

# UPDATES ON AN INTEGRATIVE ENVIRONMENTAL AND ECOLOGICAL ASSESSMENT OF THE GULF STREAM CURRENT ENVIRONMENT OFF THE COAST OF CAPE HATTERAS, NC

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The Gulf Stream (GS) energy resource is a major focus of the North Carolina Renewable Ocean Energy Program (NCROEP) because of the GS's close proximity to the North Carolina (NC) coast and potential to provide substantial baseload energy [1, 2]. The feasibility of harnessing the GS energy resource depends on several factors, among them, the ecological and environmental impacts of GS energy development, which is another primary research direction of the NCROEP. Our work is aimed at characterizing the largescale distribution and biogeochemistry of different GS micro- and macroalgae communities and on the uses of the area by sea turtles, marine mammals, and humans to provide insights into how GS energy generation may influence the characteristics and existing ecological and human uses of the GC off the NC coast in the future. Here we provide recent findings regarding the soundscape and juvenile sea turtle use of the study area.

Aural-M2 hydrophones (Multi-electronique) deployed on the continental shelf slope, off the tip of Cape Hatteras recorded (32,768 samples/s) from January 2015-April 2016. The sound spectra and variance were analyzed to characterize the broad soundscape, and especially anthropogenic contributions to it. Our analysis suggests that the soundscape is exceptionally quiet and that marine mammals are vocal throughout much of the year in the study area.

To begin to explore how neonate sea turtles use the GS environment off of the NC coast, we modeled a study after a tagging study conducted in Florida by Mansfield and others [3]. Microwave Telemetry PTT-100 solar 9.5 g solar-powered satellite transmitters were attached to the carapaces of five neonate loggerhead sea turtles (*Caretta caretta*). The turtles were released in *Sargassum* mats within the GS off of the NC coast and largely stayed within the GS, off the continental shelf, and at the surface of the water.

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