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Volume 3

Article 7

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2020

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### Recommended Citation

W., Sawyer (2020) "Major Green Crab Decline from 2018 to 2019," *Findings from the Field*: Vol. 3 , Article 7.  
Available at: <https://findings.gmri.org/journal/vol3/iss1/7>

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# Major Green Crab Decline from 2018 to 2019 in Sagadahoc County

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December 17, 2019

## Abstract

Green crabs are an invasive species. I am wondering how their population has changed since 2015. This is important because I wanted to know if the population was decreasing or increasing. On October 21, 22, and 24, 2019 seventh graders from Bath Middle School collected data from three different sites. Fort Popham has the most crabs every year, but since 2018 the number of crabs at all three sites has declined. Through my investigations I found out that the amount of crabs at Reid and Popham peaked then decreased in the middle three years.

## Introduction

What are these hungry animals coming in, destroying our plants and out competing other animals? These are green crabs of course. These invasive crabs can get to resources faster than native crabs. The green crabs from Canada and from Maine are mating and they are making a crab that is faster and can survive the winter. These green crabs first came here from Europe in the late 1800s, but they became a problem around 1950. This was because the Gulf of Maine was warming (Baril, 2016).

The crabs are still here today because they respond to whatever happens in their environment. According to the author, Melissa Gomez, "Markus Frederich and his students at the University of New England in Maine placed about a dozen crabs in a bucket, pumped in nitrogen to deprive them of oxygen for 45 minutes and then put them on an underwater treadmill. Some crabs ran for as long as five minutes and still survived." This tells how they are able to survive for so long and likely how they came on ships. They are hardy and can survive long amounts of time without food. This is how they survived. Their body's also got very cold and they

slowed down so they were able to survive by warming up when they got over the ocean. The eggs also came over on ships and then grew into crabs.

These crabs need to be stopped before all the clambers lose their jobs. Green crabs are rapidly moving up the coast because of climate change and the ocean warming. For example, in the article by Nathan Baril, he says, "They are the gophers of the sea. They dig and dig, destroying eelgrass habitats." They pull up eelgrass, which helps clean the water. This is very bad because eelgrass is an environment for crabs, worms, and fish.

We were wondering how the green crab population changed since 2015. This was important data because with it we could tell if the population has grown or shrunk in the past five years. The seventh graders at Bath Middle School collected data from all three of the sites. This data will help scientists better understand green crabs.

## Methods

On October 21, 22, and 24 seventh graders from Bath Middle School collected data at Todd's Landing, Reid State Park, and Fort Popham. We caught the crabs in traps that we placed in the water at all of the locations, then recorded the width of the crabs carapaces by measuring from the farthest spine on one side to the farthest on the other. Another measurement we did was we painted nail polish on the crabs, so that if we caught them on another day, we could record it. We repeated these steps all three times we went except for the nail polish, which we only did on two days. We also put two new cans of sardines, with sunflower oil, in the traps.

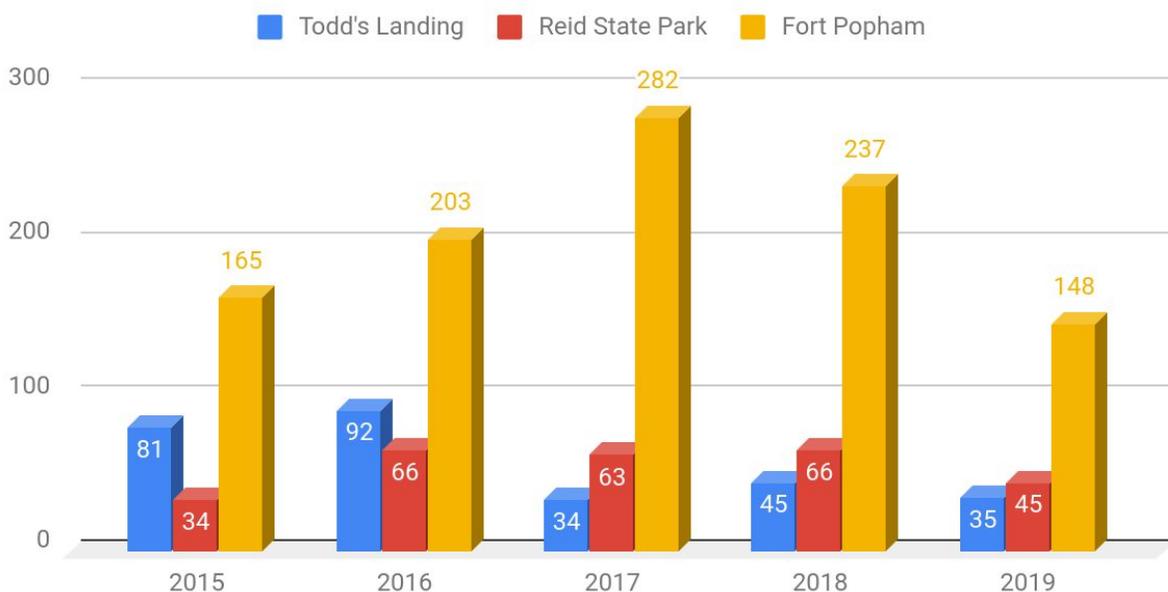
It was important that we went the same day so that we could compare data from the three different locations without varying dates to get more exact data. We didn't change the trap placement so that we could correctly compare the data. The traps sat in the water for 24 hours every

time. We were careful when handling the bycatch so they didn't get damaged. Every year a group of seventh graders has gone to the same locations in October. We released all the crabs at the location they were caught, and also put the traps back in the same place. When we measured the crabs it was always at low tide.

One of the times we were planning on going was the 23rd but it was raining too hard so we had to go on the 24th, so the trap stayed in the water longer. A few of the crabs lost claws while students were pulling them out of the traps, but we still measured them. On the 22nd we added more rope to the trap at Todd's landing because in low tide the trap was not fully submerged in water.

## Results

Amount of crabs caught from Todd's, Reid, and Popham from 2015-2019



This graph shows how many crabs were caught at Todd's Landing, Reid State Park, and Fort Popham. At Popham in 2015, there were fewer crabs, but still more than the other locations. In the two years following the

number of crabs nearly doubled. After 2017, it started declining and in 2019, it was at its lowest number of crabs in the past five years. At no time did the number of crabs at Todd's Landing or Reid State Park get close to the amount of crabs at Popham. Between Reid and Todd's, Todd's varied the most. It had the higher amount of crabs over the years in one year, but another year it had the lowest amount.

## Discussion and Conclusion

Through my investigations I found out that the amount of crabs at Reid and Popham peaked then decreased in the middle three years. My claim is based on how the population of green crabs changed since 2015. With this data, I observed that both Popham and Todd's varied over ten digits between every year, but Reid had numbers that were closer together.

A pattern with Popham is that the number of crabs go up until it peaks at 2017 then it declines. All of the Reid crabs together is less than the amount of crabs in 2017 for Popham. The amount of crabs at all three sites dropped from 2018 to 2019. Reid had a pattern where it was low then stayed equal then dropped. At Todd's it peaked right away in the first two years then dropped for the next three years. According to our data, the green crab population is going down. You should trust our data because we went to three different locations and the amount of green crabs is decreasing at all the places. This will affect the environment for the better if the population of green crabs are actually going down. I am wondering if they are just going down or if they are becoming more aggressive too. If we get information next year that the population is decreasing, then we will be able to say for sure that the green crab population is going down.

## Acknowledgements

I would like to thank KELT for providing traps for us, and give thanks to Ruth Indrick and Becky Kolak. Thank you to Reid State Park and Fort Popham for allowing us permits.

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