SUMMARY ASSESSMENT OF WEAKFISH IMPINGEMENT: SUMMER 1978

SALEM NUCLEAR GENERATING STATION
UNIT NO. 1

Docket No. 50-272
Operating License No. DPR-70

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PUBLIC SERVICE ELECTRIC AND GAS COMPANY
80 Park Place
Newark, New Jersey 07101

November 1978

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ACKNOWLEDGEMENT

This report was prepared by Public Service Electric and Gas Company, Newark, New Jersey, and Ichthyological Associates (IA), Middletown, Delaware. Data were collected at the Salem Nuclear Generating Station and in the Delaware Estuary by the staff of IA under the direction of V. J. Schuler, Project Director. Data analysis was performed by IA staff and reviewed by M. D. London, Lead Biologist with PSE&G who also coordinated report preparation.

I. SUMMARY AND CONCLUSION

This report presents and discusses data on the occurrence and abundance of juvenile, age 0+ (1978 year-class), weakfish (Cynoscion regalis) in trawl samples taken in the Delaware estuary and in impingement samples from the circulating water system (CWS) intake screens at Salem Nuclear Generating Station Unit I. It considers in an ecological perspective the extent and effect of impingement at Salem on the 1978 year-class of weakfish.

In 1978 weakfish specimens were first taken on the Salem screens on June 19 at a rate of 0.0 to 4 specimens per minute. The total sample by June 28 was 7350 specimens, in contrast with the entire 1977 weakfish impingement sample which numbered 8000 specimens. These and subsequently collected data suggested a population of age 0+ weakfish several orders of magnitude larger than had been previously observed. For example, the trawl catch on June 26, 1978 exceeded the annual catch in each of the previous 10 years and was close to the cumulative catch of the previous 3 years. Still, the disproportionally large (relative to 1977) impingement totals raised questions about impact on the year class and on the species. To address these, the ongoing ecological studies were expanded to include bay-wide (River Mile 0-73) weakfish population estimates which would provide the data necessary to quantify the event and its significance.

The three main study regions, North, Plant, and South, (Figure I-1) were divided into 17 sub-areas. Data from the weakfish population study were examined by sub-area for each and between successive estimates for indications of patterns in density and movement. No significant patterns were determined.

The estimated bay wide population of age 0+, juvenile weakfish of the size-range taken in sampling nets, which includes the size-range of fish observed in impingement samples, ranged from 1,210,000,000 on June 21, 1978 to 168,000,000 on September 7-8, 1978, a decline of more than 1,000,000,000 fish. The length of these fish was consistently less then five inches. In the same period an estimated total of 8,000,000 weakfish was impinged on the CWS traveling screens. These fish were also consistently less than five inches in length. The majority of these fish were returned to the river via the fish return system. Estimated mean survival from June 18-29 was 44%. The sampling procedure was modified on June 29 to reduce the sample handling and processing mortality component and more realistically measure actual fish survival. This resulted in an immediate increase in individual sample survival rates; estimated mean survival from June 29 through September 30 was 70%.

Consequently, PSE&G concludes that impingement mortality comprised 0.3% of the observed weakfish population decrease. Natural mortality and emigration from the system accounted for the remainder of the decrease.

The impact of weakfish impingement at Salem may also be put into perspective by estimating the number of spawning females responsible for producing the juveniles estimated to have been lost on the intake screens and relating that number to the estimated sport fishing catch. Sport fishing only takes adults.

Merriner (1976) reported that a female of 500 mm SL[2] produces slightly over 2 million eggs and that fecundity increases about 128,000 eggs per 100 g of body weight. Assuming a conservative fecundity of 1.5×10^6 eggs, estimates of the number of eggs hatched and surviving to the juvenile stage per female were calculated. Survival undoubtedly lies between the extremes of 5 and 0.1%. The number of 0+ weakfish lost to impingement (2.97×10^6) was divided by the estimated number of juveniles produced per female.

The number of females required to produce the offspring impinged was estimated to range between 40 at 5% survival to the juvenile stage, and 2000 at 0.1%. Even the highest of these estimates is miniscule when compared to the number of adult weakfish removed by sport fishing each season. Miller (1978) estimated that during 1976 Delaware registered boaters, fishing about 59% of the time in Delaware River and Bay, caught approximately 100,000 weakfish and that all boaters in Delaware waters caught approximately 2,300,000 weakfish. All available data suggest a 1:1 sex ratio for adult weakfish. (S. C. Daiber, person. comm.), or that approximately one million potentially spawning female weakfish were caught by sport fishermen in 1976. The relationship between impingement and commercial catch is of even less magnitude.

In conclusion, all available data on population size and impingement number and survival indicate that impingement at Salem did not constitute a significant impact on the 1978 year-class of weakfish.

2SL-Standard lenth: the distance from the nout to the end of the hypural plate. The plate is located near the base of the tail fin.

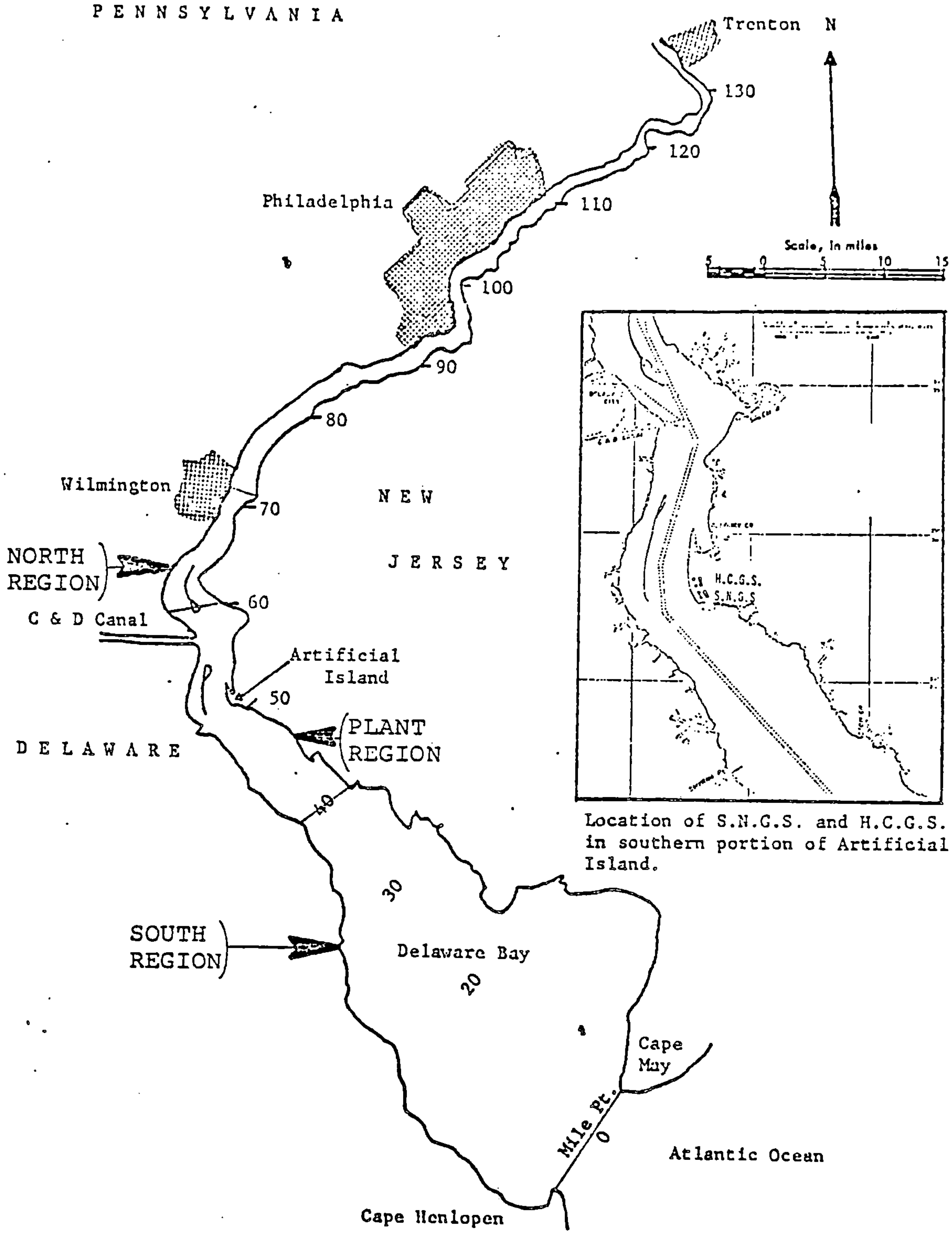

Figure I-1 - The Delaware Estuary showing the location of Artificial Island, Salem County, New Jersey and the three Weakfish study regions.

II. JUVENILE (age 0+) WEAKFISH POPULATION

A. Population Estimates

Sampling to estimate the population of juvenile (age 0+) weakfish in the Delaware River Estuary (river mile* 0-73) was conducted on July 20-21, August 2-3, August 16-17, and September 7-8, 1978. Estimates for each sampling period are the sums of sub-estimates of the three sampling regions (Figures II-1 - II-4):

South region - river mile 0-40
Plant region - river mile 40-60
North region - river mile 60-73

The weakfish population estimates for the four surveys were as follows:

Region	July 20-21	Aug. 2-3	Aug. 16-17	Sept. 7-8
South	692,000,000	167,000,000	173,000,000	149,000,000
Plant	84,000,000	33,000,000	43,000,000	16,000,000
North	9,000,000	9,000,000	1,000,000	3,000,000
Total	785,000,000	209,000,000	217,000,000	168,000,000

(Appendix B lists the unscaled estimates and confidence intervals).

The sampling design was based on a simple random sample model and employed a 4.9 m semi-balloon otter trawl (for detailed trawl description and methodology see Appendix A). This net has been demonstrated to efficiently capture juvenile weakfish of the length-frequency distribution observed on the CWS screens, the size class of primary interest. The population estimates described and discussed in this report refer primarily to fish of the size-class as they occurred in net samples. Estimates do not include the larger or smaller specimens not vulnerable to the gear but which make the population size larger than the estimate given. Sampling was conducted during daylight and confined to two-day periods to maximize precision yet retain a static view of the population.

In order to randomly select samples, each of the three sampling regions was divided into numbered grids: 184 were established in the South region, 88 in the Plant region, and 20 in the North region (Figures II-1 - II-4; for methodology of grid system design see Appendix C). The maximum number of grids which could be sampled was determined, and effort was allocated to obtain a similar percentage of grids sampled (of possible grids) in each region. Of the total 132 samples, 84 were to be taken in the South region, 39 in the Plant region,

* = Statute Mile

and 9 in the North region. Grids to be sampled were drawn randomly for each region. The same grids were sampled during each sampling period. However, weather conditions prevented the completion of effort in the South region during three of the four periods; the number of samples taken during those periods ranged from 75-82.

All specimens were enumerated. A subsample of 30 specimens per collection was measured to the nearest mm (TL) during sampling periods July 20-21, August 2-3, and August 10-17. On September 7-8, all specimens were measured in 5 mm intervals. Representative samples were preserved.

The regional population estimates were calculated as follows:

$$\text{Population} = \bar{X} \cdot C \cdot \text{Eff} \cdot \text{Den}$$

where:

$\bar{X}$ = the mean number of specimens per trawl haul by region

C = the number of possible trawl hauls in that region

(For detailed definition and calculation of these terms see Appendix D).

Ichthyofaunal population estimates, by nature, are conservative since they are influenced by biases including gear efficiency, fish accessibility, and gear selectivity. Scaling factors, Eff and Den, were included to compensate for two of these biases.

Eff = The probability of capturing a given species of a given size range is a function of the sampling gears selectivity. The gear efficiency of a 4.9 m otter trawl for juvenile spot and Atlantic croaker has been reported as 6 and 25%, respectively (Loesh 1976). Kjelson and Johnson (1978) reported a 14% gear efficiency (6.1 m otter trawl) for spot. It is assumed that for weakfish a 25% gear efficiency is reasonable, resulting in a scaling factor of 4.

Den = The factor used to compensate for the coverage (depth) of the trawl within the water column. Weakfish are semi-demersal and it was assumed that nearly all are concentrated in the bottom 2 m of the water column. Since the effective fishing height of the 4.9 m trawl is 0.61 m (pers. communication, S. Marinovich, trawl mfgr.), a scaling factor of 3 was used to account for fish accessibility.

The population estimates should be considered additionally conservative in that the geometry of the gridding system precluded the inclusion of all potentially inhabitable waters of the estuary; 28.3% of the surface area in the North region was omitted from sampling and from the population estimates, as was 5.9% of the Plant region, and 0.3% of the South region. Many of these areas were inaccessable due to boat draft limitations or underwater obstructions which could hamper trawling.

B. Population Extrapolations

Estuary-wide population estimates were also calculated for June 21 and July 5, 1978 by extrapolation from data collected in the routine trawl program within the Plant region. Figure II-5 shows the monitoring program sampling area. Justification of these estimates is based on two assumptions:

1. the vulnerability of weakfish to the sampling gear on June 21 and July 5 was similar to that on subsequent sampling dates.

2. the relative proportion of the number of weakfish in the Plant region to the entire estuary on June 21 and July 5, was no higher than that observed on July 20-21, i.e., 10.7%. This assumption considers that the earliest spawning and subsequent hatching of eggs occurs some 20-30 river miles down bay of the Plant region (for more detail see Section V).

The population extrapolations were calculated as follows:

$$\text{Population Extrapolation} = \overline{X} \cdot C \cdot Eff \cdot Den \cdot Reg$$

where: $\overline{X}$, C, Eff, and Den are as defined previously

Reg = a factor used to convert plant area population to bay-wide population. Based on the assumption that the plant region contained no more than 10% of the total weakfish population in the estuary, a factor of 10 was used.

The population extrapolations for the two dates were as follows:

Total	June 21	July 5
	1,210,000,000	513,000,000

C. Spatial and Temporal Abundance and Distribution

The unusually high abundance of weakfish (seen in trawl samples and concurrently high impingement levels prompted surveys to estimate the bay-wide population and place the impingement rates into ecological perspective. Statistical tests, (see Appendix E) were applied to survey data to detect and locate significant temporal and spatial variation. Length-frequency distribution by date and sub-area are presented in Tables II-1 - II-23. Data are summarized by date in the following discussion.

July 20-21, 1978

Juvenile (age 0+) weakfish were taken throughout the estuary on July 20-21. Growth data based on historical data collected in the monitoring program suggest that nearly all of these fish were spawned in May and were members of the first cohort, i.e., those resulting from the initial spawn. A few specimens (<100) of the second cohort, those resulting from the second spawn appeared in the catch, principally in the northern portion of the bay (Table II-1).

Although the abundance generally increased from north to south, analysis of variance indicated no significant ($P \leq 0.05$) difference in the relative abundance between North, Plant, and South regions (Table II-24). However, within each region there was an area of higher concentration: sub-area 2 in the South region, sub-areas 1 and 3 in the Plant region, and sub-area 1 in the North region (Figures II-1 - II-4, Table II-25).

The greatest weakfish abundance was in the relatively deep waters in sub-area 2, South region. Abundance there was significantly ($P \leq 0.05$) greater than in any other sub-area except sub-areas 1 and 3, Plant Region and sub-area 1, North region. The abundance in sub-area 2, south region cannot be explained on the basis of its length-frequency distribution (Table II-1).

The second ranked locale of abundance was in the south-west portion (sub-areas 1 and 3) of the Plant region (Figure II-2). This may be attributable in part to the soft mud bottom. Hilderbrand and Cable (1934) reported that age 0+ weakfish preferred a soft muddy bottom during their first summer. The abundance was about half that in sub-area 2, South region. The length frequency distribution of specimens in these sub-areas 1 and 3 was similar to those in adjacent sub-areas (Table II-1).

ANOVA (analysis of variance) indicated that the abundance west of the shipping channel was significantly ($P \leq 0.05$) greater than east in the Plant region, but not in the South or North regions (Tables II-26 - II-28).

The lowest abundance of weakfish was recorded in sub-area 5, Plant region (Table II-25). Abundance here was significantly ($P \leq 0.05$) lower than in any other Plant sub-area. This low abundance may be due to unfavorable habitat (bottom hard and scoured) and cropping by Salem (located in this sub-area).

The third ranked locale of abundance was sub-area 6, Plant region and sub-area 1, North region. The abundance here was about half that of the sub-areas 1 and 3 Plant region.

August 2-3, 1978

The abundance of weakfish in the estuary on August 2-3 was significantly ($P \leq 0.05$) less than that on July 20-21 (Table II-30); the population estimate decreased 73%. This reduction reflected a significant ($P \leq 0.05$) decrease in the abundance in both the South and Plant regions (Tables II-31, II-32). How the decrease in these regions reflects emigration or mortality is not known. The abundance in the North region had not significantly ($P \leq 0.05$) changed since July 20-21 (Table II-33). The first cohort continued as the principal component of the catch in all sub-areas. However, specimens of the second cohort appeared, in low number, in the catch in all sub-areas except sub-area 2, South region (Table II-2).

A northward shift in the abundance of weakfish had occurred since July 20-21 as evidenced by the increase in the proportion of the total catch in the Plant and North regions. The ANOVA indicated the abundance in the Plant and North regions was significantly ($P \leq 0.05$) greater than in the South region (Tables II-34). Thomas (1971) reported that age 0+ weakfish prefer low salinity waters and this shift may have been influenced by increasing salinities in the low bay.

There was no significant ($P \leq 0.05$) difference in abundance among sub-areas in the South region (Table II-35). Those fish which had appeared in abundance in sub-area 2 on July 20-21 had dispersed, possibly in response to high salinity in that area. The concentrations of weakfish in sub-areas 1, 3, and 6, Plant region and in sub-area 1, North region evident on July 20-21 were not observed on August 2-3. The abundance was similar throughout these regions; no significant ($P \leq 0.05$) difference was detected (Table II-36). Unlike during sampling period July 20-21, abundance in sub-area 5 was not significantly ($P \leq 0.05$) different than in any other sub-area (Table II-35). However, it remained lowest among sub-areas,of the Plant region.

No significant ($P \leq 0.05$) east-west difference was detected in any of the regions (Tables II-37 - II-39).

August 16-17, 1978

The abundance of weakfish in the estuary on August 16-17 did not change significantly ($P \leq 0.05$) from August 2-3 (Table II-30). The estimated population increased by 4%. There was no significant ($P \leq 0.05$) difference in abundance in plant region (Table II-32). However, there was a significant ($P<0.05$) increase in abundance in the South region and a significant ($P \leq 0.05$) decrease in abundance in the North region during the two-week period (Tables II-31, II-33). How the decrease in the North region reflects emigration or mortality is not known. By this time, individuals of the second cohort had attained a length vulnerable to capture and were taken in abundance in all but the entire North region and sub-area 9, South region. The catch in most other sub-areas included both cohorts (Table II-3).

Recruitment of the second cohort into the Plant region may have contributed to the significantly ($P \leq 0.05$) greater abundance in this region, as a whole, than was observed in the North or South regions (Table II-40). The southern portion of the Plant region, as on July 20-21 was locale of high abundance (Table II-41). Abundance in sub-areas 1 and 3, Plant region was significantly ($P \leq 0.05$) greater than in sub-area 2, Plant region. It was also significantly ($P \leq 0.05$) greater than in sub-areas 1, 3, 4, 6, 7, and 9, South region and the two sub-areas, North region (Figures II-1 - II-4 and Table II-41).

As was the case on July 20-21 sub-area 2 was the area of greatest abundance in the South region (Table II-41). However, the abundance was about half that in sub-areas 1 and 3, Plant region. This abundance was significantly ($P \leq 0.05$) greater than in sub-areas 1, 6, 7, and 9, South region and the two sub-areas, in the North region (Table II-41).

As on August 2-3 the abundance of weakfish in sub-area 5, Plant region was not significantly ($P \leq 0.05$) different from any other sub-area (Table II-41). It ranked fifth among the six sub-areas, in the Plant region.

Analysis of variance indicted that in the Plant and South regions abundance of weakfish on the west side of the shipping channel was significantly ($P \leq 0.05$) greater than the east. There was no significant ($P \leq 0.05$) east-west difference in the North region (Tables II-42 - II-44).

September 7-8, 1978

The abundance of weakfish in the estuary on September 7-8 had not decreased significantly ($P \leq 0.05$) since August 16-17 (Table II-45). The population estimate decreased some 23%. Although the population in the North region apparently increased some 95% from August 16-17 results of the Kruskal-Wallis test (See Appendix E) indicated no significant ($P \leq 0.05$) difference (Table II-46). The increase in the estimate was due to single collection in sub-area 1, North region which took 75% of the catch. There was no significant ($P \leq 0.05$) change in abundance in the South region since August 16-17. However, there was a significant ($P \leq 0.05$) decrease in the Plant region (Tables II-47, II-48).

Specimens of the second cohort were predominant in all the catches in all sub-areas, particularly in the Plant and North regions. Nearly all members of the first cohort had emigrated from the North region and sub-areas 5 and 6, Plant region (Table II-4). The first cohort was more common in the South region and sub-area 1, Plant region. Although the greatest abundance was in sub-area 1 and 8, South region, abundance in the Plant region remained significantly ($P \leq 0.05$) greater than in the North or South regions (Tables II-44 - II-51). Sub-areas 1 and 3, Plant region remained a locale of relatively high abundance (Table II-52).

As was the case on July 20-21 and August 16-17, sub-area 5 had the lowest abundance in the Plant region (Table II-52). Unlike July 20-21 and August 16-17 the central portion (sub-areas 2, 3 and 6) of the South region was an area of relatively low abundance (Table II-52). Abundance in the South region was greatest in the shallower waters of the nearshore sub-areas.

The Kruskal-Wallis tests indicated a significantly ($P \leq 0.05$) greater abundance west of the shipping channel than east in the South region (Table II-53); although abundance was also greater in the west side in the Plant and North regions, the differences were not significant ($P \leq 0.05$) (Tables II-54, II-55).

June 21 and July 5, 1978 (Extapolations)

The extrapolated population estimate for weakfish was highest on June 21. The catch per effort on that date was of unprecedented magnitude. It was comprised entirely of fish of the first cohort (Table II-5). Life history aspects and historical catch data of the weakfish are detailed in sections V and VI.

The abundance of weakfish in the Plant region on July 5 was significantly ($P \leq 0.05$) lower than that on June 21. The calculated population estimate decreased by 58%. Specimens taken on this date were also part of the first cohort (Table II-6).

SUMMARY OF SPATIAL AND TEMPORAL ABUNDANCE DATA

July 20-21, 1978

1. Weakfish were taken throughout the estuary but abundance generally increased from north to south.

2. Locales of high abundance were the south-central bay, south-west Plant region and southern part of the North region.

3. The catch was almost entirely first cohort, the product of the initial spawn.

August 2-3, 1978

1. Abundance in the estuary had decreased significantly since July 20-21, 1978.

2. Abundance in the North and Plant regions was greater than in the South region, but within regions, abundance was more evenly distributed.

3. The first cohort continued as the principal component of catch and the second cohort appeared more frequently than before.

August 16-17, 1978

1. Abundance in the estuary had not changed significantly since August 2-3.

2. Both the first and second cohorts were regularly taken.

3. Abundance in the Plant region (southwest portion particularly) was greater than in North or South regions.

4. Within the South region, the south-central portion was the center of abundance.

September 7-8, 1978

1. Abundance in the estuary had not change significantly since August 16-17.

2. Specimens of second cohort predominated the catch in the northern portion of the estuary while the first cohort remained common in the South.

3. Abundance in Plant region as a whole was greater than in the North or South regions.

4. The greatest abundance occurred in the nearshore areas in the South region.

5. Sub-area 5, Plant region was an area of low abundance, and had been throughout the surveys.

D. Abundance Per Unit Volume (w/100m3)

Calculations for density determination are described in Appendix G. Data are presented in Table II-57. II. JUVENILE (Age 0+) WEAKFISH POPULATION

E. Biomass (Kilograms of fish)

Calculations for weight determination are described in Appendix H. Data are presented in Table II-58.

III. WEAKFISH IMPINGEMENT

Impingement of organisms at the Salem CWS intake has been studied since April 1977. The following is a narrative summary of weakfish impingement through the summer of 1978, a discussion of differences between 1977 and 1978, and an evaluation of screen wash water recirculation and latent survival studies. Detailed descriptions of the CWS intake, the fish return system, sampling procedures, and data reduction are provided in Appendices J, K and L.

A. Narrative Summary

Weakfish were first taken on the CWS traveling screens in 1978 on June 19. They were collected in three of six samples at a rate of 0.3-3.3 per minute (Table III-1). Length range was 16-35 mm and survival was 64% (Table III-2). During the first week of occurrence (June 19-24) total weekly estimated impingement (henceforth referred to as the weekly estimate) was 41,800 specimens (Table III-3). Estimated daily impingement (or, daily estimate) increased steadily (June 22 peak n≤= 8000) although rate per sample (n/min) varied considerably, ranging from 0.0 to 20.7 (Table III-1). Mean (weighted) survival was 48%; mean and modal lengths were 31 and 28 mm, respectively (Table III-4).

During June 25-July 1 the weekly estimate increased to 2,338,900 (Table III-3). Daily estimates increased steadily through June 29. On that date estimated weakfish impingement was 534,900 with 52% survival (Table III-2). Of the actual number taken in samples (n = 6932) most (76%) were taken in one 3-min. sample at 0000 hours. Survival was 53%.

The high impingement rates on June 29 prompted an immediate analysis of weakfish data from the previous two weeks. This showed that impingement was highest at the late ebb tide stage just before ebb slack, and that river-borne detritus load correlated directly with impingement rate and was highest just before ebb slack. These factors indicated that fish and detritus, discharged through an outfall at the north end of the intake structure, were being recirculated and reimpinged during ebb tide. The heavy loads of detritus, which were unavoidably collected with impinged fishes, greatly hampered sample processing. Some of the heaviest 3-minute samples required five men, six hours to process because of associated debris. The mortality resulting directly from long periods in the fish counting pool and from recirculation was additive to the mortality due directly to impingement. To reduce this bias, the sampling procedure during heavy detrital loading periods was changed from sampling 3 consecutive minutes of screen wash for both survival and abundance to sampling 1 minute of flow for survival and abundance and a subsequent 2 minutes of flow for abundance only. This modified procedure was implemented at 2200 on June 29; survival rate of weakfish was 75.2% at an impingement rate of 222 per minute and 75.2% at a rate of 286 per minute (Table III-1). Additionally, the station accelerated completion of the southern screen-wash discharge which would permit screen wash flow to be discharged in the direction of both flood and ebb tidal flows.

During July 2-8 the weekly estimate (n = 2,382,800) remained approximately at the level observed the previous week (Table III-3). Daily estimates decreased by at least 100,000 from the level of June 29 but remained high on all days (Table III-2). Rate per minute as estimated from samples varied from 12.3 to 1260.0 (Table III-1). Mean survival was 66%; mean and modal lengths, were 54 and 53 mm, respectively (Table III-4). The higher survival rate reflected the validity of the modified sampling procedure and a decreased vulnerability with growth of specimens.

During July 9-12 the weekly estimate decreased by about 800,000 from the previous week (Table III-3). Daily estimates remained high, although on four of the six days sampled they were lower than estimates calculated in the previous week (Table III-2). Rate per sample varied from 9.5 to 520.0 (Table III-1). Mean survival was 70%; mean and modal lengths were 55 and 53 mm, respectively (Table III-4).

On July 11 the sampling schedule was changed to increase the number of sampling days per week from three to seven and increase the sampling frequency within each day. On three days per week the schedule became four 3-minute samples per day for survival and abundance taken at approximtely 6-hr. intervals, plus as many additional 1-minute abundance samples as practicable. On other days as many 1-minute abundance samples as practicable were taken.

On July 14 the south screen-wash discharge was put into operation. Thereafter, screen wash water was discharged north on the flood tide and south on the ebb tide. It was believed that this would minimize recirculation and thereby improve survival of impinged organisms and reduce detrital loading.

During July 16-22 the weekly estimate decreased markedly by about 1,190,000 specimens (Table III-3). After July 17 daily estimates were below those observed the previous week (Table III-2). Rate per minute per sample varied from 0.0 to 684.0 (Table III-1). Mean survival increased to 76% (Table III-3). Mean length was 59 mm and modal length remained at 53 mm (Table III-4).

The weekly estimate during July 23-29 ($\bar{n} \leq$ 382,100) changed little from that for the previous week (Table III-3). On five days the daily estimate was within the range observed during the previous week; on July 27 and 28 estimated impingement was about 100,000 specimens lower (Table III-2). Rate per sample varied from 0.0 to 270.0 (Table III-1). Mean survival decreased to 74%. Mean and modal length increased to 60 and 58 mm, respectively (Table III-4).

During July 30-August 5 the weekly estimate decreased by about 185,000 specimens (Table III-3). Daily estimates were generally within the range for the previous week (Table III-2). Rate per sample varied from 0.0 to 131.0 (Table III-1). Mean survival decreased to 70%; mean and modal length both increased to 63 mm (Table III-4). No reason for the reduction in survival was apparent.

During August 6-12 the weekly estimate decreased by about 72,000 specimens (Table III-3). Daily estimates on August 7 and 8 (Table III-2) were at least 5000 specimens below those observed the previous week, but thereafter increased steadily. Rate per sample varied from 0.0 to 117.0 (Table III-1). Mean survival was 70%; mean and modal lengths were 65 and 68 mm, respectively.

The weekly estimate increased during August 13-19 by about 20,000 specimens (Tables III-2, III-3). Daily estimates were generally within the range observed the previous week (Table III-1). Rate per sample ranged from 0.0 to 144.0 (Table III-1). Mean survival remained at 70%. Mean and modal length increased to 67 and 70 mm, respectively (Table III-4). The minimum length decreased by 10 mm and the percentage of the total catch less than 50 mm increased from 10.5% in the previous week to 13.2%. This indicated that members of the second spawn were now being impinged and partially explains the increase in total impingement.

During August 20-26 the weekly estimate decreased by about 41,000 specimens (Table III-3). During the latter part of the week only 3-5 CWS pumps were in service due to operating conditions (Table III-1); this may be related to the reduction in impingement. Daily estimates were within the range for the previous week on all days but one (Table III-2). On August 24 the daily estimate decreased to 2300. Rate per sample varied from 0.0 to 101.0 (Table III-1). Mean survival increased to 81%. Mean and modal length decreased to 63 and 58 mm, respectively, reflecting the increased involvement of specimens from the second spawn (Table III-4).

The weekly estimate during August 27-September 2 decreased by about 8,000 specimens (Table III-3). Circulator operation was quite variable during the first four days of the week and ranged from 2 to 6 pumps. Daily estimates on August 28 and 29 were below those observed the previous week but corresponded with reduced pump operation (Table III-1, III-2). Rate per sample varied from 0.0 to 98.7 (Table III-1). Mean survival increased to 84%. Mean length increased slightly to 64 mm and modal length remained at 58 mm (Table III-4).

During September 3-9 the weekly estimate decreased by 24,000 specimens (Table III-3), although estimated daily impingement was within the range observed the previous week (Table III-2). The CWS was fully operational (5-6 circulators) throughout the week. Rate per sample ranged from 0.0 to 96.0 (Table III-1). Mean survival was 85% and mean and modal length increased to 73 and 63 mm, respectively (Table III-4).

During September 10-16 the weekly estimate decreased by about 29,000 specimens (Table III-3). The daily estimate on September 15 was 1000 specimens below the lowest daily estimate in the previous week (Table III-2). Rate per sample ranged from 0.0 to 65.0 (Table III-1). Mean survival increased to 89%. Mean and modal length were 80 and 78 mm, respectively (Table III-4).

The weekly estimate during September 17-23 decreased by about 35,000 specimens (Table III-3). Daily estimates showed less variability than had been observed during the previous week (Table III-2). Impingement rate generally decreased and catches of 0.0-3.0 per minute were frequent (Table III-1). Mean survival decreased to 76% (Table III-3). The frequent low catches did not provide enough specimens to accurately assess survival. Mean length increased to 85 mm and modal length remained at 78 mm (Table III-4).

Based on the decreasing impingement rate and reduced variability in daily estimates sampling was reduced to seven days per week.

During September 24-30 the weekly estimated impingement decreased to 17,400 specimens, the lowest level observed during the period of occurrence (Table III-3). Daily estimates were consistently below 4000 specimens (Table III-2). Impingement rates of 0.0-3.0 per minute were common (Table III-1). Mean survival was 87%; however, the low number of specimens in most samples should be considered when assessing survival. Mean and modal lengths increased to 89.0 and 93.5 mm, respectively (Table III-4).

In summary, during June 18-September 30 a total of 55,352 weakfish were taken in 1617 minutes of impingement sampling. Estimated total impingement for this period was 7,994,000 (Table III-3). Most of the estimated total was taken during the three-week period from June 25 through July 15. During the first two weeks of occurrence mean survival measured in impingement samples was 44%. After the revised weakfish survival sampling procedure was implemented, mean survival was 70%, and is believed to be more representative of actual survival levels over the entire period. The data suggested that survival generally increased directly with mean and modal length. Length frequency distributions for live, dead, and damaged specimens are shown in Tables III-5, III-6, III-7, respectively. In all but two weeks mean length of live specimens was 1-7 mm greater than mean length of dead. When mean length for all condition classes are combined (Table III-4), and mean weekly survival are traced through the summer, the relationship is direct during seven weeks and inverse in seven. The relationship of length to impingement mortality has not been fully examined.

B. Comparison of 1977 and 1978 Weakfish Impingement

During 1977 a total of 7,808 weakfish were taken in 1158 minutes of impingement sampling at the CWS intake (Table III-8). Estimated total impingement from June through November was 1,877,000 specimens. Weakfish ranked third among species in total number impinged and fifth in total weight. In 1977, weakfish were first taken on 16 June and were common through September. Most (55.3%) of the total was impinged during July. During all months of occurrence estimated impingement was lower during 1977 during 1978.

In 1977 annual survival was 57%; 38% were dead and 3% damaged. Percent live ranged from 38 in June to 100 in November. During months of abundance (June-September) percent live ranged from 38 to 76. Survival generally increased from June through November.

Plots of daily estimated impingement during 1977, 1978, and 1977 vs 1978 are presented in Figures III-1, III-2 and III-3, respectively. In 1977 daily estimates were calculated by scaling the mean daily impingement rate to 24 hours. In 1978, the procedure was modified to allow factoring of the time interval between samples into the estimate (See Appendix L for computational details). However, since the 1977 estimates are based on four equally spaced samples per day they should be directly comparible with 1978 estimates.

As can be clearly seen in Figure III-3, there were major differences in the timing and magnitude of peak impingement between the two years. In 1978, weakfish impingement peaked during late June and remained high throughout the first half of July. In 1977 impingement increased during late June and early July but did not peak until July 14. Interestingly, peak impingement in 1977 coincided with a marked decrease during 1978.

Schuler and Maiden (1975), in a review of weakfish occurrence and abundance near Artificial Island, suggested that a strong year class may be indicated by large catches in late June and early July. Based on river trawl data, in both 1970 (Schuler and Maiden 1975) and 1975 (Beck and Grieve 1977) high catches of weakfish during June and early July and strong year classes were evidenced by monthly and annual trawl data.

From mid-July through the beginning of August daily impingement in 1978 remained somewhat higher than in 1977. From early August through the end of September little difference in daily impingement was evident (Fig. III-3).

C. Recirculation

An analysis of the relationship between tide and rate of weakfish and detritus impingement was conducted in an attempt to define the extent of recirculation of discharged material and to determine the effectiveness of alternating the direction of the screen-wash discharge with the tide in reducing recirculation.

This analysis was done using stepwise multiple regression techniques (Barr et al 1976). Tidal stage and elevation, which is measured relative to the station baseline datum, were combined to form a continuous variable by first assigning a negative value to all ebb tide elevations and a positive value to all flood tide elevations. All positive elevations were then subtracted from 80 and all negative elevations were added to 96. This transformation provided a convenient scale with the lowest elevations occuring near the center. On this scale mean low water equals about 8 and mean high water about 12. Since the relationship between tidal elevation and impingement was not always expected to be linear, quadratic and cubic transformations of elevation were also examined in the analysis. Weakfish impingement rates were transformed by log (rate + 1) to stabilize the variance and reduce the vertical scale on the scatterplots. Regressions were run for four different time periods. The first designated "Pre 1", was the period before the south discharge was operational (i.e., the period of recirculation).

The period after the south discharge was operational and divided into three sub-periods of generally high, moderate, and low weakfish impingement, and designated "Post 1", Post 2", and "Post 3", respectively. Results of regression analysis for weakfish are given in Tables III-9 , III-10, III-11, and III-12. Plots of density vs tidal elevation and the best fitting least-squares curve, if any, are shown in Figures III-4 , III-5 ,III-6, and III-7. For all periods the three-variable model, which included the quadratic and cubic transformations of elevation provided the highest coefficient of determination (R^2), indicating both linear and curvilinear components of the relationship. However, only during the first period (Pre 1) did the model significantly ($P \leq 0.05$) fit the sample data (Table III-9). The plot of the least-squares line for this model (Figure III-4) shows impingement increasing through the early stages of the ebb tide, peaking during the second half of the ebb, decreasing during ebb slack and throughout the flood tide. The model indicated that rate increased during flood slack.

During the periods after the south discharge was operational no strong relationship between weakfish impingement and tide were evident from the analysis (Tables III-10, III-12; Figures III-5, III-6, III-7). During period "Post 2," a least squares line was fit to the data which showed somewhat higher impingement during ebb tide (Fig. III-5), although the line did not fit the data well ($R^2 = 0.076$) and the model was not significant ($P \leq 0.05$).

Results of regression analyses for detritus are given in Tables III-13, III-14, III-15, and III-16. Plots of density vs tidal elevation and the best fitting least-squares curve are shown in Figure III-8, III-9, III-10 and III-11. In general, results were similar to those for weakfish. Again, the three-variable model provided the highest R^2 value. Only during the first period did the model significantly ($P \leq 0.05$) fit the sample data (Table III-13). The plot (Figure III-8) shows a relationship similar to that for weakfish. Regression for periods after the south discharge was operational showed no consistent relationship between detrital impingement and tide.

Results of this analysis suggest that before the south discharge was operational recirculation was responsible for higher impingement during ebb tide. The weakening of the relationship between tide and impingement after operation of the south discharge indicated reduction, if not elimination, of recirculation.

D. Latent Survival

Latent survival studies were scheduled in the on-station program to determine the survival, after various holding periods, of fishes which had been impinged at the CWS. Results would reflect on the relevance of the survival rates observed after 5 minutes of holding and regularly reported.

In 1977, 42 mixed species groups were held in the one available fish counting pool for 2-or 3-hr. periods. Samples were taken by diverting a 3-minutes of flow of screen wash water to the holding pool as soon as possible after a monitoring program sample has been taken. After a holding period of 2-or 3-hr the pool was drained and the sample processed according to the procedure followed by the monitoring program samples. Latent survival rates were compared with survival rates determined in the immediately preceding monitoring program sample which was processed immediately and serves as control.

Longer holding periods were precluded by the schedule of abundance sampling which required the pool. A few longer duration studies were done but these groups did not include weakfish. Since 2-to 3-hr. tests could more readily be done in conjunction with scheduled sampling, these were emphasized to generate as many points as possible. A total of 37 tests groups included weakfish, 18 for 3-hr. and 19 for 2-hr. (Tables III-17 and III-18). Most had too few specimens for rigorous scrutiny but do support semi-quantative review. Also, vulnerability to impingement damage decreases with increasing specimen size, and this has not been separately factored. However, there is a pattern evident in these data, i.e. in 26 of the 37 tests (65%) weakfish demonstrated higher survival after 2-, 3-hr. holding than in the control (the closest scheduled monitoring sample); 30% demonstrated a decrease; 5% remained the same. Within the 26 groups in which weakfish survival was higher after the holding period the increase over the control ranged from 4- 70%. The largest increase occurred from late August through early September. It is note worthy that during many of these 2-, 3-hr holding periods weakfish were observed to feed, an indication of "goodness" of condition.

In 1978 the intensive sampling demand on the North and the newly available (July) South pools precluded any holding for latent studies for more than 6 hr. Therefore, latent study efforts were shifted to the Delaware Experimental Laboratory. This facility has suitable holding facilities, although testing at this site also required the additional specimen handling in capture and transfer by boat or truck tanks. Test results were inconclusive due to availability and validity of control groups and mechanical difficulties. Laboratory studies and perhaps additional on-site studies, will be expanded in the 316(b) study program.

IV. SALEM IMPACT: POPULATION VS. IMPINGEMENT

The extent and probable impact of impingement losses on the 1978 year-class of weakfish can at present only be evaluated by comparing impingement and estimated population on each of the days a population survey was conducted and by comparing total population reduction and cumulative impingement through the end of the season. Table IV-1 provides a historical summary of the weakfish population estimates for the plant area and entire bay-wide (RM 0-73) and corresponding estimated impingement on each date.

By examining the percentage of weakfish in the plant area impinged it can be seen that impingement cropped approximately the same small fraction (0.03-0.07%) of the population present per day on each of the four days population estimates were based on complete sampling. Regression of estimated impingement on the plant area population for these four surveys resulted in a highly significant direct relationship ($R^2 = 0.98$; $P \leq 0.05$).

Using the regression as a predictive model, the plant area population alone on July 5 would have been 1.29×10^9. The extrapolated population estimate for July 5 was 5.13×10^7, and is 25 times lower than the predicted value. It is possible that the extrapolated population estimate, based primarily on trawl data from shallow zones underestimated the true magnitude of the population. Thomas (1971) found that small young entered the Plant area through and were most abundant in, deeper waters in and adjacent to the channel. Which of the estimates is more valid is not known.

The percentage of the Plant area population impinged on June 21 (0.006%) was much lower than would have been predicted on the basis of the regression model. Examination of length-frequency distributions (Tables II-18, II-19, II-20 and II-21) show that the lengths of almost all (99%) of the riverine population was below the effective minimum impingeable length (40 mm). Impingement of specimens less than 40 mm is variable and probably dependent on involvement with detritus and angle of approach to the screens.

The overall impact of impingement may also be evaluated by comparing the reduction of population between the first and the last estimates and the cumulative estimate of impingement for the period. The reduction in the population of weakfish in the Delaware River Estuary from June 21 to September

7-8 was estimated to be 1.04×10^9. Estimated impingement over this period was 7.86×10^6, of which 2.97×10^6 (39%)[1] were estimated to have been lost. Impingement mortality, therefore, accounted for less than 0.3% of the observed population decrease. Natural mortality and emigration from the system account for the remainder of the reduction.

All available data on population size and impingement number and survival indicate that impingement losses at S.N.G.S. did not constitute a significant impact on the 1978 year-class of weakfish.

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[1]This 39% is the mean over th entire sampling period. It does not distinguish the difference in mortality between survival rates observed before (44%) and after (70%) the improved survival sampling procedure, which was implemented on 27 June. Figure IV - 1 and IV-2 are scatter plots of impingement vs. number alive. A 70% overall survival rate for the entire period appears appropriate.

V. ASPECTS OF THE LIFE HISTORY OF THE WEAKFISH, CYNOSCION REGALIS, WITH SPECIAL REFERENCE TO ITS OCCURRENCE IN THE DELAWARE BAY & ESTUARY

The weakfish, Cynoscion regalis, is a schooling species which ranges from the east coast of Florida to Massachusetts Bay, with strays reported as far north as the Bay of Fundy (Bigelow and Schroeder 1953). Nesbit (1954), Perlmutter et al. (1956), and Harmic (1958) reported a northern spawning population in New York and northern New Jersey, and a southern spawning population from New Jersey to North Carolina. Seguin (1960) suggested the existence of New York, Delaware-lower Chesapeake, and North Carolina groups based on morphometric and meristic variation. Such divisions, however, have been disputed (Joseph 1972).

The weakfish is a warm season migrant along the middle Atlantic coast, arriving from April to May and departing from October to December (Welsh and Breder 1923). Its migration is thought to be mainly north-south, but onshore-offshore movements may also occur. During summer the weakfish generally remains inshore in bays, estuaries, and coastal waters. Yearly abundance in some areas may fluctuate greatly. Throughout most of its range the weakfish is an important sport and commercial species (Thomson et al. 1971).

The weakfish spawns in coastal waters and bays. Soon after hatching, the larvae become demersal and move into estuaries which they utilize as a nursery throughout the warm season (Harmic 1958; Chao and Musick 1977). The young are euryhaline and have been reported in fresh water (Massman et al. 1958). Their growth is fairly rapid; young in the Delaware River averaged 120 and 155 mm FL by October in 2 separate years (Thomas 1971). Weakfish feed mainly on fishes and planktonic crustaceans. Males attain sexual maturity at 2-3 years and females at 3-4 years (Welsh and Breder 1923). Merriner (1976), however, reported that in North Carolina sexual maturity was attained at 1 year by both sexes. Weakfish may live to 8 years and attain lengths exceeding 700 mm (Perlmutter et al. 1956). The spawning season is protracted, extending from April to September, with most activity occurring in May and June (Welsh and Breder 1923; Merriner 1976). Daiber (1957) stated that the spawning season in Delaware Bay was from late May through August. The spawning activity has been described to have two peaks in intensity apparently related to an age dependent differential response to conditions favorable for spawning. Generally, the first peak occurs in June and the second in July. The literature disagrees as to the exact timing of these peaks within a spawning season (Daiber 1957, Harmic 1958, and Thomas 1971), but this may be related to annual fluctuations in the occurrence of optimum physicochemical conditions which key spawning. The principal location of spawning is in the lower portion of the bay. The literature again disagrees as to the regions of principal activity. Welsh and Breder (1923) indicated that the east side of the bay between Maurice River Cove and Cape May was the primary area, while Harmic (1958) stated spawning occurred predominently in the southwest area.

Fertilized eggs have been collected at water temperatures of 16-27 C and salinities of 12-31 ppt. The eggs are pelagic and highly buoyant; they hatch in about 40 hours at 20-21 C (Welsh and Breder 1923; Harmic 1958). Egg production is high and related to both fish length and weight. Merriner (1976) stated that a female of 500 mm SL produces slightly over 2 million eggs and that fecundity increases about 128,000 eggs per 100 g of body weight. Harmic (1958) stated that the egg production for this species in the Delaware Bay might easily reach 450 billion eggs per season.

Ichthyoplankton collections have been taken near S.N.G.S. by IA since 1971. Viable weakfish eggs were first reported in collections in 1974 and have occurred annually through 1977. However, their restricted temporal occurrence and relatively low densities suggest the marginal nature of this area for spawning. In 1974 ichthyoplankton collections were taken in the vicinity of Ship John Shoal (RK 48.1-64.8). These data indicated that

1. the period of occurrence of weakfish eggs was a month longer,
2. their peak in abundance was a week earlier,
3. the magnitude of this peak was over six times greater than in the vicinity of S.N.G.S. (Maiden et al. 1976).

These data support the premise that the Delaware River in the vicinity of S.N.G.S. is not a critical area for weakfish spawning.

VI. TEMPORAL DISTRIBUTION OF AGE 0+ WEAKFISH IN THE VICINITY OF SALEM DURING 1970-1977

Age 0+ weakfish have been collected by IA near Artificial Island annually since the ecological studies began in 1968, and have been reported in the annual progress reports. These data were collected as part of a monitoring program to establish norms in temporal and spatial distribution and are not amenable to extrapolation to population estimates.

The occurrence of age 0+ weakfish in 1978 was of unprecendented magnitude. The catch for the last two weeks of June 1978 was greater than the combined annual catches from 1973 through 1977. Typically the weakfish's period of occurrence has been from June through November. Weakfish have ranked annually second to fourth in total catch during summer (June-August) and third to seventh during fall (September-November). Annually, from 70.5% to 97.5% of the total weakfish catch has occurred during June-August. Based on river trawl data, the monthly mean catch per unit effort ($\overline{n}/T$) was greatest in July in five of eight years (1970-1977), ranging from 9.4 to 69.9 (Table). In 1972 and 1973 monthly $\overline{n}/T$ was greatest in August (24.7 and 13.0, respectively). These apparent shifts in the period of peak abundance were probably caused by the heavy run-off resulting from Hurricane Agnes in 1972 and unusually heavy spring rains in 1973. In 1975 monthly $\overline{n}/T$ was greatest in June (53.7).

In the ecological studies conducted by IA in the Chesapeake and Delaware Canal near the proposed Summit Power Station, age 0+ weakfish have been collected annually from 1973 through 1977. The period of occurrence has been similar to that recorded near Artificial Island, and the month of maximum $\bar{n}/T$ typically has been July ($\bar{n}/T$ ranging from 10.3 to 125.5). Generally there has been an increasing gradient of abundance from west to east. Thomas (1971) indicated salinity probably limited distribution of weakfish in the area east of Summit Bridge. Therefore, young weakfish taken in the canal are probably from the Delaware stock.

VII. CONCLUSION

All available data on population size and impingement number and survival indicate that impingement at Salem did not constitute a significant impact on the 1978 year-class of weakfish.

APPENDIX A

DESCRIPTION OF TRAWL

A description of the trawl used is as follows: 4.9 m semi-balloon otter trawl, 4.9 m headrope, 5.8 m footrope, net made of nylon netting of the following size mesh and thread: 3.8 cm stretch mesh No. 9 thread body, 3.2 cm stretch mesh No. 15 thread cod end. Innerliner of 1.3 cm stretch mesh No. 63 thread knotless nylon netting hogtied to cod end. Head and footropes hung on 1.0 cm diameter Poly-Dac net rope with legs extended and wire rope thimbles spliced in at each end. There are six 3.8 x 6.4 cm Ark floats on headrope and 3.2 mm galvanized chain hung loop style on footrope. Nets are treated in green copper net preservative.

Trawl doors used with the above net were 61.0 cm in length and 30.5 cm in width, made of 2.54 cm mahogony lumber, 2.5 x 0.6 cm steel straps and braces, 1.0 x 5.1 cm bottom shoe runner. Doors were set with 2/0 galvanized chain and one 0.8 cm swivel at the head of each bridle. A 15.2 m bridle was attached to the trawl doors.

TRAWLING METHOD

The trawl was fished on the bottom, maintaining a ratio of towline to depth of at least 6:1. Hauls were of 10 min duration at a standard speed and were made in the direction of the current. Fishing time commenced when the trawl line became taunt. If trawl line became twisted or a large inanimate object was taken the trawl was aborted and repeated.

APPENDIX B

Unscaled weakfish population estimate*, 95% confidence interval, and percent sum by region of the Delaware Estuary for sampling periods 20-21 July through 7-8 September, 1978.

20-21 July

Region	Unscaled Estimates and 95% Confidence Interval	% of
South	57,685,223 ± 27,399,536	88.2
Plant	7,025,259 ± 2,386,112	10.7
North	715,520 ± 185,587	1.1

65,426,002

2-3 August

Region	Unscaled Estimates and 95% Confidence Interval	% of
South	13,901,513 ± 10,044,146	79.7
Plant	2,770,816 ± 806,599	15.9
North	761,760 ± 615,610	4.4

17,434,089

16-17 August

Region	Unscaled Estimates and 95% Confidence Interval	% of
South	14,400,632 ± 5,383,048	79.5
Plant	3,588,154 ± 1,355,852	19.8
North	123,520 ± 118,067	0.7

18,112,306

7-8 September

Region	Unscaled Estimates and 95% Confidence Interval	% of
South	12,410,061 ± 4,082,606	88.7
Plant	1,345,286 ± 398,520	9.6
North	240,880 ± 406,040	1.7

13,996,227

* = Numbers not rounded for demonstration purposes.

APPENDIX C

DESIGN OF GRID SYSTEM

In order to randomly select sample locations, each of the three sampling regions was divided into numbered grids based on a LORAN C overprint of the Delaware Bay (National Ocean Survey Chart #12304, 24th Ed.). The use of LORAN C grids for sample grids facilitated reproducibility of sampling locations. In the southern region (ca. river mile 0-40) four contiguous LORAN C quadrates were combined to form one numbered grid in order to obtain a sufficient number of grids to ensure well distributed and representative sampling within the region. Reduced configuration of the estuary in the Plant and North regions necessitated the reduction of grid size in these regions (25% of the area of the grids in the South region).

Incomplete near-shore grids, those that had 60% or more of their surface area covered by water, were included to ensure that all habitats had probability of being sampled.

Some areas were not included in the sample grid selection because more than 40% of their surface area was land, they were inaccessible because of water depth or shoreline configuration, or they contained hazards to vessels and/or gear.

APPENDIX D

FACTORS USED FOR POPULATION ESTIMATION

Population estimates were calculated by multiplying the mean catch per haul in the region by the total number of possible hauls (area per region ÷ area per trawl haul or 5062 m^2) in that region. The following describes the calculation procedure:

$$\text{Population Estimate} = \overline{X} \cdot C$$

where $\overline{X}$ = Total number of specimens taken/total number of hauls, and C = area of sub-area/area of trawl haul. The area of each regional sub-area and the area of a trawl haul were determined in deriving "C".
The area of each sub-area was determined with a Lietz Polar Planimeter, Model 3651-30. The bottom area covered in a standard haul was determined by multiplying the distance traveled in a haul (predetermined to be 1,368 m) times the effective fishing width of 3.7 m (pers. communication, S. Marinovich, trawl manufacturer), or 5,062m^2.

Surface area (m^2) and number of possible trawl hauls (C) by region and sub-area of the Delaware Estuary (RM 0-73) used in population estimates, 1978.

	Area ($10^7 m^2$)	Number of Possible Trawl Hauls (C)
North region		
Sub-area 1	1.92	3,790
Sub-area 2	2.13	4,210
Total	4.05	8,000
Plant region		
Sub-area 1	3.22	6,360
Sub-area 2	3.79	7,490
Sub-area 3	2.05	4,050
Sub-area 4	2.44	4,820
Sub-area 5	3.73	7,370
Sub-area 6	3.15	6,220
Total	18.38	36,310
South region		
Sub-area 1	17.30	34,077
Sub-area 2	22.90	45,160
Sub-area 3	20.30	40,162
Sub-area 4	9.10	17,938
Sub-area 5	14.70	29,099
Sub-area 6	25.90	51,165
Sub-area 7	13.80	27,222
Sub-area 8	14.30	28,170
Sub-area 9	11.30	22,244
Total	149.60	295,337

APPENDIX E

DATA TRANSFORMATION AND TESTS OF ASSUMPTIONS

Examination of historical data has shown that trawl catch data approximates the negative binomial distribution. Therefore, the transformation Y = log (catch +1) was used in an attempt to normalize the data. Subsequent to transformation, the Chi-square goodness of fit test and the F-max test were run on data from each date and selected groups of dates to test for normality and homogeneity of variances, respectively. Analysis of variance and Duncan's multiple range test (DMR) were used to analyze data which did not deviate significantly ($P \leq 0.05$) from the normal distribution or have heterogenous variances. Data which deviated from normal, e.g., data from 7-8 September, or had heterogenous variances, were tested with the non-parametric Kruskall-Wallis test. In some cases (date 6, regional comparison), when further definition of significance was required, multiple-paired testing was used.

APPENDIX E (Continued).

Results of chi square (X^2) goodness of fit tests for normality and F-max tests for homogeneity of variances performed on log-transformed population survey data for selected dates, 1978.

Dates	X^2 for normality: Critical $X^2_{.05}$	X^2 for normality: X^2	F-max for homogeneity of variances: Critical F max$_{.05}$ value	F-max for homogeneity of variances: F-max ratio
21 June, 5 July	6.329	27.879*	-	-
20-21 July	14.067	6.239	>51.4	49.1
2-3 August	12.592	4.145	>124	71.4
16-17 August	14.067	6.462	>124	34.5
7-8 September	12.592	20.88 *	>51.4	25.5
20-21 July, 2-3 August 16-17 August, 7-8 September (all regions)	15.507	17.122*	> 1.5	1.3
20-21 July, 2-3 August 16-17 August (all regions)	15.507	8,827	-	-
20-21 July, 2-3 August 16-17 August, 7-8 September (North region only)	-	-	8.4	26.1**
20-21 July, 2-3 August 16-17 August, 7-8 September (Plant region only)	-	-	> 2.4	2.3
20-21 July, 2-3 August 16-17 August, 7-8 September (South region only)	-	-	> 1.6	1.5

* Data significantly ($P \leq 0.05$) different from normal distribution.

** Variances significantly ($P \leq 0.05$) heterogenous

APPENDIX F

SUBDIVISION OF REGIONS INTO SUB-AREAS

In order to detect differences in abundance within regions further division of North, Plant, and South regions was done.

The South region (RM 0-40) was divided longitudinally into 10-mile sections of river and was further divided latitudinally into areas of roughly similar depth readings. This scheme resulted in nine sub-areas.

The Plant region (RM 40-60) was divided into 5-mile sections of river and in the southern portion was further divided latitudinally by the shipping channel. This resulted in six sub-areas.

The entire North region (RM 60-73) was divided only longitudinally into two 5-mile sections of river.

APPENDIX G

Volumetric and Density Determination by Sub-area of Delaware River Estuary (RM 0-73)

Each of the sampling quadrants was examined for continuity of depth at mean low water. If no abrupt, pronounced increase or decrease in depth was noted a mean depth for the quadrant was calculated by summing the depth soundings within the quadrant and dividing by the number of soundings (reference: U. S. Coast and Geodetic Survey Charts #12304 and 12311). This mean depth was multiplied by the area of the quadrant to obtain a volume.

In quadrants where pronounced changes in depth were evident (i.e., shoals or channels) the quadrant was subdivided into areas of similar depth and the mean depth for each of the subdivisions was calculated and multiplied by the area of the subdivision (area determined using an acreage - area measurement grid) to give a volume per subdivision. These partial volumes were summed to produce a volume per sampling quadrant.

All volumes per quadrants in a sub-area were summed to produce a total volume per sub-area.

Density was calculated by dividing the number of specimens (n) by volume (m^3) (as calculated above) and divided by 100 to obtain a number per 100 cubic meters ($n/100m^3$).

APPENDIX H

CALCULATIONS FOR WEIGHT DETERMINATION BY REGION AND DATE

A mean length per region by date was obtained by summing the individual length measurements and dividing by number of observations. The log of the weight (gm) was regressed against the lengths (mm) of some 900 specimens collected during the population surveys and resulted in the length-weight regression formula (R square = .92):

$$\text{Log weight (gm)} = (0.01780432)\,[\text{length (mm)}] - 0.84108681$$

This weight per specimen was multiplied by the estimated number of specimens (n) in each region for each date to obtain a total weight per region per date. The number of specimens (n), weight (kg), and weight (lb) in each region with the correlating impingement weights are presented in Tables II-58 and II-59.

APPENDIX I

Unscaled weakfish population estimate* and 95% confidence interval for the Plant region of the Delaware Estuary for sampling dates 21 June and 5 July, 1978.

21 June

Unscaled Estimate and 95% Confidence Interval

10,044,072 ± 6,460,106

5 July

Unscaled Estimate and 95% Confidence Interval

4,273,324 ± 4,450,471

* = Numbers not rounded for demonstration purposes.

APPENDIX J

CIRCULATING WATER SYSTEM (CWS)

INTAKE AND FISH RETURN SYSTEM DESCRIPTION

Condenser cooling water is withdrawn from the Delaware River through a shoreline intake located at the south end of Artificial Island by six circulating water pumps per unit. Each circulator is mounted in an individual pump well and is rated at 185,000 gpm (11,672 m^3/s).

Prior to station start-up the intake was modified to maximize survival of impinged organisms and permit sampling to assess impingement magnitude and impact. Modifications are similar to those made by Virginia Electric Power Company at the Surry Power Station. Principal components are vertical traveling water screens fitted with fish buckets, a low pressure fish removal system, sluices to return impinged organisms to the river, and a counting pool for sampling purposes.

Each of the six traveling screens contains 62, 3/8-in-mesh (1-cm), screen baskets 121 in wide by 21 in high (307 x 53 cm). Normal operation is continous at a speed of 6.0 ft/min (3.0 cm/s) with alternate capabilities of 10.5, 15.5, and 20.0 ft/min (5.3, 7.9, and 10.2 cm/s) depending on debris load. The base of each screen basket is fitted with a 1 1/2-in deep by 2 1/2-in wide (3.9 x 5.1 cm) lip which creates a water filled bucket. As the basket is raised through and out of the water, impinged organisms drop off the screen face into the bucket. The bucket provides a suitable environment for transport and prevents most organisms from falling back into the water and becoming reimpinged. As the basket travels over the head sprocket specimens slide onto the screen face and are spray washed into a 11- x 17-in (28- x 43-cm) sluice of running water by one outside (7 psi pressure) and two inside (15 psi) spray headers. Heavier debris is spray washed into a lower sluice (24 x 33 in, 60 x 84 cm) by two high pressure (90 psi) spray headers.

Prior to 14 July 1978 the combined flow of the upper fish sluice and the lower trash sluice were discharged through a common outfall located at the north end of the intake structure. To reduce recirculation of discharged material during ebb tide a south discharge was put into operation. This permitted screen-wash flow to be discharged in the direction of tide.

For sampling, both sluices can be diverted to concrete counting pools, located at the north and south ends of the intake, which have been designed to minimize collection stress. Prior to 14 July 1978 only the north counting pool was operational. Thereafter both pools were used depending on the direction of screen wash discharge.

A filter bag with a 1 1/4-in stretched (3.2 cm) nylon mesh body and a 1/2-in stretched (1.3 cm) mesh innerliner attached to a wooden frame can be inserted immediately upstream of the pool entrance. The bag permits filtered water to be introduced into the pool and allows discrete samples to be taken. Specimens enter the pools through steel slides which reduce water velocity. Overflow pipes limit water depth to about three feet (1 m).

The pools are drained through 12-in valves. Specimens are prevented from escaping during draining by two 3/8-in (1 cm) steel mesh screens. If the detritus load is heavy each screen can be alternately raised with an electric hoist and cleaned.

APPENDIX K

MATERIALS AND METHODS

Sampling Schedule

Prior to 29 June 1978, fishes and blue crab impinged on the CWS screens were sampled during three, 24-hr periods per week. A minimum of four 3-min samples for survival and abundance were taken at approximately 6-hr intervals (1200, 1800, 0000, 0600).

On 29 June it was determined that during periods of heavy detrital loading long periods in the counting pool were negatively biasing survival estimates. The procedure during periods of heavy detritus was modified to sample 1 min of flow for survival and abundance and a subsequent 2 min of flow for abundance only.

On 11 July, the sampling schedule was changed to increase the number of sampling days per week to seven and to increase the sampling frequency within each day. On three days per week the schedule became four 3-min samples per day for survival and abundance taken at approximately 6-hr intervals plus as many 1-min abundance samples as practicable taken throughout the balance of the day. On the remaining four days as many 1-min abundance samples as practicable were taken.

Sampling Procedure

Survival Samples

Before each survival sample was taken, a pool was filled to a depth of about 10 in (25cm) with filtered water. Sampling was initiated by rapidly removing the filter bag. After 1 or 3 min flow of total screen wash water had entered the pool, sampling was terminated by re-inserting the filter bag.

Organisms in the pool were allowed a 5-min acclimation period after which it was drained. During draining impinged organisms were collected with dip nets and their condition determined according to the following criteria.

Live: Swimming vigorously, no apparent orientation problems, behavior normal.

Dead: No vital signs, no body or opercular movement, no response to gentle probing.

Damaged: Struggling or swimming on side, indication of abrasion or laceration.

Specimens were placed in water filled labeled buckets or pans and returned to the sample processing area.

All specimens in each condition category were sorted by species, and the total number and weight of each was determined. All specimens or a representative subsample (at least 100 specimens) of each species, drawn equally from each condition category if possible, were measured to the nearest 5 mm. Length and weight range per species and per condition category was also determined. Individuals and small numbers per species were weighed to the nearest 0.1 g with an Ohaus 1600 Series triple beam balance. Large numbers per species were mass weighed to the nearest gram with a Salter suspended scale.

Abundance Samples

Abundance samples were taken by diverting a 1-min flow of screen wash water to a counting pool. After sampling the pool was drained immediately, all organisms removed and sorted by species, and the total number of each was determined. The largest and the smallest specimen of each species was measured to the nearest 5 mm.

Miscellaneous General Procedures

With all samples the number of pumps and screens in operation, screen speed, tidal stage and elevation, air temperature (C), sky condition, wind direction, and wave height at the time of each sample were recorded. Measurements of water temperature (C) in the pool were taken with a mercury thermometer or a Yellow Springs Instrument Company Model 51A oxygen analyzer, and of salinity (ppt) with an American Optical Corporation salinity refractometer, Model 10419. Detritus taken with the sample was weighed to the nearest 0.1 kg with a Dillon dynomometer or the Salter suspended scale. All data was recorded on a computer compatible field sheet.

APPENDIX L

DATA REDUCTION

An estimate of the total number of weakfish impinged per day was calculated by first multiplying the mean impingement rate per minute for each interval between two consecutive samples by the number of minutes in the interval and summing the interval estimates. The sum of the interval estimates was then scaled to 24 hr by multiplying by the number of minutes in 24 hr divided by the sum of the time intervals between all samples. The general computational formula is given by:

$$(1) \qquad \left[\sum \left(T \cdot \frac{R_1 + R_2}{2}\right)\right] \cdot \frac{1440}{\Sigma T}$$

where:

T = number of minutes in interval between consecutive samples

R_1 = rate/min at start of interval

R_2 = rate/min at end of interval

If samples were taken over less than a 12-hr period the sum of the interval estimates was not scaled to 24 hr. This method of estimation eliminates the bias inherent in computing a straight mean estimated number per 24 hr by taking into account non-uniform sampling intervals and the variability of impingement rate caused by the patchy appearance of fish schools and daily activity cycles.

An estimate of the number of weakfish returned to the river alive per day was calculated by the same method as total number except that rate of live fish per minute was entered into equation 1 instead of rate of all fish impinged per minute.

Estimates of the total number of weakfish impinged per week were calculated by several methods depending on the sampling frequency within a week. If sampling was conducted during all days within a week the daily estimates were summed to give a weekly estimate. If the interval between consecutive sampling periods was 24 hr or less an estimate of the total impingement for the period of no sampling was calculated by multiplying the mean impingement rate per hour for the interval between the sampling days by the number of hours in the interval. These estimates were added to the daily estimates to give a weekly estimate. If the interval between consecutive sampling periods was greater than 24 hr the mean impingement rate per hour for the week was calculated and multiplied by the number of hours in a week.

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Table II-1.

LENGTH FREQUENCY OF C. REGALIS — DATE JULY 20,21 1978

TL (MM)	REGION = NORTH SUBAREA 1	REGION = NORTH SUBAREA 2	REGION = PLANT SUBAREA 1	REGION = PLANT SUBAREA 2	REGION = PLANT SUBAREA 3	REGION = PLANT SUBAREA 4	REGION = PLANT SUBAREA 5	REGION = PLANT SUBAREA 6
0- 10								
11- 20			1		5			
21- 30	1		3	2	4	2		
31- 40	1		6	4	2	7		1
41- 50	12	9	69	40	39	42	26	50
51- 60	76	60	133	69	51	65	32	64
61- 70	46	41	39	19	11	30	11	52
71- 80	14	9	11	16	5	20	4	15
81- 90		1	20	24	7	13	3	2
91-100	1		8	6	4	4		3
101-110			2	2	1			2
111-120								1
121-130								
131-140								
141-150								
151-160								
161-170								
171-180								
181-190								
191-200								
NO. MEAS.	151	120	292	182	129	183	76	190
NO. TAKEN	478	327	3598	882	1219	885	208	947
MEAN MEAS.	59	59	57	60	54	58	55	58
RANGE (MM)	25- 95	45- 85	15-105	25-105	15-105	25- 95	45- 85	35-115

Table II-1. - (Continued).

LENGTH FREQUENCY OF C. REGALIS DATE JULY 20,21 1978

REGION = SOUTH

TL (MM)	SUBAREA 1	SUBAREA 2	SUBAREA 3	SUBAREA 4	SUBAREA 5	SUBAREA 6	SUBAREA 7	SUBAREA 8	SUBAREA 9
0- 10									
11- 20									
21- 30		1					2	13	1
31- 40	5							4	1
41- 50	19	10	5	1		31	3	18	22
51- 60	93	82	14	19	50	143	44	64	35
61- 70	90	173	74	53	35	107	49	21	9
71- 80	32	146	85	37	13	52	25	10	14
81- 90	14	59	56	22	19	18	14	8	1
91-100	1	7	17	5	2		7	4	
101-110				1			1	1	
111-120								1	
121-130								1	
131-140									
141-150									
151-160									
161-170									
171-180									
181-190									
191-200									
NO. MEAS.	254	478	251	138	119	351	145	145	83
NO. TAKEN	836	9704	1948	292	391	1690	429	240	96
MEAN MEAS.	61	68	73	70	65	61	66	57	56
RANGE (MM)	35- 95	25- 95	45- 95	45-105	55- 95	45- 85	25-105	25-125	25- 85

Table II-2.

LENGTH FREQUENCY OF C. REGALIS DATE AUG. 2,3 1978

TL (MM)	REGION = NORTH SUBAREA 1	SUBAREA 2	REGION = PLANT SUBAREA 1	SUBAREA 2	SUBAREA 3	SUBAREA 4	SUBAREA 5	SUBAREA 6
0- 10								
11- 20								
21- 30	2	1	3	7	5	4	5	1
31- 40	3		17	11	1	10	21	2
41- 50		1	11	4	3	4	5	5
51- 60	33	19	28	14	18	20	22	55
61- 70	53	48	104	68	44	83	32	63
71- 80	17	38	37	29	16	35	2	20
81- 90	5	8	13	5	7	17	4	8
91-100		5	7	5	13	13	4	
101-110	1		9	3	10	3	2	1
111-120			3	8	3	5	1	2
121-130	1			2	1	1		
131-140								2
141-150								
151-160								
161-170								
171-180								
181-190								
191-200								
NO. MEAS.	115	120	232	156	121	195	98	159
NO. TAKEN	348	509	710	562	307	773	204	420
MEAN MEAS.	63	68	65	67	71	68	56	64
RANGE (MM)	25-125	25- 95	25-115	25-125	25-125	25-125	25-115	25-135

Table II-2. - (Continued).

LENGTH FREQUENCY OF C. REGALIS DATE AUG. 2,3 1978

REGION = SOUTH

TL (MM)	SUBAREA 1	SUBAREA 2	SUBAREA 3	SUBAREA 4	SUBAREA 5	SUBAREA 6	SUBAREA 7	SUBAREA 8	SUBAREA 9
0- 10									
11- 20									
21- 30	7				1	6	6	2	1
31- 40	17		3	1	2	12	26	2	1
41- 50	14			6	2	8	17	5	1
51- 60	2		1	1	3		6		3
61- 70	3	17	1		1	17	5	10	17
71- 80	37	83	18	22	10	53	36	32	16
81- 90	49	58	44	39	8	29	16	13	9
91-100	12	23	29	23	1	13	11	9	3
101-110	6	6	7	15		12	12	6	4
111-120	1	1	4			5	2	4	
121-130						1	4	1	
131-140							1		
141-150							1		
151-160									
161-170									
171-180									
181-190									
191-200									
NO. MEAS.	148	188	107	107	28	156	143	84	55
NO. TAKEN	291	2499	272	134	29	273	172	131	59
MEAN MEAS.	71	80	86	84	69	74	68	78	73
RANGE (MM)	25-115	65-115	35-115	35-105	25- 95	25-125	25-145	25-125	25-105

Table II-3.

LENGTH FREQUENCY OF C. REGALIS — DATE AUG. 16/17 1978

TL (MM)	REGION = NORTH SUBAREA 1	REGION = NORTH SUBAREA 2	REGION = PLANT SUBAREA 1	REGION = PLANT SUBAREA 2	REGION = PLANT SUBAREA 3	REGION = PLANT SUBAREA 4	REGION = PLANT SUBAREA 5	REGION = PLANT SUBAREA 6
0- 10								
11- 20								
21- 30			5	8		1	7	5
31- 40	4		38	18	2	13	10	17
41- 50	3		73	22	16	34	12	13
51- 60	2	2	24	22	8	28	11	14
61- 70	30	8	27	15	23	15	29	50
71- 80	21	17	47	19	46	44	29	60
81- 90	8	6	20	14	13	44	8	32
91-100		7	8	2	3	16	3	4
101-110			5	4	2	8		
111-120			9	1	5	1	1	
121-130		1	3	4	2			
131-140			6	1	1	1	1	
141-150					2		1	
151-160								
161-170								
171-180								
181-190								
191-200								
NO. MEAS.	68	41	265	130	123	205	112	195
NO. TAKEN	84	55	1688	376	790	603	155	242
MEAN MEAS.	67	78	62	61	73	69	63	66
RANGE (MM)	35- 85	55-125	25-135	25-135	35-145	25-135	25-145	25- 95

Table II-3. - (Continued).

LENGTH FREQUENCY OF C. REGALIS DATE AUG. 16/17 1978

REGION = SOUTH

TL (MM)	SUBAREA 1	SUBAREA 2	SUBAREA 3	SUBAREA 4	SUBAREA 5	SUBAREA 6	SUBAREA 7	SUBAREA 8	SUBAREA 9
0- 10									
11- 20									
21- 30	4		7	8	6	6	5	3	
31- 40	8		15	18	11	15	7	18	2
41- 50	18	2	23	11	10	19	23	27	1
51- 60	21	20	25	13	15	37	14	17	
61- 70	10	60	35	3	11	28	7	17	
71- 80	7	37	9		3	19	1	19	2
81- 90	4	25	7			11	2	8	3
91-100	6	92	14	1		15	8	10	2
101-110	14	120	21	5	4	14	6	13	
111-120	22	72	15	2	4	4	8	13	1
121-130	14	25	8	4	1		7	13	
131-140	6	1	1	2		2	2	11	
141-150	1	1		1	1		5	6	
151-160									
161-170								1	
171-180									
181-190									
191-200									
NO. MEAS.	135	455	180	68	66	170	95	176	11
NO. TAKEN	270	1953	212	256	205	249	226	275	11
MEAN MEAS.	82	94	72	58	59	66	74	79	75
RANGE (MM)	25-145	45-145	25-135	25-145	25-145	25-135	25-145	25-165	35-115

Table II-4.

LENGTH FREQUENCY OF C. REGALIS — DATE SEPT 7,8 1978

TL (MM)	REGION = NORTH SUBAREA 1	REGION = NORTH SUBAREA 2	REGION = PLANT SUBAREA 1	REGION = PLANT SUBAREA 2	REGION = PLANT SUBAREA 3	REGION = PLANT SUBAREA 4	REGION = PLANT SUBAREA 5	REGION = PLANT SUBAREA 6
0- 10								
11- 20								
21- 30								
31- 40	1					1	1	
41- 50	2		2		4	2		1
51- 60	8		23	12	11	18	1	4
61- 70	9		77	27	40	51	10	12
71- 80	25	1	136	50	41	86	9	39
81- 90	101	6	70	38	51	49	26	62
91-100	86	3	57	18	47	49	12	23
101-110	18	1	24	13	12	21	2	9
111-120	4		24	9	5	8		5
121-130	4		13	6		3	2	
131-140			12	4	2	2		
141-150	1		12	5	1	7		
151-160			14	5	3	8		
161-170			8	3	2	2		1
171-180			10	6	1	9		
181-190	1		3	2	1	1		
191-200						1		
NO. MEAS.	260	11	485	198	221	318	63	156
NO. TAKEN	260	11	486	199	221	320	63	156
MEAN MEAS.	88	88	90	91	84	88	82	84
RANGE (MM)	35-185	75-105	45-185	55-185	45-185	35-195	35-125	45-165

Table II-4. - (Continued).

LENGTH FREQUENCY OF C. REGALIS DATE SEPT 7,8 1978
REGION = SOUTH

TL (MM)	SUBAREA 1	SUBAREA 2	SUBAREA 3	SUBAREA 4	SUBAREA 5	SUBAREA 6	SUBAREA 7	SUBAREA 8	SUBAREA 9
0- 10									
11- 20								1	
21- 30	1			2				2	
31- 40	4		1	5		1		2	
41- 50	16		3	7			6	2	
51- 60	69	1	2	31	2		15	8	
61- 70	254	22	27	93	14	7	91	60	
71- 80	317	98	35	74	42	33	75	107	
81- 90	207	114	17	32	24	34	60	130	
91-100	122	81	8	10	32	26	32	96	
101-110	79	43	11	3	20	15	14	74	
111-120	41	40	6	2	11	7	18	41	
121-130	25	18	7	3	8	3	22	17	
131-140	22	15	9	3	4	8	19	17	
141-150	37	22	13	10	10	3	19	7	
151-160	31	10	10	11	7	4	20	5	
161-170	16	11	3	11	5	3	19	2	
171-180	9	5		8	3	5	11	3	
181-190	1		2	1		1	6	2	
191-200		1	1		1	1	1		
NO. MEAS.	1251	481	155	306	183	151	428	576	
NO. TAKEN	1251	481	155	306	183	151	428	576	
MEAN MEAS.	86	98	98	82	99	99	97	91	
RANGE (MM)	25-185	55-195	35-195	25-185	55-195	35-195	45-195	15-185	

Table II-5.

LENGTH FREQUENCY OF C. REGALIS — DATE JUNE 21 1978

TL (MM)	REGION = NORTH SUBAREA 1	REGION = NORTH SUBAREA 2	REGION = PLANT SUBAREA 1	REGION = PLANT SUBAREA 2	REGION = PLANT SUBAREA 3	REGION = PLANT SUBAREA 4	REGION = PLANT SUBAREA 5	REGION = PLANT SUBAREA 6
0- 10								
11- 20					7	9	42	7
21- 30					45	44	147	69
31- 40					4	6	21	13
41- 50					1	1		
51- 60								
61- 70								
71- 80								
81- 90								
91-100								
101-110								
111-120								
121-130								
131-140								
141-150								
151-160								
161-170								
171-180								
181-190								
191-200								
NO. MEAS.					57	60	210	89
NO. TAKEN					1298	920	801	577
MEAN MEAS.					24	24	24	25
RANGE (MM)					15- 45	15- 45	15- 35	15- 35

Table II-5. - (Continued).

LENGTH FREQUENCY OF C. REGALIS DATE JUNE 21 1978

REGION = SOUTH

TL (MM)	SUBAREA 1	SUBAREA 2	SUBAREA 3	SUBAREA 4	SUBAREA 5	SUBAREA 6	SUBAREA 7	SUBAREA 8	SUBAREA 9
0- 10									
11- 20									
21- 30									
31- 40									
41- 50									
51- 60									
61- 70									
71- 80									
81- 90									
91-100									
101-110									
111-120									
121-130									
131-140									
141-150									
151-160									
161-170									
171-180									
181-190									
191-200									
NO. MEAS.									
NO. TAKEN									
MEAN MEAS.									
RANGE (MM)									

Table II-6.

LENGTH FREQUENCY OF C. REGALIS DATE JULY 5 1978

TL (MM)	REGION = NORTH SUBAREA 1	REGION = NORTH SUBAREA 2	REGION = PLANT SUBAREA 1	REGION = PLANT SUBAREA 2	REGION = PLANT SUBAREA 3	REGION = PLANT SUBAREA 4	REGION = PLANT SUBAREA 5	REGION = PLANT SUBAREA 6
0- 10								
11- 20								
21- 30							2	
31- 40					8	13	39	11
41- 50					23	10	89	34
51- 60					11	3	34	13
61- 70					11	1	19	2
71- 80					4	3	4	
81- 90							1	
91-100								
101-110								
111-120								
121-130								
131-140								
141-150								
151-160								
161-170								
171-180								
181-190								
191-200								
NO. MEAS.					57	30	188	60
NO. TAKEN					794	30	513	193
MEAN MEAS.					51	45	47	46
RANGE (MM)					35- 75	35- 75	25- 85	35- 65

Table II-6. - (Continued).

LENGTH FREQUENCY OF C. REGALIS DATE JULY 5 1978

REGION = SOUTH

TL (MM)	SUBAREA 1	SUBAREA 2	SUBAREA 3	SUBAREA 4	SUBAREA 5	SUBAREA 6	SUBAREA 7	SUBAREA 8	SUBAREA 9
0- 10									
11- 20									
21- 30									
31- 40									
41- 50									
51- 60									
61- 70									
71- 80									
81- 90									
91-100									
101-110									
111-120									
121-130									
131-140									
141-150									
151-160									
161-170									
171-180									
181-190									
191-200									
NO. MEAS.									
NO. TAKEN									
MEAN MEAS.									
RANGE (MM)									

Table II-7. - Length-frequency distributions of subsampled C. regalis by number (n), percent of catch (%), and catch per unit effort (n/T), in sub-area 1, South region, taken by trawl in population estimates, 1978. Table includes total number of specimens taken, total effort, and catch per unit effort.

Number of Specimens (n)

FL (mm)	1-10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200	n	T	n/T
20, 21 July	-	-	-	5	19	93	90	32	14	1	-	-	-	-	-	-	-	-	-	-	836	10	83.6
2, 3 Aug.	-	-	7	17	14	2	3	37	49	12	6	1	-	-	-	-	-	-	-	-	291	10	29.1
16, 17 Aug.	-	-	4	8	18	21	10	7	4	6	14	22	14	6	1	-	-	-	-	-	270	10	27.0
7, 8 Sept.	-	-	1	4	16	69	254	317	207	122	79	41	25	22	37	31	16	9	1	-	1251	10	125.1

Percent of Catch (%)

FL (mm)	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200
20, 21 July	-	-	-	2.0	7.5	36.6	35.4	12.6	5.5	0.4	-	-	-	-	-	-	-	-	-	-
2, 3 Aug.	-	-	4.7	11.5	9.5	1.4	2.0	25.0	33.1	8.1	4.0	0.7	-	-	-	-	-	-	-	-
16, 17 Aug.	-	-	3.0	5.9	13.3	15.6	7.4	5.2	3.0	4.4	10.4	16.3	10.4	4.4	0.7	-	-	-	-	-
7, 8 Sept.	-	-	0.1	0.3	1.3	5.5	20.3	25.3	16.6	9.8	6.3	3.3	2.0	1.8	3.0	2.5	1.3	0.7	0.1	-

Catch Per Unit Effort (n/T)

FL (mm)	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200
20, 21 July	-	-	-	1.7	6.3	30.6	29.6	10.5	4.6	0.3	-	-	-	-	-	-	-	-	-	-
2, 3 Aug.	-	-	1.4	3.3	2.8	0.4	0.6	7.3	9.6	2.4	1.2	0.2	-	-	-	-	-	-	-	-
16, 17 Aug.	-	-	0.8	1.6	3.6	4.2	2.0	1.4	0.8	1.2	2.8	4.4	2.8	1.2	0.2	-	-	-	-	-
7, 8 Sept.	-	-	0.1	0.4	1.6	6.9	25.4	31.6	20.8	12.3	7.9	4.1	2.5	2.2	3.7	3.1	1.6	0.9	0.1	-

Table II-8. - Length-frequency distributions of subsampled C. regalis by number (n), percent of catch (%), and catch per unit effort, (n/T), in sub-area 2, South region, taken by trawl in population estimates, 1978. Table includes total number of specimens taken, total effort, and catch per unit effort.

Number of Specimens (n)

FL (mm)	1-10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200	n	T	n/T
20, 21 July	-	-	1	-	10	82	173	146	59	7	-	-	-	-	-	-	-	-	-	-	9704	16	606.5
2, 3 Aug.	-	-	-	-	-	-	17	83	58	23	6	1	-	-	-	-	-	-	-	-	2499	18	138.8
16, 17 Aug.	-	-	-	-	2	20	60	37	25	92	120	72	25	1	1	-	-	-	-	-	1953	17	114.9
7, 8 Sept.	-	-	-	-	-	1	22	98	114	80	43	40	18	15	22	10	11	5	-	1	480	18	26.7

Percent of Catch (%)

FL (mm)	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200
20, 21 July	-	-	0.2	-	2.1	17.2	36.2	30.5	12.3	1.5	-	-	-	-	-	-	-	-	-	-
2, 3 Aug.	-	-	-	-	-	-	9.0	44.2	30.8	12.2	3.2	0.5	-	-	-	-	-	-	-	-
16, 17 Aug.	-	-	-	-	0.4	4.4	13.2	8.1	5.5	20.2	26.4	15.8	5.5	0.2	0.2	-	-	-	-	-
7, 8 Sept.	-	-	-	-	-	0.2	4.6	20.4	23.8	16.7	9.0	8.3	3.8	3.1	4.6	2.1	2.3	1.0	-	0.2

Catch Per Unit Effort (n/T)

FL (mm)	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200
20, 21 July	-	-	1.2	-	12.7	104.3	219.6	185.0	74.6	9.1	-	-	-	-	-	-	-	-	-	-
2, 3 Aug.	-	-	-	-	-	-	12.5	61.3	42.8	16.9	4.4	0.7	-	-	-	-	-	-	-	-
16, 17 Aug.	-	-	-	-	0.5	5.1	15.2	9.3	6.3	23.2	30.3	18.2	6.3	0.2	0.2	-	-	-	-	-
7, 8 Sept.	-	-	-	-	-	0.1	1.2	5.4	6.4	4.5	2.4	2.2	1.0	0.8	1.2	0.6	0.6	0.3	-	0.1

Table II-9. - Length-frequency distributions of subsampled C. regalis by number (n), percent of catch (%), and catch per unit effort (n/T), in sub-area 3, South region, taken by trawl in population estimates, 1978. Table includes total number of specimens taken, total effort, and catch per unit effort.

Number of Specimens (n)

FL (mm)	1-10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200	n	T	n/T
20, 21 July	-	-	-	-	5	14	74	85	56	17	-	-	-	-	-	-	-	-	-	-	1948	11	177.1
2, 3 Aug.	-	-	-	3	-	1	1	18	44	29	7	4	-	-	-	-	-	-	-	-	272	11	24.7
16, 17 Aug.	-	-	7	15	23	25	35	9	7	14	21	15	8	1	-	-	-	-	-	-	212	9	23.6
7, 8 Sept.	-	-	-	1	3	2	27	35	17	8	11	6	7	9	13	10	3	-	2	1	155	11	14.1

Percent of Catch (%)

FL (mm)	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200
20, 21 July	-	-	-	-	2.0	5.6	29.5	33.9	22.3	6.8	-	-	-	-	-	-	-	-	-	-
2, 3 Aug.	-	-	-	2.8	-	0.9	0.9	16.8	41.1	27.1	6.5	3.7	-	-	-	-	-	-	-	-
16, 17 Aug.	-	-	3.9	8.3	12.8	13.9	19.4	5.0	3.9	7.8	11.7	8.3	4.4	0.6	-	-	-	-	-	-
7, 8 Sept.	-	-	-	0.6	1.9	1.3	17.4	22.6	11.0	5.2	7.1	3.9	4.5	5.8	8.4	6.4	1.9	-	1.3	0.6

Catch Per Unit Effort (n/T)

FL (mm)	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200
20, 21 July	-	-	-	-	3.5	10.0	52.2	60.0	39.5	12.0	-	-	-	-	-	-	-	-	-	-
2, 3 Aug.	-	-	-	0.7	-	0.2	0.2	4.1	10.1	6.7	1.6	0.9	-	-	-	-	-	-	-	-
16, 17 Aug.	-	-	0.9	2.0	3.0	3.3	4.6	1.2	0.9	1.8	2.8	2.0	1.0	0.1	-	-	-	-	-	-
7, 8 Sept.	-	-	-	0.1	0.3	0.2	2.4	3.2	1.5	0.7	1.0	0.5	0.6	0.8	1.2	0.9	0.3	-	0.2	0.1

'able II-10 - Length-frequency distributions of subsampled C. regalis by number (n), percent of catch (%), and catch per unit effort (n/T), in sub-area 4, South region, taken by trawl in population estimates, 1978. Table includes total number of specimens taken, total effort, and catch per unit effort.

Number of Specimens (n)

FL (mm)	1-10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200	n	T	n/T
20, 21 July	-	-	-	-	-	1	19	53	37	22	5	1	-	-	-	-	-	-	-	-	292	5	58.4
2, 3 Aug.	-	-	-	1	6	1	-	22	39	23	15	-	-	-	-	-	-	-	-	-	134	5	26.8
16, 17 Aug.	-	-	8	18	11	13	3	-	-	1	5	2	4	2	1	-	-	-	-	-	256	4	64.0
7, 8 Sept.	-	-	2	5	7	31	93	74	32	10	3	2	3	3	10	11	11	8	1	-	306	5	61.2

Percent of Catch (%)

FL (mm)	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200
20, 21 July	-	-	-	-	-	0.7	13.8	38.4	26.8	15.9	3.6	0.7	-	-	-	-	-	-	-	-
2, 3 Aug.	-	-	-	0.9	5.6	0.9	-	20.6	36.4	21.5	14.0	-	-	-	-	-	-	-	-	-
16, 17 Aug.	-	-	11.8	26.5	16.2	19.1	4.4	-	-	1.5	7.4	2.9	5.9	2.9	1.5	-	-	-	-	-
7, 8 Sept.	-	-	0.6	1.6	2.3	10.1	30.4	24.2	10.5	3.3	1.0	0.6	1.0	1.0	3.3	3.6	3.6	2.6	0.3	-

Catch Per Unit Effort (n/T)

FL (mm)	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200
20, 21 July	-	-	-	-	-	0.4	8.1	22.4	15.6	9.3	2.1	0.4	-	-	-	-	-	-	-	-
2, 3 Aug.	-	-	-	0.2	1.5	0.2	-	5.5	9.7	5.8	3.7	-	-	-	-	-	-	-	-	-
16, 17 Aug.	-	-	7.5	17.0	10.4	12.2	2.8	-	-	1.0	4.7	1.9	3.8	1.9	1.0	-	-	-	-	-
7, 8 Sept.	-	-	0.4	1.0	1.4	6.2	18.6	14.8	6.4	2.0	0.6	0.4	0.6	0.6	2.0	2.2	2.2	1.6	0.2	-

Table II-11. - Length-frequency distributions of subsampled C. regalis by number (n), percent of catch (%), and catch per unit effort (n/T), in sub-area 5, South region, taken by trawl in population estimates, 1978. Table includes total number of specimens taken, total effort, and catch per unit effort.

Number of Specimens (n)

FL (mm)	1-10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200	n	T	n/T
20, 21 July	-	-	-	-	-	50	35	13	19	2	-	-	-	-	-	-	-	-	-	-	391	6	65.2
2, 3 Aug.	-	-	1	2	2	3	1	10	8	1	-	-	-	-	-	-	-	-	-	-	29	4	7.2
16, 17 Aug.	-	-	6	11	10	15	11	3	-	-	4	4	1	-	1	-	-	-	-	-	205	4	51.2
7, 8 Sept.	-	-	-	-	-	2	14	42	24	32	20	11	8	4	10	7	5	3	-	1	183	6	30.5

Percent of Catch (%)

FL (mm)	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200
20, 21 July	-	-	-	-	-	42.0	29.4	10.9	16.0	1.7	-	-	-	-	-	-	-	-	-	-
2, 3 Aug.	-	-	3.6	7.1	7.1	10.7	3.6	35.7	28.6	3.6	-	-	-	-	-	-	-	-	-	-
16, 17 Aug.	-	-	9.1	16.7	15.2	22.7	16.7	4.6	-	-	6.1	6.1	1.5	-	1.5	-	-	-	-	-
7, 8 Sept.	-	-	-	-	-	1.1	7.6	23.0	13.1	17.5	10.9	6.0	4.4	2.2	5.5	3.8	2.7	1.6	-	0.6

Catch Per Unit Effort (n/T)

FL (mm)	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200
20, 21 July	-	-	-	-	-	27.4	19.2	7.1	10.4	1.1	-	-	-	-	-	-	-	-	-	-
2, 3 Aug.	-	-	0.3	0.5	0.5	0.8	0.3	2.6	2.0	0.3	-	-	-	-	-	-	-	-	-	-
16, 17 Aug.	-	-	4.7	8.5	7.8	11.6	8.5	2.3	-	-	3.1	3.1	0.8	-	-	-	-	-	-	-
7, 8 Sept.	-	-	-	-	-	0.3	2.3	7.0	4.0	5.3	3.3	1.8	1.3	0.7	1.7	1.2	0.8	0.5	-	0.2

Table II-12 - Length-frequency distributions of subsampled C. regalis by number (n), percent of catch (%), and catch per unit effort (n/T), in sub-area 6, South region, taken by trawl in population estimates, 1978. Table includes total number of specimens taken, total effort, and catch per unit effort.

Number of Specimens (n)

FL (mm)	1-10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200	n	T	n/T
20, 21 July	-	-	-	-	31	143	107	52	18	-	-	-	-	-	-	-	-	-	-	-	1690	15	112.7
2, 3 Aug.	-	-	6	12	8	-	17	53	29	13	12	5	1	-	-	-	-	-	-	-	273	17	16.1
16, 17 Aug.	-	-	6	15	19	37	28	19	11	15	14	4	-	2	-	-	-	-	-	-	249	16	15.6
7, 8 Sept.	-	-	-	1	-	-	7	33	34	26	15	7	3	8	3	4	3	5	1	1	151	17	8.9

Percent of Catch (%)

FL (mm)	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200
20, 21 July	-	-	-	-	8.8	40.7	30.5	14.8	5.1	-	-	-	-	-	-	-	-	-	-	-
2, 3 Aug.	-	-	3.8	7.7	5.1	-	10.9	34.0	18.6	8.3	7.7	3.2	0.6	-	-	-	-	-	-	-
16, 17 Aug.	-	-	3.5	8.8	11.2	21.8	16.5	11.2	6.5	8.8	8.2	2.4	-	1.2	-	-	-	-	-	-
7, 8 Sept.	-	-	-	0.7	-	-	4.6	21.9	22.5	17.2	9.9	4.6	2.0	5.3	2.0	2.7	2.0	3.3	0.7	0.7

Catch Per Unit Effort (n/T)

FL (mm)	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200
20, 21 July	-	-	-	-	9.9	45.9	34.4	16.7	5.7	-	-	-	-	-	-	-	-	-	-	-
2, 3 Aug.	-	-	0.6	1.2	0.8	-	1.7	5.5	3.0	1.3	1.2	0.5	0.1	-	-	-	-	-	-	-
16, 17 Aug.	-	-	0.5	1.4	1.7	3.4	2.6	1.7	1.0	1.4	1.3	0.4	-	0.2	-	-	-	-	-	-
7, 8 Sept.	-	-	-	0.1	-	-	0.4	1.9	2.0	1.5	0.9	0.4	0.2	0.5	0.2	0.2	0.2	0.3	0.1	0.1

Table II-13–Length-frequency distributions of subsampled C. regalis by number (n), percent of catch (%), and catch per unit effort (n/T), in sub-area 7, South region, taken by trawl in population estimates, 1978. Table includes total number of specimens taken, total effort, and catch per unit effort.

Number of Specimens (n)

FL (mm)	1-10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200	n	T	n/T
20, 21 July	-	-	2	-	3	44	49	25	14	7	1	-	-	-	-	-	-	-	-	-	429	7	61.3
2, 3 Aug.	-	-	6	26	17	6	5	36	16	11	12	2	4	1	1	-	-	-	-	-	172	7	24.6
16, 17 Aug.	-	-	5	7	23	14	7	1	2	8	6	8	7	2	5	-	-	-	-	-	226	7	32.3
7, 8 Sept.	-	-	-	-	6	15	91	75	60	32	14	18	22	19	19	20	19	11	6	1	428	7	61.1

Percent of Catch (%)

FL (mm)	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200
20, 21 July	-	-	1.4	-	2.1	30.3	33.8	17.2	9.7	4.8	0.7		-	-	-	-	-	-	-	-
2, 3 Aug.	-	-	4.2	18.2	11.9	4.2	3.5	25.2	11.2	7.7	8.4	1.4	2.8	0.7	0.7	-	-	-	-	-
16, 17 Aug.	-	-	5.3	7.4	24.2	14.7	7.4	1.0	2.1	8.4	6.3	8.4	7.4	2.1	5.3	-	-	-	-	-
7, 8 Sept.	-	-	-	-	1.4	3.5	21.3	17.5	14.0	7.5	3.3	4.2	5.1	4.4	4.4	4.7	4.4	2.6	1.4	0.2

Catch Per Unit Effort (n/T)

FL (mm)	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200
20, 21 July	-	-	0.9	-	1.3	18.6	20.7	10.5	5.9	2.9	0.4	-	-	-	-	-	-	-	-	-
2, 3 Aug.	-	-	1.0	4.5	2.9	1.0	0.9	6.2	2.7	1.9	2.1	0.3	0.7	0.2	0.2	-	-	-	-	-
16, 17 Aug.	-	-	1.7	2.4	7.8	4.7	2.4	0.3	0.7	2.7	2.0	2.7	2.4	0.7	1.0	-	-	-	-	-
7, 8 Sept.	-	-	-	-	0.8	2.1	13.0	10.7	8.5	4.6	2.0	2.6	3.1	2.7	2.7	2.9	2.7	1.6	0.8	0.1

Table II-14 – Length-frequency distributions of subsampled *C. regalis* by number (n), percent of catch (%), and catch per unit effort (n/T), in sub-area 8, South region, taken by trawl in population estimates, 1978. Table includes total number of specimens taken, total effort, and catch per unit effort.

Number of Specimens (n)

FL (mm)	1-10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200	n	T	n/T
20, 21 July	-	-	13	4	18	64	21	10	8	4	1	1	1	-	-	-	-	-	-	-	240	6	40.0
2, 3 Aug.	-	-	2	2	5	-	10	32	13	9	6	4	1	-	-	-	-	-	-	-	131	6	21.8
16, 17 Aug.	-	-	3	18	27	17	17	19	8	10	13	13	13	11	6	-	1	-	-	-	275	6	45.8
7, 8 Sept.	-	1	2	2	2	8	60	107	130	96	74	41	17	17	7	5	2	3	2	-	576	6	96.0

Percent of Catch (%)

FL (mm)	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200
20, 21 July	-	-	9.0	2.8	12.4	44.1	14.5	6.9	5.5	2.8	0.7	0.7	0.7	-	-	-	-	-	-	-
2, 3 Aug.	-	-	2.4	2.4	6.0	-	11.9	38.1	15.5	10.7	7.1	4.8	1.2	-	-	-	-	-	-	-
16, 17 Aug.	-	-	1.7	10.2	15.3	9.7	9.7	10.8	4.6	5.7	7.4	7.4	7.4	6.3	3.4	-	0.6	-	-	-
7, 8 Sept.	-	0.2	0.4	0.4	0.4	1.4	10.4	18.6	22.6	16.7	12.9	7.1	3.0	3.0	1.2	0.9	0.4	0.5	0.4	-

Catch Per Unit Effort (n/T)

FL (mm)	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200
20, 21 July	-	-	3.6	1.1	5.0	17.6	5.8	2.8	2.2	1.1	0.3	0.3	0.3	-	-	-	-	-	-	-
2, 3 Aug.	-	-	0.5	0.5	1.3	-	2.6	8.3	3.4	2.3	1.5	1.0	0.3	-	-	-	-	-	-	-
16, 17 Aug.	-	-	0.8	4.7	7.0	4.4	4.4	4.9	2.1	2.6	3.4	3.4	3.4	2.9	1.6	-	0.3	-	-	-
7, 8 Sept.	-	0.2	0.4	0.4	0.4	1.3	10.0	17.9	21.7	16.0	12.4	6.8	2.9	2.9	1.1	0.9	0.4	0.5	0.4	-

Table II-15-Length-frequency distributions of subsampled *C. regalis* by number (n), percent of catch (%), and catch per unit effort (n/T), in sub-area 9, South region, taken by trawl in population estimates, 1978. Table includes total number of specimens taken, total effort, and catch per unit effort.

Number of Specimens (n)

FL (mm)	1-10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200	n	T	n/T
20, 21 July	-	-	1	1	22	35	9	14	1	-	-	-	-	-	-	-	-	-	-	-	96	4	24.0
2, 3 Aug.	-	-	1	1	1	3	17	16	9	3	4	-	-	-	-	-	-	-	-	-	59	4	14.8
16, 17 Aug.	-	-	-	2	1	-	-	2	3	2	-	1	-	-	-	-	-	-	-	-	11	2	5.5
7, 8 Sept.																					NONE TAKEN		

Percent of Catch (%)

FL (mm)	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200
20, 21 July	-	-	1.2	1.2	26.5	42.2	10.8	16.9	1.2	-	-	-	-	-	-	-	-	-	-	-
2, 3 Aug.	-	-	1.8	1.8	1.8	5.5	30.9	29.1	16.4	5.5	7.3	-	-	-	-	-	-	-	-	-
16, 17 Aug.	-	-	-	18.2	9.1	-	-	18.2	27.3	18.2	-	9.1	-	-	-	-	-	-	-	-

Catch Per Unit Effort (n/T)

FL (mm)	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200
20, 21 July	-	-	0.3	0.3	6.3	10.1	2.6	4.1	0.3	-	-	-	-	-	-	-	-	-	-	-
2, 3 Aug.	-	-	0.3	0.3	0.3	0.8	4.6	4.3	2.4	0.8	1.1	-	-	-	-	-	-	-	-	-
16, 17 Aug.	-	-	-	1.0	0.5	-	-	1.0	1.5	1.0	-	0.5	-	-	-	-	-	-	-	-

Table II-16.- Length-frequency distributions of subsampled C. regalis by number (n), percent of catch (%), and catch per unit effort (n/T), in sub-area 1, Plant region, taken by trawl in population estimates, 1978. Table includes total number of specimens taken, total effort, and catch per unit effort.

Number of Specimens (n)

FL (mm)	1-10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200	n	T	n/T
20, 21 July	-	1	3	6	69	133	39	11	20	8	2	-	-	-	-	-	-	-	-	-	3598	10	359.8
2, 3 Aug.	-	-	3	17	11	28	104	37	13	7	9	3	-	-	-	-	-	-	-	-	710	9	78.9
16, 17 Aug.	-	-	4	38	73	24	27	47	20	8	5	9	3	6	-	-	-	-	-	-	1688	9	187.6
7, 8 Sept.	-	-	-	-	2	23	77	136	70	57	24	24	13	12	12	14	8	10	3	-	486	9	54.0

Percent of Catch (%)

FL (mm)	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200
20, 21 July	-	0.3	1.0	2.0	23.6	45.6	13.4	3.8	6.8	2.7	0.7	-	-	-	-	-	-	-	-	-
2, 3 Aug.	-	-	1.3	7.3	4.7	12.1	44.8	16.0	5.6	3.0	3.9	1.3	-	-	-	-	-	-	-	-
16, 17 Aug.	-	-	1.5	14.4	27.6	9.1	10.2	17.8	7.6	3.0	1.9	3.4	1.1	2.3	-	-	-	-	-	-
7, 8 Sept.	-	-	-	-	0.4	4.7	15.9	28.0	14.4	11.8	5.0	5.0	2.7	2.5	2.5	2.9	1.6	2.1	0.6	-

Catch Per Unit Effort (n/T)

FL (mm)	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200
20, 21 July	-	1.1	3.6	7.2	84.9	164.1	48.2	13.7	24.5	9.7	2.5	-	-	-	-	-	-	-	-	-
2, 3 Aug.	-	-	1.0	5.8	3.7	9.5	35.3	12.6	4.4	2.4	3.1	1.0	-	-	-	-	-	-	-	-
16, 17 Aug.	-	-	2.8	27.0	51.8	17.1	19.1	33.4	14.3	5.6	3.6	6.4	2.1	4.3	-	-	-	-	-	-
7, 8 Sept.	-	-	-	-	0.2	2.5	8.6	15.1	7.8	6.4	2.7	2.7	1.5	1.4	1.3	1.6	0.9	1.1	0.3	-

Table II-17. - Length-frequency distributions of subsampled *C. regalis* by number (n), percent of catch (%), and catch per unit effort (n/T) in sub-area 2, Plant region, taken by trawl in population estimates, 1978. Table includes total number of specimens taken, total effort, and catch per unit effort.

Number of Specimens (n)

FL (mm)	1-10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200	n	T	n/T
20, 21 July	-	-	2	4	40	69	19	16	24	6	2	-	-	-	-	-	-	-	-	-	882	7	126.0
2, 3 Aug.	-	-	7	11	4	14	68	29	5	5	3	8	2	-	-	-	-	-	-	-	562	7	80.3
16, 17 Aug.	-	-	8	18	22	22	15	19	14	2	4	1	4	1	-	-	-	-	-	-	376	7	53.7
7, 8 Sept.	-	-	-	-	-	12	27	50	38	18	13	9	6	4	5	-	-	-	-	-	199	7	28.4

Percent of Catch (%)

FL (mm)	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200
20, 21 July	-	-	1.1	2.2	22.0	37.9	10.4	8.8	13.2	3.3	1.1	-	-	-	-	-	-	-	-	-
2, 3 Aug.	-	-	4.5	7.0	2.6	9.0	43.6	18.6	3.2	3.2	1.9	5.1	1.3	-	-	-	-	-	-	-
16, 17 Aug.	-	-	6.2	13.8	16.9	16.9	11.5	14.6	10.8	1.5	3.1	0.8	3.1	0.8	-	-	-	-	-	-
7, 8 Sept.	-	-	-	-	-	6.6	14.8	27.5	20.9	9.9	7.1	5.0	3.3	2.2	2.8	-	-	-	-	-

Catch Per Unit Effort (n/T)

FL (mm)	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200
20, 21 July	-	-	1.6	2.8	27.7	47.8	13.1	11.1	16.6	4.2	1.4	-	-	-	-	-	-	-	-	-
2, 3 Aug.	-	-	3.6	5.6	2.1	7.2	35.0	14.9	2.6	2.6	1.5	4.1	1.0	-	-	-	-	-	-	-
16, 17 Aug.	-	-	3.3	7.4	9.1	9.1	6.2	7.8	5.8	0.8	1.7	0.4	1.7	0.4	-	-	-	-	-	-
7, 8 Sept.	-	-	-	-	-	1.9	4.2	7.8	5.9	2.8	2.0	1.4	0.9	0.6	0.8	-	-	-	-	-

Table II-18. - Length-frequency distributions of subsampled C. regalis by number (n), percent of catch (%) and catch per unit effort (n/T), in sub-area 3, Plant region, taken by trawl in population estimates, 1978. Table includes total number of specimens taken, total effort, and catch per unit effort.

Number of Specimens (n)

FL (mm)	1-10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200	n	T	n/T
21 June	-	7	45	4	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1298	2	649.0
5 July	-	-	-	8	23	11	11	4	-	-	-	-	-	-	-	-	-	-	-	-	794	2	397.0
20, 21 July	-	5	4	2	39	51	11	5	7	4	1	-	-	-	-	-	-	-	-	-	1219	4	304.8
2, 3 Aug.	-	-	5	1	3	18	44	16	7	13	10	3	1	-	-	-	-	-	-	-	307	4	76.8
16, 17 Aug.	-	-	-	2	16	8	23	46	13	3	2	5	2	1	2	-	-	-	-	-	790	4	197.5
7, 8 Sept.	-	-	-	-	4	11	40	41	51	47	12	5	-	2	1	3	2	1	1	-	221	4	55.2

Percent of Catch (%)

FL (mm)	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200
21 June	-	12.3	79.0	7.0	1.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5 July	-	-	-	14.0	40.4	19.3	19.3	7.0	-	-	-	-	-	-	-	-	-	-	-	-
20, 21 July	-	3.9	3.1	1.6	30.2	39.5	8.5	3.9	5.4	3.1	0.8	-	-	-	-	-	-	-	-	-
2,3 Aug.	-	-	4.1	0.8	2.5	14.9	36.4	13.2	5.8	10.7	8.3	2.5	0.8	-	-	-	-	-	-	-
16, 17 Aug.	-	-	-	1.6	13.0	6.5	18.7	37.4	10.6	2.4	1.6	4.1	1.6	0.8	1.6	-	-	-	-	-
7, 8 Sept.	-	-	-	-	1.8	5.0	18.1	18.6	23.1	21.3	5.4	2.3	-	0.9	0.4	1.4	0.9	0.4	0.4	-

Catch Per Unit Effort (n/T)

FL (mm)	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200
21 June	-	79.8	512.7	45.4	11.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5 July	-	-	-	55.6	160.4	76.6	76.6	27.8	-	-	-	-	-	-	-	-	-	-	-	-
20, 21 July	-	11.9	9.4	4.9	92.0	120.4	25.9	11.9	16.5	9.4	2.4	-	-	-	-	-	-	-	-	-
2, 3 Aug.	-	-	3.1	0.6	1.9	11.4	28.0	10.1	4.5	8.2	6.4	1.9	0.6	-	-	-	-	-	-	-
16, 17 Aug.	-	-	-	3.2	25.7	12.8	36.9	73.9	20.9	4.7	3.2	8.1	3.2	1.6	3.2	-	-	-	-	-
7, 8 Sept.	-	-	-	-	1.0	2.8	10.0	10.3	12.8	11.8	3.0	1.3	-	0.5	0.2	0.8	0.5	0.2	0.2	-

Table 11-19. - Length-frequency distributions of subsampled *C. regalis* by number (n), percent of catch (%), and catch per unit effort (n/T) in sub-area 4, Plant region, taken by trawl in population estimates, 1978. Table includes total number of specimens taken, total effort, and catch per unit effort.

Number of Specimens (n)

FL (mm)	1-10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200	n	T	n/T
21 June	-	9	44	6	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	920	2	460.0
5 July	-	-	-	13	10	3	1	3	-	-	-	-	-	-	-	-	-	-	-	-	30	2	15.0
20, 21 July	-	-	2	7	42	65	30	20	13	4	-	-	-	-	-	-	-	-	-	-	885	7	126.4
2,3 Aug.	-	-	4	10	4	20	83	35	17	13	3	5	1	-	-	-	-	-	-	-	773	7	110.4
16, 17 Aug.	-	-	1	13	34	28	15	44	44	16	8	1	-	1	-	-	-	-	-	-	603	7	86.1
7, 8 Sept.	-	-	-	1	2	18	51	86	49	49	21	8	3	2	7	8	2	9	1	1	320	7	45.7

Percent of Catch (%)

FL (mm)	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200
21 June	-	15.0	73.3	10.0	1.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5 July	-	-	-	43.3	33.3	10.0	3.3	10.0	-	-	-	-	-	-	-	-	-	-	-	-
20, 21 July	-	-	1.1	3.8	23.0	35.5	16.4	10.9	7.1	2.2	-	-	-	-	-	-	-	-	-	-
2, 3 Aug.	-	-	2.0	5.1	2.0	10.3	42.6	18.0	8.7	6.7	1.5	2.6	0.5	-	-	-	-	-	-	-
16, 17 Aug.	-	-	0.5	6.3	16.6	13.7	7.3	21.5	21.5	7.8	3.9	0.5	-	0.5	-	-	-	-	-	-
7, 8 Sept.	-	-	-	0.3	0.6	5.7	16.0	27.0	15.4	15.4	6.6	2.5	0.9	0.6	2.2	2.5	0.6	2.8	0.3	0.3

Catch Per Unit Effort (n/T)

FL (mm)	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200
21 June	-	69.0	337.2	46.0	7.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5 July	-	-	-	6.5	5.0	1.5	0.5	1.5	-	-	-	-	-	-	-	-	-	-	-	-
20, 21 July	-	-	1.4	4.8	29.1	44.9	20.7	13.8	9.0	2.8	-	-	-	-	-	-	-	-	-	-
2, 3 Aug.	-	-	2.2	5.6	2.2	11.4	47.0	19.9	9.6	7.4	1.7	2.9	0.6	-	-	-	-	-	-	-
16, 17 Aug.	-	-	0.4	5.4	14.3	11.8	6.3	18.5	18.5	6.7	3.4	0.4	-	0.4	-	-	-	-	-	-
7, 8 Sept.	-	-	-	0.1	0.3	2.6	7.3	12.3	7.0	7.0	3.0	1.1	0.4	0.3	1.0	1.1	0.3	1.3	0.1	0.1

Table II-20. - Length-frequency distributions of subsampled *C. regalis* by number (n), percent of catch (%), and catch per unit effort (n/T), in sub-area 5, Plant region, taken by trawl in population estimates, 1978. Table includes total number of specimens taken, total effort, and catch per unit effort.

Number of Specimens (n)

FL (mm)	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200	n	T	n/T
21 June	-	42	147	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	801	7	114.4
5 July	-	-	2	39	89	34	19	4	1	-	-	-	-	-	-	-	-	-	-	-	513	7	73.3
20, 21 July	-	-	-	-	26	32	11	4	3	-	-	-	-	-	-	-	-	-	-	-	208	5	41.6
2, 3 Aug.	-	-	5	21	5	22	32	2	4	4	2	1	-	-	-	-	-	-	-	-	204	5	40.8
16, 17 Aug.	-	-	7	10	12	11	29	29	8	3	-	1	-	1	1	-	-	-	-	-	155	5	31.0
7, 8 Sept.	-	-	-	1	-	1	10	9	26	12	2	-	2	-	-	-	-	-	-	-	63	5	12.6

Percent of Catch (%)

FL (mm)	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200
21 June	-	20.0	70.0	10.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5 July	-	-	1.1	20.7	47.3	18.1	10.1	2.1	0.5	-	-	-	-	-	-	-	-	-	-	-
20, 21 July	-	-	-	-	34.2	42.1	14.5	5.3	4.0	-	-	-	-	-	-	-	-	-	-	-
2, 3 Aug.	-	-	5.1	21.4	5.1	22.4	32.6	2.0	4.1	4.1	2.0	1.0	-	-	-	-	-	-	-	-
16, 17 Aug.	-	-	6.2	8.9	10.7	9.8	25.9	25.9	7.1	2.7	-	0.9	-	0.9	0.9	-	-	-	-	-
7, 8 Sept.	-	-	-	1.6	-	1.6	15.9	14.3	41.3	19.0	3.2	-	3.2	-	-	-	-	-	-	-

Catch Per Unit Effort (n/T)

FL (mm)	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200
21 June	-	22.9	80.1	11.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5 July	-	-	0.8	15.2	34.7	13.3	7.4	1.5	0.4	-	-	-	-	-	-	-	-	-	-	-
20, 21 July	-	-	-	-	14.2	17.5	6.0	2.2	1.7	-	-	-	-	-	-	-	-	-	-	-
2, 3 Aug.	-	-	2.1	8.7	2.1	9.1	13.3	0.8	1.7	1.7	0.8	0.4	-	-	-	-	-	-	-	-
16, 17 Aug.	-	-	1.9	2.8	3.3	3.0	8.0	8.0	2.2	0.8	-	0.3	-	0.3	0.3	-	-	-	-	-
7, 8 Sept.	-	-	-	0.2	-	0.2	2.0	1.8	5.2	2.4	0.4	-	0.4	-	-	-	-	-	-	-

Table II-21. -Length-frequency distributions of subsampled C. regalis by number (n), percent of catch (%), and catch per unit effort (n/T), in sub-area 6, Plant region, taken by trawl in population estimates, 1978. Table includes total number of specimens taken, total effort, and catch per unit effort.

Number of Specimens (n)

FL (mm)	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200	n	T	n/T
21 June	-	7	69	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	577	3	192.3
5 July	-	-	-	11	34	13	2	-	-	-	-	-	-	-	-	-	-	-	-	-	193	3	64.3
20, 21 July	-	-	-	1	50	64	52	15	2	3	2	1	-	-	-	-	-	-	-	-	947	7	135.3
2, 3 Aug.	-	-	1	2	5	55	63	20	8	-	1	2	-	2	-	-	-	-	-	-	420	7	60.0
16, 17 Aug.	-	-	5	17	13	14	50	60	32	4	-	-	-	-	-	-	-	-	-	-	242	7	34.6
7, 8 Sept.	-	-	-	-	1	4	12	39	62	23	9	5	-	-	-	-	1	-	-	-	156	7	22.3

Percent of Catch (%)

FL (mm)	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200
21 June	-	7.9	77.5	14.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5 July	-	-	-	18.3	56.7	21.7	3.3	-	-	-	-	-	-	-	-	-	-	-	-	-
20, 21 July	-	-	-	0.5	26.3	33.7	27.4	7.9	1.0	1.6	1.0	0.5	-	-	-	-	-	-	-	-
2, 3 Aug.	-	-	0.6	1.3	3.1	34.6	39.6	12.6	5.0	-	0.6	1.3	-	1.3	-	-	-	-	-	-
16, 17 Aug.	-	-	2.6	8.7	6.7	7.2	25.6	30.8	16.4	2.0	-	-	-	-	-	-	-	-	-	-
7, 8 Sept.	-	-	-	-	0.6	2.6	7.7	25.0	39.7	14.7	5.8	3.2	-	-	-	-	0.6	-	-	-

Catch Per Unit Effort (n/T)

FL (mm)	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200
21 June	-	15.2	149.0	28.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5 July	-	-	-	11.8	36.5	13.9	2.1	-	-	-	-	-	-	-	-	-	-	-	-	-
20, 21 July	-	-	-	0.7	35.6	45.6	37.1	10.7	1.3	2.2	1.3	0.7	-	-	-	-	-	-	-	-
2, 3 Aug.	-	-	0.4	0.8	1.9	20.8	23.8	7.6	3.0	-	0.4	0.8	-	0.8	-	-	-	-	-	-
16, 17 Aug.	-	-	0.9	3.0	2.3	2.5	8.9	10.7	5.7	0.7	-	-	-	-	-	-	-	-	-	-
7, 8 Sept.	-	-	-	-	0.1	0.6	1.7	5.6	8.8	3.3	1.3	0.7	-	-	-	-	0.1	-	-	-

Table II-22. - Length-frequency distributions of subsampled C. regalis by number (n), percent of catch (%), and catch per unit effort (n/T), in sub-area 1, North region, taken by trawl in population estimates, 1978. Table includes total number of specimens taken, total effort, and catch per unit effort.

Number of Specimens (n)

FL (mm)	1-10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200	n	T	n/T
20,21 July	-	-	1	1	12	76	46	14	-	1	-	-	-	-	-	-	-	-	-	-	478	5	95.6
2,3 Aug.	-	-	2	3	-	33	53	17	5	-	1	-	1	-	-	-	-	-	-	-	348	5	69.6
16,17 Aug.	-	-	-	4	3	2	30	21	8	-	-	-	-	-	-	-	-	-	-	-	84	5	16.8
7,8 Sept.	-	-	-	1	2	8	9	25	101	86	18	4	4	-	1	-	-	-	1	-	260	5	52.0

Percent of Catch (%)

FL (mm)	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200
20,21 July	-	-	0.7	0.7	8.0	50.3	30.5	9.3	-	0.7	-	-	-	-	-	-	-	-	-	-
2,3 Aug.	-	-	1.7	2.6	-	28.7	46.1	14.8	4.4	-	0.9	-	0.9	-	-	-	-	-	-	-
16,17 Aug.	-	-	-	5.9	4.4	2.9	44.1	30.9	11.8	-	-	-	-	-	-	-	-	-	-	-
7,8 Sept.	-	-	-	0.4	0.8	3.1	3.5	9.6	38.8	33.1	6.9	1.5	1.5	-	0.4	-	-	-	0.4	-

Catch Per Unit Effort (n/T)

FL (mm)	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200
20,21 July	-	-	0.7	0.7	7.6	48.1	29.2	8.9	-	0.7	-	-	-	-	-	-	-	-	-	-
2,3 Aug.	-	-	1.2	1.8	-	20.0	32.1	10.3	3.1	-	0.6	-	0.6	-	-	-	-	-	-	-
16,17 Aug.	-	-	-	1.0	0.7	0.5	7.4	5.2	2.0	-	-	-	-	-	-	-	-	-	-	-
7,8 Sept.	-	-	-	0.2	0.4	1.6	1.8	5.0	20.2	17.2	3.6	0.8	0.8	-	0.2	-	-	-	0.2	-

Table II-23. - Length-frequency distributions of subsampled C. regalis by number (n), percent of catch (%), and catch per unit effort (n/T), in sub-area 2, North region, taken by trawl in population estimates, 1978. Table includes total number of specimens taken, total effort, and catch per unit effort.

Number of Specimens (n)

FL (mm)	1-10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200	n	T	n/T
20,21 July	-	-	-	-	9	60	41	9	1	-	-	-	-	-	-	-	-	-	-	-	327	4	81.8
2,3 Aug.	-	-	1	-	1	19	48	38	8	5	-	-	-	-	-	-	-	-	-	-	509	4	127.2
16,17 Aug.	-	-	-	-	-	2	8	17	6	7	-	-	1	-	-	-	-	-	-	-	55	4	13.8
7,8 Sept.	-	-	-	-	-	-	-	1	6	3	1	-	-	-	-	-	-	-	-	-	11	4	2.8

Percent of Catch (%)

FL (mm)	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200
20,21 July	-	-	-	-	7.5	50.0	34.2	7.5	0.8	-	-	-	-	-	-	-	-	-	-	-
2,3 Aug.	-	-	0.8	-	0.8	15.8	40.0	31.7	6.7	4.2	-	-	-	-	-	-	-	-	-	-
16,17 Aug.	-	-	-	-	-	4.9	19.5	41.5	14.6	17.1	-	-	2.4	-	-	-	-	-	-	-
7,8 Sept.	-	-	-	-	-	-	-	9.1	54.6	27.3	9.1	-	-	-	-	-	-	-	-	-

Catch Per Unit Effort (n/T)

FL (mm)	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200
20,21 July	-	-	-	-	6.1	40.9	28.0	6.1	0.7	-	-	-	-	-	-	-	-	-	-	-
2,3 Aug.	-	-	1.0	-	1.0	20.1	50.9	40.3	8.5	5.3	-	-	-	-	-	-	-	-	-	-
16,17 Aug.	-	-	-	-	-	0.7	2.7	5.7	2.0	2.4	-	-	0.3	-	-	-	-	-	-	-
7,8 Sept.	-	-	-	-	-	-	-	0.3	1.5	0.8	0.3	-	-	-	-	-	-	-	-	-

Table II-24. - Analysis of variance of log-transformed trawl data by region of weakfish, North vs. Plant vs. South regions, 20 - 21 July, 1978.

DATE=3

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: LDEN

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	2	0.76416916	0.38208458	0.93	0.3971	0.014553	34.2438
ERROR	126	51.74379063	0.41066501		STD DEV		LDEN MEAN
CORRECTED TOTAL	128	52.50795979			0.64083150		1.87137981

SOURCE	DF	TYPE III SS	F VALUE	PR > F
AREA	2	0.76416916	0.93	0.3971

Table II-25. - Analysis of variance and Duncan's multiple range test of log-transformed trawl data of weakfish by subarea for North, Plant and South regions 20 - 21 July, 1978.

DEPENDENT VARIABLE: LDEN

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	16	19.65926383	1.22870399	4.19	0.0001	0.374405	28.9393
ERROR	112	32.84869596	0.29329193		STD DEV		LDEN MEAN
CORRECTED TOTAL	128	52.50795979			0.54156433		1.87137981

SOURCE	DF	TYPE III SS	F VALUE	PR > F
SUBAC	16	19.65926383	4.19	0.0001

Table II-25. - (Continued)

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE LDEN

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05 DF=112 MS=0.293292

GROUPING			MEAN	N	SUBAREA
	A		2.549730	16	2 South
B	A		2.450570	4	3 Plant
B	A		2.404506	10	1 Plant
B	A	C	1.971070	5	1 North
B	D	C	1.895173	7	4 Plant
B	D	C	1.885378	4	2 North
B	D	C	1.883038	7	2 Plant
B	D	C	1.869050	7	6 Plant
B	D	C	1.868107	11	3 South
B	D	C	1.716535	5	4 South
	D	C	1.692355	10	1 South
	D	C	1.654112	15	6 South
	D	C	1.512100	6	8 South
	D	C	1.474526	7	7 South
	D	C	1.419479	6	5 South
	D	C	1.340613	4	9 South
	D		1.139320	5	5 Plant

Table II-26. - Analysis of variance and Duncan's multiple range test of log-transformed trawl data of weakfish, west vs. east, Plant region, 20 - 21 July 1978.

DEPENDENT VARIABLE: LDEN

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	1	1.93878851	1.93878851	4.91	0.0327	0.114519	31.7721
ERROR	38	14.99098821	0.39449969		STD DEV		LDEN MEAN
CORRECTED TOTAL	39	16.92977671			0.62809210		1.97686931

SOURCE	DF	TYPE III SS	F VALUE	PR > F
TR	1	1.93878851	4.91	0.0327

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE LDEN

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05 DF=38 MS=0.3945

GROUPING	MEAN	N	TR
A	2.220264	18	west
B	1.777729	22	East

Table II-27. - Analysis of variance of log-transformed trawl data of weakfish, west vs. east, South region, 20 - 21 July, 1978.

DEPENDENT VARIABLE: LDEN

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	1	1.07017518	1.07017518	2.49	0.1188	0.030909	36.2018
ERROR	78	33.55288654	0.43016521		STD DEV		LDEN MEAN
CORRECTED TOTAL	79	34.62306172			0.65586981		1.81170451

SOURCE	DF	TYPE III SS	F VALUE	PR > F
TR	1	1.07017518	2.49	0.1188

Table II-28. - Analysis of variance of log-transformed trawl data of weakfish, west vs. east, North region, 20 - 21 July, 1978.

DEPENDENT VARIABLE: LDEN

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	1	0.03763833	0.03763833	1.72	0.2313	0.197109	7.6562
ERROR	7	0.15331387	0.02190198		STD DEV		LDEN MEAN
CORRECTED TOTAL	8	0.19095220			0.14799318		1.93298470

SOURCE	DF	TYPE III SS	F VALUE	PR > F
TR	1	0.03763833	1.72	0.2313

Table II-29. - Analysis of variance and Duncan's multiple range test of log-transformed trawl data by subarea, Plant region, 20 - 21 July, 1978.

DEPENDENT VARIABLE: LDEN

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	5	6.26533328	1.25306666	3.94	0.0066	0.373595	28.6874
ERROR	33	10.50506651	0.31833535		STD DEV		LDEN MEAN
CORRECTED TOTAL	38	16.77039979			0.56421215		1.96676165

SOURCE	DF	TYPE III SS	F VALUE	PR > F
SUB	5	6.26533328	3.94	0.0066

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE LDEN

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05 DF=33 MS=0.318335

GROUPING	MEAN	N	SUBAREA
A	2.450570	4	3 P
A	2.408222	9	1 P
A	1.895173	7	4 P
A	1.883038	7	2 P
A	1.869050	7	6 P
B	1.139320	5	5 P

Table II-30. - Analysis of variance and Duncan's multiple range test of log-transformed trawl data of weakfish, 20 - 21 July vs. 2 - 3 August vs. 16 - 17 August, 1978.

DEPENDENT VARIABLE: LDEN

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	2	28.00148887	14.00074443	30.26	0.0001	0.137681	45.3939
ERROR	379	175.37828013	0.46273953		STD DEV		LDEN MEAN
CORRECTED TOTAL	381	203.37976900			0.68024961		1.49854759

SOURCE	DF	TYPE III SS	F VALUE	PR > F
DATE	2	28.00148887	30.26	0.0001

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE LDEN

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05 DF=379 MS=0.46274

GROUPING	MEAN	N	DATE
A	1.871380	129	20 - 21 July
B	1.370679	123	16 - 17 August
B			
B	1.249567	130	2 - 3 August

Table II-31. - Analysis of variance and Duncan's multiple range test of log-transformed trawl data of weakfish, South region, 20 - 21 July vs. 2 - 3 August vs. 16 - 17 August, 1978.

DEPENDENT VARIABLE: LDEN

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	2	27.63786594	13.81893297	30.34	0.0001	0.205915	49.8553
ERROR	234	106.58177849	0.45547769		STD DEV		LDEN MEAN
CORRECTED TOTAL	236	134.21964443			0.67489087		1.35369807

SOURCE	DF	TYPE III SS	F VALUE	PR > F
DATE	2	27.63786594	30.34	0.0001

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE LDEN

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05 DF=234 MS=0.455478

GROUPING	MEAN	N	DATE
A	1.811705	80	20 - 21 July
B	1.247019	75	16 - 17 August
C	1.004435	82	2 - 3 August

Table II-32. - Analysis of variance and Duncan's multiple range test of log-transformed trawl data of weakfish, Plant region, 20 - 21 July vs. 2 - 3 August vs. 16 - 17 August, 1978.

DEPENDENT VARIABLE: LDEN

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	2	2.26556753	1.13278377	3.30	0.0405	0.054253	32.7603
ERROR	115	39.49386685	0.34342493		STD DEV		LDEN MEAN
CORRECTED TOTAL	117	41.75943438			0.58602468		1.78882356

SOURCE	DF	TYPE III SS	F VALUE	PR > F
DATE	2	2.26556753	3.30	0.0405

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE LDEN

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05 DF=115 MS=0.343425

GROUPING		MEAN	N	DATE
	A	1.976869	40	20 - 21 July
	A			
B	A	1.732544	39	16 - 17 August
B				
B		1.652236	39	2 - 3 August

Table II-33. - Analysis of variance and Duncan's multiple range test of log-transformed trawl data of weakfish, North region, 20 - 21 July vs. 2 - 3 August vs. 16 - 17 August, 1978.

DEPENDENT VARIABLE: LDEN

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	2	6.20018046	3.10009023	11.84	0.0003	0.496603	34.0842
ERROR	24	6.28500746	0.26187531		STD DEV		LDEN MEAN
CORRECTED TOTAL	26	12.48518791			0.51173754		1.50139101

SOURCE	DF	TYPE III SS	F VALUE	PR > F
DATE	2	6.20018046	11.84	0.0003

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE LDEN

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05 DF=24 MS=0.261875

GROUPING	MEAN	N	DATE
A	1.932985	9	20 - 21 July
A			
A	1.738087	9	2 - 3 August
B	0.833101	9	16 - 17 August

Table II-34. - Analysis of variance and Duncan's multiple range test of log-transformed trawl data by region, North, Plant, and South regions, 2 - 3 August, 1978.

DEPENDENT VARIABLE: LDEN

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	2	13.39876796	6.69938398	16.42	0.0001	0.205416	51.1238
ERROR	127	51.82856993	0.40809898		STD DEV		LDEN MEAN
CORRECTED TOTAL	129	65.22733789			0.63882625		1.24956669

SOURCE	DF	TYPE III SS	F VALUE	PR > F
AREA	2	13.39876796	16.42	0.0001

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE LDEN

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05 DF=127 MS=0.408099

GROUPING	MEAN	N	AREA
A	1.738087	9	N
A			
A	1.652236	39	P
B	1.004435	82	S

Table II-35. - Analysis of variance and Duncan's multiple range test of log-transformed trawl data of weakfish by subarea, North, Plant, and South regions, 2 - 3 August, 1978.

DEPENDENT VARIABLE: LDEN

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	16	17.34969371	1.08435586	2.56	0.0021	0.265988	52.0916
ERROR	113	47.87764418	0.42369597		STD DEV		LDEN MEAN
CORRECTED TOTAL	129	65.22733789			0.65091932		1.24956669

SOURCE	DF	TYPE III SS	F VALUE	PR > F
SUBAC	16	17.34969371	2.56	0.0021

Table II-35. - (Continued)

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE LDEN

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05 DF=113 MS=0.423696

GROUPING				MEAN	N	SUBAREA
		A		1.981378	4	2 North
		A				
		A		1.894444	7	4 Plant
		A				
B		A		1.878408	4	3 Plant
B		A				
B		A		1.678153	9	1 Plant
B		A				
B		A		1.608481	7	2 Plant
B		A				
B		A	C	1.559663	7	6 Plant
B		A	C			
B	D	A	C	1.543454	5	1 North
B	D	A	C			
B	D	A	C	1.321843	7	7 South
B	D	A	C			
B	D	A	C	1.276415	5	5 Plant
B	D	A	C			
B	D	A	C	1.197021	5	4 South
B	D	A	C			
B	D	A	C	1.130630	10	1 South
B	D	A	C			
B	D	A	C	1.113054	6	8 South
B	D	A	C			
B	D	A	C	1.044888	4	9 South
B	D		C			
B	D		C	1.024338	18	2 South
	D		C			
	D		C	0.835794	11	3 South
	D					
	D			0.830129	17	6 South
	D					
	D			0.804371	4	5 South

Table II-36 - Analysis of variance of log-transformed trawl data of weakfish by subarea, Plant region, 2 - 3 August, 1978.

DATE=4 AREA=P

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: LDEN

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	5	1.40091260	0.28018252	0.95	0.4631	0.125654	32.8950
ERROR	33	9.74802549	0.29539471		STD DEV		LDEN MEAN
CORRECTED TOTAL	38	11.14893809			0.54350226		1.65223608

SOURCE	DF	TYPE III SS	F VALUE	PR > F
SUBAC	5	1.40091260	0.95	0.4631

Table II-37. - Analysis of variance of log-transformed trawl data of weakfish, west vs. east, North region, 2 - 3 August, 1978.

S T A T I S T I C A L   A N A L Y S I S   S Y S T E M   14:18 SUNDAY, OCTOBER 22, 1978   80

DATE=4   AREA=N

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: LDEN

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	1	0.57400071	0.57400071	2.11	0.1899	0.231348	30.0308
ERROR	7	1.90710811	0.27244402		STD DEV		LDEN MEAN
CORRECTED TOTAL	8	2.48110883			0.52196170		1.73808686

SOURCE	DF	TYPE III SS	F VALUE	PR > F
TR	1	0.57400071	2.11	0.1899

Table II-38. - Analysis of variance of log-transformed trawl data of weakfish, west vs. east, Plant region, 2 - 3 August, 1978.

DATE=4   AREA=P

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: LDEN

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	1	0.00268565	0.00268565	0.01	0.9253	0.000241	33.2194
ERROR	37	11.14625244	0.30125007		STD DEV		LDEN MEAN
CORRECTED TOTAL	38	11.14893809			0.54886252		1.65223608

SOURCE	DF	TYPE III SS	F VALUE	PR > F
TR	1	0.00268565	0.01	0.9253

Table II-39. - Analysis of variance of log-transformed trawl data of weakfish, west vs. east, South region, 2 - 3 August, 1978.

DATE=4   AREA=S

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: LDEN

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	1	0.30672658	0.30672658	0.65	0.4234	0.008030	68.5182
ERROR	80	37.89179643	0.47364746		STD DEV		LDEN MEAN
CORRECTED TOTAL	81	38.19852301			0.68822050		1.00443513

SOURCE	DF	TYPE III SS	F VALUE	PR > F
TR	1	0.30672658	0.65	0.4234

Table II-40. - Analysis of variance and Duncan's multiple range test of log-transformed trawl data of weakfish by region, North vs. Plant vs. South regions, 16 - 17 August, 1978.

DEPENDENT VARIABLE: LDEN

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	2	8.85469022	4.42734511	10.89	0.0001	0.153613	46.5191
ERROR	120	48.78829223	0.40656910		STD DEV		LDEN MEAN
CORRECTED TOTAL	122	57.64298245			0.63762771		1.37067898

SOURCE	DF	TYPE III SS	F VALUE	PR > F
AREA	2	8.85469022	10.89	0.0001

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE LDEN

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05 DF=120 MS=0.406569

GROUPING	MEAN	N	AREA
A	1.732544	39	P
B	1.247019	75	S
B			
B	0.833101	9	N

Table II-41. - Analysis of variance and Duncan's multiple range test of log-transformed trawl data of weakfish by subarea, North vs. Plant vs. South regions, 16 - 17 August, 1978.

DEPENDENT VARIABLE: LDEN

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	16	21.36927347	1.33557959	3.90	0.0001	0.370718	42.6783
ERROR	106	36.27370898	0.34220480		STD DEV		LDEN MEAN
CORRECTED TOTAL	122	57.64298245			0.58498274		1.37067898

SOURCE	DF	TYPE III SS	F VALUE	PR > F
SUBAC	16	21.36927347	3.90	0.0001

Table II-41. - (Continued)

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE LDEN

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05 DF=106 MS=0.342205

GROUPING				MEAN	N	SUBAREA
		A		2.211730	4	3 Plant
		A				
		A		2.134445	9	1 Plant
		A				
B		A		1.814950	7	4 Plant
B		A				
B		A		1.742937	17	2 South
B		A				
B		A	C	1.523895	7	6 Plant
B		A	C			
B	D	A	C	1.421198	6	8 South
B	D	A	C			
B	D	A	C	1.392609	4	5 South
B	D	A	C			
B	D	A	C	1.371249	5	5 Plant
B	D		C			
B	D		C	1.326302	3	2 Plant
B	D		C			
B	D		C	1.266058	4	4 South
B	D		C			
B	D		C	1.226067	9	3 South
	D		C			
	D		C	1.096912	10	1 South
	D		C			
	D		C	1.081119	7	7 South
	D		C			
	D		C	0.953104	5	1 North
	D					
	D			0.846239	16	6 South
	D					
	D			0.811625	2	9 South
	D					
	D			0.683098	4	2 North

Table II-42. - Analysis of variance and Duncan's multiple range test of log-transformed trawl data of weakfish, east vs. west, Plant region, 16 - 17 August, 1978.

DEPENDENT VARIABLE: LDEN

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	1	3.20495731	3.20495731	14.44	0.0005	0.280763	27.1889
ERROR	37	8.21019474	0.22189716		STD DEV		LDEN MEAN
CORRECTED TOTAL	38	11.41515205			0.47105961		1.73254359

SOURCE	DF	TYPE III SS	F VALUE	PR > F
TR	1	3.20495731	14.44	0.0005

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE LDEN

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05 DF=37 MS=0.221897

GROUPING	MEAN	N	TR
A	2.042180	18	West
B	1.467141	21	East

Table II-43. - Analysis of variance and Duncan's multiple range test of log-transformed trawl data of weakfish, West vs. East, South region, 16 - 17 August, 1978.

DEPENDENT VARIABLE: LDEN

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	1	3.41950012	3.41950012	8.23	0.0054	0.101288	51.6986
ERROR	73	30.34069363	0.41562594		STD DEV		LDEN MEAN
CORRECTED TOTAL	74	33.76019375			0.64469058		1.24701868

SOURCE	DF	TYPE III SS	F VALUE	PR > F
TR	1	3.41950012	8.23	0.0054

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE LDEN

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05 DF=73 MS=0.415626

GROUPING	MEAN	N	TR
A	1.441464	41	West
B	1.012540	34	East

Table II-44. - Analysis of variance of log-transformed trawl data of weakfish, east vs. west, North region, 16 - 17 August, 1978.

DATE=5 AREA=N

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: LDEN

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	1	1.26124372	1.26124372	3.75	0.0939	0.349090	69.5736
ERROR	7	2.35170271	0.33595753		STD DEV		LDEN MEAN
CORRECTED TOTAL	8	3.61294643			0.57961844		0.83310148

SOURCE	DF	TYPE III SS	F VALUE	PR > F
TR	1	1.26124372	3.75	0.0939

Table II-45. - Kruskall-Wallis test of log-transformed trawl data of weakfish, 16 - 17 August vs. 7-8 September, 1978.

WILCOXON SCORES (RANK SUMS)

LEVEL		N	SUM OF SCORES	EXPECTED UNDER HO	STD DEV UNDER HO	MEAN SCORE
16 - 17 August	5	123	17141.00	15744.00	588.53	139.36
7 - 8 September	6	132	15499.00	16896.00	588.53	117.42

WILCOXON 2-SAMPLE TEST (NORMAL APPROXIMATION)
S=17141.00 Z= 2.3737 PROB >\Z\=0.0176
T-TEST APPROX. SIGNIFICANCE=0.0184

KRUSKAL-WALLIS TEST (CHI-SQUARE APPROXIMATION)
CHISQ= 5.63 DF= 1 PROB > CHISQ=0.0176

Table II-46. - Kruskall-Wallis test of log-transformed trawl data of weakfish, North region, 16 - 17 August vs. 7 - 8 September, 1978.

WILCOXON SCORES (RANK SUMS)

LEVEL		N	SUM OF SCORES	EXPECTED UNDER HO	STD DEV UNDER HO	MEAN SCORE
16 - 17 August	5	9	88.00	85.50	11.32	9.78
7 - 8 September	6	9	83.00	85.50	11.32	9.22

WILCOXON 2-SAMPLE TEST (NORMAL APPROXIMATION)
S= 88.00 Z= 0.2208 PROB >\Z\=0.8253
T-TEST APPROX. SIGNIFICANCE=0.8279

KRUSKAL-WALLIS TEST (CHI-SQUARE APPROXIMATION)
CHISQ= 0.05 DF= 1 PROB > CHISQ=0.8253

Table II-47. - Kruskall-Wallis test of log-transformed trawl data of weakfish, South region, 16 - 17 August vs. 7 - 8 September, 1978.

WILCOXON SCORES (RANK SUMS)

LEVEL		N	SUM OF SCORES	EXPECTED UNDER HO	STD DEV UNDER HO	MEAN SCORE
16 - 17 August	5	75	6468.50	6000.00	289.83	86.25
7 - 8 September	6	84	6251.50	6720.00	289.83	74.42

WILCOXON 2-SAMPLE TEST (NORMAL APPROXIMATION)
S= 6468.50 Z= 1.6165 PROB >\Z\=0.1060
T-TEST APPROX. SIGNIFICANCE=0.1080

KRUSKAL-WALLIS TEST (CHI-SQUARE APPROXIMATION)
CHISQ= 2.61 DF= 1 PROB > CHISQ=0.1060

Table II-48. - Kruskall-Wallis test of log-transformed trawl data of weakfish, Plant region, 16 - 17 August vs. 7 - 8 September, 1978.

WILCOXON SCORES (RANK SUMS)

LEVEL		N	SUM OF SCORES	EXPECTED UNDER HO	STD DEV UNDER HO	MEAN SCORE
16 - 17 August	5	39	1845.00	1540.50	100.07	47.31
7 - 8 September	6	39	1236.00	1540.50	100.07	31.69

WILCOXON 2-SAMPLE TEST (NORMAL APPROXIMATION)
S= 1845.00 Z= 3.0430 PROB >\Z\=0.0023
T-TEST APPROX. SIGNIFICANCE=0.0032

KRUSKAL-WALLIS TEST (CHI-SQUARE APPROXIMATION)
CHISQ= 9.26 DF= 1 PROB > CHISQ=0.0023

Table II-49. - Kruskall-Wallis test of log-transformed trawl data of weakfish, North vs. Plant region, 7 - 8 September, 1978.

WILCOXON SCORES (RANK SUMS)

LEVEL	N	SUM OF SCORES	EXPECTED UNDER HO	STD DEV UNDER HO	MEAN SCORE
North	9	130.50	220.50	37.86	14.50
Plant	39	1045.50	955.50	37.86	26.81

WILCOXON 2-SAMPLE TEST (NORMAL APPROXIMATION)
S= 130.50 Z=-2.3773 PROB >\Z\=0.0174
T-TEST APPROX. SIGNIFICANCE=0.0216

KRUSKAL-WALLIS TEST (CHI-SQUARE APPROXIMATION)
CHISQ= 5.65 DF= 1 PROB > CHISQ=0.0174

Table II-50. - Kruskall-Wallis test of log-transformed trawl data of weakfish, Plant vs. South region, 7 - 8 September, 1978.

WILCOXON SCORES (RANK SUMS)

LEVEL	N	SUM OF SCORES	EXPECTED UNDER HO	STD DEV UNDER HO	MEAN SCORE
Plant	39	2802.50	2418.00	183.99	71.86
South	84	4823.50	5208.00	183.99	57.42

WILCOXON 2-SAMPLE TEST (NORMAL APPROXIMATION)
S= 2802.50 Z= 2.0898 PROB >\Z\=0.0366
T-TEST APPROX. SIGNIFICANCE=0.0387

KRUSKAL-WALLIS TEST (CHI-SQUARE APPROXIMATION)
CHISQ= 4.37 DF= 1 PROB > CHISQ=0.0366

Table II-51. - Kruskall-Wallis test of log-transformed trawl data of weakfish, North vs. South regions, 7 - 8 September, 1978.

WILCOXON SCORES (RANK SUMS)

LEVEL	N	SUM OF SCORES	EXPECTED UNDER H0	STD DEV UNDER H0	MEAN SCORE
North	9	365.00	423.00	76.95	40.56
South	84	4006.00	3948.00	76.95	47.69

WILCOXON 2-SAMPLE TEST (NORMAL APPROXIMATION)
S= 365.00 Z=-0.7537 PROB >\Z\=0.4510
T-TEST APPROX. SIGNIFICANCE=0.4530

KRUSKAL-WALLIS TEST (CHI-SQUARE APPROXIMATION)
CHISQ= 0.57 DF= 1 PROB > CHISQ=0.4510

Table II-52. - Catch per unit effort (n/T) by date and subarea, of *C. regalis* collected in population surveys.

	20, 21 July	2, 3 August	16, 17 August	7, 8 September
North region				
Subarea 1	95.6	69.6	16.8	52.0
2	81.8	127.2	13.8	2.8
Plant region				
Subarea 1	359.8	78.9	187.6	54.0
2	126.0	80.3	53.7	28.4
3	304.8	76.8	197.5	55.2
4	126.4	110.4	86.1	45.7
5	41.6	40.8	31.0	12.6
6	135.3	60.0	34.6	22.3
South region				
Subarea 1	83.6	29.1	27.0	125.1
2	606.5	138.8	114.9	26.7
3	177.1	24.7	23.6	14.1
4	58.4	26.8	64.0	61.2
5	65.2	7.2	51.2	30.5
6	112.7	16.1	15.6	8.9
7	61.3	24.6	32.3	61.1
8	40.0	21.8	45.8	96.0
9	24.0	14.8	5.5	0.0

Table II-53. - Kruskall-Wallis test of log-transformed trawl data of weakfish, west vs. east, South region, 7 - 8 September, 1978.

WILCOXON SCORES (RANK SUMS)

LEVEL	N	SUM OF SCORES	EXPECTED UNDER H0	STD DEV UNDER H0	MEAN SCORE
East	41	1354.50	1742.50	111.75	33.04
West	43	2215.50	1827.50	111.75	51.52

WILCOXON 2-SAMPLE TEST (NORMAL APPROXIMATION)
S= 1354.50 Z=-3.4721 PROB >\Z\=0.0005
T-TEST APPROX. SIGNIFICANCE=0.0008

KRUSKAL-WALLIS TEST (CHI-SQUARE APPROXIMATION)
CHISQ= 12.06 DF= 1 PROB > CHISQ=0.0005

Table II-54. - Kruskall-Wallis test of log-transformed trawl data of weakfish, west vs. east, North region, 7 - 8 September, 1978.

WILCOXON SCORES (RANK SUMS)

LEVEL	N	SUM OF SCORES	EXPECTED UNDER HO	STD DEV UNDER HO	MEAN SCORE
East	5	21.50	25.00	4.08	4.30
West	4	23.50	20.00	4.08	5.88

WILCOXON 2-SAMPLE TEST (NORMAL APPROXIMATION)
S= 23.50 Z= 0.8573 PROB >\Z\=0.3913
T-TEST APPROX. SIGNIFICANCE=0.4162

KRUSKAL-WALLIS TEST (CHI-SQUARE APPROXIMATION)
CHISQ= 0.73 DF= 1 PROB > CHISQ=0.3913

Table II-55. - Kruskall-Wallis test of log-transformed trawl data of weakfish, west vs. east, Plant region, 7 - 8 September, 1978.

WILCOXON SCORES (RANK SUMS)

LEVEL	N	SUM OF SCORES	EXPECTED UNDER HO	STD DEV UNDER HO	MEAN SCORE
East	21	355.00	420.00	35.50	16.90
West	18	425.00	360.00	35.50	23.61

WILCOXON 2-SAMPLE TEST (NORMAL APPROXIMATION)
S= 425.00 Z= 1.8312 PROB >\Z\=0.0671
T-TEST APPROX. SIGNIFICANCE=0.0749

KRUSKAL-WALLIS TEST (CHI-SQUARE APPROXIMATION)
CHISQ= 3.35 DF= 1 PROB > CHISQ=0.0671

Table II-56. - Kruskall-Wallis test of log-transformed trawl data of weakfish, 21 June vs. 5 July, 1978.

WILCOXON SCORES (RANK SUMS)

LEVEL		N	SUM OF SCORES	EXPECTED UNDER H0	STD DEV UNDER H0	MEAN SCORE
21 June	1	13	221.00	175.50	19.50	17.00
5 July	2	13	130.00	175.50	19.50	10.00

WILCOXON 2-SAMPLE TEST (NORMAL APPROXIMATION)
S= 221.00 Z= 2.3333 PROB >\Z\=0.0196
T-TEST APPROX. SIGNIFICANCE=0.0280

KRUSKAL-WALLIS TEST (CHI-SQUARE APPROXIMATION)
CHISQ= 5.44 DF= 1 PROB > CHISQ=0.0196

Table II-57. - Density ($n/100m^3$) of *C. regalis* in Delaware River Estuary, 1978, by date and sub-area, within North, Plant, and South regions, based on population estimates.

	Volume ($10^8 m^3$)	21 June	5 July	20, 21 July	2, 3 Aug.	16, 17 Aug.	7, 8 Sept.
North region							
Sub-area 1	0.86	-	-	5.06	3.68	0.89	2.75
Sub-area 2	1.15	-	-	3.59	5.59	0.61	0.01
Plant region							
Sub-area 1	2.05	-	-	13.40	2.98	6.98	2.01
Sub-area 2	2.02	-	-	5.61	3.57	2.38	1.26
Sub-area 3	1.21	26.10	15.90	12.20	3.08	7.93	2.22
Sub-area 4	0.88	30.20	9.86	8.31	7.26	5.66	3.00
Sub-area 5	1.95	5.20	3.32	1.89	1.85	1.41	5.71
Sub-area 6	1.82	7.89	2.64	5.59	2.46	1.42	9.14
South region							
Sub-area 1	7.80	-	-	4.38	1.53	1.41	6.56
Sub-area 2	28.10	-	-	11.70	2.68	2.22	0.52
Sub-area 3	11.60	-	-	7.36	1.03	0.98	0.59
Sub-area 4	2.39	-	-	5.23	2.43	5.73	5.48
Sub-area 5	5.32	-	-	4.29	0.47	3.36	2.01
Sub-area 6	17.50	-	-	3.95	0.57	0.55	0.31
Sub-area 7	2.87	-	-	6.97	2.79	3.66	6.93
Sub-area 8	6.77	-	-	1.99	1.09	2.29	4.80
Sub-area 9	4.77	-	-	1.34	0.82	0.31	0.00

Table II-58. - Number (n) and weight, by region and date, of C. regalis (age 0+) in Delaware Estuary, 1978 based on population estimates.

Region	North			Plant			South			Total		
	n	weight		n	weight		n	weight		n	weight	
Date	(10^8)	(kg	(lbs)	(10^8)	(kg)	(lbs)	(10^8)	(kg)	(lbs)	(10^8)	(kg)	(lbs)
21 June	-	-	-	1.210	47,811	105,423	-	-	-	12.10	478,110	1,054,233
5 July	-	-	-	0.513	52,183	115,064	-	-	-	5.13	521,803	1,150,635
20, 21 July	0.086	14,046	30,971	0.843	129,685	285,955	6.92	1,471,988	3,245,734	7.85	1,615,719	3,562,660
2, 3 August	0.091	19,894	43,866	0.333	72,775	160,469	1.67	563,800	1,243,179	2.09	656,469	1,447,514
16, 17 August	0.015	4,057	8,946	0.431	92,114	203,111	1.73	660,481	1,456,361	2.17	756,652	1,668,418
7, 8 September	0.029	15,625	34,453	0.161	86,581	190,911	1.49	918,658	2,025,641	1.68	1,020,864	2,251,005

Table II-59. - Number (n) and weight of C. regalis (age 0+) impinged at circulating water intakes at S.N.G.S. on dates of population surveys in Delaware Estuary.

Date	n	Weight (kg)	Weight (lb)
21 June	7.1×10^3	18.7	8.5
5 July	4.3×10^5	699.9	1543.0
20, 21 July	3.3×10^4	60.9	134.3
2,3 August	1.6×10^4	21.9	48.3
16, 17 August	2.2×10^4	23.8	52.5
7, 8 September	1.1×10^4	5.2	11.5

TABLE III-1 . - WEAKFISH IMPINGEMENT DATA FROM JUNE 19 TO JULY 30, 1978 AT S.N.G.S.

DATE	TIME	RATE (NO/MIN)	SURVIVAL (%)	MIN.LEN (MM)	MAX.LEN (MM)	CIRC	TIDE.STAGE	DETRITUS.WT (KG/MIN)
061978	0923	.3	100	NA	NA	5	FL. 2	99.9
	1053	.0	NA	NA	NA	4	EBB 2	.7
	1203	.0	NA	NA	NA	4	EBB 2	47.0
	1426	3.3	60	NA	NA	4	EBB 2	99.9
	1800	2.0	66	NA	NA	4	FL. 1	99.9
	2103	.0	NA	NA	NA	4	FL. 2	3.7
062078	0000	1.3	50	NA	NA	4	FL. 2	99.9
	0305	.0	NA	NA	NA	5	EBB 2	25.0
	0600	2.3	29	NA	NA	5	EBB 2	99.9
062178	0910	.0	NA	NA	NA	5	FL. 1	6.8
	1015	.3	0	NA	NA	5	FL. 1	99.9
	1203	1.0	100	NA	NA	5	FL. 2	99.9
	1242	.3	0	NA	NA	5	FL. 2	99.9
	1341	17.7	57	NA	NA	5	EBB 1	99.9
	1808	2.3	18	NA	NA	5	EBB 2	99.9
	2123	.7	100	NA	NA	6	FL. 1	99.9
062278	0000	.3	0	NA	NA	6	FL. 2	99.9
	0300	2.7	38	NA	NA	6	EBB 1	99.9
	0600	11.7	74	NA	NA	5	EBB 2	99.9
	0940	2.7	0	NA	NA	5	FL. 1	99.9
	1029	2.3	43	NA	NA	5	FL. 1	99.9
	1200	2.3	29	NA	NA	5	FL. 2	99.9
	1330	1.3	25	NA	NA	5	FL. 2	99.9
	1405	6.7	50	NA	NA	6	EBB 1	99.9
	1805	11.3	29	NA	NA	6	EBB 1	99.9
	2125	.7	50	NA	NA	6	EBB 2	99.9
062378	0000	.7	50	NA	NA	6	FL. 1	99.9
	0300	8.7	46	NA	NA	6	FL. 2	99.9
	0600	20.7	29	NA	NA	6	EBB 1	99.9
062678	0909	749.3	30	21	55	6	EBB 2	15.0
	1206	13.3	45	26	60	5	FL. 1	.9
	1510	6.0	44	31	55	5	FL. 2	.3
	1800	9.0	66	21	55	5	EBB 1	.8
	2100	37.0	38	21	55	5	EBB 2	16.7
062778	0000	43.0	48	21	60	6	FL. 1	7.3
	0315	28.3	61	26	60	6	FL. 2	3.3
	0600	19.7	32	31	60	6	EBB 1	1.7
062878	0851	797.0	28	16	60	6	EBB 1	26.0
	1354	82.0	44	31	65	6	FL. 1	.3

NOTE:
IF DETRITUS WEIGHT = 99.9, NO DATA ARE AVAILABLE

TABLE III-1 (CONTINUED).

DATE	TIME	RATE (NO/MIN)	SURVIVAL (%)	MIN.LEN (MM)	MAX.LEN (MM)	CIRC	TIDE.STAGE	DETRITUS.WT (KG/MIN)
062878	1804	27.3	44	31	60	6	FL. 2	1.3
	2145	535.0	37	21	65	6	EBB 1	11.0
062978	0000	1748.3	53	21	75	6	EBB 2	15.3
	0600	75.0	56	31	70	6	FL. 2	2.3
	1200	347.7	32	21	255	5	EBB 2	15.0
	1758	20.0	60	31	65	5	FL. 2	.3
	2200	222.0	75	26	65	5	EBB 1	8.0
	2240	68.5	NA	26	65	5	EBB 1	23.0
063078	0600	286.0	75	31	65	6	FL. 2	2.7
070478	1037	38.0	77	36	70	6	FL. 2	.3
	1100	38.7	82	36	75	6	FL. 2	.1
	1810	87.6	63	36	70	6	EBB 2	1.0
	2200	200.0	83	36	70	5	FL. 2	2.0
	2230	147.5	NA	36	70	5	FL. 2	99.9
070578	0600	823.7	72	36	75	5	FL. 1	6.0
	1130	26.7	53	31	70	5	FL. 2	1.3
	1204	21.3	61	36	75	5	FL. S	.8
	1800	473.0	63	36	75	6	EBB 2	3.8
	1830	281.0	NA	36	75	6	EBB 2	2.3
	2300	197.0	75	36	75	6	FL. 2	.3
	2320	167.5	NA	36	75	6	FL. 2	.6
070678	0500	714.0	66	41	75	6	EBB 2	8.6
	0555	670.0	NA	41	75	6	EBB 2	8.2
	1200	20.7	32	31	75	5	FL. 2	1.3
	1231	12.3	43	31	80	5	FL. 2	.4
	1750	147.0	63	31	70	5	EBB 2	1.7
	1835	148.0	NA	31	70	5	EBB 2	1.7
	2300	93.0	78	46	80	6	FL. 2	.9
	2315	59.5	NA	46	80	6	FL. 2	.3
070778	0500	1260.0	53	31	75	6	EBB 2	21.5
	1140	26.0	63	36	75	5	FL. 2	1.0
071078	1046	134.0	73	36	80	5	FL. 1	3.0
	1110	47.0	NA	36	80	5	FL. 1	.6
	1302	135.5	78	36	75	5	FL. 2	.7
	1750	19.0	53	31	70	4	EBB 1	2.6
	1815	9.5	NA	36	70	4	EBB 1	2.6
	2100	305.0	NA	NA	NA	5	EBB 2	21.3
071178	0000	85.7	71	36	85	6	FL. 1	7.0

NOTE:
IF DETRITUS WEIGHT = 99.9, NO DATA ARE AVAILABLE

TABLE III-1 (CONTINUED).

DATE	TIME	RATE (NO/MIN)	SURVIVAL (%)	MIN.LEN (MM)	MAX.LEN (MM)	CIRC	TIDE.STAGE	DETRITUS.WT (KG/MIN)
071478	2200	36.0	NA	NA	NA	5	EBB 1	99.9
	2300	193.0	NA	NA	NA	5	EBB 2	99.9
071578	0000	100.0	NA	NA	NA	5	EBB 2	99.9
	0005	188.0	NA	NA	NA	5	EBB 2	99.9
	0010	188.0	NA	NA	NA	5	EBB 2	99.9
	0200	64.0	NA	NA	NA	5	FL. 1	99.9
	0205	66.0	NA	NA	NA	5	FL. 1	99.9
	0210	36.0	NA	NA	NA	5	FL. 1	99.9
	0400	53.0	NA	NA	NA	5	FL. 2	99.9
	0410	54.0	NA	NA	NA	5	FL. 2	99.9
	0430	61.0	NA	NA	NA	5	FL. 2	99.9
	0600	39.0	NA	NA	NA	5	FL. 2	99.9
	0610	41.0	NA	NA	NA	5	FL. 2	99.9
	0700	39.0	NA	NA	NA	5	EBB 1	99.9
	0820	33.0	NA	NA	NA	5	EBB 1	99.9
	0900	33.0	NA	NA	NA	5	EBB 1	99.9
	1000	78.0	NA	NA	NA	5	EBB 1	99.9
	1100	91.0	NA	NA	NA	5	EBB 2	99.9
	1200	133.0	NA	NA	NA	5	EBB 2	99.9
	1300	329.0	NA	NA	NA	5	EBB 2	99.9
	1415	370.0	NA	NA	NA	5	FL. 1	99.9
	1418	370.0	NA	NA	NA	5	FL. 1	99.9
	1421	147.0	NA	NA	NA	5	FL. 1	99.9
	1600	64.0	NA	NA	NA	6	FL. 2	99.9
	1603	59.0	NA	NA	NA	6	FL. 2	99.9
	1604	64.0	NA	NA	NA	6	FL. 2	99.9
	1800	39.0	NA	NA	NA	6	FL. 2	99.9
	1803	10.0	NA	NA	NA	6	FL. 2	99.9
	1806	33.0	NA	NA	NA	5	FL. 2	99.9
	2000	33.0	NA	NA	NA	5	FL. 2	99.9
	2003	16.0	NA	NA	NA	5	FL. 2	99.9
	2006	50.0	NA	NA	NA	5	FL. 2	99.9
	2145	78.0	NA	NA	NA	5	EBB 1	99.9
	2300	36.0	NA	NA	NA	5	EBB 1	99.9
	2315	44.0	NA	NA	NA	5	EBB 1	99.9
071678	0035	221.0	NA	NA	NA	5	EBB 2	99.9
	0155	193.0	NA	NA	NA	5	EBB 2	99.9
	0306	235.0	NA	NA	NA	5	FL. 1	99.9
	0312	233.0	NA	NA	NA	5	FL. 1	99.9
	0315	158.0	NA	NA	NA	5	FL. 1	99.9
	0603	53.0	NA	NA	NA	5	FL. 2	99.9
	0608	31.0	NA	NA	NA	5	FL. 2	99.9
	0611	42.0	NA	NA	NA	5	FL. 2	99.9
	1000	42.0	NA	NA	NA	5	EBB 2	99.9

NOTE:
IF DETRITUS WEIGHT = 99.9, NO DATA ARE AVAILABLE

TABLE III-1 (CONTINUED).

DATE	TIME	RATE (NO/MIN)	SURVIVAL (%)	MIN.LEN (MM)	MAX.LEN (MM)	CIRC	TIDE.STAGE	DETRITUS.WT (KG/MIN)
071678	1200	97.0	NA	NA	NA	5	EBB 2	99.9
	1515	75.0	NA	NA	NA	6	FL. 1	99.9
	1518	84.0	NA	NA	NA	6	FL. 1	99.9
	1521	89.0	NA	NA	NA	6	FL. 1	99.9
	1835	50.0	NA	NA	NA	5	FL. 2	99.9
	1838	30.0	NA	NA	NA	5	FL. 2	99.9
	1841	42.0	NA	NA	NA	5	FL. 2	99.9
	2000	55.0	NA	NA	NA	5	FL. 2	99.9
	2200	64.0	NA	NA	NA	5	EBB 1	99.9
	2315	105.0	NA	NA	NA	6	EBB 1	99.9
071778	0420	329.0	NA	NA	NA	6	FL. 1	99.9
	0426	684.0	NA	NA	NA	6	FL. 1	99.9
	0430	193.0	NA	NA	NA	6	FL. 1	99.9
	0728	50.0	NA	NA	NA	6	FL. 2	99.9
	0731	59.0	NA	NA	NA	6	FL. 2	99.9
	0733	50.0	NA	NA	NA	6	FL. 2	99.9
	0915	26.7	86	46	81	6	EBB 1	1.0
	1200	4.0	92	46	66	5	EBB 1	10.0
	1520	42.0	81	41	90	5	EBB 2	10.7
	1800	41.7	82	41	90	5	FL. 2	3.2
	2106	50.7	86	41	85	5	EBB 1	.8
071878	0000	67.3	85	31	90	6	EBB 1	4.0
	0300	96.0	72	41	90	6	EBB 2	4.0
	0600	10.7	88	41	85	6	FL. 1	1.7
	0900	4.6	71	46	81	3	FL. 2	3.0
	1030	5.0	80	56	81	3	EBB 1	2.1
	1200	2.0	83	41	76	3	EBB 1	5.3
	1400	7.0	43	46	90	3	EBB 2	16.3
	1600	6.0	75	46	75	3	EBB 2	8.2
	2115	.0	NA	NA	NA	2	FL. 2	1.8
	2230	2.0	100	46	60	2	FL. 2	.5
071978	0000	8.6	77	46	81	2	EBB 1	3.2
	0200	1.0	100	56	56	2	EBB 2	.9
	0400	15.0	100	36	81	2	EBB 2	1.4
	0600	31.3	50	36	95	2	FL. 1	.9
	0900	4.0	100	46	75	3	FL. 2	4.1
	1200	7.3	68	46	85	5	EBB 1	2.8
	1345	10.0	50	46	95	4	EBB 1	12.5
	1500	30.0	73	46	85	5	EBB 2	15.0
	1800	43.3	73	41	85	4	FL. 1	4.1
072078	0025	6.3	79	41	75	4	EBB 1	.1
	0300	4.3	91	41	80	3	EBB 2	4.0

NOTE:
IF DETRITUS WEIGHT = 99.9, NO DATA ARE AVAILABLE

TABLE III-1 (CONTINUED).

DATE	TIME	RATE (NO/MIN)	SURVIVAL (%)	MIN.LEN (MM)	MAX.LEN (MM)	CIRC	TIDE.STAGE	DETRITUS.WT (KG/MIN)
072078	0600	56.0	64	41	90	3	EBB 2	1.7
	0900	2.0	50	46	NA	3	FL. 2	2.4
	1030	18.0	60	46	85	4	FL. 2	3.5
	1200	3.7	71	51	70	5	EBB 1	5.1
	1600	23.0	87	46	95	5	EBB 2	11.0
	1800	30.3	66	41	85	5	EBB 2	5.8
072178	0045	19.6	79	46	85	6	EBB 1	4.0
	0300	43.0	86	41	85	6	EBB 2	5.0
	0600	55.3	72	41	96	6	EBB 2	6.0
	0930	16.0	56	46	75	5	FL. 2	12.5
	1200	11.0	76	41	80	5	FL. 2	1.1
	1420	40.0	83	41	90	5	EBB 1	6.0
	1530	18.0	56	46	80	4	EBB 1	7.8
	1800	15.7	77	41	90	5	EBB 2	6.7
	2130	17.0	71	46	70	5	FL. 1	2.5
072278	0000	19.0	72	41	80	5	FL. 2	.9
	0245	10.0	100	46	90	4	EBB 1	1.0
	0600	38.6	78	41	95	5	EBB 2	4.0
	0950	18.0	NA	51	76	5	FL. 1	99.9
	1100	12.0	NA	42	66	5	FL. 2	99.9
	1300	2.0	NA	62	68	5	FL. 2	99.9
	1430	5.0	NA	48	85	5	EBB 1	99.9
	1640	13.0	NA	50	78	5	EBB 2	99.9
	1830	14.0	NA	56	78	5	EBB 2	99.9
	1930	20.0	NA	47	74	5	EBB 2	99.9
	2225	56.0	NA	30	82	5	FL. 1	99.9
072378	0030	24.0	NA	46	103	5	FL. 2	99.9
	0308	161.0	NA	45	103	5	EBB 2	99.9
	0700	178.0	NA	43	94	5	EBB 2	99.9
	0915	140.0	NA	43	107	5	FL. 1	99.9
	1145	32.0	NA	48	50	5	FL. 2	99.9
	1400	12.0	NA	43	68	5	FL. 2	99.9
	1600	24.0	NA	43	77	5	EBB 1	99.9
	1830	32.0	NA	53	87	5	EBB 2	99.9
	2105	34.0	NA	50	87	5	EBB 2	99.9
	2230	24.0	NA	52	84	5	FL. 1	99.9
	2330	17.0	NA	50	63	5	FL. 1	99.9
072478	0135	30.0	NA	48	80	5	FL. 2	99.9
	0210	13.0	NA	50	76	5	FL. 2	99.9
	0400	72.0	NA	44	79	5	EBB 1	99.9
	0605	36.0	NA	47	90	5	EBB 2	99.9
	0910	74.0	69	41	86	5	EBB 2	7.0

NOTE:
IF DETRITUS WEIGHT = 99.9, NO DATA ARE AVAILABLE

TABLE III-1 (CONTINUED).

DATE	TIME	RATE (NO/MIN)	SURVIVAL (%)	MIN.LEN (MM)	MAX.LEN (MM)	CIRC	TIDE.STAGE	DETRITUS.WT (KG/MIN)
072478	1200	33.3	74	41	81	5	FL. 1	16.6
	1500	11.0	82	51	61	5	FL. 2	1.0
	1800	30.0	88	40	80	5	EBB 2	4.0
	2100	31.0	61	46	95	5	EBB 2	5.2
072578	0000	19.6	76	46	100	5	FL. 1	3.0
	0300	60.0	84	48	100	5	FL. 2	3.3
	0600	26.0	76	46	120	5	EBB 1	4.9
	0930	270.0	NA	45	102	5	EBB 2	19.5
	1120	95.0	NA	50	87	5	FL. 1	99.9
	1215	126.0	NA	43	75	5	FL. 1	99.9
	1335	121.0	NA	42	90	5	FL. 2	99.9
	1520	41.0	NA	48	83	5	FL. 2	99.9
	1800	101.0	NA	49	92	5	EBB 1	99.9
	1900	120.0	NA	39	90	5	EBB 1	99.9
	2045	13.0	NA	54	82	4	EBB 2	99.9
	2205	45.0	NA	47	83	4	EBB 2	99.9
072678	0030	41.0	NA	48	82	4	FL. 1	99.9
	0410	28.0	NA	38	62	4	FL. 2	99.9
	0600	97.0	NA	52	77	4	EBB 1	99.9
	0900	8.0	63	51	95	4	EBB 2	3.4
	1200	6.6	80	46	90	4	EBB S	.5
	1330	5.3	50	46	61	4	FL. 1	2.2
	1500	14.0	76	41	75	4	FL. 2	1.2
	1800	.3	0	56	56	4	FL. S	.3
	2103	11.0	55	46	80	4	FL. 1	1.4
072778	0000	41.3	63	46	100	5	FL. 1	.9
	0300	2.3	70	51	85	5	FL. 2	1.1
	0600	4.3	62	51	80	5	EBB 1	.4
	0910	9.3	76	51	81	4	EBB 2	1.7
	1200	21.3	84	41	85	5	EBB 2	2.3
	1500	9.0	55	46	85	5	FL. 2	.6
	1800	5.0	80	46	66	5	FL. S	.2
	2115	2.0	100	56	100	5	EBB 2	1.0
072878	0000	9.7	90	46	100	5	EBB 2	2.0
	0320	3.3	46	40	90	5	FL. 1	2.2
	0600	5.0	60	51	80	5	FL. 2	1.0
	0855	3.0	NA	62	73	5	EBB 1	99.9
	1020	11.0	NA	58	66	5	EBB 2	99.9
	1145	16.0	NA	50	78	5	EBB 2	99.9
	1325	23.0	NA	55	72	5	FL. 1	99.9
	1445	4.0	NA	60	96	5	FL. 1	99.9
	1605	2.0	NA	50	63	5	FL. 2	99.9

NOTE:
IF DETRITUS WEIGHT = 99.9, NO DATA ARE AVAILABLE

TABLE III-1 (CONTINUED).

DATE	TIME	RATE (NO/MIN)	SURVIVAL (%)	MIN.LEN (MM)	MAX.LEN (MM)	CIRC	TIDE.STAGE	DETRITUS.WT (KG/MIN)
072878	1900	.0	NA	NA	NA	5	EBB 1	99.9
	2110	21.0	NA	63	82	5	EBB 1	99.9
	2330	73.0	NA	47	84	5	EBB 2	99.9
072978	0130	82.0	NA	51	82	5	EBB 2	99.9
	0330	21.0	NA	53	93	5	FL. 1	99.9
	0630	11.0	NA	49	77	5	FL. 2	99.9
	0900	16.0	NA	50	63	5	EBB 1	99.9
	0950	2.0	NA	57	60	5	EBB 1	99.9
	1050	6.0	NA	61	74	5	EBB 2	99.9
	1225	12.0	NA	50	72	5	EBB 2	99.9
	1420	12.0	NA	53	99	5	FL. 1	99.9
	1520	19.0	NA	50	71	5	FL. 1	99.9
	1640	19.0	NA	33	76	5	FL. 2	99.9
	1820	3.0	NA	67	75	5	FL. 2	99.9
	2100	11.0	NA	52	65	5	EBB 1	99.9
	2230	23.0	NA	49	65	5	EBB 1	99.9
073078	0100	116.0	NA	44	77	4	EBB 2	99.9
	0300	131.0	NA	42	85	5	FL. 1	99.9
	0630	1.0	NA	64	64	5	FL. 2	99.9
	0900	.0	NA	NA	NA	5	EBB 1	99.9
	0955	.0	NA	NA	NA	5	EBB 1	99.9
	1135	11.0	NA	49	85	5	EBB 2	99.9
	1250	31.0	NA	52	108	5	EBB 2	99.9
	1530	24.0	NA	50	72	5	FL. 1	99.9
	1615	28.0	NA	49	69	5	FL. 1	99.9
	1810	3.0	NA	50	58	5	FL. 2	99.9
	1900	3.0	NA	49	57	5	FL. 2	99.9
	2100	34.0	NA	41	71	5	FL. S	99.9
	2200	31.0	NA	45	94	5	EBB 1	99.9
073178	0000	27.0	NA	47	95	5	EBB 1	99.9
	0300	71.0	NA	51	92	5	EBB 2	99.9
	0600	67.0	NA	58	78	5	FL. 1	99.9
	0930	8.6	77	51	85	5	EBB 1	.7
	1200	7.6	96	31	80	5	EBB 1	5.0
	1510	16.7	78	31	85	5	EBB 2	7.1
	1800	4.6	57	51	70	5	FL. 2	.9
	2200	15.0	80	51	71	5	EBB 1	7.5
080178	0000	25.0	48	46	86	4	EBB 1	4.5
	0300	60.0	45	41	76	4	EBB 2	19.5
	0600	2.0	50	46	66	4	FL. 1	2.5
	1000	5.0	NA	58	65	5	FL. 2	99.9
	1100	53.0	NA	56	62	5	EBB 1	99.9

NOTE:
IF DETRITUS WEIGHT = 99.9, NO DATA ARE AVAILABLE

TABLE III-1 (CONTINUED).

DATE	TIME	RATE (NO/MIN)	SURVIVAL (%)	MIN.LEN (MM)	MAX.LEN (MM)	CIRC	TIDE.STAGE	DETRITUS.WT (KG/MIN)
080178	1300	3.0	NA	59	77	4	EBB 1	99.9
	1430	7.0	NA	57	87	4	EBB 2	99.9
	1630	38.0	NA	54	86	5	EBB 2	99.9
	1800	24.0	NA	50	103	5	FL. 1	99.9
	2100	29.0	NA	47	86	5	FL. 2	99.9
	2230	8.0	NA	27	84	5	EBB 1	99.9
080278	0000	4.0	NA	52	68	4	EBB 1	99.9
	0300	29.0	NA	58	91	4	EBB 2	99.9
	0600	37.0	NA	51	83	6	FL. 1	99.9
	0910	1.0	100	63	63	6	FL. 2	1.3
	1035	.0	NA	NA	NA	6	FL. 2	.6
	1200	5.7	82	46	90	6	EBB 1	.4
	1345	2.0	100	61	80	6	EBB 1	.8
	1520	9.0	89	51	80	6	EBB 2	22.1
	1800	2.0	100	56	80	6	FL. 1	3.2
	2130	8.0	88	56	76	6	FL. 2	2.7
	2230	11.0	54	51	81	5	FL. 2	3.0
080378	0000	17.6	68	46	98	5	EBB 1	5.5
	0300	19.0	63	51	80	5	EBB 2	11.5
	0400	25.0	68	51	81	5	EBB 2	6.8
	0600	28.7	77	46	76	5	EBB 2	8.2
	0910	.0	NA	NA	NA	6	FL. 2	.8
	1020	1.0	0	46	46	5	FL. 2	1.2
	1120	1.0	0	63	63	5	FL. 2	1.7
	1200	.7	50	68	68	5	EBB 1	.3
	1300	1.0	0	58	58	5	EBB 1	.5
	1420	.0	NA	NA	NA	4	EBB 1	3.4
	1800	4.0	100	51	75	5	EBB S	1.3
	2100	7.0	51	66	71	5	FL. 2	1.0
	2230	7.0	71	56	81	6	FL. 2	1.0
080478	0000	5.7	71	56	106	6	FL. S	.3
	0300	9.0	78	56	86	6	EBB 2	5.0
	0600	28.0	60	46	106	6	EBB 2	8.1
	1000	1.0	NA	61	61	5	FL. 2	99.9
	1130	1.0	NA	62	62	5	FL. 2	99.9
	1345	2.0	NA	63	67	5	EBB 2	99.9
	1440	1.0	NA	59	59	5	EBB 1	99.9
	1640	5.0	NA	51	65	5	EBB 2	99.9
	1800	12.0	NA	51	85	5	EBB 2	99.9
	1910	24.0	NA	51	95	5	EBB S	99.9
	2115	16.0	NA	56	86	6	FL. 2	99.9
	2240	13.0	NA	56	111	6	FL. 2	99.9

NOTE:
IF DETRITUS WEIGHT = 99.9, NO DATA ARE AVAILABLE

TABLE III-1 (CONTINUED).

DATE	TIME	RATE (NO/MIN)	SURVIVAL (%)	MIN.LEN (MM)	MAX.LEN (MM)	CIRC	TIDE.STAGE	DETRITUS.WT (KG/MIN)
080578	0000	4.0	NA	61	71	6	FL. S	99.9
	0130	10.0	NA	46	71	6	EBB 1	99.9
	0330	24.0	NA	46	81	5	EBB 1	99.9
	0530	27.0	NA	56	96	5	EBB 2	99.9
	0730	95.0	NA	36	90	5	EBB 2	99.9
	0915	23.0	NA	56	75	5	FL. 1	99.9
	1115	4.0	NA	36	75	5	FL. 2	99.9
	1315	2.0	NA	61	65	5	EBB 1	99.9
	1445	12.0	NA	31	70	4	EBB 1	99.9
	1630	9.0	NA	46	100	5	EBB 2	99.9
	1835	18.0	NA	51	85	4	EBB 2	99.9
	2100	3.0	NA	56	86	4	FL. 1	99.9
	2230	3.0	NA	46	61	4	FL. 1	99.9
080678	0030	5.0	NA	36	76	4	FL. S	99.9
	0230	6.0	NA	61	76	4	EBB 1	99.9
	0430	8.0	NA	56	76	4	EBB 2	99.9
	0735	12.0	NA	51	66	5	EBB 2	99.9
	0925	.0	NA	NA	NA	5	FL. 1	99.9
	1030	.0	NA	NA	NA	5	FL. 1	99.9
	1135	3.0	NA	53	62	5	FL. 2	99.9
	1335	.0	NA	NA	NA	5	FL. S	99.9
	1510	2.0	NA	62	66	5	EBB 1	99.9
	1630	2.0	NA	70	72	6	EBB 2	99.9
	1810	11.0	NA	65	113	6	EBB 2	99.9
	1940	24.0	NA	62	81	6	EBB 2	99.9
	2100	13.0	NA	51	81	5	FL. 1	99.9
	2330	20.0	NA	46	81	5	FL. 2	99.9
080778	0050	5.0	NA	61	66	5	FL. 2	99.9
	0200	4.0	NA	61	96	5	EBB 1	99.9
	0330	13.0	NA	51	71	6	EBB 1	99.9
	0530	6.0	NA	46	66	5	EBB 2	99.9
	0620	13.0	NA	56	86	5	EBB 2	99.9
	0915	18.0	78	56	76	5	FL. 1	.5
	1030	2.0	100	56	70	5	FL. 1	.6
	1100	.0	NA	NA	NA	5	FL. 2	3.6
	1200	.6	50	56	115	5	FL. 2	.4
	1330	1.0	0	76	76	6	EBB 1	1.0
	1500	.0	NA	NA	NA	6	EBB 1	.1
	1800	2.3	100	61	85	6	EBB 2	1.2
	2210	5.0	80	56	95	6	FL. 1	.5
080878	0000	33.0	60	56	86	6	FL. 2	.5
	0130	2.0	100	66	75	5	FL. 2	.5
	0300	1.0	100	86	86	5	EBB 1	.5

NOTE:
IF DETRITUS WEIGHT = 99.9, NO DATA ARE AVAILABLE

TABLE III-1 (CONTINUED).

DATE	TIME	RATE (NO/MIN)	SURVIVAL (%)	MIN.LEN (MM)	MAX.LEN (MM)	CIRC	TIDE.STAGE	DETRITUS.WT (KG/MIN)
080878	0430	8.0	75	85	NA	6	EBB 1	1.0
	0600	5.3	69	36	75	6	EBB 2	.8
	1045	4.0	NA	61	75	5	FL. 1	.7
	1410	.0	NA	NA	NA	5	FL. 2	.5
	1500	1.0	NA	68	68	6	FL. S	.2
	1550	1.0	NA	70	70	6	EBB 1	.5
	1751	4.0	NA	61	96	5	EBB 2	.8
	1850	1.0	NA	61	61	5	EBB 2	.9
	2010	14.0	NA	51	76	5	EBB 2	1.8
	2115	18.0	NA	37	78	5	FL. 1	99.9
	2230	6.0	NA	59	73	5	FL. 1	99.9
080978	0010	3.0	NA	56	61	6	FL. 2	99.9
	0140	5.0	NA	49	77	6	FL. 2	99.9
	0240	2.0	NA	68	80	6	EBB 1	99.9
	0355	5.0	NA	48	73	6	EBB 1	99.9
	0555	12.0	NA	45	96	5	EBB 2	99.9
	0700	6.0	NA	59	95	5	EBB 2	99.9
	1000	47.0	62	46	85	6	EBB 2	5.3
	1100	2.0	50	66	85	5	FL. 1	.4
	1200	4.0	55	41	75	5	FL. 1	3.2
	1330	4.0	50	61	85	5	FL. 2	.5
	1430	2.0	0	41	50	5	FL. 2	1.0
	1515	.0	NA	NA	NA	5	FL. S	.3
	1800	.7	50	46	65	5	EBB 1	5.7
	2100	31.0	77	31	85	5	EBB 2	6.1
	2230	76.0	66	51	101	6	FL. 1	3.6
081078	0000	11.0	64	46	110	6	FL. 1	1.0
	0130	23.0	83	41	90	6	FL. 2	1.1
	0300	8.0	63	51	90	6	FL. 2	.3
	0600	7.7	69	36	90	6	EBB 1	2.7
	0915	25.0	80	41	80	5	EBB 2	4.2
	1200	4.0	67	41	114	5	FL. 1	.7
	1305	2.0	50	46	70	5	FL. 2	.3
	1400	2.0	100	61	80	6	FL. 2	.1
	1500	1.0	0	71	71	6	FL. 2	.2
	1601	2.0	100	66	75	6	FL. 2	.1
	1800	1.0	0	66	66	5	EBB 1	5.7
	2100	51.0	88	36	95	5	EBB 2	5.5
	2230	53.0	64	41	86	5	EBB 2	3.2
081178	0000	47.7	57	51	110	5	FL. 1	.9
	0130	11.0	46	46	70	5	FL. 1	.5
	0300	26.0	85	46	81	5	FL. 2	.3
	0430	14.0	57	36	80	5	FL. 2	.2

NOTE:
IF DETRITUS WEIGHT = 99.9, NO DATA ARE AVAILABLE

TABLE III-1 (CONTINUED).

DATE	TIME	RATE (NO/MIN)	SURVIVAL (%)	MIN.LEN (MM)	MAX.LEN (MM)	CIRC	TIDE.STAGE	DETRITUS.WT (KG/MIN)
081178	0600	6.0	67	36	85	5	EBB 1	2.1
	0930	68.0	NA	37	102	6	EBB 2	1.0
	1045	2.2	NA	36	142	6	EBB 2	1.5
	1215	7.0	NA	61	85	6	FL. 1	1.1
	1230	29.0	NA	46	96	6	FL. 1	1.0
	1330	11.0	NA	41	70	6	FL. 2	.6
	1430	16.0	NA	41	78	6	FL. 2	.8
	1530	1.0	NA	59	59	6	FL. 2	.6
	1630	4.0	NA	61	69	6	FL. 2	1.3
	1800	13.0	NA	46	90	6	EBB 1	.5
	1930	20.0	NA	51	89	6	EBB 1	2.6
	2100	5.0	NA	36	120	6	EBB 2	99.9
	2215	13.0	NA	46	80	6	EBB 2	99.9
081278	0000	117.0	NA	46	95	6	FL. 1	99.9
	0045	88.0	NA	51	100	6	FL. 1	99.9
	0230	11.0	NA	41	105	6	FL. 2	99.9
	0340	12.0	NA	56	85	6	FL. 2	99.9
	0550	4.0	NA	41	76	6	EBB 1	99.9
	0715	3.0	NA	61	75	6	EBB 1	99.9
	0915	16.0	NA	36	80	5	EBB 2	1.2
	1015	23.0	NA	41	75	5	EBB 2	1.8
	1130	64.0	NA	41	86	5	EBB 2	3.3
	1245	23.0	NA	42	85	5	FL. 1	1.2
	1400	16.0	NA	42	76	5	FL. 1	1.6
	1515	14.0	NA	42	94	5	FL. 2	1.1
	1630	2.0	NA	51	61	6	FL. 2	.4
	1754	1.0	NA	84	84	6	EBB 1	.7
	1824	3.0	NA	51	94	6	EBB 1	.4
	2050	13.0	NA	46	85	6	EBB 1	99.9
	2200	11.0	NA	46	100	6	EBB 2	99.9
	2320	92.0	NA	41	120	6	EBB 2	99.9
081378	0115	137.0	NA	41	105	6	FL. 1	99.9
	0215	23.0	NA	56	100	6	FL. 1	99.9
	0400	20.0	NA	41	75	6	FL. 2	99.9
	0510	9.0	NA	46	80	6	FL. 2	99.9
	0745	10.0	NA	46	80	6	EBB 1	99.9
	0900	4.0	NA	58	96	6	EBB 2	99.9
	1030	11.0	NA	56	78	6	EBB 2	99.9
	1200	18.0	NA	41	84	6	EBB 2	99.9
	1330	14.0	NA	51	85	6	EBB 2	99.9
	1500	3.0	NA	41	68	6	FL. 2	99.9
	1600	5.0	NA	61	74	6	FL. 2	99.9
	1800	.0	NA	NA	NA	6	FL. 2	99.9
	1915	1.0	NA	42	42	6	FL. S	99.9

NOTE:
IF DETRITUS WEIGHT = 99.9, NO DATA ARE AVAILABLE

TABLE III-1 (CONTINUED).

DATE	TIME	RATE (NO/MIN)	SURVIVAL (%)	MIN.LEN (MM)	MAX.LEN (MM)	CIRC	TIDE.STAGE	DETRITUS.WT (KG/MIN)
081378	2050	4.0	NA	51	75	6	EBB 1	99.9
	2150	4.0	NA	46	85	6	EBB 1	99.9
	2335	13.0	NA	46	100	6	EBB 2	99.9
081478	0055	55.0	NA	46	115	6	EBB 2	99.9
	0245	15.0	NA	46	80	6	FL. 1	99.9
	0525	11.0	NA	46	70	6	FL. 2	99.9
	0625	11.0	NA	41	90	6	FL. 2	99.9
	0900	10.0	70	56	76	5	EBB 1	9.5
	1030	2.0	50	61	65	5	EBB 2	2.3
	1200	4.7	79	46	85	5	EBB 2	9.0
	1400	17.0	55	46	71	6	EBB 2	15.0
	1600	15.0	53	36	80	6	FL. 1	11.2
	1800	99.9	NA	85	NA	1	FL. 2	3.0
	2040	2.0	100	46	70	6	FL. S	.1
	2222	28.0	86	66	79	6	EBB 1	1.0
081578	0000	2.6	88	21	100	6	EBB 2	4.8
	0110	66.0	85	41	90	6	EBB 2	4.1
	0430	9.0	44	31	95	6	FL. 1	1.0
	0600	4.0	67	46	95	6	FL. 2	1.4
	0900	.0	NA	NA	NA	6	FL. 2	99.9
	1030	1.0	NA	71	71	6	EBB 1	99.9
	1200	6.0	NA	36	70	5	EBB 2	99.9
	1330	6.0	NA	31	75	5	EBB 2	99.9
	1500	7.0	NA	36	70	5	EBB 2	99.9
	1630	1.0	NA	48	48	4	FL. 1	99.9
	1800	4.0	NA	56	75	5	FL. 2	99.9
	1900	3.0	NA	56	75	5	FL. 2	99.9
	2020	3.0	NA	56	95	5	FL. 2	99.9
	2145	3.0	NA	46	65	5	EBB 1	99.9
	2305	2.0	NA	51	80	6	EBB 1	99.9
081678	0130	5.0	NA	36	75	6	EBB 2	99.9
	0330	14.0	NA	36	105	6	EBB 2	99.9
	0530	4.0	NA	66	80	6	FL. 1	99.9
	0630	.0	NA	NA	NA	6	FL. 1	99.9
	0900	1.0	NA	61	61	5	FL. 2	.5
	1000	2.0	NA	51	75	5	FL. 2	.0
	1100	4.0	NA	52	71	5	EBB 1	1.0
	1200	3.0	44	56	81	5	EBB 1	21.4
	1330	2.0	100	71	80	5	EBB 2	2.5
	1400	1.0	100	91	91	5	EBB 2	2.0
	1445	9.0	56	45	75	5	EBB 2	5.5
	1545	12.0	83	41	90	5	EBB 2	3.0
	1800	2.0	80	56	89	5	FL. 1	17.5

NOTE:
IF DETRITUS WEIGHT = 99.9, NO DATA ARE AVAILABLE

TABLE III-1 (CONTINUED).

DATE	TIME	RATE (NO/MIN)	SURVIVAL (%)	MIN.LEN (MM)	MAX.LEN (MM)	CIRC	TIDE.STAGE	DETRITUS.WT (KG/MIN)
081678	2100	11.0	NA	41	100	5	FL. 2	.3
	2242	8.0	NA	36	70	5	EBB 1	.5
081778	0000	98.0	90	36	95	6	EBB 1	13.0
	0130	4.0	NA	51	95	6	EBB 2	4.0
	0300	33.0	NA	46	90	6	EBB 2	3.8
	0430	31.0	NA	46	135	6	EBB 2	2.1
	0600	144.0	53	46	100	6	FL. 1	4.0
	0900	7.0	NA	56	90	5	FL. 2	.5
	1000	2.0	NA	61	71	4	FL. 2	.5
	1100	.0	NA	NA	NA	4	FL. S	.5
	1200	3.7	73	26	85	4	EBB 1	10.3
	1415	1.0	NA	51	51	5	EBB 2	.5
	1600	1.0	NA	71	71	5	EBB 2	5.6
	1800	8.7	42	41	100	5	FL. 1	.9
	2100	4.0	75	51	80	5	FL. 2	.5
	2215	2.0	100	61	75	6	FL. 2	.5
081878	0000	3.6	90	46	95	6	EBB 1	1.0
	0205	9.0	78	51	95	6	EBB 1	5.2
	0400	17.0	65	41	80	6	EBB 2	3.0
	0600	5.6	82	41	100	6	EBB 2	2.5
	0900	3.0	NA	46	70	5	FL. 2	99.9
	1030	5.0	NA	51	75	6	FL. 2	99.9
	1200	5.0	NA	46	100	6	EBB 1	99.9
	1330	40.0	NA	31	95	6	EBB 1	99.9
	1500	67.0	NA	36	95	5	EBB 2	99.9
	1630	27.0	NA	46	80	6	EBB 2	99.9
	1800	15.0	NA	46	80	6	EBB 2	99.9
	1915	4.0	NA	46	70	6	FL. 1	99.9
	2100	17.0	NA	41	100	6	FL. 2	99.9
	2230	13.0	NA	46	96	6	FL. 2	99.9
081978	0010	6.0	NA	51	80	6	FL. 2	99.9
	0200	15.0	NA	46	96	6	EBB 1	99.9
	0400	35.0	NA	46	105	6	EBB 2	99.9
	0600	29.0	NA	51	100	6	EBB 2	99.9
	0900	7.0	NA	36	75	6	FL. 2	99.9
	1030	12.0	NA	46	80	6	FL. 2	99.9
	1200	7.0	NA	46	85	6	FL. 2	99.9
	1330	26.0	NA	41	85	5	EBB 1	99.9
	1500	9.0	NA	36	80	5	EBB 1	99.9
	1630	15.0	NA	36	85	6	EBB 2	99.9
	1800	25.0	NA	46	85	6	EBB 2	99.9
	1900	32.0	NA	41	100	6	EBB 2	99.9
	2110	6.0	NA	66	94	6	FL. 2	99.9

NOTE:
IF DETRITUS WEIGHT = 99.9, NO DATA ARE AVAILABLE

TABLE III-1 (CONTINUED).

DATE	TIME	RATE (NO/MIN)	SURVIVAL (%)	MIN.LEN (MM)	MAX.LEN (MM)	CIRC	TIDE.STAGE	DETRITUS.WT (KG/MIN)
081978	2240	14.0	NA	41	90	6	FL. 2	99.9
082078	0010	10.0	NA	41	75	6	FL. 2	99.9
	0140	7.0	NA	46	75	6	EBB 1	99.9
	0430	18.0	NA	46	90	4	EBB 1	99.9
	0630	4.0	NA	41	74	6	EBB 2	99.9
	0900	4.0	NA	41	85	6	FL. 1	99.9
	1030	.0	NA	NA	NA	6	FL. 2	99.9
	1200	14.0	NA	46	80	6	FL. 2	99.9
	1345	9.0	NA	51	80	6	EBB 1	99.9
	1500	18.0	NA	46	90	6	EBB 1	99.9
	1630	12.0	NA	46	85	6	EBB 2	99.9
	1800	3.0	NA	26	65	6	EBB 2	99.9
	1915	10.0	NA	41	100	6	EBB 2	99.9
	2100	8.0	NA	41	70	6	FL. 1	99.9
	2230	3.0	NA	51	75	6	FL. 2	99.9
082178	0005	8.0	NA	46	85	6	FL. 2	99.9
	0200	12.0	NA	46	100	6	EBB 1	99.9
	0400	9.0	NA	41	85	6	EBB 1	99.9
	0600	18.0	NA	41	95	6	EBB 2	99.9
	0920	10.0	NA	41	81	6	FL. 1	2.0
	1000	27.0	NA	36	81	6	FL. 1	12.0
	1100	20.0	NA	36	91	6	FL. 2	15.0
	1200	17.6	66	41	90	6	FL. 2	5.3
	1400	25.0	NA	41	80	6	FL. S	1.0
	1600	34.0	NA	36	85	6	EBB 1	18.0
	1800	4.3	69	31	90	4	EBB 2	19.3
	2105	17.0	82	46	95	5	EBB 2	3.5
	2230	14.0	64	46	90	5	FL. 1	5.2
082278	0000	10.6	69	46	100	5	FL. 2	2.8
	0200	25.0	80	46	85	5	FL. 2	2.7
	0600	14.3	90	46	110	5	EBB 2	8.5
	0900	10.0	NA	41	71	5	EBB 2	99.9
	1100	23.0	NA	41	101	5	FL. 1	99.9
	1245	31.0	NA	46	81	5	FL. 2	99.9
	1500	9.0	NA	41	66	5	FL. 2	99.9
	1635	9.0	NA	51	76	5	EBB 1	99.9
	1745	13.0	NA	46	86	5	EBB 1	99.9
	2100	7.0	NA	51	115	5	EBB 2	99.9
	2330	3.0	NA	46	90	5	FL. 1	99.9
082378	0100	7.0	NA	51	75	5	FL. 2	99.9
	0300	14.0	NA	46	75	5	FL. 2	99.9
	0500	17.0	NA	46	90	5	EBB 1	99.9

NOTE:
IF DETRITUS WEIGHT = 99.9, NO DATA ARE AVAILABLE

TABLE III-1 (CONTINUED).

DATE	TIME	RATE (NO/MIN)	SURVIVAL (%)	MIN.LEN (MM)	MAX.LEN (MM)	CIRC	TIDE.STAGE	DETRITUS.WT (KG/MIN)
082378	0630	9.0	NA	46	95	5	EBB 1	99.9
	0915	2.0	NA	46	56	5	EBB 2	10.3
	1030	6.0	NA	56	81	5	EBB S	.5
	1200	1.3	50	46	56	5	FL. 1	5.0
	1400	5.0	NA	51	61	4	FL. 2	2.0
	1600	.0	NA	NA	NA	4	EBB 1	.5
	1800	7.3	86	36	80	5	EBB 1	2.0
	2100	4.0	50	46	80	5	EBB 2	4.5
	2230	6.0	50	66	125	5	EBB 2	3.0
082478	0000	5.0	60	46	65	5	FL. 1	2.0
	0200	2.0	100	41	55	5	FL. 2	3.2
	0410	.0	NA	NA	NA	4	FL. 2	1.1
	0600	.3	100	58	NA	4	EBB 1	2.4
	1315	2.3	43	51	56	5	FL. 2	.5
	1500	1.0	100	56	NA	5	FL. 2	.8
	1600	.0	NA	NA	NA	4	FL. 2	.3
	1800	1.0	0	56	NA	5	EBB 1	.3
	2130	4.0	50	51	95	5	EBB 2	2.2
	2230	4.0	100	51	60	5	EBB 2	2.2
082578	0000	1.7	100	46	85	5	EBB 2	7.8
	0300	2.0	100	46	60	5	FL. 2	1.0
	0600	.0	NA	NA	NA	5	EBB 1	5.6
	0930	13.0	85	46	80	4	EBB 2	99.9
	1130	20.0	50	41	85	4	FL. 1	99.9
	1400	25.0	76	36	95	3	FL. 2	99.9
	1600	3.0	100	76	110	4	FL. 2	99.9
	1800	.0	NA	NA	NA	3	EBB 1	99.9
	1900	2.0	100	51	55	3	EBB 1	99.9
	2100	18.0	100	41	76	3	EBB 2	99.9
	2300	74.0	84	36	90	3	EBB 2	99.9
082678	0130	1.0	100	95	NA	4	FL. 1	99.9
	0300	40.0	85	41	100	4	FL. 2	99.9
	0500	12.0	83	46	60	4	FL. 2	99.9
	0700	6.0	83	46	70	4	EBB 1	99.9
	0900	6.0	100	36	65	5	EBB 1	99.9
	1030	101.0	88	41	100	5	EBB 2	99.9
	1210	70.0	89	46	90	5	EBB 2	99.9
	1400	6.0	17	56	80	5	FL. 1	99.9
	1600	1.0	100	57	NA	5	FL. 2	99.9
	1900	.0	NA	NA	NA	4	EBB 1	99.9
	2100	.0	NA	NA	NA	4	EBB 1	99.9
	2300	34.0	82	41	95	4	EBB 2	99.9

NOTE:
IF DETRITUS WEIGHT = 99.9, NO DATA ARE AVAILABLE

TABLE III-1 (CONTINUED).

DATE	TIME	RATE (NO/MIN)	SURVIVAL (%)	MIN.LEN (MM)	MAX.LEN (MM)	CIRC	TIDE.STAGE	DETRITUS.WT (KG/MIN)
082778	0130	5.0	80	41	95	4	EBB 2	99.9
	0300	4.0	0	51	95	4	FL. 1	99.9
	0500	.0	NA	NA	NA	4	FL. 2	99.9
	0700	.0	NA	NA	NA	5	FL. 2	99.9
	0930	3.0	100	61	80	5	EBB 1	99.9
	1145	25.0	72	51	100	4	EBB 2	99.9
	1330	24.0	63	41	90	4	EBB 2	99.9
	1430	3.0	100	46	70	3	FL. 1	99.9
	1615	.0	NA	NA	NA	2	FL. 2	99.9
	1900	.0	NA	NA	NA	3	FL. 2	99.9
	2100	.0	NA	NA	NA	2	EBB 1	99.9
	2300	4.0	100	46	65	2	EBB 1	99.9
082878	0330	1.0	100	61	NA	2	FL. 1	99.9
	0500	1.0	100	71	NA	2	FL. 1	99.9
	0630	3.0	100	51	85	2	FL. 2	99.9
	0900	.0	NA	NA	NA	6	EBB 1	.2
	1200	1.0	66	46	100	6	EBB 2	.4
	1500	.0	NA	NA	NA	6	FL. 1	.6
	1600	.0	NA	NA	NA	6	FL. 2	.7
	1700	.0	NA	NA	NA	6	FL. 2	3.0
	1800	.0	NA	NA	NA	6	FL. 2	.3
	2100	.0	NA	NA	NA	2	EBB 1	.1
	2230	.0	NA	NA	NA	2	EBB 1	.3
082978	0000	1.7	60	41	60	2	EBB 2	.3
	0200	7.0	100	51	80	2	EBB 2	.8
	0430	1.0	100	67	NA	2	FL. 1	.5
	0600	.0	NA	NA	NA	2	FL. 1	.6
	0900	.0	NA	NA	NA	5	FL. 2	99.9
	1020	.0	NA	NA	NA	5	EBB 1	99.9
	1115	1.0	100	63	NA	5	EBB 1	99.9
	1200	.0	NA	NA	NA	5	EBB 2	99.9
	1330	.0	NA	NA	NA	5	EBB 2	99.9
	1445	1.0	100	68	NA	5	EBB 2	99.9
	1535	.0	NA	NA	NA	5	FL. 1	99.9
	1800	.0	NA	NA	NA	6	FL. 2	99.9
	2100	.0	NA	NA	NA	6	FL. 2	99.9
	2230	7.0	100	51	80	6	EBB 1	99.9
	2359	2.0	100	51	75	5	EBB 1	99.9
083078	0130	3.0	67	56	75	5	EBB 2	99.9
	0330	50.0	84	41	100	5	EBB 2	99.9
	0530	13.0	46	46	60	5	EBB S	99.9
	1100	16.0	81	51	80	6	EBB 1	1.5
	1200	1.0	100	71	NA	6	EBB 1	1.6

NOTE:
IF DETRITUS WEIGHT = 99.9, NO DATA ARE AVAILABLE

TABLE III-1 (CONTINUED).

DATE	TIME	RATE (NO/MIN)	SURVIVAL (%)	MIN.LEN (MM)	MAX.LEN (MM)	CIRC	TIDE.STAGE	DETRITUS.WT (KG/MIN)
083078	1330	9.0	78	41	85	6	EBB 2	3.2
	1500	41.0	63	41	95	5	EBB 2	3.0
	1800	14.3	35	46	95	5	FL. 1	29.0
	1900	9.0	66	46	80	5	FL. 2	.5
	2100	8.0	63	41	95	5	FL. 2	2.6
	2245	8.0	88	51	90	5	EBB 1	1.0
083178	0000	20.3	79	36	85	4	EBB 1	7.1
	0300	24.0	88	41	95	4	EBB 2	11.0
	0430	18.0	100	46	85	4	EBB S	10.0
	0600	4.7	50	41	95	5	FL. 1	1.9
	0906	.3	100	81	NA	6	FL. 2	14.7
	1205	13.0	79	41	85	6	EBB 1	3.5
	1242	1.7	80	56	90	6	EBB 1	1.3
	1325	6.7	95	46	95	6	EBB 1	7.3
	1345	13.3	95	46	100	6	EBB 2	14.7
	1454	15.7	83	41	95	6	EBB 2	2.4
	1525	10.3	87	41	120	6	EBB 2	2.5
	1800	27.7	69	41	100	6	FL. 1	.6
	2100	6.0	84	51	95	6	FL. 2	.9
	2230	4.0	100	56	65	6	FL. S	.3
090178	0000	25.3	91	36	115	6	EBB 1	.4
	0200	5.0	60	56	80	6	EBB 2	6.5
	0400	73.0	89	36	100	5	EBB 2	8.1
	0600	98.7	83	46	120	5	FL. 1	1.7
	0930	4.0	NA	51	60	6	FL. 2	99.9
	1030	7.0	NA	56	80	6	FL. 2	99.9
	1130	79.0	NA	46	95	6	EBB 1	99.9
	1330	8.0	NA	51	90	6	EBB 1	99.9
	1830	.7	NA	56	95	6	FL. 1	99.9
	1950	.0	NA	NA	NA	6	FL. 2	99.9
	2100	22.0	73	41	80	6	FL. 2	99.9
	2230	7.0	28	36	95	6	FL. 2	99.9
	2359	2.0	100	61	80	6	EBB 1	99.9
090278	0130	4.0	75	61	80	6	EBB 1	99.9
	0330	10.0	70	46	100	6	EBB 2	99.9
	0500	26.0	100	46	100	6	EBB 2	99.9
	0630	51.0	86	41	100	6	FL. 1	99.9
	0730	3.0	100	51	100	6	FL. 1	99.9
	0930	4.0	NA	61	115	6	FL. 2	99.9
	1030	2.0	NA	46	90	6	FL. 2	99.9
	1130	5.0	NA	51	70	6	FL. 2	99.9
	1330	11.0	NA	56	95	6	EBB 1	99.9
	1500	2.0	NA	71	90	6	EBB 1	99.9

NOTE:
IF DETRITUS WEIGHT = 99.9, NO DATA ARE AVAILABLE

TABLE III-1 (CONTINUED).

DATE	TIME	RATE (NO/MIN)	SURVIVAL (%)	MIN.LEN (MM)	MAX.LEN (MM)	CIRC	TIDE.STAGE	DETRITUS.WT (KG/MIN)
090278	1630	4.0	NA	41	75	6	EBB 2	99.9
	1845	13.0	NA	51	80	6	FL. 1	99.9
	2030	.0	NA	NA	NA	6	FL. 1	99.9
	2200	3.0	33	56	66	6	FL. 2	99.9
	2330	7.0	86	41	70	6	FL. 2	99.9
090378	0100	6.0	100	51	85	6	EBB 1	99.9
	0300	5.0	80	51	85	6	EBB 1	99.9
	0430	3.0	100	61	80	6	EBB 2	99.9
	0630	12.0	92	56	90	6	EBB 2	99.9
	0830	3.0	100	56	85	6	FL. 1	99.9
	0935	3.0	100	56	65	6	FL. 2	99.9
	1101	.0	NA	NA	NA	6	FL. 2	99.9
	1216	.0	NA	NA	NA	6	EBB 1	99.9
	1318	2.0	100	61	70	6	EBB 1	99.9
	1505	2.0	100	51	85	6	EBB 2	99.9
	1630	5.0	100	41	95	6	EBB 2	99.9
	1800	10.0	100	51	85	6	EBB 2	99.9
	2030	12.0	92	61	115	6	FL. 1	99.9
	2200	8.0	88	51	95	6	FL. 1	99.9
	2330	6.0	83	56	85	6	FL. 2	99.9
090478	0100	5.0	80	61	85	6	FL. 2	99.9
	0330	5.0	80	56	100	6	EBB 1	99.9
	0500	16.0	94	51	100	6	EBB 2	99.9
	0630	14.0	86	56	80	6	EBB 2	99.9
	0920	1.0	100	56	56	6	FL. 1	99.9
	1050	5.0	100	46	90	6	FL. 2	99.9
	1230	.0	NA	NA	NA	6	FL. 2	99.9
	1400	3.0	100	61	100	6	EBB 1	99.9
	1530	19.0	79	41	80	6	EBB 2	99.9
	1715	3.0	67	71	90	6	EBB 2	99.9
	1915	5.0	40	51	90	6	EBB 2	99.9
	2100	6.0	75	51	100	6	FL. 1	99.9
	2245	28.0	79	56	100	6	FL. 1	99.9
090578	0100	25.0	68	46	105	6	FL. 2	99.9
	0230	96.0	90	46	110	6	EBB 1	99.9
	0515	13.0	54	56	90	6	EBB 2	99.9
	0930	10.0	30	41	101	5	FL. 1	3.7
	1100	3.0	33	61	66	5	FL. 2	3.4
	1200	1.3	25	56	100	4	FL. 2	13.7
	1500	6.0	83	61	85	4	EBB 1	2.5
	1815	13.7	88	46	100	4	EBB 2	2.4
	1900	15.0	80	51	115	4	EBB 2	1.5
	2050	11.0	91	51	100	5	FL. 1	.8

NOTE:
IF DETRITUS WEIGHT = 99.9, NO DATA ARE AVAILABLE

TABLE III-1 (CONTINUED).

DATE	TIME	RATE (NO/MIN)	SURVIVAL (%)	MIN.LEN (MM)	MAX.LEN (MM)	CIRC	TIDE.STAGE	DETRITUS.WT (KG/MIN)
090978	0730	3.0	33	51	85	6	EBB 2	99.9
	0845	4.0	100	61	100	5	EBB 2	99.9
	1045	16.0	81	51	105	6	EBB 2	99.9
	1245	21.0	90	46	140	6	FL. 1	99.9
	1445	3.0	100	61	85	6	FL. 2	99.9
	1645	1.0	0	61	61	6	EBB 1	99.9
	1845	4.0	50	41	125	6	EBB 1	99.9
	2030	5.0	20	71	105	6	EBB 2	99.9
	2230	24.0	75	56	110	6	EBB 2	99.9
091078	0115	10.0	90	56	115	6	FL. 1	99.9
	0330	6.0	100	61	100	6	FL. 2	99.9
	0500	2.0	100	61	110	6	FL. 2	99.9
	0645	65.0	91	56	95	6	EBB 1	99.9
	0845	19.0	63	61	90	6	EBB 2	99.9
	1030	6.0	100	81	115	5	EBB 2	99.9
	1230	4.0	75	71	100	6	FL. 1	99.9
	1430	3.0	67	66	85	6	FL. 2	99.9
	1630	.0	NA	NA	NA	6	FL. 2	99.9
	1830	2.0	100	66	85	6	EBB 1	99.9
	2100	3.0	100	71	100	6	EBB 1	99.9
	2315	8.0	63	56	100	6	FL. 1	99.9
091178	0145	3.0	67	51	80	6	FL. 2	99.9
	0400	23.0	96	71	120	6	FL. 2	99.9
	0600	2.0	100	61	95	6	FL. 2	99.9
	0930	.0	NA	NA	NA	4	EBB 2	3.1
	1030	.0	NA	NA	NA	4	EBB 2	2.9
	1200	1.0	100	71	101	5	EBB 2	2.7
	1400	.0	NA	NA	NA	5	FL. 1	.5
	1600	.0	NA	NA	NA	5	FL. 2	1.0
	1800	.0	NA	NA	NA	4	FL. 2	1.0
	2100	.0	NA	NA	NA	4	EBB 1	.9
	2230	.0	NA	NA	NA	5	EBB 1	8.5
091278	0000	9.0	88	51	100	5	EBB 2	5.5
	0200	10.0	90	56	100	5	EBB 2	1.2
	0400	.0	NA	NA	NA	5	FL. 2	1.2
	0600	.3	100	85	85	5	FL. 2	.2
	0930	.0	NA	NA	NA	5	EBB 1	99.9
	1030	.0	NA	NA	NA	5	EBB 2	99.9
	1130	.0	NA	NA	NA	4	EBB 2	99.9
	1300	2.0	50	53	82	4	EBB 2	99.9
	1430	3.0	100	61	75	4	EBB 2	99.9
	1530	.0	NA	NA	NA	4	FL. 1	99.9
	1700	.0	NA	NA	NA	6	FL. 1	99.9

NOTE:
IF DETRITUS WEIGHT = 99.9, NO DATA ARE AVAILABLE

TABLE III-1 (CONTINUED).

DATE	TIME	RATE (NO/MIN)	SURVIVAL (%)	MIN.LEN (MM)	MAX.LEN (MM)	CIRC	TIDE.STAGE	DETRITUS.WT (KG/MIN)
090578	2105	2.0	100	61	90	5	FL. 1	.4
	2130	2.0	80	66	100	6	FL. 1	.5
	2200	3.0	75	46	95	6	FL. 1	.9
090678	0000	3.0	88	46	90	6	FL. 2	.5
	0200	4.0	100	66	85	6	FL. 2	1.0
	0400	6.0	100	56	85	6	EBB 1	3.6
	0600	7.0	91	46	100	6	EBB 1	3.0
	0945	3.0	33	61	105	5	EBB 1	.9
	1200	5.3	100	56	101	5	FL. 2	3.2
	1500	.0	NA	NA	NA	5	EBB 1	2.3
	1940	4.6	64	61	100	5	EBB 2	6.3
	2110	2.6	100	51	125	5	EBB 2	3.3
	2130	7.6	91	51	100	5	FL. 1	.5
	2200	1.3	100	51	100	6	FL. 1	.1
090778	0000	1.6	100	66	95	6	FL. 1	1.6
	0200	2.0	100	61	80	6	FL. 2	.2
	0400	2.6	100	51	95	6	EBB 1	2.1
	0600	2.6	88	61	116	6	EBB 1	5.1
	0930	7.0	57	56	75	5	EBB 2	1.1
	1200	.7	100	66	80	5	FL. 1	2.9
	1500	.0	NA	NA	NA	5	EBB 1	.4
	1800	.7	100	71	90	4	EBB 2	6.3
	1825	.3	0	91	91	4	EBB 2	1.5
	2040	1.7	100	71	90	6	EBB 2	.3
	2100	2.0	67	61	105	6	EBB 2	.3
	2120	3.3	100	51	100	6	EBB 2	.5
	2140	3.7	91	51	100	6	EBB 2	.7
090878	0000	1.3	50	56	75	6	FL. 1	.1
	0200	4.0	100	56	71	6	FL. 2	.2
	0400	3.0	100	56	80	6	EBB 1	.8
	0600	13.3	83	56	100	6	EBB 1	1.7
	0930	34.0	74	56	110	6	EBB 2	99.9
	1130	28.0	82	56	105	5	FL. 1	99.9
	1300	13.0	85	56	90	5	FL. 2	99.9
	1500	2.0	50	66	70	5	FL. 2	99.9
	1700	3.0	100	56	70	5	EBB 1	99.9
	1915	14.0	79	56	105	6	EBB 1	99.9
	2200	15.0	40	56	105	6	FL. 1	99.9
	2330	2.0	50	56	70	6	FL. 2	99.9
090978	0130	1.0	100	61	61	5	FL. 2	99.9
	0330	1.0	0	56	56	6	FL. 2	99.9
	0545	6.0	100	56	90	6	EBB 1	99.9

NOTE:
IF DETRITUS WEIGHT = 99.9, NO DATA ARE AVAILABLE

TABLE III-1 (CONTINUED).

DATE	TIME	RATE (NO/MIN)	SURVIVAL (%)	MIN.LEN (MM)	MAX.LEN (MM)	CIRC	TIDE.STAGE	DETRITUS.WT (KG/MIN)
091278	1830	.0	NA	NA	NA	6	FL. 2	99.9
	2100	3.0	100	66	110	6	EBB 1	99.9
	2300	1.0	100	71	71	6	EBB 1	99.9
091378	0031	3.0	66	76	90	6	EBB 2	99.9
	0230	5.0	100	61	95	6	EBB 2	99.9
	0400	9.0	66	61	90	6	FL. 1	99.9
	0630	7.0	57	51	81	6	FL. 2	99.9
	0905	6.0	83	61	96	6	FL. 2	1.0
	1100	59.0	80	31	106	5	EBB 1	2.3
	1200	14.3	93	31	115	6	EBB 2	3.3
	1400	4.0	100	26	86	6	EBB 2	3.8
	1600	9.0	89	66	91	6	FL. 1	1.2
	1800	17.7	66	41	140	6	FL. 2	4.5
	2100	7.0	97	66	110	5	FL. 2	1.0
	2230	29.0	69	56	110	4	EBB 1	2.5
091478	0000	16.0	70	61	110	5	EBB 1	7.2
	0330	10.0	80	66	105	6	EBB 2	4.5
	0600	8.6	84	61	115	5	FL. 2	4.2
	0907	6.0	100	61	100	6	FL. 2	4.0
	1200	7.0	71	56	125	5	EBB 1	7.1
	1500	8.0	75	71	121	4	EBB 2	5.4
	1800	3.0	67	56	96	4	FL. 1	.7
	2100	5.0	40	71	165	5	FL. 2	3.4
091578	0000	4.3	100	71	115	6	EBB 1	22.0
	0300	.0	NA	NA	NA	5	EBB 2	15.8
	0600	1.7	80	41	100	6	FL. 1	.5
	0930	1.0	100	71	71	6	FL. 2	99.9
	1000	2.0	50	71	96	6	EBB 1	99.9
	1100	2.0	100	61	96	6	EBB 1	99.9
	1200	2.0	100	76	96	6	EBB 1	99.9
	1330	2.0	50	76	104	6	EBB 2	99.9
	1500	3.0	75	66	89	6	EBB 2	99.9
	1630	2.0	100	91	96	6	FL. 1	99.9
	1800	2.0	100	66	86	6	FL. 1	99.9
	1930	.0	NA	NA	NA	6	FL. 2	99.9
	2100	.0	NA	NA	NA	6	FL. 2	99.9
	2230	.0	NA	NA	NA	6	FL. 2	99.9
091678	0001	3.0	0	51	75	6	EBB 1	99.9
	0200	4.0	0	66	100	6	EBB 1	99.9
	0400	3.0	0	51	70	6	EBB 2	99.9
	0600	2.0	0	51	75	6	FL. 1	99.9
	0900	2.0	NA	104	110	6	FL. 2	99.9

NOTE:
IF DETRITUS WEIGHT = 99.9, NO DATA ARE AVAILABLE

TABLE III-1 (CONTINUED).

DATE	TIME	RATE (NO/MIN)	SURVIVAL (%)	MIN.LEN (MM)	MAX.LEN (MM)	CIRC	TIDE.STAGE	DETRITUS.WT (KG/MIN)
091678	1000	.0	NA	NA	NA	6	FL. 2	99.9
	1100	2.0	50	76	141	6	FL. 2	99.9
	1200	.0	NA	NA	NA	6	EBB 1	99.9
	1300	8.0	88	66	96	6	EBB 1	99.9
	1430	2.0	50	81	96	6	EBB 2	99.9
	1600	1.0	100	115	115	6	EBB 2	99.9
	1745	.0	NA	NA	NA	6	EBB 2	99.9
	1915	1.0	0	115	115	6	FL. 1	99.9
	2140	2.0	NA	91	130	6	FL. 2	99.9
	2245	1.0	0	98	98	6	FL. 2	99.9
091778	0001	1.0	0	92	92	6	EBB 1	99.9
	0200	4.0	0	81	110	6	EBB 1	99.9
	0400	2.0	0	71	95	6	EBB 2	99.9
	0600	1.0	0	111	111	6	EBB S	99.9
091878	1000	.0	NA	NA	NA	6	FL. 2	.5
	1200	.0	NA	NA	NA	6	FL. 2	2.7
	1400	3.0	100	56	100	6	EBB 1	1.8
	1600	.0	NA	NA	NA	6	EBB 1	2.0
	1800	6.0	100	71	100	6	EBB 2	1.7
	2100	1.0	0	96	96	6	FL. 1	1.2
	2240	1.0	100	101	106	6	FL. 2	2.2
091978	0000	.3	100	76	80	6	FL. 2	5.2
	0300	1.0	0	81	81	6	EBB 1	3.7
	0600	.0	NA	NA	NA	6	EBB 2	5.0
	0930	3.0	100	76	105	5	FL. 1	99.9
	1200	.0	NA	NA	NA	5	FL. 2	99.9
	1400	.0	NA	NA	NA	6	FL. 2	99.9
	1600	8.0	88	36	105	6	EBB 1	99.9
	1800	.0	NA	NA	NA	6	EBB 2	99.9
	1930	3.0	100	81	100	6	EBB 2	99.9
	2100	.0	NA	NA	NA	6	FL. 1	99.9
	2230	5.0	100	86	105	6	FL. 2	99.9
092078	0030	.0	NA	NA	NA	6	FL. 2	99.9
	0300	7.0	57	56	120	6	EBB 1	99.9
	0630	10.0	60	66	115	6	EBB 2	99.9
	0950	.0	NA	NA	NA	5	FL. 1	.2
	1050	.0	NA	NA	NA	5	FL. 1	.5
	1200	.3	100	91	91	5	FL. 2	.7
	1400	1.0	100	111	111	5	FL. 2	.6
	1600	1.0	100	76	76	5	EBB 1	1.1
	1800	.3	100	96	96	5	EBB 2	3.0
	2100	1.0	0	96	96	6	EBB 2	3.7

NOTE:
IF DETRITUS WEIGHT = 99.9, NO DATA ARE AVAILABLE

TABLE III-1 (CONTINUED).

DATE	TIME	RATE (NO/MIN)	SURVIVAL (%)	MIN.LEN (MM)	MAX.LEN (MM)	CIRC	TIDE.STAGE	DETRITUS.WT (KG/MIN)
092078	2230	1.0	100	86	86	6	FL. 1	1.7
092178	0000	2.3	71	51	120	6	FL. 2	1.9
	0200	.0	NA	NA	NA	6	FL. 2	1.5
	0600	.3	100	91	91	6	EBB 1	3.0
	1002	4.0	100	76	91	5	EBB S	.2
	1200	.0	NA	NA	NA	5	FL. 1	.2
	1400	.0	NA	NA	NA	5	FL. 2	.3
	1600	.0	NA	NA	NA	5	EBB 1	.2
	1800	1.0	100	76	76	5	EBB 1	2.0
	2110	1.0	0	96	96	6	EBB 2	1.8
092278	0000	.0	NA	NA	NA	6	FL. 1	1.0
	0200	.0	NA	NA	NA	6	FL. 2	99.9
	0400	1.0	100	71	71	6	EBB 1	1.1
	0600	.0	NA	NA	NA	6	EBB 1	1.6
	0900	1.0	100	106	106	5	EBB 2	99.9
	1100	.0	NA	NA	NA	5	FL. 1	99.9
	1330	.0	NA	NA	NA	5	FL. 2	99.9
	1530	.0	NA	NA	NA	5	EBB 1	99.9
	1800	.0	NA	NA	NA	5	EBB 1	99.9
	1930	1.0	100	96	96	5	EBB 2	99.9
	2100	15.0	NA	76	120	6	EBB 2	99.9
	2300	34.0	NA	56	120	6	FL. 1	99.9
092378	0100	7.0	NA	71	115	6	FL. 2	99.9
	0300	3.0	NA	66	95	3	FL. 2	99.9
	0500	.0	NA	NA	NA	3	EBB 1	99.9
	0700	1.0	NA	86	86	3	EBB 1	99.9
	0900	1.0	100	86	86	3	EBB 2	99.9
	1130	3.0	67	81	98	3	FL. 1	99.9
	1330	7.0	57	71	108	3	FL. 1	99.9
	1530	.0	NA	NA	NA	3	FL. 2	99.9
	1800	3.0	100	51	115	4	EBB 1	99.9
	2100	1.0	NA	77	77	3	EBB 1	99.9
	2300	8.0	NA	81	120	3	EBB 2	99.9
092478	0100	2.0	NA	86	105	3	FL. 1	99.9
	0300	6.0	NA	76	110	3	FL. 2	99.9
	0500	1.0	NA	101	101	4	FL. 2	99.9
	0700	3.0	NA	81	95	4	EBB 1	99.9
092578	0930	.0	NA	NA	NA	3	EBB 2	2.5
	1045	.0	NA	NA	NA	3	EBB 2	2.7
	1200	.3	100	106	110	3	EBB 2	3.0
	1425	.0	NA	NA	NA	3	FL. 1	2.0

NOTE:
IF DETRITUS WEIGHT = 99.9, NO DATA ARE AVAILABLE

TABLE III-1 (CONTINUED).

DATE	TIME	RATE (NO/MIN)	SURVIVAL (%)	MIN.LEN (MM)	MAX.LEN (MM)	CIRC	TIDE.STAGE	DETRITUS.WT (KG/MIN)
092578	1600	1.0	100	55	55	4	FL. 2	2.5
	1800	.0	NA	NA	NA	5	EBB 1	1.0
	2100	.0	NA	NA	NA	3	EBB 1	1.5
	2230	.0	NA	NA	NA	3	EBB 2	1.5
092678	0000	20.3	85	46	115	4	EBB 2	2.8
	0300	.0	NA	NA	NA	4	FL. 1	1.6
	0600	1.0	67	91	NA	5	FL. 2	.4
	0900	.0	NA	NA	NA	5	EBB 1	99.9
	1030	1.0	0	63	63	4	EBB 2	99.9
	1200	2.0	100	46	66	4	EBB 2	99.9
	1400	1.0	100	67	67	4	FL. 1	99.9
	1600	1.0	100	93	93	5	FL. 2	99.9
	1830	.0	NA	NA	NA	5	FL. 2	99.9
	2100	.0	NA	NA	NA	5	EBB 1	99.9
	2230	4.0	75	51	120	5	EBB 1	99.9
092778	0000	11.0	73	76	100	5	EBB 2	99.9
	0400	5.0	40	51	110	6	FL. 1	99.9
	0530	5.0	80	91	110	4	FL. 2	99.9
	0630	3.0	100	51	110	3	FL. 2	99.9
	0915	1.0	0	86	86	3	FL. S	.5
	1030	1.0	100	106	110	3	EBB 1	1.0
	1200	1.7	40	56	125	3	EBB 1	1.1
	1400	.0	NA	NA	NA	4	EBB 2	4.0
	1600	1.0	100	101	105	4	FL. 1	1.4
	1800	.0	NA	NA	NA	4	FL. 2	1.8
	2100	.0	NA	NA	NA	5	EBB 1	1.0
	2230	.0	NA	NA	NA	5	EBB 1	.6
092878	0000	.0	NA	NA	NA	5	EBB 2	.4
	0300	3.0	67	51	90	5	EBB 2	2.5
	0600	.6	100	101	121	5	FL. 2	1.0
	0900	.0	NA	NA	NA	5	FL. 2	.4
	1200	.3	100	86	90	5	EBB 1	2.0
	1400	1.0	0	101	101	4	EBB 2	3.8
	1600	3.0	100	61	100	4	EBB 2	1.9
	1800	2.3	86	66	105	4	FL. 1	.8
	2130	2.0	50	51	61	4	EBB 1	.7
	2300	4.0	75	56	100	6	EBB 1	9.5
092978	0000	9.0	100	51	110	6	EBB 2	7.5
	0300	3.0	67	91	105	6	FL. 1	18.5
	0600	3.0	78	91	121	6	FL. 2	6.6
	0905	1.0	100	102	102	4	FL. 2	99.9
	1115	.0	NA	NA	NA	5	EBB 1	99.9

NOTE:
IF DETRITUS WEIGHT = 99.9, NO DATA ARE AVAILABLE

TABLE III-1 (CONTINUED).

DATE	TIME	RATE (NO/MIN)	SURVIVAL (%)	MIN.LEN (MM)	MAX.LEN (MM)	CIRC	TIDE.STAGE	DETRITUS.WT (KG/MIN)
092978	1300	.0	NA	NA	NA	4	EBB 1	99.9
	1500	3.0	100	36	105	4	EBB 2	99.9
	1830	2.0	100	71	100	5	FL. 1	99.9
	2100	.0	NA	NA	NA	5	FL. 2	99.9
	2230	9.0	67	81	115	6	FL. S	99.9
093078	0050	.0	NA	NA	NA	6	EBB 1	99.9
	0330	3.0	67	86	100	6	EBB 2	99.9
	0600	4.0	75	81	100	6	FL. 1	99.9
	0855	1.0	100	92	92	6	FL. 2	99.9
	1100	.0	NA	NA	NA	6	EBB 1	99.9
	1300	.0	NA	NA	NA	6	EBB 1	99.9
	1500	2.0	100	91	100	5	EBB 2	99.9
	1830	1.0	100	102	102	4	FL. 1	99.9
	2100	.0	NA	NA	NA	5	FL. 2	99.9
	2230	2.0	100	106	115	5	FL. 2	99.9

NOTE:
IF DETRITUS WEIGHT = 99.9, NO DATA ARE AVAILABLE

Table III-2. Estimated total impingement, weighted survival and minimum and maximum survival, by sampling period, of weakfish impinged at the circulating water intake, S.N.G.S., during 19 June through 30 September 1978.

DATE	ESTIMATED NUMBER PER PLPIOD *	PERIOD OF ESTIMATE (HR)	WEIGHTED SURVIVAL(%)	MIN*OBSERVED SURVIVAL (%)	MAX*OBSERVED SURVIVAL (%)
061978	2100	24	64	60	100
062078	300	6	36	29	50
062178	7100	24	54	0	100
062278	8000	24	44	0	74
062378	3400	6	34	29	50
062678	151300	24	31	30	66
062778	10900	6	48	32	61
062878	388300	24	32	28	44
062978	534900	24	52	32	75
070478	133900	24	77	63	83
070578	427300	24	69	53	75
070678	302100	24	65	32	78
070778	257200	7	53	53	63
071078	60900	10	74	53	78
071178	343900	24	66	53	92
071278	477400	24	70	56	71
071378	128400	24	62	51	87
071478	85300	24	76	77	77
071578	126800	24	NA	NA	NA
071678	125000	24	NA	NA	NA
071778	115100	24	83	81	92
071878	31500	24	76	43	100
071978	23400	24	70	50	100
072078	27000	24	69	50	91
072178	39500	24	75	56	86
072278	28000	24	79	72	100
072378	111100	24	NA	NA	NA
072478	55200	24	72	61	88
072578	128000	24	80	76	84
072678	33800	24	65	0	80
072778	14800	24	70	55	100
072878	16100	24	73	46	90
072978	23100	24	NA	NA	NA
073078	48600	24	NA	NA	NA
073178	40200	24	79	57	96
080178	33600	24	45	45	50
080278	17300	24	79	54	100
080378	13700	24	67	0	100
080478	15400	24	65	60	78
080578	28200	24	NA	NA	NA
080678	11200	24	NA	NA	NA
080778	8400	24	78	0	100
080878	8000	24	65	60	100
080978	18400	24	65	0	77
081078	21300	24	74	0	100

* ESTIMATED OVER DESIGNATED PERIOD

Table III-2. - (Continued)

DATE	ESTIMATED NUMBER PER PERIOD *	PERIOD OF ESTIMATE (HR)	WEIGHTED SURVIVAL(%)	MIN*OBSERVED SURVIVAL (%)	MAX*OBSERVED SURVIVAL (%)
081178	26800	24	63	46	85
081278	31200	24	NA	NA	NA
081378	17400	24	NA	NA	NA
081478	32300	24	70	50	100
081578	14400	24	79	44	88
081678	8000	24	72	44	100
081778	36000	24	67	42	100
081878	22800	24	73	65	90
081978	25600	24	NA	NA	NA
082078	12700	24	NA	NA	NA
082178	23300	24	70	64	82
082278	21300	24	80	69	90
082378	9400	24	64	50	86
082478	2300	24	67	0	100
082578	16600	24	81	50	100
082678	30000	24	85	17	100
082778	7300	24	69	0	100
082878	900	24	94	66	100
082978	2000	24	96	60	100
083078	25400	24	69	35	100
083178	18200	24	83	50	100
090178	39500	24	82	28	100
090278	13700	24	86	33	100
090378	8100	24	93	80	100
090478	11200	24	81	40	100
090578	26200	24	79	25	100
090678	5600	24	87	33	100
090778	3100	24	83	0	100
090878	18100	24	75	40	100
090978	10200	24	76	0	100
091078	15000	24	85	63	100
091178	4100	24	93	67	100
091278	2800	24	89	50	100
091378	18100	24	78	57	100
091478	11100	24	74	40	100
091578	2100	24	85	50	100
091678	3100	24	37	0	100
091778	800	6	0	0	0
091878	2700	24	90	0	100
091978	2300	24	90	0	100
092078	4100	24	62	0	100
092178	1300	24	80	0	100
092278	4100	24	99	100	100
092378	3700	24	71	57	100
092478	1100	6	NA	NA	NA
092578	300	24	100	100	100
092678	2900	24	82	0	100
092778	3600	24	68	0	100
092878	2100	24	73	0	100
092978	3500	24	84	67	100
093078	2100	24	84	67	100

* ESTIMATED OVER DESIGNATED PERIOD

Table III-3. - Weekly number of weakfish taken in samples, estimated number impinged, and estimated number lost at the circulating water intake, S.N.G.S., during 18 June through 30 September 1978.

Week	No. Taken in Samples	Estimated No. Impinged	% Live	Estimated No. Lost	No. of 24-hr Periods Sampled
18-24 June	351	41,800	48	21,700	3
25 June- 1 July	13,716	2,338,900	44	1,309,800	3
2-8 July	9,338	2,382,800	66	810,200	3
9-15 July	13,679	1,580,100	70	474,000	6
16-22 July	3,281	389,500	76	93,500	7
23-29 July	3,807	382,100	74	99,300	7
30 July-5 August	1,638	197,000	70	59,100	7
6-12 August	2,125	125,300	70	37,600	7
13-19 August	1,814	156,500	70	47,000	7
20-26 August	1,178	115,600	81	22,000	7
27 August-2 September	1,712	107,000	84	17,100	7
3-9 September	1,182	82,500	85	12,400	7
10-16 September	955	56,300	89	6,200	7
17-23 September	278	21,200	76	5,100	6
24-30 September	298	17,400	87	2,300	6
Total	55,352	7,994,000		3,017,300	

Table III-4. - Weekly length-frequency of all conditions of weakfish impinged at the circulating water intake. S.N.G.S., during 13 June through 30 September 1978.

TL (MM)	051378 1600 TO 051578 0300	061978 0925 TO 062378 0600	062578 0909 TO 063078 0630	070478 1037 TO 070778 1140	071078 1046 TO 071578 2003	071678 0608 TO 072278 2225	072378 0030 TO 072978 2100	073078 0100 TO 080578 2230	080678 0030 TO 081278 2320	081378 0115 TO 081978 2240	082078 0010 TO 082678 2300	082778 0130 TO 090278 2330	090378 0100 TO 090978 2230	091078 0115 TO 091678 2245	091778 0001 TO 092378 2300	092478 0100 TO 093078 2230
16- 20		12	1													
21- 25		52	17							1						
26- 30		112	51			1				1	1					
31- 35		89	156	11	9	2	1	3	1	5	1			3		
36- 40		44	227	54	76	6	2	3	13	22	7	5			1	1
41- 45		13	374	167	254	97	19	6	30	41	33	33	4	3		
46- 50		2	330	302	406	298	81	28	44	87	113	65	14	4		2
51- 55		1	232	356	470	536	265	97	46	77	151	179	38	10	3	9
56- 60			77	340	265	371	325	159	104	45	187	220	101	17	3	10
61- 65			15	219	215	262	155	176	147	179	127	215	159	48	20	8
66- 70			1	93	148	137	57	124	187	218	108	117	155	71	5	3
71- 75			1	29	104	109	45	49	124	219	78	100	99	75	21	6
76- 80				3	60	79	31	28	46	128	87	83	84	106	72	4
81- 85					25	61	29	12	33	75	52	62	70	79	49	14
86- 90					7	29	19	10	17	27	25	37	77	62	52	23
91- 95					2	25	8	9	5	17	11	35	39	60	35	33
96-100					1	4	9	3	6	17	7	16	38	51	35	24
101-105							3		3	4	1	2	17	18	13	24
106-110					1		1	3	1		2		5	12	8	17
111-115								1	4	1	1	2	3	9	7	6
116-120							1		2			2	1	1	5	1
121-125									1		1		2	3		3
126-130													1	2		
131-135																
136-140										1			3	1		
141-145									1					1		
146-150																
151-155										1						
156-160																
161-165														1		
166-170																
171-175																
176-180										1						
181-185																
186-190																
191-195																
196-200																
201-205																
206-210																
211-215																
216-220																
221-225																
226-230																
231-235																
236-240																
241-245		1			2											
246-250				1												
251-255			1							1						
NO. MEAS.		326	1469	1595	1996	2037	1051	711	835	1206	995	1176	911	633	333	193
NO. TAKEN		351	13716	9336	13679	3281	3807	1638	2125	1816	1178	1712	1182	955	278	298
SAMP. MIN	57	87	113	66	86	107	107	98	127	122	163	128	143	111	90	89
MEAN MEAS.		31	44	56	55	59	60	63	65	67	63	66	73	80	85	89
RANGE (MM)		18-243	18-253	33-248	33-243	28- 98	33-118	33-113	33-143	23-253	28-123	38-118	43-138	33-163	38-118	38-123

Table III-5. - Weekly length-frequency of live weakfish impinged at the circulating water intake, S.N.G.S., during 13 June through 30 September 1978.

TL (MM)	061378 1500 TO 061578 0300	061978 0925 TO 062378 0600	062678 0909 TO 063078 0600	070478 1037 TO 070778 1140	071078 1046 TO 071578 2003	071678 0604 TO 072278 2225	072378 0030 TO 072978 2100	073078 0100 TO 080578 2230	080678 0030 TO 081278 2320	081378 0115 TO 081978 2240	082078 0010 TO 082678 2300	082778 0100 TO 090278 2330	090378 0100 TO 090978 2230	091078 0115 TO 091678 2245	091778 0001 TO 092378 2300	092478 0100 TO 093078 2230
16- 20		6														
21- 25		24	5							1						
26- 30		46	12							2						
31- 35		47	69	2				2	1	1	1			3		
36- 40		12	90	24	19	1		1	4	4	2	2			1	1
41- 45		7	142	83	90	53	5	2	11	12	15	25	3	3		
46- 50		2	133	172	202	202	44	6	16	34	54	40	11	1		2
51- 55			115	200	208	398	194	54	17	26	69	129	32	4	2	6
56- 60			39	142	160	279	237	91	56	24	85	135	74	11	1	9
61- 65			10	127	131	215	119	117	83	46	50	135	131	35		7
66- 70			1	55	66	101	39	90	93	61	41	60	132	50	1	3
71- 75			1	17	70	84	32	31	62	76	31	65	82	60	4	5
76- 80				2	33	56	18	25	17	35	47	60	73	60	8	2
81- 85					16	43	15	5	14	26	29	44	60	65	4	9
86- 90					3	21	13	3	10	7	13	23	58	46	12	17
91- 95					1	23	3	4	1	8	6	23	30	47	9	24
96-100					1		6	1		4	4	13	32	35	9	13
101-105												2	13	14	6	16
106-110					1			2	1		2		4	10	2	16
111-115									2			1	3	6	4	8
116-120												2		1	1	
121-125											1		1	3		3
126-130													1	1		
131-135																
136-140													3			
141-145																
146-150																
151-155																
156-160																
161-165																
166-170																
171-175																
176-180																
181-185																
186-190																
191-195																
196-200																
201-205																
206-210																
211-215																
216-220																
221-225																
226-230																
231-235																
236-240																
241-245		1			2											
NO. MEAS.		145	637	869	1023	1476	725	434	393	369	450	733	743	476	64	146
NO. TAKEN		170	6031	4194	5074	1633	792	497	412	401	636	1315	1301	761	91	241
SAMP. MIN	57	87	113	46	86	107	107	98	127	122	163	128	143	111	90	89
MEAN MEAS.		31	44	54	57	59	60	63	65	66	63	65	73	80	89	89
RANGE (MM)		18-243	23- 73	33- 78	38-243	38- 93	43- 98	33-108	33-113	23- 98	33-123	38-118	43-138	33-128	38-118	38-123

Table III-6. - Weekly length-frequency of dead weakfish impinged at the circulating water intake, S.N.G.S., during 13 June through 30 September 1978.

TL (MM)	061378 1600 TO 061578 0300	061978 0923 TO 062378 0600	062578 0930 TO 063078 0500	070478 1037 TO 070778 1140	071078 1046 TO 071578 2003	071678 0508 TO 072278 2225	072378 0030 TO 072978 2100	073078 0100 TO 080578 2230	080678 0030 TO 081278 2320	081378 0115 TO 081978 2240	082078 0010 TO 082678 2300	082778 0100 TO 090278 2330	090378 0100 TO 090978 2230	091078 0115 TO 091678 2245	091778 0001 TO 092378 2300	092478 0100 TO 093078 2230
16- 20		6														
21- 25		25	4													
26- 30		60	25							1						
31- 35		37	55	7	8	1										
36- 40		30	136	23	35	4			3	1	3	3				
41- 45		6	153	76	110	35	5		6	5	2	7	1			
46- 50			145	97	115	76	19	5	5	5	14	12	3	2		
51- 55		1	79	105	115	109	52	19	6	6	20	31	6	2	1	
56- 60			24	104	74	59	63	32	22	11	22	41	21	3		1
61- 65			8	60	59	43	20	30	26	22	17	45	21	7		
66- 70				21	38	25	10	22	27	26	9	14	16	10		
71- 75				3	22	14	4	8	15	19	8	13	10	6	4	
76- 80				1	20	12	6	1	9	9	7	8	7	11		1
81- 85					2	8	3	1	2	5	2	7	4	5	2	
86- 90						3		2	2	3	4	5	7	1	2	2
91- 95						1	1					5	4	2		3
96-100						2	1			1		1	5		2	2
101-105										1			3	2	1	2
106-110														1	1	
111-115									1							
116-120							1									
121-125									1				1			
126-130																
131-135																
136-140																
141-145																
146-150																
151-155																
156-160																
161-165																
166-170																
171-175																
176-180																
181-185																
186-190																
191-195																
196-200																
201-205																
206-210																
211-215																
216-220																
221-225																
226-230																
231-235																
236-240																
241-245																
246-250				1												
NO. MEAS.		165	538	499	598	392	185	120	125	115	108	192	109	52	13	11
NO. TAKEN		165	7182	1006	1766	392	225	121	129	129	109	194	116	56	20	12
SAMP. MIN	57	87	113	46	86	107	107	98	127	122	163	128	145	111	93	89
MEAN MEAS.		33	43	52	53	56	58	61	66	66	60	62	70	75	86	90
RANGE (MM)		18- 53	23- 63	33-248	33- 83	33- 98	43-118	48- 88	38-123	28-103	38- 88	38- 98	43-123	48-108	53-108	58-103

Table III-7. - Weekly length-frequency of damaged weakfish impinged at the circulating water intake, S.N.G.S., during 13 June through 30 September 1978.

TL (MM)	061378 1200 TO 061578 2300	061978 0923 TO 062378 0600	062678 0930 TO 063078 0600	070478 1037 TO 070778 1140	071078 1046 TO 071578 2000	071678 0603 TO 072278 2225	072378 0030 TO 072978 2100	073078 0100 TO 080578 2230	080678 0230 TO 081278 2320	081378 0115 TO 081978 2240	082078 0010 TO 082678 2300	082778 0100 TO 090278 2330	090378 0100 TO 090978 2230	091078 0115 TO 091678 2245	091778 0001 TO 092378 2300	092478 0100 TO 093078 2230
16- 20			1													
21- 25			8													
26- 30		4	14													
31- 35		8	32	2		1										
36- 40		2	33	7	3											
41- 45			59	23	21	4	1			1	1					
46- 50			41	32	49	15	2	8		2	3	4		1		
51- 55			35	48	65	29	10	18	2	1	2	10				3
56- 60			14	50	25	32	20	28	5	6	4	10	4	3		
61- 65			3	30	25	23	8	20	11	5	5	10	7	3		1
66- 70				16	20	9	6	9	8	3		4	8	4		
71- 75				8	13	8	2	3	7	13	4	4	7	4		1
76- 80					4	9	1	1	2	6	3	7	4	9		
81- 85					2	7	3	1	4	2	4	4	6	5		3
86- 90					2	2	1	2		1	1	2	12	9		2
91- 95						1	1	1		2	2	3	5	7	2	3
96-100						1						2	1	10	4	3
101-105									1				1	1	2	4
106-110													1	1		
111-115														1		
116-120													1			1
121-125																
126-130																
131-135																
136-140														1		
141-145																
146-150																
151-155																
156-160																
161-165														1		
166-170																
171-175																
176-180																
181-185																
186-190																
191-195																
196-200																
201-205																
206-210																
211-215																
216-220																
221-225																
226-230																
231-235																
236-240																
241-245																
246-250																
251-255			1													
NO. MEAS.		14	241	216	229	141	55	91	40	42	29	60	59	60	8	21
NO. TAKEN		14	306	293	334	141	55	92	44	42	29	60	65	65	8	25
SAMP. MIN	57	87	113	46	86	107	107	98	126	122	163	128	143	111	93	89
MEAN MEAS.		31	43	56	55	61	61	60	68	69	68	67	73	85	98	86
RANGE (MM)		26- 38	18-253	33- 73	38- 88	33- 98	43- 93	48- 93	53-103	43- 93	43- 93	48- 98	58-118	48-163	93-103	53-118

Table III-8. - Percent survival, actual and estimated number, and length range, by month, of weakfish impinged at the circulating water intake, S.N.G.S., June through November 1977.

Month	No. of 3-min. Samples	CF	% Live	Actual No.	Estimated No.	Length (mm) Min.	Max.
June	63	30	38	859	237,245	23	78
July	59	59	54	4,321	1,118,232	28	133
August	74	72	66	1,992	407,950	33	168
September	88	34	76	634	114,062	33	148
October	8	1	100	1	60	123	123
November	94	1	100	1	146	93	93
Total	386	197	57	7,808	1,876,695		

CF = Catch frequency (number of samples in which the species appeared).

Table III-9. - Results of the stepwise multiple regression analysis of tide height and weakfish impingement rate (n/min) during period Pre 1 (26 June - 14 July 1978).

MAXIMUM R-SQUARE IMPROVEMENT FOR DEPENDENT VARIABLE LDEN

STEP 1 VARIABLE HEIGHT3 ENTERED R SQUARE = 0.17763229

	DF	SUM OF SQUARES	MEAN SQUARE	F	PROB>F
REGRESSION	1	4.52009460	4.52009460	15.77	0.0002
ERROR	73	20.92626223	0.28666113		
TOTAL	74	25.44635683			

	B VALUE	STD ERROR	TYPE II SS	F	PROB>F
INTERCEPT	2.27889933				
HEIGHT3	-0.00021289	0.00005361	4.52009460	15.77	0.0002

THE ABOVE MODEL IS THE BEST 1 VARIABLE MODEL FOUND.

STEP 2 VARIABLE HEIGHT ENTERED R SQUARE = 0.20911752

	DF	SUM OF SQUARES	MEAN SQUARE	F	PROB>F
REGRESSION	2	5.32127891	2.66063946	9.52	0.0002
ERROR	72	20.12507792	0.27951497		
TOTAL	74	25.44635683			

	B VALUE	STD ERROR	TYPE II SS	F	PROB>F
INTERCEPT	1.79968494				
HEIGHT	0.08726053	0.05154116	0.80118431	2.87	0.0948
HEIGHT3	-0.00048798	0.00017089	2.27910594	8.15	0.0056

STEP 2 HEIGHT3 REPLACED BY HEIGHT2 R SQUARE = 0.24113457

	DF	SUM OF SQUARES	MEAN SQUARE	F	PROB>F
REGRESSION	2	6.13599636	3.06799817	11.44	0.0001
ERROR	72	19.31036049	0.26819945		
TOTAL	74	25.44635683			

	B VALUE	STD ERROR	TYPE II SS	F	PROB>F
INTERCEPT	1.42905585				
HEIGHT	0.22698252	0.08381147	1.96714230	7.33	0.0086
HEIGHT2	-0.01503028	0.00442536	3.09382337	11.54	0.0011

THE ABOVE MODEL IS THE BEST 2 VARIABLE MODEL FOUND.

MAXIMUM R-SQUARE IMPROVEMENT FOR DEPENDENT VARIABLE LDEN

STEP 3 VARIABLE HEIGHT3 ENTERED R SQUARE = 0.39740243

	DF	SUM OF SQUARES	MEAN SQUARE	F	PROB>F
REGRESSION	3	10.11244605	3.37081468	15.61	0.0001
ERROR	71	15.33391278	0.21597060		
TOTAL	74	25.44635683			

	B VALUE	STD ERROR	TYPE II SS	F	PROB>F
INTERCEPT	-0.91656638				
HEIGHT	1.32139509	0.26591086	5.33320080	24.69	0.0001
HEIGHT2	-0.15750312	0.03343997	4.79116513	22.18	0.0001
HEIGHT3	0.00542769	0.00126493	3.97644771	18.41	0.0001

THE ABOVE MODEL IS THE BEST 3 VARIABLE MODEL FOUND.

Table III-10. - Results of the stepwise multiple regression analysis of tide height and weakfish impingement rate (n/min) during period Post 1 (15 - 26 July 1978).

MAXIMUM R-SQUARE IMPROVEMENT FOR DEPENDENT VARIABLE LOEN

STEP 1 VARIABLE HEIGHT3 ENTERED R SQUARE = 0.01577690

	DF	SUM OF SQUARES	MEAN SQUARE	F	PROB>F
REGRESSION	1	0.25315139	0.25315139	1.17	0.2829
ERROR	73	15.79255141	0.21633632		
TOTAL	74	16.04570279			

	B VALUE	STD ERROR	TYPE II SS	F	PROB>F
INTERCEPT	1.54934608				
HEIGHT3	-0.00004417	0.00004268	0.25315139	1.17	0.2829

THE ABOVE MODEL IS THE BEST 1 VARIABLE MODEL FOUND.

STEP 2 VARIABLE HEIGHT ENTERED R SQUARE = 0.03695203

	DF	SUM OF SQUARES	MEAN SQUARE	F	PROB>F
REGRESSION	2	0.59292127	0.29646063	1.38	0.2578
ERROR	72	15.45278152	0.21462197		
TOTAL	74	16.04570279			

	B VALUE	STD ERROR	TYPE II SS	F	PROB>F
INTERCEPT	1.37652080				
HEIGHT	0.03887063	0.03089344	0.33976988	1.58	0.2124
HEIGHT3	-0.00017229	0.00010888	0.53739730	2.50	0.1179

STEP 2 HEIGHT3 REPLACED BY HEIGHT2 R SQUARE = 0.04657016

	DF	SUM OF SQUARES	MEAN SQUARE	F	PROB>F
REGRESSION	2	0.74725090	0.37362545	1.76	0.1796
ERROR	72	15.29845189	0.21247850		
TOTAL	74	16.04570279			

	B VALUE	STD ERROR	TYPE II SS	F	PROB>F
INTERCEPT	1.28036662				
HEIGHT	0.08407285	0.05141602	0.56810645	2.67	0.1066
HEIGHT2	-0.00521766	0.00289178	0.69172693	3.26	0.0754

THE ABOVE MODEL IS THE BEST 2 VARIABLE MODEL FOUND.

MAXIMUM R-SQUARE IMPROVEMENT FOR DEPENDENT VARIABLE LOEN

STEP 3 VARIABLE HEIGHT3 ENTERED R SQUARE = 0.06295747

	DF	SUM OF SQUARES	MEAN SQUARE	F	PROB>F
REGRESSION	3	1.01019683	0.33673228	1.59	0.1980
ERROR	71	15.03550596	0.21176769		
TOTAL	74	16.04570279			

	B VALUE	STD ERROR	TYPE II SS	F	PROB>F
INTERCEPT	1.03803850				
HEIGHT	0.22215091	0.13412496	0.58094716	2.76	0.1021
HEIGHT2	-0.02397824	0.01708188	0.61727556	1.97	0.1648
HEIGHT3	0.00071309	0.00063994	0.24294592	1.24	0.2689

THE ABOVE MODEL IS THE BEST 3 VARIABLE MODEL FOUND.

Table III-11. - Results of the stepwise multiple regression analysis of tide height and weakfish impingement rate (n/min) during period Post 2 (27 July - 10 September 1978).

MAXIMUM R-SQUARE IMPROVEMENT FOR DEPENDENT VARIABLE LDEN

STEP 1 VARIABLE HEIGHT3 ENTERED R SQUARE = 0.03416668

	DF	SUM OF SQUARES	MEAN SQUARE	F	PROB>F
REGRESSION	1	4.09888236	4.09888236	18.36	0.0001
ERROR	519	115.86837417	0.22325313		
TOTAL	520	119.96725653			

	B VALUE	STD ERROR	TYPE II SS	F	PROB>F
INTERCEPT	0.96719878				
HEIGHT3	-0.00008059	0.00001881	4.09888236	18.36	0.0001

THE ABOVE MODEL IS THE BEST 1 VARIABLE MODEL FOUND.

STEP 2 VARIABLE HEIGHT ENTERED R SQUARE = 0.06796009

	DF	SUM OF SQUARES	MEAN SQUARE	F	PROB>F
REGRESSION	2	8.15298525	4.07649262	18.89	0.0001
ERROR	518	111.81427128	0.21585767		
TOTAL	520	119.96725653			

	B VALUE	STD ERROR	TYPE II SS	F	PROB>F
INTERCEPT	0.65485953				
HEIGHT	0.06387719	0.01473948	4.05410289	18.78	0.0001
HEIGHT3	-0.00030369	0.00005470	6.65331141	30.82	0.0001

STEP 2 HEIGHT3 REPLACED BY HEIGHT2 R SQUARE = 0.07315312

	DF	SUM OF SQUARES	MEAN SQUARE	F	PROB>F
REGRESSION	2	8.77597896	4.38798948	20.44	0.0001
ERROR	518	111.19127756	0.21465498		
TOTAL	520	119.96725653			

	B VALUE	STD ERROR	TYPE II SS	F	PROB>F
INTERCEPT	0.53028668				
HEIGHT	0.12499100	0.02423901	5.70780163	26.59	0.0001
HEIGHT2	-0.00799593	0.00137336	7.27630513	33.90	0.0001

THE ABOVE MODEL IS THE BEST 2 VARIABLE MODEL FOUND.

MAXIMUM R-SQUARE IMPROVEMENT FOR DEPENDENT VARIABLE LDEN

STEP 3 VARIABLE HEIGHT3 ENTERED R SQUARE = 0.07654862

	DF	SUM OF SQUARES	MEAN SQUARE	F	PROB>F
REGRESSION	3	9.18332759	3.06110920	14.29	0.0001
ERROR	517	110.78392894	0.21428226		
TOTAL	520	119.96725653			

	B VALUE	STD ERROR	TYPE II SS	F	PROB>F
INTERCEPT	0.35647712				
HEIGHT	0.21855055	0.07204967	1.97163281	9.20	0.0025
HEIGHT2	-0.02117513	0.00965669	1.03034234	4.81	0.0288
HEIGHT3	0.00052882	0.00038355	0.40734863	1.90	0.1686

THE ABOVE MODEL IS THE BEST 3 VARIABLE MODEL FOUND.

Table III-12. - Results of the stepwise multiple regression analysis of tide height and weakfish impingement rate (n/min) during period Post 3 (11 - 30 September, 1978).

STEP 1 VARIABLE HEIGHT3 ENTERED R SQUARE = 0.02321459

	DF	SUM OF SQUARES	MEAN SQUARE	F	PROB>F
REGRESSION	1	0.53113491	0.53113491	3.45	0.0654
ERROR	145	22.34822200	0.15412567		
TOTAL	146	22.87935690			

	B VALUE	STD ERROR	TYPE II SS	F	PROB>F
INTERCEPT	0.45885707				
HEIGHT3	-0.00004944	0.00002663	0.53113491	3.45	0.0654

THE ABOVE MODEL IS THE BEST 1 VARIABLE MODEL FOUND.

STEP 2 VARIABLE HEIGHT ENTERED R SQUARE = 0.03470171

	DF	SUM OF SQUARES	MEAN SQUARE	F	PROB>F
REGRESSION	2	0.79395290	0.39697645	2.59	0.0786
ERROR	144	22.08540401	0.15337086		
TOTAL	146	22.87935690			

	B VALUE	STD ERROR	TYPE II SS	F	PROB>F
INTERCEPT	0.32353989				
HEIGHT	0.02892393	0.02209537	0.26281799	1.71	0.1926
HEIGHT3	-0.00014848	0.00008019	0.52586816	3.43	0.0661

STEP 2 HEIGHT3 REPLACED BY HEIGHT2 R SQUARE = 0.03967830

	DF	SUM OF SQUARES	MEAN SQUARE	F	PROB>F
REGRESSION	2	0.90781398	0.45390699	2.97	0.0542
ERROR	144	21.97154293	0.15258016		
TOTAL	146	22.87935690			

	B VALUE	STD ERROR	TYPE II SS	F	PROB>F
INTERCEPT	0.24835718				
HEIGHT	0.06359829	0.03652382	0.46263295	3.03	0.0838
HEIGHT2	-0.00420414	0.00205319	0.63972924	4.19	0.0424

THE ABOVE MODEL IS THE BEST 2 VARIABLE MODEL FOUND.

MAXIMUM R-SQUARE IMPROVEMENT FOR DEPENDENT VARIABLE LDEN

STEP 3 VARIABLE HEIGHT3 ENTERED R SQUARE = 0.04846607

	DF	SUM OF SQUARES	MEAN SQUARE	F	PROB>F
REGRESSION	3	1.10887253	0.36962418	2.43	0.0668
ERROR	143	21.77048438	0.15224115		
TOTAL	146	22.87935690			

	B VALUE	STD ERROR	TYPE II SS	F	PROB>F
INTERCEPT	0.03530728				
HEIGHT	0.17755582	0.10566098	0.42990515	2.82	0.0951
HEIGHT2	-0.02005163	0.01394170	0.31491963	2.07	0.1525
HEIGHT3	0.00062410	0.00054308	0.20105855	1.32	0.2524

THE ABOVE MODEL IS THE BEST 3 VARIABLE MODEL FOUND.

Table III-13. - Results of the stepwise multiple regression analysis of tide height and detritus impingement rate (kg/min) during period Pre 1 (26 June - 14 July 1978).

MAXIMUM R-SQUARE IMPROVEMENT FOR DEPENDENT VARIABLE DETRITUS

WARNING: 13 OBSERVATIONS DELETED DUE TO MISSING VALUES.

STEP 1 VARIABLE HEIGHT2 ENTERED R SQUARE = 0.23551251

	DF	SUM OF SQUARES	MEAN SQUARE	F	PROB>F
REGRESSION	1	607.61802479	607.61802479	18.48	0.0001
ERROR	60	1972.36391069	32.87273184		
TOTAL	61	2579.98193548			

	B VALUE	STD ERROR	TYPE II SS	F	PROB>F
INTERCEPT	9.53375047				
HEIGHT2	-0.04302488	0.01000742	607.61802479	18.48	0.0001

THE ABOVE MODEL IS THE BEST 1 VARIABLE MODEL FOUND.

STEP 2 VARIABLE HEIGHT ENTERED R SQUARE = 0.25362784

	DF	SUM OF SQUARES	MEAN SQUARE	F	PROB>F
REGRESSION	2	654.35525671	327.17762835	10.02	0.0002
ERROR	59	1925.62667878	32.63774032		
TOTAL	61	2579.98193548			

	B VALUE	STD ERROR	TYPE II SS	F	PROB>F
INTERCEPT	6.76129528				
HEIGHT	1.19126059	0.99548638	46.73723192	1.43	0.2362
HEIGHT2	-0.10520296	0.05290778	129.04372215	3.95	0.0514

THE ABOVE MODEL IS THE BEST 2 VARIABLE MODEL FOUND.

STEP 3 VARIABLE HEIGHT3 ENTERED R SQUARE = 0.37882354

	DF	SUM OF SQUARES	MEAN SQUARE	F	PROB>F
REGRESSION	3	977.35790030	325.78596677	11.79	0.0001
ERROR	58	1602.62403518	27.63144888		
TOTAL	61	2579.98193548			

	B VALUE	STD ERROR	TYPE II SS	F	PROB>F
INTERCEPT	-17.44737050				
HEIGHT	11.87161285	3.25532841	367.47981824	13.30	0.0006
HEIGHT2	-1.52301352	0.41753139	367.64860530	13.31	0.0006
HEIGHT3	0.05471422	0.01600291	323.00264360	11.69	0.0012

THE ABOVE MODEL IS THE BEST 3 VARIABLE MODEL FOUND.

Table III-14 . - Results of the stepwise multiple regression analysis of tide height and detritus impingement rate (kg/min) during period Post 1 (15 - 26 July 1978).

MAXIMUM R-SQUARE IMPROVEMENT FOR DEPENDENT VARIABLE DETRITUS

WARNINGS: 40 OBSERVATIONS DELETED DUE TO MISSING VALUES.

STEP 1 VARIABLE HEIGHT3 ENTERED R SQUARE = 0.04860182

	DF	SUM OF SQUARES	MEAN SQUARE	F	PROB>F
REGRESSION	1	37.37710506	37.37710506	1.69	0.2032
ERROR	33	731.67032352	22.17182799		
TOTAL	34	769.04742857			

	B VALUE	STD ERROR	TYPE II SS	F	PROB>F
INTERCEPT	6.33715899				
HEIGHT3	-0.00104789	0.00080707	37.37710506	1.69	0.2032

THE ABOVE MODEL IS THE BEST 1 VARIABLE MODEL FOUND.

STEP 2 VARIABLE HEIGHT ENTERED R SQUARE = 0.24828765

	DF	SUM OF SQUARES	MEAN SQUARE	F	PROB>F
REGRESSION	2	190.94497861	95.47248931	5.28	0.0104
ERROR	32	578.10244996	18.06570156		
TOTAL	34	769.04742857			

	B VALUE	STD ERROR	TYPE II SS	F	PROB>F
INTERCEPT	1.00937033				
HEIGHT	1.21255975	0.41589182	153.56787356	8.50	0.0064
HEIGHT3	-0.00569788	0.00175339	190.77511301	10.56	0.0027

STEP 2 HEIGHT3 REPLACED BY HEIGHT2 R SQUARE = 0.26029456

	DF	SUM OF SQUARES	MEAN SQUARE	F	PROB>F
REGRESSION	2	200.17885008	100.08942504	5.63	0.0080
ERROR	32	568.86857849	17.77714308		
TOTAL	34	769.04742857			

	B VALUE	STD ERROR	TYPE II SS	F	PROB>F
INTERCEPT	-0.44216405				
HEIGHT	2.15150357	0.66876481	183.99214325	10.35	0.0030
HEIGHT2	-0.13940571	0.04156108	200.00898448	11.25	0.0021

THE ABOVE MODEL IS THE BEST 2 VARIABLE MODEL FOUND.

STEP 3 VARIABLE HEIGHT3 ENTERED R SQUARE = 0.26193562

	DF	SUM OF SQUARES	MEAN SQUARE	F	PROB>F
REGRESSION	3	201.44091253	67.14697084	3.67	0.0227
ERROR	31	567.60651604	18.30988761		
TOTAL	34	769.04742857			

	B VALUE	STD ERROR	TYPE II SS	F	PROB>F
INTERCEPT	-1.11419319				
HEIGHT	2.61837667	1.90340369	34.64879296	1.89	0.1788
HEIGHT2	-0.21212342	0.28016954	10.49593392	0.57	0.4547
HEIGHT3	0.00307833	0.01172512	1.26206245	0.07	0.7946

THE ABOVE MODEL IS THE BEST 3 VARIABLE MODEL FOUND.

Table III-15. - Results of the stepwise multiple regression analysis of tide height and detritus impingement rate (kg/min) during period Post 2 (27 July - 10 September 1978).

MAXIMUM R-SQUARE IMPROVEMENT FOR DEPENDENT VARIABLE DETRITUS

WARNING: 295 OBSERVATIONS DELETED DUE TO MISSING VALUES.

STEP 1 VARIABLE HEIGHT3 ENTERED R SQUARE = 0.04455046

	DF	SUM OF SQUARES	MEAN SQUARE	F	PROB>F
REGRESSION	1	172.00331514	172.00331514	10.44	0.0014
ERROR	224	3688.86150787	16.46813173		
TOTAL	225	3860.86482301			

	B VALUE	STD ERROR	TYPE II SS	F	PROB>F
INTERCEPT	3.83471261				
HEIGHT3	-0.00081623	0.00025256	172.00331514	10.44	0.0014

THE ABOVE MODEL IS THE BEST 1 VARIABLE MODEL FOUND.

STEP 2 VARIABLE HEIGHT ENTERED R SQUARE = 0.05116730

	DF	SUM OF SQUARES	MEAN SQUARE	F	PROB>F
REGRESSION	2	197.55001897	98.77500948	6.01	0.0029
ERROR	223	3663.31480404	16.42742065		
TOTAL	225	3860.86482301			

	B VALUE	STD ERROR	TYPE II SS	F	PROB>F
INTERCEPT	2.60959610				
HEIGHT	0.24648049	0.19765136	25.54670383	1.56	0.2137
HEIGHT3	-0.00167816	0.00073577	85.45788297	5.20	0.0235

STEP 2 HEIGHT3 REPLACED BY HEIGHT2 R SQUARE = 0.05311150

	DF	SUM OF SQUARES	MEAN SQUARE	F	PROB>F
REGRESSION	2	205.05630319	102.52815159	6.25	0.0023
ERROR	223	3655.80851982	16.39376018		
TOTAL	225	3860.86482301			

	B VALUE	STD ERROR	TYPE II SS	F	PROB>F
INTERCEPT	1.93667447				
HEIGHT	0.57897595	0.32459969	52.15589930	3.18	0.0758
HEIGHT2	-0.04384366	0.01841146	92.96416719	5.67	0.0181

THE ABOVE MODEL IS THE BEST 2 VARIABLE MODEL FOUND.

STEP 3 VARIABLE HEIGHT3 ENTERED R SQUARE = 0.05429992

	DF	SUM OF SQUARES	MEAN SQUARE	F	PROB>F
REGRESSION	3	209.64465999	69.88155333	4.25	0.0062
ERROR	222	3651.22016302	16.44693767		
TOTAL	225	3860.86482301			

	B VALUE	STD ERROR	TYPE II SS	F	PROB>F
INTERCEPT	1.04307744				
HEIGHT	1.06320232	0.97271868	19.64908686	1.19	0.2756
HEIGHT2	-0.11236208	0.13102851	12.09464102	0.74	0.3921
HEIGHT3	0.00276268	0.00523089	4.58835680	0.28	0.5979

THE ABOVE MODEL IS THE BEST 3 VARIABLE MODEL FOUND.

Table III-16. - Results of the stepwise multiple regression analysis of tide height and detritus impingement rate (kg/min) during period Post 3 (11 - 30 September 1978)

MAXIMUM R-SQUARE IMPROVEMENT FOR DEPENDENT VARIABLE DETRITUS

WARNING: 81 OBSERVATIONS DELETED DUE TO MISSING VALUES.

STEP 1 VARIABLE HEIGHT2 ENTERED R SQUARE = 0.06788140

	DF	SUM OF SQUARES	MEAN SQUARE	F	PROB>F
REGRESSION	1	74.72786261	74.72786261	4.73	0.0332
ERROR	65	1026.13124186	15.78663449		
TOTAL	66	1100.85910448			

	B VALUE	STD ERROR	TYPE II SS	F	PROB>F
INTERCEPT	4.43935254				
HEIGHT2	-0.01367993	0.00628763	74.72786261	4.73	0.0332

THE ABOVE MODEL IS THE BEST 1 VARIABLE MODEL FOUND.

STEP 2 VARIABLE HEIGHT3 ENTERED R SQUARE = 0.06987693

	DF	SUM OF SQUARES	MEAN SQUARE	F	PROB>F
REGRESSION	2	76.92465210	38.46232605	2.40	0.0985
ERROR	64	1023.93445238	15.99897582		
TOTAL	66	1100.85910448			

	B VALUE	STD ERROR	TYPE II SS	F	PROB>F
INTERCEPT	4.76849296				
HEIGHT2	-0.03046203	0.04572978	7.09923889	0.44	0.5077
HEIGHT3	0.00109400	0.00295235	2.19678949	0.14	0.7122

THE ABOVE MODEL IS THE BEST 2 VARIABLE MODEL FOUND.

STEP 3 VARIABLE HEIGHT ENTERED R SQUARE = 0.11921907

	DF	SUM OF SQUARES	MEAN SQUARE	F	PROB>F
REGRESSION	3	131.24339671	43.74779890	2.84	0.0441
ERROR	63	969.61570777	15.39072552		
TOTAL	66	1100.85910448			

	B VALUE	STD ERROR	TYPE II SS	F	PROB>F
INTERCEPT	-3.30529999				
HEIGHT	3.56704871	1.89873224	54.31874461	3.53	0.0649
HEIGHT2	-0.46658708	0.23644152	59.93451851	3.89	0.0528
HEIGHT3	0.01687638	0.00868598	55.51460795	3.61	0.0621

THE ABOVE MODEL IS THE BEST 3 VARIABLE MODEL FOUND.

Table III-17. - Two hour latent mortality samples of impinged weakfish taken in the fish holding pool at S.N.G.S. from 7 July to 5 September 1977.

		CONTROL			LATENT			
Date	Time	No. Taken	No. Live	% Live	No. Taken	No. Live	% Live	Change in % Live
7 July	0045	58	41	70	94	85	90	20
8 July	0037	141	80	57	55	46	84	27
11 July	1231	8	6	75	13	9	69	- 6
12 July	0035	14	6	43	34	29	85	42
13 July	1241	28	14	50	1	1	100	50
14 July	0045	172	89	59	95	83	87	28
14 July	1245	74	42	57	181	91	50	- 7
15 July	0030	187	157	84	223	203	91	7
18 July	1227	21	19	90	4	2	50	40
20 July	1230	8	7	88	17	12	71	-17
21 July	1235	34	22	65	22	19	86	21
28 July	1245	74	43	58	20	13	65	7
28 July	0100	118	7	6	145	52	36	30
29 July	0100	75	15	20	28	5	18	- 2
4 August	0025	4	3	75	7	7	100	25
8 August	1240	60	35	58	36	31	86	28
10 August	1235	95	73	77	245	230	94	17
25 August	1241	12	9	75	26	19	72	- 3
5 September	1224	14	12	86	4	2	50	-36

Table III-18. - Three hour latent mortality samples of impinged weakfish taken in the fish holding pool at S.N.G.S. from 25 July to 9 September 1977.

		CONTROL			LATENT			
Date	Time	No. Taken	No. Live	% Live	No. Taken	No. Live	% Live	Change in % Live
25 July	1230	15	15	100	12	10	83	-17
26 July	0045	5	1	20	20	12	60	40
5 August	0027	9	9	100	11	11	100	0
9 August	0053	130	65	50	156	87	56	6
11 August	0055	74	52	71	233	186	80	9
15 August	1240	4	1	25	29	23	79	54
18 August	0035	3	3	100	6	6	100	0
18 August	1232	4	3	75	3	3	100	25
19 August	0040	48	39	81	80	47	59	-22
23 August	0035	24	19	79	18	8	44	-35
24 August	1250	7	7	100	14	12	86	-14
25 August	0035	9	2	22	12	11	92	70
26 August	0040	28	13	46	41	34	83	37
31 August	1900	14	8	57	38	30	79	22
1 September	0640	20	11	55	15	11	73	18
7 September	1240	42	33	79	18	15	83	4
8 September	0050	182	136	75	293	258	88	13
9 September	0035	4	4	100	29	27	94	- 6

Table IV-1. - Estimated number of impinged weakfish on dates where there are plant area and bay wide population estimates.

Date	Daily Estd. No. Impd.	Plant (study) Area Pop. Est.	Bay Wide Pop. Est.	% Weakfish in Plant (study) Area Impd.	% Weakfish In Bay Area Impd.
21 June*	7.1×10^{3}	1.21×10^{8}	1.21×10^{9}	0.006	0.0006
5 July *	4.3×10^{5}	5.13×10^{7}	5.13×10^{8}	0.80	0.08
20-21 July	3.3×10^{4}	8.43×10^{7}	7.85×10^{8}	0.03	0.004
2-3 August	1.6×10^{4}	3.33×10^{7}	2.09×10^{8}	0.05	0.008
16-17 August	2.2×10^{4}	4.31×10^{7}	2.17×10^{8}	0.05	0.01
7-8 September	1.1×10^{4}	1.61×10^{7}	1.68×10^{8}	0.07	0.007

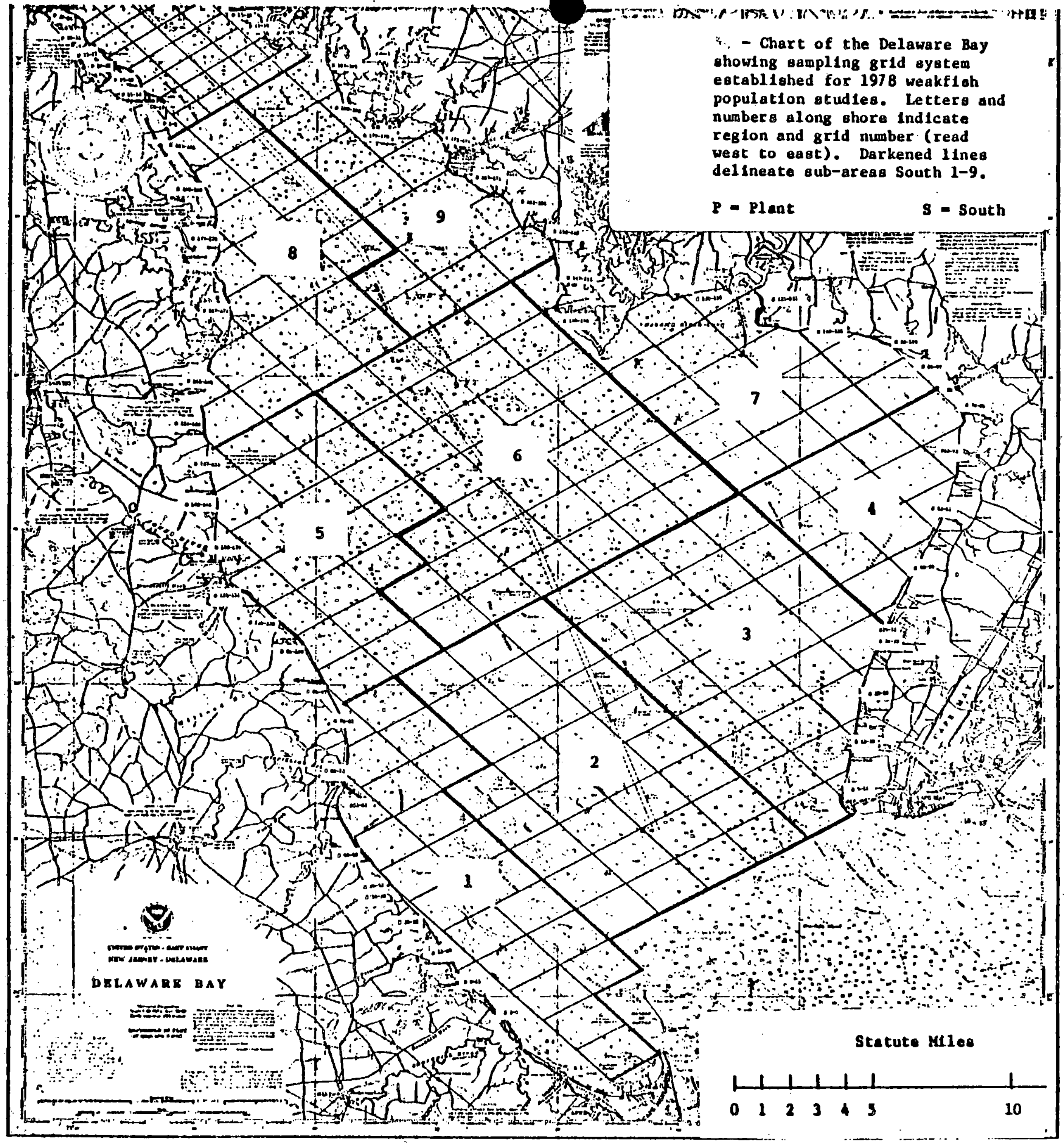
* Extrapolated estimate

Table VI-1. - Monthly abundance[1] of age 0+ weakfish taken by trawl in representative river trawl zones in the vicinity of S.N.G.S. during June through November 1970-1977.

	June	July	Aug.	Sept.	Oct.	Nov.
1970	17.1	69.9	8.9	4.1	2.3	0.0
1971	19.3	64.5	29.4	5.6	5.5	1.2
1972	0.2	5.9	24.7	15.9	2.6	0.1
1973	1.1	8.8	12.0	4.0	2.2	0.2
1974	0.3	9.4	5.2	3.2	2.0	0.2
1975	53.7	38.8	15.2	13.3	4.3	0.2
1976	0.0	15.4	9.8	4.6	1.3	0.0
1977	1.3	47.4	13.8	8.8	1.3	0.0

[1] Abundance - catch per unit effort (n/T)

Figure II - 1



- Chart of the Delaware Bay showing sampling grid system established for 1978 weakfish population studies. Letters and numbers along shore indicate region and grid number (read west to east). Darkened lines delineate sub-areas South 1-9.

P = Plant S = South

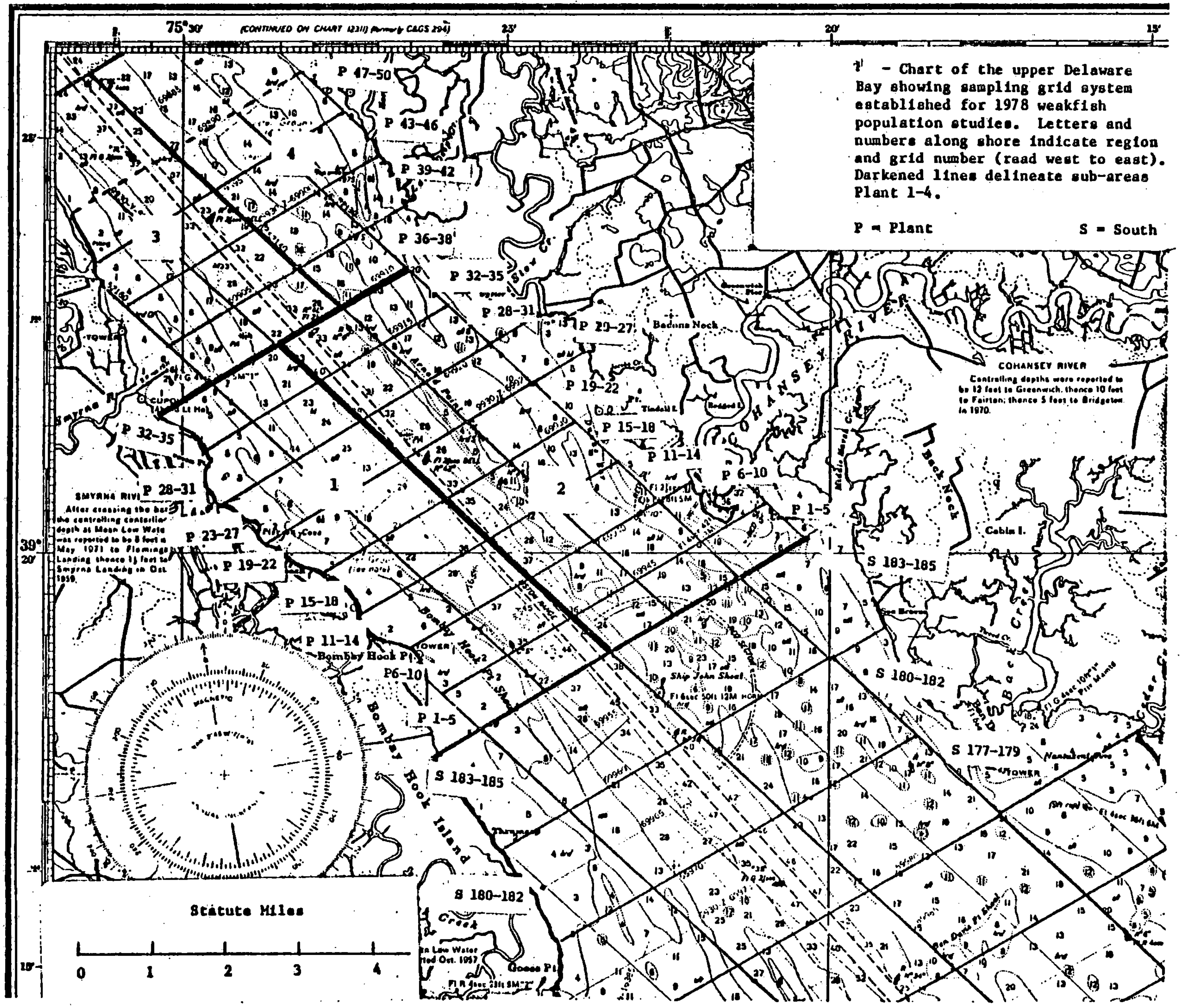
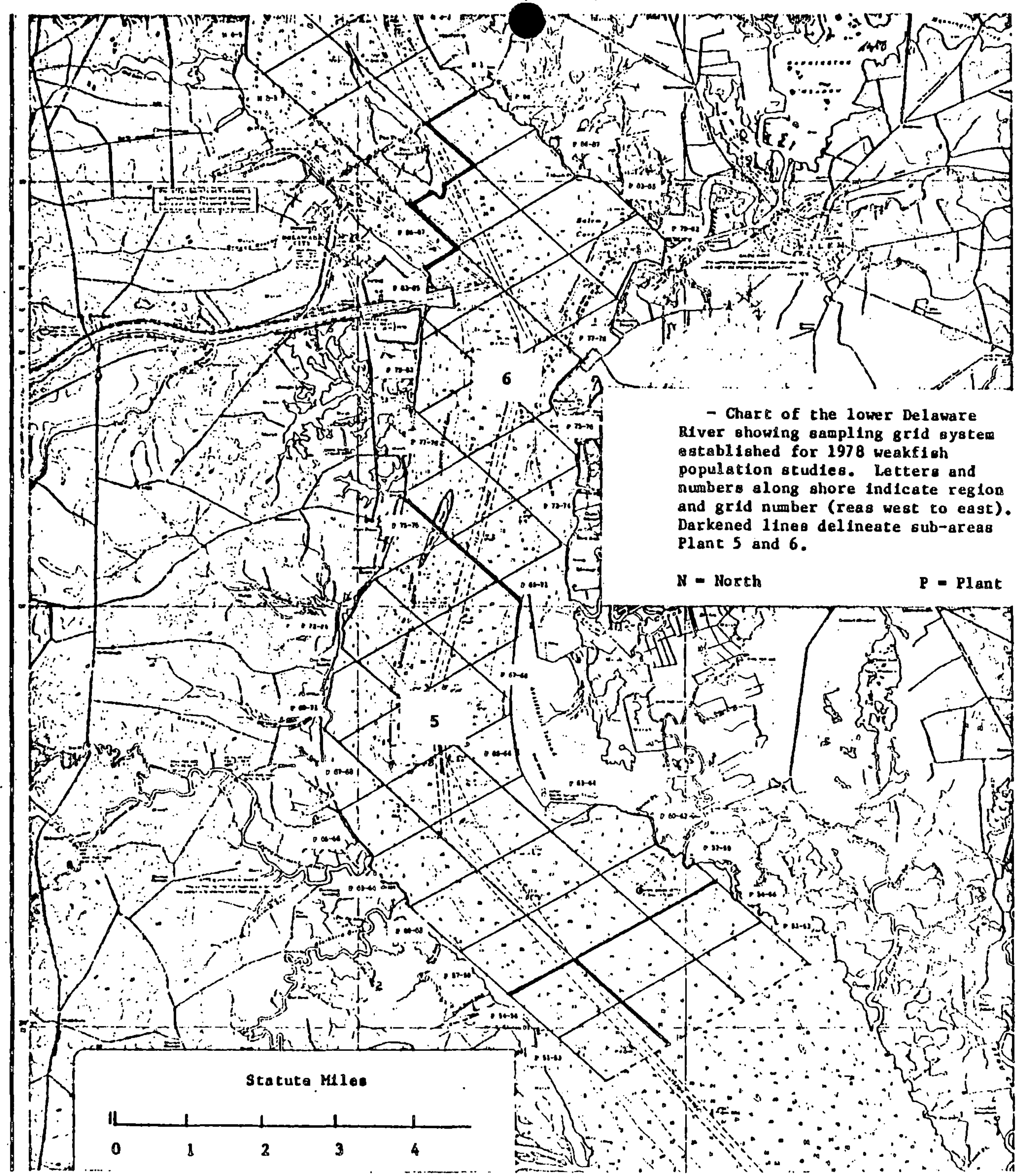


Chart of the upper Delaware Bay showing sampling grid system established for 1978 weakfish population studies. Letters and numbers along shore indicate region and grid number (read west to east). Darkened lines delineate sub-areas Plant 1-4.

P = Plant S = South

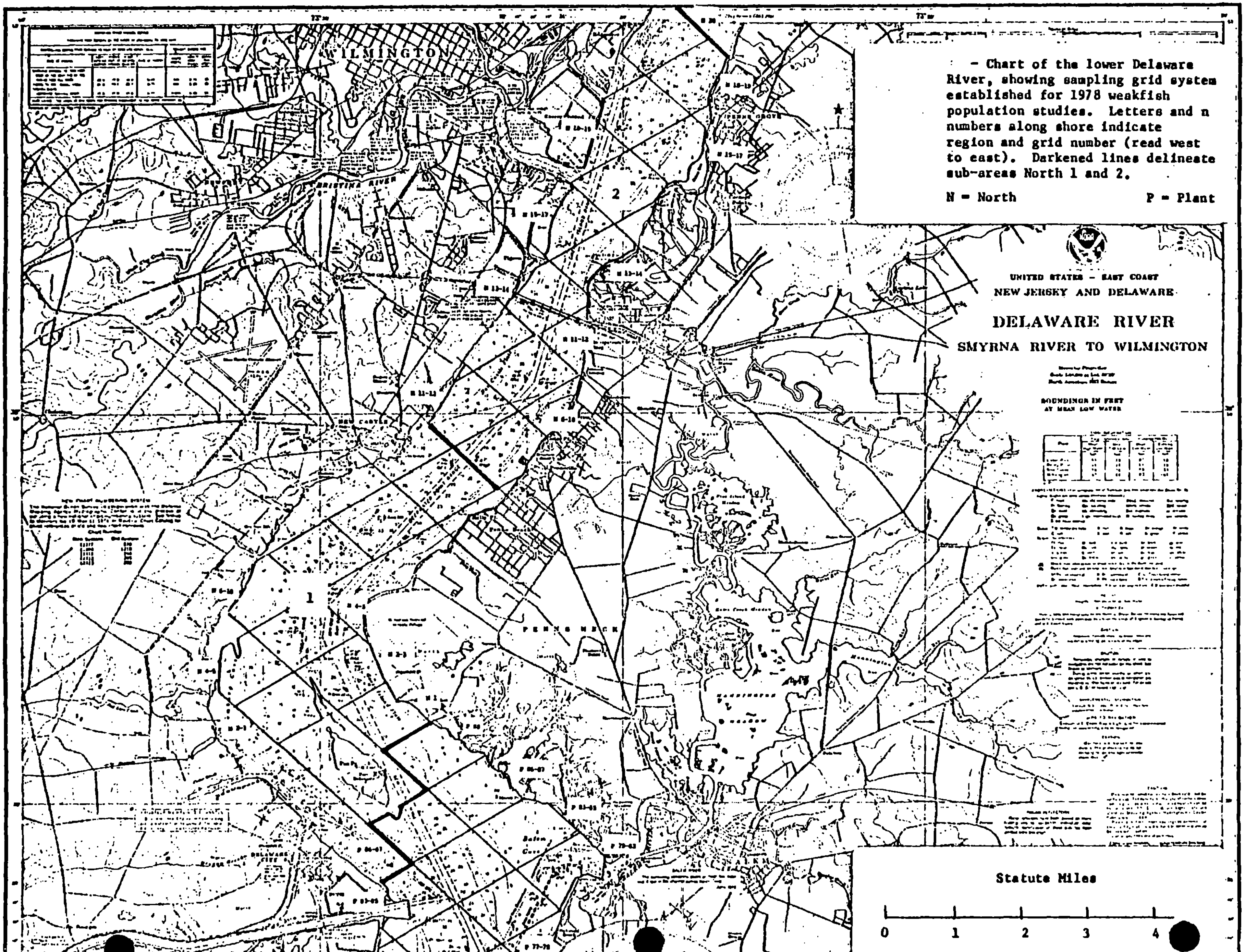
Figure II-3



- Chart of the lower Delaware River showing sampling grid system established for 1978 weakfish population studies. Letters and numbers along shore indicate region and grid number (reas west to east). Darkened lines delineate sub-areas Plant 5 and 6.

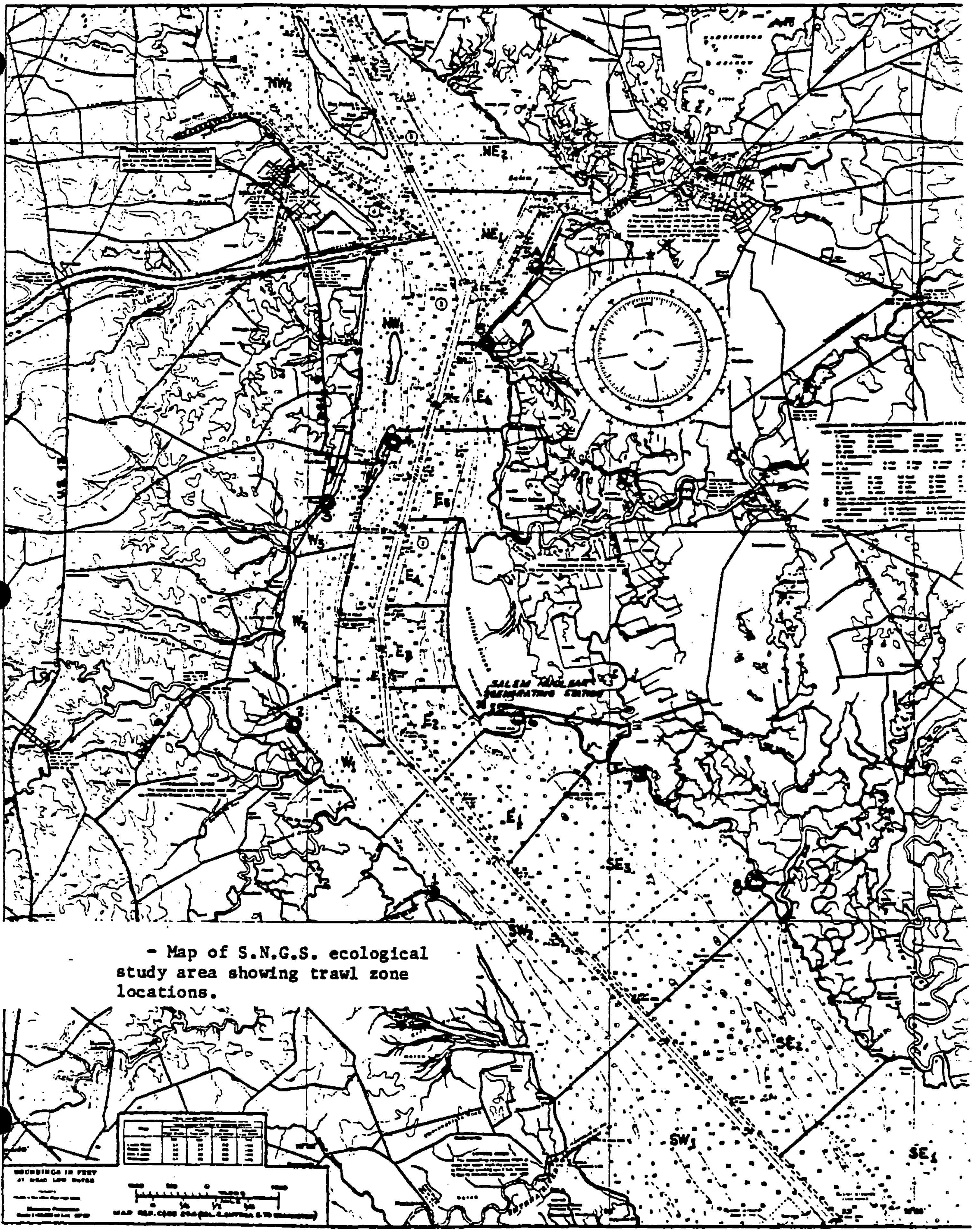
N = North P = Plant

Figure II - 4



- Chart of the lower Delaware River, showing sampling grid system established for 1978 weakfish population studies. Letters and n numbers along shore indicate region and grid number (read west to east). Darkened lines delineate sub-areas North 1 and 2.

N = North P = Plant



- Map of S.N.G.S. ecological study area showing trawl zone locations.

Figure III-1. - Weakfish impingement estimates plotted against date (16 June - 17 September 1977).

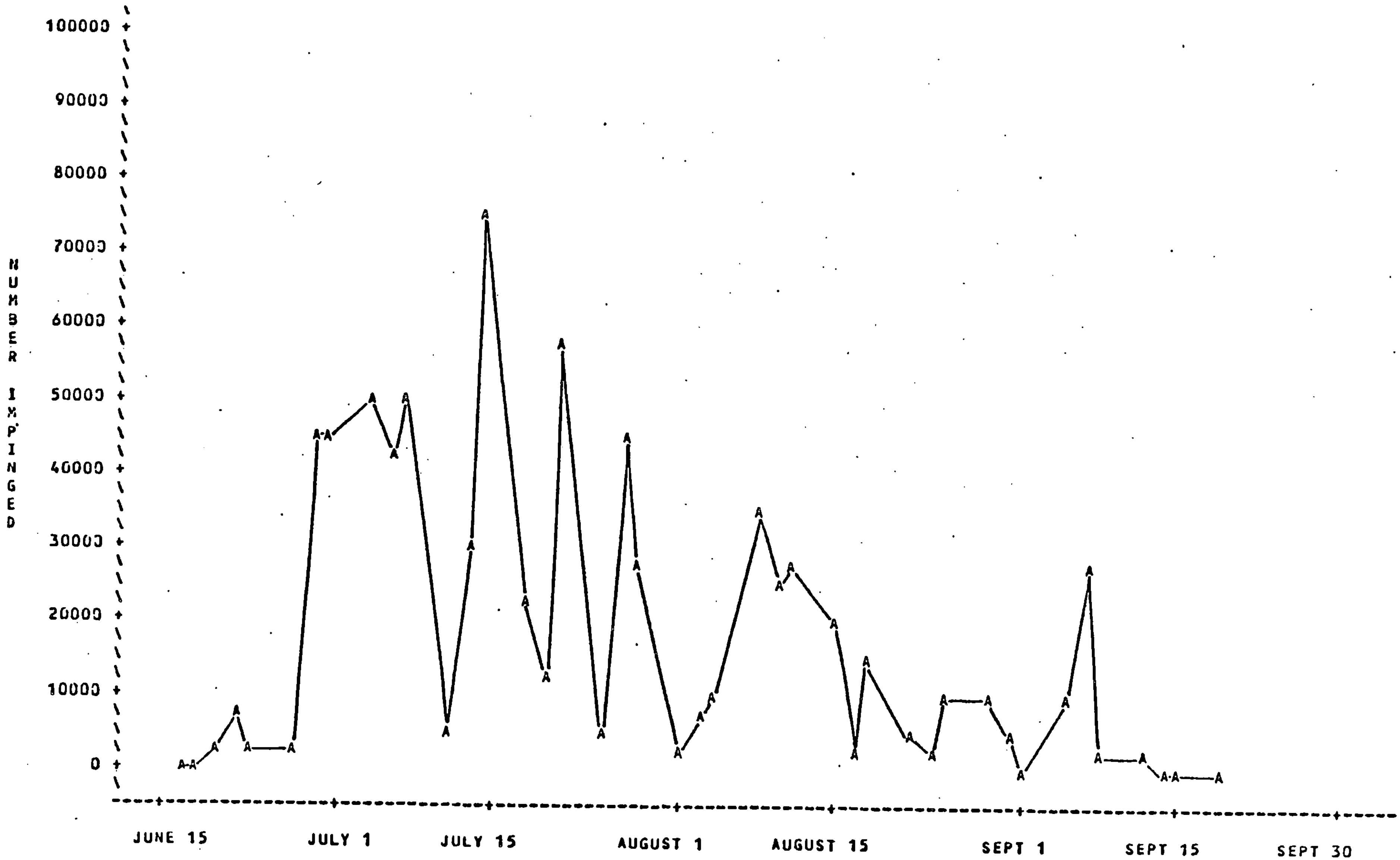


Figure III-2. - Weakfish impingement estimates plotted against date (19 June - 30 September 1978).

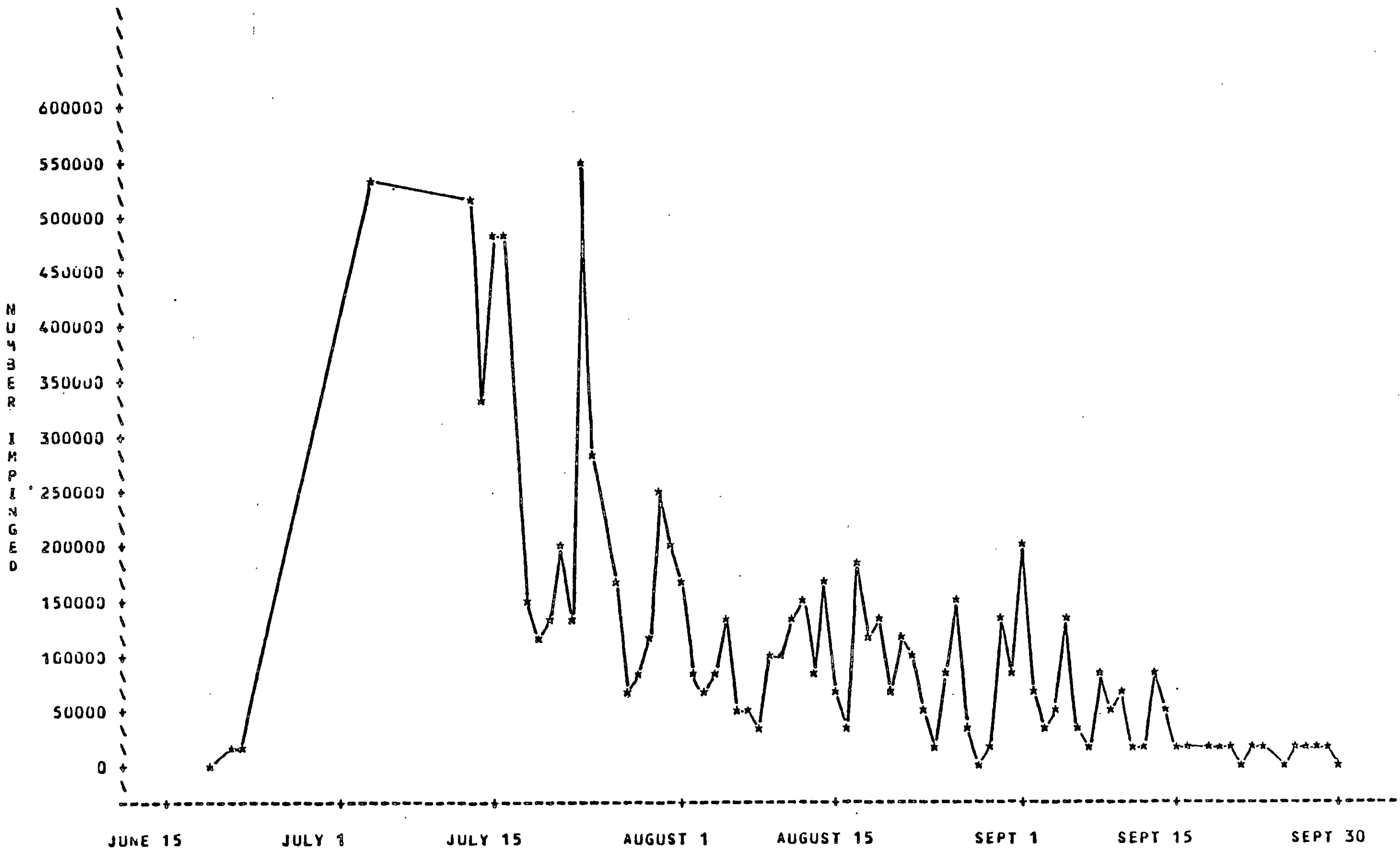


Figure III-3. - Weakfish impingement estimates plotted against dates in 1977 and 1978.

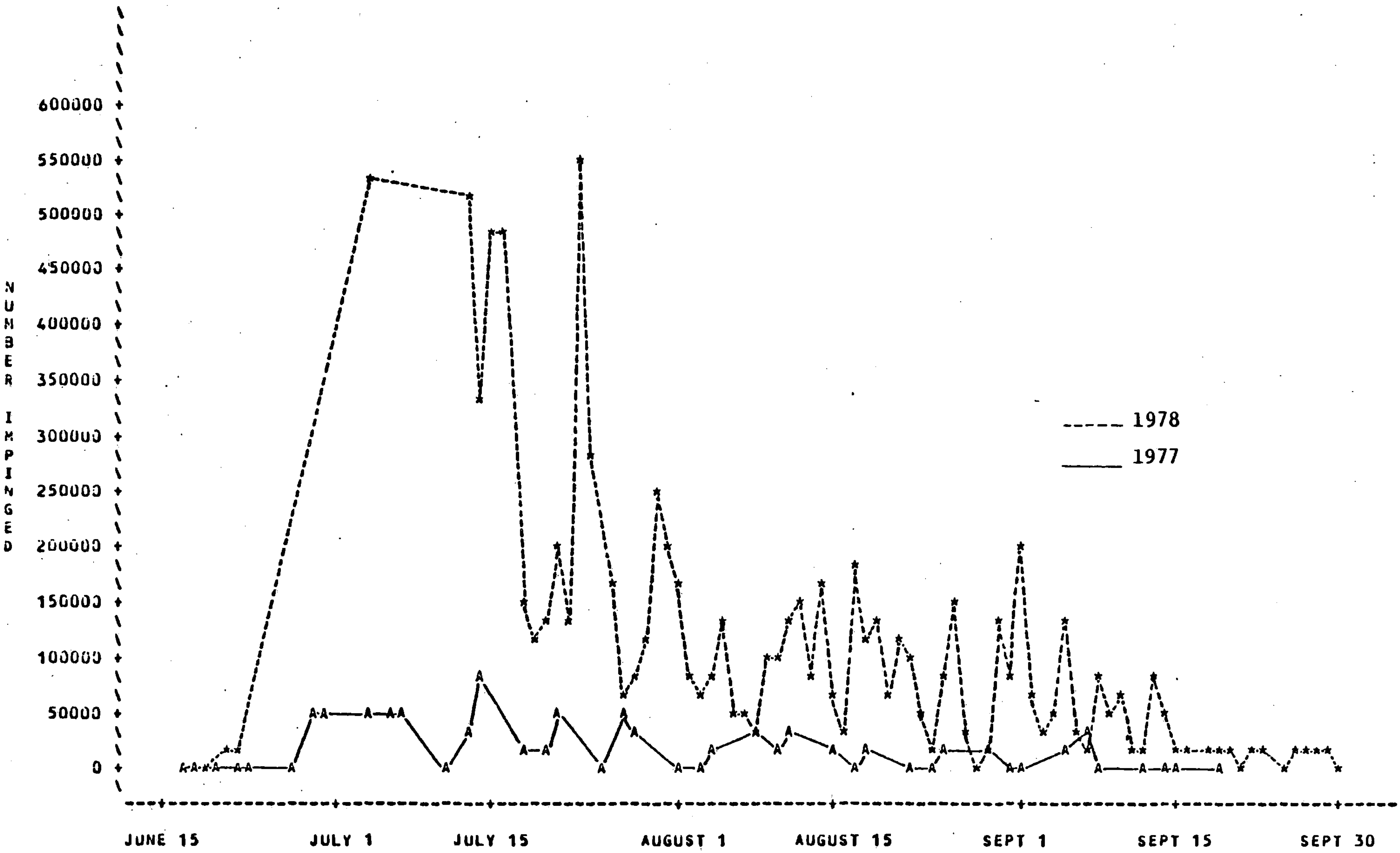


Figure III-4. - Weakfish impingement rate (log [density + 1]) plotted against tide height for period Pre 1 (26 June - 14 July 1978). The best fitting least-squares line based on the regression analysis in Table III-9 is also plotted.

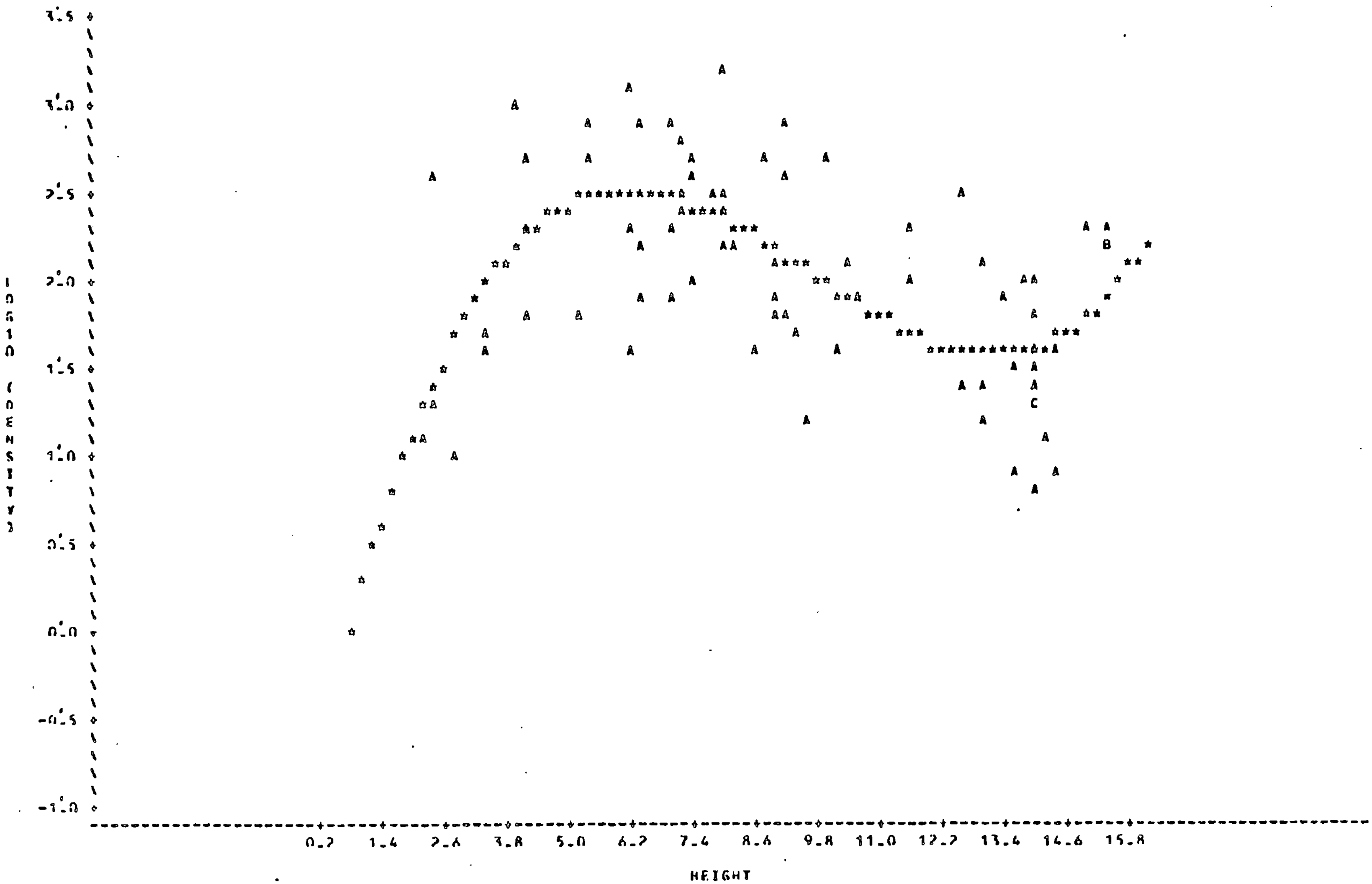


Figure III-5..- Weakfish impingement rate (log [density + 1]) plotted against tide height for period Post 1 (15 - 26 July 1978).

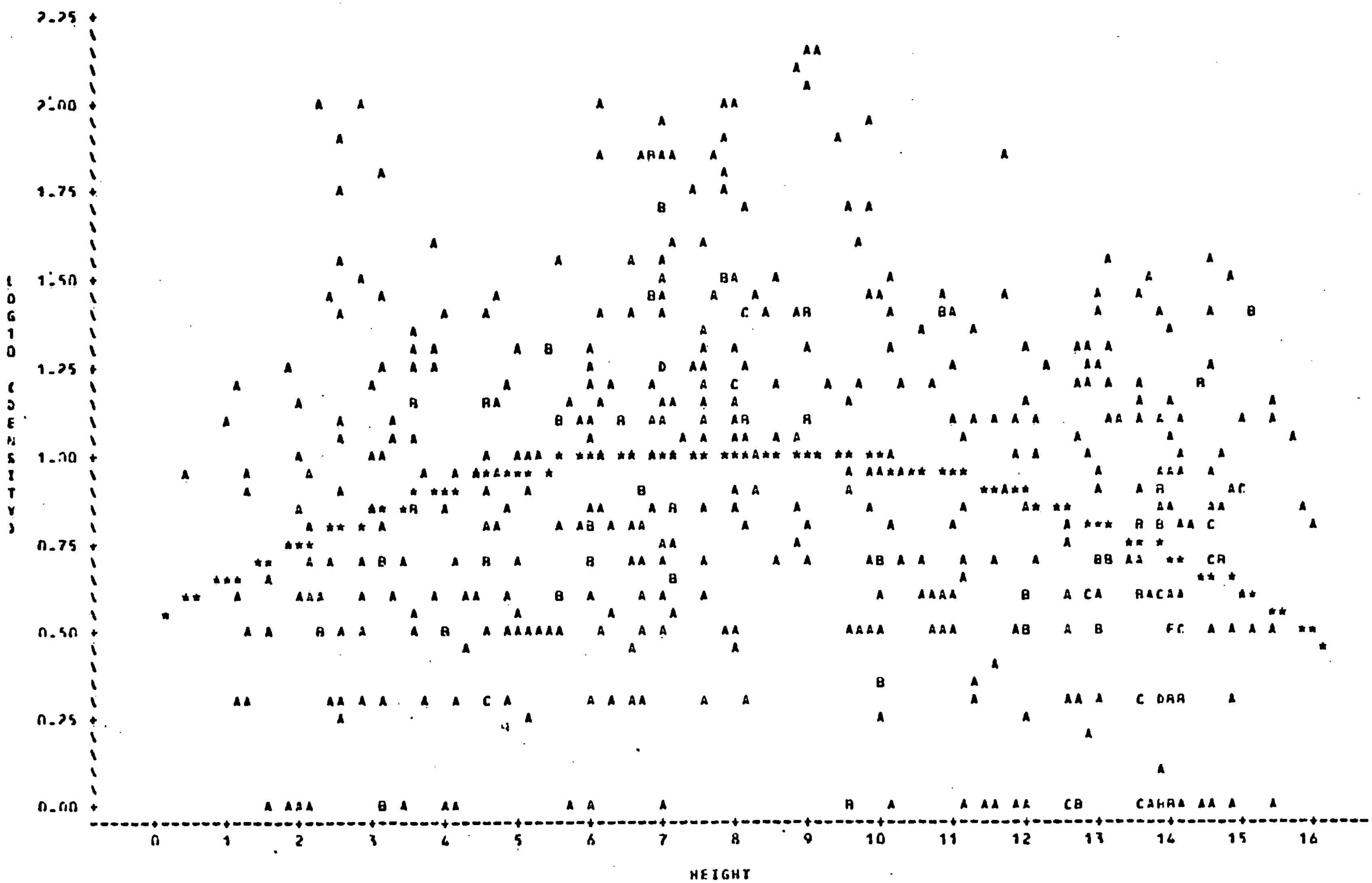


Figure III-6. - Weakfish impingement rate (log [density + 1]) plotted against tide height for period Post 2 (27 July - 10 September 1978). The best fitting least-squares line (non-significant) based on the regression analysis in Table III-11 is also plotted.

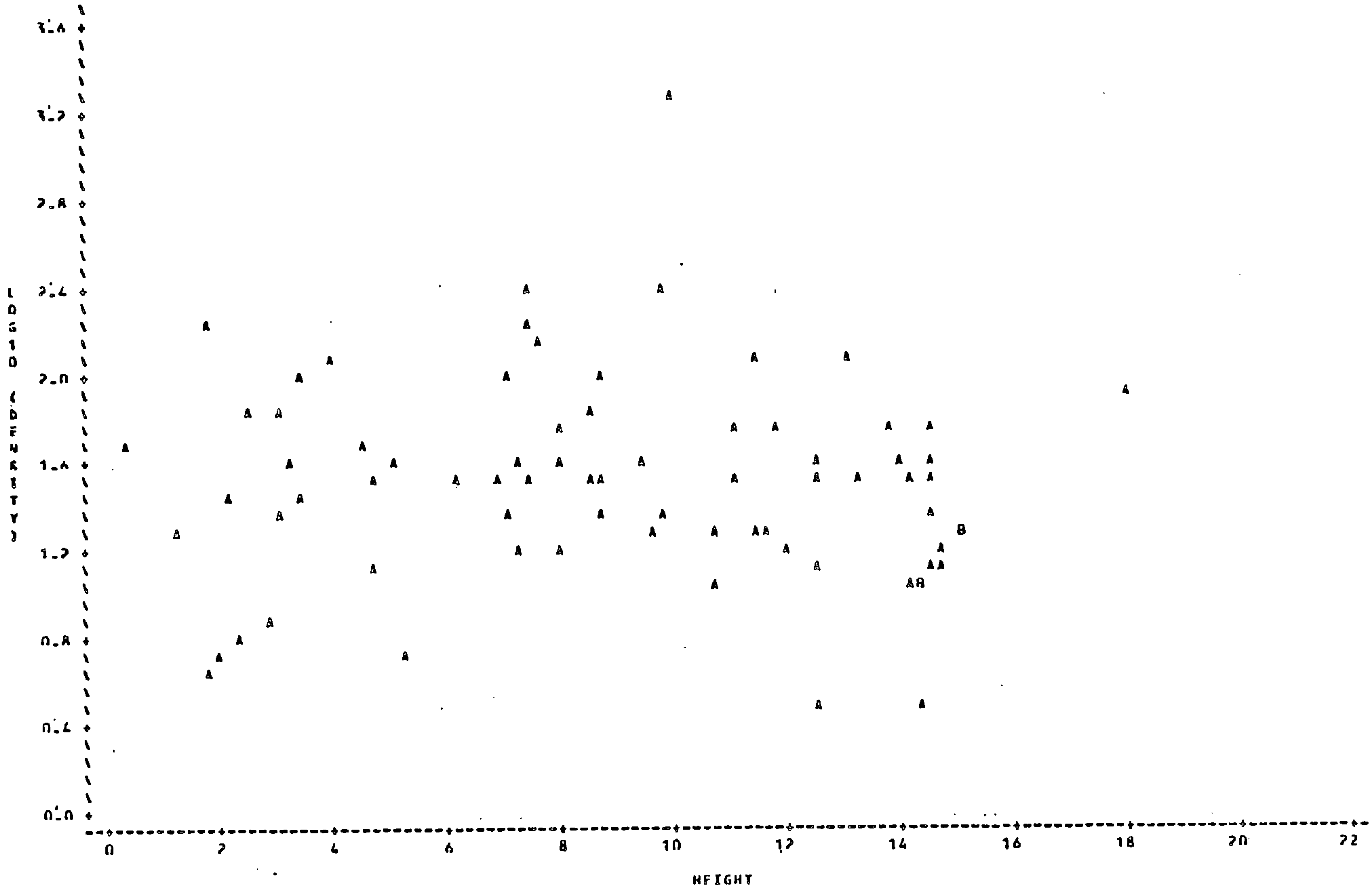


Figure III-7. - Weakfish impingement rate (log [density + 1]) plotted against tide height for period Post 3 (11 - 30 September 1978).

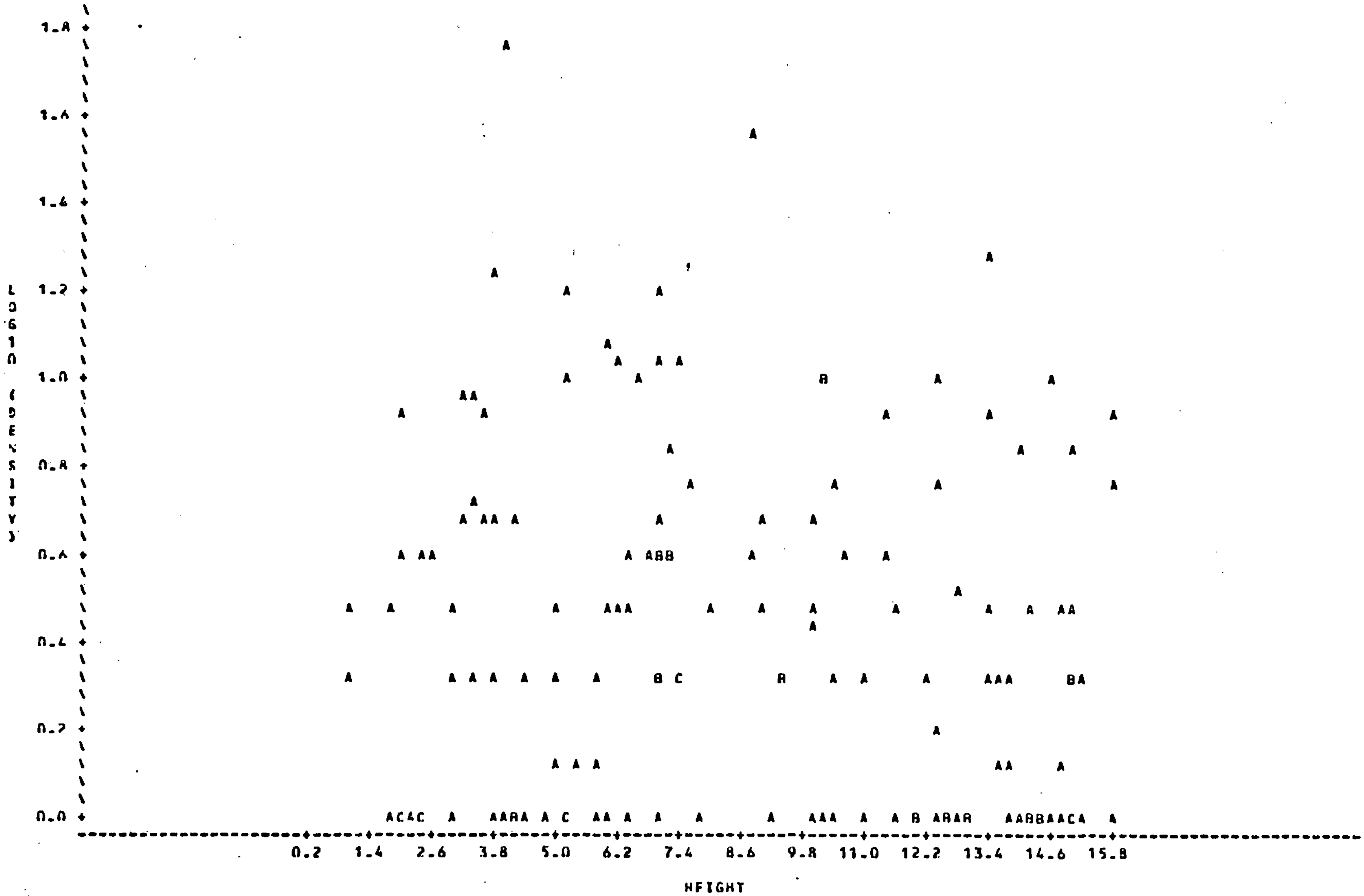


Figure III-8. - Detritus impingement rate (kg/min) plotted against tide height for period Pre 1 (26 June - 14 July 1978). The best fitting least-squares line based on the regression analysis in Table III-13 is also plotted.

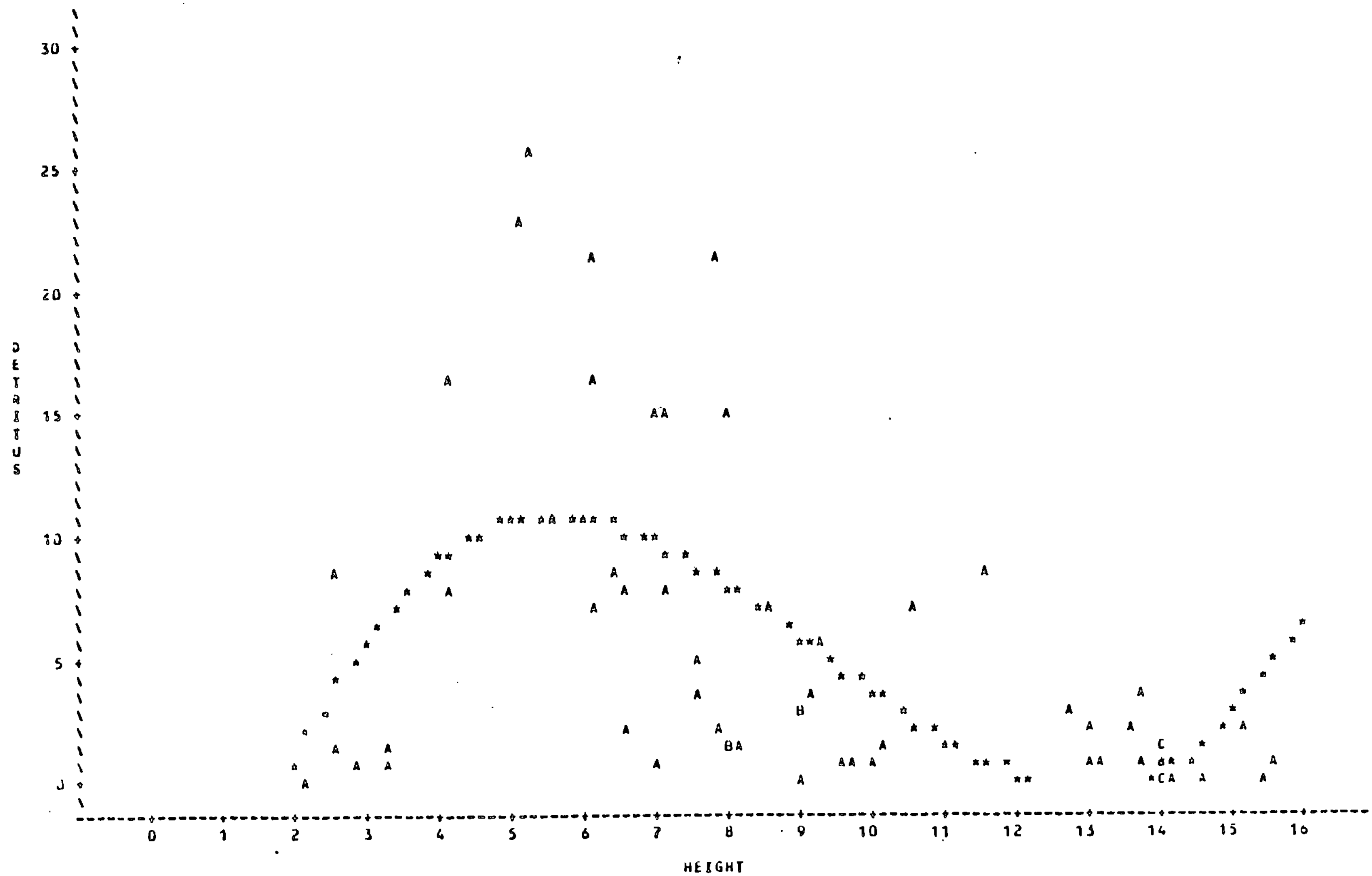


Figure III-9. - Detritus impingement rate (kg/min) plotted against tide height for period Post 1 (15 - 26 July 1978). The best fitting least-squares line (non-significant) based on the regression analysis in Table III-14 is also plotted.

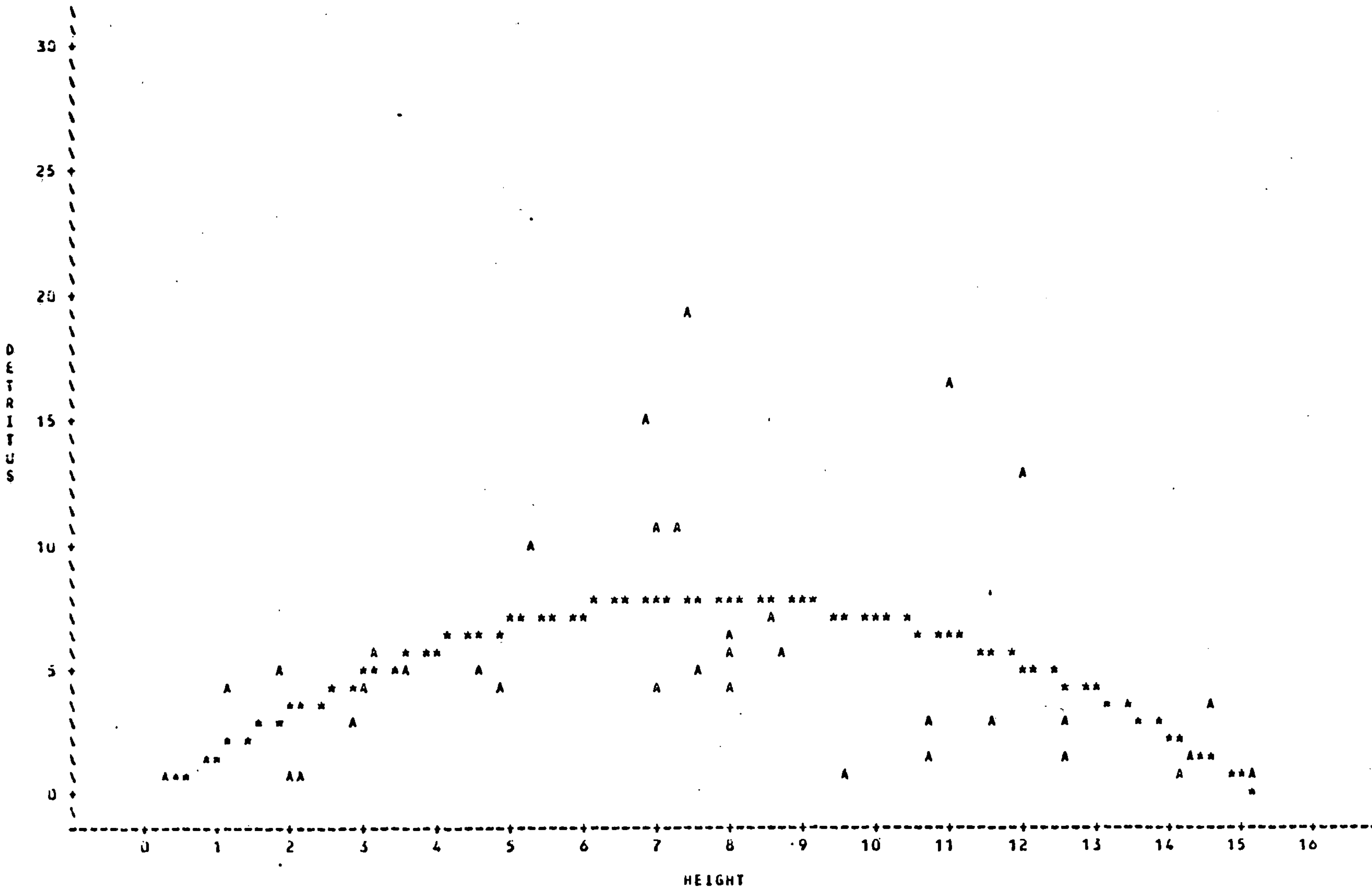


Figure III-10. - Detritus impingement rate (kg/min) plotted against tide height for period Post 2 (27 July - 10 September 1978). The best fitting least-squares line (non-significant) based on the regression analysis in Table III-15 is also plotted.

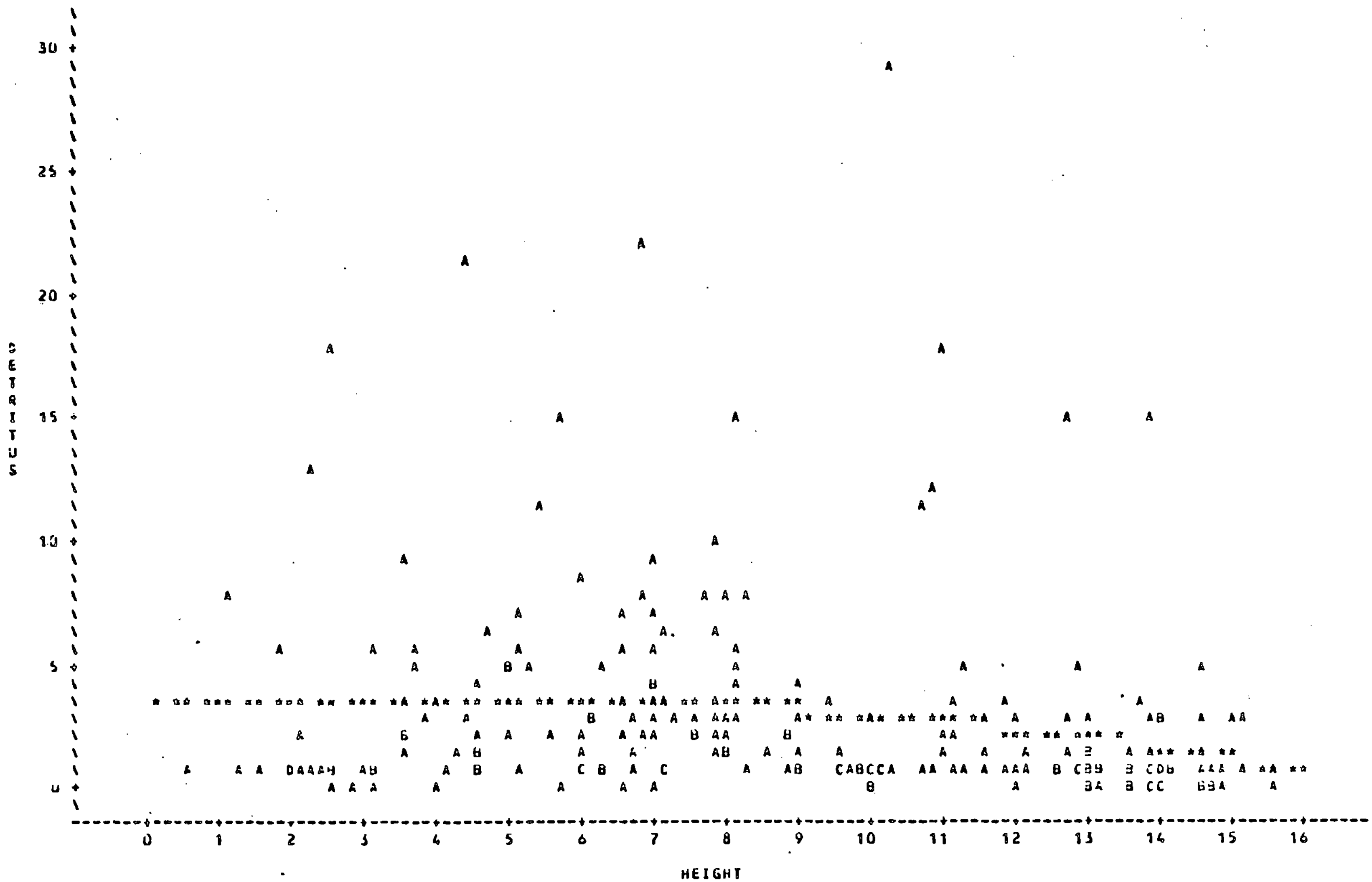


Figure III-11. - Detritus impingement rate (kg/min) plotted against tide height for period Post 3 (11 - 30 September 1978). The best fitting least-squares line (non-significant) based on the regression analysis in Table III-16 is also plotted.

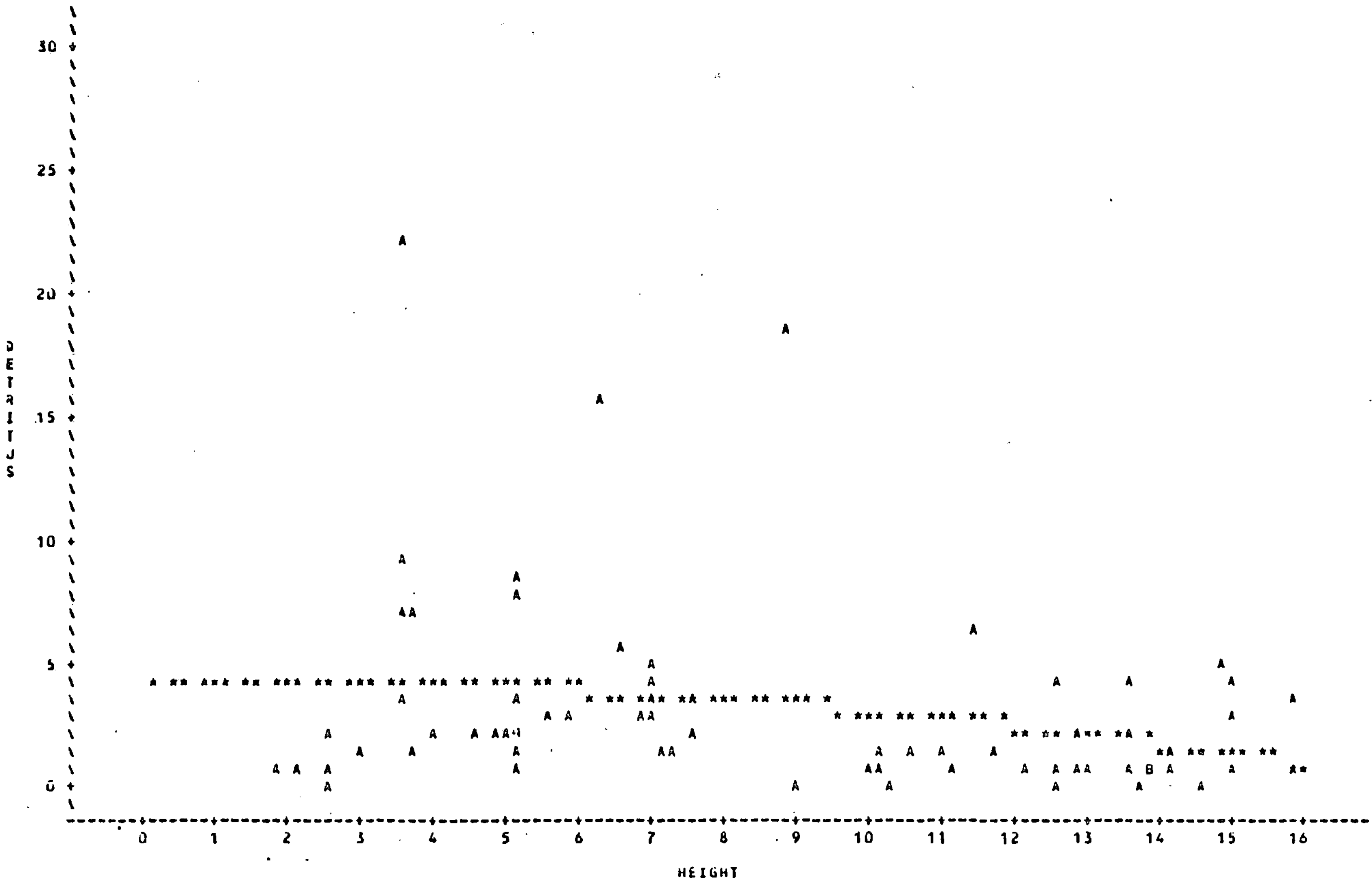
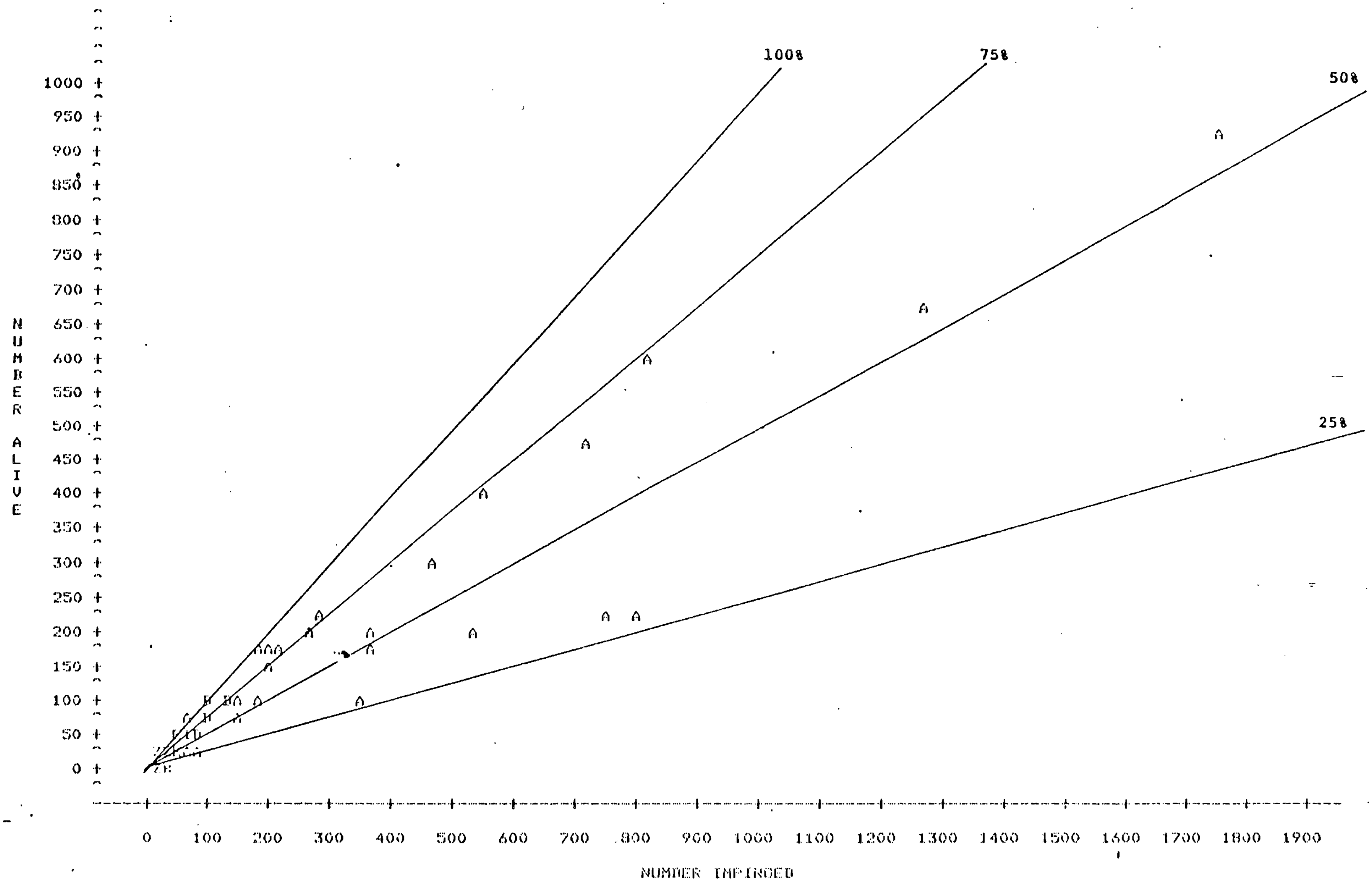


Figure IV-1

NUMBER OF WEAKFISH ALIVE VS. TOTAL NUMBER IMPINGED 14:48 MONDAY, OCTOBER 23, 1978

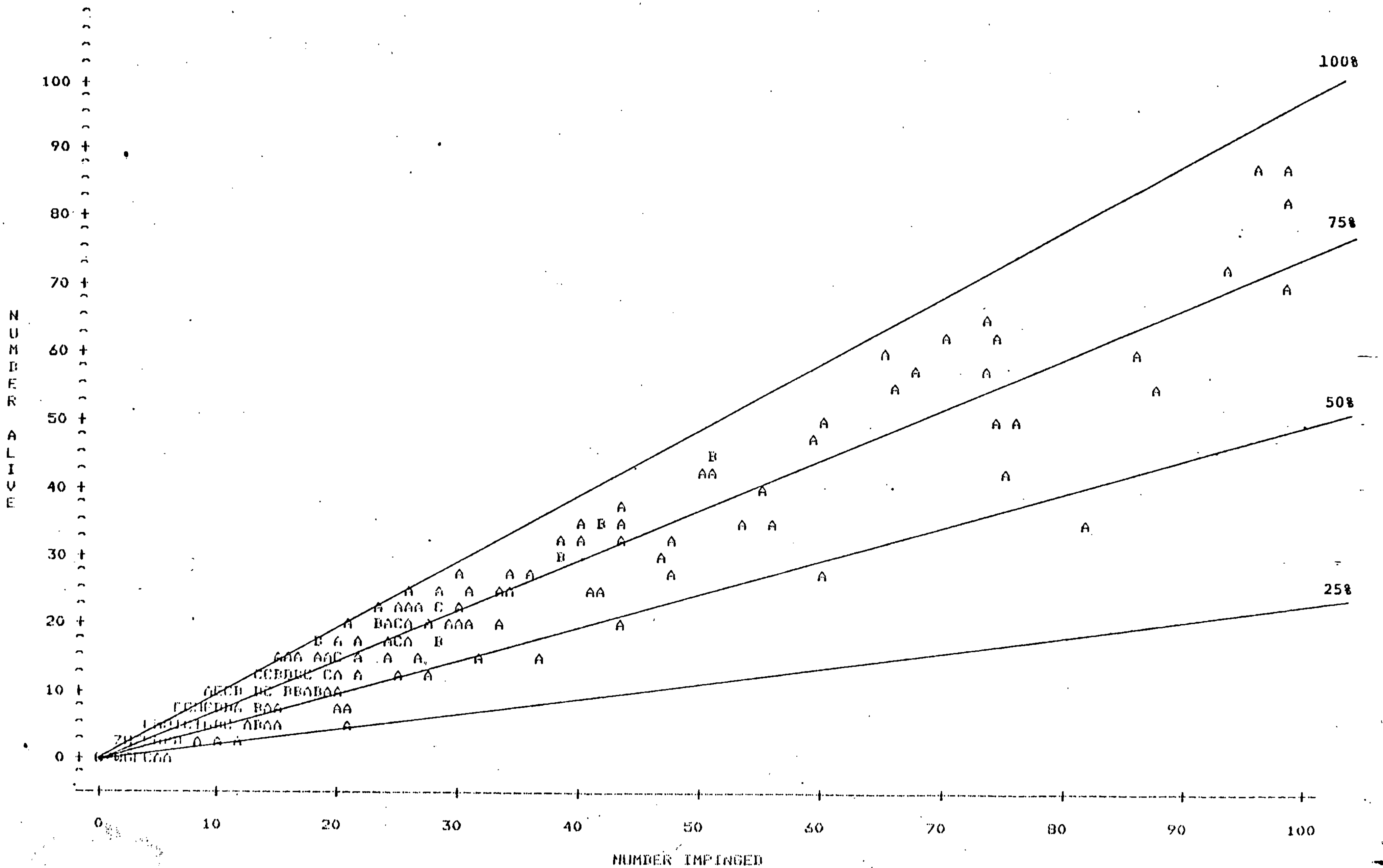


NOTE: 382 OBS HIDDEN
EOF:

OF:

FOR IMPINGEMENT RATES BELOW 100 FISH PER MINUTE   14:48 MONDAY, OCTOBER 23, 1978

PLOT OF ALIVE*TOTAL   LEGEND: A = 1 OBS, B = 2 OBS, ETC.



NOTE: 24 OBS HAD MISSING VALUES OR WERE OUT OF RANGE   76 OBS HIDDEN