

# ECONOMIC IMPACT ANALYSIS: COSTS AND BENEFITS OF COASTAL RESILIENCY STRATEGIES



*Florida Department of Economic Opportunity*

[www.FloridaJobs.org/WaterfrontsFlorida](http://www.FloridaJobs.org/WaterfrontsFlorida)

## PROJECT OVERVIEW

- Resources on how to build community resiliency are available from the Dept. of Economic Opportunity's community resiliency program
- The objective of this project was to evaluate costs and benefits of applying different strategies
  - Purpose: To help a community determine an approach to coastal resiliency that is best-suited to its needs
- Two pilot counties: Okaloosa County and Martin County
- Study area: Coastal High Hazard Area (CHHA)

## RESILIENCY STRATEGIES EVALUATED


*Potential planning strategies that Counties could use to increase coastal resiliency of their communities, include:*

- *conservation easements*
- *rolling easements*
- *land buy-outs*
- *transfers of development rights*
- *purchase of development rights*
- *Shoreline armoring*

*Analyzed how costs and benefits to a community change over time to inform coastal resiliency choices*



## OWNERSHIP BASED STRATEGIES

- *Conservation easements*
  - *Exchange development rights permanently for a portion of one's land for tax benefits and typically a cash payment*
    - *Landowner wants to see the property remain in its current state*
- *Rolling easements* 
  - *Exchange the right to rebuild after a storm for tax benefits and sometimes a cash payment*
    - *Allows landowner to develop land, but cannot prevent coastal changes*
- *Land buy-outs*
  - *Voluntary sale by landowner*
    - *Typically publicly funded to avoid rebuilding in an area with high public costs or risks*



## INCENTIVE BASED STRATEGIES

- *Transfers of development rights allow a landowner to sell the development rights of her land to an inland parcel for a greater development right*
  - *Used in Charlotte County extensively; used in Brevard County after Hurricane Charlie*
- *Purchase of development rights typically use public or non-profit funding to purchase a landowner's right to rebuild after a storm*
  - *Retires the right and allows the land to return to natural state*



## PHYSICAL PROTECTION STRATEGIES

- *Armoring refers to protecting waterfront property through the use of sea walls formed by steel pilings and stone revetments*
- *Extends use of property for an indefinite period of time*
- *Causes significant ecological impact*



# COST BENEFIT ANALYSIS

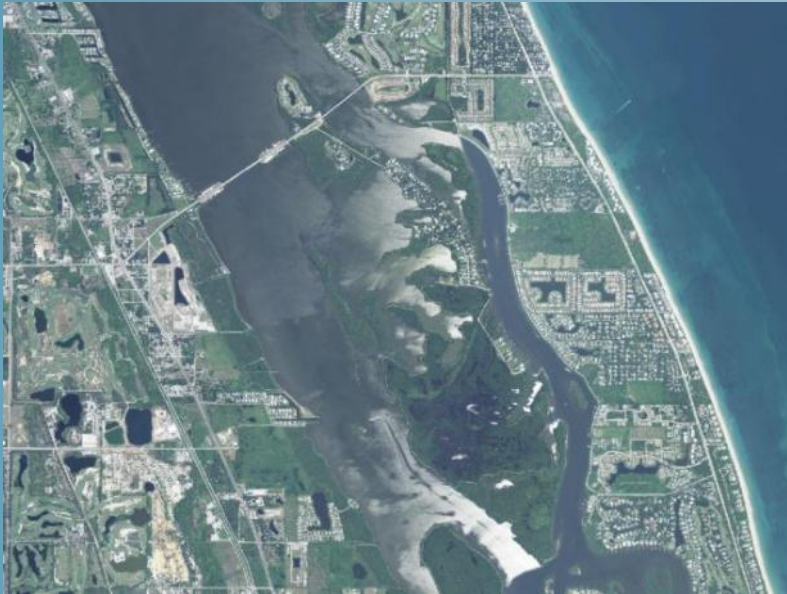


*First step is deciding what to include?*

- *Evaluate current conditions*
- *Included every parcel in Martin County's and Okaloosa County's Coastal High Hazard Area with a single family residence*



# COST BENEFIT ANALYSIS



- *Second Step: What to measure?*
- *Calculate measures for each cost and benefit*
  - *Parcel level*
  - *Determine which parcels are candidates for which strategies*
- *If benefits exceed costs for a parcel, the strategy is considered a good option for that parcel*



## COSTS MEASURED

- Acquisition costs
  - based on property values
- Construction costs
  - for armoring or demolition
- Administrative costs
  - to oversee programs
- Foregone revenues
  - lost future rents or taxes



## BENEFITS MEASURED

- *Avoided costs*
  - *of municipal services in the future*
- *Amenity values*
  - *from environmental or recreational services*



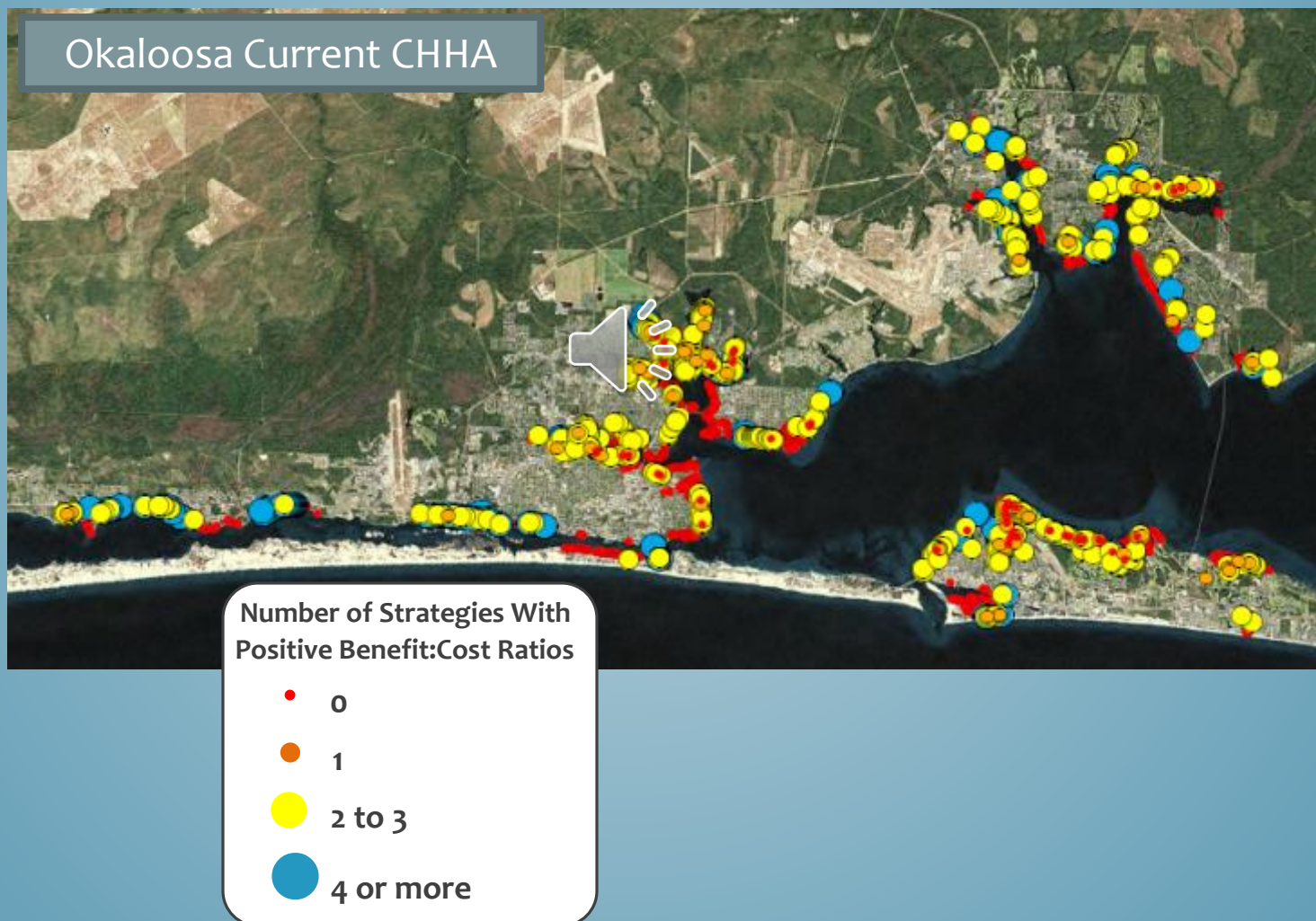
## RESULTS OF THE COST-BENEFIT ANALYSIS

- *All strategies are viable for some parcels*
  - *But each strategy does not apply to all parcels*
- *Most parcels have multiple viable strategies under current conditions*
- *The viability of a particular strategy varies widely across each county*
- *Viability of any strategy depends on how close the parcel is to valuable amenities like the beach, conservation areas, and parks*



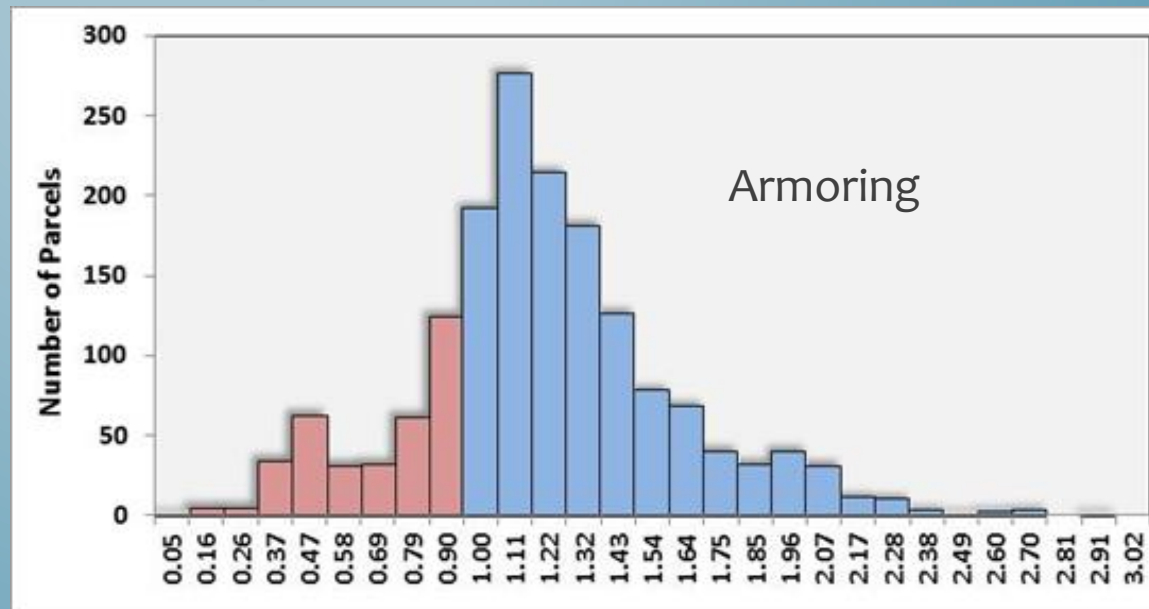
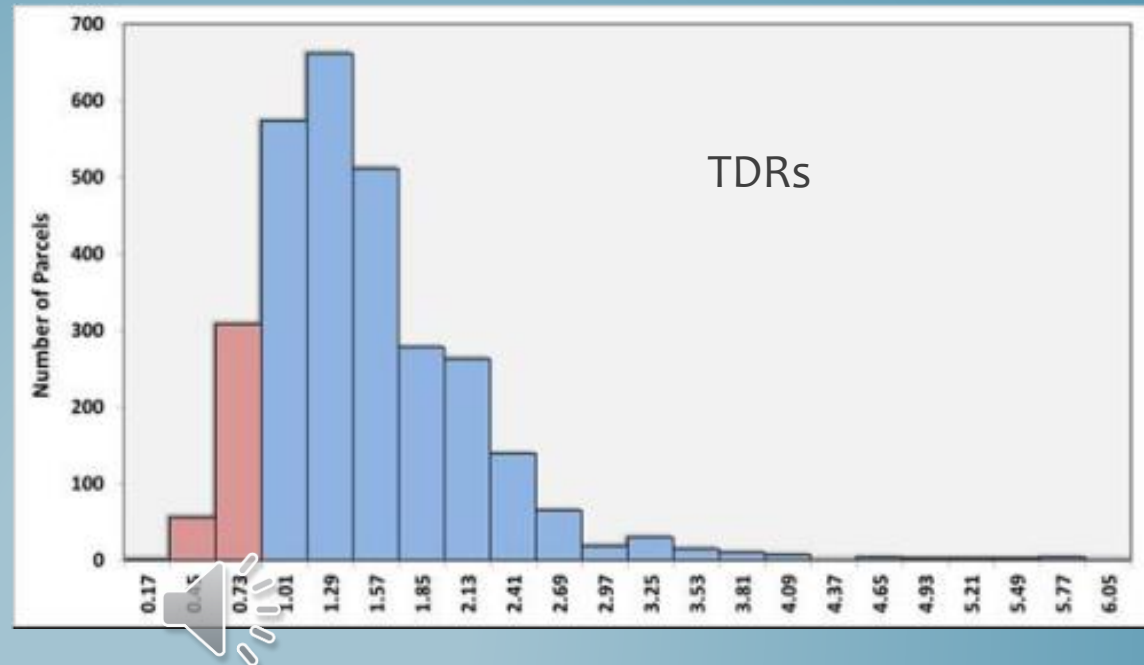


# MULTIPLE COASTAL RESILIENCY STRATEGIES ARE VIABLE FOR MOST PARCELS



## RESULTS

- These graphs illustrate how strategies varied widely by location
- The cost benefit ratio of Transfer of Development Rights (TDRs) for all parcels in Okaloosa County averages 1.69, while armoring averages 1.15
- Out of 3,000 parcels in the CHHA, TDR's are viable for all but about 350, while armoring is viable for 1,311



## OVERALL FINDINGS – CURRENT CONDITIONS

*Specific patterns emerged for residential properties:*

- *Most properties have more than one strategy that is cost-effective*
- *Properties closest to most amenities have the most strategies that are cost-effective*
- *Properties with the highest property values have the fewest strategies that are cost-effective*



## OVERALL FINDINGS – CURRENT CONDITIONS

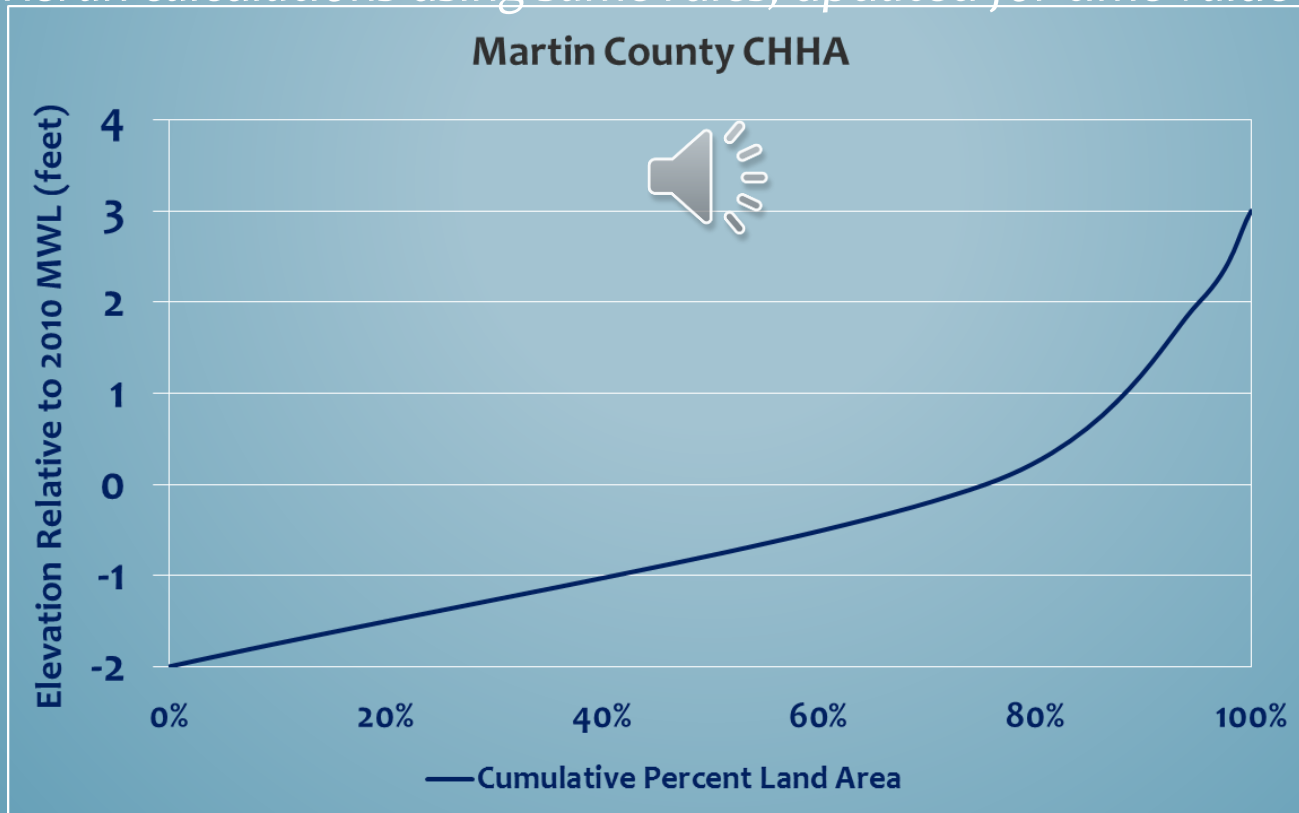
*For other land use types, a parcel-by-parcel analysis was not completed but sample parcels were analyzed*

- The trends were the same as residential, generally speaking*
- Land use type (single family residential, commercial, etc.) is not as important to benefit-cost ratio as location of the parcel*



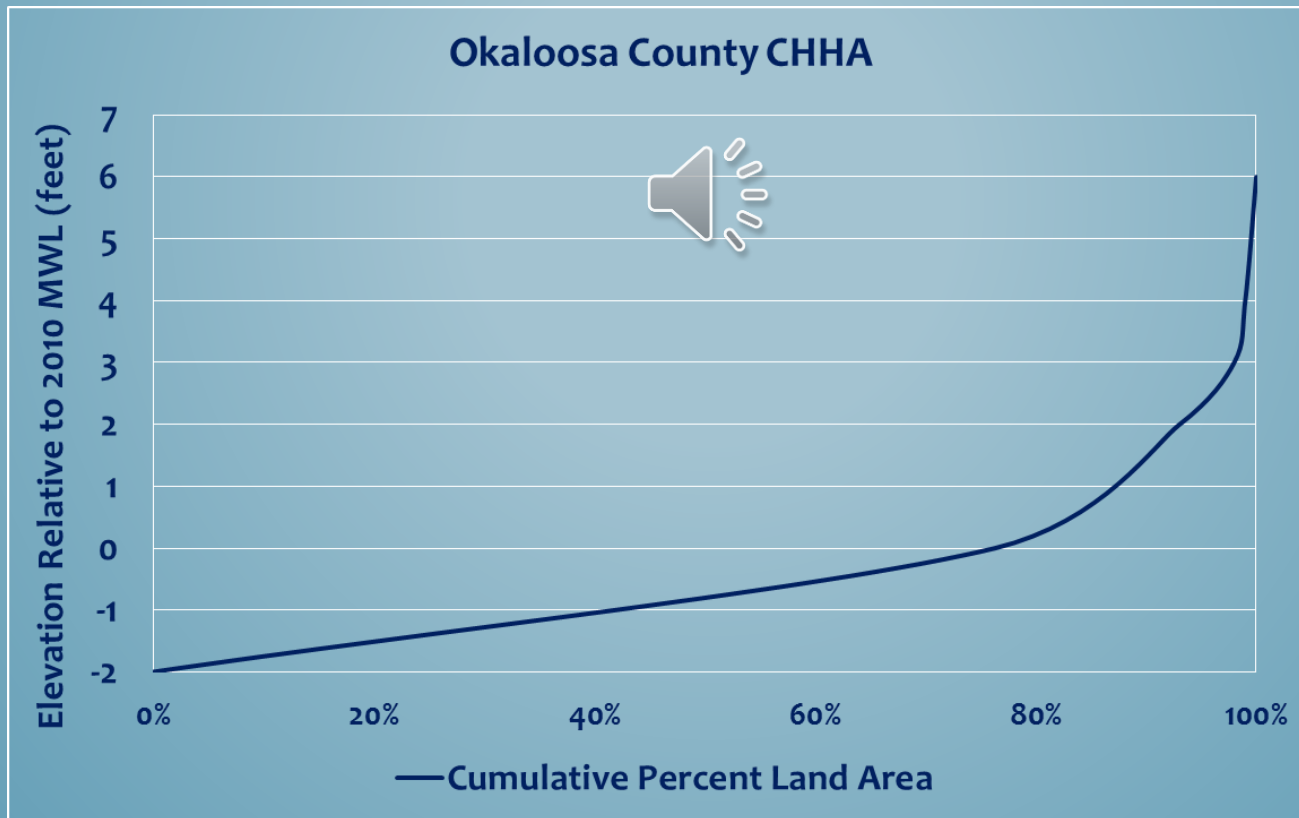
## INUNDATION SCENARIO

- Migrated CHHA line inward one meter of increased inundation; in some areas this is a few feet, in others much farther, depending on local slope
  - Reran calculations using same rules, updated for time value of money



## INUNDATION SCENARIO

- Each County's natural slope and elevation is different, which will have different effects for inundation scenarios and the strategies that are viable



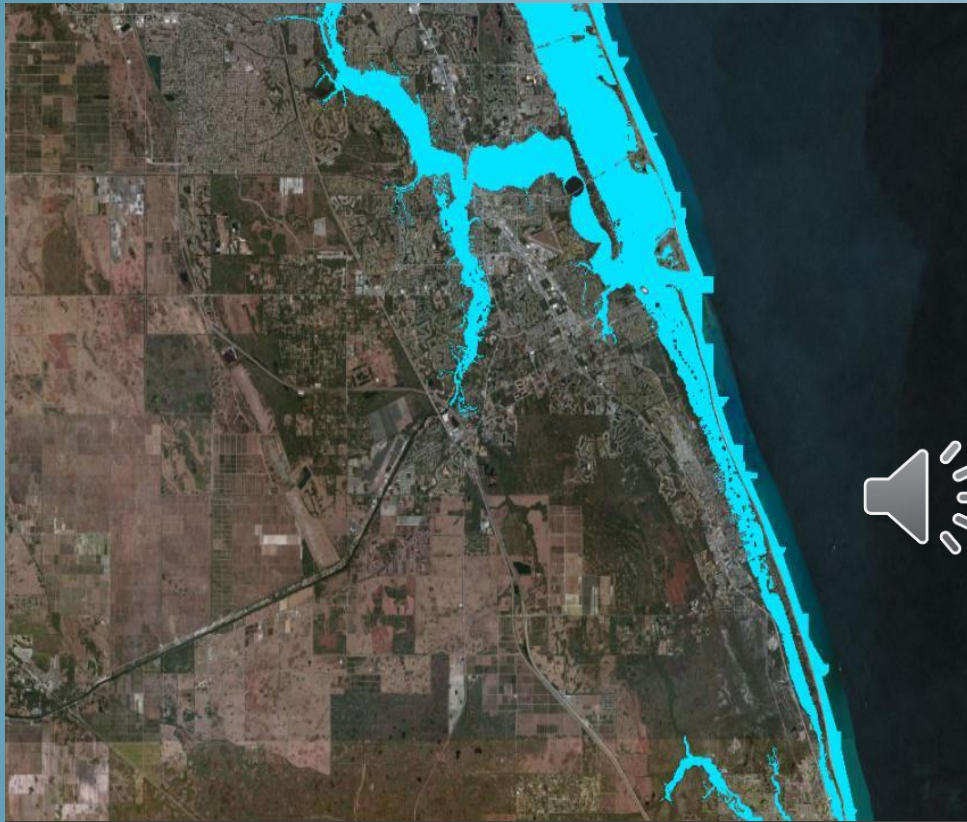


## INUNDATION SCENARIO RESULTS

- Trends in results over time:
- Some parcels that were not close to amenities may become closer due to shoreline migration
  - In Okaloosa County, certain parcels had more viable strategies in the future scenario, as specific strategies became viable due to shoreline migration
- Properties that are farthest from amenities may be very costly to protect
- Many properties are lost to inundation, either because the parcel is inundated or access to it is blocked by inundation



## MARTIN COUNTY COASTAL RESILIENCY



**MARTIN COUNTY CHHA WITH  
CURRENT CATEGORY 1 STORM  
INUNDATION (ABOVE) AND FUTURE  
WITH 1 METER ADDITIONAL  
INUNDATION (RIGHT)**



# OKALOOSA COUNTY COASTAL RESILIENCY



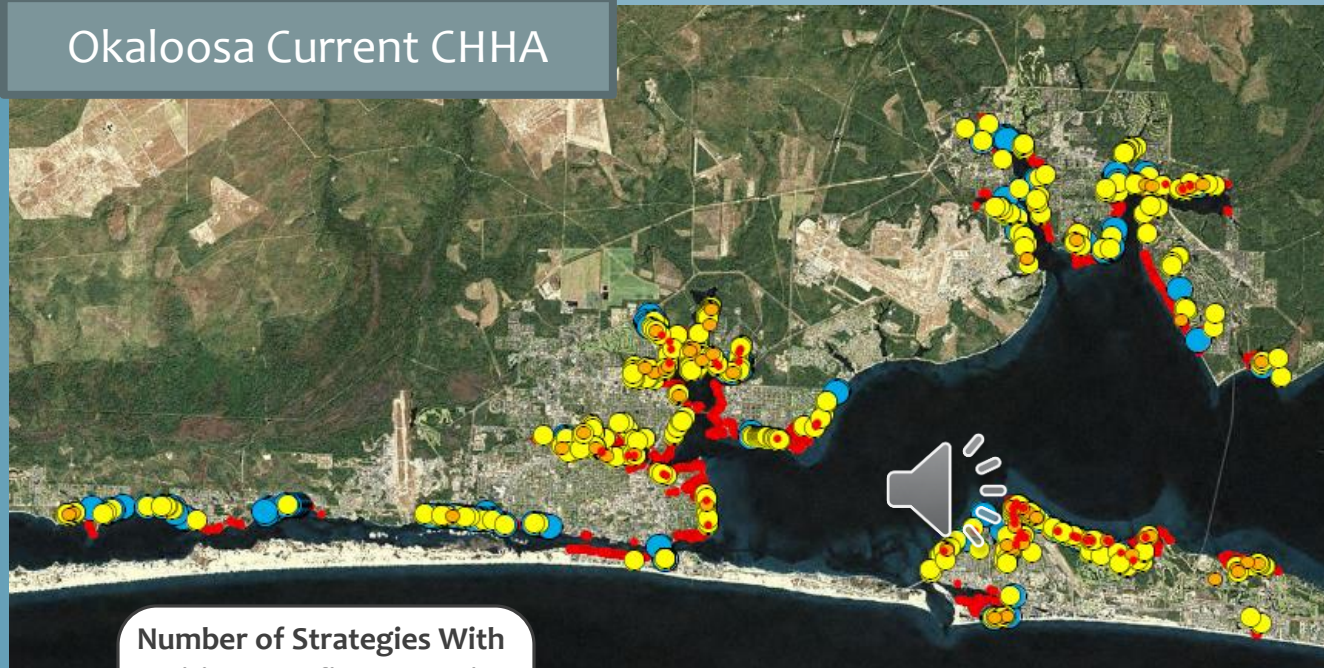
**OKALOOSA COUNTY CHHA WITH CURRENT  
CATEGORY 1 STORM INUNDATION (ABOVE)  
AND FUTURE WITH 1 METER ADDITIONAL  
INUNDATION (RIGHT)**





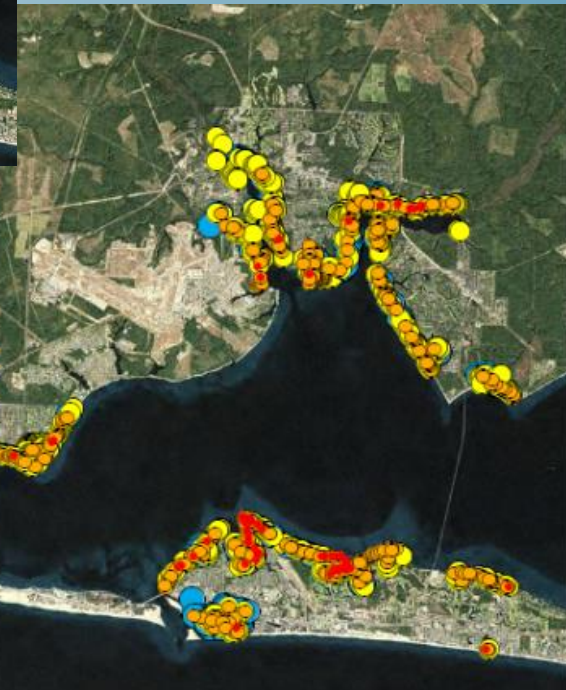
# MULTIPLE COASTAL RESILIENCY STRATEGIES ARE VIABLE FOR MOST PARCELS

Okaloosa Current CHHA



Number of Strategies With Positive Benefit:Cost Ratios

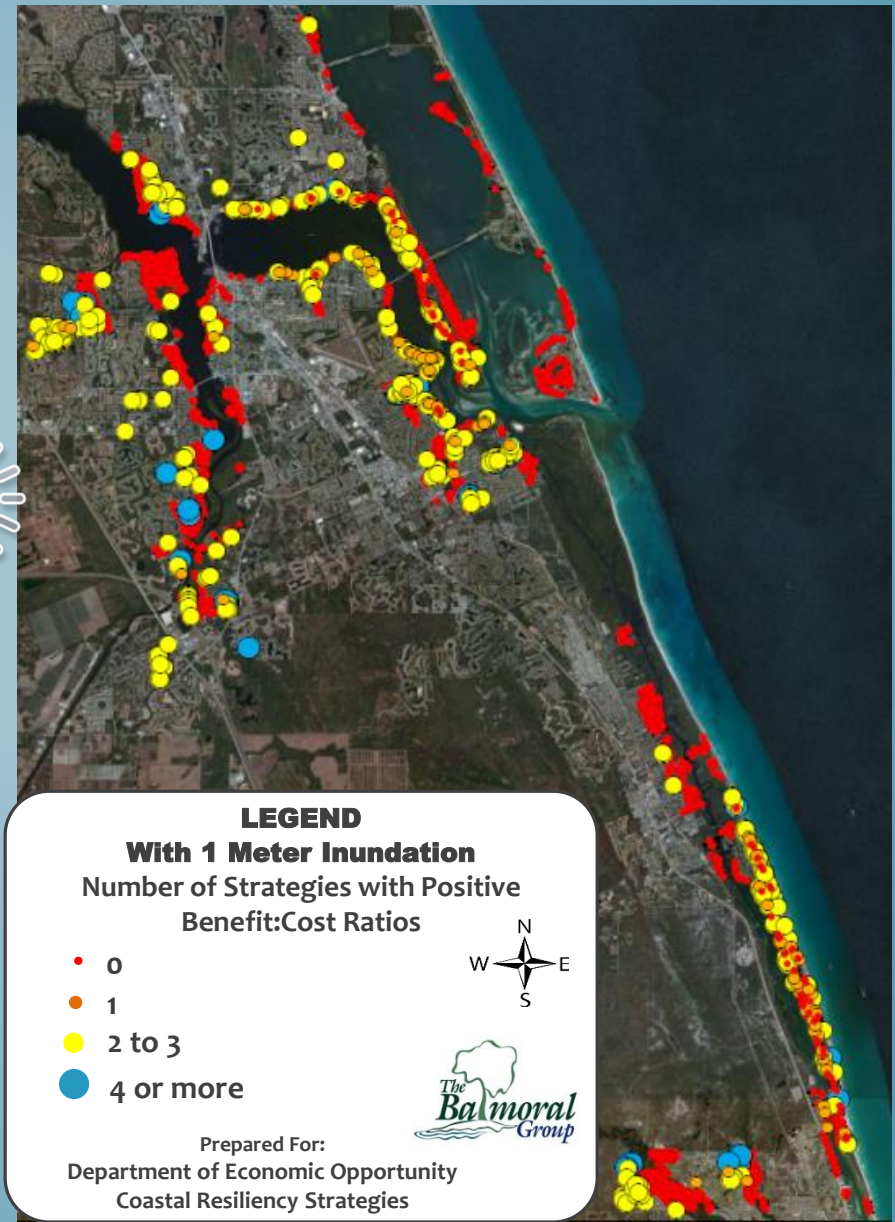
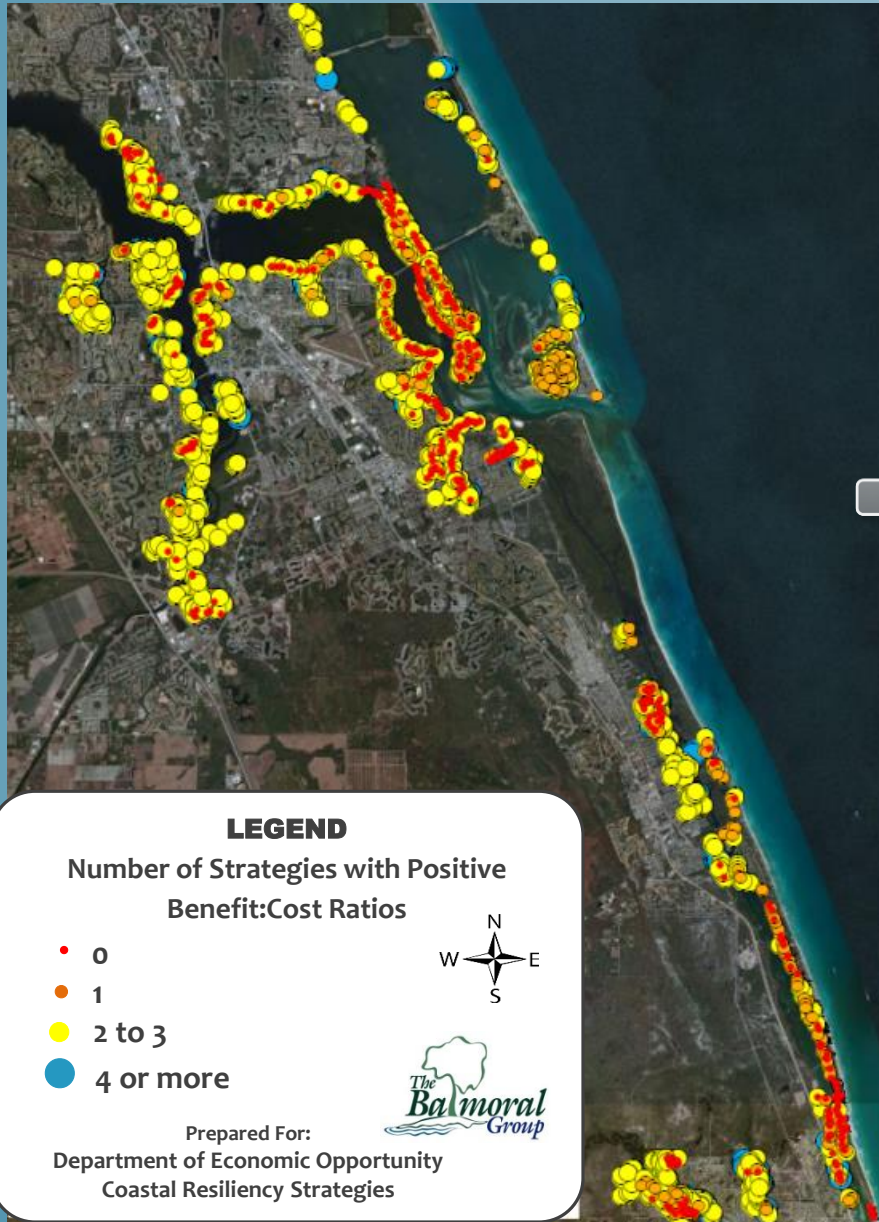
- 0
- 1
- 2 to 3
- 4 or more



Okaloosa CHHA with 1 meter additional inundation



# MULTIPLE COASTAL RESILIENCY STRATEGIES ARE VIABLE FOR MOST PARCELS



## TRANSFERABILITY OF RESULTS

- *Properties near amenities have greatest current flexibility to pursue multiple avenues of coastal resiliency*
  - *Amenities include beaches, open land, conservation areas and parks*
  - *Those properties contribute most to assets that communities value highly*
- *Land use type is not as important to benefit-cost ratio as location of the parcel*
- *The retirement or relocation of development rights offers a powerful tool for coastal resiliency*
  - *But only if development rights are treated as a valuable resource by the community*



## STRATEGY-SPECIFIC RESULTS

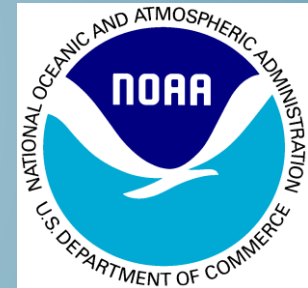
- *Ownership-based approaches (conservation and rolling easements) have the highest average returns, but have fewer applicable candidates*
- *Incentive-based strategies (TDRs and PDRs) are a good option for most property types and parcels*
  - *Flexibility in regulations is key to success*
- *Physical protection showed positive benefit ratios, but no parcels showed high returns*



## PROJECT OUTCOMES

- *Damage from storms can be mitigated by gradually encouraging migration of development rights away from low-lying and oceanfront areas*
- *The final report offers template Comp Plan language that communities can consider using to integrate coastal resiliency into their local plans*
- *Incorporating suggested changes to Comp Plan language to reflect State's recent revisions will allow planners maximum flexibility in adapting to coastal changes over time, regardless of when or if they occur*
  - *New legislation allows communities to designate Adaptation Action Areas to increase flexibility in coastal resiliency planning*

For more information, contact Waterfronts Florida Program:  
[www.FloridaJobs.org/WaterfrontsFlorida](http://www.FloridaJobs.org/WaterfrontsFlorida)



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*The knowledge you need,  
the integrity you trust™*

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- Further acknowledgments and a complete bibliography can be found in the final report at [www.deo.myflorida.com/waterfrontsflorida](http://www.deo.myflorida.com/waterfrontsflorida)