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NSF Hurricane Workshop Summary:

Ecosystem Responses to Hurricanes Synthesis Workshop

Award 1903760

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Hurricanes and high-energy storms are increasingly causing severe disruptions to all components of coastal ecosystems from the water's edge up through upland habitats. Although hurricanes are episodic, their impacts are often unpredictable, and the relative severity of different stressors and the identity of the affected ecosystems varies among storms. All of these characteristics make it difficult to develop general conceptual frameworks for how ecosystems respond to hurricane disturbance. However, such a general framework is desperately needed because global climate models predict that the severity of these events will increase and affected impact zones will change over the next 100 years. This makes it imperative to understand how ecosystems respond to hurricanes so that we may make predictions about coastal ecosystems under future climate scenarios and develop corresponding management strategies to increase coastal resilience.

Objective: We will bring together research teams studying multiple ecosystem types (estuarine, freshwater, and terrestrial) and ecosystem responses (physical, biogeochemical, organismal – mobile vs sedentary, microbial, animal, and plant) to identify shared and unique responses to different types of hurricane stressors. The project combines the strengths of a traditional symposium with a directed meta-analysis to address the following questions:

- (1) What is the variation in the resistance and resilience of ecosystem components to Hurricane disturbance among different ecosystems (coastal waters, estuarine, freshwater, and terrestrial) and response types (fauna, flora, biogeochemical, physical)?
- (2) Which intrinsic ecosystem characteristics and disturbance characteristics predict response magnitude and recovery rates following hurricane disturbance?

Implementation: The proposed research is organized into three phases: recruitment and workflow design, a three day workshop, and post-workshop analysis and synthesis. **Phase 1:** A diverse group of applicants with appropriate datasets will be selected to maximize variation among participants in terms of career stage, study system, response variables, and disturbance event identity. After selection, participants will remit data prior to the start of the workshop. **Phase 2:** Participants will meet in person for a multi-day workshop to present their data stories, review preliminary data synthesis generated by the PI's, brain-storm further opportunities for collaboration and synthesis, and develop and assign action items for generating research and data products. **Phase 3:** PI's will lead post-workshop data analysis and participants will generate manuscripts based upon the outcomes of the workshop. The project technician will curate the final datasets and remit them to a public data repository for archiving.

Requirements: All workshop participants must be in possession of and have permission to share time series data that covers the period before and after a major hurricane or tropical storm landfall event. Participation priority will be given to individuals studying recent major hurricanes that comprise a diverse group of career stages and backgrounds. Funding will be limited for multiple applicants that are part of the same project and have the same data.