

## BLUE CRAB (*CALLINECTES SAPIDUS*) POPULATION IN THE POQUONOCK RIVER

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### Introduction

The Poquonock River is an estuary. An estuary is where a river meets the sea. Estuaries are important because it has protected areas and have abundant food, making a good breeding area for fish and shellfish. Many commercially important organisms spend their early life here. In the Poquonock River, there are various species of fish, shellfish, and crabs. One of these crabs is the Blue crab (*Callinectes sapidus*).

Blue crab distribution is based on multiple biotic and biotic factors. An environment with eelgrass is the best, so Blue crabs can hide and have protection in the larval and juvenile phases. A second requirement is to have abundant amounts of food. The salinity levels need to be between 23 to 33 PPT ([www.bluecrab.info](http://www.bluecrab.info), 2016). In addition, it has to be warm or the blue crabs will migrate. Blue crabs are omnivores so they will consume anything in sight for example, clams, oysters, mussels, smaller crustaceans, dead fish, and plant and animal detritus. Even smaller blue crabs can be prey.

In a crab's life, migration location and food source is all based on the simple fact that eggs need to be laid in safe places where they can live and grow. The first part of a crab's cycle after it mates is eggs. Which the female releases at the mouth of the river where salinity is highest. The next stage is a Zoea, which is when the larva is free swimming and it is still at the middle of the river around 22 ppt. Next is the Megalopa, the last stage of the larva life, is found in a salinity of 19 ppt. Once settled to the bottom, juvenile crabs, found in water with a salinity level a little more than 16 ppt. Finally are the adult crabs that can live in water with 15 ppt salinity water until they are ready to mate.

Blue crabs are an important part of the ecosystem, like all living things. Blue crabs will eat almost anything including, clams, oysters, mussels, and fish. Blue crabs are also prey for fish, birds, turtles, and even other blue crabs. There is a recreational blue crab fishery for Long Island Sound, but not a commercial one at this time. Blue crabs are one of the most popular crabs to eat (ranker.com, 2016), and if there were a commercial fishery, all the legal sized blue crabs could be harvested in weeks if not properly monitored and controlled.

One of the biggest issues about the Blue crab population is that Blue crabs keep expanding their range north as the water warms up because they live in warmer water." Given the crabs' affinity for warmer waters, Johnson hypothesized that increasing ocean temperatures could be facilitating there limited northward migration."(Niina Heikkinen, 2015). But, this affects other animals, in particular the Rock crabs (*Cancer irroratus*) and the American lobsters (*Homarus americanus*). The blue crabs are moving North because the climate change is changing the water temperature in Long Island Sound where the temperature is now warm enough for them to migrate to, but they compete with other native species

The purpose of this experiment was to document the number of Blue crabs in the Poquonock River and compare it to past data. Then, decide if there are enough blue crabs to possibly start a Blue crab commercial fishery. If a student puts 6 blue crab traps out in the Poquonock river then the average amount of blue crabs per trap ratio is 33:1 because the salinity level in the water has to be greater than 22 ppt for the larva to survive and grow properly.

### **Methods**

For this study, six blue crab traps were set in the Poquonock River; three traps were in Basin 2 and three in Basin 3. Traps were randomly set in each basin on June 30, July 5, July 6, and July 7 of 2016 and soaked for 24 hours. Each day the traps were baited, set, their GPS location recorded, and the temperature (°C) and salinity (ppt), was measured with an YSI meter at both the surface and the bottom of the water. The traps were pulled and the crabs were identified, counted, measured (mm) and recorded.

### **Results**

In all traps, spider crabs were the most abundant crab. Spider crabs and blue crabs were present in every trap, while green crabs were only present in traps three and 4 {Fig.2}. Basin 3 traps 1, 2, and 3 had more spider and blue crabs than basin 2. The majority of spider crabs were in the size range of 51-60mm. The largest spider crabs were 90mm however the largest blue crab was 160mm. The majority of blue crabs were 101-110mm and 131-140mm {Fig.3}. Ninety- six percent of the blue crabs caught were male. There were only 4% females {Fig.4}. There was a 0.06524 negative correlation between the number of blue crabs and the salinity of the water at each trap site {Fig.5}.

### **Discussion**

Spider crabs were the most abundant crabs; there were 219 of them. The reason that there were so many more spider crabs than blue crabs is because blue crabs are constantly harvested recreationally. Spider crabs are not harvested because they do not have much meat and few predators. They tend to be in big groups, so if you catch one you will catch more. Few green crabs were caught because they prefer sandy seafloors such as Bakers cove, and there were no samples from there (the green crab team did sample from there). However, blue crabs can deal with the muddy sediments found in the upper river because they can swim while green crabs walk on the sea floor.

Most of the blue crabs were juveniles. This could be because of a rising population in the basins: it could also be because immediately after becoming legal size (130mm from point to point when hard shelled) blue crabs were harvested by fishermen.

There may have been more males than females because the females were out in Long Island Sound releasing eggs. The females go up to shallow waters to breed and immediately move to deep waters to release the eggs. There was only one female caught and it was probably on its way to deeper waters

There have been suggestions in Connecticut to open a commercial fishery for blue crabs. However, based upon this study, there should not be a commercial fishery. There is not that many blue crabs and they would be harvested in weeks if not protected. The blue crabs population consists mostly of juveniles and when they become adults they need to breed before being harvestable.

### **Questions for Further Investigation**

1. What is the blue crab population if the female blue crabs are up river breeding?
2. What is the population of blue crabs in Baker Cove?
3. What is blue crab population in the sound?

### **References Cited**

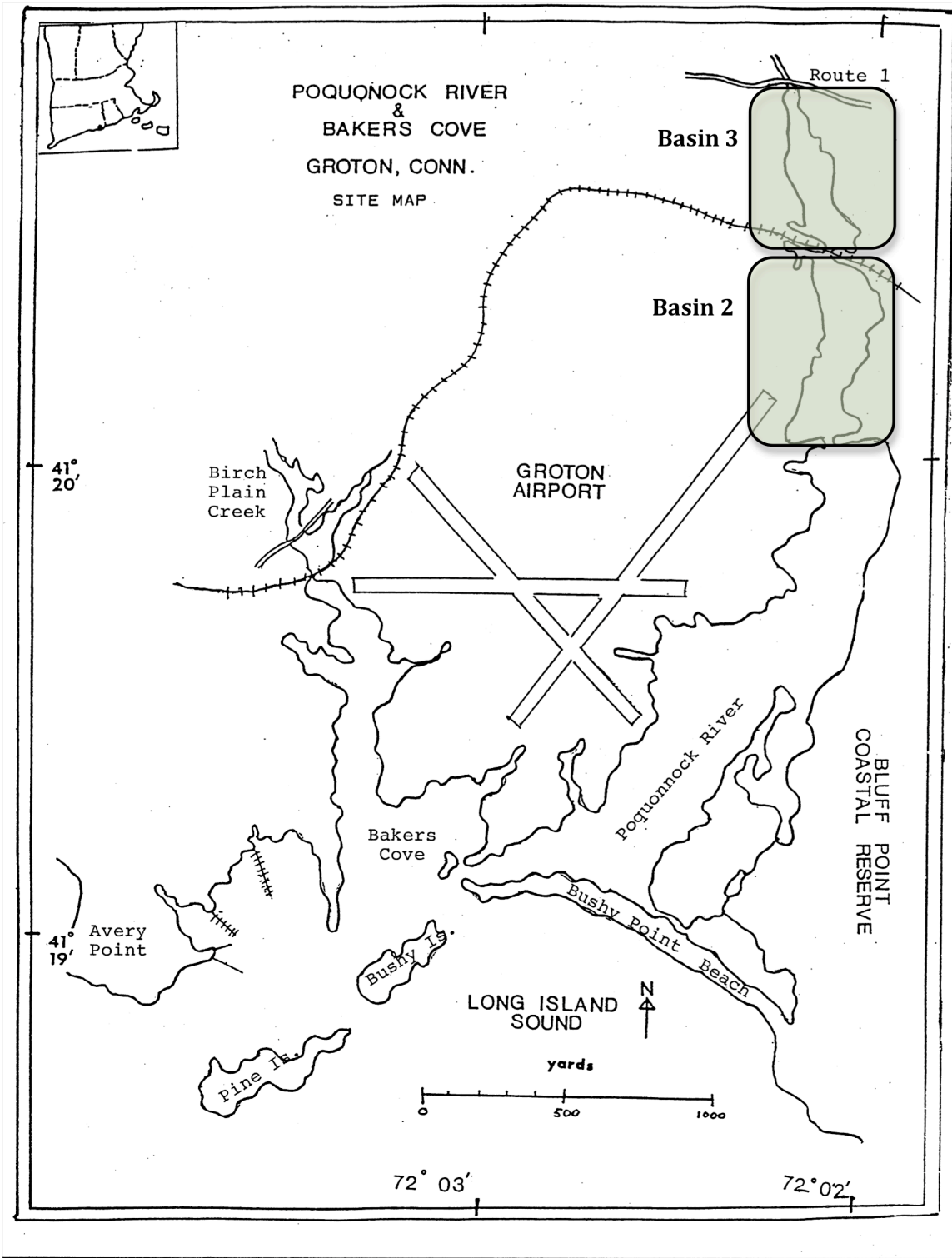
[www.ranker.com](http://www.ranker.com)

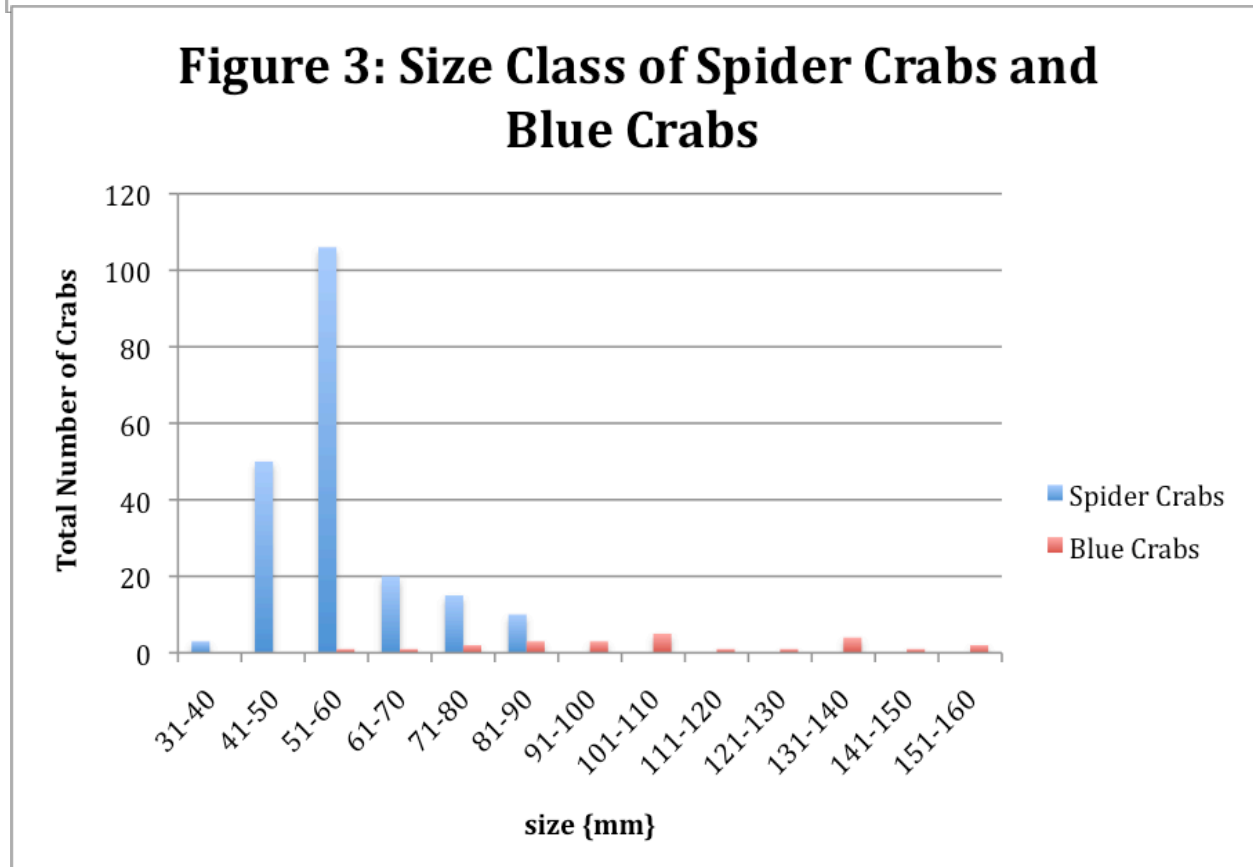
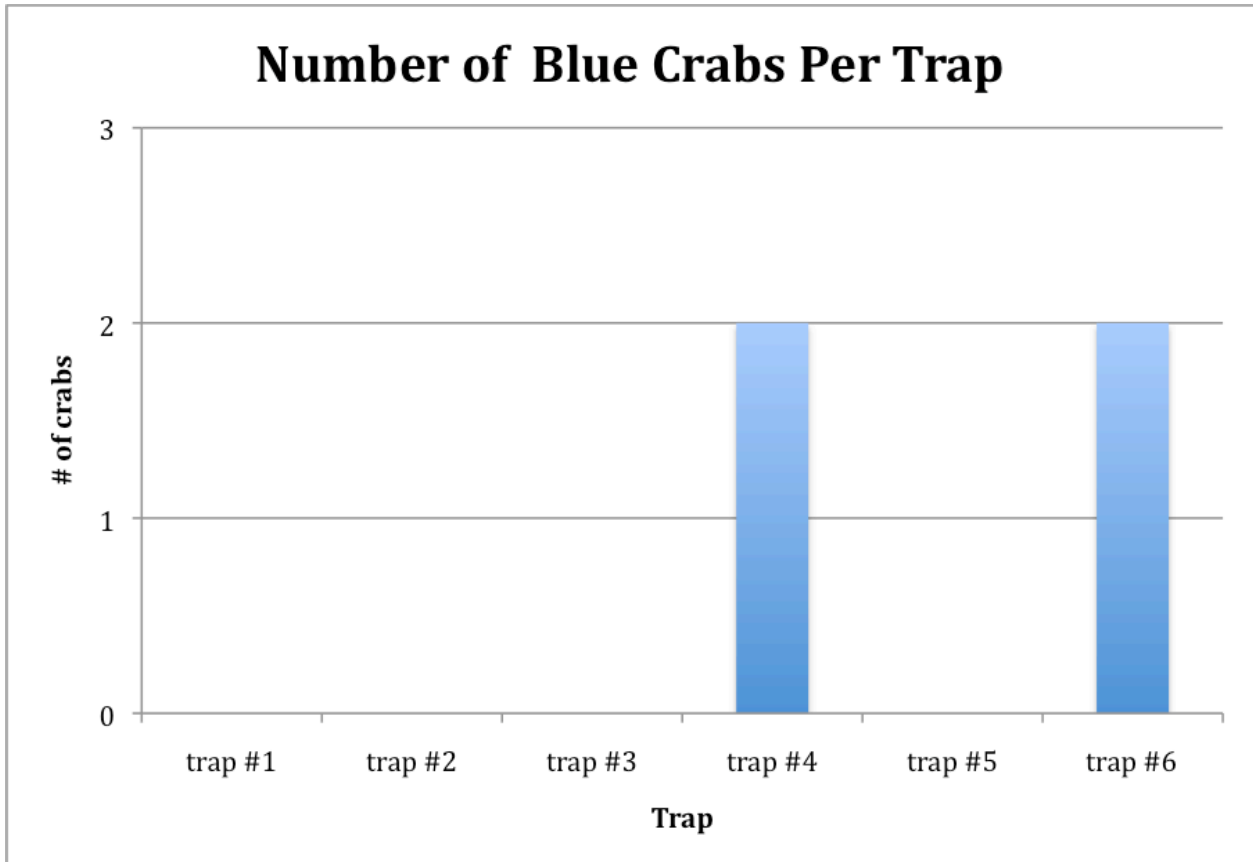
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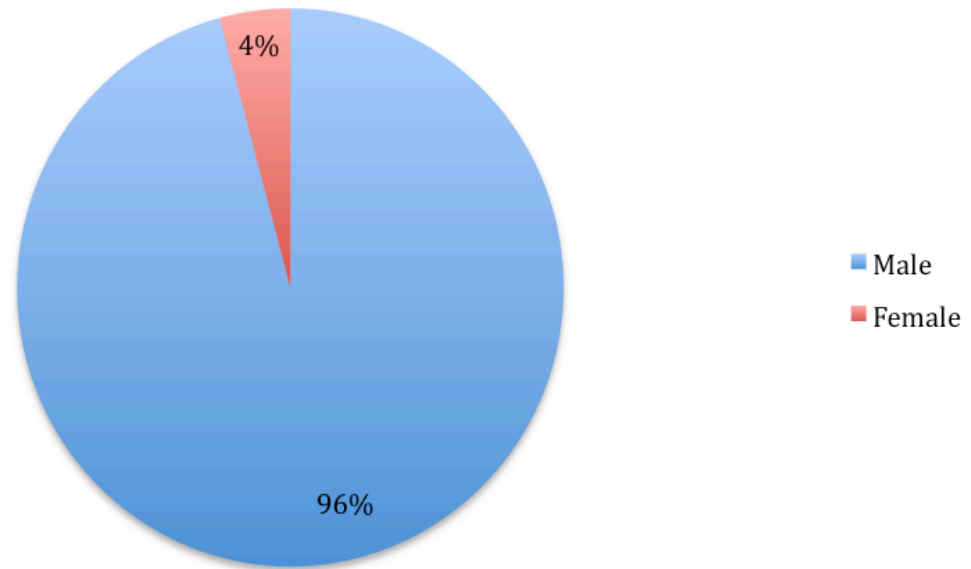
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**Figure 4: Total Male vs. Female Blue Crabs in The Poquonock River**



**Figure 5: Total Number of Blue Crabs vs. Salinity in the Poquonock River**

