Town of Jupiter Island Vulnerability Assessment Public Outreach Meeting #2

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TOWN OF JUPITER ISLAND FLORIDA

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Project Scope of Work

Task 1: Identify VA Data Standards

Task 2: Kick Off Meeting

Task 3: Steering Committee

Task 4: Public Outreach Meeting #1

Task 5: Acquire Background Data

Task 6: Exposure Analysis

Task 7: Sensitivity Analysis

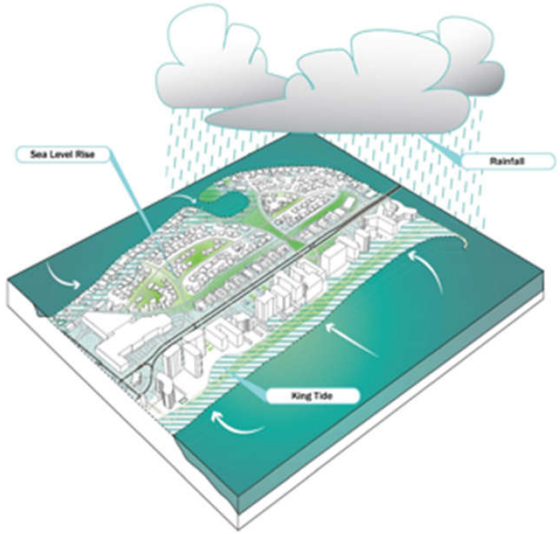
Task 8: Public Outreach Meeting #2

Task 9: Final VA Report, Maps, and Tables

Completed Work

Ongoing

Next Step



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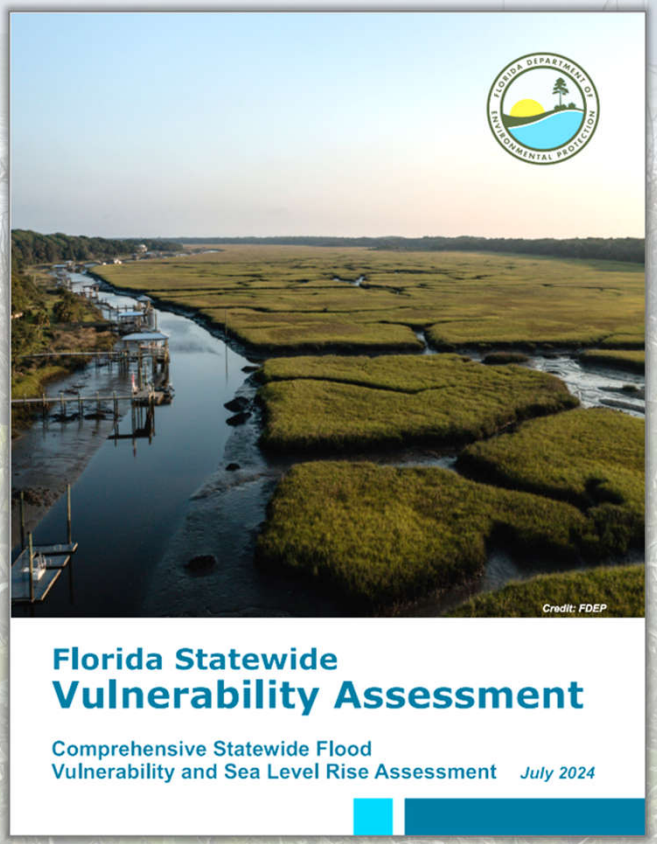
Resilient Florida Grant Program and Statute

- Resilient Florida Program established in **2021** under Senate Bill 1954 – Florida Statute (F.S.) 380.093
- **Florida is particularly vulnerable** to increasing severity and frequency of rainfall events, storm surge, tidal flooding, and sea level rise
- Created opportunities to **support local governments** to improve resilience to flooding and sea level rise
  - Incentive: grant funding eligibility
  - Minimum standards to evaluate flood risk



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What is a Vulnerability Assessment?

- The **Vulnerability Assessment** :
  - Identify grantee's critical and regionally significant assets
  - Evaluate flood risks associated with SLR, tides, storm surge, rainfall, and compound flooding
  - Prioritize the assets by criticality and flood risk

- The Town will use this information to identify projects, develop adaption strategies, and implement resiliency measures **short-, intermediate- and long-term**

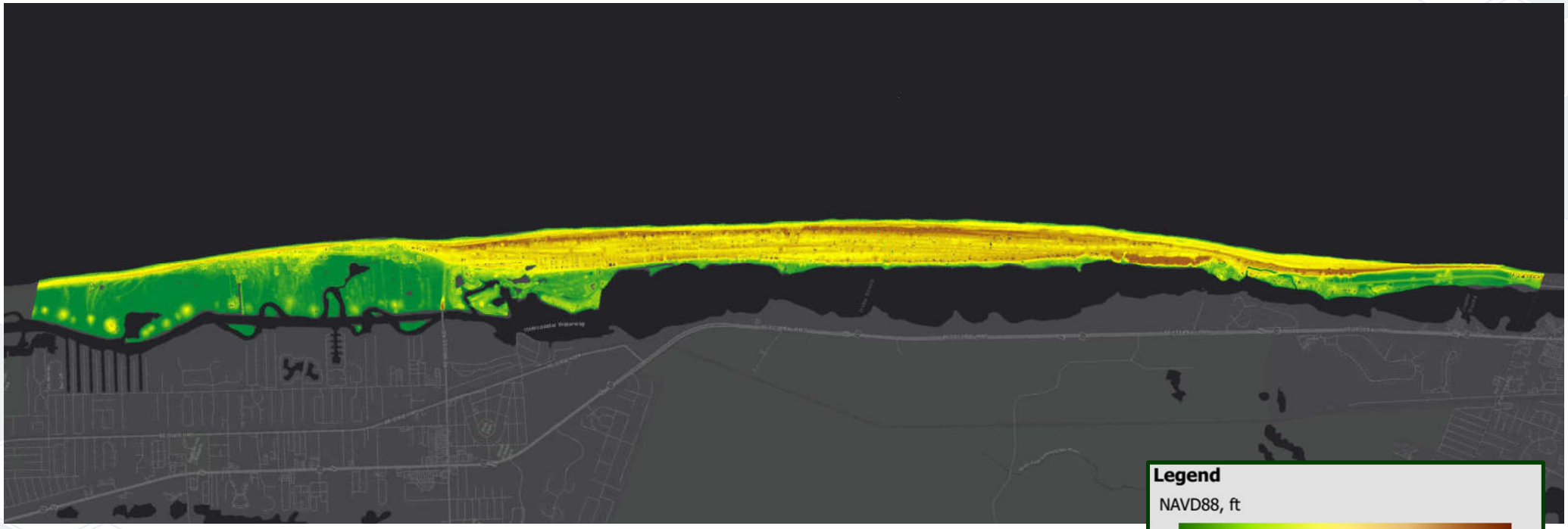
- The Town can submit projects to the Statewide Flooding and Sea Level Rise Resilience Plan for potential award of **legislative funding**

Task 1: Identify VA Data Standards

Goal: Identify data standards to include **sea level rise scenarios** and **planning horizons** needed to perform the Vulnerability Assessment

- **Categories of Data:**
  - Topographical Data
  - Flood Scenario Data
  - Critical Asset Inventory
- **Flood Scenario Data:**
  - Sea Level Rise
  - Mean Higher High Water
  - High Tide Flooding
  - Storm Surge
  - Rainfall
  - Compound Flooding
- **Data Sources:**
  - Town of Jupiter Island Data
  - Martin County Data
  - Florida Flood Hub
  - NOAA
  - FEMA
  - LiDAR
  - FDEM

Digital Elevation Model



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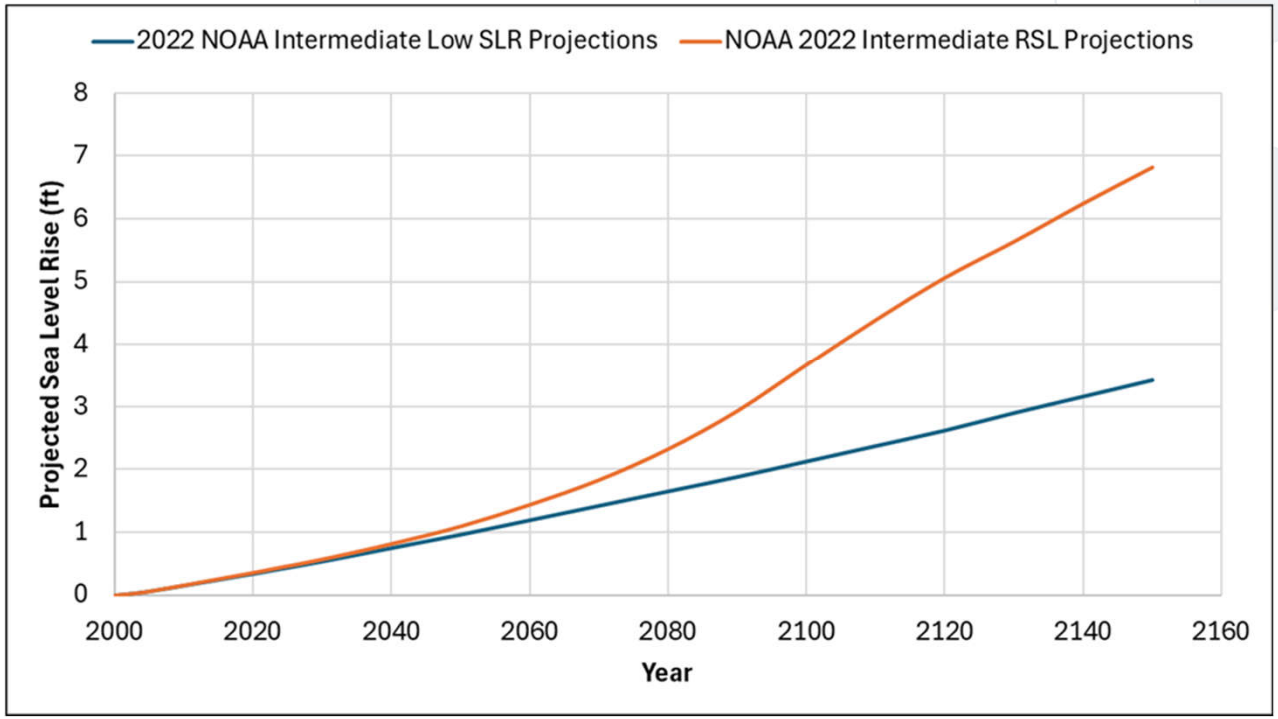
Sea Level Rise

Florida Statute Minimum Requirements:

- **2022 NOAA Sea Level Rise projections** (Intermediate Low & Intermediate)
- **2050 & 2080 Planning Horizons**
- High tide flooding
- 100-yr Storm Surge
- 100-yr Rainfall
- 500-yr Rainfall
- Compound flooding



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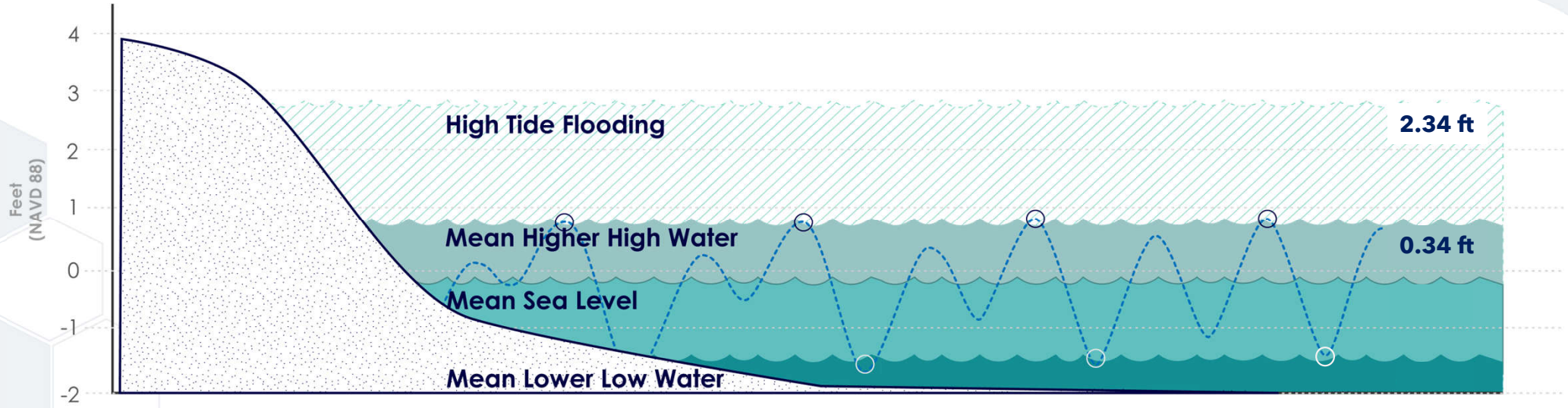
Tidal Flooding

High Tide Flooding is 2 ft above Mean Higher High Water; defined by FDEP.

NOAA defines a datum as *a base elevation used as a reference to set heights and depths*.

Common datums:

- **Mean Higher High Water (MHHW)**
- **Mean Lower Low Water (MLLW)**
- **Mean Sea Level (MSL)**
- **North American Vertical Datum of 1988 (NAVD88)**



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High Tide Flooding

- High tide flooding, king tide, nuisance flooding, or sunny day flooding
- Typically occur from **September to November** in Martin County

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How is a 100-Year Flood Determined?

An **Annual Exceedance Probability (AEP)** is the **statistical likelihood that an event will occur <u>each</u> year**.

- 1% AEP was selected by the National Flood Insurance Program as a fair balance between protecting the public and overly stringent regulations.
- **Ten or more years** of data are used to perform a frequency analysis (USGS).
- The 100-year flood **can change** as more data is collected.

Satellite imagery of Hurricane Ian (2022), estimated as 100-yr storm surge at Fort Myers

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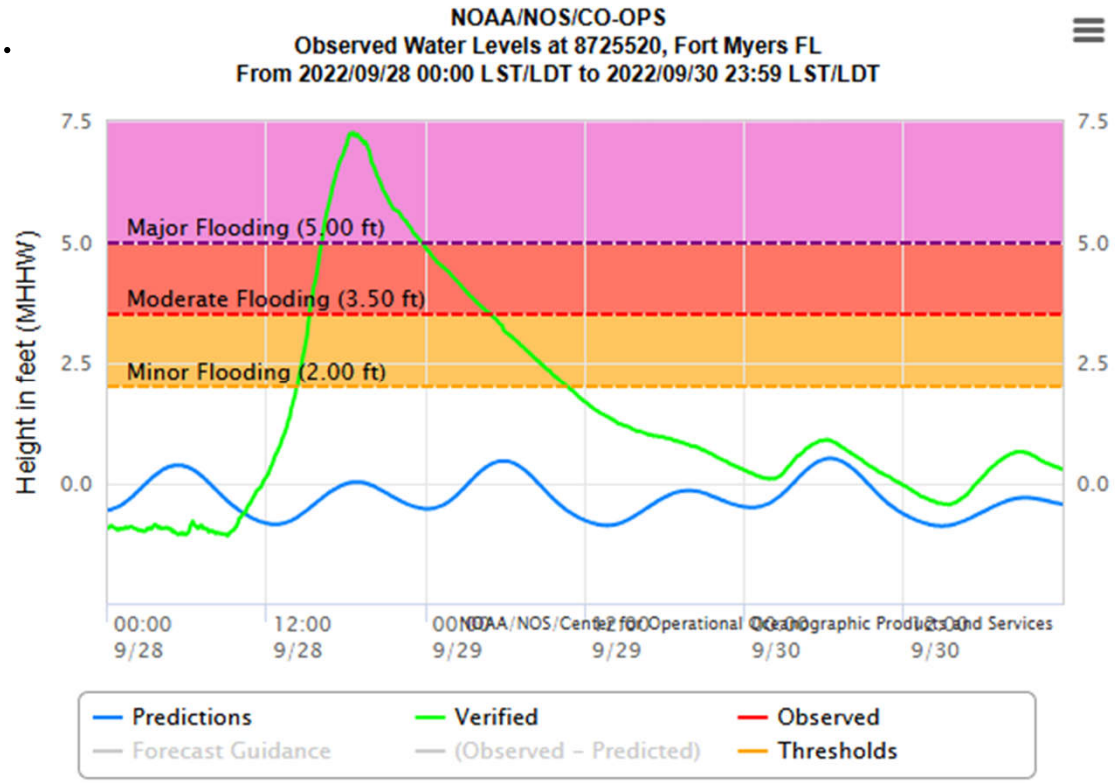
Storm Surge Flooding

Storm Surge is the abnormal rise in water levels generated by a storm.

- **100-year Storm Surge** specified storm surge level that has a **1% probability of being reached in any given year**.
- Can occur multiple times in one year
- Varies for different regions



Hurricane Ian (2022) estimated as 100-yr storm surge at Fort Myers

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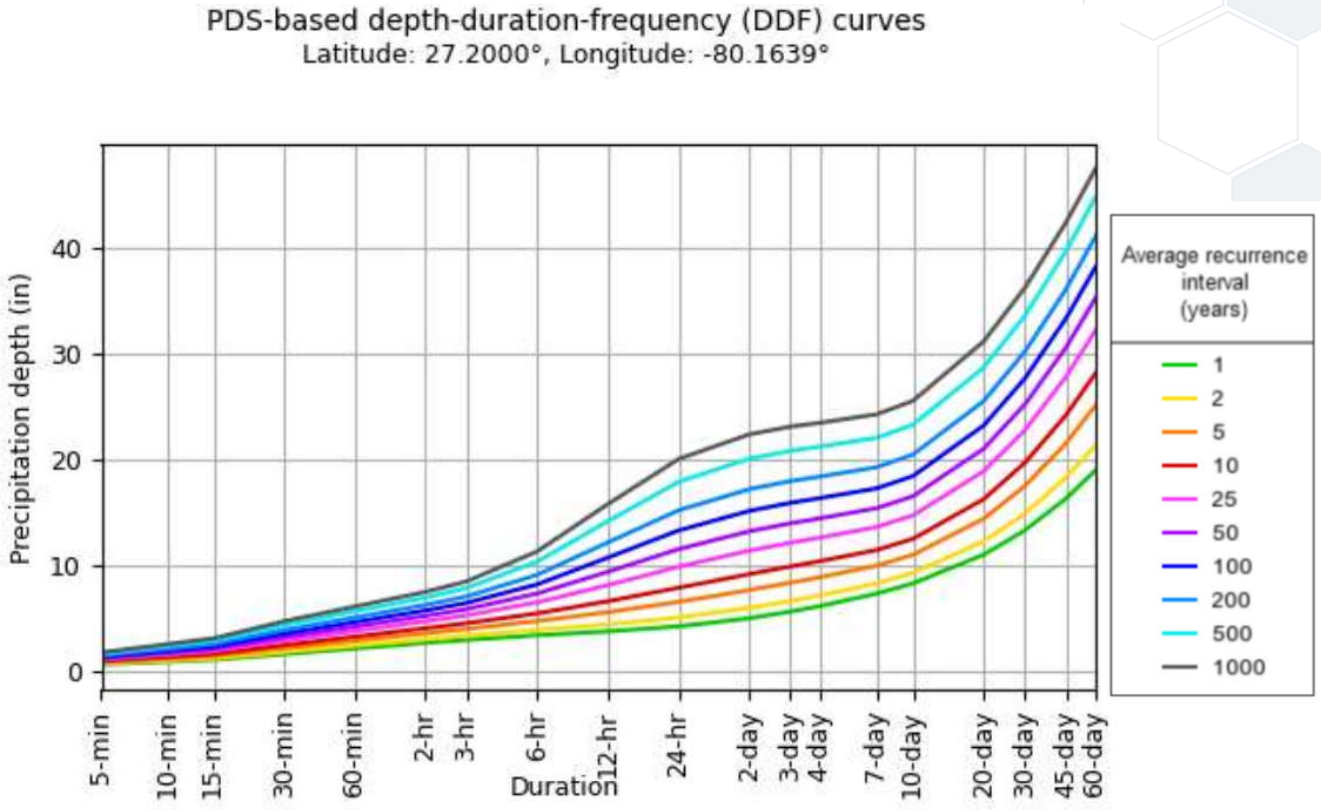
Rainfall Induced Flooding

Rainfall AEPs used in this study:

- **100-year Rainfall:** Specified rainfall amount that has a **1% chance of being reached in any given year**.
- **500-year Rainfall:** Specified rainfall amount that as a **0.2% chance of occurring in any given year**.



Source: NOAA ATLAS 14

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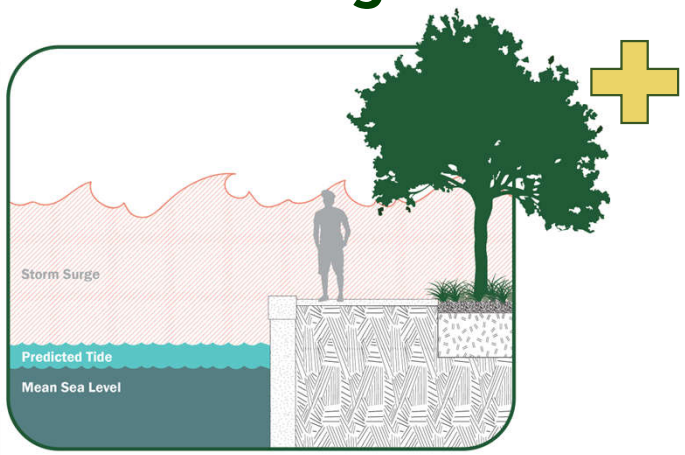
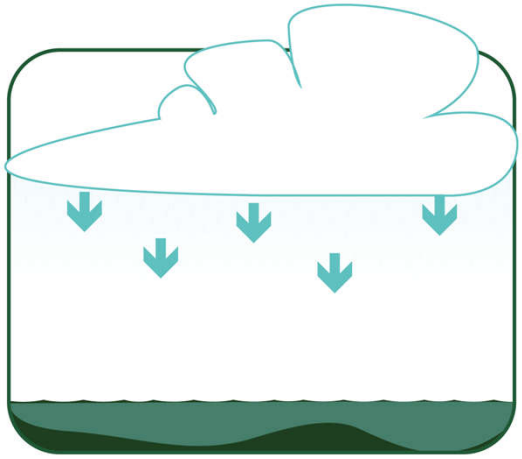
Compound Flooding

Multiple factors often play a role in flooding. This study takes into consideration the **combination** of multiple flood types.

Storm Surge



Rainfall



High Tide Flooding

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Critical Asset Classes & Types

Critical assets are publicly owned or maintained. **Regionally Significant** assets are *critical assets that support the needs of communities spanning multiple geopolitical jurisdictions. Some privately owned assets were included in this analysis for planning purposes.*

Transportation and Evacuation Routes

- Airports
- Bridges
- Bus Terminals
- Ports
- Major Roadways
- Marinas
- Railroads
- Rail Facilities

Critical Infrastructure

- Communications
- Disaster Debris Sites
- Solid and Hazardous Waste Facilities
- Electrical Facilities
- Military Installations
- Drinking Water Facilities
- Wastewater Facilities
- Stormwater Facilities

Critical Community and Emergency Facilities

- Affordable Public Housing
- Schools, Colleges, Universities
- Community Centers
- Disaster Recovery Centers
- Emergency Medical Facilities
- Emergency Operation Centers
- Fire stations
- Governmental Facilities
- Hospitals
- Law Enforcement facilities

Natural, Cultural, and Historical Resources

- Conservation Lands
- Parks
- Shorelines
- Surface Waters
- Wetlands
- Historical and Cultural Assets

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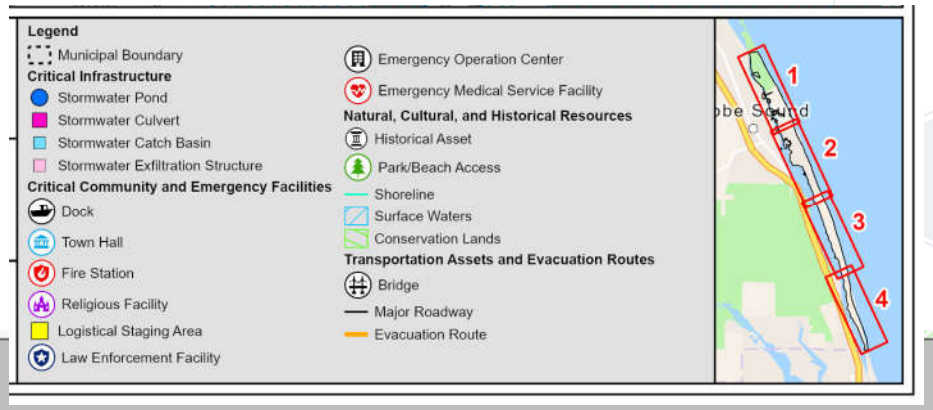
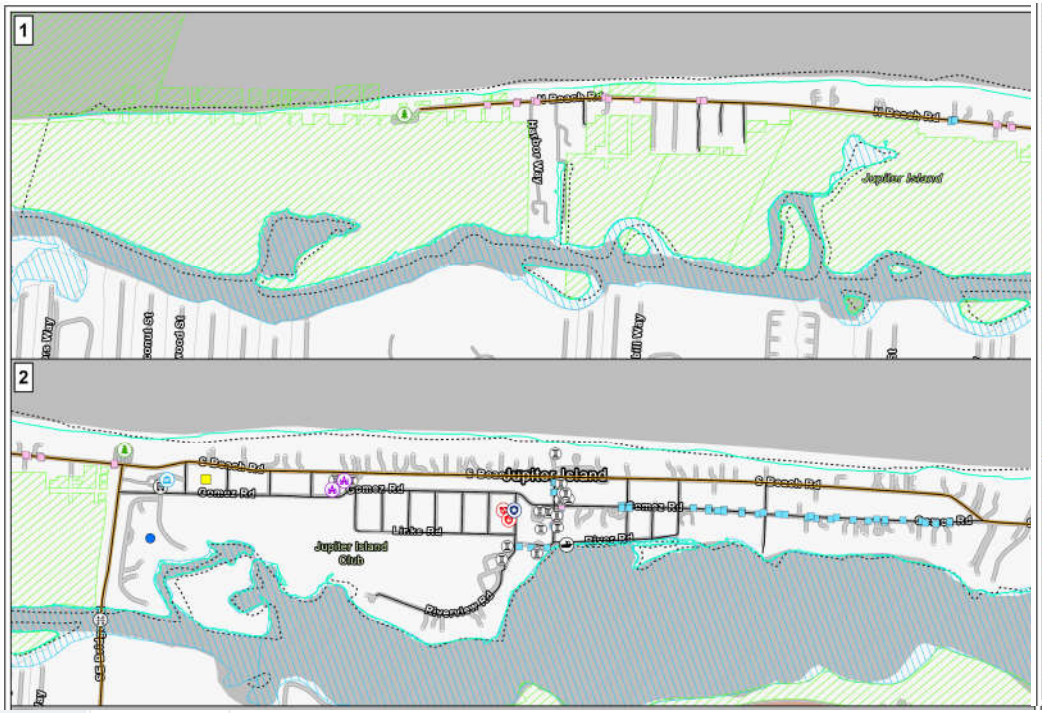
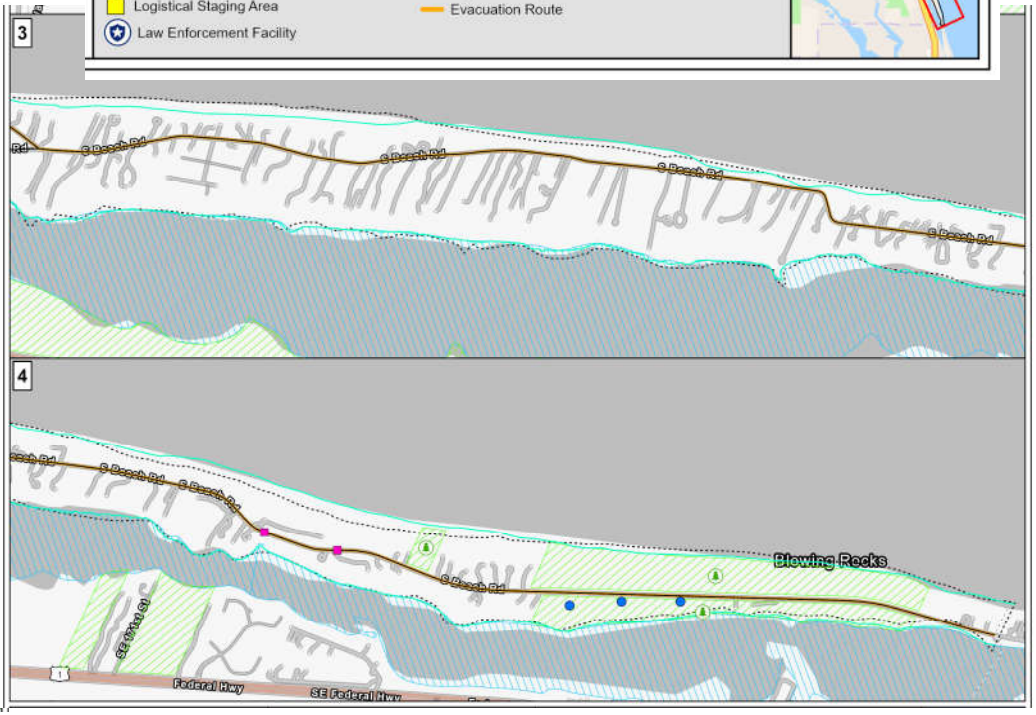
Critical Asset Class and Type

Asset Class	Asset Type	Counts			
		Town Owned	Reg. Significant	Privately Owned	Total
Transportation and Evacuation Routes	Bridges	0	1	0	1
	Major Roadways	26	1	1	28
	Evacuation Routes	2	1	0	3
	Subtotal	**28**	**3**	**1**	**32**
Critical Infrastructure	Stormwater Treatment Facilities and Pump Stations – Ponds	0	0	4	4
	Stormwater Treatment Facilities and Pump Stations – Exfiltration Structures	18	0	0	18
	Stormwater Treatment Facilities and Pump Stations – Catch Basins	45	0	0	45
	Stormwater Treatment Facilities and Pump Stations – Culverts	0	2	0	2
	Subtotal	**63**	**2**	**4**	**69**
Critical Community and Emergency Facilities	Religious Facilities	0	0	2	2
	Emergency Medical Service Facilities	1	0	0	1
	Emergency Operation Centers	1	0	0	1
	Fire Stations	1	0	0	1
	Law Enforcement Facilities	1	0	0	1
	Local Government Facilities	1	0	0	1
	Logistical Staging Areas	1	0	0	1
	Docks	1	0	0	1
	Subtotal	**9**	**0**	**0**	**9**
Natural, Cultural, and Historic Resources	Conservation Lands	1	5	0	6
	Parks/Beach Access	1	2	0	3
	Historical Assets	0	0	17	17
	Shorelines	0	1	0	1
	Surface Waters	0	4	0	4
	Subtotal	**2**	**12**	**17**	**31**
Total		**102**	**17**	**22**	**141**

Critical Assets Map







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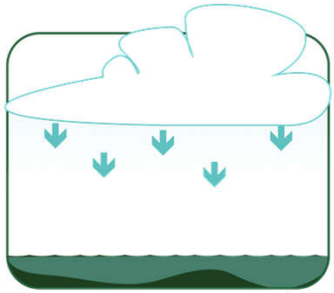
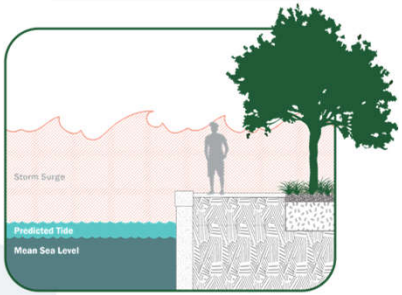
Task 6: Exposure Analysis





Modified Bathtub Model

Dynamic Model

Scenario No.	Rainfall	SLR Projection	Planning Horizon	Tidal Condition
1	N/A	N/A	2023 – Current	HTF
2	N/A	NOAA Intermediate Low	2050	HTF
3	N/A	NOAA Intermediate	2050	HTF
4	N/A	NOAA Intermediate Low	2080	HTF
5	N/A	NOAA Intermediate	2080	HTF
6	N/A	N/A	2023 – Current	100-yr SS
7	N/A	NOAA Intermediate Low	2050	100-yr SS
8	N/A	NOAA Intermediate	2050	100-yr SS
9	N/A	NOAA Intermediate Low	2080	100-yr SS
10	N/A	NOAA Intermediate	2080	100-yr SS
11	100-yr	N/A	2023 – Current	MHHW
12	100-yr	NOAA Intermediate	2050	MHHW
13	500-yr	N/A	2023 – Current	MHHW
14	100-yr	N/A	2023 – Current	100-yr SS + HTF
15	100-yr	NOAA Intermediate	2050	100-yr SS
16	500-yr	N/A	2023 – Current	100-yr SS + HTF

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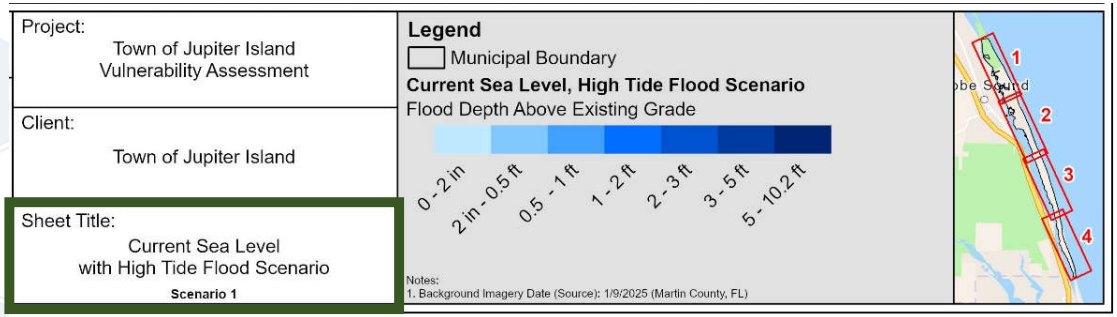
Flood Depth Maps

- Inundation maps were generated for each of the 16 flood scenarios
- Maps show the greatest flood depth expected



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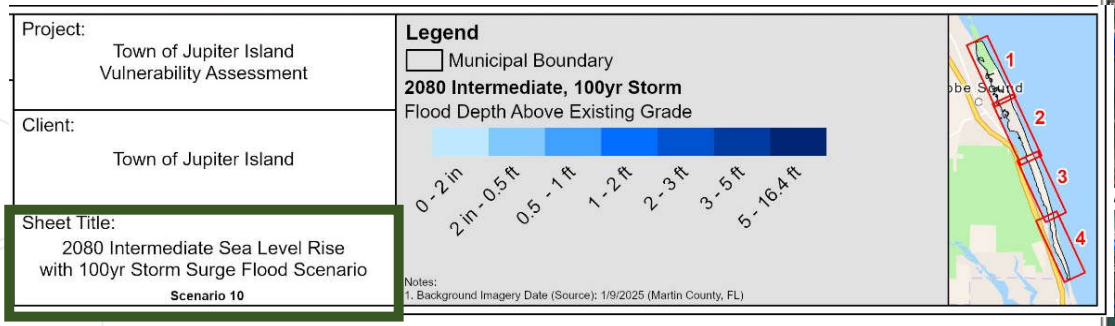
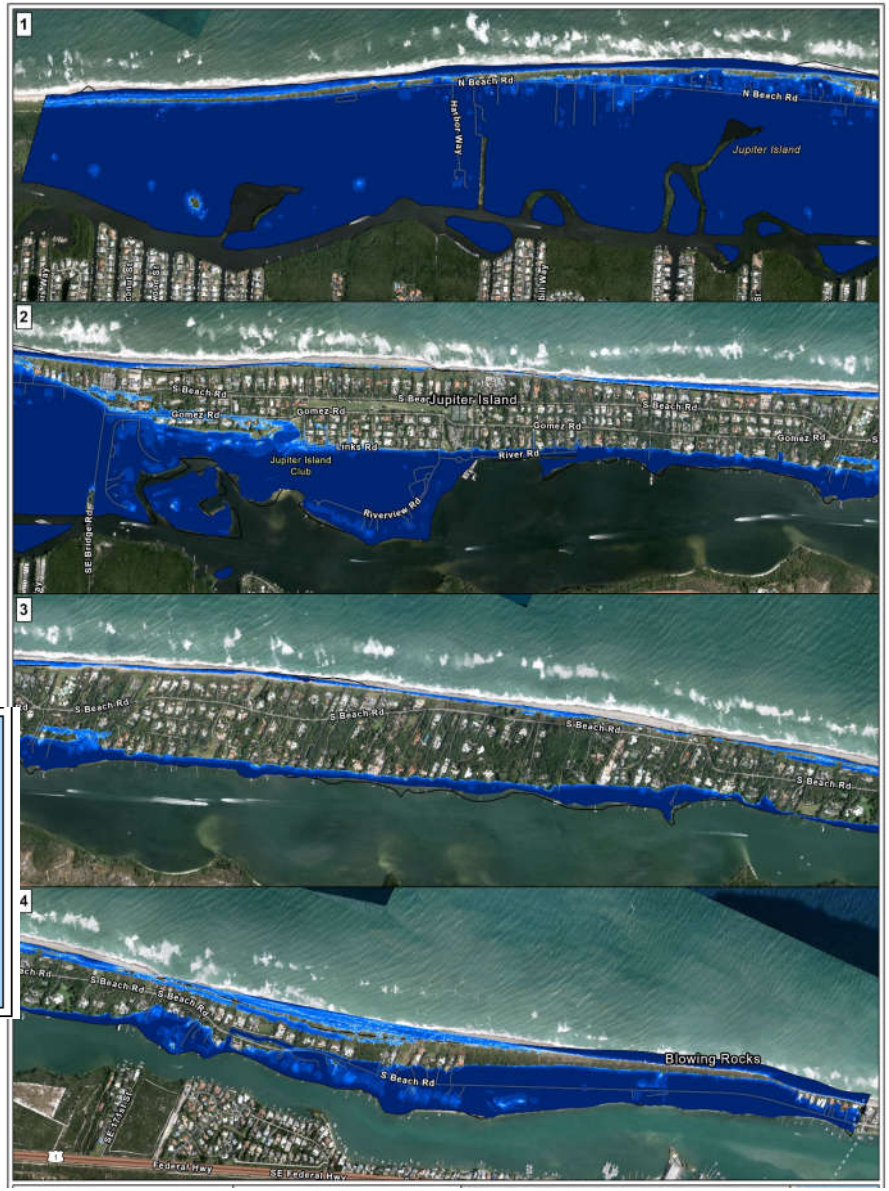
Flood Depth Maps

- Scenario 10 (2080 Intermediate SLR with 100-yr Storm Surge) exhibits the greatest flood depths
- Overwash from the Atlantic Ocean predicted along N Beach Rd and the 600 Block of S Beach Rd





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Task 7: Sensitivity Analysis

- **What assets are the most critical to the Town from an operations standpoint?**
- Goal: To **quantify the flood risk** for each asset class
- Evaluate the **impact of flood severity** on each asset class based on the flood depths assets are exposed to under each flood scenario
- Identify the percentage of land area inundated and number of critical assets affected in each flood scenario
- Location: 24 N. Beach Rd
  - This location has two exfiltration structures

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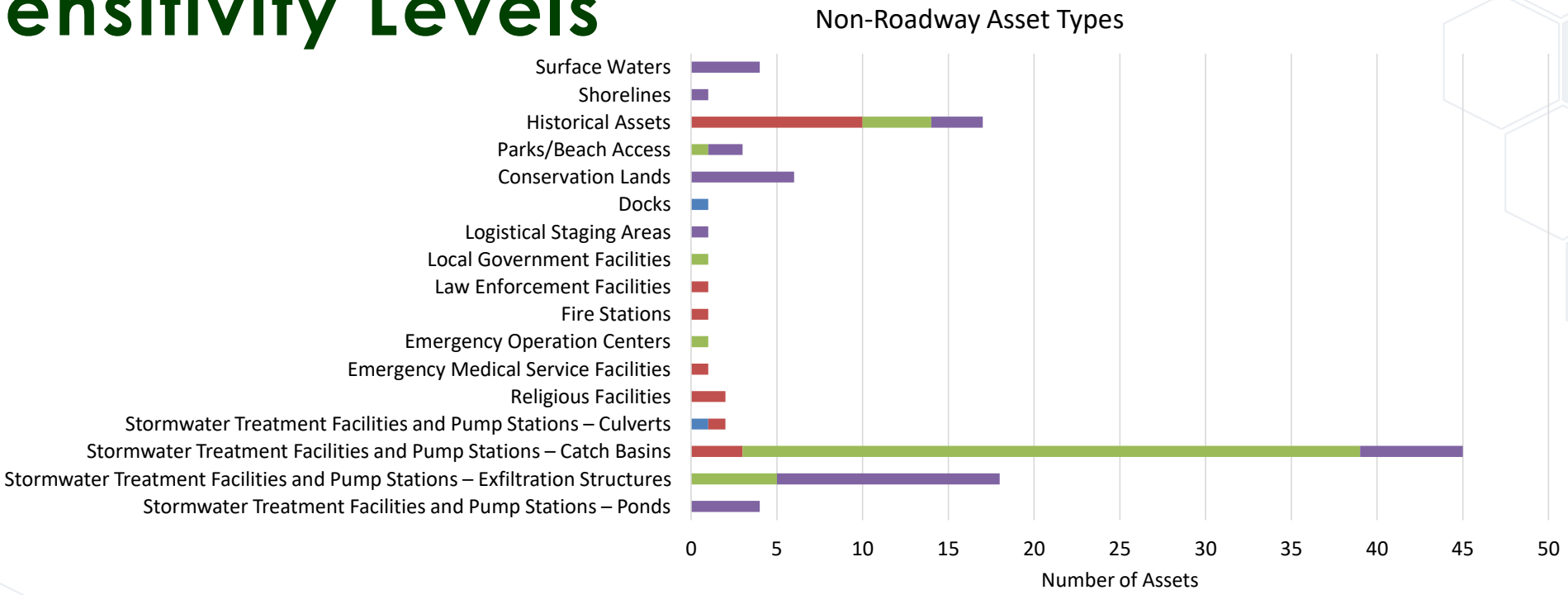
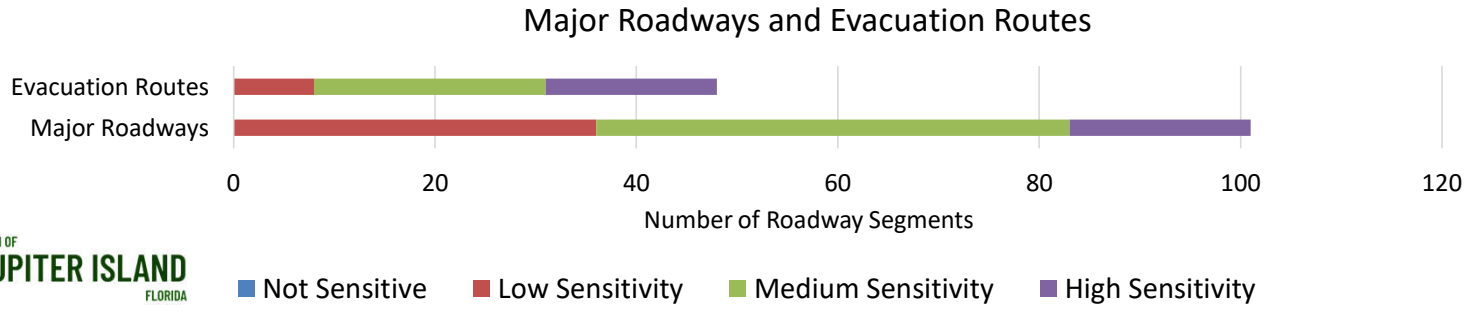
Sensitivity Levels





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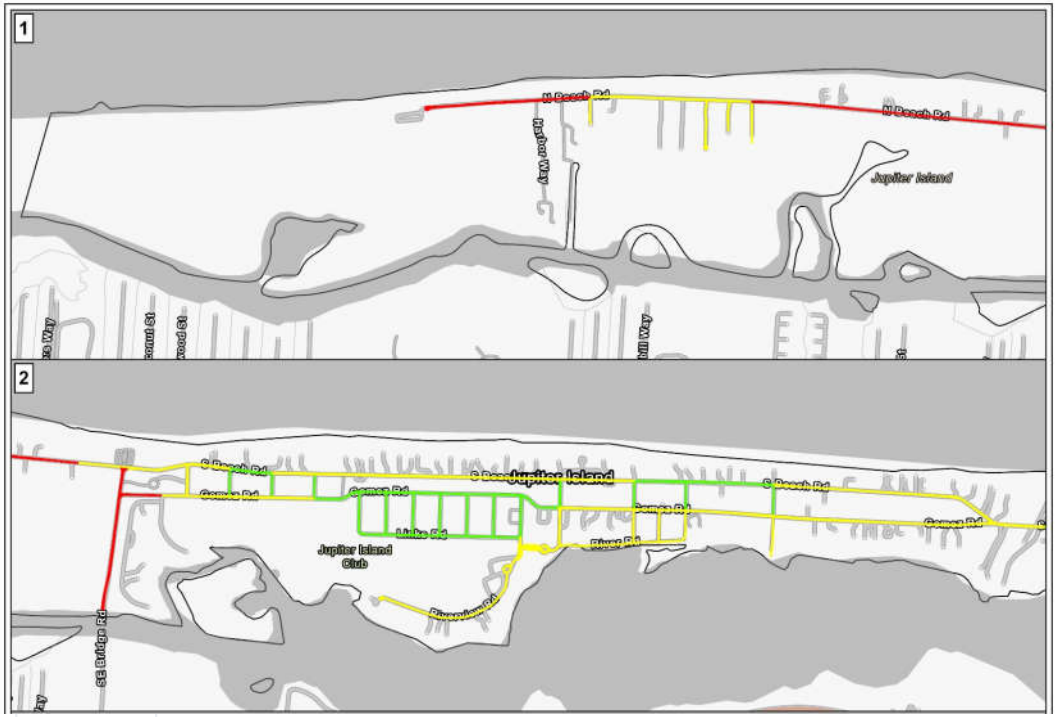
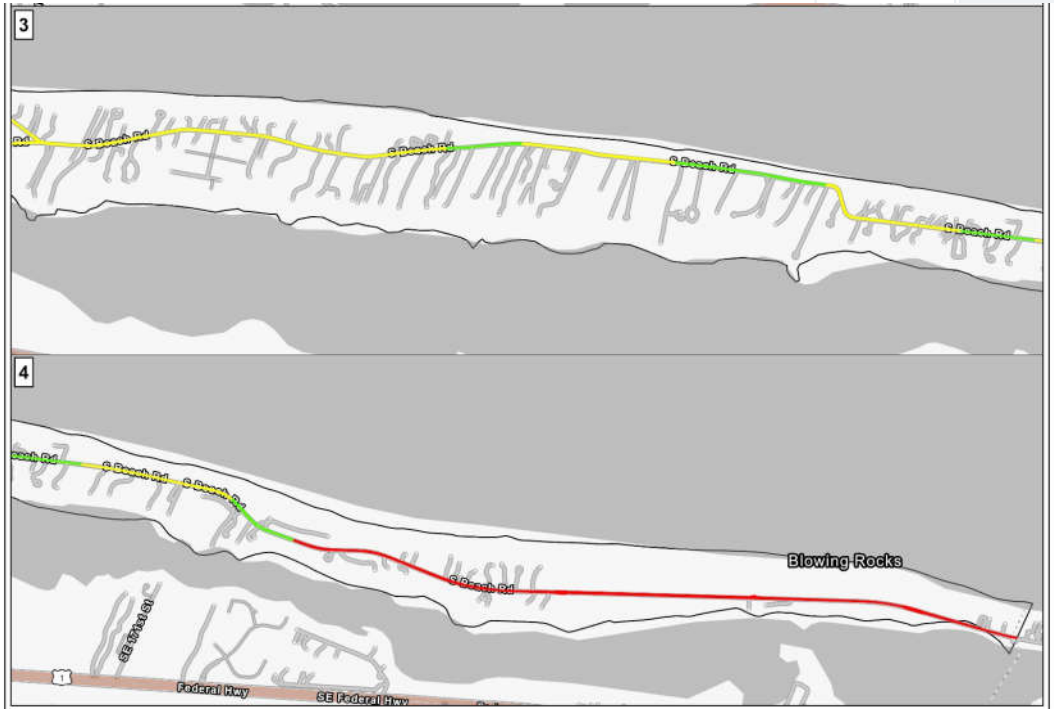
Sensitivity Maps – Major Roadways





Legend

- Municipal Boundary

Sensitivity

- Low
- Medium
- High
- Not Sensitive

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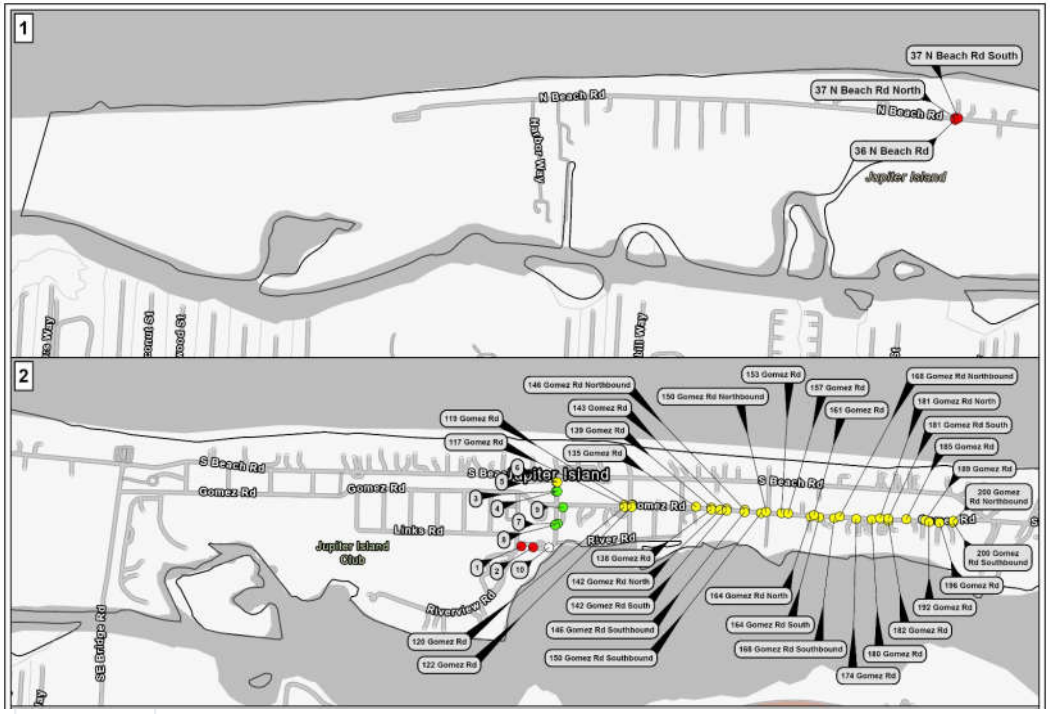
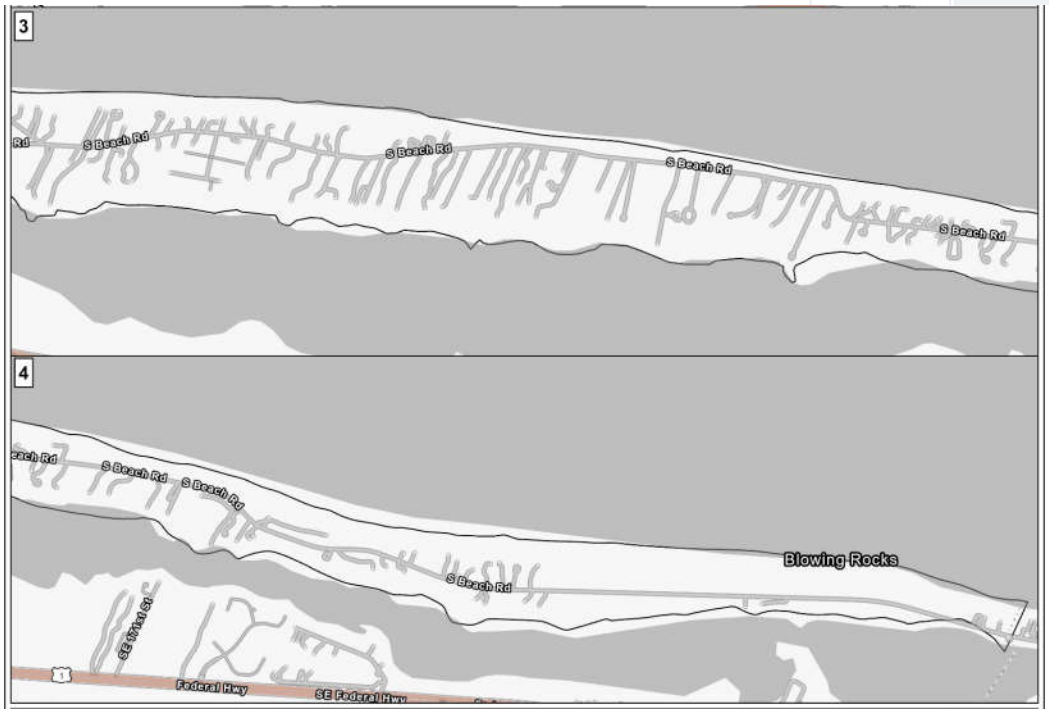
Sensitivity Maps – Stormwater Catch Basins





Legend

- Municipal Boundary

Sensitivity

- Low
- Medium
- High
- Not Sensitive

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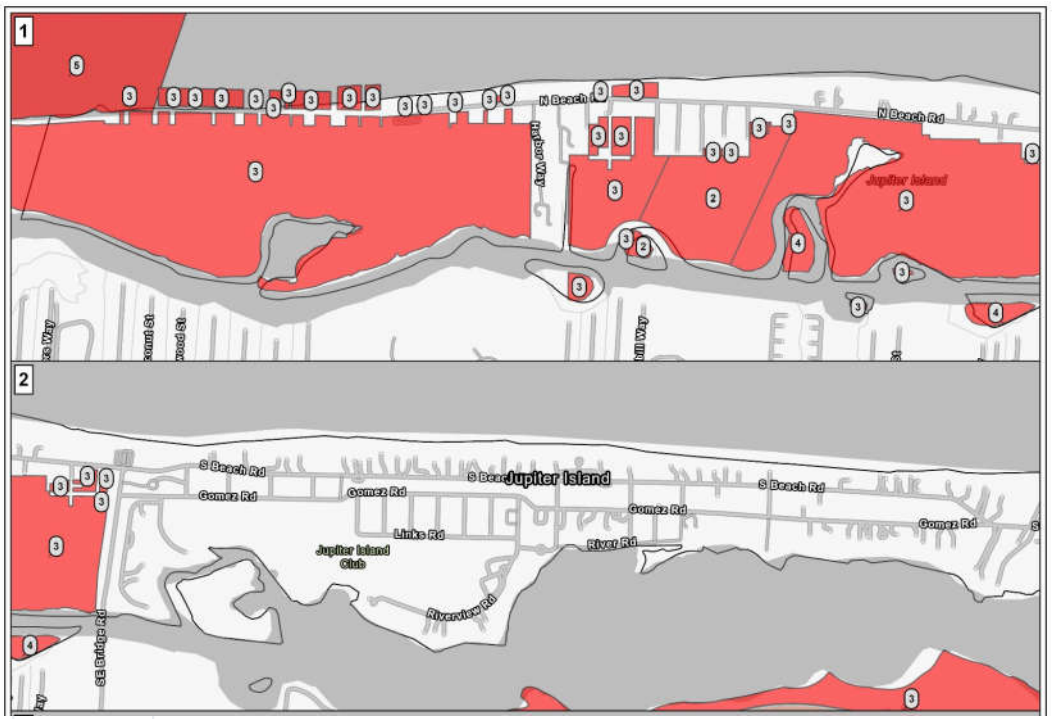
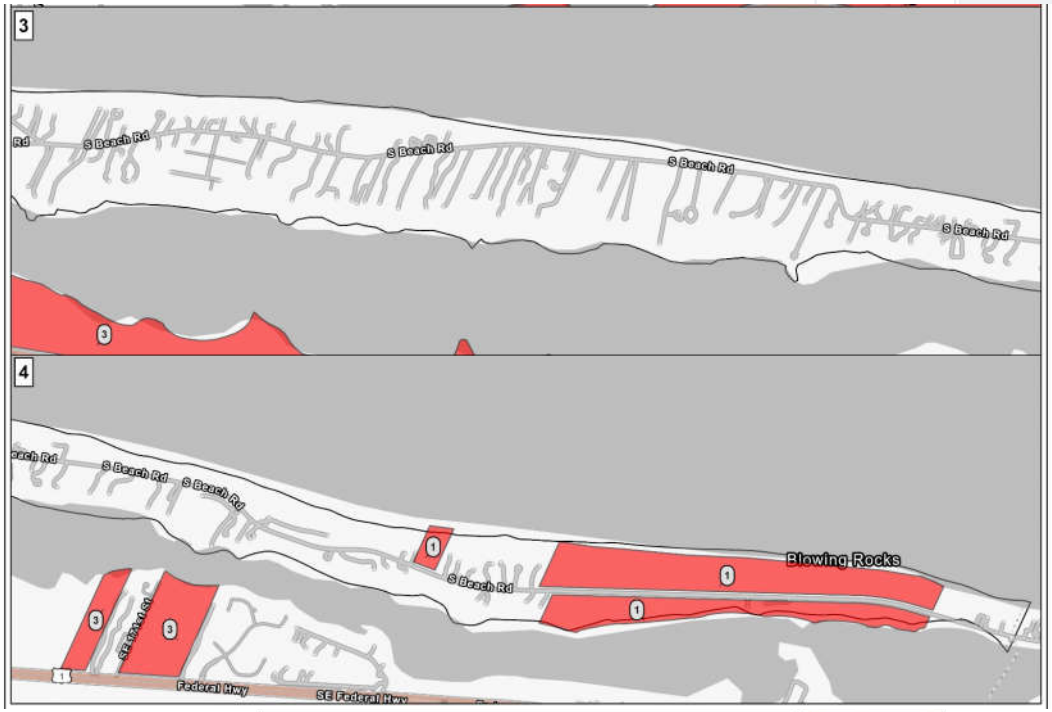
Sensitivity Maps – Conservation Lands





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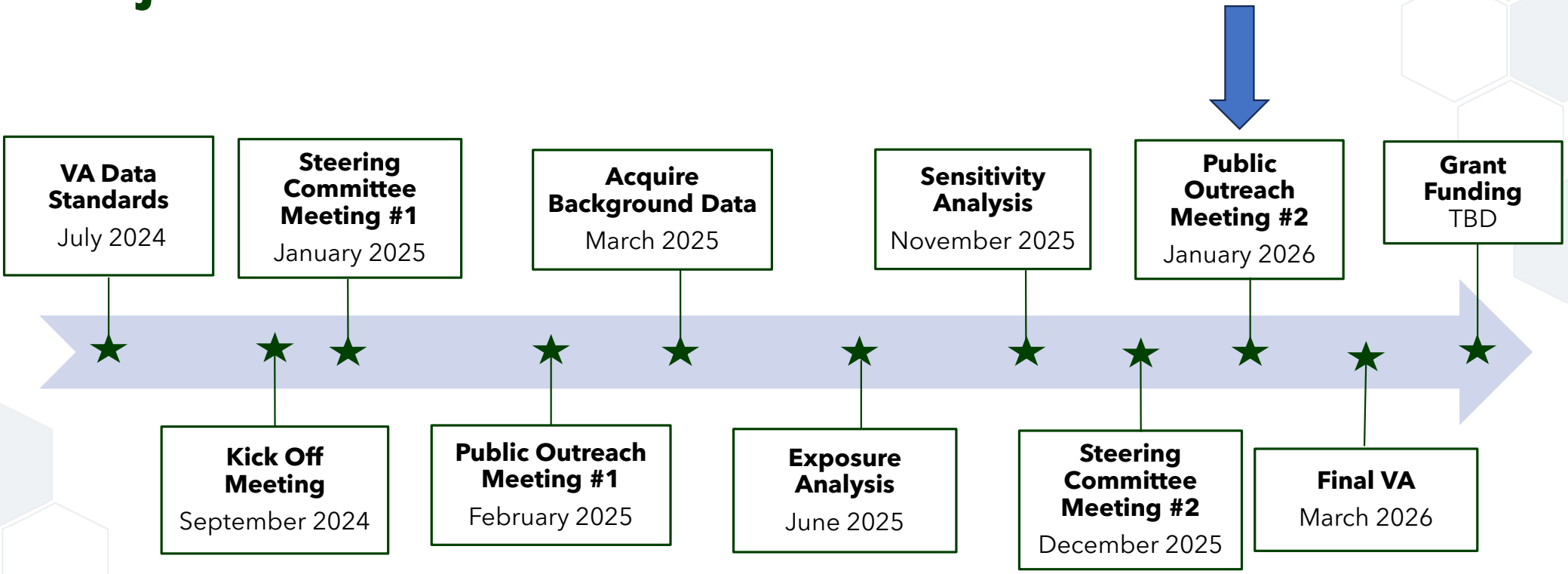
Summary of Risk

- The Town is particularly vulnerable to back bay flooding
- Very few assets are classified as “Not Sensitive” due to widespread flooding under some modeled scenarios
- Assets along N Beach Rd, the southern portion of S Beach Rd, and adjacent to the ICW shoreline experience the highest flood depths
- Aside from roadways, the stormwater asset classes contain the greatest number of “Medium Sensitivity” and “High Sensitivity” assets

Project Schedule



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