

Providence College

DigitalCommons@Providence

Biology Student Scholarship

Biology

Spring 5-19-2023

The Impact of Age and Catch Location on the Mortality Rates of Striped Bass

Owen Finnegan
Providence College

Follow this and additional works at: https://digitalcommons.providence.edu/bio_students



Part of the [Biology Commons](#)

Finnegan, Owen, "The Impact of Age and Catch Location on the Mortality Rates of Striped Bass" (2023). *Biology Student Scholarship*. 39.

https://digitalcommons.providence.edu/bio_students/39

This Poster is brought to you for free and open access by the Biology at DigitalCommons@Providence. It has been accepted for inclusion in Biology Student Scholarship by an authorized administrator of DigitalCommons@Providence. For more information, please contact dps@providence.edu.

The Impact of Age and Catch Location on the Mortality Rates of Striped Bass

Owen Finnegan, Dr. Rachael Bonoan, Dr. Peter Rodgers
Providence College



Background

Striped bass are one of the most popular and sought-after gamefish in the United States for recreation and commercial fishermen. This popularity comes from their size, with many fish reaching 40+ pounds, a prominent dish in seafood restaurants, and their expansive habitat as they inhabit waters from Florida to Canada (1). During the late 1970s/80s, the population began sharply declining due to overfishing, and governments enacted regulations to stabilize the population (1). However, as of 2020, overfishing is still occurring, and regulations are continuously evolving (1). Each state has their own rules and regulations for possessing striped bass for commercial and recreational fishermen.

This study examines how the age and catch location of the fish influences the mortality rates. This study aims to see if specific age ranges or areas have higher mortality rates and if state governments could place regulations to protect these fish in these vulnerable regions

Methods

The data used in this research was collected from North Carolina to Maine by the Atlantic States Marine Fisheries Commission (ASMFC). The ASMFC collected this data from 1982-2021 using state and federal commercial reporting, surveys by recreational fishermen, fishery-independent surveys, and tagging programs (1). Fishing mortality was determined using harvest, commercial discards, and recreational discards. The data is split into two parts dependent on catch location: Chesapeake Bay and the ocean (0-200 miles offshore).



Tag placed into a striped bass to track its growth and health

Results

In striped bass, age significantly impacts mortality (Anova on LM, $F = 58.927$, $df = 14/1170$, $p < 0.001$), along with catch location (Anova on LM, $F = 974.592$, $df = 1/1170$, $p < 0.001$), and their interaction (Anova on LM, $F = 41.062$, $df = 14/1170$, $p < 0.001$). As shown by Fig. 2, Bay fish had their highest mortality rate at age 5 (0.0519), which decreased every year after age 5. However, Ocean fish mortality increased yearly up to age 15*.

The study grouped any fish over the age of 15 into this category*



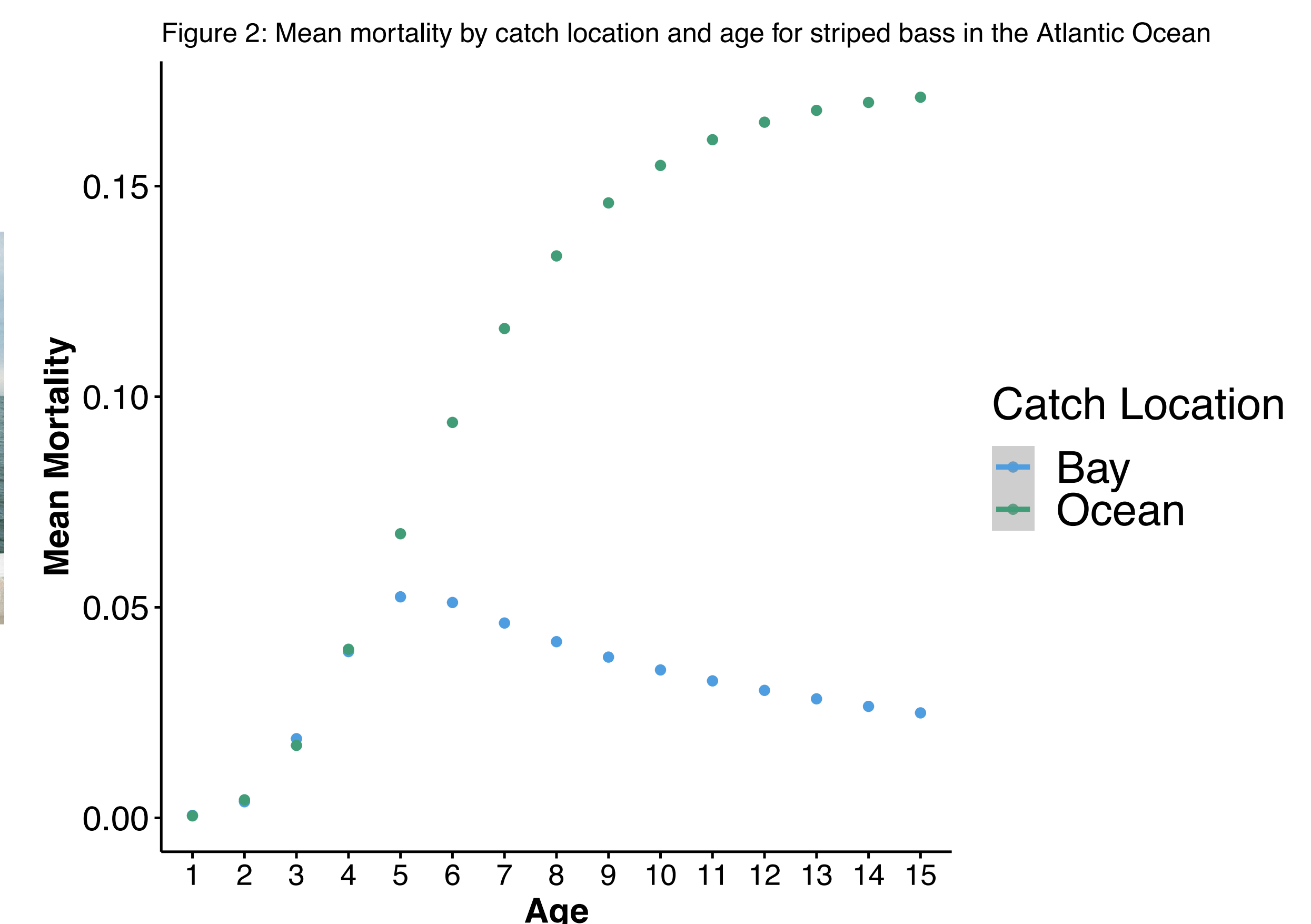
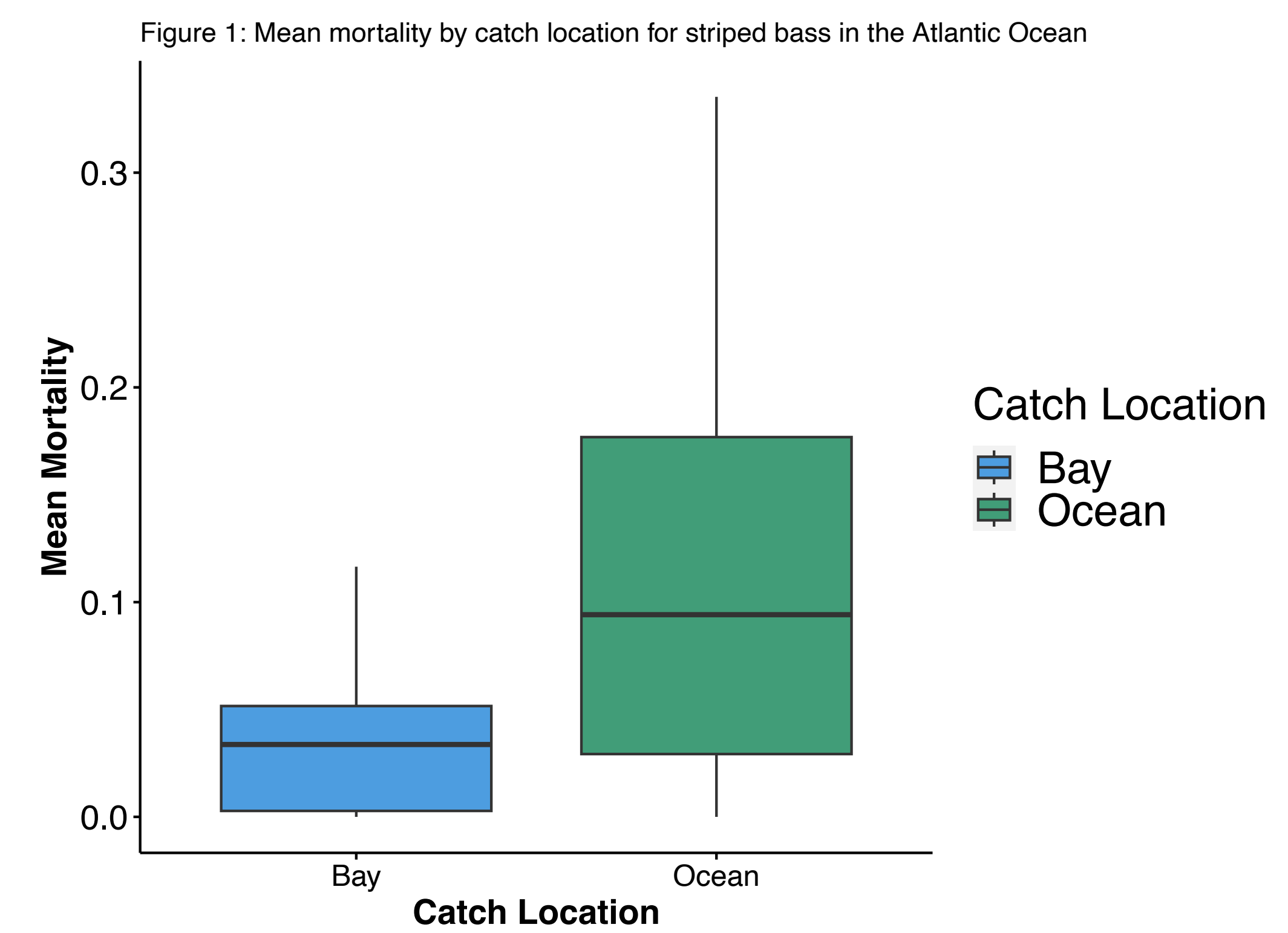
Juvenile striped bass (left) found in the Chesapeake Bay and a full-grown adult or "trophy" striped bass (right) caught from a boat

Conclusions

This study suggests that for fish caught in the ocean, as their age increased, so did their mortality rates, while fish in the Chesapeake Bay had a more consistent mortality rate after age 5. Chesapeake Bay is known to be a spawning ground for striped bass and may offer better shelter for these fish once they reach maturity around 4 years old (2). One way to interpret this data is that marine and tributary waters (bays) regulations should be separate, which New York and Maryland have already implemented. A problem facing some striped bass regulations is the season to keep fish sometimes runs year-round, depending on the state. During winter months or the spawning season, critical times for the population, states should alter rules to protect the age ranges most susceptible to death after being caught. The most shocking discovery of this research was the massive discrepancy in the higher ages between the locations. These higher ages are supposed to benefit the most from current regulations. However, this data shows that these fish have the lowest chance of surviving when caught in the ocean once released meaning these old productive breeders are still at risk even if they aren't being harvested.

Acknowledgements

Thank you to Dr. Peter Rodgers for helping me find the data used in the figures above and to Dr. Rachael Bonoan for helping me organize my data while assisting me with the R coding.



References

- (1) Bettoli PW and Osborne RS. 1998. Hooking mortality and behavior of striped bass following catch and release angling. *N Am J Fish Manage* 18(3):609-15.
- (2) Secor DH. 2000. Spawning in the nick of time? effect of adult demographics on spawning behaviour and recruitment in Chesapeake Bay striped bass. *ICES J Mar Sci* 57(2):403-11.