

The Business Case for Resilience in Southeast Florida

An Economic Analysis



Project History

- ULI coordinated with the Southeast Florida Regional Climate Change Compact to conduct a new regional analysis examining the economic impacts of sea level rise and flooding, and *economic opportunities associated with investments in resilient infrastructure*.
- Led by the Southeast Florida Business Community in partnership with the four counties.
 - What is the business case for adapting to sea level rise and more frequent flooding?
- Funders & Partners
 - Florida DEP Grant
 - Broward, Miami-Dade, Monroe, and Palm Beach Counties
 - Business Community
 - Philanthropy
 - AECOM, ULI, Brizaga



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.



Study Process



Identify Vulnerabilities

Gather existing data and analyze future coastal conditions to identify impacted areas.



Determine Costs + Benefits

Calculate avoided damages (i.e., benefits) and costs of proposed adaptation strategies. Identify co - benefits of proposed strategies.



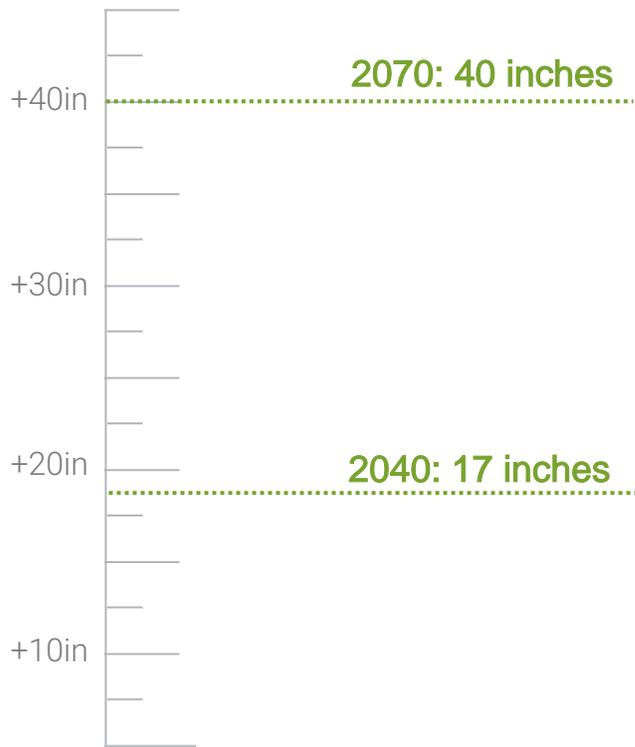
Recommend Immediate Steps

Develop recommendations to advance investment in resilient institutions, infrastructure, and economies.

Note : This study represents a high -level regional analysis, leveraging readily available and regionally standardized physical and economic data, replicable analysis techniques, and generalized assumptions.

① Sea Level Rise Projections

NOAA 2017 Intermediate -High projections were selected for planning time horizons of 2020, 2040, and 2070



Why Higher Frequency Flooding?

This study examines coastal conditions that occur often and not associated with catastrophic events.

- This study examines events that occur frequently, where the economic implications are not readily understood.
- Adaptation can reduce flooding from higher frequency events.
- These impacts from these events will get noticeably worse as sea levels rise if no action is taken.

Key Terms

Mean Higher High Water

Average of the highest of the two high tides occurring each day. Referred to in this study also as daily inundation.

1-Year Tide

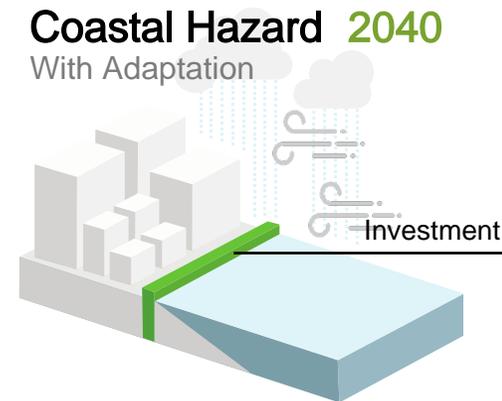
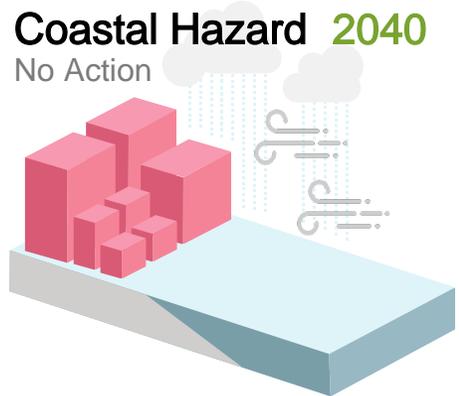
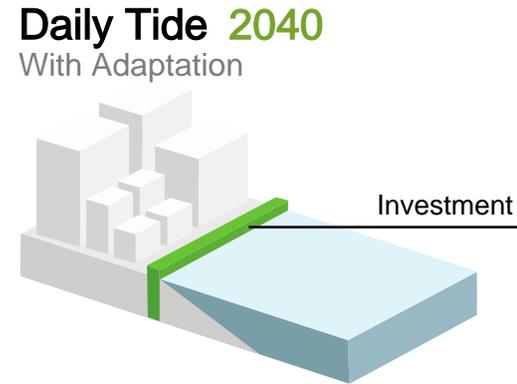
The annual highest tide, also referred to as the King Tide.

10-Year Storm Tide

A tide with a 10% chance of occurring in any given year. This event represents high frequency conditions of temporarily elevated water levels due to coastal storms.

② Avoided Damage Diagrams

Visualizing damages with and without investments



② Calculating Avoided Damages

Impacts were modeled for parcels where

25%

or more of the parcel footprint is exposed to the modeled coastal conditions.

Temporary Storm Damages

Permanent Damages from Rising Sea Levels



Direct Property Impacts

- Structure and content damages
- Relocation costs

Direct Property Impacts

- Property value loss



Business and Employment Impacts

- Sales output loss
- Income loss
- Job impacts

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Fiscal Impacts

- Sales tax loss
- Tourist development tax loss

Fiscal Impacts

- Property tax loss
- Sales tax loss
- Tourist development tax loss

2040 Highlight of No Action

Temporary Storm Damages

Permanent Damages from Rising Sea Levels



Direct Property Impacts

\$3.2 bil

In structure and content losses from one **10-year tide** event under 2040 conditions.

\$4.2 bil

In property value exposed to **daily tidal inundation** in 2040.



Business and Employment Impacts

360 jobs

Impacted by a **10-year tide** in 2040.

720 jobs

Impacted by **daily tidal inundation** in 2040.



Fiscal Impacts

\$2 mil

Sales & tourism tax losses from **10-year tide** in 2040.

\$28 mil

Fiscal loss from **daily tidal inundation** in 2040.

**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.*

2070 Highlight of No Action

Temporary Storm Damages

Permanent Damages from Rising Sea Levels



Direct Property Impacts

\$16.5 bil

In structure and content losses from one **10-year tide** event under 2070 conditions.

\$53.6 bil

In property value exposed to **daily tidal inundation** in 2070.



Business and Employment Impacts

1,300 jobs

Impacted by a **10-year tide** in 2070.

17,800 jobs

Impacted by **daily tidal inundation** in 2070.



Fiscal Impacts

\$8 mil

Sales & tourism tax losses from **10-year tide** in 2070.

\$384 mil

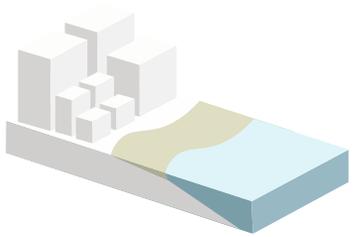
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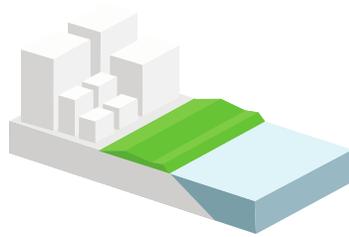
② Community -wide Adaptation

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

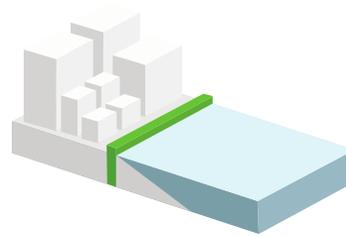
Examples:



Beach Nourishment & Dune Restoration



Berm Construction

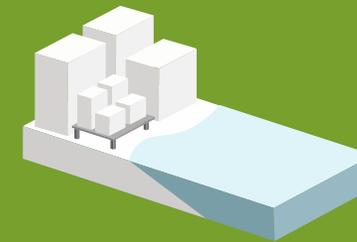


Seawall Construction

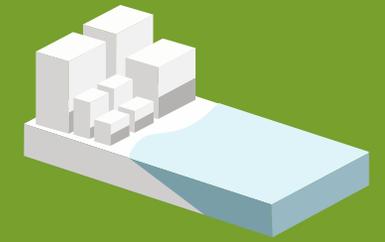
② Building -level Adaptation

A combination of structural improvements to property itself.

Examples:



Elevating Structures



Floodproofing

Note: Community-wide and building-level adaptation strategies work together, it is not one or the other. Building-level adaptation will not provide benefit to regional infrastructure or to coastal resources such as beaches.

② Benefit -Cost Analysis Results

Community -wide:

<i>Benefits*</i>		<i>Cost*</i>		<i>Benefit-Cost Ratio</i>	<i>Job Years Supported**</i>
\$37.9B	÷	\$18.2B	=	2.08	85,000

Building -level :

<i>Benefits*</i>		<i>Cost*</i>		<i>Benefit-Cost Ratio</i>	<i>Job Years Supported**</i>
\$17.6B	÷	\$4.4B	=	3.97	56,000

One Job



x

Ten Years



=

Ten Job Years

10

*Results presented in net present value terms using a 5 percent discount rate over the period of analysis from 2020 to 2070

** Estimated job years supported due to direct investment spending in the four counties of analysis. Job years is equivalent to one year of work for one person; for example, a new construction job that lasts ten years will equate to ten job years.

② Adaptation Strategies Co-Benefits

1. Preserve Property Values
2. Lower Insurance Premiums
3. Protect Property Tax Revenues
4. Maintain South Florida's Beaches

HIGHLIGHT

Benefit of Natural Landscapes and Beaches in South Florida

South Florida's natural landscape, which includes beaches, wetland areas, and coastal and ocean habitats, provides opportunities for recreational activities that attract tourists from around the world.

2.9 mil

People visiting South Florida's national parks in 2019.*

\$91 bil

Tourism's contribution to Florida's Gross State Product in 2018.**

In addition to the economic benefits from tourism, South Florida's beaches also provide important protection from coastal storms.

*National Park Service

**Rockport Analytics

③ Key Strategies

Investing in adaptation has a positive return for Southeast Florida. Now what?

Cross-Cutting: Prioritize Equity & Address Social Vulnerability

- i** *Increase* Climate Risk Awareness
- ii** *Develop* Actionable Funding and Financing Plans to Pay for Resilience
- iii** *Invest* in Key Vulnerable and Emerging Industries
- iv** *Develop* an Occupational Roadmap to Resilience
- v** *Engage* with and *Provide* Support to the Small Business Community
- vi** *Make* Social Vulnerability a Priority during Adaptation Decision-Making
- vii** *Prioritize* Projects Strategically and *Monitor* Equity and Efficacy
- viii** *Promote* Adaptation Strategies that Maximize Co-benefits
- ix** *Understand* Reputational Risks and Associated Impacts
- x** *Conduct* Further Analysis for Project-Level Benefits and Costs

3 Strategy Highlights

Increase Climate Risk Awareness

In national study to identify efforts to disclose flood risk exposure, Florida was given an “F” rating.*

Could require **mandatory seller disclosure form** as nearby states have done.

Other options: banks could state address risk in **loan terms** – e.g., if a property becomes uninsurable due to hazard risk, the loan can go in default, or they have the option to purchase insurance on behalf of the borrower and add this cost to the recurring mortgage payment.

*NRDC 2018

Develop Actionable Funding and Financing Plans to Pay for Resilience

Steps include:

1. Implement a mix of **funding and financing tools**
2. Carefully **consider the suitability** of funding & financing tools
3. Prioritize **equitable funding and financing plans**, ensuring outcomes are not regressive and do not burden certain populations more than others.

Develop an Occupational Roadmap to Resilience

Steps include:

1. Build upon previously conducted analyses and findings
2. Conduct a series of analyses:
 - Vulnerable occupation analysis
 - Skills gap / pathway analysis
 - Knowledge gap / pathway analysis
 - Demand change forecast analysis due to climate change
3. Create an online **career pathway portal** for job seekers

3 Strategy Highlights , cont'd

Engage with and Provide Support to the Small Business Community

*South Florida's small businesses are faring worse during the Covid-19 Pandemic than most metropolitan areas in the U.S.**

90%

of firms have **fewer** than 20 Employees in the four-county region**

Steps include:

1. Streamline **access to capital & financing**
2. Develop & support **business continuity plans**

*Portero 2020

**Census Bureau 2016 County Business Patterns, published 2019

Make Social Vulnerability a Priority during Adaptation Decision - Making

Considering property value, tax dollars at risk, and other monetary factors—unfairly disadvantages socially vulnerable groups.

It is critical to:

Overlay social vulnerability on hazard mapping to prioritize strategies that protect communities with the highest need

Consider the impacts of historic **land use and planning policies** that perpetuate disadvantages

Strategically Prioritize Projects & Monitor Efficacy

Steps include:

1. Use **transparent and standardized** decision-making tools
2. Identify **linkages and interdependences** across planning institutions and programs – to advance independent and collective outcomes efficiently; includes **coordination between public and private sector**
3. **Maintain public database** of assets at risk & data on effectiveness of implemented adaptation strategies to share key challenges and successes

Typical Resilience/Reliability Standards

- Avoid Single Point of Failure
- Redundancy
- N+1+1 for Critical Equipment
- Hardening against severe weather
- Surge and storage capacity
- Flood Protection
- Instrumentation for equipment protection, monitoring, control
- Material Selection
- Corrosion Resistance
- Equipment Durability
- Safe Accessibility
- Standardization
- Wind



Case Studies

“Building a Better Norfolk”

- 2018 ordinance in Norfolk, Virginia
- Includes freeboard requirements
- Includes designation of a Coastal Resilience Overlay (CRO) and Upland Resilience Overlay (URO)
 - In the CRO there are additional development requirements
 - In the URO, development is encouraged
- Incentive program through Resilience Quotient System
 - Points can be earned for adoption of difference resilience measures; different point attainment requirements based on development type unless developer opts instead to meet elevation and drainage standards
 - Open space acquisition and extinguishing development rights in CRO can get points for developers building in URO



Case Studies

Broward County

- 2020 Broward County Climate Change Action Plan, Adopted in 2021
 - Overall goal of 80% emission reduction by 2050 and increase in climate resilience
 - By 2025, complete county property and facility evaluation that evaluates future flood risk, vulnerability identification, requirements for adaptation and a timeline to address
- Update to 100 -year Flood Map to account for the effects of future climate change
- In March 2020, Broward County adopted an ordinance that requires specific language to be included in contracts for the sale of real estate located in tidally influenced areas in the county.



Florida Funding Opportunities

- *Department of Economic Opportunity (DEO) Community Development Block Grant (CDBG-MIT) (currently closed) -Mitigation*
 - *Rebuild Florida Critical Facility Hardening Program (Launched April 15, 2020. Awards announced February 3, 2021)*
 - *Rebuild Florida General Planning Support Program (Launched May 15, 2020. Awards announced January 8, 2021)*
 - *Rebuild Florida Mitigation General Infrastructure Program (Launched Round 2 - June 16, 2021. Deadline to submit September 17, 2021)*
- *FEMA Building Resilient Infrastructure and Communities (BRIC) (Opened Sept. 30, 2021. Deadline to submit Jan. 28, 2022)*
- *Florida's Clean Water State Revolving Fund Loans (Submitted anytime during year. Prioritization occurs August, November, February and May)*
- *Coastal Partnership Initiative (CPI) Grant (Accepted Once a Year. Published in Florida Administrative Register (August 2021 -October 2021))*
 - *Four (4) program areas: Resilient Communities, Public Access, Working Waterfronts; and Coastal Stewardship*
- *Florida Resilient Coastlines Program (FRCP) (Closed Sept. 1, 2021) To effectively address the impacts of flooding and sea level rise*
 - *Analyze and plan for vulnerabilities*
 - *Projects for adaptation and mitigation*



Thank you.

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