Post-Cruise Report: Pursuit Cruise

October 1, 2021

The following is a short synopsis of the recent Pursuit cruise. The cruise plan was designed using information canvassed from clam boat captains who relayed locations of high densities of surfclams and ocean quahogs, augmented by recent (2016-2018) NMFS survey data. This information suggested a central tendency for species overlap in the 40-50 m depth range, deeper in the south than in the north. The cruise track was designed to run transects across this depth range from inshore (~35 m) to offshore (~60 m) so that the most inshore location had surfclams only and the most offshore stations had ocean quahogs only. The cruise track oriented the transects at an angle so that the boat zig-zagged through the region to limit time lost in steaming between stations.

At each station, we took two 5-min dredge tows, one with a wider bar spacing than the other. Analysis was limited to the number and size of clams of the two target species caught in the tow and the GPS-measured tow length. Depth was also recorded.

The following data are available upon request. Tow position (decimal degrees latitude and longitude), station depth, tow distance (m), tow swept area (m^2), number of clams caught (by species), clam size frequency (by species), and clam density (by species and by size class: clams m^{-2}).

We took 117 tows on the cruise, somewhat over 50 stations. With a few exceptions, these stations ranged from offshore Ocean City, Maryland to Hudson Canyon. We briefly sampled a deeper section of the Long Island shelf just north of Hudson Canyon, but full sample analyses were not performed.

Analyses were performed using the assumption that sorting on deck is infeasible if the clam mix is greater than 1 clam in 25 of the mixing species (e.g., >1 surfclam in 25 clams). Analyses can be performed on other options. The important point is to identify the degree of mixing that prevents sorting at sea. In the present analysis, the assumption that a mixture exceeding 1 in 25 for either species precludes sorting at sea.

Preliminary “off the boat” data analyses have been performed based on this assumption and additional assumptions as listed in the following text. Data are found in the associated excel spreadsheet. Figures are in the associated powerpoint. Figure 1 (Slide 1) is a map showing the distribution of 4 types of stations. The green boxes, oriented offshore, are locations where more than 24 of every 25 clams was an ocean quahog. In most cases, these tows were exclusively ocean quahog. Note that most of these stations are in the 55-60 m range. The dark pink boxes oriented inshore are locations where more than 24 of every 25 clams was a surfclam. In most cases, these tows were exclusively surfclam. Note that most of these stations are in the 30-40 m range. The salmon boxes generally on the inshore half of the intervening region are stations where at least 1 ocean quahog was present for every 25 clams, but no more than 12 (a 50:50 split). The brown boxes generally on the offshore half of the intervening region are stations where at least 1 surfclam was present for every 25 clams, but no more than 12 (a 50:50 split). Both of the station types yielding mixed clams occupy a substantial region between 40 and 55 m with the surfclam-rich stations somewhat inshore of the ocean quahog-rich stations.

Figure 2 (Slide 2) shows the estimated density of ocean quahogs at each station. Largest catches were between 40 and 60 m and scattered over most of the surveyed domain. Figure 3 (Slide 3)

shows the estimated density of surfclams. Largest catches were between 45 and 50 m. Thus, the two species are both abundant over much of the overlap zone.

Figure 4 (Slide 4) shows the estimated density of surfclams <120 mm. Generally, these animals would be in the 3-6-year-old age range. We cannot be sure for the offshore samples, as growth is likely slower in colder water, but certainly most of these animals have recruited since 2015. These smaller animals mark locations of surfclam population expansion. Note that most large catches are between 40 and 50 m, but some are between 50 and 60 m. This is clear evidence of population expansion consistently at least out to 60 m.

Note also on Figure 4 areas on the Long Island shelf between 50 and 60 m just north of Hudson Canyon. These are small animals, likely 3-5 years old. The NMFS survey has never recorded surfclams in this region. Their last survey likely was prior to recruitment or the clams were still too small to be caught in the survey dredge. Their capture now is strong evidence that the anticipated expansion of the surfclam population offshore Long Island is well underway. This should be seen as a region likely supporting a future surfclam fishery, if the issue of species overlap can be overcome. We were not able to survey extensively in this region, but I suspect the surfclam recruitment dynamics observed will extend over much of the western Long Island shelf and I would reiterate the urgency of including that expectation in the positions taken relative to the BOEM windfarm plan.

The excel spreadsheet has the following basic information: station position in decimal degrees longitude and latitude and the station name (e.g., 1P). The P and S designations stand for port and starboard dredges. The “ocean quahog” dredge was on the starboard side; the “surfclam” dredge was on the port side. DensityS is surfclam density in clams m^{-2} based on measured tow length and dredge width (i.e., swept area). DensityQ is ocean quahog density in clams m^{-2}. The group designations tie into Figure 1. Group clamS are the dark pink squares on Figure 1. Group clamQ are the green squares on Figure 1. Group mixSQ are the salmon squares on Figure 1. Group mixQS are the brown squares on Figure 1.

Estimated LPUE are also provided, broken down by clam species (LpueS, LpueQ) and total LPUE (LpueS+Q). These estimates are in cages hr^{-1} and are based on the following assumptions. Tow speed is 3.1 kn; the dredge is fished 50 min out of every hour; dredge width is 120 in; dredge efficiency is set to 1.0 because the density estimates provided are not corrected for dredge efficiency. The number of surfclams per bushel is assumed to be 85; the number of ocean quahogs is set to 125. Other assumptions can be employed if desired.