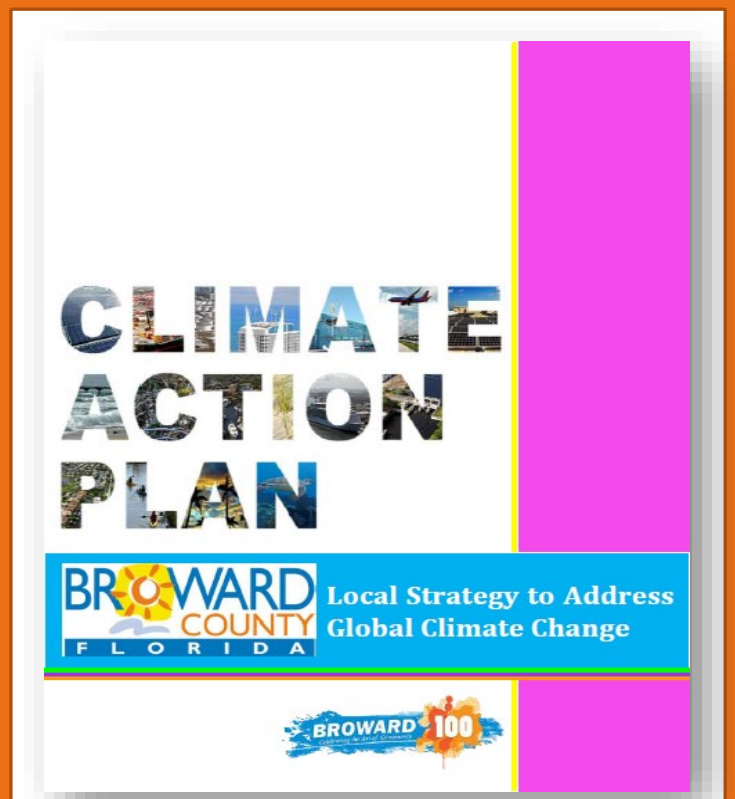
Resilient Broward: One Community, A Shared Strategy

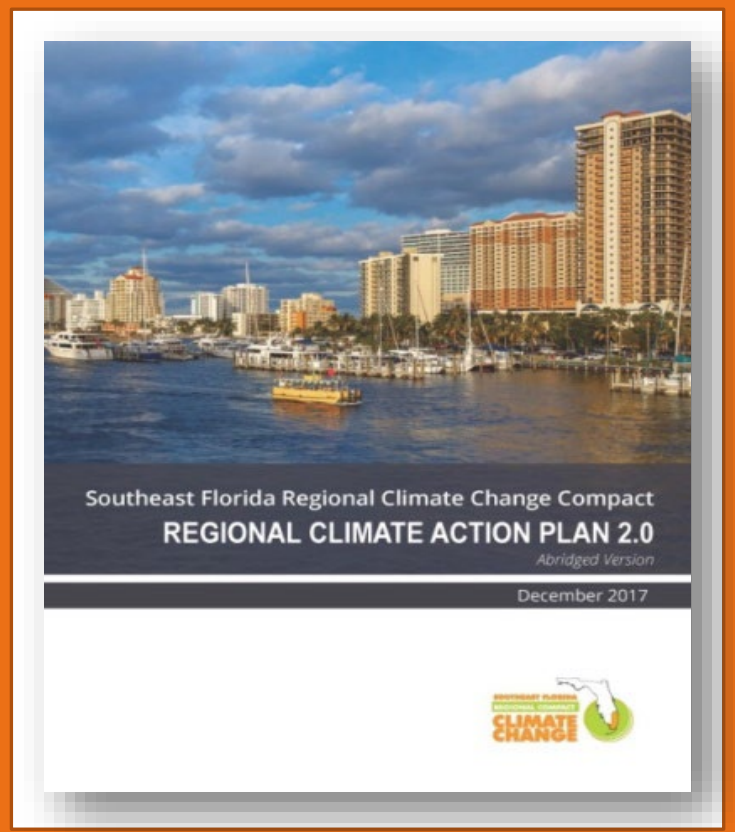
PRESENTED TO THE RESILIENCE PLAN STEERING COMMITTEE

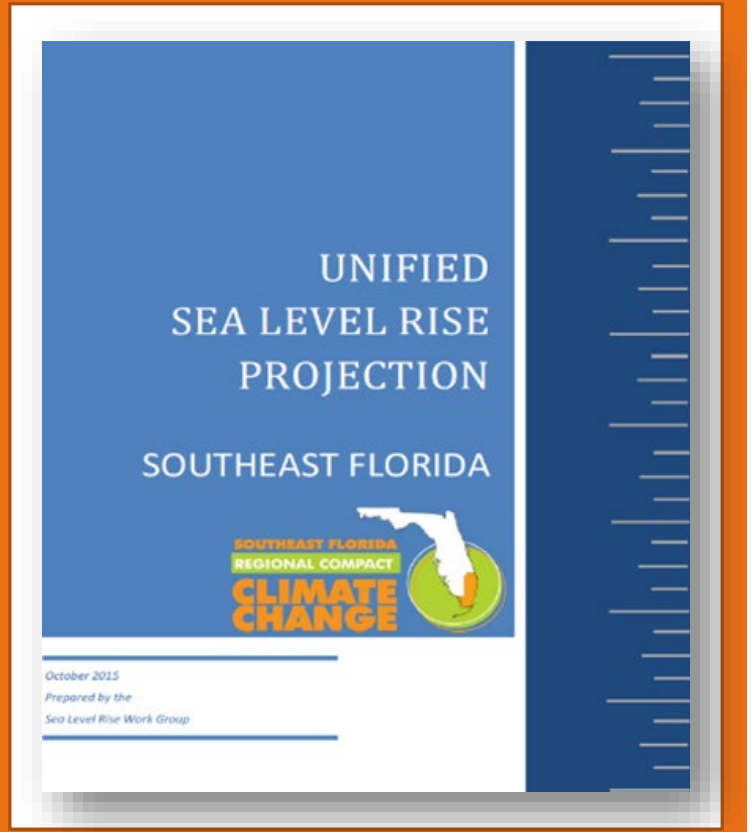
JUNE 8, 2022

A Deep History

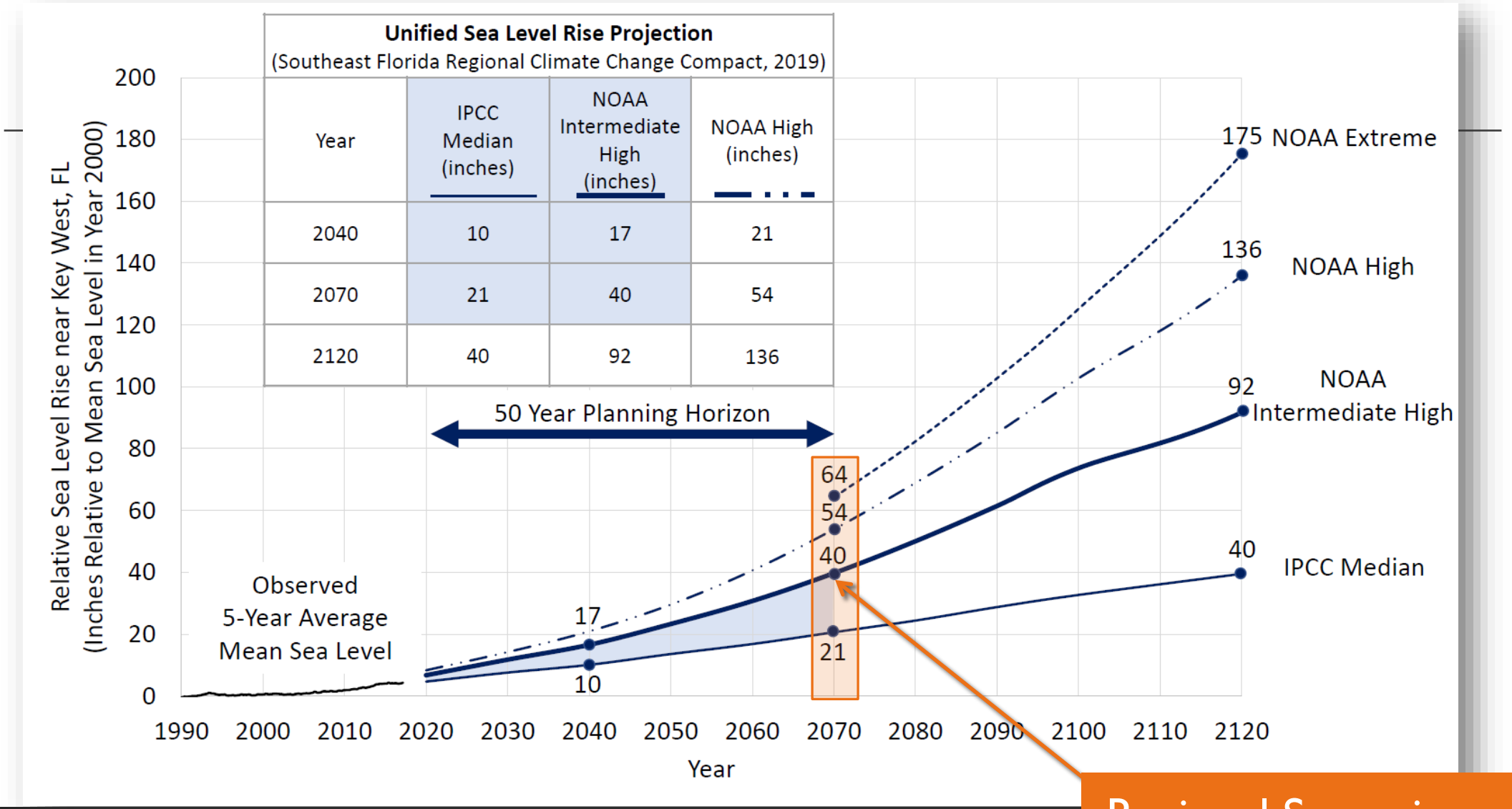
16 Years of Resilience Policy and Planning







Unified Regional Sea Level Rise Projection



Implications: Planning and Investments

- Land Use
- Infrastructure Siting
- Resilience Standards
- Drainage
- Level of Service
- Finished Floor Elevations
- Development Strategies
- Shoreline Management

Rising Flood Risk and Flood Events

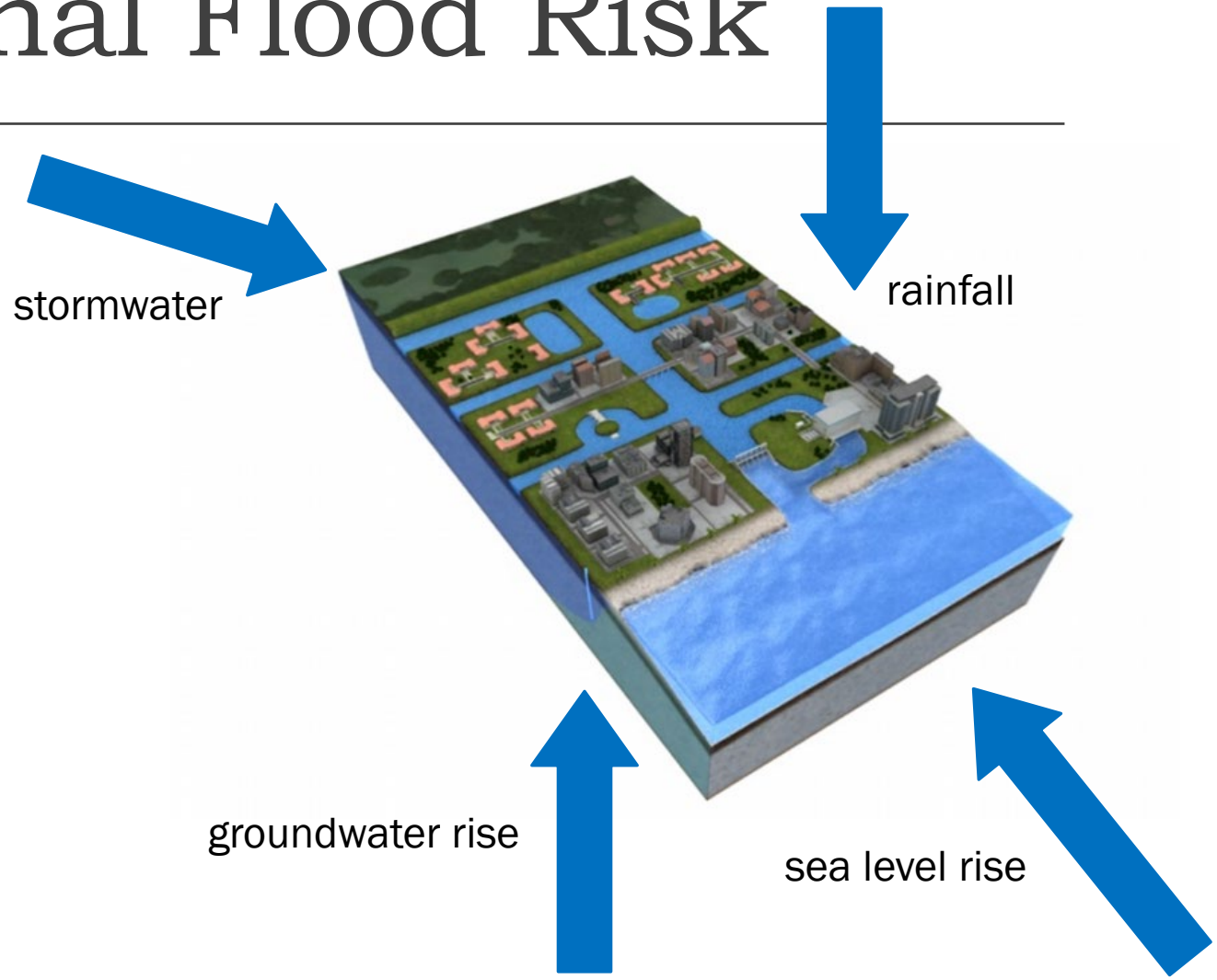
The Isles, Fort Lauderdale

Melrose Park, Fort Lauderdale

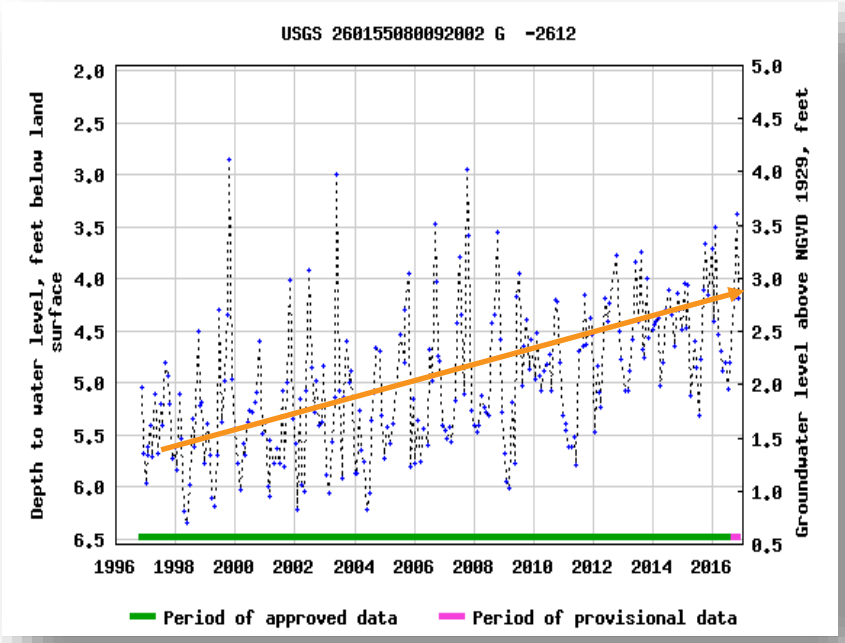
Sawgrass Mills, Sunrise

Multi-dimensional Flood Risk

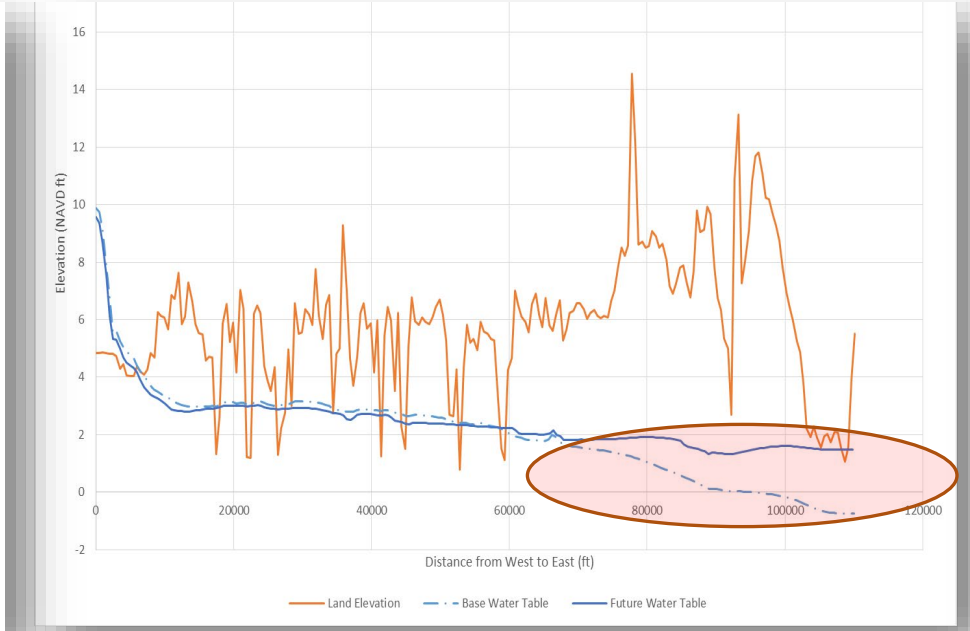
- Sea level rise
- Groundwater table rise
- Coastal water rise
- Increase in rainfall
- Storm surge and tides



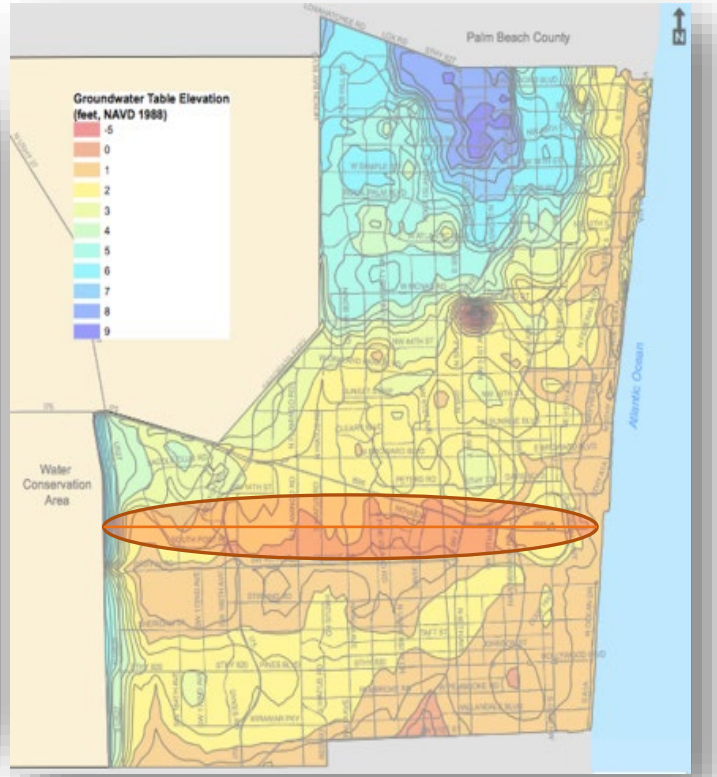
Groundwater Rise and Action



Observed Change



Modeled Change – 2.5 feet SLR



New Groundwater Table Map

* Future Conditions Groundwater Table - applies to new construction and major redevelopment

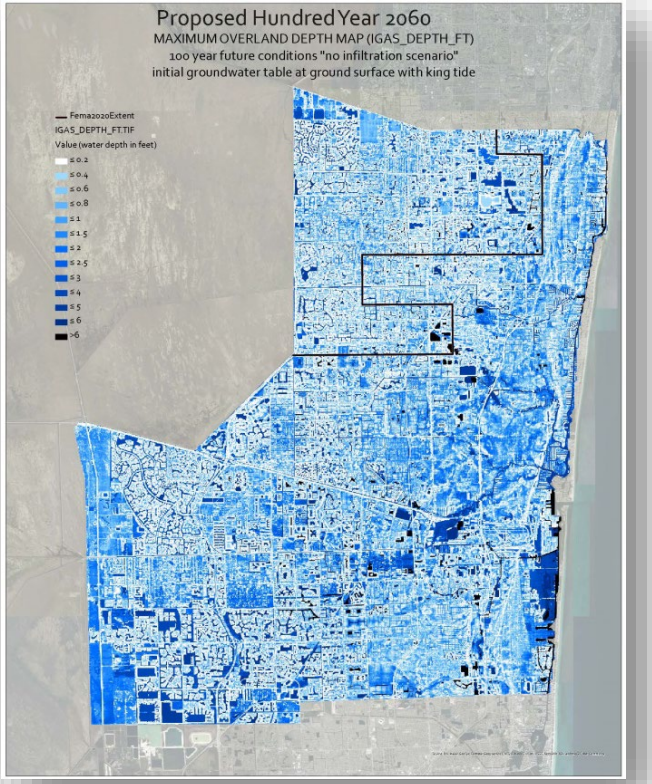
Tidal Flooding and Action

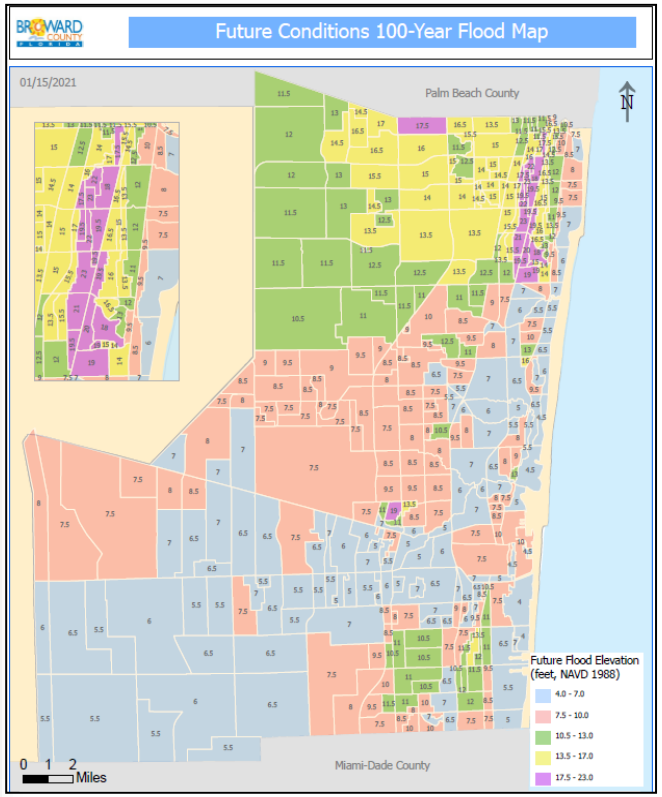
- Modeled water levels:
  - 2 feet sea level rise
  - High tides
  - 25-yr storm surge
- Land Use Plan requires 5 feet NAVD by 2050, allows 4 feet NAVD until 2035
- Applies to new construction, major restoration and properties cited for water trespass

* Resilience standard for tidal flood barriers

Hollywood Marina

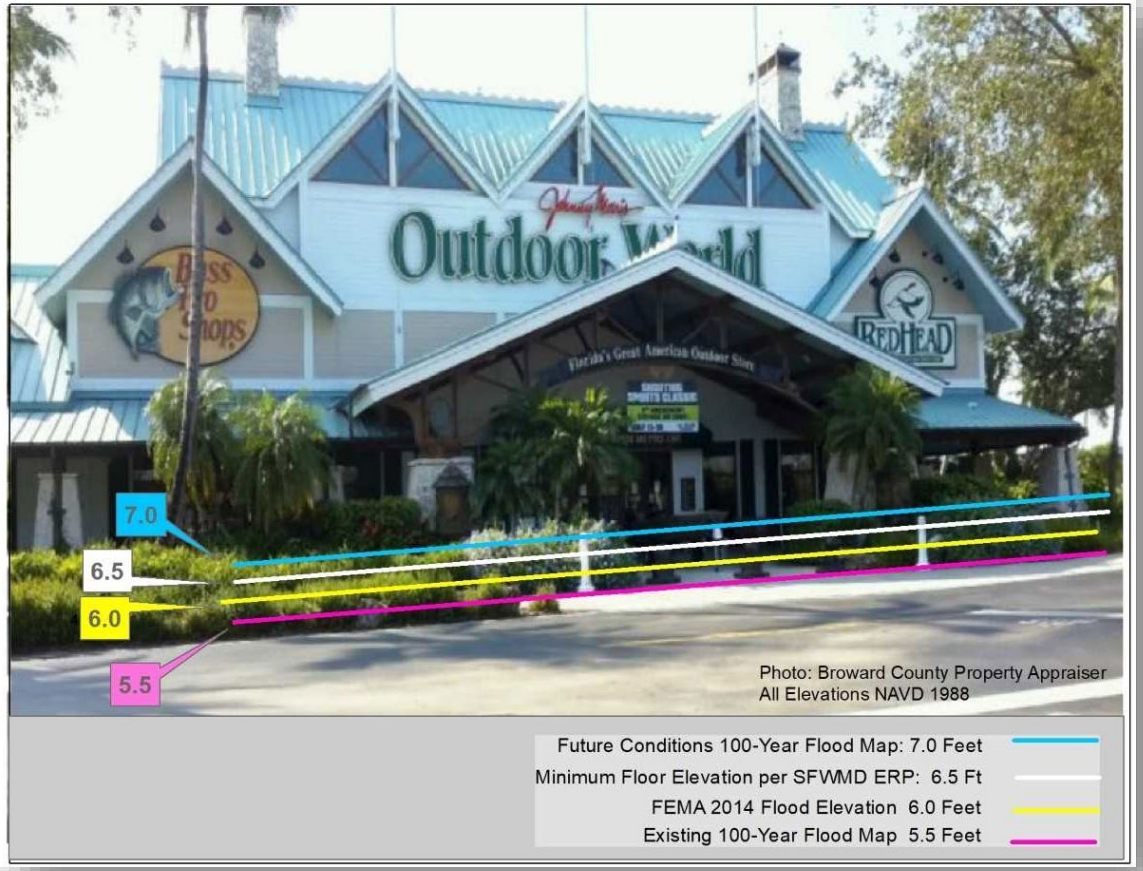
Rising Flood Elevations and Action

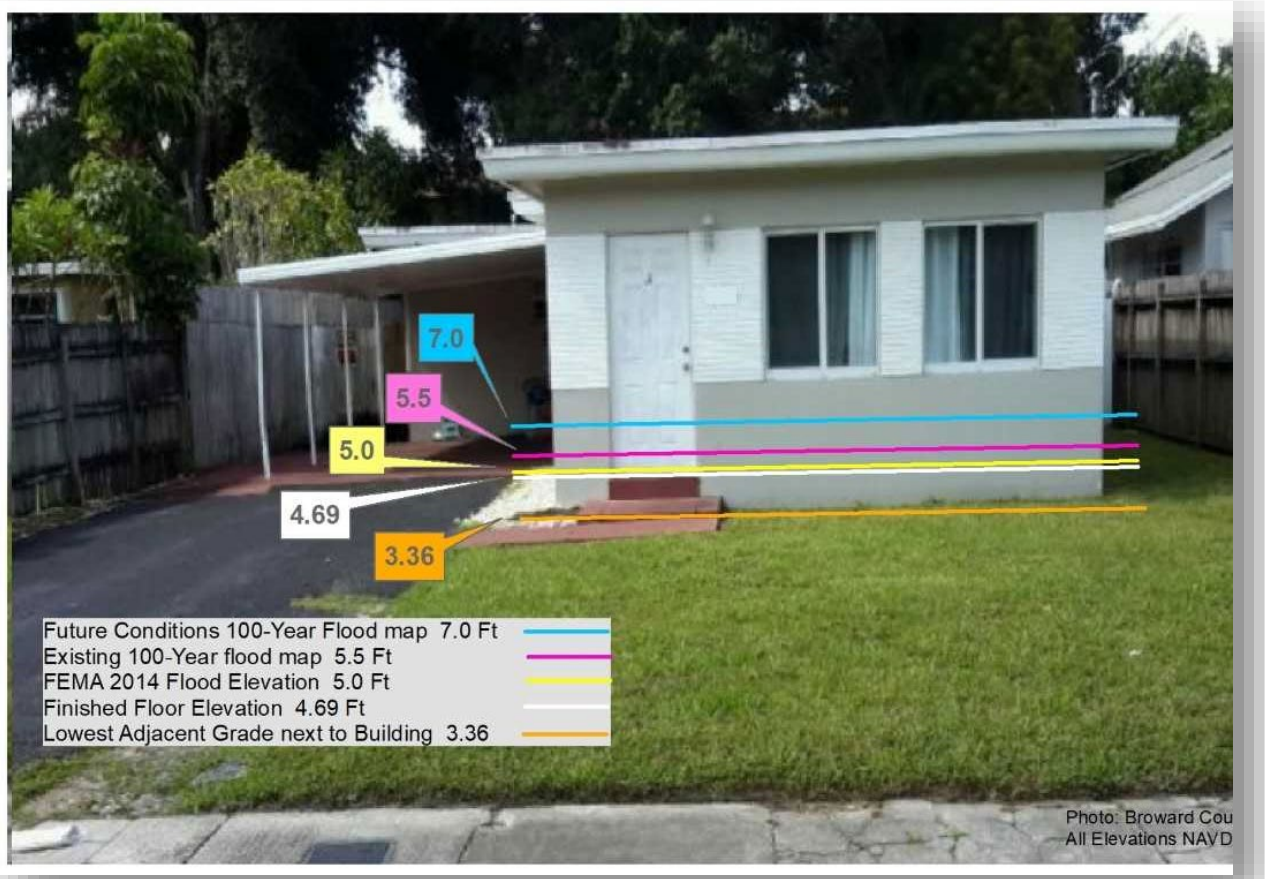




* Future Conditions Flood Map – Applies to New Construction and Major Redevelopment

Commercial and Residential Relevance





What About the Existing Landscape?

10:43 5G 61%

Eta may be gone, but these South Florida schools can't open because of the storm

BY DAVID GOODHUE UPDATED NOVEMBER 10, 2020 8:25 PM

Tropical Storm Eta made landfall in the Keys Sunday night and kept moving. The rain drenched the southern half of Florida, leaving behind flooded streets and yards.

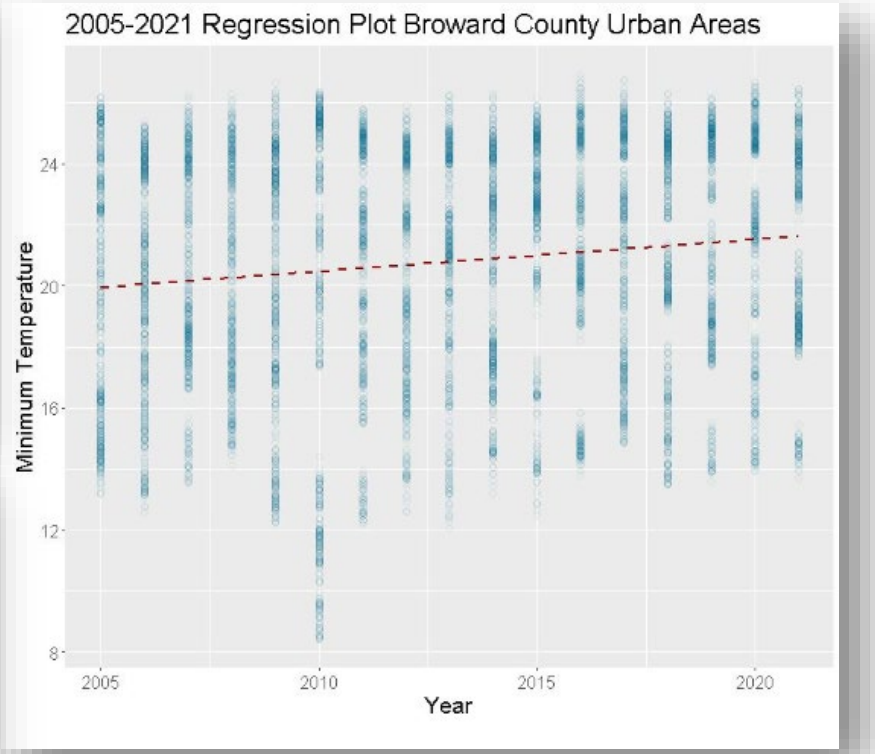
BY CARL JUSTE | MATIAS OCNER | YADIRA LOPEZ

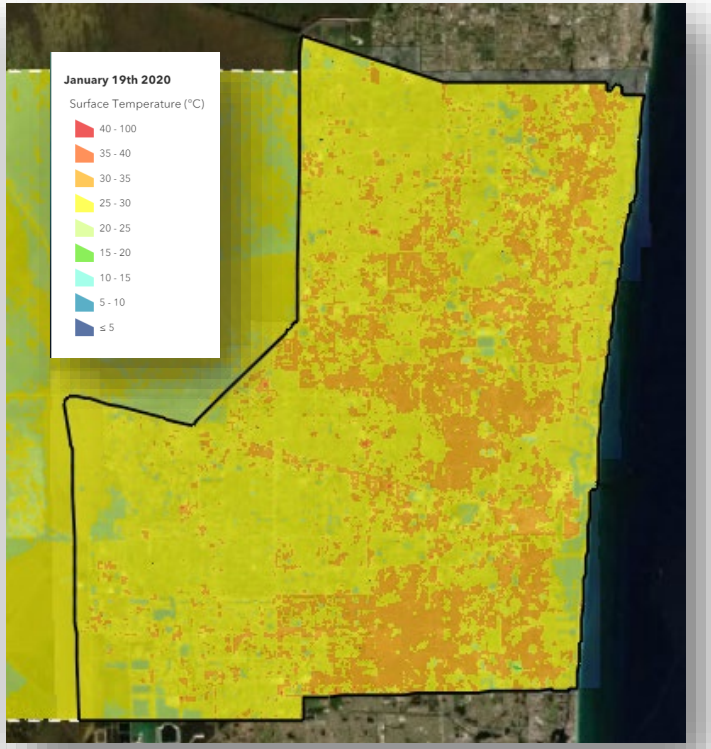
And Let's Not Forget Heat

Linear Model Regression Table

Variable	Change per year	Overall Change
Mean Temperature Broward County	0.06 C	0.90 C
Mean Temperature Broward County Urabn Areas	0.06 C	0.90 C
Minimum Temperature Broward County	0.11 C	1.65 C
Minimum Temperature Broward County Urban Areas	0.10 C	1.50 C
Maximum Temperature Broward County	0.03 C	0.45 C
Maximum Temperature Broward County Urban Areas	0.04 C	0.60 C

BROWARD COUNTY			
Heat Index above	Historical (1971-2000)	By midcentury (2036-2065)	By late century (2070-2099)
90℉ ------	152 days	184 days	198 days
100℉ ------	34 days	128 days	162 days
105℉ ------	5 days	80 days	132 days
Off the Charts	0 days	1 days	14 days



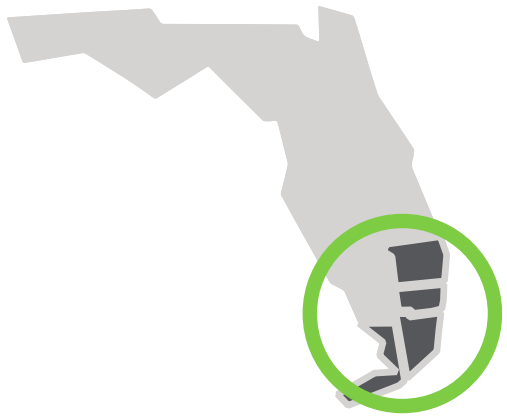


Strong Economic Basis for Action

SE FL – Resilience Business Case Analysis

Project Purpose

To identify the ***return on investment*** for resilience and adaptation measures in Southeast Florida.



Key Findings

There is a ***regional business case*** for resilience in Southeast Florida.

4:1

Building-level adaptation strategies outweigh the costs 4:1

2:1

Community-wide adaptation strategies outweigh the costs 2:1

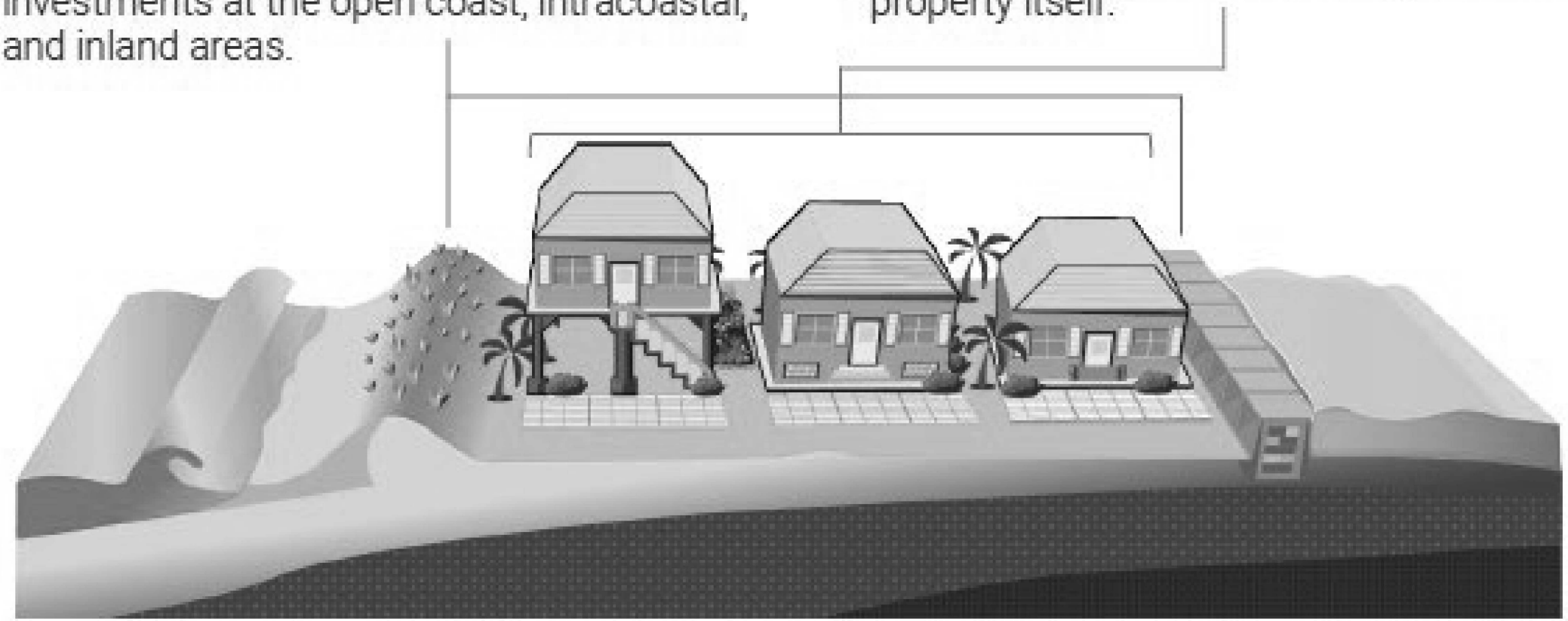
***Note**: Community-wide and building-level adaptation strategies work together.*

Community-wide Adaptation

- A combination of soft and hard engineering investments at the open coast, intracoastal, and inland areas.

Building-level Adaptation

- A combination of structural improvements to property itself.



Note: Building-level adaptation will not provide benefit to regional infrastructure or to coastal resources such as beaches.

Highlight of No Action with Rising Seas

	Permanent Damages 2040	Permanent Damages 2070
Direct Property Impacts	**$4.2bil** In property value exposed to **daily tidal inundation** in 2040.	**$53.6bil** In property value exposed to **daily tidal inundation** in 2070.
Business and Employment Impacts	**720** Impacted by **daily tidal inundation** in 2040.	**17,800 jobs** Impacted by **daily tidal inundation** in 2070.
Fiscal Impacts	**$28mil** Fiscal loss from **daily tidal inundation** in 2040.	**$384mil** Fiscal loss from **daily tidal inundation** in 2070.

**Results shown here are not adjusted to account for financial discounting. Parcels impacted by daily tidal inundation are excluded from the 10-year tide damages. The 10-year tide results account for the impacts of one storm event and are not adjusted for probability of the storm event occurring.*

Public and Private Sector Endorsement

Annual Broward Resilience Roundtable

Broward County Risk Assessment and Resilience Plan

Project Objectives

Integrate	Include	Provide	Form
Integrate robust risk analytics and economic analyses	Include a resilient County infrastructure improvement plan and redevelopment strategies	Provide a visualization platform and written plan to aid regional planning and project tracking	Form the foundation for collective mitigation of future flooding, addressing

Plan Elements Addressing

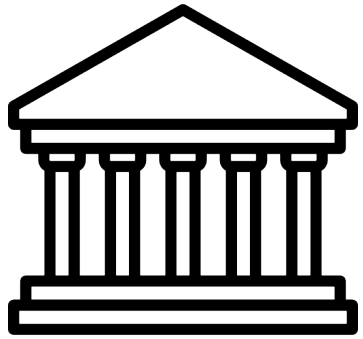
- water management infrastructure
- transportation systems
- critical infrastructure
- green infrastructure and heat
- basin-scale redevelopment
- land use planning

Technical Tasks – Risk Assessment and Modeling

- Adjusted Rainfall Scenarios
- Defined Sea Level Rise Scenarios
- Near and Mid-term Time Horizons
- Varied Coastal Conditions
- Groundwater Scenarios

County Asset Assessment

- Risk Assessment Criteria
- Risk Profile
- Risk Ranking
- Site Specific Adaptation Plans (Conceptual)
- Risk Factor Methodology – Guidance
- Capital Planning Checklist



Economic Modeling

Resilience Adaptation Plan

- Near-term & Long-term
- Structural & Programmatic Measures
- Green & Grey Infrastructure
- Innovative Design & Technology Advancements

Stakeholder Engagement

- Data availability
- Hydrologic details
- Community baseline
- Planning efforts
- Adaptation priorities
- Planning platform concepts

Adaptation Strategy Approach

- Determine scale of adaptation (building vs. community)
- Identify viable options for redevelopment
- Plan selection process
- Stakeholder feedback
- Iteration

Strategy Analysis

- Basin level water management – environmental, heat mitigation, shared infrastructure
- Canal operational conditions and alternatives
- Alternate water management and redevelopment strategies
- Property scale proposals
- Quantified risk reduction benefits

Economic Outcomes

Dollar value of benefits and change in the County's risk exposure and socioeconomic trends

Asset and real estate valuations, credit worthiness, and insurance affordability – relative to baseline

Short-, medium- and long-term socioeconomic metrics at the census tract for each suite of adaptation scenarios.

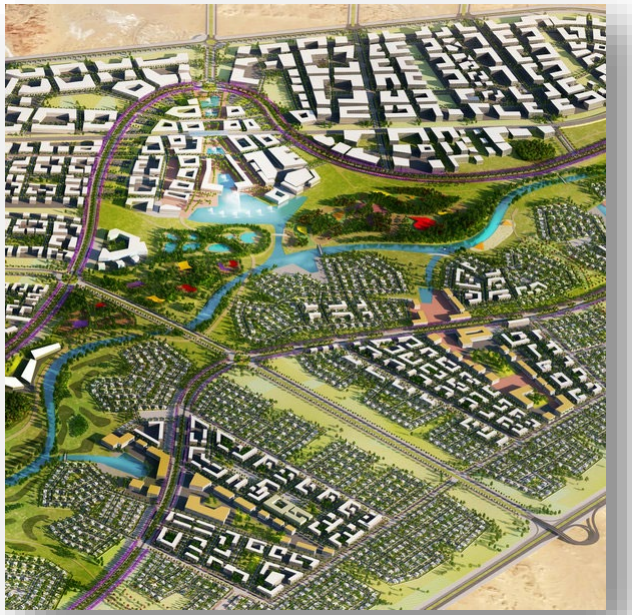
Mapping of fiscal implications at the County level for each time horizon and adaptation schema

Financing plan and economic feasibility (benefit-cost) framework of different financing options for selected schema

Proposal for equitable cost allocation

Resilience Plan Elements

- Written plan
- On-line platform with visualization and project tracking features
- Prioritized adaptation roadmap
- Sites targeted for redevelopment
- Green infrastructure performance targets
- Evaluation of socioeconomic challenges
- Streetscape adaptation renderings



On-line Platform

- 2D Mapping and 3D Visualizations for 24 representative scenarios (no action vs action)
- 360º Visualizations for 30 select locations (for each of 24 scenarios)
- Economic analysis dashboard and project tracking

Outcomes

- Coordinated resilience plan with allocated water management assignments
- Actionable recommendations for phased implementation
- Meets all requirements for state resilience plan (i.e., projects eligible for funding)
- Provides boundary conditions for more detailed municipal analyses
- Single source of truth based on aggregated data
- Actionable

Requested Role of Steering Committee

- Serve as sectoral and community representatives
- Provide additional project oversight
- Contribute subject matter expertise
- Aid in identifying gaps/testing assumptions
- Propose refinements
- Review and respond to primary deliverables
- Help to ensure production of a powerful work product

Questions ?

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