

USGS NSF GRIP, GSP Opportunity

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 USGS Center:	Wetland and Aquatic Research Center
 Project Title:	Long-term trends in forest regeneration across drought and salinity gradients in the northern Gulf Coast
 Summary:	Relict forests are becoming more common as as climates become hotter, drier and more saline. The first sign of threat to these forests is a chronic lack of seedling and sapling recruitment. This project will help pinpoint forests at risk to help in future management.
 Project Hypothesis or Objectives:	Freshwater species along rivers of the Gulf Coast lie along a freshwater tidal to fresh riverine gradient, but tree regeneration is lower where drought and salinity limit freshwater tree species (Middleton et al. 2015). Also, the Gulf itself lies along a geographical gradient of temperature, evapotranspiration and drought from TX to FL. This study will examine the potential effects of climate-change-induced sea-level rise, drought and water extraction by examining seed production and dispersal patterns across the Gulf Coast, specifically targeting inland and coastal swamps in long-term research plots (North American Baldcypress Swamp Network (NABCSN) (Middleton et al. 2015). The objectives of this project will be to determine if climate-change environments, based on scenarios of excessive drought, flooding, salinity and CO ₂ , influence dominant swamp species by examining regeneration patterns (seed set, seedling and sapling recruitment) in inland and coastal settings across a drought gradient from the range limits in eastern Texas across the Gulf Coast. Sea-level rise may compress the tidal freshwater zone along the coast, and upstream seed dispersal limitation may ensue because seed dispersal of these freshwater species is primarily toward the sea in the direction of riverine water flow (Middleton 1999). Hypotheses tested will be that regeneration is most successful on the Gulf Coast eastward toward the Panhandle of Florida, and that future compression of tidal freshwater forested wetlands can be expected with drought/sea-level rise scenarios.

● **Duration:** Up to 12 months

● **Internship Location:** Lafayette, LA

● **Field(s) of Study:** Life Science

● **Applicable NSF Division:** DEB Environmental Biology

● **Intern Type Preference:** NSF Graduate Research Fellow (GRF) via the Graduate Research Intern Program (GRIP)

● **Keywords:** geographical ecology, wetland, coastal, salinity intrusion, water extraction

● **Expected Outcome:** The project will help predict climate change responses of freshwater tree species by tracking responses of tree regeneration to salinity and flow shifts. Managers can use project information to design water management strategies to maximize swamp forest health and regeneration. The proposed study will dovetail with other ongoing projects in NABCSN including long-term and production studies (Middleton) and an on-going groundwater salinity intrusion with Dr. David Kaplan, Dept. of Engineering Sciences, UF, Gainesville.

● **Special skills/training Required:** botanical background

● **Duties/Responsibilities:** The intern will create a matrix model projection of baldcypress swamp range compression from the west with predicted levels of drought, salinity intrusion and sea-level rise with data from the North American Baldcypress Swamp Network using R. GIS experience is desirable. The intern will also collect primary field data at the long-term research sites, specifically to compare seed production, and seedling and sapling recruitment patterns.
