

# Addressing the Resiliency Challenge: Economics & Funding

Valerie Seidel, The Balmoral Group

# Resiliency Issues



# Challenges

## Funding

Local governments barely cover infrastructure costs now  
New resiliency expenses?

## Uncertainty

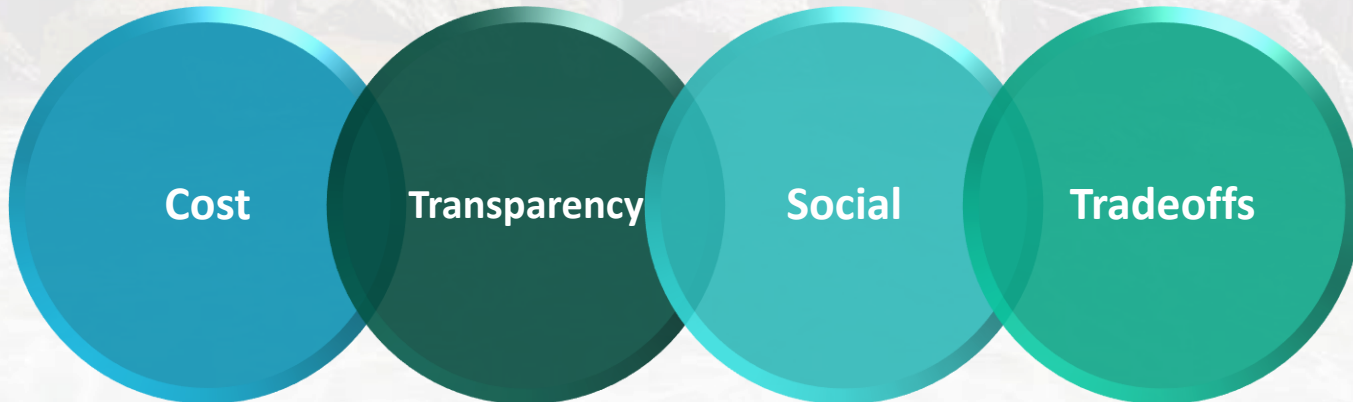
Societal challenge of our time  
Emerging issues, acceptance

## Social Justice

Intergenerational discounting  
Distributional impacts

## Tradeoffs

Engineering vs. economics vs. environment  
Unintended consequences



# Funding

## New Legislation

---

Competitive and  
requires  
preparation

## Traditional Sources

---

Also competitive  
Requires broad  
view

# New Florida Legislation

- F.S. 380.093(5) A 3 year plan for statewide flooding with ranked projects
  - Sea Level Rise
  - Generates funding for local projects
  - Trust fund expires 7/1/2025
  - HJR 1377: can't add costs of flood mitigation upgrades to property assessed values

# New Florida Legislation

- F.S. 380.093(3) requires consistent vulnerability assessments:
  - Most recently available DEM *and* industry accepted analysis and modeling
  - At least NOAA Int Low and NOAA Int High, 2040 & 2070
    - Tidal flooding, including future high tide flooding
    - Current and future storm surge flooding
    - Rain-fall induced flooding to the extent practicable
    - Compound flooding
  - Include entire municipality (city or county) and all critical assets (defined in Statute)
  - Address Peril of Flood compliance (if applicable)
- State will stitch these together to achieve a statewide resilience map

# Funding Reality

- Planning Grants: \$20 million from FL legislature
  - Peril of Flood Compliance
  - Vulnerability Assessments
  - Adaptation/Resilience Plans
- Implementation/Adaptation Projects to adapt critical assets
  - \$500,000,000 from American Rescue Plan Act
  - Projects must be identified in a vulnerability assessment that complies with the requirements in s. 380.093 (3), F.S.
  - 50% cost share
- A lot of money – but there will be more need than \$ available

# Other Funding

- Funding is available but requires creativity
- Resiliency takes many forms
- Understand funding rules and requirements
- Understand local capacity for compliance







# Creative Funding – Federal Sources

## Funding themes:

- Navigation, Flood Control
- Recreation, Water Supply and Emergency Management
- Emerging issues that threaten the ecological and economic well-being
- Healthy and accessible urban waters, Improved Water Quality
- Hazard Mitigation, Resilient Infrastructure, Utility Protection

Funding Program	Stormwater	WWTFs and Septic Systems	Habitat Restoration	Muck Removal and Navigation	Monitoring and Research	Capital Construction
American Waters Resources Act (AWIA)/Water Resources Development Act (WRDA).	X	X	X	X	X	X
America's Water Infrastructure Act (AWIA)	X	X		X		X
EPA - Sewer Overflow and Stormwater Reuse Municipal Grants Program	X	X				X
EPA - Urban Waters Small Grants Program (UWSG).	X		X		X	
FEMA - Flood Mitigation Assistance (FMA) Grant Program	X			X	X	X
FEMA - Building Resilient Infrastructure and Communities (BRIC)	X					X
Average Award: \$14.2 M						

This is only A-F of the list

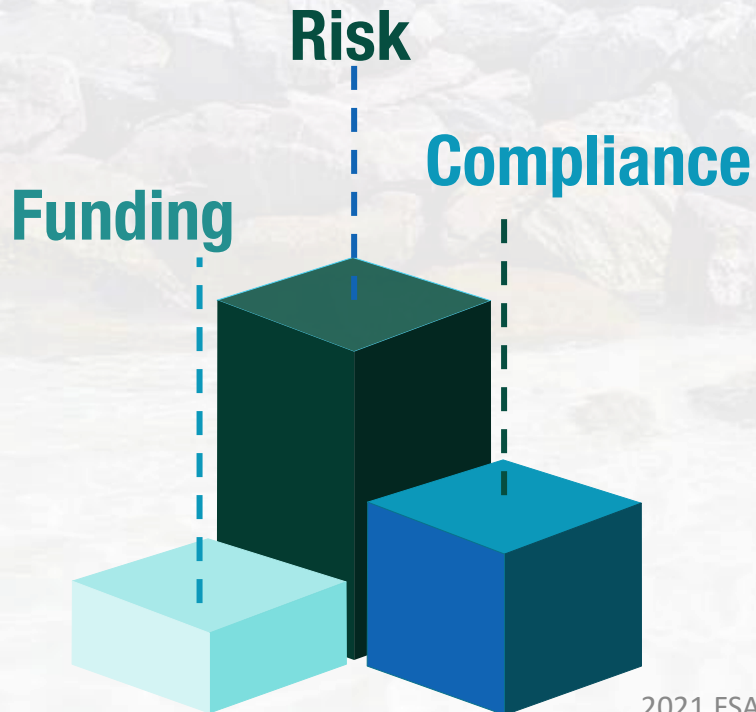
# Creative Funding – Local Sources

Hypothetical Infrastructure Surtax to finance improvement bonds

County	Current Condition		Low Scenario		Accelerated Scenario	
	Current Infrastructure Surcharge	Projected Average Infrastructure Sales Tax Revenues (\$ millions per year)	Proposed Infrastructure Surcharge	Projected Additional Revenues per Year (\$ millions)	Proposed Infrastructure Surcharge	Projected Additional Revenues per Year (\$ millions)
Brevard	0.5%	52.68	0.5%	0.00	1.0%	52.68
Indian River	1.0%	31.66	1.0%	0.00	1.0%	0.00
Martin	0.0%	0.00	0.5%	11.19	1.0%	22.37
St. Lucie	0.5%	19.32	0.5%	0.00	1.0%	19.32
Volusia	0.0%	0.00	0.5%	50.93	1.0%	101.86
Total		\$ 103.66		\$62.12		\$ 196.24

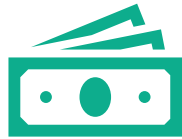
# Uncertainty

## Understanding Local Capacity – Economic Analysis can help



- **Funding**  
Identify eligibility, framing projects to meet criteria
- **Compliance**  
Ensuring local ability to meet funding requirements – reporting, procurement, monitoring, etc.
- **Appetite for Risk**  
Local foresight and tradeoffs
  - Spend now or spend later
  - Externalities = public perception
    - Back Bay Walls
  - Economic Analysis helps

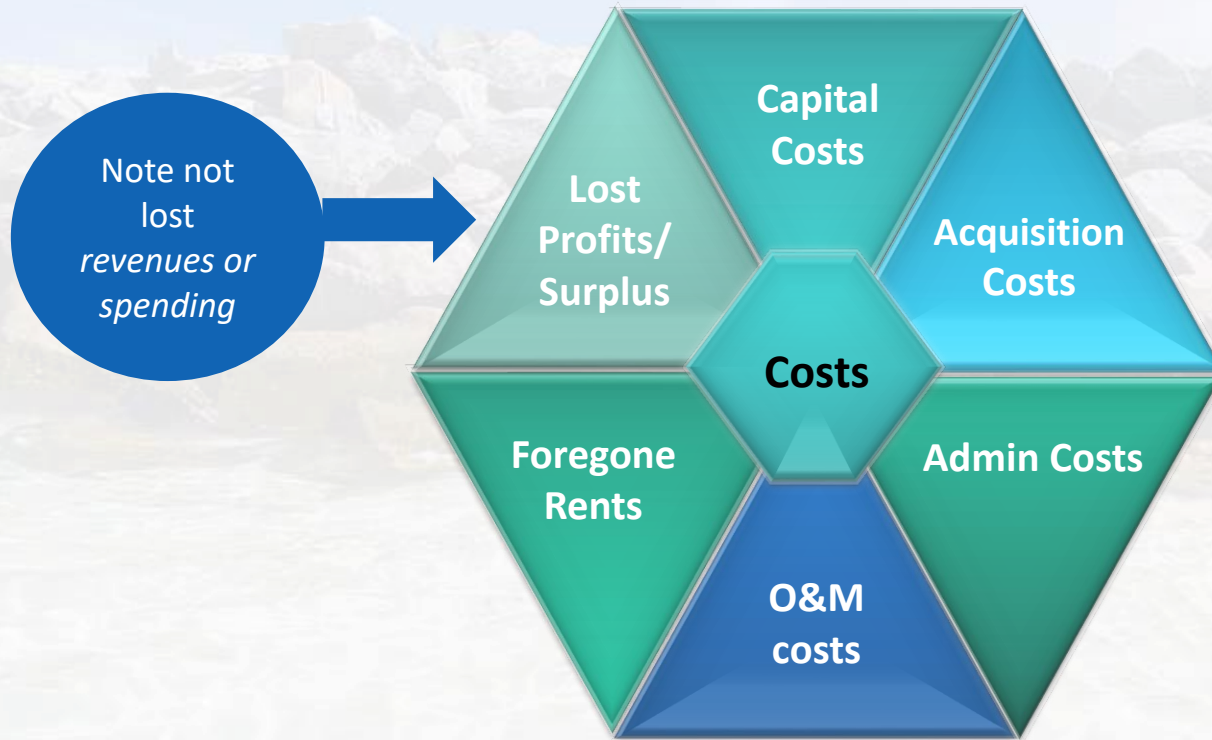
# Economic Analysis $\neq$ Economic Impact Analysis



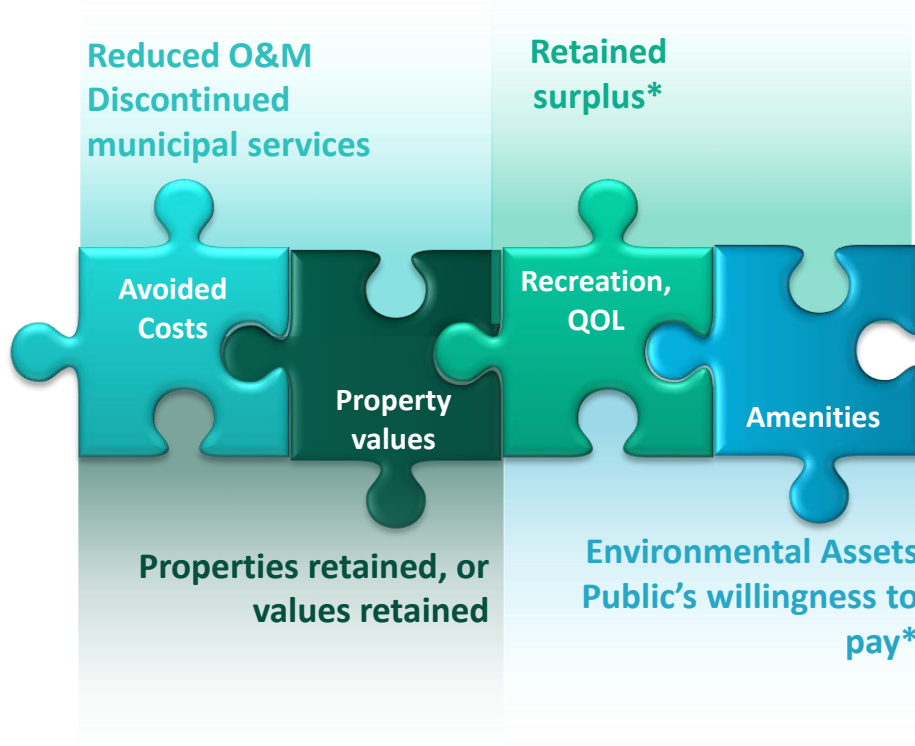
In Florida, economic impact analysis has been used in public funding decisions.

- ***Economic impact analysis is not appropriate*** for choosing between alternative infrastructure investments.
  - Feds don't allow it, for valid reasons
  - The larger the expenditure, the greater the multiplier effects, whether the project has net benefits or not
- *"Applicants should not include employment or output multipliers that purport to measure secondary effects as societal benefits because these secondary effects are generally the same (per dollar spent) regardless of what kind of project is funded."*
- Allows for little consideration of uncertainty

# Cost-benefit analysis: Costs



# Benefits



- **\*surplus** = the net economic benefit.
  - Producer surplus is **the difference between the actual price of a good or service**—the market price—and the lowest price a producer would be willing to accept for a good. Consumer surplus is the difference between what a consumer is willing to pay and what they actually pay for a good or service.
- Who cares?
  - **You do** as a taxpayer, so we don't subsidize money-losing ventures.
    - "Good money after bad"
- **\* public willingness to pay**
  - Non-market values

# Non-market values

Economic Analysis can help quantify public preferences and externalities

**Non-market values estimate the “price” to an intangible item for which there is no ready market from which to derive a price – what people are willing to give up to get a good or service**







**Positive  
externalities**

1

WTP for improved habitat

2

WTP for improved water quality

3

WTP for improved access (waterfront,  
transport, sidewalks, etc.)



**Negative  
externalities**

4

Avoided costs/penalties of environmental  
restoration

5

WTP to avoid service disruption

6

Avoided costs of flood damage, regulatory  
violations (impaired water quality)

# Typical CBA

Direct Costs	Units	Quantity	30 Year Horizon		
			Cost		Relative to Base Case 7%
			One Time/ Annual Cost		
Administrative/Staff costs	Per hour/ staff	-		-\$1,785,413	
Maintenance Costs of a protection structure	\$ per year	1	\$265,400	\$207,613	
Land acquisition costs	\$	-			
Construction Costs	\$	1	\$25,391,743	\$25,391,743	
Periodic Nourishment Costs	\$ per year	1	\$333,300	\$3,533,321	
Demolition and Restoration Costs	\$ per lot	-			
Direct Cost Sub-Total:			\$25,990,443	\$29,132,677	
Indirect Costs	Units	Quantity	Cost		Relative to Base Case 7%
			One Time/ Annual Cost		
Total number of properties/building impacted by erosion	\$ per Property				
Total Area lost to erosion	\$ per SF				
Net impact to Council rate revenue	\$ Per Lot				
Indirect Cost Sub-Total:					
Costs Total:					

Community Benefits	Units	Quantity	30 Year Horizon		
			Benefit		Relative to Base Case 7%
			One Time/ Annual Value		
Additional premium per property due to beach quality (beach width) within 500m of the beach	\$ Per Lot	663	\$12,100,186	\$1,317,032	
Residual Value	\$	1	\$10,156,697	\$1,334,256	
Direct Benefits Sub-Total:			\$22,256,883.03	\$2,651,287.66	
Non-Market Benefits	Units	Quantity	Benefit		Relative to Base Case 7%
			One Time/ Annual Value		
Environmental WTP- Beach and Sandy Seabed value	Per Wamberal Household	2,135	\$12,371	-\$64,697	
WTP for Beach Amenity (Generic beach amenity including walking, swimming, surfing, enjoying nature)	Per Visitor/Year	54,611	\$1,785,853	\$0	
WTP for surfing - Residents	Per Surfer	6,725	\$155,255	\$0	
Non-Market Benefits Sub-Total:			\$1,953,478	\$0	
Benefits Total:			\$24,210,361	\$12,849,587	
Results					
Net Benefits:				(\$16,347,786)	
Benefit: Cost Ratio:				0.44	

Shift the focus from costs to benefits

# Uncertainty: Perception vs. Reality

## Perceived Risk

Spending money  
unnecessarily

## Actual Risk

Loss of economic  
drivers

Actual risks are values that drive economy

- Beach-related activity and commerce
- Insidious costs
  - Increased Maintenance and Repair
  - Relocation of critical assets
- Increased materials costs
  - Enhanced drainage systems
  - Business interruptions
  - Design Specs/Materials design to withstand adverse conditions
- Consider time value of money

# Social Justice

Resiliency investments are intergenerational  
Projects need to consider socioeconomic impacts

- Low discount rates favor future generations (our kids and grandkids)
- High discount rates favor immediate return – oldest residents

**Intergenerational  
Equity**

**Unintended  
Consequences**

- Census data to check if project investments favor high income or disfavor minority and low income neighborhoods
- Civil rights issue

# Social Justice

Resiliency investments are intergenerational  
Projects need to consider socioeconomic impacts

- Do projects create incentives to displace lower income residents or historically minority neighborhoods?

**Climate  
gentrification**

**Distributional  
Impacts**

- Line by line analysis of CBA – who is affected, positively or negatively?

# Distributional Analysis

Cost/benefit	Stakeholder Group	Geography	Cost/Benefit	Type of Good/Service	30 Year NPV
Administrative / Staff costs	Council/Government	Entire Municipality	Benefit	Common-pool	-1785412.845
Maintenance and repair costs	Council/Government	Entire Municipality	Cost	Common-pool	207612.8599
Land acquisition costs	Council/Government	Entire Municipality		Common-pool	
Construction Costs	Council/Government	Entire Municipality	Cost	Common-pool	25391742.86
Periodic Nourishment Costs	Council/Government	Entire Municipality	Cost	Common-pool	3533320.971
Demolition and Restoration Costs	Council/Government	Entire Municipality		Common-pool	
Lost value of at-risk properties	Home-owners	Shorefront	Benefit	Private	-24659200.05
Lost revenues of Municipal Services	Council/Government	Entire Municipality	Benefit	Common-pool	-383794.7675
Household income	Council/Government	Entire Municipality	Benefit	Common-pool	-7529270.675
Additional premium per property due to beach quality (beach width) flows to home owners	Homeowners	Shoreline Neighbourhood	Benefit	Private	-5441979.204
Additional premium per property due to beach quality (beach width) flows to the council	Council/Government	Entire Municipality	Benefit	Common-pool	-264401.092
Residual Value	Council/Government	Entire Municipality	Benefit	Common-pool	-1334256.024
Environmental WTP- Beach and Sandy Seabed value	Community/Households	Entire Municipality	Cost	Public	10085.75828
WTP for Beach Amenity (Generic beach amenity including walking, swimming, surfing, enjoying nature)	Community/Households	Entire Municipality		Public	0
WTP for surfing	Community/Households	Entire Municipality		Public	0

Not rocket science, but achieves **transparency** and adds insight

# Trade-offs

## If you have a hammer....



- Successful management of resiliency challenges requires transparently evaluating trade-offs
  - Practical, innovative solutions weigh trade-offs
  - Risk-averse vs. risk-aware
- Changing the dialogue
  - Research has found that public works directors and utility managers among the most risk-averse individuals (for good reason)
  - Most engineers/technical professionals specialize in a few areas
  - Broad, multi-disciplinary analysis often ventures outside our comfort zone

# Trade-offs

The scientific and societal challenge of our time

## Alternatives Analysis

generally only compares costs



Tradeoffs between engineering feasibility and public capacity for projects

Economic Analysis needs to consider socioeconomic and environmental impacts



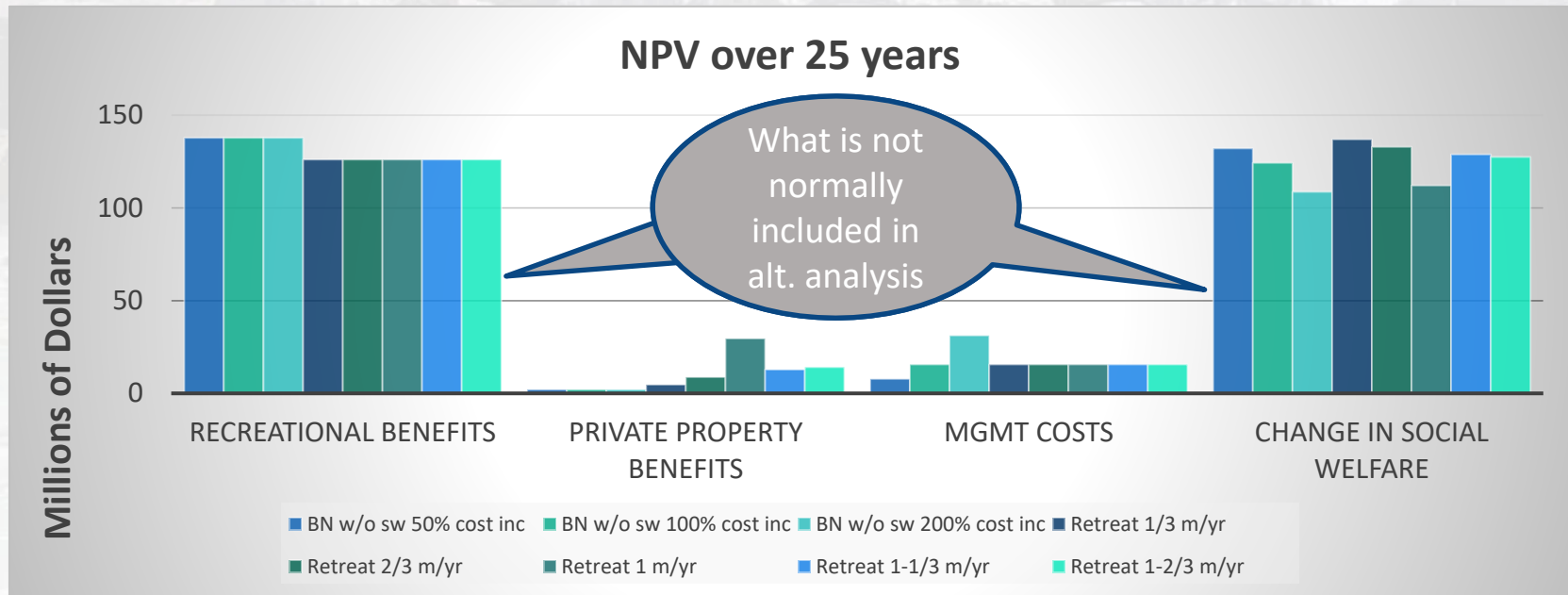
Environmental impacts = tomorrow's costs, today's public outrage



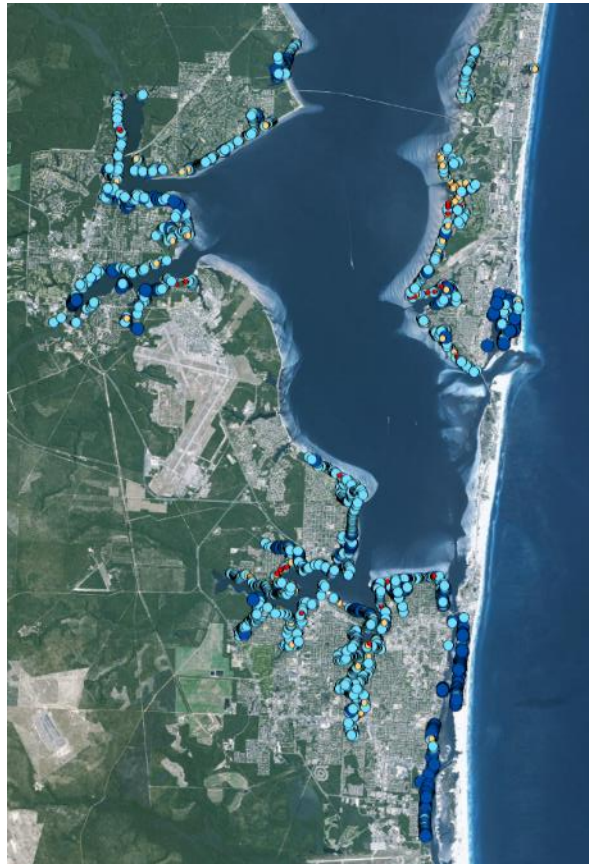
# Magnitude of Risks – loss of benefits

Nonmarket values (value of beach for recreation, aesthetics, and other use and non-use values) exceeded value of property by orders of magnitude

- E.g. previous studies found property values drop 30% with loss of beach width in a community



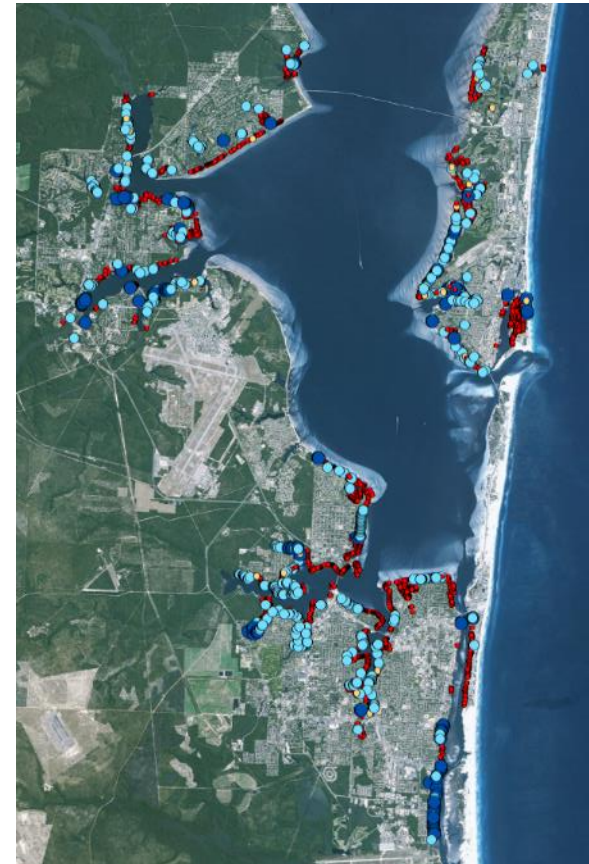
# Today's decisions foreclose some future decisions



Impacted  
properties  
Current and  
After projected  
SLR

**Why the State  
wants an overall  
plan**

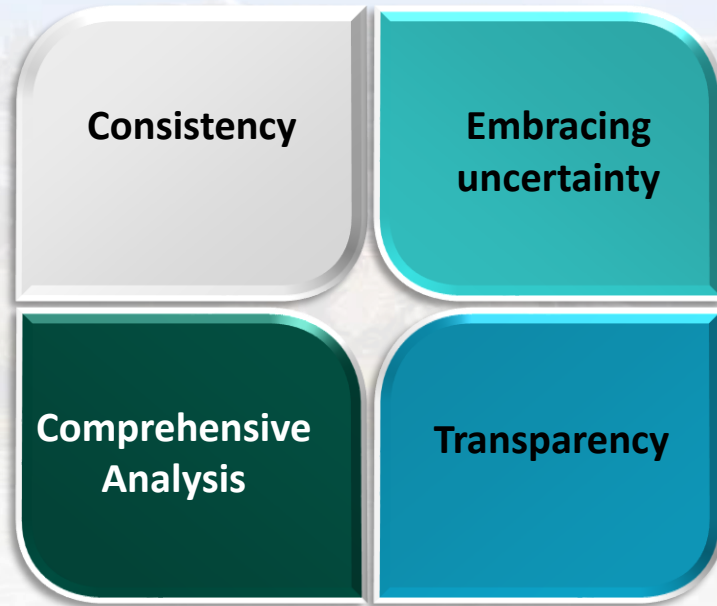
Avoiding Whac-  
a-mole



**LEGEND**

- 0
- 1
- 2 to 3
- 4 or more

# Addressing the Resiliency Challenge: Economics & Funding



## Success!

- Prioritization that gains public acceptance
- Achieves coastal resiliency goals
- Ranks high for funding priority



# THANK YOU

Contact: Valerie Seidel  
[vseidel@balmoralgroup.us](mailto:vseidel@balmoralgroup.us)

