Populations of Green Crabs (*Carcinus maenas*) and their Sizes in October 2015 through 2019 in Georgetown and Phippsburg, Maine

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Abstract

Green crabs are the source of many problems, including destroying eelgrass and harming the shellfish industry. This study is important because knowing their populations and sizes helps us to predict future events and thus, I chose to look at crab sizes and populations to see if they were linked. We did our studies by going to a location and setting traps, while also looking for crabs in the surrounding seaweed and recording data about the crabs. The data showed a trendline that was decreasing significantly, but the mean sizes went up or stayed the same. I then concluded that the population and size are linked because the data was similar.

Introduction

What we know about the green crab is limited, but extensive. It is known that green crabs are destroying the environment and the economy. Also, the green crabs came here in the ballast tanks of ships, according to O'chang Studios. They thrive in warm water, while also destroying eelgrasses and eating shellfish, damaging Maine's economy. Some things that are not known is the exact population, or all the problems they will cause.

The reason for going and doing this research is to find out the green crab population based on the number of crabs that were found in the crab traps to compare to past years, thus, seeing the effect on the ecosystem. The data from this research and others is vital to the survival of Maine's ecosystem, and to sustain the fisherpeople and Maine's economy. The research questions are whether or not the population of green crabs is increasing or decreasing, and if population size and organism size are related.

Methods

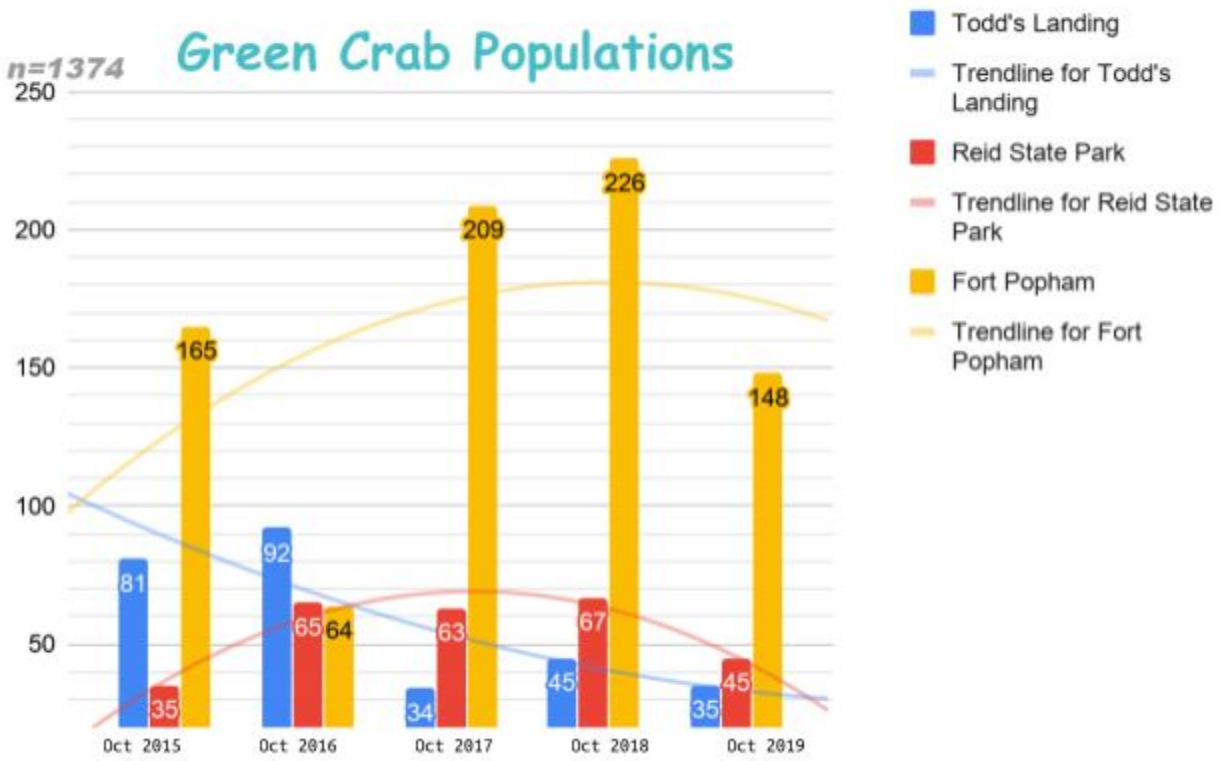
On October 21, 22, and 24 the seventh graders of 2019 from Bath Middle School

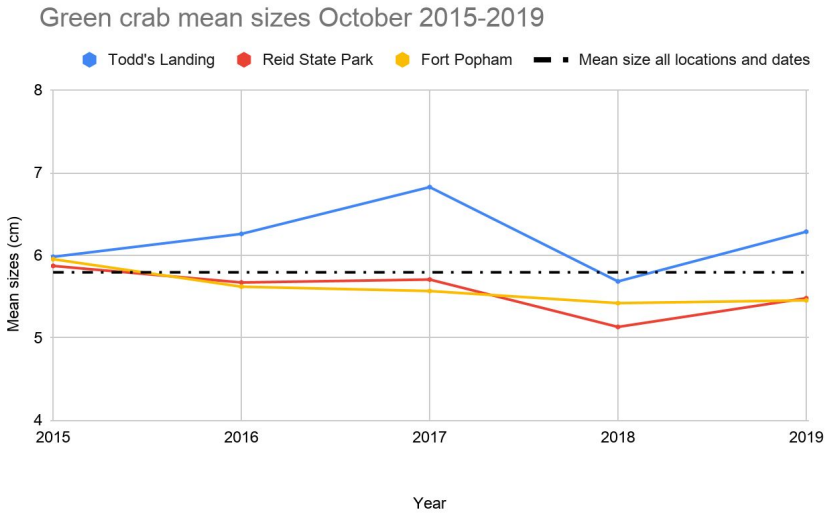
collected our data at Todd's Landing and Reid State Park in Georgetown, ME, and Fort Popham in Phippsburg, ME. Data was on recorded crab population, size, sex, and color right under the claws. Environmental conditions that were measured were salinity of water, and water temperature, and air temperature. Bycatch was caught and recorded, and then released back into the water. Crabs that were caught were given nail poish to see if the seventh graders could recatch any crabs to determine the population size.

Data had to be collected in late October to keep it fair because almost all previous field work was done in this time window. The same bait was used, sardines in sunflower oil from Reny's, and put two fresh cans in the traps every time. The traps were collected on the same days. It was planned for the traps to be in the water for twenty-four hours so to experience a single full tide cycle.

Events that affected the data happened that could not change was on October 23, there was a rainstorm and the trip was postponed, so one set of traps was in the water for forty-eight hours. Also, on October 22 rope was added to the trap because the trap was not completely submerged. The same day, a crab had its claw ripped off when somebody pulled a crab out of the trap too hard, which affected our data because it was documented with the claw missing.

Results





The first graph represents the green crab population over time, specifically in Octobers, which shows that the population size is going down. The bar sizes indicate the number of crabs caught, while the numbers show the exact catch. Trendlines display that the population is going down, possibly down to

zero. The blue bars are for Todd's Landing, the red for Reid, and the yellow for Fort Popham. The second graph shows the mean size by year, from 2015-2019. I found that the recent populations of green crabs have dropped a mean percent of 70.2%.

Discussion and Conclusion

I claim that the green grab population is declining. Through the investigation it was found that the green crab population has gone down by quite a lot. In Todd's Landing the population went down by 77.8%. Reid State Park's green crab population declined by 67.2%. The population of green crabs in Fort Popham decreased by 65.5%.

The claim is based on the evidence of the chart's trendlines. I observed that the trendlines were shrinking in value. This evidence supports the claim because all population sizes have declined, but also significantly, suggesting there might be a recovery in the ecosystem due to human influence or intervention.

I also claim that size and population size are linked because the graphs look similar. For instance, Todd's Landing in 2017, the crabs caught were low, suggesting the overall population was low. Also, the mean size went up significantly during an extreme drop in population.

Limitations included the inaccuracy of the salinity measurements and the lack of other measurements. This data could be inaccurate because of the randomness of catching a crab. Just catching crabs isn't the most accurate representation of a population because the traps only catch large crabs and the hungry crabs, but it can be used for speculation. Further research is a requirement, and what needs to be measured also needs to be extended. It would help if water purity and clarity could be measured, since the main problem from green crabs is destroying eelgrass, causing the water to be cloudier.

Acknowledgements

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References Cited

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