

MAPPING TOOLS & DATA FOR ASSESSING VULNERABILITY TO SEA LEVEL RISE AND COASTAL FLOODING

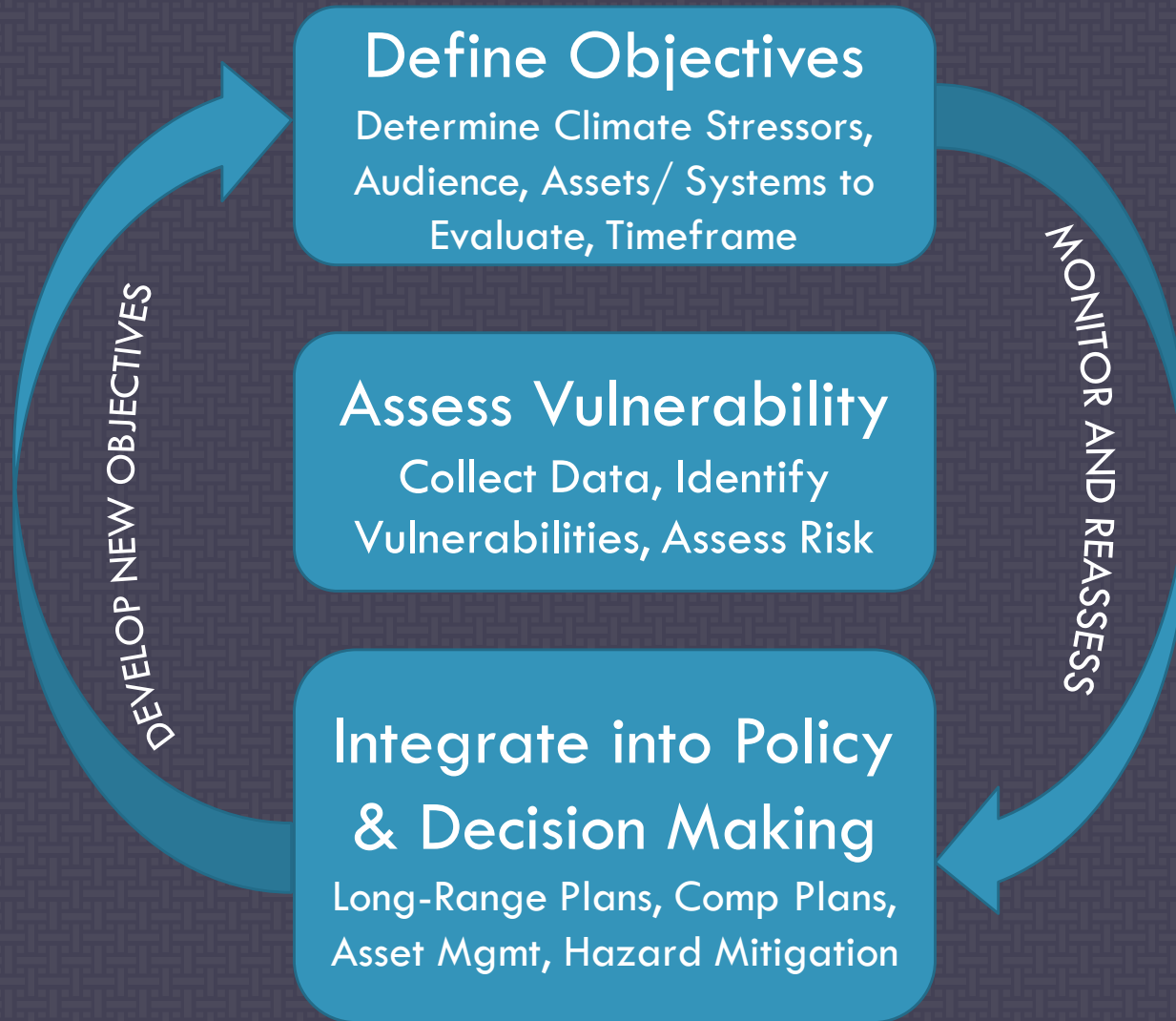
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University of Florida GeoPlan Center

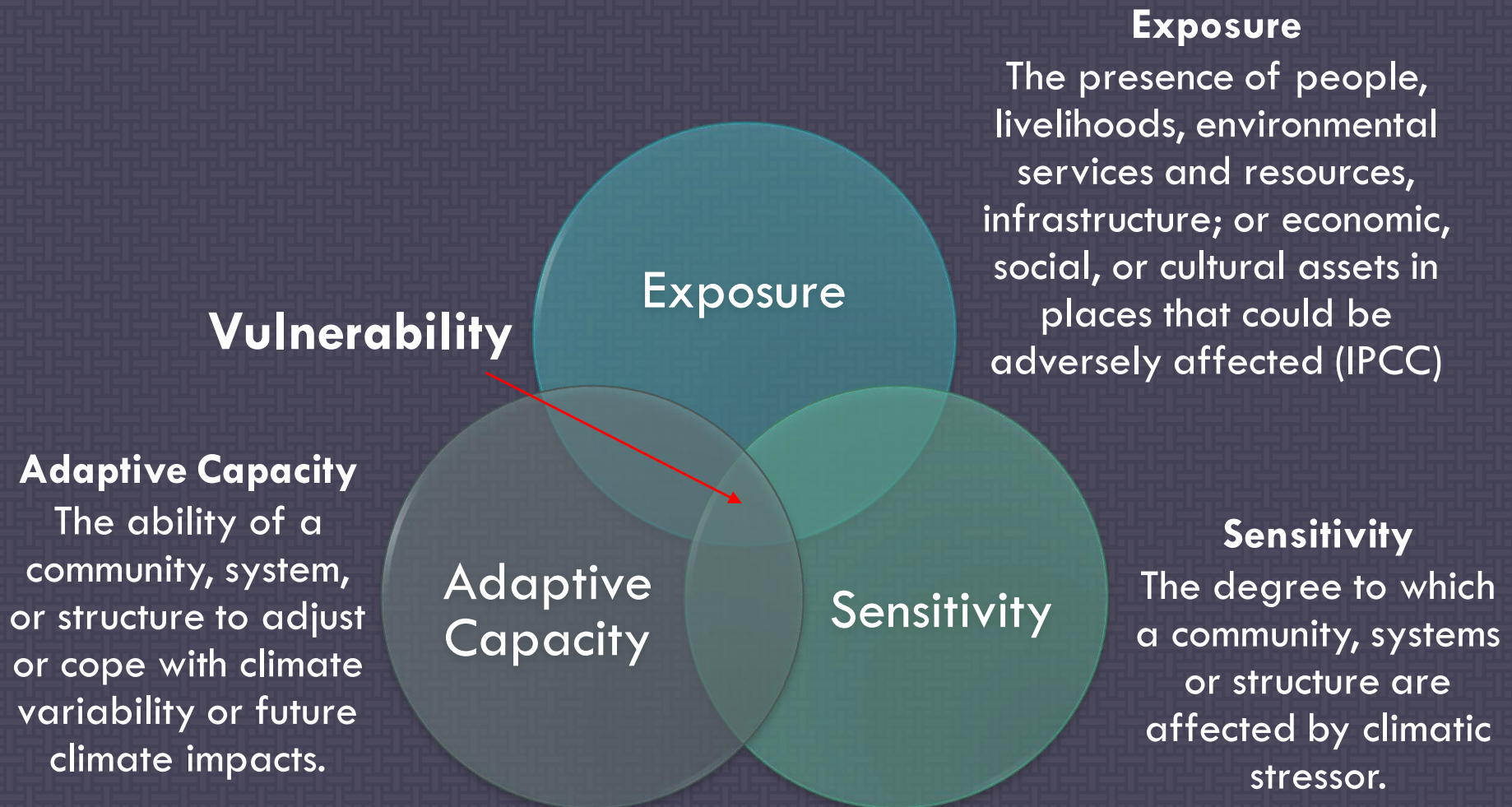
Resilient Florida: Planning, Policy and Practice Workshop, Aug. 8. 2019

HOW DO WE MEASURE VULNERABILITY?

VULNERABILITY ASSESSMENT FRAMEWORK



MEASURING VULNERABILITY



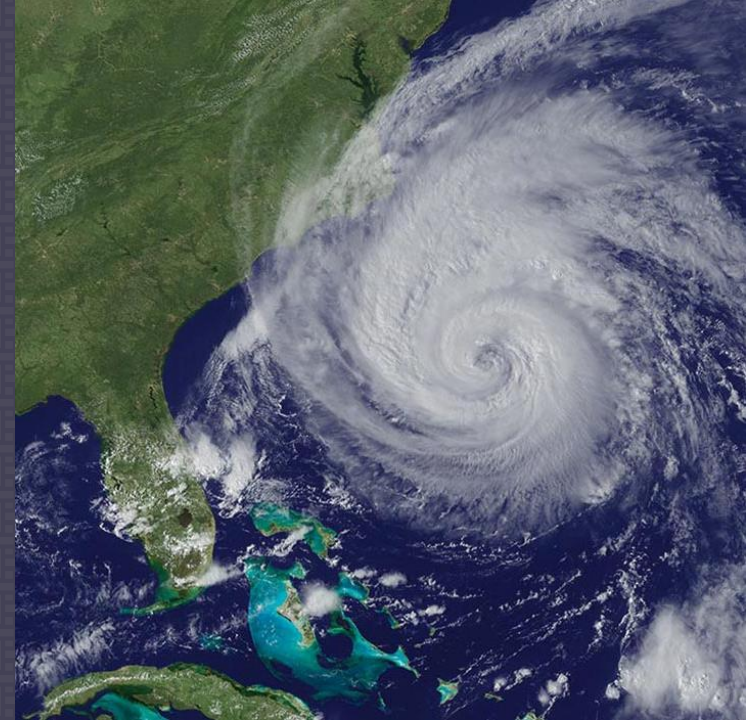
WHAT TOOLS ARE AVAILABLE?

MAPPING & VISUALIZATION TOOLS

Help determine *exposure to climate effects*.

Maps showing **where** climate stressors and effects are projected to occur. Overlay with local resources to find **location and information about potential vulnerabilities**:

- **How much** population/ property value/ affected areas? **Where?**
- **When** are effects most likely to occur? Are there broad tipping points?
- **Which** habitats/ infrastructure/ neighborhoods might be affected?



MAPPING & VISUALIZATION TOOLS

Just a few of publicly available and free tools...

Tool Name	Climate Stressors	Focus/ Analysis
NOAA Coastal Flood Exposure Mapper	SLR, Storm surge, FEMA Flood zones, High tide flooding	Societal, infrastructure & ecosystem exposure analyses, create & share custom maps
NOAA Sea Level Rise Viewer	SLR, High tide flooding	Local scenarios, Marsh migration, Social Vulnerability
Climate Central Surging Seas Risk Finder	SLR	Social Vulnerability, Population, Demographics, Property, more
Sea Level Scenario Sketch Planning Tool, UF & FDOT	SLR, Storm Surge, FEMA Flood zones	Transportation, Local scenarios by decade
TNC Coastal Resilience	SLR, Storm Surge	Custom decision support, community planning, future habitat, SLAMM

MAPPING & VISUALIZATION TOOLS

Example of region-specific tool:

- Tampa Bay SLR & Habitat Change Projections, USF Water Atlas: <http://maps.wateratlas.usf.edu/blue-carbon/>

Paid services and Consultants

- Resiliency and mapping professionals offer paid services to help navigate the vulnerability assessment process and produce specialized analyses and reports.

TOOLS, TOOLS, AND MORE TOOLS

The screenshot displays the 'Florida Sea Level Scenario Sketch Planning Tool' interface. At the top, the header includes 'UF GEOPLAN CENTER' and 'Florida Sea Level Scenario Sketch Planning Tool', with links for 'Help' and 'About'. Below the header, a 'Scenario Selector' dropdown is visible. The main content area features a 'Surging Seas RISK ZONE MAP' banner. A central panel titled '1. TOOL FUNCTION' asks 'I need help with:' and lists seven reasons for needing a tool or model, each with an unchecked checkbox: 'Identifying Vulnerabilities', 'Viewing Past/Current Conditions', 'Engaging/Communicating', 'Adaptation Planning', 'Facilitating Recovery/Rebuilding', and 'Visualizing Climate Projections'. To the left of this panel is a vertical teal sidebar with the 'Gulf TREE' logo, a numbered list (1-5) with a red circle around the number 3, and the text 'TOOL MATCHES 111'. On the right side, there is a map of Florida with a legend for '3ft SLR Low-lying Areas' and '3ft SLR Depth' (High, Low). The bottom of the interface shows a map of the Straits of Florida with a 60km scale bar and a 'BASEMAPS' button. The footer contains copyright information for the United States Department of Commerce, National Oceanic and Atmospheric Administration, National Ocean Service, and the Office for Coastal Management, along with a last modified date of 04/19/2019 and links for Contact Us, Privacy Policy, and Disclaimer.

UF GEOPLAN CENTER Florida Sea Level Scenario Sketch Planning Tool Help About

Scenario Selector

Surging Seas RISK ZONE MAP

Need a definition?

1. TOOL FUNCTION

I need help with:

First, choose all the reasons why you need a tool or model.

- ☐ Identifying Vulnerabilities
- ☐ Viewing Past/Current Conditions
- ☐ Engaging/Communicating
- ☐ Adaptation Planning
- ☐ Facilitating Recovery/Rebuilding
- ☐ Visualizing Climate Projections

Gulf TREE

1 2 3 4 5

TOOL MATCHES 111

3ft SLR Low-lying Areas

3ft SLR Depth

- High
- Low

60km

Straits of Florida

Powered By ESRI 30.0009, -93.1421

20 mi

United States Department of Commerce National Oceanic and Atmospheric Administration National Ocean Service Website owner: Office for Coastal Management Last Modified: 04/19/2019 Contact Us Privacy Policy Disclaimer

NOT JUST PRETTY PICTURES

It's all about THE DATA.

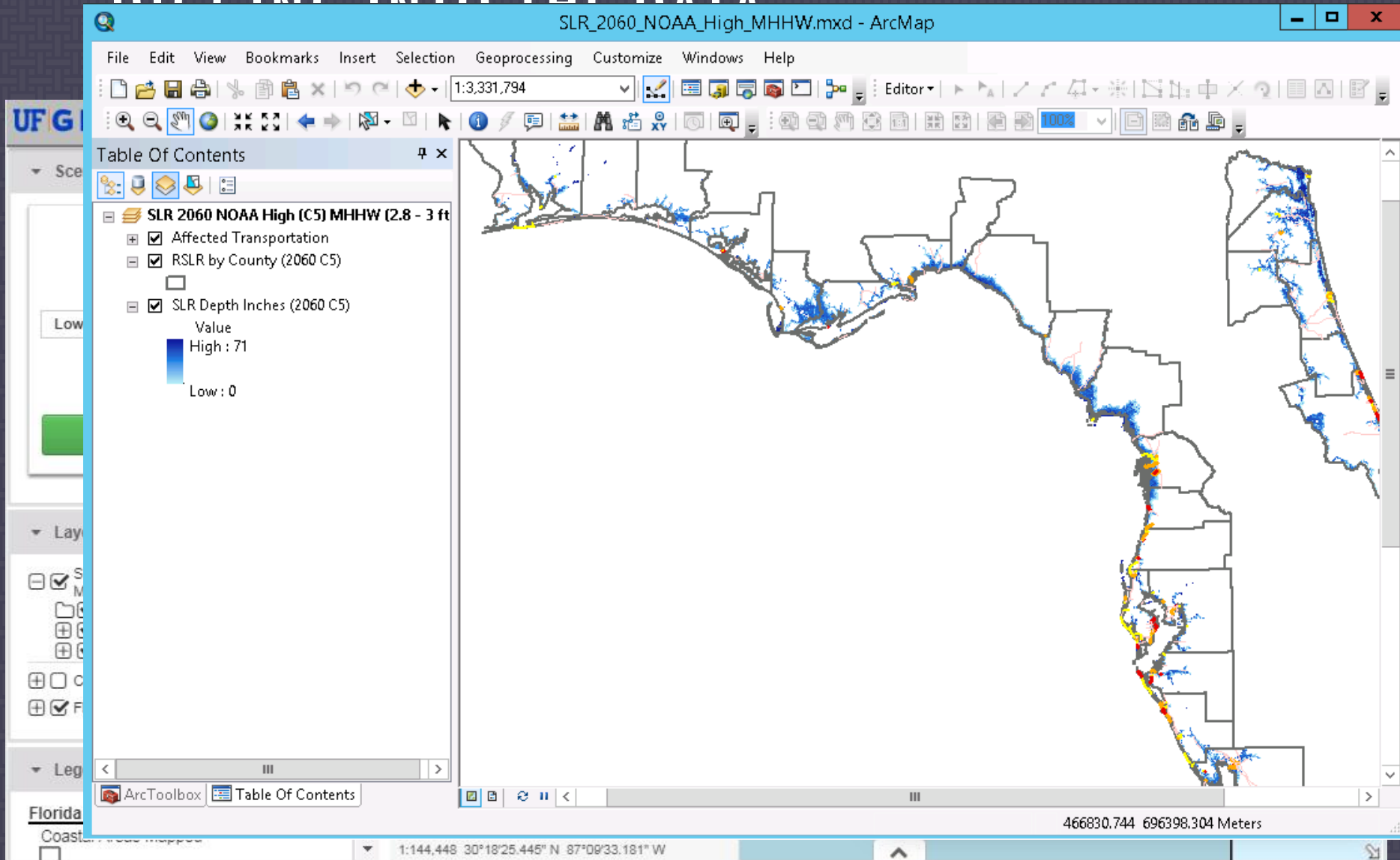
Most mapping tools offer **GIS data for download.**

Assessing vulnerability is context specific. There is no one-size-fits-all tool that provides all info needed.

How we use the GIS data:

- Conduct custom community vulnerability assessments
- Narrow down the scale and focus for adaptation options
- Start conversations with community members, elected officials, decision makers about adaptation options

DIGGING INTO THE DATA



SATELLITE BEACH SLR EXPOSURE ANALYSIS: POPULATION & FUTURE LAND USES

Sea Level Rise (High Curve) Exposure

TABLE 13: Satellite Beach Estimated Population Exposure to Sea Level Rise Zones

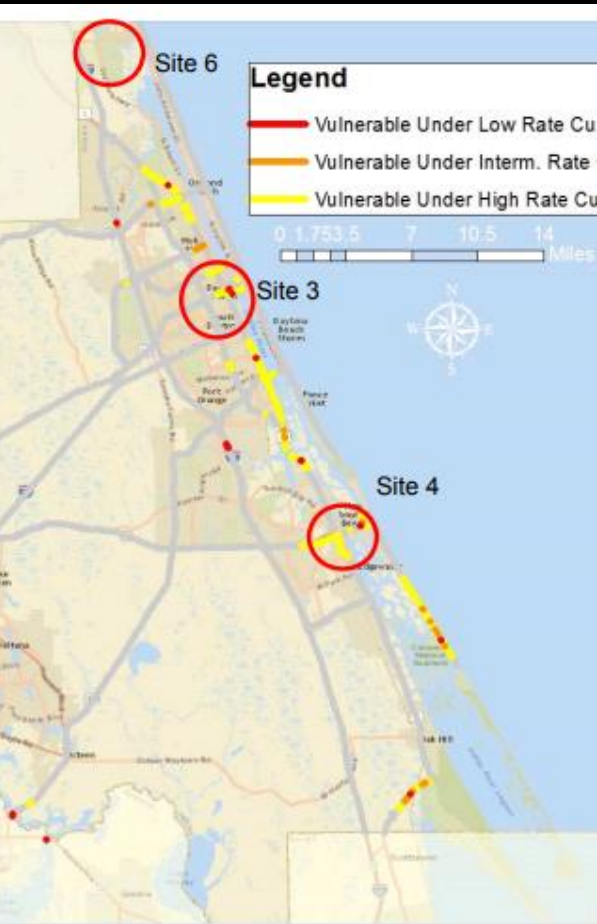
Population Exposure to Hazard Zones – *Sea Level Rise*

Timeframe	Residential Units in Zone	Estimated Population in Zone	Percent of Satellite Beach Population	Estimated Elderly Population (+65)
2040	355	758	7.34%	154
2070	742	1,585	15.34%	322
2100	2,668	5,699	55.15%	1,157

Future Land Use Summary of Parcels within Hazard Zones – *Number of Parcels Per Land Use (Built and Non-Built)*

Year	Low Density Residential	Med/Hi. Density Residential	Commercial and Office	Industrial	Institutional	Agricultural
2040	265	9	1	0	3	0
2070	507	110	35	1	9	0
2100	1,824	364	38	1	12	0

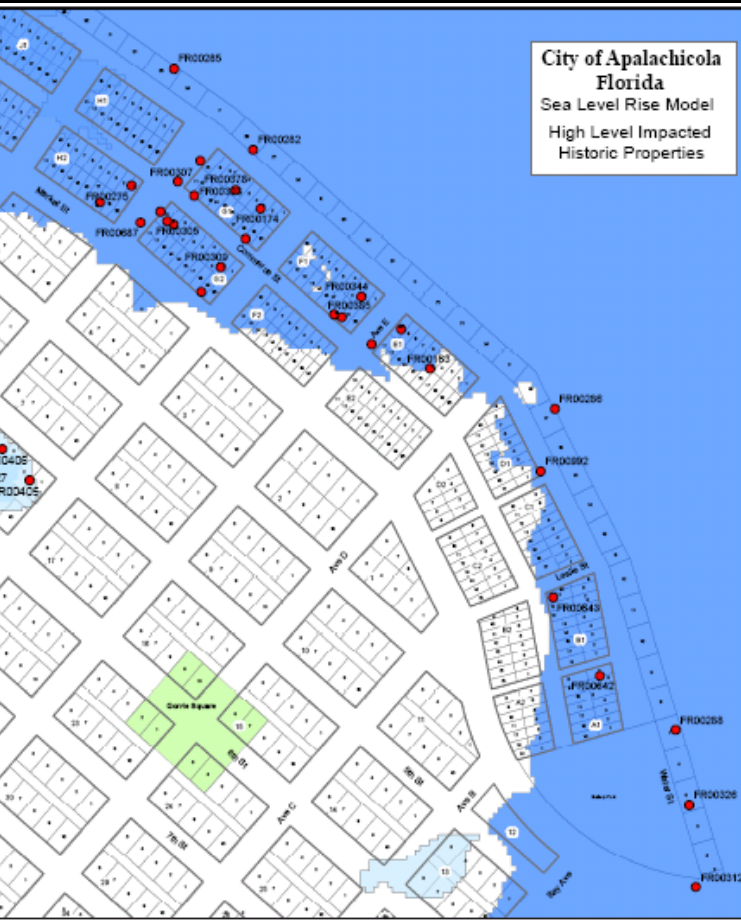
Source: East Central Florida Regional Planning Council, 2015



Roadway	Volusia County Evacuation Routes								
	Year and Estimated Miles Inundated (by Projection Rate Curve)								
	Low			Intermediate			High		
	2040	2070	2100	2040	2070	2100	2040	2070	2100
CR 4019 (LPGA Blvd.)						0.2 mi			0.6 mi
CR A1A (Atlantic Ave./Turtle mound)			<0.25 mi			0.9 mi			8 mi
State Highway A1A			<0.25 mi			<0.25 mi	0.5 mi		8.5 mi
Interstate 4			<0.25 mi			<0.25 mi			0.3 mi
Interstate 95			<0.25 mi			<0.25 mi			0.3 mi
Silver Beach / Orange Ave.			<0.25 mi			<0.25 mi			0.3 mi
State Road 40						<0.25 mi			0.4 mi
State Road 415			<0.25 mi			<0.25 mi			0.9 mi
State Road 421									<0.25 mi
State Road 430						<0.25 mi			0.8 mi
State Road 44									0.7 mi
State Road 46			<0.25 mi			<0.25 mi			<0.25 mi
State Road 5A									<0.25 mi
US Highway 1			<0.25 mi			<0.25 mi	<0.25 mi		11 mi
US Highway 92						<0.25 mi			0.5 mi

SLR EXPOSURE ANALYSIS OF EVACUATION ROUTES

East Central Florida
Regional Planning
Council and River to
Sea TPO, 2016



Historic Resource Exposure Analysis

Analysis of the impacts to historic resources within C-1, C-4 & RF districts

The historic resource exposure analysis determines the number of historic resources that are located in the low, medium or high inundation areas within the C-1, C-4 and RF districts which may be threatened by coastal flooding. The historic resources listed in the Table 5 below are those sites that as listed on the Master Site File of historic sources with the Florida Division of Historic Resources. The historic resources are mapped on maps 10-16.

Table 5. Historic Resource Inventory

Site Number	Lot & Block	Name	Address	SLR L	SLR M	SLR H
8FR163	Lots 3-5, 16-18 - Blk E-1	J. E. Grady & Co.	200-204 Water St			X
8FR174	Lots 1-3 Blk G-1	Wefing's Marine	Ave F & Water St		X	X
8FR176	Lot 6 BLOCK 18	Stevens House	76 Ave G			X
8FR266		Hutchinson House	121 6th St			X
8FR275		Block H-2	162 Commerce St (Vacant)			X
8FR282	NW 1/2 Wharf Lot E	Power Plant	265 N Water St		X	X
FR283	Lot 20 Blk G-1	Willis Warehouse	F & Commerce		X	X
FR285	Lot 29 Blk 122 FT Wharf Lot F	Wharf		X	X	X
8FR286	Wharf Lot 16	Marine Ways	Water St		X	X
8FR288	Oyster Packing House	Water Street & Gorrie Bridge		X	X	X
8FR303	Lot 12-13 Blk G-1	Demo George & Co.	155 Commerce St		X	X
8FR304	Block H-2	160 Commerce St (Vacant)			X	X
8FR305	Lot 6-9 Block G-2	Vacant		X	X	X
8FR307	Lot 11 Blk G-1	Economy Cash Store	159 Commerce St		X	X
8FR308	Lot 10 Blk G-1	The Peoples Ice Co.	280 Water St		X	X
8FR309	Lot 1 & SE 20 Ft Lot 2	Block G-2	132 Commerce St (Vacant)		X	X
8FR310	Lot 9-20 Blk H-2	Blok H-2 (Vacant)			X	X
8FR312	City of Apalachicola	near Wharf lots 1-2	Battery Park (Vacant)	X	X	X
8FR326	City of Apalachicola	Blocks A1 & A2	Battery Park (Vacant)	X	X	X
8FR329	Lot 11 Blk E-1	Sponge Exchange	Commerce Street			X
8FR339	Lot 9 Blk E-1	Structure	218 Water Street			X
8FR344	Lot 1-5, 16&17 & partial Lot 20	City Hall	222 Water Street			X
8FR378	Lot 5-7 Blk G-1	Marine Supply	Water Street		X	X

CITY OF APALACHICOLA HISTORIC RESOURCES EXPOSURE ANALYSIS

GIS Data from NOAA
Coastal Flood Exposure
Mapper

RESOURCES

Finding the Right Tool

GULF TREE

- <http://www.gulftree.org/>

NOAA Digital Coast

- <https://www.coast.noaa.gov/digitalcoast/>

Joe Bauer, FDEP,

- Joseph.Bauer@dep.state.fl.us

Conducting Vulnerability Assessments

Florida Adaptation Planning Guidebook

- <https://floridadep.gov/rcp/florida-resilient-coastlines-program/documents/adaptation-planning-guidebook>

Adaptation Clearinghouse - Georgetown Climate Center

- <https://www.adaptationclearinghouse.org/>