Preliminary Results of Commercial Sea Scallop Survey in the Hudson Canyon South Closed Area June 2000

William D. DuPaul  
*Virginia Institute of Marine Science*

David B. Rudders  
*Virginia Institute of Marine Science*

Paul J. Rago  
*National Marine Fisheries Service*

Follow this and additional works at: [https://scholarworks.wm.edu/reports](https://scholarworks.wm.edu/reports)

Part of the [Aquaculture and Fisheries Commons](https://scholarworks.wm.edu/aquaculture-fisheries)

Recommended Citation


This Report is brought to you for free and open access by W&M ScholarWorks. It has been accepted for inclusion in Reports by an authorized administrator of W&M ScholarWorks. For more information, please contact [scholarworks@wm.edu](mailto:scholarworks@wm.edu).
PRELIMINARY RESULTS OF COMMERCIAL SEA SCALLOP SURVEY IN THE HUDSON CANYON SOUTH CLOSED AREA

JUNE 2000

Submitted To:
Sea Scallop Plan Development Team
New England Fishery Management Council
New Bedford, Massachusetts
July 24-25, 2000

William D. DuPaul and David B. Rudders
Virginia Institute of Marine Science
School of Marine Science
College of William and Mary
Gloucester Point, Virginia

Paul J. Rago
National Marine Fisheries Service
Northeast Fisheries Science Center
Woods Hole, Massachusetts

VIMS Marine Resource Report No. 2000-6
July 21, 2000
This report presents the preliminary results of the commercial survey of the Hudson Canyon Closed Area. The survey was conducted aboard the F/V Alice Amanda from June 8-15, 2000. A systematic grid design was utilized with survey stations located approximately 5 nm apart (Figure 1). Survey stations were located both inside and outside the boundaries of the closed area. Additional stations were added along the western, northern and southern boundaries in an attempt to resolve the boundary effects on sea scallop abundance and size distribution. Survey tows were 10 minutes in duration at a speed of 4.5-5.0 kts. The sampling gear consisted of two standard 15 ft. New Bedford style sea scallop dredges with 8 inch twine tops, ring bags knit with 3.5” (88.9 mm) rings, and no tickler or rock chains. An inclinometer was attached to the frame of the starboard dredge to measure dredge angle and bottom contact time.

The results of the initial data analysis are shown in Figures 2-8. Catch data are shown in Figures 2-4 with scallop catches separated into two categories of shell height: less than 90 mm (Figure 2) and greater than or equal to 90 mm shell height (Figure 3). A total scallop catch at each station is shown in Figure 4.

Differences in sea scallop abundance and size structure were examined with respect to samples taken inside or outside of the closed area (Figure 5), strata calculated by dividing the closed area into equal North and South portions along the 39° 01.566′ latitude (Figure 6), and by depth regimes within the closed area (Figure 7).

Catch data stratified by two factors: 1). North and South 2). inside and outside the closed area are shown in Table 1. The initial biomass estimate is shown in Table 2. The following assumptions were used in calculating biomass:

1. Stratification of the closed area into two roughly equal portions.
2. Utilizing a systematic grid design, number of stations was proportional to area of strata.
3. Tows that fell on closed area boundary were included in the calculation.
4. All scallops harvested were included.
5. The coefficients of the shell height-meat weight relationship:
   \[ a=-12.1628 \quad b=3.2539. \]
6. A nominal tow length of 1 nm. Each tow covered 0.00494 nm².
7. A dredge efficiency of 40%
8. Harvest represents a removal of 25% of the standing stock.

The next iterations of biomass estimates will follow accordingly:

1. The number of scallops from 80-100 mm will be corrected for the selectivity of the 3.5” ring dredge. This means that the total number of scallops at each 5 mm interval from 80-100 mm will increase. Consequently, their contribution will also increase the biomass estimate. We will still use the nominal tow length of 1 nm and a 40% dredge efficiency.

2. The biomass estimate in 1 will be calculated to account for growth and natural mortality (0.1) to project the standing stock in 2001.

3. The biomass estimate in 1 and 2 will be calculated to account for actual tow length and changes in dredge efficiency based on the 1999 depletion experiments in the Hudson Canyon Closed Area on 100+ mm scallops.
Table 1  Results of commercial survey in the Hudson Canyon Closed Area.

<table>
<thead>
<tr>
<th>Sub-Area</th>
<th>Area (nm²)</th>
<th>N (tows)</th>
<th>Mean (grams)</th>
<th>Variance</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Open North</td>
<td>?</td>
<td>19</td>
<td>8,014.6</td>
<td>18,888,235.0</td>
<td>4,346.1</td>
</tr>
<tr>
<td>Open South</td>
<td>?</td>
<td>16</td>
<td>8,338.2</td>
<td>339,215,165.0</td>
<td>2,807.9</td>
</tr>
<tr>
<td>Closed North</td>
<td>711</td>
<td>62</td>
<td>19,145.5</td>
<td>7,884,538.7</td>
<td>18,417.8</td>
</tr>
<tr>
<td>Closed South</td>
<td>756</td>
<td>66</td>
<td>31,181.8</td>
<td>1,082,958,654.7</td>
<td>32,908.3</td>
</tr>
</tbody>
</table>

Table 2  Estimated Biomass for the Hudson Canyon Closed Area in June 2000. Harvest represents 25% of the estimated biomass.

<table>
<thead>
<tr>
<th></th>
<th>Total</th>
<th>Standard Error</th>
<th>Total -2*SE</th>
<th>Total +2*SE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biomass (MT)</td>
<td>18,818.8</td>
<td>1763.6</td>
<td>15,291.6</td>
<td>22,345.9</td>
</tr>
<tr>
<td>Biomass (Lbs)</td>
<td>42,154,059.3</td>
<td>3,950,382.2</td>
<td>34,253,295.0</td>
<td>50,054,823</td>
</tr>
<tr>
<td>Harvest (Lbs)</td>
<td>10,538,514.8</td>
<td>987,595.5</td>
<td>8,563,323.8</td>
<td>12,513,705.9</td>
</tr>
</tbody>
</table>
7. A dredge efficiency of 40%
8. Harvest represents a removal of 25% of the standing stock.

The next iterations of biomass estimates will follow accordingly:

1. The number of scallops from 80-100 mm will be corrected for the selectivity of the 3.5" ring dredge. This means that the total number of scallops at each 5 mm interval from 80-100 mm will increase. Consequently, their contribution will also increase the biomass estimate. We will still use the nominal tow length of 1 nm and a 40% dredge efficiency.

2. The biomass estimate in 1 will be calculated to account for growth and natural mortality (0.1) to project the standing stock in 2001.

3. The biomass estimate in 1 and 2 will be calculated to account for actual tow length and changes in dredge efficiency based on the 1999 depletion experiments in the Hudson Canyon Closed Area on 100+ mm scallops.
Table 1 Results of commercial survey in the Hudson Canyon Closed Area.

<table>
<thead>
<tr>
<th>Sub-Area</th>
<th>Area (nm²)</th>
<th>N (tows)</th>
<th>Mean (grams)</th>
<th>Variance</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Open North</td>
<td>?</td>
<td>19</td>
<td>8,014.6</td>
<td>18,888,235.0</td>
<td>4,346.1</td>
</tr>
<tr>
<td>Open South</td>
<td>?</td>
<td>16</td>
<td>8,338.2</td>
<td>339,215,165.0</td>
<td>2,807.9</td>
</tr>
<tr>
<td>Closed North</td>
<td>711</td>
<td>62</td>
<td>19,145.5</td>
<td>7,884,538.7</td>
<td>18,417.8</td>
</tr>
<tr>
<td>Closed South</td>
<td>756</td>
<td>66</td>
<td>31,181.8</td>
<td>1,082,958,654.7</td>
<td>32,908.3</td>
</tr>
</tbody>
</table>

Table 2 Estimated Biomass for the Hudson Canyon Closed Area in June 2000. Harvest represents 25% of the estimated biomass.

<table>
<thead>
<tr>
<th></th>
<th>Total</th>
<th>Standard Error</th>
<th>Total -2*SE</th>
<th>Total +2*SE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biomass (MT)</td>
<td>18,818.8</td>
<td>1763.6</td>
<td>15,291.6</td>
<td>22,345.9</td>
</tr>
<tr>
<td>Biomass (Lbs)</td>
<td>42,154,059.3</td>
<td>3,950,382.2</td>
<td>34,253,295.0</td>
<td>50,054,823</td>
</tr>
<tr>
<td>Harvest (Lbs)</td>
<td>10,538,514.8</td>
<td>987,595.5</td>
<td>8,563,323.8</td>
<td>12,513,705.9</td>
</tr>
</tbody>
</table>
Figure 1
Hudson Canyon Closed Area Survey Stations
Figure 2
Hudson Canyon Closed Area
Number/Tow
Less than 90 mm

Number/Tow
- 0
- 1 - 100
- 101 - 1000
- 1001 - 5000
- >5000
Figure 3
Hudson Canyon Closed Area
Number/Tow
Greater than 90 mm

Legend:
- 0
- 1 - 100
- 101 - 1000
- 1001 - 5000
- >5000
FIGURE 5
AVERAGE NUMBER OF SCALLOPS CAUGHT PER TOW
HUDSON CANYON CLOSED AREA
JUNE 2000
FIGURE 6
AVERAGE NUMBER OF SCALLOPS CAUGHT PER TOW
HUDSON CANYON CLOSED AREA
JUNE 2000

AVERAGE NUMBER OF SCALLOPS CAUGHT PER TOW
SHELL HEIGHT (MM)
FIGURE 7
AVERAGE NUMBER OF SCALLOPS CAUGHT PER TOW BY DEPTH
HUDSON CANYON CLOSED AREA
JUNE 2000

AVERAGE NUMBER OF SCALLOPS CAUGHT PER TOW

SHELL HEIGHT (MM)