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DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL MARINE FISHERIES SERVICE

COMMERCIAL FISHERIES RESEARCH AND DEVELOPMENT ACT
(PUBLIC LAW 88-309)

STATE: NEW JERSEY

PROJECT NO.: 3-405-R

SEGMENT NO.: 2

PROJECT TITLE: INVENTORY OF NEW JERSEY'S ESTUARINE SHELLFISH RESOURCES

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ABSTRACT

The inventory program initiated in 1983 continued. During Segment 2, 188 stations were sampled in Little Egg Harbor Bay from Manahawkin to Holgate. Only the hard clam, Mercenaria mercenaria, was collected in significant numbers. The hard clam resource within the surveyed area of Little Egg Harbor Bay was estimated at 177.2 million clams. Recruitment rates and size-frequency data indicate that the hard clam population of this region is dominated by a few larger, older year classes.

Biological investigations were performed for 40 prospective lease applications received for areas from Little Egg Harbor Bay in Ocean County to Great Sound in Cape May County. Following a review of the biological reports submitted for these applications, the Atlantic Coast Shellfish Council approved all but seven of the applications.

The hard clam relay program continued to operate in Monmouth County. The reported harvest for 1986 was 5,182,560 clams with a resultant catch per effort of 1307 clams/man/day. These figures are virtually identical to those of 1985.

The Mullica River oyster beds were monitored for setting success, survival and overall bed condition. The seed beds were in poor condition and had high mortality rates, with MSX infection being the likely reason for the observed decline in bed condition.

JOB NO. 1 SHELLFISH INVENTORY

The long term goal of the Shellfish Inventory project has been to determine the distribution and abundance of commercially valuable molluscan shellfish within New Jersey's coastal estuaries. The last inventory of New Jersey's estuarine shellfish resource was completed in 1963 and the information is seriously antiquated. To provide the current data necessary to manage the State's estuarine shellfish resources, a comprehensive inventory was initiated in 1983 during the previous project (3-332-R).

During Segment 2 the shellfish inventory program concentrated its effort in Little Egg Harbor Bay. As in the previous project, the sampling program was designed primarily to sample the hard clam, Mercenaria mercenaria, since this is the most abundant and widely distributed molluscan species within the estuaries along the Atlantic Coast of New Jersey. The sampling procedure consists of towing a miniature hydraulic clam dredge (knife width of one foot) from a 32 foot research vessel to collect adult shellfish. The dredge is constructed to collect all hard clams 30 millimeters in length or greater. Sampling efficiency for other shellfish species varies according to the size of the organism.

Stations were established at approximately quarter mile intervals. Stations were located by one or more methods including a three-point sextant fix, hand bearing compass reading or LORAN C coordinates. After station position was established a buoy was placed overboard to insure the maintenance of the boat's position throughout sampling operations at each station. Following deployment of the buoy, air

and water temperatures were recorded. Water samples were collected for later analysis of dissolved oxygen, salinity, and pH. Given the high sampling frequency and minimal variation of hydrographic data throughout Little Egg Harbor Bay water samples were collected at only the first and last station of each field day. Dissolved oxygen was determined by Winkler titration. Salinities were determined by a hand held refractometer and pH readings were obtained with a Taylor slide comparator.

Following collection of the water samples, one benthic sample was collected by use of a Petersen dredge. A portion of this sample was retained for later sediment analysis following procedures outlined in ASTM Standard D422-51 (modified). Using the Wentworth grain size classification, any sediment retained on a 2.0 millimeter sieve is considered gravel and any sediment passing through a 63 micron sieve is classified as mud. Results were expressed as percentages of gravel, sand and mud. The sediment samples collected from Little Egg Harbor Bay await analysis. The remainder of the sediment sample was washed through a 1.0 millimeter sieve and all material and organisms retained on the sieve were preserved in 10% formalin. These samples were then transferred to isopropyl (70%) alcohol for later identification and enumeration of all benthic invertebrates. Benthic invertebrates are currently awaiting sorting, identification and enumeration.

The water depth of the area was recorded and the tow line length determined utilizing a tow line length to depth ratio of 4:1. In some situations in areas of deeper water the tow line length to depth ratio was reduced to 3:1. In no instance, however, did this ratio fall below 3:1.

Two 100 foot tows were made, one on each side of the buoy, into the prevailing current. The 100 foot distance was measured by paying out a marked line while towing the dredge. In bottoms with a high percentage of clay, old oyster shell, or eel grass (Zostera marina), it was not possible to tow the entire 100 feet because the dredge would become clogged. Therefore, individual tows were shortened to 50 feet in this type of substrate. At the end of the measured tow the vessel was held as stationary as possible until the dredge was raised off the bottom to prevent sampling more than the desired area. The number of clams collected on each tow was recorded and the mean density determined by utilizing the average of the two tows. Mean hard clams densities (other species also) are expressed in terms of number per square foot.

All hard clams and paired hard clam valves collected were measured lengthwise to the nearest millimeter. A size-frequency distribution for Little Egg Harbor Bay was constructed using the pooled data from all 188 stations. In all cases the hard clams collected were graded into the following size categories:

Seed (SL)	30-37 mm in length
Littlenecks (LN)	38-55 mm in length
Cherrystones (CS)	56-76 mm in length
Chowders (CH)	> 76 mm in length

Natural hard clam mortality at each station was determined. This mortality was based upon the percentage of empty paired valves in the entire sample of paired valves and live clams. Paired valves were also examined in an attempt to determine the cause of death.

Detailed results of clam density, water quality, size-frequency distribution and densities of associated benthic organisms can be found in Attachment A (Table 1). A total of 188 stations were sampled in Little Egg Harbor Bay from Manahawkin to Holgate. Like most of New Jersey's estuarine areas, some areas in Little Egg Harbor Bay were too shallow to be sampled even at high water. Charts showing stations locations are contained in Attachment A (Figure 1).

The hard clam was the only commercially important shellfish species collected within Little Egg Harbor Bay. No soft clams (Mya arenaria), bay scallops (Argopecten irradians), or oysters (Crassostrea virginica) were collected and only three blue mussels (Mytilus edulis) were collected from the 188 stations sampled. Figure 2 (Attachment A) depicts the distribution and abundance of hard clams in Little Egg Harbor Bay.

HARD CLAMS

As previously mentioned, the sampling program was designed primarily to sample hard clam populations in a variety of substrate types. The inventory program provided information not only on the distribution and abundance of hard clams but also data on mortality, recruitment, and year class strength.

The hard clam was the most widely distributed shellfish species throughout Little Egg Harbor Bay. For the purpose of delineating the general abundance patterns of the hard clam resource the three classifications of occurrence, moderate density, and high density were established and assigned density values of 0.01-0.19, 0.20-0.49 and $\geq$ 0.50 hard clams per square foot, respectively. The density

categories selected resulted from a comparison of the densities observed during the sampling program and densities reported by other researchers.

In order to develop an estimate of the hard clam resource within a particular estuary, it is necessary to make some basic assumptions. One assumption is that the dredge is 100% efficient. Although we are confident that the dredge is relatively efficient, in actuality it is probably something less than 100% efficient. Our estimate of the hard clam resource is therefore a conservative one. The other assumption that we must take into consideration is that the density observed at each station is representative of a much larger area than that sampled. This may not be the case, however, as previous work by the Bureau of Shellfisheries and others has commonly shown hard clams to be rather gregarious, exhibiting a clustered distribution. To minimize this source of estimation error, sampling frequency was increased to the maximum extent practicable.

Hard clam densities ranged from 0 to 2.62 clams per square foot. For the purpose of calculating estimates of the hard clam resource the following density classifications were established:

Number of clams per square foot
$< .05$
.06-.11
.12-.49
.5- .99
1.0-1.99
≥ 2.0

Adjacent stations within the same density category listed above were grouped together and a mean density for that area determined by utilizing the hard clam density means of the individual stations. A planimeter was utilized to estimate the size of the individual areas. The mean density was then applied to the size of the area to yield the standing stock estimate for that particular area. By summing the small areas a resource estimate of Little Egg Harbor Bay was developed. The The hard clam resource was distributed over 16,372 acres within Little Egg Harbor Bay. The estimated standing stock of hard clams in the surveyed area of Little Egg Harbor Bay is 177.2 million clams.

YEAR CLASS STRENGTH

To examine year class strength for Little Egg Harbor Bay, a single size-frequency distribution was constructed for the nearly 7000 clams measured from throughout the bay (Figure 3, Attachment A). From this graph it is apparent that the hard clam population is dominated by a few larger, older year classes. Individual hard clams collected by the dredge ranged in size from 20-106 mm with a mean size of 74.8 millimeters. The dominance of the population by a few older year classes supports the contention of area shellfishermen that the hard clam resource in Little Egg Harbor has been declining, particularly in regard to the more desirable littleneck and cherrystone size categories.

RECRUITMENT

Recruitment is defined as the percentage of clams entering the fishery at the legal size of 38 mm in length. To determine annual recruitment rates it was assumed that the seed collected between

30 and 37 mm represented a single year class and would thus be expected to be recruited into the fishery within the coming year. For the purpose of this discussion, only those recruitment rates for moderate and high density areas are considered since the recruitment rates for low density areas would be biased due to the small sample size.

The dominance of the Little Egg Harbor Bay hard clam population by a few older year classes, as exhibited in the size-frequency distribution, was documented further by examination of recruitment rates for various areas. Recruitment rates ranged from 0.0 to 34.6 percent with an average of 3.92% for all moderate and high density areas. This figure is well below the average recruitment rate of 5.7% for other areas inventoried since 1983. Those areas with the highest recruitment rates occurred in the middle third of Little Egg Harbor Bay between three and five miles north of Beach Haven Inlet. Within this general area, however, there is no distinquishable pattern to the recruitment rates.

HARD CLAM MORTALITY

Natural adult ($\geq$ 30 mm) hard clam mortalities varied considerably from station to station. The average total mortality for Little Egg Harbor Bay was 11.6 percent. Of the total mortality figure 19.9% was attributed to predation by horseshoe crabs (Limulus polyphemus), 17.4% due to predation by whelks (Busycon caraliculatum, B. carica), and 0.89% due to predation by the moon snail (Polinices duplicatus). Observed abundance of the common clam predators such as: conchs, Busycon carica, and B. canaliculatum; moon snails, Polinices duplicatus

and Lunatia heros; oyster drills, Urosalpinx cinerea and Eupleura caudata; horseshoe crabs, Limulus polyphemus and starfish, Asterias forbesii was relatively low.

During Segment 3, sampling will be conducted in Great Bay and proceed southward as time allows. The inventory program is scheduled to continue sampling New Jersey estuaries that have not been recently inventoried until all estuaries have been completed and the distribution of the shellfish within these estuaries delineated. Collection of the related data of recruitment and mortality rates, year class strength, sediment types and associated benthic invertebrates will hopefully result in the development of management plans for the various species.

JOB NO. 2 INVESTIGATION OF LEASE GROUND APPLICATIONS

Commercial shellfishermen requiring areas of bay bottom for planting seed oysters and clams or as layout grounds submit lease applications to the Atlantic Coast Shellfish Council for their review. Following this review process, the Council makes recommendations to the Commissioner of the Department of Environmental Protection whether the lease should be granted or remain open for public use. The current philosophy of both the Atlantic Coast Shellfish Council and the New Jersey Bureau of Shellfisheries is to discourage leasing of productive habitat so that the resources of such areas remain available for public (commercial and recreational) utilization.

In order to assist the Council in their decision, each lease application is investigated for shellfish productivity with a biological report being submitted to each councilman prior to the monthly meeting of the Council. The application is considered and discussed at the first meeting with the final decision being rendered at the meeting the following month.

The biological investigation of each lease application yields data on the present shellfish density of the area, year class strength and recruitment, mortality, associated organisms, substrate type and basic water quality (i.e. dissolved oxygen, salinity, pH, depth, and temperature). This information, in addition to the history of the area, is used to determine the productivity of the area.

Each prospective lease is classified as productive, potentially

productive or nonproductive shellfish habitat depending on the results of the biological investigation. Productive habitat is defined as an area that is and/or has been a regular producer of various shellfish species, although the classification is generally associated with hard and soft clams and oysters. An area can be productive habitat for one species and nonproductive for another. The Mullica River oyster seed beds, for example, are extremely productive oyster habitat but nonproductive with respect to hard clam habitat. Areas are classified as nonproductive when there is no regular natural recruitment. However, many of these areas are excellent for growth making them favorable for aquacultural use. Areas with biological data insufficient to classify them as productive or nonproductive are termed potentially productive.

During Segment 2, 58 applications were received for lease ground along the Atlantic Coast from Little Egg Harbor Bay to Great Sound. Eighteen of the applications were canceled due to the applicants' noncompliance with the policy of the Atlantic Coast Shellfish Council requiring the staking of all lots within six months of the date of application.

Of the 40 applications for which biological investigations were performed, three were found to be productive, seven nonproductive and 30 were classified as potentially productive. Following a review of the biological reports submitted for these applications, the Atlantic Coast Shellfish Council approved all but seven of the applications. The applications denied were either classified as productive or were sheltered areas that

were regularly worked during harsh winter weather. The Council has a policy of denying lease applications in such areas so that they can remain available for public use.

Specific information regarding the location and results of the biological investigations for each lease can be found in Attachment B.

JOB NO. 3 HARD CLAM RELAY MONITORING

The relay program consists of transferring hard clams, Mercenaria mercenaria, from condemned areas onto leased lots in approved water. Following a thirty day purification period, samples are analyzed for bacterial contamination and if the analysis reveals the elimination of harmful bacteria the lots are opened for harvest. Since the inception of the relay program in 1970, over 76 million clams have been utilized from condemned waters.

The intensive sampling program of the Inventory Program (Job 1) required that all available personnel devote most of their time to this activity. Consequently, relay monitoring was limited to the tabulation of harvest and catch per effort data obtained from the harvest receipts submitted by each relay participant.

During Segment 2, the relay program continued in the waters of Raritan and Sandy Hook Bays as well as the Navesink, Shrewsbury, Manasquan and Shark Rivers in Monmouth County. In addition, a limited relay was conducted in Tuckerkton Creek and Cove in southern Ocean County. Harvest and catch per effort data by area are included in Attachment B.

Table I (Attachment B) includes the relay summary data for 1986. The 3965 man days of effort in 1986 yielded a total reported harvest for all relay areas of 5,182,560 clams. The majority of shellfishing activity took place in the Navesink and Shrewsbury Rivers, where 2592 man-days of effort yielded a harvest of 3,564,975 clams (68.8% of the total relay harvest). The mean catch per effort for all relay areas in 1986 was 1307 clams/man/day, which is virtually identical to the

1985 figure of 1316 clams/man/day. Tuckerton Cove yielded the highest catch per effort (1908 clams/man/day) although the harvest from this area (151,664 clams) was less than three percent of the total harvest.

The reported relay harvest for the first eight months of 1987, as shown in Table 2 (Attachment B), was 3,109,170 clams-- a reduction of nearly 11% over the harvest for the same period in 1986. The Navesink and Shrewsbury Rivers continued to provide a majority (71.47%) of the total harvest. Sandy Hook Bay yielded the highest catch per effort (1603 clams/man/day) when the data is grouped by estuary. The special opening of section 10F within the Security Zone around the Earle Naval Pier contributed significantly to the overall catch per effort figure for Sandy Hook Bay. During the 106.18 man days of effort in Section 10F, shellfishermen had an average catch per effort of 2271 clams/man/day and a total harvest of 241,185 clams.

The observed reduction in harvest is probably due to a combination of factors, primarily decreased densities in some harvest areas and reduced by participation by shellfishermen choosing to work open areas rather than participate in the relay program. The overall catch per effort for all relay areas in 1987 was 1226 clams/man/day, a 6.2% reduction from the 1986 figure of 1307 clams/man/day. In addition to this factor, some shellfishermen have reduced their participation in the program since they have been able to "make a days pay" in approved waters of Ocean and Atlantic Counties. This factor is reflected in the percentage of the total relay harvest which is planted in Tuckerton in southern Ocean County. In 1986, 17.9% of

the total harvest was planted here. For the first eight months of 1987, however, Tuckerton received only 4.4% of the total relay harvest. If the approved waters of Ocean and Atlantic Counties continued to yield adequate harvests, it is likely that the decline in relay participation by individuals planting in Tuckerton will continue into 1988.

JOB NO. 4 OYSTER RESEARCH, INVENTORY, AND MANAGEMENT

The management of the Mullica River oyster beds is conducted with the objective of providing market size oysters for harvest while at the same time ensuring that the seed beds are not excessively depleted. To this end, the oyster beds were monitored to evaluate the oyster spawning season, seed oyster transplant program, bed condition, and oyster mortality.

The regular monitoring of the seed and market beds continued to determine setting success, mortality and overall bed condition. Numerous one bushel samples of oyster and shell were collected from each bed. Bed condition was evaluated in terms of the percentage of oyster within each sample. Mortality was determined by calculating the percentage of gapers and boxes (paired valves) within a total sample of live oysters, gapers and boxes. Year class structure was determined by dividing samples into the age categories of spat, yearlings, and older oysters. The percentage of spat in each sample is an indication of the successful settlement and survival of young-of-the-year oysters.

The regular sampling of the seed beds revealed both French's Point and Moss Point beds to be in poor condition in comparison to data collected over the last ten years (Attachment D). French's Point consisted of 45.2% oyster with a mean annual mortality of 26.5 percent. Moss Point was composed of only 10.4% oyster and had a mean annual mortality of 62.1 percent. These figures represent a drastic change from the historical averages. For example, during the period 1975-1985 French's Point and Moss Point

had average bed conditions of 83.8% and 75.8%, respectively. The bed condition of the Moss Point Bed in 1986 (10.4% oyster) was 86.3% below the average bed condition for the period 1975-1985. Both seed beds experienced an above average set in 1986. The age composition of French's Point consisted of 21.2% spat with Moss Point consisting of 33.3% spat.

The Mullica River market beds, with infrequent natural set, greater disease and predation pressure, and periodic harvest, has shown a steady decline in bed condition since being planted during the transplant programs of 1979-1981. Given the poor condition of these beds in 1985 (Fitney Bit Bed: 16.8% oyster; Reef Bed: nearly 0% oyster) and the limited manpower of the Bureau, the market beds were not sampled in 1986. Reports by shellfishermen confirm the continuing decline of these beds. In light of this, the market beds will not be opened to harvest during the 1987-1988 season.

The declining bed condition, which has been observed for the last two years, is attributed to a great extent to infestation by the parasite Haplosporidium nelsoni (MSX) and to a lesser extent to the protistan parasite Perkinsus marinus ("Dermo"). Although in Segment 2 no oysters were sent to the Rutgers Oyster Research Laboratory in Bivalve, New Jersey for histological examination, samples analyzed over the past five years have shown an increasing prevalence of these two parasites, corresponding to the decline in bed condition. The extensive oyster mortalities experienced in the Mullica River estuary since 1984 were comparable to those experienced in Delaware Bay during the same period.

ATTACHMENT A

FIGURE 1
LITTLE EGG HARBOR BAY SHELLFISH INVENTORY
STATION LOCATIONS

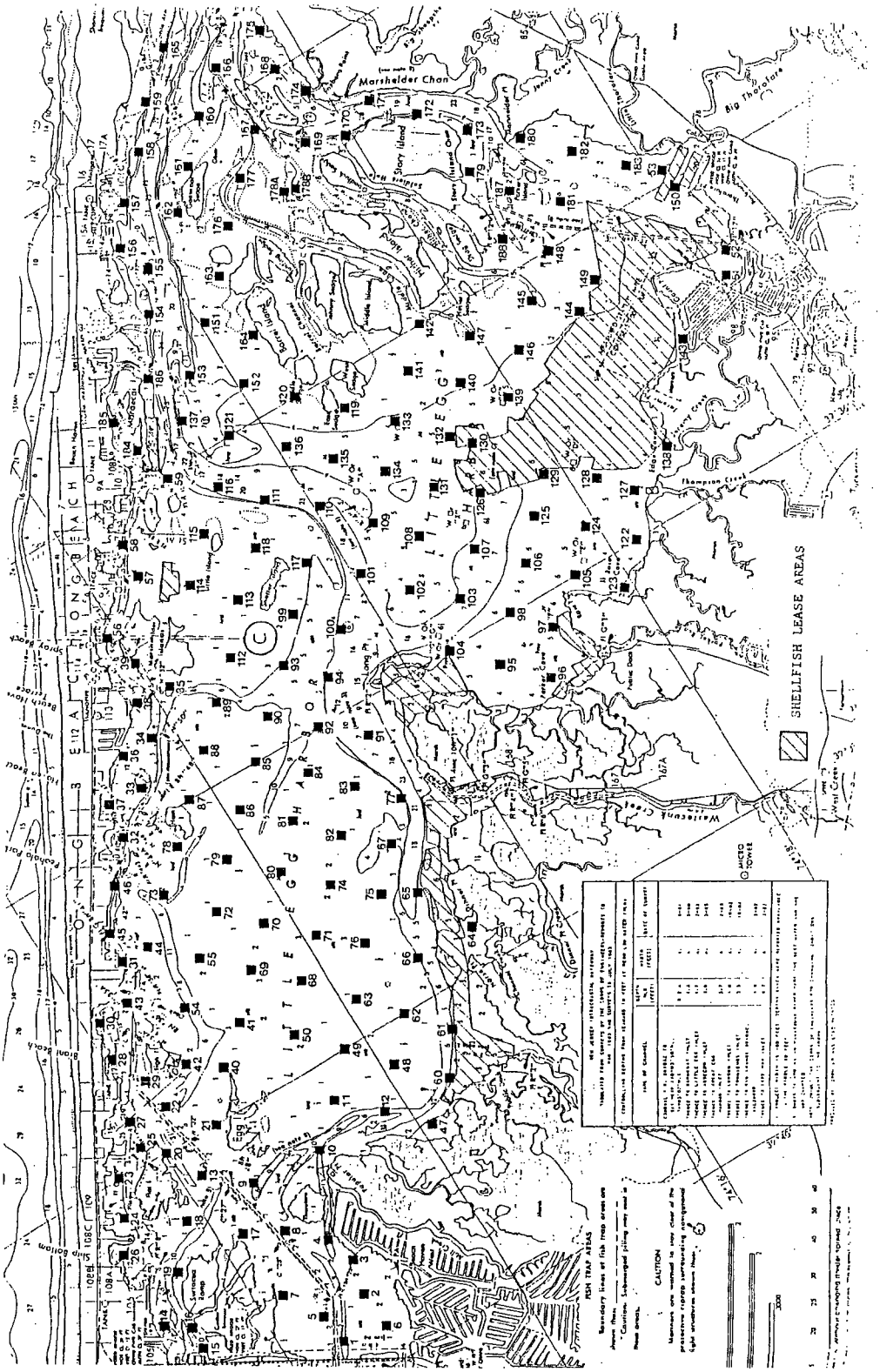


FIGURE 2
LITTLE EGG HARBOR BAY SHELLFISH INVENTORY
DISTRIBUTION AND ABUNDANCE OF THE HARD CLAM, MERCENARIA MERCENARIA

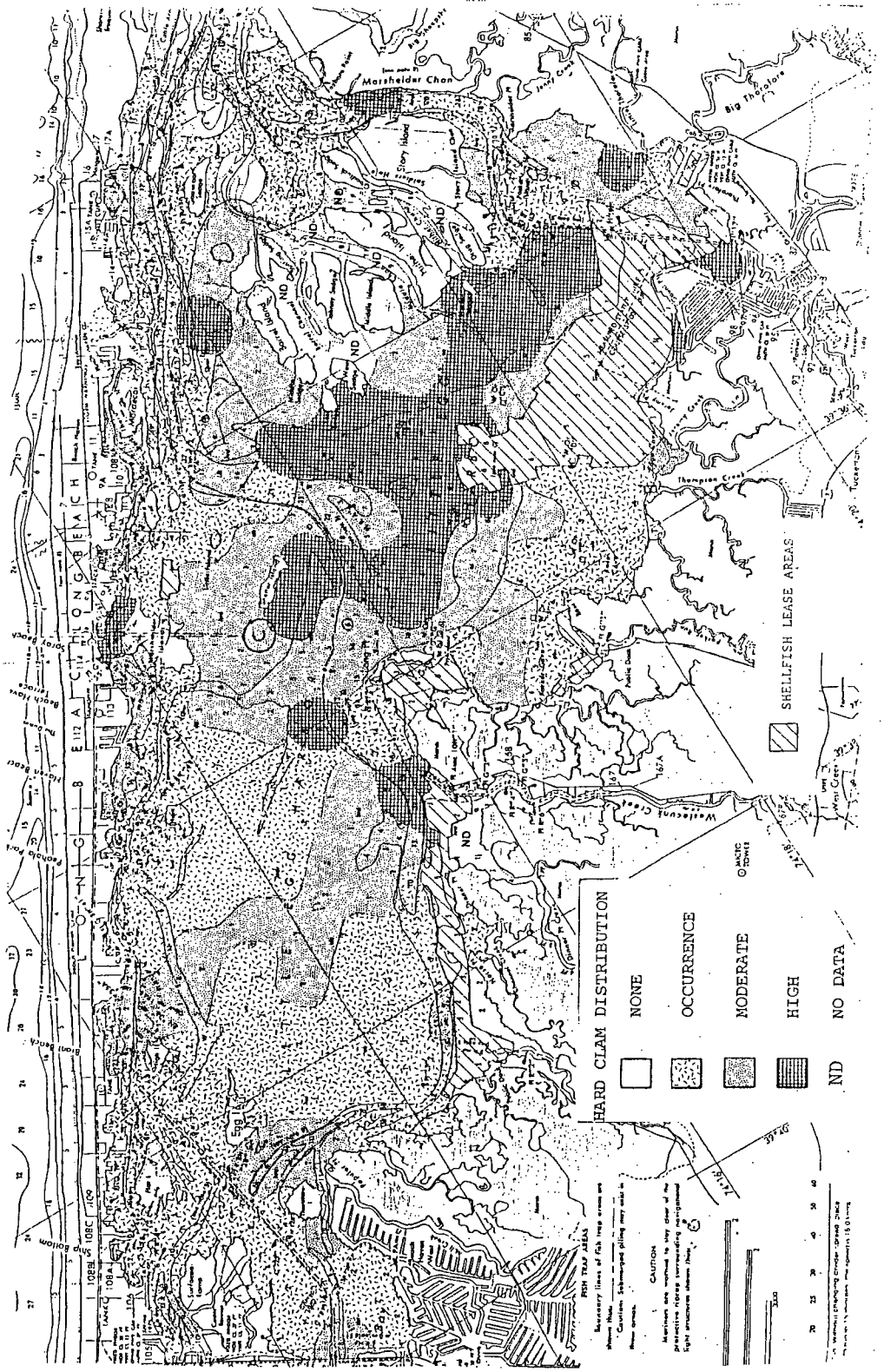


FIGURE 3

SIZE-FREQUENCY DISTRIBUTION

LITTLE EGG HARBOR BAY HARD CLAM POPULATION

Mercenaria mercenaria

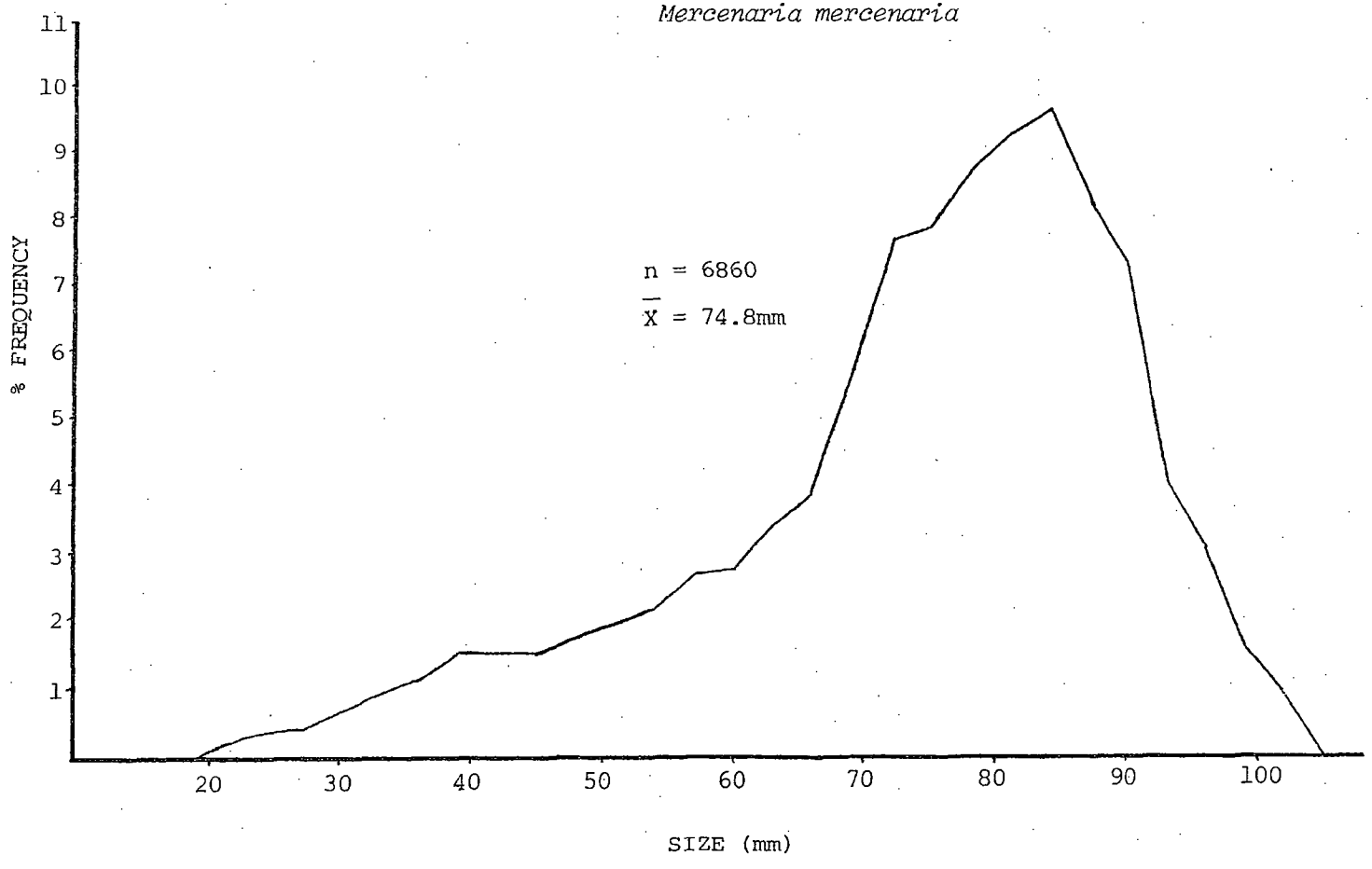


TABLE 1
SHELLFISH INVENTORY SUMMARY

ATION NUMBER			LE86-1	LE86-2	LE86-3	LE86-4	LE86-5
ITITUDE N			39°39.70'	39°39.50'	39°39.30'	39°39.00'	39°39.50'
NGITUDE W			74°12.47'	74°12.79'	74°12.90'	74°12.79'	74°12.40'
LLECTION DATE			7/28/86	7/28/86	7/29/86	7/29/86	8/4/86
DE AND HOURS			High + 0.5	High + 1.0	Low + 1.5	Low + 4.5	High + 4.0
MPERATURE	AIR		29.5	28.5	30.0	28.	27.0
°C	WATER	S	ND	28.0	28.0	ND	25.5
		B	ND	28.0	28.0	ND	25.5
D.O.	S		ND	-	-	ND	-
(ppm)	B		ND	8.2	7.0	ND	5.6
LINITY	S		ND	-	-	ND	-
(ppt)	B		ND	27.0	29.0	ND	24.0
pH	S		ND	-	-	ND	-
	B		ND	8.1	8.2	ND	7.8
PTH (ft)			10.0	4.0	4.0	10.0	3.5
BSTRATE	% GRAVEL		*	*	*	*	*
	% SAND		*	*	*	*	*
	% MUD		*	*	*	*	*
TIMATED HARD CLAM NSITY (#/ft²)			0.20	0.02	0.02	0.30	0.10
%	SL		9.5	0.0	0.0	2.3	0.0
OMMERCIAL	LN		16.7	0.0	0.0	9.3	33.3
SIZES	CS		54.8	100.0	50.0	60.4	66.7
	CH		19.0	0.0	50.0	28.0	0.0
JMBER CLAMS COLLECTED			42	2	2	43	6
ZE RANGE (mm)			31-84	61-75	59-78	31-94	51-64
SIZE (mm)			56.9	67.5	69.0	67.0	58.0
MORTALITY			6.7	0.0	0.0	0.0	14.3

Analysis pending

ND-No Data

TABLE 1
SHELLFISH INVENTORY SUMMARY

STATION NUMBER			LE86-6	LE86-7	LE86-8	LE86-9	LE86-10
LATITUDE N			39°39.80'	39°39.25'	39°38.88'	39°38.50'	39°38.50
LONGITUDE W			74°12.83'	74°12.15'	74°12.47'	74°12.47'	74°13.11
COLLECTION DATE			8/4/86	8/4/86	8/4/86	8/4/86	8/4/86
TIDE AND HOURS			High + 5.0	High + 5.5	Low + 0.0	Low + 1.0	High +1.
TEMPERATURE °C	AIR		28.0	27.5	26.5	28.5	27.0
	WATER	S	-	-	-	26.5	26.5
		B	-	-	-	26.5	26.3
D.O. (ppm)	S		-	-	-	6.1	5.9
	B		-	-	-	6.0	5.7
SALINITY (ppt)	S		-	-	-	25.0	21.0
	B		-	-	-	25.0	24.0
pH	S		-	-	-	7.7	7.7
	B		-	-	-	7.8	7.7
DEPTH (ft)			6.0	4.0	4.0	6.0	7.0
SUBSTRATE	% GRAVEL		*	*	*	*	*
	% SAND		*	*	*	*	*
	% MUD		*	*	*	*	*
ESTIMATED HARD CLAM DENSITY (#/ft²)			0.02	0.05	0.13	0.21	0.33
% COMMERCIAL SIZES	SL		0.0	0.0	0.0	15.0	3.1
	LN		28.6	20.0	23.1	20.0	9.4
	CS		71.4	60	61.5	60.0	34.4
	CH		0.0	20	15.4	5.0	53.1
NUMBER CLAMS COLLECTED			7	5	13	20	32
SIZE RANGE (mm)			54-72	53-78	41-82	26-79	36-97
$\bar{X}$ SIZE (mm)			63.4	67.2	63.7	59.4	73.5
% MORTALITY			0.0	0.0	0.0	4.8	8.6

TABLE 1
SHELLFISH INVENTORY SUMMARY

:ATION NUMBER			LE86-11	LE86-12	LE86-13	LE86-14	LE86-15
\TITUDE N			$39^{o}38.25'$	$39^{o}38.50'$	$39^{o}.38.25'$	$39^{o}39.00'$	$39^{o}39.05'$
)NGITUDE W			$74^{o}13.11'$	$74^{o}13.75'$	$74^{o}12.15'$	$74^{o}11.19'$	$74^{o}11.30'$
)LLECTION DATE			8/5/86	8/5/86	8/5/86	8/6/86	8/6/86
:DE AND HOURS			High + 4.0	High + 5.0	Low + 0.0	High + 1.0	High + 2.0
:MPERATURE	AIR		30.0	28.0	29.0	27.0	27.5
^{o}C	WATER	S	ND	ND	-	27.0	ND
		B	ND	ND	-	27.0	ND
D.O.	S		ND	ND	-	5.2	ND
(ppm)	B		ND	ND	7-4	5.0	ND
\LINITY	S		ND	ND	-	22.0	ND
(ppt)	B		ND	ND	25.0	25.0	ND
pH	S		ND	ND	-	7.3	ND
	B		ND	ND	7.7	7.6	ND
:PTH (ft)			4.5	6.0	4.0	5.0	5.0
JBSTRATE	% GRAVEL		*	*	*	*	*
	% SAND		*	*	*	*	*
	% MUD		*	*	*	*	*
:TIMATED HARD CLAM :NSITY (#/ft^2)			0.01	0.01	0.13	0.12	0.0
%	SL		0.0	0.0	0.0	0.0	0.0
)MMERCIAL	LN		50.0	0.0	15.4	16.7	0.0
SIZES	CS		50.0	33.3	76.9	75.0	0.0
	CH		0.0	66.7	7.7	8.3	0.0
UMBER CLAMS COLLECTED			4	9	13	12	0
IZE RANGE (mm)			50-74	57-87	50-83	53-84	-
SIZE (mm)			57.5	65.3	65.3	66.5	-
MORTALITY			33.3	0.0	0.0	0.0	0.0

TABLE 1
SHELLFISH INVENTORY SUMMARY

STATION NUMBER			LE86-16	LE86-17	LE86-18	LE86-19	LE86-20
LATITUDE N			39°39.25'	39°38.75'	39°38.50'	39°38.75'	39°38.00'
LONGITUDE W			74°11.35'	74°12.15'	74°11.83'	74°11.51'	74°12.00'
COLLECTION DATE			8/6/86	8/6/86	8/7/86	8/7/86	8/12/86
TIDE AND HOURS			High + 2.5	High + 3.5	High + 1.0	High + 2.0	Low + 2.0
TEMPERATURE °C	AIR		29.0	28.5	27.0	28.0	24.0
	WATER	S	ND	ND	27.0	ND	24.5
		B	ND	ND	27.0	ND	24.5
D.O. (ppm)	S		ND	ND	-	ND	-
	B		ND	ND	6.2	ND	5.3
SALINITY (ppt)	S		ND	ND	-	ND	-
	B		ND	ND	25.0	ND	25.0
pH	S		ND	ND	-	ND	-
	B		ND	ND	7.6	ND	7.6
DEPTH (ft)			5.0	4.0	4.0	4.0	4.0
SUBSTRATE	% GRAVEL		*	*	*	*	*
	% SAND		*	*	*	*	*
	% MUD		*	*	*	*	*
ESTIMATED HARD CLAM DENSITY (#/ft²)			0.20	0.1	0.01	0.05	0.15
% COMMERCIAL SIZES	SL		0.0	0.0	0.0	0.0	3.3
	LN		2.0	16.7	25.0	40.0	6.7
	CS		94.0	83.3	50.0	60.0	57.0
	CH		4.0	0.0	25.0	0.0	33.0
NUMBER CLAMS COLLECTED			49	12	8	5	30
SIZE RANGE (mm)			42-91	39-75	14-82	39-74	33-92
$\bar{X}$ SIZE (mm)			73.3	63.3	58.9	57.0	69.2
% MORTALITY			3.9	7.7	27.3	37.5	3.2

TABLE 1
SHELLFISH INVENTORY SUMMARY

TATION NUMBER			LE86-21	LE86-22	LE86-23	LE86-24	LE86-25
ATITUDE N			39°38.00'	39°37.75'	39°38.00'	39°38.25'	39°37.85'
ONGITUDE W			74°12.47'	74°12.15'	74°11.51'	74°11.34'	74°11.80'
OLLECTION DATE			8/12/86	8/12/86	8/12/86	8/12/86	8/12/86
IDE AND HOURS			Low + 3.0	Low + 4.0	Low + 5.0	Low + 5.5	High + 0.0
EMPERATURE	AIR		24.5	24.0	23.0	23.0	23.0
°C	WATER	S	ND	ND	ND	ND	24.0
		B	ND	ND	ND	ND	24.0
D.O.	S		ND	ND	ND	ND	-
(ppm)	B		ND	ND	ND	ND	6.4
ALINITY	S		ND	ND	ND	ND	-
(ppt)	B		ND	ND	ND	ND	25.0
pH	S		ND	ND	ND	ND	-
	B		ND	ND	ND	ND	7.6
EPTH (ft)			3.0	4.0	4.0	4.0	3.5
UBSTRATE	% GRAVEL		*	*	*	*	*
	% SAND		*	*	*	*	*
	% MUD		*	*	*	*	*
STIMATED HARD CLAM ENSITY (#/ft²)			0.1	0.15	0.11	0.10	0.05
%	SL		0.0	0.0	3.5	0.0	0.0
OMMERCIAL	LN		37.5	33.3	22.8	33.3	40.0
SIZES	CS		62.5	40.0	45.6	16.7	60.0
	CH		0.0	24.7	38.1	50.0	0.0
UMBER CLAMS COLLECTED			8	15	57	6	5
IZE RANGE (mm)			48-64	46-74	32-92	42-94	58-73
SIZE (mm)			63.0	60.2	67.8	71.5	66.2
MORTALITY			0.0	6.3	0.0	0.0	0.0

TABLE 1
SHELLFISH INVENTORY SUMMARY

STATION NUMBER			LE86-26	LE86-27	LE86-28	LE86-29	LE86-30
LATITUDE N			39°38.50'	39°37.70'	39°37.25'	39°37.50'	39°37.00'
LONGITUDE W			74°11.19'	74°11.80'	74°12.05'	74°12.15'	74°12.15'
COLLECTION DATE			8/13/86	8/13/86	8/13/86	8/14/86	8/14/86
TIDE AND HOURS			Low + 1.0	Low + 2.0	Low + 3.0	Low + 0.5	Low + 1.5
TEMPERATURE °C	AIR		22.5	23.0	24.0	23.0	24.0
	WATER	S	24.2	ND	ND	23.5	ND
		B	24.2	ND	ND	23.5	ND
D.O. (ppm)	S		4.8	ND	ND	-	ND
	B		4.7	ND	ND	6.6	ND
SALINITY (ppt)	S		25.0	ND	ND	-	ND
	B		25.0	ND	ND	29.0	ND
pH	S		7.9	ND	ND	-	ND
	B		7.9	ND	ND	8.1	ND
DEPTH (ft)			10.0	4.0	7.0	4.0	4.0
SUBSTRATE	% GRAVEL		*	*	*	*	*
	% SAND		*	*	*	*	*
	% MUD		*	*	*	*	*
ESTIMATED HARD CLAM DENSITY (#/ft^2)			0.1	0.1	0.44	0.1	0.14
% COMMERCIAL SIZES	SL		9.1	0.0	4.5	0.0	0.0
	LN		0.0	0.0	18.2	33.3	7.1
	CS		54.5	100.0	55.9	66.7	57.2
	CH		36.4	0.0	11.4	0.0	35.7
NUMBER CLAMS COLLECTED			11	6	44	9	14
SIZE RANGE (mm)			36-85	58-71	30-84	38-75	54-84
$\bar{X}$ SIZE (mm)			72.8	64.5	66.0	60.3	69.9
% MORTALITY			21.4	0.0	36.2	10.0	6.7

TABLE 1
SHELLFISH INVENTORY SUMMARY

STATION NUMBER			LE86-31	LE86-32	LE86-33	LE86-34	LE86-35
LATITUDE N			39°36.75'	39°36.00'	39°35.75'	39°35.50'	39°35.25'
LONGITUDE W			74°12.50'	74°13.11'	74°13.43'	74°13.75'	74°14.07'
COLLECTION DATE			8/14/86	8/14/86	8/14/86	8/14/86	8/14/86
TIDE AND HOURS			High + 2.0	Low + 2.5	Low + 3.0	Low + 4.0	Low + 5.0
TEMPERATURE °C	AIR		24.0	24.0	24.0	25.0	25.0
	WATER	S	ND	ND	ND	ND	24.0
		B	ND	ND	ND	ND	24.0
D.O. (ppm)	S		ND	ND	ND	ND	-
	B		ND	ND	ND	ND	7.5
SALINITY (ppt)	S		ND	ND	ND	ND	-
	B		ND	ND	ND	ND	29.0
pH	S		ND	ND	ND	ND	-
	B		ND	ND	ND	ND	8.3
DEPTH (ft)			4.0	4.0	4.0	8.0	4.0
SUBSTRATE	% GRAVEL		*	*	*	*	*
	% SAND		*	*	*	*	*
	% MUD		*	*	*	*	*
ESTIMATED HARD CLAM DENSITY (#/ft^2)			0.12	0.11	0.14	0.12	0.15
% COMMERCIAL SIZES	SL		0.0	0.0	7.1	0.0	7.7
	LN		25.0	27.3	28.6	5.6	30.8
	CS		68.3	36.3	50.0	11.1	30.1
	CH		16.7	36.4	14.3	83.3	30.8
NUMBER CLAMS COLLECTED			12	11	14	18	13
SIZE RANGE (mm)			38-79	38-87	30-86	49-97	32-86
$\bar{X}$ SIZE (mm)			63.0	68.2	60.4	85.2	59.1
% MORTALITY			0.0	0.0	17.6	10.0	7.1

TABLE 1
SHELLFISH INVENTORY SUMMARY

STATION NUMBER			LE86-36	LE86-37	LE86-38	LE86-39	LE86-40
LATITUDE N			$39^{o}35.50'$	$39^{o}35.75'$	$39^{o}35.25'$	$39^{o}35.10'$	$39^{o}37.25'$
LONGITUDE W			$74^{o}13.43'$	$74^{o}13.11'$	$74^{o}13.75'$	$74^{o}13.80'$	$74^{o}12.79'$
COLLECTION DATE			8/26/86	8/26/86	8/26/86	8/26/86	9/3/86
TIDE AND HOURS			Low + 3.0	Low + 4.0	Low + 5.0	High + 0.0	High + 3.
TEMPERATURE ^{o}C	AIR		23.5	23.0	24.0	24.0	23.5
	WATER	S	20.7	ND	ND	-	-
		B	20.7	ND	ND	-	-
D.O. (ppm)	S		7.10	ND	ND	-	-
	B		6.4	ND	ND	7.3	6.4
SALINITY (ppt)	S		24.0 .	ND	ND	-	-
	B		25.0	ND	ND	24.0	25.0
pH	S		7.9	ND	ND	-	-
	B		7.9	ND	ND	7.9	8.1
DEPTH (ft)			10.0	8.0	4.0	4.0	4.0
SUBSTRATE	% GRAVEL		*	*	*	*	*
	% SAND		*	*	*	*	*
	% MUD		*	*	*	*	*
ESTIMATED HARD CLAM DENSITY (#/ft^{2})			0.31	0.20	0.33	0.24	0.04
% COMMERCIAL SIZES	SL		2.1	10.0	5.9	10.3	0.0
	LN		2.1	6.0	14.7	28.2	20.0
	CS		51.0	48.0	35.3	53.9	80.0
	CH		44.8	46.0	39.1	7.6	0.0
NUMBER CLAMS COLLECTED			47	50	34	39	5
SIZE RANGE (mm)			31-94	24-95	20-90	25-90	49-67
$\bar{X}$ SIZE (mm)			73.9	66.7	69.0	59.3	59.4
% MORTALITY			16.1	3.8	8.1	9.3	16.7

TABLE 1
SHELLFISH INVENTORY SUMMARY

CATION NUMBER			LE86-41	LE86-42	LE86-43	LE86-44	LE86-45
ATITUDE N			39°37.50'	39°37.50'	39°37.00'	39°36.75'	39°36.75'
ONGITUDE W			74°13.11'	74°12.47'	74°12.40'	74°12.79'	74°12.55'
OLLECTION DATE			9/3/86	9/3/86	9/3/86	9/3/86	9/3/86
DE AND HOURS			High + 4.0	High + 4.5	High + 5.0	High + 5.5	Low + 0.0
EMPERATURE	AIR		22.5	23.0	24.5	24.5	24.5
°C	WATER	S	ND	ND	ND	ND	ND
		B	ND	ND	ND	ND	ND
D.O.	S		ND	ND	ND	ND	ND
(ppm)	B		ND	ND	ND	ND	ND
ALINITY	S		ND	ND	ND	ND	ND
(ppt)	B		ND	ND	ND	ND	ND
pH	S		ND	ND	ND	ND	ND
	B		ND	ND	ND	ND	ND
EPTH (ft)			6.0	5.0	4.0	4.0	4.0
UBSTRATE	% GRAVEL		*	*	*	*	*
	% SAND		*	*	*	*	*
	% MUD		*	*	*	*	*
STIMATED HARD CLAM ENSITY (#/ft²)			0.11	0.10	0.30	0.14	0.10
% OMMERCIAL SIZES	SL		0.0	0.0	6.9	0.0	0.0
	LN		26.3	12.5	17.2	14.3	33.3
	CS		73.7	75.0	65.6	85.7	66.7
	CH		0.0	12.5	10.3	0.0	0.0
UMBER CLAMS COLLECTED			19	8	29	14	9
IZE RANGE (mm)			48-76	51-79	18-81	52-76	39-76
SIZE (mm)			65.2	65.6	62.7	64.4	59.7
MORTALITY			0.0	0.0	3.3	6.7	10.0

TABLE 1
SHELLFISH INVENTORY SUMMARY

STATION NUMBER			LE86-46	LE86-47	LE86-48	LE86-49	LE86-50
LATITUDE N			$39^{o}36.55'$	$39^{o}38.75'$	$39^{o}38.25'$	$39^{o}38.00'$	$39^{o}37.75'$
LONGITUDE W			$74^{o}12.79'$	$74^{o}14.07'$	$74^{o}14.07'$	$74^{o}13.75'$	$74^{o}13.43'$
COLLECTION DATE			9/3/86	9/4/86	9/4/86	9/4/86	9/4/86
TIDE AND HOURS			Low + 1.0	High + 2.0	High + 3.0	High + 3.5	High + 4
TEMPERATURE ^{o}C	AIR		24.5	21.0	22.0	22.0	22.0
	WATER	S	21.4	20.7	ND	ND	ND
		B	21.4	20.6	ND	ND	ND
D.O. (ppm)	S		7.7	7.1	ND	ND	ND
	B		6.8	6.8	ND	ND	ND
SALINITY (ppt)	S		26.5	26.0	ND	ND	ND
	B		26.5	26.5	ND	ND	ND
pH	S		8.1	8.1	ND	ND	ND
	B		8.1	8.1	ND	ND	ND
DEPTH (ft)			10.0	5.0	5.0	5.0	5.0
SUBSTRATE	% GRAVEL		*	*	*	*	*
	% SAND		*	*	*	*	*
	% MUD		*	*	*	*	*
ESTIMATED HARD CLAM DENSITY ($\#/ft^2$)			0.10	0.05	0.10	0.03	0.05
% COMMERCIAL SIZES	SL		6.3	0.0	0.0	33.3	20.0
	LN		25.0	0.0	11.1	0.0	60.0
	CS		43.8	62.5	88.9	66.7	20.0
	CH		24.9	37.5	0.0	0.0	0.0
NUMBER CLAMS COLLECTED			16	8	9	3	5
SIZE RANGE (mm)			36-88	68-94	40-67	32-62	52-59
$\bar{X}$ SIZE (mm)			62.3	75.4	60.7	52.0	51.0
% MORTALITY			46.7	20.0	0.0	0.0	0.0

TABLE 1
SHELLFISH INVENTORY SUMMARY

TATION NUMBER			LE86-51	LE86-52	LE86-53	LE86-54	LE86-55
ATITUDE N			$39^{o}34.75'$	$39^{o}34.62'$	$39^{o}33.95'$	$39^{o}37.50'$	$39^{o}37.00'$
ONGITUDE W			$74^{o}20.20'$	$74^{o}20.50'$	$74^{o}20.10'$	$74^{o}12.79'$	$74^{o}13.11'$
OLLECTION DATE			9/8/86	9/8/86	9/8/86	10/1/86	10/1/86
IDE AND HOURS			Low + 4.0	Low + 4.5	High + 2.0	High + 3.5	High + 4.5
EMPERATURE	AIR		17.5	17.5	20.5	24.5	24.5
^{o}C	WATER	S	-	ND	-	21.5	ND
		B	-	ND	-	21.5	ND
D.O.	S		-	ND	-	6.7	ND
(ppm)	B		-	ND	-	6.7	ND
ALINITY	S		28.0	ND	29.0	28.0	ND
(ppt)	B		-	ND	29.0	28.0	ND
pH	S		-	ND	8.1	7.5	ND
	B		8.1	ND	8.1	7.5	ND
EPTH (ft)			4.0	5.0	5.0	6.0	5.0
UBSTRATE	% GRAVEL		*	*	*	*	*
	% SAND		*	*	*	*	*
	% MUD		*	*	*	*	*
STIMATED HARD CLAM ENSITY ($\#/ft^2$)			0.69	0.85	0.10	0.21	0.20
% OMMERCIAL SIZES	SL		2.9	2.2	0.0	5.0	0.0
	LN		10.3	6.6	10.5	10.0	41.2
	CS		56.9	55.0	47.4	65.0	47.1
	CH		29.9	36.2	42.1	20.0	11.7
UMBER CLAMS COLLECTED			174	271	19	20	17
IZE RANGE (mm)			20-93	26-95	38-96	52-89	47-86
SIZE (mm)			68.9	71.2	74.3	70.8	62.3
MORTALITY			9.1	5.4	9.5	4.8	5.6

TABLE 1
SHELLFISH INVENTORY SUMMARY

STATION NUMBER			LE87-56	LE87-57	LE87-58	LE87-59	LE87-60
LATITUDE N			39°34.35'	39°34.50'	39°34.25'	39°34.00'	39°38.55'
LONGITUDE W			74°13.90'	74°14.39'	74°14.39'	74°15.03'	74°14.44'
COLLECTION DATE			7/13/87	7/13/87	7/13/87	7/13/87	7/16/87
TIDE AND HOURS			Low + 2.5	Low + 4.0	Low + 5.0	High + 0.5	Low + 0.5
TEMPERATURE °C	AIR		31.0	ND	ND	ND	-
	WATER	S	26.1	ND	ND	ND	23.2
		B	26.1	ND	ND	ND	23.6
D.O. (ppm)	S		7.5	ND	ND	ND	-
	B		6.7	ND	ND	ND	7.9
SALINITY (ppt)	S		28.0	ND	ND	ND	-
	B		28.5	ND	ND	ND	23.0
pH	S		8.5	ND	ND	ND	-
	B		8.5	ND	ND	ND	8.3
DEPTH (ft)			7.0	5.0	5.0	5.0	4.0
SUBSTRATE	% GRAVEL		*	*	*	*	*
	% SAND		*	*	*	*	*
	% MUD		*	*	*	*	*
ESTIMATED HARD CLAM DENSITY (#/ft^2)			0.77	0.08	0.30	0.11	0.15
% COMMERCIAL SIZES	SL		5.4	40.0	6.7	0.0	0.0
	LN		19.1	20.0	3.3	0.0	0.0
	CS		41.1	30.0	40.0	0.0	38.5
	CH		44.4	10.0	50.0	100.0	61.5
NUMBER CLAMS COLLECTED			87	10	30	10	13
SIZE RANGE (mm)			23-96	23-77	35-91	89-105	57-86
$\bar{X}$ SIZE (mm)			69.0	49.2	69.8	90.6	77.3
% MORTALITY			7.4	0.0	0.0	0.0	7.1

TABLE 1
SHELLFISH INVENTORY SUMMARY

STATION NUMBER			LE87-61	LE87-62	LE87-63	LE87-64	LE87-65
LATITUDE N			39°38.25'	39°38.00'	39°37.75'	39°37.75'	39°37.30'
LONGITUDE W			74°14.71'	74°14.39'	74°14.07'	74°15.30'	74°15.03'
COLLECTION DATE			7/16/87	7/16/87	7/16/87	7/17/87	7/17/87
TIDE AND HOURS			Low + 2.0	Low + 3.0	Low + 5.0	Low + 0.0	Low + 0.5
TEMPERATURE °C	AIR		27.0	23.0	23.0	25.0	25.0
	WATER	S	ND	ND	23.6	22.5	ND
		B	ND	ND	23.6	22.5	ND
D.O. (ppm)	S		ND	ND	-	-	ND
	B		ND	ND	10.4	8.5	ND
SALINITY (ppt)	S		ND	ND	-	-	ND
	B		ND	ND	24.0	23.0	ND
pH	S		ND	ND	-	-	ND
	B		ND	ND	8.3	7.9	ND
DEPTH (ft)			5.0	4.5	5.0	4.0	8.0
SUBSTRATE	% GRAVEL		*	*	*	*	*
	% SAND		*	*	*	*	*
	% MUD		*	*	*	*	*
ESTIMATED HARD CLAM DENSITY (#/ft²)			0.23	0.14	0.11	0.09	0.07
% COMMERCIAL SIZES	SL		0.0	0.0	0.0	0.0	0.0
	LN		0.0	42.9	36.4	0.0	0.0
	CS		64.7	57.1	63.6	58.8	14.3
	CH		35.3	0.0	0.0	41.2	85.7
NUMBER CLAMS COLLECTED			34	14	11	17	14
SIZE RANGE (mm)			57-91	40-75	38-72	69-99	71-95
$\bar{X}$ SIZE (mm)			76.6	51.8	57.5	73.4	82.9
% MORTALITY			17.1	0.0	0.0	26.1	6.7

TABLE 1
SHELLFISH INVENTORY SUMMARY

STATION NUMBER			LE87-66	LE87-67	LE87-68	LE87-69	LE87-70
LATITUDE N			39°37.75'	39°37.00'	39°37.50'	39°37.25'	39°37.00'
LONGITUDE W			74°14.71'	74°15.03'	74°13.75'	74°13.43'	74°13.75'
COLLECTION DATE			7/17/87	7/17/87	7/22/87	7/22/87	7/22/87
TIDE AND HOURS			Low + 1.5	Low + 2.5	High + 2.0	High + 3.0	High + 4.
TEMPERATURE °C	AIR		26.0	25.0	27.5	27.0	27.0
	WATER	S	ND	22.6	25.5	ND	ND
		B	ND	22.8	25.0	ND	ND
D.O. (ppm)	S		ND	8.6	7.9	ND	ND
	B		ND	8.7	7.7	ND	ND
SALINITY (ppt)	S		ND	24.0	25.0	ND	ND
	B		ND	24.0	26.0	ND	ND
pH	S		ND	8.3	8.2	ND	ND
	B		ND	8.3	8.2	ND	ND
DEPTH (ft)			6.0	6.0	5.0	5.0	5.0
SUBSTRATE	% GRAVEL		*	*	*	*	*
	% SAND		*	*	*	*	*
	% MUD		*	*	*	*	*
ESTIMATED HARD CLAM DENSITY (#/ft^2)			0.13	0.28	0.26	0.14	0.20
% COMMERCIAL SIZES	SL		0.0	0.0	9.1	0.0	0.0
	LN		0.0	3.4	57.6	7.1	25.0
	CS		29.2	24.1	33.3	92.9	65.0
	CH		60.8	72.5	0.0	0.0	10.0
NUMBER CLAMS COLLECTED			24	29	33	14	20
SIZE RANGE (mm)			58-102	49-99	30-73	43-74	48-80
$\bar{X}$ SIZE (mm)			82.5	79.0	57.2	62.8	61.3
% MORTALITY			7.7	17.1	10.8	12.5	4.8

TABLE 1
SHELLFISH INVENTORY SUMMARY

STATION NUMBER			LE87-71	LE87-72	LE87-73	LE87-74	LE87-75
LATITUDE N			39°37.25'	39°36.75'	39°36.50'	39°37.00'	39°37.25'
LONGITUDE W			74°14.25'	74°13.43'	74°13.11'	74°14.39'	74°14.71'
COLLECTION DATE			7/22/87	7/23/87	7/23/87	7/23/87	7/23/87
TIDE AND HOURS			High + 4.5	High + 0.0	High + 1.0	High + 2.5	High + 3.0
TEMPERATURE °C	AIR		27.0	28.5	31.5	29.0	28.0
	WATER	S	ND	26.5	ND	ND	ND
		B	ND	26.0	ND	ND	ND
D.O. (ppm)	S		ND	-	ND	ND	ND
	B		ND	7.3	ND	ND	ND
SALINITY (ppt)	S		ND	-	ND	ND	ND
	B		ND	26.0	ND	ND	ND
pH	S		ND	-	ND	ND	ND
	B		ND	8.4	ND	ND	ND
DEPTH (ft)			5.0	4.5	5.0	6.0	5.0
SUBSTRATE	% GRAVEL		*	*	*	*	*
	% SAND		*	*	*	*	*
	% MUD		*	*	*	*	*
ESTIMATED HARD CLAM DENSITY (#/ft^2)			0.40	0.05	0.11	0.25	0.26
% COMMERCIAL SIZES	SL		12.8	0.0	0.0	12.0	0.0
	LN		15.4	0.0	27.3	4.0	0.0
	CS		41.0	80.0	63.6	48.0	34.6
	CH		31.8	20.0	9.1	46.0	65.4
NUMBER CLAMS COLLECTED			39	5	11	25	26
SIZE RANGE (mm)			28-89	64-79	53-83	31-93	57-97
MEAN SIZE (mm)			64.3	69.0	66.3	67.7	78.2
% MORTALITY			7.1	37.5	8.3	3.8	10.3

ND-No Data

TABLE 1
SHELLFISH INVENTORY SUMMARY

STATION NUMBER			LE87-76	LE87-77	LE87-78	LE87-79	LE87-80
LATITUDE N			$39^{o}37.50'$	$39^{o}36.75'$	$39^{o}36.25'$	$39^{o}36.50'$	$39^{o}36.75'$
LONGITUDE W			$74^{o}14.39'$	$74^{o}15.35'$	$74^{o}13.11'$	$74^{o}13.75'$	$74^{o}14.07'$
COLLECTION DATE			7/23/87	7/23/87	7/24/87	7/24/87	7/24/87
TIDE AND HOURS			High + 4.0	High + 4.5	Low + 5.5	High + 0.5	High + 1.
TEMPERATURE	AIR		ND	-	27.0	28.0	29.0
^{o}C	WATER	S	ND	27.0	25.3	ND	ND
		B	ND	26.9	25.3	ND	ND
D.O.	S		ND	-	-	ND	ND
(ppm)	B		ND	8.2	6.5	ND	ND
SALINITY	S		ND	-	-	ND	ND
(ppt)	B		ND	26.0	26.0	ND	ND
pH	S		ND	-	-	ND	ND
	B		ND	8.4	8.4	ND	ND
DEPTH (ft)			3.0	5.0	5.0	4.5	5.0
SUBSTRATE	% GRAVEL		*	*	*	*	*
	% SAND		*	*	*	*	*
	% MUD		*	*	*	*	*
ESTIMATED HARD CLAM DENSITY (#/ft^2)			0.05	0.55	0.08	0.09	0.17
% COMMERCIAL SIZES	SL		0.0	4.7	10.0	9.0	0.0
	LN		20.0	5.8	0.0	18.1	11.7
	CS		80.0	18.6	80.0	54.5	76.5
	CH		0.0	70.9	10.0	18.4	12.8
NUMBER CLAMS COLLECTED			5	86	10	11	17
SIZE RANGE (mm)			53-72	33-97	34-79	27-84	52-80
$\bar{X}$ SIZE (mm)			61.2	77.5	64.8	62.5	67.6
% MORTALITY			28.6	13.1	9.0	15.4	19.0

TABLE 1
SHELLFISH INVENTORY SUMMARY

TATION NUMBER			LE87-81	LE87-82	LE87-83	LE87-84	LE87-85
ATITUDE N			39°36.50'	39°36.75'	39°36.50'	39°36.25'	39°36.00'
ONGITUDE W			74°14.39'	74°14.71'	74°15.03'	74°14.71'	74°14.39'
OLLECTION DATE			7/24/87	7/24/87	7/27/87	7/27/87	7/27/87
IDE AND HOURS			High + 1.5	High + 2.5	Low + 2.0	Low + 3.5	Low + 4.0
EMPERATURE	AIR		28.5	28.5	26.0	26.0	25.5
°C	WATER	S	ND	25.8	24.6	ND	ND
		B	ND	26.0	24.4	ND	ND
D.O.	S		ND	-	-	ND	ND
(ppm)	B		ND	7.2	6.1	ND	ND
ALINITY	S		ND	-	-	ND	ND
(ppt)	B		ND	26.0	27.0	ND	ND
pH	S		ND	-	-	ND	ND
	B		ND	8.4	8.4	ND	ND
EPTH (ft)			5.0	6.0	5.5	4.0	4.0
UBSTRATE	% GRAVEL		*	*	*	*	*
	% SAND		*	*	*	*	*
	% MUD		*	*	*	*	*
STIMATED HARD CLAM ENSITY (#/ft^2)			0.10	0.32	0.21	0.06	0.02
% OMMERCIAL SIZES	SL		0.0	2.9	3.1	0.0	0.0
	LN		0.0	8.8	0.0	28.6	50.0
	CS		90.0	85.3	47.0	42.9	0.0
	CH		10.0	3.0	59.9	29.9	50.0
UMBER CLAMS COLLECTED			10	34	32	7	2
IZE RANGE (mm)			58-81	34-86	37-96	40-96	46-80
SIZE (mm)			66.6	70.6	74.6	68.1	63.0
MORTALITY			0.0	5.6	3.0	14.3	0.0

ND No Data

TABLE 1
SHELLFISH INVENTORY SUMMARY

STATION NUMBER			LE87-86	LE87-87	LE87-88	LE87-89	LE87-90
LATITUDE N			39°36.25'	39°36.00'	39°35.75'	39°35.50'	39°35.75'
LONGITUDE W			74°14.07'	74°13.75'	74°14.07'	74°14.39'	74°14.71'
COLLECTION DATE			7/27/87	7/27/87	7/27/87	7/27/87	7/27/87
TIDE AND HOURS			Low + 5.0	High + 0.0	High + 1.0	High + 1.5	High + 2.
TEMPERATURE °C	AIR		26.0	26.5	27.0	27.0	27.0
	WATER	S	ND	ND	ND	ND	26.4
		B	ND	ND	ND	ND	26.5
D.O. (ppm)	S		ND	ND	ND	ND	-
	B		ND	ND	ND	ND	9.4
SALINITY (ppt)	S		ND	ND	ND	ND	-
	B		ND	ND	ND	ND	28.0
pH	S		ND	ND	ND	ND	-
	B		ND	ND	ND	ND	8.6
DEPTH (ft)			4.0	4.0	5.0	6.0	4.0
SUBSTRATE	% GRAVEL		*	*	*	*	*
	% SAND		*	*	*	*	*
	% MUD		*	*	*	*	*
ESTIMATED HARD CLAM DENSITY (#/ft²)			0.11	0.03	0.01	0.26	0.24
% COMMERCIAL SIZES	SL		7.7	0.0	0.0	0.0	4.2
	LN		30.8	100.0	50.0	25.0	25.0
	CS		30.8	0.0	50.0	50.0	37.5
	CH		31.7	0.0	0.0	25.0	33.1
NUMBER CLAMS COLLECTED			13	3	2	40	24
SIZE RANGE (mm)			25-88	43-57	4162	38-88	33-92
$\bar{X}$ SIZE (mm)			63.2	47.0	52.5	64.7	67.9
% MORTALITY			13.3	0.0	33.3	2.4	4.0

TABLE 1
SHELLFISH INVENTORY SUMMARY

STATION NUMBER			LE87-91	LE87-92	LE87-93	LE87-94	LE87-95
LATITUDE N			$39^{o}36.25'$	$39^{o}36.00'$	$39^{o}35.50'$	$39^{o}35.75'$	$39^{o}36.25'$
LONGITUDE W			$74^{o}15.35'$	$74^{o}15.03'$	$74^{o}15.03'$	$74^{o}15.35'$	$74^{o}16.65'$
COLLECTION DATE			7/28/87	7/28/87	7/28/87	7/28/87	7/29/87
TIDE AND HOURS			Low + 2.5	Low + 3.5	High + 0.0	High + 1.0	Low + 4.5
TEMPERATURE ^{o}C	AIR		26.0	27.0	26.5	26.5	23.5
	WATER	S	25.4	ND	ND	24.1	24.6
		B	25.5	ND	ND	23.9	24.5
D.O. (ppm)	S		7.0	ND	ND	8.4	7.3
	B		6.5	ND	ND	8.0	7.1
SALINITY (ppt)	S		26.0	ND	ND	28.0	27.5
	B		26.0	ND	ND	28.0	28.0
pH	S		8.4	ND	ND	8.4	8.2
	B		8.4	ND	ND	8.4	8.2
DEPTH (ft)			11.0	7.0	7.0	8.0	8.0
SUBSTRATE	% GRAVEL		*	*	*	*	*
	% SAND		*	*	*	*	*
	% MUD		*	*	*	*	*
ESTIMATED HARD CLAM DENSITY (#/ft^2)			0.13	0.50	0.30	0.30	0.21
% COMMERCIAL SIZES	SL		0.0	0.0	1.7	2.1	0.0
	LN		0.0	0.0	3.4	2.1	2.0
	CS		19.2	24.5	10.2	23.4	41.7
	CH		80.8	75.5	85.7	72.4	56.3
NUMBER CLAMS COLLECTED			26	106	59	47	48
SIZE RANGE (mm)			61-102	60-96	29-98	32-101	51-90
$\bar{X}$ SIZE (mm)			87.0	81.9	84.0	80.1	77.3
% MORTALITY			18.8	4.5	13.2	11.3	18.6

* - Analysis pending ND-No Data

TABLE 1
SHELLFISH INVENTORY SUMMARY

STATION NUMBER			LE87-96	LE87-97	LE87-98	LE87-99	LE87-100
LATITUDE N			39°36.00'	39°36.25'	39°36.00'	39°35.25'	39°35.50'
LONGITUDE W			74°16.97'	74°17.29'	74°16.97'	74°15.35'	74°15.67'
COLLECTION DATE			7/29/87	7/29/87	7/29/87	8/3/87	8/3/87
TIDE AND HOURS			Low + 5.5	High + 0.0	High + 1.0	High + 4.5	High + 5.(
TEMPERATURE °C	AIR		23.5	23.5	23.5	25.5	27.5
	WATER	S	ND	ND	25.0	25.5	ND
		B	ND	ND	24.8	23.4	ND
D.O. (ppm)	S		ND	ND	7.8	6.4	ND
	B		ND	ND	7.6	6.4	ND
SALINITY (ppt)	S		ND	ND	27.5	28.0	ND
	B		ND	ND	27.5	28.0	ND
pH	S		ND	ND	8.2	8.2	ND
	B		ND	ND	8.2	8.2	ND
DEPTH (ft)			7.0	8.0	8.0	7.0	7.0
SUBSTRATE	% GRAVEL		*	*	*	*	*
	% SAND		*	*	*	*	*
	% MUD		*	*	*	*	*
ESTIMATED HARD CLAM DENSITY (#/ft²)			0.10	0.05	0.32	0.85	0.49
% COMMERCIAL SIZES	SL		0.0	0.0	3.2	0.6	0.0
	LN		0.0	0.0	6.5	11.0	3.4
	CS		11.1	0.0	32.3	18.4	39.3
	CH		88.9	100.0	68.0	70.0	57.3
NUMBER CLAMS COLLECTED			9	8	31	163	61
SIZE RANGE (mm)			71-95	83-100	29-90	37-98	38-98
$\bar{X}$ SIZE (mm)			84.0	100.0	74.8	70.7	77.8
% MORTALITY			30.8	46.7	22.5	9.44	1.6

TABLE 1
SHELLFISH INVENTORY SUMMARY

STATION NUMBER			LE87-101	LE87-102	LE87-103	LE87-104	LE87-105
LATITUDE N			39°35.25'	39°35.50'	39°35.75'	39°36.00'	39°36.00'
LONGITUDE W			74°16.01'	74°16.33'	74°16.65'	74°16.33'	74°17.61'
COLLECTION DATE			8/3/87	8/3/87	8/3/87	8/3/87	8/4/87
TIDE AND HOURS			Low + 2.0	Low + 3.0	Low + 3.5	Low + 4.5	High + 4.0
TEMPERATURE °C	AIR		29.0	29.0	28.0	29.0	28.0
	WATER	S	ND	ND	ND	24.7	24.8
		B	ND	ND	ND	24.5	24.4
D.O. (ppm)	S		ND	ND	ND	-	6.2
	B		ND	ND	ND	7.8	5.9
SALINITY (ppt)	S		ND	ND	ND	27.5	26.0
	B		ND	ND	ND	27.5	28.0
pH	S		ND	ND	ND	8.4	8.2
	B		ND	ND	ND	8.4	8.4
DEPTH (ft)			8.0	7.0	9.0	9.0	7.0
SUBSTRATE	% GRAVEL		*	*	*	*	*
	% SAND		*	*	*	*	*
	% MUD		*	*	*	*	*
ESTIMATED HARD CLAM DENSITY (#/ft²)			1.00	0.66	0.20	0.08	0.16
% COMMERCIAL SIZES	SL		0.0	1.5	0.0	0.0	0.0
	LN		4.1	0.0	0.0	11.9	0.0
	CS		24.8	32.3	23.8	23.8	30.0
	CH		71.1	66.2	76.2	64.3	70.0
NUMBER CLAMS COLLECTED			145	65	21	42	31
SIZE RANGE (mm)			42-107	29-94	64-94	49-98	72-102
$\bar{X}$ SIZE (mm)			79.9	70.8	81.7	77.1	84.1
% MORTALITY			4.0	8.5	25.0	28.8	11.4

* Analysis pending

ND=No Data

TABLE 1
SHELLFISH INVENTORY SUMMARY

STATION NUMBER			LE87-106	LE87-107	LE87-108	LE87-109	LE87-110
LATITUDE N			39°35.75'	39°35.50'	39°35.25'	39°35.00'	39°34.75'
LONGITUDE W			74°17.29'	74°16.97'	74°16.65'	74°16.33'	74°16.01'
COLLECTION DATE			8/4/87	8/4/87	8/4/87	8/4/87	8/4/87
TIDE AND HOURS			High + 4.0	High + 5.0	High + 5.5	Low + 0.0	Low + 1.0
TEMPERATURE °C	AIR		29.5	30.0	32.0	30.0	30.0
	WATER	S	ND	ND	ND	ND	ND
		B	ND	ND	ND	ND	ND
D.O. (ppm)	S		ND	ND	ND	ND	ND
	B		ND	ND	ND	ND	ND
SALINITY (ppt)	S		ND	ND	ND	ND	ND
	B		ND	ND	ND	ND	ND
pH	S		ND	ND	ND	ND	ND
	B		ND	ND	ND	ND	ND
DEPTH (ft)			8.0	8.0	6.0	7.0	11.0
SUBSTRATE	% GRAVEL		*	*	*	*	*
	% SAND		*	*	*	*	*
	% MUD		*	*	*	*	*
ESTIMATED HARD CLAM DENSITY (#/ft²)			0.07	0.25	0.60	0.20	0.27
% COMMERCIAL SIZES	SL		9.4	7.9	0.0	6.5	1.7
	LN		15.6	10.5	0.0	9.7	5.2
	CS		40.6	39.5	36.0	16.1	34.5
	CH		35.4	53.1	64.0	67.7	59.6
NUMBER CLAMS COLLECTED			32	38	61	31	58
SIZE RANGE (mm)			31-90	26-90	63-98	33-97	31-105
$\bar{X}$ SIZE (mm)			67.6	68.0	76.2	76.4	86.5
% MORTALITY			0.0	11.6	10.3	6.1	3.3

TABLE 1
SHELLFISH INVENTORY SUMMARY

TATION NUMBER			LE87-111	LE87-112	LE87-113	LE87-114	LE87-115
ATITUDE N			39°34.50'	39°35.25'	39°35.00'	39°34.75'	39°34.50'
ONGITUDE W			74°15.35'	74°14.71'	74°15.03'	74°14.71'	74°15.03'
OLLECTION DATE			8/4/87	8/10/87	8/10/87	8/10/87	8/10/87
IDE AND HOURS			Low + 2.0	Low + 4.0	Low + 4.0	Low + 5.5	High + 0.0
EMPERATURE	AIR		30.0	26.5	26.5	ND	28.0
°C	WATER	S	25.2	24.5	ND	ND	ND
		B	25.0	24.5	ND	ND	ND
D.O.	S		7.0	-	ND	ND	ND
(ppm)	B		7.0	6.0	ND	ND	ND
ALINITY	S		30.0	-	ND	ND	ND
(ppt)	B		30.0	28.0	ND	ND	ND
pH	S		8.2	-	ND	ND	ND
	B		8.4	8.2	ND	ND	ND
EPTH (ft)			10.0	6.0	6.0	6.0	5.0
UBSTRATE	% GRAVEL		*	*	*	*	*
	% SAND		*	*	*	*	*
	% MUD		*	*	*	*	*
STIMATED HARD CLAM ENSITY (#/ft^2)			0.18	0.24	0.30	0.34	0.11
% COMMERCIAL SIZES	SL		0.0	8.0	21.6	10.6	47.0
	LN		2.0	16.0	54.1	23.4	17.6
	CS		14.3	24.0	13.5	57.4	29.4
	CH		83.7	52.0	11.8	9.6	6.0
NUMBER CLAMS COLLECTED			35	50	37	47	17
IZE RANGE (mm)			42-102	21-102	23-82	26-85	22-86
$\bar{X}$ SIZE (mm)			79.4	71.8	46.8	61.6	46.1
% MORTALITY			2.8	7.4	7.5	6.0	26.1

TABLE 1
SHELLFISH INVENTORY SUMMARY

STATION NUMBER			LE87-116	LE87-117	LE87-118	LE87-119	LE87-120
LATITUDE N			39°34.25'	39°35.00'	39°34.75'	39°34.25'	39°34.00'
LONGITUDE W			74°15.25'	74°15.67'	74°15.35'	74°16.65'	74°16.33'
COLLECTION DATE			8/10/87	8/11/87	8/11/87	8/11/87	8/11/87
TIDE AND HOURS			High + 1.0	Low + 3.0	Low + 4.0	Low + 5.0	High + 0.(
TEMPERATURE °C	AIR		30.0	23.0	23.0	23.0	23.0
	WATER	S	23.0	20.5	ND	ND	ND
		B	22.8	20.5	ND	ND	ND
D.O. (ppm)	S		6.8	6.7	ND	ND	ND
	B		6.7	6.6	ND	ND	ND
SALINITY (ppt)	S		-	30.0	ND	ND	ND
	B		-	30.0	ND	ND	ND
pH	S		-	8.3	ND	ND	ND
	B		-	8.4	ND	ND	ND
DEPTH (ft)			13.0	7.0	4.0	7.0	6.0
SUBSTRATE	% GRAVEL		*	*	*	*	*
	% SAND		*	*	*	*	*
	% MUD		*	*	*	*	*
ESTIMATED HARD CLAM DENSITY (#/ft^2)			0.36	0.66	0.24	0.69	0.29
% COMMERCIAL SIZES	SL		9.8	0.8	34.6	4.4	1.7
	LN		18.3	3.8	26.9	5.9	0.0
	CS		19.6	21.2	23.1	18.5	5.2
	CH		53.3	74.2	16.4	72.2	94.1
NUMBER CLAMS COLLECTED			153	132	26	135	58
SIZE RANGE (mm)			12-99	36-103	19-99	28-97	35-107
$\bar{X}$ SIZE (mm)			70.4	80.7	52.2	78.3	88.1
% MORTALITY			26.4	6.4	3.9	7.4	14.7

TABLE 1
SHELLFISH INVENTORY SUMMARY

CATION NUMBER			LE87-121	LE87-122	LE87-123	LE87-124	LE87-125
ATITUDE N			39°34.00'	39°36.00'	39°36.25'	39°35.75'	39°35.50'
ONGITUDE W			74°15.67'	74°18.26'	74°17.94'	74°17.94'	74°17.61'
OLLECTION DATE			8/11/87	8/12/87	8/12/87	8/12/87	8/12/87
DE AND HOURS			High + 1.0	Low + 2.0	Low + 3.0	Low + 4.0	Low + 5.0
MPERATURE	AIR		25.0	23.5	24.0	24.0	24.0
°C	WATER	S	19.5	23.6	ND	ND	ND
		B	22.0	23.5	ND	ND	ND
D.O.	S		7.9	6.9	ND	ND	ND
(ppm)	B		7.8	6.9	ND	ND	ND
ALINITY	S		30.0	27.0	ND	ND	ND
(ppt)	B		30.0	28.0	ND	ND	ND
pH	S		8.4	8.2	ND	ND	ND
	B		8.5	8.2	ND	ND	ND
EPTH (ft)			8.0	7.0	7.0	9.0	10.0
UBSTRATE	% GRAVEL		*	*	*	*	*
	% SAND		*	*	*	*	*
	% MUD		*	*	*	*	*
STIMATED HARD CLAM ENSITY (#/ft²)			0.30	0.03	0.1	0.15	0.24
%	SL		0.0	0.0	0.0	0.0	0.0
OMMERCIAL	LN		17.2	0.0	0.0	0.0	2.7
SIZES	CS		46.6	25.0	0.0	26.6	51.4
	CH		46.2	75.0	100.0	73.4	45.9
UMBER CLAMS COLLECTED			58	4	12	15	37
IZE RANGE (mm)			38-101	73-90	81-96	70-94	46-92
SIZE (mm)			70.2	60.0	88.3	82.8	77.2
MORTALITY			13.4	33.3	7.7	6.3	26.0

TABLE 1
SHELLFISH INVENTORY SUMMARY

STATION NUMBER			LE87-126	LE87-127	LE87-128	LE87-129	LE87-130
LATITUDE N			39°35.25'	39°35.70'	39°35.50'	39°35.25'	39°34.12'
LONGITUDE W			74°17.29'	74°18.40'	74°18.26'	74°17.81'	74°17.44'
COLLECTION DATE			8/12/87	8/18/87	8/18/87	8/18/87	8/18/87
TIDE AND HOURS			Low + 5.5	High + 3.0	High + 3.5	High + 4.5	High + 5.(
TEMPERATURE	AIR		24.0	30.0	30.0	30.0	31.0
°C	WATER	S	23.9	26.6	ND	ND	ND
		B	23.8	26.4	ND	ND	ND
D.O.	S		7.4	-	ND	ND	ND
(ppm)	B		7.0	5.7	ND	ND	ND
SALINITY	S		29.0	-	ND	ND	ND
(ppt)	B		29.0	27.0	ND	ND	ND
pH	S		8.3	-	ND	ND	ND
	B		8.3	8.2	ND	ND	ND
DEPTH (ft)			11.0	6.0	6.0	7.0	7.0
SUBSTRATE	% GRAVEL		*	*	*	*	*
	% SAND		*	*	*	*	*
	% MUD		*	*	*	*	*
ESTIMATED HARD CLAM DENSITY (#/ft^2)			0.57	0.17	0.18	0.18	0.52
% COMMERCIAL SIZES	SL		5.3	0.0	0.0	5.0	7.7
	LN		7.0	8.0	17.9	5.0	3.8
	CS		59.6	56.0	39.2	25.0	42.3
	CH		38.1	36.0	42.9	70.0	57.2
NUMBER CLAMS COLLECTED			57	25	28	20	52
SIZE RANGE (mm)			28-87	46-88	50-88	31-93	32-89
$\bar{X}$ SIZE (mm)			67.3	71.5	61.7	76.5	72.3
% MORTALITY			1.5	26.5	30.0	33.3	16.1

TABLE 1
SHELLFISH INVENTORY SUMMARY

TATION NUMBER			LE87-131	LE87-132	LE87-133	LE87-134	LE87-135
ATITUDE N			$39^{o}35.0'$	$39^{o}34.75'$	$39^{o}34.50'$	$39^{o}34.75'$	$39^{o}34.50'$
ONGITUDE W			$74^{o}16.97'$	$74^{o}17.29'$	$74^{o}16.97'$	$74^{o}16.65'$	$74^{o}16.33'$
OLLECTION DATE			8/18/87	8/19/87	8/19/87	8/19/87	8/19/87
IDE AND HOURS			Low + 1.0	High + 2.5	High + 3.0	High + 4.0	High + 4.5
EMPERATURE	AIR		33.5	26.5	26.5	27.0	28.0
^{o}C	WATER	S	26.5	25.8	ND	ND	ND
		B	26.0	25.9	ND	ND	ND
D.O.	S		-	6.5	ND	ND	ND
(ppm)	B		7.0	6.4	ND	ND	ND
ALINITY	S		-	28.0	ND	ND	ND
(ppt)	B		28.0	28.0	ND	ND	ND
pH	S		-	8.4	ND	ND	ND
	B		8.3	8.4	ND	ND	ND
EPTH (ft)			6.0	8.0	7.0	6.0	7.0
UBSTRATE	% GRAVEL		*	*	*	*	*
	% SAND		*	*	*	*	*
	% MUD		*	*	*	*	*
STIMATED HARD CLAM ENSITY ($\#/ft^2$)			0.73	0.60	0.58	0.77	0.78
% OMMERCIAL SIZES	SL		1.3	4.1	1.1	0.0	3.3
	LN		2.1	7.4	3.5	2.0	11.5
	CS		20.3	45.5	5.8	17.3	4.1
	CH		56.3	43.0	90.6	80.7	81.1
UMBER CLAMS COLLECTED			143	121	86	150	122
IZE RANGE (mm)			27-100	27-96	37-98	39-98	29-103
SIZE (mm)			80.5	71.5	78.4	82.7	75.0
MORTALITY			8.9	10.4	13.1	12.8	5.4

ND-No Data

TABLE 1
SHELLFISH INVENTORY SUMMARY

STATION NUMBER			LE87-136	LE87-137	LE87-138	LE87-139	LE87-140
LATITUDE N			39°34.25'	39°33.75'	39°35.50'	39.34.75'	39°34.50'
LONGITUDE W			74°16.01'	74°15.35'	74°18.90'	74°17.94'	74°17.61'
COLLECTION DATE			8/19/87	8/19/87	9/1/87	9/1/87	9/1/87
TIDE AND HOURS			High + 5.5	Low + 0.0	Low + 0.0	Low + 1.0	Low + 2.0
TEMPERATURE °C	AIR		27.5	28.0	21.0	21.0	22.5
	WATER	S	ND	26.0	20.1	ND	ND
		B	ND	25.9	19.9	ND	ND
D.O. (ppm)	S		ND	-	-	ND	ND
	B		ND	7.9	7.5	ND	ND
SALINITY (ppt)	S		ND	-	-	ND	ND
	B		ND	28.0	28.0	ND	ND
pH	S		ND	-	-	ND	ND
	B		ND	8.4	8.3	ND	ND
DEPTH (ft)			7.0	7.0	5.0	7.0	6.0
SUBSTRATE	% GRAVEL		*	*	*	*	*
	% SAND		*	*	*	*	*
	% MUD		*	*	*	*	*
ESTIMATED HARD CLAM DENSITY (#/ft²)			2.62	0.03	0.22	0.48	0.70
% COMMERCIAL SIZES	SL		6.7	0.0	0.0	2.1	3.3
	LN		21.9	25.0	0.0	10.4	4.7
	CS		25.7	25.0	28.0	43.8	23.3
	CH		45.7	50.0	72.0	44.7	68.7
NUMBER CLAMS COLLECTED			269	4	25	48	150
SIZE RANGE (mm)			24-109	52-112	66-89	32-96	31-94
$\bar{X}$ SIZE (mm)			69.6	82.5	80.0	68.9	72.8
% MORTALITY			5.6	0.0	19.4	12.7	8.5

TABLE 1
SHELLFISH INVENTORY SUMMARY

TATION NUMBER			LE87-141	LE87-142	LE87-143	LE87-144	LE87-145
ATITUDE N			$39^{o}34.25'$	$39^{o}34.00'$	$39^{o}35.00'$	$39^{o}34.50'$	$39^{o}34.25'$
ONGITUDE W			$74^{o}17.29'$	$74^{o}17.61'$	$74^{o}19.55'$	$74^{o}18.90'$	$74^{o}18.58'$
OLLECTION DATE			9/1/87	9/1/87	9/2/87	9/2/87	9/2/87
IDE AND HOURS			Low + 2.5	Low + 3.0	High + 5.5	Low + 0.0	Low + 1.0
EMPERATURE	AIR		22.5	24.5	25.0	23.5	23.5
^{o}C	WATER	S	ND	20.4	19.5	ND	ND
		B	ND	20.3	19.3	ND	ND
D.O.	S		ND	-	-	ND	ND
(ppm)	B		ND	7.2	6.7	ND	ND
ALINITY	S		ND	-	-	ND	ND
(ppt)	B		ND	28.0	27.0	ND	ND
pH	S		ND	-	-	ND	ND
	B		ND	8.3	8,3	ND	ND
EPTH (ft)			5.0	4.0	5.0	5.0	4.0
UBSTRATE	% GRAVEL		*	*	*	*	*
	% SAND		*	*	*	*	*
	% MUD		*	*	*	*	*
STIMATED HARD CLAM ENSITY ($\#/ft^2$)			0.39	0.23	0.52	0.39	0.65
%	SL		1.2	0.0	0.0	7.1	0.6
OMMERCIAL	LN		2.5	0.0	17.6	12.5	4.7
SIZES	CS		21.0	9.1	62.7	51.8	22.9
	CH		75.3	90.9	20.7	38.6	71.8
UMBER CLAMS COLLECTED			81	33	51	56	170
IZE RANGE (mm)			34-95	57-109	41-83	33-99	35-108
$\bar{x}$ SIZE (mm)			80.7	88.9	66.4	67.0	80.1
% MORTALITY			19.8	17.5	5.6	11.1	11.5

ND-No Data

TABLE 1
SHELLFISH INVENTORY SUMMARY

STATION NUMBER			LE87-146	LE87-147	LE87-148	LE87-149	LE87-150
LATITUDE N			$39^{o}34.50'$	$39^{o}34.25'$	$39^{o}34.00'$	$39^{o}34.10'$	$39^{o}34.00'$
LONGITUDE W			$74^{o}18.26'$	$74^{o}17.94'$	$74^{o}18.90'$	$74^{o}19.18'$	$74^{o}20.20'$
COLLECTION DATE			9/2/87	9/2/87	9/3/87	9/3/87	9/3/87
TIDE AND HOURS			Low + 1.5	Low + 2.0	High + 4.0	High + 4.5	High + 5.0
TEMPERATURE	AIR		24.5	24.5	21.0	21.0	21.0
^{o}C	WATER	S	ND	20.9	19.9	ND	20.0
		B	ND	20.7	19.8	ND	19.9
D.O.	S		ND	-	-	ND	-
(ppm)	B		ND	7.9	6.6	ND	7.1
SALINITY	S		ND	-	-	ND	-
(ppt)	B		ND	28.0	27.0	ND	27.0
pH	S		ND	-	-	ND	-
	B		ND	8.4	8.3	ND	8.3
DEPTH (ft)			5.0	5.0	4.0	5.0	4.0
SUBSTRATE	% GRAVEL		*	*	*	*	*
	% SAND		*	*	*	*	*
	% MUD		*	*	*	*	*
ESTIMATED HARD CLAM DENSITY ($\#/ft^2$)			0.74	0.70	0.64	0.60	0.22
% COMMERCIAL SIZES	SL		0.0	1.4	0.0	0.0	9.4
	LN		4.1	4.3	3.2	16.7	11.3
	CS		27.0	9.9	11.3	50.0	37.7
	CH		68.9	84.4	86.5	33.3	41.6
NUMBER CLAMS COLLECTED			74	141	62	60	53
SIZE RANGE (mm)			38-104	34-102	39-101	38-96	31-88
X SIZE (mm)			79.8	82.7	85.5	68.6	56.7
% MORTALITY			5.1	19.0	13.9	14.3	14.5

TABLE 1
SHELLFISH INVENTORY SUMMARY

STATION NUMBER			LE87-151	LE87-152	LE87-153	LE87-154	LE87-155
LATITUDE N			39°33.25'	39°33.75'	39°33.50'	39°33.00'	39°32.70'
LONGITUDE W			74°16.01'	74°16.01'	74°15.67'	74°15.67'	74°15.57'
COLLECTION DATE			9/4/87	9/4/87	9/4/87	9/4/87	9/4/87
TIDE AND HOURS			High + 2.5	High + 3.0	High + 3.5	High + 3.5	High + 5.0
TEMPERATURE °C	AIR		22.0	22.0	23.0	23.0	25.0
	WATER	S	19.5	ND	ND	ND	ND
		B	19.5	ND	ND	ND	ND
D.O. (ppm)	S		-	ND	ND	ND	ND
	B		7.2	ND	ND	ND	ND
SALINITY (ppt)	S		-	ND	ND	ND	ND
	B		28.0	ND	ND	ND	ND
pH	S		-	ND	ND	ND	ND
	B		8.3	ND	ND	ND	ND
DEPTH (ft)			4.0	5.0	7.0	6.0	8.0
SUBSTRATE	% GRAVEL		*	*	*	*	*
	% SAND		*	*	*	*	*
	% MUD		*	*	*	*	*
ESTIMATED HARD CLAM DENSITY (#/ft²)			0.52	0.40	0.01	0.07	0.01
% COMMERCIAL SIZES	SL		0.0	0.0	0.0	7.6	80.0
	LN		9.7	2.7	0.0	31.0	0.0
	CS		24.3	2.7	0.0	54.0	0.0
	CH		66.0	94.6	100.0	54.0	20.0
NUMBER CLAMS COLLECTED			103	74	2	13	5
SIZE RANGE (mm)			41-110	44-107	85-97	37-86	11-92
$\bar{X}$ SIZE (mm)			80.7	88.1	96.0	59.1	35.4
% MORTALITY			11.1	3.9	0.0	52.0	44.4

ND=No Data

TABLE 1
SHELLFISH INVENTORY SUMMARY

STATION NUMBER			LE87-156	LE87-157	LE87-158	LE87-159	LE87-160
LATITUDE N			39°32.50'	39°32.25'	39°32.00'	39°31.75'	39°32.00'
LONGITUDE W			74°15.74'	74°16.01'	74°16.33'	74°16.65'	74°16.97'
COLLECTION DATE			9/4/87	9/4/87	9/10/87	9/10/87	9/10/87
TIDE AND HOURS			High + 5.5	Low + 0.0	Low + 2.5	Low + 3.0	Low + 3.5
TEMPERATURE °C	AIR		24.0	23.0	24.0	24.0	24.0
	WATER	S	ND	20.0	21.0	ND	ND
		B	ND	20.0	21.0	ND	ND
D.O. (ppm)	S		ND	-	-	ND	ND
	B		ND	7.4	6.4	ND	ND
SALINITY (ppt)	S		ND	-	-	ND	ND
	B		ND	28.0	29.0	ND	ND
pH	S		ND	-	-	ND	ND
	B		ND	8.3	8.2	ND	ND
DEPTH (ft)			4.0	4.0	7.0	5.0	6.0
SUBSTRATE	% GRAVEL		*	*	*	*	*
	% SAND		*	*	*	*	*
	% MUD		*	*	*	*	*
ESTIMATED HARD CLAM DENSITY (#/ft^2)			0.03	0.41	0.0	0.03	0.0
% COMMERCIAL SIZES	SL		0.0	0.0	0.0	0.0	0.0
	LN		0.0	0.0	0.0	0.0	0.0
	CS		0.0	1.2	0.0	3.3	0.0
	CH		100.0	98.8	0.0	66.7	0.0
NUMBER CLAMS COLLECTED			6	82	0	3	0
SIZE RANGE (mm)			91-106	76-106	-	66-97	-
$\bar{X}$ SIZE (mm)			99.0	101.0	-	80.0	-
% MORTALITY			0.0	1.2	0.0	0.0	0.0

TABLE 1
SHELLFISH INVENTORY SUMMARY

TATION NUMBER			LE87-161	LE87-162	LE87-163	LE87-164	LE87-165
ATITUDE N			$39^{o}32.25'$	$39^{o}32.50'$	$39^{o}33.00'$	$39^{o}33.50'$	$39^{o}31.50'$
ONGITUDE W			$74^{o}16.65'$	$74^{o}16.33'$	$74^{o}16.33'$	$74^{o}16.33'$	$74^{o}17.05'$
OLLECTION DATE			9/10/87	9/10/87	9/10/87	9/10/87	9/14/87
IDE AND HOURS			Low + 4.5	High + 0.0	High + 0.5	High + 1.0	Low + 1.0
EMPERATURE	AIR		24.0	25.0	25.0	25.0	22.0
^{o}C	WATER	S	ND	ND	ND	21.6	21.2
		B	ND	ND	ND	21.6	20.7
D.O.	S		ND	ND	ND	-	-
(ppm)	B		ND	ND	ND	7.0	5.8
ALINITY	S		ND	ND	ND	-	-
(ppt)	B		ND	ND	ND	30.0	29.0
pH	S		ND	ND	ND	-	-
	B		ND	ND	ND	8.2	8.3
EPTH (ft)			4.0	4.0	5.0	5.0	7.0
UBSTRATE	% GRAVEL		*	*	*	*	*
	% SAND		*	*	*	*	*
	% MUD		*	*	*	*	*
STIMATED HARD CLAM ENSITY ($\#/ft^2$)			0.03	0.05	0.37	0.23	0.0
%	SL		0.0	0.0	0.0	0.0	0.0
OMMERCIAL	LN		0.0	0.0	1.4	0.0	0.0
SIZES	CS		0.0	1.3	5.5	4.4	0.0
	CH		100.0	98.7	93.1	95.6	0.0
UMBER CLAMS COLLECTED			6	7	73	45	0
IZE RANGE (mm)			71-91	69-95	41-108	72-107	-
$\bar{x}$ SIZE (mm)			85.0	85.3	90.8	90.1	-
% MORTALITY			14.3	0.0	6.4	6.3	0.0

TABLE 1
SHELLFISH INVENTORY SUMMARY

STATION NUMBER			LE87-166	LE87-167	LE87-168	LE87-169	LE87-170
LATITUDE N			39°31.75'	39°32.25'	39°32.00'	39°32.50'	39°32.60'
LONGITUDE W			74°17.29'	74°17.29'	74°17.71'	74°17.61'	74°17.94'
COLLECTION DATE			9/14/87	9/14/87	9/14/87	9/15/87	9/15/87
TIDE AND HOURS			Low + 2.0	Low + 3.5	Low + 4.0	High + 5.5	Low + 0.0
TEMPERATURE °C	AIR		23.0	25.0	26.0	24.5	24.5
	WATER	S	ND	ND	21.2	21.1	ND
		B	ND	ND	21.2	21.1	ND
D.O. (ppm)	S		ND	ND	-	-	ND
	B		ND	ND	7.2	6.5	ND
SALINITY (ppt)	S		ND	ND	-	-	ND
	B		ND	ND	30.0	30.0	ND
pH	S		ND	ND	-	-	ND
	B		ND	ND	8.3	8.2	ND
DEPTH (ft)			7.0	6.0	6.0	5.0	5.0
SUBSTRATE	% GRAVEL		*	*	*	*	*
	% SAND		*	*	*	*	*
	% MUD		*	*	*	*	*
ESTIMATED HARD CLAM DENSITY (#/ft²)			0.01	0.04	0.01	0.11	0.01
% COMMERCIAL SIZES	SL		0.0	14.3	0.0	9.1	0.0
	LN		0.0	85.7	0.0	63.6	0.0
	CS		100.0	0.0	100.0	27.3	0.0
	CH		0.0	0.0	0.0	0.0	100.0
NUMBER CLAMS COLLECTED			1	21	1	11	2
SIZE RANGE (mm)			-	29-50	-	37-57	94-99
$\bar{X}$ SIZE (mm)			74.0	43.1	72.0	47.6	96.0
% MORTALITY			0.0	19.2	50.0	15.4	0.0

TABLE 1
SHELLFISH INVENTORY SUMMARY

STATION NUMBER			LE87-171	LE87-172	LE87-173	LE87-174	LE87-175
LATITUDE N			39°32.50'	39°32.75'	39°33.00'	39°32.25'	39°31.70'
LONGITUDE W			74°18.26'	74°18.58'	74°18.90'	74°17.84'	74°17.84'
COLLECTION DATE			9/15/87	9/15/87	9/15/87	9/15/87	9/16/87
TIDE AND HOURS			Low + 1.0	Low + 1.5	Low + 2.0	Low + 3.0	Low + 0.5
TEMPERATURE °C	AIR		25.0	26.0	24.5	25.0	25.5
	WATER	S	ND	ND	ND	17.1	21.7
		B	ND	ND	ND	17.3	21.7
D.O. (ppm)	S		ND	ND	ND	-	-
	B		ND	ND	ND	6.7	6.8
SALINITY (ppt)	S		ND	ND	ND	-	-
	B		ND	ND	ND	30.0	29.0
pH	S		ND	ND	ND	-	-
	B		ND	ND	ND	8.2	8.3
DEPTH (ft)			7.0	5.0	6.0	8.0	5.0
SUBSTRATE	% GRAVEL		*	*	*	*	*
	% SAND		*	*	*	*	*
	% MUD		*	*	*	*	*
ESTIMATED HARD CLAM DENSITY (#/ft²)			1.13	0.08	0.02	0.05	0.0
% COMMERCIAL SIZES	SL		2.7	0.0	0.0	0.0	0.0
	LN		17.7	12.5	33.3	0.0	0.0
	CS		56.6	0.0	55.6	40.0	0.0
	CH		23.0	87.5	11.1	60.0	0.0
NUMBER CLAMS COLLECTED			113	8	7	5	0
SIZE RANGE (mm)			24-93	55-99	42-77	60-90	-
$\bar{X}$ SIZE (mm)			65.0	86.6	62.3	77.4	-
% MORTALITY			34.7	0.0	43.8	61.5	0.0

* - Analysis pending

ND-No Data

TABLE 1
SHELLFISH INVENTORY SUMMARY

STATION NUMBER			LE87-176	LE87-177	LE87-178A	LE87-178B	LE87-179
LATITUDE N			39°32.75'	39°32.50'	39°32.75'	39°22.75'	39°33.25'
LONGITUDE W			74°16.65'	74°16.97'	74°17.29'	74°17.29'	74°18.65'
COLLECTION DATE			9/22/87	9/22/87	9/22/87	9/22/87	9/22/87
TIDE AND HOURS			Low + 5.0	High + 0.0	High + 0.5	High + 1.0	High + 1.
TEMPERATURE °C	AIR		23.0	23.0	24.0	-	24.0
	WATER	S	ND	ND	ND	ND	ND
		B	ND	ND	ND	ND	ND
D.O. (ppm)	S		ND	ND	ND	ND	ND
	B		ND	ND	ND	ND	ND
SALINITY (ppt)	S		ND	ND	ND	ND	ND
	B		ND	ND	ND	ND	ND
pH	S		ND	ND	ND	ND	ND
	B		ND	ND	ND	ND	ND
DEPTH (ft)			4.0	4.0	4.0	8.0	4.0
SUBSTRATE	% GRAVEL		*	*	*	*	*
	% SAND		*	*	*	*	*
	% MUD		*	*	*	*	*
ESTIMATED HARD CLAM DENSITY (#/ft²)			0.27	0.0	0.01	0.11	0.29
% COMMERCIAL SIZES	SL		3.1	0.0	0.0	0.0	0.0
	LN		15.6	0.0	0.0	4.7	3.7
	CS		45.8	0.0	100.0	47.7	31.5
	CH		35.5	0.0	0.0	47.6	64.8
NUMBER CLAMS COLLECTED			96	0	1	21	54
SIZE RANGE (mm)			31-111	-	-	53-94	44-106
$\bar{X}$ SIZE (mm)			70.7	-	71.0	74.6	79.7
% MORTALITY			8.6	100.0	0.0	22.2	16.9

* - Analysis pending

ND-No Data

TABLE 1
SHELLFISH INVENTORY SUMMARY

TATION NUMBER			LE87-180	LE87-181	LE87-182	LE87-183	LE87-184
ATITUDE N			39°33.25'	39°33.75'	39°33.50'	39°33.75'	39°33.75'
ONGITUDE W			74°19.23'	74°19.23'	74°19.55'	74°19.87'	74°14.95'
OLLECTION DATE			9/22/87	9/23/87	9/23/87	9/23/87	9/23/87
IDE AND HOURS			High + 2.0	Low + 4.0	Low + 4.5	Low + 5.0	High + 0.5
EMPERATURE	AIR		24.0	14.0	14.0	18.0	18.0
°C	WATER	S	ND	17.4	ND	ND	ND
		B	ND	17.3	ND	ND	ND
D.O.	S		ND	-	ND	ND	ND
(ppm)	B		ND	6.8	ND	ND	ND
ALINITY	S		ND	-	ND	ND	ND
(ppt)	B		ND	28.0	ND	ND	ND
pH	S		ND	-	ND	ND	ND
	B		ND	8.2	ND	ND	ND
EPTH (ft)			4.0	4.0	4.0	6.0	4.0
UBSTRATE	% GRAVEL		*	*	*	*	*
	% SAND		*	*	*	*	*
	% MUD		*	*	*	*	*
STIMATED HARD CLAM ENSITY (#/ft²)			0.22	0.01	0.34	0.79	0.30
%	SL		0.0	0.0	4.5	4.5	7.1
OMMERCIAL	LN		4.5	0.0	3.0	8.3	14.3
SIZES	CS		15.9	0.0	9.0	51.5	35.8
	CH		79.6	100.0	83.5	35.7	42.8
UMBER CLAMS COLLECTED			44	2	67	157	28
IZE RANGE (mm)			50-111	91-95	33-105	22-96	33-106
SIZE (mm)			84.1	93.0	67.0	64.3	68.5
MORTALITY			15.4	0.0	9.4	16.5	3.4

- Analysis pending

ND-No Data

TABLE 1
SHELLFISH INVENTORY SUMMARY

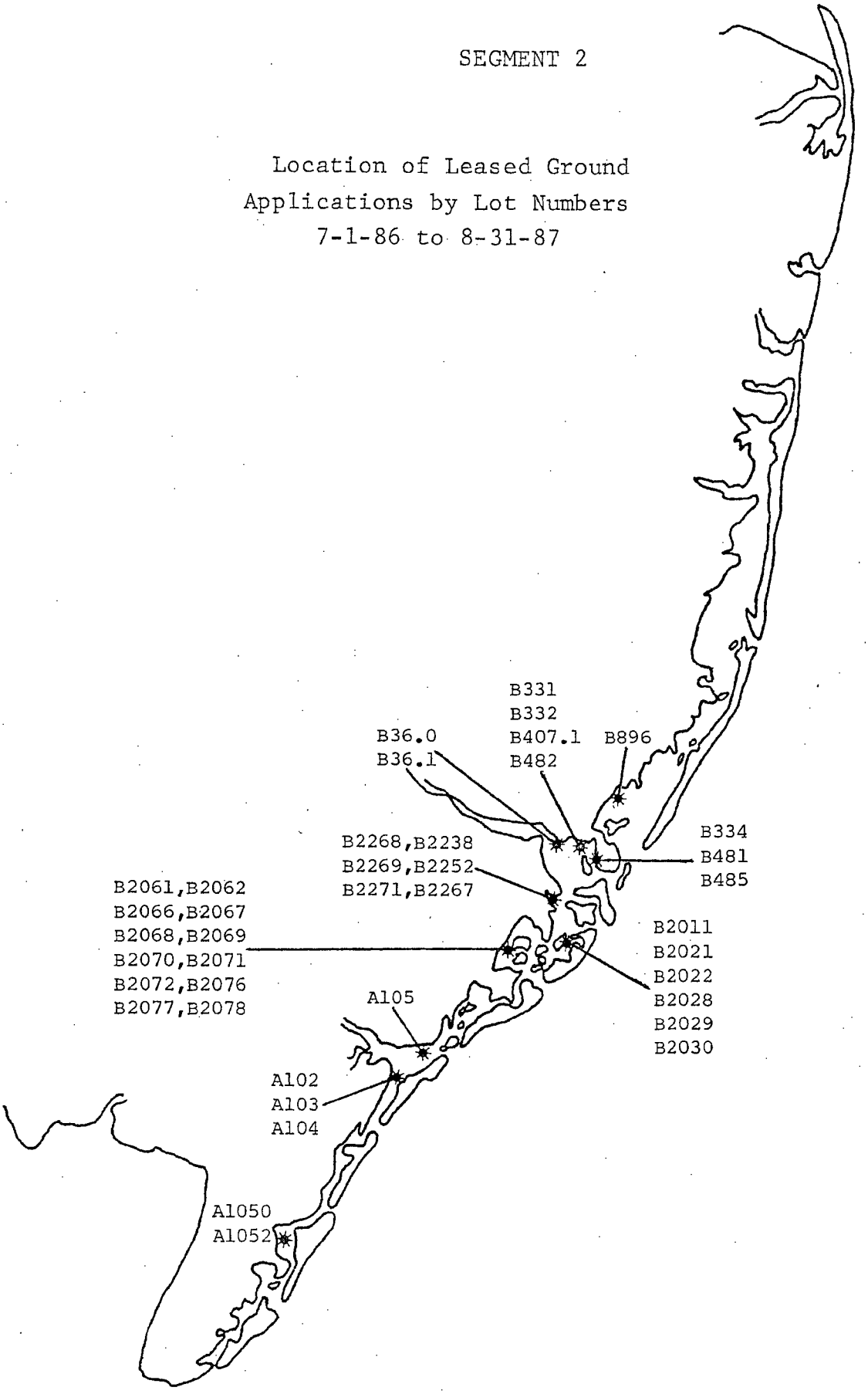
STATION NUMBER			LE87-185	LE87-186	LE87-187	LE87-188
LATITUDE N			39°33.55'	39°33.35'	39°33.50'	39°33.80'
LONGITUDE W			74°14.85'	74°15.30'	74°18.90'	74°18.60'
COLLECTION DATE			9/23/87	9/23/87	10/9/87	10/9/87
TIDE AND HOURS			High + 1.0	High + 1.5	Low + 5.0	High + 0.0
TEMPERATURE °C	AIR		23.0	24.0	12.0	15.5
	WATER	S	ND	18.5	12.4	ND
		B	ND	18.5	12.6	ND
D.O. (ppm)	S		ND	-	-	ND
	B		ND	7.7	8.1	ND
SALINITY (ppt)	S		ND	-	-	ND
	B		ND	30.0	28.0	ND
pH	S		ND	-	-	ND
	B		ND	8.4	8.2	ND
DEPTH (ft)			4.0	5.0	3.0	4.0
SUBSTRATE	% GRAVEL		*	*	*	*
	% SAND		*	*	*	*
	% MUD		*	*	*	*
ESTIMATED HARD CLAM DENSITY (#/ft²)			0.15	0.01	0.01	0.03
% COMMERCIAL SIZES	SL		0.0	0.0	0.0	0.0
	LN		26.7	0.0	0.0	0.0
	CS		46.6	0.0	0.0	20.0
	CH		26.7	100.0	100.0	80.0
NUMBER CLAMS COLLECTED			15	1	1	5
SIZE RANGE (mm)			38-96	-	-	69-96
$\bar{X}$ SIZE (mm)			66.8	101.0	103.0	85.0
% MORTALITY			6.3	0.0	0.0	37.5

* Analysis pending

ATTACHMENT B

SEGMENT 2

Location of Leased Ground
Applications by Lot Numbers
7-1-86 to 8-31-87



KEY TO LEASED GROUND SUMMARY CHARTS

SUBSTRATE	COMMERCIAL SIZES	LOT CLASSIFICATION
1. Mud	SL-Sublegal	P-Productive
2. Muddy-Sand	LN-Littlenecks	PP-Potentially Productive
3. Sandy-Mud	CS-Cherrystones	NP-Non-Productive
4. Sand	CH-Chowders	
5. Gravel		MORTALITY
6. Shell		R-Recent
7. Peat		T-Total (Annual)
8. Clay		

ASSOCIATED MOLLUSKS

1. Anadara ovalis
2. Anomia simplex
3. Arctica islandica
4. Argopecten irradians
5. Astarte castanea
6. Busycon canaliculatum
7. Busycon carica
8. Crassostrea virginica
9. Crepidula fornicata
10. Crepidula plana
11. Diastoma alternatum
12. Ensis directus
13. Epitonium sp.
14. Eupleura caudata
15. Gemma gemma
16. Geukensia demissa
17. Ilyanassa obsoleta
18. Laevicardium mortoni
19. Lucinoma filosa
20. Lunatia heros
21. Lyonsia hyalina
22. Macoma balthic
23. Macoma tenta
24. Mercenaria campechiensis
25. Mercenaria mercenaria
26. Mercenaria mercenaria notata
27. Mulinia lateralis
28. Mya arenaria
29. Mytilus edulis
30. Nassarius vibex
31. Petricola pholadiformis
32. Pitar morrhuanus
33. Placopecten magellanicus
34. Polinices duplicatus
35. Prunum roscidum
36. Retusa sp.
37. Solemya velum
38. Spisula solidissima
39. Tagelus plebeius
40. Tellina sp.
41. Teredo navalis
42. Urosalpinx cinerea
43. Anadara transversa
44. Barnea truncata
45. Cyrtopleura costrata
46. Nucula proxima
47. Nuculana acuta
48. Yoldia sapotilla
49. Yoldia limatula
50. Yoldia throcialformis
51. Aligena elevata
52. Anachis avara
53. Haminoea solitaria
54. Crepidula convexa
55. Lyonsia arenosa
56. Turbonilla interrupta
57. Nassarius trivittatus

LEASED GROUND APPLICATION SUMMARY - HARD CLAMS

MAP NUMBER			8	8	8	8	5	6
LOT NUMBER			A105	A103	A102	A104	B888.1	B407.
DATE			8/25/86	8/25/86	8/25/86	9/10/86	11/12/86	12/15/
TIDE AND HOURS			Low + 4.5 hrs.	Low + 5 hrs.	Low + 5 hrs.	Low + 0 hrs.	High +3 hrs.	High +0.5
TEMPERATURE °C	AIR		26.0	24.0	24.0	-	15.0	-
	WATER	S	-	-	-	-	9.8	-
		B	22.0	22.0	22.0	-	9.8	-
pH	S		-	-	-	-	8.1	-
	B		8.2	8.2	8.2	8.2	8.1	8.1
D.O. (ppm)	S		-	-	-	-	9.5	-
	B		5.9	6.8	6.8	6.7	9.3	9.2
SALINITY (ppt)	S		-	-	-	-	26.0	-
	B		29.0	29.0	29.0	30.0	27.0	30.1
DEPTH (m)			2.0	1.3	1.3	2.0	2.0	2.3
TURBIDITY (Secchi m)			1.0	1.0	1.0	1.3	-	-
SUBSTRATE			1,3	3	2	1,6	1	1,7
% COMMERCIAL SIZES	SL		1.2	0.0	0.0	0.0	0.0	5.6
	LN		4.7	0.0	7.1	0.0	0.0	5.6
	CS		21.2	18.2	28.6	42.9	44.0	22.2
	CH		72.9	81.8	64.3	57.1	56.0	66.6
NUMBER CLAMS COLLECTED			85	22	15	15	26	19
SIZE RANGE (mm)			36-107	58-105	54-100	64-95	58-98	37-90
$\bar{X}$ SIZE (mm)			80.8	84.4	78.7	81.4	77.7	75.1
ESTIMATED CLAM DENSITY (#/m^2)			2.4	0.57	0.47	0.17	0.93	0.68
NUMBER YEAR CLASSES			9	6	6	4	5	5
JUVENILE PRESENCE (#/m^2)			3.6	0.0	0.0	0.0	0.0	0.0
% MORTALITY	R		-	-	-	-	-	-
	T		3.4	0.0	0.0	0.0	18.8	21.7
ASSOCIATED MOLLUSKS			1,2,8,9,29 40	1,36,37,40 54	1,37,40	1,37,40,53	1,6,7,27	1,15,27,3
LOT CLASSIFICATION			P	PP	PP	PP	P	PP

LEASED GROUND APPLICATION SUMMARY - HARD CLAMS

MAP NUMBER			6	6	7	7	7	6
LOT NUMBER			B2238, B2252 B2267, B2268	* B2269 B2271	*B2062, B2066 B2067, B2068	*B2071, B2072 B2076, B2077	*B2069,B2070 B2078,B2061	B36 * B36.1
DATE			4/29/87	4/29/87	5/1/87-7/9/87	5/1/87-7/9/87	5/1/87-7/9/87	5/6/87
TIDE AND HOURS			Low+5.5 hrs.	Low+5.5 hrs.	High+0 hrs.	High+0 hrs.	High+0 hrs.	Low+0 hr
TEMPERATURE °C	AIR		-	-	-	-	-	-
	WATER	S	-	-	-	-	-	-
		B	-	-	-	-	-	-
pH	S		8.0	8.0	-	-	-	7.9
	B		-	-	8.1	8.1	8.1	7.9
D.O. (ppm)	S		10.9	10.9	-	-	-	11.1
	B		-	-	7.8	7.8	7.8	10.3
SALINITY (ppt)	S		19.0	19.0	-	-	-	14.0
	B		-	-	27.0	27.0	27.0	15.0
DEPTH (m)			1.3	1.3	1.6	1.6	1.6	1.6
TURBIDITY (Secchi m)			1.0	1.0	-	-	-	1.3
SUBSTRATE			1	1	1,3,6	1,3,6	1,3,6	1,7
% COMMERCIAL SIZES	SL		0.0	0.0	0.7	0.7	0.7	0.0
	LN		0.0	0.0	5.5	5.5	5.5	6.5
	CS		46.3	46.3	19.6	19.6	19.6	69.6
	CH		53.7	53.7	74.2	74.2	74.2	23.9
NUMBER CLAMS COLLECTED			40	40	271	271	271	168
SIZE RANGE (mm)			58-103	58-103	31-110	31-110	31-110	40-94
$\overline{X}$ SIZE (mm)			78.4	78.4	79.8	79.8	79.8	70.8
ESTIMATED CLAM DENSITY (#/m^2)			0.43	0.43	2.0	2.0	2.0	5.1
NUMBER YEAR CLASSES			5	5	9	9	9	5
JUVENILE PRESENCE (#/m^2)			2.69	2.69	2.0	2.0	2.0	0.0
% MORTALITY	R		-	-	-	-	-	-
	T		6.8	6.8	4.0	4.0	4.0	2.3
ASSOCIATED MOLLUSKS			1,15,32,40	1,15,32,40	1,15,29,32, 37,40	1,15,29,32 37,40	1,15,29,32 37,40	29,39
LOT CLASSIFICATION			NP	NP	PP	PP	PP	PP

* Composite sample of adjacent lots.

LEASED GROUND APPLICATION SUMMARY - HARD CLAMS

MAP NUMBER			6	6	6	6	6	6
LOT NUMBER			B485	B481	B482	B334	B331	B332
DATE			5/28/87	5/28/87	5/28/87	5/28/87	6/17/87	6/17/8
TIDE AND HOURS			High + 1 hr.	High+0.5hrs	High +3.5hrs.	High + 2 hrs.	Low + 3 hrs.	Low+3.5h
TEMPERATURE °C	AIR		-	-	-	-	-	-
	WATER	S	-	-	-	14.5	20.0	20.0
		B	-	-	16.5	-	20.0	20.0
pH	S		7.8	8.2	-	7.8	8.0	8.0
	B		-	-	7.8	-	8.1	8.1
D.O. (ppm)	S		10.3	10.3	-	7.7	7.6	7.6
	B		-	-	8.1	-	7.3	7.3
SALINITY (ppt)	S		26.0	26.0	-	24.0	28.0	28.0
	B		-	-	26.0	-	28.0	28.0
DEPTH (m)			0.6	1.0	1.3	1.3	2.0	2.0
TURBIDITY (Secchi m)			0.6	1.0	1.0	1.0	1.0	1.0
SUBSTRATE			1	3	1,7	1,3,6	1	1
% COMMERCIAL SIZES	SL		0.0	0.0	0.0	0.0	0.0	0.0
	LN		40.0	38.5	0.0	26.8	2.4	6.9
	CS		60.0	61.5	100.0	37.5	32.0	19.8
	CH		0.0	0.0	0.0	35.7	65.6	73.3
NUMBER CLAMS COLLECTED			10	13	2	56	122	101
SIZE RANGE (mm)			47-69	46-65	57-71	45-95	49-101	47-101
$\bar{X}$ SIZE (mm)			56.0	57.1	64.0	67.8	80.0	80.4
ESTIMATED CLAM DENSITY (#/m^2)			0.43	0.43	-	1.5	1.2	0.97
NUMBER YEAR CLASSES			3	3	2	6	6	6
JUVENILE PRESENCE (#/m^2)			3.6	0.0	0.0	0.0	0.0	0.0
% MORTALITY	R		-	-	-	-	-	-
	T		0.0	7.0	0.0	0.0	2.4	5.6
ASSOCIATED MOLLUSKS			15,40	15,29,31, 40	15	1,40	1,27,29,40	1,27,29,37 40
LOT CLASSIFICATION			PP	PP	NP	P	PP	PP

LEASED GROUND APPLICATION SUMMARY - HARD CLAMS

MAP NUMBER			9	9	7	7	7	7
LOT NUMBER			A1052	A1050	B2011	B2028	B2029	B2021
DATE			6/26/87	6/26/87	7/1/87	7/1,7/10/87	7/1,7/10/87	7/1,7/10/
TIDE AND HOURS			High + 2hrs.	High+0.5hrs.	High + 0 hrs.	High + 2hrs.	High + 2hrs.	High +2hr
TEMPERATURE	AIR		-	-	-	-	-	-
°C	WATER	S	21.3	21.3	22.5	-	-	-
		B	21.3	21.3	22.5	22.5	22.5	22.5
pH	S		8.2	-	-	-	-	-
	B		-	8.2	8.1	8.1	8.1	8.1
D.O.	S		8.1	-	-	-	-	-
(ppm)	B		-	8.1	7.5	7.5	7.5	7.5
SALINITY	S		31.0	-	-	-	-	-
(ppt)	B		-	31.0	31.0	31.0	31.0	31.0
DEPTH (m)			1.6	1.6	1.6	1.3	1.3	1.3
TURBIDITY (Secchi m)			1.0	1.0	-	-	-	-
SUBSTRATE			1	3	1	1	1	1
%	SL		0.0	0.0	0.0	0.0	0.0	0.0
COMMERCIAL	LN		5.0	3.9	20.9	22.5	22.5	22.5
SIZES	CS		45.0	23.5	51.8	52.1	52.1	52.1
	CH		50.0	72.6	27.3	25.4	25.4	25.4
NUMBER CLAMS COLLECTED			20	51	110	71	71	71
SIZE RANGE (mm)			50-110	53-104	41-100	48-96	48-96	48-96
$\bar{X}$ SIZE (mm)			80.1	84.3	71.4	72.3	72.3	72.3
ESTIMATED CLAM DENSITY (#/m^2)			0.64	0.97	1.5	1.2	0.28	1.1
NUMBER YEAR CLASSES			8	6	6	7	7	7
JUVENILE PRESENCE (#/m^2)			0.0	0.0	7.18	3.59	5.38	0.0
%	R		-	-	-	-	-	-
MORTALITY	T		0.0	1.9	2.6	0.0	20.0	3.3
ASSOCIATED MOLLUSKS			1,15,40	1,40	1,15,17,29 36,40,53	15,36,40,53	15,36,40	1,15,17,32 36,40
LOT CLASSIFICATION			PP	PP	PP	PP	PP	PP

LEASED GROUND APPLICATION SUMMARY - HARD CLAMS

MAP NUMBER			7	7				
LOT NUMBER			B2022	B2030				
DATE			7/1,7/10/87	7/1,7/10/87				
TIDE AND HOURS			High + 2.0hrs.	High+2 hrs.				
TEMPERATURE	AIR		-	-				
°C	WATER	S	-	-				
		B	22.5	22.5				
pH	S		-	-				
	B		8.1	8.1				
D.O.	S		-	-				
(ppm)	B		7.5	7.5				
SALINITY	S		-	-				
(ppt)	B		31.0	31.0				
DEPTH (m)			1.3	1.3				
TURBIDITY (Secchi m)				-				
SUBSTRATE			1	1				
%	SL		0.0	0.0				
COMMERCIAL	LN		22.5	22.5				
SIZES	CS		52.1	52.1				
	CH		25.4	25.4				
NUMBER CLAMS COLLECTED			71	71				
SIZE RANGE (mm)			48-96	48-96				
$\bar{X}$ SIZE (mm)			72.3	72.3				
ESTIMATED CLAM DENSITY ($\#/m^2$)			1.1	0.22				
NUMBER YEAR CLASSES			7	7				
JUVENILE PRESENCE ($\#/m^2$)			0.0	0.0				
%	R		-	-				
MORTALITY	T		0.0	0.0				
ASSOCIATED MOLLUSKS			15,17,40	15,17,36,40				
LOT CLASSIFICATION			PP	PP				

ATTACHMENT C

TABLE 1: 1986 HARD CLAM RELAY
REPORTED HARVEST AND EFFORT

AREA	# CLAMS	# MANDAYS	CATCH PER EFFORT (CLAMS/MAN/DAY)	% OF TOTAL RELAY HARVEST
1A	26,159	18.0	1453	0.50
1B	2,350	1.5	1567	0.04
1C	900	0.5	1800	0.02
Total	84,286	62.66	1345	1.63
2A	8,900	7.5	1187	0.17
2B	32,050	18.0	1781	0.62
2C	2,400	1.0	2400	0.05
Total	148,843	107.83	1380	2.87
3A	173,133	122.5	1413	3.34
3B	270,362	195.33	1384	5.22
3C	11,797	7.5	1573	0.23
Total	1,147,982	925.51	1240	22.15
4A	422,774	307.00	1377	8.16
4B	210,355	153.83	1367	4.06
4C	77,727	58.00	1340	1.50
4D	0	0	0	0.0
Total	1,224,629	963.5	1271	23.63
5A	90,176	78.34	1151	1.74
5B	67,579	52.5	1287	1.30
5C	22,600	19.0	1189	0.44
Total	636,200	474.49	1341	12.28
6A	19,179	18.0	1066	0.37
6B	1,238	1.0	1238	0.02
Total	128,364	86.15	1490	2.48
7A	0	0	0	0.0
7B	0	0	0	0.0
7C	0	0	0	0.0
Total	3,850	4.0	963	0.07
8A	15,599	15.50	1006	0.30
8B	19,905	9.00	2212	0.38
8C	17,500	11.00	1591	0.34
Total	423,950	294.66	1439	8.18
Total Area 9	0	0	0	0
10A	12,650	9.0	1406	0.24
10B	103,456	80.34	1288	2.00
10C	7,500	5.0	1500	0.14
10D	24,266	17.83	1361	0.47
10E	74,283	57.5	1292	1.43
Total	574,051	392.36	1463	11.08
11A	3,500	2.0	1750	0.07
11B	17,306	10.50	1648	0.33
11C	1,800	1.0	1800	0.03
11D	2,534	3.50	724	0.05
11E	25,644	13.50	1900	0.49
Total	56,693	34.84	1627	1.09

*Totals include figures where specific section (A,B,C) was not reported.

TABLE 1 (cont.)

AREA	# CLAMS	# MANDAYS	CATCH PER EFFORT (CLAMS/MAN/DAY)	% OF TOTAL RELAY HARVEST
W	11,397	11.0	1036	0.22
X	299,852	260.0	1153	5.79
Y	9,697	11.0	882	0.19
Total Manasquan River	320,946	282.0	1138	6.19
Z (Shark River)	153,050	159.0	963	2.95
Tuckerton Creek (TCK)	17,555	11.5	1527	0.34
Tuckerton Cove (TCV)	151,664	79.5	1908	2.93
Tuckerton Total	169,219	91.0	1860	3.27
Not Reported	110,497	87.0	1270	2.13

1986 RELAY: REPORTED HARVEST AND EFFORT BY ESTUARY

Raritan Bay	54,159	31.34	1728	1.04
Sandy Hook Bay	809,714	566.35	1430	15.62
Navesink River	1,989,193	1524.14	1305	38.4
Shrewsbury River	1,575,782	1224.17	1287	30.40
Manasquan River	320,946	282.0	1138	6.19
Shark River	153,050	159.0	963	2.95
Tuckerton Creek	17,555	11.5	1527	0.34
Tuckerton Cove	151,664	79.5	1908	2.93
Not Reported	110,497	87.0	1270	2.13
Totals	5,182,560	3965	1307	100

PLANTING SITE	# CLAMS	% OF RELAY TOTAL
Swan Point	4,253,815	82.1
Tuckerton	928,745	17.9

*Totals include figures where specific section (A,B,C) was not reported.

TABLE 2: 1987 HARD CLAM RELAY
REPORTED HARVEST AND EFFORT (January 1 - August 31)

AREA	# CLAMS	# MANDAYS	CATCH PER EFFORT (CLAMS/MAN/DAY)	% OF TOTAL RELAY HARVEST
1A	5,900	5.33	1,107	0.19
1B	1,000	1.00	1,000	0.03
1C	0	0	0	0.00
Total	15,676	13.51	1,160	0.51
2A	5,633	4.33	1,301	0.18
2B	25,896	14.17	1,828	0.83
2C	28,800	26.01	1,107	0.89
Total	88,581	64.51	1,373	2.85
3A	120,817	101.51	1,190	3.89
3B	184,251	148.98	1,237	5.93
3C	43,297	35.65	1,215	1.39
Total	879,083	691.27	1,272	28.27
4A	194,014	181.66	1,068	6.24
4B	286,214	227.85	1,256	9.21
4C	125,474	88.01	1,426	4.04
4D	67,167	74.83	898	2.16
Total	1,003,700	876.50	1,145	32.28
5A	37,894	37.84	1,001	1.22
5B	535	.66	811	0.02
5C	2,529	4.33	584	0.08
Total	69,920	79.03	885	2.25
6A	1,100	1.00	1,100	0.04
6B	0	0	0	0.00
Total	1,100	1.00	1,100	0.04
7A	16,324	14.50	1,126	0.53
7B	0	0	0	0.00
7C	0	0	0	0.00
Total	24,374	22.00	1,108	0.78
8A	65,993	42.83	1,527	2.12
8B	5,750	5.50	1,045	0.18
8C	142,229	116.33	1,223	4.57
Total	243,747	184.16	1,324	7.84
Total Area 9	0	0	0	0.00
10A	3,700	3.50	1,057	0.12
10B	36,513	28.00	1,304	1.17
10C	21,600	16.00	1,350	0.69
10D	106,050	82.67	1,283	3.41
10E	10,600	5.83	1,818	0.34
10F	241,185	106.18	2,271	7.76
Total	466,784	278.19	1,678	15.01
11A	0	0	0	0.00
11B	0	0	0	0.00
11C	4,200	3.00	1,400	0.14
11D	0	0	0	0.00
11E	14,500	8.83	1,642	0.47
Total	18,700	11.83	1,581	0.60

* Totals include figures where specific section (A,B,C) was not reported.

TABLE 2 (cont.)

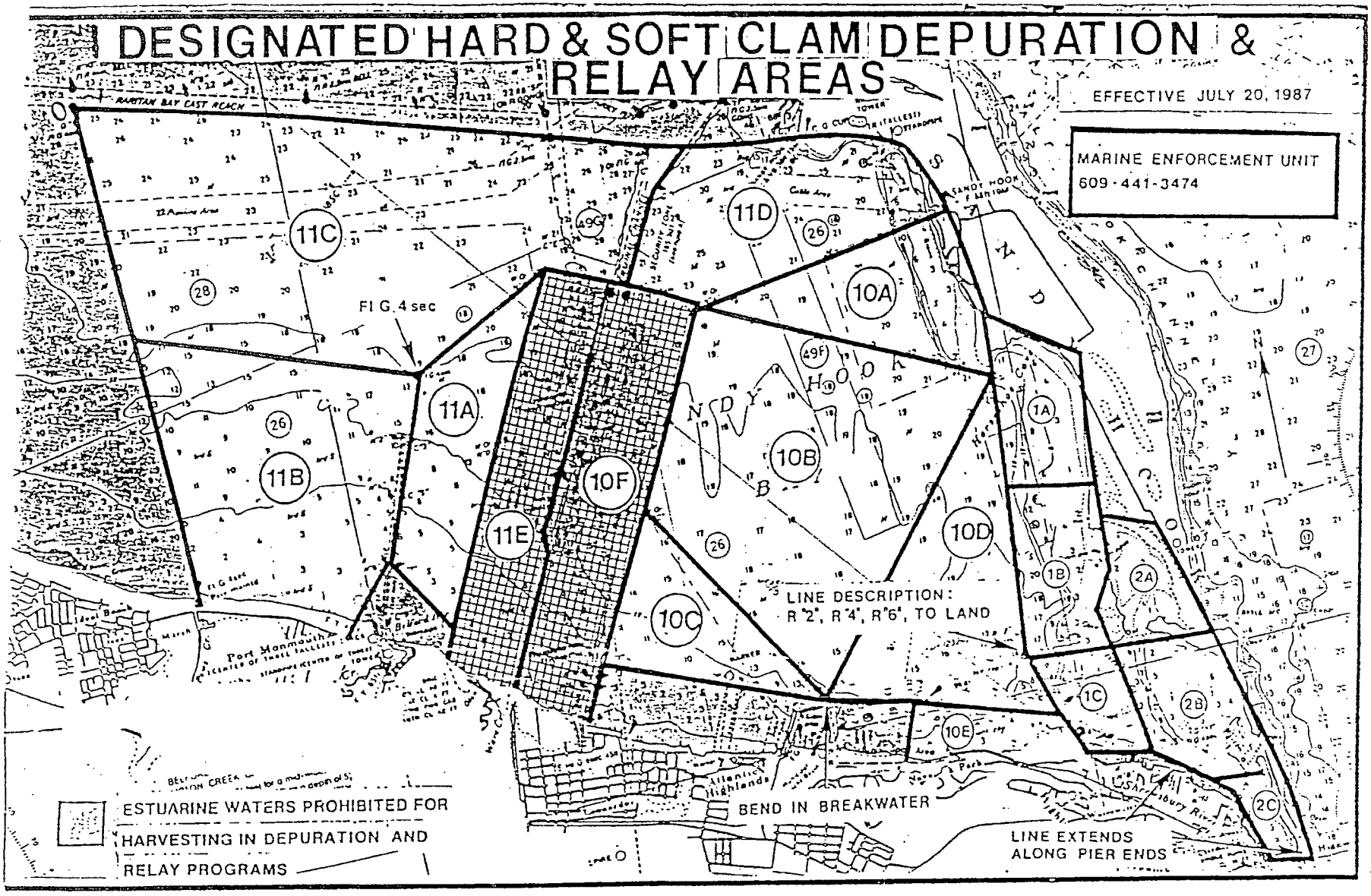
AREA	# CLAMS	# MANDAYS	CATCH PER EFFORT (CLAMS/MAN/DAY)	% OF TOTAL RELAY HARVEST
W	35,750	38.50	929	1.15
X	109,259	145.00	736	3.51
Y	30,531	34.50	885	0.98
Total Manasquan River	175,540	218.00	805	5.65
Z (Shark River)	0	0	0	0.00
Tuckerton Creek (TCK)	0	0	0	0.00
Tuckerton Cove (TCV)	0	0	0	0.00
Not Reported	121,965	96.00	1,270	3.92

1987: REPORTED HARVEST AND EFFORT BY ESTUARY

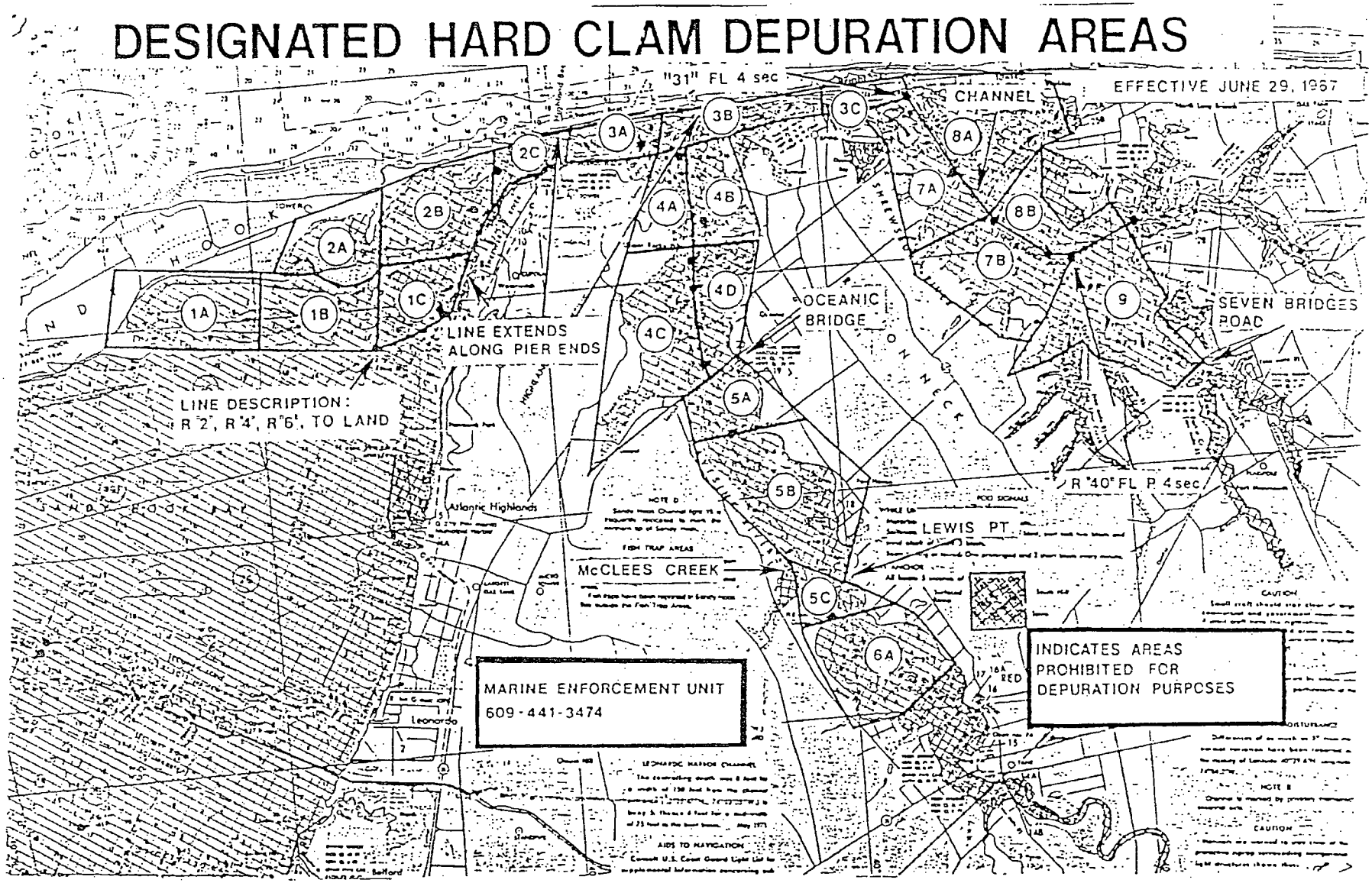
Raritan Bay	18,700	11.83	1,581	0.60
Sandy Hook Bay	571,041	356.21	1,603	18.37
Navesink River	1,074,720	956.53	1,124	34.57
Shrewsbury River	1,148,204	868.43	1,321	36.90
Manasquan River	175,540	218.00	805	5.64
Shark River	0	0	0	0.00
Not Reported	121,965	96.00	1,270	3.92
Totals	3,109,170	2507	1,226	100

PLANTING SITE	# CLAMS	% OF RELAY TOTAL
Swan Point	2,971,945	95.6
Tuckerton	137,225	4.4

* Totals include figures where specific section (A,B,C) was not reported.

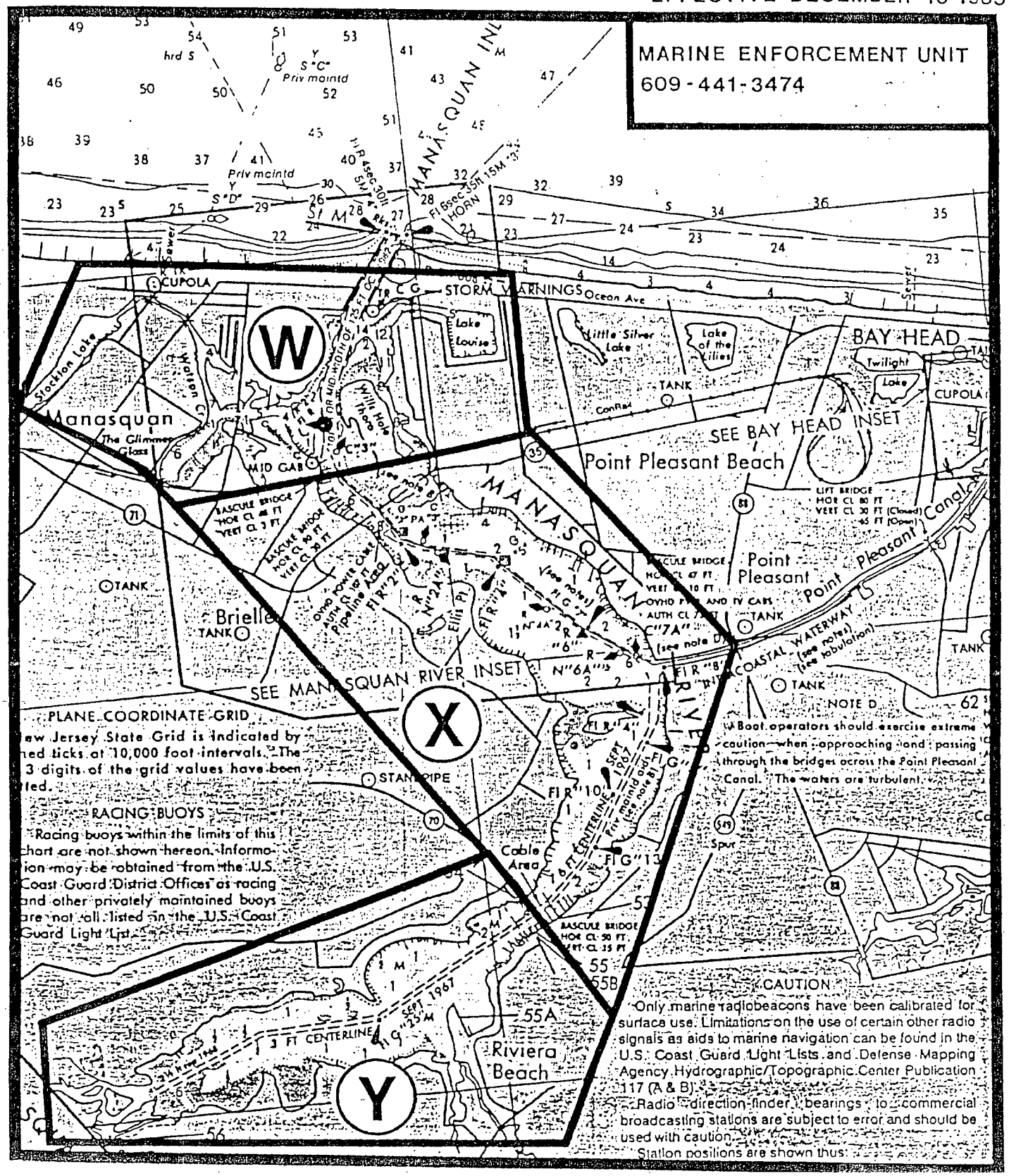

DESIGNATED HARD & SOFT CLAM DEPURATION & RELAY AREAS
EFFECTIVE JULY 20, 1987
MARINE ENFORCEMENT UNIT
609-441-3474
11C
11D
10A
11A
11B
10F
11E
10B
10D
10C
10E
1A
1B
1C
2A
2B
2C
LINE DESCRIPTION:
R "2", R "4", R "6", TO LAND
BEND IN BREAKWATER
LINE EXTENDS
ALONG PIER ENDS
ESTUARINE WATERS PROHIBITED FOR
HARVESTING IN DEPURATION AND
RELAY PROGRAMS

DESIGNATED HARD CLAM DEPURATION AREAS



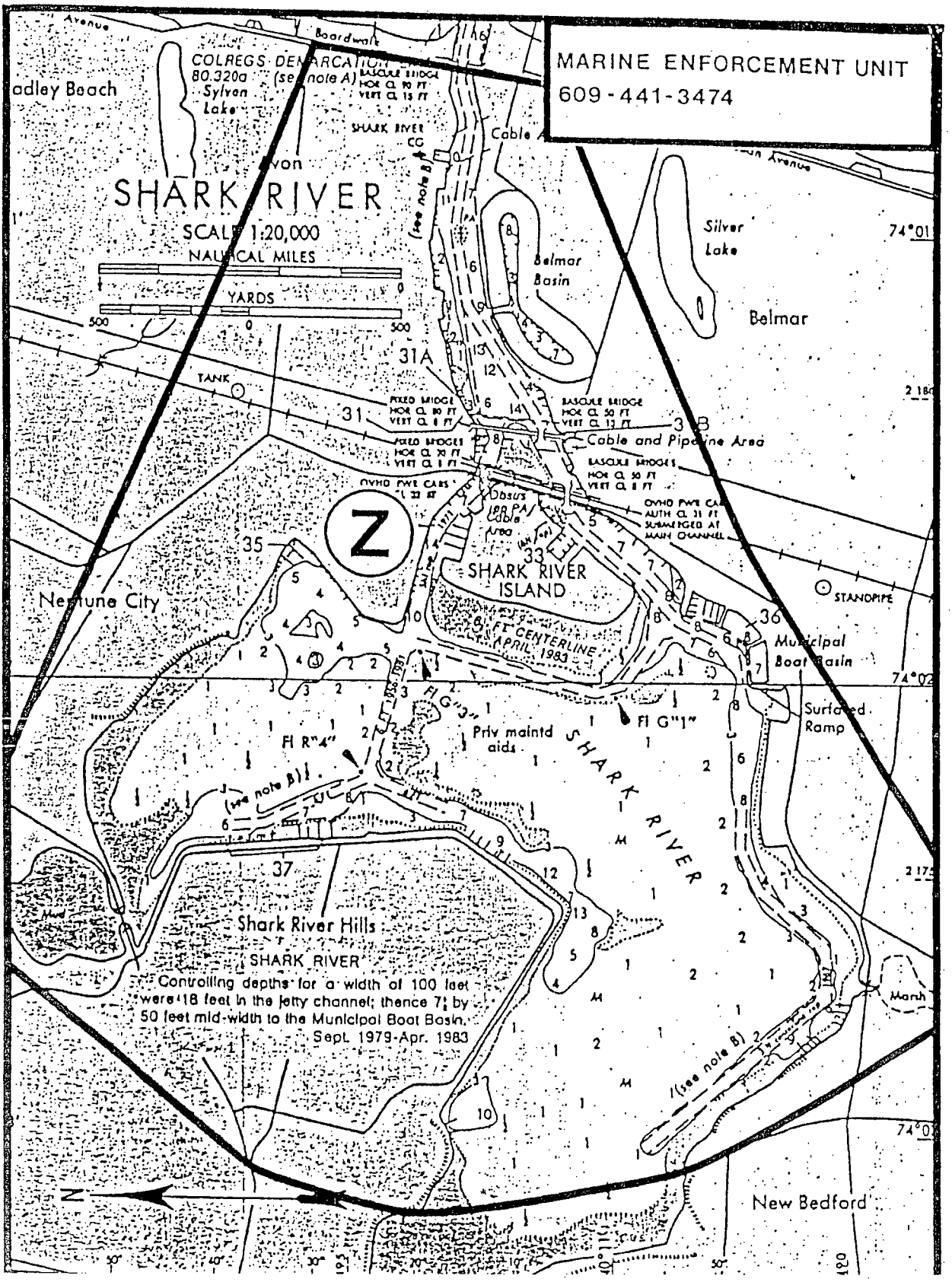
MANASQUAN RIVER HARD CLAM RELAY

EFFECTIVE DECEMBER 16 1985



1987 HARD CLAM RELAY

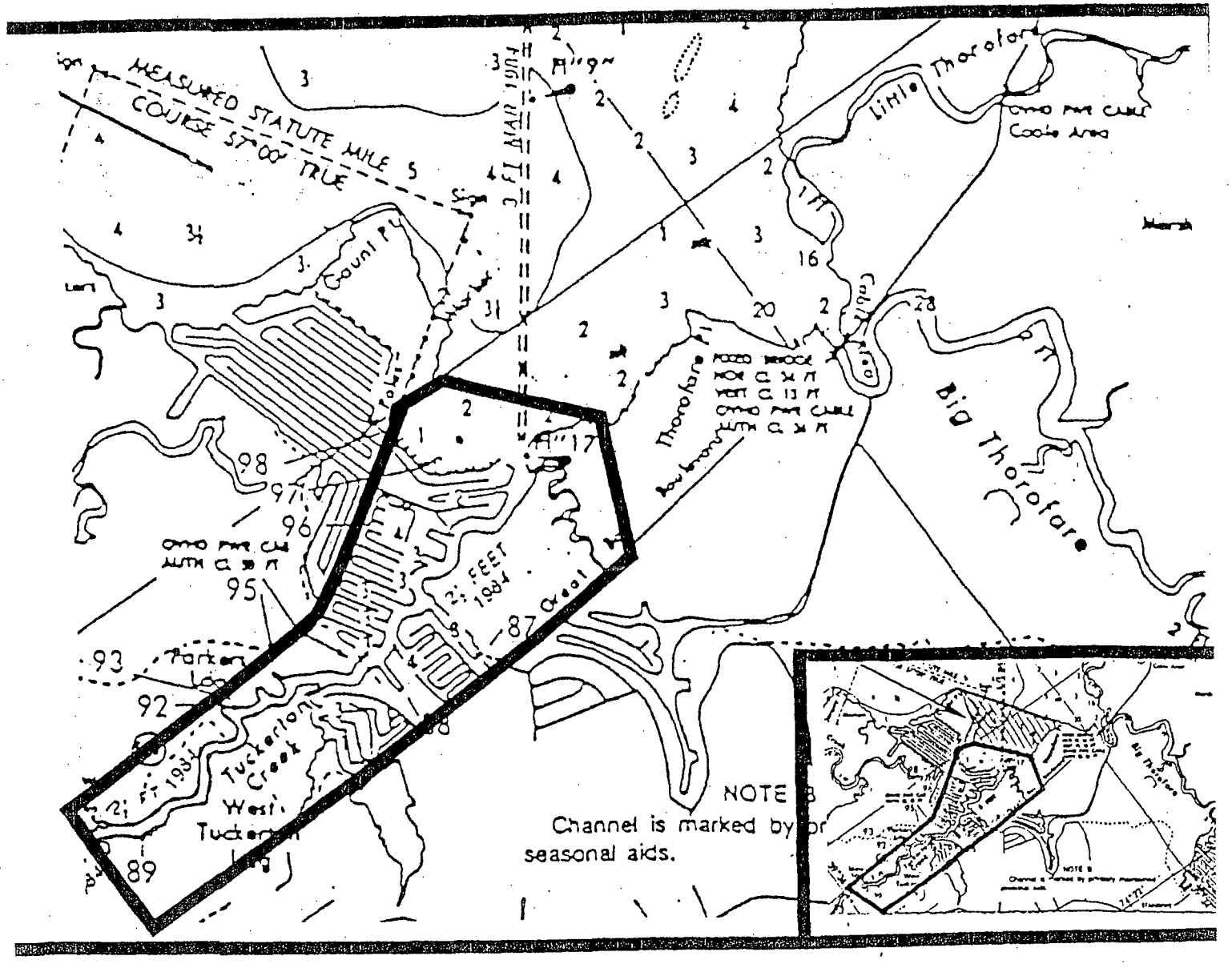
DESIGNATED SHARK RIVER SECTION



TUCKERTON
HARD CLAM RELAY

SH, GAME AND WILDLIFE
ARINE ENFORCEMENT UNIT
09-441-3474

EFFECTIVE DECEMBER 1, 1986



ATTACHMENT D

MULLICA RIVER OYSTER SEED BED DATA

1974 - 1986

EAR	MOSS POINT BED						FRENCHES POINT BED					
	BED CONDITION % OYSTER	AGE COMPOSITION OF POPULATION % SPAT	% YEARLING	% OLDER OYSTERS	# SPAT /BUSHEL*	% ANNUAL MORTALITY	BED CONDITION % OYSTER	AGE COMPOSITION OF POPULATION % SPAT	% YEARLING	% OLDER OYSTERS	# SPAT /BUSHEL*	% ANNUAL MORTALIT
974	ND	24.1	15.8	60.1	ND	ND	ND	30.6	25.8	43.6	ND	ND
975	80.9	5.2	25.6	69.2	77	6.4	79.3	3.2	28.1	68.7	53	5.6
976	85.9	0.2	3.2	96.6	2	10.4	91.8	0.3	2.1	97.6	3	5.9
977	67.7	6.0	0.9	93.1	46	24.0	78.7	12.3	3.1	84.6	132	14.4
978	65.3	1.0	4.1	94.9	5	13.7	84.7	8.8	14.7	76.5	80	6.2
979	81.1	62.5	0.8	36.7	1066	4.9	84.2	65.7	0.6	33.7	1635	5.0
980	81.0	3.0	43.9	53.1	13	5.8	91.2	1.0	42.1	56.9	31	1.1
981	56.8	59.1	14.0	26.9	1145	10.2	87.4	30.5	6.3	63.2	384	4.1
982	73.8	8.5	19.8	71.7	80	11.7	94.7	13.3	17.7	68.9	178	2.2
983	81.4	28.9	5.1	66.0	394	11.3	78.2	18.6	13.0	68.4	245	11.9
984	94.8	1.7	7.3	91.0	21	1.7	85.3	1.7	12.3	86.0	21	3.0
985	65.5	39.3	0.7	60.0	235	36.6	65.8	59.7	3.0	37.3	675	34.6
986	10.4	33.3	30.8	35.9	74	62.1	45.2	21.2	54.0	24.8	262	26.5

ND - No Data Available
*37 qt./bushel

Source: Nacote Creek Shellfish Office Records