



COASTAL RESILIENCE PARTNERSHIP
SOUTHEAST PALM BEACH COUNTY



Southeast Palm Beach County Climate Change Vulnerability Assessment

Lake Worth Beach Commission Presentation
June 15, 2021



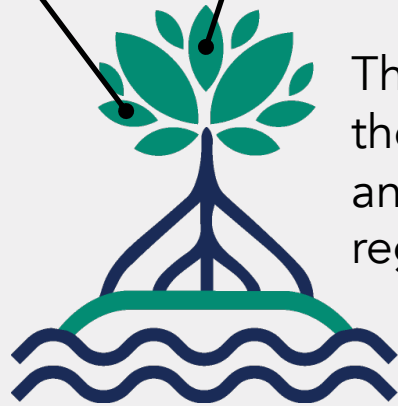
COASTAL RESILIENCE PARTNERSHIP

The **eight** smaller leaves represent the local governments in the Coastal Resilience Partnership.

The three bigger leaves represent the regions similar **physical, geographic, and social** characteristics.

The mangrove is a nod to the importance of nature and the environment to the region and its economy.

Water is a tremendous asset to our region but is also a threat. Sea level rise is the most obvious sign of climate change in the region.



Unincorporated
Palm Beach County

Lake Worth Beach

Lantana

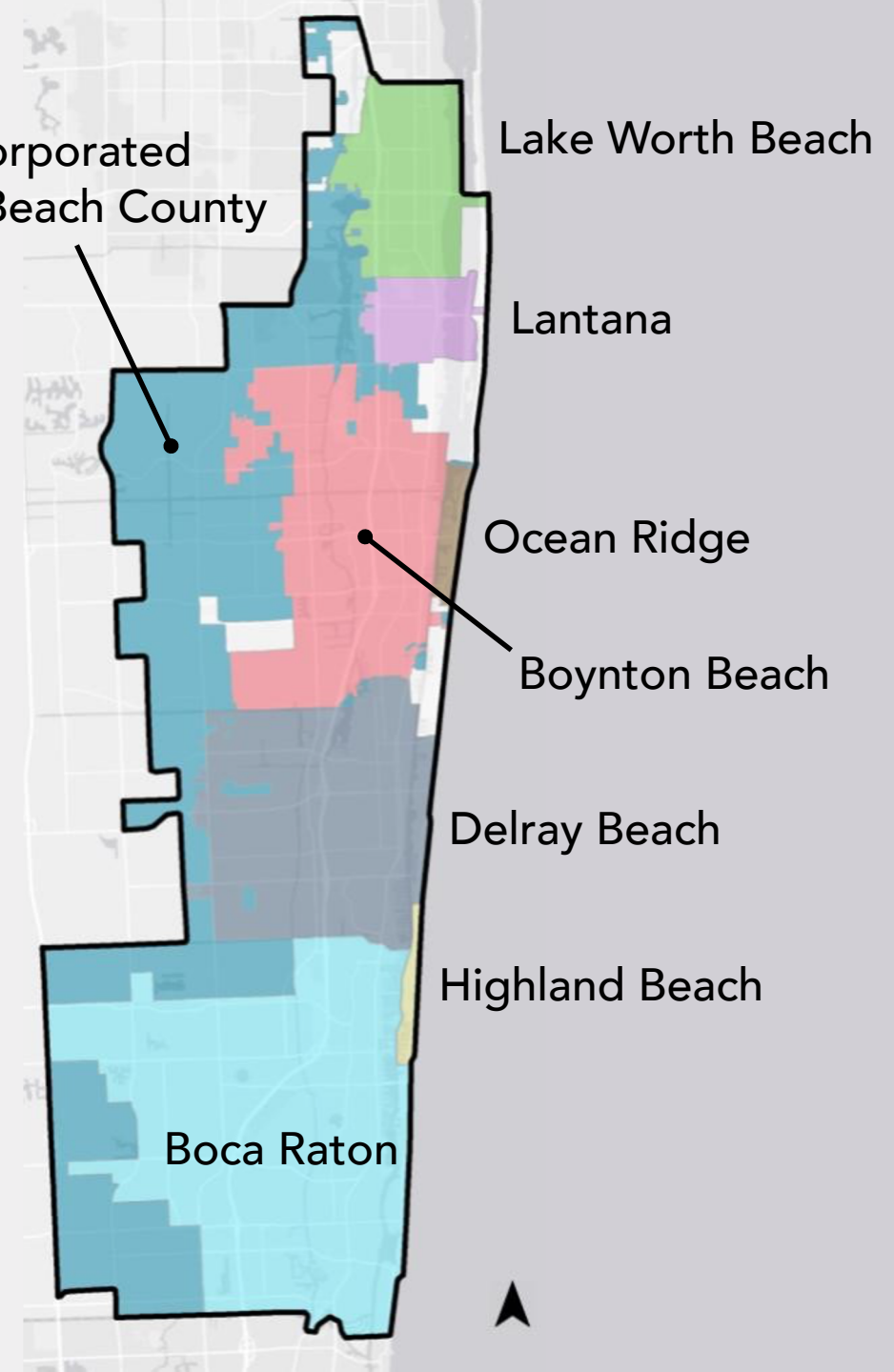
Ocean Ridge

Boynton Beach

Delray Beach

Highland Beach

Boca Raton



WHAT IS VULNERABILITY & RISK? WHY ASSESS IT?



Vulnerability

Asset characteristics used to indicate levels of sensitivity, potential impact, and adaptive capacity.



Sensitivity

The range or magnitude of how much an asset may be hurt by a threat.



Risk

Both threat and asset characteristics used to indicate levels of probability of a particular climate event from happening and its associated consequence.



Adaptive Capacity

The extent to which an asset may change and its ability to adapt.

Many analyses just look at **exposure**, which tells you whether a particular asset may be impacted by a threat but does not reveal how sensitive the asset is to that threat, nor the probability of occurrence, nor whether an asset can be adapted to reduce exposure.



STUDY PROCESS



1. Explore Climate Threats



2. Assemble Data on Community Systems



3. Assess Vulnerabilities and Risks



4. Investigate Potential Adaptation Strategies



5. Reporting and Tool Deployment

TOP DOZEN THREATS



High Winds



**Rainfall-Induced
Flooding**



**Harmful Algal
Blooms**



**Pest & Disease
Outbreaks**



Extreme Heat



Drought



Wildfire



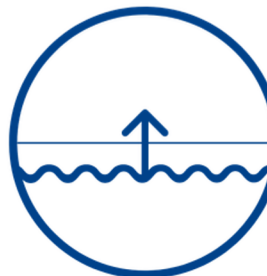
**Shoreline
Recession**



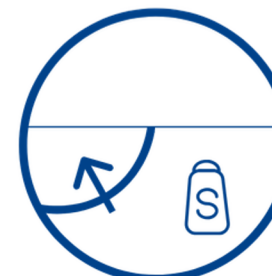
Tidal Flooding



Storm Surge



**Groundwater
Inundation**



**Saltwater
Intrusion**

SEA LEVEL RISE PROJECTIONS



NOAA High

Recommended for
Sensitive and Critical
Infrastructure

NOAA Intermediate High

Recommended for
Assets with Adaptive
Capacity

IPCC Median

Recommended for
Assets with Short Life
Cycle

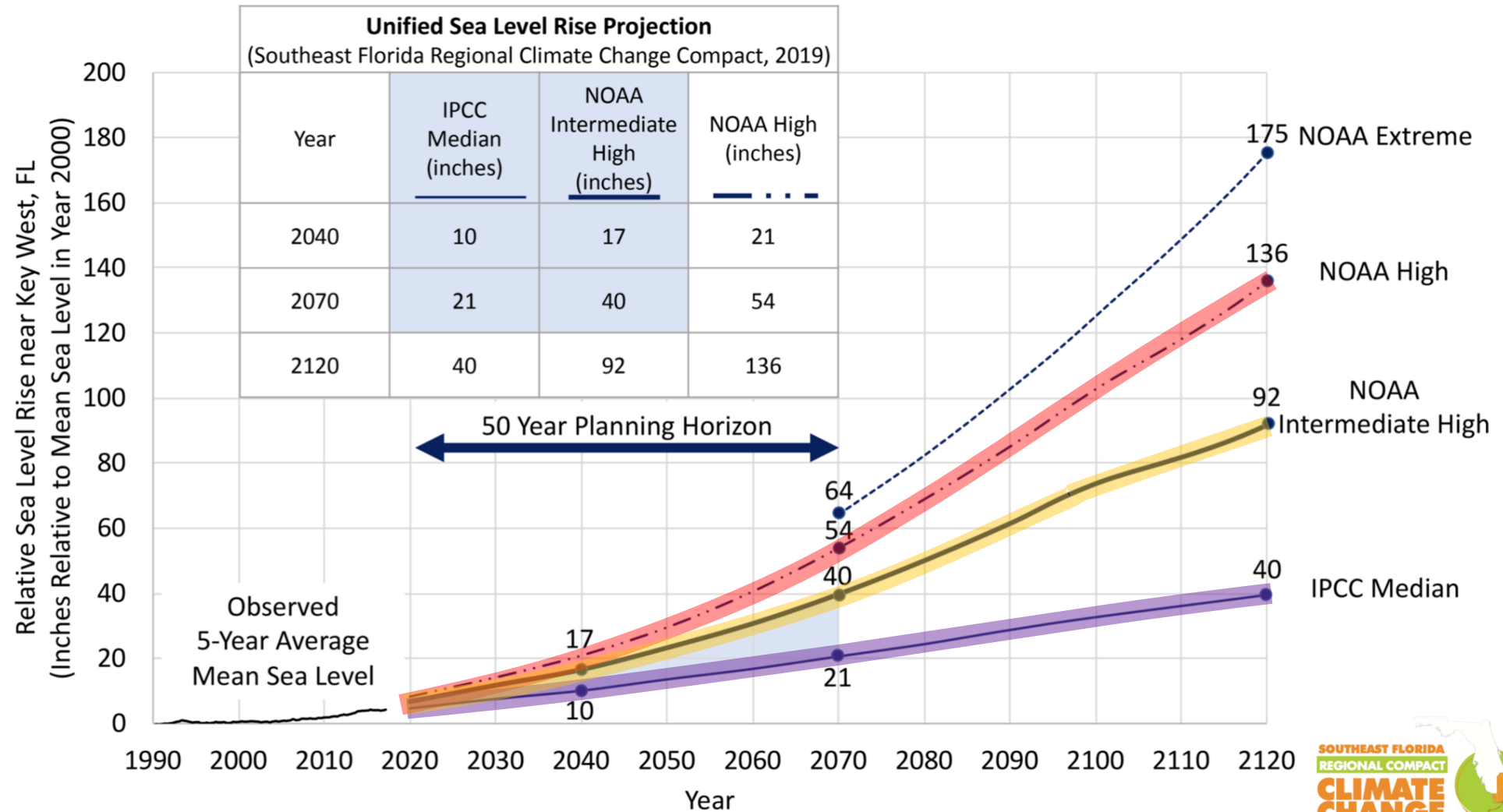


FIGURE 1: Unified Sea Level Rise Projection

OVERVIEW OF ASSETS ANALYZED



Critical Facilities



Water Infrastructure



Economic Factors



People and Socioeconomics



Transportation & Mobility



Natural Resources



Property



PUBLIC OUTREACH OVERVIEW

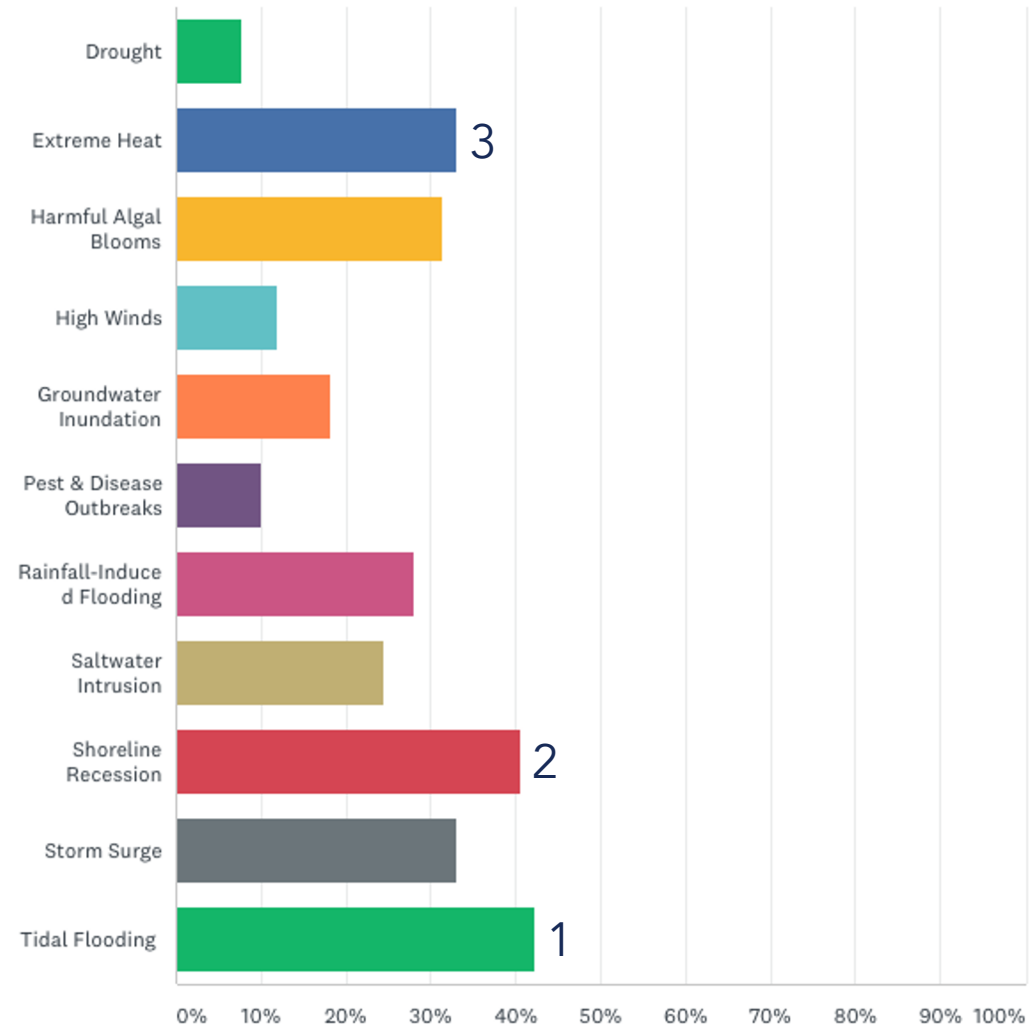
Public Engagement was an important part of this project and an essential part of the work of the Coastal Resilience Partnership.

Two public workshops were held as part of this study, and a third will be held to release the results. **Six staff workshops** were held as part of this study.

A **microregional survey** was done to help inform adaptation strategies.

The CRP is looking at how 12 climate threats may affect our local area. In your opinion, which of these climate threats will have the biggest negative impact in Southeast Palm Beach County? (Check up to 3)

Answered: 558 Skipped: 87



COMMUNITY FLOOD VULNERABILITY OVERVIEW

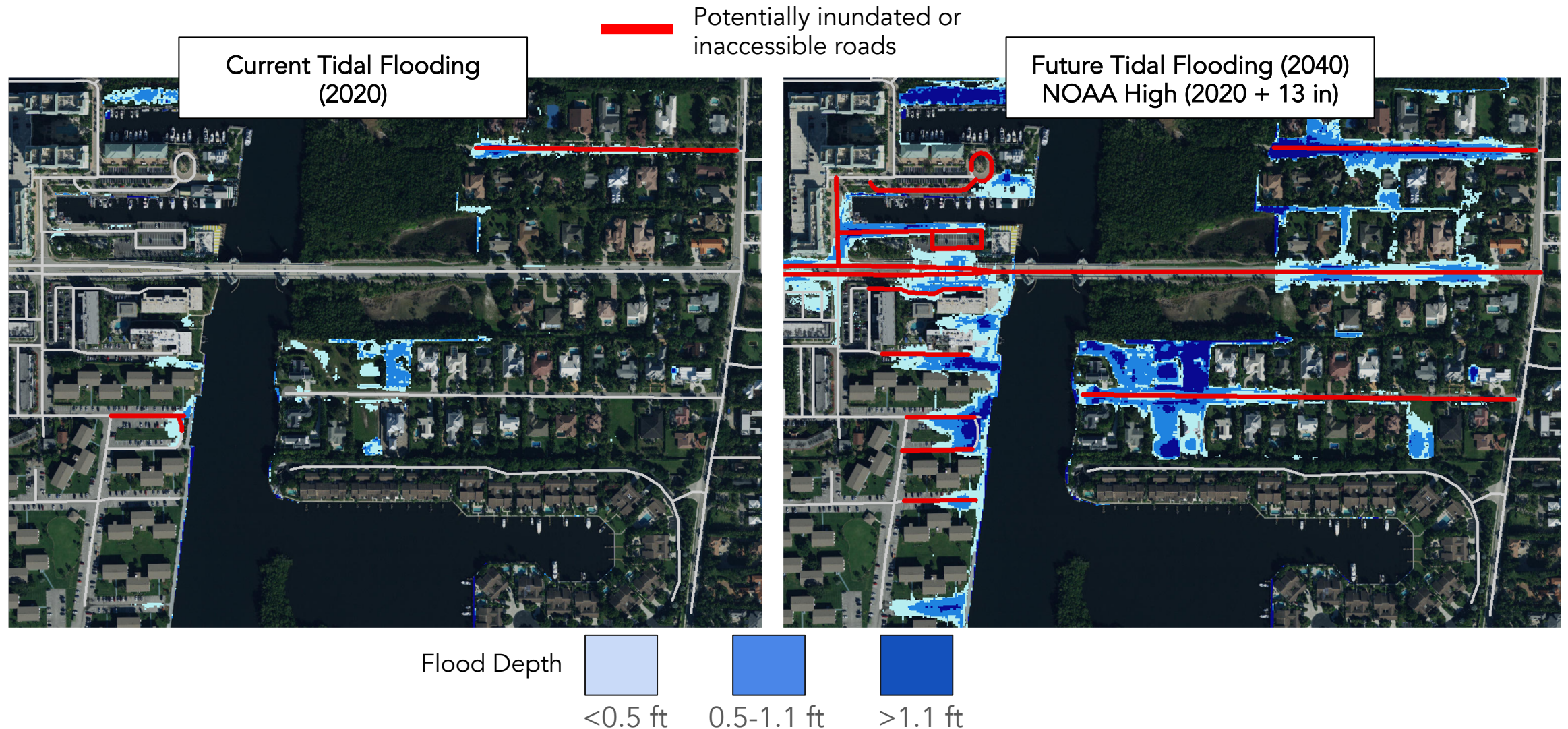


Levels of vulnerability and risk vary for the different types of flooding.

Regional Vulnerability and Risk to Flooding for Current Conditions (2020)

	Total Assets	Rainfall-Induced Flooding	Storm Surge (Vulnerability)	Tidal Flooding
Commercial & Industrial	3,191	1,186 (30%)	177 (5%)	13 (<1%)
Residential	118,014	49,832 (42%)	8,487 (7%)	342 (<1%)

Roadway Example: Future Change and Adaptation Based on Vulnerability Assessment Output





RAINFALL INDUCED FLOODING

Flooding due to the accumulation of rainwater on normally dry land.

Climate Stressors:

- Sea level rise (outfalls)
- Changes in spatial & temporal variability of rainfall

Non-Climate Stressors:

- Increases in impervious surfaces
- Aging infrastructure
- Development & floodplain alternation
- Stormwater system maintenance challenges

Data Sources:

- Stormwater master plans; H&H/stormwater Models
- FEMA Maps/"Riverine" Floodplain Mapping
- Problem area reports
- Inundation mapping



RAINFALL INDUCED FLOODING ASSESSMENT

LAKE WORTH BEACH RESIDENTIAL ASSETS & TRANSPORTATION

	2020	2020 + 5"	2020 + 33"
Assets with Medium/High Combined Vulnerability & Risk Score	2,232 (24%)	2,577 (28%)	3,310 (36%)
	\$253M (20%)	\$351M (28%)	\$540M (43%)

	2020	2020 + 5"	2020 + 33"
Major Roads Inaccessible (Mi)	45 (53%)	45 (53%)	47 (55%)
Minor Roads Inaccessible (Mi)	104 (35%)	109 (36%)	119 (40%)
Inaccessible Properties	2,988 (28%)	3,248 (31%)	3,897 (37%)

SOCIAL EQUITY & ADAPTATION



It is important to consider frontline communities – or those that will experience climate change first and worst and ensure that we all rise above the challenge together. Here are a few example equity strategies -

Shared Benefits

Can the benefits of an action or strategy reduce historical or current disparities, economic or otherwise?

Relationship Building

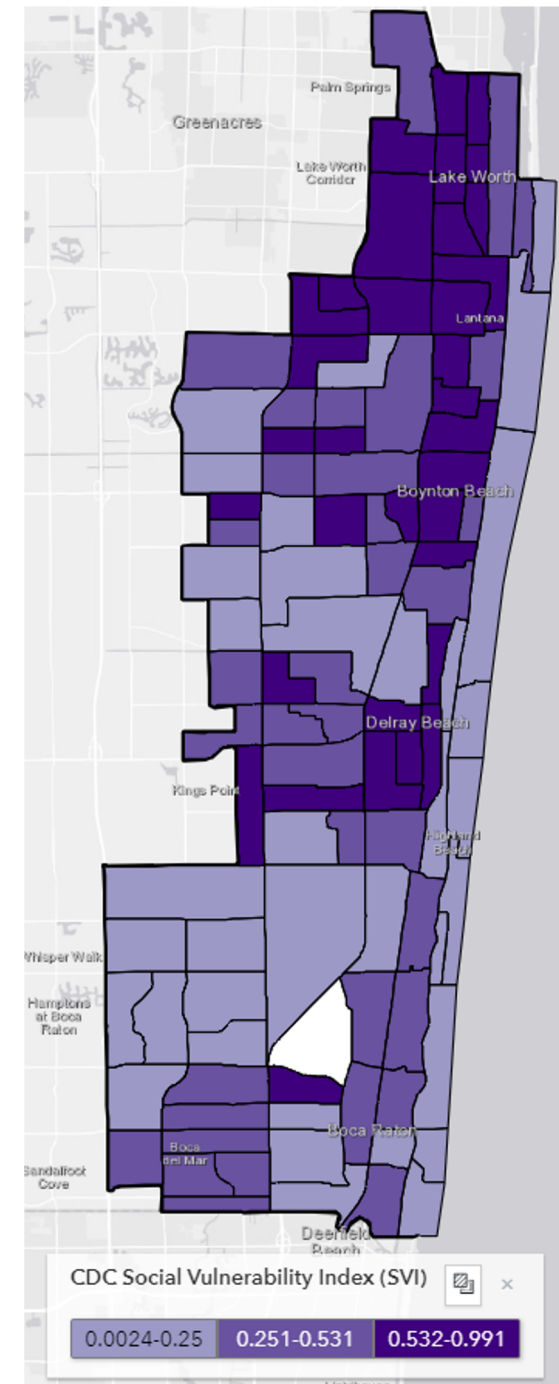
Does the action help foster building effective, long-term relationships and trust between diverse communities and local government?

Alignment and Partnership

Does the action align with existing priorities of frontline communities and allow for collaboration and partnership?

Capacity Building

Does the action help build frontline community capacity through funding or expanded knowledgebase?



OVERVIEW OF ADAPTATION STRATEGIES



 Infrastructure	Physical Infrastructure
	Green Infrastructure
 Land Use, Building Codes and Standards	Land Use - Practice
	Land Use - Planning
	Land Use - Policy
 Planning, Policy and Management (non- land use)	Building Codes/Standards
	Planning
	Policy
	Operations and Practice

 Capacity Building	External Partnerships
	Analysis and Research
	Monitoring and Technology
 Public Outreach	Community Resources
	Public Communication
 Funding & Financing	Community Engagement
	Local Funding
	External Funding
	Financing

Top Findings

1. High levels (percentages) of vulnerability are associated with High Winds throughout the City due to age of structures.
2. A large percentage of properties (75%) are vulnerable to potential inaccessibility during current-day RIF.
3. City is unique in the region in its social vulnerability characteristics. Therefore, it's importance to recognize many of the City's residents face disproportionate impacts from climate threats. Within the region, the City has among the highest percentages of households living below the poverty line, the highest food SNAP participation, and the highest levels of overall social vulnerability.



Select Municipal Strategies

1. Consider the use of **living shorelines** as a combination with or alternative to hard infrastructure, such as seawalls.
2. Explore the concept of **Adaptation Urbanism** – integrating compact development, sustainable transport, blue and green infrastructure, and equity.
3. Collaborate as the CRP to compile resources to encourage sustainable landscaping practices, pervious surfaces, and downspout disconnection for homeowners and businesses, including **Florida-Friendly Landscaping™** and those that reduce fertilizer usage.
4. Engage **Lake Worth Drainage District (LWDD) and SFWMD** regarding the impacts of current and future flood events on the secondary and primary canal systems in Southeastern Palm Beach County.
5. Continue regionally important conversations regarding climate change, sustainability, and resilience, engaging the public and appropriate stakeholders.
6. Identify grant opportunities to **fund adaptation strategies**.

FUNDING ADAPTATION



Be prepared for State and Federal Grants.

The region will be more competitive working together as the Coastal Resilience Partnership than alone – more resilience dollars will soon be coming from the State and Federal governments.

Communities that act sooner will see preserved property value and tax revenue.

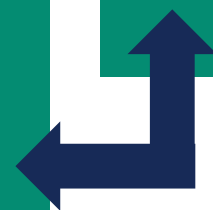
The community's primary tax base is from property taxes and value. By protecting and preserving property value, the community is also protecting their operational budget.

Bond rating agencies are examining climate risk and action as part of ratings.

The financial industry is looking at climate risk as part of the bond rating process. Community that do not act may see negative impacts. The opposite is also true – communities planning or that take action have seen better bond ratings.

Planning will allow for exploration of innovative financing and public-private partnerships.

By understanding what is needed, when it might be needed, and how much it might cost, local governments can leverage private sector investment over time.



FINANCING ADAPTATION





COASTAL RESILIENCE PARTNERSHIP

SOUTHEAST PALM BEACH COUNTY

The work of the Coastal Resilience Partnership is a model of how neighboring local governments can come together to address regional challenges.

Understanding the problem, identifying the impacts, and developing a menu of strategies is only the first step.

Adaptation and mitigation will be a long process requiring sustained effort and collaboration on across all levels of government.

Q&A



TIDAL FLOODING ASSESSMENT

RESIDENTIAL ASSETS

Although the number of assets with high combined risk & vulnerability is relatively small, it accounts for a much larger percentage of total value in the region, comparatively.

	2020 + 13"	2020 + 33"
Assets with Medium/High Combined Vulnerability & Risk Score	1,015 (0.9%)	3,854 (3.4%)
	\$4.72B (6.9%)	\$12.1B (31.5%)
Assets Exposed	5,026 (4.4%)	7,594 (6.7%)
	\$16.7B (24.3%)	\$21.6B (31.5%)

