

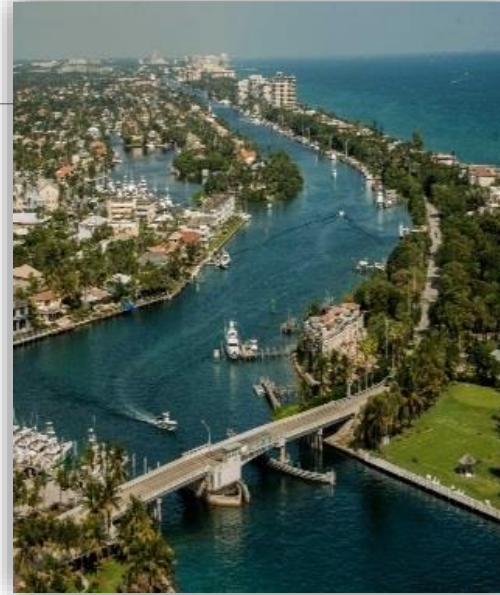
Community Resilience : The Collaborative Call to Action

LEGISLATORS' RESILIENCY WORKSHOP

FEBRUARY 6, 2019

Southeast Florida: Geography in the Context Resilience

- ❑ 194 mi of shoreline/132 mi beaches
- ❑ Vibrant coastal economies
- ❑ Home to 6.18 M residents
- ❑ 1/3 State's pop. and GDP
- ❑ Flat and low-lying landscape
- ❑ Porous geology/shallow aquifer
- ❑ Complex water management system
- ❑ Rich nearshore reef and coastal resources



Resiliency Challenges for our Region

- ❑ Sea level rise
- ❑ Extreme rainfall and drought
- ❑ Increased storm intensity
- ❑ Coastal and inland flooding
- ❑ Beach erosion
- ❑ Rising temperatures
- ❑ Saltwater intrusion
- ❑ Natural resource degradation

Tidal Flooding



Inland Flooding



Flood Risk is Prominent, and On the Rise

Climate change 'triple threat' increases severe flooding risk in biggest US cities

Hurricanes are slowing, which could be a big problem

By [Brandon Miller](#), CNN
Updated 2:40 PM ET, Thu June 7, 2018

Climate Impacts

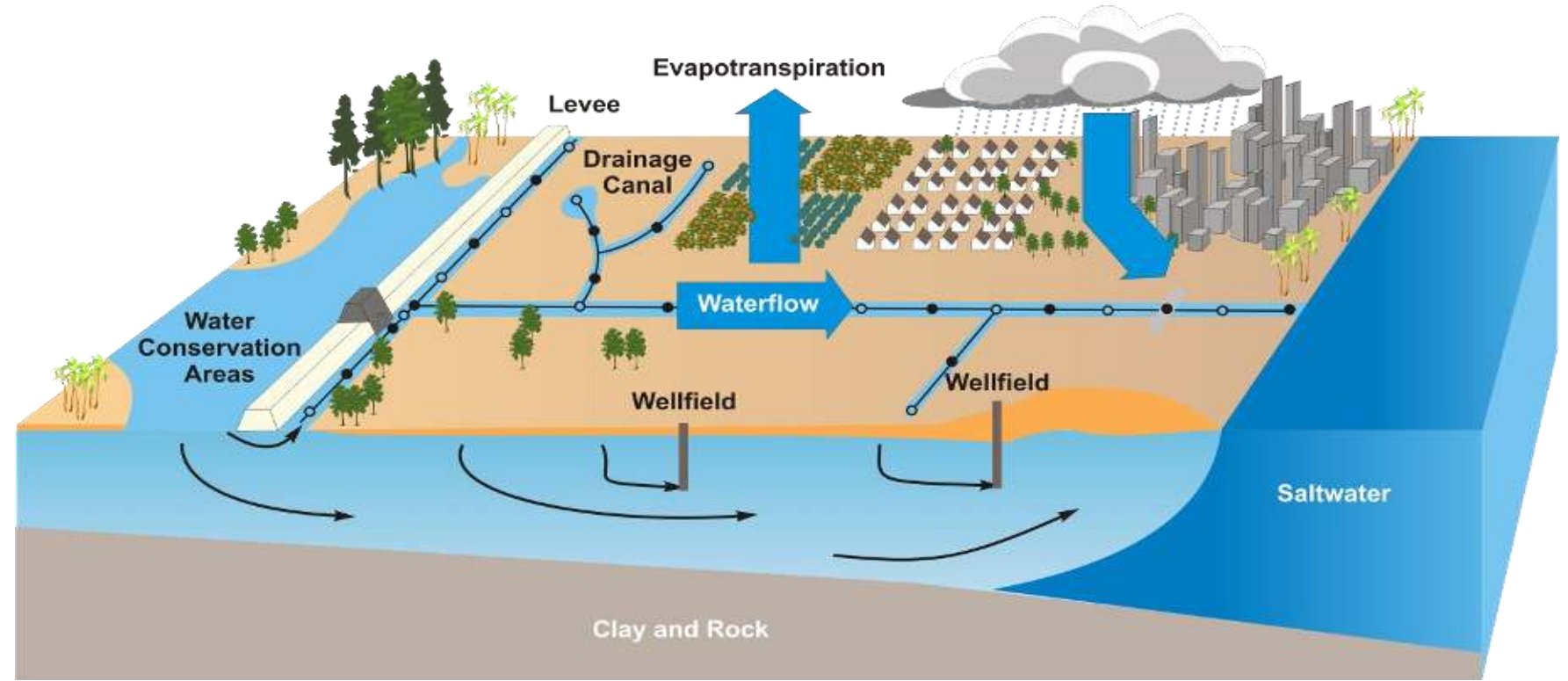
- Rainfall and Storms
- Storm Surge
- Tidal Flooding

Development Trends

- Value of Assets
- Location of People



Complex Hydrology



Implications

❑ Drainage Systems

- Loss of soil storage, reduced function

❑ Wastewater Systems

- Increase infiltration and inflow

❑ Septic Systems

- Impacts to drainage fields

❑ Waterways

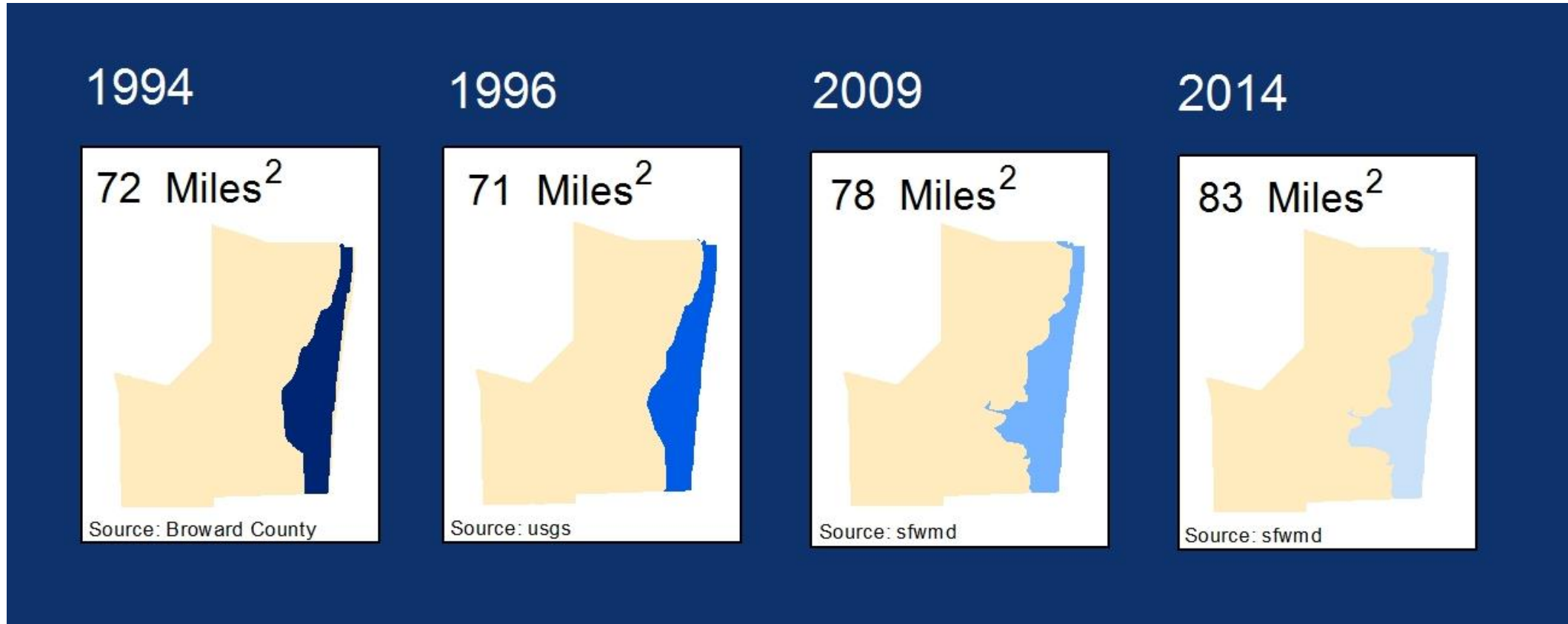
- Saltwater intrusion

❑ Water Management Operations

- Increased pump demands



Saltwater Contamination of Water Supplies



Impacts Cascade: Inland and Coastal

Inland – Compromised drainage



Coastal - Seawall overtopping



Major Infrastructure Implications



Hollywood Lakes Marina

 Video of Marina boat ramp flooding on 9 27 15.MOV



Port of Miami Tunnel

Exposing Public and Private Vulnerabilities



Collapse of A1A, 1 month after Sandy

Risks:

- Public health and safety
- Community livability
- Environment
- Economic



Extreme rainfall event – 16 inches 1:100 year storm

Impacts on the Environment & Economy

SCIENCE • ENVIRONMENT
Red Tide Is Spreading to Florida's East Coast. Here's What to Know About It
f t e

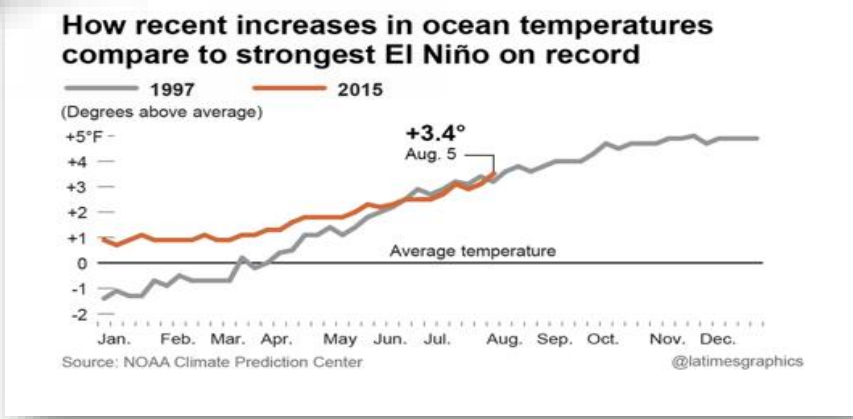
SCIENCE
Miles of Algae and a Multitude of Hazards
By LES NOLINIGATIS JULY 18, 2016
f t e

HEALTH
What We Know and What We Don't Know About the Zika Cases in South Florida
By DONALD C. McNEIL Jr. AUG. 19, 2016



Air quality warning issued for Broward County

Posted October 10, 2016 08:57 am
Matthew devastates Florida sands key to protection, tourism
Comments 6 Share



THE STATUS OF CORAL HEALTH IN SOUTHEAST FLORIDA

October 2, 2015
Walker and Klug, 2015

October 29, 2015
Walker and Klug, 2015

Statewide: Severe Weather and Flood Risk

2014 Pensacola – 22” rainfall



Credit: Tony Giberson, Pensacola News Journal

2015 Flagler County – Hurricane Matthew



2015 Palm Beach – 22” rainfall



2018 Panhandle - Hurricane Michael



Diverse and Statewide Impacts of Irma

Naples, FL



Credits: REUTERS/Stephen Yang

Monroe County, FL



Credit: Floridatoday.com

Jacksonville, FL



Credit: News.wjct.org

Collier County, FL



Credits: Liam James Doyle/Naples Daily News

Statewide Challenges of Sea Level Rise

- Saltwater intrusion
- Storm surge



- Saltwater intrusion
- Minimum flows and levels

- Flood control structures
- Vulnerability to surge
- Saltwater intrusion

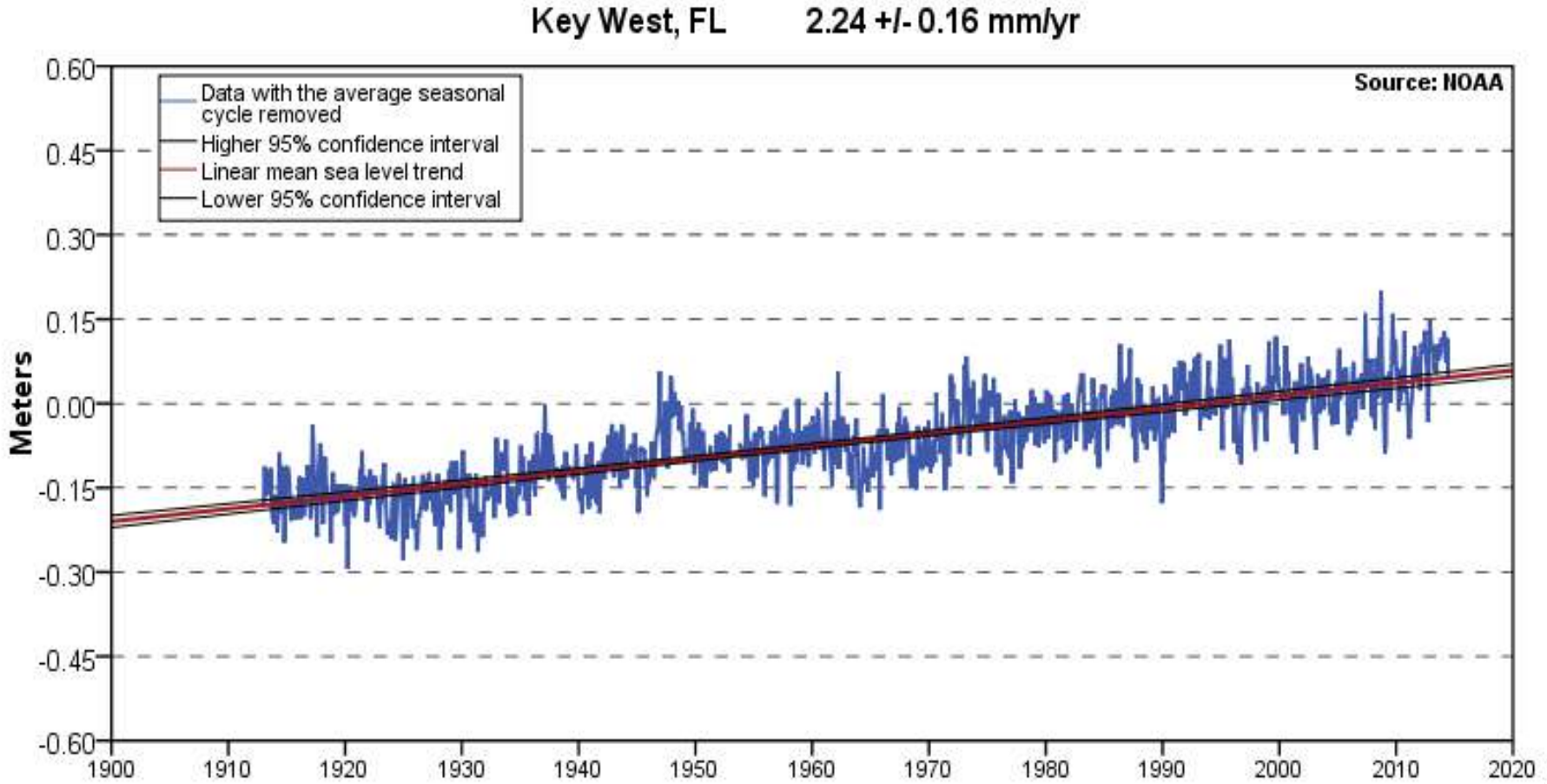
- Flood control structures
- Vulnerability to surge
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- Flood control structures
- Vulnerability to surge
- Saltwater intrusion



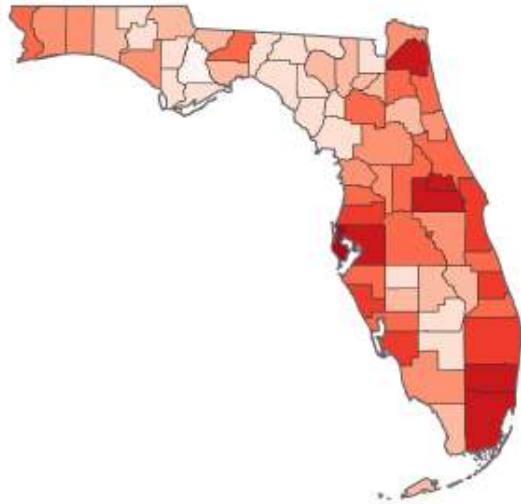
Statewide: 64% water supply from groundwater

Sea Level Rise - A Statewide Trend



The Case for Immediate Action

Florida Population Density by County



Florida population surging again

- ❑ 20 million residents
- ❑ 3rd largest state by population
- ❑ 8th most densely populated
- ❑ 5th fastest growing

ECONOMIC YEARBOOK 2017

Civic Hardware: Infrastructure projects drive growth across Florida

| 3/28/2017

SECTIONS Q SEARCH

Sum

South Florida expected to create jobs faster than US



Startling Figures

Risk From Rising Seas Could Sink South Florida's Economy Before The Water Even Arrives

1,314 views | Jul 31, 2018, 11:28am

Study: As Sea Levels Rise, Home Values Sink

Rising sea levels could cost the world \$14 trillion a year by 2100

July 3, 2018, Institute of Physics



Ocean & Coastal Management
Volume 133, December 2016, Pages 11-17



"Living on the edge": Estimating the economic cost of sea level rise on coastal real estate in the Tampa Bay region, Florida

ENVIRONMENT

Sea rise could force millions in Florida to adapt or flee, study finds

At Risk Taxable Value of Property			
	Monroe	Broward	Palm Beach
1 foot	\$ 2.7 B	\$403 M	\$396 M
2 foot	\$ 8.4 B	\$1.8 B	\$ 1.2 B
3 foot	\$ 15.1 B	\$ 6.9B	\$ 3.6 B

But Significant Economic Opportunity

Is South Florida Doomed By Sea-Level Rise? Experts Say No. In Fact, They're Optimistic

By KATE STEIN - MAR 27, 2010

Understanding the \$316 billion climate adaptation economy

Jocelyn Timperley
Friday, March 4, 2016 - 12:35am






	National Benefit-Cost Ratio Per Peril <small>*BCR numbers in this study have been rounded</small>	Federally Funded	Beyond C Requirements
Overall Hazard Benefit-Cost Ratio	6:1	4:1	
 Riverine Flood	7:1	5:1	
 Hurricane Surge	Too few grants	7:1	
 Wind	5:1	5:1	
 Earthquake	3:1	4:1	
 Wildland-Urban Interface Fire	3:1	4:1	

Table 1. Benefit-Cost Ratio by Hazard and Mitigation Measure.



Getting Ahead of the Curve for a Resilient Economy:

An Introduction to Risks and Opportunities of Climate Change for Top Business Sectors in Southeast Florida



Returns on Resilience

ULI's Urban Resilience Program works to help communities prepare for increased climate risk in ways that not only allow a quicker, safer return to normalcy after an event, but also enable them to thrive going forward.

The Returns on Resilience project showcases real estate developments that incorporate resilient design measures, with positive financial, operational and other business outcomes. To suggest a project for inclusion, email resilience@uli.org.

Resilient Investments

Increased Free Board



Raised Sea Walls



Storm system Improvements



Regional Water Storage



Elevating Roads and Critical Infrastructure



Flood Management



Building Regional Resiliency

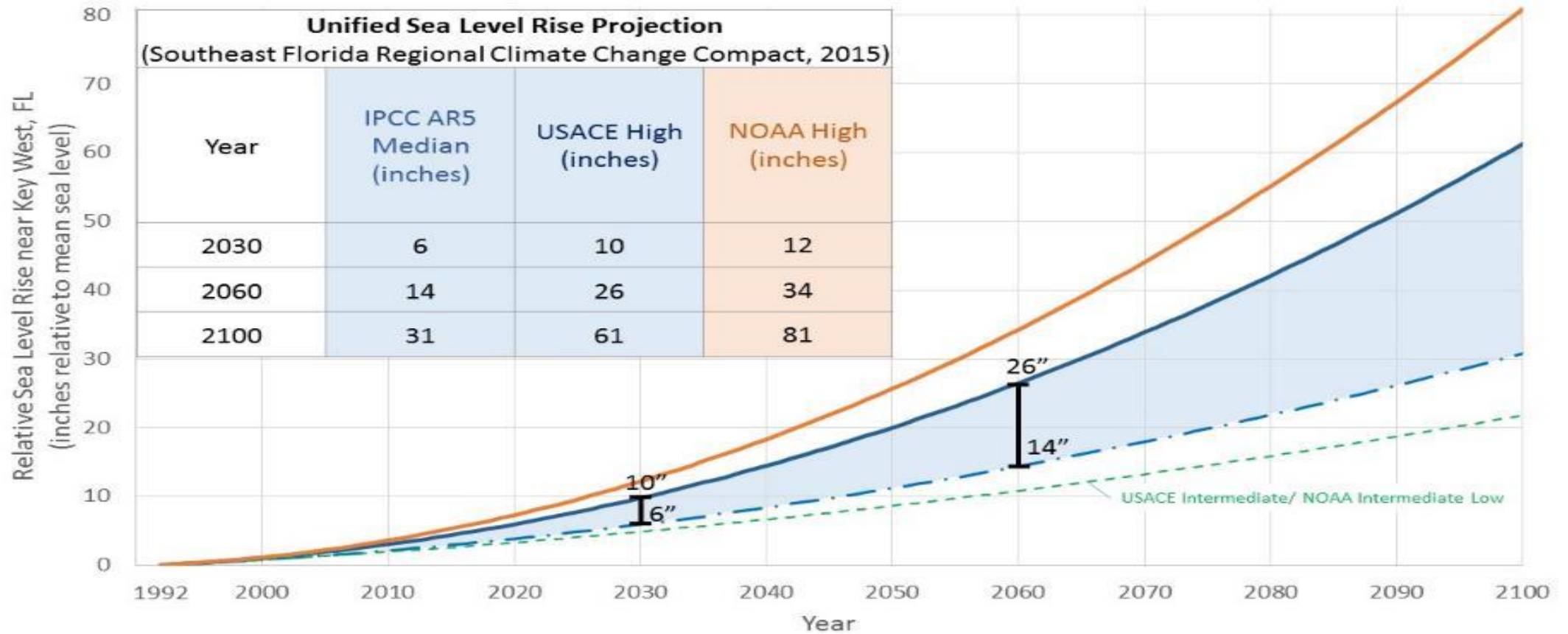
IMPLEMENTATION IN ACTION

Regional Action : The Southeast Florida Regional Climate Change Compact

- ❑ 4 Counties, 109 Cities
- ❑ 10 years of collaboration
- ❑ Commitments:
 - Policy collaboration
 - Regional planning tools
 - Regional Climate Action Plan
 - Annual summits



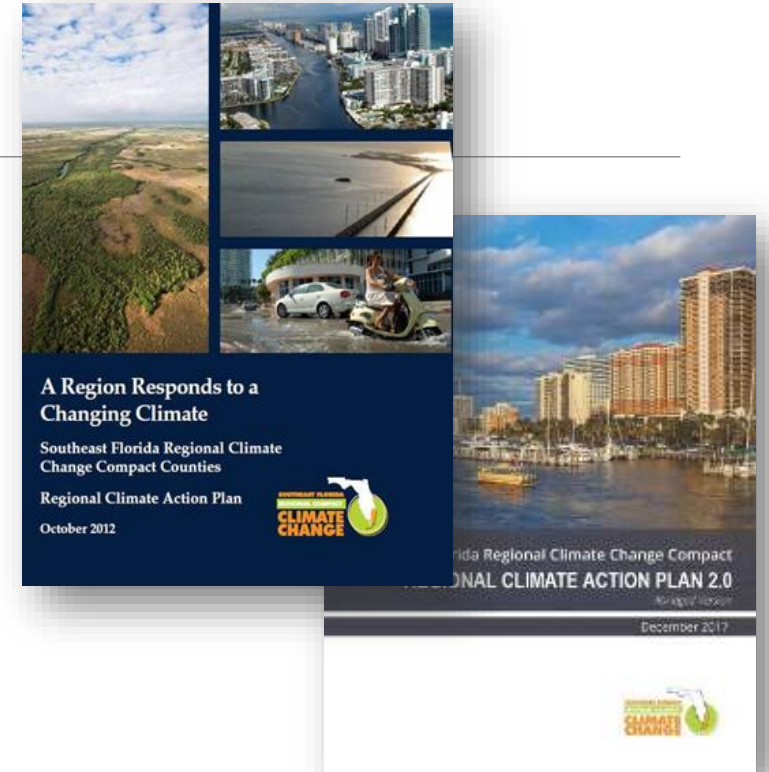
Regional Sea Level Rise Projection



The Regional Climate Action Plan (RCAP 2.0)

Focal Areas:

- Economic Resilience
- Sustainable Community and Transportation Planning
- Water Management
- Risk Reduction and Emergency Management
- Energy and Fuel
- Natural Systems
- Agriculture
- Outreach and Public Policy



*>140 Recommendations
Adaptation and Mitigation*



[Download at www.southeastfloridaclimatecompact.org](http://www.southeastfloridaclimatecompact.org)

Economic Basis for Action

- ❑ Protect infrastructure
- ❑ Reduce flood risk and losses
- ❑ Protect credit ratings
- ❑ Improve insurance affordability
- ❑ Protect property values/tax base

Environmental risks
Evaluating the impact of climate change on
US state and local issuers

MOODY'S
INVESTORS SERVICE

Bloomberg
**South Florida's Real Estate
Reckoning Could Be Closer
Than You Think**

**Moody's Warns Cities to Address
Climate Risks or Face Downgrades**

By **Christopher Flavelle**
November 29, 2017 4:00 AM
From **Climate Changed**



Bloomberg

**BUSINESS
INSIDER**

**Cities and states could see their credit ratings crash if
they don't start preparing for climate change**



Jeremy Berke
© Dec. 1, 2017, 9:16 AM 2,407

Expanding the Conversation: Focus on Economic Resilience

2016 Discussion

- ❑ Regional economics workshop
- ❑ Sea level rise forum

2017 Collaboration

- ❑ Business resilience committees
- ❑ Summit theme “ Business of Resilience”
- ❑ Statement of Collaboration

2018 Action

- ❑ Perform regional risk assessment
- ❑ Identify priority capital improvements
- ❑ Business case ROI

Business Roundtable



Broward Resilience Roundtable



2017 Compact Summit



Public-Private Collaboration Economic Resilience



The Regional Model is Expanding

Collaboration Among Counties Improves Regional Vulnerability Assessments

To better prepare for current and future sea level rise, four counties in South Florida joined forces to agree upon consistent sea level rise mapping methods.

EDITORIALS

Southeast Florida sea-level rise compact a model for other regions



BY MIAMI HERALD EDITORIAL BOARD

November 03, 2018 11:16 PM

Updated November 05, 2018 10:48 AM



Ten years ago, officials in South Florida, lobbying for a federal climate bill in Washington, discovered they didn't have enough clout as a county or a city. They realized they needed to speak as a region.



ZAC TAYLOR | MONDAY, OCTOBER 01, 2018

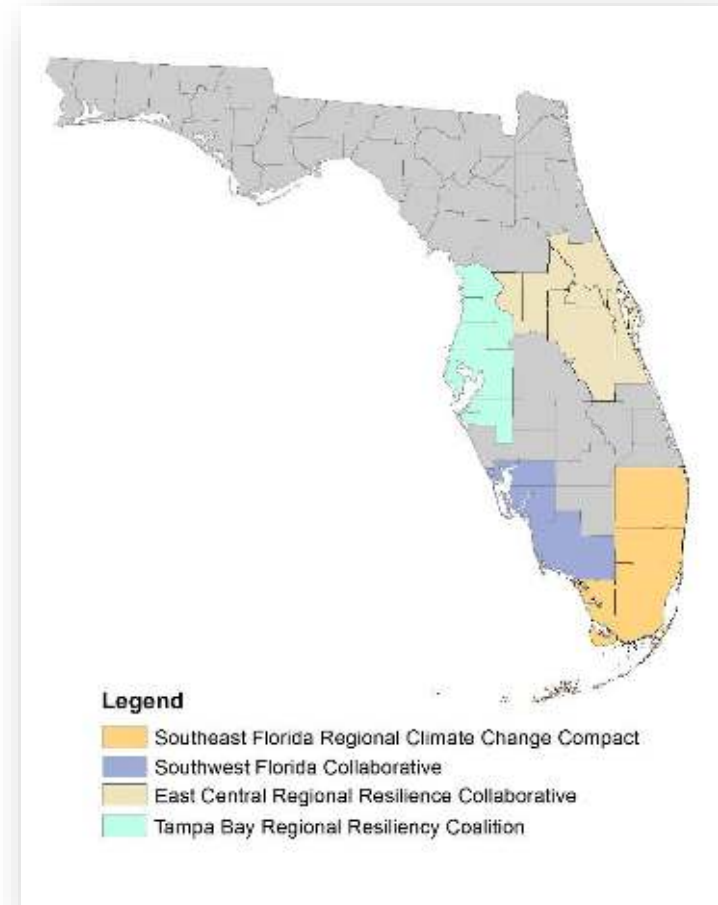
New Tampa Bay Regional Resiliency Coalition promises collaborative action on climate change

SHARE



Like 215

Regional Collaboration On Climate May Have Set A Precedent For Miami's Amazon Application



Local Implementation



□ Planning Processes

- Land use/Comp planning
- Water Supply/emergency/transp.
- Capital budgets

□ Updating Standards

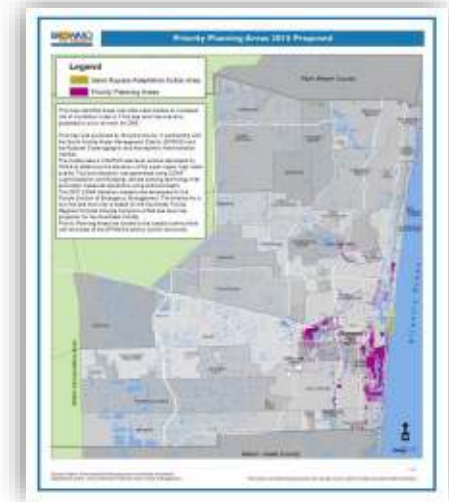
- Living shorelines
- Drainage/stormwater
- Seawalls and Freeboard
- Commercial development



Adaptation Action Areas

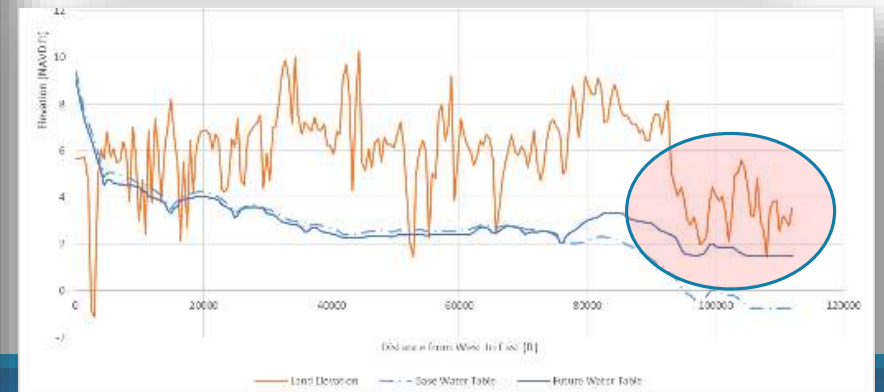
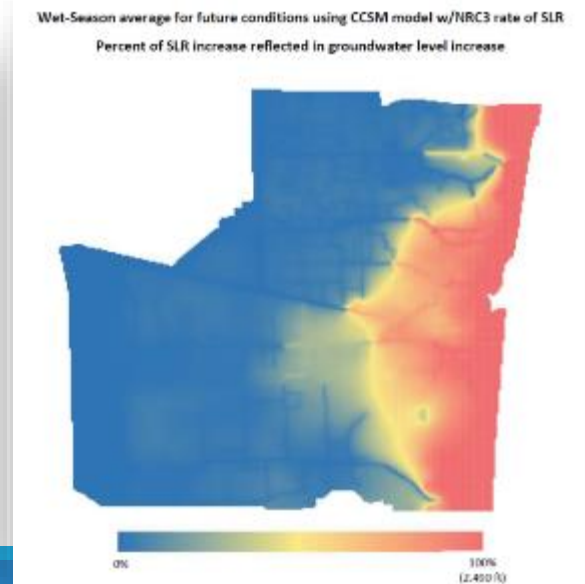
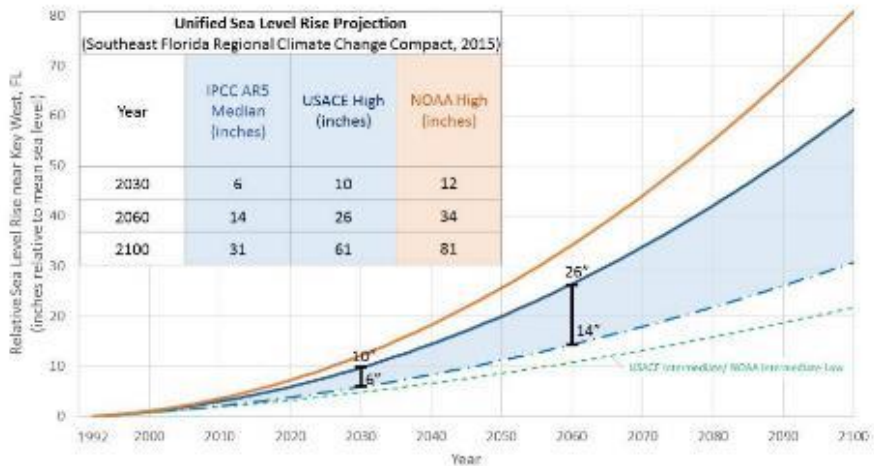
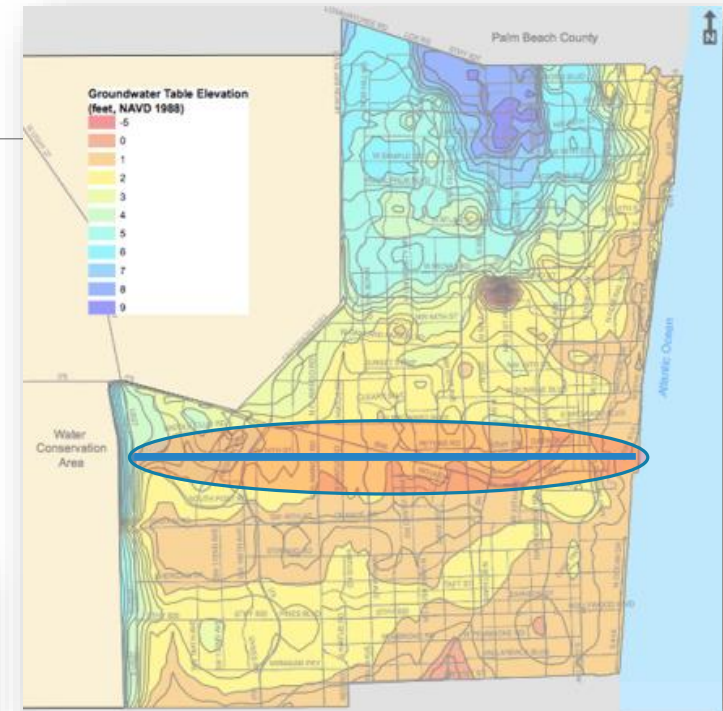
Download

The 2011 Florida Legislature made significant changes to the state's growth management laws, including creating Adaptation Action Areas (AAA). In accordance with Section 103.110(4) and Section 103.117(5)(g), Florida Statutes, an AAA is an official designation within the coastal management element of a local government's comprehensive plan which identifies one or more areas that experience coastal flooding due to extreme high tides and storm surge, and that are vulnerable to the related impacts of rising sea levels for the purpose of prioritizing funding for infrastructure, access, and adaptive planning. The City adopted Ordinance No. C 14-27, amending the Comprehensive Plan to incorporate a new goal, objective, and funding policies associated with AAAs.



Future Conditions Planning: Groundwater Table Map

- ❑ Accounts for 2' SLR
- ❑ 9% increase in rainfall
- ❑ 2060-2069 conditions
- ❑ Adopted July, 2017



Future Conditions: 100-year Flood Map

- ❑ Update FEMA model for 100-year flood
- ❑ Account for 2' SLR and ↑ Rainfall
- ❑ Revise finish floor elevations
- ❑ Insulate against NFIP rate changes

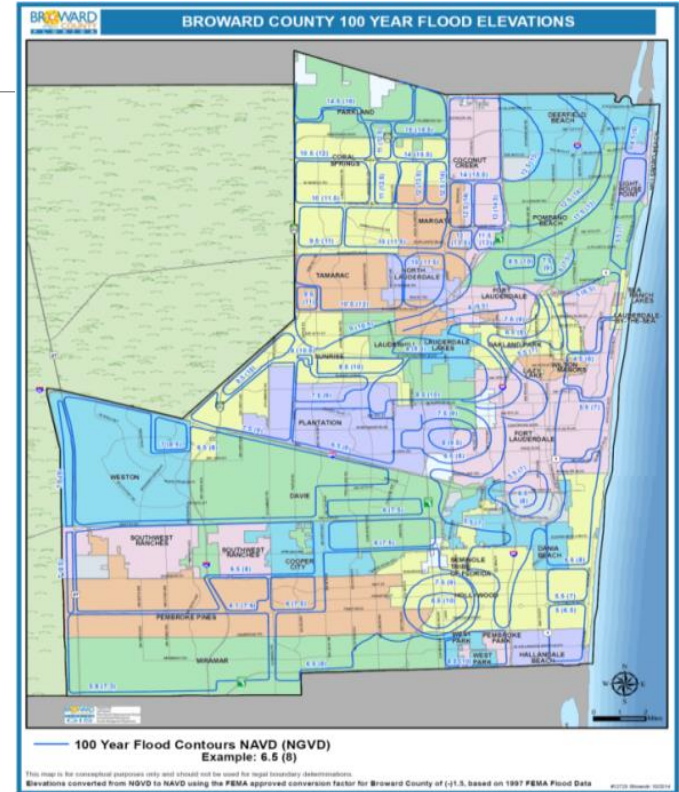


Flood Insurance	
Current (FFE at +1 above 2014 BFE)	\$650
FFE = 2014 BFE	\$1,817

Finished Floor Elevation: 10.25' NAVD

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

1992 FEMA Base Flood Elevation: 8.5' NAVD

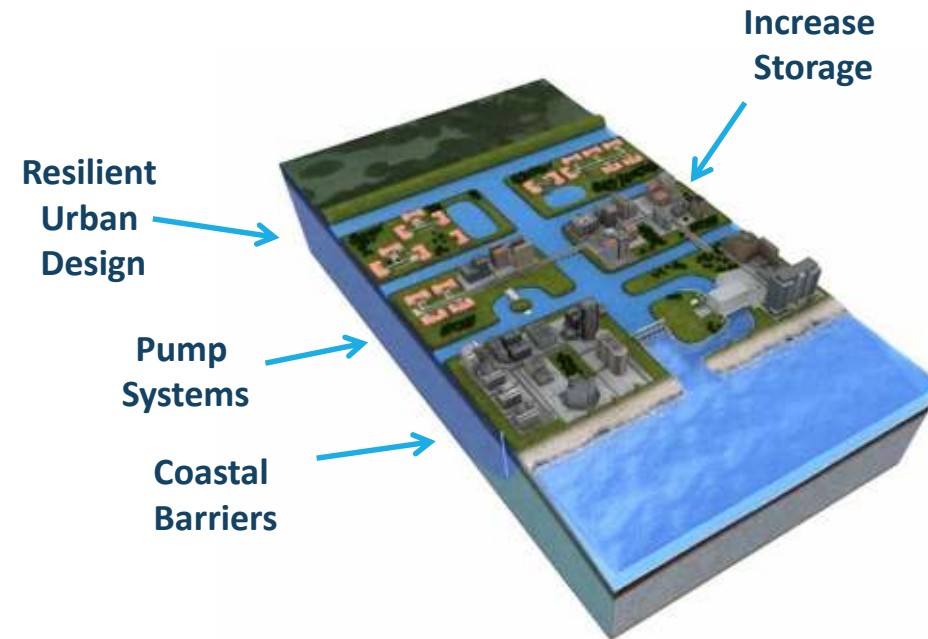


The Path Towards Resilience



Requires a Holistic and Sustained Approach:

- Future conditions assessments
- Scenario-based planning
- Coordinated investments
- Maximize co-benefits



Opportunities for State Support

- Require resiliency planning standards for all state agencies
- Require resiliency (future conditions) for state funded projects
- Expand state agency data collection and technical assistance
- Expanded funding for stormwater projects, esp. green infrastructure (flood and environmental benefits!)
- Funding for septic tanks conversions (urban and rural, WQ and public health)
- Partner in resilient energy investments (esp. solar and EV investments)
- Support regional initiatives



Questions?

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