

# Ready & Resilient Combating Water Hazards in an Era of Extreme Weather



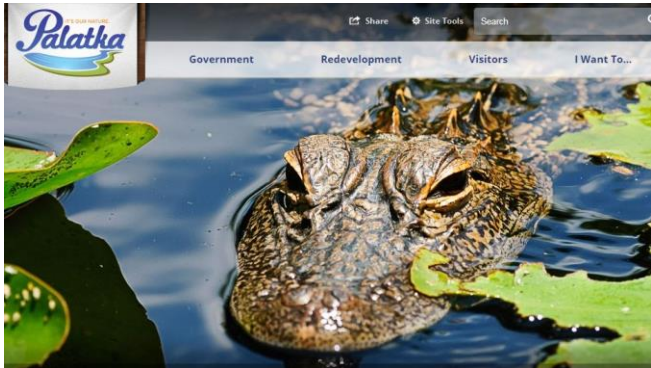
6<sup>th</sup> Annual Fall  
Research Symposium

## Understanding Community Values to Support Resiliency Improvements

CJ Reynolds, Institute for Marine Remote Sensing, College of Marine Science,  
University of South Florida/ International Ocean Institute-USA



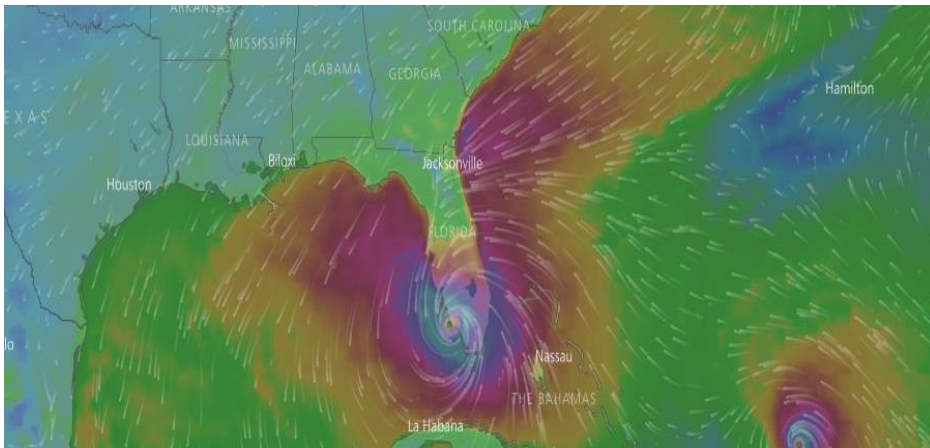






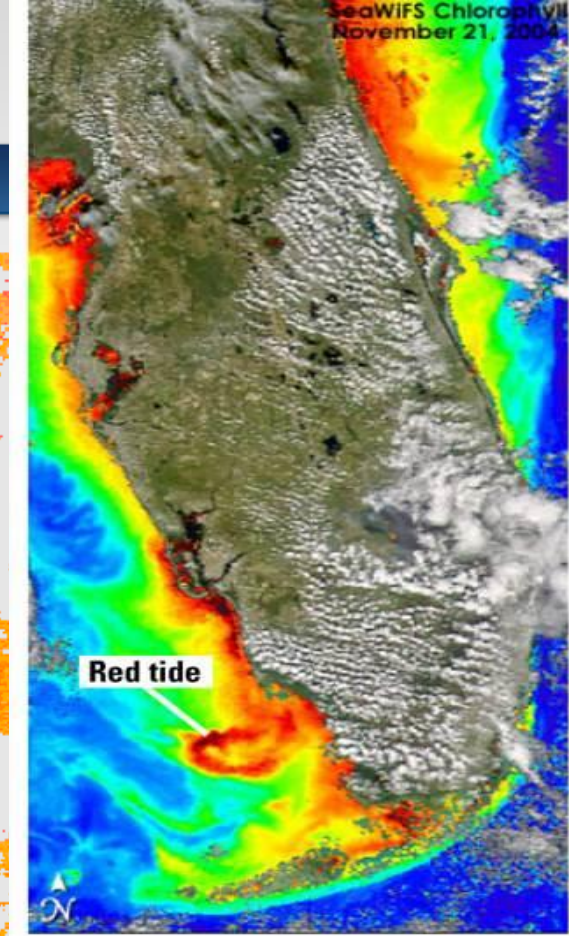
# Ready & Resilient Leaders

- Understanding Perceptions of Adaptation and Finance
- Water -- the next issue
- Actions cities can take
- Resiliency Visioning Exercise





USF



SeaWiFS ocean chlorophyll concentration (mg/m<sup>3</sup>)

0.04 0.4 4 40



- Grad students and researchers led by Dr. Frank Muller-Karger produce high resolution satellite images and data tools**
- Effects of weather, climate and human/infrastructure impacts
  - Social factors, policy, stakeholder engagement
  - Decision making and management processes – local to global



# METROPOLE

An Integrated Framework to Analyze Local Decision Making and Adaptive Capacity to Large-Scale Environmental Change

Vulnerability/cost assessments, workshops

Three countries, local officials, staff, organizations, neighborhood leaders and scientists



Selsey, UK



**BELMONT**  
FORUM



Santos, BRAZIL



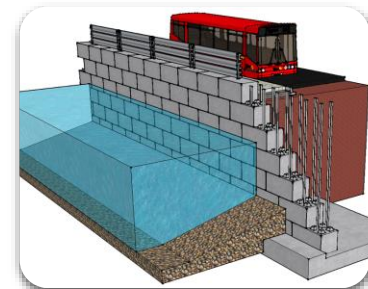
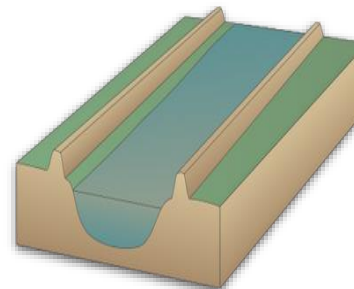
Broward County, US

# Which Adaptation Options Should Local Government Implement and When?

(Now/10/25/100/Never/Unsure)

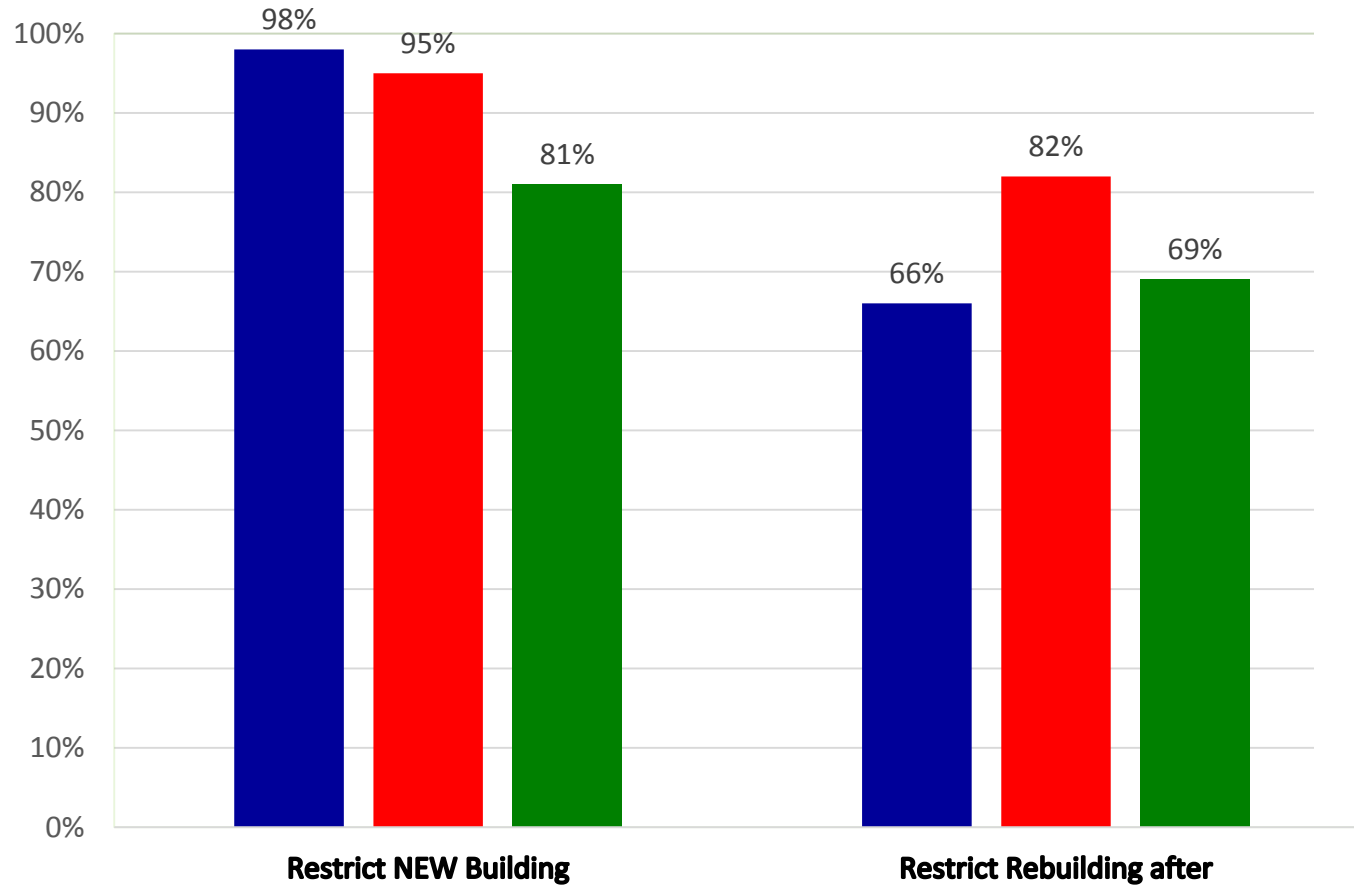
Same pattern in all 3 countries

- Local Gov should act **NOW** and **10 Years**
- Same top options = nature-based or development control
- Delayed “grey” projects and voluntary buy outs



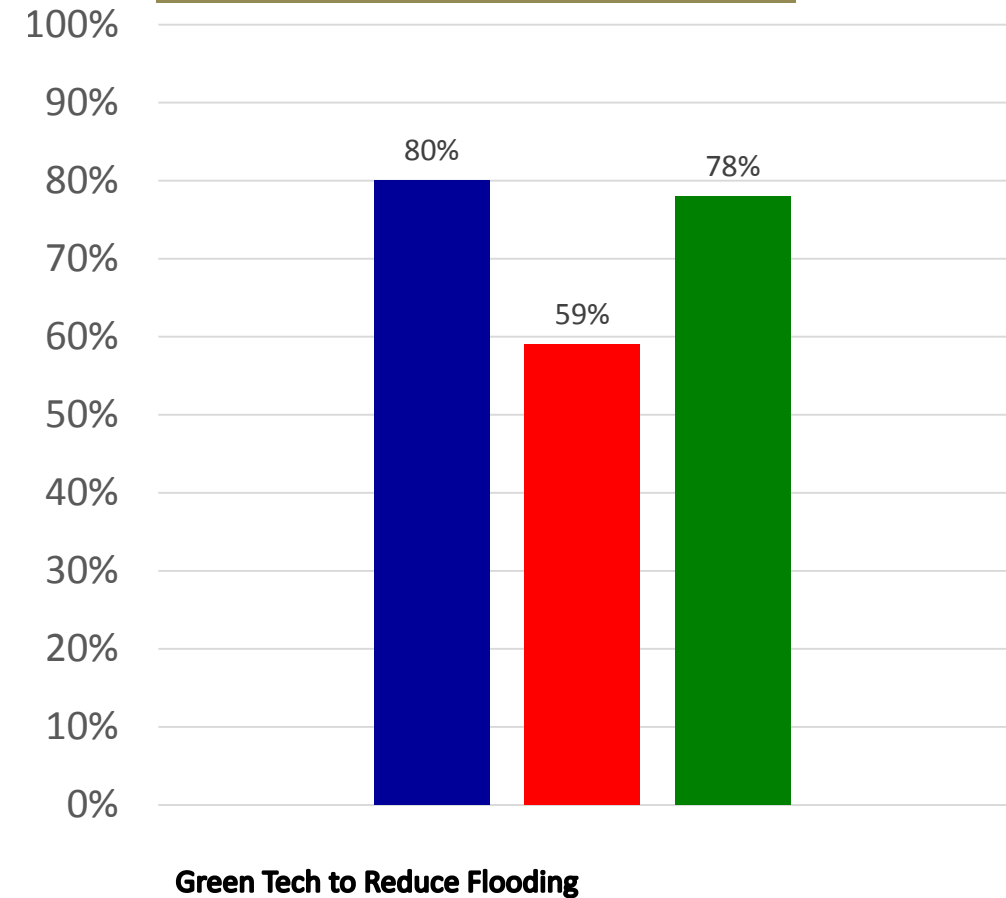
# Top Priorities (% choosing Now)

## Land-Use Policies



US ● UK ● BR ●

## Green Tech



# Acceptability of Public Finance Mechanisms

Ratings Scale: 1 = not acceptable to 5= totally

1. Create low-interest loan program for flood proofing and elevating residences
2. Develop special district assessment for properties in highly vulnerable areas
3. Issue a bond to finance public infrastructure improvements
4. Create a new county-wide resiliency fund based on property taxes
5. Add flood resiliency surcharge on water utility bills
6. Custom option: US/sales tax, BR/transfer tax, UK/development tax



# Acceptability of Public Finance Mechanisms

Similar pattern in Brazil and US. UK was different.

**Lower:** General charges to all community payers (utility /sales tax)

**Moderate:** Mechanisms that enable financing for adaptation (bonds/loans)

**More acceptable:** “targeted” fees/taxes on at risk property (special districts)



## Do local research!

- Differences between men, women, age groups.
- Political affiliation – same order, but different scores

# Social Factors and Adaptation Options

Study shows there is common ground!

Preferences for nature-based solutions and restricting development

- Offers co-benefits *now* -- aesthetics, recreation, wildlife
- Perception of fiscal savings, less government costs
- Restricting new development in vulnerable areas – protect paradise.
- “Delayed gray”...uncertainty of future risks/needs, dislike of large projects, and concerns about quality of life





# Social and Cognitive Factors Influence *Time Priority*

1. Formal and informal **leadership roles**, **social norms** perceptions of what others would do
2. Personal **experience** with hazards **increases concerns** about threats and overall support
3. Future discounting -- **immediate** benefits are valued more than future benefits
4. Difficulty imagining **beyond 15 years**



# Fairness of Finance

Fairness is a deeply held core value

Costs, taxes and fees that are specific to risk/place & owner are perceived as more “fair” or acceptable than general community fees

SO --FAIR means different things to different people – based on circumstance, values – reflected in attitudes of fees, taxes

*It's about finance as an instrument that encourages behavior change, providing people and institutions with the incentives, motivation, and security they need to invest in prevention and make decisions for the long-term, and direct resources to proven interventions.” Georgia Levenson Keohane*



# Take Aways --Building Community Resiliency

- #1 Take a look at Special Districts for potential resiliency funding
- #2 Make sure your CRAs are resilient - align/integrate to resiliency improvements
- #3 Study successful referendums – Brevard, San Francisco Bay \$12 parcel tax
- #4 Educate business and citizen leaders on finance tools, benefits/trade-offs
- #5 Start with nature-based stormwater solutions**



# ***Water Issues and Actions Cities Can Take***





# Helping Citizens Become Resilient

1. Integrate social vulnerability assessments into planning to protect and empower our most vulnerable and less able citizens
2. Partner with health and social services organizations
3. Reports to read:
  - United Way ALICE report -- families & income in your county
  - Southeast Compact RCAP v 2.0 -- social equity
  - CDC Climate Ready States & Cities – BRACE



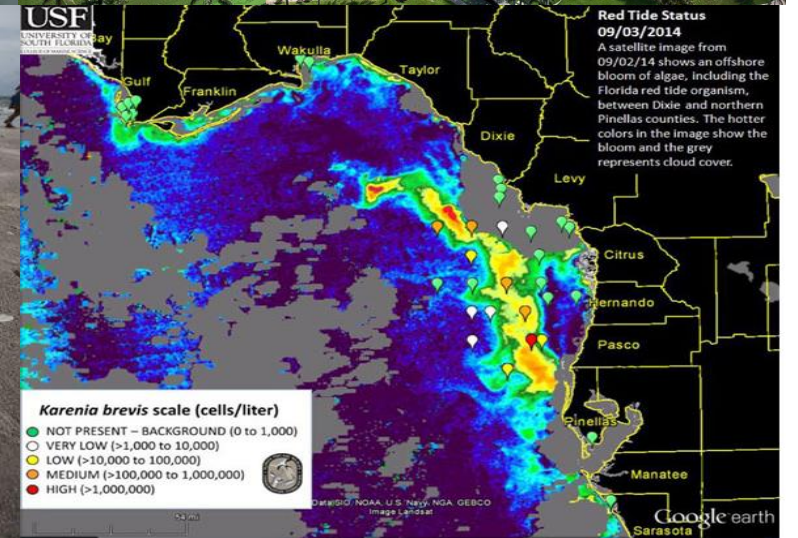


# Stormwater: What do we do with it

**Stormwater Pollution is a Major Contributor to the Degradation of Our Rivers and Oceans**



Algae in Springs





# Different View of the Problem

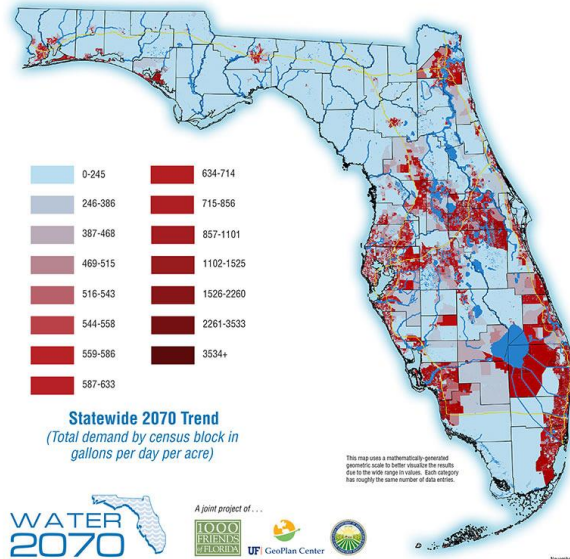
Mapping Florida's Future – Alternative Patterns of Water Use in 2070



A joint project of . . .



UF | GeoPlan Center



- Groundwater is recharged by rain/surface – takes years to filter
- Streets and stormwater systems *rapidly divert* large amounts of dirty water to bays, rivers
- Groundwater pumping and dropping water tables – sink holes
- Salt water intrusion & drinking water issues – increased costs for cities, people

# Resiliency Action: Operation UnPave Paradise

Structural permeable surfaces have become financially feasible and beautiful

- 
- Comparable costs to asphalt, less than concrete
  - Provides stormwater mitigation, flood risk reduction (avoided costs)
  - Treating rain where it falls... reduces overall volume, peak flows and increase ground water contributions





# “Operation UnPave Paradise”

Challenge: Updates to state policies and programs are needed – FDEP, Florida WaterStar, WMDs

Things cities can do

- ✓ review/revise local incentives, permits, codes for new residential and commercial development
- ✓ Do a flood and parking assessment
- ✓ Private sector to implement / showcase best practices
- ✓ Propose regional collaboration on technical education and planning – RPCs, engineering, developers, universities



**Florida Water Star<sup>SM</sup>**  
**New Commercial and Institutional Building Criteria**

The Florida Water Star<sup>SM</sup> Commercial and Institutional program certifies new offices, retail and service establishments, and institutional and nonindustrial buildings.

**Does NOT INCLUDE a category or criteria for paved surfaces!**



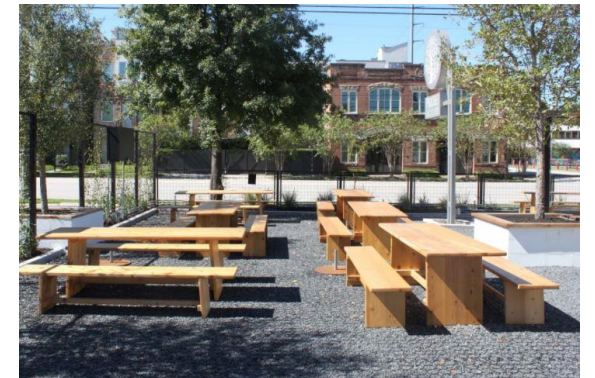
# Benefits of Operation UnPave Paradise

**Research shows strong support for green and nature-based flood reduction solutions**

*You can make a visible and tangible difference!*

- ✓ Energizes, educates, inspires your community
- ✓ Protects public buildings – schools, community centers, stadiums
- ✓ Supports businesses – flood reduction, more space, profit
- ✓ Reduces/delays large stormwater system investments
- ✓ Improves local watersheds
- ✓ Healthier marine life

Permeable parking at  
Houston bar & grill.





# Resiliency Visioning Exercise



1. Where do I want my city to be in 6 months?
2. How do I feel when I get there?
3. What is the first action I need do to start towards my goal?

Write the questions and answers, place into the envelop and seal.  
Write your name and home address on the envelop. Give to staff.  
We will mail in six months. ***No one will read this.***

# ***Thank you!***

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