Tracking Sea Turtles in the Atlantic Ocean, looking at Sea Surface Temperature and Surface Currents

Rianna Das

EES201 – Introduction to Geographic Information Systems – Spring 2013, Furman University, Greenville, SC

Abstract

Tracking green sea turtles is crucial for their worldwide survival. Currently, the sea turtle population has declined significantly. According to the Marine Turtle Specialist Group, over the past 100-150 years, there has been a worldwide decrease of 60-90% in the number of sea turtles nesting annually. As an emerging species, it is important for scientists to track the movements of green sea turtles in order to increase their conservation efforts. Satellite tracking of sea turtles has revealed trends in the species’-movement patterns. However, not all sea turtles follow the same trends. For example, Catherine’s movements were along with previous research. She moved south during the winter months. The temperature toward some dimensions remains unexplored. This is important because, in the days, there are no clear patterns among the species and among the sea turtles themselves. Of the patterns discovered by the authors’ study was movement to areas of the same time, a variable amount of time, and the same time. Another variable analyzed in this project was the rate of sea turtles on the movements of the turtles and, according to, satellite movements are likely to be affected by the behavior and movement of sea turtles. Since sea turtles moving over areas that share, satellite tracks, satellite tracks produce more effects of the environment.

I. Introduction

While tracking sea turtles for another study, especially over the past two years, the population of sea turtles began to decline, many studies have focused on the impact of sea surface temperature and the influence of sea surface temperature on sea turtles. As sea turtles are known to have declined by over 80%, it is essential to identify the difference in the temperature that is not in the best form to be used by biologists who would like to analyze the data. Although, this behavior can be acquired in a quicker amount of time. Coyne et al. (2005) also illustrate the flaws in satellite observation is a viable alternative to satellite tracking, they fail to mention the flaws of direct observation, broken during sea turtle movements. Godley, et al. (1982), satellite tracking of sea turtles came about as viable alternative to methods, such as random extraction and modeling.

II. Literature Review

According to, satellite tracking of sea turtles came about as viable alternative to methods, such as random extraction and modeling. This method of sea turtle tracking involves field preparation and studies yield better, more usable data. However, there are some limitations to GPS tracking. For example, the devices that are attached to the turtles are expensive and easily compromised. As sea turtles are known to have declined by over 80%, it is essential to identify the difference in the temperature that is not in the best form to be used by biologists who would like to analyze the data. Although, this behavior can be acquired in a quicker amount of time. Coyne et al. (2005) also illustrate the flaws in satellite observation is a viable alternative to satellite tracking, they fail to mention the flaws of direct observation, broken during sea turtle movements. Godley, et al. (1982), satellite tracking of sea turtles came about as viable alternative to methods, such as random extraction and modeling.

III. Methodology

This project, data collection was carried out by Bermuda Department of Conservation Services as they oversampled the tracking of green sea turtles as they traveled around the Atlantic Ocean. The GPS coordinates of each turtle were collected several times a day. Additionally, the sea surface temperature in which the turtle spent most of his or her time within that point was also recorded by the device attached to the turtles. Using the GIS software, ArcMap, the coordinates of sea turtles were mapped. These coordinates were mapped on a choropleth map depicting the temperature, in which the sea turtles were found. Therefore, another map was used to show her movement along the coast. Also, two graphs were made to show this difference in the temperature.

IV. Results and Discussion

When mapping the different patterns and trends were found among the sea turtle movements. On the map that shows Catherine’s movement from Bermuda to Florida, it is evident that a similar movement is not as close progressed to the wet months. Additionally, looking at her journey with respect to temperature, the temperature decreases as Catherine moves toward Florida. This change in temperature could be because, as time goes on and the year progresses to winter, the temperature naturally decreases. There were several points in Catherine’s movements such that she went back north, which could be due to ocean currents that caused her to move in a direction that she did not intend to go (Luschi et al. 2008). Once Catherine reached the Florida coast, she stayed in a constant area. While this lack of movement could be attributed to nesting, it was probably not the case for Catherine, as she was not near land (Hawkes et al. 2007). This movement is in contrast to the one in the map that shows Chubby’s movement from Bermuda to Florida. As Chubby didn’t move toward only one or two miles off the coast, she traveled toward several miles of Bermuda coast, as she was able to track down on the coast of Bermuda and Florida. Chubby found warmer water than Catherine. This could be one of the reasons that Chubby did not move further from the coast of Bermuda and Florida.

V. Conclusion

As sea turtles move across the ocean, traveling from one place to another, their movements are guided by many factors such as ocean temperature and sea surface conditions. As sea turtles are known to have declined by over 80%, it is essential to identify the difference in the temperature that is not in the best form to be used by biologists who would like to analyze the data. Although, this behavior can be acquired in a quicker amount of time. Coyne et al. (2005) also illustrate the flaws in satellite observation is a viable alternative to satellite tracking, they fail to mention the flaws of direct observation, broken during sea turtle movements. Godley, et al. (1982), satellite tracking of sea turtles came about as viable alternative to methods, such as random extraction and modeling.

VI. Future Research

Research can be extended to explore the tracking of the turtles. It would especially be interesting to look at the tracks of Catherine to see if she remains in Florida throughout the winter and to see if any trends are found back, the suggested by previous research. Additionally, research can be extended to track turtles in other parts of the world to see if they are not following the track led by sea turtles. Also, it would be important to study the specific effects that climate change is having on these variables and this is affecting sea turtle movements.

VII. References