Sea Level Rise and Storm Surge Vulnerability Assessment

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22 April 2021

PINELLAS COUNTY, FLORIDA
BOARD OF COUNTY COMMISSIONERS

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LAND&WATER ENGINEERING SCIENCE

Pinellas County

Why plan for Sea Level Rise (SLR)?

A resilient Tampa Bay acknowledges and responds to coastal vulnerabilities (Tampa Bay CSAP).

- 590 miles of coastline
- ~1 million residents
- Blue sky flooding is happening now
- Capital improvement project planning
- Adaptation planning
- Resilient communities

Blue Sky Flooding

St. Pete Beach

Vulnerable Assets

Identify if asset is flooded or not for various scenarios

- Assets include:
  - Transportation
  - Stormwater
  - Wastewater
  - Water supply
  - Natural gas
  - Electricity

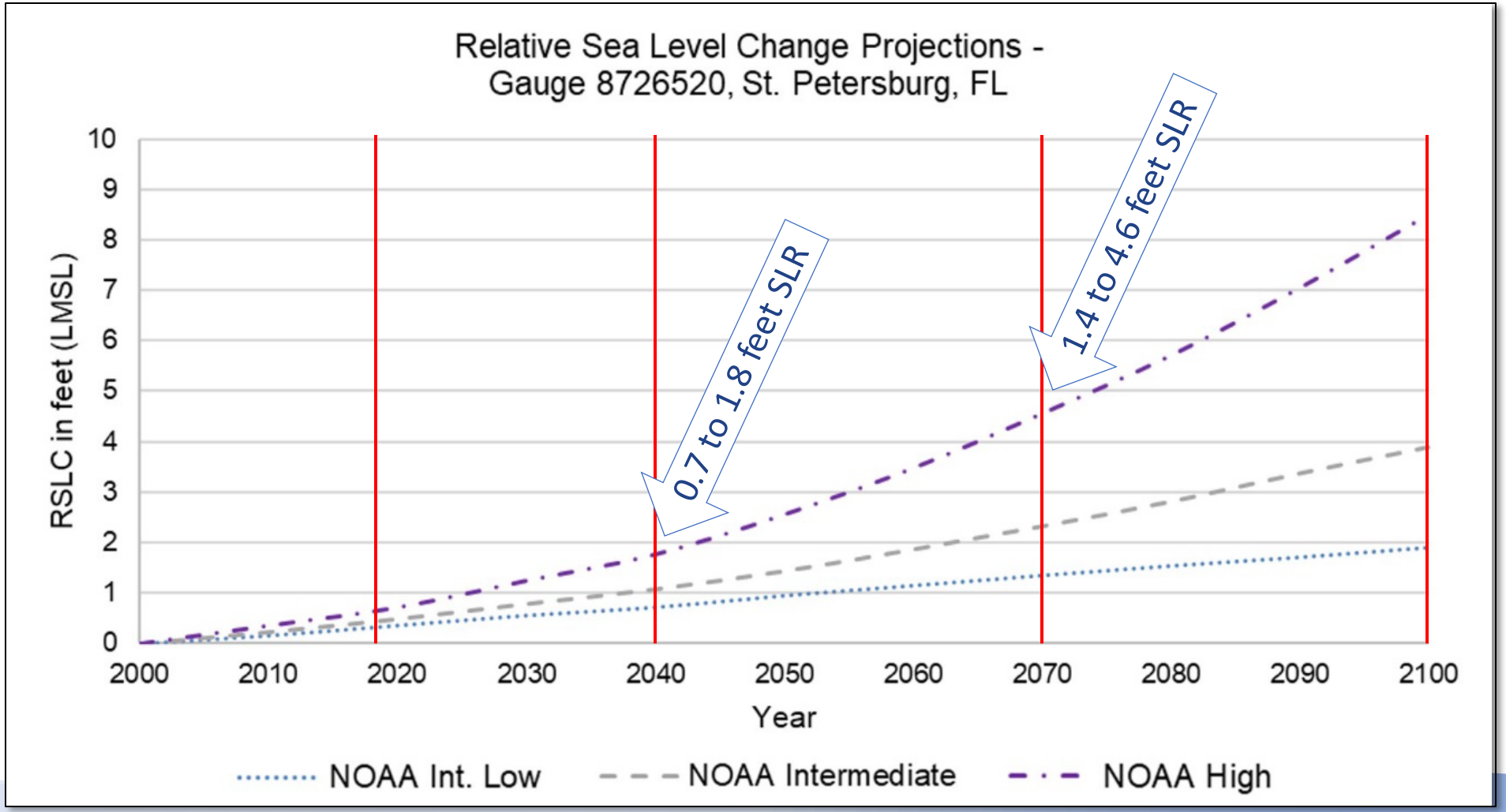
Tarpon Springs

Project Phases

- Data collection ✓
- Vulnerability analysis ✓
  - Sea level rise
  - Storm surge
- Adaptation assessments (in progress)
- Reporting (in progress)

Exposure Factors

Sea Level Change Projections



Exposure

SLR Projections

- Intermediate low
- Intermediate
- High

Time Horizons

- Current year (2018)
- 2040
- 2070
- 2100

St. Petersburg

Exposure (continued)

Depth and Duration of Tidal Flooding

- Hours per year (hpy)
- From MHW to 1 hpy ("king tide")

Storm Surge on top of SLR

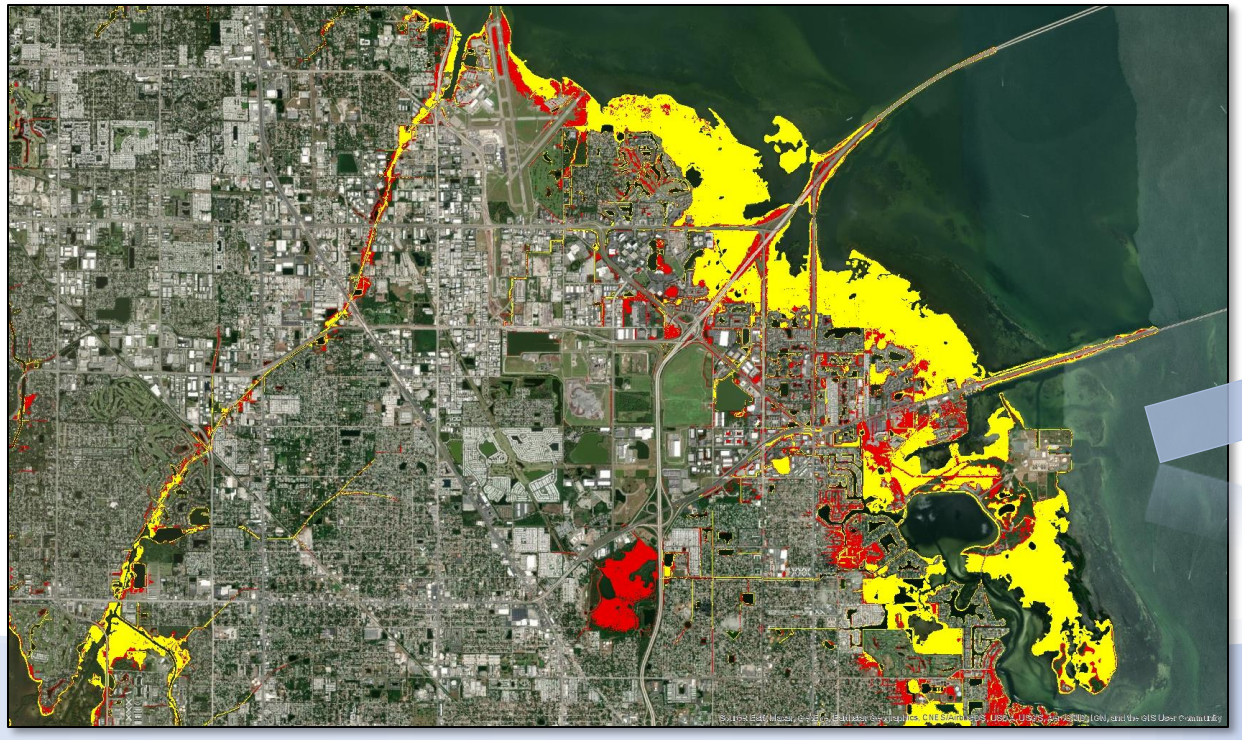
- 25, 50, 100, 250, 500-year

St. Pete Beach

Results

Current vs. 2040 High SLR Scenario

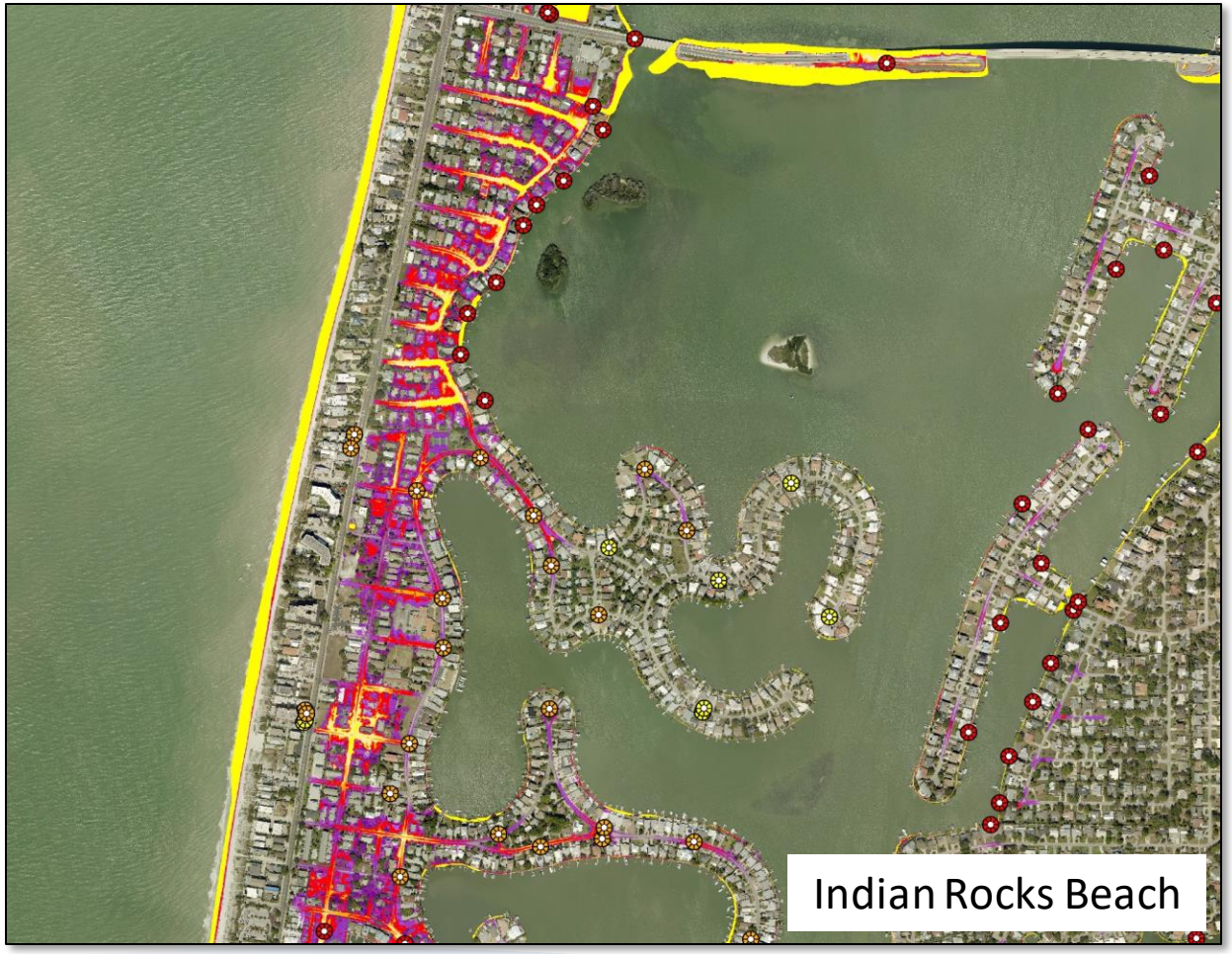
- Current 1 HPY (king tide) flooding
- 2040 High SLR
- No storm surge



Barrier Island Situation in 2040

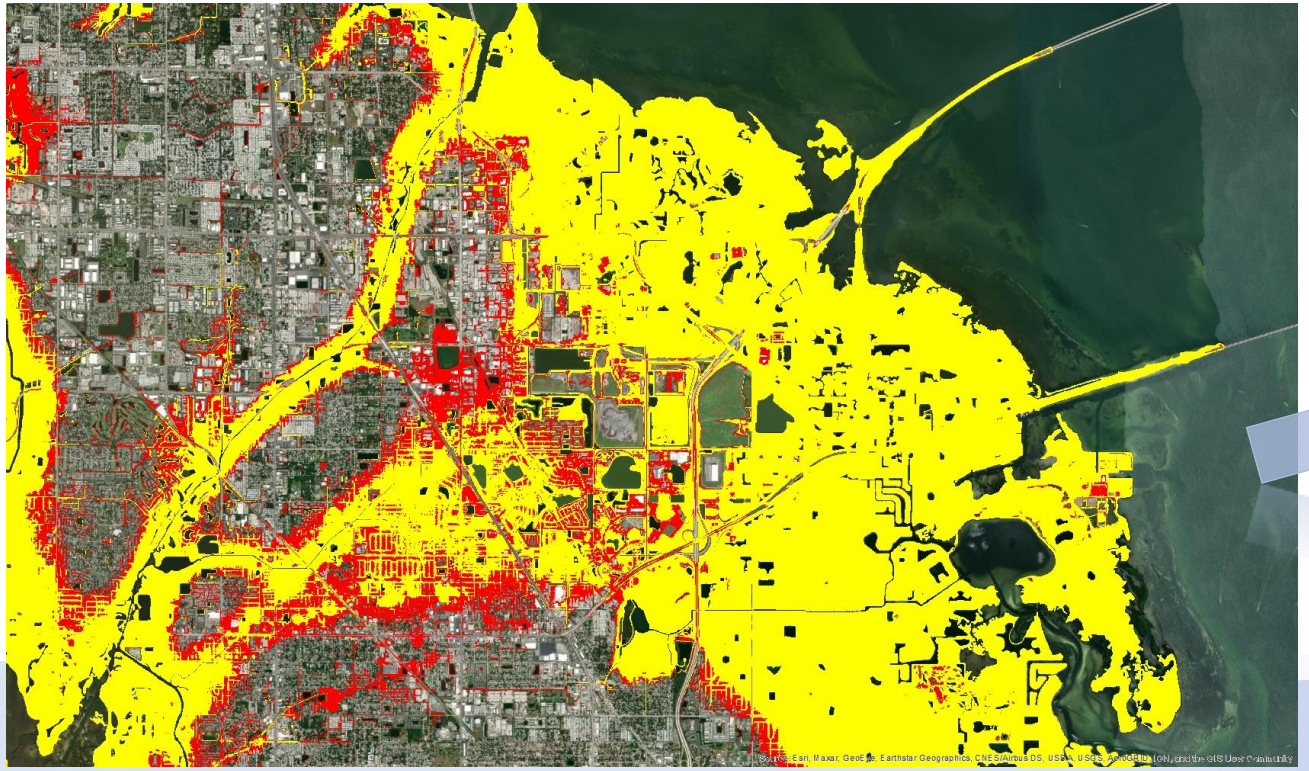
Indian Rocks Beach

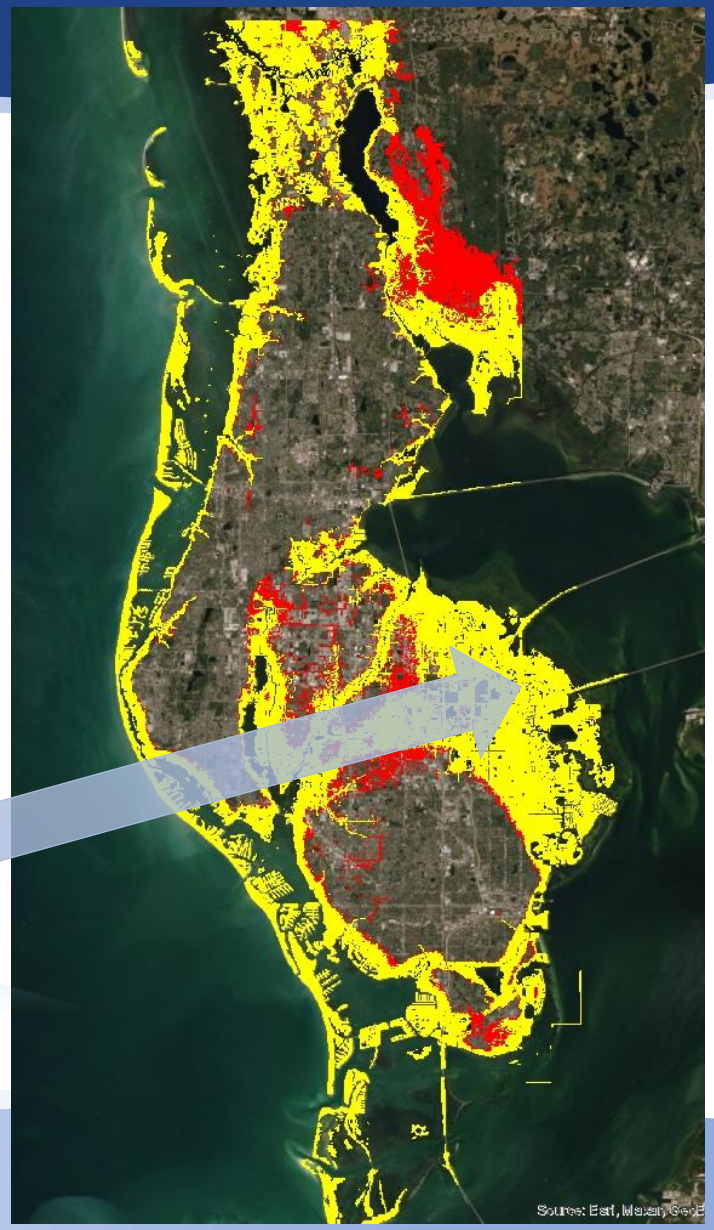
- High SLR scenario
- No storm surge
- Many streets flooded due to tides
- Common barrier island situation



Storm Surge – Current vs. 2040 High SLR

- Current 100-year Storm Surge
- 2040 Storm Surge with High SLR

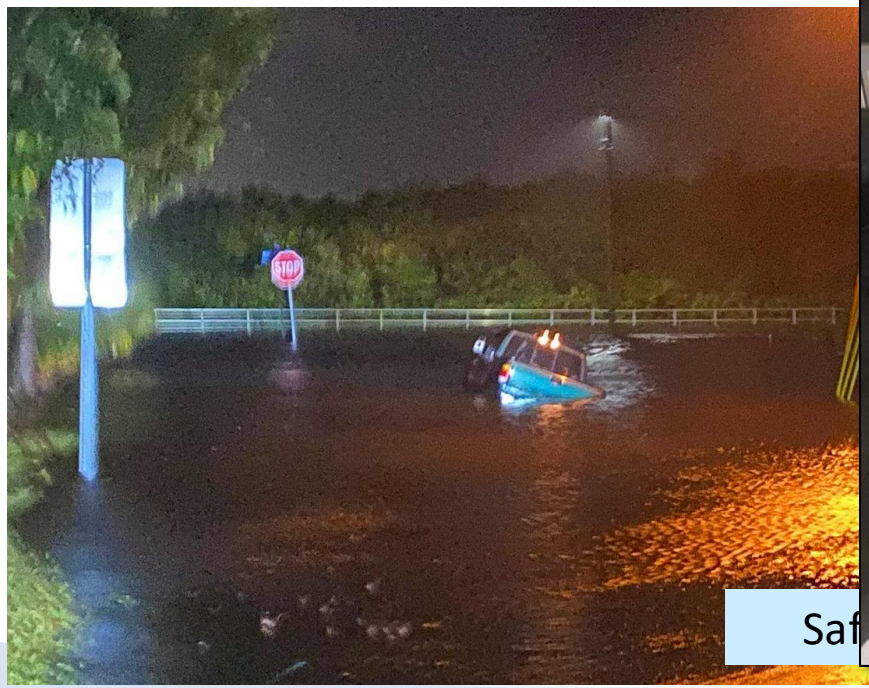




The Homeowner's Perspective

TS Eta (November 202

- <10-year (6 inches) r
- 3 to 4 feet storm sur



Saf

Treasure Island

St. Pete Beach

Next Steps

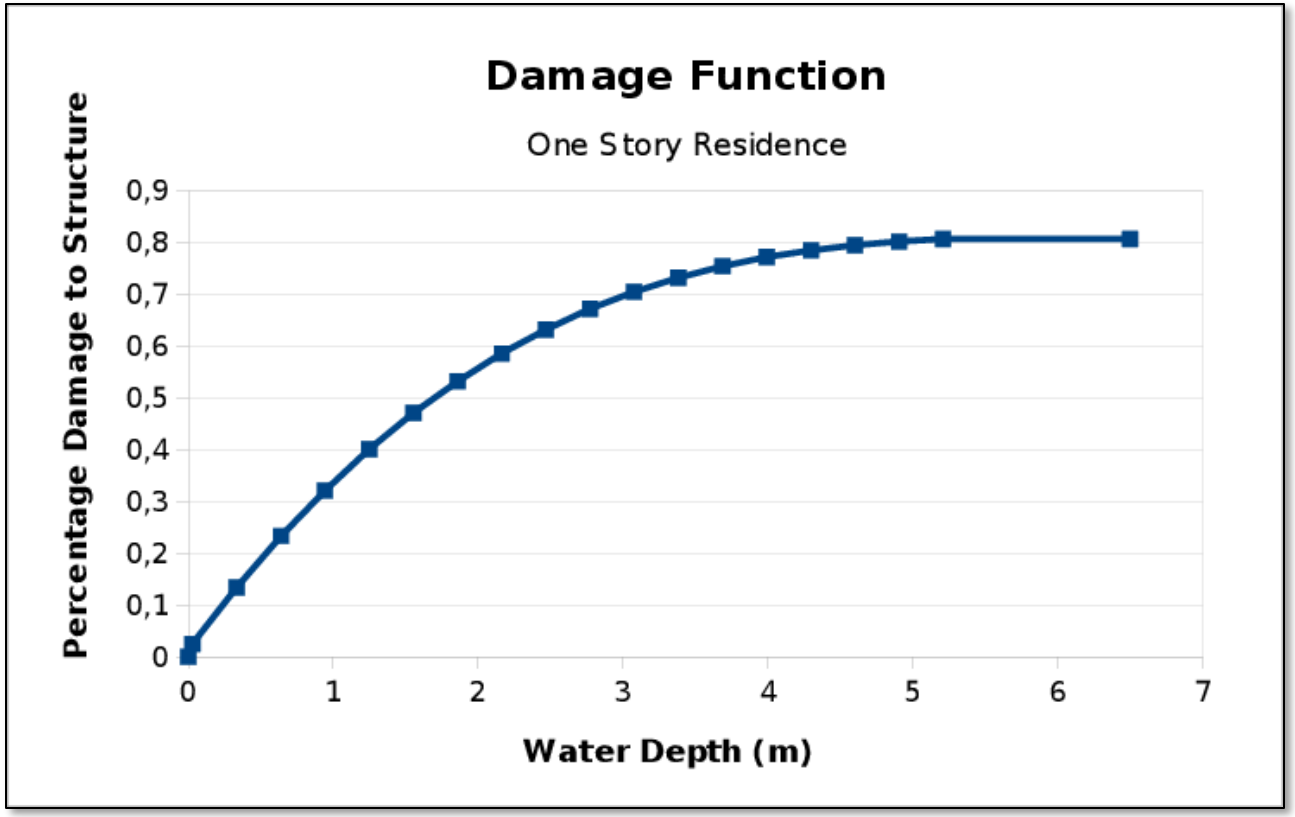
Adaptation Planning

Vulnerability of Assets

Adaptation Strategies

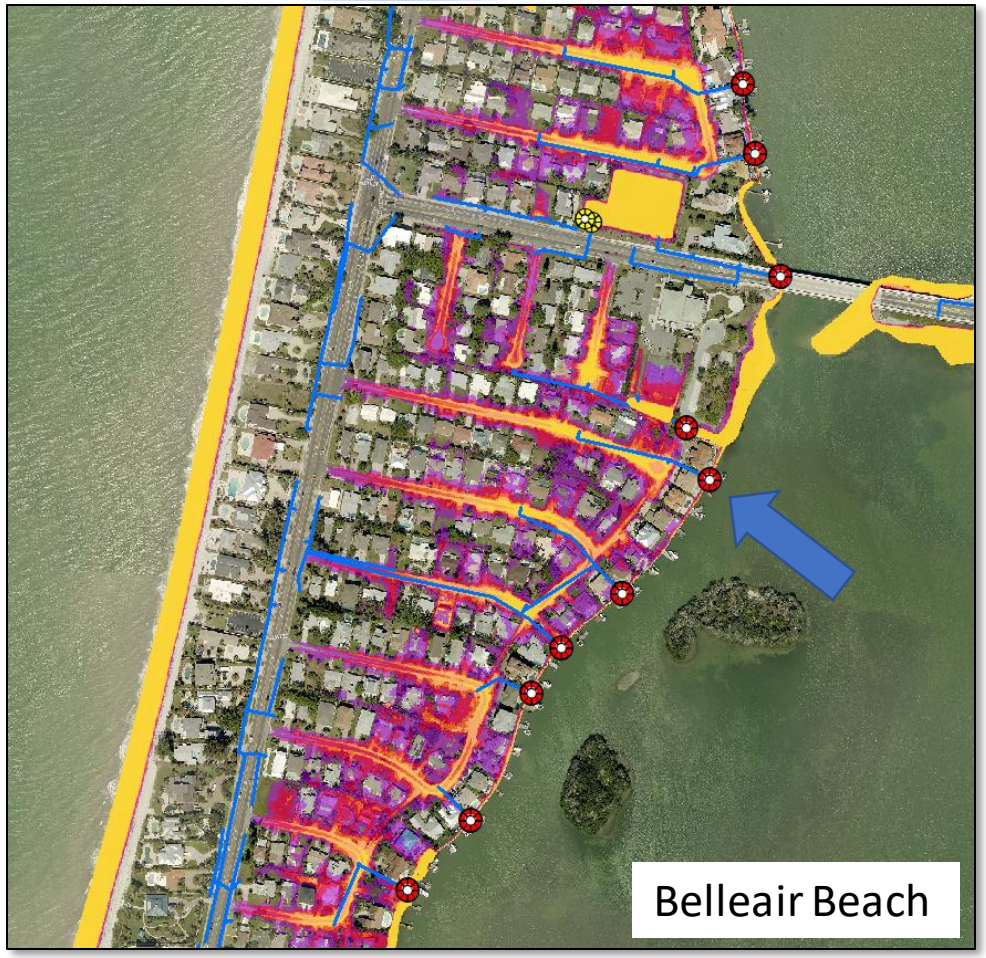
Asset Ranking

- Depth-Damage functions
- Relate depth of flood to cost of damage
- Rank assets by expected damage cost



Adaptation Strategies

- **Install tidal check valves at key stormwater discharge points**
- **Increase seawall height?**
- **Elevate or build higher?**



Adaptation for Direct Connections

- **Example: Twin City MHP flooded during TS Eta**
- **Check valves won't work due to overland flows**
- **Seawall? (How high?)**
- **Elevate? (How much freeboard?)**
- **Retreat? (How far and where to?)**

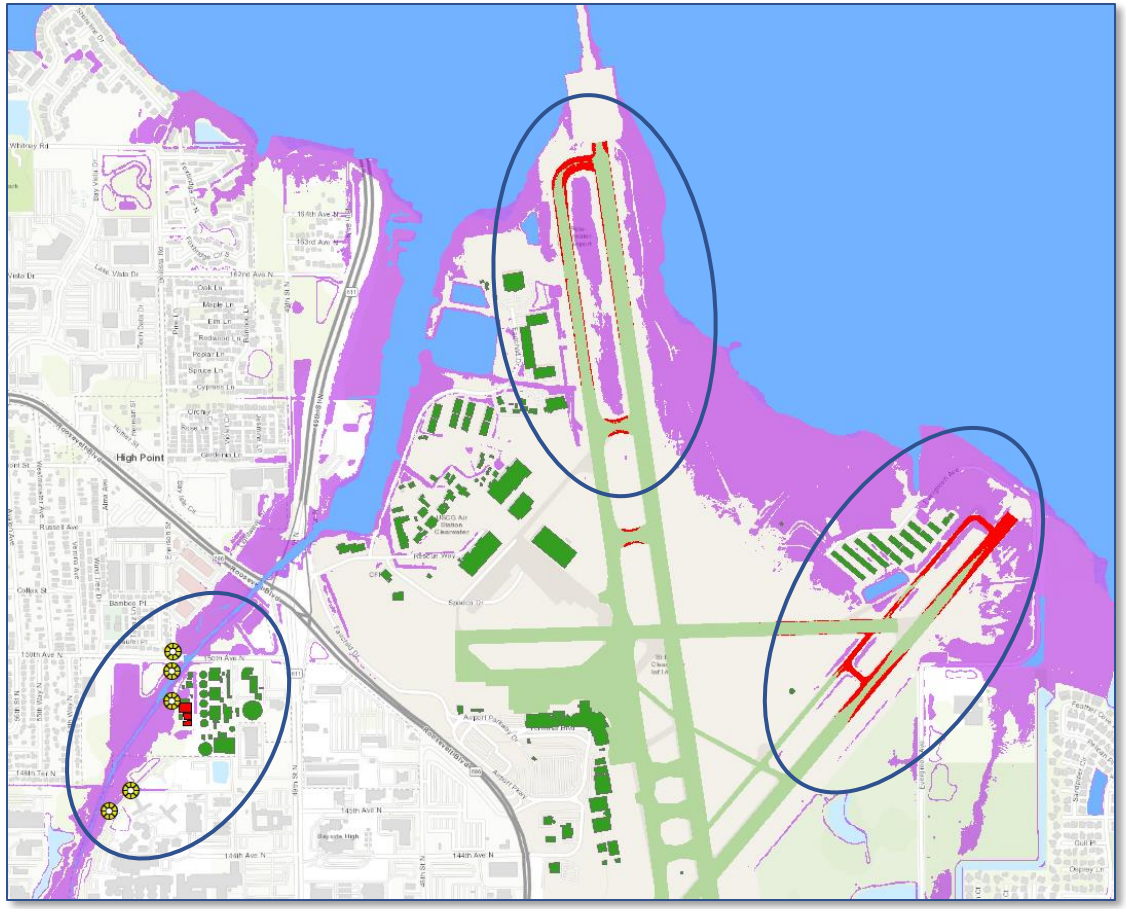
PIE and Largo Water Treatment Plant

Assets subject to flooding

- WW Bldgs, WW manholes & PIE Bldgs at 2040 SLR, Intermediate Scenario, 1 hpy flood
- PIE runways at 2070 SLR, High scenario, 1,185 hpy (MHW) flood

Adaptation

- Flood proof buildings
- Seawalls
- Modify air traffic schedules or use alternate runways



Questions?