Developing a Parcel Level Natural Hazards Index: Charleston South Carolina a Case Study

Norman Levine and K. Eric Anderson

ABSTRACT: The Charleston region of South Carolina is home to more than 500,000 residents and continues to be one of the fastest-growing metropolitan areas in the country. Residents are drawn to the landscape; however, as population has increased, so has the risk of exposure to the regional hazards. Since the landfall of Hurricane Hugo (1989), disaster and resiliency planning has been a major focus for the region. Episodic hazards have challenged Charleston's ability to safeguard citizens and vital infrastructure. Charleston County is often considered to have more potential geo-hazards than many other regions. In South Carolina: winds, oceans and land based hazards are common. The region is prone to coastal hazards due to erosion, sea level rise, flooding and hurricanes, as well as, earthquake hazards leading to ground shaking and failure.

With buildings dating back to the 1700s, building degradation and destruction is a major concern. A risk assessment for the buildings affected by these hazards is necessary for hazard mitigation as well as future growth and expansion of the region. To better understand the threats to Charleston's infrastructure a GIS of hazards in the region was created. Maps of multiple hazards were used to create indexes including: Hurricane, Earthquake, Liquefaction, Sea level Rise and Flooding. Using parcel level data of the age and condition of each of the building in the region indices for each hazard index was categorized into six levels (1 Worst – 6 Best). The results from the study conclude that 75% of the buildings in Charleston County remain within a range of moderate to extremely high risk. Implications for this study include the ability to concentrate hazard mitigation in the areas with the most need. This study will permit planners and emergency managers to implement integrated planning and strategic intervention, for the region enhancing its ability to absorb and recover from chronic and catastrophic events.

KEYWORDS: Natural hazards index, Big data modeling, Data visualization, Landuse planning, Hazards planning

Norman Levine, Associate Professor and Director, Cooper GIS Laboratory and Lowcountry Hazards Center, College of Charleston, Charleston, SC 29424

K. Eric Anderson, Executive Director, Cartography and Geographic Society, Mt. Pleasant, SC 29465