AIA Florida

Provider #: A022

Wicked Water III: Florida, Flooding and Financing Adaptation
Course Number: CNV20WWD

Date: June 17, 2020

CONTINUING EDUCATION AIA

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Questions related to specific materials, methods, and services will be addressed at the conclusion of this presentation.

Wicked Water III

Florida, Flooding and Financing Adaptation

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Sea Level Rise: Shifting from Reactive Solutions to Cost Effective & Equitable Prevention

Keren Bolter, PhD

A Changing Risk Context

URBAN POPULATION
10^9

STORM INTENSITY
% PDI

SEA LEVEL RISE
2x(1/10m)

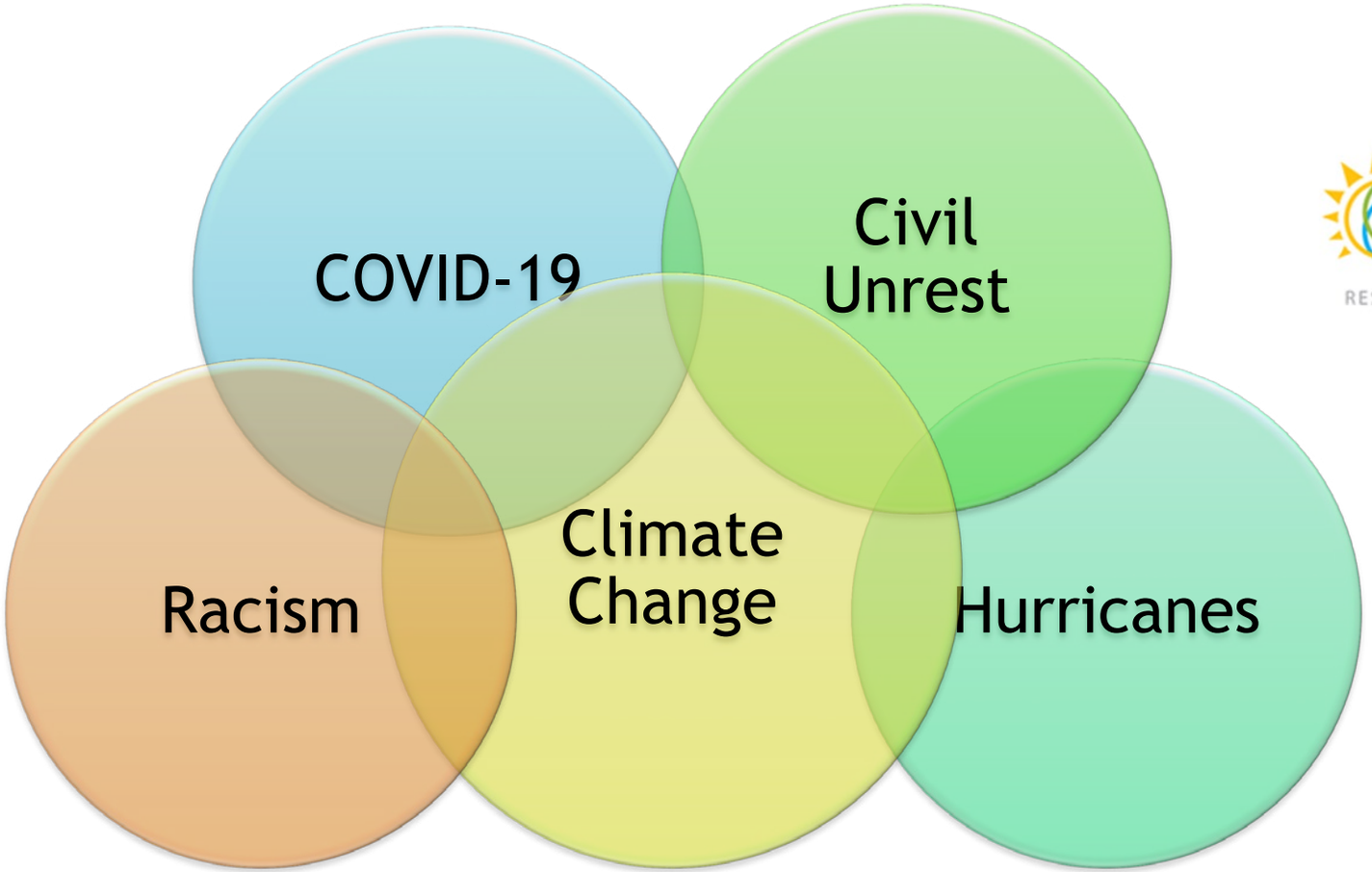
TEMPERATURE
°C

1850 1900 1950 2000 2050 2100

TRENDS

YOU ARE HERE

Equity at the Core



FLORIDA HURRICANE RESPONSE HUB

Building disaster-related workforce capacity

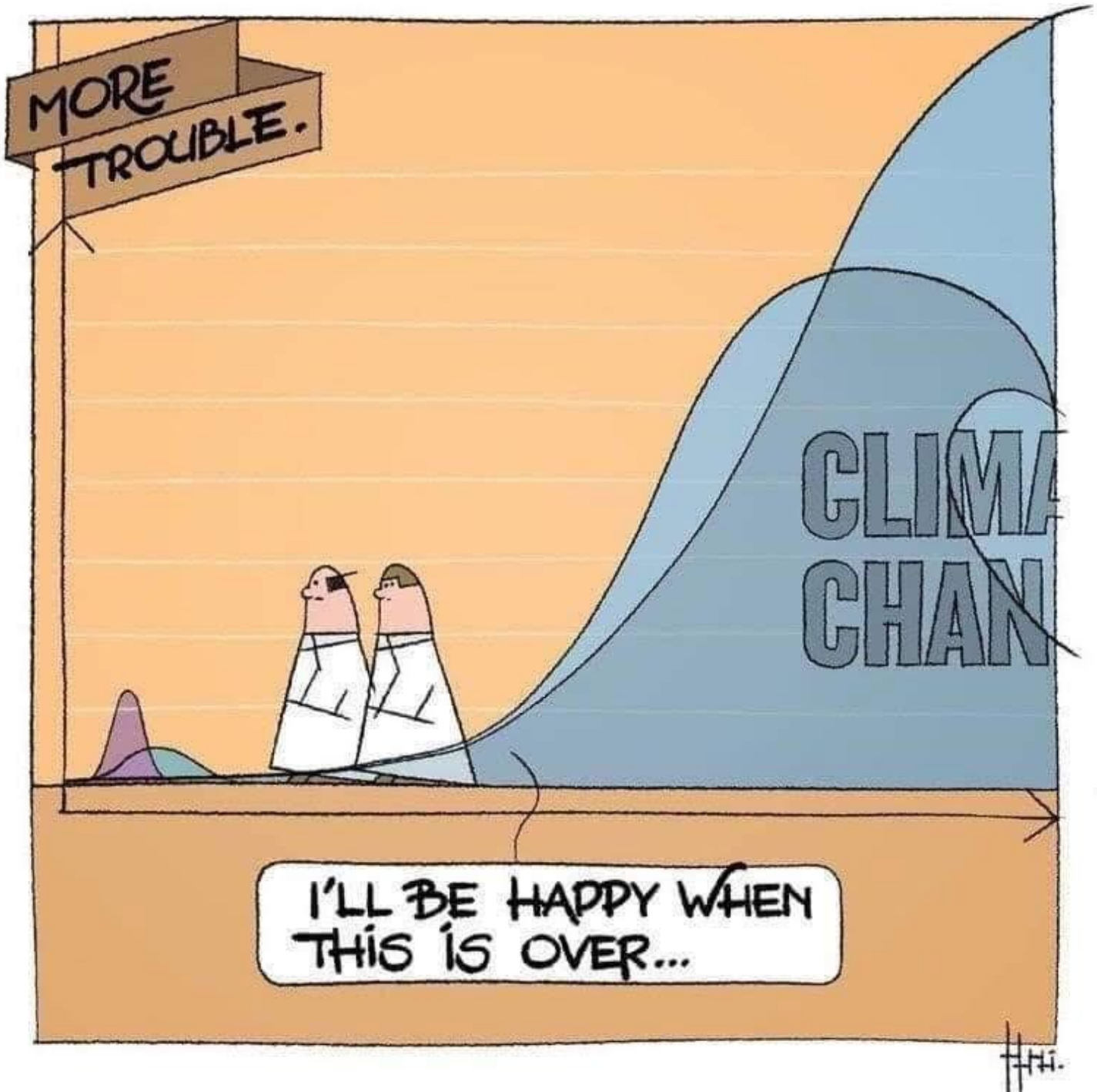
Florida Institute for Health Innovation

RESULTS-ORIENTED. RESPONSIVE. DATA-DRIVEN

CDC

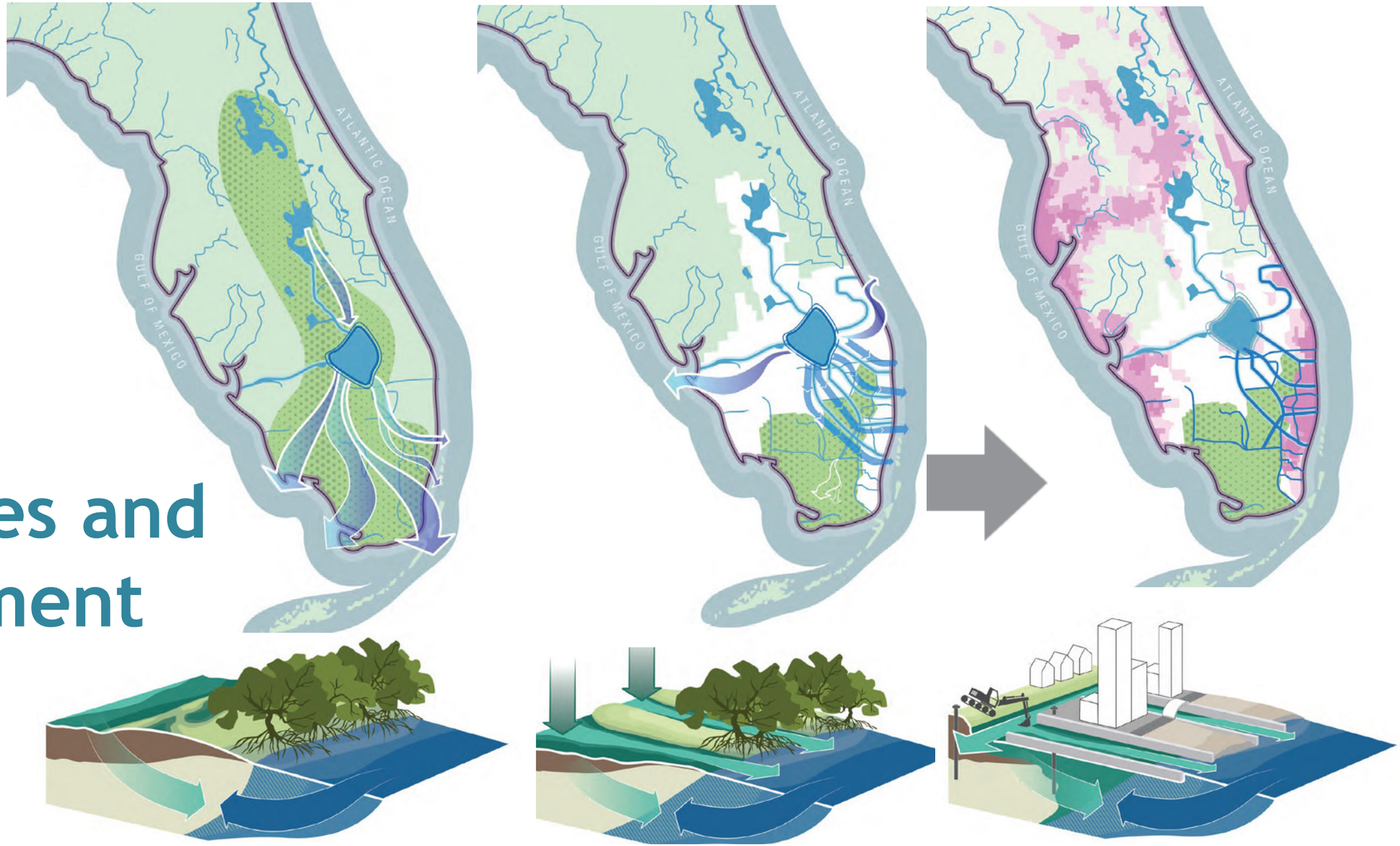
CENTERS FOR DISEASE CONTROL AND PREVENTION

flhealthinnovation.org/hrh

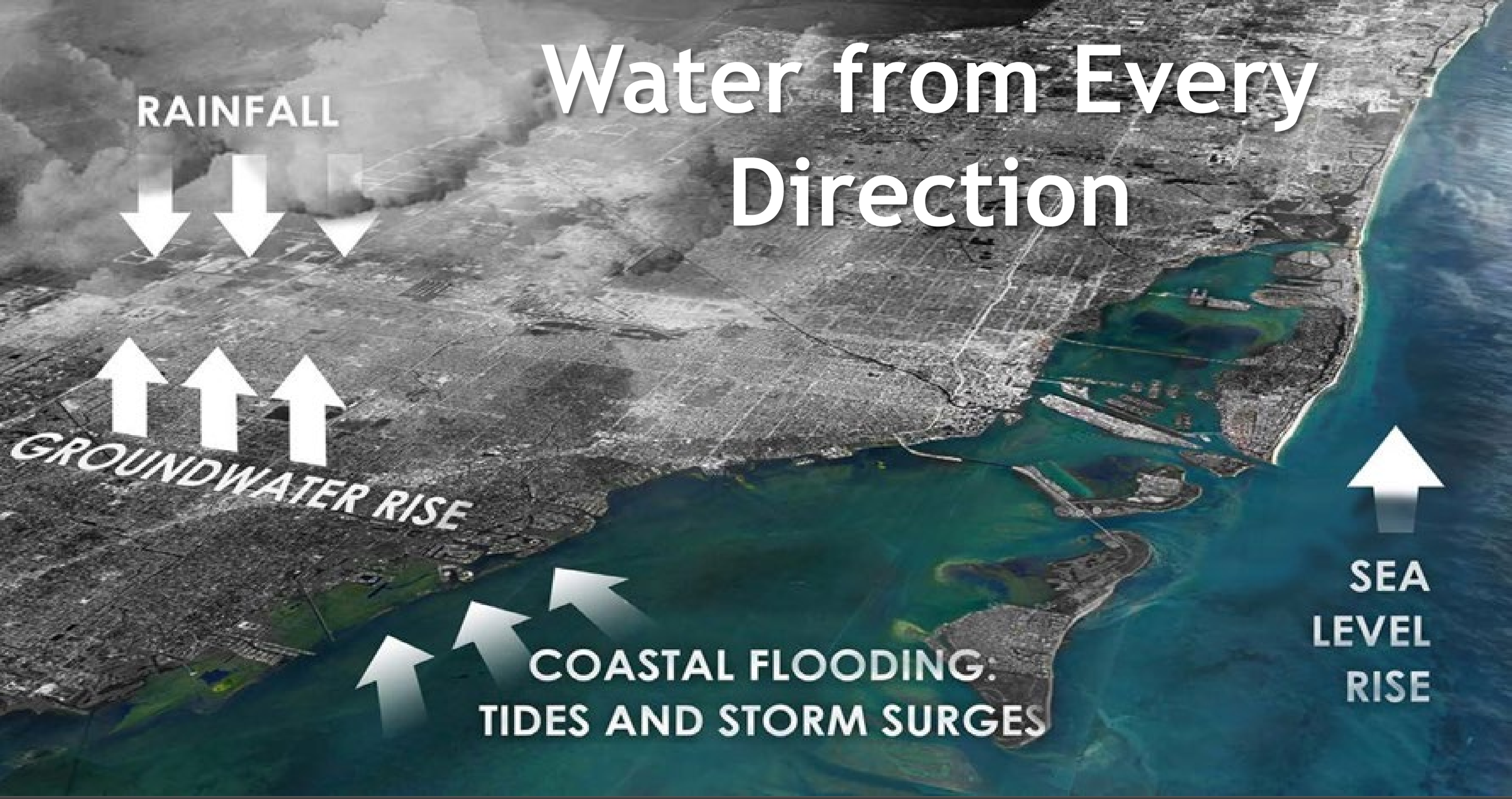

MORE TROUBLE.
CLIMA
CHAN
I'LL BE HAPPY WHEN THIS IS OVER...
Hi.


COVID-19
THE UPCOMING ECONOMIC CRISIS
CLIMATE CHANGE

Everglades and Development



Water from Every Direction



Effective Adaptation Strategies

1) land-use regulations & building codes

2) limits on insurance subsidies

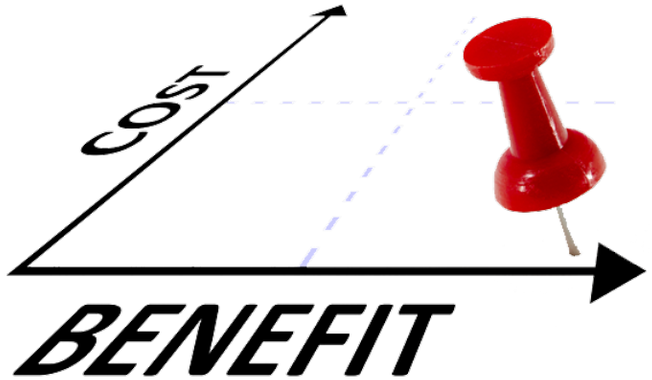
3) redesign and retrofitting of structures

4) updates for drainage, flood control, and water supply infrastructure

5) increased coastal protection

CO-BENEFITS!

Value of Resilience



National Institute of BUILDING SCIENCES

FEMA

*Natural Hazard **Mitigation** Saves: 2017 Interim Report*
www.nibs.org/page/mitigationsaves

13,151 AFFORDABLE HOMES MADE FROM RESILIET

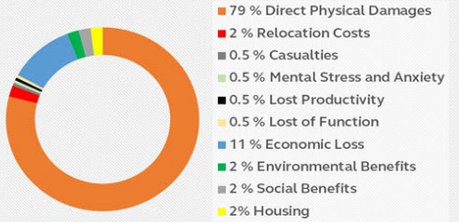
788 STRUCTURES PROTECTED FROM STORM SURGE

3,234 TONS CO^2 REDUCED ANUALLY

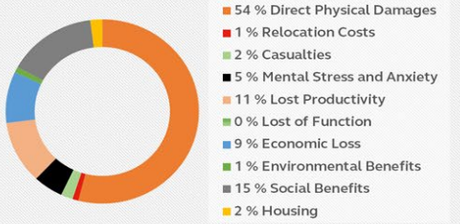
17 MILLION GALLONS STORMWATER **RUNOFF** REDUCED ANUALLY STORM SURGE

$433 MILLION HEALTHCARE COST AVOIDED ANNUALLY

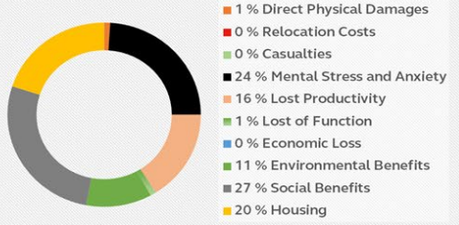
Manhattan Tip NPV



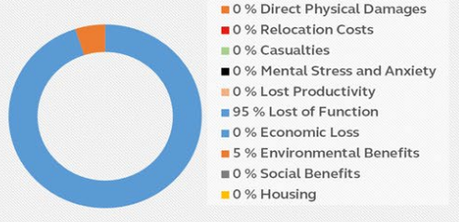
Two Bridges NPV



NYCHA NPV



NYCHA NPV

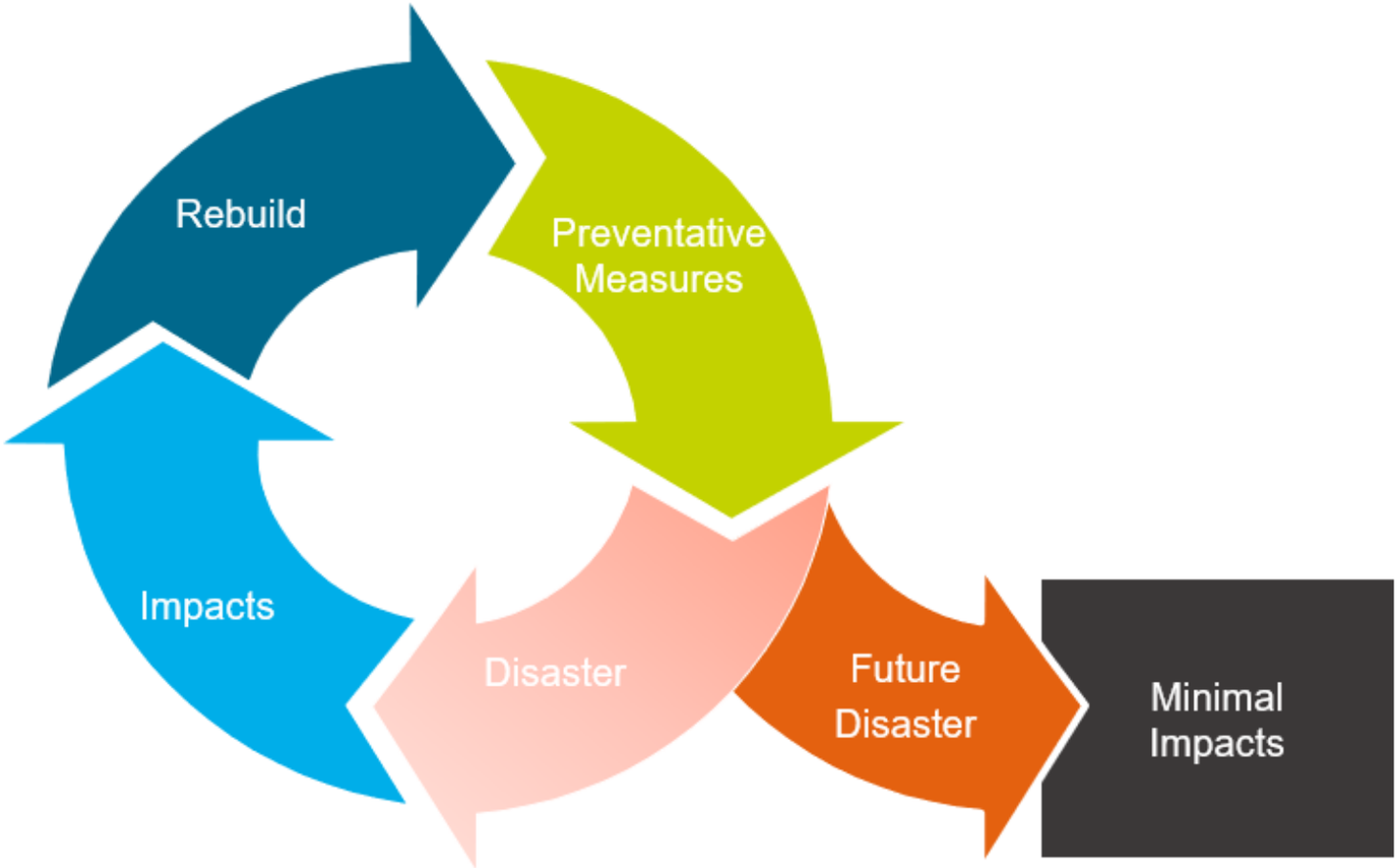


Stop the Cycle

Solution-Oriented Approach

vs.

Prevention-Oriented Approach



Stop the Cycle.

FEMA funding opportunities

Potential Projects

Green Infrastructure Projects

Stormwater Management Projects

Aquifer Storage and Recovery

Power Resiliency (Generators)

Erosion Control

Floodplain Restoration

Stream Restoration

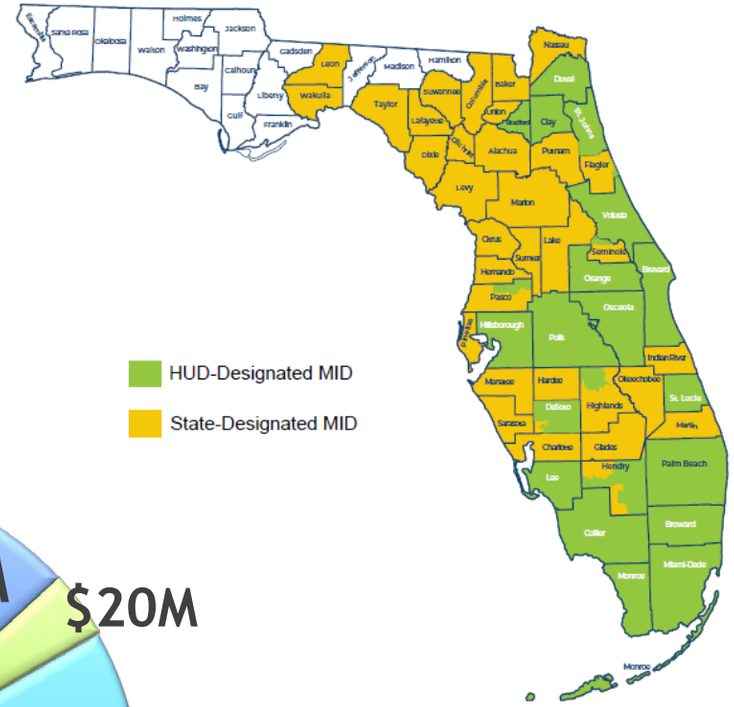
Infrastructure Retrofits

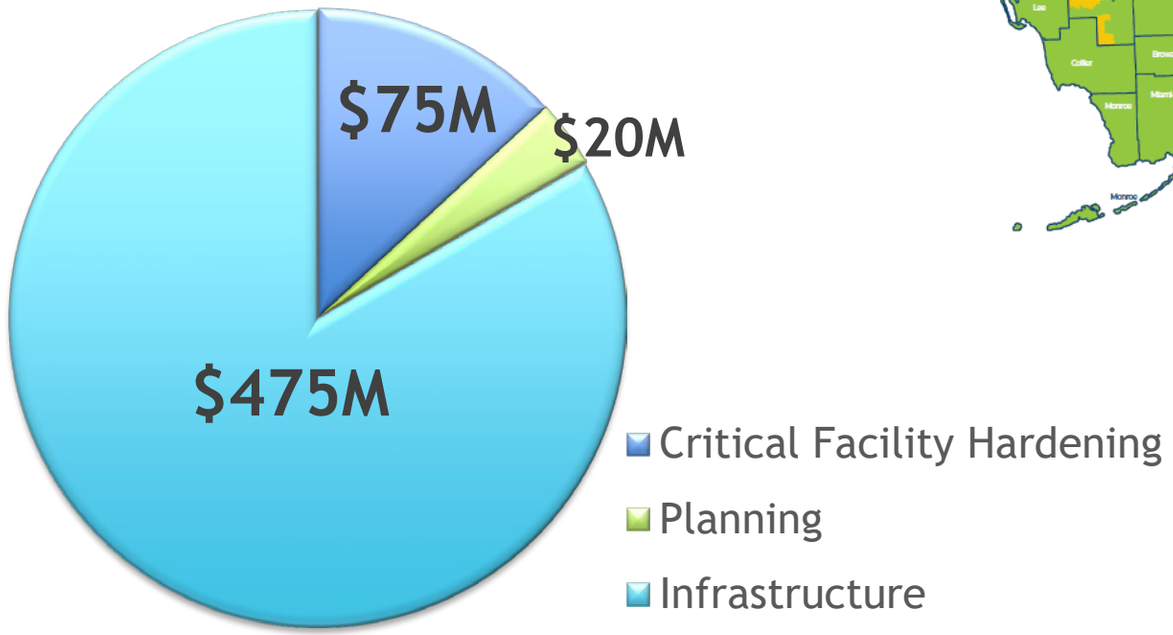
Rebuild Florida

U.S. Department of Housing and Urban Development (HUD) Community Development Block Grant – Mitigation (CDBG-MIT) funds administered by the Florida Department of Economic Opportunity (DEO).

$633 million to support Florida communities in hazard mitigation

https://floridajobs.org/rebuildflorida/mitigation





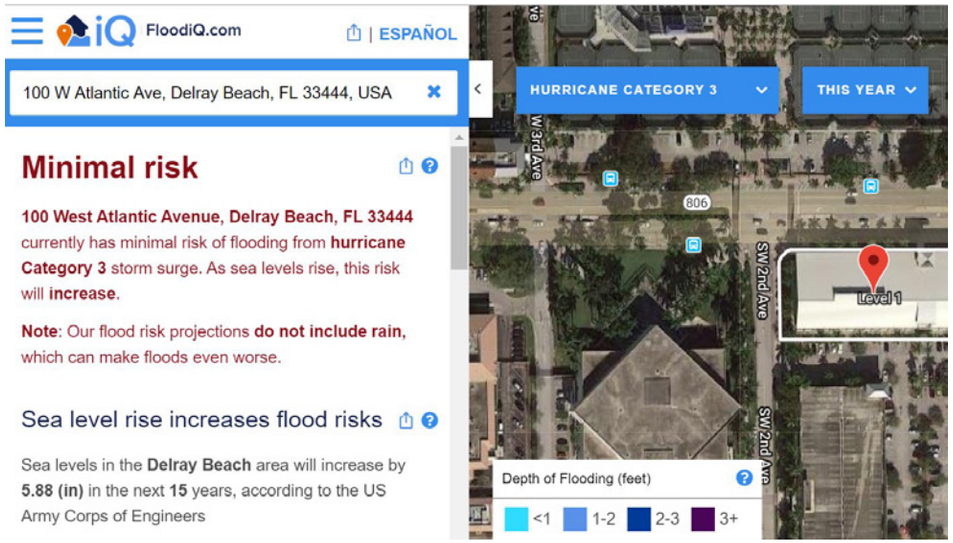
Tools to Learn more

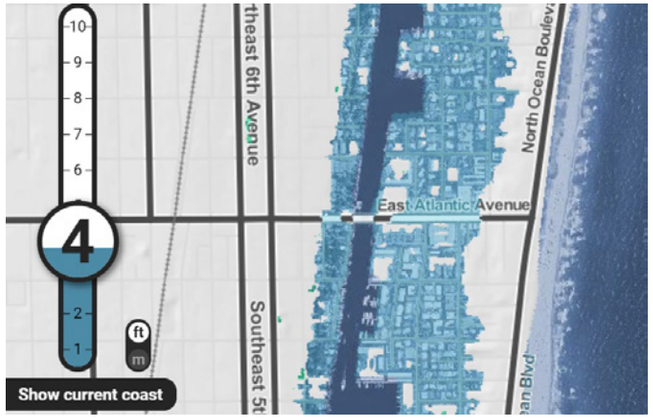
Flood IQ
https://floodiq.com/

Surging Seas
sealevel.climatecentral.org/

NOAA SLR Viewer
https://coast.noaa.gov/digitalcoast/tools/slr

and another great NOAA tool
https://coast.noaa.gov/digitalcoast/tools/flood-exposure.html





Communicating about Sea Level Rise

Health Impacts

Financial Impacts

Habitat Loss

Environmental Justice

Sustainability for future generations

Tipping Points

Who Pays?

KEREN BOLTER, PHD

e keren.bolter@arcadis.com

Thank you!

We have caveman emotions;
medieval institutions;
and god-like technology
-E. O. Wilson

FUTURE CONDITIONS: COMMUNITY DESIGN AND INFRASTRUCTURE

AIA WEBINAR - WICKED WATER PANEL

JUNE 17, 2020

WICKED WATER CONSIDERATIONS

- Climate Trends
  - Rising Seas
  - Rainfall Intensification
  - Increased Storm Surge
- Exposures
  - Population
  - Assets

Tidal Flooding

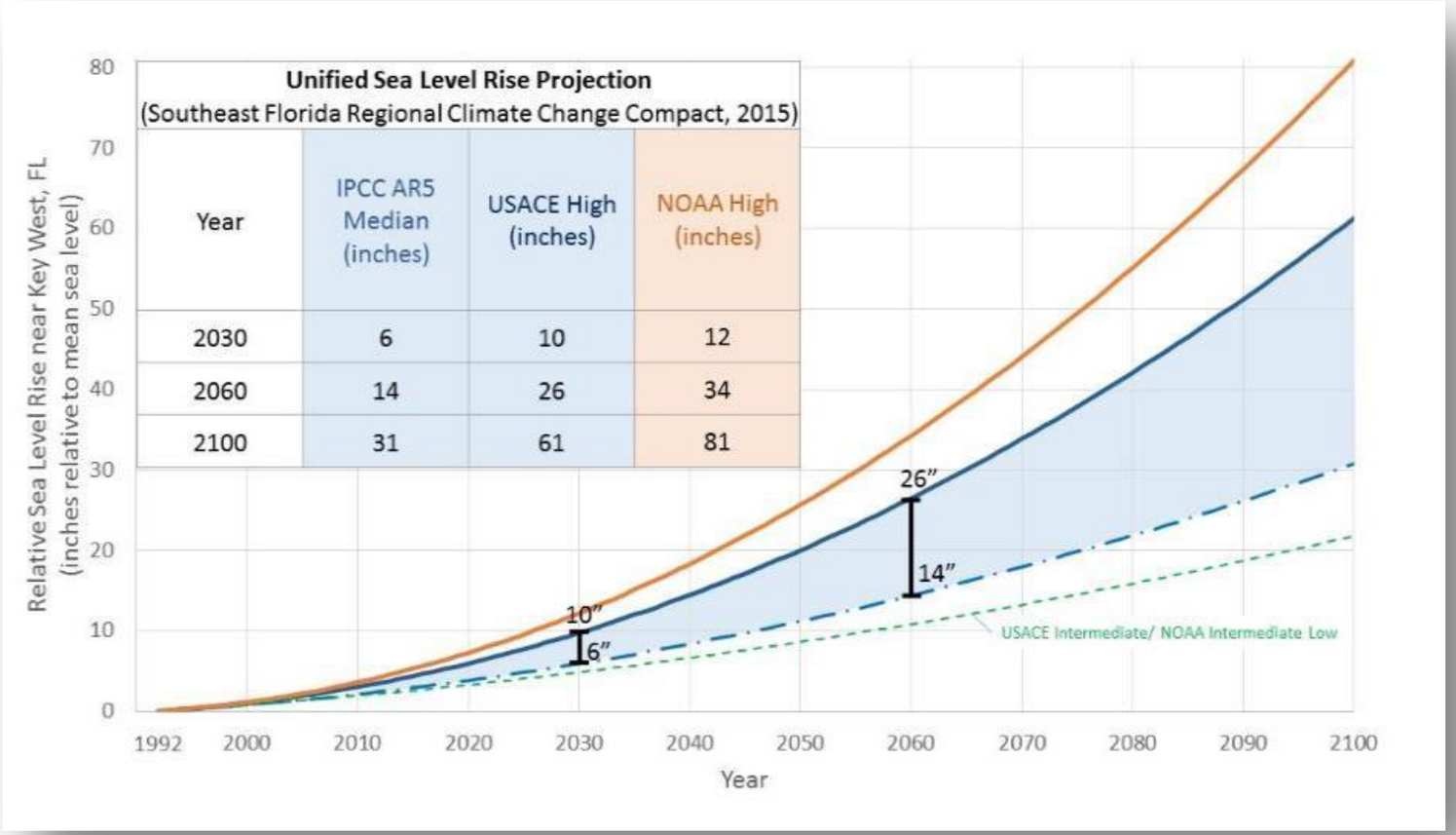
Inland Flooding

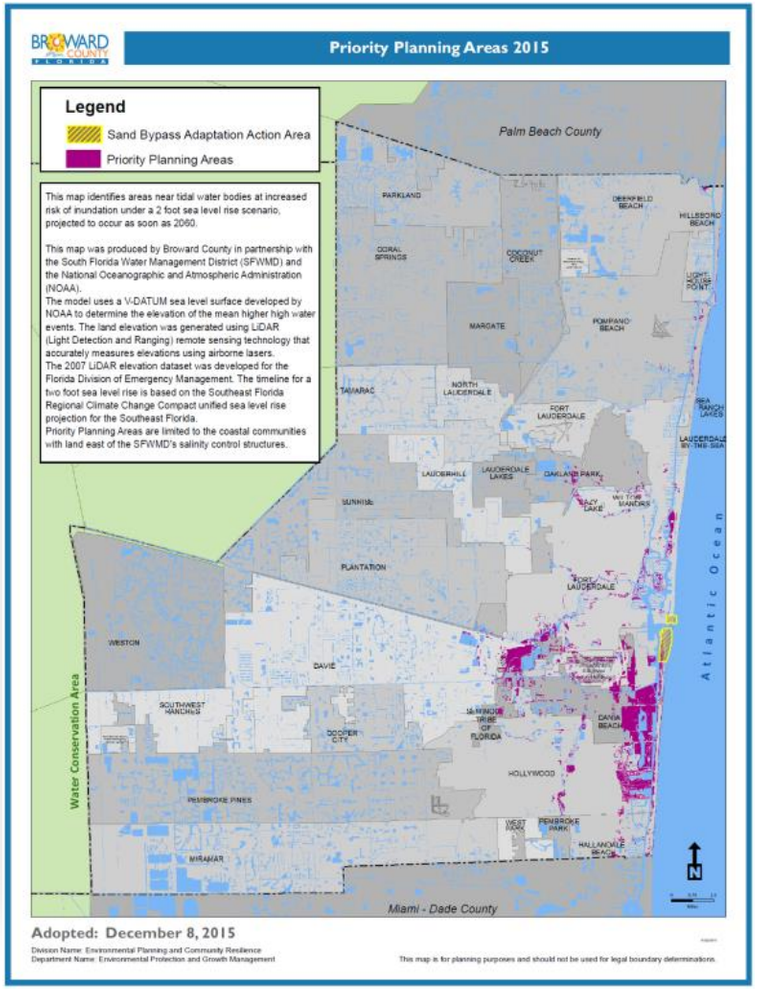
King Tide Coastal Erosion

CHANGES TO PLANNING AND INVESTMENTS

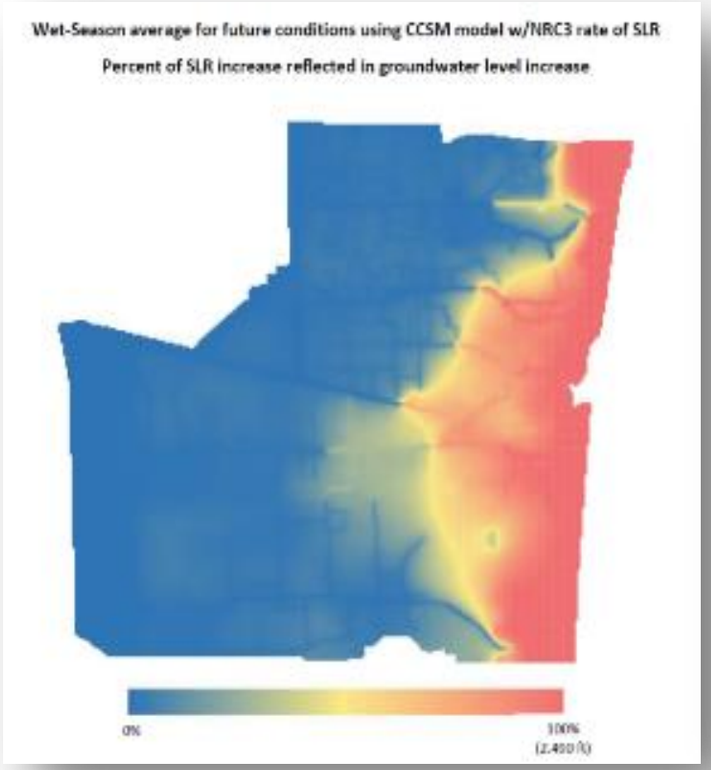
- Considerations
  - Land Use
  - Infrastructure Citing
  - Resilience Standards
  - Expanded Drainage
  - Additional Free Board

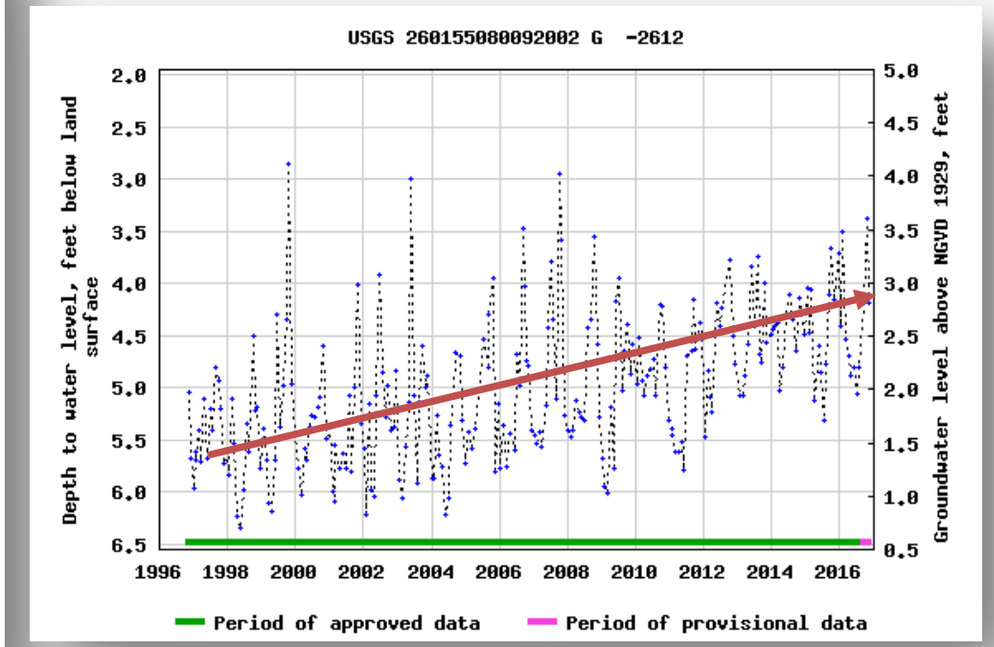
FUTURE CONDITIONS PLANNING: SEA LEVEL RISE AND LAND USE

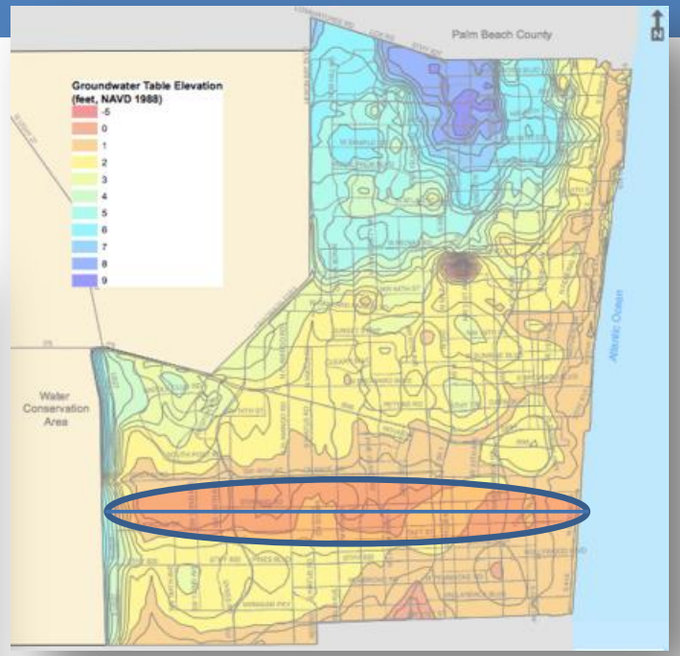


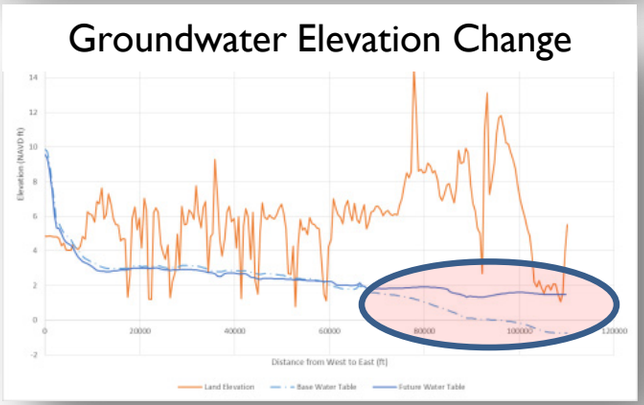


FUTURE CONDITIONS: GROUNDWATER WET SEASON ELEVATIONS



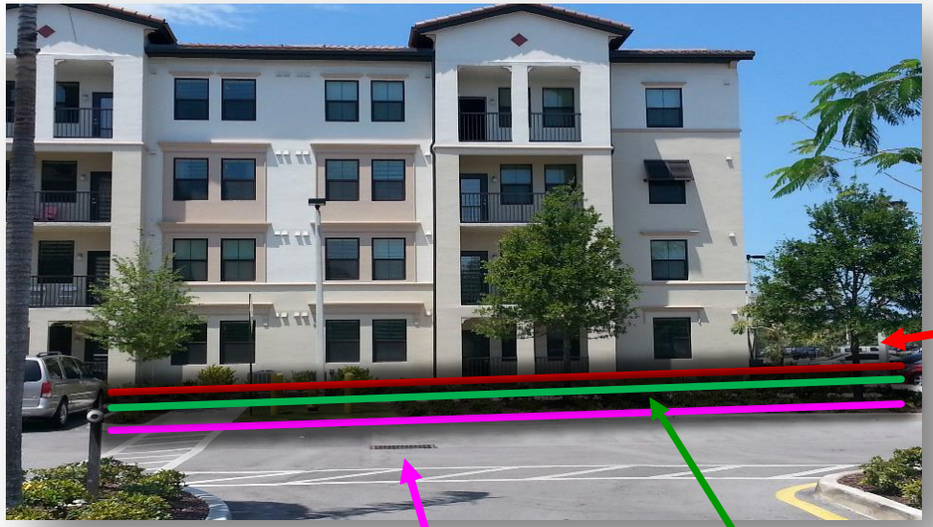






FUTURE CONDITIONS: 100-YEAR FLOOD MAP

Evolving Flood Elevations and Building Requirements



Finished Floor Elevation: 10.25' NAVD

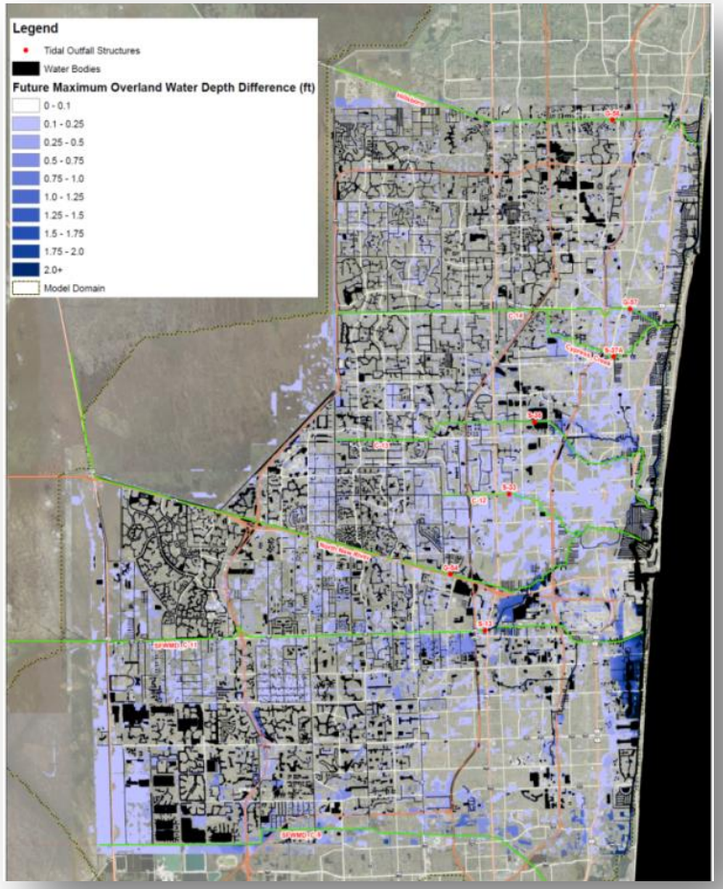
1992 FEMA Base Flood Elevation: 8.5' NAVD

2014 FEMA Base Flood Elevation: 9' NAVD ≈ Broward County 100-YR Elevation: 9' NAVD

Flood Insurance

Current (FFE at +1 above 2014 BFE)	$650
FFE = 2014 BFE	$1,817

Future Conditions Flood Map Elevation Difference



COUNTYWIDE RESILIENCE STANDARDS: TIDAL FLOOD BARRIERS

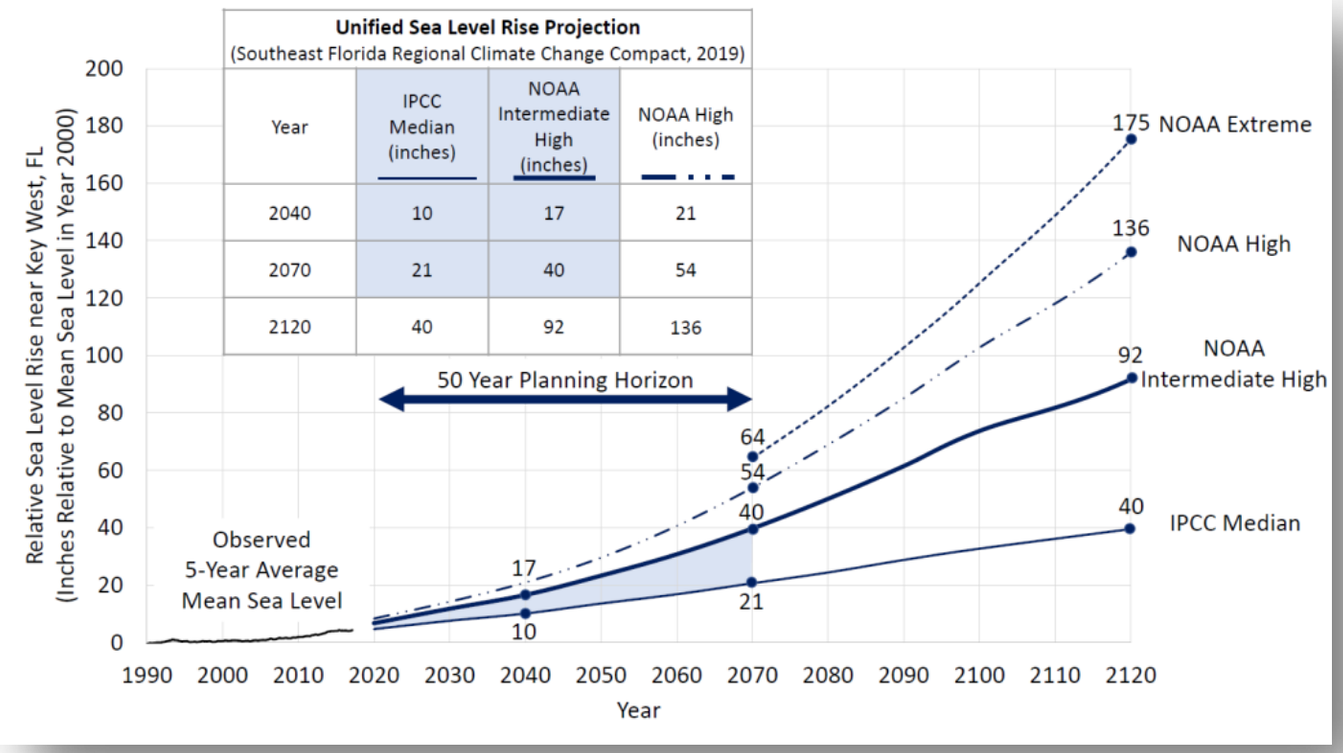
- Modeled water levels:
  - 2 feet sea level rise
  - High tides
  - 25-yr storm surge
- Requires **5 feet NAVD by 2050,** allows **4 feet NAVD until 2035**
- Requires adoption in 2 years

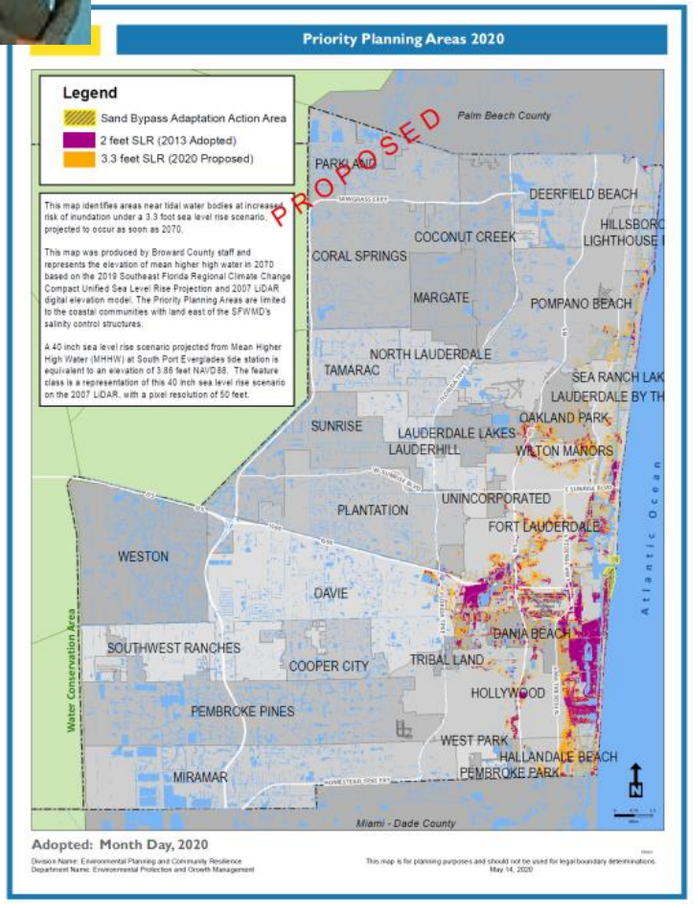
Hollywood Marina

FUTURE CONDITIONS: THE NEXT GENERATION

Unified Sea Level Rise Projection
(Southeast Florida Regional Climate Change Compact, 2019)

Year	IPCC Median (inches)	NOAA Intermediate High (inches)	NOAA High (inches)
2040	10	17	21
2070	21	40	54
2120	40	92	136





NEXT STEPS: A COUNTYWIDE RESILIENCE PLAN

- Risk Assessment and Resilient Infrastructure Plan
  - Basin-level analysis
  - Critical infrastructure and services
  - Mitigation strategies
  - Planning level cost estimates
  - Redevelopment strategies
  - Priority capital improvements
  - Quantified risk reduction

Courtesy of MIT and U Toronto

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AMERICAN FLOOD COALITION

Flooding and Sea Level Rise in Florida: Policy and Funding Perspectives

Anne Baker, ASLA, PLA, LEED AP

FL AIA Wicked Water Panel
June 17, 2020

We are the American Flood Coalition

A 501(c)3 nonprofit organization and nonpartisan coalition advocating for national solutions to flooding and sea level rise

- Federal Champions
- Cities, Towns and Counties
- Elected Officials
- Businesses
- Military Groups
- Civic and Academic Groups

What we do

Best-in-class educational guides

Scalable educational resources to meet our members' needs

Tools for effective communication

Opportunities and tools for communicating about flooding with stakeholders at all levels

Networks of leaders on flooding

Forum to connect virtually and in-person with other leaders and share learnings

Competitive local resilience pilots

Competitive local pilots that promote deeper engagement on flooding and sea level rise

Platform for advocacy and education

Strong platform that makes local voices and needs heard at the federal level

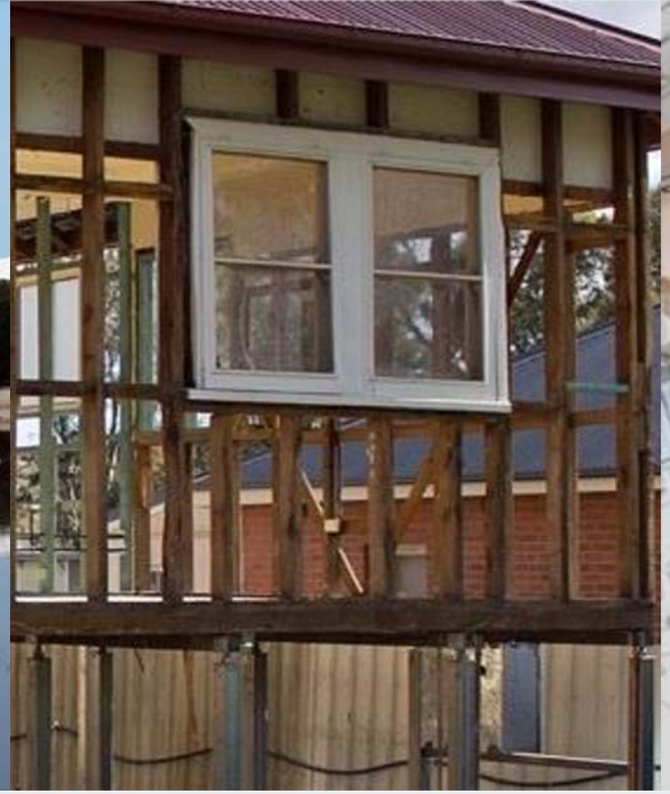
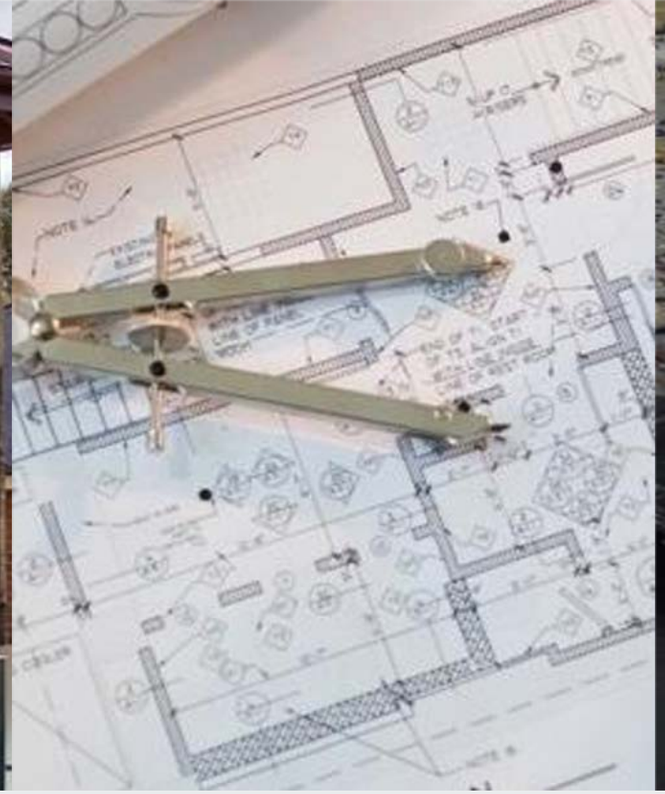
Florida Membership

Our Florida coalition members

- **11** federal champions
- **58** cities and counties
- **21** elected officials
- **11** businesses and associations
- **1** military group

"Floridians know the sea is rising – our beaches are smaller and eroding, flooding is more frequent and threats to our fresh water are increasing. **It's a threat to our economy, our national security, and our environment.**"

Congressman Michael Waltz
American Flood Coalition Federal Champion


Our 4 pillars for coastal and inland solutions

Economy

Invest in infrastructure that boosts the economy and protects property values

Communities

Use proactive planning to keep communities safe and save taxpayer dollars

Rebuilding

Build back stronger to protect communities from future flooding

Military

Ensure our military installations are ready to deploy 365 days a year

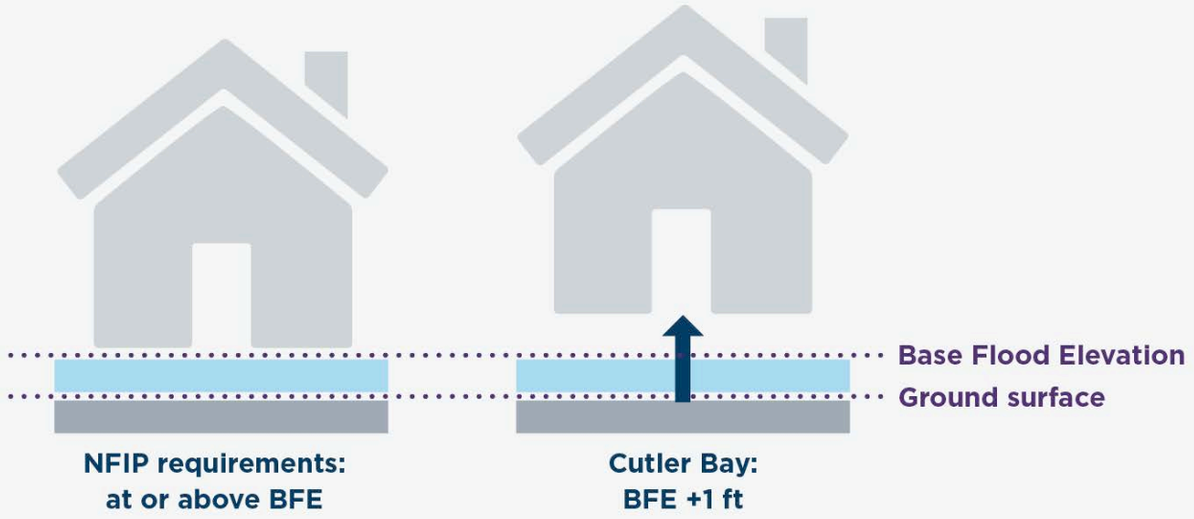
FEMA Community Rating System

‘Get Started’ steps for local communities

- Take an inventory of open space
- Build partnerships with diverse stakeholders
- Exceed minimum NFIP requirements for buildings

Considerations for sea level rise

- In areas prone to sea level rise, achieving high CRS credits may be challenging
- Planning for long term sea level rise (through year 2100) is a creditable activity



*The Base Flood Elevation (BFE) is the elevation that has a 1% chance of flooding each year – or a **26% chance of flooding during a 30-year mortgage***

*Average cost of flood damage per home in the Houston area following Hurricane Harvey: **$56,297***

https://www.houstontx.gov/council/g/chapter19/Floodplain-Mgmt-Data-Analysis.pdf

FEMA CRS: Cutler Bay

- Cutler Bay is **1 of 3 communities in FL** with a CRS rating of 4
- Result is **30% flood insurance discount** for many homeowners and local businesses
- Cutler Bay's Floodplain Mitigation Plan (FMP) identifies risk and vulnerability to flood hazards and recommends mitigation actions. Examples of actions taken thus far for CRS credit:
    - **Open Space Preservation** (401 credits)
    - **Higher Regulatory Standards** (338 credits)
    - **Drainage System Maintenance** (240 credits)
    - **Outreach Projects** (218 credits)
    - **Flood Warning Projects** (85 credits)

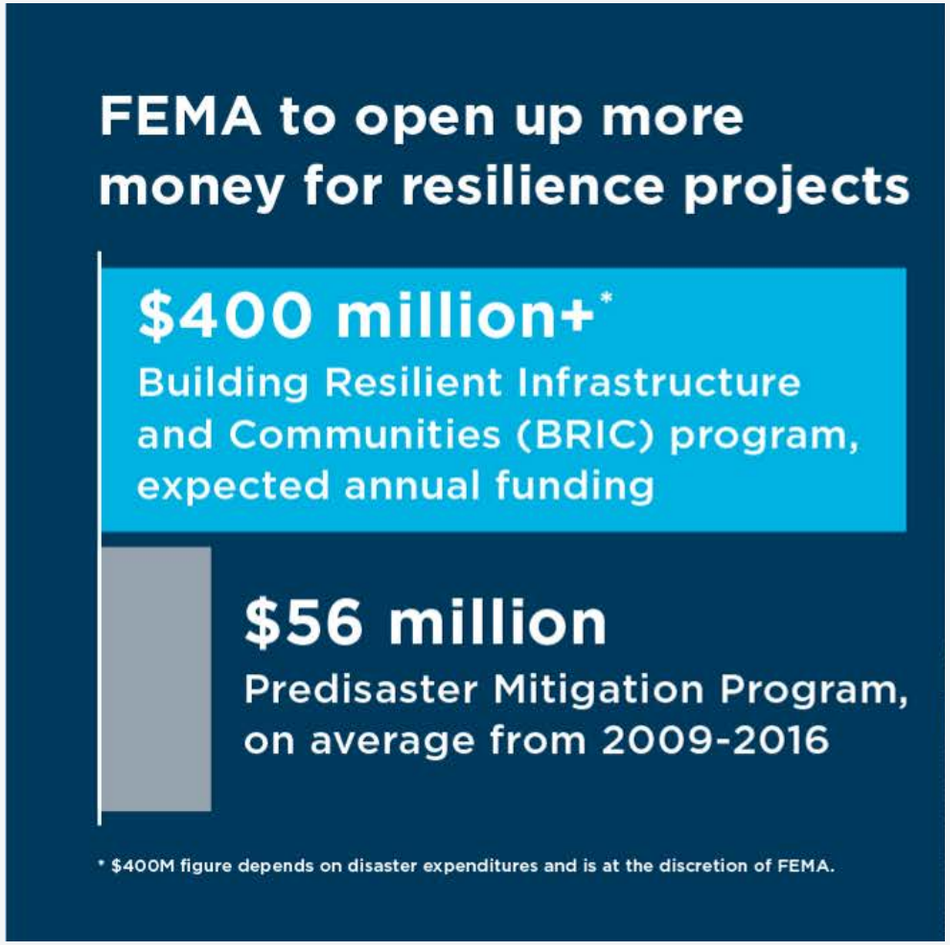
FEMA BRIC Program

Risks

- Will local communities have bandwidth to apply during COVID-19?
- The selection criteria and funding levels are still being defined, so it is hard for communities to prepare for applying

Opportunity

- Can architects frame design opportunities for local communities so that they have a better jumpstart on the process?



https://www.fema.gov/bric

Flooding and sea level rise matter to Florida's economy

Sales tax revenue at risk

A record 126 million tourists visited Florida in 2019. Sea level rise poses a **threat to the tourism industry, which employs 1 million residents.**

Agriculture

The state's second largest industry is at risk due to rising groundwater levels, in certain parts of the state, and changes in rainfall patterns.

Main Street Impacts

Nearly 40% of small businesses never reopen after a flood disaster.

Property value at risk

Since 2005, Florida homes have lost a collective $5.42 billion due to flooding, which will affect the revenue of local governments.

Bond ratings

Moody's Investors Service includes flood risk in municipal credit assessments and stated in 2017 that the lack of sufficient adaptation strategies will be a growing negative credit factor.

Brainstorming actions with a local community

	Year 1	Year 2	Year 3
Staff	Identify gaps in staff **capacity**	Designate a **resilience lead**	Build **regional** collaboration
Community engagement	Publicly **commit** to addressing SLR	**Resident** engagement: town halls, workshops	Engage **business** community
	Create a **strong resilience brand**		
Funding & financing	Enroll in **NFIP CRS**	Review **state & federal funding**	Develop a FEMA **Hazard Mitigation Plan**
		Review **municipal funding**	Determine **cost** of adaptation
Planning & projects	Implement **consistent sea level rise projection**	Catalogue existing **open space**	Review and and update **zoning, ordinances, building codes**
	Conduct **mapping & planning** to identify vulnerable areas	Identify **critical projects**	Review options for **stormwater retention**

Informational resources

Federal Funding Guide for Small Cities

- Includes federal grant and technical assistance programs
- 24 programs most relevant to communities with <50,000 population

Other Guides

- Dual Disaster Handbook (floodcoalition.org/covid19/)
- Vulnerability assessments
- Seawall ordinances
- Seawall financing
- Jump-starting adaptation
- In-depth guides on key federal programs

Federal Funding for Small Cities Guide full link: https://mcusercontent.com/ec9c20819838d6547c69401b2/files/1253f254-be8c-4425-a9fd-7fd397e2e359/AFC_small_cities_funding_guide_FINAL_042820_20_DIGITAL.pdf

AMERICAN FLOOD COALITION

Contact us

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Dr. Alec Bogdanoff
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WICKED WATER DIALOGUE

QUESTIONS FROM ATTENDEES

This concludes The American Institute of Architects
Continuing Education Systems Course

AIA Florida

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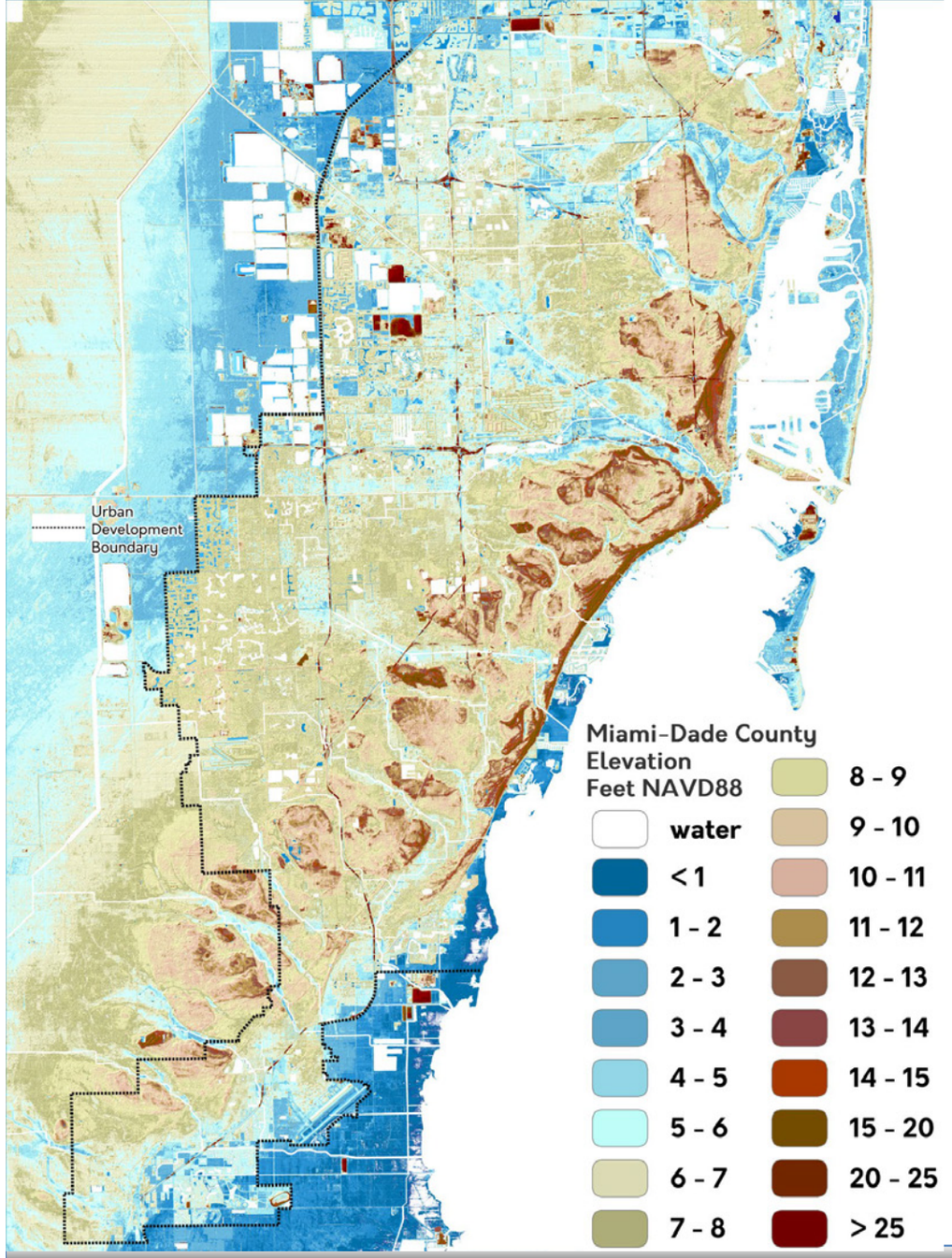
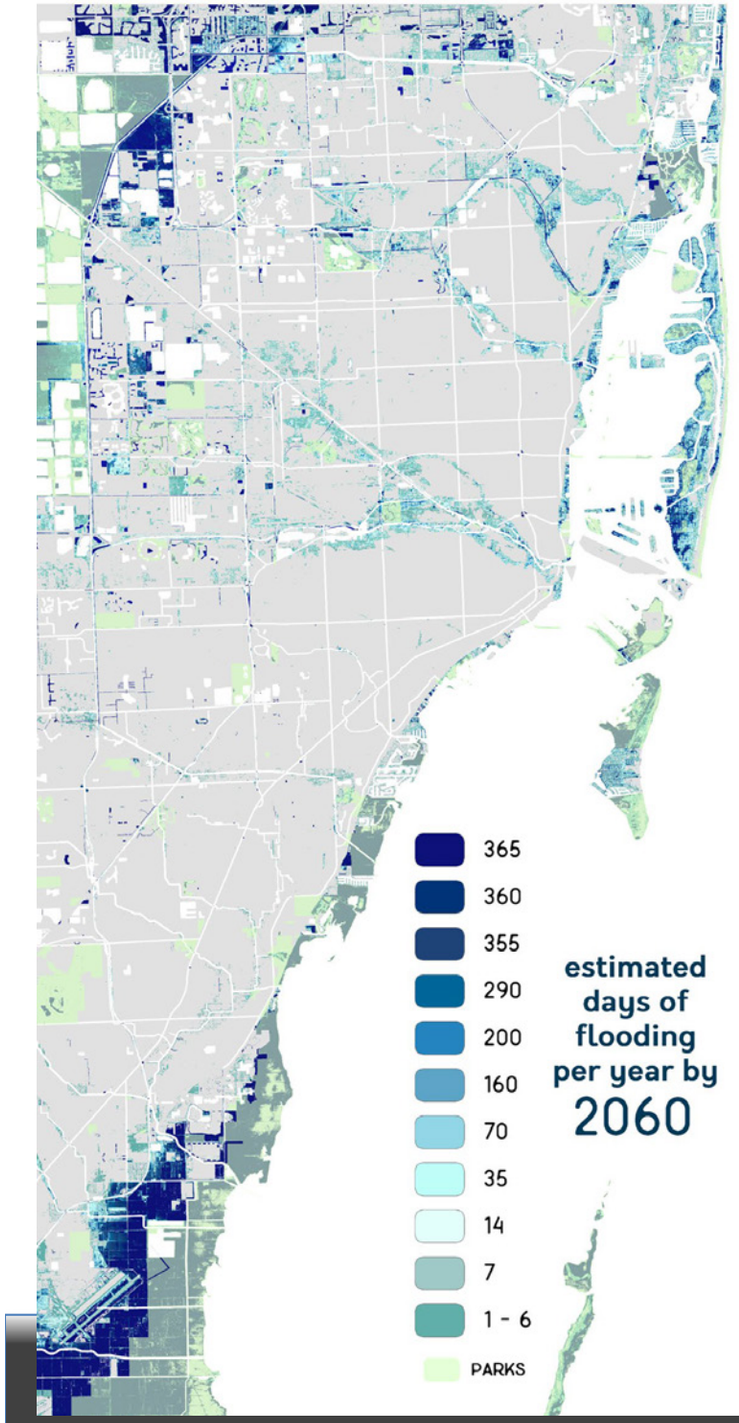
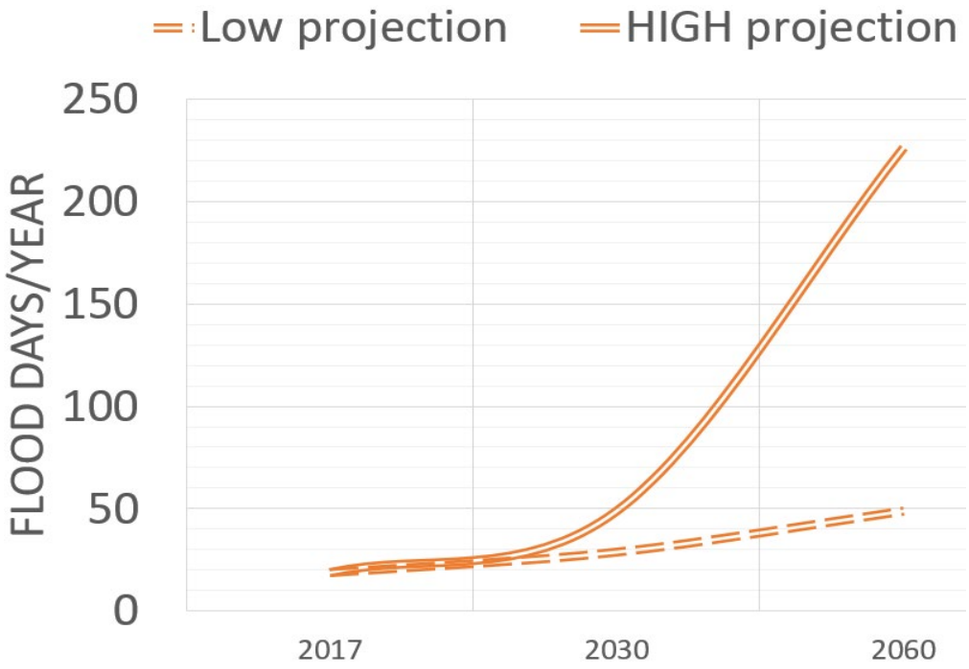


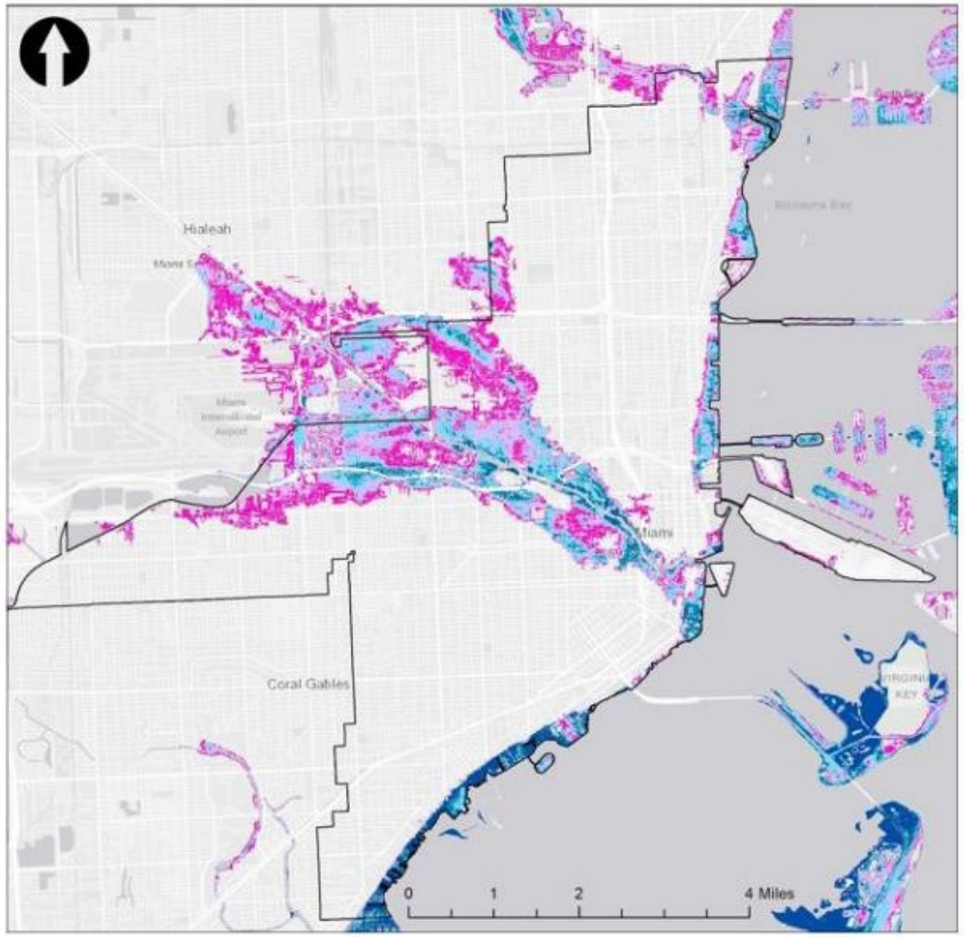
Miami-Dade County Sea Level Rise Strategy

MIAMI-DADE COUNTY



King tide flooding in days per year





Future Expansion of the Coastal High Hazard Area in the City of Miami

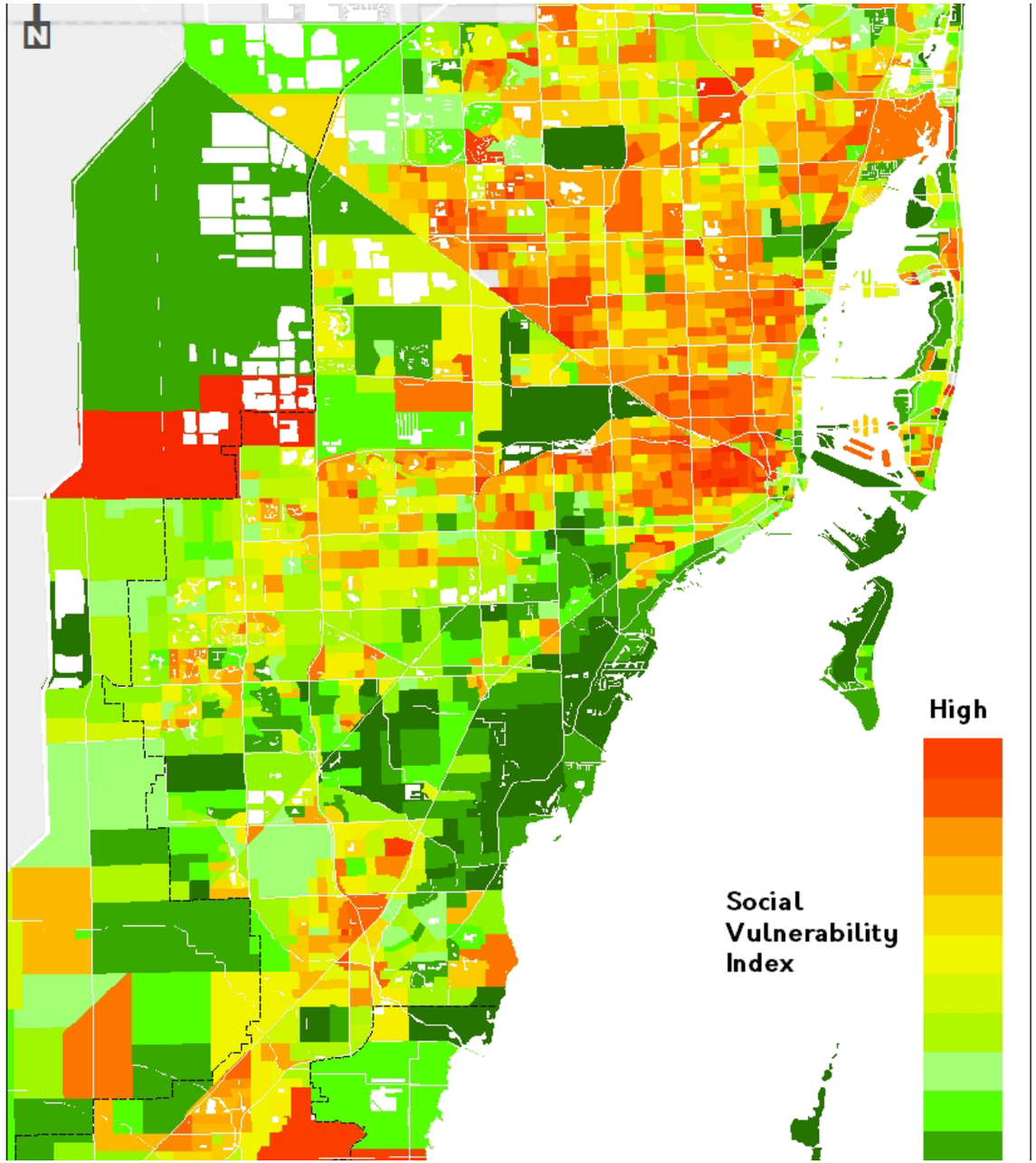
- City of Miami
- CHHA + 2ft SLR
- CHHA + 1ft SLR
- Current CHHA up to 1 ft inundation
- Current CHHA 1 -2 ft inundation
- Current CHHA 2-8 ft inundation

Other Impacts of Chronic Flooding and Sea Level Rise

- Health problems associated with standing water
- Reductions in water quality
- Saltwater intrusion
- Property value impacts
- Socioeconomics
- Vulnerable populations have greater impacts

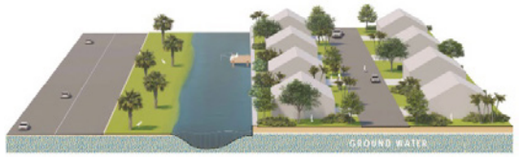
Social Vulnerability Index

LIKELIHOOD						
	0-1 ft	M	MH	H	H	H
	1-2 ft	ML	M	MH	H	H
	2-3 ft	L	ML	M	MH	H
	3-4 ft	L	L	ML	M	MH
	4-5 ft	L	L	L	ML	M
		0-.20	.20-.40	.40-.60	.60-.80	.80-1
CONSEQUENCE						

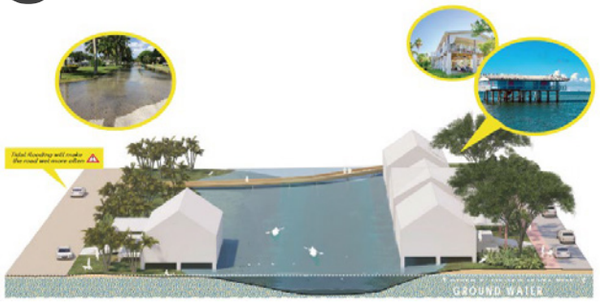


Adaptation Approaches

Where are these applicable?



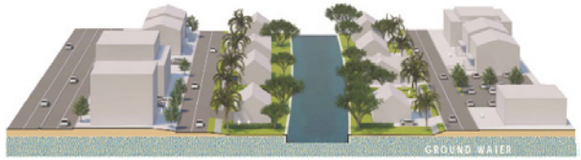
Build on fill



Build like the keys

Build around transit

Build on high ground

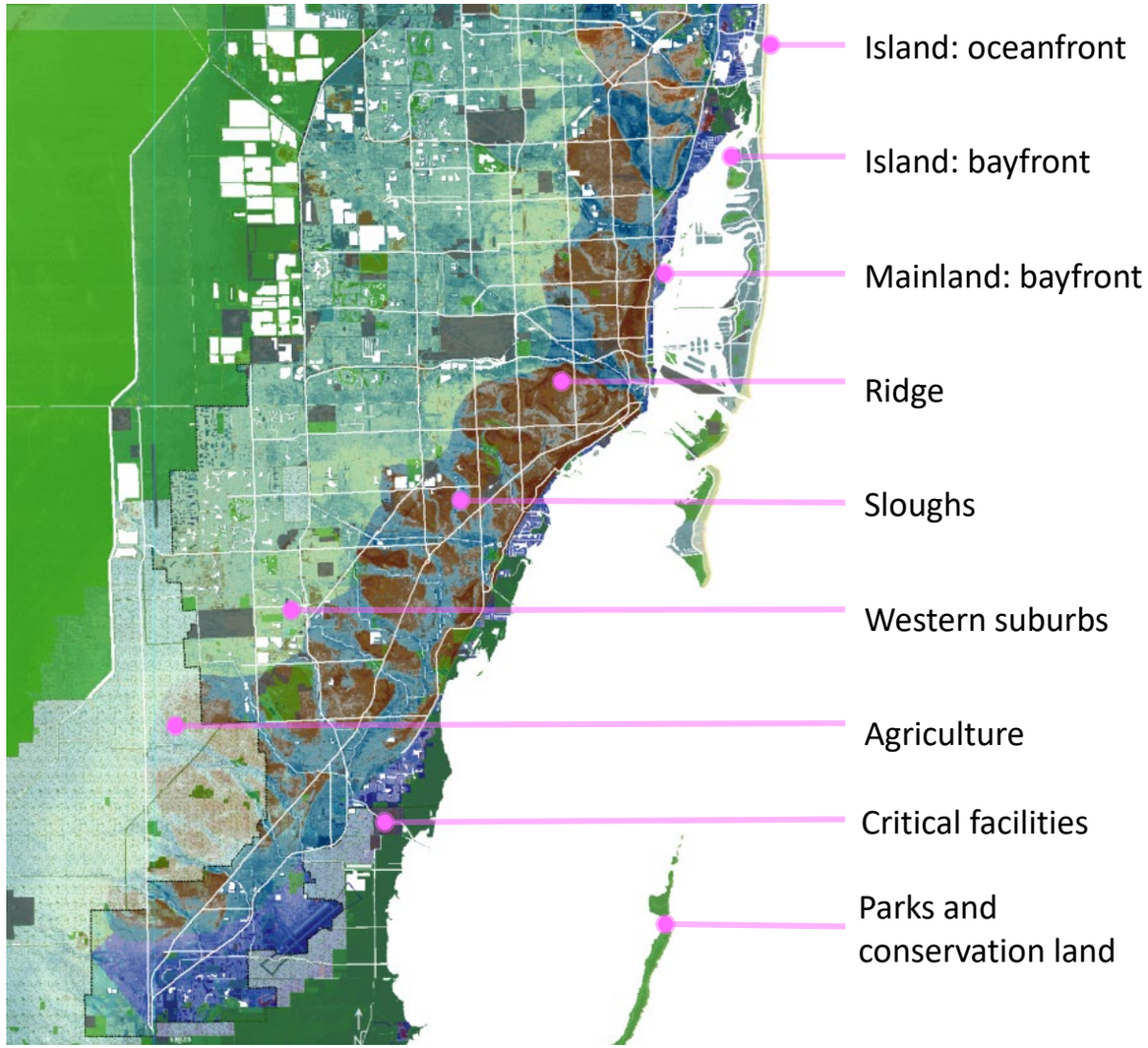


Blue & greenways

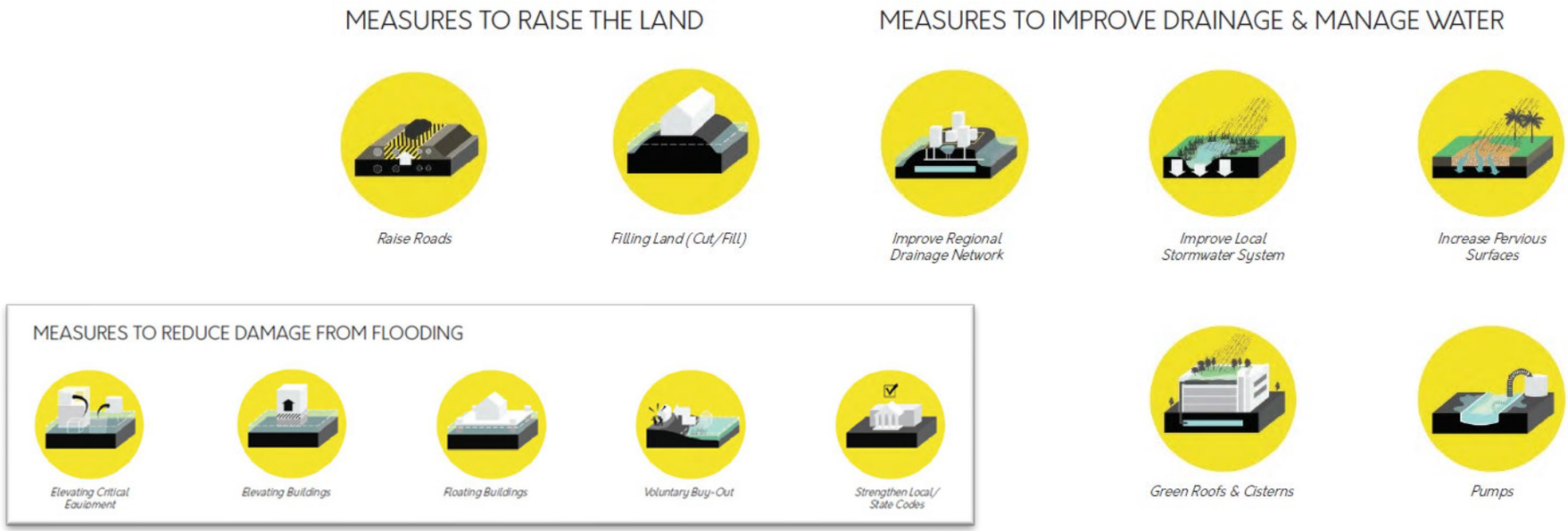
Green & blue neighborhoods

Adaptation approaches and strategies paired with

Land Typologies



Adaptation Tools



Stakeholder engagement