Session I – Climate Change and Challenges to Ecological and Economic Sustainability
12:00 Noon

The Use of Vegetation Indices To Track Marsh Changes Following Hurricane Disturbances

Brady R. Couvillion[1], Gregory D. Steyer[2], and John A. Barras[2]

[1]I.A.P. Worldwide Services, U.S. Geological Survey, National Wetlands Research Center, Baton Rouge, Louisiana, USA, Email: bcouvillion@usgs.gov

[2]U.S. Geological Survey, National Wetlands Research Center, Baton Rouge, Louisiana, USA

Abstract

Coastal Louisiana marshes were subjected to severe environmental stress from hurricanes Katrina and Rita in fall 2005. MODerate-resolution Imaging Spectroradiometer (MODIS) vegetation indices, including the Normalized Difference Vegetation Index (NDVI) and the Enhanced Vegetation Index (EVI), were used to quantify the extent and severity of damage to vegetative communities and subsequent recovery. A pre-hurricane baseline dataset, using monthly average composites from February 2000 through February 2005 MODIS imagery, was created. The use of multi-year composites minimizes effects due to seasonal variations and better isolates post-hurricane effects. Data from March 2005 to November 2006 were compiled on a monthly basis and compared to the baseline average to create a "departure from average" statistic. Departure from average values, using both NDVI and EVI indices, suggests a substantial decline in the density and vigor of vegetation after September 2005 throughout most of coastal Louisiana, with concentrations of damaged vegetation in the hurricane landfall areas. Below average NDVI and EVI values were observed in most marsh community types through November 2006, but recovery of vegetation is evident. Vegetation indices are useful tools for tracking marsh changes, especially when integrated with physical landscape change assessments and field verifications as conducted in this study.