

Invasive Species In Maine

Windsor 7 Fall 2013
Expedition Report

Alien Invaders



King Middle School
Portland, Maine

How We Learned About These Issues in Each Class

- Language Arts
- Math
- Social Studies
- Science
- Scientific Communication



Language Arts

Will, Abubakar, Liam, Joe, and Cillo



Introduction

In language arts we learned how to write an argument. An argument is made up of many parts including a clear and strong claim, reasons, evidence, warrants, and counterarguments. First, we had to learn the parts of an argument. We examined arguments and labeled the different parts. To speed this process along, Mrs. MacDonald made a page on the website Quizlet to help us study. Then we had a quiz to make

sure all the terms were committed to memory. We also read strong and weak arguments to see if we could tell the difference between supported and unsupported claims. Finally, it was time to start working on our arguments. In social studies, we had researched information on either the Green or Asian Shore Crab. In language arts, we used the information to argue about why the state should spend money to eradicate the species we studied.

Which species should the state tackle

Math

Sophia, Addison, Easton, and Elisa



Introduction

From beginning to end sampling, collecting, and counting data has been important to the Alien Invaders expedition as a whole; this is where math come in. In September, we jumped into the expedition by traveling to Biddeford Pool to sample a population of crabs. This furthered our learning in Math because we had been previously working toward the learning target of: "I can understand that statistics can be

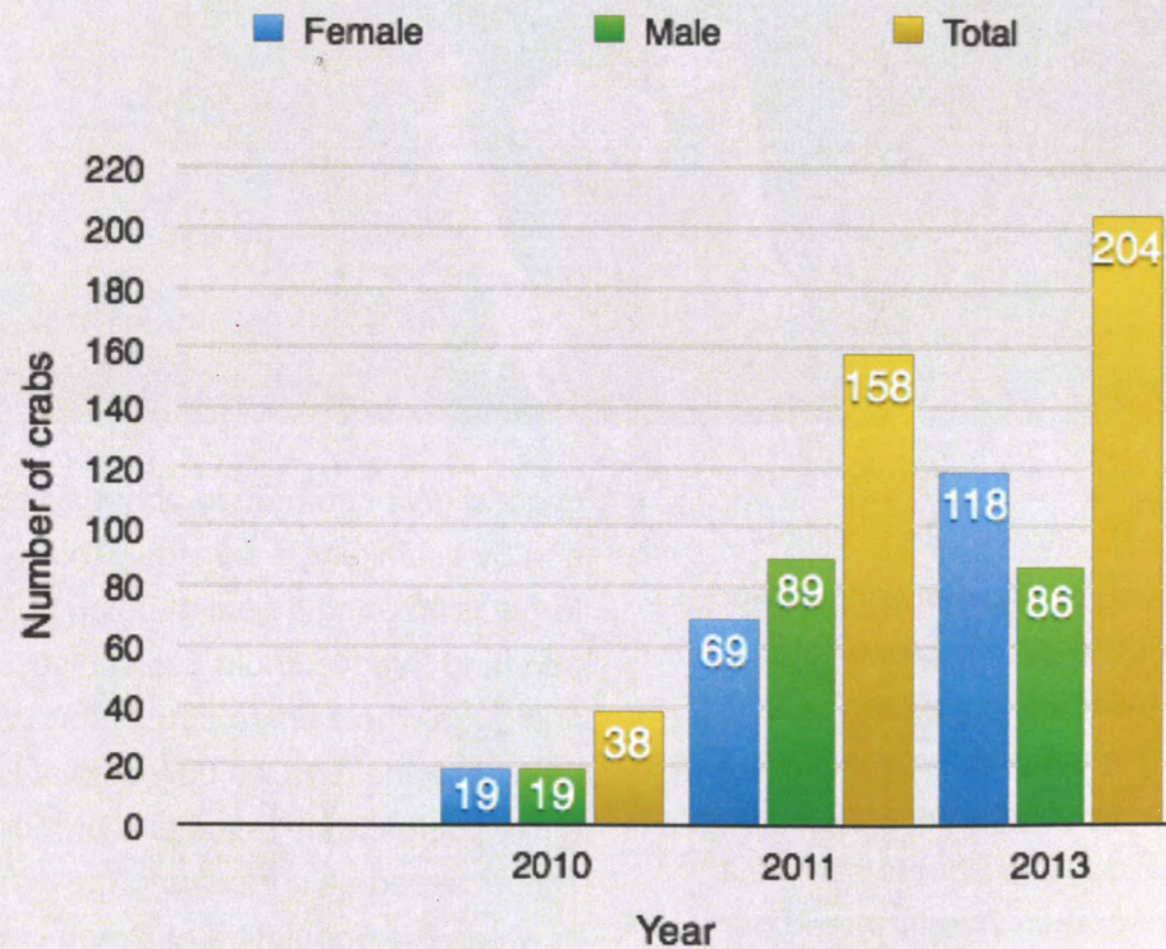
used to gain information about a population by examining a sample." This learning target is creating a goal of being able understand that we could use statistics to find out a whole entire population. We then used the data we collected at Biddeford Pool to create ratios and proportions. These helped us understand the difference between the population of Green crab vs. The population of Asian Shore crabs. All of this included much organizing and choosing the most relevant data. Lastly,

we concluded the expedition by asking questions about the difference in the data from past to present years and what the data told us, as well as graphing our information. All in all, math might not have been the most prominent part of the expedition, but lots of learning for the expedition occurred in Mr. Thorne's classroom.

Examples of Graphs

Addison's Work

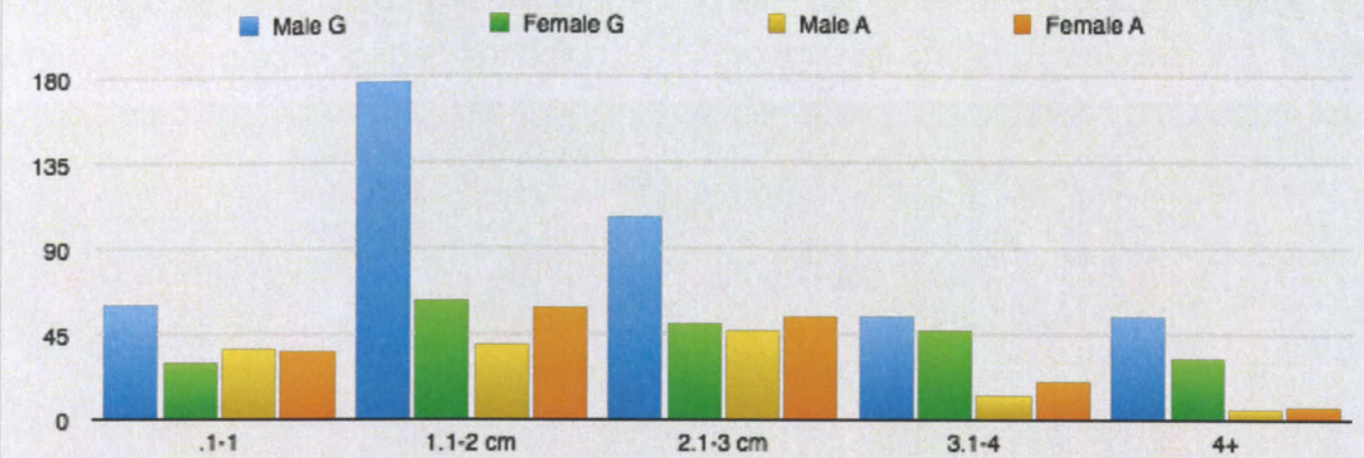
Question: How has the population of total Asian Shore Crabs changed since 2010-13?



Conclusion: The total population of Asian Shore Crabs in 2010 was 38. In just a year it grew nearly 4 times more, at 158 crabs.

Easton's Work

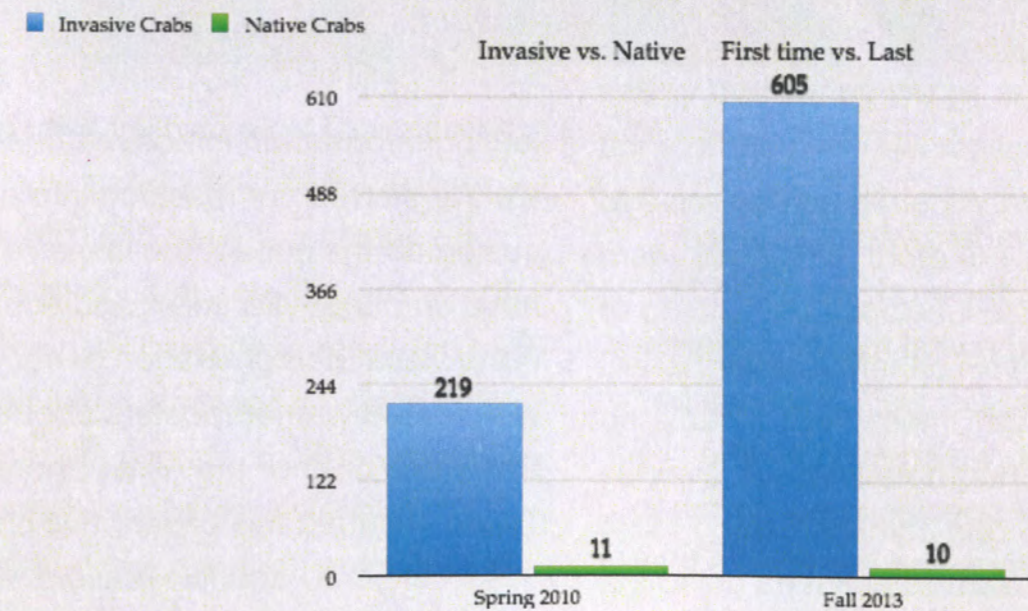
Question: How do Green Crabs and Asian Shore Crabs compare in size?



Conclusion: This chart tells you that the Green Crabs are the bigger species in size, and female Asian Shore Crabs are bigger than male Asian Shore Crabs.

Elisa's Work

Question: How do the numbers of invasive crabs to native crabs the first time we collected compare to the numbers of invasive crabs to native crabs the most recent time we collected?



From this data, you can see how the species have changed over time. From this you can see that, while the native crab populations have only decreased mildly, invasive crabs have increased incredibly.

Red Swamp Crayfish

by Daisy, Inez, Abubakar and Rovin, and Trevor



Description

The red swamp crayfish is 2.2-4.7 inches long and has 4 pairs of walking legs. The red swamp crayfish has two long antennae and two short antennae. The red swamp crayfish has 4 pairs of swimmerets at its rear. It has a spine that comes up in a point above its eyes. The part that connects the Red swamp crayfish's abdomen to the carapace is called the cephalic groove. It is normally orange or reddish but

in some cases they can be mutated blue or albino. Sometimes only parts of them get mutated blue. The red swamp crayfish has a shell called a carapace. They look like a miniature lobster. It has one tail with four uropods and one telson. A uropod is the last part of the abdomen of a lobster or a related species that creates part of the tail fan, and a telson is pretty much the same thing but is in the middle. It fits into the food web as a predator omnivore. It is an omnivore because the red swamp cray-

fish will eat plants or animal organisms. The red swamp crayfish eats most plants, but if it has the opportunity it will eat insect larvae, tadpole, snails, and occasionally it will eat young Californian newts. It can reproduce very fast for fresh water animals and can lay up to 600 eggs in each generation and can have up to 2 generations per year. In conclusion, the red swamp crayfish plays a huge role in the marine food chain and the red swamp crayfish has many distinguishing features.

Environmental Impacts

The red swamp crayfish has many environmental impacts. The first impact that the red swamp crayfish causes is that it eats different types of fish in all of the rivers and streams. That makes it so the other animals in the food web that rely on the fish for food will have less food available. For example, if a bird eats certain type of fish and the type fish dies out, that bird would have less food available. So could the animal that eats the bird. That could be a huge chain effect of having less available food for all organisms. The next impact on the environment that the red swamp crayfish has is that it may eat some crops. For example, in some areas it has been reported that the red swamp crayfish has been eating the rice crops. That could lead

to torn up and useless fields. Deer could eat the rice crops, so the deer population could start declining in those areas. Certain birds could eat the seeds from the rice plants, so that could lead to the population of those birds becoming smaller and smaller. There are many negative effects that happen when the crayfish eats people's crops. The last impact that the red swamp crayfish has on the environment is, they are very highly reproductive. That is a bad thing because the more crayfish, the more space they take up. If they take up too much space, they can end up taking the habitats of other native species. That can put pressure on the species, usually leading to near eradication of the native species. In some cases, it leads to complete eradication of the native species. In conclusion, the red swamp crayfish causes many problems to the environment and its ecosystem.

Economic Impacts

The Red Swamp Crayfish has a positive and negative impact on the economy. The positive impact of Red Swamp Crayfish is that it is an important source of food for humans especially in Cajun communities. In Louisiana alone more than 50,000 metric tons annually are harvested. It is found in pet markets in many parts of Europe. It

was also introduced to Japan as a food source for bullfrogs. Although there are positive impact the Red Swamp Crayfish has negative impacts. Due to the success of commercial aquaculture in its native southern range of the USA, it was introduced to many parts of northern USA. Most of these introductions have had negative consequences. Many of these areas have sophisticated irrigation systems in which the crayfish have burrowed. The burrowing activity has damaged the levees, dams, and water control structures. In addition, *Procambarus clarkii* is an intermediate host for many parasitic helminths of vertebrates which may create new health problems in areas where the species is successfully established. It can create health problems because if you eat this species there might be a chance you can get parasitic worms in your body. Many areas introduced to the Red Swamp Crayfish are now trying to eradicate them. These are the ways the Red Swamp Crayfish are causing negative problems in northern USA.

Control Methods

To help reduce "*Procambarus clarkii*" humans have been studying the crayfish by bleaching a pond and watching to see if they will survive the threat and seeing what type of animal would kill the species. Dur-

ing the experiment the Scientists bleached the pond but some of the crayfish survived the threat. The next experiment that was tested was to use insecticide. When the insecticide was introduced to the crayfish the crayfish rode out the insecticide by burrowing under mud. Red swamp crayfish also was used for bait and some of the red swamp crayfish escaped and started to overpopulate and eat all the vegetation in an area and ate practically anything they could find. Electric traps, fish predators, disease-causing organisms, and use of toxins are some ways the crayfish is being controlled. Only the use of predaceous fish has been used successfully (not harming the environment) to help control the species. The use of x-rays exposing radiation to males has been found to reduce the size of the populations. Reproductive success decreased and hatchlings were reduced by 43% in a test study. Possible management options for "*Procambarus clarkii*" include reduction of populations. Dried ponds of water and electrical fences restrict the crayfish. Floating plant traps have been successful. All physical methods will have an environmental impact as well. Since no biocides are crayfish-specific other invertebrates, such as arthropods, may be eliminated along with crayfish, and may have to be re-introduced. There is cause for concern about toxin be-

cause it targets the top predators in the food chain, although this is less of a problem with pyrethroids. In conclusion the red swamp crayfish has been tested multiple times and few worked.

Dead Man's Fingers

by Joy, Quentin, Ethan, and Maryan



Description

Most people have probably slipped on sea weed at a rocky shore beach, but did you know it is not all sea weed. It is an invasive species called the *Codium fragile*, also known as Dead Man's Fingers. This species usual size is about 30 centimeters long and it looks like any other sea weed out of water, pale green. It can also be pale ivory or white out of water. It has branches that are shaped in a cylindrical way that

split when growing into a bush like appearance. These branches have long hair fronds that give them a soft fuzzy feeling when submerged, but when it is washed up on shore it loses this hair. The natural habitat for this species is in rocky shore and intertidal zones. You can find them attached to rocks or other algae. Although you find the Dead Man's Fingers in the rocky shore it is an invasive species and it does not belong there. The *Codium fragile* is originally from West Asia. Now they are

found in many places especially in North America. This species was introduced to North America in 1957 in Long Island, New York. Since then it has spread its way to Alaska, California, and the upper part of New England, and into Maine. This species has had a huge impact on Maine's ecosystem. The reason for this is because it spreads quickly and effectively, especially in Maine. So the next time you go to a beach and slip look to see if it is a Dead Man's Finger or just regular algae.

Environmental Impacts

Dead Man's Fingers might sound like a funny name, but they cause environmental problems in Maine. Dead Man's Fingers can reproduce sexually and vegetatively so they reproduce quickly. They can attach to shells like crab shells, mussels, clams, and oysters. If one piece of the plant falls off, where it attaches it will grow. Dead Man's Fingers can cause an odd smell that can drive tourists away from beaches and other attractions. Dead Man's Fingers kill shellfish by attaching themselves to the shellfish which smothers them and they die.

Economic Impacts

One of the most devastating effects of the Dead Man's Fingers invasion is the eco-

nomical impacts. The marine plant impacts the economy, including clam profits and the collapse of the fishing industry. This species also displaces kelp beds and it can be extremely damaging to kelp farming. The largest problem this species is causing is the damage to the bivalve industry. Bivalves are animals with two shells such as, mussels, oysters or clams. This species so far has had the largest economic effect on clams. This plant can live on every hard surface under the water, including rocks, coral, and bivalves. When it attaches to the organism it kills it. This plant has a parasitism like relationship with native bivalves as it attaches itself to them. Farmers of clams are worried that their harvest will decrease because the species is destroying the clam population. Another way Dead Man's Fingers have an economic impact is when it washes up on beaches and people no longer want to pay the fee to go there. Many beaches in Massachusetts are now contaminated with Dead Man's Fingers and are no longer popular with tourists. The park has to spend huge amounts of money to clean the species out of the sand using large machines. Many towns do not have the money to clean up the mess and the beaches lay deserted. This weed appears unattractive and unpleasant to people. Many people have not yet been effected

by the *Codium fragile*, but it is bound to cause a number of problems before we can control it.

Control Methods

There are many different control methods. The first control method is biological control. For example, sea slugs will eat Dead Man's finger which can control large populations. The second control method is manual control, when you remove it by hand, which requires time and labor. The third control method is chemical, but if chemicals are used they might kill or hurt other species around the Dead Man's Finger. The fourth control method is mechanical. Mechanical removal is possible, but it is generally considered impractical because Dead Man's Finger or *Codium fragile* can reproduce from mere fragments of itself. The actual control method being used for Dead Man's finger is pesticides and herbicides.

Eurasian Milfoil

by Pedro, Jackson, and Hani



Description

Eurasian Milfoil has slender stems up to 3 meter long. The submerged leaves (usually between 15-35mm long) are born in whorls of four, pinnate, with numerous leaflets thread-like, 4-13mm long. Plants have flowers produced in the leaf axils (male above, female below) on a spike 5-15cm long held vertically above the water surface. Each flower is inconspicuous, orange-red and 4-6mm long. Eurasian

Milfoil has 12-21 pairs of leaflet while Northern Water Milfoil, *M. Sibiricum*, only has 5-9 pairs. The two can hybridize and the resulting hybrid plants can cause taxonomic confusion as leaf character are intermediate and can overlap with parent species. Eurasian milfoil is dangerous and we need to get rid of it as fast that we can

Environmental Impacts

The Eurasian Milfoil impacts the environment in many ways. For example, the mil-

Chinese Mystery Snail

by Ben, Thomas, Sebastian, and Emily



Description

Have you ever heard of the Chinese Mystery Snail, *Bellamya chinensis*? Probably not, because it is a relatively new invasive species. Although recently, this snail has been giving the native snails quite a hard time. First of all, the Chinese Mystery Snail is 40-65 millimeters tall and 40 millimeters wide. It is also a dark green moss like color to a blackish brown, blending in with its new habitat. It has one foot and two tenta-

cles with an eyeball on each. And it also has one mouth and one antennae. The shell surrounding its vital organs also has a trapdoor on its outside, giving it a slight advantage over most native snails.

The Chinese Mystery Snail has been eating the native snail's foods, causing it to take over, and kill off the remaining native species. For example, it eats fruits, plants, veggies, and algae, all examples of foods the native population eats. The fact that it

is eating most of the food needed for the native snails is causing them to die out, leaving even more room for the invasive snail to take over the food web. Not only is the Chinese Mystery Snail eating the native snail's food, but it is taking over their habitats, leaving less room for the native snails to live, just more odds stacked against their survival. All of these impacts to the native snails are devastating the food web it lives in. Just like a Jenga set, take one wrong piece out and the whole tower falls down.

Environmental Impacts

The Chinese Mystery Snail has made it into the country and is upsetting food chains by stealing food and space from native species. They reproduce quickly and form very dense populations that could destroy the population of native snails. They are eating the food in lakes needed for native snails.

Economic Impacts

Economic damage caused by the invading species, the Chinese Mystery Snail, could upset Maine's fishing industry. For example, one fisherman caught two tons of Chinese Mystery Snails in Sandusky Bay, Ohio. As this snail species continues to increase in population across the land of the

United States, management companies will be forced to fix the economic costs of dealing with, or ignoring this invasive species. One example of a possible economic impact may be on sport fishing. The same impact it has in Ohio could happen in Maine, unless we control it. Not enough information is known on the economic impacts of this snail. More studies need to be conducted.

Control Methods

There are many ways to control Chinese Mystery Snails. The controls are biological, chemical, cultural, and prevention control methods.

Biological control methods are most commonly used, only because they cause the least bit of damage to other aquatic organisms. Releasing fish or other turtles to capture the snail would be an example of biological control. Another method is the chemical control. An example of this would be to use a copper based pesticide. This is a very bad method to use because the Chinese Mystery Snails are able to close up their shell, and not be poisoned or affected by the copper in the pesticide. Other options of controlling the snail are not releasing the snails from your aquarium. Another step is to remove mud, plants, fish and ani-

mals from all equipment and drain all the water from the bilge and live wells before leaving a launch area. You should also clean your boating equipment with hot water or a pressure washer and allow it to dry for five days before using it in another body of water. All of these methods are used so the Chinese Mystery Snail is stopped not only from growing in population but also they are stopped from repopulating.

Common Buckthorn

by May, Ronaldo, Madelyn, and Will



Description

The Common Buckthorn is an invasive species. Most people don't know how to identify this backyard monster. The Common Buckthorn can grow up to 25 feet tall if it has a supporter plant or object. The Buckthorn grows with multiple plants at the base. The Buckthorn is a vine like shrub. There are female and male plants. The females bare small green flowers that sometimes but rarely flower purple. The flowers

bloom late summer. The males don't produce flowers. Only the female flowers produce berries which are small, 1/4 of an inch, hard, purple-black, and glossy. The leaves are small, glossy, green, and egg shaped. It is called the Buckthorn because of a small, 1/4 inch sharp thorn that is on the tip of the branch. Another distinguishing feature of this invasive plant is the fact that when the bark is cut into it has a pumpkin orange heartwood and a butter yellow sapwood. The Common Buckthorn

can grow up to three inches a day. A major contributor to the rapid growth of this crazy plant is the fact that it doesn't need very much water. The Common Buckthorn plays an important role in the food web. The Common Buckthorn is a producer so it provides food for insects and birds. The birds eat the berries then deposit them in a different location later on, this is how this invasive species gets spread throughout our country.

Environmental Impacts

The Common Buckthorn has many environmental impacts. It has destroyed many ecosystems in the northern part of America. The Common Buckthorn has killed and destroyed many native species by taking away sunlight, water, and other resources. It can go a long time without water or sunlight. It can adapt to environments quickly which is a big advantage for the Common Buckthorn. The Common Buckthorn disperses berries rapidly, which allows it to reproduce quickly in far away places. The Common Buckthorn is also bad for the landscape. Common Buckthorn can ruin a landscaping site quickly. The Common Buckthorn has many impacts on the environment.

Economic Impacts

The economic impact of the Common Buckthorn is that more and more money is being spent trying to find chemicals and ways to control the spread of the plant. More specifically, there are no natural controls. People spend money to try and stop it from spreading. It also damages soybean aphids, a pest of soybean crops. It is a host for a crown rust fungus that impacts oat crops. The common buckthorn out competes our native plants for the light, moisture, and nutrients. As a result the native species are in serious decline.

Control Methods

The Common Buckthorn is a major threat in Maine and many other states. There are various ways this invasive species can be controlled. The first major way is by fire. This is when you burn small trees or seedlings repeatedly until native species regain their rightful place. However, you should set a controlled burn, and it should be monitored by professionals. Another way to control them, is by using the herbicide, triclopyr. Using this herbicide makes sense because it is one of the leading herbicides used to control Common Buckthorn. Also, you could use continuous cutting. This is when you cut the trees often

to keep them from re-sprouting. Finally, another easy way to control Buckthorn is by simply pulling it out by hand. You could also use a weed wrench, but only try to pull them with a weed wrench or by hand when they are seedlings. This shows how much of a threat the Common Buckthorn is.