

LTER Schoolyard Program Case Studies

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Case Study Outline

Four case studies will be created based on research occurring in the LTER projects. The purpose of these case studies is to engage AP Environmental Students in real world scientific research and application.

The following case studies will be created for use during the corresponding unit of study:

Threatened Loggerhead Population Trends in Georgia: How the numbers are influenced by predation, anthropogenic impacts & climate change.

The Impact of salt water intrusion on fresh water ecosystems

Salinity, Turbidity, and Nutrient Content of the Altamaha River

The Hydrology of the coastal Georgia: Implications of change

The case studies will be composed of the following:

1. A question used to focus student thought
2. Identification and discussion of the research methods and processes used in the field, their significance and validity, and how we translate those methods to the classroom.
3. Data Analysis of the LTER projects and examination of what the data may implicate.
4. Relationships between and application of course content and research results and what these results articulate about our changing environment and our approach to scientific research in the classroom.

Threatened Loggerhead Population Trends in Georgia: How the numbers are influenced by predation, anthropogenic impacts & climate change.

A. Use the power point to introduce and discuss Sea Turtle Ecology:

Power Point Table of Contents:

Title Slide

Slide Two: Case Study Introduction

Photo of juvenile sea turtle. The caption asks what students observe from this photo. Discuss student observations. Discuss **predation** among sea turtle populations and how they are an **R- Strategist organism** where many eggs are laid but few survive to adulthood. Discuss human impacts of sea turtle populations and why they are protected by the **Endangered Species Act**.

Slide Three: Brainstorm and Discuss Sea Turtle Predators

Discuss methods being used to prevent natural predation from the site below:

<http://seaturtleexploration.com/explore-and-learn/sea-turtle-web-lessons/protecting-the-nest/>

Slide Four- Seven: Locating and monitoring sea turtle nests

End of power point

B. Student Data Analysis: Visit : <http://www.seaturtle.org/nestdb/?view=3> To discuss jargon and terminology with students prior to data analysis. Discuss data analysis and field student questions concerning research methods on recovering turtle populations.

Turtle Nesting Data Analysis- Student Copy

1. Visit: <http://www.seaturtle.org/nestdb/?view=3>
2. Select Sapelo Island and select three other beaches and compare the “Egg losses” category. What inferences can you make concerning the differences in data across beaches? What are some possible explanations?
3. Why would eggs be lost to research? Is this a contradiction in turtle conservation?
4. Compare the “significant nest loss” of 2017 and 2018 on Sapelo Island and suggest an explanation for the data observed.
5. Compare the “false crawls” on Jekyll and Tybee to Cumberland and Sapelo Island. What possible explanations can be made for the difference in nesting females?
6. Based on the overall provided data- what observations, inferences, and conclusions can be drawn about sea turtle nesting in Georgia (consider seasons, predation, management practices, etc.).
7. Visit the website below:
<http://www.seaturtle.org/nestdb/genetics.shtml?program=3&beach=82&year=2018&species=Cc>
The data you see was gathered by collecting egg samples to track maternal DNA.
How many nest were on Sapelo in 2018?
How many females had unique DNA?
How many females were first time nesters?
What was the average nest per female? explain how this number is possible.
How many days between nesting occurred on average?
How many turtles were reported to nest on more than one beach?
Why is this data significant for managing sea turtle populations?
8. http://www.seaturtle.org/PDF/HawkesLA_2007_GlobalChanBiol.pdf What are some ways that climate change impacts turtle population? Is the DNA that is currently being collected able to help scientists address changes in gender population concerns?
9. It is estimated that approximately 1 out of 1000 hatchlings will make it to adult hood, what are some factors that influence this statistic? The US Fish and Wildlife Service has listed Loggerhead Sea Turtles as **Threatened**. What does this distinction mean for the turtle population and what are some of the anthropogenic causes of its decline?