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## The Green Crab Population through 2015-2021, and How It Changed

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# The Green Crab Population through 2015-2021, and How It Changed

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## **Abstract**

Has the green crab population changed over the course of six years? To determine this we got our data by casting the circular base traps in the waters of Reid State Park, Todds Landing, and Fort Popham. We also measured the crabs by gender, size, and color. With this crab data we can estimate the amount of change overtime. The importance of this information helps us see how much the invasive population of green crabs have grown. The huge wave of these new green crabs can have terrorizing nature to the local marine habitats with their aggressive behavior against other marine species and destroying the local water habitats of surrounding marshes such as eelgrass beds. The end result of this experiment indicates that the green crab population has stayed at the same high level and increased overtime. For example, Fort Popham with 331 crabs from all three traps, with a calculated value of 110 per trap. And with 2015 data being 165, with a calculated value of 82.

## **Introduction**

The scientific question I'm going to be focusing on is how the population overtime changed in the years of 2015-2021. In order to learn more about this topic it's important to learn about the destruction green crabs caused. For example, the green crab caused overwhelming destruction in marshes. From the mass destruction of eelgrass to the little numbers of native crabs left in the wild of the Gulf of Maine. Eelgrass is a type of plant that likes to grow in the soft mud of marshes and usually under water as a layer of bedding. Green crabs take this chance to dig tunnels under the mud with their massive claws. This simple act rips up the delicate roots of the plant, and as a result, it greatly destroys the eel grass. The damage of this type of plant leaves marshes bare, leaving smaller invertebrates, and fish suffer at the risk of being without shelter, food or habitat. Marine birds also like to use this environment for nesting. Eelgrass is a filter helping keep the small rivers, and ponds clean around the perimeter of the marsh, and in the marsh. This makes eelgrass an excellent tool for the accessibility of life by holding sediment in place in marshes. Eelgrass takes in carbon dioxide, and methane. These two chemicals can harm the animals that live there. If the green crab population does not decrease, it could well be the end for this marine environment.

According to Dr. MARRISA McMahan, "There is a competition that we see between the lobsters, and the Green crabs, and because of this back then when you walked by

the lowest points of the intertidal zone or the lowest tide in the month you would have been able to flip over rocks and find tons of juvenile lobsters underneath, now when you look you just be able to find a Green crab". Because of this we see a huge drop in the lobster population that harms the fishers that harvest lobster, and harms the balance that lobster are a part of in the Gulf of Maine, for example lobsters help keep the function of energy and the transfer of materials in check.

## Methods

For this experiment we went to Reid State Park at the lowest time of tide that was available. My investigating question is about how the population overtime changed, in the time period of 2015-2021. This same experiment has been done for six years.

The equipment that our class used for this experiment is a quadrant; exactly one meter in total area, and a transect tape measuring 100 meters in length. A few smaller items such as ruler, pencil and a relatively good bucket were also needed. The process that we used in order for this adventurous experiment is; first, using a random number generator to select a random area on the transect tape. To give a specific place at Reid state park for a random amount of data from the portion of the intertidal zone at the given location. Then the exact data of the quadrats. We also used a packet, full of data logs for possible entries. This allowed us to have the exact amount of data in the assigned quadrats such as the size, sex, and its nature such as aggression or peaceful. To add on we painted a selected few crabs with different color nail polish. The colors being a red, and dark tone yellow. On Monday, October 25 2021, and Thursday, October 28 2021. The two days separated by a few days to see if the ones caught on Thursday are the same October 29 2021. The observations that we made were mostly from photographs later. We did the quadrat, landscape, and body parts of the crab such as claws onsite.

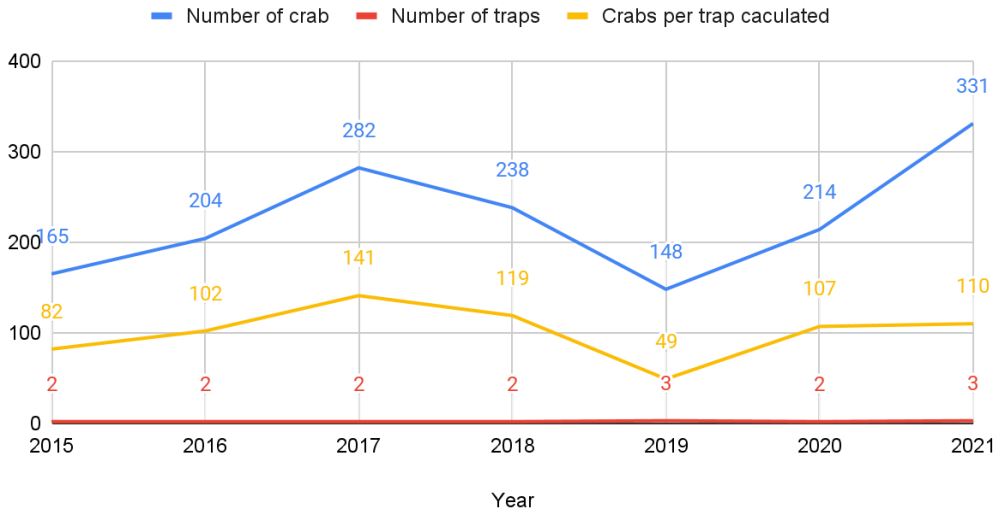
## Results

The calculated value part of the data table shows the data as a better estimated amount for the data for one trap to give more fairness; between the early years of the experiment being 2015-2018. Having only two traps, and 2021 having three.

### Popham

Year	Number of crabs caught	Number of Traps Used	Crabs per trap calculated value
2015	165	2	82
2016	204	2	102
2017	282	2	141
2018	238	2	119
2019	148	3	49
2020	214	2	107
2021	331	3	110

### Number of crab, Number of traps and Crabs per trap calculated



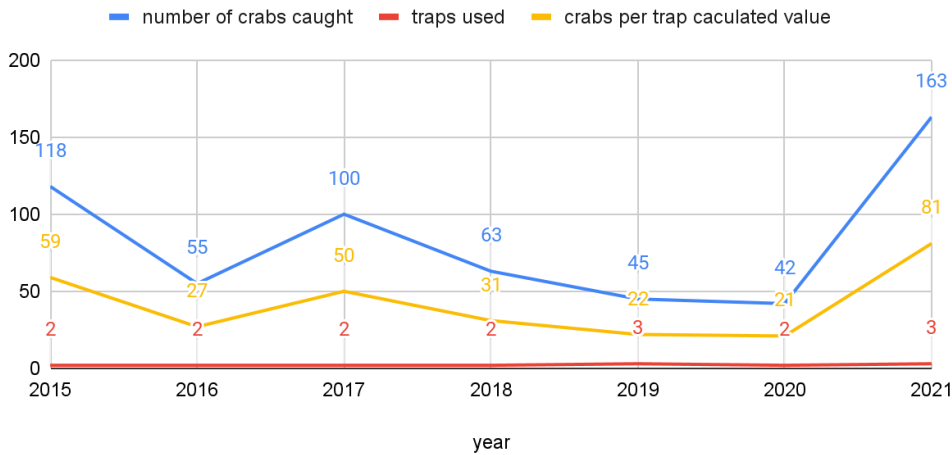
The Popham data chart models the way the data changes over the course of 6 years from 2015-2021. This data shows the crabs population grew to new heights, 331 in the year 2021, (110 crabs per trap). The all-time high before was 282 back in 2017. (141 crabs per trap) . The data helps explain this quite drastic change in the form of the quadrat data, and the trap data, compared to others Like Todds Landing all time high is 101.

### Reid

Year	Number of crabs caught	Number of Traps Used	Crabs per trap calculated value
2015	118	2	59
2016	55	2	27
2017	100	2	50
2018	63	2	31

2019	45	3	22
2020	42	2	21
2021	163	3	81

Number of crabs caught, traps used and crabs per trap calculated value



Overall the amount of the green crab population from Reid to Fort Popham is different. The highest number of crabs found in Reid is 163 out of three separate traps, while Popham had 331 in the total number of the traps. That is a lot more in comparison to Reid.

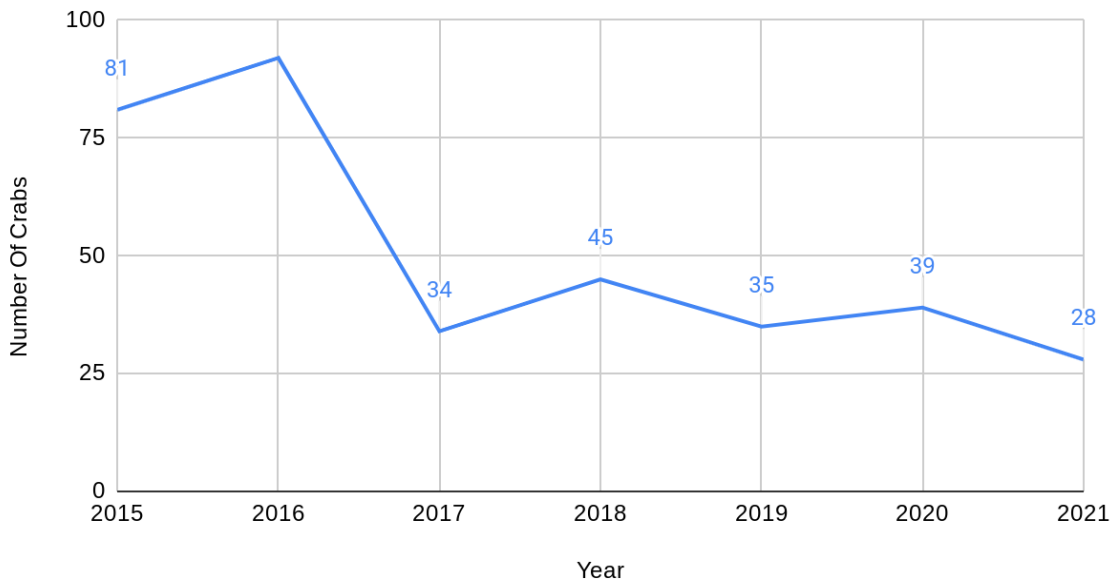
### Todds, Landing

Year	Number of crabs caught	Number of Traps Used	Crabs per trap calculated value
2015	81	1	81
2016	93	1	93
2017	34	1	34

2018	45	1	45
2019	35	1	35
2020	39	1	39
2021	28	1	28

For the final graph, Todds Landing was the lowest total for the data with the highest being 93 that's very low in comparison two both Reid, and Popham. This data was back in 2016 and steadily climbing down to 28 in 2021.

Number Of Crabs vs. Year





## **Discussion and Conclusion**

My research question was “If the green crab population changed over the course of 6 years 2015 to 2021.” The answer I found for my question is, yes the population is changing and relatively fast. The highest ever recorded number of crabs at Reid is this year 2021 with a total of 163 crabs caught in three traps. In the course of 2015-2020, the data has not come close to the 2021 data. The Todd’s Landing data is different compared to Reid, the data changed from the highest in 2016 being 91 to 2021 being 28 Compared to Reid, Todd has the lowest number chain. Pophams data fits in with the fact that it's the highest recorded data in all the years of gathered research from this project with the highest alone being 331 crabs in three traps, 2021, the lowest score for Fort Popham is 148 that's almost as high as the highest recorded data from Reid.

The final conclusion about my statement question is that the data is lowering and rising in other cases for example Popham, its numbers are rising and to absurd numbers such as 331. Reid’s numbers are at a similar point with the data going up, and down. The data at the end has risen to 163 compared to previous years. That's a lot. Todd’s Landing data is in a mix of scale sometimes it tips up other it dwindles. The ending statement for my question is that the data has been changing in ways that are unbalanced. The impact that is taking place is hurting the marine ecosystems in Fort Popham, this tip of the scale is unbalancing the important parts of the environment and dwindling the numbers of native fish, crabs, and the mollusks. The Todd’s Landing data of the green crabs is because the balance of the crabs is not hurting the marine environments as much as Popham, this is a really good thing because the decreasing amount of green crabs helps the native marine animals return to their native home, or habitat. The Reid data shown on the graphs indicate the change of the habitats in more of a negative way, the increase of the green crab population means the more of the change in native marine animals including native crabs such as the Jonah crab, and rock crab.

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