

# Delaware Bay 1994 Random Sampling of Oyster Seed Beds

by

John N. Kraeuter and Susan E. Ford

with

Robert D. Barber and Jesselyn A. Gandy

Haskin Shellfish Research Laboratory  
Institute of Marine and Coastal Sciences  
Rutgers University  
Port Norris, New Jersey 08349  
January 17, 1995

## Summary of the 1994 Random Sampling of the Delaware Bay Seed Beds

Attached is a summary of the 1994 seedbed sampling data with similar data for 1993 and 1992. All data were collected between October 31 and November 3, 1994 using a boat and captain donated by Bivalve Packing. This information is provided based on a stratified random sampling of grids from the seed beds. The strata (groups) from which the samples were selected are: Test area, general bed, marginal areas. One sample was taken from one of the 4 test area grids, and no more than two samples were taken from the marginal areas of the beds. The remainder of the samples were from the general bed. All data were adjusted to a 37 quart bushel.

The data format is the same as in the past years. Data are displayed from the farthest up bay beds to those down bay. For each bed the percentage of oysters for each sample is presented, with rankings from highest to lowest. Percentage of oyster is based on volume of oyster (exclusive of spatted shell) in the sample divided by the total volume of the shell, oyster and debris in the sample. Those samples that have over 40% oyster are underlined. The test area is a small area of 4-6 grids that has been sampled consistently as representative of the better areas of the bed. The test area sample is indicated by an \*. Oysters per bushel, yearlings per bushel and spat per bushel are based on actual counts adjusted to 37 quarts.

Due to the influence of Dermo on the industry we have continued the new set of columns for Percentage Mortality and added data on Weighted Prevalence and %Prevalence of Dermo. The Percentage Mortality figure is based on the number of boxes that were counted in the samples. Prevalence is the percentage of oysters with detectable infections. Weighted Prevalence is the average infection intensity (scored from 0 to 5) of all infected and uninfected oysters.

The major points of interest this year are:

- o There was no seed bed harvest in 1994. This means that all changes in the numbers of oysters are due to additions from the past setting and losses due to mortality.
- o Number of oysters per bushel remain low on all beds below Bennies Sand.
- o The number of oysters per bushel has generally declined on most beds for the past 3 years.
- o The number of oysters in market size categories on most beds has increased due to good growth.
- o Mortalities based on box counts declined from at least 45% last year to 30% or lower on all beds below Bennies Sand with the exception of Egg Island and Ledge. Low numbers of oyster collected make data from these beds subject to large probability of error.

- o Spat setting was greatly improved over last year, but was low on most beds. Good set (over 200 per bushel occurred on Cohansey, New Beds, and Beadons).
- o Dermo remains about the same as last year on beds below Arnolds. Prevalence is higher than last year on Arnolds and Round Island. Prevalence is 90 to 100 % on most beds. The 30% result on Beadons is a sample from one grid and likely to underestimate abundance. Weighted Prevalence (a measure that indicates infection intensity) seems to have declined slightly from last year, but remains high on all beds from Middle throughout the rest of the bay. This should be carefully considered in any decision to move oysters.

The size distribution data, Table 3 have been used to estimate the numbers of oysters in each size group for a 37 quart bushel dredge sample for all sampled beds. These data can provide an estimate of the numbers of oysters in each size class. We have highlighted (bold) and summed the number of 2.5 inch long oysters per average bushel of material expected from each of the beds. If you want to find out how many 3 inch or larger oysters per bushel you would simply sum beginning at the bottom (110 mm) to the approximately 3 inch size (75 mm). A summary of 1993 and 1994 data for selected beds is provided in Table 2 below. Although there appeared to be a general decline in numbers of oysters, the remaining oysters have grown so there are more market sized oysters on most beds.

Please remember that these data do not provide an estimate of the numbers of oysters on the seed beds, but provide a relative assessment of what could be expected from a dredge haul on a particular bed. I urge you to read this information in conjunction with Dr. Ford's analysis of disease on the seed beds.

**These data are available because of the generous support of Bivalve Packing, a grant from the State of New Jersey, and the dedication of many individuals at the Haskin Shellfish Research Laboratory.**









Table 2. Average number of oysters per bushel based on samples from selected seed beds in 1993 and 1994. The values indicate the numbers of oysters greater than 2.5 and 3 inches in length that could be expected if a bushel of oyster and shell was removed directly from the dredge (no pre-sorting). Note the greater number of large oysters even though the total numbers per bushel generally declined.

| Bed        | 1994                                   |                                      |            | 1993                                   |                                      |            |
|------------|--|--------------------------------------|------------|--|--------------------------------------|------------|
|            | greater than<br>2.5 inches<br>(63.5mm) | greater than<br>3 inches<br>(76.2mm) | Number/Bu. | greater than<br>2.5 inches<br>(63.5mm) | greater than<br>3 inches<br>(76.2mm) | Number/Bu. |
| Arnolds    | 91                                     | 23                                   | 301        | 28                                     | 8                                    | 395        |
| Middle     | 67                                     | 29                                   | 138        | 14                                     | 4                                    | 163        |
| Cohansey   | 76                                     | 34                                   | 152        | 19                                     | 6                                    | 177        |
| Ship John  | 71                                     | 27                                   | 149        | 31                                     | 7                                    | 267        |
| Shell Rock | 55                                     | 27                                   | 134        | 18                                     | 6                                    | 151        |
| Bennies    | 34                                     | 19                                   | 75         | 14                                     | 6                                    | 66         |
| New Beds   | 50                                     | 30                                   | 124        | 12                                     | 3                                    | 67         |

Table 3. Size frequency distributions of oysters collected on Delaware Bay seed beds in the Fall of 1994. All data have been adjusted to reflect the average numbers of oysters per bushel collected on the bed during the random sampling. These data can be converted to the numbers of oysters above a certain size by adding the numbers in the Bushel Frequency column beginning at the Bottom of the column. For instance Arnold's 1994 data.

Sample Calculation:

There are 25.4 mm per inch. Two inch oysters are 50.8 mm (so everything in the 50 mm and larger categories would be larger than 2 inches).

Three inch oysters are  $25.4 \times 3 = 76.2$  mm. In 1994 there were  $1+2+1+1+6+12 = 23$  oysters larger than 75 mm (approximately 3 inches).

Table 3. Size/Frequency distribution of oysters from Delaware Bay seed beds, 1994

Total = Average number of oysters per bushel. No. measured = Number of oysters measured from that seed bed.

Greater than 2.5"/bu = Average number of oysters larger than 2.5 inches to be expected per bushel of material dredged. (Sum of the bold numbers on the table)

| Size (mm)             | Round Is  | Arnolds   | Up.Middle | Middle    | Cohansey  | Ship John | Shell Rock | BenSand  | Bennies  | NewBeds   | Strawberry | Hawksnest | Beadons  | Egg Island | Ledge    |
|-----------------------|-----------|-----------|-----------|-----------|-----------|-----------|------------|----------|----------|-----------|------------|-----------|----------|------------|----------|
| 0                     | 0         | 0         | 0         | 0         | 0         | 0         | 0          | 0        | 0        | 0         | 0          | 0         | 0        | 0          | 0        |
| 5                     | 0         | 0         | 0         | 0         | 0         | 0         | 0          | 0        | 0        | 0         | 0          | 0         | 0        | 0          | 0        |
| 10                    | 0         | 0         | 0         | 0         | 0         | 0         | 0          | 0        | 0        | 0         | 0          | 0         | 0        | 0          | 0        |
| 15                    | 0         | 0         | 0         | 0         | 0         | 0         | 0          | 0        | 0        | 0         | 0          | 0         | 0        | 0          | 0        |
| 20                    | 0         | 0         | 0         | 0         | 0         | 0         | 0          | 0        | 0        | 0         | 0          | 0         | 0        | 0          | 0        |
| 25                    | 0         | 0         | 0         | 0         | 0         | 2         | 1          | 0        | 0        | 1         | 1          | 1         | 1        | 0          | 0        |
| 30                    | 1         | 1         | 0         | 1         | 0         | 6         | 1          | 0        | 1        | 3         | 1          | 1         | 3        | 0          | 0        |
| 35                    | 5         | 5         | 0         | 5         | 4         | 8         | 2          | 2        | 2        | 4         | 1          | 2         | 3        | 0          | 0        |
| 40                    | 16        | 17        | 12        | 6         | 12        | 9         | 9          | 2        | 4        | 10        | 2          | 6         | 4        | 1          | 0        |
| 45                    | 23        | 24        | 0         | 9         | 14        | 12        | 17         | 1        | 9        | 14        | 2          | 9         | 4        | 1          | 1        |
| 50                    | 38        | 47        | 12        | 13        | 15        | 12        | 19         | 2        | 10       | 20        | 2          | 8         | 4        | 2          | 2        |
| 55                    | 43        | 59        | 0         | 15        | 13        | 11        | 17         | 1        | 7        | 10        | 2          | 5         | 3        | 1          | 1        |
| 60                    | 44        | 59        | 0         | 21        | 18        | 19        | 14         | 0        | 8        | 10        | 2          | 4         | 2        | 1          | 3        |
| <b>65</b>             | <b>30</b> | <b>33</b> | <b>24</b> | <b>20</b> | <b>20</b> | <b>22</b> | <b>13</b>  | <b>0</b> | <b>7</b> | <b>10</b> | <b>2</b>   | <b>4</b>  | <b>1</b> | <b>1</b>   | <b>2</b> |
| 70                    | 21        | 35        | 0         | 18        | 22        | 22        | 15         | 1        | 8        | 10        | 1          | 3         | 1        | 2          | 1        |
| 75                    | 17        | 12        | 0         | 15        | 15        | 10        | 10         | 1        | 7        | 10        | 2          | 3         | 0        | 2          | 2        |
| 80                    | 9         | 6         | 0         | 7         | 8         | 7         | 4          | 2        | 5        | 10        | 0          | 2         | 0        | 1          | 2        |
| 85                    | 4         | 1         | 0         | 4         | 5         | 6         | 6          | 1        | 4        | 5         | 1          | 2         | 0        | 1          | 1        |
| 90                    | 1         | 1         | 0         | 1         | 4         | 2         | 4          | 0        | 2        | 2         | 0          | 0         | 0        | 1          | 2        |
| 95                    | 0         | 2         | 0         | 2         | 1         | 1         | 1          | 1        | 1        | 2         | 0          | 1         | 0        | 0          | 1        |
| 100                   | 0         | 1         | 0         | 0         | 1         | 1         | 1          | 0        | 0        | 1         | 0          | 0         | 0        | 0          | 1        |
| 105                   | 0         | 0         | 0         | 0         | 0         | 0         | 1          | 1        | 0        | 0         | 0          | 0         | 0        | 0          | 0        |
| 110                   | 0         | 0         | 0         | 0         | 0         | 0         | 0          | 0        | 0        | 0         | 0          | 0         | 0        | 0          | 0        |
| Total                 | 253       | 301       | 47        | 138       | 152       | 149       | 134        | 14       | 75       | 124       | 19         | 50        | 28       | 16         | 18       |
| No. Measured          | 547       | 498       | 4         | 647       | 500       | 483       | 494        | 52       | 593      | 595       | 163        | 290       | 366      | 190        | 106      |
| Greater than 2.5"/bu. | 82        | 91        | 24        | 67        | 76        | 71        | 55         | 7        | 34       | 50        | 6          | 15        | 2        | 8          | 12       |