**Title:** Do Coastal Ecosystems Mitigate Storm Surges and Tsunamis

**Statement of Problem:** Governments worldwide have recently embarked on many expensive restoration projects involving barrier islands, coastal marshes and mangrove forests following catastrophic disturbance A commonly-held perception among the general public, policy-makers, and some scientists is that coastal ecosystems provide significant measurable protection to human habitation during extreme storms and tsunamis. Restoration activities have been particularly intensive after the December 2004 tsunami in the Indian Ocean and the 2005 hurricane season in the Gulf of Mexico. Yet, the scientific evidence is equivocal. Field observations and some modeling studies cast doubt on these widely held beliefs. The scientific question can be cast in terms of the interactions between coastal ecosystems and extreme events. Firstly, how are coastal ecosystems impacted by extreme events? And secondly, do coastal ecosystems mitigate the extreme event, that is, under what conditions do they afford some form of protection, and if so, how much?

**Objectives:** First, thoroughly review the literature concerning the role of coastal ecosystems in mitigating damage to build a publicly accessible comprehensive database of actual observations that can be used for analyses. This literature review will also provide insights into how these perceptions came about and how they have been propagated. Second, bring physical and biological scientists in a major workshop to address this topic. Many hydrodyCopyright and DisclaimerThe State of South Carolina owns the copyright to the Code of Laws of South Carolina, 1976, as contained herein. Any use of the text, section headings, or catchlines of the 1976 Code is subject to the terms of federal copyright and othernamic models exist concerning tsunami propagation through mangroves. However these models are badly miscalibrated in how they represent the forests. Similar situations exist for other types of coastal ecosystems. Third, disseminate the results and recommendations to the public-policy makers and appropriate government entities to ensure the recommendations are included in the planning process.

**Relevance and Impact:** The cost of restoring coastal ecosystems and communities is huge. Restoration must be based on sound science and the general public and decision makers must understand their options.

**Partnerships:** A number of scientists from all disciplines in USGS have expertise pertinent to this project. Federal partners include the National Park Service and Fish and Wildlife Service, both of which have coastal units along all U applicable laws and such text, section headings, or catchlines may not be reproduced in whole or in part in any form or for inclusion in any material which is offered for sale or lease without the express written permission of the Chairman of the South Carolina S coastlines. The US Army Corps of Engineers would be extremely interested in the results.