



Residents' Receptivity to Sea Level Rise Adaptations on Tybee Island

Catie Sauer
Carolinas Coastal Resilience Conference
Columbia, SC
31 October, 2018



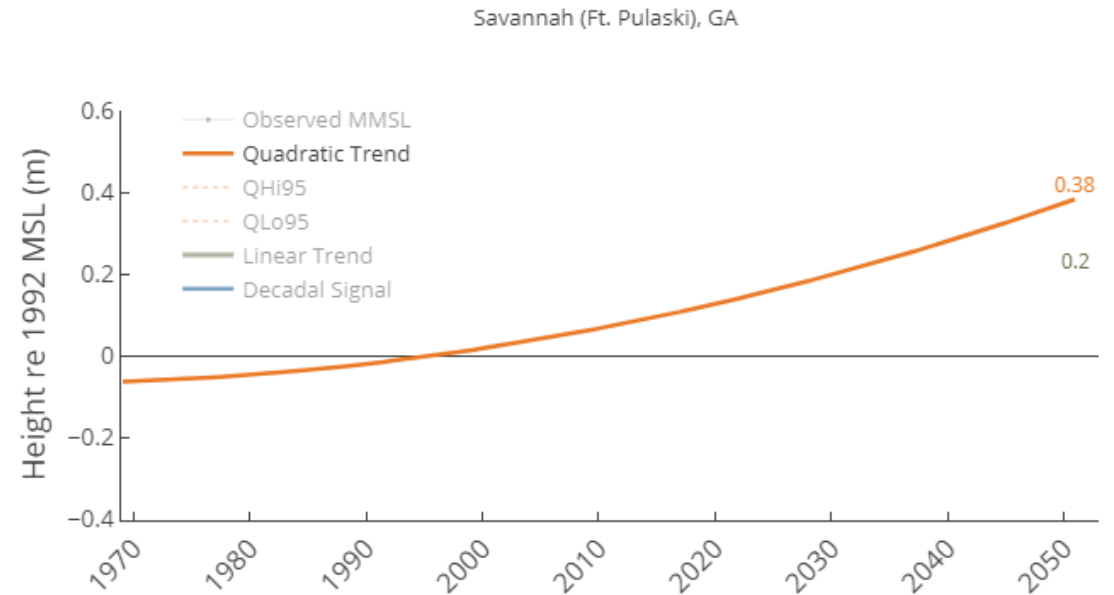
Geographic Context

- The sea level at Tybee Island has risen roughly 12 inches in the last 100 years
- Projected SLR of ~15 inches by 2050
- Impacts already being felt on Tybee include coastal erosion, tidal flooding, and storm-surge flooding
- Nuisance flooding has been steadily increasing
- Solutions identified by the Tybee Island Sea Level Rise Adaptation Plan (2016)
 1. Retrofit low-lying stormwater drainage systems
 2. Elevate pump-well houses
 3. Continue beach nourishment program

Savannah, Georgia

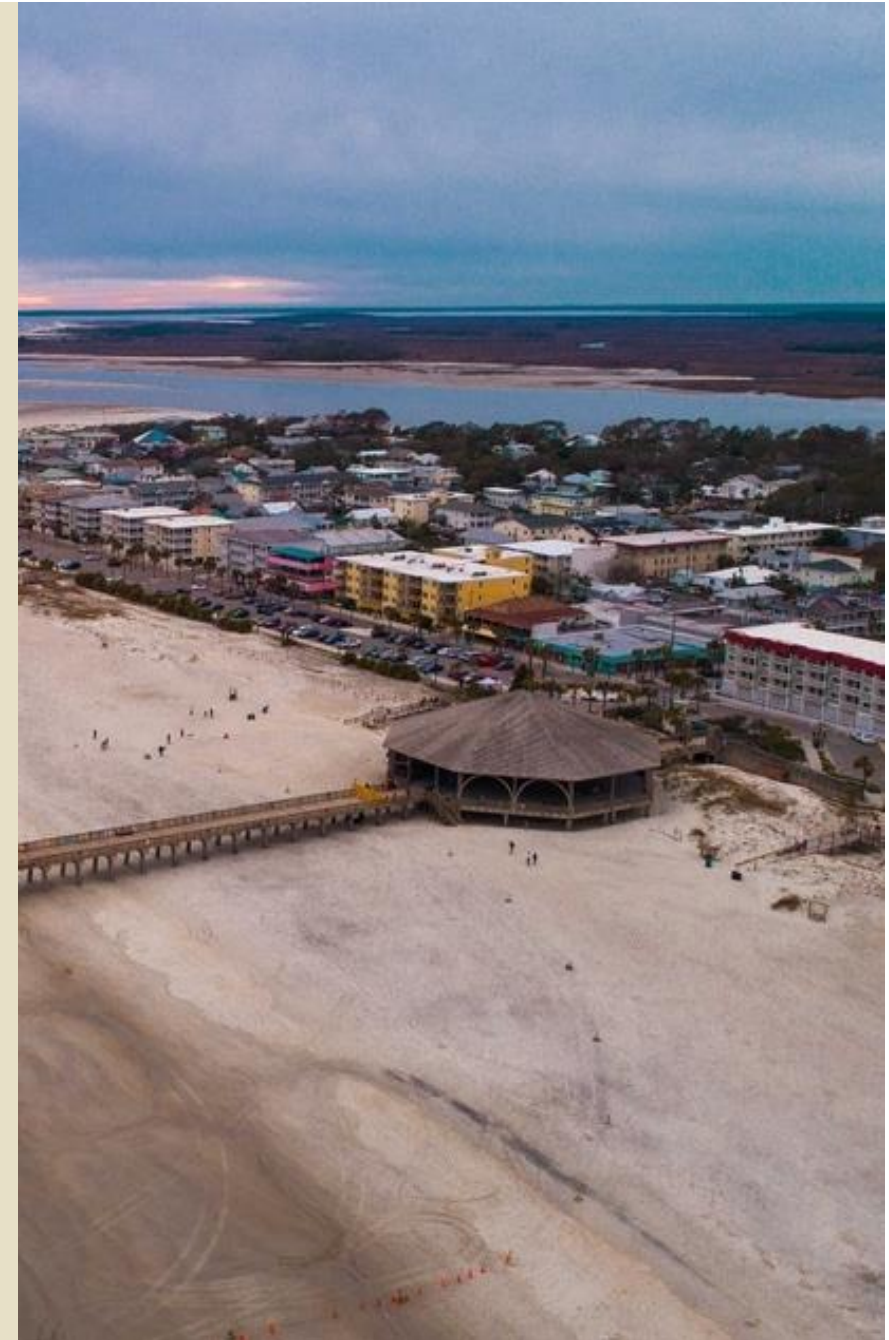
Sea-Level Report Card

2050 Projection



Similarities with NC and SC

- Small, developed, barrier islands
- Islands with similar demographics as Tybee: Folly Beach, Isle of Palms, Nags Head, Emerald Isle, Duck
- Common hazards: erosion, hurricanes, sunny day flooding, storm surge flooding
- Projected SLR for Duck, NC is ~16 inches by 2050
- Hatteras Island frequently subjected to closure of State Highway 12
- North Carolina loses about 6 feet of land per year to erosion



A word cloud of terms related to coastal planning and community values. The words are arranged in a dense, overlapping manner. The most prominent words, shown in larger fonts, include 'beach', 'community', 'building', 'town', 'marsh', 'height', 'small', 'natural', 'environment', 'character', 'friendly', 'construction', 'island', 'water', 'local', 'beauty', 'history', 'family', 'limit', 'tree', 'live', 'ocean', 'risk', 'quirky', 'ling', 'cottage', 'charm', 'ecosystem', 'high', and 'clean'. The words are in various shades of purple and blue.

The Planner's Role

- Finding out what aspects of “place” a community values and how they want them to be protected
- Educating and engaging the public on issues of climate change and sea level rise
- Exploring problems and potential outcomes
- Facilitating communication between citizens, experts, and officials

Importance of Public Perceptions in Planning

- Social acceptability is key to successful climate policy. Extensive community participation creates momentum for the planning process and builds local buy-in for new policies, increasing policy compliance (Pitt 2010).
- If people do not believe sea level rise is occurring or that human activities have a role in it, they are less likely to encourage public officials to fund mitigation or adaptation activities (Burger and Gochfeld 2017).
- Flood protection is generally perceived to be the responsibility of the government, rather than of individual householders (Krasovskaia et al 2007, Terpstra and Gutteling 2008).
- High levels of trust in governments, and reliance on public adaptations such as flood insurance or seawalls, discourages private adaptation (Harries 2012, Koerth et al 2013, Zheng and Dallimer 2016)
- Information AND Involvement are critical

Protection Motivation Theory (PMT)

R.W. Rogers, 1975

- Threat (Risk) Appraisal
 - Probability
 - Severity
- Coping (Adaptation) Appraisal
 - Adaptation efficacy
 - Self efficacy
 - Cost
- Where do people get stuck?
- Subsequent climate adaptation literature based on PMT:
 - Psychological or Cognitive factors better predictors for adaptation behavior than Demographics (Grothmann and Patt 2005, Koerth et al 2013, Muller et al 2011)
 - Cognitive factors easier to change than demographics (Werg et al 2013)
 - Personal Experience of a natural disaster not a reliable predictor (Koerth et al 2013, Peacock et al 2005, Soetanto et al 2017)

The Survey

- Do Tybee residents perceive a risk from SLR?
 - Do Tybee residents feel that they can adapt to SLR?
 - What kinds of adaptations do Tybee residents most support?
 - Who do Tybee residents believe is responsible for implementing SLR adaptations?
-
- Do survey responses support PMT?



Results Summary

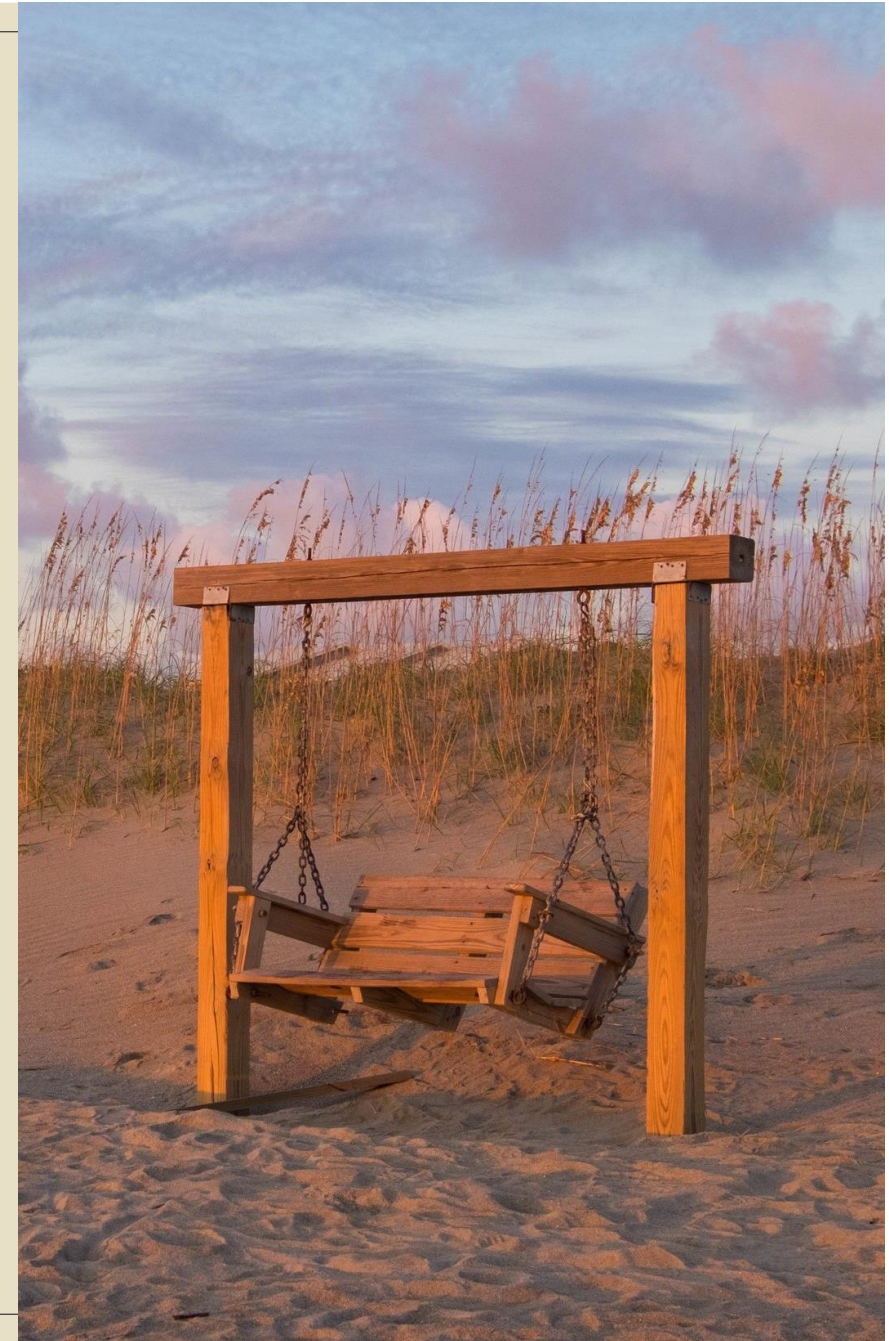
- Risk Appraisal is high, Adaptation Efficacy is high, Self-Efficacy is low, Costs of inaction are high
- More than 80% of respondents have been personally affected by a flood or severe storm on Tybee
- 40% of respondents have already attempted some type of adaptation strategy
- Vast majority of respondents willing to work with neighbors to implement SLR adaptations
- Over 25% of homeowners who responded unaware they are in a FEMA Special Flood Hazard Area
- Government seen as better able to implement adaptations than individuals
- Federal and state governments are expected to do more than local (the “missing middle”)
- Most preferred adaptation strategies
 1. Restore natural areas like dunes and wetlands
 2. Require new development to be able to withstand flooding
 3. Discourage or prohibit development of sensitive lands through measures such as zoning
- Many respondents want to learn more about SLR adaptations

Chat with Mayor Bueltermann

- Matthew, Irma, and Florence confirmed what Tybee residents already knew: they are very vulnerable
- Moving forward with 2016 Adaptation plan: Hwy 80 to be raised 8 inches this winter; relocation of one pump-well house has been budgeted for
- After Irma, Tybee got a grant to elevate 64 homes in flood-prone areas, with priority given to owner-occupied homes. Tybee is also pursuing money to build berms on the shore side of the island (\$5 mil from state and \$13 mil from feds)
- Many entities in GA seem unaware of these funds so don't go after them. Lots of time and effort by Tybee staff. State has stepped forward with money for dune rehabilitation and so have Feds. Process of years of lobbying, calling, writing letters, and social media campaigns
- USACE focusing more on dune restoration than beach nourishment in recent (post-2000) projects
- Many residents use NextDoor to communicate, but there is no formal citizen-response network

Conclusions and Recommendations

- Improve communication about the types and effectiveness of SLR adaptations and building residents' confidence in them.
- Increase residents' awareness of their location in a FEMA Special Flood Hazard Area and what that means for their property.
- Make Tybee utility organizations the lead points of contact for SLR adaptation information



Conclusions and Recommendations

- Reduced funding + devolution of flood-mitigation responsibility to individuals (i.e. FEMA) = Tybee should consider household incentive programs in addition to community-scale or public efforts.
 - Solar co-ops, group flood insurance, water fixtures,
 - Adaptation “expos”
- Household-level assistance, such as a cost-share program, may be used as a good-faith appeal to the individualistic residents and potentially create buy-in for larger, more “bureaucratic” initiatives.





QUESTIONS?