

USGS NSF GRIP Opportunity

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| ● USGS Center: | Patuxent Wildlife Research Center |
| ● Project Title: | Response of a tidal brackish marsh to global change drivers: an ecosystem level manipulation of warming and elevated carbon dioxide |
| ● Project Hypothesis or Objectives: | <p>The USGS and the Smithsonian Institution have initiated the first in situ active aboveground and belowground warming experiment in a coastal wetland that is focused on wetland temperature responses and also examines the interaction between warming, elevated CO₂, and inundation frequency on wetland resilience in the face of changes in global change drivers.</p> <p>Our objectives are to quantify how warming affects the stability of coastal wetlands soil pools, the ability of coastal wetlands to maintain contemporary rates of carbon sequestration, and to quantify the interactions between temperature, elevated CO₂, and inundation frequency on soil carbon dynamics. We address the following hypotheses:</p> <p>H1. Warming will increase primary productivity of plants (shoot+root) and decrease the root to shoot ratio; the net effect will be an increase in belowground production.</p> <p>H2. The net effect of warming on both plant productivity and decomposition will be to initially increase marsh elevation in marsh plant communities.</p> <p>H3. The plant level response to the interaction of warming and elevated carbon dioxide will differ in plant communities dominated by C₃ and C₄ photosynthesis pathways.</p> |
| ● Duration: | 12 months |
| ● Internship Location: | Laurel, MD |
| ● Area of Discipline: | Plant Ecology, Coastal Ecology, Wetland Ecology, Physiological Ecology, Global Change Ecology |
| ● Expected Outcome: | We do not know where elevated temperatures fit in the hierarchy of global change drivers (elevated CO ₂ , sea level rise, nutrient |

fertilization), or how it will change the relative influence of ecosystem processes on wetland resiliency. This project will result in an understanding of how increased temperatures will interact with other global change drivers to affect coastal wetland resiliency. USGS will benefit by helping to develop a skilled workforce in the area of global change ecology and address a topic of important national need – the fate of coastal wetlands in response to climate change.

The intern will be encouraged to develop independent projects that complement the larger research initiative. Interns will develop skills in coastal wetland ecology and will be exposed to ecological research involving an interdisciplinary team of wetland ecologists and global change modelers. The research will expand the intern's knowledge of coastal wetland ecosystems and their response to global change drivers, develop professional skills, and support the development of professional networks. Peer reviewed journal articles with the intern leading or as co-author are expected.

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|  Special skills/training Required: | Experimental field ecological research and associated laboratory approaches and knowledge of plant physiological ecology. |
|  Duties/Responsibilities: | The intern will investigate the physiological responses of marsh plants to increased warming and elevated atmospheric carbon dioxide concentrations focused on photosynthetic and respiratory acclimation, phenology, morphology and biochemistry. |
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