

How Does Acid Rain Affect the Marine Isopod Species in Nature?

Team: Gold Turtles

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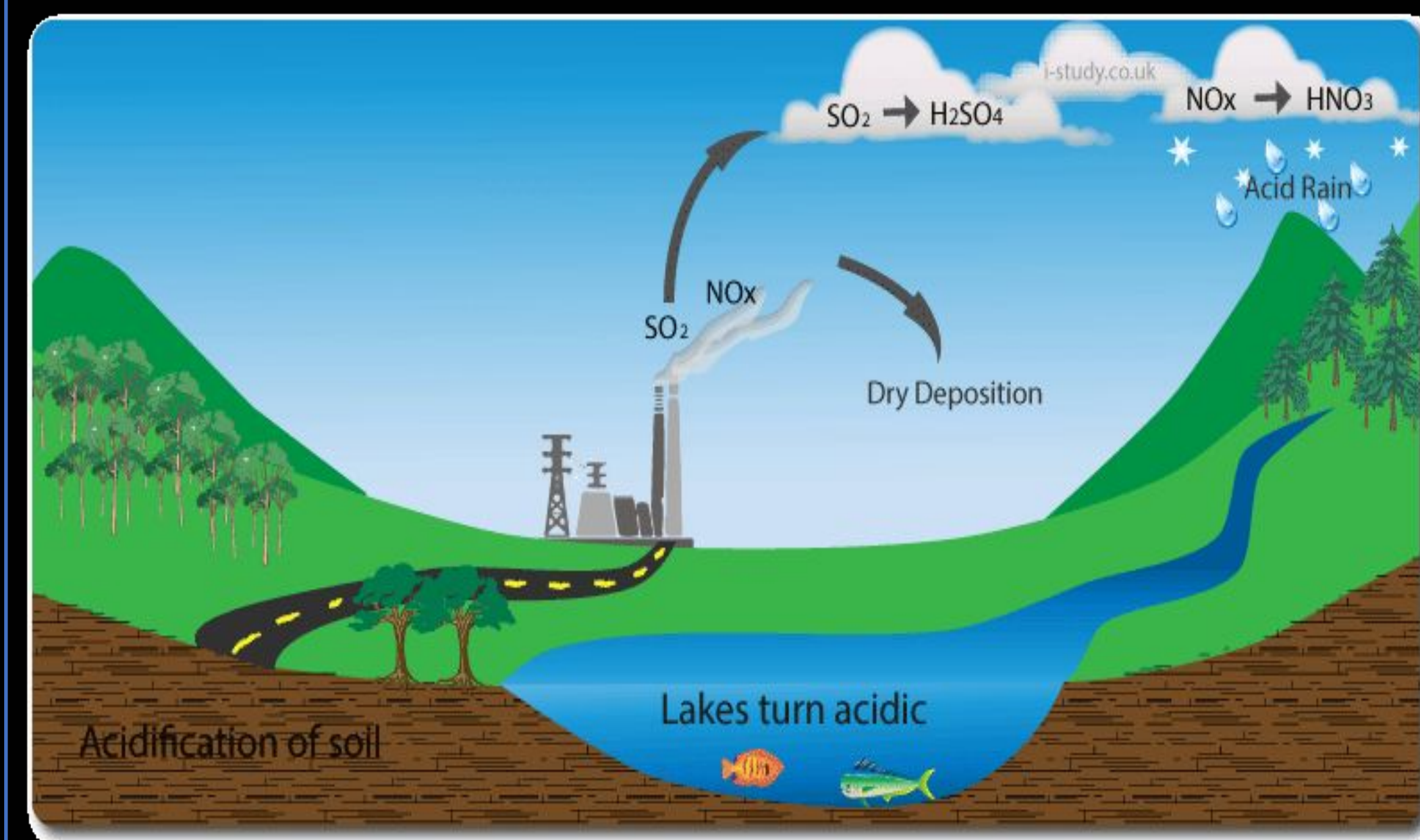
Methodology

In our research project we collected samples of the water and invertebrates in the Cold Spring Harbor Spit. We collected invertebrates with a scientist from the Cold Spring Harbor Laboratory with us to help guide us through our collection. The first method we used to samples was by using a sift. We dragged the sift through the water in a few different spots and analyzed what was caught in it. Another way we collected invertebrates was by searching for them. We dug in the mud-sand with shovels and turned over rocks to find organisms. Additionally, we also gathered the organisms by using tweezers. The tweezers will be used for small organisms such as extremely small insects. We put all the organisms we found into test tubes and plastic containers. As we collected organisms we will labeled the test tubes with sample numbers, documented, the latitude and longitude where they were found and put them on ice to preserve them. Also, we took samples of water in 3 different containers and labeled them with numbers and latitude and longitude. We brought these samples back to the Cold Spring Harbor DNA Learning Center for filtering and further testing. At the learning center, tested the pH levels of the water using pH strips. A scientist at the DNA Learning Center assisted us during our collection.

After the on site collection in the harbor, we brought the organisms to the Learning Center for further analysis. We took pictures of the larger organisms and used a dissecting microscope to take more detailed pictures of the smaller organisms. We also took measurements of the organisms and tried to determine the genus/species of them. We documented the location where each organism was found, as well as a description of the environment to help with identification. Finally, each group from our class entered our data that we gathered about the organisms into an excel spreadsheet so that we had a class data set to analyze the biodiversity of organisms that we collected on our trip. This data set will be used to compare the change in biodiversity from the Davenport study until today and help us understand the factors that may contribute to that change.

Future

In the future, the pH of the water in the area should continue to be tested. Acid rain is an issue that is prevalent in Cold Spring Harbor and will continue to be there unless acted upon. Unless measures are taken to reduce CO₂ emissions and pollution, the pH of the water will continue to lower which will prove to be detrimental to the biodiversity in the area.

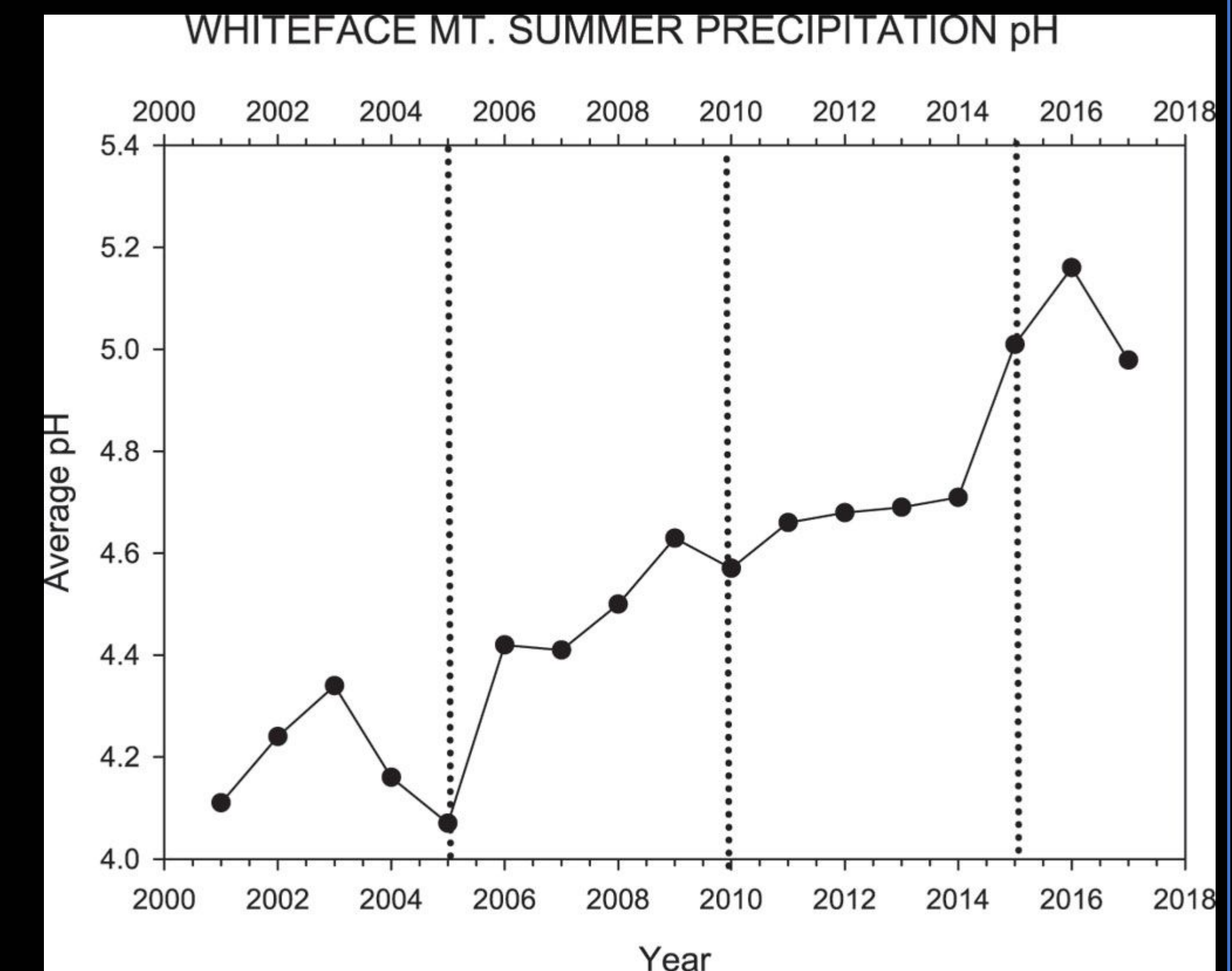


Introduction

The environment around us changes drastically, and it is very difficult for us to maintain an understanding of the current state, good or bad. As difficult as it is to keep track of the biodiversity on earth, it is significantly more difficult to follow marine biodiversity. We made it our goal to help find the answers to changes in marine life, habitats, and more specifically water acidity. We traveled to the Cold Spring Harbor Spit to investigate and collect samples that we would further test. At the spit, we walked onto the beach by the water and began to collect our samples. We collected water samples, marine life, and other interesting things that we thought could provide us with valuable information. We collected our samples with many techniques such as a net. After our collection period at the beach, we went to the DNA learning center. At the learning center, we further analyzed our samples through a microscope so we could possibly identify what they were. After sorting and identifying the marine life, we will DNA barcode them. To DNA barcode, we start by preparing our samples. After we will isolate and amplify our samples so we can obtain better and more accurate research. With our isolated samples, we will extract the DNA, make copies of the DNA using PCR, and then complete gel electrophoresis. We will use our results to identify and confirm what species our sample is. One of the types of marine life that we found is possible a very interesting find. We were told by an expert at the DNA laboratory that this species of marine isopod has possibly never been barcoded before, which would make it a novel species. When we DNA barcode the marine isopod, we will determine the species to discover if this marine isopod is yet to be barcoded yet. So in addition to researching how acidification is affecting the sound, we also focused on researching how marine isopods are affected by varying acidity levels.

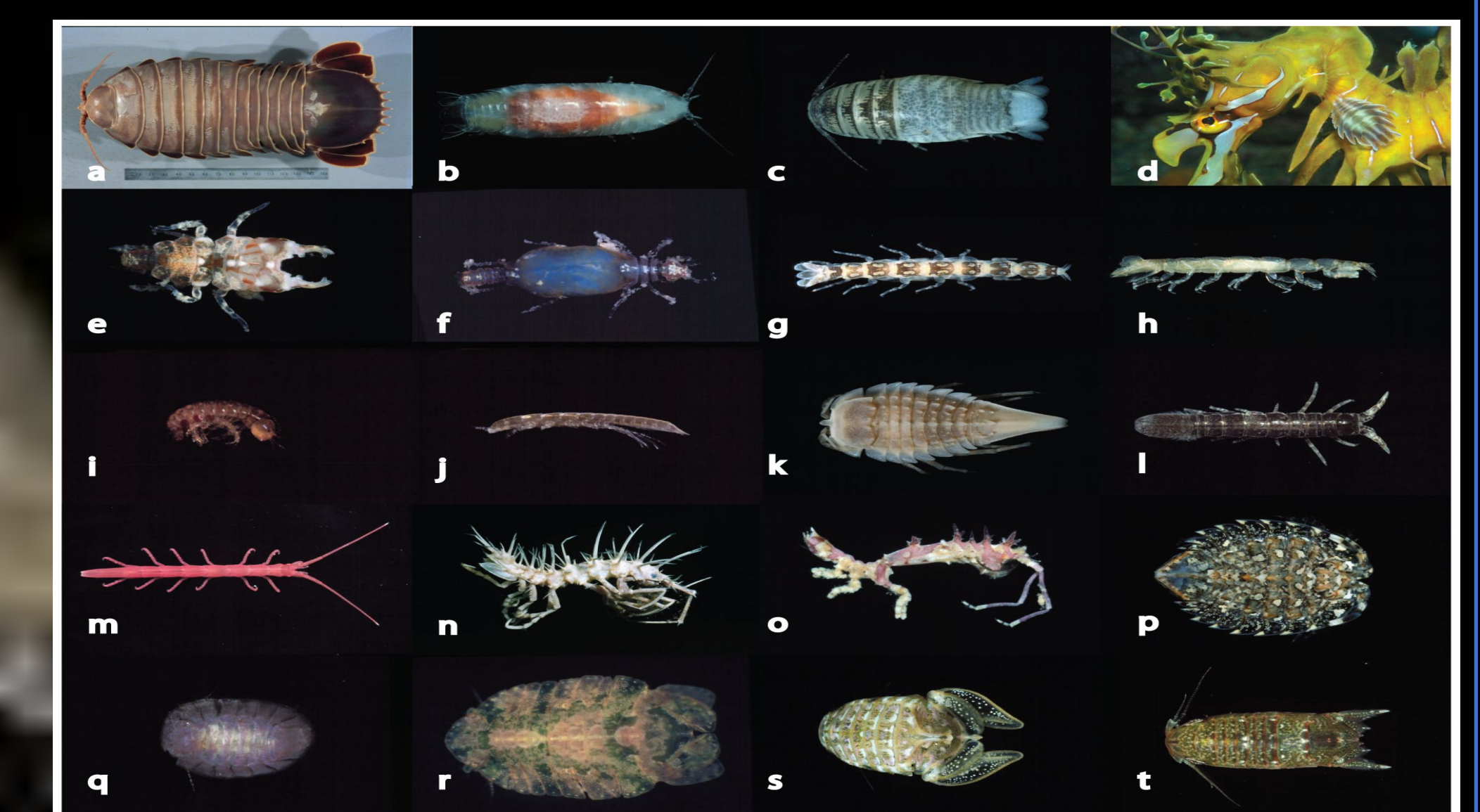
Conclusion

In our project, we were trying to learn about the biodiversity of the Cold Spring Harbor Sound, and the component of water acidification was continuously appearing. After completing some research, we were able to recognize how much of a detriment water acidification is to the marine biodiversity of Cold Spring Harbor. This process was primarily done through acid rain, which is a result of pollution. Pollution in the form of acid rain is affecting biodiversity in a way that is hard to predict. Average water acidity levels are decreasing which can be extremely harmful to many species.



Limitations

- Despite the many resources provided, our project had some major limitations.
- One of the primary aspects of our project was to learn more about the novel species we may have found. We did some research to try to figure out what species it was and get some background information, but we were unable to know for sure. Due to schools closing, we were unable to DNA barcode our samples, therefore we never knew for sure what species we were working with.
- After researching, we found that this marine isopod could have been one of many types, making it difficult to make an accurate prediction. After researching many things such as what it looks like and when and where to find it, we were able to narrow it down but couldn't know for sure.
- Another limitation we had was time. When we were collecting our samples, we were only provided a small time frame to work with. We had between one and two hours to locate marine life on the beach, but we would have hoped for more time to explore in an attempt to gather a wider variety of life.



Delimitations

- There were many components to our experiment that made it very strong.
- Our location in comparison to our beach was very helpful on our field trip and when doing research. Our school is very close to the beach, making our field trip very convenient. It was a short ride so we maximized our time working there.
- Our classroom resources were very beneficial to our project. We had access to computers whenever needed, which was very important because that is how we completed our work. Another piece of technology that was helpful was the printer. We were able to print out pictures and articles while researching.
- Another aspect that strengthened our project was our location and relationship with the DNA labs. We were able to go into the labs and have assistance from scientists.