

**TWILLEY, LSU**  
**DHS Coastal Resilience Center of Excellence**  
**Research Project Work Plan**

**1/1/2016 – 12/31/2017**

1. **Project Title.** Integrated Modeling Approaches with Application to Pre- and Post-disaster Planning for Creating More Resilient Communities
2. **Principal Investigator.** Robert R. Twilley, Louisiana Sea Grant/Oceanography & Coastal Science, LSU
3. **Other Research Participants/Partners.**

Jeff Carney, Coastal Sustainability Studio, LSU

Traci Birch, Coastal Sustainability Studio, LSU

Carola Kaiser, Center for Computation and Technology (CCT), LSU

Brant Mitchell, Stephenson Disaster Management Institute (SDMI),  
LSU

4. **Short Project Description.**

We propose a unique combination of research centers (Coastal Sustainability Studio (CSS) and Stephenson Disaster Management Institute (SDMI)) and a research and outreach organization (Louisiana Sea Grant College Program (LSG)) to develop pre- and post-disaster planning and adaptation tools for coastal communities to increase resilience. These efforts will enable vulnerable communities to plan, react, and recover more quickly and effectively in areas facing repetitive disturbance. The goals of the program are to improve emergency response with regard to protecting vulnerable infrastructure and populations, and to reduce repetitive loss by providing accurate impact data to community planners in the immediate aftermath of an event. This program focuses on significant reduction in risk with the use of high-fidelity storm surge data and impact scenario viewers during the pre-disaster planning and rapid reaction to storms, and accurate information useful to post-disaster recovery planning. Together this group will provide (1) Planning tools that visualize aggregated risks to include hurricane force winds, storm surge, and inland flooding along with vulnerable populations based on socio-economic status; (2) modeling and visualization tools to communicate flood risks during a tropical cyclone event by identifying vulnerable populations and structures that are susceptible to storm surge; (3) post-landfall search and rescue grid system with prioritization based on socio-economic vulnerabilities; (4) methodology for helping community planning departments and recovery planning teams effectively utilize and implement changes to their built environment through effective resilience based planning.

5. **Abstract.**

We propose that an integration of coastal modeling tools linked to innovative design/planning approaches, together with effective outreach to both emergency managers and land use planners is needed to provide crucial community-level data for effective pre- and post-disaster planning. Beyond large-scale models or those that only demonstrate one aspect of hazard impact (e.g. storm surge), communities need clear guidance on exactly which vulnerable infrastructure and populations may be threatened and/or protected (pre-disaster planning and rapid response), and accurate post-event impact in order to make crucial land use and

redevelopment decisions quickly. The ability to leverage this type of community-specific data provides the opportunity to avoid loss and rebuild for maximum future risk reduction. The trans-disciplinary LSU partnership builds on the strengths of each research center and outreach institution, and will provide transformational products to vulnerable communities to actively address improved flood prediction, protection, and response. We will incorporate established modeling outputs into a new consequence model showing how flood risk (both from storms and SLR) will impact people, industry, and infrastructure. This much needed information will be used to enhance pre- and post-disaster planning for efforts. Louisiana Sea Grant and CSS will engage federal, state and local planners and emergency managers to incorporate these products into planning efforts beyond the targeted work being undertaken with established partner community(ies), the products will be tested at annual FEMA-lead hazard preparation workshops (i.e. Res/Con and LEPA) to engage end users directly in the development process, and will be leveraged to develop integrated approaches for university-based design studio courses and design/outreach entities addressing these issues.