Announcing the Final Examination of Ahmed Hamed for the degree of Master of Science

Time & Location: October 23, 2013 at 2:00 PM in Business Administration II 301

Title: Assessing the Economic and Ecosystem Loss of Sea Turtle Nesting Habitat Caused by Sea Level Rise of Florida Coasts

Sea level rise (SLR) is posing a great risk of flooding and inundation to coastal areas in Florida. Some coastal nesting species, including sea turtle species, have experienced diminished habitat from SLR. In an effort to assess the economic and ecosystem service loss to coastal areas with respect to sea turtles Contingent Valuation Method and Habitat Equivalency Analysis were used.

The Contingent Valuation Method (CVM) was used to measure the economic impacts of SLR on sea turtles. Using the open-ended and dichotomous choice CVM, we obtained the willingness to pay (WTP) values of Florida residents to implement certain mitigation strategies which would protect Florida’s east coast sea turtle nesting areas. We reduced the problem of sample selection bias by surveying residents of two cities that would potentially have varying interest in coastal conservation due to their relative distance from the coast. We estimate the hypothetical WTP of Florida households to implement policies designed to protect sea turtle habitat from development encroachment to be between $21 and $29 per year for a maximum of five years. Characteristics of respondents were found to have statistically significant impacts on their willingness to pay. Findings include a negative correlation between the age of a respondent and the probability of an individual willing to pay the hypothetical WTP amount. Counter intuitively, we found that WTP of an individual was not dependent on prior knowledge of the effects of SLR on sea turtle habitat. As the level of this awareness increased, the probability to pay the hypothetical WTP value decreased. The greatest indicators of whether or not an individual was willing to pay to protect sea turtle habitat were the respondents perception regarding the importance of sea turtle population health to the ecosystem, and their confidence in the conservation methods used.

Concepts of Habitat Equivalency Analysis were used in order to determine the ecosystem service lost due to SLR. The study area of Archie Carr National Wildlife Refuge (ACNWR) has a continually increasing sea turtle population due to various conservation efforts. However, we assess how the inundation of the coastal area will injure this habitat, and if mitigation strategies to compensate for the loss are necessary. The carrying capacity (CC) of the refuge was chosen as the metric of the ecosystem service. Using the estimated area of ACNWR and the approximate area needed by a sea turtle to nest, the theoretical number of sea turtle nests possible on the refuge was calculated. This value was then projected to the year 2100 using the sea level rise scenarios provided by IPCC (2007) and NRC (2010). In order to quantify the injury caused by the decrease in the refuge’s CC, the number of sea turtle nests on the refuge was projected to the year 2100 using the data obtained over the past 30 years. Our analysis concludes that the sea turtle nest CC of the refuge under the grimmest scenario will remain significantly higher than the most optimistic projected sea turtle nesting values by the year 2100.

Major: Civil Engineering

Educational Career:
Bachelor’s of Environmental Engineering, BS, 2012, University of Central Florida
Master's of Water Resource Engineering, MS, 2013, University of Central Florida

Committee in Charge:
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Approved for distribution by Kaveh Madani, Committee Chair, on September 26, 2013.
The public is welcome to attend.