

Program Brief

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Resource Education
Research Project Summary November 2016



Turtle T.H.i.S. (Teens Helping in the Seashore), A Citizen Science Project

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Background

Gulf Islands National Seashore stretches across 160 miles of coastline along the Gulf of Mexico. Four species of endangered sea turtles and one species of threatened sea turtle inhabit this region. These turtles come ashore, bury their clutch of eggs in the sand, and then return to sea. About two months later, hatchlings emerge from the nest with an immediate biological mandate—a mad dash to horizon's light and the open seas it indicates.

In the past, this instinctual drive toward the light was an effective strategy for reaching the sea. The exponential growth of light pollution over the past century has increasingly diminished the success of this drive, often drawing hatchlings toward the brighter lights of society and away from the Gulf of Mexico. This correlation between light pollution and hatchling disorientation has been noted since the 1950's, but the correlation with blue wavelengths of light and disorientation has not yet been well studied. It is hypothesized that the hatchlings are most sensitive to blue wavelengths of light. To test this correlation and determine

sensitivity to blue wavelengths, Gulf Islands National Seashore with the help of the NPS night skies team and the U.S. Geological Survey, developed Turtle T.H.i.S. (Teens Helping in the Seashore) to address this information deficit and to engage students and the community in the study.

Citizen Science at Work in Parks

Park Rangers, youth ambassadors, the NPS night skies team, a U.S. Geological Survey scientist, and local teachers have teamed up to train high school students to measure ambient light at select points along Gulf Islands National Seashore and adjoining



Connecting students with the resource. Local Students at the seashore measuring the night sky's luminance.

public beaches. These students measure the night sky's luminance and blue wavelengths of ambient light. Each weekend when the sun has set, small groups of high school students supervised by a park staff member set out to points along the beach with the Turtle T.H.i.S. equipment to measure ambient light that night.

Methods

The park is taking a twofold approach to assessing the correlation between sea turtle disorientation and sensitivity to light conditions. The SQM devices have a reach of 200 meters, so students sample transects placed every 400 meters along the beach beginning at a randomized start point. Each point includes a complete hemispheric measurement at the mean high tide line, the dune toe slope, and the dune peak. This methodology provides an all-encompassing set of measurements spanning the Gulf coast shoreline of two islands. In addition to

transect measurements, students fine-tune the sample points for disorientation comparisons by measuring the light conditions at each individual nest site. To keep the data as close to the probable light conditions the sea turtles would have experienced, measurements are taken within a 20% range of the lunar phase during which the nest was originally laid or hatched. In this way, site-specific data is compared to the incidence of disorientation records as measured by the resource management division of the park. All of the data is then analyzed by a US Geological Survey quantitative biologist.



Gulf Islands National Seashore and adjoining Pensacola Beach, 400 meter transect points

Equipment

To address the hypothesis that sea turtles are most sensitive to blue light wavelengths generated by anthropogenic sources, each SQM unit is equipped with two light meters—one with a blue light filter and one without. These units are outfitted to create the Turtle T.H.i.S. kit with a tripod, leveler, and mount, to measure the prevailing light conditions 360 degrees around a horizontal plane. The angled altitude of the unit is then adjusted using the mount, and another round of measurements is taken. This process is then repeated two more times, completing the dataset for that site.



Status and Future

Students and park personnel have completed data collection for 2014 and 2015. A preliminary analysis of the 2014 data suggests that blue light levels are influencing both nest placement and nestling disorientation. Students have begun collecting transect data by focusing on Pensacola Beach and then will expand across the islands, systematically going from one transect to the next. When completed, this process will begin again both for the transects and then for the 2016 sea turtle nesting season, and will produce a spatial image of light pollution across the seashore over time.

The project seeks to include other coastal parks and schools with the goal to enhance the reach of the data to as much of the US coastline as possible. It is the hope of the team that data collected may be used to better inform decision making related to the use of artificial lighting near sensitive sea turtle nesting sites as well as to educate the public about the impact people can have on the world around us.

