



# Preliminary Sea Level Rise Case Study: Navarre Beach, FL



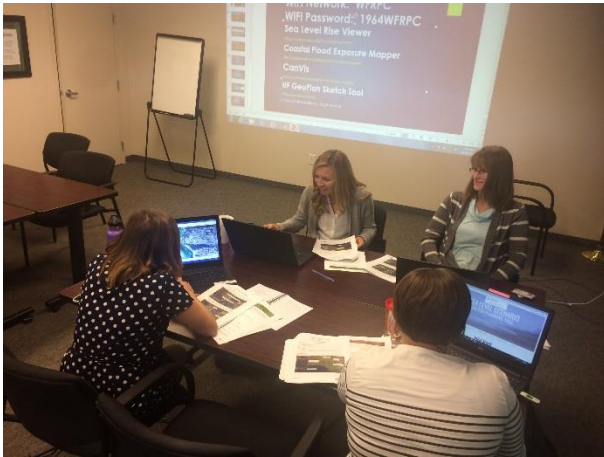
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## Background

The Florida Department of Economic Opportunity (DEO), in partnership with the South Florida Regional Planning Council, University of Florida (UF), and National Oceanic and Atmospheric Administration (NOAA) Office for Coastal Management, undertook a statewide Training of Trainers project. The goal of this project is to promote the translation of science to policy and risk preparedness in Florida communities by increasing understanding of, access to, and use of existing tools. This project will also benefit communities by enhancing the understanding of coastal vulnerability and by increasing Regional Planning Councils' capacity to train and provide technical assistance with the use of coastal flood hazard tools and associated techniques.

The West Florida Regional Planning Council (WFRPC) partnered with the Apalachee Regional Planning Council (Apalachee RPC) to conduct the project and held the workshop on October 26<sup>th</sup>, 2016. The workshop was essential to promote the use of coastal flood hazard assessment tools and create vulnerability assessments for local communities. The workshop aimed to introduce three NOAA adaptation assessment tools and the University of Florida's Sketch Planning Tool for visualizing vulnerability and enhancing preparedness. Additionally, the Apalachee RPC presented a vulnerability assessment case study for Franklin, Gulf and Wakulla counties by using the Sketch Planning Tool.

In the implementation part of the workshop, attendees were divided into two groups to conduct location specific assessments by using the tools introduced. Due to a technical issue with the NOAA sites, the attendees mainly worked with the UF's Sketch Planning Tool to assess vulnerability. The group that included planners from Santa Rosa County chose the unincorporated community of Navarre Beach as their study location and indicated that they would like to integrate sea level rise adaptation into the local comprehensive plan. Therefore, this case study will use Navarre Beach as the location to explore infrastructures that may be at risk of sea level rise hazards and exposed to coastal inundation.



## Study Area Summary

Navarre Beach is an unincorporated community in Santa Rosa County in the northwest Florida Panhandle. It embraces mostly U.S. Military personnel, Federal Civil Servants, local population, retirees, and defense contractors. Navarre Beach draws tourists and locals to its 12 miles of pristine white shoreline adjacent to the Gulf Islands National Seashore. In 2010 the population of Navarre Beach is 638 according to the United States Census Bureau.

Based on *Climate Central Sea Level Rise and Coastal Flood Risk Summary Report*, 531 people will be at risk of exposure in Navarre on land below 7-foot Mean Higher High Water (MHHW). In the same scenario, 611 acres of land, 1,248 housing units, 10 miles of road will be also significantly affected. At a 10-foot level, 624 people (97.8% of the total population in Navarre) and \$435 million properties will be exposed in total. Navarre Beach is in the top quarter of cities in Florida ranked by its percentage of homes exposed.

# COASTAL RISKS FOR NAVARRE, FL

Selected water level: 7 feet. May occur from sea level rise, coastal flooding, or both.

## What's at risk on land below 7 feet? <sup>1,2</sup>

- Population: 910
- Homes: 400
- Property value: \$74 Million
- Hazardous waste sites: 1
- Miles of road: 3 miles

## 7 feet in historical context <sup>3,4</sup>

- Highest observed area flood: 7.4 feet in 1926
- Statistical 1-in-100 year flood height: 7 feet
- Most recent flood over 7 feet observed in: not in record

## Unnatural Coastal Floods<sup>5</sup>

About two-thirds of U.S. coastal flood days since 1950 would not have met the National Weather Service's local definition of flooding without the few inches so far of human-caused, climate-driven sea level rise.

## Rising seas = more floods<sup>4</sup>

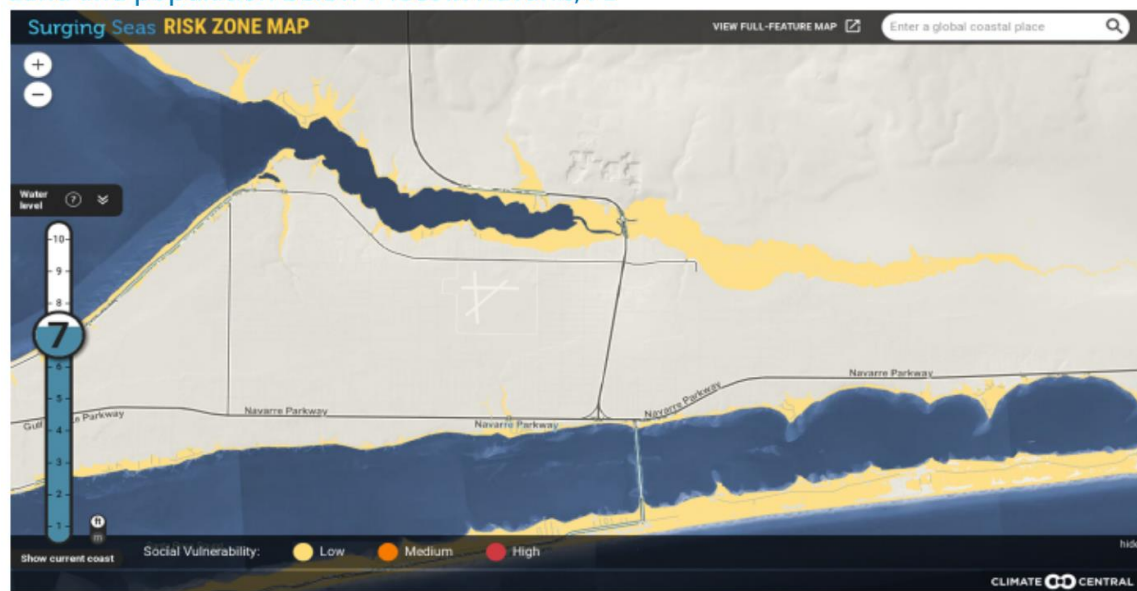
- Navarre, FL has already experienced about 8 inches of sea level rise over the last 90 years of records. Climate change is projected to drive much more rise this century.
- This raises the starting point for storm surges and high tides, making coastal floods more severe and more frequent.

## When could a 7-foot flood happen? <sup>3,4,6</sup>

- Likelihood by 2030: 15% – 16%
- Likelihood by 2050: 33% – 39%
- Likelihood by 2100: 69% – 100%

The ranges shown derive from the intermediate low vs. highest global sea level scenarios of the 2014 U.S. National Climate Assessment, which point to projected local rises of 1.7 vs. 6.2 feet by 2100. The lower scenario corresponds to low future levels of heat-trapping pollution, whereas the higher one aims to reflect uncut pollution and maximum ice sheet loss rates.

## Land and population below 7 feet in Navarre, FL



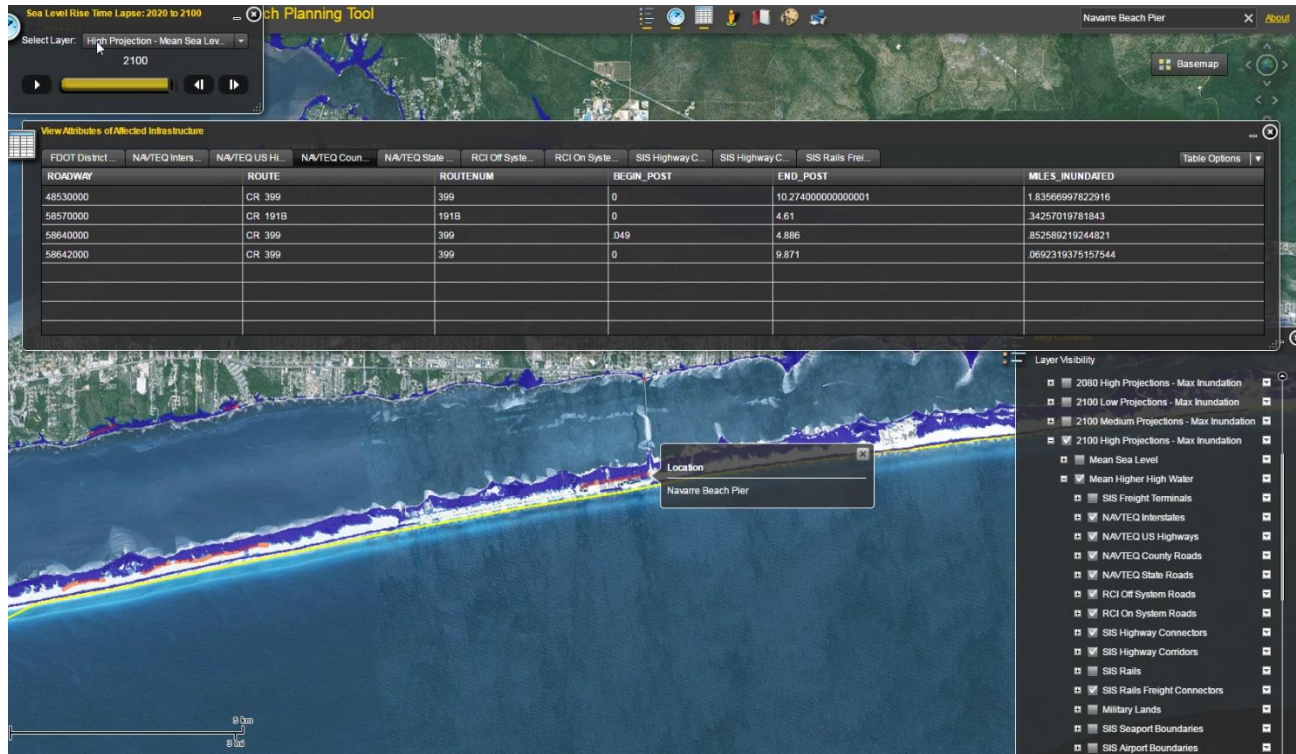
Social vulnerability (e.g. from low income) compounds coastal risk. Land below 7 feet is colored according to the legend. Surging Seas uses high-accuracy lidar elevation data supplied by NOAA. Map reflects a uniform sea level and/or flood height. Individual storm surge, tidal or rainfall events cause more complex and uneven water surfaces.

Variable	Total Exposure	Excluding isolated areas
Acres of land	1,037	1,027
Population	917	906
High social vulnerability pop.	0	0
Housing units	405	400
Property (\$ billions)	0.1	0.1
Road miles	3	3
EPA-listed sites	1	1
Schools	0	0

At 10 feet, 1,958 people (6.6 percent of the total population in Navarre) and \$148 million are exposed in total.



The workshop groups followed the instruction of the vulnerability assessment sheet and used the Sketch Planning Tool to identify the impacted transportation infrastructures. Based on the workshop's efforts, the table below represents the roadways that may be impacted by sea level rise by year 2100, Mean Higher High Water. Approximately 6.99 miles of roadway on the Navarre Beach will be affected seriously by 2100. Even though the total feet of impacted roadway is not a large number, the influence will be significantly considering the size of the community.



Impacted Roadway	Total Feet of Roadway impacted (Miles)
CR 399	2.75
CR 191B	0.34
SR 87	0.85
Hwy 87 S	0.01
J Earle Bowden Way	1.77
Gulf Blvd	0.84
Navarre Beach CSWY	0.01
Soundside Dr	0.33
Winding Shore Dr	0.09
<b>In Total</b>	<b>6.99</b>

The results from the sketch tool caused the following thoughtful discussions and adaption strategies:

- A waste water treatment plant identified in the area would need to be relocated.
- The bridge approach should be elevated or replaced.
- It is necessary to educate property owners about sea level rise and related adaption strategies.
- To have a sustainable development, the roads and bridges should be elevated.
- The results from the sketch tool should be taken into the consideration when developing the Comprehensive Plan, Land Development Code, and Local Mitigation Strategy.
- The county needs to coordinate with Florida-Alabama Transportation Organization about the priorities ranking, Development of Needs Plan, and specific design to future need.
- Navarre Beach should consider not leasing or selling any properties significantly at risk of sea level rise.

The data and map provided from the Sketch Tool shows the impacts in the year 2100 if the sea level rise continues at a pace in accordance with the high range projection used in the U.S. Army Corps of Engineers (USACE) models. Sea level rise will cause certain negative influences to the key segments of the roadway network and facilities on Navarre Beach. Local planners should incorporate the adaptation strategies to inform existing community plans, policies, and projects.

## Conclusion

The workshop provided a great opportunity to begin educating local planners and stakeholders. Surveys to assess the workshop were given to each of the attendees, and all of the attendees agreed that the event was a good use of their time. All attendees also agreed that they learned something that will apply in their work or future decisions. The workshop received constructive feedback including the following:

- Attendees appreciated the increased awareness of the online programs and how to use the online tools.
- Attendees look forward to using the NOAA tools when the site is working.
- One attendee suggested including other tools in future workshops.
- Consider applied use of sea level tools in comprehensive planning, land use development, and transportation planning.

The workshop also initiated communication and networking within the communities along the Gulf Coast. The northwest Florida community has many local government, citizen, academic, and private sector organizations that are dedicated to the resiliency of the coastal area. In order to support their dedication, at least two follow-up workshops for planners and stakeholders will

be held in northwest Florida to facilitate awareness and use of tools for sea level rise assessment vulnerability.