Findings from the Field

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Crab Per Trap to Year and Location 2013-2017

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Abstract:

Many workers who harvest these marine mammals are being put at risk because of the invaders who are destroying eelgrass, home to many small fish and even juvenile lobsters, who are putting these creatures out of homes into open and unsafe waters. The catch and release method was used to calculate how big the population of green crabs are in the coastal region of Phippsburg and Georgetown. There was only one re-catch caught at Reid State Park marked with yellow nail polish; making the population of green crabs in the Georgetown area one of the biggest. At Fort Popham there were over 270 crabs caught and no recaptures making the Phippsburg coastal region even bigger than the Georgetown green crab population. My overall results were based on the number of crabs caught per trap to the year they were caught and in multiple locations in which we went. I found that in 2015 crab population started rising in 2 locations and started to decrease in the other. In conclusion, green crabs are one of the biggest and baddest invasive crab species of them all. From towering and dominating population and overall aggressiveness, strength and speed, green crabs aren't going anywhere soon.

Introduction:

Did you know that because of global warming, Maine has the 2nd fastest warming water in the world? (Greenhalgh 2016) Did you also know that because of this we are suffering major damage to our oceans, also including threats to Maine's economy by even possibly threatening juvenile lobsters? This damage can all be brought back to the invaders the green crabs. In 2013, the population of green crabs exploded, many researchers believed that green crabs were here since the early 1900's because of the warm water that was still quickly increasing. Sadly, they will not die like they are supposed to because we've been experiencing unusually warm winters the past few years. (Byrne 2013) The gap in our knowledge is how many are there?

Green crabs are a threat to Maine's ocean sustainability, the article, Invasive Species Exploit a Warming Gulf of Maine, Sometimes with Destructive Results by Colin Woodard states that, "Eelgrass coverage in Maquoit Bay fell by 83%," in October of 2015. Maquoit Bay is in Brunswick, Maine, very close to our study site, but imagine that if only one bay near the ocean has fallen more than 50% how the population of eelgrass has decreased in the entire ocean over the past 2 years. The essential question is: How are the invasive crabs species impacting the marine ecosystem?

One of the ways invasive species are impacting the marine ecosystem is by tearing out eelgrass, a crucial need for young fish. Eelgrass is an extremely important survival skill for all ocean species it is a nursery for all baby fish and species such as the juvenile lobster, because these species are fighting for eelgrass and being endangered out in open waters and the species may not survive. Although, lobsters aren't the only thing being harmed by green crabs. Clams are also being endangered because they are one of the most favored foods by green crabs. They are being found less and less throughout Maine's mudflats.

These invasive species have major effects on not only the ecosystem they surround, but the economy as well. If a species like soft-shelled clams aren't surviving it can damage the economy of Maine. If these crucial species aren't surviving it puts many people with jobs harvesting marine animals at risk by lowering their chances to make money and pay for their meals.

It's important to understand that our essential question is important to Maine and its ecosystems. Without it we wouldn't understand the harm green crabs bring and the effect it has on our oceans. We have

an amazing economy today, and delicious food, but with green crabs still thriving in our oceans we may not have it anymore. Green crabs may also make the economy worse by getting rid of the great stock markets of commercial fish and also rid thousands of people of their jobs. In conclusion, green crabs are a very harmful, invasive species destroying our oceans without a good cause.

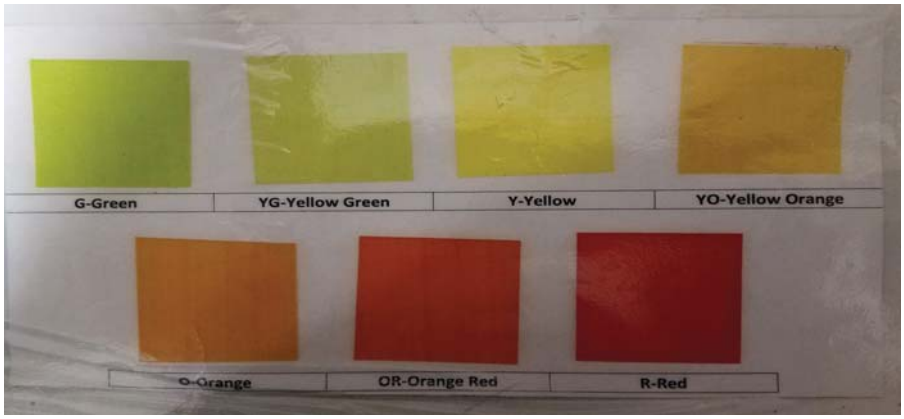
Methods:

The method we used was catch and release to see how big the population of green crabs were.

We set 3 traps that were legal green crab traps baited with sardines. The traps were put into the water approximately 24 hours before it was pulled the next day. The day the traps were pulled they were separated into buckets for each body of water they were pulled from in which they were measured, identified by sex, crab color, aggressiveness and if any markings or paint was present. We measured each crab by using the centimeter side of a ruler to measure from final spine to final spine over the carapace of the crab. The sex was determined by the shape of the apron on the abdomen of each crab. The crab color was determined by the color on the abdomen between each claw. Each crab was quickly assessed before being cleaned with acetone (nail polish remover). After each crab was cleaned we applied a thin coat of yellow, quick drying nail polish for our marking color. We released our catch to the body of water in which they were found, one at Todd's Landing and two at Reid State Park, we reset our traps before returning home.

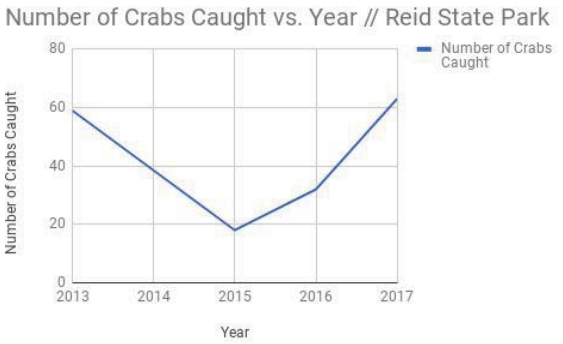
Our next trip, the traps were actually set for 48 hours instead of 24 due to the heavy rains occurring on Wednesday, 10/25, and Thursday, 10/26, an accidental error. Even though there was heavy rains on Thursday we still pulled traps, assessed and marked. We made another small error on Thursday and used the same color nail polish on Tuesday, something to come back at us in the future. On Friday, we assessed each crab and marked just like the days before but this time each crab was marked with a pink, quick drying nail polish instead of yellow so we would know the re-catch.

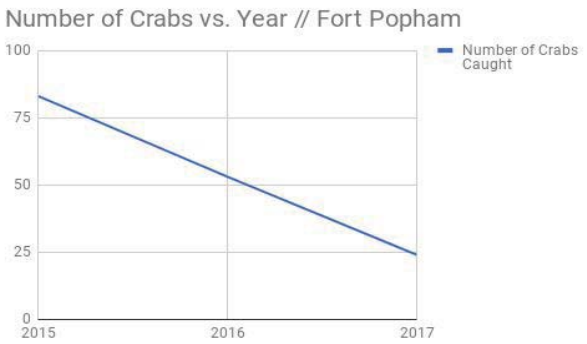
Everything was made fair by using the same amount of bait and the same kind. Each trap was put into the same body of water and each trap was of the same kind.

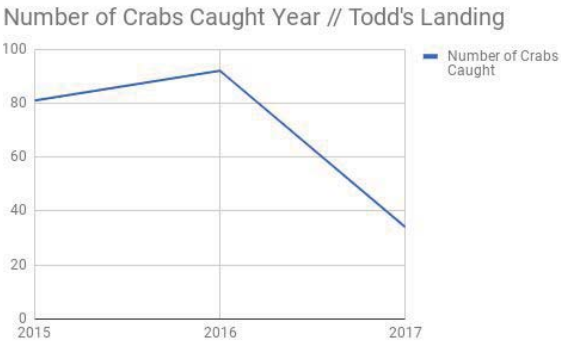


This is the color chart we used to find the color of each crab.

Results







The line charts above show the number of crabs caught per trap since 2013 at each location we've been to. The reason it is per trap rather than all the traps put together was so it was made fair because at different locations in different years there were more traps set than others which led to more crabs than others. Therefore everything is made fair by using per trap instead of per year.

The number of crabs caught each year is divided by 2 to show what has approximately come out of each individual trap and not all of the traps combined. As you can see in 2016, Todd's Landing had an increase as Reid State Park started to gradually increase as Fort Popham was decreasing. In 2017, Todd's Landing and Fort Popham were both decreasing although Reid was just starting to increase.

See next page for table. ->

Year // Reid State Park	Numbers of Crabs Caught (Per Trap)
2017	63
2016	32
2015	18
2013	59
Year // Todd's Landing	Numbers of Crabs Caught (Per Trap)
2017	34
2016	92
2015	81
Year // Fort Popham	Numbers of Crabs Caught (Per Trap)
2017	24
2016	53
2015	83

Conclusion

Green crabs are impacting the marine ecosystems of Maine in a very harmful way. For instance, green crabs do the most damage by being the most aggressive and having the largest population. Many may argue that green crabs aren't doing the majority of the damage but if they are right then who's doing this damage?

I argue that green crabs are doing the damage because they have out ranked the population of any other crab in the state of Maine. Green crabs have pushed native crabs out and into deeper waters as they don't thrive in the way that they would if they got equal food. Also, nothing eats green crabs and winters aren't freezing them anymore due to global warming in the state of Maine. With this, green crabs are indestructible.

Green crabs have are an appearance like no other. All green crabs have a 5 spined carapace and are usually colored green but can also be dark brown, orange, or red. Did you the species can also survive with missing limbs? The percentage of green crabs that were damaged during our expedition was 2% of survival without every limb from crabs at both Reid and Todd's Landing.

The catch and release method was extremely important to our experiment. Colored nail polish was applied to each crab to know if one was re-caught or not (see page 3 for more info). The reason we did this was to show how big the population of green crabs in the area was. We only had one re-catch and it was on Friday, October 27. Sadly, we made an error. On Thursday, due to the limited supply of nail polish we again

painted the crabs yellow because the re-catch color was yellow, so we can not tell which day it came from, Monday or Thursday.

In conclusion, green crabs are an important topic to learn about. If green crabs aren't more widely known then they may cause even more destruction to not just Maine oceans but oceans all around the world. If the green crab population continues to grow than they may also wipe out a majority of crab populations world wide. If green crabs are still eating away the marine ecosystems many workers whose jobs are harvesting and maintaining the marine life may be out of jobs which of course affects the economy. If people are out of jobs they do not have enough money to support themselves or their families.

Green crabs are bad to marine ecosystems and need to be stopped. If not many things may and probably will become scarce for not only Maine's but the world's environment.

References

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