Findings from the Field

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Green Crab Sample Populations in Georgetown and Phippsburg, Maine, 2019

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Abstract

Green crabs are an invasive species— originally from Europe— that are a danger to native Maine species such as eelgrass, Jonah and rock crabs, soft-shell clams and other muscles. In recent years, their populations have grown immensely, and they have come to be one of Maine's biggest hazards to native life. Bath Middle School´s seventh grade gathered data on this crustation at three locations; Fort Popham, Reid State Park, and Todd´s Landing, using crab traps and other tools to capture them. The data shows that the green crab sample population is significantly larger than that of native crabs, and that quite a lot of crabs inhabit the locations in general. As a result, 148 crabs were captured at Fort Popham, 44 crabs at Reid State Park, 34 at Todd´s Landing, totaling 226 crabs and helping to further knowledge of green crabs and samples of their populations.

Introduction

The green crab, *carcinus maenas*, is an invasive species that has been wreaking havoc on Maine coasts for years. Originating in Europe, it was brought to Maine on European ships and can survive in habitats ranging 46.4°F to 77°F, but prefer warmer places, making the ever-warming waters of the Gulf of Maine an ideal place for it to settle down. ¨ Green crabs are voracious predators that can withstand changing temperatures, low salinity and low oxygen levels ¨, said Melissa Gomez in the *New York Times* article *´Highly Aggressive Green Crabs From Canada Menace Maine's Coasts´.* Green crab populations have grown immensely over the past several years and green crabs are now endangering soft-shell clams, native crabs (such as rock crabs and Jonah crabs), eelgrass, and many more species which are vital to the environment and the economy. They have the biggest effect on eelgrass and soft-shell clams, uprooting most of the eelgrass in their searches for prey, and devouring thousands of soft-shell clams each year. ¨It has been found that both eelgrass and soft-shell clams populations have declined greatly since green crabs have become invasive ¨, according to *´Impact of green crab (Carcinus maenas L.) predation on a population of soft-shell clams*

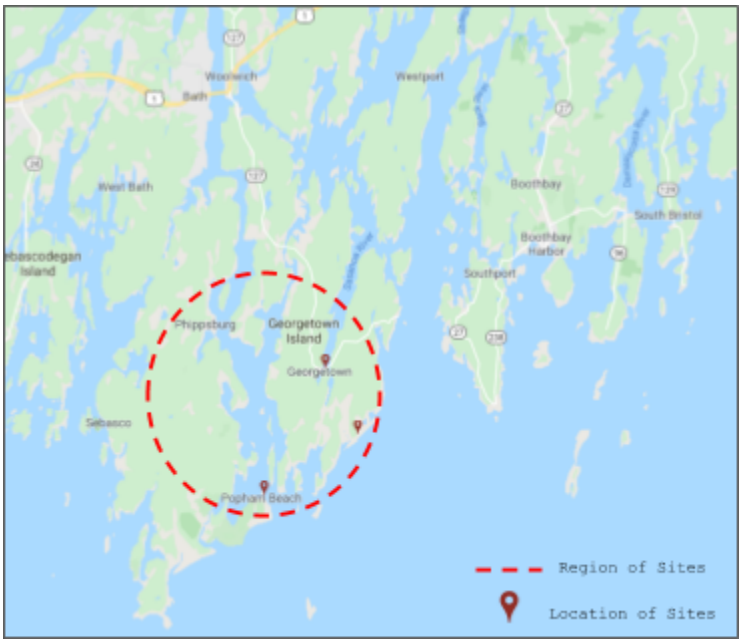
(Mya arenaria L.) in the Southern Gulf of St. Lawrence′, written by Trevor Floyd and Jim Williams on August 1st, 2004. This had made it harder to fish for soft-shell clams, which are an important part of Maine food cultures. The soft-shell clamming industry also provides jobs for hundreds of people, which could become a problem if soft-shell clams were to become scarce.

Many people have tried to solve this problem, alas none have succeeded in putting a sizable dent in the growing population of these crabs. As the years pass, green crabs continue to become a greater danger to native species.

Seventh graders at Bath Middle School wanted to know; how did sample populations of green crabs compare through nearby locations such as Todd′s Landing, Popham Historical Site, and Reid State Park. And which location had the largest crab population.

Methods

On the week of October 21st, Monday, Tuesday, and Thursday, the seventh grade from Bath Middle School visited three different locations to collect data on the invasive species, green crabs. Crab traps were placed at Fort Popham in Phippsburg, and Todd′s Landing and Reid State Park, which are both located in Georgetown, and left there for twenty-four hours. Each trap contained two cans of sardines, purchased at Reny′s, and soaked in sunflower oil, to help the fragrance last longer and lure in more crabs. We first stopped at Todd′s Landing, where we dragged in the first trap. Our class removed all the by-catch, then the cans of bait. After that, we took out the crabs and placed them in buckets. Next, we drove to Reid State Park. The seventh graders pulled out three more traps and repeated what we had done with the first trap. We then took all of the crabs and painted their carapaces with nail polish



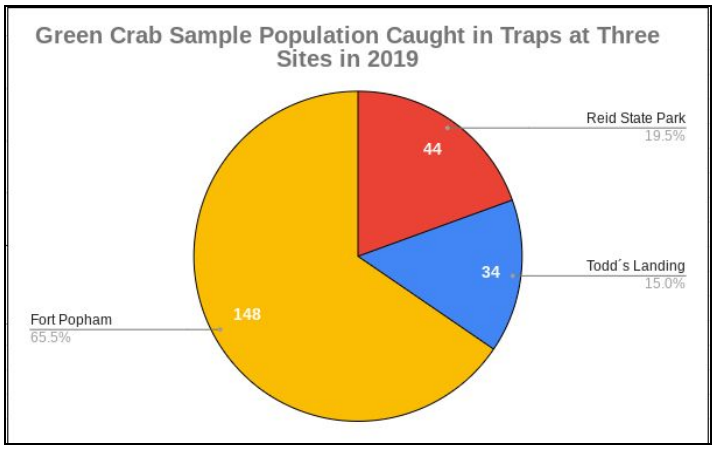
(white nail polish for Monday, pink for Tuesday). That process is called ´tagging´ and we did it in case we recaptured a crab from a previous day. We did not reset traps or tag crabs on Thursday.

We measured the sex, size of carapace, species, claw number and aggressivenes of each crab, documenting it on record sheets.

The student investigators conducted this investigation to learn more about green crabs. We made sure to do everything as similarly as possible each day. Examples of this are; going at the same time each day, using the same bait, visiting at low-tide and at the same locations. It's important that we did it this way so that the conditions for each experiment could be ´fair´, meaning everything would be as similar as possible.

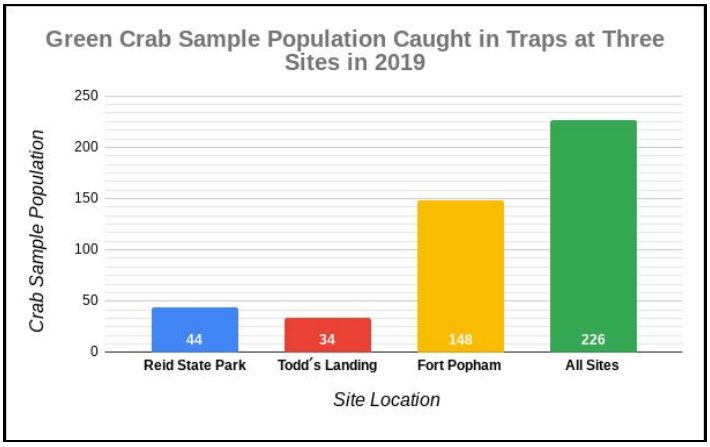
Our original plan was to go on Monday, Tuesday, and Wednesday, but due to rainy weather, the Wednesday trip was postponed until Thursday. Because of that, one of the traps stayed in the water for about forty-eight hours. That also meant that we had to retrieve the trap at mid-tide instead of low-tide. These factors most likely affected the amount of by-catch and crabs caught in the trap on that day.

Results



After visiting the three locations, we tallied up our data and created several charts to display the data that we collected. The graph to the right shows the sample populations of green crabs caught in traps at each location. 148 crabs were caught in traps at Popham Historical Site over the period of three days, holding 65 point five percent of the total amount of crabs. Taking up 19.5 percent of the pie chart is the amount of crabs caught at Reid State Park; 44. 15 percent goes to Fort Popham, with 34 crabs caught.

This histogram compares sample populations of green crab caught in traps at Fort Popham, Reid State Park, and Todd's Landing, as well as the total amount caught at every location. At Reid, there were 44 crabs that were caught, while 34 were caught at Todd's Landing. An additional 148 crabs were captured at Ft. Popham, totaling 226 crabs at all three locations. This brings us back to the question that was previously asked; how did sample populations of green crabs compare throughout the three locations? Well, in 2019, Fort Popham had the highest sample population by far, with a whopping 148 total green crabs, which was much more than originally expected.



Discussion and Conclusion

The results of our investigation were considerably surprising to me, to say the least. I had certainly never expected such a large number of crabs to be caught. With all of the data collected, that can help us answer the question that I asked earlier on; how did sample populations of green crabs compare throughout the three locations? Some sample populations were higher than others, with 148 crabs being caught at Popham Historical Site, while a meer 34 were gathered at Todd's Landing. Maybe more crabs were found at Fort Popham because the land was less rocky than it was at Reid State Park or Todd's Landing. This could also be because Popham State Historical Site is muddier and has more salinity in the waters than the other two locations. Such a large gap seems hard to fathom, with the locations even being located in the same region, but it is quite possible. Maybe these numbers were affected by the fact that some traps remained in the water for 48 hours instead of the usual 24, or maybe it was because we visited at mid-tide on the third day. Whatever the case, the data was drastically different throughout the three locations. Further investigation could prove fruitful to advancing knowledge of this.

Acknowledgements

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References

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