

Trash in the Sea and How it Affects You and Me

New Mexico

Supercomputing Challenge

Final Report

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Team # 21

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Table of Contents:

● Introduction	3
● Description of Project	4
● Results	5
● Executive Summary	6
● Acknowledgments	7
● References	8

Introduction:

Since March of last year, COVID 19 has taken a large grasp of all of our lives, so when looking for project inspiration we knew we wanted to do something in the opposite direction. My partner and I have always had a love for the ocean and marine life, and for a long time in 2019 and the beginning of 2020 ocean pollution was being widely spoken about. People stopped using single-use straws, began carrying reusable water bottles and bags, there was a strong hope for change. Again with the world being stuck in a global pandemic, the use of single-use items became very important and all of that hope slowly died off. A lot of people can acknowledge the fact that the ocean is very heavily polluted and that many organisms are being affected by it, but as humans sometimes when something doesn't directly affect us we fail to make any changes to our life in effort to help those causes. With our project, we hope to bring attention to the very large problem with waste in the ocean by showing how it can affect our personal lives. The goal for our project will be to code a program that will show how the amount of pollution will affect our air quality when given a year between 2000 and 2050.

Description of Project:

For our project, we used python to create a program that when given a year between 2000-2050 will estimate the population, amount of trash, and how the air quality will be affected. More than 50% of our oxygen comes from organisms in the ocean and the large amounts of trash are affecting the way they create our oxygen. The program is also able to graph the results in order to show how the population has risen as well as the amount of trash. To be able to get these results we had to look into how our population has grown in the past twenty years and how it's predicted to grow and change. Using the information we found we created this formula to predict the population for a given year between 2000 to 2050.

$$P=0.0738y+6.11$$

In which p is population and y is a given between 2000-2050

We also had to research how much trash we create and find an average to represent a single person. Using that information as well as the information from our previous equation we made this next equation.

$$0.1(336p)+t$$

In which p is the population and t represents the existing trash in the ocean.

These equations were the building blocks of our code and are used to predict the air quality for a given year between 2000 and 2060. The program is limited to only being able to predict using factors that are present today. It doesn't take into consideration people moving to eco-friendly lifestyles or legislation/laws being put into place that limits the amount of trash a country is able to create. While we did want to take these factors into consideration, it is hard to predict how effective these laws will be. We ended up settling for putting a factor that would simulate what

would happen if we could cut 10% of our total waste starting in 2025 and see how it would improve our air quality compared to the other prediction.

Results:

Our program was able to showcase the major problem we have with pollution on earth and the negative effects it will have on our air quality if we don't take careful steps in these upcoming years. The program's prediction for population aligns with the prediction with the UN saying that by 2050 our population will have reached about 9.8 billion. We discovered that the amount of trash in the ocean had grown incredibly within the span of 50 years. The program clearly puts into perspective how the population directly ties to the amount of waste we create and the ten percent of it that ends up in the ocean. And while it may have not been our program's goal it also highlighted how much trash would end up on our land if we don't find a better way to dispose of it. The program also displays how negatively our air quality has been affected due to the large amounts of trash in our ocean. The program only shows us how 50% of our air quality will be affected and does not take into consideration things like deforestation and air pollutants so the air quality is very worrying. We also discovered if we cut our waste by 10% the change will be very large but still not large enough to improve our air quality by that much. The results both shocked and worried us as it displayed how important it is for change to be made in these next years before it is too late to make any.

Executive Summary-

How does the Trash in the Sea affect you and Me? The trash in the sea will soon begin to heavily impact all of our lives if we don't take action soon. More than fifty percent of the oxygen we breathe every day comes from organisms in the sea doing photosynthesis. A large amount of trash in the sea is blocking the sun from reaching these organisms, not letting them do their jobs, and making them die off. As our population continues to rapidly grow so does the amount of trash we produce. Ten percent of the trash we create ends up in our oceans. If our population continues to grow at the rate in which it is and no change is made our air quality will get worse and at some point not be safe to breathe. From our program, we learned how crucial it is for some change to be made in order for us as a population to be able to continue to live freely as we do now. While it is difficult to cut down on single-use items especially during the middle of a pandemic, we have to find solutions and work towards cutting down on plastic before we have to face the consequences in the future. We need to find smarter ways to dispose of our garbage as well as look for ways in which we can clean the trash that is already in the ocean. Some simple yet effective things you can do in your life are cut down on water bottles and instead try a reusable bottle, use reusable bags for your groceries, and buy items in bulk. While in many cases these things may not be accessible or realistic it is important to make as many changes as you can to your life. As a society, we should also be pushing for changes to be made by big corporations, by big corporations moving towards biodegradable packaging we can make a major impact on the amount of plastic being created. If as a society we can cut down on waste, push companies to stop creating waste, recycle more effectively, and push for green legislation we can improve our environment and quality of life in the future. These changes are not just crucial for ourselves but will also save lots of marine life from extinction.

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