

MEMORANDUM FOR: Sarah Heil,  
Assistant Regional Administrator  
for Sustainable Fisheries

FROM: David Gouveia,  
Assistant Regional Administrator  
for Analysis and Program Support

SUBJECT: Request for Calculation of Surfclam Size Distribution

Per your request, my staff has reviewed the landings information and biological sampling data for surfclams since the previous size analysis (August 2019 through July 2020), and determined the proportion of surfclams in the fishery smaller than 4.75 inches does not exceed the 30 percent trigger for suspending the minimum size requirement.

Please do not hesitate to contact me with any questions.  
cc: Potts, Lanning

## Estimated Proportion of Undersized Surfclam Landings for 2020

John Sullivan.  
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National Marine Fisheries Service  
September 14, 2020

### Introduction

The Code of Federal Regulations includes a provision for the suspension of minimum landing size regulations for surfclam (*Spisula solidissima*) [CFR 50, §648.75 (b)(3)]:

*“upon recommendation of the Mid-Atlantic Fishery Management Council (MAFMC), the Regional Administrator may suspend annually, by publication in the Federal Register, the minimum shell-height standard unless discard, catch, and survey data indicate that 30 percent of the surfclams are smaller than 4.75 inches (12.065 cm) and the overall reduced shell height is not attributable to beds where the growth of individual surfclams has been reduced because of density dependent factors.”*

Each year an analysis of the size composition of surfclam landings is conducted to inform any recommendation by the Mid-Atlantic Council to the Regional Administrator concerning surfclam minimum size restrictions. The following report summarizes the analysis of Atlantic surfclam landings in 2020.

### Data Sources and Procedures

Samples of surfclam landings were collected from the Georges Bank, New Jersey and DelMarVa stock areas. These samples were not evenly distributed and, therefore, had to be weighted by stock area and volume. The coast-wide distribution of undersized surfclams was then calculated.

The estimate for coast wide undersized surfclams landed was determined by calculating a weighted average proportion of undersized surfclams with equation 1:

$$\hat{P}_c = \left( \sum_{j=1}^n W_j \hat{P}_j \right) \quad (1)$$

where

$\hat{P}_c$  is the estimated coast wide proportion of undersized surfclams landed

$W_j$  is the proportion of landings from stock area  $j$  in the coast wide reported landings, as calculated with equation 2:

$$W_j = \frac{L_j}{\sum_1^3 L_j} \quad (2)$$

$L_j$  is the volume landed (bushels) from stock area  $j$

$\hat{P}_j$  is the estimated proportion of undersized surfclams in stock area  $j$ , as calculated with equation 3

$$\hat{P}_j = \left( \sum_{i=1}^n w_{ij} p_{ij} \right) \quad (3)$$

$w_{ij}$  is the proportion of the landings of sample  $i$  to total landings of all samples from stock area  $j$ , as calculated with equation 4:

$$w_{ij} = \frac{l_{ij}}{\sum_{i=1}^n l_{ij}} \quad (4)$$

$l_{ij}$  is the volume (bushels) for sample  $i$  from stock area  $j$

$p_{ij}$  is the proportion of undersized surfclams in sample  $i$  from stock area  $j$ , as calculated with equation 5:

$$p_{ij} = \frac{x_{ij}}{n_{ij}} \quad (5)$$

$n_{ij}$  is the number of surfclams in sample  $i$  from stock area  $j$

$x_{ij}$  is the number of surfclams <121 mm in size from sample  $i$  of stock area  $j$

Once the coast wide weighted average proportion of undersized surfclams was determined, the coast wide variance of the proportional mean was calculated and used to determine the 95% confidence intervals around that estimate.

The variance estimate for the proportion of undersized coast wide landings was calculated using equation 6:

$$\text{var}(\hat{P}_c) = \sum_{j=1}^3 W_j^2 \times \text{var}(\hat{P}_j) \quad (6)$$

where

$W_j$  is the proportion of all landings from stock area  $j$  to the coast wide landings from all three areas (Georges Bank, New Jersey and DelMarVa), as calculated with equation 2

$\text{var}(\hat{p}_j)$  is the variance associated with each stock area  $j$  estimated with equation 7:

$$\text{var}(\hat{p}_j) = \sum_{i=1}^n w_{ij}^2 \times \text{var}(\hat{p}_{ij}) \quad (7)$$

$w_{ij}$  is the proportion of the landings of sample  $i$  to total landings of all samples from stock area  $j$ , as calculated with equation 4

$\text{var}(\hat{p}_{ij})$  is the variance of the proportion of sample  $i$  in stock area  $j$  estimated with equation 8:

$$\text{var}(\hat{p}_{ij}) = \frac{(p_{ij} \times (1 - p_{ij}))}{n_{ij}} \quad (8)$$

The 2020 sampling period extended from August 1, 2019 through July 31, 2020. Surfclam samples were collected from vessels fishing in Georges Bank statistical areas 521, 522, 525, and 562; in New Jersey statistical areas 612, 613, 614, and 615; and in DelMarVa statistical area 622. A total of 161 samples from 23 distinct vessels were used for this analysis of the 2020 sampling period.

Two types of data were used in the analysis: (1) landings information and (2) biological sampling data. Surfclam landings data were collected as part of the Greater Atlantic Regional Fisheries Office mandatory reporting requirements. Vessel and dealer permit holders reported landed volume (bushels), vessel permit number, and fishing location, as well as other information from each vessel trip. This information provided landings data for the principle stock areas. Stakeholder Engagement Division (SED) field staff collected biological samples from selected vessels upon docking. Each sample consisted of shell height measurements from approximately 30 randomly selected individual surfclams. Fishing location of the sampled catch was recorded by SED field staff from information reported by the vessel operators. For length records that lacked area fished information, area fished was determined from the vessel log report for the trip or from the most recent available surfclam log report that included area fished for a particular vessel. Volume of the catch from which the sample was derived was pulled from vessel clam log data for the sampled trip. Oracle tables (sfoqpr and sfoqvr in the sfclam schema on the nero oracle server) were used to query and match vessel trip landings by date and permit

number. If vessel clam log data could not be matched to a sampled trip, dealer-reported volume information for the sampled trip was used. There were several instances where a sampled trip lacked volume landed information from either the vessel clam logs or dealer reports. The volume of these unmatched samples was estimated using the average number of bushels of surfclams landed on all trips by that vessel in fishing year 2020.

Landings information from the principal stock areas indicated that Georges Bank landings made up approximately 37% of the coast wide catch. The remaining 63% of the catch came from the DelMarVa and New Jersey stock areas (Table 1).

Table 1. FY2020 Landings of surfclams reported by vessels August 1, 2019 – July 31, 2020.

Stock area	Reported Landings (bushels) August, 2019 - July, 2020	Meat weight of reported landings (lbs.)	Percent of reported landings
Georges Bank	599,478	10,191,126	36.7%
New Jersey	559,000	9,503,000	34.2%
DelMarVa	476,075	8,093,275	29.1%
Grand Total	1,634,553	27,787,401	100.0%

The nominal length distribution of all biological samples obtained from August 1, 2019 – July 31, 2020 indicated that the majority of surfclams sampled were equal to or larger than 121 mm. The mean length of the coast wide samples was 138 mm (Figure 1).

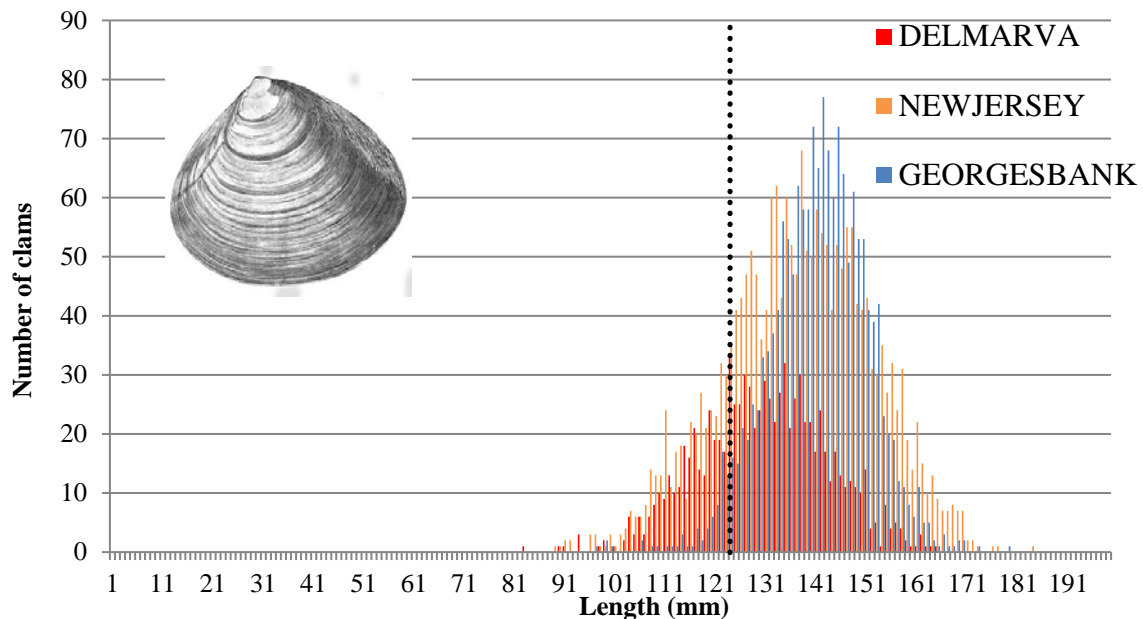


Figure 1. Length frequency distribution of surfclams from dockside sampling for FY2020. The dashed vertical line separates surfclams above and below 121 mm.

The 161 samples used in this analysis contained 4831 measured surfclams, of which 491 individual surfclams were undersized. Fourteen of the 154 samples collected had 30% or more undersized surfclams; 9 of those samples came from the DelMarVa stock area, 5 came from New Jersey, no samples with 30% or more undersized surfclams came from the George’s Bank stock area (Table 2).

Table 2. Description of the 161 individual surfclam samples collected in 2020, with the proportion of undersized surfclams in each sample.

Sample Number	Stock Area	Number of surfclams in sample	Proportion of undersized surfclams*	Volume of catch (bushels)
1	DelMarVa	30	0.30	960
2	DelMarVa	30	0.20	960
3	DelMarVa	30	0.27	3072
4	DelMarVa	30	0.43	3072
5	DelMarVa	30	0.23	960
6	DelMarVa	30	0.20	960
7	DelMarVa	30	0.37	960
8	DelMarVa	30	0.17	480
9	DelMarVa	30	0.07	960
10	DelMarVa	30	0.40	1472
11	DelMarVa	30	0.17	960
12	DelMarVa	30	0.27	1440
13	DelMarVa	30	0.17	960
14	DelMarVa	30	0.03	1137
15	DelMarVa	30	0.30	960
16	DelMarVa	30	0.00	1440
17	DelMarVa	30	0.20	864
18	DelMarVa	30	0.30	1440
19	DelMarVa	30	0.10	960
20	DelMarVa	30	0.03	1888
21	DelMarVa	30	0.33	960
22	DelMarVa	30	0.07	896
23	DelMarVa	30	0.13	1248
24	DelMarVa	30	0.07	832
25	DelMarVa	30	0.13	896
26	DelMarVa	30	0.13	960

27	DelMarVa	30	0.00	960
28	DelMarVa	30	0.20	1472
29	DelMarVa	30	0.40	960
30	DelMarVa	30	0.30	960
31	Georges Bank	30	0.03	4288
32	Georges Bank	30	0.03	3360
33	Georges Bank	30	0.00	5760
34	Georges Bank	29	0.00	4320
35	Georges Bank	30	0.00	4288
36	Georges Bank	30	0.07	3520
37	Georges Bank	30	0.00	3171
38	Georges Bank	30	0.13	4288
39	Georges Bank	30	0.00	4000
40	Georges Bank	30	0.00	2272
41	Georges Bank	30	0.03	4288
42	Georges Bank	30	0.03	2912
43	Georges Bank	30	0.03	2496
44	Georges Bank	30	0.00	2560
45	Georges Bank	30	0.07	1440
46	Georges Bank	30	0.07	1664
47	Georges Bank	30	0.03	3171
48	Georges Bank	30	0.00	2816
49	Georges Bank	30	0.00	3488
50	Georges Bank	30	0.07	4096
51	Georges Bank	30	0.00	4800
52	Georges Bank	30	0.03	4544
53	Georges Bank	29	0.03	3264
54	Georges Bank	30	0.03	3040
55	Georges Bank	30	0.00	224
56	Georges Bank	30	0.00	640
57	Georges Bank	30	0.00	3712
58	Georges Bank	30	0.00	192
59	Georges Bank	30	0.00	896
60	Georges Bank	30	0.00	4288
61	Georges Bank	30	0.00	4160
62	Georges Bank	30	0.03	3136
63	Georges Bank	30	0.00	3424
64	Georges Bank	30	0.00	4768
65	Georges Bank	30	0.00	3328
66	Georges Bank	30	0.00	3680
67	Georges Bank	30	0.00	3648

68	Georges Bank	30	0.00	2464
69	Georges Bank	30	0.07	3264
70	Georges Bank	31	0.00	3456
71	Georges Bank	30	0.00	4800
72	Georges Bank	30	0.00	4000
73	Georges Bank	30	0.00	1952
74	Georges Bank	30	0.00	2688
75	Georges Bank	30	0.03	2976
76	Georges Bank	30	0.03	1920
77	Georges Bank	30	0.00	3456
78	Georges Bank	30	0.00	4288
79	Georges Bank	30	0.00	3584
80	Georges Bank	30	0.00	3616
81	Georges Bank	30	0.00	4288
82	Georges Bank	30	0.00	3104
83	Georges Bank	30	0.00	4800
84	Georges Bank	30	0.00	2848
85	New Jersey	30	0.10	1056
86	New Jersey	30	0.20	704
87	New Jersey	30	0.10	576
88	New Jersey	30	0.27	960
89	New Jersey	30	0.13	480
90	New Jersey	30	0.07	1344
91	New Jersey	30	0.53	960
92	New Jersey	30	0.00	704
93	New Jersey	30	0.00	640
94	New Jersey	30	0.27	960
95	New Jersey	30	0.00	576
96	New Jersey	31	0.16	960
97	New Jersey	30	0.27	960
98	New Jersey	30	0.00	704
99	New Jersey	30	0.00	896
100	New Jersey	30	0.03	480
101	New Jersey	30	0.00	352
102	New Jersey	30	0.00	1312
103	New Jersey	30	0.23	1088
104	New Jersey	30	0.10	1536
105	New Jersey	30	0.00	576
106	New Jersey	30	0.27	896
107	New Jersey	30	0.20	896
108	New Jersey	31	0.39	2048



109	New Jersey	30	0.03	896
110	New Jersey	30	0.10	960
111	New Jersey	30	0.30	960
112	New Jersey	30	0.13	1440
113	New Jersey	30	0.17	1440
114	New Jersey	30	0.03	1344
115	New Jersey	30	0.00	1440
116	New Jersey	30	0.00	960
117	New Jersey	30	0.10	2048
118	New Jersey	30	0.07	1952
119	New Jersey	30	0.17	1024
120	New Jersey	30	0.07	672
121	New Jersey	30	0.03	1344
122	New Jersey	30	0.07	480
123	New Jersey	30	0.23	960
124	New Jersey	30	0.17	480
125	New Jersey	30	0.00	928
126	New Jersey	30	0.07	1440
127	New Jersey	30	0.10	960
128	New Jersey	30	0.00	640
129	New Jersey	30	0.20	1440
130	New Jersey	30	0.10	960
131	New Jersey	30	0.03	96
132	New Jersey	30	0.17	832
133	New Jersey	30	0.23	960
134	New Jersey	30	0.33	960
135	New Jersey	30	0.07	2560
136	New Jersey	30	0.00	544
137	New Jersey	30	0.27	768
138	New Jersey	30	0.13	640
139	New Jersey	30	0.10	928
140	New Jersey	29	0.10	960
141	New Jersey	30	0.17	960
142	New Jersey	30	0.23	768
143	New Jersey	30	0.27	832
144	New Jersey	30	0.07	192
145	New Jersey	30	0.13	192
146	New Jersey	30	0.07	960
147	New Jersey	30	0.07	480
148	New Jersey	30	0.17	896
149	New Jersey	30	0.10	800

150	New Jersey	30	0.33	640
151	New Jersey	30	0.07	960
152	New Jersey	30	0.00	736
153	New Jersey	30	0.13	704
154	New Jersey	30	0.00	256

\*samples with more than 30% undersized surfclams are highlighted.

### Estimation Results

An estimated 11.3% of the coast wide surfclam landings to date in 2020 were undersized. The lower and upper 95% confidence bounds for this estimate were 10.7% and 11.9%. These estimates are below the 30% maximum that would preclude the Regional Administrator from suspending the minimum shell height standard (Table 3).

Table 3. Proportional distribution of 2020 undersized surfclams by area and coast-wide.

Area	Estimated percentage of surfclams <121 mm	Lower 95% Confidence Interval	Upper 95% Confidence Interval
Georges Bank	1.5%	1.5%	1.6%
New Jersey	13.2%	13.1%	13.3%
DelMarVa	21.5%	21.3%	21.6%
<b>Coast-wide*</b>	11.3%	10.7%	11.9%

\* weighted mean