

Hurricane Sandy Impacts on Coastal Wetland Resilience in the Northeast United States



The Challenge: The high winds and storm surge associated with Hurricane Sandy impacted coastal wetlands from Virginia to Maine. Understanding the ecological and geological impacts of hurricanes on coastal wetlands and their interactive effects with local conditions is important for identifying resilience of these communities to predicted global sea-level rise. Given the projected increase in number and intensity of hurricanes, we need to understand the impact of physical and chemical stressors associated with hurricanes in order to efficiently and effectively protect and restore these critical habitats. Storm-related sediment deposition and erosion are two of the potential long-term impacts of severe storms such as Hurricane Sandy on marsh surface elevation and resilience. But wetland impacts are unique for every major storm because of each storm's unique characteristics (wind speed, angle of approach, tidal stage).



The Science: Hurricane Sandy provides an excellent opportunity to evaluate storm impacts across a broad geographic area and range of geomorphic and wetland settings. The USGS and its partners are using an existing ad hoc network of marsh accretion and elevation monitoring stations in the Northeast U. S. to provide critical data on marsh responses to the storm. This broad geographical approach allows for evaluation of marsh impacts along gradients of soil type, salinity, and geomorphic setting (e.g., back-barrier lagoon). The data will provide insights on impacts of infrequent large disturbances that are projected to become more frequent and powerful.



The Future: By determining the extent and magnitude that Hurricane Sandy influenced marsh surface elevation and resilience we can improve predictions on the sustainability of coastal wetlands with increases in severe storm frequency and rising sea level. The results from the analyses of the ad hoc network will be used to develop a plan for the development of a strategic monitoring network for assessing the impacts of climate change related phenomena on coastal wetlands in the Northeast U.S. By identifying wetlands that are highly susceptible to elevation change, based on storm intensity, site characteristics, and overall landscape context, we can target monitoring efforts and increase management effectiveness.