

Tracking the Effects of Sea Level Rise in Georgia's Coastal Communities

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Active link to report: http://issuu.com/danahabeeb/docs/slr_studio_final_1118

Supporting Material: MIS_1: The Impact Statement, which prominently features the sea level rise studio findings, was used by the president of Georgia Tech during his 2013 tour of Georgia and is now used for one-on-one meetings hosted by the office of the president.

Support Material: MIS_2: Creative Loafing, Atlanta's most popular and oldest newsweekly, has recently published an article on the studio's findings entitled: *Underwater: Now's the time to start planning for how climate change will affect Georgia's coast.*

Awards Received: Georgia Planning Association 2013 Outstanding Student Project Award; Florida Academy of Sciences 2013 Student Paper Award

Project Description:

The central thrust of *Tracking the Effects of Sea Level Rise in Georgia's Coastal Communities* is to empirically measure an extensive array of intermediate and longer term impacts of sea level rise on the three northernmost coastal Georgia counties and to develop a broad array of possible policy responses for state and local government consideration. The Georgia Conservancy commissioned the project to obtain baseline measurements and contemporary policy thinking to provide the foundation for a long-term educational effort to substantially increase public knowledge of sea level rise, its consequences and possible policy responses.

The study area contains eleven barrier islands and 300,000 people. Savannah is the largest city in the region and Tybee Island, an extensively developed barrier island, is a significant tourist destination. Sapelo Island is the home of one of the longest lasting communities of the Gullah-Geechee, an African-American ethnic group with strong cultural ties to West Africa.

A one-meter bathtub model constructed by the Skidaway Institute was used to assess the impact on social and physical geographies. Changes were measured against present land use and development patterns. Using a high-resolution digital elevation model and sea level projection rates, we estimated sea level rise at five intermediate times.

An abbreviated summary of the analysis concludes the following: 31% of the land in the three counties (419 square miles) will be inundated by 2110. Fifteen percent of all households, over 20,000 households, and over 50,000 people will be inundated, with 85% in Chatham County (Savannah). Thirty percent of the impacted population are non-white, 15% are over 64 years old, 7% lack a high school education, 11% are single parent families and 11% are children. Job losses at employment

sites will exceed 6,950 with over one-third of these held by African Americans. People without sufficient educations, with disabilities or with medical limitations will have substantially greater difficulties coping. The greatest physical impact will be on wetlands. More than 50% of the land projected to be impacted is wetland, resulting in a 75% loss of all wetlands. Many wetland areas are endangered and extremely rare habitats.

Using NatureServe's Global Conservation Status Ranks, 5% of areas containing Critically Imperiled habitats will be inundated, all of which is forest. Thirty-nine percent of Imperiled habitats in forests and 18% of Imperiled habitats in wetlands will be inundated. Over one-third (36%) of Vulnerable habitats in wetlands will be inundated. Including grass and sand landcovers, 45% of the land area of Vulnerable habitats will be underwater at mean high tide.

In the City of Darien 30% of the land area is projected to be inundated. There will be substantial losses of buildings in Chatham County: 8,968 buildings compared with 859 buildings lost in Liberty County and 1,234 buildings lost in McIntosh County.

Buildings valued at nearly three billion dollars (\$2,925,691,000) would be lost; a majority (79%) will be residential structures. In Chatham County losses will be spread between Savannah, its suburbs and Tybee Island. Almost one-half of the developed land (47%) on Tybee Island will be inundated, including 39% of its residential land.

The Gullah-Geechee settlement on Sapelo Island will be nearly completely inundated, and Gullah-Geechee settlements in Pin Point and Sandfly will be partially inundated.

The majority of the historic district in Savannah will not be inundated. However, much of the commercial district adjacent to the Savannah River along River Street is threatened. As these buildings form the foundations for the buildings above and along Bay Street, the impacts will be significant. Six miles of US 80 across tidal marshes to Tybee Island will be inundated, thereby preventing access to the island. Approximately 11 miles of segments of CSX Norfolk Southern rail links to the Port of Savannah will be inundated, thereby severing connection with the Port's multi-modal terminal.

Three waste water treatment plants will inundated as will one landfill. The area's seven electrical power plants will not be directly affected. The location of supply intakes is no longer public information, so GIS maps were provided oversight agencies. Four hazardous materials sights will be inundated.

Conceptually, adaptations to increasing sea level range from attempting to hold the increase back (full protection) through multiple different forms of accommodation to a full (managed and considered) retreat from the coast. All of the potential alternatives involve substantial social, political, economic and fiscal issues and consequences.

There are considerably more alternatives than can be discussed here. Some of the specific “full protection” approaches that could be considered are dikes, levees, floodwall, seawalls, revetments and bulkheads (all extremely expensive and each with substantial secondary effects). Some of the more intricate and complex forms of accommodation include elevating coastal structures; restructuring land uses; relocating, protecting or rebuilding critical infrastructure such as water supply, sewage treatment and “essential” roads and highways; identifying and mitigating hazardous materials and sites; protecting or relocating historic resources; channeling future growth to less threatened areas; and restructuring the present, actuarially unsound National Flood Insurance Program. One promising, environmentally sound approach is a multi-government Transfer of Development Rights to locate growth and compensatory development out of harm’s way. Another approach to accommodation that should receive thorough consideration is the creation of regional wetland migration corridors which can maintain some of the beneficent protections wetlands provide. Full retreat would involve very complex and contentious decisions regarding who and what goes where and who pays.

The Conservancy is presently preparing the educational program and using the report in its work with the Georgia Coastal Hazards Community of Practice where coordinated research and policy development are actively under way.