# 2013
# CLAM DENSITY SURVEY STUDY OVERVIEW
# *for*
# HEMPSTEAD HARBOR

*Prepared for:*

**Town of Oyster Bay**
Department of Environmental Resources
150 Miller Place
Syosset, New York 11791

*Prepared by:*

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Hauppauge, New York 11788

**JULY 9, 2014**

TOWN OF OYSTER BAY

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## Study Overview

A shellfish density survey of Hempstead Harbor was conducted in October 2013 by Cashin Associates, P.C. at the request of the Town of Oyster Bay. The survey was done in accordance with the scope and methodology utilized for a shellfish survey of the harbor performed in 2008 for the Town of Oyster Bay and the Hempstead Harbor Protection Committee. The survey involved the collection of 120 bottom grab samples at 61 stations throughout the harbor utilizing a barge mounted crane and bucket dredge. Grab samples were washed through graduated grates and sieves to recover clams and other shellfish over one quarter inch in size. The methodology and sample locations were the same as those utilized in the 2008 survey. The study area and sampling locations for this survey are shown in Figures 4 and 5. The findings of the inventory are presented in Tables 1 to 5, and are summarized below.

## Study Findings

1. A map indicating the general distribution and abundance of clams in the study area as found during the 2013 survey is shown on Figure 3. The highest densities of clams were found at stations along the shore on the west side of the harbor, and in the portions of the harbor south of Bar Beach. As is typical for populations of clams and other benthic invertebrates, clam populations were found to be very patchy, often with wide variation in clam abundance between adjacent stations and between samples taken at the same location.

Generally, central portions of the harbor, with depths over 25 feet, had low densities of clams, or no clams present. These areas had muddy sediments characterized with high percentage (over 90%) of silt and clay fractions.

2. Clams were found at 28 of the 61 stations in 2013, representing 45.9% of the total stations sampled. In 2008, clams were found at 34 of the 61 stations or 55.7%.

3. The highest density of clams was 23.6 clams/sqm found at station 54, located in uncertified waters in the portions of the harbor south of the Beach Bar peninsula.

4. The overall average density of clams found in the harbor was 1.7 clams/sqm. The average density in 2008 was 1.6 clams/sqm. Based on a statistical analysis, this is not a statistically significant change in overall density.

5. Although the overall density in clams in the bay did not change significantly from 2008 to 2017, the density of seed clams in the harbor decreased, and the seed clam population represented a smaller percentage of the overall clam population in 2013. The decline in the seed clam population indicates a potential weakening of the resource, especially if it continues for several consecutive years and more than one year class of clams is affected.

6. Since the 2008 study, a portion of the outer harbor (Figure 6) has been certified and opened for harvesting of shellfish because of improvements in water quality. The density of clams in the portion of the harbor that has been certified is less than it was in 2008,

possibly reflecting harvesting pressure on the resource. The mean density of clams in the harvest area in 2008 was 1.98 clams/sqm and in 2013 was 1.22 clam/sqm in 2013. This difference in density is not statistically significant (based on a two-tailed t-test of the difference between the means at 5% significance level, P=0.67).

7. The overall average size of clams sampled was 67.2 mm, compared to 58.1 mm in 2008. This increase in size may be attributed to the fact that commercial harvesting tends to focus on areas with smaller size clams (littlenecks) which are much more commercially desirable than the larger size (chowders). Selective harvesting of littlenecks would tend to increase the average size of the remaining stock. The decline in the seed stock as noted above would also tend to increase the mean size of the population.

8. The presence of the *notata* variant clams was noted in the 2013 survey. *Notata* is a hard clam variant that occurs naturally at very low levels, but that is commonly used for hatchery stocks and seeding programs. There were 6 *notata* clams found out of a total of 445 clams collected, representing 1.3%. This is higher than that which would be expected in a natural clam population (less than half a percent would be expected to occur naturally). This may be due to the clam seeding conducted by the Hempstead Harbor Protection Committee in the harbor over past years, which included clams of the *notata* variant.

**Conclusions**

The overall density of clams in the harbor has not changed significantly since the 2008 survey. Although the number of stations with clams declined, the mean density of clams has stayed approximately the same. Hard clams in the harbor were widespread and fairly abundant, although the clam population is less that that of other Long Island embayments with productive clam fisheries.

One change noted in the Harbor's clam population is that the density of seed sized clams was less in 2013 as when compared to 2008. A decline in seed abundance is an indication of potential weakening of the population in terms of its ability to sustain itself. Clam populations generally consist of many year classes of clams, so a decline in one year class of seeds may not have a significant long-term effect on the resource. However, decline in several consecutive year classes of seeds could result in an overall decline of the resource. Further research and inventory work would be required to assess whether the decline in seeds is an ongoing condition, or whether it was a statistical anomaly in the 2013 sampling.

# TABLES

**TABLE 1**
**Station Locations and Depth**

| STATION NO. | LAT. | LONG. | DEPTH (ft.) |
|---|---|---|---|
| 1 | 73.64763603 | 40.88634495 | 18 |
| 2 | 73.65541748 | 40.88383378 | 34 |
| 3 | 73.66437993 | 40.88100424 | 34 |
| 4 | 73.67324204 | 40.87839427 | 30 |
| 5 | 73.68294009 | 40.87514785 | 30 |
| 6 | 73.69179963 | 40.87235432 | 30 |
| 7 | 73.70324120 | 40.86867417 | 22 |
| 8 | 73.69754593 | 40.86648455 | 21 |
| 9 | 73.69146840 | 40.86851827 | 36 |
| 10 | 73.68167412 | 40.87131856 | 30 |
| 11 | 73.67158167 | 40.87471746 | 42 |
| 12 | 73.66059048 | 40.87816950 | 36 |
| 13 | 73.65147374 | 40.88121576 | 22 |
| 14 | 73.65735444 | 40.87495476 | 32 |
| 15 | 73.66569320 | 40.87217896 | 34 |
| 16 | 73.67340544 | 40.86985771 | 30 |
| 17 | 73.68204296 | 40.86695258 | 31 |
| 18 | 73.69079805 | 40.86421293 | 23 |
| 19 | 73.68403099 | 40.86249449 | 21 |
| 20 | 73.67596881 | 40.86482564 | 29 |
| 21 | 73.66889419 | 40.86715406 | 30 |
| 22 | 73.66263842 | 40.86925438 | 30 |
| 23 | 73.65756089 | 40.87112940 | 18 |
| 24 | 73.65753284 | 40.86678690 | 20 |
| 25 | 73.65742088 | 40.86526797 | 20 |
| 26 | 73.65742721 | 40.86368007 | 22 |
| 27 | 73.66441157 | 40.86440980 | 29 |
| 28 | 73.67215382 | 40.86216863 | 31 |
| 29 | 73.67845145 | 40.86004935 | 23 |

**TABLE 1**
**Station Locations and Depth**

| STATION NO. | LAT. | LONG. | DEPTH (ft.) |
|---|---|---|---|
| 30 | 73.67100493 | 40.85853200 | 32 |
| 31 | 73.66056716 | 40.86157085 | 26 |
| 32 | 73.65542958 | 40.85925248 | 15 |
| 33 | 73.66077990 | 40.85747102 | 20 |
| 34 | 73.66627985 | 40.85585589 | 29 |
| 35 | 73.67216290 | 40.85385603 | 11 |
| 36 | 73.65381776 | 40.85588424 | 13 |
| 37 | 73.65845617 | 40.85430596 | 20 |
| 38 | 73.66409384 | 40.85249614 | 21 |
| 39 | 73.66961713 | 40.85053541 | 18 |
| 40 | 73.66742828 | 40.84685102 | 20 |
| 41 | 73.66249789 | 40.84854296 | 20 |
| 42 | 73.65736830 | 40.85009782 | 18 |
| 43 | 73.65247866 | 40.85183190 | 15 |
| 44 | 73.65512359 | 40.84650612 | 15 |
| 45 | 73.65914697 | 40.84509121 | 18 |
| 46 | 73.66510192 | 40.84333314 | 17 |
| 47 | 73.66276855 | 40.83977870 | 6 |
| 48 | 73.65881636 | 40.841044830 | 17 |
| 49 | 73.65479946 | 40.84045864 | 9 |
| 50 | 73.65674090 | 40.83735517 | 13 |
| 51 | 73.65223548 | 40.83238343 | 7 |
| 52 | 73.65710012 | 40.83324180 | 12 |
| 53 | 73.64859314 | 40.82424656 | 3 |
| 54 | 73.65351966 | 40.82600066 | 9 |
| 55 | 73.65135546 | 40.82462968 | 6 |
| 56 | 73.65027965 | 40.82182178 | 9 |
| 57 | 73.65158309 | 40.81834789 | 10 |
| 58 | 73.64830720 | 40.81923315 | 12 |

## TABLE 2
## Mean Clam Density at Each Station
## (density in clams/sqm)

| STATION NO. | CLAM DENSITY 2008 | CLAM DENSITY 2013 |
|---|---|---|
| 1 | 2.3 | 0.0 |
| 2 | 0.0 | 0.0 |
| 3 | 0.3 | 0.0 |
| 4 | 0.0 | 0.2 |
| 5 | 0.0 | 0.0 |
| 6 | 0.0 | 0.0 |
| 7 | 0.7 | 0.7 |
| 8 | 0.0 | 14.8 |
| 9 | 0.3 | 0.0 |
| 10 | 0.0 | 0.0 |
| 11 | 0.0 | 0.0 |
| 12 | 0.0 | 0.2 |
| 13 | 29.3 | 0.0 |
| 14 | 0.0 | 0.0 |
| 15 | 0.3 | 0.0 |
| 16 | 0.0 | 0.2 |
| 17 | 0.0 | 0.0 |
| 18 | 0.7 | 0.0 |
| 19 | 3.7 | 7.1 |
| 20 | 0.0 | 0.2 |
| 21 | 0.3 | 0.2 |
| 22 | 0.3 | 0.0 |
| 23 | 4.3 | 0.0 |
| 24 | 9.7 | 0.0 |
| 25 | 1.0 | 0.0 |
| 26 | 2.3 | 0.0 |
| 27 | 0.0 | 0.7 |
| 28 | 0.0 | 0.2 |
| 29 | 0.7 | 3.2 |
| 30 | 0.0 | 2.5 |
| 31 | 0.0 | 0.0 |
| 32 | 0.0 | 0.0 |

| STATION NO. | CLAM DENSITY 2008 | CLAM DENSITY 2013 |
|---|---|---|
| 33 | 0.7 | 0.0 |
| 34 | 0.0 | 1.1 |
| 35 | 0.3 | 0.0 |
| 36 | 1.3 | 0.7 |
| 37 | 5.0 | 0.0 |
| 38 | 0.3 | 0.9 |
| 39 | 0.0 | 0.0 |
| 40 | 0.0 | 2.3 |
| 41 | 1.0 | 0.0 |
| 42 | 0.3 | 0.0 |
| 43 | 0.7 | 2.5 |
| 44 | 0.3 | 0.0 |
| 45 | 0.0 | 0.0 |
| 46 | 0.0 | 0.0 |
| 47 | 1.3 | 9.1 |
| 48 | 0.0 | 0.0 |
| 49 | 0.3 | 0.0 |
| 50 | 0.0 | 0.2 |
| 51 | 3.0 | 1.4 |
| 52 | 0.0 | 0.0 |
| 53 | 2.0 | 0.5 |
| 54 | 0.0 | 23.6* |
| 55 | 2.7 | 9.5 |
| 56 | 4.0 | 5.7 |
| 57 | 0.3 | 7.5 |
| 58 | 0.0 | 6.4 |
| 59 | 3.3 | 3.6 |
| 60 | 7.7 | 0* |
| 61 | 1.0 | 7.7 |

**Note: These densities were calculated with only one sample taken at the site*

**TABLE 3**
**Mean Clam Density by Size Class**
**(density in clams/sq/m)**

| | Seeds | Little Necks | Cherry Stones | Chowder | Total |
|---|---|---|---|---|---|
| **2008 Harbor-Wide Mean Density** | 0.51 | 0.36 | 0.26 | 0.48 | 1.6 |
| **2013 Harbor-Wide Mean Density** | 0.20 | 0.46 | 0.40 | 0.62 | 1.7 |

**TABLE 4**
**2008 Hard Clam *Notata* Variant**
**Percent of Total Hard Clam Population by Size Class**

| | Seeds | Little Necks | Cherry Stones | Chowders | Total |
|---|---|---|---|---|---|
| ***Notata* Variant** | 5 | 0 | 0 | 0 | 5 |
| **Total Hard Clams** | 94 | 66 | 48 | 87 | 295 |
| **Percent of *Notatas* in Total Hard Clam Population** | 5.32 | 0.00 | 0.00 | 0.00 | 1.69 |
| | 3.13 | | 0.00 | | |

**Table 5**
**2013 Hard Clam *Notata* Variant**
**Percent of Total Hard Clam Population by Size Class**

| | Seeds | Little Necks | Cherry Stones | Chowders | Total |
|---|---|---|---|---|---|
| ***Notata* Variant** | 3 | 3 | 0 | 0 | 5 |
| **Total Hard Clams** | 53 | 121 | 106 | 164 | 445 |
| **Percent of *Notatas* in Total Hard Clam Population** | 5.66 | 2.48 | 0.00 | 0.00 | 1.12 |
| | 3.45 | | 0.00 | | |

# FIGURES

**FIGURE 1**
**2008 - Size Frequency Distribution of Standing Stock – Harbor-Wide**

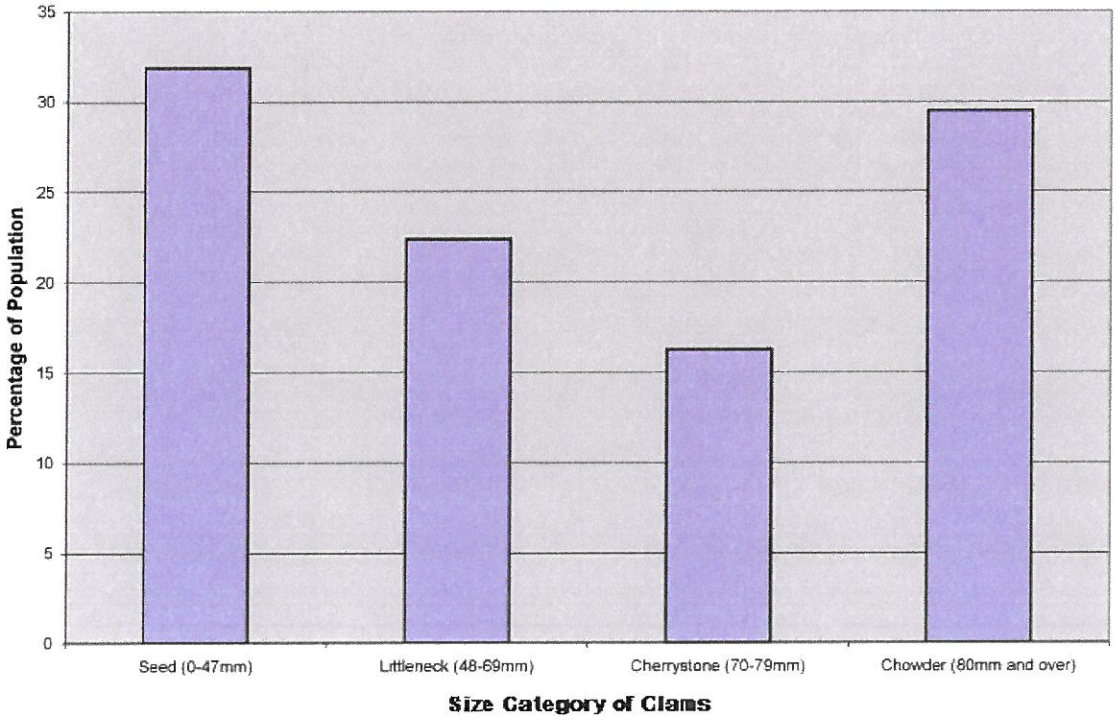



**FIGURE 2**
**2013 - Size Frequency Distribution of Standing Stock – Harbor-Wide**

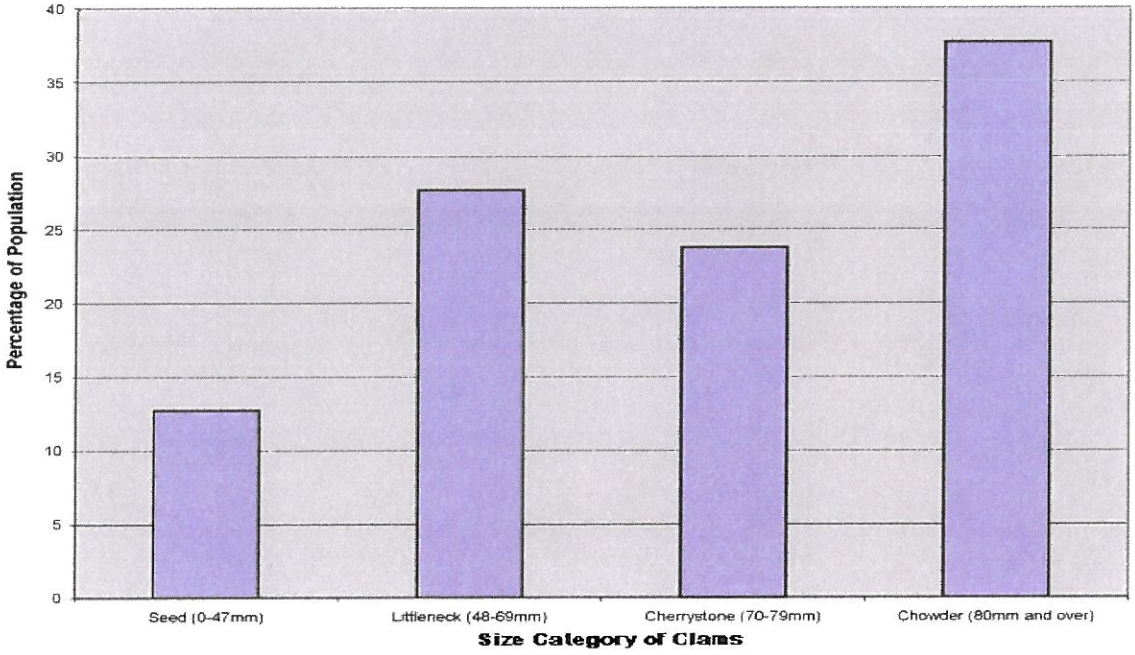


**FIGURE 3**
**Distribution and Abundance of Clams**

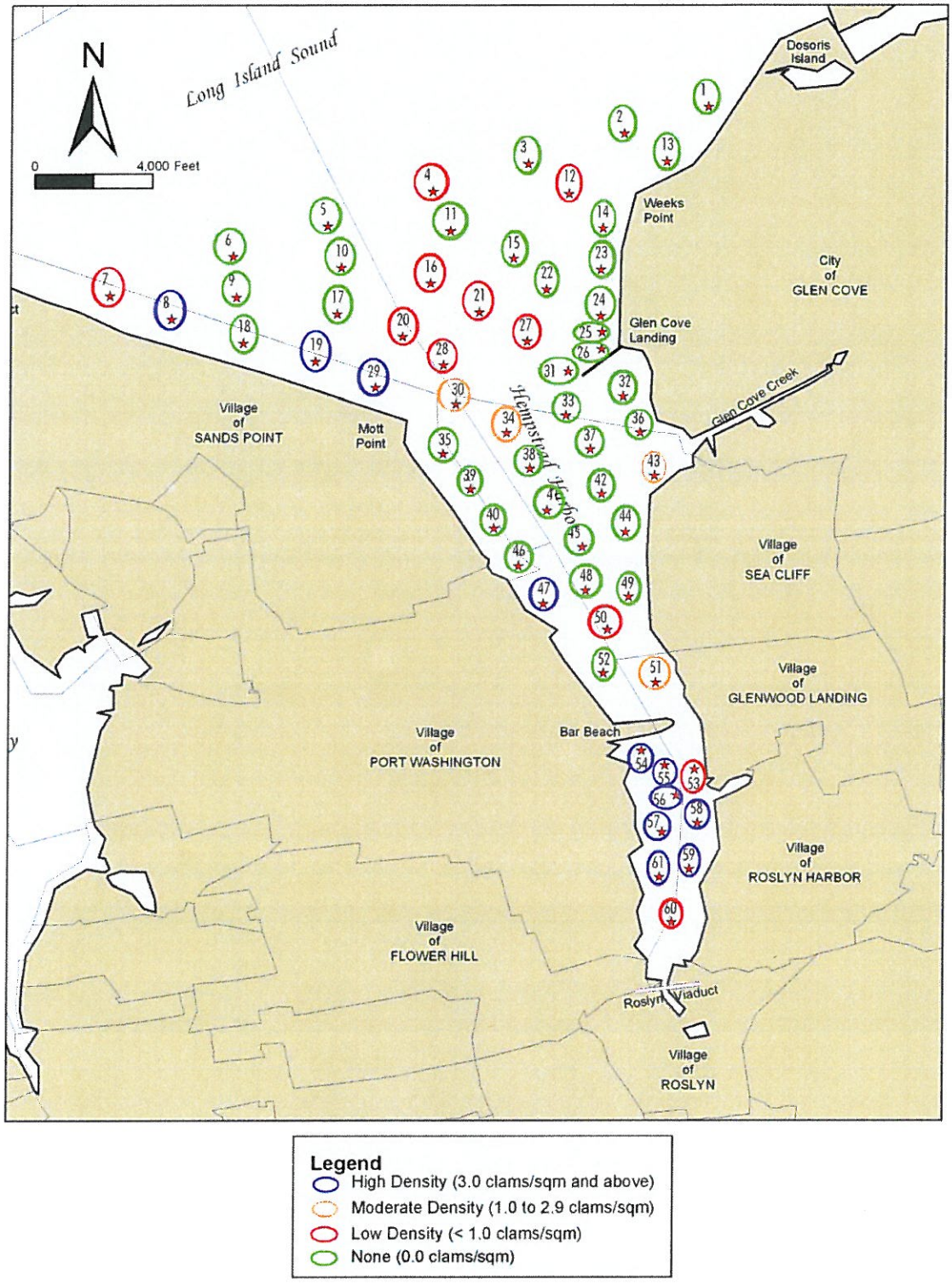


**FIGURE 4**
**Harbor Study Area**

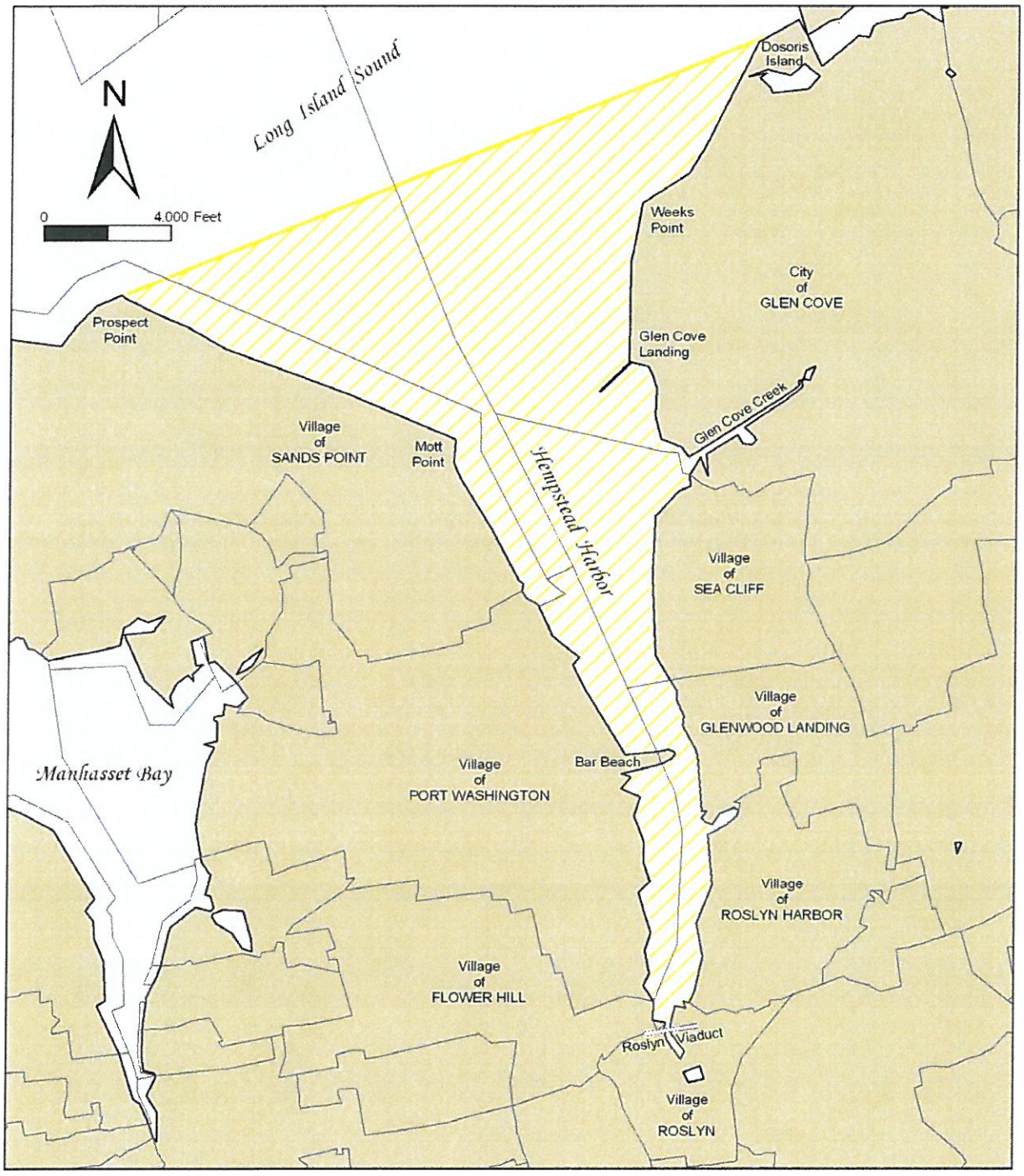


**FIGURE 5**
**Clam Sampling Locations**

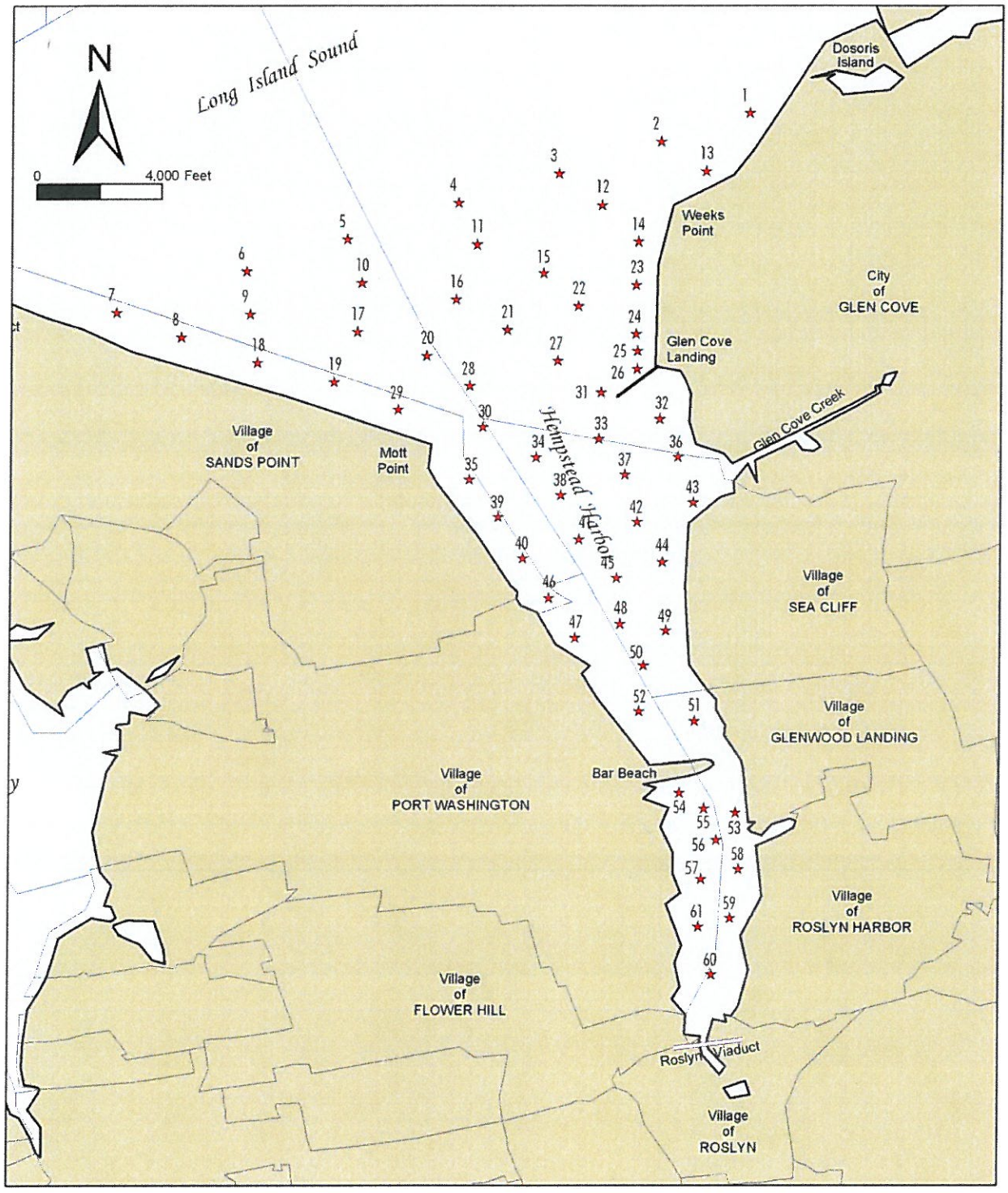
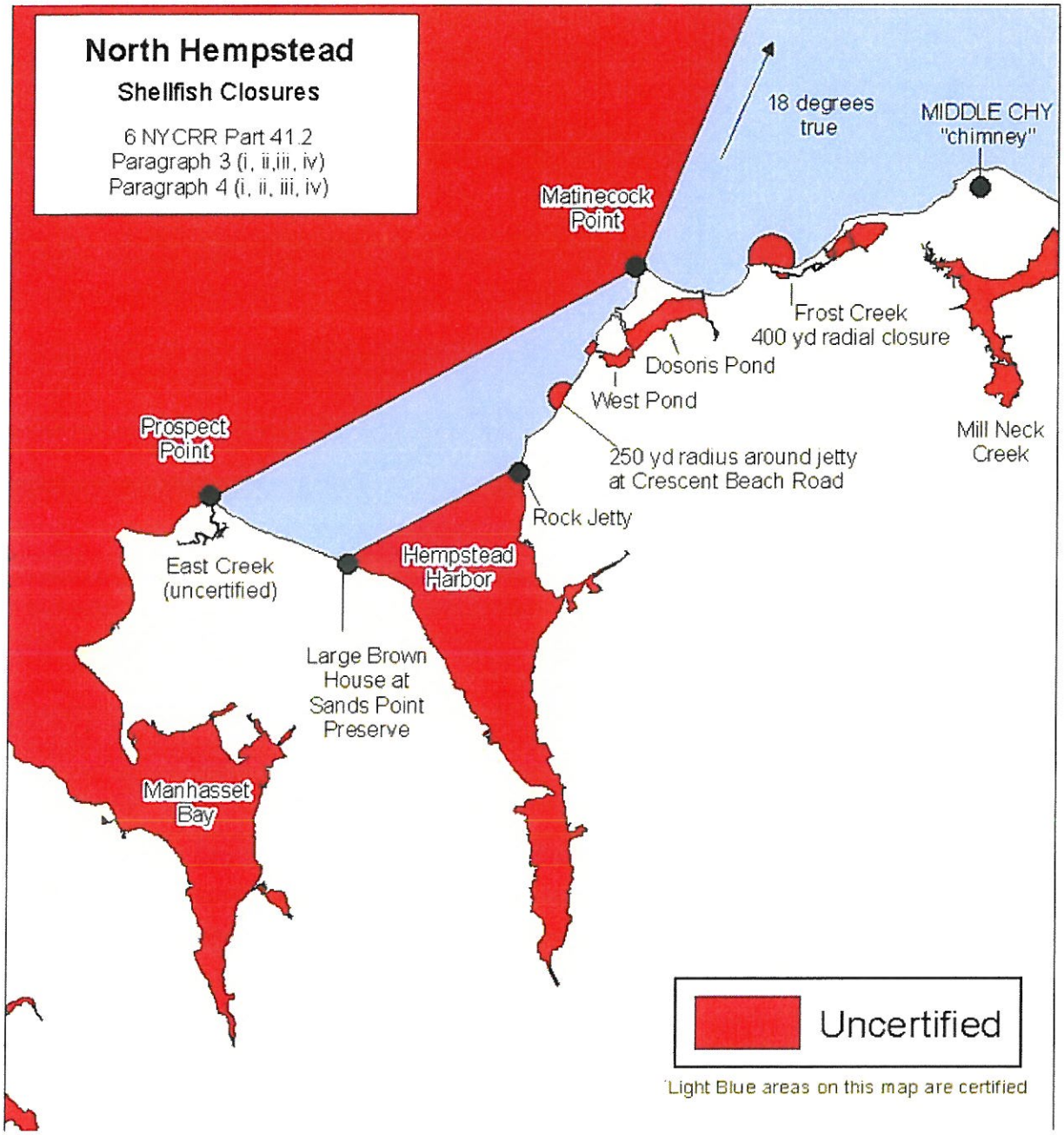


**FIGURE 6**
**2013 NYSDEC North Hempstead Harbor Shellfish Closures**



# ATTACHMENT

**TOWN OF OYSTER BAY**
**Hard Clam Survey**
**All Stations**

| STATION NUMBER | 1 | | 2 | | 3 | | 4 | | 5 | | 6 | | 7 | | 8 | | 9 | | 10 | | 11 | | 12 | | 13 | | 14 | | 15 | | 16 | | 17 | | 18 | | 19 | | 20 | | 21 | | 22 | | 23 | | 24 | | 25 | | 26 | | 27 | | 28 | | 29 | | 30 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SAMPLE NUMBER | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 2 |
| LENGTH MEASUREMENTS (mm) | | | | | | | 42 | | | | | | 66 | 40 | 35 | | | | | | | | 56 | | | | | | | | 85 | | | | | | 21 | 52 | 54 | | 86 | | | | | | | | | | 57 | 54 | | 50 | 27 | 27 | 70 | 56 |
| | | | | | | | | | | | | | 75 | 59 | 35 | | | | | | | | | | | | | | | | | | | | | | 46 | 60 | | | | | | | | | | | | | 60 | | | | 76 | 42 | 76 | 82 |
| | | | | | | | | | | | | | 80 | 60 | 37 | | | | | | | | | | | | | | | | | | | | | | 76 | 66 | | | | | | | | | | | | | | | | | 80 | 70 | 79 | 86 |
| | | | | | | | | | | | | | | 60 | 41 | | | | | | | | | | | | | | | | | | | | | | 76 | 66 | | | | | | | | | | | | | | | | | 81 | 70 | 83 | 90 |
| | | | | | | | | | | | | | | 61 | 42 | | | | | | | | | | | | | | | | | | | | | | 80 | 70 | | | | | | | | | | | | | | | | | 81 | 75 | 90 | |
| | | | | | | | | | | | | | | 61 | 44 | | | | | | | | | | | | | | | | | | | | | | 82 | 71 | | | | | | | | | | | | | | | | | 82 | 75 | 91 | |
| | | | | | | | | | | | | | | 62 | 46 | | | | | | | | | | | | | | | | | | | | | | 86 | 74 | | | | | | | | | | | | | | | | | | 76 | 100 | |
| | | | | | | | | | | | | | | 64 | 50 | | | | | | | | | | | | | | | | | | | | | | 90 | 74 | | | | | | | | | | | | | | | | | | 80 | | |
| | | | | | | | | | | | | | | 66 | 50 | | | | | | | | | | | | | | | | | | | | | | 90 | 74 | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | 67 | 51 | | | | | | | | | | | | | | | | | | | | | | 95 | 74 | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | 69 | 55 | | | | | | | | | | | | | | | | | | | | | | 95 | 75 | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | 69 | 56 | | | | | | | | | | | | | | | | | | | | | | | 76 | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | 70 | 56 | | | | | | | | | | | | | | | | | | | | | | | 77 | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | 70 | 60 | | | | | | | | | | | | | | | | | | | | | | | 80 | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | 74 | 60 | | | | | | | | | | | | | | | | | | | | | | | 80 | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | 74 | 60 | | | | | | | | | | | | | | | | | | | | | | | 81 | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | 74 | 60 | | | | | | | | | | | | | | | | | | | | | | | 82 | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | 75 | 60 | | | | | | | | | | | | | | | | | | | | | | | 83 | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | 75 | 60 | | | | | | | | | | | | | | | | | | | | | | | 88 | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | 78 | 61 | | | | | | | | | | | | | | | | | | | | | | | 90 | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | 80 | 61 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | 80 | 61 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | 81 | 65 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | 83 | 66 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | 85 | 66 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | 90 | 70 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | 90 | 71 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | 95 | 71 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | 71 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | 75 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | 75 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | 75 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | 76 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | 80 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | 80 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | 81 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | 85 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| NUMBER OF CLAMS | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 3 | 28 | 37 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 11 | 20 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 1 | 6 | 8 | 7 | 4 |
| NUMBER OF NOTATAS | | | | | | | | | | | | | | | | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| AVERAGE SIZE PER SAMPLE (mm) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 42 | 0 | 0 | 0 | 0 | 0 | 73 67 | 71 9 | 60 8 | 0 | 0 | 0 | 0 | 0 | 0 | 56 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 85 | 0 | 0 | 0 | 0 | 0 | 76 74 3 | | 54 | 0 | 86 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 58 5 | 54 | 0 | 50 | 71 | 63 6 | 84 1 | 74 7 |
| AVERAGE SIZE PER STATION (mm) | 0 0 | | 0 0 | | 0 0 | | 42 0 | | 0 0 | | 0 0 | | 73 7 | | 65 5 | | 0 0 | | 0 0 | | 0 0 | | 56 0 | | 0 0 | | 0 0 | | 0 0 | | 85 0 | | 0 0 | | 0 0 | | 75 2 | | 54 0 | | 86 0 | | 0 0 | | 0 0 | | 0 0 | | 0 0 | | 57 0 | | 50 0 | | 67 3 | | 82 1 | |
| CLAM DENSITY PER SAMPLE (Clams/m$^2$) | 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 | 1 4 | 12 7 | 16 8 | 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 5 | 0 0 | 0 0 | 0 0 | 0 0 | 0 0 | 5 0 | 9 1 | 0 5 | 0 0 | 0 5 | 0 0 | 0 0 | 0 0 | 0 0 | 0 0 | 0 0 | 0 0 | 0 0 | 0 0 | 0 9 | 0 5 | 0 0 | 0 5 | 2 7 | 3 6 | 3 2 | 1 8 |
| CLAM DENSITY PER STATION (Clams/m$^2$) | 0 0 | | 0 0 | | 0 0 | | 0 2 | | 0 0 | | 0 0 | | 0 7 | | 14 8 | | 0 0 | | 0 0 | | 0 0 | | 0 2 | | 0 0 | | 0 0 | | 0 0 | | 0 2 | | 0 0 | | 0 0 | | 7 1 | | 0 2 | | 0 2 | | 0 0 | | 0 0 | | 0 0 | | 0 0 | | 0 7 | | 0 2 | | 3 2 | | 2 5 | |

| | TOTAL |
|---|---|
| TOTAL NUMBER OF CLAMS | 445 |
| TOTAL NUMBER OF NOTATAS | 6 |
| AVERAGE NUMBER OF CLAMS PER SAMPLE | 3 7 |
| AVERAGE SIZE OF ALL CLAMS SAMPLED (mm) | 67 2 |
| AVERAGE DENSITY (Clams/m$^2$) | 1 7 |

| Note: | |
|---|---|
| NS | No Second Sample Taken at Station |
| # | Notata clam |

**TOWN OF OYSTER BAY**
**Hard Clam Survey**
**All Stations**

| STATION NUMBER | 31 | | 32 | | 33 | | 34 | | 35 | | 36 | | 37 | | 38 | | 39 | | 40 | | 41 | | 42 | | 43 | | 44 | | 45 | | 46 | | 47 | | 48 | | 49 | | 50 | | 51 | | 52 | | 53 | | 54 | | 55 | | 56 | | 57 | | 58 | | 59 | | 60 | | 61 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SAMPLE NUMBER | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 2 |
| LENGTH MEASUREMENTS (mm) | | | | | | | 50 | 36 | | | 70 | | | | 66 | 47 | | | 26 | | | | 48 | 61 | | | | | | | 51 | 41 | | | | | 90 | | 58 | | | | 31 | 38 | 30 | NS | 76 | 36 | 35 | 56 | 39 | 80 | 36 | 37 | 54 | 46 | 0 | NS | 56 | 35 |
| | | | | | | | 62 | 55 | | | 76 | | | | 67 | 54 | | | 29 | | | | 51 | 74 | | | | | | | 55 | 41 | | | | | | | 60 | | | | | | 31 | | | | 41 | | 48 | 65 | 55 | 85 | 45 | 41 | 76 | 54 | | | 64 | 58 |
| | | | | | | | 68 | | | | 90 | | | | | | | | 29 | | | | 60 | 76 | | | | | | | 59 | 50 | | | | | | | 61 | | | | | | 31 | | | | 66 | | 56 | 66 | 62 | 90 | 50 | 42 | 81 | 81 | | | 65 | 60 |
| | | | | | | | | | | | | | | | | | | | 39 | | | | 64 | | | | | | | | 76 | 50 | | | | | | | 63 | | | | | | 34 | | | | 66 | | 60 | 91 | 66 | | 63 | 44 | 86 | 85 | | | 66 | 60 |
| | | | | | | | | | | | | | | | | | | | 41 | | | | 65 | | | | | | | | 91 | 51 | | | | | | | 77 | | | | | | 36 | | | | 69 | | 60 | 91 | 69 | | 79 | 46 | 90 | 90 | | | 68 | 66 |
| | | | | | | | | | | | | | | | | | | | 55 | | | | 75 | | | | | | | | 93 | 52 | | | | | | | 83 | | | | | | 36 | | | | 70 | | 66 | | 70 | | 80 | 56 | 91 | 91 | | | 75 | 66 |
| | | | | | | | | | | | | | | | | | | | 56 | | | | 76 | | | | | | | | | 57 | | | | | | | | | | | | | | 36 | | | | 71 | | 66 | | 71 | | 82 | 60 | 91 | 95 | | | 75 | 69 |
| | | | | | | | | | | | | | | | | | | | 70 | | | | 82 | | | | | | | | | 60 | | | | | | | | | | | | | | 38 | | | | 71 | | 70 | | 71 | | 83 | 62 | 99 | 96 | | | 75 | 70 |
| | | | | | | | | | | | | | | | | | | | 70 | | | | | | | | | | | | | 60 | | | | | | | | | | | | | | 40 | | | | 74 | | 70 | | 76 | | 83 | 66 | | | 79 | 70 |
| | | | | | | | | | | | | | | | | | | | 86 | | | | | | | | | | | | | 60 | | | | | | | | | | | | | | 42 | | | | 74 | | 75 | | 78 | | 85 | 71 | | | 80 | 71 |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 62 | | | | | | | | | | | | | | 42 | | | | 75 | | 75 | | 78 | | 85 | 75 | | | 83 | 75 |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 65 | | | | | | | | | | | | | | 45 | | | | 75 | | 80 | | 78 | | 86 | 83 | | | 85 | 81 |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 66 | | | | | | | | | | | | | | 46 | | | | 75 | | 82 | | 79 | | 89 | 84 | | | 90 | 81 |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 70 | | | | | | | | | | | | | | 50 | | | | 77 | | 84 | | 79 | | 91 | | | | 102 | 82 |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 70 | | | | | | | | | | | | | | 50 | | | | 79 | | 85 | | 80 | | | | | | 85 |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 70 | | | | | | | | | | | | | | 51 | | | | 79 | | 86 | | 80 | | | | | | 86 |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 71 | | | | | | | | | | | | | | 53 | | | | 79 | | 90 | | 80 | | | | | | 90 |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 73 | | | | | | | | | | | | | | 55 | | | | 80 | | 90 | | 80 | | | | | | 91 |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 75 | | | | | | | | | | | | | | 56 | | | | 80 | | 94 | | 81 | | | | | | 95 |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 75 | | | | | | | | | | | | | | 61 | | | | 81 | | | | 81 | | | | | | 95 |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 76 | | | | | | | | | | | | | | 61 | | | | 81 | | | | 84 | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 76 | | | | | | | | | | | | | | 61 | | | | 81 | | | | 85 | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 76 | | | | | | | | | | | | | | 65 | | | | 81 | | | | 85 | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 76 | | | | | | | | | | | | | | 66 | | | | 83 | | | | 90 | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 79 | | | | | | | | | | | | | | 66 | | | | 84 | | | | 91 | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 80 | | | | | | | | | | | | | | 70 | | | | 85 | | | | 91 | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 80 | | | | | | | | | | | | | | 71 | | | | 85 | | | | 96 | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 80 | | | | | | | | | | | | | | 71 | | | | 85 | | | | 98 | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 80 | | | | | | | | | | | | | | 71 | | | | 85 | | | | 101 | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 82 | | | | | | | | | | | | | | 74 | | | | 86 | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 83 | | | | | | | | | | | | | | 75 | | | | 86 | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 84 | | | | | | | | | | | | | | 75 | | | | 87 | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 90 | | | | | | | | | | | | | | 77 | | | | 88 | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 92 | | | | | | | | | | | | | | 80 | | | | 89 | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 80 | | | | 90 | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 80 | | | | 91 | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 80 | | | | 91 | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 81 | | | | 100 | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 81 | | | | 111 | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 81 | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 82 | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 83 | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 84 | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 85 | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 85 | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 86 | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 95 | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 95 | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 102 | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 111 | | | | | | | | | | | | | | |
| NUMBER OF CLAMS | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 2 | 0 | 0 | 3 | 0 | 0 | 0 | 2 | 2 | 0 | 0 | 10 | 0 | 0 | 0 | 0 | 0 | 8 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 34 | 0 | 0 | 0 | 0 | 1 | 0 | 6 | 0 | 0 | 0 | 1 | 1 | 52 | - | 1 | 41 | 20 | 5 | 30 | 3 | 15 | 13 | 8 | 8 | 0 | - | 14 | 20 |
| NUMBER OF NOTATAS | | | | | | | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 2 | | | | | | | | | | | | | | | | | | |
| AVERAGE SIZE PER SAMPLE (mm) | 0 | 0 | 0 | 0 | 0 | 0 | 60 | 45 5 | 0 | 0 | 79 | 0 | 0 | 0 | 67 | 51 | 0 | 0 | 50 | 0 | 0 | 0 | 0 | 0 | 65 | 70 | 0 | 0 | 0 | 0 | 0 | 0 | 71 | 68 6 | 0 | 0 | 0 | 0 | 90 | 0 | 67 | 0 | 0 | 0 | 31 | 38 | 64 7 | - | 76 | 79 3 | 72 7 | 74 | 78 | 85 | 75 | 59 | 84 | 80 | 0 | - | 76 | 74 |
| AVERAGE SIZE PER STATION (mm) | 0 0 | | 0 0 | | 0 0 | | 54 2 | | 0 0 | | 78 7 | | 0 0 | | 58 5 | | 0 0 | | 50 1 | | 0 0 | | 0 0 | | 66 4 | | 0 0 | | 0 0 | | 0 0 | | 69 0 | | 0 0 | | 0 0 | | 90 0 | | 67 0 | | 0 0 | | 34 5 | | 64 7 | - | 79 2 | | 72 9 | | 79 0 | | 67 8 | | 81 6 | | 0 0 | | 75 0 | |
| CLAM DENSITY PER SAMPLE (Clams/m$^2$) | 0 0 | 0 0 | 0 0 | 0 0 | 0 0 | 0 0 | 1 4 | 0 9 | 0 0 | 0 0 | 1 4 | 0 0 | 0 0 | 0 0 | 0 9 | 0 9 | 0 0 | 0 0 | 4 5 | 0 0 | 0 0 | 0 0 | 0 0 | 0 0 | 3 6 | 1 4 | 0 0 | 0 0 | 0 0 | 0 0 | 0 0 | 0 0 | 2 7 | 15 5 | 0 0 | 0 0 | 0 0 | 0 0 | 40 9 | 0 0 | 2 7 | 0 0 | 0 0 | 0 0 | 0 5 | 0 5 | 23 6 | - | 0 5 | 18 6 | 9 1 | 2 3 | 13 6 | 1 4 | 6 8 | 5 9 | 3 6 | 3 6 | 0 0 | - | 6 4 | 9 1 |
| CLAM DENSITY PER STATION (Clams/m$^2$) | 0 0 | | 0 0 | | 0 0 | | 1 1 | | 0 0 | | 0 7 | | 0 0 | | 0 9 | | 0 0 | | 2 3 | | 0 0 | | 0 0 | | 2 5 | | 0 0 | | 0 0 | | 0 0 | | 9 1 | | 0 0 | | 0 0 | | 0 2 | | 1 4 | | 0 0 | | 0 5 | | 23 6 | - | 9 5 | | 5 7 | | 7 5 | | 6 4 | | 3 6 | | 0 0 | | 7 7 | |

TOTAL NUMBER OF CLAMS
TOTAL NUMBER OF NOTATAS
AVERAGE NUMBER OF CLAMS PER SAMPLE
AVERAGE SIZE OF ALL CLAMS SAMPLED (mm)
AVERAGE DENSITY (Clams/m$^2$)