WATER RESOURCES RESEARCH GRANT PROPOSAL

Project ID: FL4381

Title: Dynamics of Tidal Marsh Plant Communities as a function of Changes in Freshwater Inflows and Tidal Inundation Time in the Timucuan Ecological and Historic Preserve, Jacksonville, FL

Focus Categories: Wetlands, Water Quantity

Keywords: Salt Marsh Wetlands, Groundwater Seepage, Freshwater Quantity, Tidal Inundation, Marsh Vegetation

Start Date: 03/01/2001

End Date: 02/28/2002

Federal Funds Requested: $13,768

Non-Federal Matching Funds Requested: $28,162

Congressional District: 5th

Principal Investigator:
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Abstract

Two unique shifts in plant community structure have been observed in the tidal marshes of the Timucuan Ecological and Historical Preserve in Jacksonville, Florida. First, in the lower preserve a decrease and landward retreat of marshes has occurred where elevation is relatively high or soil salinity is low. These habitats are being replaced by monotypic stands of one of two species. Spartina alterniflora (smooth cordgrass), or Juncus roemerianus (black needlerush). The change in plant species composition is consistent with other researcher's observations of the effects of sea level rise, decreased freshwater inflow, and land subsidence.

In the upper preserve, however, the opposite seems to have occurred. There, the vegetatively more diverse marsh habitats have expanded into previously monotypic stands of Spartina alterniflora and Juncus roemerianus. In addition, the lower limit of freshwater wetland plants has extended downstream. These changes could arise from increased freshwater flows and land accretion. We have evidence the changes in vegetation community structure occurred within the past decade. Furthermore, other research suggests small changes in tidal inundation time or freshwater inflow might result in large-scale vegetation shifts as seen in the Timucuan Preserve. We hypothesize the changes are in response to a decrease in freshwater inflow and an increase in tidal inundation time in the lower preserve and an increase in freshwater inflow and a decrease in tidal inundation time in the upper preserve.

To determine the influence of freshwater flows on these areas, rain gauge data will be reviewed, groundwater inflows will be estimated, and soil salinity at varying depths will be measured within and around the adjacent boundary of each dynamic habitat. To quantify tidal inundation time, water level recorders will be surveyed in so that absolute elevation can be measured. The data collected from this

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biological effects is a relatively new idea. And if such a hypothesis is true then the research could change how biological and water resource managers evaluate decisions for development, river or creek dredging, or changing quantities of water inflow. Nonetheless, the research firmly establishes a baseline data set for long-term references as conditions continue to change in the area.