World Academy of Science, Engineering and Technology
International Journal of Environmental and Ecological Engineering
Vol:11, No:04, 2017

Understanding the Notion between Resiliency and Recovery through a Spatial-Temporal Analysis of Section 404 Wetland Alteration Permits before and after Hurricane Ike

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Abstract : Historically, wetlands in the United States have been lost due to agriculture, anthropogenic activities, and rapid urbanization along the coast. Such losses of wetlands have resulted in high flooding risk for coastal communities over the period of time. In addition, alteration of wetlands via the Section 404 Clean Water Act permits can increase the flooding risk to future hurricane events, as the cumulative impact of this program is poorly understood and under-accounted. Further, recovery after hurricane events is acting as an encouragement for new development and reconstruction activities by converting wetlands under the wetland alteration permitting program. This study investigates the degree to which hurricane recovery activities in coastal communities are undermining the ability of these places to absorb the impacts of future storm events. Specifically, this work explores how and to what extent wetlands are being affected by the federal permitting program post-Hurricane Ike in 2008. Wetland alteration patterns are examined across three counties (Harris, Galveston, and Chambers County) along the Texas Gulf Coast over a 10-year time period, from 2004-2013 (five years before and after Hurricane Ike) by conducting descriptive spatial analyses. Results indicate that after Hurricane Ike, the number of permits substantially increased in Harris and Chambers County. The vast majority of individual and nationwide type permits were issued within the 100-year floodplain, storm surge zones, and areas damaged by Ike flooding, suggesting that recovery after the hurricane is compromising the ecological resiliency on which coastal communities depend. The authors expect that the findings of this study can increase awareness to policy makers and hazard mitigation planners regarding how to manage wetlands during a long-term recovery process to maintain their natural functions for future flood mitigation.

Keywords : ecological resiliency, Hurricane Ike, recovery, Section 404 Permitting, wetland alteration
Conference Title : ICNHRR 2017 : International Conference on Natural Hazard Risk Reduction
Conference Location : Boston, United States
Conference Dates : April 24-25, 2017