

REPORT FOR THE DAUPHIN ISLAND ADAPTATION PATHWAY MEETING

Review of attendees, topics discussed, and conclusions

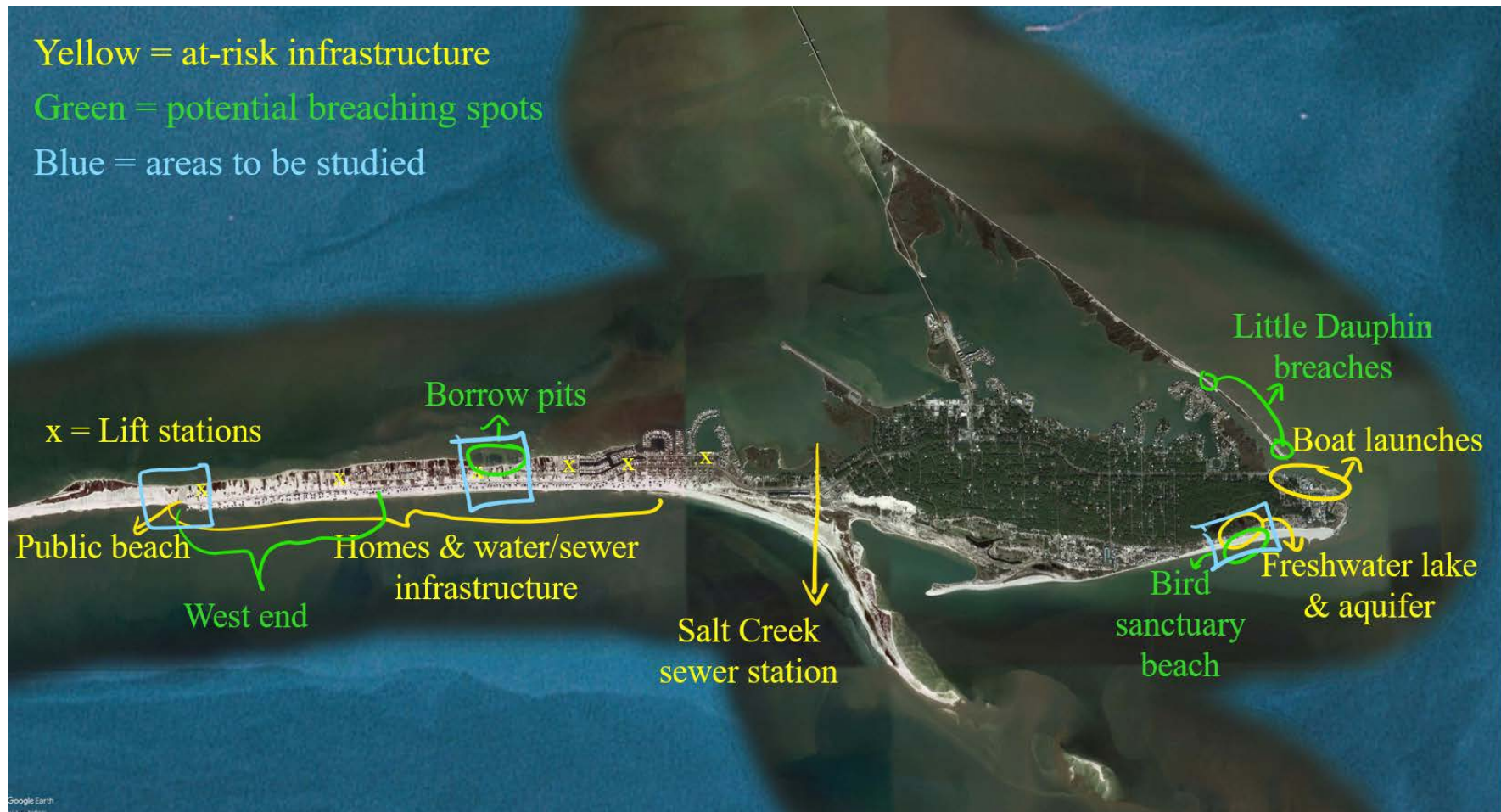
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MASGP-20-082

Executive Summary for Dauphin Island Adaptation Pathway Meeting

On January 23, 2020 representatives from the Town of Dauphin Island, the Dauphin Island Planning Commission, Alabama Power, Dauphin Island Water and Sewer Board, University of South Alabama, and the Northern Gulf of Mexico Sentinel Site Cooperative met to discuss potential areas of Dauphin Island to focus on for an upcoming study. The study is focused on understanding the effectiveness of different adaptation strategies individually and together at protecting Dauphin Island in the face of future storm surge as sea-levels rise. These strategies will be tested against Hurricane Nate, with a goal of preventing storms like Nate from causing severe damage with higher seas. The map below summarizes the discussion identifying areas of the island vulnerable to breaching, critical infrastructure that would be at-risk to damage if the island breached, and areas to focus the study based on those considerations.



Adaptation Strategies: *These are different adaptation strategies that will be analyzed during the study.*

Gulf-side Strategies

- Beach nourishment to current width & height
- Beach nourishment to widen beach
- Raise dunes
- Buried seawall beneath dunes
- Elevated drive-ways

Sound-side Strategies

- Filling borrow pits
- Back-bay bulkheads
- Raise back-bay bulkheads
- Breakwater

Additional Strategies

- Raise entire island
- Close "end" of Bienville
- Not clearing sand from the roads post storm (elevates roads)

REPORT FROM DI ADAPTATION PATHWAY MEETING – JAN 23, 2020

Attendees

- Jeff Collier, Mayor, Dauphin Island; jcollier@townofdauphinisland.org
- Carolyn Wood, Dauphin Island Planning Commission; carlyke@gmail.com
- Renee Collini, Program Coordinator NGOM SSC; r.collini@msstate.edu
- Stephanie Smallegan, Coastal Engineer University of South Alabama; ssmallegan@southalabama.edu
- Mikaela Heming, Project Coordinator NGOM SSC; m.heming@msstate.edu
- Peyton Posey, Graduate Student University of South Alabama; spp1421@jagmail.southalabama.edu
- Pat Edwards, Planning Commission; bipedwards@msn.com
- Howard, DI Water & Sewer Board;
- Sharon Murril, AL Power; swmurril@southernco.com



Project Background Discussion

Objectives for the research are:

- understand how different adaptation strategies individually and in combination keep certain locations on the island from breaching,
- assemble the strategies in an adaptation pathway based on their cost and effectiveness as sea levels rise, and
- support Dauphin Island planning with the adaptation pathway.

Key points about the science:

- **The adaptation strategies will be evaluated against Hurricane Nate with different amounts of sea-level rise added.** This work is intended to help the island be resilient to smaller, more frequent storms, such as Nate, as seas rise.
- **The sea-level rise points on the adaptation pathway (Fig 1) are not tied to a timeline,** the focus of this work is to be responsive as seas rise, not to be predictive of a future scenario. To use this science will require checking on water levels at regular intervals and determining how much seas have risen.
- **The comparisons between the model developed for this project and what happened on Dauphin Island after Nate show excellent agreement,** with significantly greater agreement than the research standard.
- **The model is limited to estimating how and where sand/dunes move** – cannot evaluate some of the areas on the northeast side – e.g. water treatment facility.

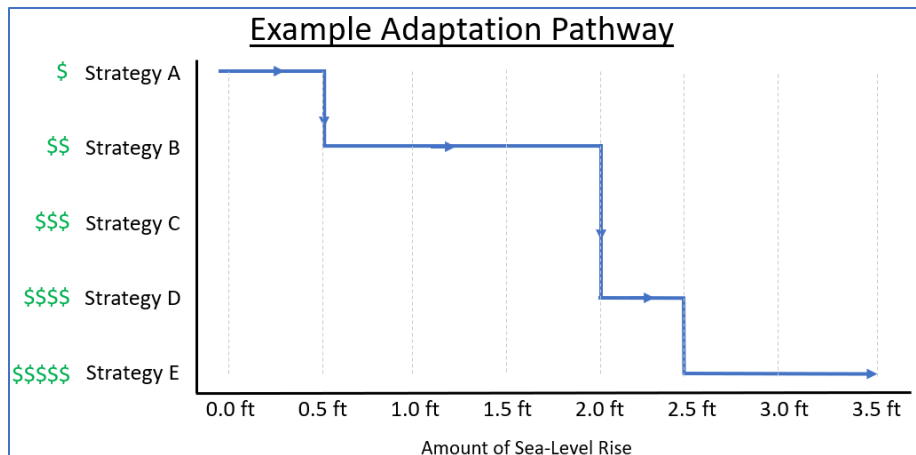


Figure 1 This graphic was provided during the meeting to facilitate understanding of the overarching project concepts.

Vulnerable Areas and Infrastructure on Dauphin Island

Areas that are morphologically vulnerable to breaching were identified (Fig 2) and discussed.

- Move from 4 to 2 lane – just east of the canals
- Borrow pits
- Little Dauphin breaching along Government Cut
- Little Dauphin breaching at Billy Goat hole – would majorly impact the usability of the launch and as a protected dock for ferry (AI DOT), pilots, and crew boats
- The bird sanctuary lake – impact freshwater aquifers if permanently/chronically exposed to saltwater

Discussion about the high-priority areas to research included Box 2 (Fig 2) and any large portion of the west end being cut-off as both would have a major impact to the economy. The contribution of the west end beach to bringing tourism revenue to the island was also discussed. It was clarified that though the study outputs will be focused on one area of the island, it would be possible to use that to understand any section of the west end.

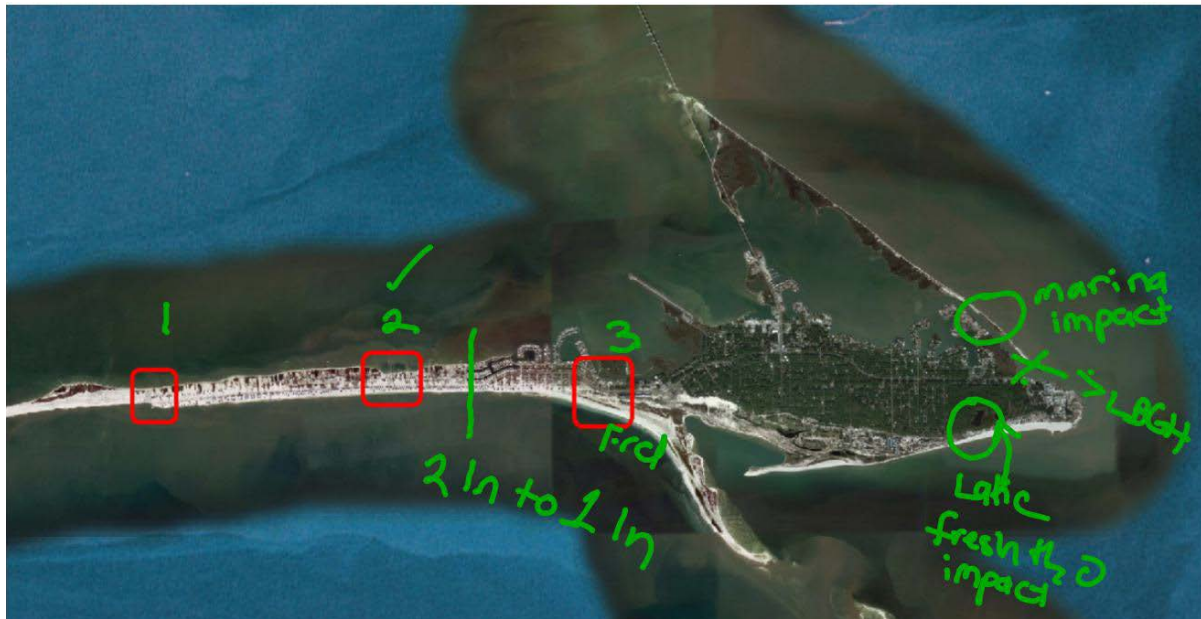


Figure 2 Notes from the discussion on the most vulnerable areas to the island and which areas should be the focus of the study.

Infrastructure that could directly or indirectly be impacted by either storm surge or breaching was identified and discussed (Fig 3).

- Aquifers
 - Access to one via the pond at the east end in the bird sanctuary
 - Deep water well at the little red schoolhouse
 - Well near the wastewater treatment facility – supplies about 15% of water to the island
- Wastewater treatment facility
- Water and sewer lines in the courts (west from around Seahoy/St. Stephens)
 - Flooding on the highest tides each month – have to dig out meters each month to read them
 - Wearing on infrastructure

- 1 on 10 slope in the middle of Bienville, lift stations are 24' down. Lines from houses are 2-3 ft buried
- Nate put sand into the system – significantly damaged their infrastructure
- Drain lines are the biggest problem – covers for sewage lines
- Lift stations*
- End of Bienville
 - Economically critically important – primary tourism draw
 - Freshwater loop at the same location
- Power
 - Poles buried between 5 and 8 ft deep depending on size of pole
 - Buried lines installed at a depth of 2-3 feet. *

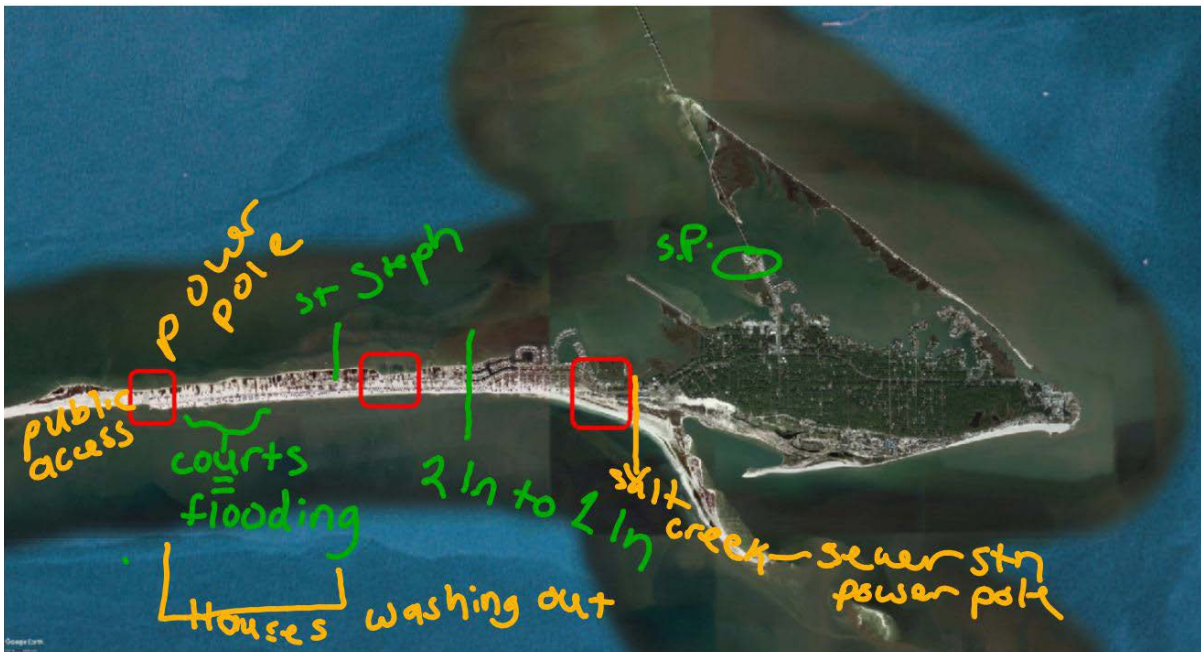


Figure 3 Notes during the vulnerable infrastructure discussion were taken directly on to the map of Dauphin Island.

*Additional data on the infrastructure is pending.

Adaptation Strategies

Suggestions were made of various strategies to consider, followed by discussion of which strategies Dauphin Island residents would be willing to consider.

- Gulf-side strategies
 - Beach nourishment to maintain current width and height
 - Beach nourishment to widen beach
 - Raise dunes
 - Buried seawall beneath the dunes
 - Community drives
 - Elevated drives
- Sound-side strategies
 - Filling borrow pits
 - Back-bay bulkheads
 - Raise back-bay bulkheads (Quivira, Port Royal, DelChamps)

- Breakwater
 - Raise entire island
 - Close “end” of Bienville
 - Not clearing sand from the roads post-storm (elevates roads)

The community drives were immediately considered a non-starter as it has been discussed before; however, an alternative that has been proposed is elevating the driveways at the point where they cross the berm.

Resident perceptions of these strategies should be explored at a TBD public meeting due to the fact that many of these strategies require cooperation from residents as none of the codes/ordinances would require these changes.

Other considerations about individual strategies were discussed. Stephanie pointed out that on other barrier islands where they have raised bulkheads, the bulkheads become a barrier to stormwater drainage and can generating a ponding effect by increasing the time required for stormwater to drain.

Planning Perspectives

Those representing the town and infrastructure on Dauphin Island reviewed the likelihood of each sea-level rise scenario occurring (Table 1). Each person was able to vote for the two scenarios they thought were most appropriate for planning on Dauphin Island.

The results were 2 votes for intermediate-low, 4 votes for intermediate, 3 votes for intermediate-high, and 1 vote for high. The top two voted scenarios project 4 ft (intermediate) and 6 ft (intermediate-high) of sea-level rise in the next 80 years.

Additionally, discussions were had around planning horizons and considerations. Nothing specific is mandated for Dauphin Island for planning horizons. Common timelines usually fell between 30 and 40 years and new infrastructure is being or will soon be added with those timelines in mind including Salt Creek Bridge and the new water treatment facility.

Regarding building elevation and what datums official documents are referenced to, the primary datum is NAVD88. There is a 2 ft over base flood elevation requirement island wide as well that is based on the FEMA flood maps.

Characterization of Challenges on Dauphin Island

These are issues that were described by the island residents at the meeting to be kept in mind as important context for the research.

- North-side homes with bulkheads built in the 50s are having water come over their bulkheads on high-tides
- Increased flooding and damage from storms
 - During high tides there is flooding in the Courts
 - Nate generated a lot of attention because the damage was greater than expected from a small storm

Sea Level Rise Scenario	Likelihood
Low	100%
Intermediate-low	96%
Intermediate	17%
Intermediate-high	1.3%
High	0.3%
Extreme	0.1%

Table 1 The probability that each of the listed sea-level rise scenarios will be exceeded.

- The west end is critical for not just rental taxes, but the tourism of people coming to spend time at the beach. This is a challenge because the west end beach is very vulnerable
- Comprehensive Plan has specific strategies to diversify economic portfolio of Dauphin Island
 - Aloe Bay Project to develop a thriving working waterfront/boardwalk area
 - Potential breakwater offshore of Aloe Bay to protect it
 - Want to consider SLR in the Aloe Bay project design
- Water and Sewer is facing multiple challenges
 - The wastewater treatment facility is vulnerable to flooding as they are experiencing erosion and higher water levels on site
 - The wastewater treatment facility needs to be upgraded with more durable materials – the “new” ones (~2004) are already rusting out – want to replace tin material with concrete containers but stuck in a paperwork/political waiting game with RESTORE Bucket 3 funding
 - The west end flooding is damaging their equipment more often and putting a fiscal and physical strain on their system
 - Three homes may have to be disconnected
 - If the wastewater treatment plan fails, the entire island will be without water and sewer

Current Ongoing, Planned, or Considered Non-Structural Adaptation Activities

- Ongoing
 - Dune overlay identifying zones on the island that have specific building codes/ordinances that are designed to preserve the integrity of the dunes
 - Code and zoning update for entire island
 - Aloe Bay Project
 - Allow setbacks to be altered so those building on the Gulf side are able to build closer to the road
- Planned
 - Remote readers (RFID or Bluetooth) to minimize the amount of sand that needs to be dug out to get readings each month
- Considered
 - Leave sand on the roads post-storm
 - Require elevated driveways