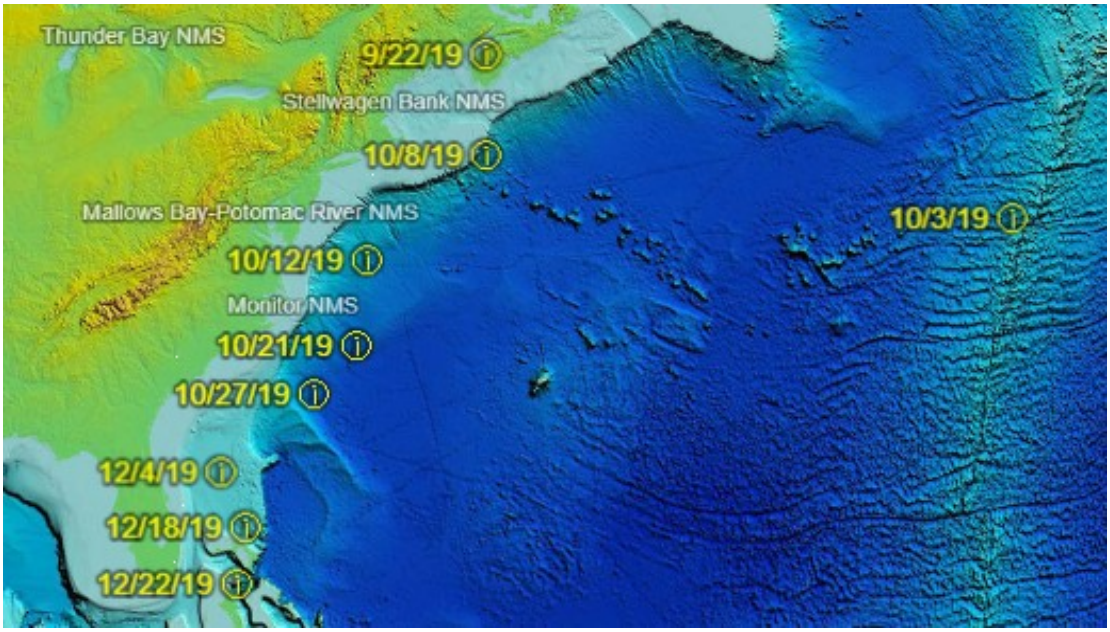
For the in-depth animal tracking study, I have chosen White Sharks and sharks name is Ironbound from 2019. I have always been fascinated with sharks and I watch shark week on Discovery every year just learn more about sharks. Here is some background information about the White Sharks. White Sharks are at the top of the food chain, but “its large size and low (reproductive rates, growth rates, age at maturity, longevity, etc.) make the white shark vulnerable to declines from human impacts. Due to these natural vulnerabilities, the white shark is one of the most widely protect sharks globally.” (www.fisheries.noaa.gov). The white shark is one of the most well study in the world and they still do not know a lot about sharks. What I found surprising is that in the U.S. waters they do not know the white shark population is. In the northeastern Pacific the white sharks look like the population is rising. NOAA says that it hard to determine the white sharks age, but NOAA gives a range from 30 years old to over 70 years old. That is an amazing that they can get that old. When the sharks are born their length is around 4 feet long and could grow up to 20 feet long. The white sharks can weigh over 2 tons. As for the types of food they eat covers from diet of fish, invertebrates, marine mammals, seal, sea lions and occasionally dead whales. The white sharks like to stay in waters temperatures around to 50 to 80 degrees. So, my research question is what is the main mechanism for the white sharks to keep moving up and down the coast? I feel that is a combination of factors of why the white sharks are always moving around. For example, I feel that food, water temperature and bathymetry play big part in the movement and maybe something I do not know yet.

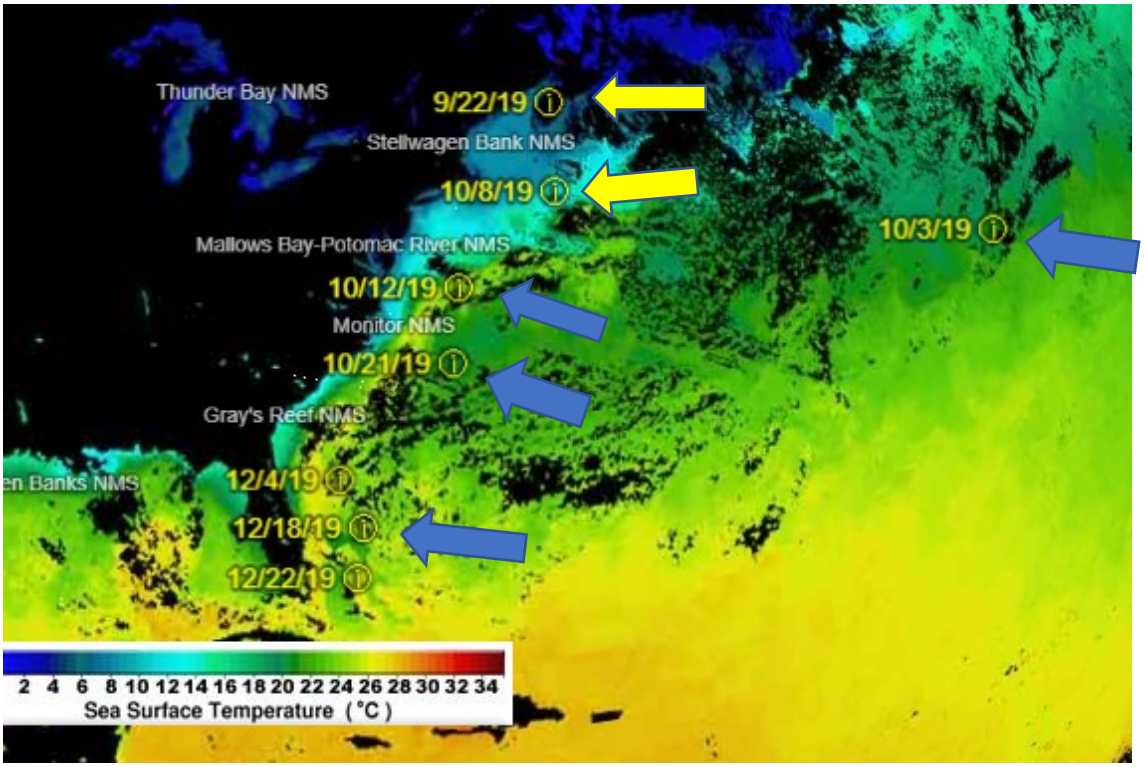
The way I am going to research to see what the main mechanisms are making the white sharks travel I am going to sue the following items. I am going to start using the ACES site (Animals in Curriculum-based Ecosystem Studies), NOAA Fisheries. At these sites I will being investigating the bathymetry, phytoplankton, and sea surface.

Bathymetry imagery: i



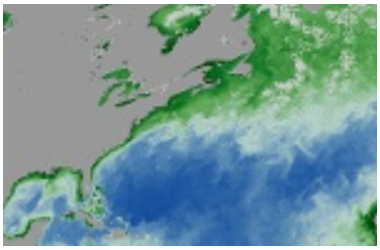
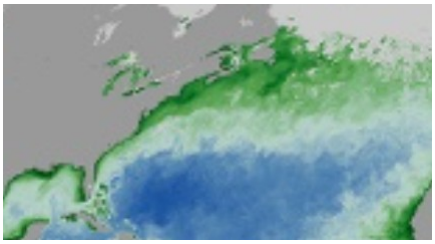
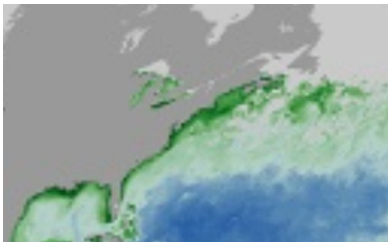
Looking closer at the bathymetry on 10/3/19 Ironbound starts out by the Mid-Atlantic Ridge. At the point of the blue arrow Ironbound is about 2508.66km or 1558.81 mi off the east coast of the United States. The depth of the water by the Mid-Atlantic Ridge is between 5,000 to 7,000 deep. That makes me curious of why Ironbound all the way is out by the Mid-Atlantic Ridge. In looking at the bathymetry map Ironbound looks like he goes past small islands and their might some good feeding areas along his path. Then by 10/8/2019 Ironbound is back oof the coast of the United States. Here he is in shallow waters where the depth runs from 500-1500 depth, and this is much shallower than the Mid-Atlantic Ridge. Ironbound stays close to the continental shelf. Ironbound starts up by Maine and starts heading down to Florida by 12/22/19 and while he is moving down to Florida, he never goes into deeper water than 500-1500 depths. I am very curious of what the phytoplankton and sea surface temperatures are like when I look at that data.

Surface Temperature:



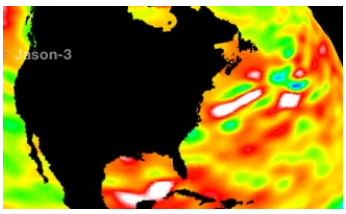
Looking at the sea surface temperatures map Ironbound stayed in mostly around 22-24 degrees Celsius and the blue arrows show where it was at with the warmer temperatures. Where the yellow arrows are pointing Ironbound was in colder water for part of September and October then he headed to the colder water. So, looking at this data Ironbound liked the warmer water, because that is where he stayed around more.

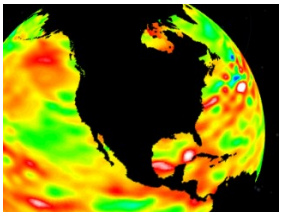
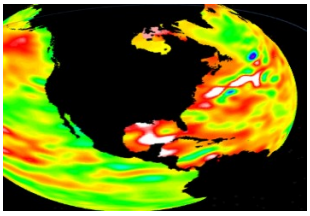
Chlorophyl/Phytoplankton:

October 2019 November 2019 December 2019

Using the NASA Earth Observatory for looking at the Chlorophyl levels will helping me maybe understand the way Ironbound move to certain locations. The reason I am looking at the chlorophyl levels is that phytoplankton uses chlorophyll that helps them carryout photosynthesis. When scientists look at the levels of the chlorophyl they can tell where the locations of phytoplankton are by way the chlorophyll in the water changes and reflects and absorbs the sunlight. Taking a closer look at the chlorophyll levels during the months of October, November and December gives me a better idea of why Ironbound travels to the south. In the month of October, the chlorophyll levels are here by the Maine. This tells me that Ironbound is up in the north for food and then he starts moving down the coast to find more food as you can see the chlorophyll levels change in November and December. This gives me more clues on why Ironbound travels so much.



Looking at the NASA's Eyes on the Earth and setting the data points from October 2019 to December 2019to see what the Seal levels where during that time. In looking at the data the sea levels during October 2019 around Maine the sea levels were around 100 mm. Then the sea levels started to go down a little to around 88mm. I am thinking that the sea levels do have some impact on the way that Ironbound travels.

Looking at the data that was collected from the NASA Eyes on the Earth, NASA Earth Observatory, ACES on phytoplankton/chlorophyll, sea surface temperature, and bathymetry. The patterns the data shows that the white shark's movement is correlated to surface temperature, phytoplankton, and sea levels. The question I asked was what makes the white shark move

around a lot. Ironbound is attracted to the food levels like the phytoplankton with starts out high around Maine. When the phytoplankton levels start to drop around Maine Ironbound starts down to the Florida. When looking at the bathymetry Ironbound for the most part stays close to the continental shelf and stay in shallow waters. When looking at the sea levels and the phytotron it seems they coincide with each other. When the sea levels are higher the phytoplankton is also high. Then when the sea levels and the phytoplankton go down that is when Ironbound starts to move down the coast. So, Ironbound travels down the coast with the warmer waters and where the phytoplankton is more plentiful.

Discussion:

I feel it is important to understand why the white sharks don't stay in the same area all the time. If scientist understand what motivates the whites' sharks to cover large areas will help them to have a better understanding of their migrations. From what I have learned that white sharks are still kind of a mystery, but they are learning more each year. I know that Ocearch is doing all kind of research on the white sharks. Here are some research questions that scientist should investigate more. The first one would be what is the impact of the rising ocean surface temperatures on the white sharks? We know that the ocean surface temperature is rising to temperatures we have not seen before so what will the impact of the temperatures have on the white sharks? Will the rising temperatures impact some of the food that the white sharks eat for example the phytoplankton? How rising of oceans affect the white shark's migration patterns? Will the rising ocean have the white sharks move more inland once the water has taken over or will they move to a different area? I feel there are some questions you can ask, because the white sharks are still kind of a mystery. I know they have tagged some sharks and then like disappear for a while then suddenly, they are back. This kind of information just fascinates me.

Citation

Fisheries, N. O. A. A. (2022, March 24). *White Shark*. NOAA. Retrieved April 18, 2022, from https://www.fisheries.noaa.gov/species/white-shark

https://earthobservatory.nasa.gov/

http://www.signalsofspring.net/aces/visitor_links.cfm?pagehl=links