AMBUR-HVA: A New Hazard Vulnerability Assessment Tool for Regional Coastal Resiliency Planning

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1. Introduction

A team of coastal scientists and managers, representing each of the partner states in the Governors' South Atlantic Alliance (GSAA; NC, SC, GA, FL), have developed and applied a new hazard vulnerability assessment (HVA) geospatial tool for performing regionally consistent evaluations of coastal hazard vulnerability. The tool leverages and enhances the capabilities of an advanced shoreline change analysis geospatial tool (AMBUR, Analysis of Moving Boundaries Using 'R',[1]) to integrate coastal hazard vulnerability data. AMBUR-HVA leverages existing and newly created geospatial data, while incorporating both physical and socioeconomic vulnerabilities. Each state's technical and management team identified a pilot study area within their state and conducted an HVA analysis of their site.

2. AMBUR-HVA

Technical and management partners identified a core set of hazards (i.e., shoreline change, inundation and socioeconomically based lack of disaster resiliency) that would be included in the software tool to assess hazard vulnerability in a regionally consistent manner. These hazards, parameterized by publically available and newly created datasets (i.e., shoreline change rates, SLOSH modeling, FEMA flood zones, and the SoVI (Social Vulnerability index)), are integrated by AMBUR-HVA to produce maps and geospatial datasets portraying the distribution of hazard vulnerability in the southeastern U.S. region (Fig. 1).

AMBUR-HVA, which can be easily modified to add modules, was designed to initially include 4 modules to assess inland and shoreline vulnerability: an inundation module, a shoreline change module, a social vulnerability module, and a composite (all primary hazards) module. Algorithms were created to accommodate both oceanfront and estuarine shorelines and to translate calculated HVA rankings into simple numeric rankings corresponding to "very low", "low", "medium", "high", and "very high". Such broad rankings were established to be management friendly and help end-users understand the relative importance of each hazard category. The pilot data and software are available at http://gsaaportal.org/learn/topic and http://ambur.r-forge.r-project.org/R/?group_id=476, respectively.

3. Results and Discussion

Hazard vulnerability assessments were carried out in pilot study areas along high-priority estuarine and oceanfront shorelines. To enable the HVA analysis, shoreline change rates were generated by state PIs for each pilot area. HVA results are provided in map form to communicate the information to stakeholders, and highlight shoreline change vulnerability, inundation vulnerability, socioeconomic vulnerability and all combined vulnerabilities in each pilot area (Fig.1). Fetch, a major driver for shoreline change, is the most requested dataset for inclusion in future versions of AMBUR-HVA. Also, given the significant labor required to produce digitized shorelines from imagery and/or maps, and the critical need for these data in assessing coastal vulnerability, incorporation of a LiDAR-derived tidal datum is proposed to speed up the process.

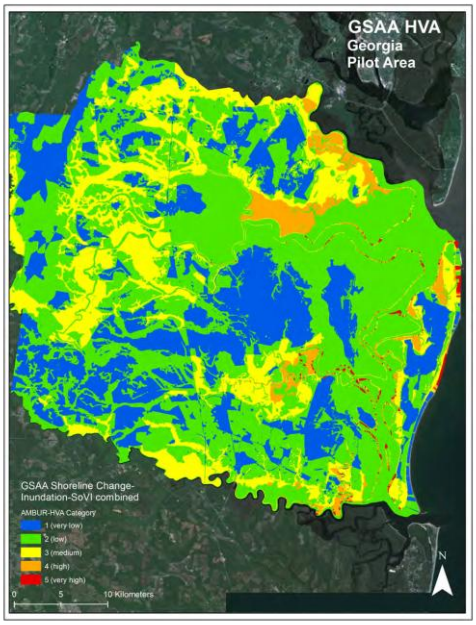

Fig. 1. Combined shoreline change, inundation and socioeconomic hazard vulnerability assessment for the Georgia pilot area.

4. Acknowledgments

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5. References

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