

Clam resource distribution: A GIS summary

Link to StoryMap format: <https://arcg.is/0m4nXj0>

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Introduction

Two major clam species are targeted by the offshore fisheries of the Georges Bank and Mid-Atlantic regions: the Atlantic Surf Clam, a warm-water species, and the Ocean Quahog, a cold-water species. As the continental shelf warms, Atlantic Surf Clams are encroaching into Ocean Quahog territory, but the quahogs have yet to leave. Fishery regulations allow only one species to be landed at a time. Additionally, the clams serve different product lines, so the processors don't want mixed catches.

The aim of this project is to assemble historical survey and fishing data to develop GIS layers that illustrate how the overlap between Ocean Quahogs and Atlantic Surf Clams has grown in recent decades to its current state. The overall distribution, species density, and effect of temperature are explored to better understand the overlap. Our results aim to help inform natural resource management decisions surrounding these clam species.

Methods

[Link to supplemental process document.](#)

Clam tow data provided by Daniel Hennen, Ph.D., Operations Research Analyst at NOAA's Northeast Fisheries Science Center.

Temperature data provided by Hubert du Pontavice, Ph.D., Postdoctoral Research Associate at Princeton University.

Results

Distribution

Between 1982 and 2016, Ocean Quahog distribution remains fairly constant, with a slight decrease in the southern part of the distribution in recent years. Atlantic Surf Clams gradually retreat north, especially in the last decade or so. In the most recent time range where data is available for both species (2013 - 2017), the species almost completely overlap throughout the Atlantic.

Density

Between 1982 and 2016, the density of Ocean Quahog remains fairly constant until about 2000, when we see a drop-off in the southernmost part of the range. In 2010, we see increasingly greater densities in the northern part of the range around Georges Bank. Within the last decade

or so, the density of Atlantic Surf Clams has shifted northward, especially to Georges Bank. While in the 80's, Atlantic Surf Clams have a greater density in the south and Ocean Quahogs dominate the north, by the 2000's the species overlap almost completely.

We have now discussed overlap in distribution and density, as well as the high density of Ocean Quahogs in the north despite the encroachment of Atlantic Surf Clams. It appears that these GIS layers support the concerns of natural resource managers and fisheries regarding species overlap between Atlantic Surf Clams and Ocean Quahogs.

Temperature

We propose that temperature is the primary driver of increased overlap between the species ranges of Atlantic Surf Clams and Ocean Quahogs. Temperatures have increased in the Mid-Atlantic in recent decades and in Georges Bank from about the 80's onward, but especially within the past 10 years or so. As warm regions expand in the south and offshore New York and New Jersey, we see more mixing of clam species, especially around Georges Bank and the inshore portions of New York and New Jersey.

Future work

- Once 2022 SCMFIS survey data is processed, incorporate it into the existing datasets
- Employ the same datasets as projections of future overlap and resource compromise
- Utilize data to investigate potential designations of multi-species trips
- Provide the layers in a format suitable for inclusion in discussions focused on resource access through wind farm placement