Gulf of Mexico Land Change Assessment and Application to Louisiana Coastal Habitat Change

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08/22/2017

The Bureau of Ocean Energy Management (BOEM) often requires detailed information regarding land area changes and emergent marsh vegetation types (i.e., fresh, intermediate, brackish, and saline) for modeling habitat capacities and mitigation. The U.S. Geological Survey, in collaboration with BOEM, developed two geospatial data products to address these needs. The first product included a comprehensive analysis of land-water extent and land-water change along the coastal zone of the northern Gulf of Mexico. This research analyzed change from cloud-free Landsat imagery from 1984 to 2014. This multi-temporal analysis enables the removal of transient phenomena such as temporary flooding and thereby facilitates the assessment of sustained change from specific events or gradual processes. The second product included 10-m maps of emergent marsh vegetation types for coastal Louisiana for 2007 and 2013 and a map of change between these two datasets. We used classification-tree analyses to map emergent marsh vegetation types by using helicopter-based marsh vegetation surveys in 2007 and 2013, Landsat and high-resolution aerial imagery, bare-earth digital elevation models based on airborne light detection and ranging data, alternative contemporary land cover classifications, and other spatially explicit variables. We developed image objects from 2007 and 2013 National Agriculture Imagery Program 1-m color-infrared aerial photography. These image objects were used to refine the classification by using a majority filter on the marsh classes for each object. The marsh-type maps, marsh-type change map, and the land/water change datasets produced through this effort will been used to assist and advance conservation efforts for priority natural resources.