

Monroe County  
Resiliency Efforts  
Rhonda Haag,  
Chief Resilience  
Officer

June 16, 2023



MONROE COUNTY  
FLORIDA



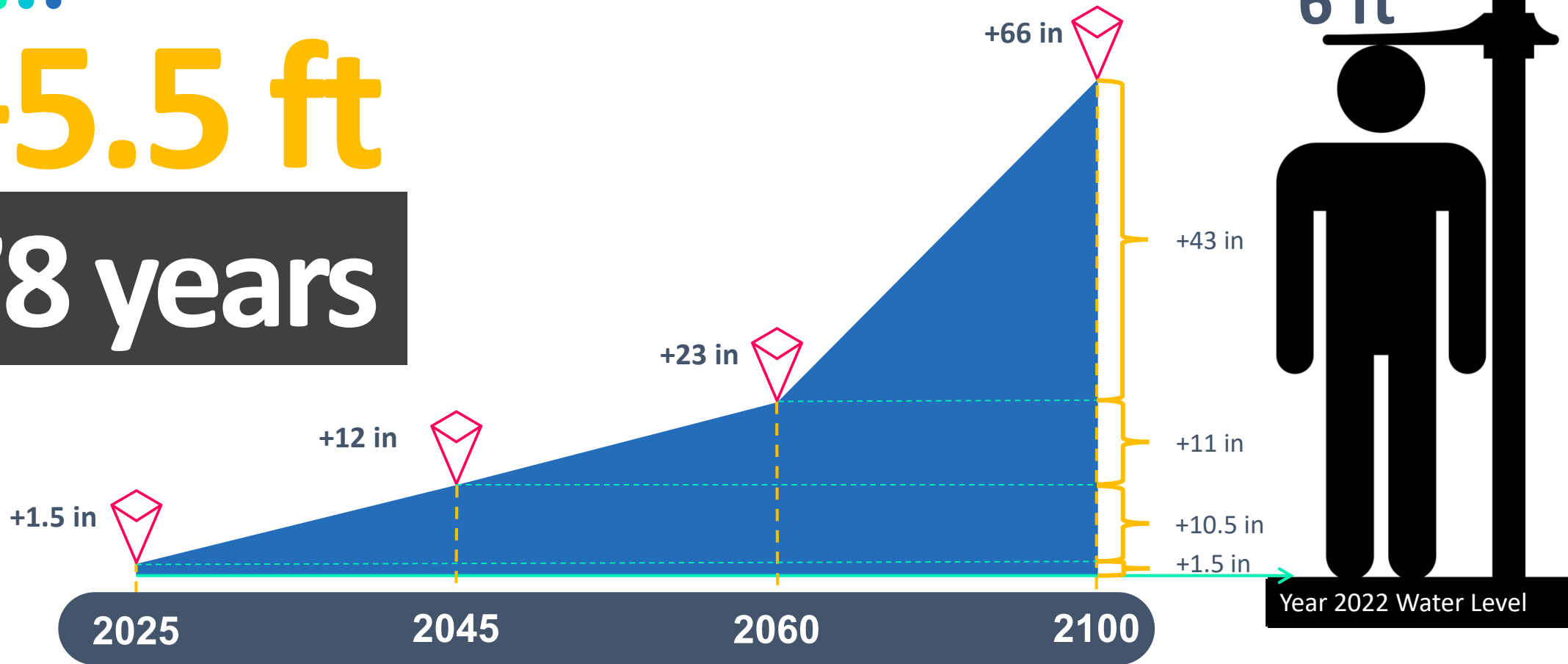
wsp ERIN L. DEADY, P.A. 

# Sea Level Rise Projections



# +5.5 ft

# 78 years



SLR Condition: NOAA 2017 Intermediate-High  
SE FL Regional Climate Compact Updated Projections 2019

# New! Resilience Planning & Living Shoreline Projects



1. \$50,000 Pigeon Key Resilient Design
2. \$120,843 Watershed Mgmt. Plan for CRS Points
3. \$139,350 Vulnerability Assessment Update to meet State Requirements
4. \$150,000 Natural Resource Habitat Assessment DEP funded w/\$75,000 match
5. \$200,000 Harry Harris Park Resilient Redesign w/ \$100,000 match.
6. \$900,000 Long Key Living Shoreline
7. \$3 Million Duck Key Living Shoreline/Breakwater Repairs

# Municipal Projects Managed by County

1. **Watershed Management Plans and Vulnerability Assessments** (County, Marathon and Layton / Key Colony Beach) \$797,722
2. **Mobile Lidar Surveying** \$481,934 underway in all 5 municipalities, funded by municipalities. To be complete December 2023
3. **Street Elevation Planning** \$1.5 Million to begin fall 2023. Local funding.



## Funding Allocation by Jurisdiction

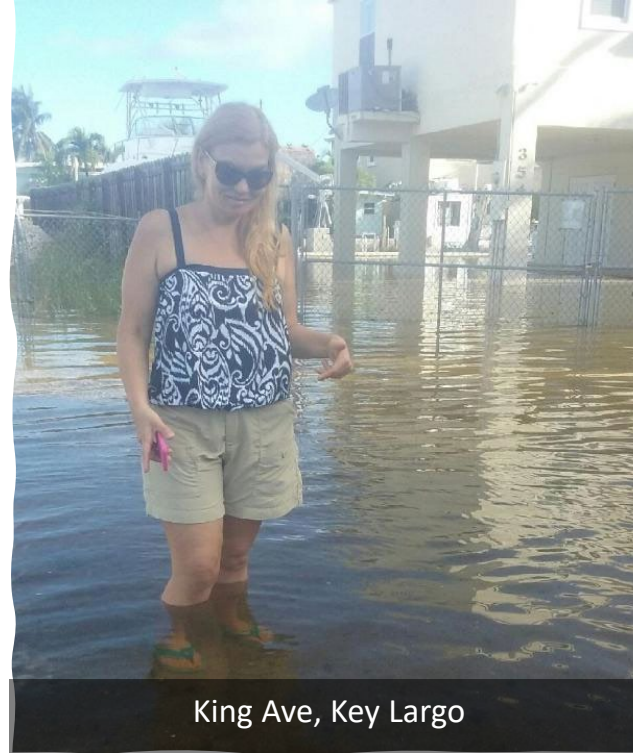
## Phase II Design

Islamorada	\$416,771
Key West – doing their own	\$561,735
Marathon	\$471,133
Layton	\$12,080
Key Colony Beach	\$42,281
<b>Total</b>	<b>\$1,504,000</b>

# Monroe County Roadway Vulnerability Study

## GOALS:

- 1) Help make the Keys more able to withstand sea level rise impacts (become more resilient)
- 2) Help maintain access to homes and businesses
- 3) Help protect property values.



King Ave, Key Largo



Sexton Way, Key Largo

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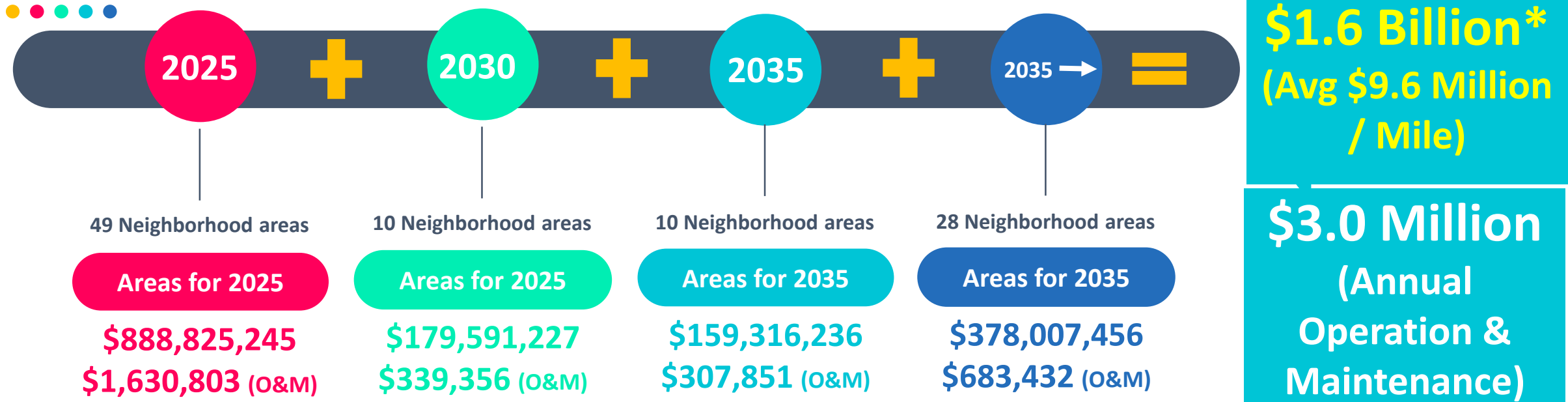


King Ave, Key Largo



Kennedy Drive, Key West

# Adaptation Plan and Program Cost



Projected SLR + King Tides will affect the following:

(SLR Condition: NOAA 2017 Intermediate-High + King Tides)

	2045	Unincorporated Countywide %
Miles of Vulnerable and Critical County Maintained Roadways	166 MI	53%
# of Residential Units along County Maintained Roadways	13,399 Res. Units	76%

\* Cost estimate is conceptual and does not include design, right-of-way acquisition, harmonization/cost to cure, and legal fees. Cost estimates are preliminary and subject to change. Cost Estimate is based on 2020 Dollars.

# Roads Next Steps

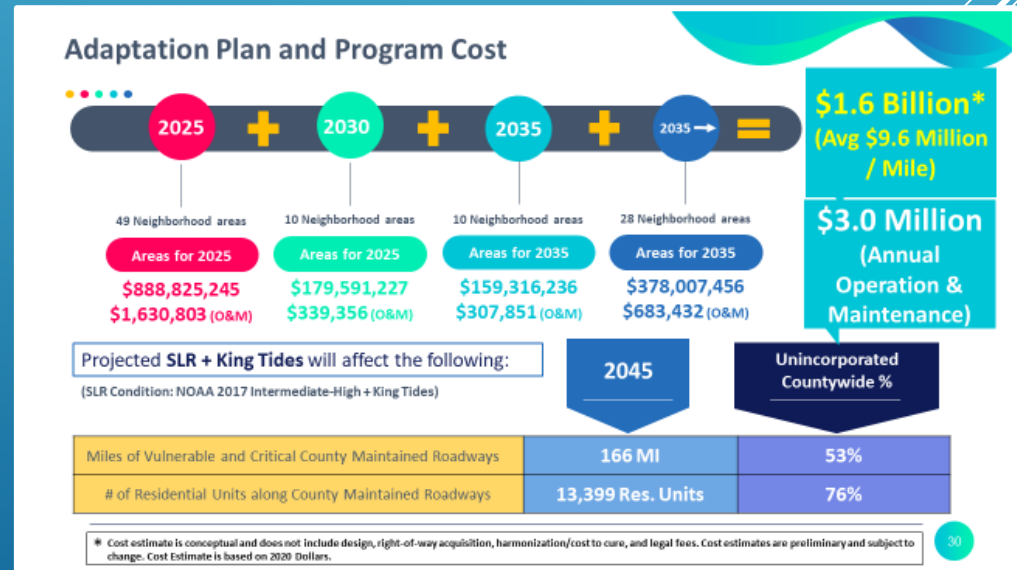
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1. **Special Assessments Development** for Canals and Roads –2023.
  2. **15 Resilient FL Road Adaptation Grants** for \$380 Million applied in August 2022, top 3:
    - a) **Upper Keys / Key Largo** - Winston Waterways Largo Gardens  
\$30.7 Million (50% match)
    - b) **Middle Keys / Conch Key** - awarded  
\$7 Million (50% match)
    - c) **Lower Keys / Big Coppitt**  
\$49 Million (50% match)**TOTAL \$86.7 Million / \$43 Million Match**
- 



# Issues for Resolution

- How To Fund \$1.8 Billion in Road Adaptation Projects – 100% Grant Funding is unlikely
- County only has enough match for the 3 new 2023 projects if County borrows the 50% match amount of \$43 Million. No more match available for 25 years.
- How to Fund annual Operations & Maintenance costs of Pump Stations.
- Implement neighborhood assessments – MSBU?
- Implement County-wide resilience utility, similar to stormwater utility?
- All 5 municipalities are conducting the same planning work – County assisting.







US Army Corps  
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Norfolk District



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# FLORIDA KEYS COASTAL STORM RISK MANAGEMENT FEASIBILITY STUDY APPROVED PAN



# PLAN



## The Recommended Plan Includes:

- U.S. 1 shoreline stabilization** (revetment) in 6 areas
- Nonstructural measures for residential and non-residential structures at risk:
  - Elevation of residential structures**- 4,698 structures
  - Floodproofing of commercial properties and critical infrastructure**- 1,052 commercial structures / 53 critical infrastructure buildings

## Estimated Project Costs and Benefits:

- Total Estimated Project Cost (65/35 cost share):  
**\$2,772,359,000**
  - 65% federal funding of project = \$1,802,033,000
  - **35% non-federal funding of project = \$970,326,000**
- Total Average Annual Benefit: \$131,603,000
- Benefit Cost Ratio is 1.5



# NONSTRUCTURAL MEASURES IN RECOMMENDED PLAN

Location	Elevation	Floodproofing	Critical Infrastructure Floodproofing	Total NS
City of Key Colony Beach	30	7	2	39
City of Key West	2,028	382	12	2,422
City of Layton	31	9	1	41
City of Marathon	562	225	14	801
Unincorporated Monroe County	1,839	348	15	2,202
Village of Islamorada	208	81	9	298
Grand Total	4,698	1,052	53	5,803

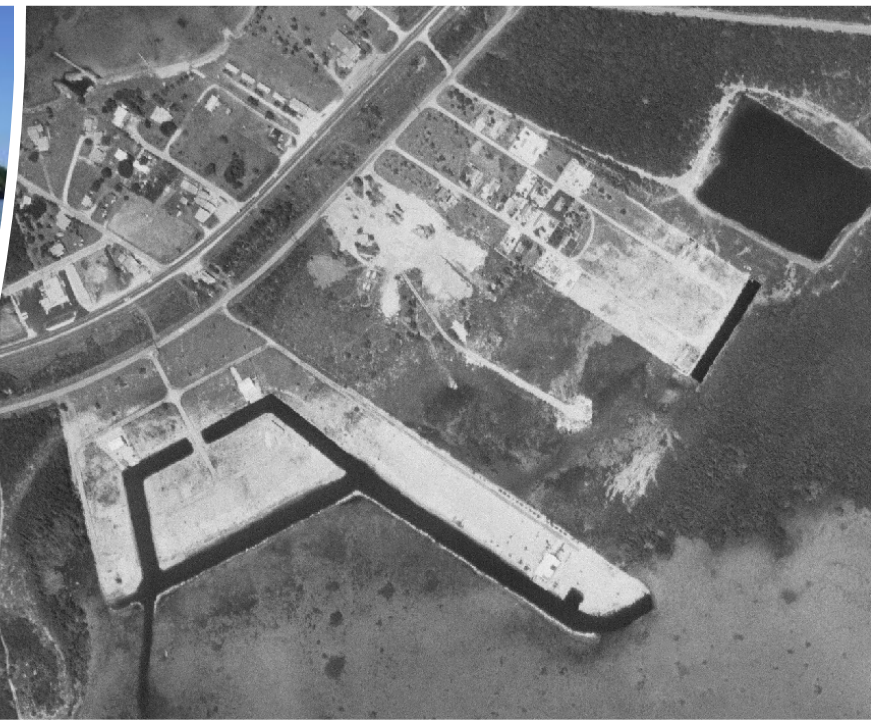
# NONSTRUCTURAL COST DISTRIBUTION

Location	Elevation	Floodproofing	Critical Infrastructure Floodproofing	Total NS
City of Key Colony Beach	\$14,842,720	\$2,662,316	\$911,396	\$18,416,432
City of Key West	\$1,003,367,893	\$145,286,365	\$5,468,377	\$1,154,122,635
City of Layton	\$15,337,478	\$3,422,977	\$455,698	\$19,216,153
City of Marathon	\$278,053,627	\$85,574,430	\$6,379,774	\$370,007,830
Unincorporated Monroe County	\$909,858,755	\$132,355,118	\$6,835,472	\$1,049,049,344
Village of Islamorada	\$102,909,527	\$30,806,795	\$4,101,283	\$137,817,605
<b>Grand Total</b>	<b>\$2,324,370,000</b>	<b>\$400,108,000</b>	<b>\$24,152,000</b>	<b>\$2,748,630,000</b>

The costs on this slide are estimates that are based on an average cost per structure for each nonstructural measure category.

# Breakwaters - Protecting Neighborhoods

- \$2.1 Million Tavernier Breakwater Repair / Air Curtain Project Construction anticipated for fall 2023. HUD funded.
- \$1.3 Million Rock Harbor Breakwater Repair / Air Curtain project Construction anticipated for fall 2023. HUD funded.



# Canal Restorations for FY23-24

1) **Canal #105 backfill and culvert.** Tavernier / Key Largo. Cost estimate \$668,870.

2) **Canal #255 organic muck removal, backfilling, air curtain and injection well.** Big Pine Key. Cost estimate \$300,000

3) **Canal #315 organic muck removal, backfilling and air curtain.** Big Pine Key. *Design only.* Cost estimate \$2,373,982.

4) **Canal #295 organic muck removal, backfilling and air curtain.** Big Pine Key. Cost estimate \$1,040,726.

5) **Canal #297 organic muck removal, backfilling and air curtain.** Big Pine Key. *Design only.* Cost estimate \$1,352,390.

6) **Canal #290 backfilling and air curtain.** Big Pine Key. *Design only.* Cost estimate \$900,000



# New Canals for FY23-24 con't.

- 7) **Canal #287 organic muck removal, backfilling and air curtain.** Big Pine Key. Design only. Cost estimate \$2,942,881
- 8) **Canal #82 organic muck removal, backfilling and air curtain.** Key Largo. Design only. Cost estimate \$2,547,229.
- 9) **Canal #474 backfill and air curtain.** Geiger Key. Cost estimate \$220,650.
- 10) **Pilot Project! Canal #278 injection well.** Big Pine Key. Cost estimate \$250,000
- 11) **Pilot Project! Canal #58 injection well.** Key Largo. Cost estimate \$250,000
- 12) **Canal #293 organic muck removal, backfill and air curtain.** Big Pine Key. Design only. Cost estimate \$2,145,335 Million. Funded by DEP Ft. Myers.

