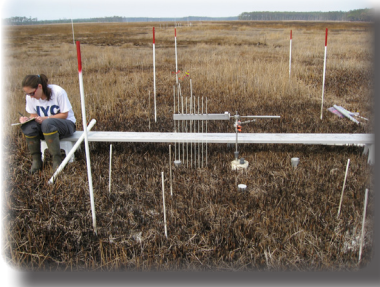


The Effects of Prescribed Fire Management on Tidal Marsh Sustainability



- **The Challenge:** In order to keep pace with rising sea levels, marshes must build vertically through the accumulation of mineral sediments and plant organic matter (primarily roots and rhizomes) in the soil. In the mineral-sediment poor marshes at Blackwater National Wildlife Refuge (NWR), marsh vertical development depends solely on the accumulation of organic matter in the soil, which has not kept pace with the local rate of sea-level rise, resulting in a high rate of wetland loss during the past 80 years. Since the 1970's, the refuge has employed an annual prescribed fire regime to achieve multiple wildlife management objectives. The refuge manager needed to know if using prescribed fire to improve wildlife value of the marsh habitats on the refuge was inadvertently contributing to their destruction by negatively affecting plant growth and organic matter accumulation in the soil.



- **The Science:** Understanding the relationship between fire, organic matter accumulation, and marsh sustainability in relation to sea-level rise is important in recognizing the limits and consequences of fire as a management tool in coastal marshes. The USGS Patuxent Wildlife Research Center addressed the concerns of the refuge manager at Blackwater NWR by measuring wetland vertical development in field plots with varying fire return frequencies (annual, 3-5 years, 7-10 years, and no burn control). Annual burning had a strong positive influence on plant production. Annual burning does not pose an additional risk to long-term sustainability of the marsh habitats there, although the effect of annual burning on elevation gain was equivocal.



- **The Future:** In addition to continuing monitoring at Blackwater NWR, the effects of fire on marsh elevation need to be evaluated in other marsh settings. To date, there are only two locations (McFadden NWR, Texas and Blackwater NWR, Maryland) where the effects of prescribed fire on marsh elevation dynamics have been evaluated. Both sites possess microtidal to nontidal astronomical tidal ranges and very low mineral sediment supplies. Investigations need to be carried out in additional geomorphic settings with differing tidal ranges and sediment supplies to determine if the marsh elevation responses to prescribed fire are applicable across the broader range of settings where prescribed fire is applied in the southeastern United States.