RESIO, UNF

DHS Coastal Resilience Center
Research Project Work Plan
1/1/2016 – 12/31/2017

1. **Project Title –** The Incorporation of Rainfall into Hazard Estimates for Improved Coastal Resiliency

2. **Principal Investigator –** Don Resio, University of North Florida, 1 UNF Drive, Bldg 50/3204, Jacksonville, FL 32224.

3. **Other Research Participants/Partners –** Funded Directly By the University of North Carolina:

   Jackson State University - Tom Richardson (PI) , former Director of the Coastal and Hydraulics Laboratory at ERDC and Bruce Ebersole, former Division Chief, United States Army ERDC.

   ARCADIS - Hugh Roberts (PI), hydrodynamics specialist and ADCIRC modeler and Nancy Powell, former Hydraulics and Hydrology Branch Chief for USACE New Orleans District.

4. **Short Project Description.** Rising sea level, climate variability, and growing coastal populations increasingly threaten the immense investments in critical coastal infrastructure within the United States, and could greatly impact the commercial and military value of coastal cities such as New York, New Orleans, Norfolk/Hampton Roads and many others. At the same time, natural coastal areas are essential to maintaining healthy ecosystems in these areas, since they provide much needed food and recreation and perform an important role in maintaining overall environmental stability. Decisions, ranging from operational (search and rescue, evacuations, recovery operations, etc.) to longer term planning (FEMA RiskMaps, development and reconstruction efforts, etc.) must be based on accurate quantification of factors which affect this balance between the natural and built environments in order to maximize resilience in these areas. A major factor known to be important in most coastal areas, interactions among rainfall, hydrologic flows and coastal surges is presently not treated within operational modeling systems. This project will develop a methodology for incorporating these interactions in a statistically and physically appropriate manner into FEMA's operational coastal modeling systems.

5. **Abstract.** This project will develop a method for including rainfall-runoff effects into FEMA-JPM studies, and evaluate the potential impacts of incorporating these effects into improved estimates of flooding hazards. There are two parallel efforts the project will be undertaking: 1) an improved understanding of the statistics of river/tributary discharges in terms of both antecedent conditions and the conditional probabilities of rainfall patterns and magnitudes given a tropical cyclone in a particular area and 2) a physics-based coupling of major tributaries into the ADCIRC model, including antecedent and rainfall effects during a surge event. The goal is to develop a model that is ready to be transitioned into realistic JPM applications in areas where rainfall, hydrologic flows and surges are expected to interact strongly.