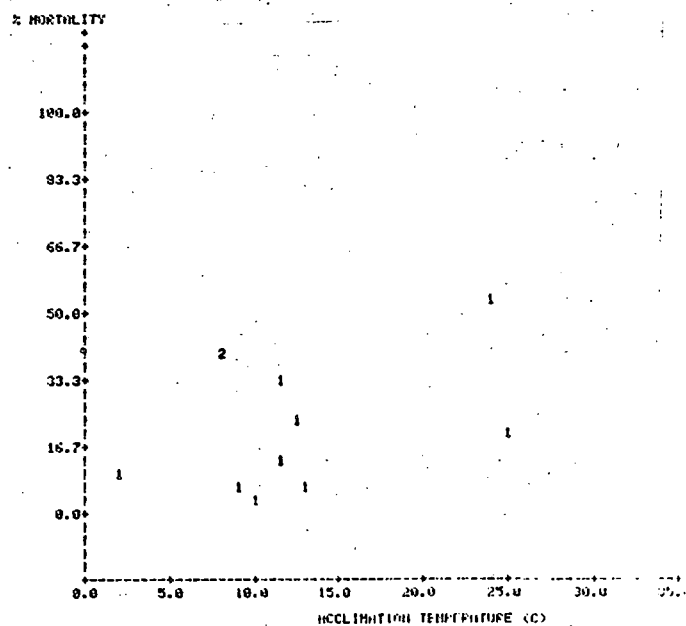
Control



0.5 Hour

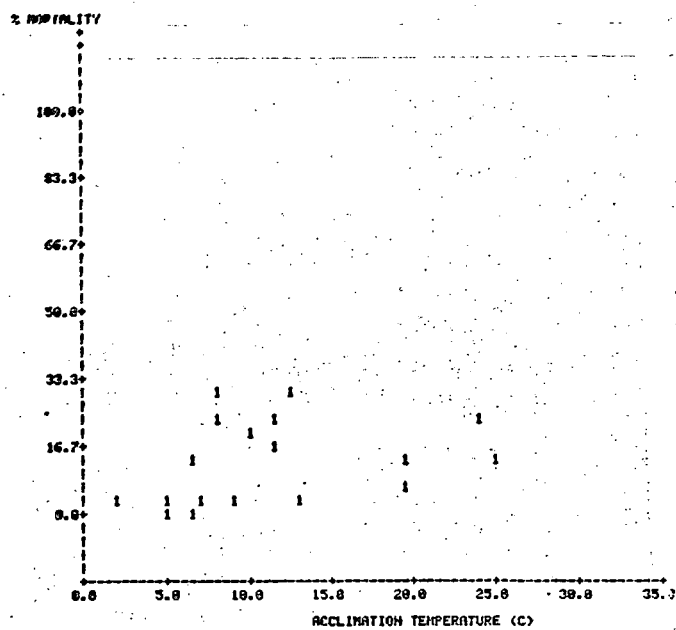


1.0 Hour

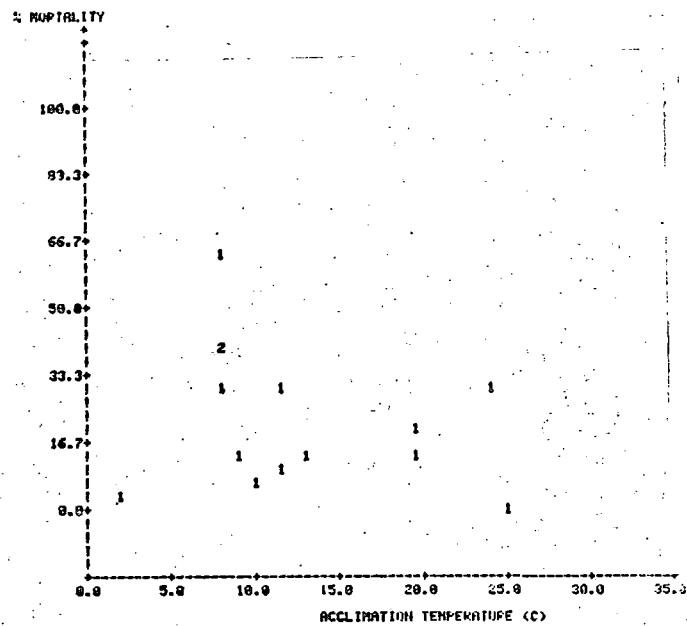


4.0-4.5 Hour

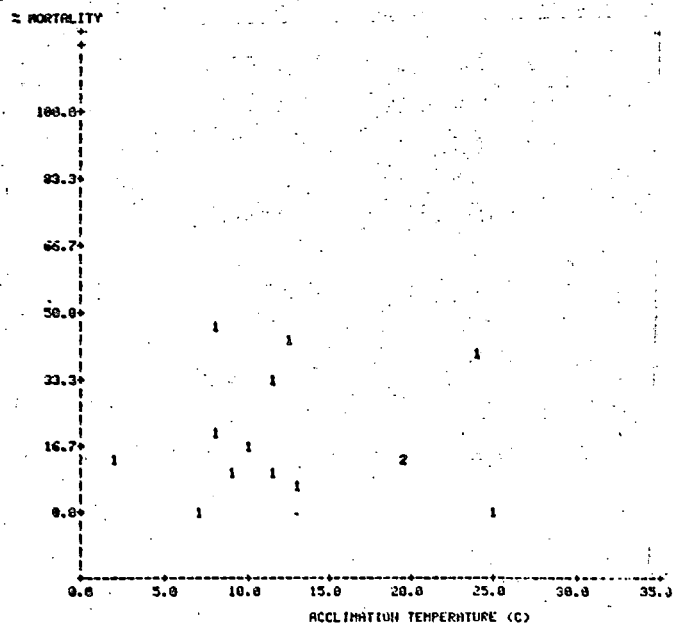
Figure 27 . - Percent mortality experienced by the opossum shrimp, *Neomysis americana*, in secondary entrainment studies conducted at Δ temperature of 1.0-2.5 C at three exposure times. Numeral on plot = number of tests.



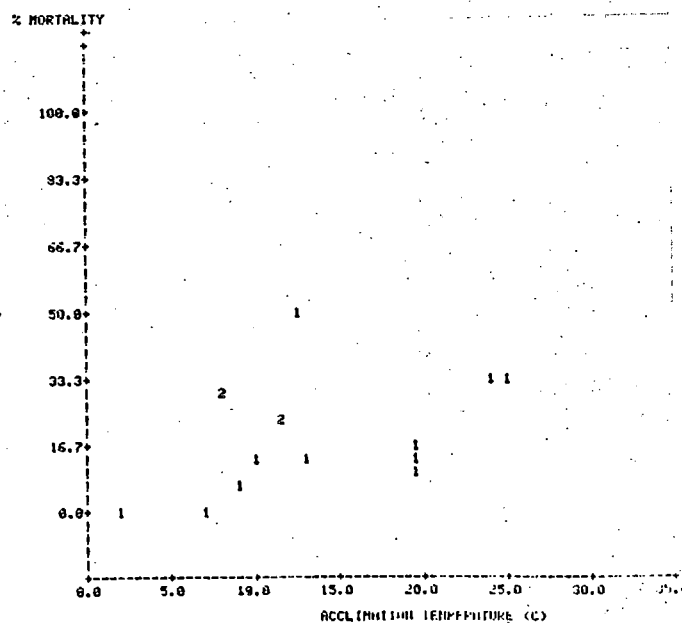
Control



0.5 Hour

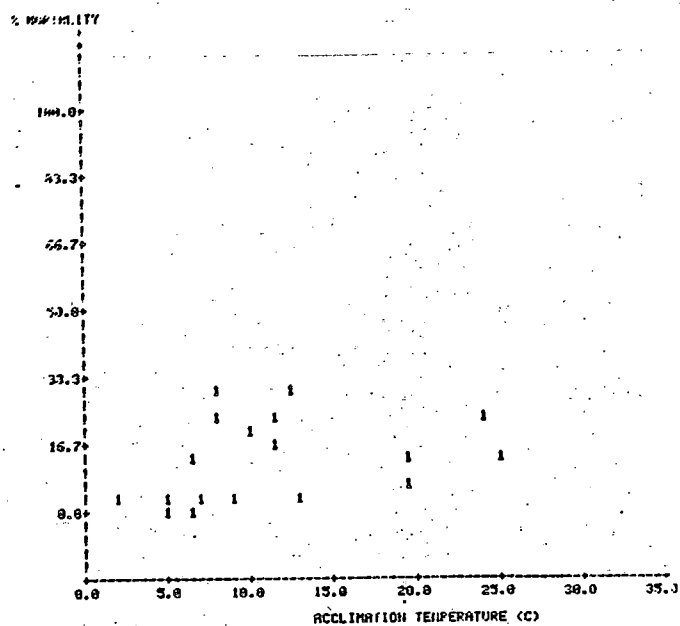


1.0-1.5 Hour

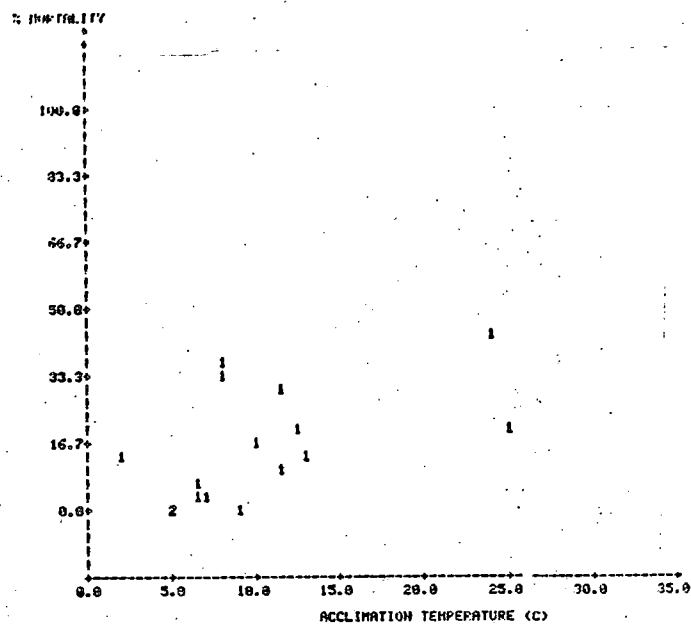


4.0-4.5 Hour

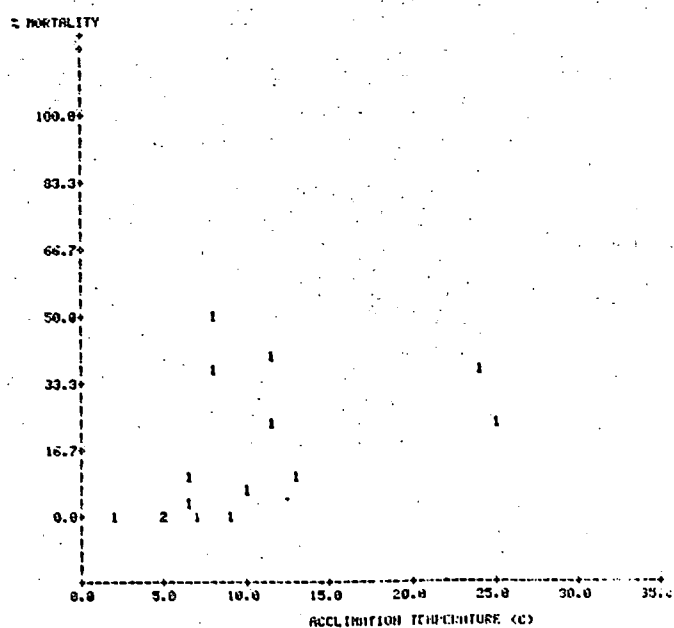
Figure 28. -- Percent mortality experienced by the opossum shrimp, *Neomysis americana*, in secondary entrainment studies conducted at Δ temperature of 3.0-4.5 C at three exposure times. Numeral on plot = number of tests.



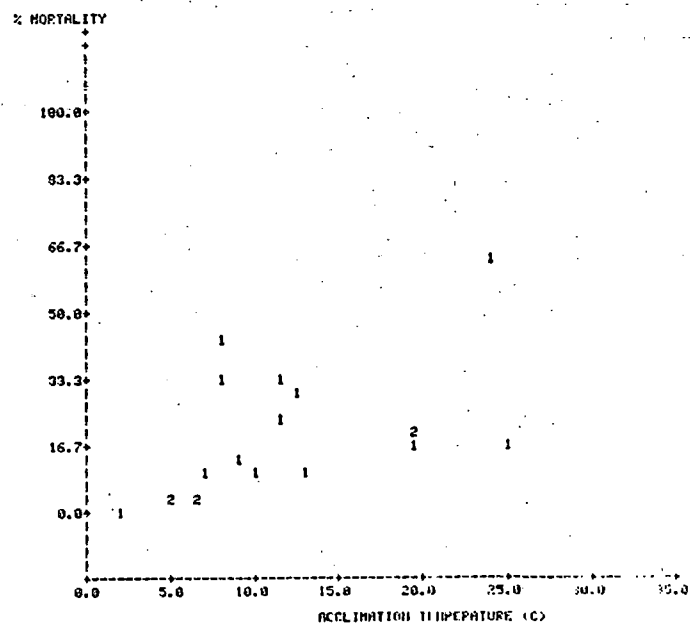
Control



0.5 Hour



1.0-1.5 Hour



4.0-4.5 Hour

Figure 29. - Percent mortality experienced by the opossum shrimp, *Neomysis americana*, in secondary entarainment studies conducted at Δ temperature of 5.0-6.5 C at three exposure times. Numeral on plot = number of tests.

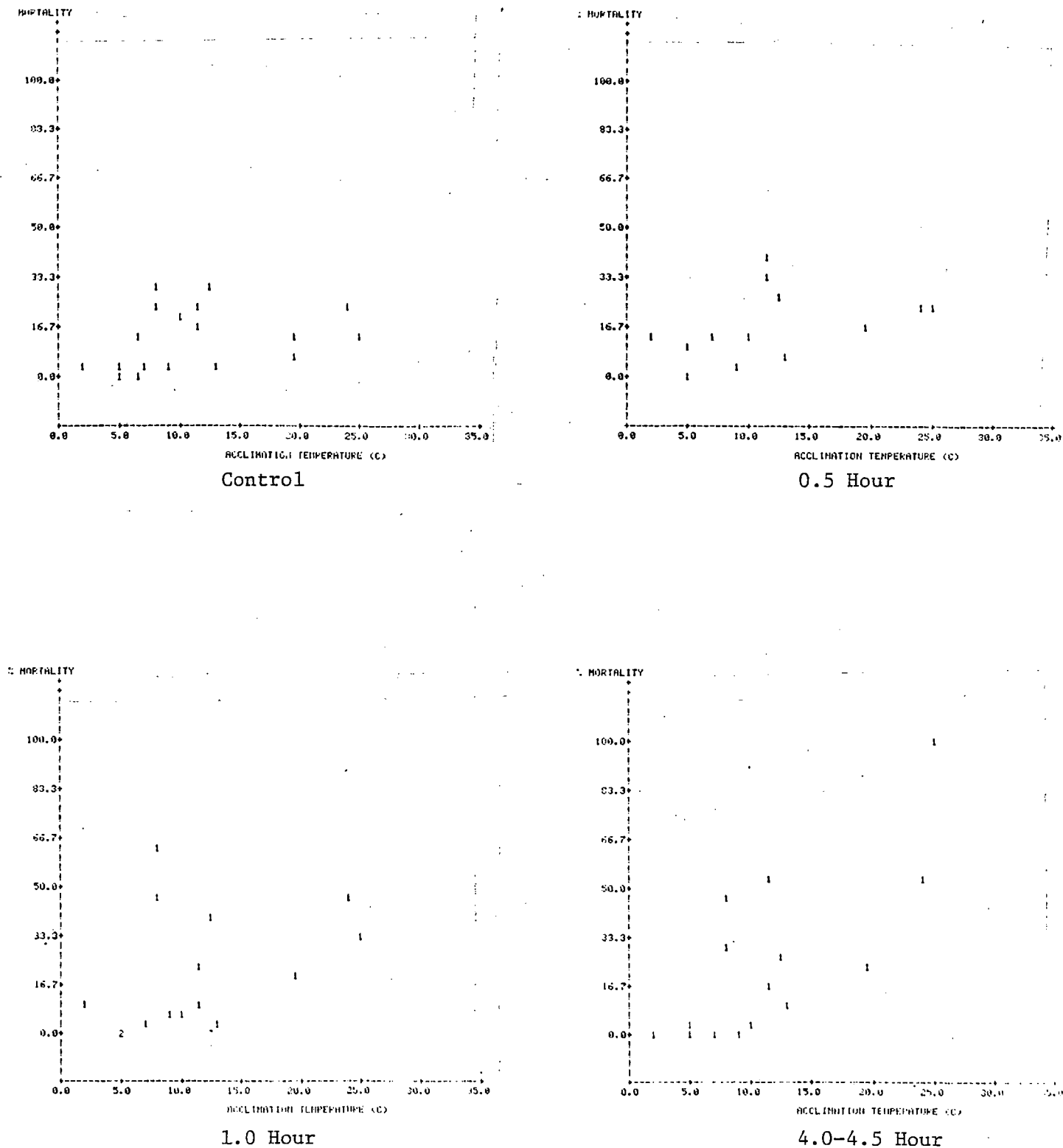


Figure 30. - Percent mortality experienced by the opossum shrimp, *Neomysis americana*, in secondary entrainment studies conducted at Δ temperature of 7.0-8.5 C at three exposure times. Numeral on plot = number of tests.

A REPORT ON
THE SALEM NUCLEAR GENERATING STATION,
ARTIFICIAL ISLAND, SALEM COUNTY, NEW JERSEY

Concern D

Response to EPA Region II concern regarding the effect of the
S.N.G.S. thermal plume on migration of anadromous fishes.

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CONCERN D

EPA Region II has expressed concern regarding the effect of the thermal plume from the Salem Nuclear Generating Station (S.N.G.S.) on the migratory behavior of anadromous fishes which occur in the Delaware River. It was requested that plume characteristics be evaluated relative to temperature avoidance responses of these fishes and that a description of the river segment which might be avoided during migration be presented.

Ecological studies in the region of Artificial Island have established that five anadromous fishes utilize the Delaware River as a migratory pathway to and from upriver spawning areas; these are blueback herring (Alosa aestivalis), alewife (Alosa pseudoharengus), hickory shad (Alosa mediocris), American shad (Alosa sapidissima), and striped bass (Morone saxatilis).

Temperature avoidance studies have been conducted since 1969 at salinities and acclimation (ambient) temperatures pertinent to the S.N.G.S. area and plume. As of 30 September 1977 a total of 16 temperature avoidance tests had been conducted on alewife, 32 on blueback herring, 16 on American shad, and 40 on striped bass. Due to the unavailability of specimens, no studies were conducted with hickory shad. For the fishes tested there are sufficient data to permit statistical analysis of temperature avoidance results.

The procedures for collection and maintenance of fishes and those employed in the temperature avoidance tests are given in Appendix A. Analysis procedure and the regression model are discussed in Appendix B.

All available data on fish migration, avoidance temperatures, and the thermal plume during normal operating conditions ($\Delta 16.2$ F discharge) indicate that anadromous fish movement will be neither impeded nor

limited by the plume. Anadromous fishes utilize the entire river width in passage through the Artificial Island area. They may avoid the highest temperatures near the discharge jet but are expected to readily pass around and/or under this relatively small area (Table 1). The maximum Δ temperature of the S.N.G.S. plume outside the discharge jet is 8 F (4 C) (ARL 1977). Calculations in Table 2 show this to represent some 10% of the river cross section when ambient current is 0.5 fps with one unit operating and 11% with 2 units operating (Figs. 1, 2). When ambient current is 2.5 fps the area potentially avoided represents 3% of the river cross section when 1 unit is operating and 5% when 2 are operating (Figs. 3, 4). No thermal blockage of the river is expected. No reduction in numbers of adults reaching spawning areas is expected. Juvenile emigration will not be adversely affected. Consequently, no depletion of anadromous fish stocks can be expected as a result of the S.N.G.S. thermal plume.

Species Discussion

This section discusses ecological data and temperature avoidance study results on anadromous fishes in relation to the S.N.G.S. thermal plume (ARL 1977) and to potential area which may be avoided by (or denied to) these fishes as habitat during migration.

Blueback herring: Adult blueback herring enter the estuary in late March and April during annual migration to spawning areas in tidal tributaries and the upper tidal portions of the river (Miller, et al. 1973; Smith 1971). Gill net surveys near Artificial Island from 1970 through 1976 indicate that adults pass through this region from mid-March through early June at ambient river temperatures of 5 C (41 F) to 24 C (75 F) (Schuler 1971; Rhode and Schuler 1974a, 1974b, 1974c; Schuler and Spangler 1976; Grieve, Beck, and Schuler 1977; Beck and Grieve 1978). Most were observed during mid-April (temperature range 8 to 14 C).

Juvenile blueback herring occur in the region of Artificial Island during most of the year (Tables 3-9). These include fish spawned in nearby tributaries and which use this area as a nursery. Emigration of juveniles, as evidenced by peak mean monthly catch data (Fig. 5), has generally occurred in late fall (November). The next period of abundance has been in spring (March-May). River temperature during periods of abundance has ranged from 5 C (41 F) to 24 C (75 F) (Fig. 5).

During periods of movement both adults and juveniles have been taken throughout the region near Artificial Island (Schuler 1971; Rhode and Schuler 1974a, 1974b, 1974c; Schuler and Spangler 1976; Grieve, Beck, and Schuler 1977; Beck and Grieve 1978). This indicates that no specific migratory pathways exist and that blueback herring passage by Artificial

Island is not limited to or particularly associated with the area near the S.N.G.S. thermal discharge.

The results of temperature avoidance tests with blueback herring are given in Table 10. These were conducted at acclimation (ambient) temperatures of 6.0 C (42.8 F) to 26.0 C (78.8 F); the mean acclimation temperature was 14.5 C (58.1 F). Blueback herring acclimated to 6.0 C (42.8 F) were observed to avoid 36.0 C (96.8 F), the highest observed avoidance temperature. Multiple regression analysis shows acclimation temperature to be the only significant ($P \leq 0.05$) variable. It accounted for about 71% of the variation (Table 11).

Regression analysis indicates that fish acclimated to between 1.0 C (33.8 F) and 23.1 C (73.6 F) will avoid only the immediate area of the discharge jet.

The avoidance temperatures of the blueback herring are plotted against acclimation temperature in Figure 6. All avoidance temperatures are above the maximum penetrable plume Δ temperature, also shown in the figure. Consequently, only the discharge jet, which occupies from 3 to 11% of the river cross section, is expected to be avoided by migrating blueback herring (Figs. 1-4).

Alewife: Adult alewife enter the estuary in March and April on the annual migration to spawning areas in freshwater portions of tidal tributaries and above river mile 134 (Miller, et al. 1973; Smith 1971). Gill net surveys near Artificial Island from 1970 through 1976 indicate that adults pass through this region from mid-March through early June at ambient river temperatures of 5 C (41 F) to 24 C (75 F) (Schuler 1971; Rhode and Schuler 1974a, 1974b, 1974c; Schuler and Spangler 1976; Grieve, Beck, and Schuler 1977; Beck and Grieve 1978). Most were observed

in early April (temperature range 8 to 14 C).

Juvenile alewife may occur in the region during most of the year (Tables 3-9). These include fish spawned in nearby tributaries and which use the area as a nursery (Smith 1975). Emigration, as evidenced by peak monthly trawl catch data (Fig. 7), has generally occurred in late fall (November). The next period of abundance has been in spring and early summer (March-June). River temperature during periods of abundance has ranged from 5 C (41 F) to 24 C (75 F) (Fig. 7).

During periods of movement both adults and juveniles are taken throughout the region near Artificial Island (Schuler 1971; Rhode and Schuler 1974a, 1974b, 1974c; Schuler and Spangler 1976; Grieve, Beck, and Schuler 1977; Beck and Grieve 1978). This indicates that no specific migratory pathways exist and that alewife migration near Artificial Island is not limited to or particularly associated with the area near the S.N.G.S. thermal discharge.

The results of temperature avoidance tests with alewife are given in Table 12. These were conducted at acclimation (ambient) temperatures of 10.0 C (50.0 F) to 28.0 C (82.4 F); the mean acclimation temperature was 20.4 C (68.7 F). Alewife acclimated to 10.0 C (50.0 F) were observed to avoid 18.0 C (64.4 F). Alewife acclimated to 28.0 C (82.4 F) were observed to avoid 30.0 C (86.0 F). The highest observed avoidance temperature was 34.0 C (93.2 F) at an acclimation of 26.0 C (78.8 F). Although relatively few (16) tests were conducted, acclimation temperature accounted for 89% of the variation (Table 13).

Regression analysis indicates that fish acclimated to between 1.0 C (33.8 F) and 27.0 C (80.6 F) will avoid only the immediate area of the discharge jet (Δ 8 F).

The avoidance temperatures of alewife are plotted against acclimation temperature in Figure 8. Most avoidance temperatures are above the maximum penetrable plume Δ temperature, also shown in the figure. Consequently, only the discharge jet, which occupies from 3 to 11% of the river cross section, is expected to be avoided by migrating alewife (Figs. 1-4).

Hickory shad: From 1970 through 1976 annual catch of adult hickory shad in gill net surveys near Artificial Island has ranged between zero and 20 specimens (Schuler 1971; Rhode and Schuler 1974a, 1974b, 1974c; Schuler and Spangler 1976; Grieve, Beck, and Schuler 1977; Beck and Grieve 1978). Adults have been taken in April and May at ambient river temperatures of 8 C (46 F) to 17 C (63 F). Juveniles have been taken infrequently and in low number by trawl (Tables 3-9), with catch per unit effort usually less than 0.1 (1 fish per ten hauls). Juveniles have been taken in April through July and in October and November at river temperatures of 8 C (46 F) to 26 C (79 F).

No temperature avoidance tests were conducted with hickory shad due to general unavailability of test specimens. However, it is expected that hickory shad will respond to elevated temperatures in a manner similar to that observed for the other clupeids tested. It will probably avoid only the area of the discharge jet which varies from 3 to 11% of the river cross section (Figs. 1-4). Migration of hickory shad will probably not be adversely effected, and no influence on the population is expected.

American shad: Adult American shad enter the estuary in late February and March during the annual migration to spawning areas in the Delaware River above river mile 134 (Miller et al. 1973). Gill net surveys near Artificial Island from 1970 through 1976 indicate that adults pass through the area from mid-March through early May at river temperatures of 5 C (41 F) to 17 C (63 F) (Schuler 1971; Rhode and Schuler 1974a, 1974b, 1974c; Schuler and Spangler 1976; Grieve, Beck, and Schuler 1977; Beck and Grieve 1978). Most have passed through the area in April (temperature range 8 to 14 C). Juvenile American shad have been taken infrequently and in low numbers (Tables 3-9, Fig. 9) during March through June and in October through December at ambient river temperatures of 5 C (41 F) to 24 C (75 F) (Fig. 9).

Juvenile and adult American shad have been taken throughout the region near Artificial Island (Schuler 1971; Rhode and Schuler 1974a, 1974b, 1974c; Schuler and Spangler 1976; Grieve, Beck, and Schuler 1977; Beck and Grieve 1978). This suggests that no specific migratory pathways exist and that American shad migration by Artificial Island is not limited to or particularly associated with the area near the S.N.G.S. thermal discharge.

The results of temperature avoidance tests with American shad are given in Table 14. Tests were conducted at acclimation (ambient) temperatures of 7.0 C (44.6 F) to 28.0 C (82.4 F); the mean acclimation temperature was 16.2 C (61.2 F). American shad acclimated to 7.0 C (44.6 F) were observed to avoid 26.0 C (78.8 F). At acclimation to 28 C (82 F) avoidance temperatures were from 32.0 C (89.6 F) to 34.0 C (93.2 F), the highest observed avoidance temperature for American shad.

In the multiple regression analysis acclimation temperature accounted for about 60% of the variation (Table 15). Inclusion of the variables light level and salinity increased the explained variation to about 80%. Although salinity accounted for about 10% of this variation the coefficient for salinity was not significant ($P \leq 0.05$). The regression coefficient for light level was significant. However, of 16 tests with American shad all but two were conducted at the same light level. This precluded light level as a justifiable variable in the equation. The equation was therefore reduced to the linear model based on acclimation temperature.

Regression analysis indicates that fish acclimated to between 0.2 C (32.4 F) and 27.8 C (82.0 F) will avoid only the immediate area of the discharge jet ($\Delta 8$ F).

The avoidance temperatures of the American shad are plotted against acclimation temperature in Figure 10. Nearly all avoidance temperatures exceed the maximum penetrable plume Δ temperature, also shown in the Figure. Consequently, only the discharge jet, which occupies from 3 to 11% of the river cross section, is expected to be avoided by migrating American shad (Fig. 1-4).

Striped bass: Adult striped bass enter the estuary in March and April during the annual migration to spawning areas in brackish portions of the Delaware River, Chesapeake and Delaware Canal and in the upper Chesapeake Bay (Kernehan et al. 1975). Gill net surveys near Artificial Island from 1970 through 1976 indicate that adults pass through the area from mid-March through mid-May at ambient river temperatures of 5 C (41 F) to 17 C (63 F) (Schuler 1971; Rhode and Schuler 1974a, 1974b, 1974c; Schuler and Spangler 1976; Grieve, Beck, and Schuler 1977; Beck

and Grieve 1978). Most were observed to pass in April (temperature range 8 to 14 C).

Juvenile striped bass utilize the area near Artificial Island as a nursery (Bason 1971). Juveniles have been taken by trawl during most of the year (Tables 3-9). However, no period of consistent abundance has been observed between years (Fig. 11).

Adult and juvenile striped bass have been taken throughout the region near Artificial Island (Schuler 1971; Rhode and Schuler 1974a, 1974b, 1974c; Schuler and Spangler 1976; Grieve, Beck, and Schuler 1977; Beck and Grieve 1978). This indicates that no specific migratory pathways exist and that striped bass movement near Artificial Island is not limited to or particularly associated with the area near the S.N.G.S. thermal discharge.

The results of temperature avoidance tests conducted with striped bass are given in Table 16. Tests were conducted at acclimation (ambient) temperatures of 3.0 C (37.4 F) to 29.0 C (84.2 F) and salinity from 0 to 10.5 ppt; mean acclimation temperature was 16.8 C (62.2 F), mean salinity was 4.9 ppt. Striped bass acclimated to 29.0 C (84.2 F) were observed to avoid 35.0 C (95.0 F) to 37.0 C (98.6 F).

Results of regression analysis are given in Table 17. Acclimation temperature and salinity were the only significant ($P \leq 0.05$) variables and accounted for about 85% of the variability. Both variables were related directly to avoidance temperature. Acclimation temperature was more than five times as important as salinity in estimating the avoidance temperature.

Regression analysis indicates that striped bass acclimated to between 5.0 C (41.0 F) and 17.0 C (62.6 F) at a salinity of 4.9 ppt

will avoid only the immediate area of the discharge jet ($\Delta 8$ F).

The avoidance temperatures of striped bass are plotted against acclimation temperature in Figure 12. Nearly all exceed the maximum penetrable plume Δ temperature, also shown in the figure. Consequently, only the discharge jet, which occupies from 3 to 11% of the river cross section, is expected to be avoided by migrating striped bass.

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Table 1 . - Estimated percent of the cross-sectional area¹ (ft²) of the Delaware River from the S.N.G.S. discharge to Appoquinimink Creek potentially avoided by five anadromous fishes at maximum acclimation temperature. Periods and temperatures of abundance for each species are also shown.

	Life Stage	Month	Temperature Range (F)	Avoidance Temperature at Maximum Acclimation Temperature (F)	Percent River Cross Section Avoided	
					Minimum	Maximum
Blueback herring						
Period of abundance	Adult	March-June	41 - 75	> Δ 8*	3	11
	Juvenile	March-May, November	41 - 75			
Alewife						
Period of abundance	Adult	March-June	41 - 75	> Δ 8*	3	11
	Juvenile	March-June, November	41 - 75			
Hickory shad						
Period of abundance	Adult	April-May	41 - 63	-	3	11
	Juvenile	None				
American shad						
Period of abundance	Adult	March-May	41 - 63	Δ 8*	3	11
	Juvenile	None				
Striped bass						
Period of abundance	Adult	March-May	41 - 63	Δ 8*	3	11
	Juvenile	None				

¹ Estimated cross-sectional area of river segment equals 2.6×10^5 ft²

* Δ 8 F is the maximum penetrable plume Δ T

Table 2. - Estimated cross-sectional area (ft²) of the S.N.G.S. thermal plume for one and two unit operation at Δ temperature of 16.2 F during 0.5 and 2.5 fps river flow conditions (Figs. 3-6). Estimated cross-sectional area from the S.N.G.S. discharge to Appoquinimink Creek equals 2.6×10^5 ft².

One Unit Operation (1,110,000 gpm/unit)

Ambient current = .5 fps

<u>Δ F</u>	<u>2</u>	<u>4</u>	<u>6</u>	<u>8</u>
Area (ft ²)	7.9×10^4	5.5×10^4	2.5×10^4	2.5×10^4
% of river cross section	30%	21%	10%	10%

Ambient current = 2.5 fps

<u>Δ F</u>	<u>2</u>	<u>4</u>	<u>6</u>	<u>8</u>
Area (ft ²)	1.9×10^4	1.2×10^4	8.5×10^3	8.5×10^3
% of river cross section	7%	5%	3%	3%

14

Two Unit Operation (1,110,000 gpm/unit)

Ambient current = .5 fps

<u>Δ F</u>	<u>2</u>	<u>4</u>	<u>6</u>	<u>8</u>
Area (ft ²)	1.2×10^5	9.7×10^4	6.4×10^4	2.9×10^4
% of river cross section	46%	37%	25%	11%

Ambient current = 2.5 fps

<u>Δ F</u>	<u>2</u>	<u>4</u>	<u>6</u>	<u>8</u>
Area (ft ²)	3.3×10^4	2.1×10^4	1.7×10^4	1.2×10^4
% of river cross section	13%	8%	7%	5%

Table 3. - Monthly mean catch per unit effort of anadromous fishes taken by 16-ft trawl¹ in zones east and west of the shipping channel and in all zones (total) near the Salem Nuclear Generating Station, New Jersey, 1970.

		Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Temp. (C)	Max.			7.0	14.5	19.8	24.6	29.5	28.0	26.5	20.0	11.0	10.0
	Min.			3.5	5.0	14.5	22.2	24.5	25.5	23.5	16.5	10.3	9.0
	$\bar{X}$			5.9	10.1	16.1	23.1	26.3	26.8	24.6	18.0	10.6	9.4
Salinity (ppt)	Max.			9.0	6.5	5.0	9.3	11.3	11.6	14.5	10.5	11.0	4.0
	Min.			5.0	0.0	0.0	1.0	1.0	2.5	4.2	2.5	1.0	0.0
	$\bar{X}$			7.4	1.3	2.0	3.7	5.1	6.1	7.1	5.7	4.6	1.0
Blueback herring	west			N.S.	0.7	0.6	0.2	1.8	0.3	0.0	*	N.S.	1.1
	east			0.2	0.3	0.1	5.2	0.1	*	0.0	0.0	10.5	2.5
	Total			0.2	0.6	0.3	3.5	0.6	0.1	0.0	*	10.5	1.4
Hickory shad	west			N.S.	0.3	0.0	0.0	*	0.0	0.0	*	N.S.	0.0
	east			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total			0.0	0.2	0.0	0.0	*	0.0	0.0	*	0.0	0.0
Alewife	west			N.S.	0.6	0.0	12.7	4.1	7.7	0.6	1.5	N.S.	3.3
	east			0.6	0.3	0.4	2.1	2.2	0.4	1.3	0.8	7.4	1.5
	Total			0.6	0.5	0.2	5.7	2.7	2.5	1.0	1.1	7.4	2.8
American shad	west			N.S.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	N.S.	0.0
	east			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Striped bass	west			N.S.	0.2	0.2	1.1	0.5	1.5	0.0	0.3	N.S.	1.0
	east			0.2	0.0	0.0	0.3	0.1	0.1	0.9	0.2	0.3	0.5
	Total			0.2	0.2	0.1	0.5	0.3	0.5	0.3	0.2	0.3	0.9

¹10-minute haul

* $0.0 < n/T \leq 0.05$

Table 4. - Monthly mean catch per unit effort of anadromous fishes taken by 16-ft trawl¹ in zones east and west of the shipping channel and in all zones (total) near the Salem Nuclear Generating Station, New Jersey, 1971.

		Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Temp. (C)	Max.		3.0	6.0	11.7	16.2	27.0	27.0	28.2	25.8	20.5	12.8	7.0
	Min.		1.0	4.5	9.0	12.0	19.3	25.6	25.7	22.1	17.5	7.5	4.8
	X		1.9	5.2	9.9	14.0	22.1	26.4	26.6	23.9	18.9	10.6	5.8
Salinity (ppt)	Max.		2.5	4.0	8.7	8.4	10.0	12.5	13.3	9.6	5.4	6.7	5.0
	Min.		0.0	0.0	0.3	0.9	1.3	3.0	1.6	0.0	0.0	1.0	0.0
	X		0.3	0.3	3.4	4.1	4.7	7.2	5.9	2.5	2.8	3.8	0.8
Blueback herring	west		0.0	0.8	1.4	0.2	0.3	0.1	*	*	*	5.2	0.0
	east		0.0	4.2	4.9	0.2	2.5	0.2	*	0.1	*	1.6	0.2
	Total		0.0	3.0	3.7	0.2	1.7	0.1	*	0.1	*	2.8	0.1
Hickory shad	west	No Sample	0.0	0.0	0.0	0.0	*	0.0	0.0	0.0	0.0	0.0	0.0
	east		0.0	0.0	0.0	*	*	*	0.0	0.0	0.0	0.0	0.0
	Total		0.0	0.0	0.0	*	*	*	0.0	0.0	0.0	0.0	0.0
Alewife	west		0.0	0.6	2.7	0.3	1.2	1.2	0.7	1.0	0.6	8.0	0.0
	east		0.0	0.4	0.7	1.7	4.3	0.2	0.2	0.5	0.1	3.3	*
	Total		0.0	0.5	1.4	1.2	3.2	0.5	0.4	0.7	0.5	4.9	*
American shad	west		0.0	0.0	0.1	0.0	*	0.0	0.0	0.0	0.0	0.0	0.0
	east		0.0	0.0	0.0	*	*	0.0	0.0	0.0	0.0	0.0	0.0
	Total		0.0	0.0	0.1	*	*	0.0	0.0	0.0	0.0	0.0	0.0
Striped bass	west		0.3	0.0	0.3	0.6	4.2	0.6	1.8	2.7	2.2	1.3	0.0
	east		0.0	0.1	0.3	1.1	1.3	0.7	0.4	1.1	0.5	0.7	0.0
	Total		0.1	0.1	0.3	0.9	2.4	0.6	0.9	1.5	1.2	0.9	0.0

¹10-minute haul

* $0.0 < n/T \leq 0.05$

Table 5. - Monthly mean catch per unit effort of anadromous fishes taken by 16-ft trawl¹ in zones east and west of the shipping channel and in all zones (total) near the Salem Nuclear Generating Station, New Jersey, 1972.

		Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Temp. (C)	Max.	5.2	3.6	8.5	12.0	19.4	23.0	27.2	26.0	25.1	19.0	13.0	6.0
	Min.	3.0	1.6	4.4	6.0	14.8	20.0	18.8	22.8	17.9	13.6	10.1	3.2
	$\bar{X}$	4.4	2.6	5.7	8.3	17.0	21.4	24.5	24.7	21.8	15.6	11.8	4.6
Salinity (ppt)	Max.	5.0	8.0	5.0	6.9	5.5	6.8	5.9	10.5	18.3	14.6	15.8	1.0
	Min.	0.0	4.6	0.8	0.0	0.0	0.0	0.0	2.2	3.2	7.1	5.0	0.0
	$\bar{X}$	1.0	6.6	2.8	2.7	1.6	1.7	1.7	5.9	9.6	10.3	9.8	0.1
Blueback herring	west	0.3	0.5	0.0	5.7	2.9	0.1	0.1	0.0	0.0	0.0	0.0	0.0
	east	0.2	0.0	9.8	4.2	0.1	0.4	0.0	0.0	*	0.0	0.1	0.0
	Total	0.2	*	1.4	4.7	1.0	0.3	0.1	0.0	*	0.0	*	0.0
Hickory shad	west	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	east	0.0	0.0	0.0	*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Alewife	west	0.0	0.0	0.0	1.5	1.1	0.9	2.1	0.0	*	0.3	0.6	0.8
	east	0.0	0.3	0.2	0.8	0.2	0.1	0.5	0.0	0.0	0.1	0.3	0.0
	Total	0.0	0.2	0.1	1.0	0.5	0.4	1.0	0.0	*	0.1	0.4	0.4
American shad	west	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	east	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total	0.0	0.0	0.0	0.3	*	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Striped bass	west	0.3	0.0	0.0	0.7	1.8	2.1	1.9	0.8	0.5	0.7	0.5	0.0
	east	0.0	0.3	0.0	0.6	0.1	0.4	0.6	*	0.3	0.3	0.1	0.0
	Total	0.2	0.2	0.0	0.6	0.7	1.0	1.0	0.3	0.4	0.4	0.2	0.0

¹10-minute haul

* $0.0 < n/T \leq 0.05$

Table 6. - Monthly mean catch per unit effort of anadromous fishes taken by 16-ft trawl¹ in zones east and west of the shipping channel and in all zones (total) near the Salem Nuclear Generating Station, New Jersey, 1973.

		Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Temp. (C)	Max.			8.8	11.0	17.5	24.4	27.0	27.1	29.0	20.0	11.8	10.3
	Min.			2.5	6.1	13.5	21.7	24.0	24.1	21.0	14.5	8.5	2.4
	$\bar{X}$			6.2	9.1	15.3	23.2	26.0	25.9	24.5	17.8	10.3	5.1
Salinity (ppt)	Max.			7.4	6.0	6.4	6.5	6.0	7.6	9.0	9.5	13.0	4.0
	Min.			2.1	0.0	0.0	0.1	0.0	0.5	2.8	3.0	0.0	0.0
	$\bar{X}$			5.0	1.5	1.6	1.8	2.5	3.8	5.6	6.0	5.1	0.8
Blueback herring	west			0.0	0.3	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.0
	east			0.0	0.7	0.1	0.0	0.4	0.0	0.0	0.0	1.4	2.1
	Total			0.0	0.5	0.1	0.0	0.3	0.0	0.0	0.0	1.0	1.6
Hickory shad	west	No Sample	No Sample	0.0	0.0	0.0	*	0.0	0.0	0.0	0.0	0.0	0.0
	east			0.0	0.1	*	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total			0.0	*	*	*	0.0	0.0	0.0	0.0	0.0	0.0
Alewife	west			0.0	0.3	0.0	0.0	0.3	0.0	0.0	0.0	1.0	0.0
	east			0.0	0.3	0.1	*	*	0.0	0.0	0.0	0.7	0.2
	Total			0.0	0.3	0.1	*	0.1	0.0	0.0	0.0	0.8	0.2
American shad	west			0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	east			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total			0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Striped bass	west			0.4	0.2	0.3	0.5	1.3	1.5	0.0	0.1	0.1	0.0
	east			0.6	0.1	0.3	0.2	0.4	0.2	*	0.0	0.0	0.1
	Total			0.5	0.1	0.3	0.3	0.7	0.6	*	*	0.1	0.1

¹10-minute haul

* $0.0 < n/T \leq 0.05$

Table 7. - Monthly mean catch per unit effort of anadromous fishes taken by 16-ft trawl¹ in zones east and west of the shipping channel and in all zones (total) near the Salem Nuclear Generating Station, New Jersey, 1974.

		Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Temp. (C)	Max.	6.0	3.1	7.5	12.5	20.5	26.2	26.2	30.0	24.8	16.5	15.0	6.9
	Min.	1.8	0.0	4.2	8.5	13.7	19.5	23.9	25.2	20.8	12.6	5.1	3.7
	$\bar{X}$	2.6	2.0	6.0	10.7	17.7	22.2	25.1	26.2	23.1	14.7	11.0	4.3
Salinity (ppt)	Max.	5.5	8.0	8.0	3.5	4.0	10.0	12.6	11.8	10.0	10.8	15.0	4.0
	Min.	0.0	1.8	0.0	0.0	0.0	0.9	4.8	3.5	2.0	1.5	0.0	0.0
	$\bar{X}$	1.0	4.2	1.7	0.7	4.0	3.7	7.1	5.9	4.3	5.2	6.3	0.9
Blueback herring	west	*	0.2	0.5	2.2	*	0.0	0.0	0.0	0.0	0.2	0.3	0.1
	east	0.0	0.5	3.0	3.4	0.1	0.0	0.0	0.0	0.0	0.1	7.4	0.2
	Total	*	0.4	1.9	3.1	*	0.0	0.0	0.0	0.0	0.1	6.2	0.1
Hickory shad	west	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	east	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Alewife	west	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	*	0.1	0.0
	east	*	0.0	0.5	0.3	*	0.0	*	0.0	0.0	0.1	0.1	0.0
	Total	*	0.0	0.3	0.3	*	0.0	*	0.0	0.0	0.1	0.1	0.0
American shad	west	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	east	0.0	0.0	0.1	0.2	0.0	0.0	0.0	0.0	0.0	0.0	*	0.0
	Total	0.0	0.0	0.1	0.2	0.0	0.0	0.0	0.0	0.0	0.0	*	0.0
Striped bass	west	0.0	0.0	0.1	*	0.1	0.4	0.1	*	*	*	0.1	0.0
	east	0.0	0.0	*	0.1	0.2	0.1	*	0.0	0.0	0.1	*	0.0
	Total	0.0	0.0	0.1	0.1	0.2	0.2	*	*	*	0.1	*	0.0

¹10-minute haul

* $0.0 < n/T \leq 0.05$

Table 8. - Monthly mean catch per unit effort of anadromous fishes taken by 16-ft trawl¹ in zones east and west of the shipping channel and in all zones (total) near the Salem Nuclear Generating Station, New Jersey, 1975.

		Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Temp. (C)	Max.	7.5	6.2	7.9	13.2	24.3	26.5	29.0	30.0	24.5	20.0	15.8	8.8
	Min.	0.5	1.0	1.0	2.7	10.0	19.5	23.2	21.5	18.0	13.0	9.1	0.2
	$\bar{X}$	4.0	4.1	3.7	7.8	18.2	22.9	25.6	26.3	20.7	17.1	12.6	6.0
Salinity (ppt)	Max.	3.0	0.0	5.5	12.0	7.0	10.0	14.0	14.0	12.0	5.0	5.0	6.0
	Min.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0	0.0
	$\bar{X}$	0.8	0.0	0.5	5.0	1.8	2.4	3.5	5.8	6.6	2.4	2.3	3.0
Blueback herring	west	0.0	0.0	2.0	1.2	0.2	1.3	0.0	0.0	0.0	0.2	2.1	0.2
	east	0.0	0.0	4.9	3.0	0.1	0.8	*	0.0	0.0	0.0	0.9	0.2
	Total	0.0	0.0	4.2	2.4	0.1	0.9	*	0.0	0.0	0.1	1.4	0.2
Hickory shad	west	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	east	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Alewife	west	0.0	0.0	2.0	0.2	0.0	0.0	0.1	0.0	0.0	0.7	0.8	1.1
	east	0.0	0.1	4.8	0.5	*	0.0	*	*	0.0	0.2	1.3	0.8
	Total	0.0	*	4.2	0.4	*	0.0	0.1	*	0.0	0.4	1.1	0.9
American shad	west	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	east	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	*
	Total	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	*
Striped bass	west	0.0	0.0	0.1	0.1	0.2	0.0	0.1	0.0	0.0	0.3	0.1	0.1
	east	0.0	0.0	*	*	*	0.2	0.0	0.0	0.0	*	0.1	0.0
	Total	0.0	0.0	*	*	0.1	*	*	0.0	0.0	0.1	0.1	*

¹10-minute haul

* $0.0 < n/T \leq 0.05$

Table 9. - Monthly mean catch per unit effort of anadromous fishes taken by 16-ft trawl¹ in zones east and west of the shipping channel and in all zones (total) near the Salem Nuclear Generating Station, New Jersey, 1976.

		Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Temp. (C)	Max.	4.0	8.0	11.0	18.3	19.4	27.8	27.2	27.0	23.9	18.3	10.1	4.9
	Min.	0.1	0.0	4.4	7.8	14.1	18.1	22.8	22.6	18.8	14.0	5.1	0.7
	X	1.4	3.9	7.7	12.6	17.3	22.2	25.5	25.0	21.9	16.2	8.0	2.8
Salinity (ppt)	Max.	9.0	8.0	7.0	12.0	8.0	12.0	14.0	15.0	15.0	17.0	14.0	9.0
	Min.	0.0	0.0	0.0	0.0	0.0	0.0	1.0	1.0	0.0	0.0	0.0	1.0
	X	2.5	1.9	1.4	3.5	3.0	4.0	5.9	5.6	7.1	4.7	4.5	4.4
Blueback herring	west	0.0	*	2.2	0.3	0.1	0.0	*	0.0	0.0	0.7	1.1	0.0
	east	0.0	0.3	3.9	0.1	*	0.0	0.0	0.0	0.0	0.6	4.4	0.0
	Total	0.0	0.3	3.3	0.2	0.1	0.0	*	0.0	0.0	0.7	3.5	0.0
Hickory shad	west	0.0	0.0	0.0	0.0	0.0	*	0.0	0.0	0.0	0.0	0.1	0.0
	east	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total	0.0	0.0	0.0	0.0	0.0	*	0.0	0.0	0.0	0.0	*	0.0
Alewife	west	0.0	0.0	0.3	0.3	0.0	0.0	0.0	0.0	0.0	0.6	2.6	0.0
	east	0.0	0.0	0.1	0.5	0.1	0.0	*	*	0.0	0.7	1.2	0.0
	Total	0.0	0.0	0.3	0.5	*	0.0	*	*	0.0	0.6	1.6	0.0
American shad	west	0.0	0.0	*	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0
	east	0.0	0.0	0.1	*	0.0	0.0	0.0	0.0	0.0	*	0.0	0.0
	Total	0.0	0.0	*	*	0.0	0.0	0.0	0.0	0.0	*	0.0	0.0
Striped bass	west	0.0	0.1	0.0	0.0	0.0	0.0	*	0.0	0.0	*	0.0	0.1
	east	0.0	0.0	0.0	*	0.0	*	*	0.0	0.0	0.1	0.0	0.0
	Total	0.0	*	0.0	*	0.0	*	*	0.0	0.0	*	0.0	*

¹10-minute haul

* 0.0 < n/T ≤ 0.05

Table 10. - A chronological summary of temperature avoidance studies with blueback herring, Alosa aestivalis. All tests were conducted at near air-saturated levels of dissolved oxygen and pH of 7 to 8.

DATE	REPLICATE	NO. OF FISH PER TEST	SIZE RANGE (TL IN MM)		SALINITY (PPT)	LIGHT LEVEL (FOOT (LUX) CANDLES)		ACCLIMATION TEMPERATURE (C) (F)		AVOIDANCE TEMPERATURE (C) (F)	
ALOSA AESTIVALIS											
9 MAY 74	1	4	86	100	7	215	20.0	15	59	20	68
	2	3	92	101	7	215	20.0	15	59	28	82
10 MAY 74	1	4	102	107	7	21.5	2.0	15	59	26	79
	2	4	92	112	7	21.5	2.0	15	59	29	84
22 APR 75	1	4	62	98	5.5	215	20.0	9	48	18	64
	2	3	87	90	5.5	215	20.0	9	48	18	64
23 APR 75	1	4	79	93	5.5	21.5	2.0	9	48	23	73
	2	4	81	106	5.5	21.5	2.0	9	48	23	73
11 NOV 75	1	4	57	83	6.5	215	20.0	15	59	21	70
	2	4	67	84	6.5	215	20.0	15	59	23	73
31 MAR 76	1	4	68	85	4	215	20.0	12	54	19	66
1 APR 76	1	3	87	92	4.5	21.5	2.0	12	54	18	64
	2	3	76	81	4.5	21.5	2.0	12	54	17	63
12 MAY 76	1	4	102	111	5.5	215	20.0	19	66	28	82
	2	4	98	112	5.5	215	20.0	19	66	30	86
29 APR 77	1	4	87	100	7	215	20.0	16	61	28	82
	2	4	87	100	7	215	20.0	16	61	28	82

Table 10. - Continued.

DATE	REPLICATE	NO. OF FISH PER TEST	SIZE RANGE (TL IN MM)		SALINITY (PPT)	LIGHT LEVEL (FOOT (LUX) CANDLES)		ACCLIMATION TEMPERATURE		AVOIDANCE TEMPERATURE	
			MIN.	MAX.				(C)	(F)	(C)	(F)
ALOSA AESTIVALIS											
2 MAY 77	1	4	90	98	7	215	20.0	17	63	29	84
	2	4	85	94	7	215	20.0	17	63	29	84
28 JUN 77	1	4	20	30	7	215	20.0	26	79	36	97
	2	4	26	32	7	215	20.0	26	79	36	97
31 AUG 77	1	4	52	61	8.5	215	20.0	26	79	32	90
14 SEP 77	1	4	26	36	6	215	20.0	17.5	64	28	82
	2	4	28	45	6	215	20.0	17.5	64	28	82
5 OCT 77	1	4	32	40	10.5	215	20.0	15	59	27	81
	2	4	30	33	10.5	215	20.0	15	59	27	81
3 NOV 77	1	4	47	70	4.5	215	20.0	10	50	19	66
	2	4	40	67	4.5	215	20.0	10	50	23	73
4 NOV 77	1	4	44	68	4.5	21.5	2.0	12	54	22	72
	2	4	42	80	4.5	21.5	2.0	12	54	26	79
14 NOV 77	1	4	55	70	4.5	215	20.0	6	43	23	73
	2	4	60	74	4.5	215	20.0	6	43	13	55

Table 11. - Components for the linear regression equation to estimate avoidance temperatures (C) of the blueback herring, Alosa aestivalis. * - Significant at $P \leq .05$; ** - significant at $P \leq .01$.

Constant (a) = 11.788		F (1, 30) = 72.576**		N = 32
Standard Error of Estimate = 3.004		R = 0.841		$R^2 = 0.708$
<u>Variable (Xi)</u>	<u>Mean (Xi)</u>	<u>Correlation (r) With Y</u>	<u>Regression Coefficient (bi)</u>	<u>Standard Error of bi</u>
Acclimation Temperature (C)	14.5	0.841**	0.898**	0.105

Table 12. - A chronological summary of temperature avoidance studies with alewife, Alosa pseudoharengus. All tests were conducted at near air-saturated levels of dissolved oxygen and pH of 7 to 8.

DATE	REPLICATE	NO. OF FISH PER TEST	SIZE RANGE (TL IN MM)		SALINITY (PPT)	LIGHT LEVEL (FOOT (LUX) CANDLES)		ACCLIMATION TEMPERATURE		AVOIDANCE TEMPERATURE	
			MIN.	MAX.		(C)	(F)	(C)	(F)		
ALOSA PSEUDOHARENGUS											
5 AUG 70	1	3	79	80	4	215	20.0	25	77	30	86
21 OCT 71	1	4	125	131	4.5	215	20.0	18	64	-	-
5 NOV 71	1	4	132	145	4.5	215	20.0	17	62	24	75
30 SEP 75	1	3	128	140	6	215	20.0	21	69	27	80
	2	2	124	135	6	215	20.0	21	69	24	75
25 MAR 76	1	4	92	130	4	215	20.0	10	50	18	64
30 MAR 76	1	4	115	127	4	215	20.0	12	53	19	66
14 APR 77	1	4	80	100	6.5	215	20.0	12	53	20	68
2 AUG 77	1	4	68	74	9	215	20.0	26	78	34	93
9 AUG 77	1	4	72	80	10.5	215	20.0	27	80	33	91

Table 12. - Continued.

DATE	REPLICATE	NO. OF FISH PER TEST	SIZE RANGE (TL IN MM) MIN. MAX.		SALINITY (PPT)	LIGHT LEVEL (FOOT (LUX) CANDLES)		ACCLIMATION TEMPERATURE (C) (F)		AVOIDANCE TEMPERATURE (C) (F)	
ALOSA PSEUDOHARENGUS											
16 AUG 77	1	4	69	75	10.5	215	20.0	28	82	30	86
31 AUG 77	1	4	69	71	8.5	215	20.0	26	78	32	89
14 SEP 77	1	4	75	82	6	215	20.0	20	68	26	78
	2	4	75	79	6	215	20.0	20	68	25	77
21 SEP 77	1	3	70	82	10	21.5	2.0	22	71	31	87
	2	3	75	80	10	21.5	2.0	22	71	28	82

Table 13. - Components for the linear regression equation to estimate avoidance temperatures (C) of the alewife, Alosa pseudoharengus. * = Significant at $P \leq .05$; ** = significant at $P \leq .01$.

Constant (a) = 9.243		F (1, 14) = 117.783**		N = 16
Standard Error of Estimate = 1.671		R = 0.945**		$R^2 = 0.894$
<u>Variable (Xi)</u>	<u>Mean (Xi)</u>	<u>Correlation (r) With Y</u>	<u>Regression Coefficient (bi)</u>	<u>Standard Error of bi</u>
Acclimation Temperature (C)	20.4	0.945**	0.847**	0.078

Table 14. - A chronological summary of temperature avoidance studies with American shad, Alosa sapidissima. All tests were conducted at near air-saturated levels of dissolved oxygen and pH of 7 to 8.

DATE	REPLICATE	NO. OF FISH PER TEST	SIZE RANGE (TL IN MM)		SALINITY (PPT)	LIGHT LEVEL (FOOT (LUX) CANDLES)		ACCLIMATION TEMPERATURE (C) (F)		AVOIDANCE TEMPERATURE (C) (F)	
ALOSA SAPIDISSIMA											
28 JUN 77	1	4	34	41	7	215	20.0	28	82	34	93
	2	4	31	39	7	215	20.0	28	82	34	93
30 JUN 77	1	4	35	38	7	215	20.0	28	82	32	90
	2	4	32	37	7	215	20.0	28	82	32	90
15 SEP 77	1	4	48	57	6	215	20.0	18	64	25	77
	2	4	47	53	6	215	20.0	18	64	26	79
4 OCT 77	1	4	58	62	10.5	215	20.0	15	59	30	86
	2	4	56	68	10.5	215	20.0	15	59	30	86
13 OCT 77	1	4	57	67	4	215	20.0	14	57	25	77
	2	4	57	62	4	215	20.0	14	57	25	77
18 OCT 77	1	4	60	68	3.5	215	20.0	7	45	26	79
	2	4	58	68	3.5	215	20.0	7	45	26	79
27 OCT 77	1	4	82	97	4	21.5	2.0	11	52	22	72
	2	4	86	91	4	21.5	2.0	11	52	22	72
2 NOV 77	1	3	73	89	4.5	215	20.0	10	50	27	81
9 NOV 77	1	4	65	92	4.5	215	20.0	8	46	27	81

Table 15. - Components for the linear regression equation to estimate avoidance temperatures (C) of the American shad, Alosa sapidissima. * = Significant at $P \leq .05$; ** = significant at $P \leq .01$.

Constant (a) = 21.416		F(1, 14) = 21.283**		N = 16
Standard Error of Estimate = 2.52		R = 0.777		R ² = 0.603
<u>Variable (Xi)</u>	<u>Mean (Xi)</u>	<u>Correlation (r) With Y</u>	<u>Regression Coefficient (bi)</u>	<u>Standard Error of bi</u>
Acclimation Temperature (C)	16.2	0.777**	0.386**	0.084

Table 16. - A chronological summary of temperature avoidance studies with striped bass, Morone saxatilis. All tests were conducted at near air-saturated levels of dissolved oxygen and pH of 7 to 8.

DATE	REPLICATE	NO. OF FISH PER TEST	SIZE RANGE (TL IN MM)		SALINITY (PPT)	LIGHT LEVEL (FOOT (LUX) CANDLES)		ACCLIMATION TEMPERATURE (C) (F)		AVOIDANCE TEMPERATURE (C) (F)	
			MIN.	MAX.							
MORONE SAXATILIS											
24 JUN 70	1	4	34	42	4	215	20.0	21	69	32	89
1 JUL 70	1	4	35	41	1	215	20.0	21	69	33	91
	2	4	34	41	1	215	20.0	21	69	33	91
21 AUG 70	1	3	69	102	4	215	20.0	27	80	34	93
24 AUG 70	1	1	-	-	4	21.5	2.0	27	80	34	93
21 OCT 70	1	4	105	126	7	215	20.0	16	60	26	78
	2	4	108	130	7	215	20.0	16	60	23	73
23 OCT 70	1	4	102	140	7	215	20.0	15	59	27	80
3 NOV 70	1	4	126	140	4.5	21.5	2.0	14	57	28	82
12 NOV 70	1	4	125	135	1	215	20.0	14	57	29	84
	2	4	122	140	1	215	20.0	14	57	29	84
3 DEC 70	1	4	104	120	4	215	20.0	11	51	24	75
	2	2	97	108	4	215	20.0	11	51	18	64

Table 16. - Continued.

DATE	REPLICATE	NO. OF FISH PER TEST	SIZE RANGE (TL IN MM)		SALINITY (PPT)	LIGHT LEVEL (FOOT (LUX) CANDLES)		ACCLIMATION TEMPERATURE (C) (F)		AVOIDANCE TEMPERATURE (C) (F)	
			MIN.	MAX.							
MORONE SAXATILIS											
16 DEC 70	1	4	102	129	4	215	20.0	5	41	16	60
8 OCT 71	1	2	132	135	4.5	215	20.0	18	64	29.5	85
22 DEC 71	1	3	76	106	4.5	215	20.0	6	42	19	66
	2	3	87	98	4.5	215	20.0	6	42	19	66
14 MAR 72	1	4	82	201	2.6	215	20.0	5	41	18	64
	2	4	89	113	2.6	215	20.0	5	41	18	64
1 SEP 72	1	2	77	92	5	215	20.0	26	78	31	87
	2	2	142	173	5	215	20.0	26	78	33	91
8 NOV 72	1	4	87	126	0	215	20.0	10	50	21	69
	2	4	120	146	0	215	20.0	10	50	23	73
14 JUL 76	1	4	38	55	4	215	20.0	26	78	29	84
	2	4	43	56	4	215	20.0	26	78	32	89
10 SEP 76	1	4	90	105	4.5	21.5	2.0	24	75	28.9	84
2 DEC 76	1	4	116	145	3	21.5	2.0	3	37	15.6	60
	2	4	117	141	3	21.5	2.0	3	37	15.6	60

Table 16. - Continued.

DATE	REPLICATE	NO. OF FISH PER TEST	SIZE RANGE (TL IN MM)		SALINITY (PPT)	LIGHT LEVEL (FOOT (LUX) CANDLES)		ACCLIMATION TEMPERATURE (C) (F)		AVOIDANCE TEMPERATURE (C) (F)	
MCRONE SAXATILIS											
7 DEC 76	1	4	110	147	3	215	20.0	7	44	11.1	51
	2	4	137	146	3	215	20.0	7	44	11.1	51
10 DEC 76	1	3	120	132	8	215	20.0	10	50	13.9	57
	2	3	116	130	8	215	20.0	10	50	13.9	57
6 JUL 77	1	3	42	62	7	215	20.0	23	73	32	89
	2	3	45	50	7	215	20.0	23	73	32	89
21 JUL 77	1	3	55	60	8.5	215	20.0	29	84	35	95
	2	4	46	55	8.5	215	20.0	29	84	37	98
2 AUG 77	1	4	50	61	9	215	20.0	26	78	33	91
11 AUG 77	1	4	49	74	10.5	21.5	2.0	29	84	37	98
	2	4	50	70	10.5	21.5	2.0	29	84	37	98
26 AUG 77	1	4	60	74	8.5	21.5	2.0	25	77	29	84
	2	3	63	65	8.5	21.5	2.0	25	77	29	84

Table 17. - Components for the multiple linear regression equation to estimate avoidance temperatures (C) for the striped bass, Morone saxatilis,
 * = Significant at P.05 or greater; and ** = significant at P.01 or greater.

Constant (a) = 13.375		F(2, 37) = 102.298**			N = 40
Standard Error of Estimate = 3.108		R = 0.920**			R ² = 0.847
<u>Variable (Xi)</u>	<u>Mean (Xi)</u>	<u>Correlation (r) With Y</u>	<u>Regression Coefficient (bi)</u>	<u>Standard Error of bi</u>	<u>Standardized Reg. Coef.</u>
Acclimation Temperature (C)	16.8	0.907**	0.892**	0.067	1.002
Salinity (ppt)	4.9	0.335*	-0.503*	0.205	-0.184

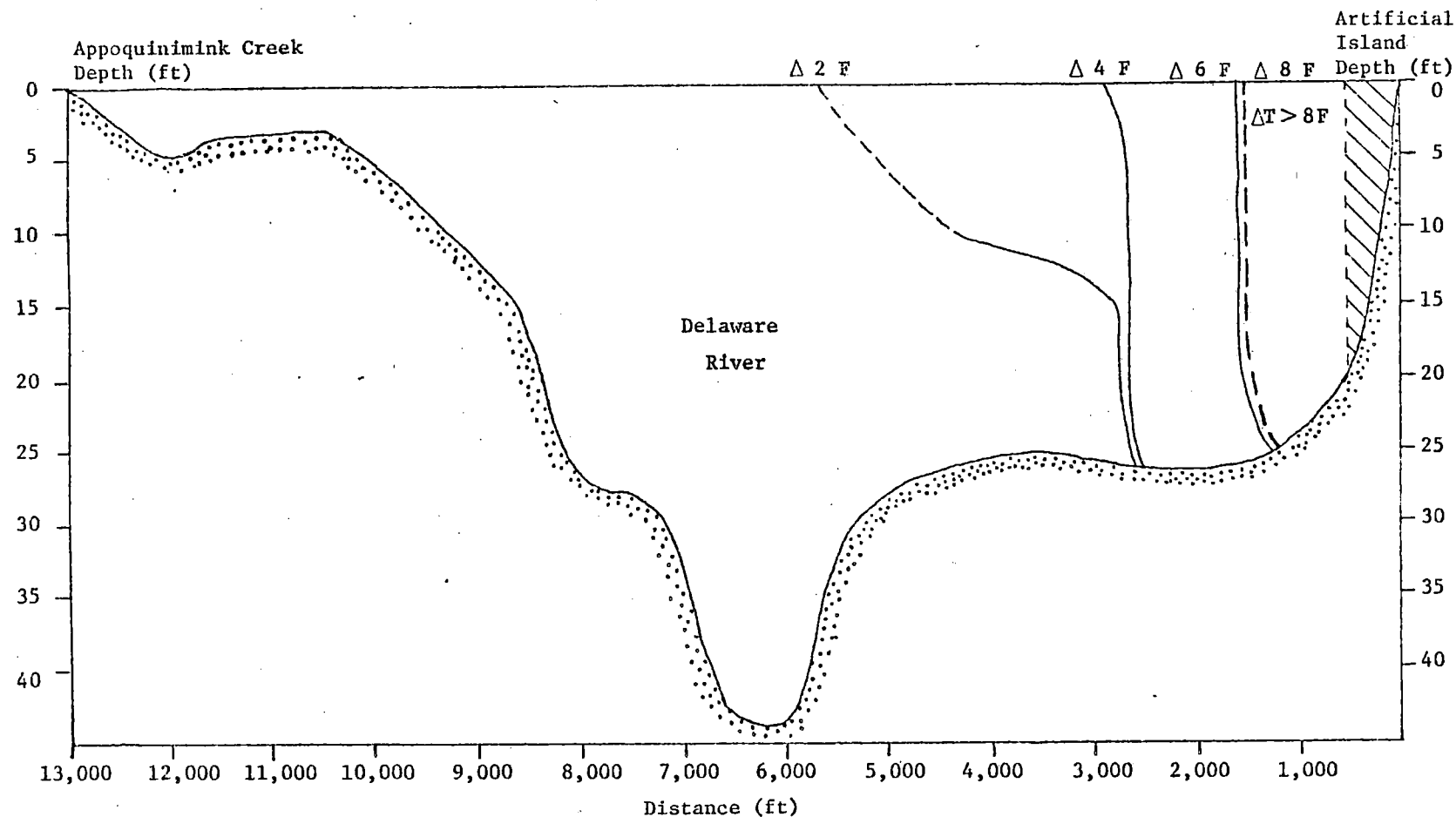


Figure 1. - Cross section of the S.N.G.S. thermal plume in relation to the cross section of the Delaware River from the point of discharge to Appoquinimink Creek during one unit operation ($16.2 \Delta F$) at an ambient current of 0.5 fps. No elevated temperatures expected in shaded area (ARL 1977). Dotted line indicates extrapolation beyond available data.

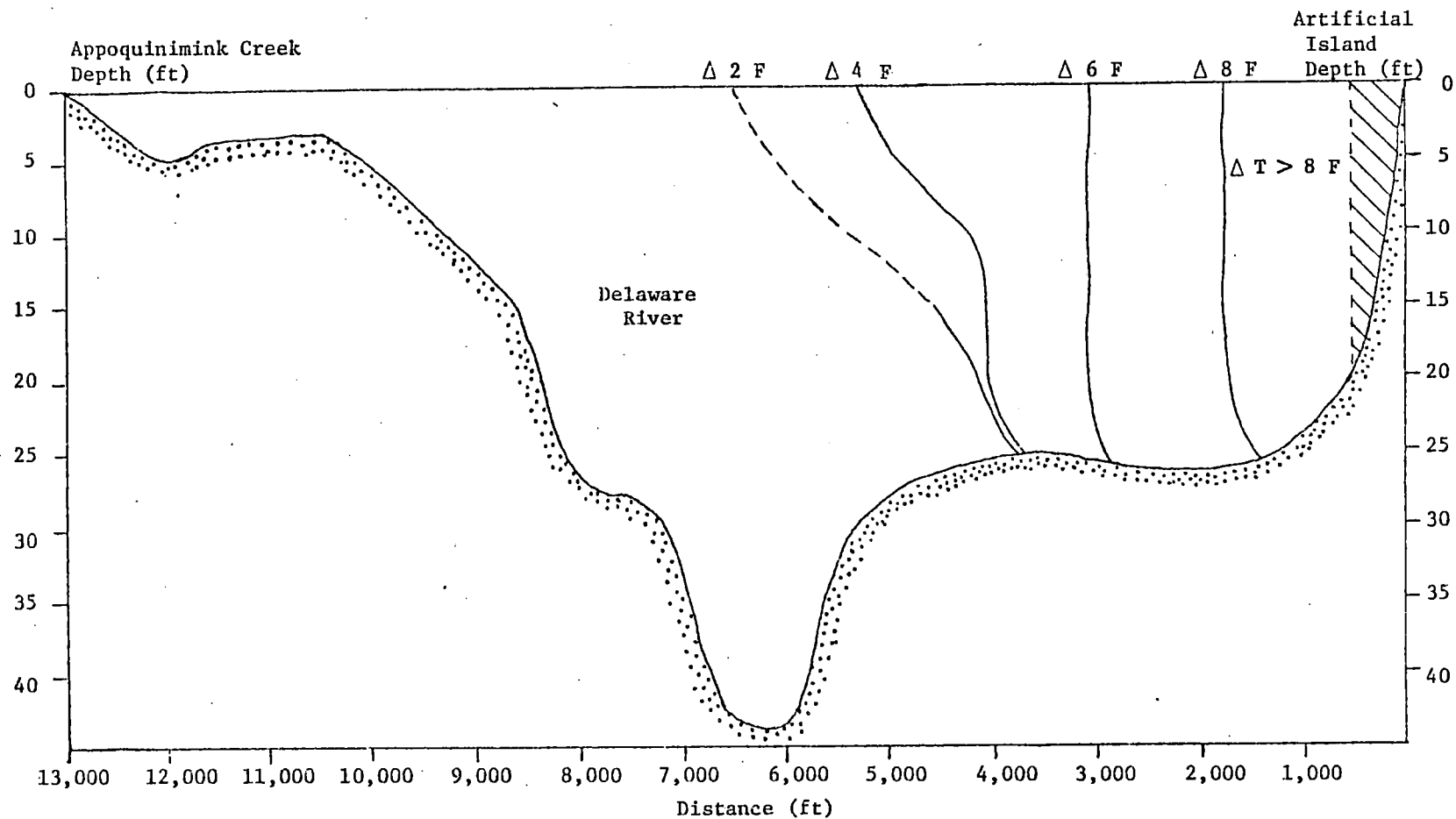


Figure 2. - Cross section of the S.N.G.S. thermal plume in relation to the cross section of the Delaware River from the point of discharge to Appoquinimink Creek during two unit operation ($16.2 \Delta F$) at an ambient current of 0.5 fps. No elevated temperatures expected in shaded area (ARL 1977). Dotted line indicates extrapolation beyond available data.

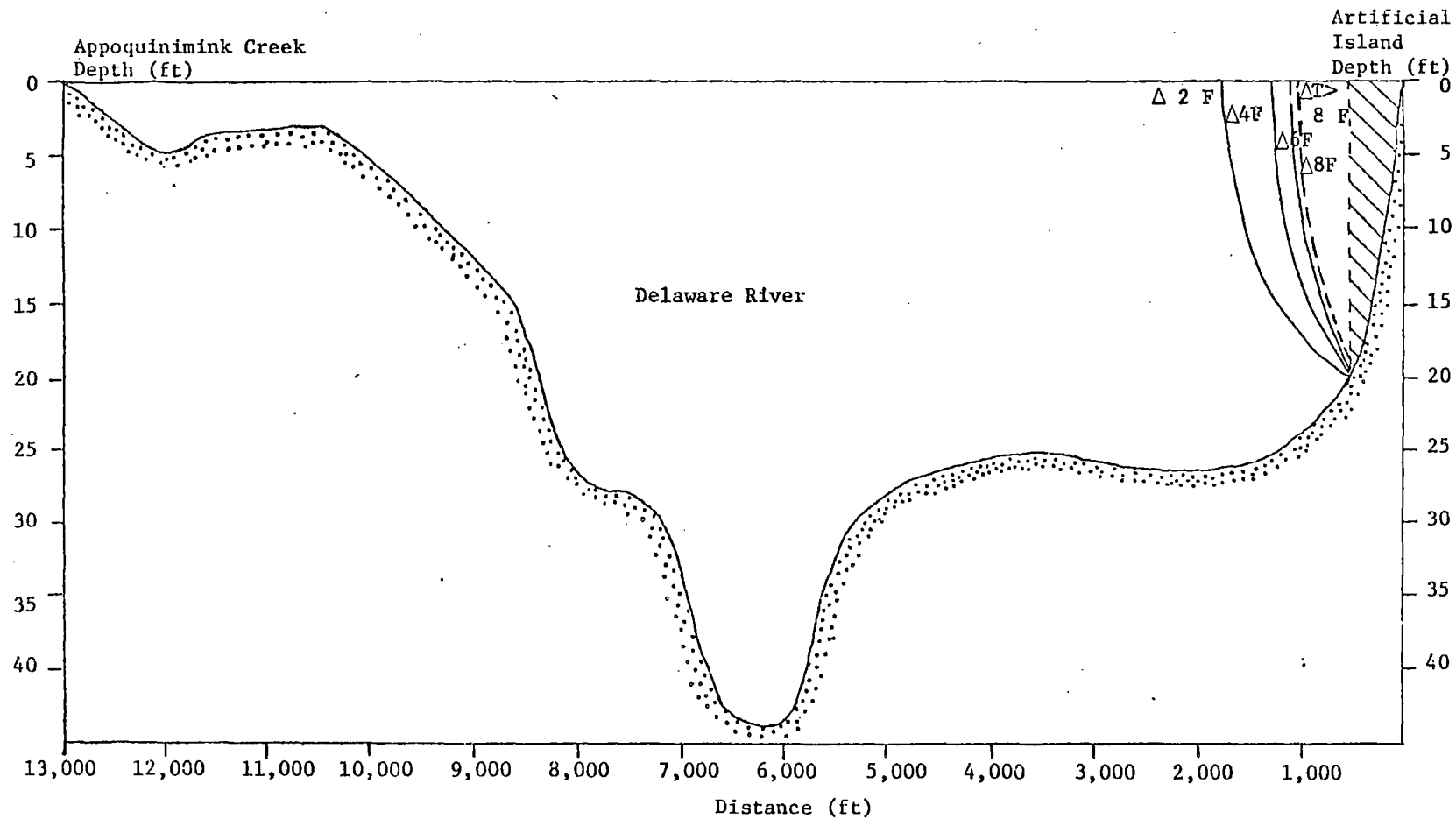


Figure 3. - Cross section of the S.N.G.S. thermal plume in relation to the cross section of the Delaware River from the point of discharge to Appoquinimink Creek during one unit operation ($16.2 \Delta F$) at an ambient current of 2.5 fps. No elevated temperatures expected in shaded area (ARL 1977). Dotted line indicates extrapolation beyond available data.

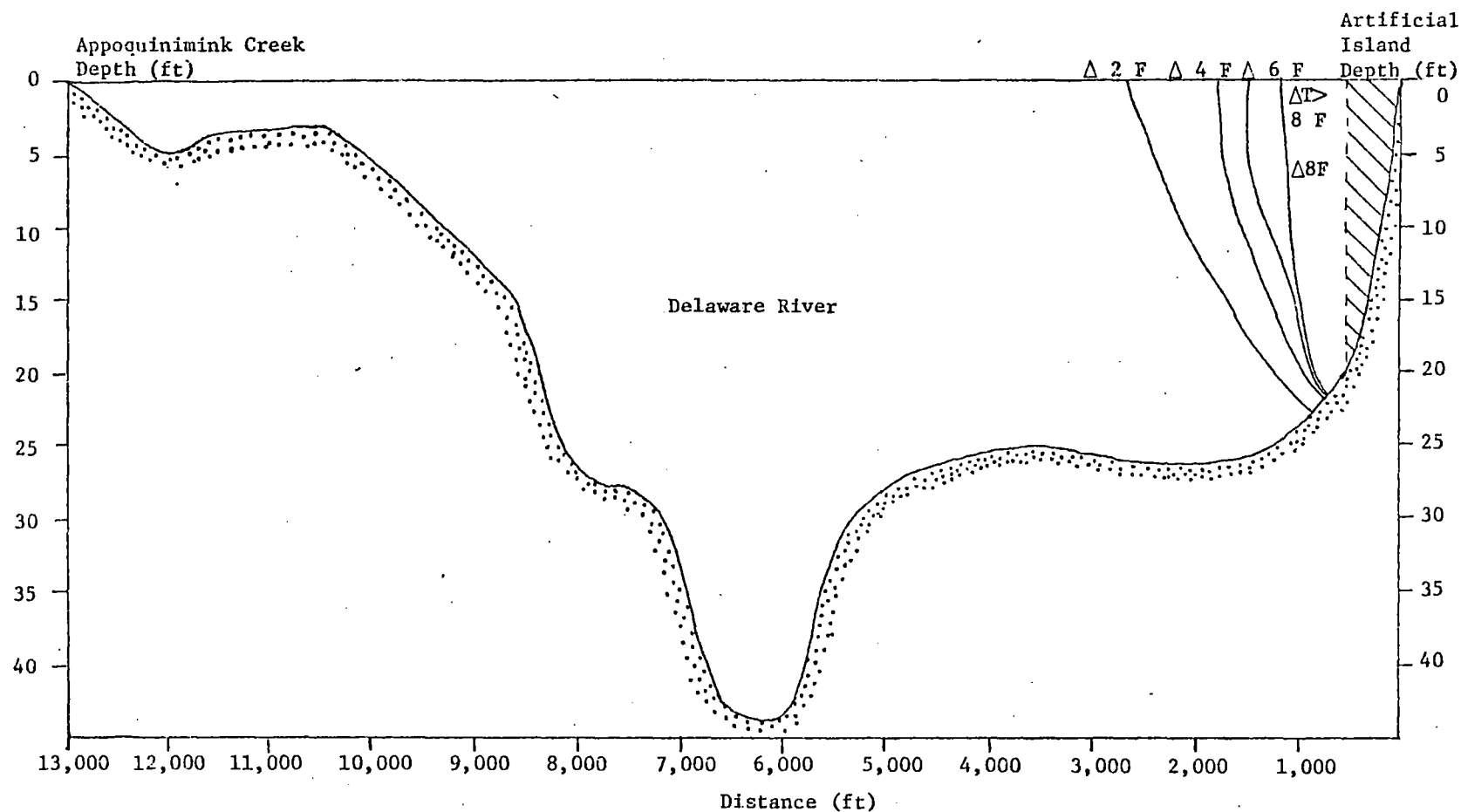


Figure 4. - Cross section of the S.N.G.S. thermal plume in relation to the cross section of the Delaware River from the point of discharge of Appoquinimink Creek during two unit operation ($16.2 \Delta F$) at an ambient current of 2.5 fps. No elevated temperatures expected in shaded area (ARL 1977). Dotted line indicates extrapolation beyond available data.

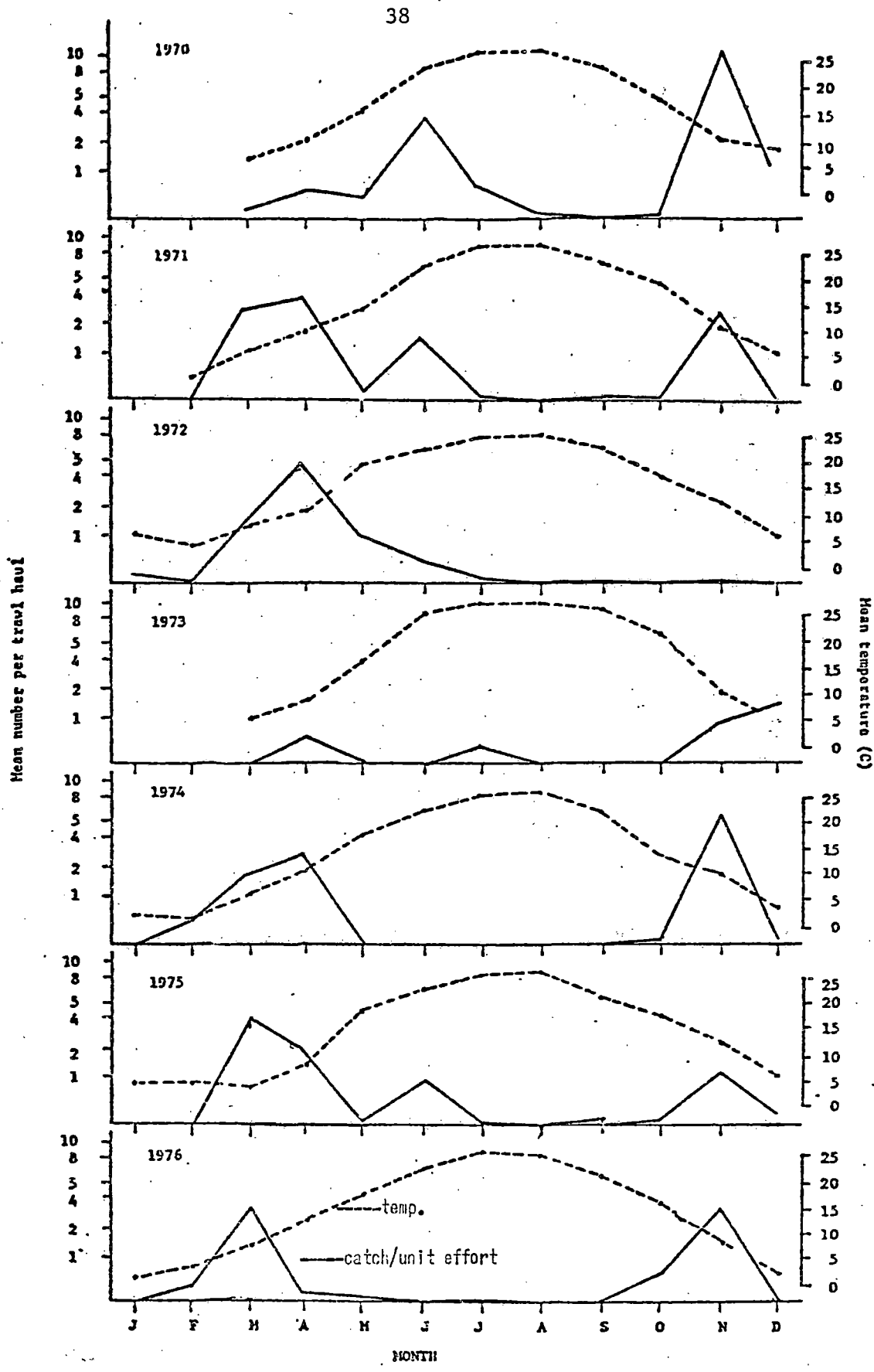


Figure 5 . - Mean temperature (C) by year and monthly mean catch per unit effort (16-ft trawl, 10-min haul) of blueback herring, Alosa aestivalis, taken in the Delaware River near the Salem Nuclear Generating Station, 1970 through 1976.

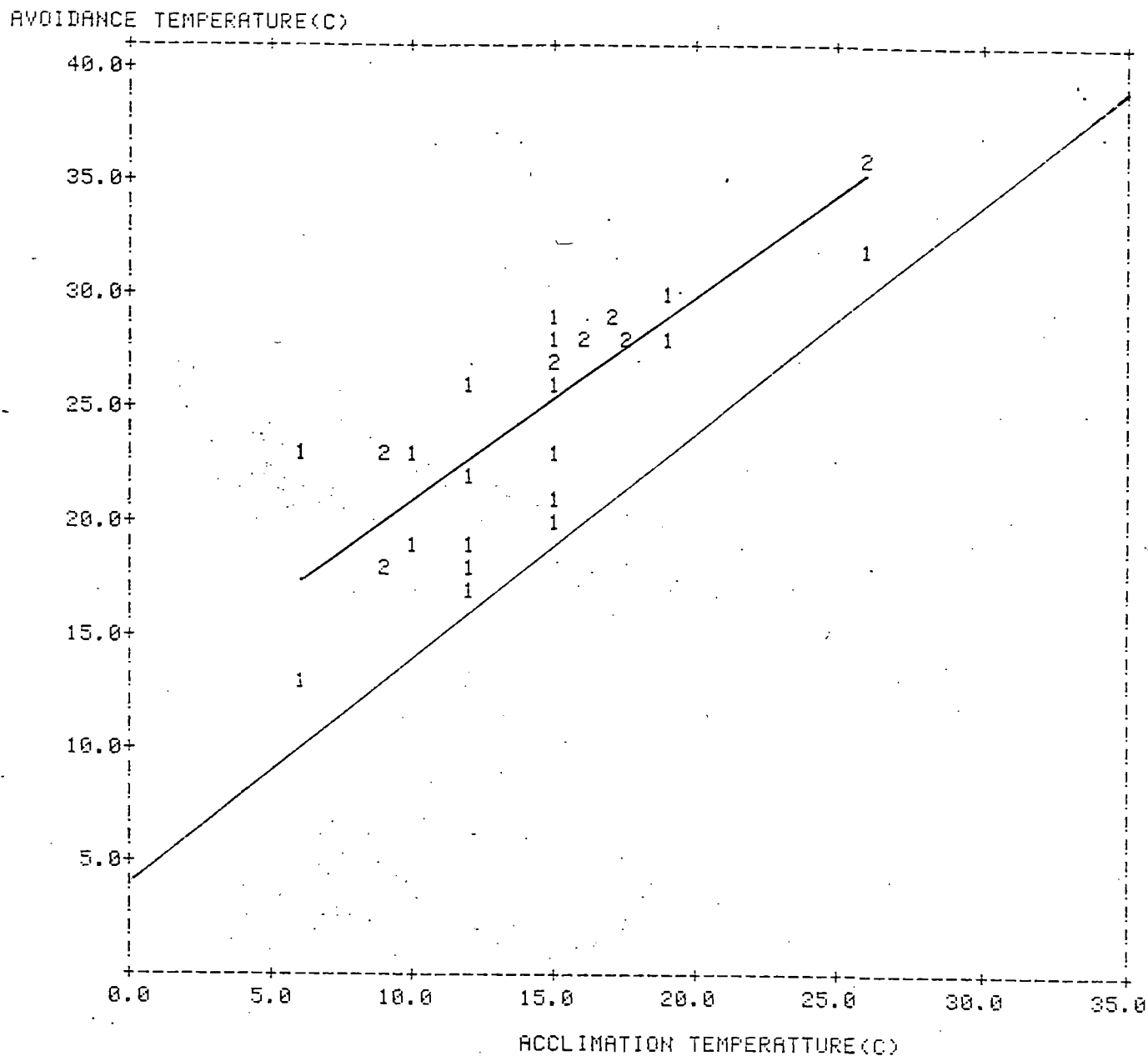


Figure 6. - The relationship of the temperature (4 C) of the maximum penetrable isotherm to avoidance temperatures of blueback herring, *Alosa aestivalis*, plotted against acclimation (ambient) temperatures. The number of data points occurring at a specific avoidance temperature is indicated numerically. The regression line of estimated avoidance temperature using the components in Table 11 is also shown.

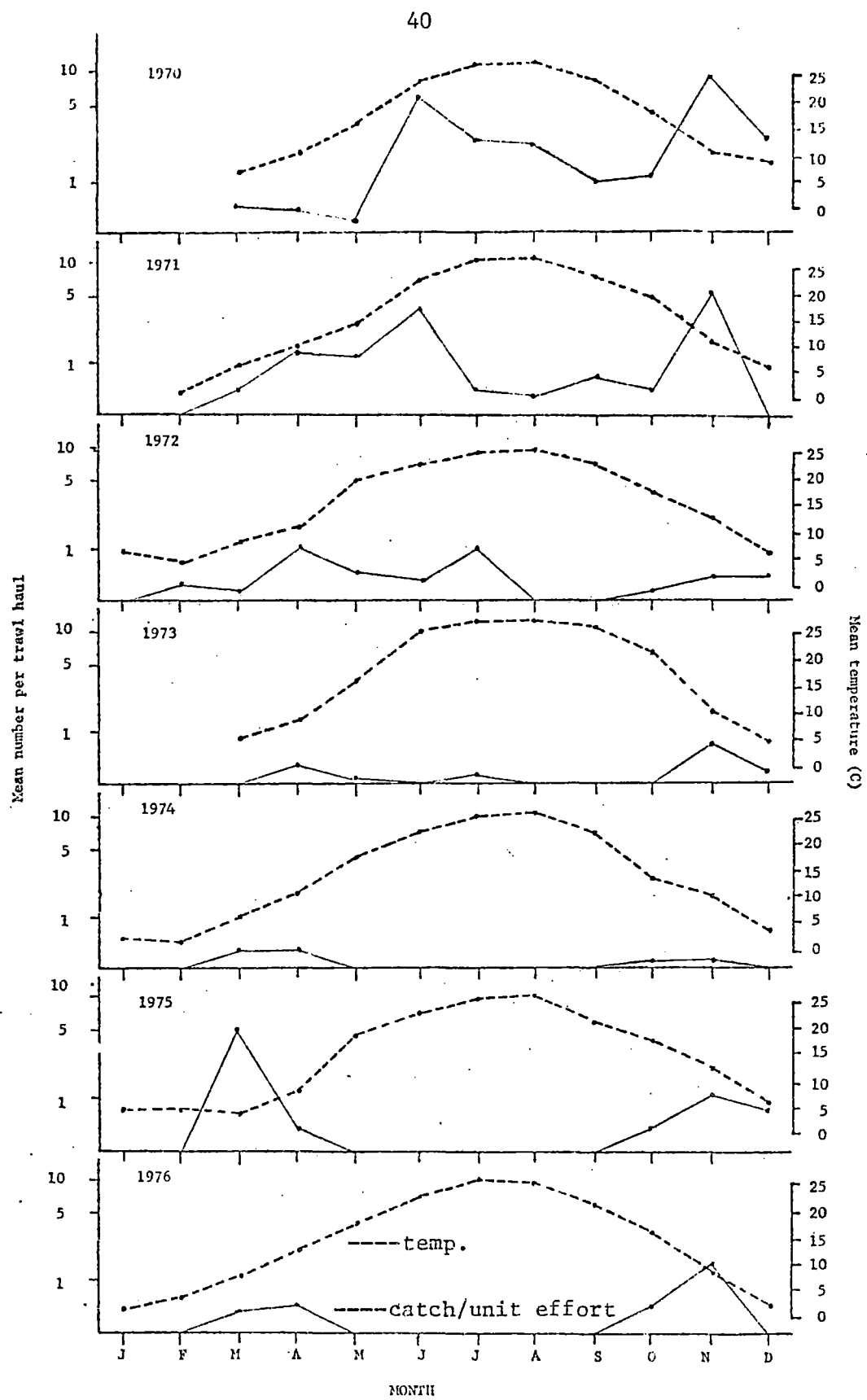


Figure 7. - Mean temperature (C) by year and monthly mean catch per unit effort (16-ft trawl, 10-min haul) of alewife, *Alosa pseudoharengus*, taken in the Delaware River near the Salem Nuclear Generating Station, 1970 through 1976.

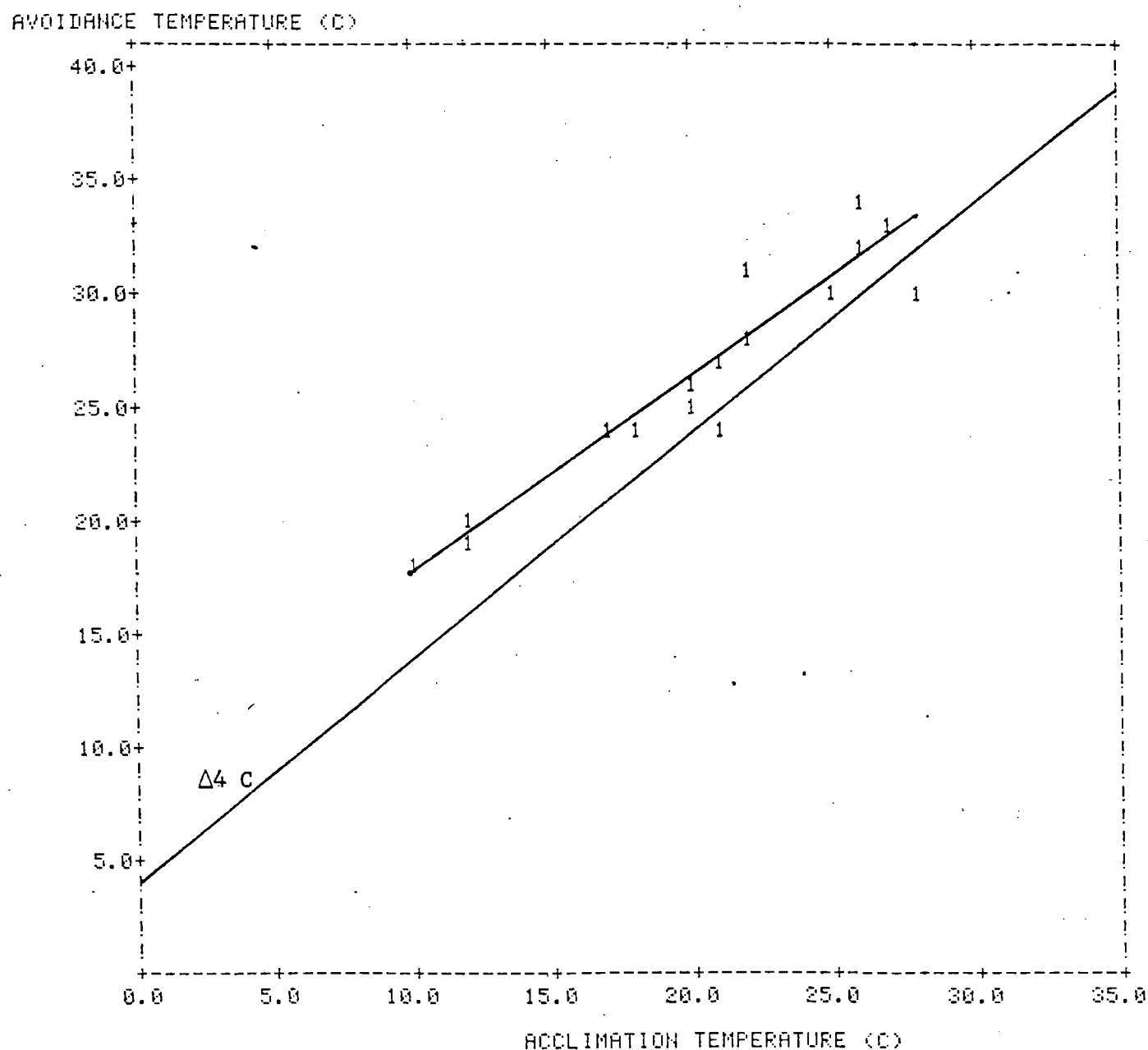


Figure 8. - The relationship of the temperature (4 C) of the maximum penetrable isotherm to avoidance temperatures of alewife, Alosa pseudoharengus, plotted against acclimation (ambient) temperatures. The number of data points occurring at a specific avoidance temperature is indicated numerically. The regression line of estimated avoidance temperature using the components in Table 13 is also shown.

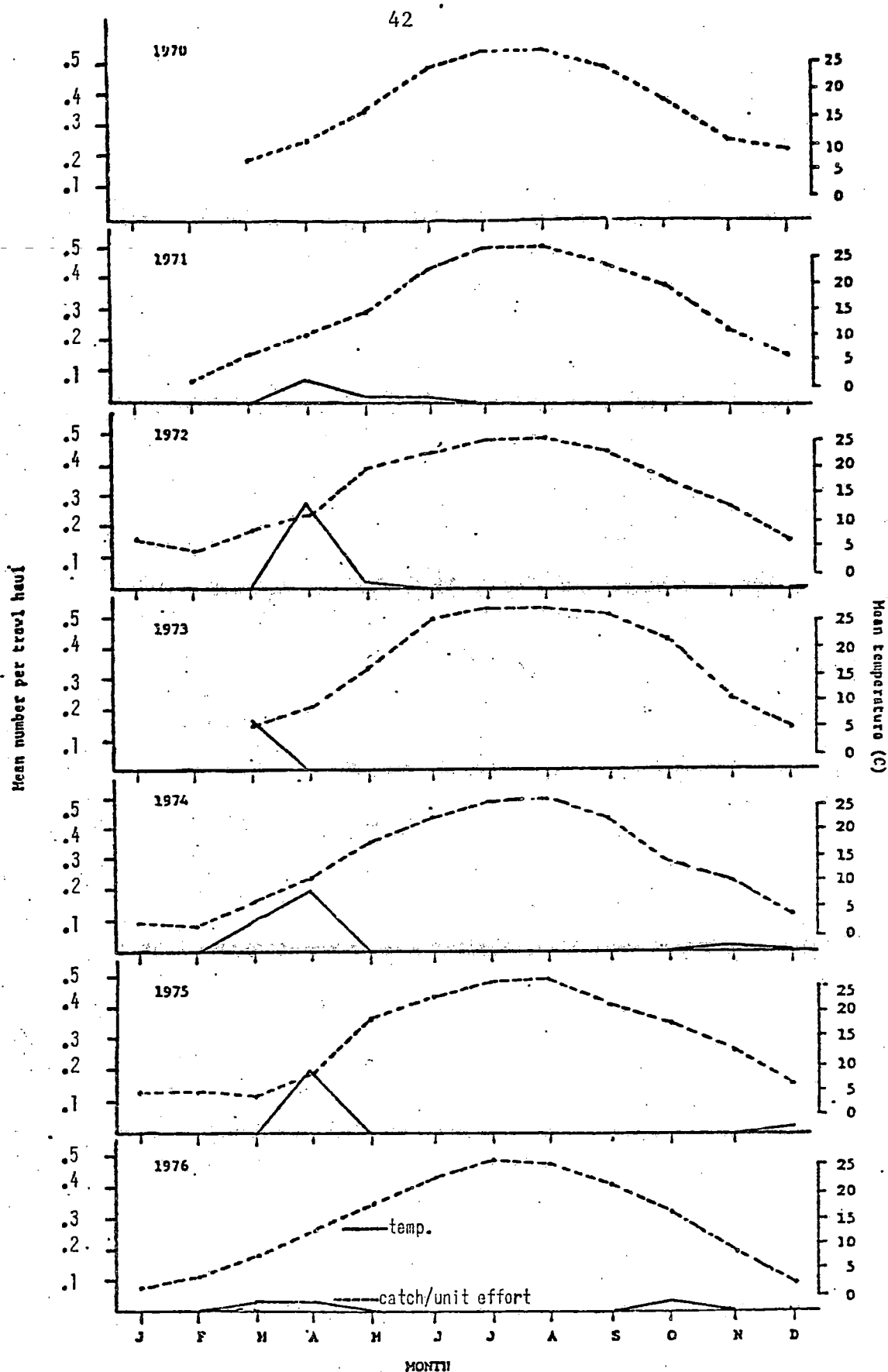


Figure 9. - Mean temperature (C) by year and monthly mean catch per unit effort (16-ft trawl, 10-min haul) of American shad, *Alosa sapidissima*, taken in the Delaware River near the Salem Nuclear Generating Station, 1970 through 1976

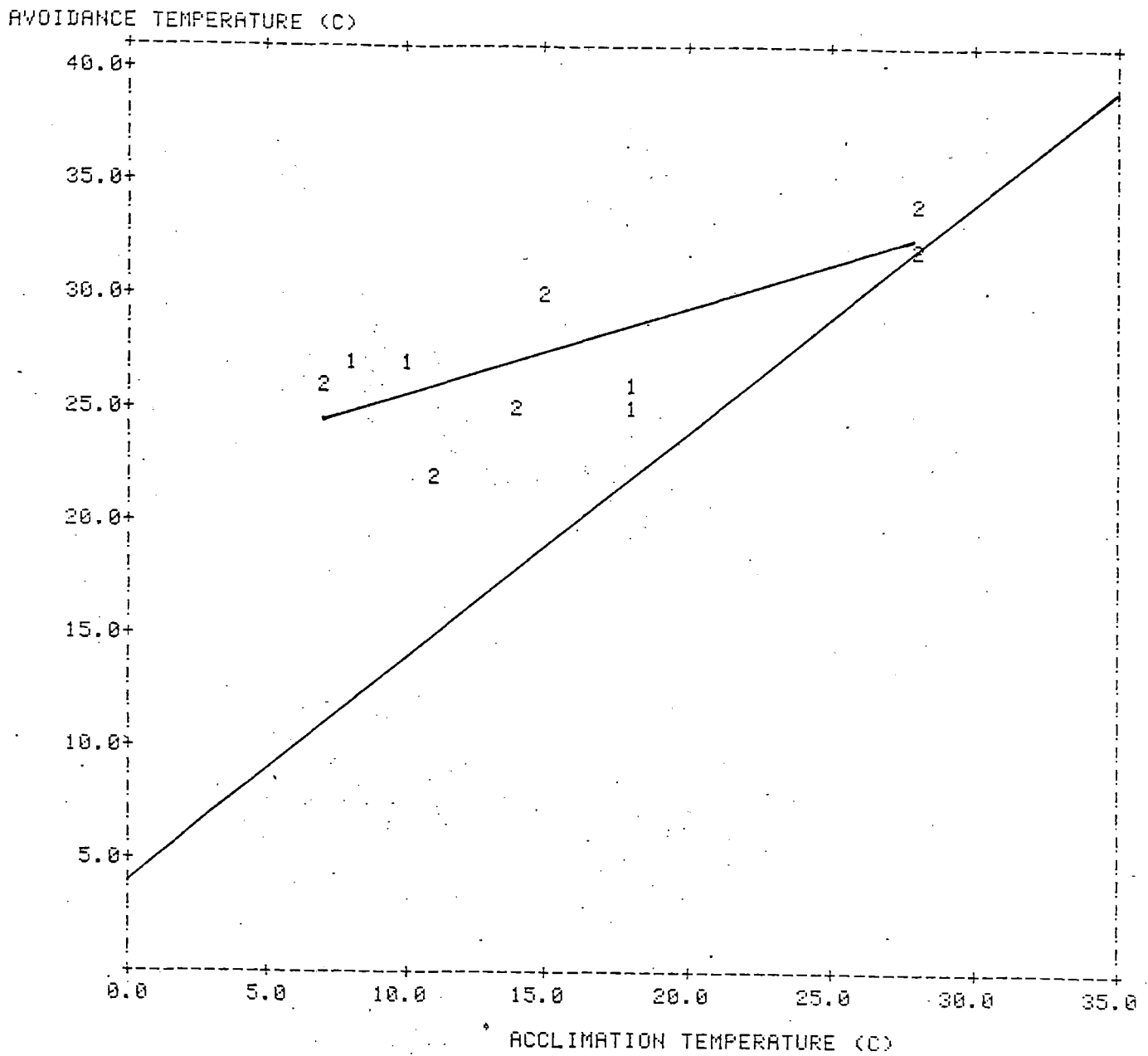


Figure 10. - The relationship of the temperature (4 C) of the maximum penetrable isotherm to avoidance temperatures of American shad, *Alosa sapidissima*, plotted against acclimation (ambient) temperatures. The number of data points occurring at a specific avoidance temperature is indicated numerically. The regression line of estimated avoidance temperature using the components in Table 15 is also shown.

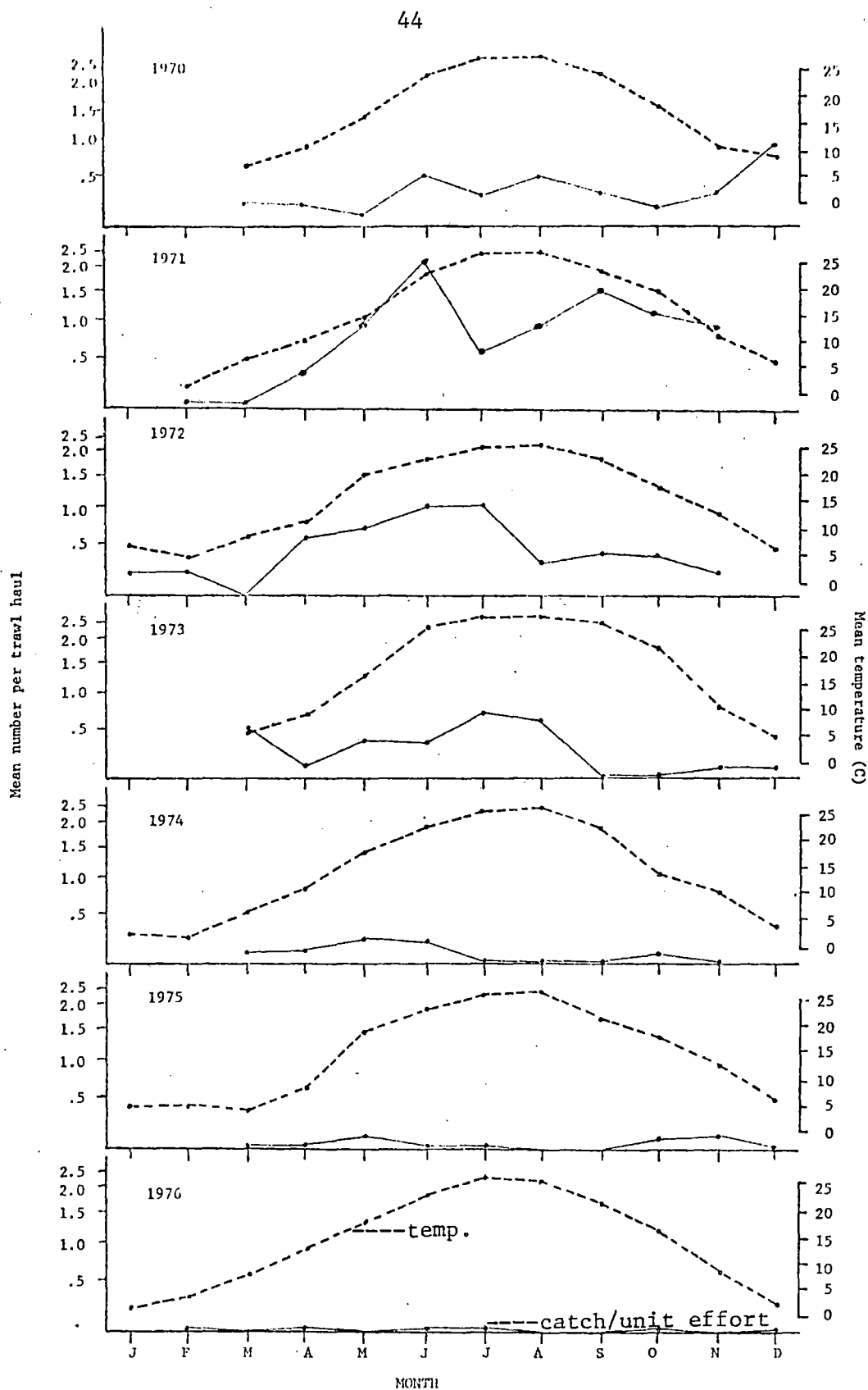


Figure 11. - Mean temperature (C) by year and monthly mean catch per unit effort (16-ft trawl, 10-min haul) of striped bass, *Morone saxatilis*, taken in the Delaware River near the Salem Nuclear Generating Station, 1970 through 1976.

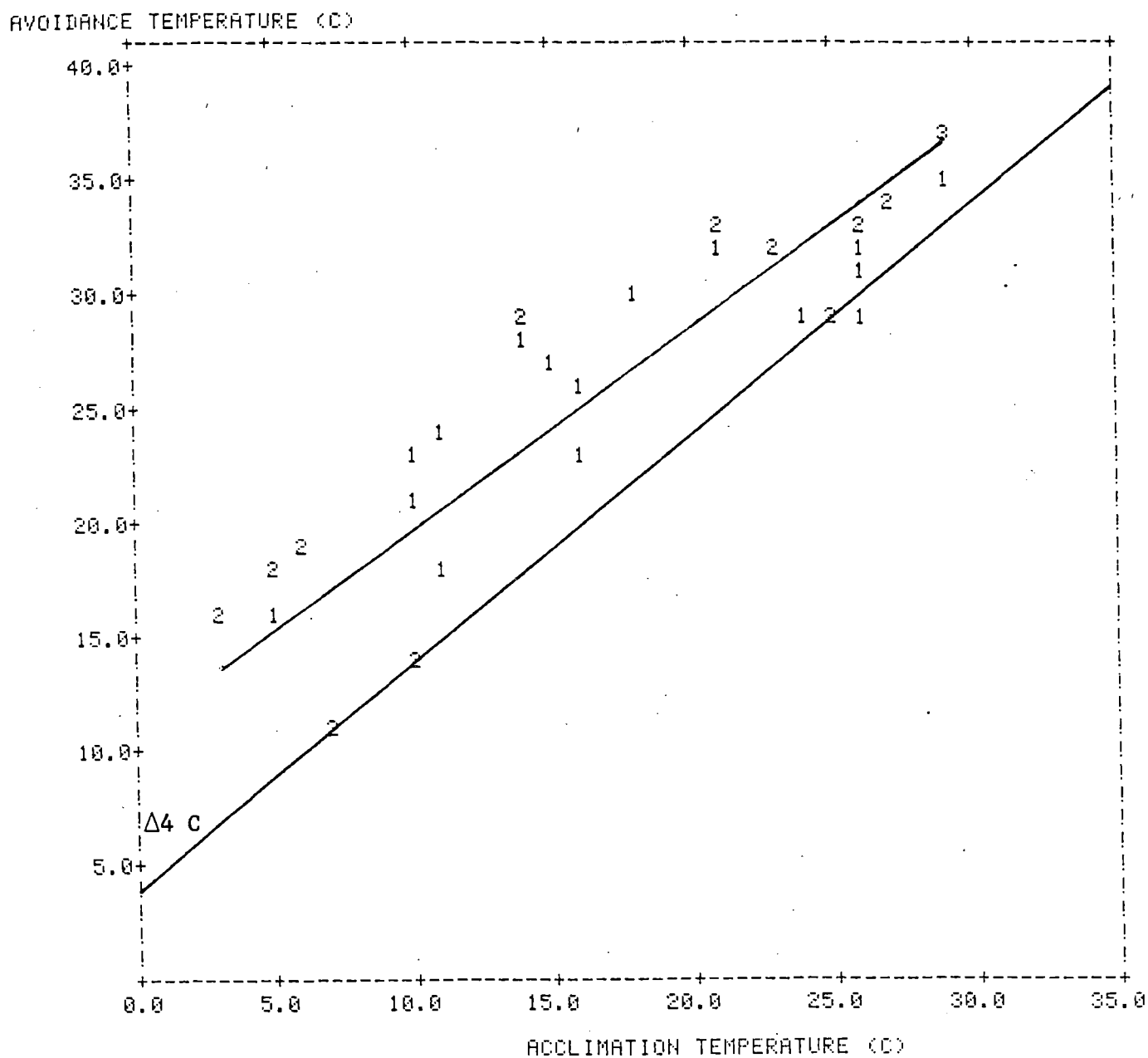


Figure 12. - The relationship of the temperature (4 C) of the maximum penetrable isotherm to avoidance temperatures of striped bass, *Morone saxatilis*, plotted against acclimation (ambient) temperatures. The number of data points occurring at a specific avoidance temperature is indicated numerically. The regression line of estimated avoidance temperature using the components in Table 17 is also shown.

APPENDIX A: EXPERIMENTAL PROCEDURES

Since 1969, experimental studies of temperature preference and avoidance on fishes of the Delaware River estuary have been conducted at the Delaware Experimental Laboratory of Ichthyological Associates, Inc. Cold shock studies on fishes began in 1970. Secondary (plume) entrainment simulation studies on fishes and invertebrates began in 1976. Salinity tolerance studies on fishes began in 1976.

Collection and Maintenance of Fishes and Invertebrates

All fishes and invertebrates used in experimental studies were taken from native populations in the watersheds of the Delaware River estuary and upper Chesapeake Bay. Precautions were taken to minimize handling stress. Fishes were captured by seine and, when feasible, taken from the seines by means of a water filled scoop. A modified trawl with a special noncollapsible cod end was used when seines were ineffective. Short (2-3 minute) hauls were made with the trawl at reduced boat speed. Larval fish used in secondary entrainment studies were obtained by artificially fertilizing eggs in the field or collecting eggs in a one-meter ichthyoplankton net towed at low boat speeds. Neomysis americana was collected in a drifted one-half or one-meter ichthyoplankton net or by seine. Gammarus spp. was collected in a modified crab pot.

Healthy appearing specimens were placed in insulated transport tanks filled with water at ambient temperature and salinity. The level of dissolved oxygen in the tank was maintained with an air pump. Specimens were transported as quickly as possible to laboratory holding facilities.

All fishes were held at the approximate temperature (± 2 C) and generally the salinity (± 2 ppt) of capture. They were maintained in recirculated flowing water which was filtered and occasionally subjected to ultraviolet light for sterilization. Specimens were held for no less than 18 hours prior to testing. Photoperiods were maintained on the seasonally appropriate light-dark cycles. Lighting for both test and holding facilities was provided by the Duro Test "Vita-Light" which has a spectral energy distribution comparable to natural daylight. Light levels were measured with a Weston Model 614 light meter (± 2 foot-candles). Temperature, salinity, pH, and level of DO were monitored for all holding and test waters in use. Water used in closed cycle systems was used for no more than two weeks before replacement.

Measurements and Conditions of Testing

All studies throughout the year were conducted under near air-saturated levels of DO at appropriate salinity within a range of 0.0 to 25.0 ppt and acclimation temperature within a range of 2 to 30 C (36-38 F).

Temperature, salinity, DO, light, pH levels, and total lengths (TL) of specimens were measured and recorded for all tests. Additionally, these parameters were varied to determine their effect on the response. Water for most studies was taken at high tide from Appoquinimink Creek, a tributary of the Delaware River.

Temperature was measured with YSI Series 400 thermistors (± 0.2 F) and with N.B.S. total immersion and A.S.T.M. partial immersion thermometers calibrated in 1.0 C intervals. Salinity was measured with a YSI Model 33 S-C-T Meter (precision at 1.0 ppt) and a Beckman Model RS5-3 (precision at 0.01 ppt). Photovolt Model 126A pH meter having a precision of 0.1 pH

units was used to measure pH. The level of DO was measured with a YSI Model 54 temperature compensated DO meter and probe having a precision of 0.1 ppm (on the 0-10 ppm scale) and 0.2 ppm (on the 0.20 ppm scale).

Temperature Avoidance Studies

The avoidance design employed in these studies was a modification of the design first employed by Shelford and Allee (1913). The development of the modified design has been described in detail by Meldrim (1971), and procedures followed those of Meldrim and Gift (1971) and Meldrim et al. (1974). Briefly, in this modified design a control and replicate response is determined at the same time. The apparatus was constructed such that waters of differing temperature flowed from Forma-Scientific temperature controlled circulating baths into the opposing ends of a divided trough and then drained at the respective centers. Because of the sharp gradient at the center drains, the apparatus was effectively divided into rectangular quadrants. The water temperature was the same in diagonally opposed quadrants, but different in those directly opposed (within the same trough). One set of diagonally opposed quadrants was designated as experimental, the other as controls. Temperatures in the directly opposing quadrants were increased in a step gradient fashion with the experimental quadrants ("T+") being 3 to 5 F higher than the controls ("T"). Equal numbers of fish were placed in each quadrant. The amount of time spent in each respective quadrant was determined over a 5- to 15-minute period and a frequency distribution was formed. The frequency distribution was then analyzed with a t-test. Tests continued through the step gradient until a significant ($P \leq 0.05$) avoidance response was given in both subtroughs.

Dissolved oxygen concentration and pH were monitored with a YSI Model 54 DO meter and the Photovolt Model 126A pH meter. Thermal conditions (± 0.5 F) in the apparatus were monitored by a Leeds and Northrup "Speedomax G" multi-channel temperature recorder connected to thermocouples at 6-inch intervals. The trough was enclosed for light level regulation as well as to permit observer movement around the trough area. Because of the increase in specimen activity which accompanied temperature increases, observations for temperature tests were made via closed-circuit television. Tests were often video-taped for subsequent analysis.

Cold Shock Studies

Cold shock studies were conducted in closed cycle 8-gal (28-liter), 22-gal (83-l), and 50-gal (190-l) aquaria. Equal numbers of fish were placed in control and experimental tanks. Generally, 10 fish were tested for each experimental condition; however, no fewer than five fish were tested for each condition. Care was taken not to exceed two grams fish weight per liter of water in the chamber. Fish were exposed to instantaneous change from ambient temperature to levels which permit estimation of the median lethal temperature. Times to both loss of equilibrium (L.O.E.) and mortality were recorded. Observations were continuous for the first 30 minutes of exposure and at hourly intervals for the next four hours. Thereafter, observations were made at approximately 24-hour intervals. Response was determined over test periods of up to 96 hours.

Temperature was recorded at each observation and dead fish were removed and measured. At the conclusion of the test all fish were removed and measured. Tests in which control mortality exceeded 20%

were not considered in the evaluation. Based on test sample size (some tests had less than 10 fish) a 20% level was considered more appropriate than the arbitrary 10% control mortality exclusion level specified by Standard Methods (APHA 1975).

Secondary Entrainment Studies

Secondary (plume) entrainment studies were conducted to determine the mortality resulting from passage through the S.N.G.S. thermal plume on bay anchovy larvae and eggs, white perch larvae, weakfish larvae, Neomysis americana, and Gammarus spp.

Plume entrainment was simulated by exposing test organisms to four Δ temperatures (approximately 2.0, 4.0, 6.0, 7.5 C) for three different exposure times (0.5, 1.0, 4.0 hrs). Test organisms were usually taken from holding facilities (acclimation temperature) with pipette or scoop and placed in 1-liter test jars in heated baths. Rough counts of organisms in each jar were made to assure more than five per treatment. Normally, two test groups received similar handling and were placed in jars and kept at acclimation temperature for purpose of comparison (controls). At each of three exposure times a jar was removed from the test bath and placed in an acclimation bath. Live and dead organisms were tallied in test and control jars at the end of each exposure time. Normally, test jars were held at ambient for at least an additional 24 hours and another live:dead count was made to determine latent mortalities. However, with certain species which are difficult to maintain tests may have been terminated at an earlier time. Number of live and dead within each test treatment were compared with controls using a Chi-square (2 x 2) test (Sokal and Rohlf 1969)

at $P \leq .05$. A large number ($>30\%$) of significant treatments was considered evidence of secondary entrainment mortality. A pattern of significant Chi-square results with respect to acclimation temperature, Δ temperature, or exposure time indicated possible correlation.

Salinity Tolerance

The experimental testing procedure is a static bioassay design that enables exposure to discreet salinities in a temperature controlled waterbath. Since tolerance to low salinity is a function of water temperature, the scope of this study was to evaluate the sensitivity to lower salinities throughout the year.

Test apparatus consisted of aerated 10-gal (38 liter) aquaria containing corner filters. Temperature was maintained by a circulating waterbath. Test water was made by adding seawater to natural freshwater. Salinities were monitored with a Beckman Model RS5-3 salinometer having a precision of 0.01 ppt salinity.

The procedure of the test is similar to that of cold shock. Equal numbers of organisms were randomly placed in aquaria and observed hourly during the first eight hours. Subsequent observations were made at least twice daily or until death occurred throughout the remainder of the 96-hour test.

Literature Cited

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APPENDIX B: EXPERIMENTAL DATA ANALYSIS PROCEDURE

Sufficient data were obtained for most species to permit statistical analysis of temperature avoidance tests. Results of temperature avoidance tests were subjected to stepwise (backward) multiple linear regression analysis. The generalized regression equation model is:

$$Y = a + b_i X_i + b_j X_j + \dots b_n X_n + e$$

where Y = the estimated avoidance temperature (C); a = the constant; b_i , b_j , and b_n = the regression coefficients; X_i , X_j , and X_n = the independent variables; and e is the error term.

Independent variables incorporated into the analysis were acclimation temperature (C), mean total length (mm) of the group tested, salinity (ppt), and light level (lux). In cases in which more than one independent variable was significant ($P \leq 0.05$), standardized regression coefficients were calculated to permit comparison of their relative importance. Regardless of other variables found to significantly affect the response, the avoidance temperatures of a species were plotted against respective acclimation temperatures.

Plots of avoidance temperatures permit a visual examination of the relationship of plume Δ temperatures to the avoidance temperatures of a species. Such plots show which plume temperatures (which then can be converted to plume volumes) are avoided at a particular ambient temperature.

The data for tolerance tests (cold shock, secondary entrainment, and salinity tolerance) were generally not subjected to statistical analysis. However, the salinity tolerance data for the Atlantic silverside

were evaluated by probit and multiple regression analysis. Median survival times were calculated for all species tested in salinity tolerance studies.

APPENDIX C: DETERMINATION OF SECONDARY ENTRAINMENT RATES WITHIN THE
S.N.G.S. THERMAL PLUME.

Secondary entrainment (plume entrainment) rate within the S.N.G.S. thermal plume was estimated with the formula:

$$(\Delta d / \Delta i - 1) * D = \text{secondary entrainment rate within the isotherm (i)}$$

where Δd = Δ temperature (F) at the discharge, Δi = Δ temperature (F) at an isotherm, D = discharge rate (cfs). Estimates were made at normal plant operating conditions. These included one and two unit operation (1,110,000 gpm/unit, 2,473 cfs/unit) at the normal discharge temperature of 16.2 F (ARL 1977).

In the equation it is assumed that mixing of the discharge with ambient water is the only mechanism of temperature decay. Heat loss to the atmosphere is not accounted for, making the estimates somewhat conservative (over-estimate). The component $\Delta d / \Delta i$ is the ratio of total entrainment (discharge rate + secondary entrainment rate) to the discharge rate (primary entrainment rate). A constant (1.0) is subtracted to account for primary entrainment rate, and the result is multiplied by the discharge rate. The result represents the total secondary entrainment rate within the isotherm (i) used in the equation.

The time-temperature histories of water particles passing along the plume centerline at the surface and at a depth of 10 ft were calculated from data given by ARL (1977). Average velocities were determined from velocity distance figures. Distance along plume centerline within isotherms was calculated from horizontal plots of the plume. The average velocity was multiplied by distance to determine time of travel.

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