ABSTRACT

Evaluating the biology and ecology of sea turtles in the context of anthropogenic climate change

My dissertation research addresses several key gaps in our knowledge of how long-term threats, like climate change, impact the survival and reproduction of thermally-sensitive endangered sea turtles. Many aspects of the sea turtle life history, such as sex determination in hatchlings, are directly affected by environmental temperatures, making sea turtles crucial sentinels for monitoring the impacts of ecosystem variability. My research evaluates rising nesting beach temperatures as a factor driving a feminizing trend in hatchling sex ratios for the world's most endangered sea turtle, the Kemp's ridley in the Gulf of Mexico. Increasing environmental temperatures also influence the timing of important events for other life stages of sea turtles, such as reproductive migrations and breeding for adults. I am using drone technology to investigate how climate change is affecting the timing of arrival, distribution, and rarely-observed courtship and mating behaviors of adult Kemp's ridley and green sea turtles at important offshore breeding habitat. Drones have enabled the expansion of my research to include other life stages and species of sea turtles in a variety of habitats, including the most data-deficient species of sea turtle, the flatback, endemic to tropical Australia. This work has most recently led to a multi-species comparison of behavioral disturbance to drones, which is critical information in the establishment of ethical and effective drone -use protocols in scientific research. Thus, my Ph.D. research is not only demonstrating the ability of novel technology to enhance sea turtle conservation, but is providing key insight into critical aspects of sea turtle life histories that occur at in-water habitats where sea turtles spend about 99% of their lives. In light of an uncertain future, this research is generating pivotal information for the conservation and protection of the most endangered, data-limited, and geographically restricted species of endangered sea turtles in the world.