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Fishery independent standing stock surveys of oyster populations in Virginia 1997

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Annual Report for the period October 1, 1996 - September 30, 1997
with general commentary and **Summary Report**
for the funding period October 1, 1993 - September 30, 1997

for the program entitled:

Fishery independent standing stock surveys of oyster populations in Virginia

submitted to:

The Chesapeake Bay Stock Assessment Committee:
NOAA Chesapeake Bay Office
National Marine Fisheries Service
410 Severn Avenue, Suite 107A
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by

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Introduction

The Virginia oyster resource and the need for stock assessment

Extensive description of the Virginia oyster resource and history of its utilization has been given by Haven, Hargis and Kendall (1981), and more recently reviewed by Hargis and Haven (1988). These contributions, among many others, describe a state of continuing decline. The James River, Virginia has served as the focal point for the Virginia oyster industry for over a century, being the source of the majority of seed oysters that were transplanted for grow-out to locations within the Virginia portion of the Chesapeake Bay and much further afield in the Middle Atlantic states (Haven et al, 1981). The Rappahannock River in Virginia was, for many years, a source of large and valued oysters for both the shucking and half shell trade. Other subestuaries and embayments in the Virginia portion of the Chesapeake Bay have served variously as both seed oyster (e.g. the Great Wicomico and Piankatank Rivers) and market oyster (Mobjack Bay, Tangier Sound and Pocomoke Sound) sources for the once substantial historical fishery. Until the initiation of the current project with support of the Chesapeake Bay Stock Assessment Committee of NOAA (hereafter CBSAC) there was little effort to estimate standing stocks of oysters in the Virginia subestuaries, especially the James and Rappahannock Rivers. Continuing losses of productive oyster reef over the past 35 years to Haplosporidium nelsoni, commonly known as MSX, and Perkinsus marinus, commonly known as "Dermo", in the higher salinity regions of the Bay and the subestuaries, combined with increased fishing pressure on all remaining stocks, have emphasized the need for working estimates of standing stock. This need has been further exaggerated in the James River by a change in emphasis in the past decade from the harvesting of "seed" oysters to larger "market" oysters, and the reduction in size limit of the latter from three to two-and-one-half inches maximum dimension for the 1988 through 1994 public oyster fishing seasons. The fishery continues to exploit the limited remaining broodstock from the James River in order to retain a viable fishery for "market" oysters, while simultaneously threatening the long term future of the river as the only functional seed producing location in the Virginia portion of the Chesapeake Bay.

The oyster fishery of the Eastern Shore of Virginia differs significantly from that of the Bay, being based on predominantly intertidal stocks that fringe the extensive reef systems between the barrier islands and the peninsula shoreline. While attracting less attention than the Bay fishery the Eastern Shore oyster fishery has also suffered significant decline in the past three decades with disease, harvest and environmental degradation all contributing to the demise. As with the Bay stocks, prudent long term management is required to stabilize the resource and future production.

Intensive, fishery independent estimates are rare but pivotal to examination of spawning capabilities of broodstock supporting commercial fisheries and related requirements for establishment of fishery catch quotas. This is especially the case with oyster stocks. To facilitate resource management of the Bay and Eastern Shore oyster stocks a fishery independent survey was proposed to and subsequently supported by the CBSAC in 1993. The first year of activity focused on the James and Rappahannock Rivers in the Bay and the annual report covering that material was submitted in November, 1994. That report contained commentary on both fishery independent and fishery dependent data as tools to assist oyster fishery management in Virginia. One disappointing conclusion of that report was that fishery dependent data collected prior to 1994 was of very limited value in stock assessment because of the habit of "two piling" - the simultaneous harvest of seed and market oysters - with the confounding effect that effort data were practically impossible to generate for each directed fishery product. Consequently subsequent efforts focused exclusively on fishery independent survey methods. The second year of activity began in the Fall of 1994 with further examination of the James and Rappahannock, but was expanded in the Spring of 1995 to include the resources of the Eastern Shore of Virginia. In the third year of scheduled support (1995-1996) efforts were again expanded to further include a number of subestuaries in the Virginia portion of the Chesapeake Bay. This report presents the fourth year of new data, but is restricted to the James and Piankatank Rivers, and Tangier Sound within the Bay. Finally, new data is discussed in the context of a four year presentation of fishery independent data covering the entire 1993-1997 funding period.

Fishery Independent Sampling

The objective of the study was to effect a fishery independent study of the standing stock of oysters, both market and seed, in selected (as limited by funding resources) locations in the Virginia portion of the Chesapeake Bay.

1. Methods: Subestuaries of the Virginia portion of the Chesapeake Bay

General comments on selection of sample locations and sample numbers

Spatial variability in distribution of oysters within an oyster reef system, and distribution of reefs in the intertidal and/or subtidal regions complicate fishery independent estimation of standing stock. For all locations a quantitative sampling program was employed using a stratified random grid with the documented oyster reefs or rocks forming the strata. A list of all locations sampled, the oyster reefs by name (as commonly used in historical documents and current fishery descriptions) is given in Tables 1 through 4 in the Results and Discussion section. These generally adhere to the location and names used by Baylor and subsequently resurveyed by Haven and collaborators in the late 1970's and described in Haven et al (1981). Although use of metric values is generally preferred and adhered to in the present document the acreage value is given because of common use in management discussions.

In the James River the area surveyed is described in extensive surveys made by VIMS and reported by Haven and Whitcomb (1983), and briefly in the previous annual reports of the current investigators. These areas have been subjected to regular survey by VMRC and VIMS personnel for at least two decades by dredge. The limits of the known oyster reef were mapped by the Surveying Engineering Department at VMRC and the grids for sampling set with Loran coordinates (Loran was checked daily when in the field from known markers at both the beginning and end of the day). The James River public oyster grounds (Baylor grounds) currently supporting oyster populations are illustrated in Figure 1A as an overlay of a map of bottom type (oyster rock, shell and mud, shell and sand, sand, and soft mud). The purpose of this figure is to illustrate that the reef systems as identified in the Baylor surveys are not uniform in substrate, and therefore not expected to be uniform in oyster distribution within a single reef. The reef areas sampled are illustrated in Figures 1B. Four additional reefs of minor importance and which are not the focus of regular area of fishing activity were examined in 1996-1997. They are not discussed in detail in this report. The legend of Figure 1B identifies the sampled reefs by number. These numbers are often cross referenced with reef names in this report where convenience dictates, and are the suffix in the figure numbers for Figures 2.1 through 2.19, size distribution data for reefs 1 through 19 respectively as illustrated in the Results and Discussion section. Sampling areas 1 through 11 in Figure 1B represent the limits of hard oyster rock strata selected, mapped and sampled within the larger public oyster grounds in those regions. The limits of hard oyster rock strata within sampling areas 12 through 23 were not mapped separately because of the large areas involved; consequently, we knew beforehand that sampling grids selected in areas 12 - 23 would include both oyster rock strata as well as bare sandy or muddy strata. Sampling sites were picked by random numbers within the grids and oysters were sampled with a hydraulically operated patent tong. In this manner a total of 825 stations on 19 reefs were occupied in the James River in 1993-1994, 786 stations on 23 reefs in 1994-1995, 815 stations on 23 reefs in 1995-1996, and 822 stations on 23 reefs in 1996-1997.

The sampling protocol for the Piankatank River and Tangier Sound was as for the James River and employed a quantitative sampling program using quadrats located in a random grid placed over a map of the known oyster resources. The 1996-1997 sampling included 78 stations on 10 reefs in the Piankatank River, and 69 stations on 8 reefs in Tangier Sound. Stratified sampling for all locations was based on surveys by Haven et al (1981) as later archived at both VIMS and VMRC in digital format using ARCINFO software, and random grid applications as for James and Rappahannock surveys as described earlier.

Sampling gear

Both tongs and dredges are commonly used to examine oyster populations; however, only the former are good quantitative tools (see Chai et al, 1992). In 1993-1994 we examined a standard patent tong of known area; however, tests proved this to be an unpredictable sampling tool in that penetration into the hard bottom on the reef surface was inconsistent resulting in high variability in replicate samples on the same site. We replaced the tong with an hydraulically operated tong which separates the closing actions of the tong from the retrieval action. This has proven to be vastly superior in providing consistent penetration of the bottom and replication sampling and was retained as the only sampling tool for all stations in the Bay and its tributaries in all years of the study. Tong design insured that the tong opening was consistent during operation and that an area of one square meter was sampled. None the less two sources of concern accompany the use of patent tongs for quantitative surveying. These are :(1) does the tong consistently penetrate the bottom to sufficient depth to sample the entire oyster population at the surface, and (2) is any portion of the sampled material lost by "spilling over" the top of the tong during the retrieval process in passage to the surface? Both can be addressed in the current application. All of the reefs surveyed in the current surveys using tongs are relatively thin, that is they are a superficial crust of live oysters and shell overlaying an anoxic layer of underlying substrate. In sampling the tong contents consistently included a layer of underlying anoxic material indicating penetration of the living oyster layer. The tong was equipped with a basket like upper cover which retained surface material during retrieval. The common observation of worm tubes in the surface of tong samples prior to washing for retrieval of oysters indicated the absence of consistent loss of material during retrieval. The hydraulic tong was installed on the VMRC vessel R/V Wolftrap for 1993-1994 surveys, and transferred to its successor, the R/V Baylor for surveys thereafter.

Data collection

The open dimensions of the tong were such that it sampled one square meter. Upon retrieval the sample was washed on the cull board and processed for counts of live oysters as spat (young of the year, usually <30 mm), small oysters (less than 3 inches = 76 mm), and market (greater than 3 inches) oysters. The 3 inch size limit was applied in 1994-1995, 1995-1996, and 1996-1997 surveys in agreement with the size limit enforced by VMRC regulation. Prior to that period a 2.5 inch (= 62.5 mm) size limit was employed for the Fall 1987 - Spring 1994 period, thus a 2.5 inch limit was employed in 1993-1994 surveys. In addition, the opportunity was taken to collect data on dead oysters with paired valves (boxes, indicating recent mortality). The volume of shell retrieved in each tong was also recorded as an index of the quantity of cultch material present at each station. Between six and nine people were on board on each day of sampling, and all were trained to avoid inconsistency in categorization of oysters. This process was labor intensive, with between 30 and 60 samples being processed each day depending on weather conditions, crew size and the time required to wash and separate samples.

Adequacy of sampling in design of surveys

In the initial stages of analysis of the 1993-1994 data sets questions relating to sampling design and adequacy were addressed, mostly because of a lack of previous quantitative assessment data for this resource. Although thorough discussions of these questions were a component of the 1993-1994 annual report a brief recapitulation is appropriate here for completeness. The two primary questions addressed were:

1. Are there strata reasonable? The background behind this question is that recent surveys by Haven and Whitcomb (1983, 1989) illustrate varying bottom type within the chosen strata - from mud to hard shell bottom. This could present a significant sampling problem in that strata are sufficiently heterogeneous to be of limited ecological and statistical value.

2. Assuming 1 (above) is not a problem, are there sufficient samples to adequately represent the strata and allow estimates of abundance per unit area and, subsequently, total standing stock.

Bros and Cowell (1987) offer a good discussion of methods of estimating sample size in situations where minimum detectable difference cannot be specified a priori, as is the case in this situation. Their proposed method incorporates use of resolving power as a primary factor and sampling feasibility (an issue here with time and cost) as a secondary factor. They suggest the standard error of the mean be used as a measure of appropriate sampling effort. We have adopted their suggestion. Questions 1 and 2 above were primarily addressed by a single analysis in which data were examined collectively within each strata. A plot was generated of mean number of oysters per patent tong (one square meter) sample and standard error of the mean versus number of samples included in the calculation. This calculation was repeated ten times for data within a strata with samples being chosen at random from those available. Random sampling eliminated any bias that resulted from sequential data entry in accordance with sampling in the field sampling (the latter may have resulted, inadvertently in temporally focused sampling on a particular substrate type). In a regime where variability with bottom type was high and the sample size was low then the mean would not stabilize, and where sampling was insufficient the standard error of the mean would not demonstrate a **stable** trend of decreasing value - remembering of course that the standard error value will eventually continue to decrease with increasing number of samples included in the calculation because the standard error is inversely proportional to the square root of the number of observations of the mean. Increasing sample size will eventually solve both these problems, but the number of samples required might be very large. The same criteria were applied in sampling in all years of the study. In no instance did we encounter suggestions of inadequate sampling on major reefs. Adequacy of sampling can be more problematic on very small reefs simply because there is less "room to move" over the reef and lower numbers of samples were collected, but we are confident that collected data are good representations of the populations at hand.

Data reduction and archiving

A custom database program for field data was developed by the Fisheries Data Management Unit (FDMU) in the Department of Fisheries Science at the School of Marine Science and Virginia Institute of Marine Science. A database program in Microsoft Access was also developed by FDMU for raw count data for all information classes for all stations. This was employed for 1993-4 and 1994-5 data. In subsequent years this has been replaced by a

Filemaker database with the intent of making all data World Wide Web accessible at a future date. Size distribution data was archived and analysis effected using Microsoft Excel before eventual transfer to the Filemaker database.

2. Results and Discussion

General summary of population sizes and size distribution data

Stock assessment estimates for the James River are given in Tables 1 through 3, with Table 1 providing information on live oysters by size class and Table 2 providing information on boxes and residual shell. Given that the James River remains the only commercial public fishery of any note within the Virginia portion of the bay, Table 3 provides a comparison of spat, small and market oyster standing stock in the James River by reef for the Fall 1993 (funding year 1993-1994), Fall 1994 (funding year 1994-1995), Fall 1995 (funding year 1995-1996), and Fall 1996 (funding year 1996-1997) surveys.

As in previous years there remains a high variability in mean oyster density among the sampled reefs in the James River (Tables 1-3); however, the most notable change in stock data since the 1995 examination is the remarkable recovery in market oyster standing stock to above 1994 levels. Much of this is due to growth of small oysters into the market category in the intervening year in the sweep of reefs from Horsehead through Cross Rock. Deep Water Shoal remains essentially devoid of market oysters after freshet related losses in 1995 (see below).

The recovery in small oysters in 1996 to above 1995 levels is the result of a series of events that resulted in high spatfall in the late summer and early fall of 1995. A freshet in the month of June 1995 produced a short duration, low salinity event when water temperature was at its annual maximum with resulting mortality. Reefs in low salinity areas suffered freshet losses. These losses are particularly evident at Deep Water Shoal (reef #'s 1 and 2, see figures 2.1 and 2.2), Horsehead, V-Rock, and Point of Shoals in comparisons of Tables 1-3 and the "box" counts (paired oyster valves exhibiting some fouling, thus not a recent mortality) given on a reef by reef basis in Figures 2.1 through 2.19. Late spatfall on the new substrate from recent mortalities survived disease challenge and grew to small oysters in 1996.

1996 spat settlement was again notable from Upper Deep Water Shoal through Mulberry Point. It will be three to five years, generally nearer five years, before these animals will contribute to the public fishery if the current three inch (76 mm) minimum size limit is maintained (estimate based on continuing growth studies in situ at Horsehead). The observations of post freshet settlement in 1995 support the argument that substrate in the James is limiting. The necessity to maintain shell replenishment on the productive reefs cannot be understated.

Figures 2.1 through 2.19 illustrate size frequency distribution data for reefs 1 - 19 as mentioned earlier. These Figures serve mainly to reinforce the conclusions of the previous paragraphs. The graphics illustrate the survival of the late spat set at Deep Water Shoal (2.1 and 2.2) after the freshet related mortalities in 1995 but the general absence of larger oysters at these locations, the continuation of gradual increase in size of oysters Horsehead, Moon Rock and V Rock (2.3 through 2.7), increasing numbers of small oysters at Point of Shoals (2.8), and a small decrease at Cross Rock (2.9) and Shanty Rock (2.10). A spat fall event is notable at Dry Lumps (2.11) as the remaining small oysters from 1995 move towards the market size category. Within this list of reefs it is important to note that where shell applications were made **to the reefs** (as opposed to the previous practice of shell planting in areas distinct from the reefs) to facilitate settlement the 1995 year class remains well represented (Mid and Low Horsehead, V Rock, Point of Shoals and Cross Rock); however, the notable exception is Moon Rock where no shell enhancement was made and the 1995 year class is comparatively poor. These observations provide strong support for the practice of light applications of shell **to productive reefs** , rather than peripheral areas, on a continuing basis to maintain a clean substrate that is conducive to spat settlement. The Mulberry Point (2.12) area shows a reversal in trend of oyster abundance in comparison with the downward changes in abundance over the prior three year interval. The remaining downstream areas from Swash through Jail Island and Wreck Shoal (2.13 through 2.19) show little change since 1995 or a continuance of the moderate, generally downward changes in abundance. Some minor consideration is again required in comparison of 1993-1994 data with later data sets because of the change in size limits of markets oysters as described earlier. The 1993-1994 survey used a 2.5 inch separation for small versus market oysters, whereas the 1994-1994 survey used a three inch separation. The data dictate that we maintain a vigilant watch over the number of available market oysters to the fishery for these also serve as broodstock (noting the disproportionate value of large oysters to egg production), especially given the fact that the major losses are from natural events are beyond direct management control. Continuing implementation of market only reefs, such as Point of Shoals, where all small oysters are returned for potential future harvest as market oysters are efforts to be applauded.

Table 4 presents data for the previous and current years for surveys in the Piankatank River and Tangier Sound. Both of these regions differ considerably from the James River in their roles in the current Virginia fishery resource utilization and restoration effort.

The Piankatank is a river retained for exclusive use (with respect to the public fishery) by VMRC in association with replenishment efforts. This builds on an historic use pattern for seed oysters. Locations sampled in both years in the Piankatank are traditionally valued seed producing regions. All are small by comparison with areas in the James and data is presented on a per sq. m basis in Table 4. Spat settlement in 1996 was consistently lower by approximately an order of magnitude than 1995; however, 1995 spat had survive to contribute to a strong small oyster count at all stations except Deep Rock in 1996. For convenience, only mean values are given in Table 4, but it is notable that the 1996 small oyster mean exceeds the 1995 value plus the 1995 spat value. This is due to numerous high values in the 1996 small oyster samples giving high means but with high standard deviations (not shown). None the less the high 1996 small oyster value is encouraging for potential relay of these oysters or for retention of these stocks in the Piankatank for broodstock purposes in conjunction with the reef sanctuary project in that river. Market size oysters are limited in number in this river mostly because of transplant programs that remove oysters before they reach this size. Shell resources remain reasonable on most sampled reefs because of continual shell planting as part of replenishment activity. It is worth noting that 10 liters of shell uniformly spread over the surface of one sq. m represents a layer one centimeter thick - or about a single layer of shells.

Tangier Sound is in contract to the Piankatank River. Tangier was once a producer of large and prized market oysters, but this resource is all but gone. Recruitment to the region is poor, illustrated by comparison of spat values for both 1995 and 1996, and there is a uniform lack of both small and market oysters. Not evident from the Table 4 data is the proportion of large (often over 4 inch) oysters in the Tangier market size category. These are prized for use in broodstock sanctuary programs that are proving valuable in the Piankatank and Great Wicomico Rivers. Shell resources in Tangier are limited, reflecting limited effort to maintain the resource in recent years.

Conclusions and recommendations

The current survey represents the fourth year of fishery independent surveys in the James River, and essentially the second such surveys for the Piankatank and Tangier regions. The concordance of total standing stock for four years of survey in the James lends support to the soundness of the survey design, and the presentation of data in the form of Figures 2.1 through 2.19 allows reef by reef evaluation of the effects of shell application, harvest, freshets, disease, and management actions such as closure. Although this level of monitoring and data presentation is costly and time intensive, the value of the approach is emerging as a powerful tool in resource management and should be continued. In this respect the effects of impacts that can be controlled (harvest) versus those that cannot (disease, weather, freshets) cam be discriminated. For example, the alarming decline of market oysters in the James between the Fall 1994 and Fall 1995 surveys was not related to commercial harvest but to atypical environmental conditions which exacerbated disease associated losses, and added the insult of a major summer freshet resulting in further mortalities associated with low salinity stress at high temperature. These atypical events serve to underscore the fragility of the James River oyster resource, but also provides valued input to the resource management process. Again, for example, if the James is to be considered as the remaining vestige of native oyster in the Virginia portion of the Bay, and if there is to be serious adoption of a commitment in resource management to "No Net Loss" as recommended by the 1991 Haskell - Pruitt Blue Ribbon Panel, then there must be appreciation of fishery independent data by management agencies in separating fishery effect from other effects. Unfortunately, we cannot assume that when, **in any one year**, market harvest is less than or equal to recruitment that we have the basis for a **multi year** plan to stabilize or rebuild the resource. Losses such as those observed in the 1994-1995 period may be atypical, but without a commitment to build equity in the resource on a annual basis such unpredictable losses will result in continuing erosion of the resource to unacceptably low levels. There is clear need to consider "No Net Loss" **as a minimal acceptable standard within any one year**, but with a long term commitment to build equity in the resource in order to buffer against atypical years where natural events cause extensive mortality. Management based on assessment data, especially management by region, is prudent.

Size distribution data for the James River further illustrate losses and gains over the four years of successive survey, and also serve to indicate the value of recent initiatives to apply shell at maintenance levels to facilitate spat settlement on productive reefs, and to make certain areas of the river "market only" harvesting regions requiring the return of all spat and small oysters caught during harvest. These activities have resulted in increases in small oyster numbers on "market only" reefs as illustrated in the series of Figures in section 2. With typical river flow years such small oysters should recruit to the fishery in a three - four year time period.

The general lack of shell resource throughout the Virginia portion of the Bay remains a great concern. Replenishment activity in such areas as the James must focus on low density shell supplementation of extant reef, not to extend reefs into areas where they have not developed over recent geological time. Oyster shells, an already valuable and increasingly costly resource, will rapidly bury and require further shell application unless applied in an optimum region and at optimum thickness. The long employed methods of large scale shell planting which allowed only minimal control of the thickness of application have been subject to recent attention, and while they are not perfect, they are improved with respect to controlled shell application at lower density. Careful shell application and management can be successful in seed production as illustrated in the Piankatank River; however, the application of shell in Tangier may be imprudent in that extant oysters are so limited in this region that their use in transplant programs to reefs or sanctuaries should be seriously considered on a continuing basis.

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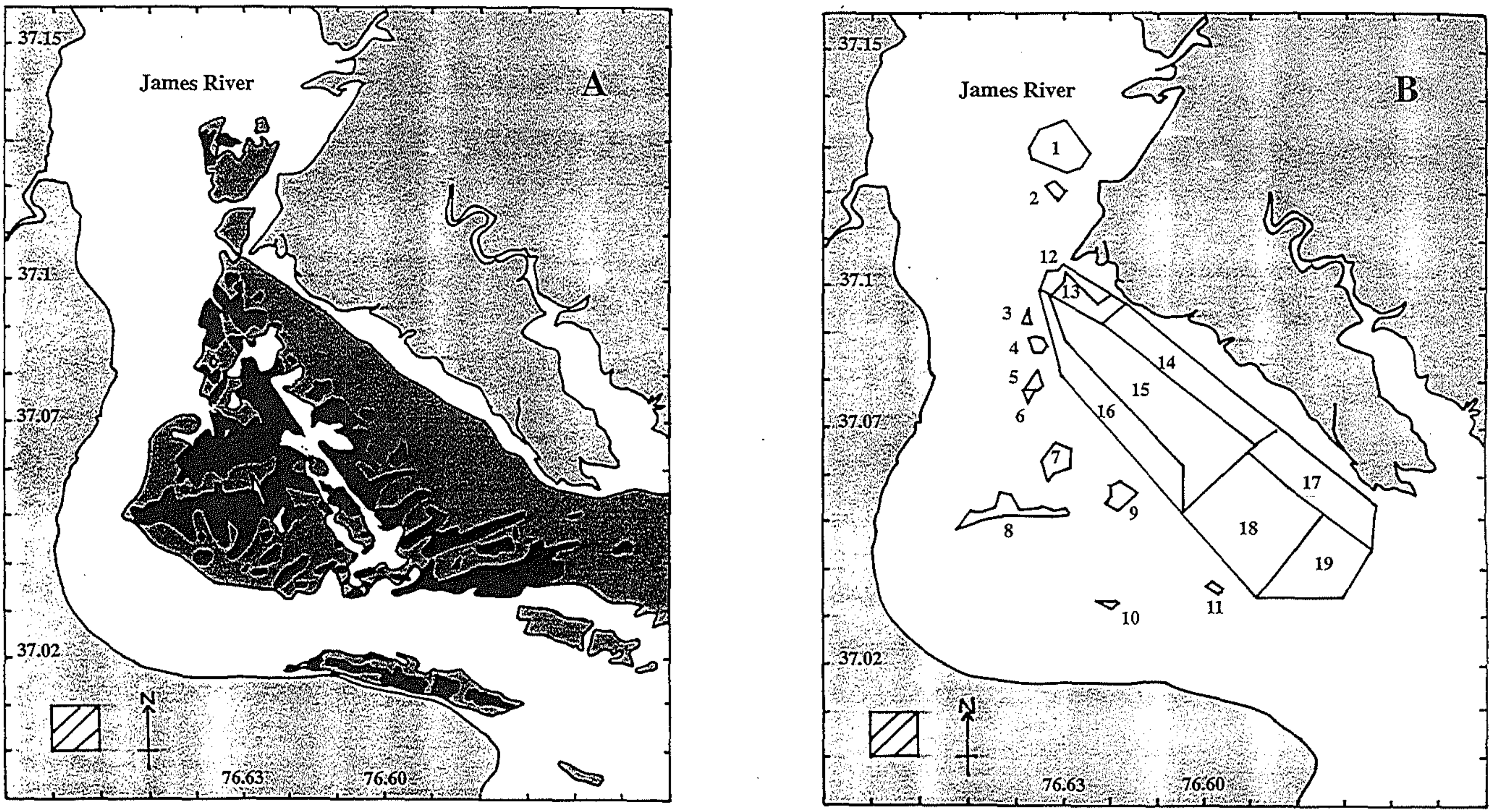
Figure legends.

Figure 1A. Shoreline and bottom type in the upper James River, Virginia, modified from Haven and Whitcomb (1983). Areas in black represent oyster reef, gray represents mixed shell-mud and shell-sand, white represent primarily soft mud. Axes are longitude and latitude in decimal degrees. Cell size = 0.1 x 0.1 degrees.

Figure 1B. Oyster reef systems in the James River, Virginia as surveyed for stock assessment during the 1993 and 1994, and used in subsequent larval dispersal modeling exercises. Note the reduced spatial distribution compared to 1983. The numerical key identifying reefs and shoals corresponds to that used throughout the current text. and is as follows: 1: Upper Deep Water Shoal, 2: Lower Deep Water Shoal, 3: Upper Horsehead, 4: Middle Horsehead, 5: Lower Horsehead, 6: Moon Rock, 7: V Rock, 8: Point of Shoals, 9: Cross Rock, 10: Shanty Rock, 11: Dry Lump, 12: Mulberry Point, 13: Swash, 14: Upper Jail Island, 15: Swash Mud, 16: Offshore Swash, 17: Lower Jail Island, 18: Offshore Jail Island, 19: Wreck Shoal.

Figures 2.1 through 2.19: Size frequency distribution data for reefs 1 - 19 as described in Figure 1B. Data is presented in 5 mm size increments with the midpoint of the size class (rounded up the nearest mm). Data is presented as both size frequency by percentage and in absolute numbers per sq. m. Reef area is presented as the basis of estimating standing stock in bushels using the size discriminator of <30 mm as spat (young of year), 30-75 mm as small oysters at 1000 per bushel, and > 75 mm as market oysters at 500 per bushel. Size frequency of boxes (articulated valve of dead animals is given on a number per sq. m basis. Summary distinction is made between "new boxes" which are devoid of fouling, and "old boxes" which have notable internal fouling.



A
James River
37.15
37.1
37.07
37.02
N
76.63
76.60
B
James River
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
37.15
37.1
37.07
37.02
N
76.63
76.60

Table 1: James River Oyster Resources by reef: 1993 -1996 Fall surveys: oysters per squaré meter by size class

REEF NAME	ACRES	Spat: <30mm length				Small: >30mm, <75mm length 1000 small / bushel estimate				Market: >75mm length 500 market / bushel estimate			
		1993	1994	1995	1996	1993	1994	1995	1996	1993	1994	1995	1996
Up D Wtr Shl	234	0.8	6.8	191.2	59.2	62.2	39.4	9.9	36.1	7.8	8.8	1.7	0.9
Low D Wtr Shl	20	0.0	2.6	16.7	1.7	12.5	13.0	1.8	2.8	3.7	7.1	0.1	1.0
Up Horsehead	3	0.0	44.0	72.9	103.7	285.6	173.9	244.3	276.6	72.2	30.4	19.2	27.0
Mid Horsehead	19	5.4	63.0	130.0	83.5	210.0	187.7	325.2	411.7	7.4	7.2	14.8	38.0
Low Horsehead	19	7.5	139.5	147.7	95.2	252.1	251.6	237.7	278.8	11.9	20.3	7.5	24.5
Moon Rock	4	11.0	232.5	139.5	46.3	230.0	268.3	220.4	225.9	39.4	23.2	15.2	21.2
V-Rock	72	1.6	29.4	85.1	71.2	167.0	139.2	185.2	267.9	15.3	10.5	9.7	19.7
Pt of Shoals	132	1.1	68.1	93.1	40.1	121.9	147.6	188.8	176.3	9.1	9.4	10.6	18.0
Cross Rock	37	0.2	93.8	49.8	27.2	75.1	55.1	145.0	114.1	6.1	5.8	4.8	14.3
Shanty Rock	4	1.1	65.1	18.8	5.8	32.4	83.8	69.2	36.9	2.2	1.5	2.5	0.6
Dry Lump	6	2.1	51.1	10.0	11.9	15.6	39.9	17.1	18.8	0.4	0.0	0.1	0.0
Mulberry Point	87	0.3	8.8	12.8	12.6	25.1	31.4	22.7	48.4	1.4	1.2	2.4	7.5
Mulberry & Swash	165	0.0	2.4	5.7	2.2	4.6	14.4	11.3	12.6	0.4	1.1	1.1	1.3
Upper Jail Is	612	0.1	8.9	1.7	3.3	9.7	12.8	6.7	5.2	1.1	2.0	0.4	1.0
Swash Mud	1245	0.3	8.5	3.0	3.2	26.1	22.6	20.3	21.4	2.3	2.0	1.9	5.4
Offshore Swash	627	3.4	17.2	0.2	9.3	31.2	27.7	36.4	44.8	0.7	1.5	3.6	3.9
Lower Jail Is	629	0.1	1.2	0.8	4.5	11.2	8.3	10.6	4.2	3.2	2.7	2.1	2.6
Offsh.Jail Island	1017	0.1	8.9	1.7	3.3	9.7	12.8	6.7	5.2	1.1	2.0	0.4	1.0
Wreck Shoal	585	0.2	9.0	1.5	2.2	9.1	8.6	6.1	2.5	0.7	0.7	0.2	0.6

TABLE 2: JAMES RIVER STANDING STOCK ESTIMATES: 1993-1996 (BUSHELS)

		SMALL OYSTER				MARKET OYSTER				TOTAL			
REEF NAME	ACRES	1993	1994	1995	1996	1993	1994	1995	1996	1993	1994	1995	1996
Up D Wtr Shl	234	58762	37206	9386	34119	14700	16631	3292	1721	73462	53838	12678	35839
Low D Wtr Shl	20	1010	1050	148	226	589	1135	20	156	1599	2186	168	382
Up Horsehead	3	3473	2115	2971	3364	1755	739	468	655	5228	2854	3438	4019
Mid Horsehead	19	16520	14765	25581	32383	1166	1136	2328	5971	17686	15901	27910	38354
Low Horsehead	19	19828	19788	18695	21929	1865	3195	1177	3857	21693	22983	19872	25786
Moon Rock	4	3670	4281	3517	3605	1258	740	485	677	4928	5021	4002	4283
V-Rock	72	48585	40493	53872	77928	8880	6110	5661	11437	57464	46603	59533	89364
Pt of Shoals	132	64844	78514	100468	93798	9708	9998	11251	19131	74552	88512	111719	112928
Cross Rock	37	11129	8164	21496	16912	1805	1718	1411	4243	12934	9883	22908	21155
Shanty Rock	4	469	1212	1001	534	65	43	71	18	534	1255	1072	552
Dry Lump	6	374	956	410	450	20	0	7	0	393	956	417	450
Mulberry Point	87	4907	6151	4435	9462	565	451	940	2927	5472	6602	5375	12389
Mulberry & Swash	165	3753	11722	9214	10233	646	1723	1823	2153	4399	13445	11036	12387
Upper Jail Is	612	39796	52506	27431	21248	8842	16424	2949	7893	48638	68930	30380	29141
Swash Mud	1245	131211	113791	101956	107874	22658	19910	19265	54749	153869	133701	121221	162622
Offshore Swash	627	78904	70225	92239	113322	3539	7810	18320	19717	82443	78035	110559	133039
Lower Jail Is	629	28551	20962	26929	10789	16147	13619	10581	13344	44698	34581	37510	24133
Offsh.Jail Island	1017	39796	52506	27431	21248	8842	16424	2949	7893	48638	68930	30380	29141
Wreck Shoal	585	21495	20336	14385	5926	3414	3361	754	2733	24910	23697	15139	8659
TOTAL	5517	577076	556745	541565	585348	106464	121169	83753	159274	683540	677913	625318	744621

Estimates based on oyster density from patent tong samples and size class distribution in all years

Oysters < 30mm length classified as spat

Oysters > 30mm but < 75mm classified as small: 1000 oysters per bushel

Oysters > 75 mm classified as market size, 500 oysters per bushel

Table 3: James River Oyster Resource: 1993-1996

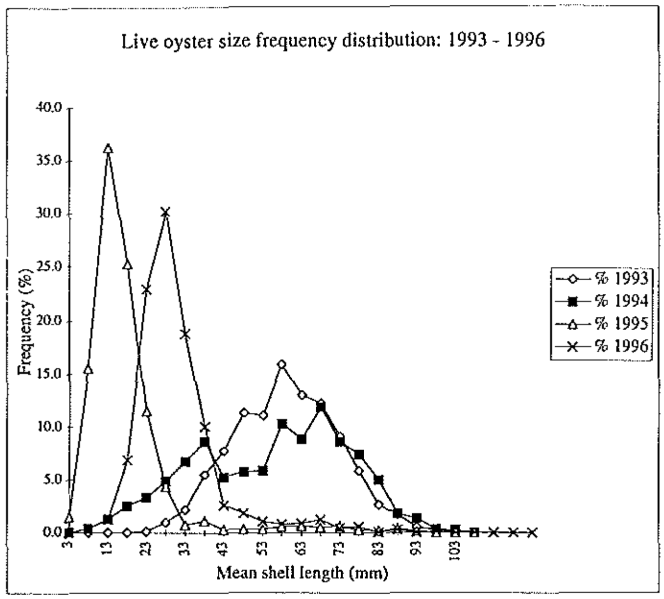
REEF NAME	ACRES		length	1993	1994	1995	1996	bushel estimates	1993	1994	1995	1996
Up D Wtr Shl	234	spat	<30mm	0.8	6.8	191.2	59.2	small	58762	37206	9386	34119
		small	>30<75mm	62.2	39.4	9.9	36.1	market	14700	16631	3292	1721
		market	>75mm	7.8	8.8	1.7	0.9	total	73462	53838	12678	35839
Low D Wtr Shl	20	spat	<30mm	0.0	2.6	16.7	1.7	small	1010	1050	148	226
		small	>30<75mm	12.5	13.0	1.8	2.8	market	589	1135	20	156
		market	>75mm	3.7	7.1	0.1	1.0	total	1599	2186	168	382
Up Horsehead	3	spat	<30mm	0.0	44.0	72.9	103.7	small	3473	2115	2971	3364
		small	>30<75mm	285.6	173.9	244.3	276.6	market	1755	739	468	655
		market	>75mm	72.2	30.4	19.2	27.0	total	5228	2854	3438	4019
Mid Horsehead	19	spat	<30mm	5.4	63.0	130.0	83.5	small	16520	14765	25581	32383
		small	>30<75mm	210.0	187.7	325.2	411.7	market	1166	1136	2328	5971
		market	>75mm	7.4	7.2	14.8	38.0	total	17686	15901	27910	38354
Low Horsehead	19	spat	<30mm	7.5	139.5	147.7	95.2	small	19828	19788	18695	21929
		small	>30<75mm	252.1	251.6	237.7	278.8	market	1865	3195	1177	3857
		market	>75mm	11.9	20.3	7.5	24.5	total	21693	22983	19872	25786
Moon Rock	4	spat	<30mm	11.0	232.5	139.5	46.3	small	3670	4281	3517	3605
		small	>30<75mm	230.0	268.3	220.4	225.9	market	1258	740	485	677
		market	>75mm	39.4	23.2	15.2	21.2	total	4928	5021	4002	4283
V-Rock	72	spat	<30mm	1.6	29.4	85.1	71.2	small	48585	40493	53872	77928
		small	>30<75mm	167.0	139.2	185.2	267.9	market	8880	6110	5661	11437
		market	>75mm	15.3	10.5	9.7	19.7	total	57464	46603	59533	89364
Pt of Shoals	132	spat	<30mm	1.1	68.1	93.1	40.1	small	64844	78514	100468	93798
		small	>30<75mm	121.9	147.6	188.8	176.3	market	9708	9998	11251	19131
		market	>75mm	9.1	9.4	10.6	18.0	total	74552	88512	111719	112928
Cross Rock	37	spat	<30mm	0.2	93.8	49.8	27.2	small	11129	8164	21496	16912
		small	>30<75mm	75.1	55.1	145.0	114.1	market	1805	1718	1411	4243
		market	>75mm	6.1	5.8	4.8	14.3	total	12934	9883	22908	21155
Shanty Rock	4	spat	<30mm	1.1	65.1	18.8	5.8	small	469	1212	1001	534
		small	>30<75mm	32.4	83.8	69.2	36.9	market	65	43	71	18
		market	>75mm	2.2	1.5	2.5	0.6	total	534	1255	1072	552
Dry Lump	6	spat	<30mm	2.1	51.1	10.0	11.9	small	374	956	410	450
		small	>30<75mm	15.6	39.9	17.1	18.8	market	20	0	7	0
		market	>75mm	0.4	0.0	0.1	0.0	total	393	956	417	450
Mulberry Point	87	spat	<30mm	0.3	8.8	12.8	12.6	small	4907	6151	4435	9462
		small	>30<75mm	25.1	31.4	22.7	48.4	market	565	451	940	2927
		market	>75mm	1.4	1.2	2.4	7.5	total	5472	6602	5375	12389
Mulberry & Swash	165	spat	<30mm	0.0	2.4	5.7	2.2	small	3753	11722	9214	10233
		small	>30<75mm	4.6	14.4	11.3	12.6	market	646	1723	1823	2153
		market	>75mm	0.4	1.1	1.1	1.3	total	4399	13445	11036	12387
Upper Jail Is	612	spat	<30mm	0.1	8.9	1.7	3.3	small	39796	52506	27431	21248
		small	>30<75mm	9.7	12.8	6.7	5.2	market	8842	16424	2949	7893
		market	>75mm	1.1	2.0	0.4	1.0	total	48638	68930	30380	29141
Swash Mud	1245	spat	<30mm	0.3	8.5	3.0	3.2	small	131211	113791	101956	107874
		small	>30<75mm	26.1	22.6	20.3	21.4	market	22658	19910	19265	54749
		market	>75mm	2.3	2.0	1.9	5.4	total	153869	133701	121221	162622
Offshore Swash	627	spat	<30mm	3.4	17.2	0.2	9.3	small	78904	70225	92239	113322
		small	>30<75mm	31.2	27.7	36.4	44.8	market	3539	7810	18320	19717
		market	>75mm	0.7	1.5	3.6	3.9	total	82443	78035	110559	133039
Lower Jail Is	629	spat	<30mm	0.1	1.2	0.8	4.5	small	28551	20962	26929	10789
		small	>30<75mm	11.2	8.3	10.6	4.2	market	16147	13619	10581	13344
		market	>75mm	3.2	2.7	2.1	2.6	total	44698	34581	37510	24133
Offsh.Jail Island	1017	spat	<30mm	0.1	8.9	1.7	3.3	small	39796	52506	27431	21248
		small	>30<75mm	9.7	12.8	6.7	5.2	market	8842	16424	2949	7893
		market	>75mm	1.1	2.0	0.4	1.0	total	48638	68930	30380	29141
Wreck Shoal	585	spat	<30mm	0.2	9.0	1.5	2.2	small	21495	20336	14385	5926
		small	>30<75mm	9.1	8.6	6.1	2.5	market	3414	3361	754	2733
		market	>75mm	0.7	0.7	0.2	0.6	total	24910	23697	15139	8659

Figure 2.1

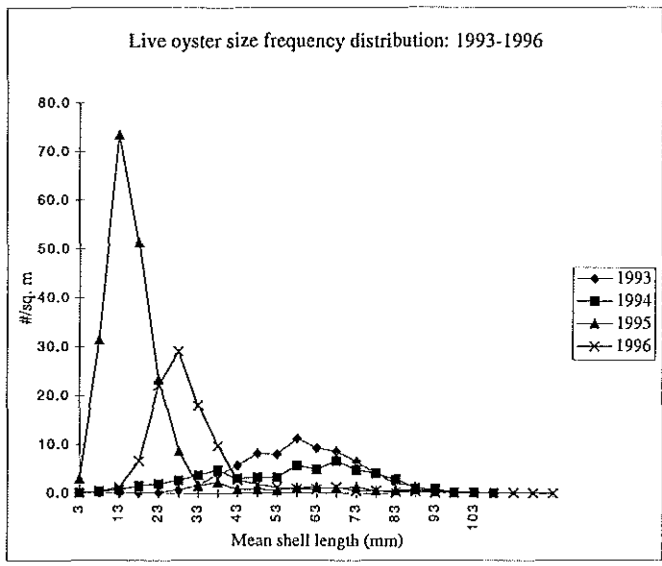
UPPER DEEP WATER SHOAL

LIVE OYSTER Summary

Size Class Midpoint (mm)	% 1993	% 1994	% 1995	% 1996
3	0.0	0.0	1.4	0.0
8	0.0	0.4	15.5	0.3
13	0.0	1.2	36.2	1.2
18	0.0	2.5	25.3	6.9
23	0.1	3.3	11.5	22.9
28	1.0	4.9	4.3	30.2
33	2.2	6.7	0.7	18.8
38	5.4	8.6	1.1	10.1
43	7.7	5.2	0.3	2.6
48	11.3	5.7	0.3	1.8
53	11.1	5.8	0.3	1.0
58	15.9	10.3	0.5	0.8
63	13.0	8.9	0.6	0.9
68	12.2	11.9	0.5	1.2
73	9.1	8.6	0.6	0.4
78	5.9	7.4	0.2	0.5
83	2.7	5.0	0.2	0.1
88	1.7	1.8	0.3	0.3
93	0.5	1.3	0.1	0.0
98	0.2	0.3	0.0	0.1
103	0.1	0.3	0.0	0.0
108	0.0	0.0	0.0	0.0
113	0.0	0.0	0.0	0.0
118	0.0	0.0	0.0	0.0
123	0.0	0.0	0.0	0.0
Oysters/sq.m	70.7	54.9	202.9	96.2

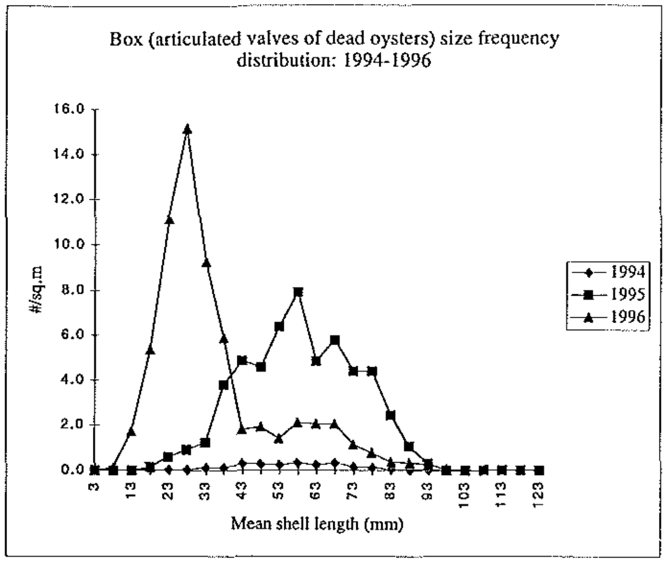


	1993	1994	1995	1996
3	0.0	0.0	2.9	0.0
8	0.0	0.2	31.5	0.3
13	0.0	0.7	73.4	1.2
18	0.0	1.4	51.3	6.6
23	0.1	1.8	23.3	22.0
28	0.7	2.7	8.7	29.1
33	1.5	3.7	1.4	18.1
38	3.9	4.7	2.3	9.7
43	5.5	2.9	0.6	2.5
48	8.0	3.2	0.6	1.7
53	7.8	3.2	0.5	1.0
58	11.2	5.6	1.1	0.7
63	9.2	4.9	1.2	0.8
68	8.6	6.5	0.9	1.2
73	6.4	4.7	1.2	0.4
78	4.1	4.1	0.5	0.5
83	1.9	2.8	0.4	0.1
88	1.2	1.0	0.7	0.2
93	0.3	0.7	0.2	0.0
98	0.2	0.2	0.0	0.1
103	0.1	0.1	0.0	0.0
108	0.0	0.0	0.0	0.0
113	0.0	0.0	0.0	0.0
118	0.0	0.0	0.0	0.0
123	0.0	0.0	0.0	0.0
by size class/sq.m				
<30mm	0.8	6.8	191.2	59.2
>30<75mm	62.2	39.4	9.9	36.1
>75mm	7.8	8.8	1.7	0.9
reef area (acres	233.9	233.9	233.9	233.9
bushel estimates				
small	58762	37206	9386	34119
market	14700	16631	3292	1721
total	73462	53838	12678	35839



UPPER DEEP WATER SHOAL

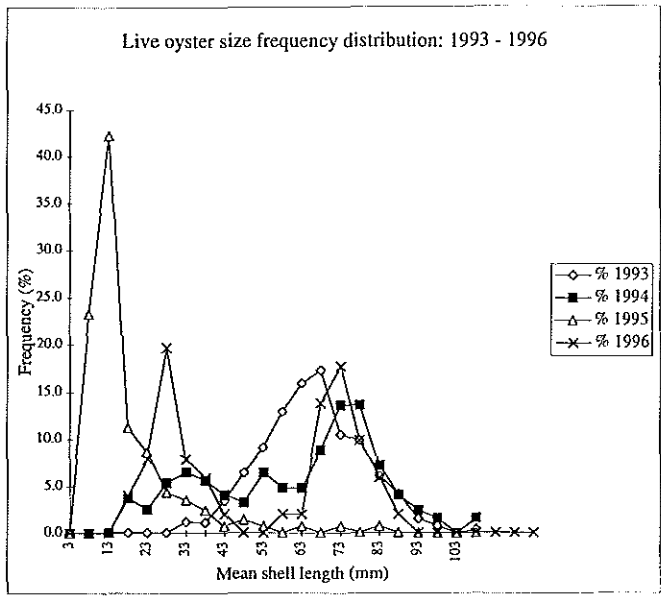
BOX Summary	1994	1995	1996
3	0.0	0.0	0.0
8	0.0	0.0	0.1
13	0.0	0.0	1.7
18	0.0	0.2	5.3
23	0.0	0.6	11.1
28	0.0	0.9	15.1
33	0.1	1.2	9.2
38	0.1	3.8	5.9
43	0.3	4.9	1.8
48	0.3	4.6	1.9
53	0.2	6.4	1.4
58	0.3	7.9	2.1
63	0.2	4.9	2.0
68	0.3	5.8	2.0
73	0.1	4.4	1.1
78	0.1	4.4	0.8
83	0.0	2.4	0.4
88	0.0	1.1	0.3
93	0.0	0.3	0.3
98	0.0	0.0	0.1
103	0.0	0.0	0.0
108	0.0	0.0	0.0
113	0.0	0.0	0.0
118	0.0	0.0	0.0
123	0.0	0.0	0.0
Box /sq.m	2.3	53.7	62.8
old	1.50	52.60	15.46
new	0.80	1.10	47.30

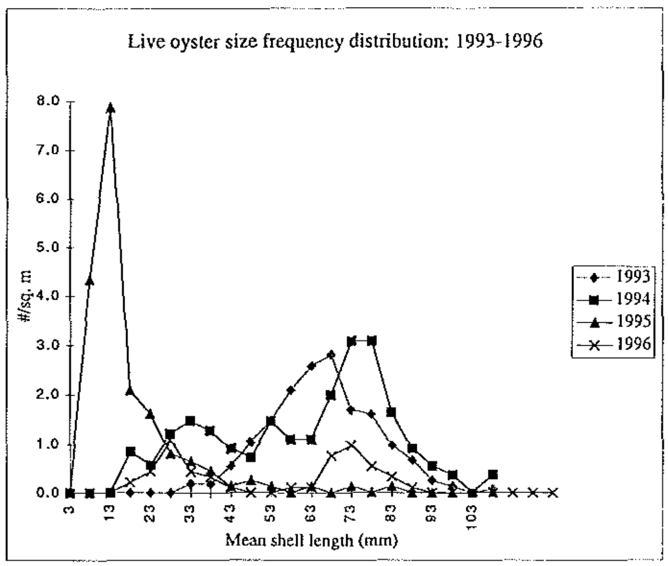


LOWER DEEP WATER SHOAL

LIVE OYSTER Summary

Size Class Midpoint (mm)	% 1993	% 1994	% 1995	% 1996
3	0.0	0.0	0.0	0.0
8	0.0	0.0	23.2	0.0
13	0.0	0.0	42.2	0.0
18	0.0	3.7	11.2	3.9
23	0.0	2.5	8.6	7.8
28	0.0	5.3	4.3	19.6
33	1.1	6.5	3.4	7.8
38	1.1	5.6	2.4	5.9
43	3.4	4.0	0.7	2.0
48	6.4	3.2	1.3	0.0
53	9.0	6.4	0.7	0.0
58	12.8	4.8	0.0	2.0
63	15.8	4.8	0.7	2.0
68	17.2	8.8	0.0	13.7
73	10.4	13.5	0.7	17.6
78	9.8	13.5	0.0	9.8
83	6.0	7.2	0.7	5.9
88	4.1	4.0	0.0	2.0
93	1.5	2.4	0.0	0.0
98	0.8	1.6	0.0	0.0
103	0.0	0.0	0.0	0.0
108	0.4	1.6	0.0	0.0
113	0.0	0.8	0.0	0.0
118	0.0	0.0	0.0	0.0
123	0.0	0.0	0.0	0.0
Oysters/sq.m	16.2	22.7	18.6	05.5
	1993	1994	1995	1996
3	0.0	0.0	0.0	0.0
8	0.0	0.0	4.3	0.0
13	0.0	0.0	7.9	0.0
18	0.0	0.8	2.1	0.2
23	0.0	0.6	1.6	0.4
28	0.0	1.2	0.8	1.1
33	0.2	1.5	0.6	0.4
38	0.2	1.3	0.4	0.3
43	0.6	0.9	0.1	0.1
48	1.0	0.7	0.3	0.0
53	1.5	1.4	0.1	0.0
58	2.1	1.1	0.0	0.1
63	2.6	1.1	0.1	0.1
68	2.8	2.0	0.0	0.8
73	1.7	3.1	0.1	1.0
78	1.6	3.1	0.0	0.5
83	1.0	1.6	0.1	0.3
88	0.7	0.9	0.0	0.1
93	0.2	0.5	0.0	0.0
98	0.1	0.4	0.0	0.0
103	0.0	0.0	0.0	0.0
108	0.1	0.4	0.0	0.0
113	0.0	0.2	0.0	0.0
118	0.0	0.0	0.0	0.0
123	0.0	0.0	0.0	0.0
by size class/sq.m				
<30mm	0.0	2.6	16.7	1.7
>30<75mm	12.5	13.0	1.8	2.8
>75mm	3.7	7.1	0.1	1.0
reef area (acres	19.9	19.9	19.9	19.9
bushel estimates				
small	1010	1050	148	226
market	589	1135	20	156
total	1599	2186	168	382





LOWER DEEP WATER SHOAL

BOX Summary	1994	1995	1996
3	0.0	0.0	0.0
8	0.0	0.1	0.0
13	0.0	0.4	0.0
18	0.4	0.1	0.2
23	0.1	0.0	0.4
28	0.0	0.3	1.1
33	0.1	0.4	0.4
38	0.0	1.3	0.3
43	0.1	1.4	0.1
48	0.1	1.3	0.0
53	0.1	0.6	0.0
58	0.0	2.7	0.1
63	0.0	2.5	0.1
68	0.1	3.2	0.7
73	0.0	1.4	0.9
78	0.0	1.9	0.5
83	0.0	0.9	0.3
88	0.0	0.4	0.1
93	0.0	0.0	0.0
98	0.0	0.4	0.0
103	0.0	0.1	0.0
108	0.0	0.0	0.0
113	0.0	0.0	0.0
118	0.0	0.0	0.0
123	0.0	0.0	0.0
Box /sq.m	1.3	19.4	5.4
old	0.8	18.1	2.7
new	0.5	1.3	2.7

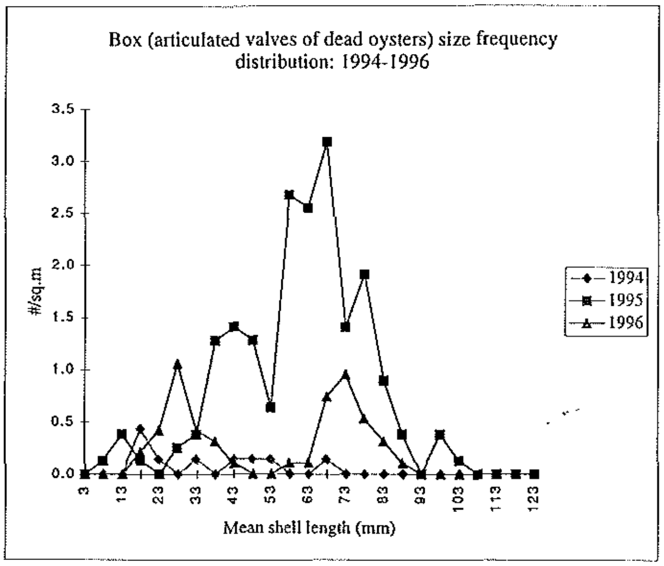
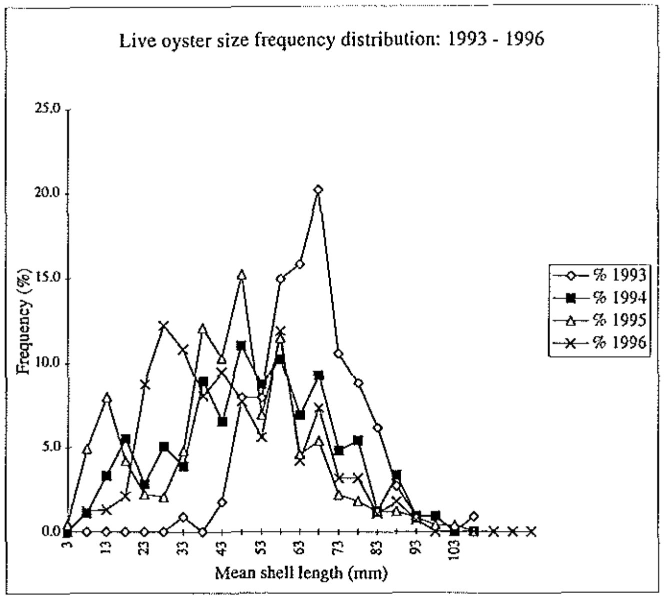


Figure 2.3

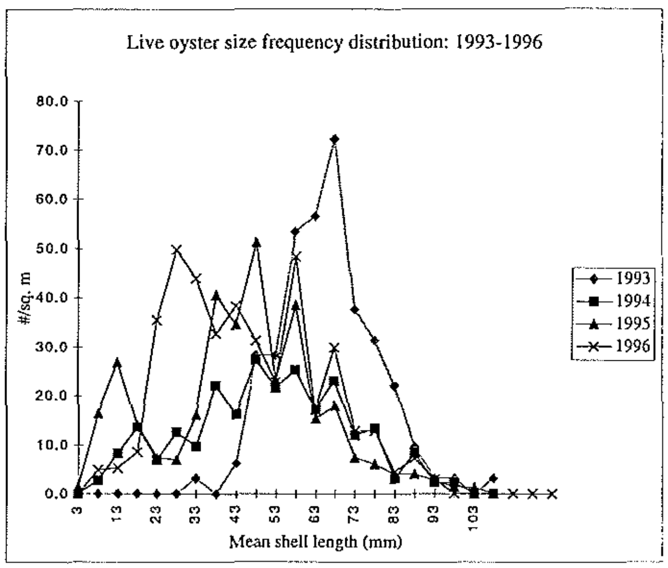
UPPER HORSEHEAD

LIVE OYSTER Summary

Size Class Midpoint (mm)	% 1993	% 1994	% 1995	% 1996
3	0.0	0.0	0.4	0.0
8	0.0	1.1	4.9	1.2
13	0.0	3.3	8.0	1.3
18	0.0	5.5	4.2	2.1
23	0.0	2.8	2.2	8.7
28	0.0	5.0	2.0	12.2
33	0.9	3.9	4.8	10.8
38	0.0	8.9	12.0	8.0
43	1.8	6.5	10.3	9.4
48	7.9	11.0	15.2	7.7
53	7.9	8.7	6.9	5.6
58	14.9	10.2	11.4	11.8
63	15.8	6.9	4.5	4.2
68	20.2	9.2	5.3	7.3
73	10.5	4.8	2.2	3.1
78	8.8	5.4	1.8	3.1
83	6.1	1.2	1.2	1.0
88	2.6	3.3	1.2	1.7
93	0.9	0.9	0.8	0.7
98	0.9	0.9	0.4	0.0
103	0.0	0.0	0.4	0.0
108	0.9	0.0	0.0	0.0
113	0.0	0.3	0.0	0.0
118	0.0	0.3	0.0	0.0
123	0.0	0.0	0.0	0.0
Oysters/sq.m	357.8	248.3	336.4	407.3

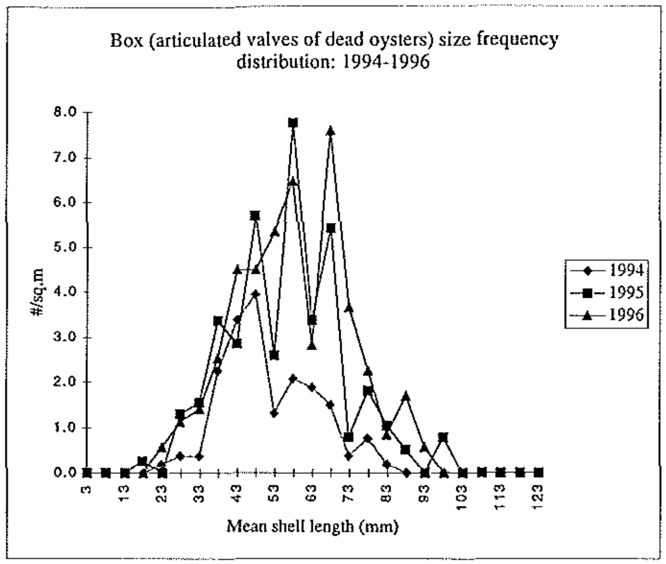


	1993	1994	1995	1996
3	0.0	0.0	1.5	0.0
8	0.0	2.7	16.4	4.9
13	0.0	8.2	26.8	5.3
18	0.0	13.6	14.1	8.5
23	0.0	7.0	7.4	35.5
28	0.0	12.5	6.9	49.6
33	3.1	9.6	16.1	44.0
38	0.0	22.1	40.5	32.6
43	6.3	16.2	34.5	38.3
48	28.2	27.3	51.1	31.2
53	28.2	21.6	23.2	22.7
58	53.4	25.2	38.5	48.2
63	56.5	17.1	15.3	17.0
68	72.2	23.0	17.9	29.8
73	37.7	11.9	7.3	12.8
78	31.4	13.3	6.0	12.8
83	22.0	3.0	4.0	4.3
88	9.4	8.2	4.0	7.1
93	3.1	2.2	2.7	2.8
98	3.1	2.2	1.3	0.0
103	0.0	0.0	1.3	0.0
108	3.1	0.0	0.0	0.0
113	0.0	0.7	0.0	0.0
118	0.0	0.7	0.0	0.0
123	0.0	0.0	0.0	0.0
by size class/sq.m				
<30mm	0.0	44.0	72.9	103.7
>30<75mm	285.6	173.9	244.3	276.6
>75mm	72.2	30.4	19.2	27.0
reef area (acres	3.0	3.0	3.0	3.0
bushel estimates				
small	3473	2115	2971	3364
market	1755	739	468	655
total	5228	2854	3438	4019



UPPER HORSEHEAD

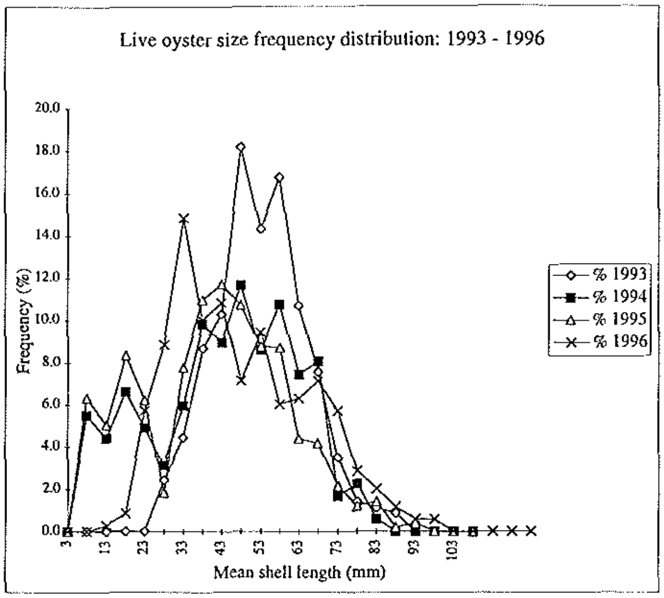
BOX Summary	1994	1995	1996
3	0.0	0.0	0.0
8	0.0	0.0	0.0
13	0.0	0.0	0.0
18	0.0	0.3	0.0
23	0.2	0.0	0.6
28	0.4	1.3	1.1
33	0.4	1.5	1.4
38	2.2	3.4	2.5
43	3.4	2.8	4.5
48	3.9	5.7	4.5
53	1.3	2.6	5.3
58	2.1	7.7	6.5
63	1.9	3.4	2.8
68	1.5	5.4	7.6
73	0.4	0.8	3.6
78	0.7	1.8	2.2
83	0.2	1.0	0.8
88	0.0	0.5	1.7
93	0.0	0.0	0.6
98	0.0	0.8	0.0
103	0.0	0.0	0.0
108	0.0	0.0	0.0
113	0.0	0.0	0.0
118	0.0	0.0	0.0
123	0.0	0.0	0.0
Box /sq.m	18.5	39.0	46.6
old	7.2	36.0	25.9
new	11.3	3.0	20.7



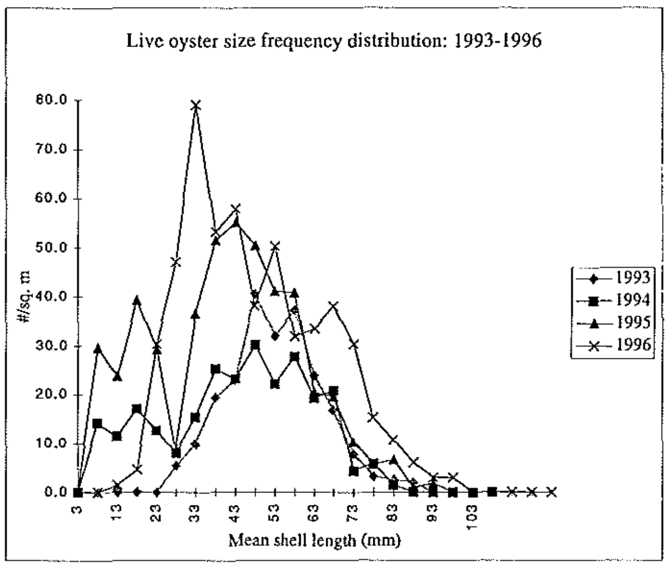
MIDDLE HORSEHEAD

LIVE OYSTER Summary

Size Class Midpoint (mm)	% 1993	% 1994	% 1995	% 1996
3	0.0	0.0	0.0	0.0
8	0.0	5.5	6.3	0.0
13	0.0	4.4	5.0	0.3
18	0.0	6.6	8.3	0.9
23	0.0	4.9	6.2	5.7
28	2.4	3.1	1.8	8.8
33	4.4	5.9	7.8	14.8
38	8.7	9.8	11.0	10.0
43	10.3	9.0	11.7	10.8
48	18.2	11.7	10.7	7.1
53	14.3	8.5	8.7	9.4
58	16.7	10.7	8.7	6.0
63	10.7	7.4	4.3	6.3
68	7.5	8.0	4.2	7.1
73	3.5	1.7	2.2	5.7
78	1.4	2.2	1.2	2.8
83	1.1	0.6	1.4	2.0
88	0.9	0.0	0.2	1.1
93	0.0	0.0	0.4	0.6
98	0.0	0.0	0.0	0.6
103	0.0	0.0	0.0	0.0
108	0.0	0.0	0.0	0.0
113	0.0	0.0	0.0	0.0
118	0.0	0.0	0.0	0.0
123	0.0	0.0	0.0	0.0
Oysters/sq.m	222.9	257.9	470.0	533.2

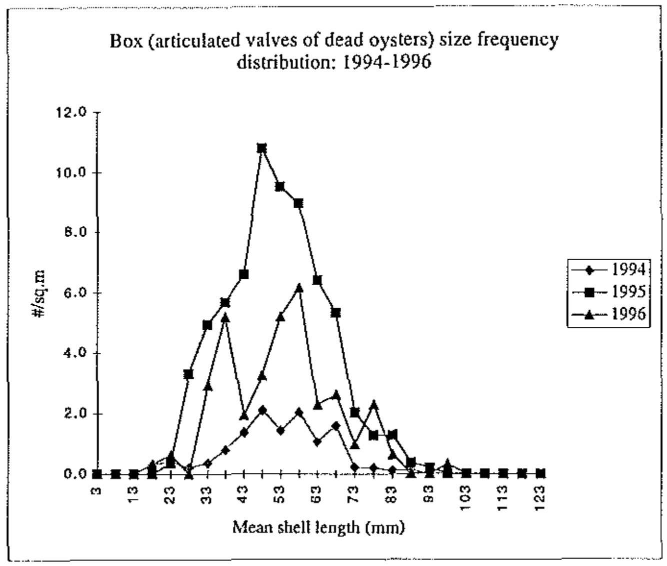


	1993	1994	1995	1996
3	0.0	0.0	0.0	0.0
8	0.0	14.2	29.5	0.0
13	0.0	11.3	23.6	1.5
18	0.0	17.0	39.2	4.6
23	0.0	12.5	29.2	30.4
28	5.4	8.0	8.5	47.1
33	9.8	15.3	36.4	79.0
38	19.3	25.3	51.5	53.2
43	22.9	23.1	55.0	57.7
48	40.5	30.1	50.3	38.0
53	31.9	22.1	41.0	50.1
58	37.3	27.7	40.8	31.9
63	23.8	19.2	20.4	33.4
68	16.8	20.8	19.5	38.0
73	7.7	4.3	10.1	30.4
78	3.1	5.7	5.6	15.2
83	2.4	1.5	6.5	10.6
88	1.9	0.0	0.9	6.1
93	0.0	0.0	1.8	3.0
98	0.0	0.0	0.0	3.0
103	0.0	0.0	0.0	0.0
108	0.0	0.0	0.0	0.0
113	0.0	0.0	0.0	0.0
118	0.0	0.0	0.0	0.0
123	0.0	0.0	0.0	0.0
by size class/sq.m				
<30mm	5.4	63.0	130.0	83.5
>30<75mm	210.0	187.7	325.2	411.7
>75mm	7.4	7.2	14.8	38.0
reef area (acres	19.5	19.5	19.5	19.5
bushel estimates				
small	16520	14765	25581	32383
market	1166	1136	2328	5971
total	17686	15901	27910	38354



MIDDLE HORSEHEAD

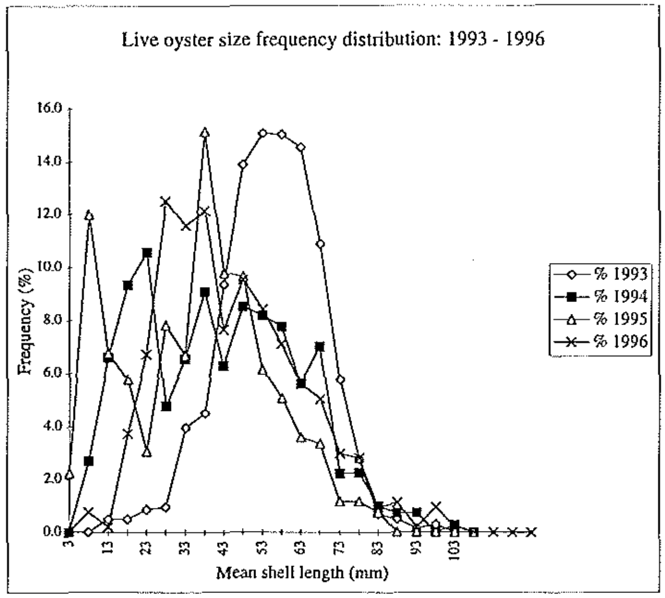
BOX Summary	1994	1995	1996
3	0.0	0.0	0.0
8	0.0	0.0	0.0
13	0.0	0.0	0.0
18	0.3	0.0	0.3
23	0.4	0.4	0.6
28	0.2	3.3	0.0
33	0.4	4.9	2.9
38	0.8	5.7	5.2
43	1.4	6.6	1.9
48	2.1	10.8	3.2
53	1.4	9.5	5.2
58	2.0	9.0	6.1
63	1.1	6.4	2.3
68	1.6	5.3	2.6
73	0.2	2.0	1.0
78	0.2	1.3	2.3
83	0.1	1.3	0.6
88	0.1	0.4	0.0
93	0.0	0.2	0.0
98	0.0	0.0	0.3
103	0.0	0.0	0.0
108	0.0	0.0	0.0
113	0.0	0.0	0.0
118	0.0	0.0	0.0
123	0.0	0.0	0.0
Box /sq.m	12.2	66.9	34.6
old	5.5	55.2	18.3
new	6.7	11.7	16.3



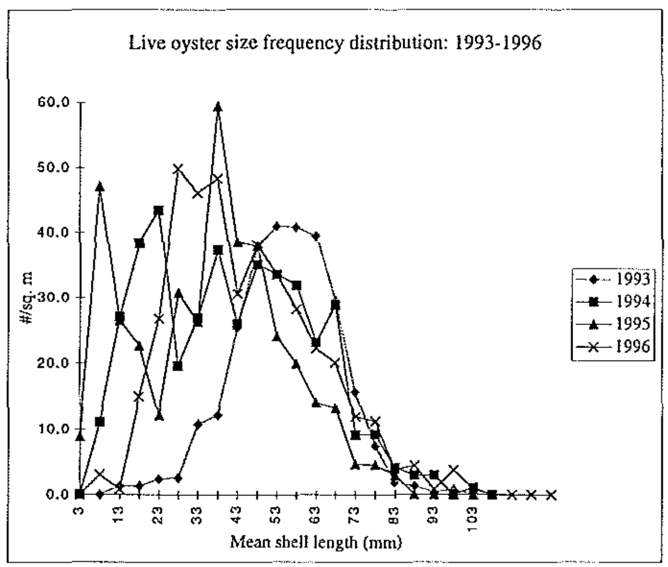
LOWER HORSEHEAD

LIVE OYSTER Summary

Size Class Midpoint (mm)	% 1993	% 1994	% 1995	% 1996
3	0.0	0.0	2.2	0.0
8	0.0	2.7	12.0	0.8
13	0.5	6.6	6.7	0.2
18	0.5	9.3	5.8	3.7
23	0.9	10.5	3.1	6.7
28	1.0	4.8	7.8	12.5
33	3.9	6.5	6.7	11.6
38	4.5	9.1	15.1	12.1
43	9.3	6.3	9.8	7.6
48	13.9	8.5	9.6	9.5
53	15.1	8.2	6.1	8.4
58	15.0	7.8	5.1	7.1
63	14.5	5.6	3.6	5.6
68	10.9	7.0	3.4	5.0
73	5.8	2.2	1.2	3.0
78	2.8	2.2	1.2	2.8
83	0.7	1.0	0.7	0.9
88	0.5	0.7	0.0	1.1
93	0.2	0.7	0.0	0.2
98	0.3	0.0	0.0	0.9
103	0.0	0.3	0.0	0.2
108	0.0	0.0	0.0	0.0
113	0.0	0.0	0.0	0.0
118	0.0	0.0	0.0	0.0
123	0.0	0.0	0.0	0.0
Oysters/sq.m	271.4	411.4	392.8	398.5



	1993	1994	1995	1996
3	0.0	0.0	8.8	0.0
8	0.0	11.1	47.0	3.0
13	1.3	27.1	26.5	0.7
18	1.3	38.3	22.7	14.9
23	2.3	43.4	12.0	26.8
28	2.6	19.6	30.7	49.8
33	10.7	26.9	26.3	46.1
38	12.2	37.3	59.4	48.3
43	25.3	25.8	38.4	30.5
48	37.6	35.0	37.8	37.9
53	40.9	33.6	24.0	33.5
58	40.7	31.9	19.9	28.3
63	39.4	23.1	14.1	22.3
68	29.5	28.8	13.2	20.1
73	15.6	9.1	4.6	11.9
78	7.5	9.2	4.5	11.2
83	1.9	4.1	2.9	3.7
88	1.3	3.0	0.0	4.5
93	0.4	3.0	0.0	0.7
98	0.8	0.0	0.0	3.7
103	0.0	1.1	0.0	0.7
108	0.0	0.0	0.0	0.0
113	0.0	0.0	0.0	0.0
118	0.0	0.0	0.0	0.0
123	0.0	0.0	0.0	0.0
by size class/sq.m				
<30mm	7.5	139.5	147.7	95.2
>30<75mm	252.1	251.6	237.7	278.8
>75mm	11.9	20.3	7.5	24.5
reef area (acres	19.5	19.5	19.5	19.5
bushel estimates				
small	19828	19788	18695	21929
market	1865	3195	1177	3857
total	21693	22983	19872	25786

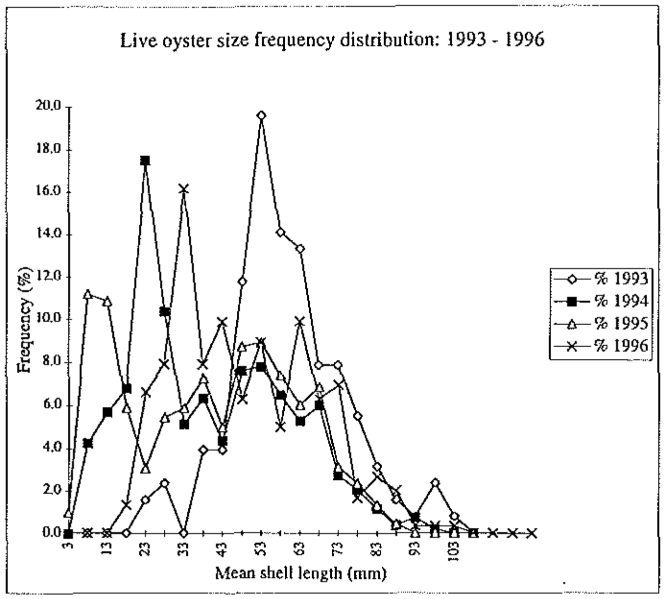


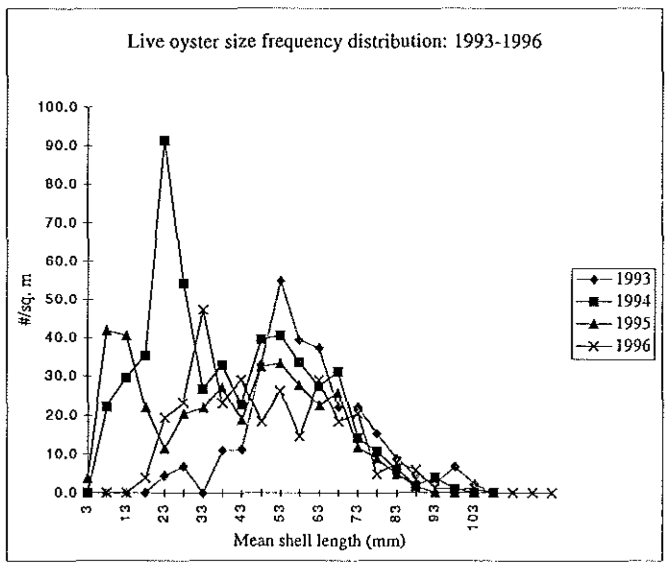
MOON ROCK

LIVE OYSTER Summary

Size Class Midpoint (mm)	% 1993	% 1994	% 1995	% 1996
3	0.0	0.0	1.0	0.0
8	0.0	4.2	11.1	0.0
13	0.0	5.6	10.8	0.0
18	0.0	6.7	5.8	1.3
23	1.6	17.4	3.0	6.6
28	2.3	10.3	5.4	7.9
33	0.0	5.1	5.8	16.1
38	3.9	6.3	7.2	7.9
43	3.9	4.3	4.9	9.9
48	11.7	7.5	8.7	6.3
53	19.5	7.7	8.9	8.9
58	14.1	6.4	7.4	4.9
63	13.3	5.2	6.0	9.9
68	7.8	5.9	6.8	6.3
73	7.8	2.7	3.1	6.9
78	5.5	2.0	2.3	1.6
83	3.1	1.1	1.3	2.6
88	1.6	0.4	0.4	2.0
93	0.8	0.7	0.0	0.3
98	2.3	0.2	0.0	0.3
103	0.8	0.0	0.0	0.3
108	0.0	0.0	0.0	0.0
113	0.0	0.0	0.0	0.0
118	0.0	0.0	0.0	0.0
123	0.0	0.0	0.0	0.0
Oysters/sq.m	280.4	524.0	375.1	293.5

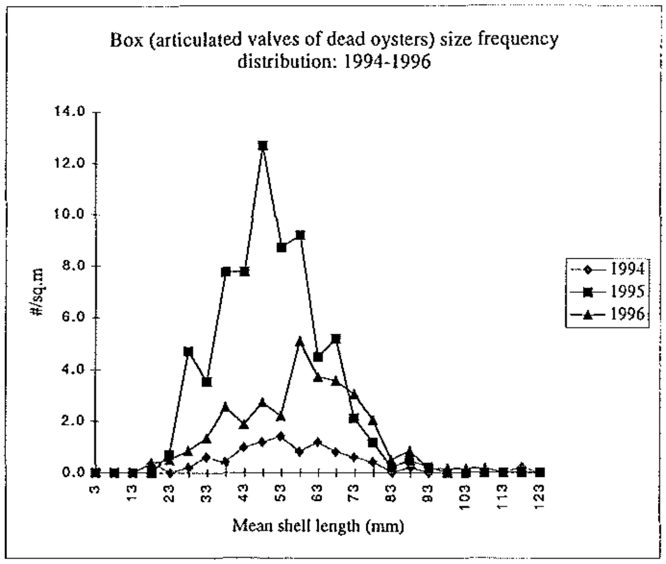
	1993	1994	1995	1996
3	0.0	0.0	3.7	0.0
8	0.0	22.1	41.8	0.0
13	0.0	29.6	40.6	0.0
18	0.0	35.3	21.9	3.9
23	4.4	91.4	11.3	19.3
28	6.6	54.1	20.2	23.2
33	0.0	26.7	21.9	47.3
38	11.0	33.0	27.1	23.2
43	11.0	22.6	18.6	29.0
48	32.9	39.5	32.5	18.3
53	54.8	40.5	33.3	26.1
58	39.4	33.6	27.6	14.5
63	37.2	27.3	22.4	29.0
68	21.9	31.1	25.5	18.3
73	21.9	14.1	11.6	20.3
78	15.3	10.7	8.8	4.8
83	8.8	6.0	4.9	7.7
88	4.4	1.9	1.5	5.8
93	2.2	3.8	0.0	1.0
98	6.6	0.9	0.0	1.0
103	2.2	0.0	0.0	1.0
108	0.0	0.0	0.0	0.0
113	0.0	0.0	0.0	0.0
118	0.0	0.0	0.0	0.0
123	0.0	0.0	0.0	0.0
by size class/sq.m				
<30mm	11.0	232.5	139.5	46.3
>30<75mm	230.0	268.3	220.4	225.9
>75mm	39.4	23.2	15.2	21.2
reef area (acres	4.0	4.0	4.0	4.0
bushel estimates				
small	3670	4281	3517	3605
market	1258	740	485	677
total	4928	5021	4002	4283





MOON ROCK

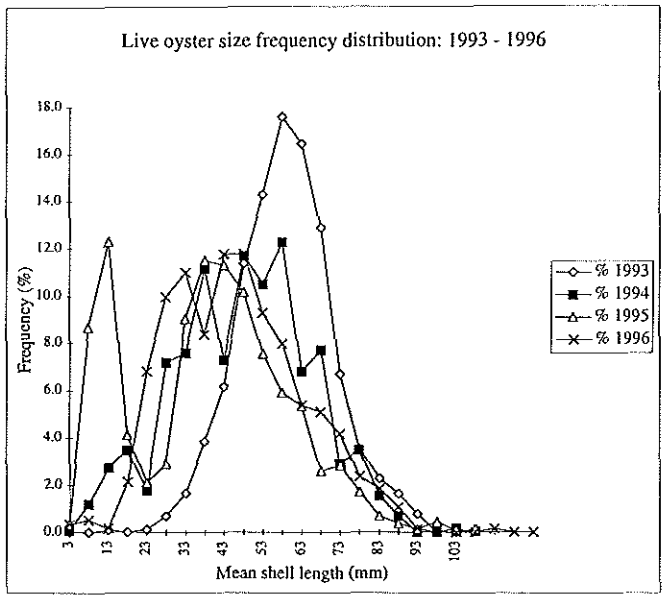
BOX Summary	1994	1995	1996
3	0.0	0.0	0.0
8	0.0	0.0	0.0
13	0.0	0.0	0.0
18	0.4	0.0	0.3
23	0.0	0.7	0.5
28	0.2	4.7	0.8
33	0.6	3.5	1.3
38	0.4	7.7	2.5
43	1.0	7.7	1.9
48	1.2	12.7	2.7
53	1.4	8.7	2.2
58	0.8	9.2	5.1
63	1.2	4.5	3.7
68	0.8	5.2	3.5
73	0.6	2.1	3.0
78	0.4	1.2	2.0
83	0.0	0.2	0.5
88	0.2	0.5	0.8
93	0.0	0.2	0.2
98	0.0	0.0	0.2
103	0.0	0.0	0.2
108	0.0	0.0	0.2
113	0.0	0.0	0.0
118	0.2	0.0	0.0
123	0.0	0.0	0.0
Box /sq.m	9.2	68.8	31.9
old	7.3	64.2	21.1
new	1.9	4.6	10.8



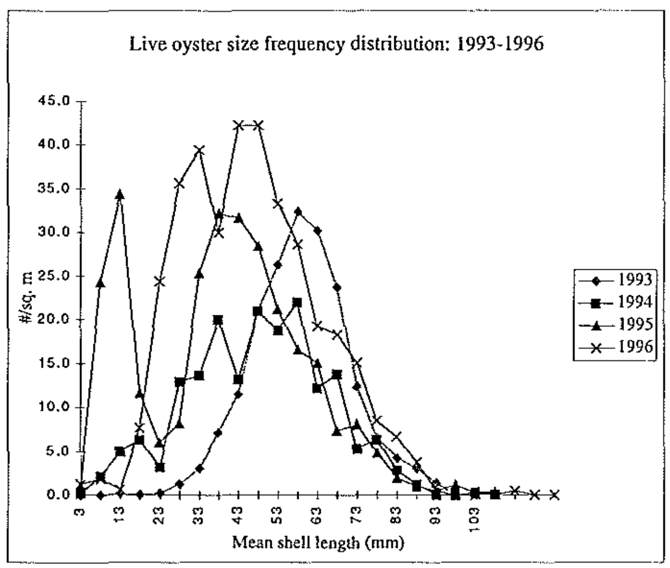
V ROCK

LIVE OYSTER Summary

Size Class Midpoint (mm)	% 1993	% 1994	% 1995	% 1996
3	0.0	0.1	0.4	0.3
8	0.0	1.2	8.7	0.5
13	0.1	2.7	12.2	0.2
18	0.0	3.5	4.1	2.1
23	0.1	1.8	2.1	6.8
28	0.7	7.2	2.9	9.9
33	1.6	7.6	9.0	11.0
38	3.8	11.1	11.5	8.4
43	6.2	7.3	11.3	11.7
48	11.4	11.7	10.1	11.7
53	14.3	10.5	7.5	9.3
58	17.6	12.2	5.9	8.0
63	16.4	6.8	5.3	5.4
68	12.9	7.7	2.6	5.1
73	6.7	2.9	2.9	4.2
78	3.5	3.5	1.7	2.3
83	2.3	1.6	0.7	1.8
88	1.6	0.7	0.3	1.0
93	0.7	0.0	0.1	0.1
98	0.0	0.0	0.4	0.0
103	0.0	0.2	0.1	0.0
108	0.1	0.0	0.1	0.0
113	0.0	0.0	0.0	0.1
118	0.0	0.0	0.0	0.0
123	0.0	0.0	0.0	0.0



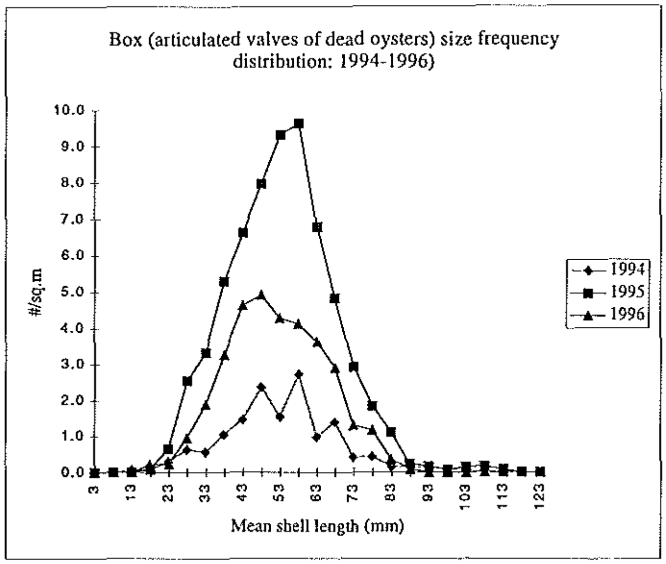
Oysters/sq.m	183.9	179.1	280.1	358.8
	1993	1994	1995	1996
3	0.0	0.2	1.0	1.2
8	0.0	2.1	24.3	1.8
13	0.2	4.9	34.3	0.6
18	0.0	6.2	11.5	7.6
23	0.2	3.2	5.9	24.4
28	1.2	12.8	8.1	35.6
33	3.0	13.6	25.3	39.3
38	7.1	19.9	32.1	30.0
43	11.4	13.0	31.6	42.2
48	20.9	20.9	28.4	42.2
53	26.2	18.7	21.1	33.3
58	32.3	21.9	16.5	28.6
63	30.2	12.2	15.0	19.2
68	23.7	13.7	7.3	18.3
73	12.3	5.2	8.0	15.0
78	6.5	6.2	4.8	8.4
83	4.2	2.8	1.9	6.6
88	3.0	1.2	1.0	3.7
93	1.4	0.0	0.4	0.5
98	0.0	0.0	1.2	0.0
103	0.0	0.3	0.2	0.0
108	0.2	0.0	0.3	0.0
113	0.0	0.0	0.0	0.5
118	0.0	0.0	0.0	0.0
123	0.0	0.0	0.0	0.0



by size class				
<30mm	1.6	29.4	85.1	71.2
>30<75mm	167.0	139.2	185.2	267.9
>75mm	15.3	10.5	9.7	19.7
reef area (acres	72.0	72.0	72.0	72.0
bushel estimates				
small	48585	40493	53872	77928
market	8880	6110	5661	11437
total	57464	46603	59533	89364

V ROCK

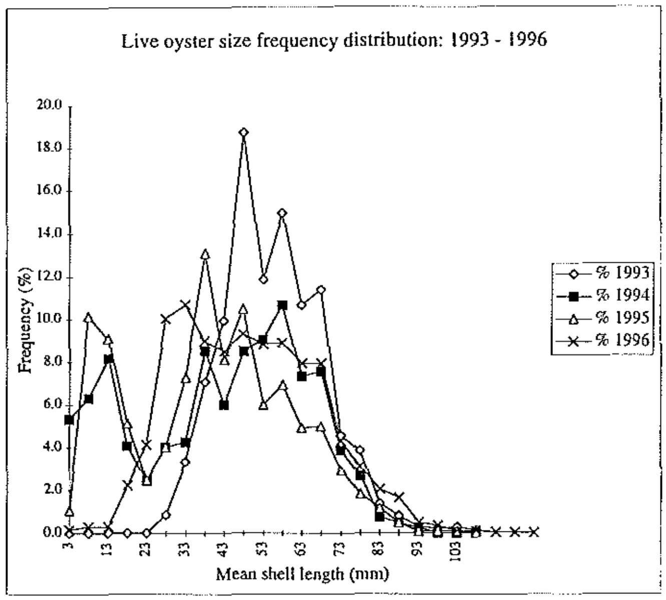
BOX Summary	1994	1995	1996
3	0.0	0.0	0.0
8	0.0	0.0	0.0
13	0.1	0.0	0.0
18	0.1	0.1	0.2
23	0.3	0.6	0.2
28	0.6	2.5	0.9
33	0.6	3.3	1.9
38	1.0	5.3	3.2
43	1.5	6.6	4.6
48	2.4	8.0	4.9
53	1.5	9.3	4.3
58	2.7	9.6	4.1
63	1.0	6.8	3.6
68	1.4	4.8	2.9
73	0.4	2.9	1.3
78	0.4	1.8	1.2
83	0.1	1.1	0.4
88	0.1	0.2	0.1
93	0.1	0.2	0.0
98	0.1	0.1	0.0
103	0.1	0.2	0.0
108	0.0	0.2	0.0
113	0.0	0.1	0.0
118	0.0	0.0	0.0
123	0.0	0.0	0.0
Box /sq.m	14.4	63.5	33.7
old	4.8	54	22.9
new	9.6	9.5	10.82



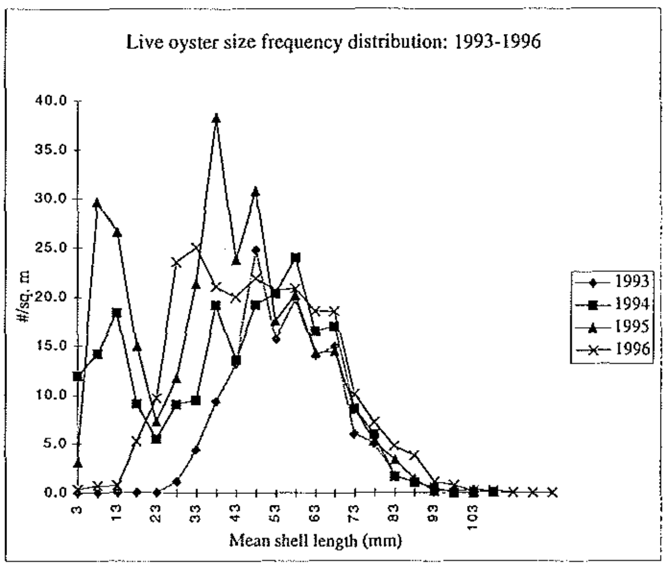
POINT OF SHOALS

LIVE OYSTER Summary

Size Class Midpoint (mm)	% 1993	% 1994	% 1995	% 1996
3	0.0	5.3	1.1	0.1
8	0.0	6.3	10.1	0.3
13	0.0	8.2	9.1	0.3
18	0.0	4.0	5.1	2.2
23	0.0	2.4	2.5	4.1
28	0.9	4.0	4.0	10.0
33	3.3	4.2	7.3	10.7
38	7.1	8.5	13.1	9.0
43	9.9	6.0	8.1	8.5
48	18.7	8.5	10.5	9.3
53	11.8	9.0	6.0	8.8
58	14.9	10.6	6.9	8.9
63	10.6	7.3	4.9	7.9
68	11.4	7.5	5.0	7.9
73	4.5	3.8	2.9	4.3
78	3.8	2.7	1.8	3.1
83	1.3	0.7	1.1	2.0
88	0.8	0.5	0.5	1.6
93	0.3	0.2	0.1	0.5
98	0.2	0.0	0.1	0.3
103	0.3	0.0	0.1	0.1
108	0.1	0.0	0.0	0.1
113	0.1	0.0	0.0	0.0
118	0.0	0.1	0.0	0.0
123	0.0	0.0	0.0	0.0
Oysters/sq.m	132.1	225.1	292.5	234.3



	1993	1994	1995	1996
3	0.0	11.9	3.1	0.3
8	0.0	14.2	29.6	0.7
13	0.0	18.4	26.6	0.7
18	0.0	9.1	14.9	5.2
23	0.0	5.5	7.2	9.7
28	1.1	9.0	11.7	23.5
33	4.4	9.5	21.3	25.0
38	9.3	19.1	38.2	21.0
43	13.1	13.5	23.7	19.9
48	24.7	19.1	30.6	21.8
53	15.6	20.3	17.5	20.6
58	19.7	24.0	20.1	20.8
63	14.1	16.5	14.3	18.6
68	15.0	16.9	14.5	18.6
73	6.0	8.6	8.5	10.0
78	5.0	6.0	5.2	7.2
83	1.8	1.7	3.3	4.7
88	1.0	1.0	1.3	3.8
93	0.3	0.5	0.1	1.1
98	0.3	0.0	0.3	0.8
103	0.3	0.0	0.2	0.2
108	0.2	0.0	0.0	0.2
113	0.2	0.0	0.0	0.0
118	0.0	0.2	0.0	0.0
123	0.0	0.0	0.0	0.0

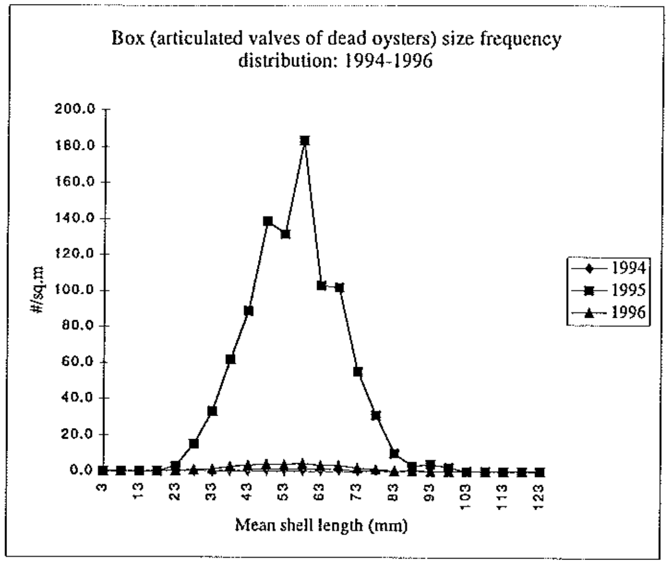


by size class/sq.m				
<30mm	1.1	68.1	93.1	40.1
>30<75mm	121.9	147.6	188.8	176.3
>75mm	9.1	9.4	10.6	18.0
reef area (acres	131.7	131.7	131.7	131.7
bushel estimates				
small	64844	78514	100468	93798
market	9708	9998	11251	19131
total	74552	88512	111719	112928

Figure 2.8

POINT OF SHOALS

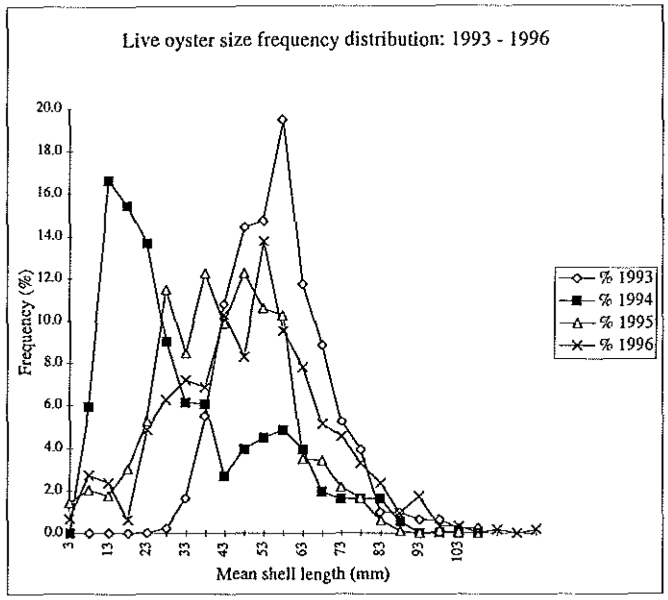
BOX Summary	1994	1995	1996
3	0.0	0.0	0.0
8	0.0	0.0	0.0
13	0.1	0.0	0.0
18	0.1	0.0	0.1
23	0.1	3.0	0.3
28	0.1	14.9	0.6
33	0.1	32.8	1.1
38	0.7	61.7	2.5
43	0.9	88.6	3.0
48	1.2	138.3	4.0
53	1.0	131.4	3.6
58	1.1	183.1	4.2
63	1.0	102.5	3.1
68	0.9	101.5	3.1
73	0.2	54.7	1.8
78	0.3	30.9	1.1
83	0.1	10.0	0.3
88	0.0	3.0	0.4
93	0.0	4.0	0.1
98	0.0	2.0	0.1
103	0.0	0.0	0.0
108	0.0	0.0	0.0
113	0.0	0.0	0.0
118	0.0	0.0	0.0
123	0.0	0.0	0.0
Box /sq.m	8.1	87.5	29.5
old	6.2	77.1	21.2
new	1.9	10.4	8.3



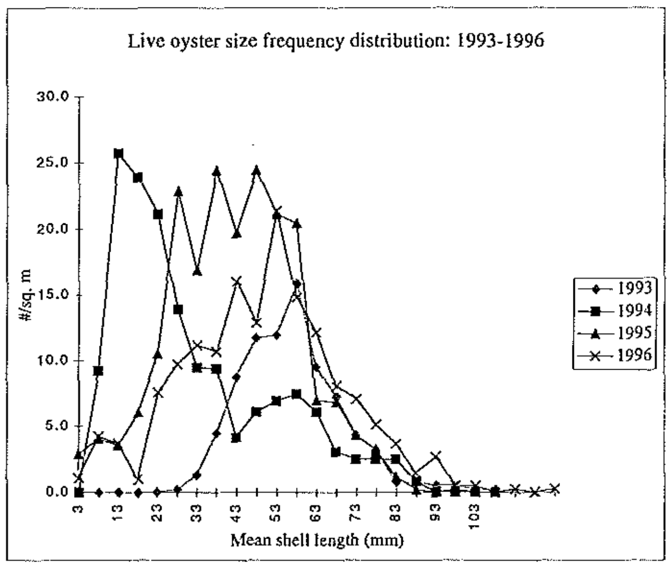
CROSS ROCK

LIVE OYSTER Summary

Size Class Midpoint (mm)	% 1993	% 1994	% 1995	% 1996
3	0.0	0.0	1.4	0.7
8	0.0	6.0	2.0	2.7
13	0.0	16.6	1.8	2.4
18	0.0	15.4	3.0	0.6
23	0.0	13.6	5.3	4.8
28	0.2	9.0	11.5	6.2
33	1.6	6.1	8.5	7.2
38	5.5	6.1	12.2	6.9
43	10.8	2.7	9.9	10.3
48	14.4	3.9	12.2	8.3
53	14.7	4.5	10.6	13.7
58	19.5	4.8	10.2	9.5
63	11.7	3.9	3.5	7.8
68	8.8	2.0	3.4	5.1
73	5.2	1.6	2.1	4.5
78	3.9	1.6	1.6	3.3
83	1.0	1.6	0.6	2.3
88	1.0	0.5	0.1	0.9
93	0.6	0.0	0.0	1.7
98	0.6	0.0	0.1	0.3
103	0.2	0.0	0.0	0.3
108	0.2	0.0	0.0	0.0
113	0.0	0.0	0.0	0.2
118	0.0	0.0	0.0	0.0
123	0.0	0.0	0.0	0.2
Oysters/sq.m	81.3	154.7	199.6	155.6

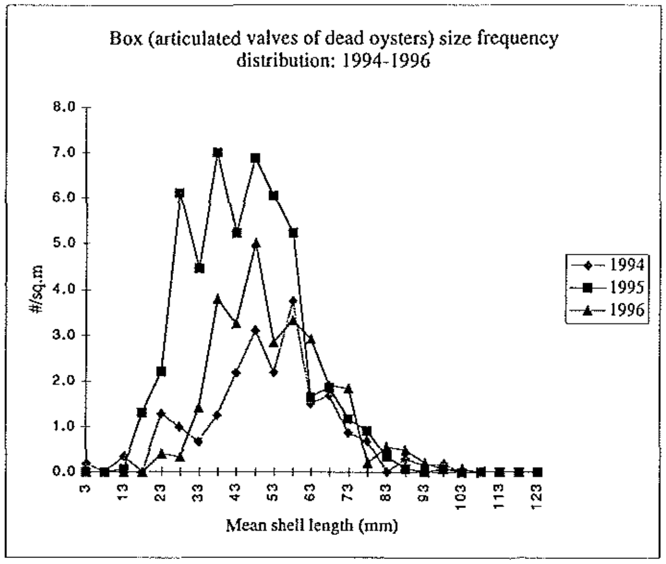


	1993	1994	1995	1996
3	0.0	0.0	2.9	1.1
8	0.0	9.2	4.0	4.2
13	0.0	25.7	3.5	3.7
18	0.0	23.9	6.0	1.0
23	0.0	21.1	10.5	7.5
28	0.2	13.9	22.9	9.7
33	1.3	9.5	16.9	11.2
38	4.5	9.4	24.4	10.7
43	8.8	4.1	19.7	16.0
48	11.7	6.1	24.4	12.9
53	12.0	6.9	21.1	21.4
58	15.8	7.5	20.4	14.8
63	9.5	6.1	7.0	12.1
68	7.2	3.0	6.8	8.0
73	4.3	2.5	4.3	7.0
78	3.2	2.5	3.2	5.1
83	0.8	2.5	1.2	3.6
88	0.8	0.8	0.2	1.5
93	0.5	0.0	0.0	2.7
98	0.5	0.0	0.2	0.5
103	0.2	0.0	0.0	0.5
108	0.2	0.0	0.0	0.0
113	0.0	0.0	0.0	0.2
118	0.0	0.0	0.0	0.0
123	0.0	0.0	0.0	0.2
by size class/sq.m				
<30mm	0.2	93.8	49.8	27.2
>30<75mm	75.1	55.1	145.0	114.1
>75mm	6.1	5.8	4.8	14.3
reef area (acres	36.7	36.7	36.7	36.7
bushel estimates				
small	11129	8164	21496	16912
market	1805	1718	1411	4243
total	12934	9883	22908	21155



CROSS ROCK

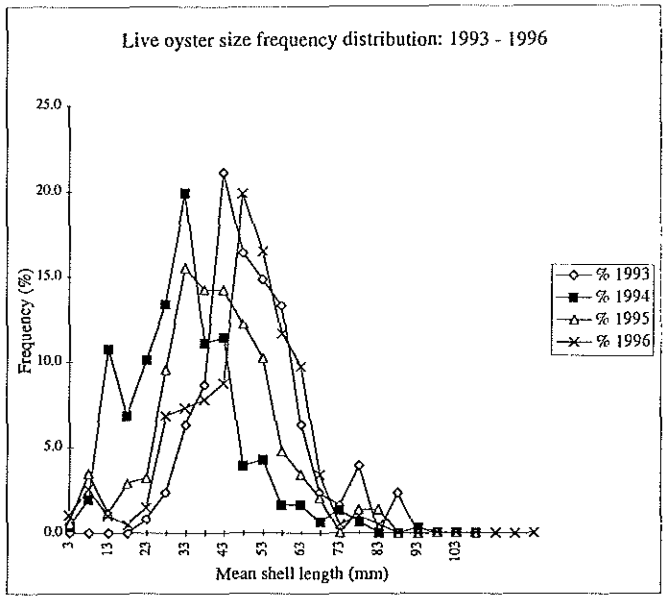
BOX Summary	1994	1995	1996
3	0.2	0.0	0.0
8	0.0	0.0	0.0
13	0.4	0.1	0.0
18	0.0	1.3	0.0
23	1.3	2.2	0.4
28	1.0	6.1	0.3
33	0.7	4.5	1.4
38	1.2	7.0	3.8
43	2.2	5.2	3.2
48	3.1	6.9	5.0
53	2.2	6.1	2.8
58	3.7	5.2	3.3
63	1.5	1.7	2.9
68	1.7	1.9	1.9
73	0.9	1.2	1.8
78	0.7	0.9	0.2
83	0.0	0.3	0.5
88	0.3	0.1	0.5
93	0.1	0.0	0.2
98	0.2	0.1	0.1
103	0.0	0.0	0.1
108	0.0	0.0	0.0
113	0.0	0.0	0.0
118	0.0	0.0	0.0
123	0.0	0.0	0.0
Box /sq.m	21.2	50.6	28.8
old	15.2	44.4	20.1
new	6.0	6.2	8.6



SHANTY ROCK

LIVE OYSTER Summary

Size Class Midpoint (mm)	% 1993	% 1994	% 1995	% 1996
3	0.0	0.3	0.6	1.0
8	0.0	2.0	3.5	2.6
13	0.0	10.7	1.2	1.0
18	0.0	6.8	2.9	0.5
23	0.8	10.1	3.2	1.5
28	2.3	13.4	9.5	6.8
33	6.3	19.9	15.5	7.3
38	8.6	11.1	14.2	7.7
43	21.1	11.4	14.2	8.7
48	16.4	3.9	12.2	19.9
53	14.8	4.2	10.2	16.5
58	13.3	1.6	4.7	11.6
63	6.3	1.6	3.4	9.7
68	2.3	0.7	2.0	3.4
73	1.6	1.3	0.0	0.5
78	3.9	0.7	1.4	1.0
83	0.0	0.0	1.4	0.5
88	2.3	0.0	0.0	0.0
93	0.0	0.3	0.0	0.0
98	0.0	0.0	0.0	0.0
103	0.0	0.0	0.0	0.0
108	0.0	0.0	0.0	0.0
113	0.0	0.0	0.0	0.0
118	0.0	0.0	0.0	0.0
123	0.0	0.0	0.0	0.0
Oysters/sq.m	35.8	150.4	90.4	43.3
	1993	1994	1995	1996
3	0.0	0.5	0.5	0.4
8	0.0	2.9	3.1	1.1
13	0.0	16.1	1.0	0.4
18	0.0	10.3	2.6	0.2
23	0.3	15.2	2.9	0.6
28	0.8	20.1	8.6	2.9
33	2.2	29.9	14.0	3.1
38	3.1	16.7	12.9	3.4
43	7.5	17.2	12.9	3.8
48	5.9	5.9	11.0	8.6
53	5.3	6.4	9.2	7.1
58	4.8	2.5	4.3	5.0
63	2.2	2.5	3.1	4.2
68	0.8	1.0	1.8	1.5
73	0.6	2.0	0.0	0.2
78	1.4	1.0	1.2	0.4
83	0.0	0.0	1.2	0.2
88	0.8	0.0	0.0	0.0
93	0.0	0.5	0.0	0.0
98	0.0	0.0	0.0	0.0
103	0.0	0.0	0.0	0.0
108	0.0	0.0	0.0	0.0
113	0.0	0.0	0.0	0.0
118	0.0	0.0	0.0	0.0
123	0.0	0.0	0.0	0.0
by size class/sq.m				
<30mm	1.1	65.1	18.8	5.8
>30<75mm	32.4	83.8	69.2	36.9
>75mm	2.2	1.5	2.5	0.6
reef area (acres	3.6	3.6	3.6	3.6
bushel estimates				
small	469	1212	1001	534
market	65	43	71	18
total	534	1255	1072	552



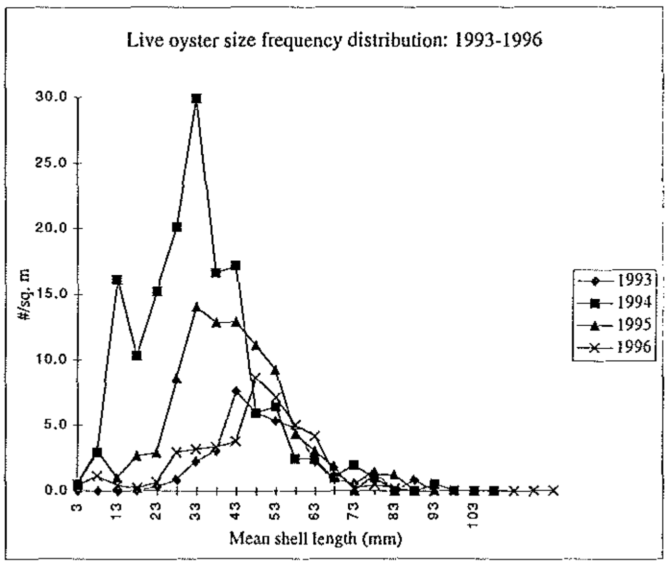
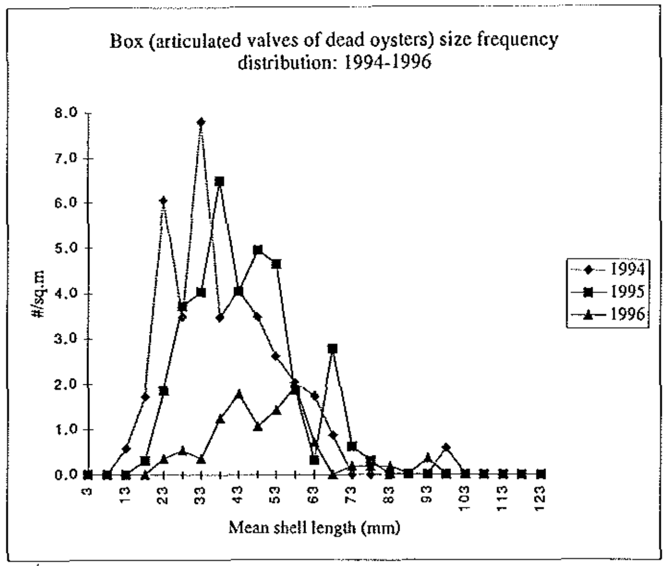


Figure 2.10

SHANTY ROCK

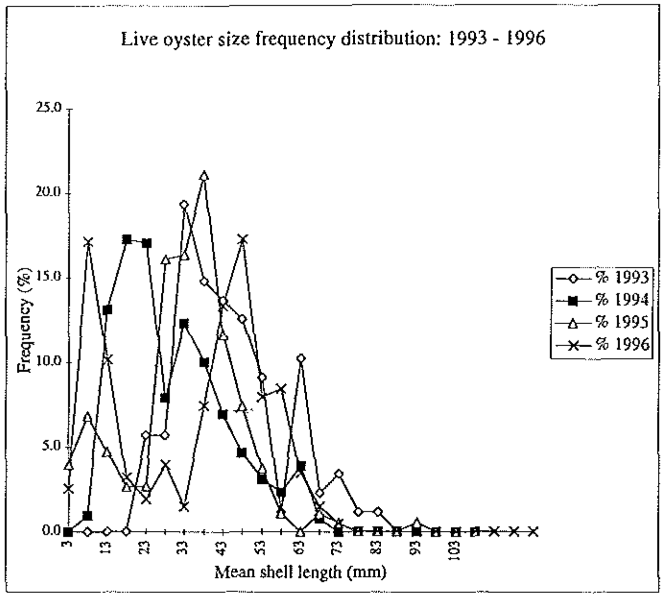
BOX Summary	1994	1995	1996
3	0.0	0.0	0.0
8	0.0	0.0	0.0
13	0.6	0.0	0.0
18	1.7	0.3	0.0
23	6.1	1.9	0.4
28	3.5	3.7	0.5
33	7.8	4.0	0.4
38	3.5	6.5	1.2
43	4.0	4.0	1.8
48	3.5	4.9	1.1
53	2.6	4.6	1.4
58	2.0	1.9	2.0
63	1.7	0.3	0.7
68	0.9	2.8	0.0
73	0.0	0.6	0.2
78	0.0	0.3	0.2
83	0.0	0.0	0.2
88	0.0	0.0	0.0
93	0.0	0.0	0.4
98	0.6	0.0	0.0
103	0.0	0.0	0.0
108	0.0	0.0	0.0
113	0.0	0.0	0.0
118	0.0	0.0	0.0
123	0.0	0.0	0.0
Box /sq.m	38.4	36.1	10.3
old	21.3	33.3	6.9
new	17.1	2.9	3.4



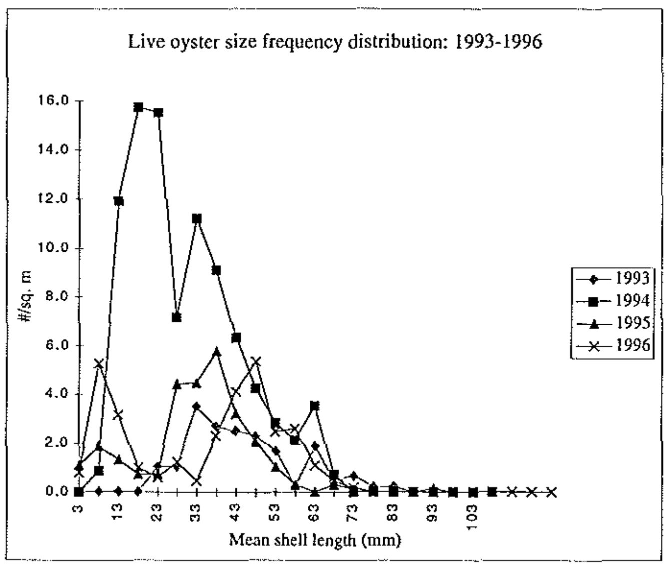
DRY LUMPS

LIVE OYSTER Summary

Size Class Midpoint (mm)	% 1993	% 1994	% 1995	% 1996
3	0.0	0.0	3.9	2.5
8	0.0	0.9	6.8	17.1
13	0.0	13.1	4.7	10.2
18	0.0	17.3	2.6	3.2
23	5.7	17.0	2.6	1.9
28	5.7	7.9	16.1	3.9
33	19.3	12.3	16.3	1.5
38	14.8	10.0	21.1	7.4
43	13.6	6.9	11.6	13.3
48	12.5	4.6	7.4	17.3
53	9.1	3.1	3.7	7.9
58	1.1	2.3	1.1	8.4
63	10.2	3.8	0.0	3.5
68	2.3	0.8	1.1	1.5
73	3.4	0.0	0.5	0.5
78	1.1	0.0	0.0	0.0
83	1.1	0.0	0.0	0.0
88	0.0	0.0	0.0	0.0
93	0.0	0.0	0.5	0.0
98	0.0	0.0	0.0	0.0
103	0.0	0.0	0.0	0.0
108	0.0	0.0	0.0	0.0
113	0.0	0.0	0.0	0.0
118	0.0	0.0	0.0	0.0
123	0.0	0.0	0.0	0.0
Oysters/sq.m	18.1	91.0	27.3	30.7



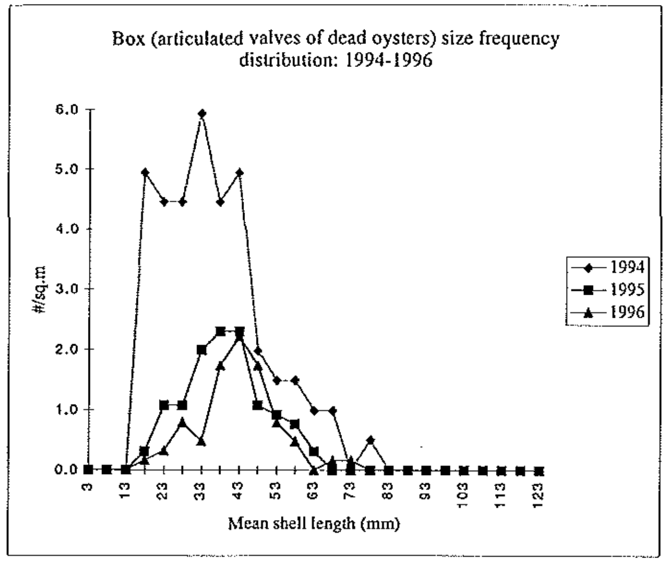
	1993	1994	1995	1996
3	0.0	0.0	1.1	0.8
8	0.0	0.9	1.9	5.3
13	0.0	11.9	1.3	3.1
18	0.0	15.7	0.7	1.0
23	1.0	15.5	0.7	0.6
28	1.0	7.2	4.4	1.2
33	3.5	11.2	4.5	0.5
38	2.7	9.1	5.8	2.3
43	2.5	6.3	3.2	4.1
48	2.3	4.2	2.0	5.3
53	1.6	2.8	1.0	2.4
58	0.2	2.1	0.3	2.6
63	1.8	3.5	0.0	1.1
68	0.4	0.7	0.3	0.5
73	0.6	0.0	0.1	0.2
78	0.2	0.0	0.0	0.0
83	0.2	0.0	0.0	0.0
88	0.0	0.0	0.0	0.0
93	0.0	0.0	0.1	0.0
98	0.0	0.0	0.0	0.0
103	0.0	0.0	0.0	0.0
108	0.0	0.0	0.0	0.0
113	0.0	0.0	0.0	0.0
118	0.0	0.0	0.0	0.0
123	0.0	0.0	0.0	0.0



by size class/sq.m				
<30mm	2.1	51.1	10.0	11.9
>30<75mm	15.6	39.9	17.1	18.8
>75mm	0.4	0.0	0.1	0.0
reef area (acres	5.9	5.9	5.9	5.9
bushel estimates				
small	374	956	410	450
market	20	0	7	0
total	393	956	417	450

DRY LUMPS

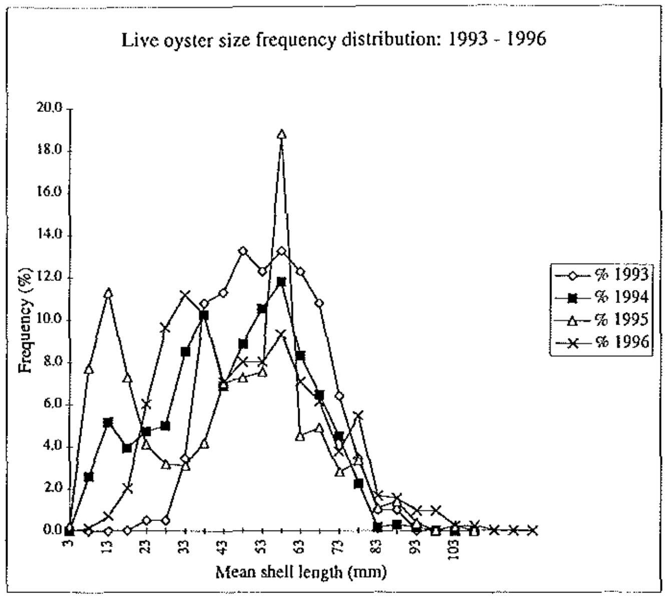
BOX Summary	1994	1995	1996
3	0.0	0.0	0.0
8	0.0	0.0	0.0
13	0.0	0.0	0.0
18	5.0	0.3	0.2
23	4.5	1.1	0.3
28	4.5	1.1	0.8
33	6.0	2.0	0.5
38	4.5	2.3	1.7
43	5.0	2.3	2.2
48	2.0	1.1	1.7
53	1.5	0.9	0.8
58	1.5	0.8	0.5
63	1.0	0.3	0.0
68	1.0	0.0	0.2
73	0.0	0.0	0.2
78	0.5	0.0	0.0
83	0.0	0.0	0.0
88	0.0	0.0	0.0
93	0.0	0.0	0.0
98	0.0	0.0	0.0
103	0.0	0.0	0.0
108	0.0	0.0	0.0
113	0.0	0.0	0.0
118	0.0	0.0	0.0
123	0.0	0.0	0.0
Box /sq.m	36.7	12.1	9.0
old	22	11.4	7.6
new	14.7	0.7	1.4



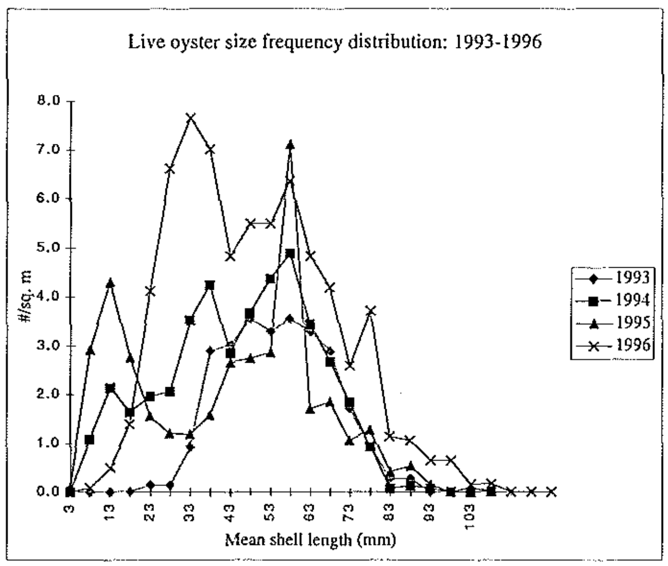
MULBERRY POINT

LIVE OYSTER Summary

Size Class Midpoint (mm)	% 1993	% 1994	% 1995	% 1996
3	0.0	0.0	0.2	0.0
8	0.0	2.6	7.7	0.1
13	0.0	5.2	11.3	0.7
18	0.0	3.9	7.2	2.0
23	0.5	4.7	4.1	6.0
28	0.5	5.0	3.1	9.6
33	3.4	8.5	3.1	11.2
38	10.8	10.2	4.1	10.2
43	11.3	6.9	7.0	7.1
48	13.2	8.8	7.2	8.0
53	12.3	10.5	7.5	8.0
58	13.2	11.8	18.8	9.3
63	12.3	8.3	4.5	7.1
68	10.8	6.4	4.9	6.1
73	6.4	4.5	2.8	3.8
78	3.4	2.2	3.3	5.4
83	1.0	0.1	1.1	1.6
88	1.0	0.3	1.4	1.5
93	0.0	0.1	0.4	0.9
98	0.0	0.0	0.0	0.9
103	0.0	0.0	0.2	0.2
108	0.0	0.0	0.0	0.2
113	0.0	0.0	0.0	0.0
118	0.0	0.0	0.0	0.0
123	0.0	0.0	0.0	0.0
Oysters/sq.m	26.8	41.4	37.8	68.5



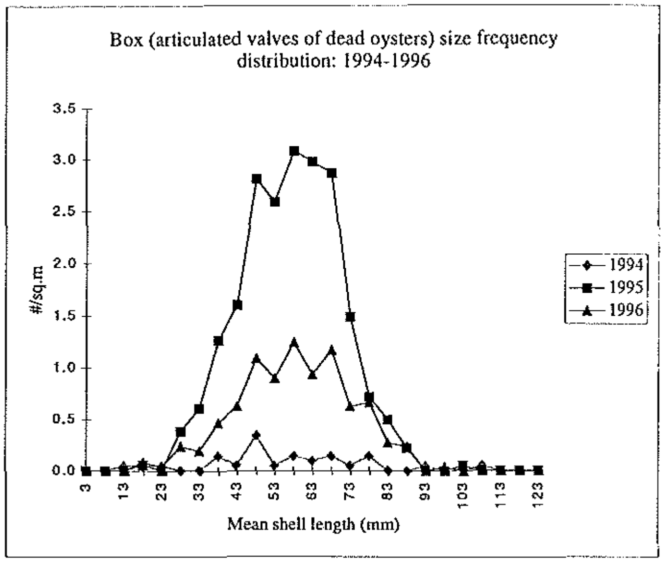
	1993	1994	1995	1996
3	0.0	0.0	0.1	0.0
8	0.0	1.1	2.9	0.1
13	0.0	2.1	4.3	0.5
18	0.0	1.6	2.7	1.4
23	0.1	1.9	1.5	4.1
28	0.1	2.1	1.2	6.6
33	0.9	3.5	1.2	7.6
38	2.9	4.2	1.6	7.0
43	3.0	2.8	2.7	4.8
48	3.5	3.7	2.7	5.5
53	3.3	4.4	2.8	5.5
58	3.5	4.9	7.1	6.4
63	3.3	3.4	1.7	4.8
68	2.9	2.7	1.8	4.2
73	1.7	1.8	1.1	2.6
78	0.9	0.9	1.3	3.7
83	0.3	0.1	0.4	1.1
88	0.3	0.1	0.5	1.0
93	0.0	0.1	0.1	0.6
98	0.0	0.0	0.0	0.6
103	0.0	0.0	0.1	0.2
108	0.0	0.0	0.0	0.2
113	0.0	0.0	0.0	0.0
118	0.0	0.0	0.0	0.0
123	0.0	0.0	0.0	0.0



	1993	1994	1995	1996
by size class/sq.m				
<30mm	0.3	8.8	12.8	12.6
>30<75mm	25.1	31.4	22.7	48.4
>75mm	1.4	1.2	2.4	7.5
reef area (acres	48.4	48.4	48.4	48.4
bushel estimates				
small	4907	6151	4435	9462
market	565	451	940	2927
total	5472	6602	5375	12389

MULBERRY POINT

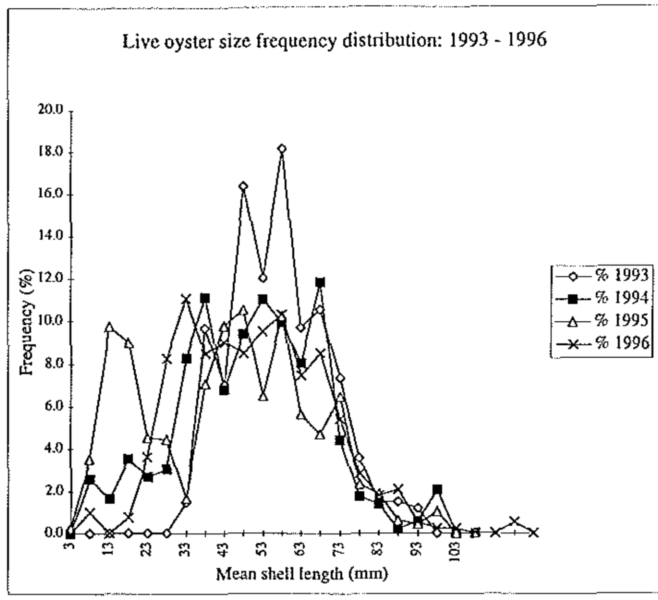
BOX Summary	1994	1995	1996
3	0.0	0.0	0.0
8	0.0	0.0	0.0
13	0.0	0.0	0.0
18	0.0	0.1	0.1
23	0.0	0.0	0.0
28	0.0	0.4	0.2
33	0.0	0.6	0.2
38	0.1	1.3	0.5
43	0.0	1.6	0.6
48	0.3	2.8	1.1
53	0.0	2.6	0.9
58	0.1	3.1	1.2
63	0.1	3.0	0.9
68	0.1	2.9	1.2
73	0.0	1.5	0.6
78	0.1	0.7	0.7
83	0.0	0.5	0.3
88	0.0	0.2	0.2
93	0.0	0.0	0.0
98	0.0	0.0	0.0
103	0.0	0.1	0.0
108	0.0	0.0	0.0
113	0.0	0.0	0.0
118	0.0	0.0	0.0
123	0.0	0.0	0.0
Box /sq.m	1.4	21.2	8.8
old	1.4	21.0	7.0
new	0.0	0.2	1.8



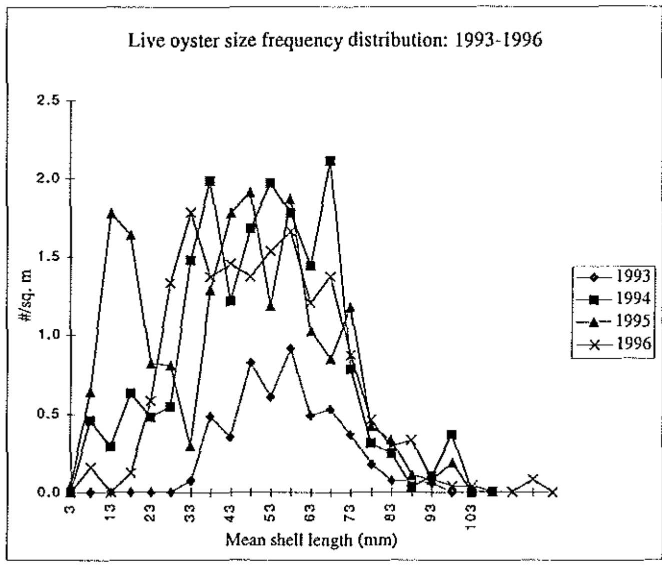
MULBERRY & SWASH(1993), SWASH (1994-1996)

LIVE OYSTER Summary

Size Class Midpoint (mm)	% 1993	% 1994	% 1995	% 1996
3	0.0	0.0	0.2	0.0
8	0.0	2.6	3.5	1.0
13	0.0	1.6	9.7	0.0
18	0.0	3.5	9.0	0.8
23	0.0	2.7	4.5	3.6
28	0.0	3.0	4.4	8.2
33	1.5	8.2	1.6	11.1
38	9.6	11.1	7.1	8.5
43	7.0	6.8	9.8	9.0
48	16.3	9.4	10.5	8.5
53	12.0	11.0	6.5	9.5
58	18.1	9.9	10.3	10.3
63	9.7	8.0	5.6	7.5
68	10.5	11.8	4.7	8.5
73	7.3	4.4	6.4	5.4
78	3.5	1.7	2.3	2.8
83	1.5	1.4	1.8	1.8
88	1.5	0.2	0.6	2.1
93	1.2	0.6	0.4	0.5
98	0.0	2.1	1.0	0.3
103	0.0	0.0	0.0	0.3
108	0.0	0.0	0.0	0.0
113	0.3	0.0	0.0	0.0
118	0.0	0.0	0.0	0.5
123	0.0	0.0	0.0	0.0
Oysters/sq.m	05.0	17.9	18.2	16.1



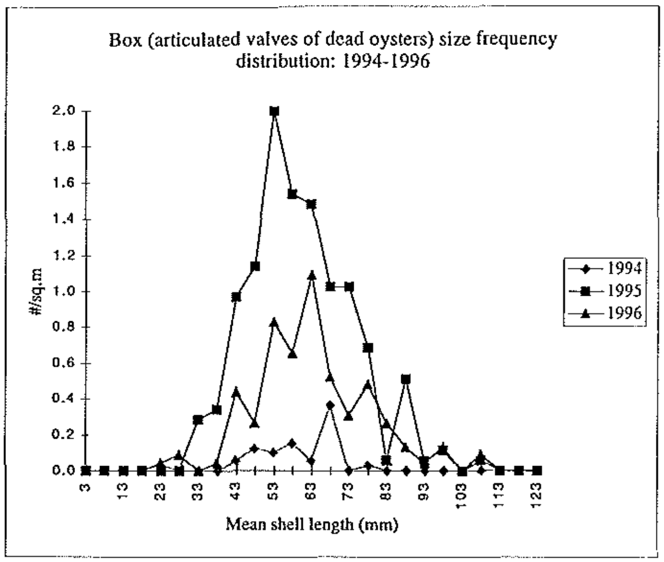
	1993	1994	1995	1996
3	0.0	0.0	0.0	0.0
8	0.0	0.5	0.6	0.2
13	0.0	0.3	1.8	0.0
18	0.0	0.6	1.6	0.1
23	0.0	0.5	0.8	0.6
28	0.0	0.5	0.8	1.3
33	0.1	1.5	0.3	1.8
38	0.5	2.0	1.3	1.4
43	0.4	1.2	1.8	1.5
48	0.8	1.7	1.9	1.4
53	0.6	2.0	1.2	1.5
58	0.9	1.8	1.9	1.7
63	0.5	1.4	1.0	1.2
68	0.5	2.1	0.8	1.4
73	0.4	0.8	1.2	0.9
78	0.2	0.3	0.4	0.5
83	0.1	0.2	0.3	0.3
88	0.1	0.0	0.1	0.3
93	0.1	0.1	0.1	0.1
98	0.0	0.4	0.2	0.0
103	0.0	0.0	0.0	0.0
108	0.0	0.0	0.0	0.0
113	0.0	0.0	0.0	0.0
118	0.0	0.0	0.0	0.1
123	0.0	0.0	0.0	0.0



by size class/sq.m				
<30mm	0.0	2.4	5.7	2.2
>30<75mm	4.6	14.4	11.3	12.6
>75mm	0.4	1.1	1.1	1.3
reef area (acres	201.0	201.0	201.0	201.0
bushel estimates				
small	3753	11722	9214	10233
market	646	1723	1823	2153
total	4399	13445	11036	12387

MULBERRY & SWASH(1993), SWASH (1994-1996)

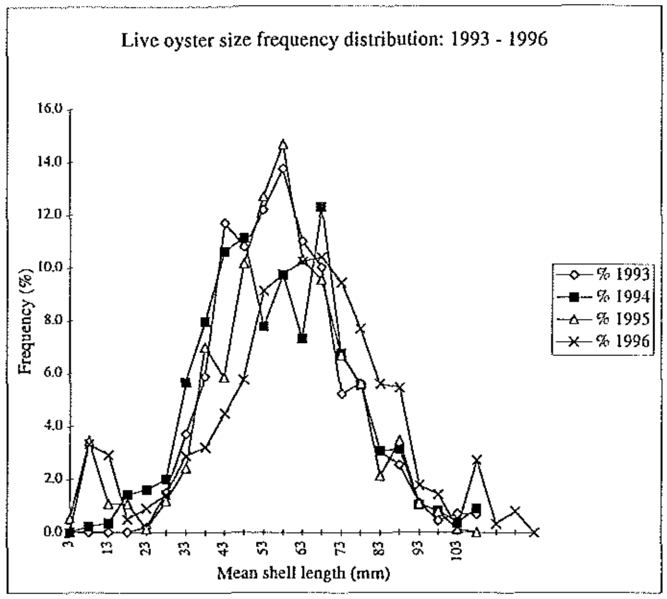
BOX Summary	1994	1995	1996
3	0.0	0.0	0.0
8	0.0	0.0	0.0
13	0.0	0.0	0.0
18	0.0	0.0	0.0
23	0.0	0.0	0.0
28	0.0	0.0	0.1
33	0.0	0.3	0.0
38	0.0	0.3	0.0
43	0.1	1.0	0.4
48	0.1	1.1	0.3
53	0.1	2.0	0.8
58	0.1	1.5	0.7
63	0.1	1.5	1.1
68	0.4	1.0	0.5
73	0.0	1.0	0.3
78	0.0	0.7	0.5
83	0.0	0.1	0.3
88	0.0	0.5	0.1
93	0.0	0.1	0.0
98	0.0	0.1	0.1
103	0.0	0.0	0.0
108	0.0	0.1	0.1
113	0.0	0.0	0.0
118	0.0	0.0	0.0
123	0.0	0.0	0.0
Box /sq.m	0.9	11.3	5.4
old	0.8	11.1	4.6
new	0.1	0.2	0.8



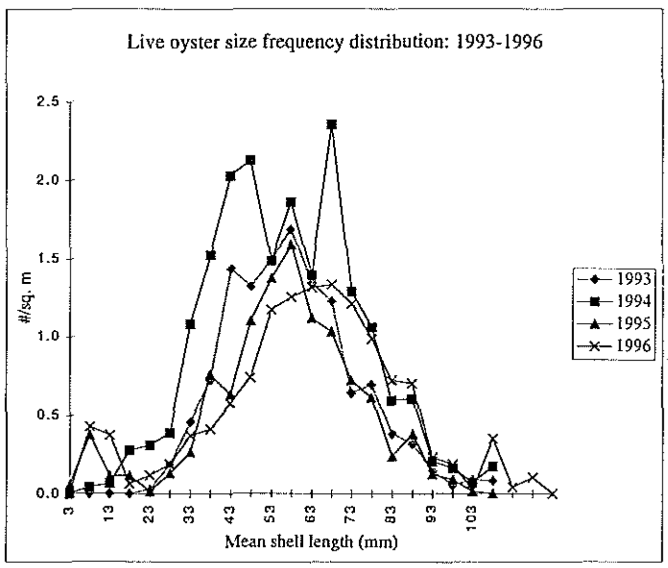
UPPER JAIL ISLAND

LIVE OYSTER Summary

Size Class Midpoint (mm)	% 1993	% 1994	% 1995	% 1996
3	0.0	0.0	0.5	0.0
8	0.0	0.2	3.4	3.3
13	0.0	0.3	1.1	2.9
18	0.0	1.4	1.1	0.5
23	0.2	1.6	0.1	0.9
28	1.5	2.0	1.2	1.4
33	3.7	5.6	2.4	2.9
38	5.9	7.9	7.0	3.2
43	11.7	10.6	5.8	4.5
48	10.8	11.1	10.1	5.7
53	12.2	7.8	12.7	9.1
58	13.7	9.7	14.6	9.7
63	11.0	7.3	10.3	10.2
68	10.0	12.3	9.5	10.4
73	5.2	6.7	6.6	9.4
78	5.6	5.5	5.6	7.7
83	3.1	3.1	2.1	5.6
88	2.5	3.1	3.4	5.4
93	1.1	1.1	1.1	1.8
98	0.4	0.8	0.8	1.4
103	0.7	0.4	0.1	0.2
108	0.7	0.9	0.0	2.7
113	0.0	0.4	0.1	0.3
118	0.0	0.1	0.1	0.8
123	0.0	0.0	0.0	0.0
Oysters/sq.m	12.2	19.1	10.8	12.8

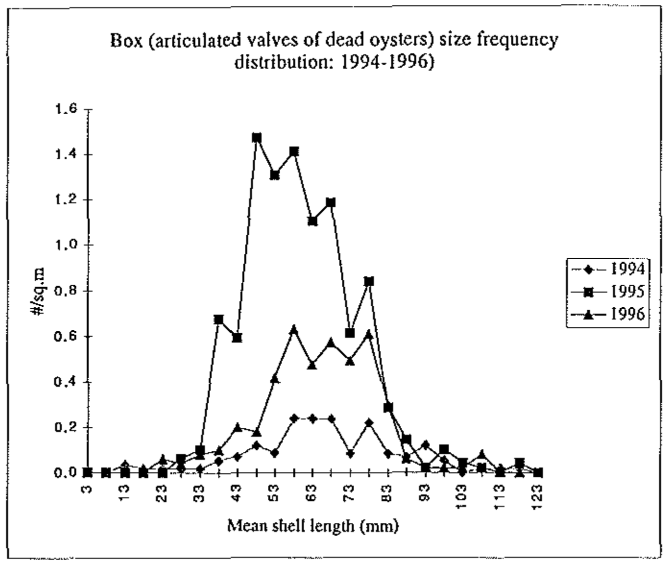


	1993	1994	1995	1996
3	0.0	0.0	0.1	0.0
8	0.0	0.0	0.4	0.4
13	0.0	0.1	0.1	0.4
18	0.0	0.3	0.1	0.1
23	0.0	0.3	0.0	0.1
28	0.2	0.4	0.1	0.2
33	0.5	1.1	0.3	0.4
38	0.7	1.5	0.8	0.4
43	1.4	2.0	0.6	0.6
48	1.3	2.1	1.1	0.7
53	1.5	1.5	1.4	1.2
58	1.7	1.9	1.6	1.2
63	1.3	1.4	1.1	1.3
68	1.2	2.4	1.0	1.3
73	0.6	1.3	0.7	1.2
78	0.7	1.1	0.6	1.0
83	0.4	0.6	0.2	0.7
88	0.3	0.6	0.4	0.7
93	0.1	0.2	0.1	0.2
98	0.1	0.2	0.1	0.2
103	0.1	0.1	0.0	0.0
108	0.1	0.2	0.0	0.3
113	0.0	0.1	0.0	0.0
118	0.0	0.0	0.0	0.1
123	0.0	0.0	0.0	0.0
by size calss				
<30mm	0.2	1.1	0.8	1.2
>30<75mm	10.3	15.1	8.6	8.4
>75mm	1.7	2.9	1.5	3.3
reef area (acres	612.0	612.0	612.0	612.0
bushel estimates				
small	25482	37388	21197	20657
market	8568	14512	7195	16394
total	34051	51899	28392	37052



UPPER JAIL ISLAND

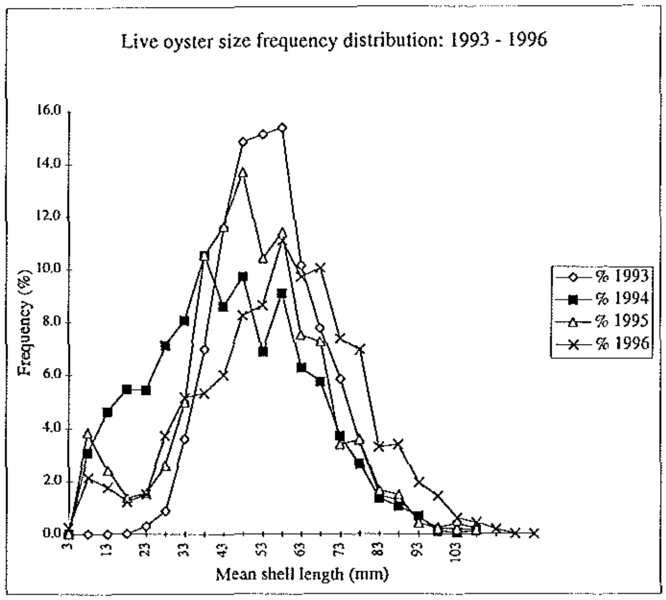
BOX Summary	1994	1995	1996
3	0.0	0.0	0.0
8	0.0	0.0	0.0
13	0.0	0.0	0.0
18	0.0	0.0	0.0
23	0.0	0.0	0.1
28	0.0	0.1	0.0
33	0.0	0.1	0.1
38	0.1	0.7	0.1
43	0.1	0.6	0.2
48	0.1	1.5	0.2
53	0.1	1.3	0.4
58	0.2	1.4	0.6
63	0.2	1.1	0.5
68	0.2	1.2	0.6
73	0.1	0.6	0.5
78	0.2	0.8	0.6
83	0.1	0.3	0.3
88	0.1	0.1	0.1
93	0.1	0.0	0.0
98	0.1	0.1	0.0
103	0.0	0.0	0.0
108	0.0	0.0	0.1
113	0.0	0.0	0.0
118	0.0	0.0	0.0
123	0.0	0.0	0.0
Box /sq.m	1.8	10.0	4.3
old	1.6	9.7	3.9
new	0.2	0.3	0.4



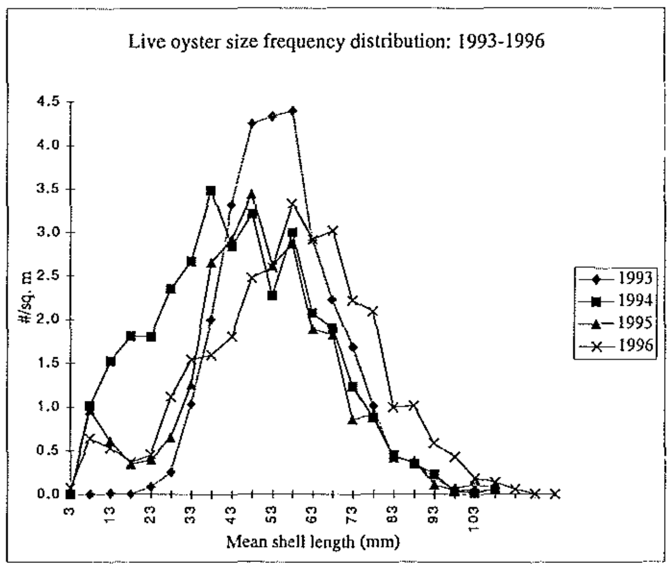
SWASH SLOUGH (1993) AND SWASH MUD (1994-1996)

LIVE OYSTER Summary

Size Class Midpoint (mm)	% 1993	% 1994	% 1995	% 1996
3	0.0	0.0	0.0	0.2
8	0.0	3.1	3.8	2.1
13	0.0	4.6	2.4	1.8
18	0.0	5.4	1.3	1.2
23	0.3	5.4	1.6	1.5
28	0.9	7.1	2.6	3.7
33	3.6	8.0	5.0	5.1
38	7.0	10.5	10.5	5.3
43	11.6	8.6	11.6	6.0
48	14.8	9.7	13.7	8.2
53	15.1	6.8	10.4	8.6
58	15.3	9.0	11.4	11.1
63	10.1	6.2	7.5	9.7
68	7.7	5.7	7.2	10.0
73	5.8	3.7	3.4	7.4
78	3.5	2.6	3.6	6.9
83	1.4	1.3	1.6	3.3
88	1.3	1.0	1.5	3.4
93	0.6	0.7	0.4	1.9
98	0.2	0.1	0.2	1.4
103	0.4	0.0	0.2	0.6
108	0.2	0.1	0.2	0.4
113	0.2	0.0	0.0	0.2
118	0.0	0.0	0.0	0.0
123	0.0	0.0	0.0	0.0
Oysters/sq.m	28.7	33.1	25.1	30.1

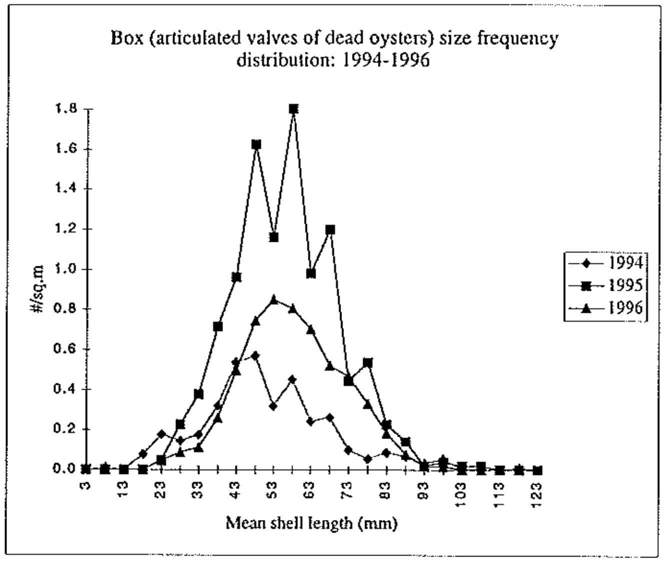


	1993	1994	1995	1996
3	0.0	0.0	0.0	0.1
8	0.0	1.0	1.0	0.6
13	0.0	1.5	0.6	0.5
18	0.0	1.8	0.3	0.4
23	0.1	1.8	0.4	0.5
28	0.2	2.3	0.6	1.1
33	1.0	2.7	1.3	1.5
38	2.0	3.5	2.6	1.6
43	3.3	2.8	2.9	1.8
48	4.2	3.2	3.4	2.5
53	4.3	2.3	2.6	2.6
58	4.4	3.0	2.9	3.3
63	2.9	2.1	1.9	2.9
68	2.2	1.9	1.8	3.0
73	1.7	1.2	0.9	2.2
78	1.0	0.9	0.9	2.1
83	0.4	0.4	0.4	1.0
88	0.4	0.3	0.4	1.0
93	0.2	0.2	0.1	0.6
98	0.1	0.0	0.0	0.4
103	0.1	0.0	0.0	0.2
108	0.1	0.0	0.0	0.1
113	0.1	0.0	0.0	0.1
118	0.0	0.0	0.0	0.0
123	0.0	0.0	0.0	0.0
by size class/sq.m				
<30mm	0.3	8.5	3.0	3.2
>30<75mm	26.1	22.6	20.3	21.4
>75mm	2.3	2.0	1.9	5.4
reef area (acres	1244.9	1244.9	1244.9	1244.9
bushel estimates				
small	131211	113791	101956	107874
market	22658	19910	19265	54749
total	153869	133701	121221	162622



SWASH SLOUGH (1993) AND SWASH MUD (1994-1996)

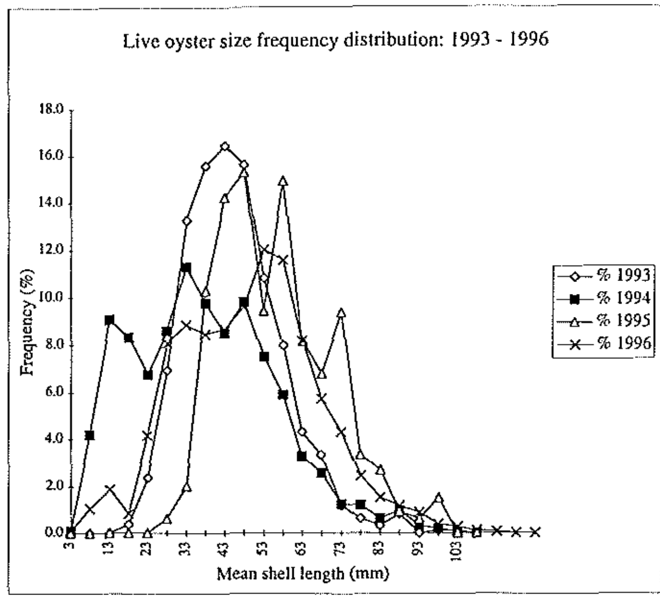
BOX Summary	1994	1995	1996
3	0.0	0.0	0.0
8	0.0	0.0	0.0
13	0.0	0.0	0.0
18	0.1	0.0	0.0
23	0.2	0.0	0.0
28	0.1	0.2	0.1
33	0.2	0.4	0.1
38	0.3	0.7	0.3
43	0.5	1.0	0.5
48	0.6	1.6	0.7
53	0.3	1.2	0.8
58	0.4	1.8	0.8
63	0.2	1.0	0.7
68	0.3	1.2	0.5
73	0.1	0.4	0.5
78	0.1	0.5	0.3
83	0.1	0.2	0.2
88	0.1	0.1	0.1
93	0.0	0.0	0.0
98	0.1	0.0	0.0
103	0.0	0.0	0.0
108	0.0	0.0	0.0
113	0.0	0.0	0.0
118	0.0	0.0	0.0
123	0.0	0.0	0.0
Box /sq.m	3.7	10.5	5.7
old	2.7	9.9	4.7
new	1.0	0.6	1.1



OFFSHORE SWASH

LIVE OYSTER Summary

Size Class Midpoint (mm)	% 1993	% 1994	% 1995	% 1996
3	0.0	0.1	0.0	0.1
8	0.0	4.2	0.0	1.0
13	0.0	9.1	0.0	1.9
18	0.3	8.3	0.0	0.8
23	2.4	6.7	0.0	4.1
28	6.9	8.6	0.6	8.1
33	13.2	11.3	2.0	8.8
38	15.6	9.7	10.3	8.5
43	16.4	8.5	14.2	8.7
48	15.6	9.8	15.3	9.6
53	10.8	7.5	9.4	12.0
58	8.0	5.9	14.9	11.6
63	4.3	3.3	8.2	8.2
68	3.3	2.6	6.8	5.7
73	1.2	1.2	9.4	4.3
78	0.6	1.2	3.3	2.4
83	0.3	0.6	2.7	1.5
88	0.8	1.0	0.9	1.1
93	0.0	0.3	0.6	0.9
98	0.1	0.2	1.5	0.4
103	0.1	0.0	0.0	0.3
108	0.0	0.0	0.0	0.1
113	0.0	0.1	0.0	0.1
118	0.1	0.0	0.0	0.0
123	0.0	0.0	0.0	0.0
Oysters/sq.m	35.3	46.4	40.3	57.9
	1993	1994	1995	1996
3	0.0	0.0	0.0	0.0
8	0.0	1.9	0.0	0.6
13	0.0	4.2	0.0	1.1
18	0.1	3.9	0.0	0.5
23	0.8	3.1	0.0	2.4
28	2.4	4.0	0.2	4.7
33	4.7	5.2	0.8	5.1
38	5.5	4.5	4.1	4.9
43	5.8	3.9	5.7	5.0
48	5.5	4.6	6.2	5.5
53	3.8	3.5	3.8	7.0
58	2.8	2.7	6.0	6.7
63	1.5	1.5	3.3	4.7
68	1.2	1.2	2.7	3.3
73	0.4	0.6	3.8	2.5
78	0.2	0.5	1.3	1.4
83	0.1	0.3	1.1	0.9
88	0.3	0.4	0.4	0.7
93	0.0	0.1	0.2	0.5
98	0.0	0.1	0.6	0.2
103	0.0	0.0	0.0	0.2
108	0.0	0.0	0.0	0.1
113	0.0	0.0	0.0	0.0
118	0.0	0.0	0.0	0.0
123	0.0	0.0	0.0	0.0
by size class/sq.m				
<30mm	3.4	17.2	0.2	9.3
>30<75mm	31.2	27.7	36.4	44.8
>75mm	0.7	1.5	3.6	3.9
reef area (acres	626.5	626.5	626.5	626.5
bushel estimates				
small	78904	70226	92239	113322
market	3539	7810	18320	19717
total	82443	78035	110559	133039



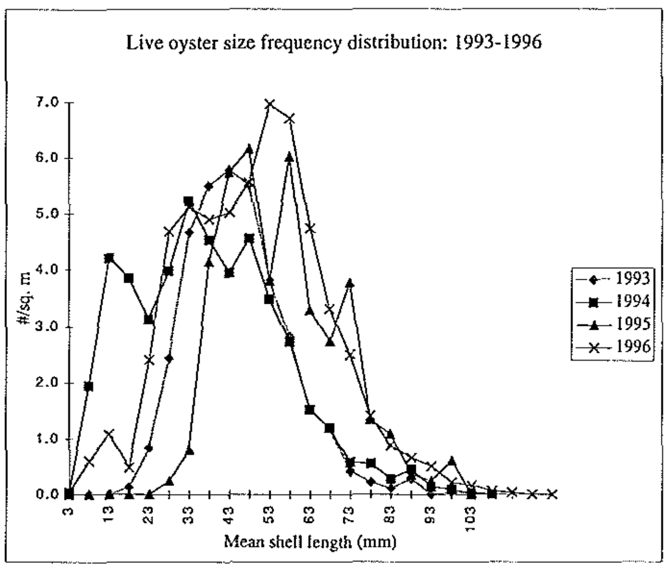
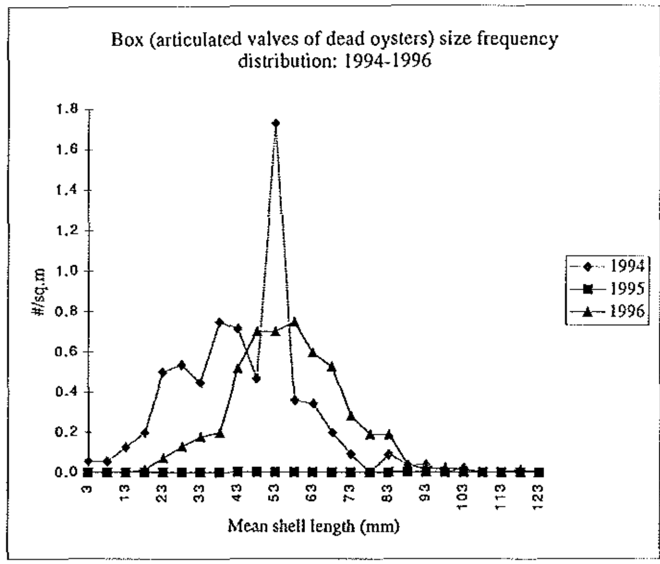


Figure 2.16

OFFSHORE SWASH

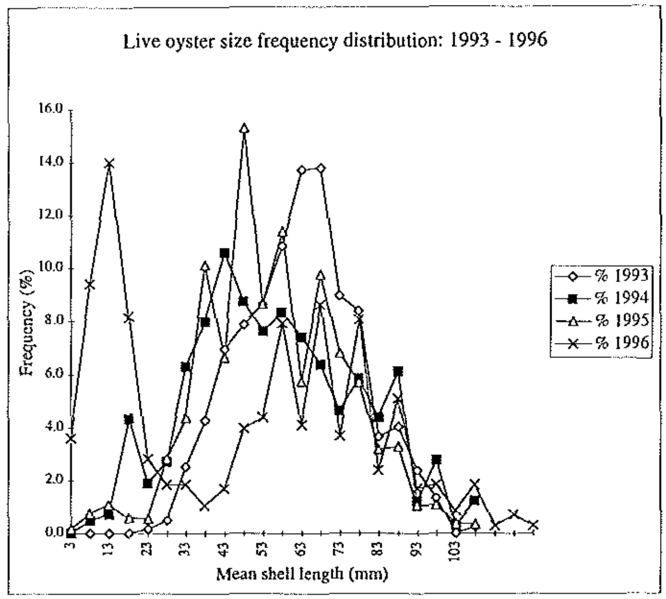
BOX Summary	1994	1995	1996
3	0.1	0.0	0.0
8	0.1	0.0	0.0
13	0.1	0.0	0.0
18	0.2	0.0	0.0
23	0.5	0.0	0.1
28	0.5	0.0	0.1
33	0.4	0.0	0.2
38	0.7	0.0	0.2
43	0.7	0.0	0.5
48	0.5	0.0	0.7
53	1.7	0.0	0.7
58	0.4	0.0	0.7
63	0.3	0.0	0.6
68	0.2	0.0	0.5
73	0.1	0.0	0.3
78	0.0	0.0	0.2
83	0.1	0.0	0.2
88	0.0	0.0	0.0
93	0.0	0.0	0.0
98	0.0	0.0	0.0
103	0.0	0.0	0.0
108	0.0	0.0	0.0
113	0.0	0.0	0.0
118	0.0	0.0	0.0
123	0.0	0.0	0.0
Box /sq.m	6.7	11.4	5.1
old	4.4	9.4	3.9
new	2.3	2.8	1.2

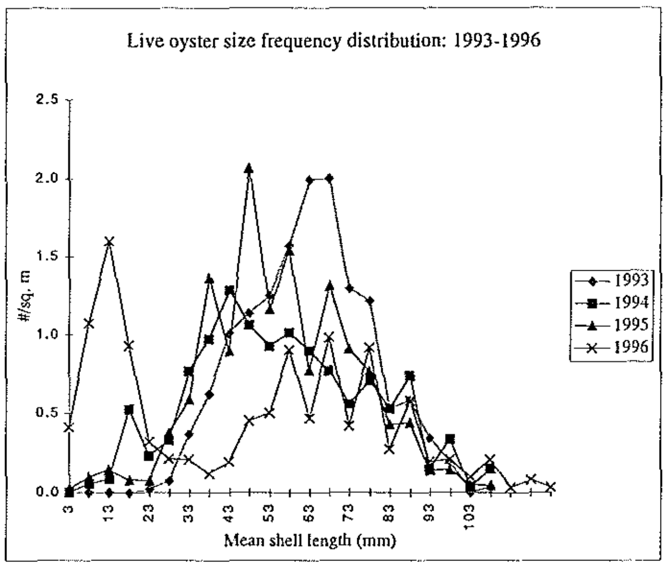


LOWER JAIL ILSAND

LIVE OYSTER Summary

Size Class Midpoint (mm)	% 1993	% 1994	% 1995	% 1996
3	0.0	0.0	0.2	3.6
8	0.0	0.5	0.7	9.4
13	0.0	0.7	1.1	14.0
18	0.0	4.3	0.6	8.1
23	0.2	1.9	0.5	2.8
28	0.5	2.7	2.8	1.8
33	2.5	6.3	4.4	1.8
38	4.3	8.0	10.1	1.0
43	6.9	10.6	6.6	1.7
48	7.9	8.7	15.3	4.0
53	8.6	7.6	8.6	4.4
58	10.8	8.3	11.4	7.9
63	13.7	7.4	5.7	4.1
68	13.8	6.4	9.7	8.6
73	8.9	4.6	6.8	3.7
78	8.4	5.8	5.7	8.1
83	3.6	4.4	3.2	2.4
88	4.0	6.1	3.3	5.1
93	2.4	1.2	1.0	1.7
98	1.3	2.7	1.1	1.8
103	0.0	0.3	0.4	0.8
108	0.2	1.2	0.3	1.8
113	0.8	0.3	0.2	0.3
118	0.3	0.0	0.3	0.7
123	0.9	0.0	0.2	0.3
Oysters/sq.m	14.5	12.2	13.5	11.4
	1993	1994	1995	1996
3	0.0	0.0	0.0	0.4
8	0.0	0.1	0.1	1.1
13	0.0	0.1	0.1	1.6
18	0.0	0.5	0.1	0.9
23	0.0	0.2	0.1	0.3
28	0.1	0.3	0.4	0.2
33	0.4	0.8	0.6	0.2
38	0.6	1.0	1.4	0.1
43	1.0	1.3	0.9	0.2
48	1.1	1.1	2.1	0.5
53	1.3	0.9	1.2	0.5
58	1.6	1.0	1.5	0.9
63	2.0	0.9	0.8	0.5
68	2.0	0.8	1.3	1.0
73	1.3	0.6	0.9	0.4
78	1.2	0.7	0.8	0.9
83	0.5	0.5	0.4	0.3
88	0.6	0.7	0.4	0.6
93	0.3	0.1	0.1	0.2
98	0.2	0.3	0.1	0.2
103	0.0	0.0	0.0	0.1
108	0.0	0.2	0.0	0.2
113	0.1	0.0	0.0	0.0
118	0.0	0.0	0.0	0.1
123	0.1	0.0	0.0	0.0
by size class/sq.m				
<30mm	0.1	1.2	0.8	4.5
>30<75mm	11.2	8.3	10.6	4.2
>75mm	3.2	2.7	2.1	2.6
reef area (acres	628.9	628.9	628.9	628.9
bushel estimates				
small	28551	20962	26929	10789
market	16147	13619	10581	13344
total	44698	34581	37510	24133





LOWER JAIL ILSAND

BOX Summary	1994	1995	1996
3	0.0	0.0	0.0
8	0.0	0.0	0.0
13	0.0	0.0	0.0
18	0.1	0.0	0.0
23	0.0	0.0	0.0
28	0.2	0.1	0.0
33	0.1	0.3	0.0
38	0.3	0.6	0.1
43	0.2	0.3	0.2
48	0.7	1.4	0.3
53	0.3	1.1	0.2
58	0.8	1.8	0.4
63	0.5	1.2	0.4
68	0.6	1.2	0.3
73	0.4	0.8	0.3
78	0.5	0.4	0.3
83	0.2	0.3	0.1
88	0.5	0.5	0.2
93	0.1	0.2	0.0
98	0.1	0.1	0.0
103	0.1	0.0	0.0
108	0.0	0.1	0.0
113	0.0	0.0	0.0
118	0.0	0.0	0.0
123	0.0	0.0	0.0
Box /sq.m	5.5	10.6	3.0
old	3.4	10.0	2.6
new	2.1	0.5	0.4

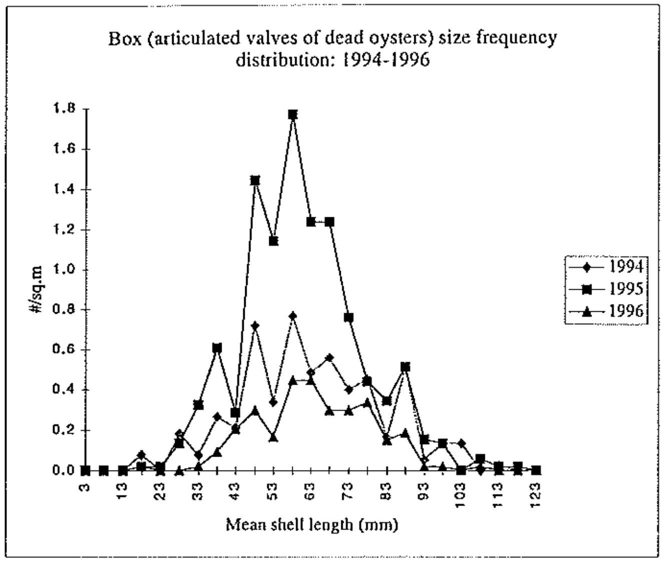
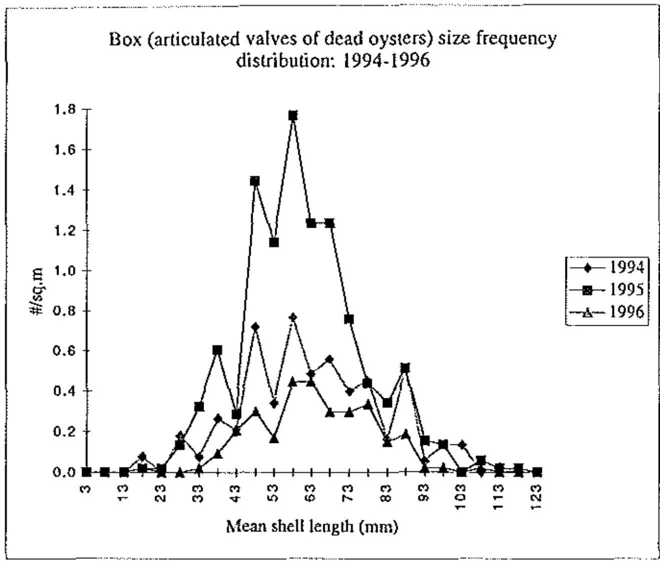


Figure 2.17

LOWER JAIL ILSAND

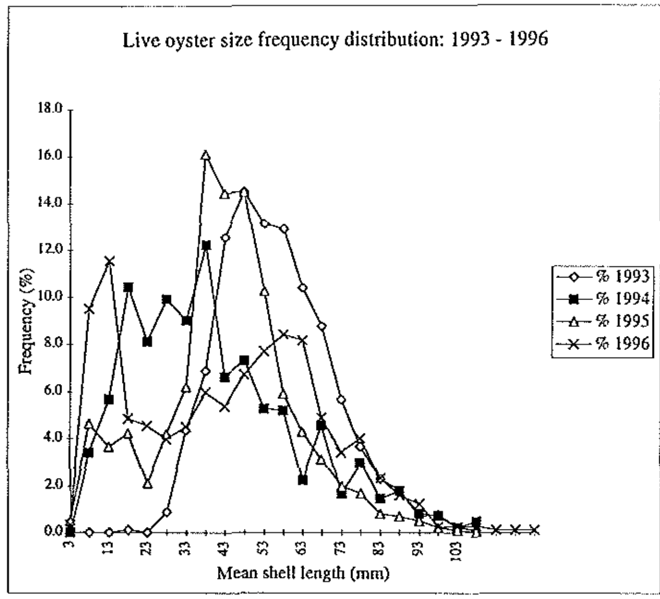
BOX Summary	1994	1995	1996
3	0.0	0.0	0.0
8	0.0	0.0	0.0
13	0.0	0.0	0.0
18	0.1	0.0	0.0
23	0.0	0.0	0.0
28	0.2	0.1	0.0
33	0.1	0.3	0.0
38	0.3	0.6	0.1
43	0.2	0.3	0.2
48	0.7	1.4	0.3
53	0.3	1.1	0.2
58	0.8	1.8	0.4
63	0.5	1.2	0.4
68	0.6	1.2	0.3
73	0.4	0.8	0.3
78	0.5	0.4	0.3
83	0.2	0.3	0.1
88	0.5	0.5	0.2
93	0.1	0.2	0.0
98	0.1	0.1	0.0
103	0.1	0.0	0.0
108	0.0	0.1	0.0
113	0.0	0.0	0.0
118	0.0	0.0	0.0
123	0.0	0.0	0.0
Box /sq.m	5.5	10.6	3.0
old	3.4	10.0	2.6
new	2.1	0.5	0.4



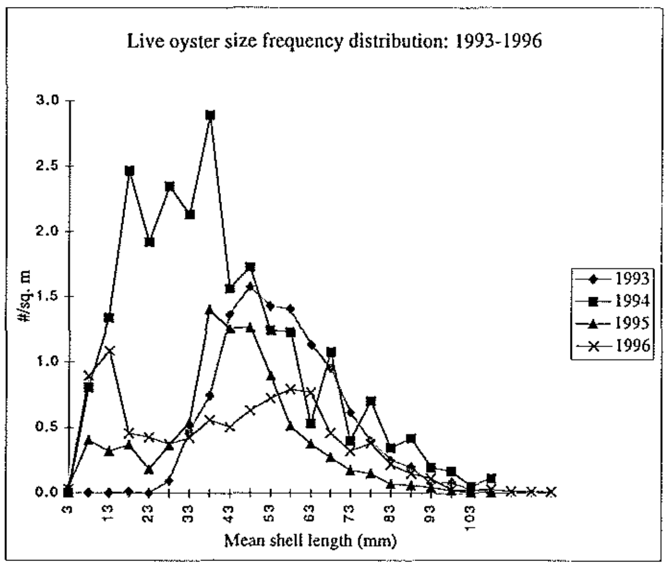
OFFSHORE JAIL ISLAND

LIVE OYSTER Summary

Size Class Midpoint (mm)	% 1993	% 1994	% 1995	% 1996
3	0.0	0.0	0.5	0.3
8	0.0	3.4	4.6	9.5
13	0.0	5.7	3.6	11.5
18	0.1	10.4	4.2	4.9
23	0.0	8.1	2.1	4.5
28	0.9	9.9	4.2	4.0
33	4.4	9.0	6.2	4.5
38	6.9	12.2	16.1	6.0
43	12.6	6.6	14.4	5.4
48	14.5	7.3	14.5	6.7
53	13.1	5.2	10.2	7.7
58	12.9	5.2	5.9	8.4
63	10.4	2.2	4.3	8.2
68	8.7	4.5	3.1	4.9
73	5.6	1.7	2.0	3.4
78	3.7	3.0	1.7	4.0
83	2.3	1.5	0.8	2.3
88	1.8	1.8	0.7	1.6
93	0.7	0.8	0.5	1.2
98	0.8	0.7	0.2	0.2
103	0.2	0.2	0.1	0.2
108	0.1	0.5	0.0	0.2
113	0.2	0.0	0.0	0.1
118	0.2	0.0	0.1	0.1
123	0.0	0.0	0.1	0.1
Oysters/sq.m	10.9	23.7	08.7	09.4

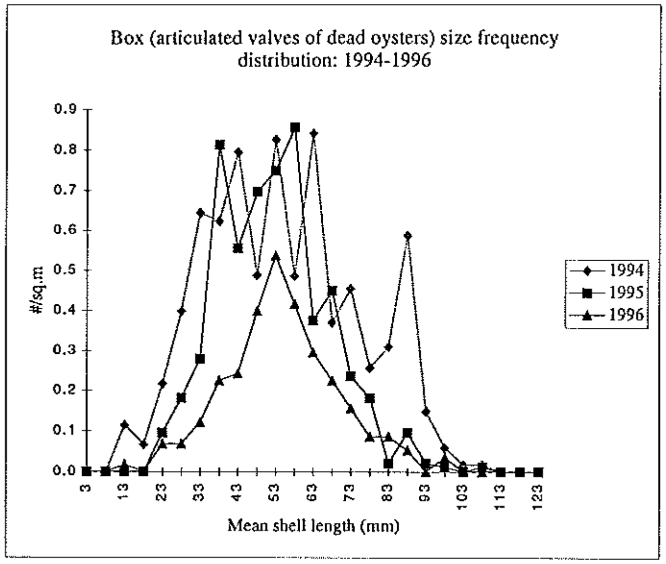


	1993	1994	1995	1996
3	0.0	0.0	0.0	0.0
8	0.0	0.8	0.4	0.9
13	0.0	1.3	0.3	1.1
18	0.0	2.5	0.4	0.5
23	0.0	1.9	0.2	0.4
28	0.1	2.3	0.4	0.4
33	0.5	2.1	0.5	0.4
38	0.7	2.9	1.4	0.6
43	1.4	1.6	1.3	0.5
48	1.6	1.7	1.3	0.6
53	1.4	1.2	0.9	0.7
58	1.4	1.2	0.5	0.8
63	1.1	0.5	0.4	0.8
68	1.0	1.1	0.3	0.5
73	0.6	0.4	0.2	0.3
78	0.4	0.7	0.1	0.4
83	0.2	0.3	0.1	0.2
88	0.2	0.4	0.1	0.1
93	0.1	0.2	0.0	0.1
98	0.1	0.2	0.0	0.0
103	0.0	0.1	0.0	0.0
108	0.0	0.1	0.0	0.0
113	0.0	0.0	0.0	0.0
118	0.0	0.0	0.0	0.0
123	0.0	0.0	0.0	0.0
by size class/sq.m				
<30mm	0.1	8.9	1.7	3.3
>30<75mm	9.7	12.8	6.7	5.2
>75mm	1.1	2.0	0.4	1.0
reef area (acres	1017.2	1017.2	1017.2	1017.2
bushel estimates				
small	39796	52506	27431	21248
market	8842	16424	2949	7893
total	48638	68930	30380	29141



OFFSHORE JAIL ISLAND

BOX Summary	1994	1995	1996
3	0.0	0.0	0.0
8	0.0	0.0	0.0
13	0.1	0.0	0.0
18	0.1	0.0	0.0
23	0.2	0.1	0.1
28	0.4	0.2	0.1
33	0.6	0.3	0.1
38	0.6	0.8	0.2
43	0.8	0.6	0.2
48	0.5	0.7	0.4
53	0.8	0.7	0.5
58	0.5	0.9	0.4
63	0.8	0.4	0.3
68	0.4	0.4	0.2
73	0.5	0.2	0.2
78	0.3	0.2	0.1
83	0.3	0.0	0.1
88	0.6	0.1	0.1
93	0.1	0.0	0.0
98	0.1	0.0	0.0
103	0.0	0.0	0.0
108	0.0	0.0	0.0
113	0.0	0.0	0.0
118	0.0	0.0	0.0
123	0.0	0.0	0.0
Box /sq.m	7.2	5.6	3.0
old	4.7	4.9	2.6
new	2.5	0.7	0.4

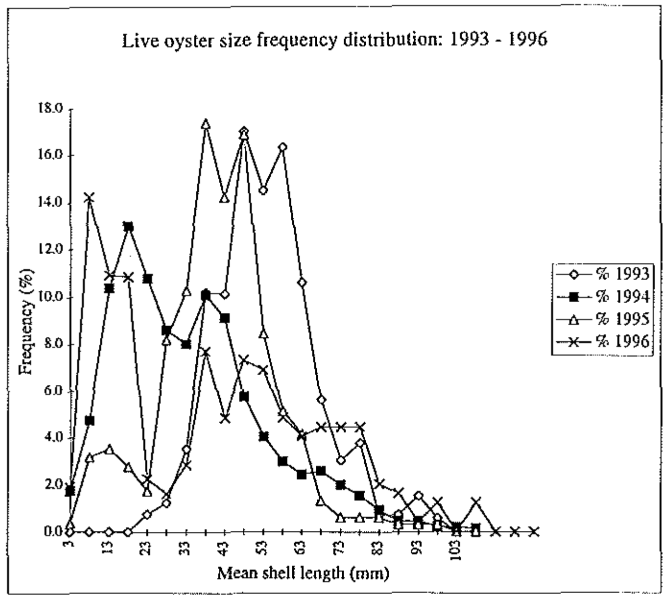


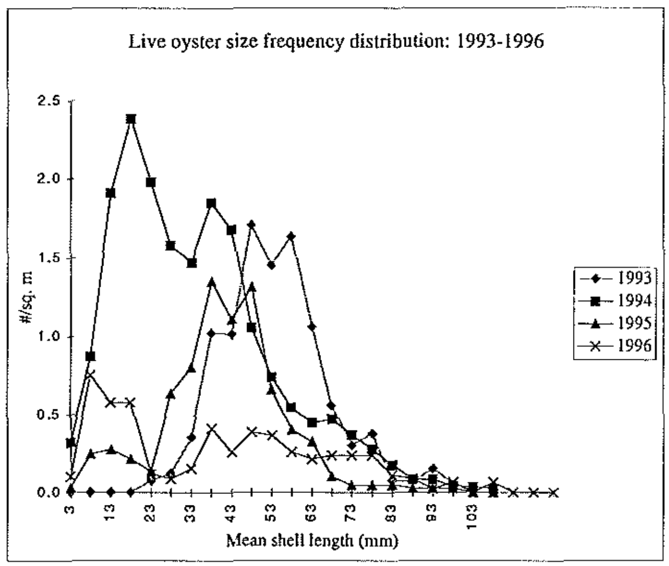
WRECK SHOAL

LIVE OYSTER Summary

Size Class Midpoint (mm)	% 1993	% 1994	% 1995	% 1996
3	0.0	1.7	0.4	1.9
8	0.0	4.7	3.2	14.2
13	0.0	10.4	3.5	10.9
18	0.0	13.0	2.8	10.8
23	0.7	10.8	1.7	2.2
28	1.2	8.6	8.2	1.6
33	3.5	8.0	10.3	2.8
38	10.2	10.1	17.4	7.7
43	10.1	9.1	14.2	4.9
48	17.0	5.7	16.9	7.3
53	14.5	4.0	8.4	6.9
58	16.3	3.0	5.1	4.9
63	10.6	2.4	4.1	4.0
68	5.6	2.6	1.3	4.5
73	3.0	2.0	0.6	4.5
78	3.8	1.5	0.6	4.5
83	0.7	0.9	0.6	2.0
88	0.7	0.4	0.3	1.6
93	1.5	0.4	0.3	0.4
98	0.6	0.2	0.3	1.2
103	0.0	0.2	0.0	0.0
108	0.0	0.1	0.0	1.2
113	0.0	0.0	0.0	0.0
118	0.0	0.0	0.0	0.0
123	0.0	0.0	0.0	0.0
Oysters/sq.m	10.0	18.4	07.8	05.3

	1993	1994	1995	1996
3	0.0	0.3	0.0	0.1
8	0.0	0.9	0.2	0.8
13	0.0	1.9	0.3	0.6
18	0.0	2.4	0.2	0.6
23	0.1	2.0	0.1	0.1
28	0.1	1.6	0.6	0.1
33	0.4	1.5	0.8	0.2
38	1.0	1.8	1.3	0.4
43	1.0	1.7	1.1	0.3
48	1.7	1.1	1.3	0.4
53	1.5	0.7	0.7	0.4
58	1.6	0.5	0.4	0.3
63	1.1	0.4	0.3	0.2
68	0.6	0.5	0.1	0.2
73	0.3	0.4	0.0	0.2
78	0.4	0.3	0.0	0.2
83	0.1	0.2	0.0	0.1
88	0.1	0.1	0.0	0.1
93	0.1	0.1	0.0	0.0
98	0.1	0.0	0.0	0.1
103	0.0	0.0	0.0	0.0
108	0.0	0.0	0.0	0.1
113	0.0	0.0	0.0	0.0
118	0.0	0.0	0.0	0.0
123	0.0	0.0	0.0	0.0
by size class				
<30mm	0.2	9.0	1.5	2.2
>30<75mm	9.1	8.6	6.1	2.5
>75mm	0.7	0.7	0.2	0.6
reef area (acres	584.8	584.8	584.8	584.8
bushel estimates				
small	21495	20336	14385	5926
market	3414	3361	754	2733
total	24910	23697	15139	8659





WRECK SHOAL

BOX Summary	1994	1995	1996
3	0.0	0.0	0.0
8	0.0	0.0	0.0
13	0.0	0.0	0.0
18	0.3	0.1	0.0
23	0.2	0.1	0.0
28	1.1	0.2	0.0
33	1.0	0.6	0.1
38	1.2	0.7	0.2
43	0.5	0.6	0.1
48	0.6	0.7	0.5
53	0.4	0.6	0.2
58	0.6	0.5	0.3
63	0.3	0.3	0.1
68	0.3	0.6	0.2
73	0.2	0.2	0.1
78	0.2	0.1	0.0
83	0.1	0.0	0.0
88	0.1	0.0	0.0
93	0.1	0.0	0.0
98	0.0	0.0	0.0
103	0.0	0.0	0.0
108	0.0	0.0	0.0
113	0.0	0.0	0.0
118	0.0	0.0	0.0
123	0.0	0.0	0.0
Box /sq.m	7.2	5.4	2.1
old	5.2	5.2	1.5
new	2.0	0.2	0.6

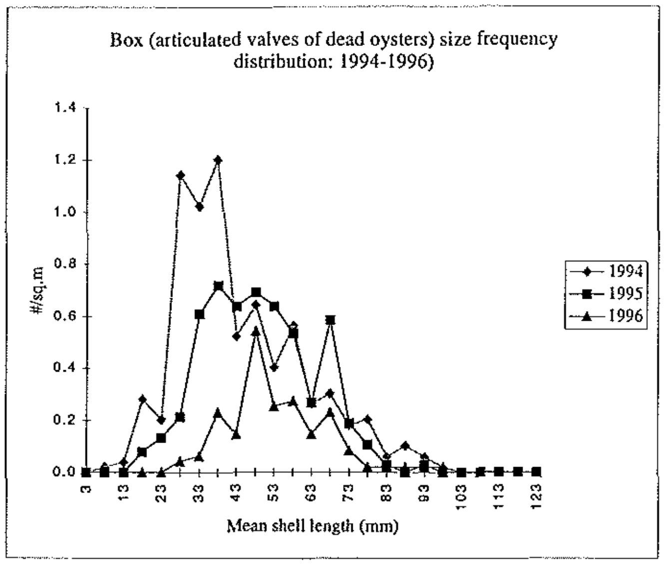


Table 4: Oyster Stock Assessment 1995-1996 and 1996-1997.
Piankatank River and Tangier Sound
n is sample number, all other values are per sq. m

	Reef area acres	n	n	spat	spat	small	small	market	market	new box	newbox	old box	old box	shell L	shell L
Year		95	96	95	96	95	96	95	96	95	96	95	96	95	96
Piankatank River	acres														
Bland's Point	25.00	7	6	31.43	1.83	5.29	65.50	0.14	0.33	2.71	0	23.43	4.00	14.29	14.00
Burton Point A	37.00	9	8	11.11	2.75	5.00	20.38	0.33	0.50	2.22	0.25	38.00	1.50	11.67	12.00
Burton Point B	7.57	7	7	15.00	1.43	3.29	48.29	0.43	0.43	0.86	0.29	14.71	2.00	8.14	8.43
Cape Tune	42.00	9	8	11.44	1.25	7.56	13.38	0	0	3.78	0.13	43.78	7.63	17.89	17.38
Deep Rock			8		0.88		4.88		0.38		0.25		1.00		6.75
Deep Rock 2			8		0		0		0		0		0		0
Ginney Point	6.00	7	7	15.71	2.43	1.71	27.57	0	0.14	0.29	0	2.00	0.57	11.00	7.07
Heron Rock	12.45	7	7	16.00	2.29	3.86	28.29	0	0	1.29	0.14	9.29	0.86	10.57	5.07
Palace Bar	41.00	9	9	17.67	4.44	5.22	33.44	0.11	0	0.44	0.11	13.33	3.11	16.78	15.11
Stove Point	5.23	7	7	25.43	2.86	2.43	26.14	0.14	0	0.71	0.14	5.14	0.43	8.71	4.14
Tangier Sound															
California A	11.27	7	7	6.71	0.14	6.14	0.14	1.43	0	1.43	0	3.86	0.43	6.29	4.00
California B1	53.66	7	7	0.71	2.86	2.43	2.86	0.86	0	0.57	0.29	0.57	2.14	5.43	8.00
California B2	18.28	7	13	2.14	0.60	7.29	1.50	1.43	0.50	0.29	0.40	5.29	1.30	7.14	7.90
Cod Harbor	18.62	7	7	9.71	2.57	6.71	5.71	0.43	0.29	1.29	1.57	4.14	4.86	7.29	4.71
Flat Rock	12.70	7	9	2.71	0	2.43	0	0.43	0	1.14	0	4.29	0	2.64	0
Hurley		10	11	0	0	0	0	0.10	0	0	0	1.10	0	5.50	0
Hurley 2	58.04	7	12	2.43	0.25	3.29	0	0.57	0	0.86	0.17	3.86	0	4.14	5.67
Thoroughfare	24.00	8	8	1.00	3.88	3.38	6.63	0.38	0.88	0.63	0.25	2.38	9.00	5.75	10.75

Estimates based on oyster density from patent tong samples and size class distribution in all years
Oysters < 30mm length classified as spat
Oysters > 30mm but < 75mm classified as small: 1000 oysters per bushel
Oysters > 75 mm classified as market size, 500 oysters per bushel