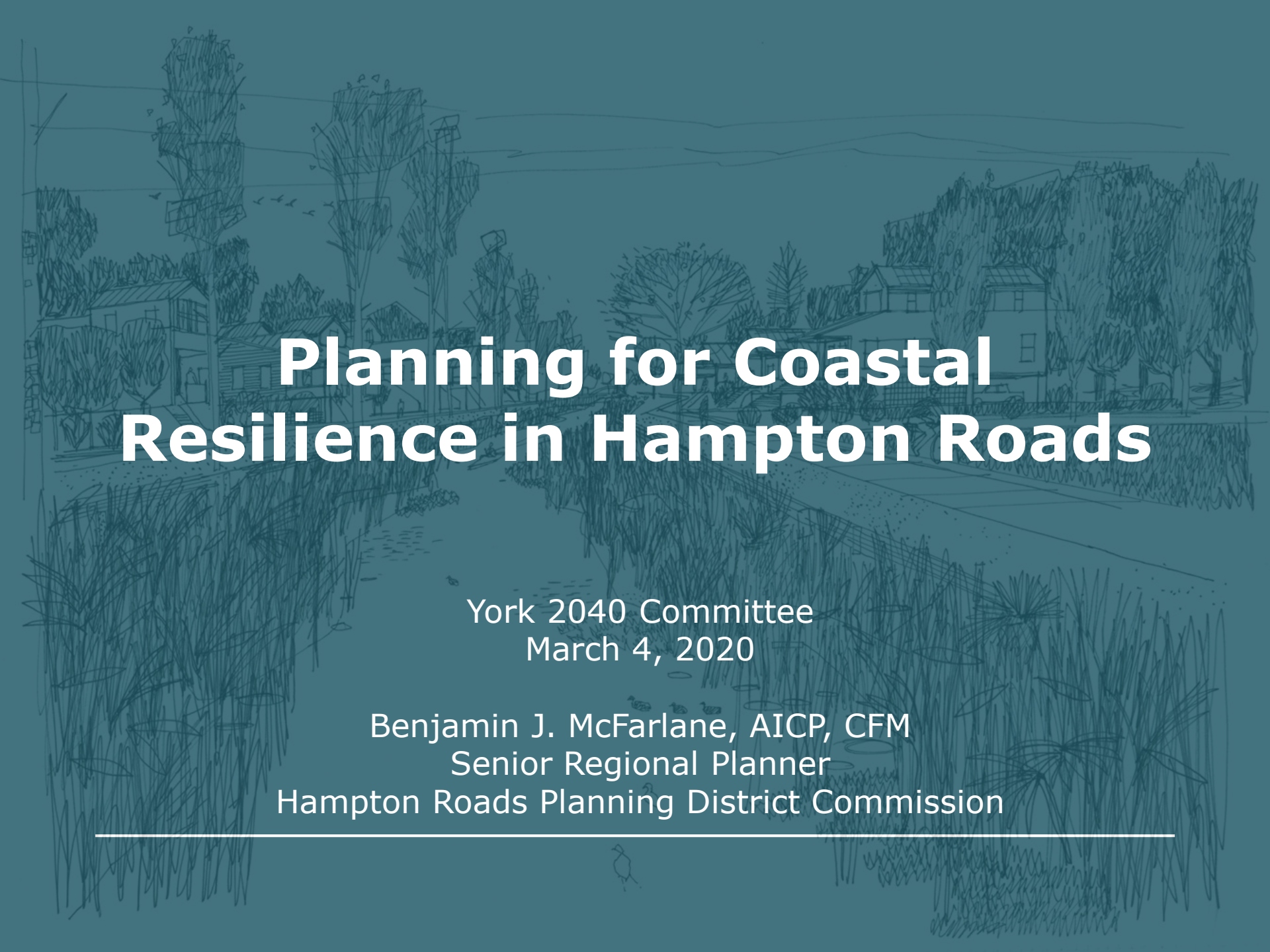
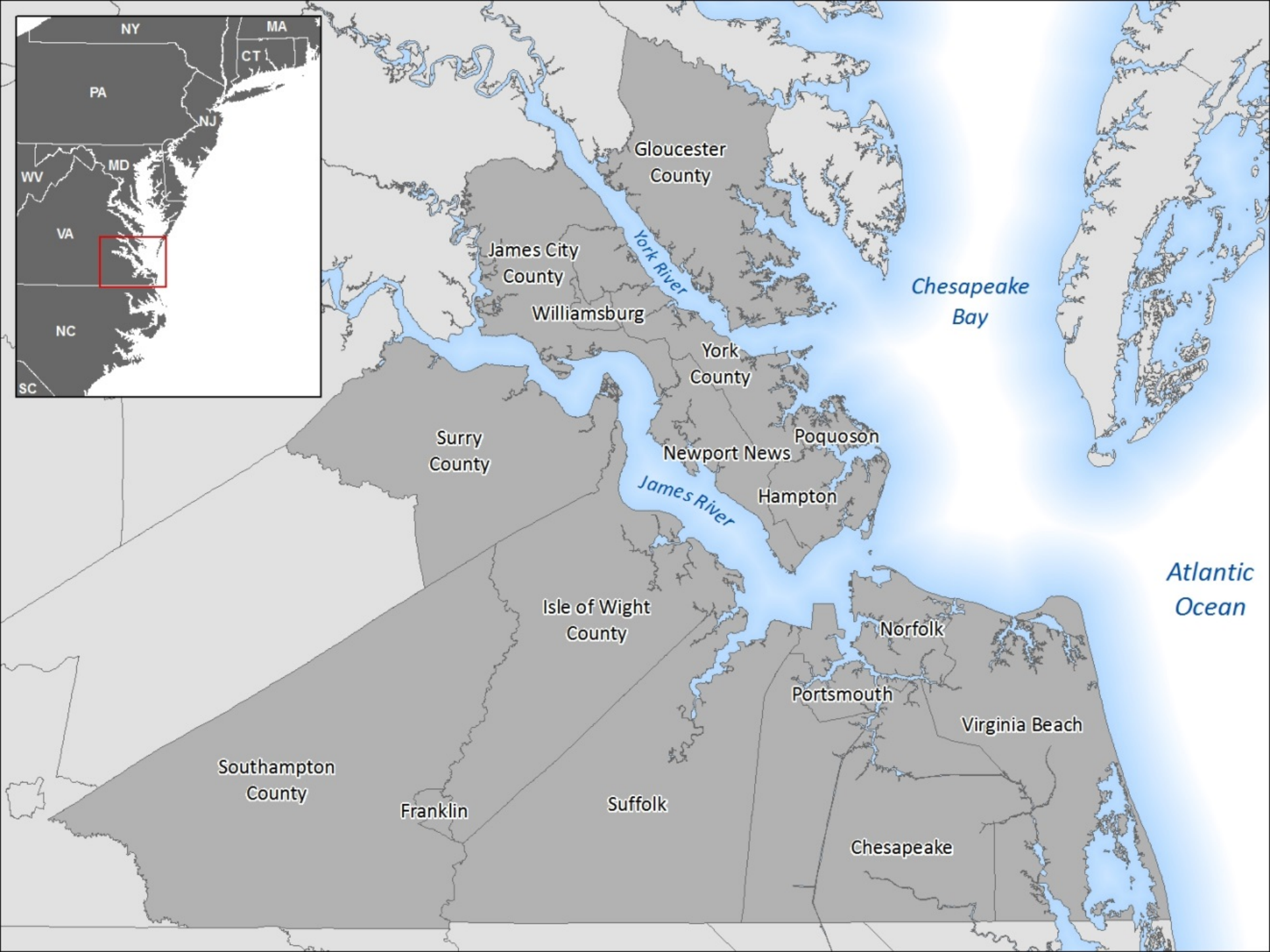


The background of the slide is a blue-toned sketch of a coastal landscape. It features several houses with gabled roofs, some with solar panels, nestled among tall, thin trees. In the foreground, there is a body of water with reeds or marsh grasses. The overall style is a loose, artistic line drawing.

Planning for Coastal Resilience in Hampton Roads

York 2040 Committee
March 4, 2020

Benjamin J. McFarlane, AICP, CFM
Senior Regional Planner
Hampton Roads Planning District Commission



What does HRPDC do?

- The Commission:
 - “**serves as a forum** for local and elected officials and chief administrators to **deliberate** and **decide** issues of **regional importance**”
- The Staff:
 - “provides the local governments and citizens of Hampton Roads credible and timely **planning, research, and analysis** on matters of mutual concern, and”
 - “**provides leadership and offers strategies and support services** to other public and private, local, and regional agencies, in their efforts to improve the region’s quality of life.”

Adapting to Sea Level Rise

1. Protection



2. Accommodation



3. Retreat



Adapting to Sea Level Rise - Protection

- Large, structural improvements designed to keep water out and land dry (sea walls, flood gates, levees, etc.)



Maeslantkering Storm
Surge Barrier, Netherlands
Wired Magazine, 2008

Adapting to Sea Level Rise - Accommodation

- Structural and behavioral improvements that allow for “living with water” (raising houses, flood-proofing ground floors, moving cars to high ground at high tides, etc.)



Above the Flood: Elevating Your Floodprone House

FEMA 347 / May 2000



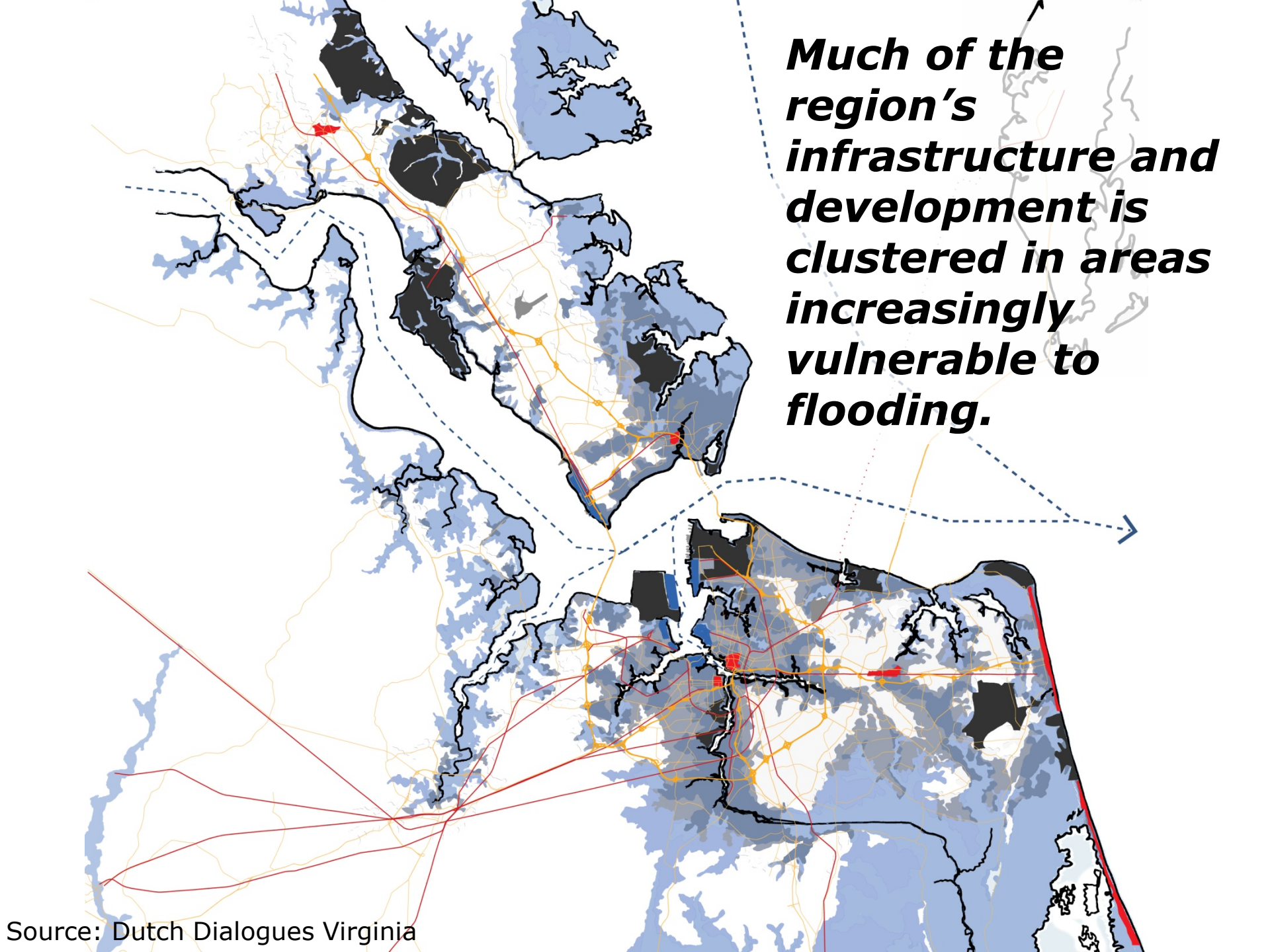
FEMA

Adapting to Sea Level Rise - Retreat

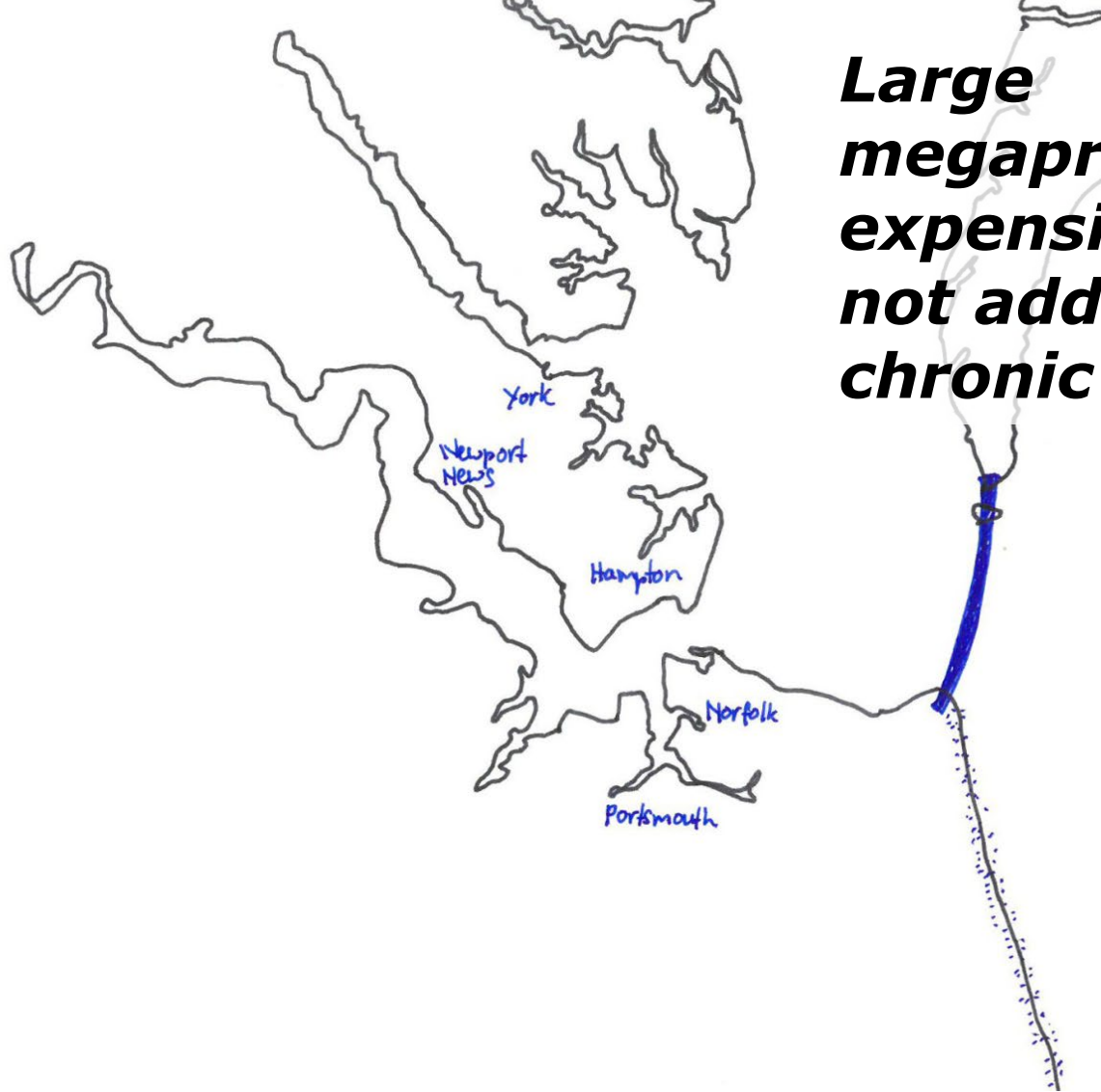
- Moving out of or not building in vulnerable areas (property buy-outs, transfer of development rights, etc.)



Georgetown Climate Center, 2011

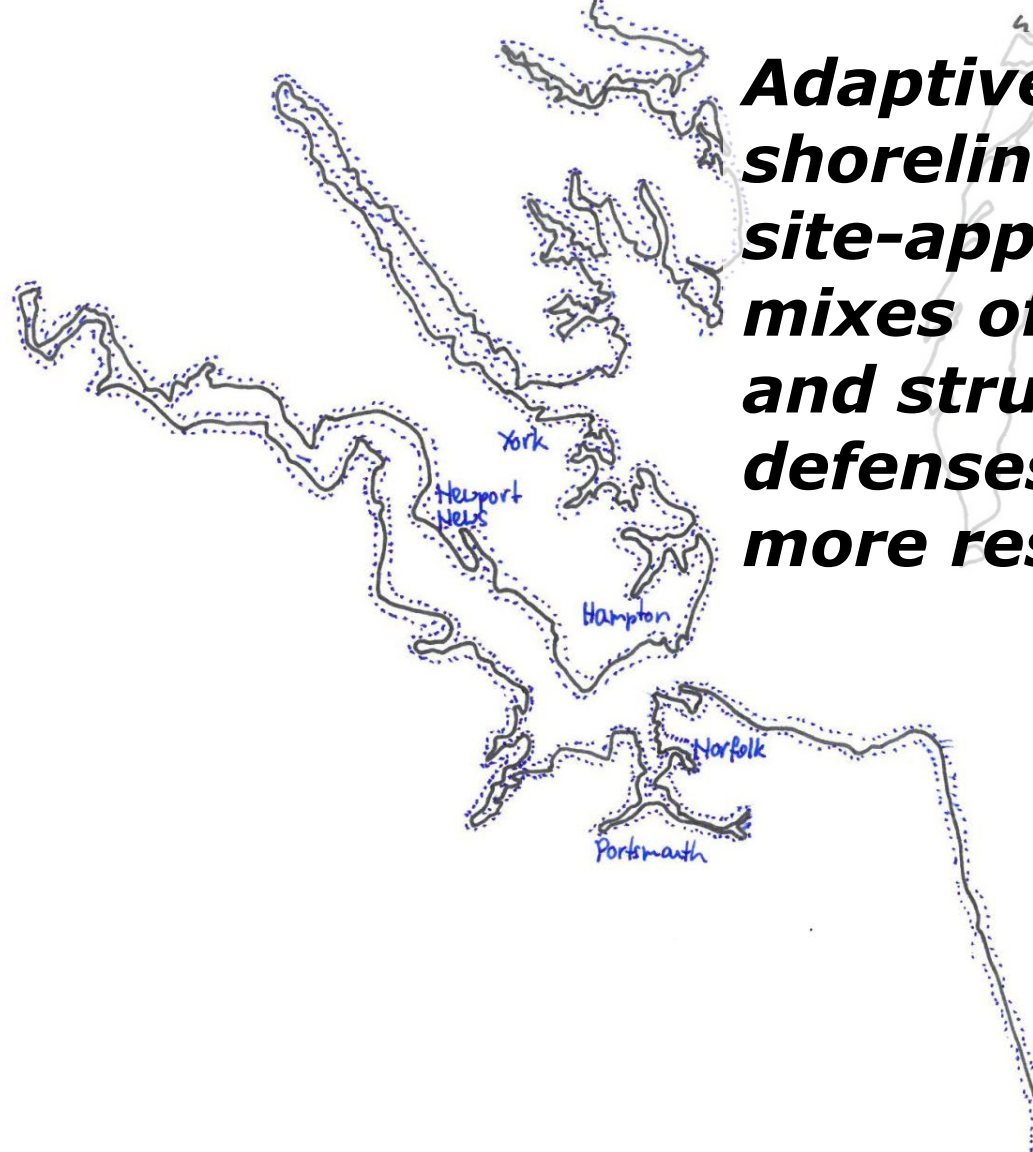
A map of a coastal region, likely the Chesapeake Bay area, showing infrastructure and flood vulnerability. The map features a network of roads in yellow and orange, and rail lines in red. Blue shaded areas represent flood-prone regions, while black areas indicate urban centers. A dashed blue arrow points from the text to a specific cluster of infrastructure and flood-prone areas in the lower right. The text is in a bold, italicized, black font.

***Much of the
region's
infrastructure and
development is
clustered in areas
increasingly
vulnerable to
flooding.***



***Large
megaprojects are
expensive and do
not address
chronic flooding.***

Will Storm Surge Barriers Work?



Adaptive shorelines – local, site-appropriate mixes of natural and structural defenses – are more resilient.



Coastal Resiliency Program

Develop

Develop policy recommendations for local governments

Coordinate

Coordinate with state and federal agencies and academic institutions

Advocate

Advocate for additional state and federal support

Implement

Implement projects where regional cooperation has tangible benefits



Program Overview

HRPDC Subcommittee

- Determines priorities for political advocacy

CAO Committee

- Considers technical recommendations in line with other local priorities

Coastal Resilience Committee

- Provides oversight of program and technical review of staff recommendations

HRPDC Staff

- Manages individual projects and develops recommendations for local, state, and legislative policies and actions

Regional Efforts





Regional Resilience Inventory

DOCUMENT

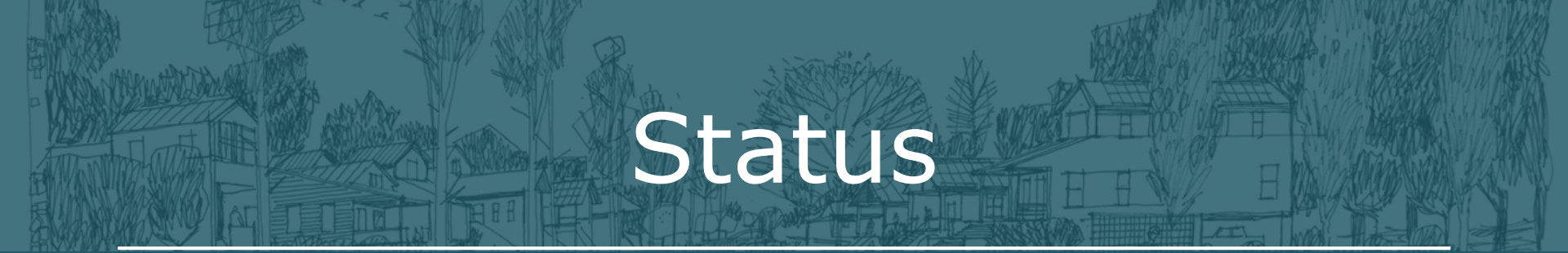
Document the need for state and federal assistance

IDENTIFY

Identify possible opportunities for coordination and collaboration

TRACK

Track local progress on resiliency



Status

Inventory includes projects from 12 localities

Over 400 projects included:

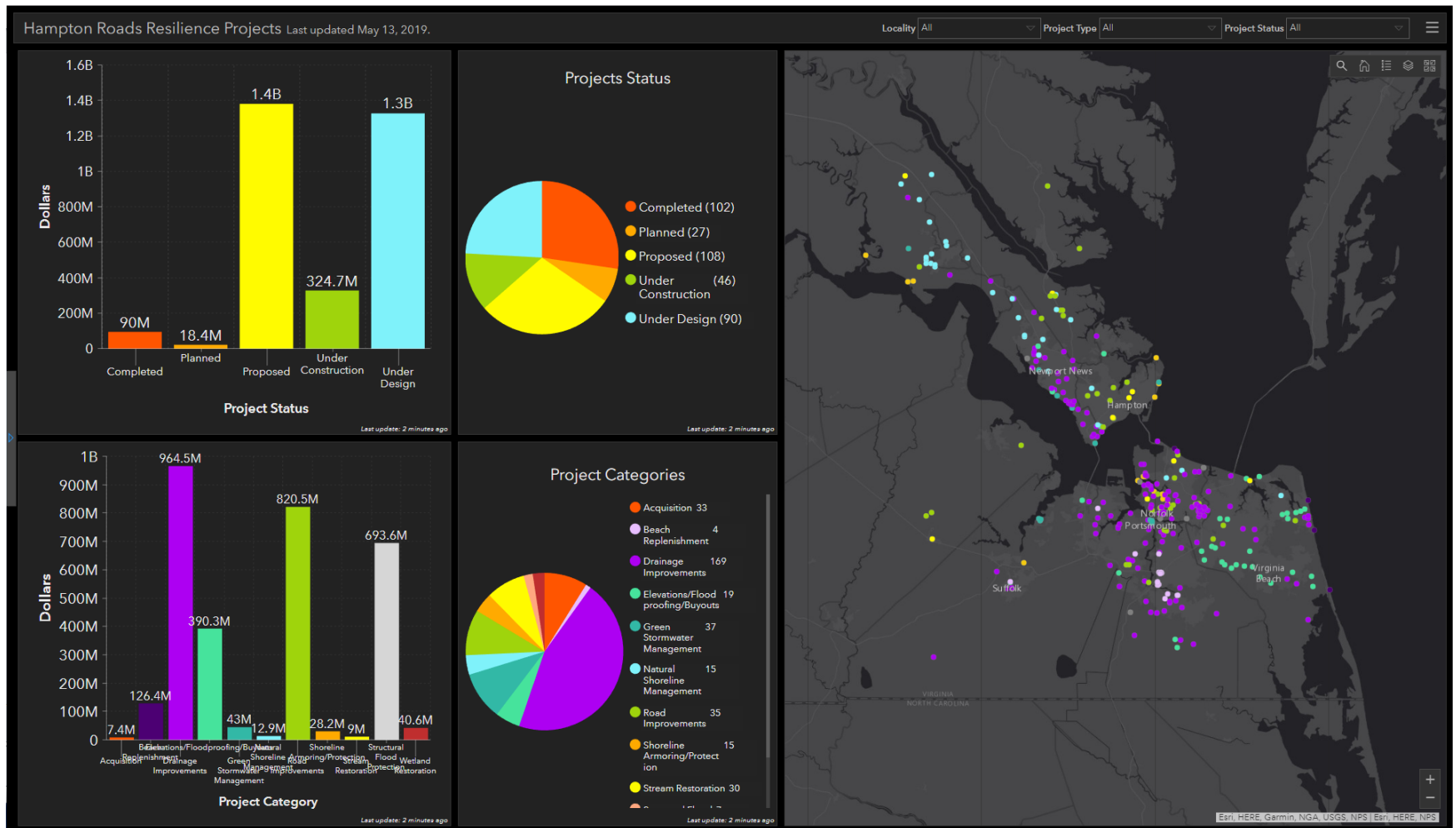
- 133 projects completed (\$123 million)

- 154 projects underway (\$1.6 billion)

- 120 programmed or proposed (\$1.6 billion)

Online at www.HRGEO.org

Resilience Projects Dashboard



Resilience Policies StoryMap

Resiliency Programs and Policies

York County

Policy Fast Facts

Freeboard Standard: 3 feet above the base flood elevation for new and substantially improved structures in the Special Flood Hazard Area, and an additional 1 foot of freeboard (4 feet total) required in Coastal A and VE Zones (within the LIMWA). (2014 Floodplain Ordinance)

2013 Comprehensive Plan Update:

Environment chapter addresses flooding and sea level rise as coastal hazards, and a map of flood zones is included.

2017 Hampton Roads Hazard Mitigation Plan:

Includes mitigation actions related to structures in flood-prone areas, stormwater management, shoreline erosion, and public outreach.

Hampton Roads Planning District Commission



Program Spotlight

Home Elevation Assistance

The County recently completed 4 home elevation projects in 2020 at a total cost of \$1.76 million. Funding was provided in part through FEMA's Hazard Mitigation Grant Program. Following a Presidential Major Disaster Declaration, the FEMA HMGP funds can support implementing mitigation measures that reduce flood risk. Local governments apply for HMGP funds through the Virginia Department of Emergency Management.

The home elevation projects were administered by the County's Department of Planning and Development Services and Department of Public Works.



By The Numbers

Community Rating System score of **7**

15% Discount on flood insurance premiums in the Special Flood Hazard Area

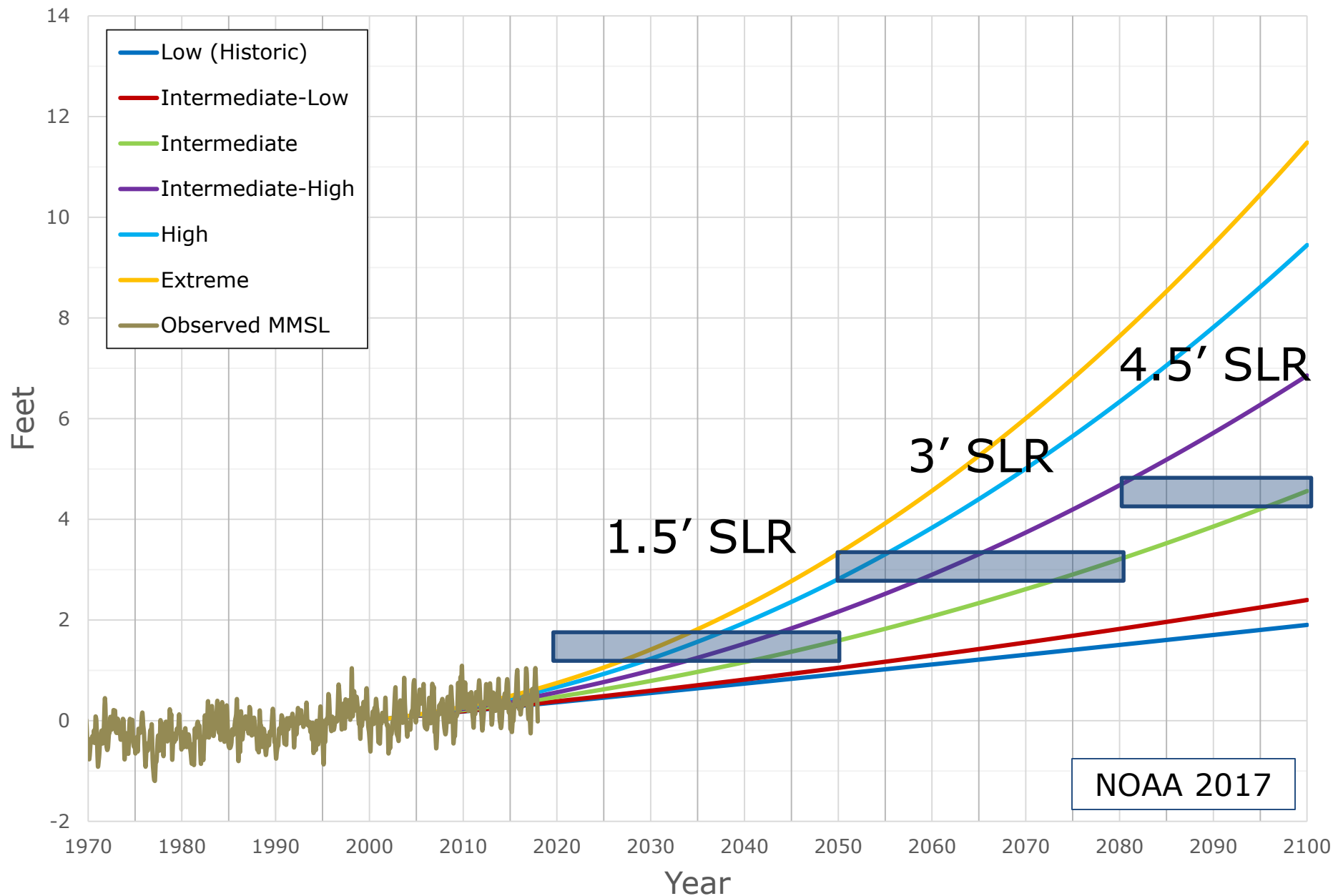
3,193 Flood insurance policies in force
Count as of June 30, 2019

February 2020

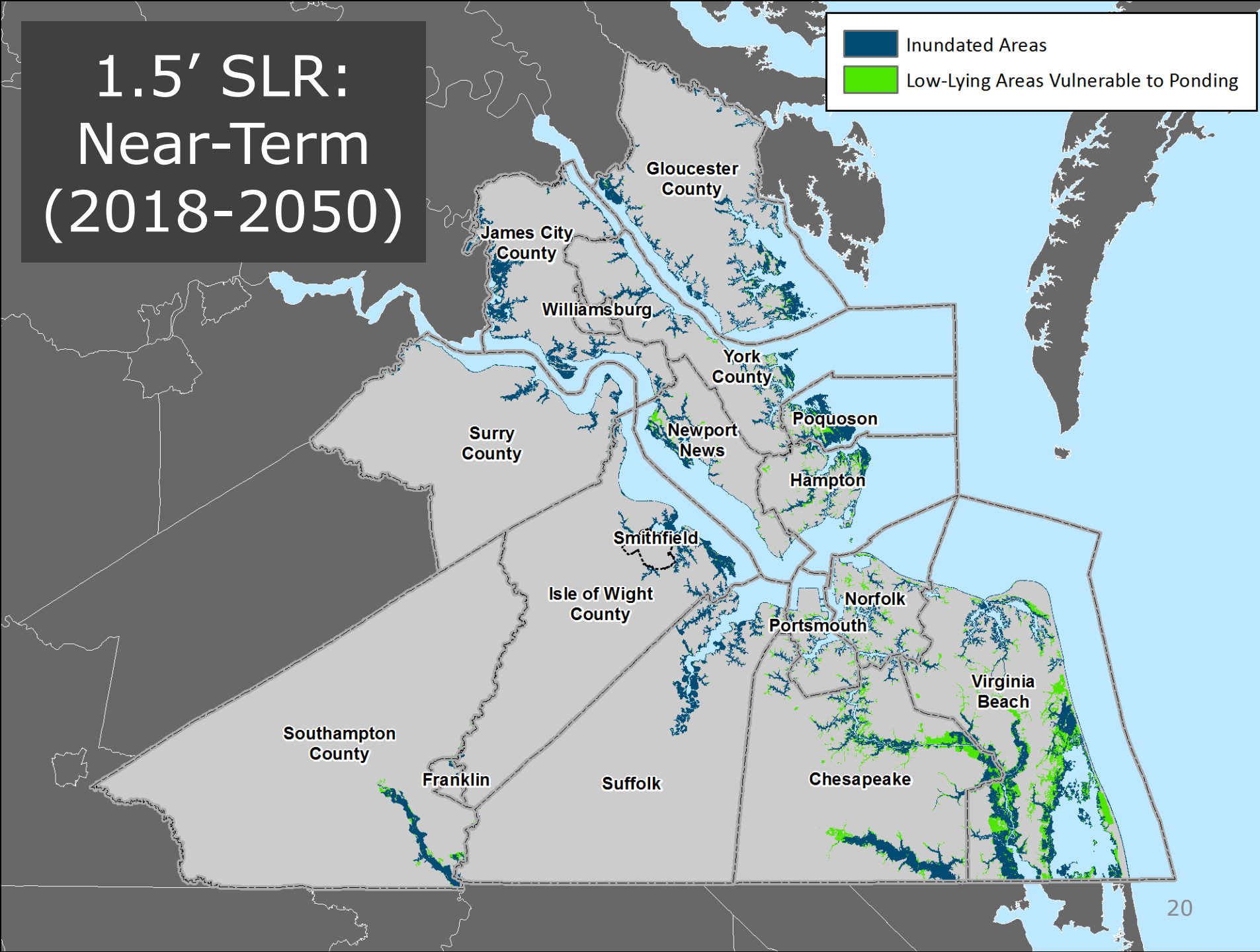
Regional Sea Level Rise Policy

- **Screening values:**
 - 1.5 feet for near-term planning (2018-2050)
 - 3 feet for medium-term planning (2050-2080)
 - 4.5 feet for long-term planning (2080-2100)
- **Risk-based engineering:**
 - Utilize best available sea level rise projections
 - Explicitly account for construction timeline, project lifespan, criticality, and vulnerability to flooding
 - Determine possible sea level rise impacts
 - Perform benefit-cost analysis of adaptation options

Projected Relative Sea Level Change at Sewell's Point, Virginia - 2000-2100

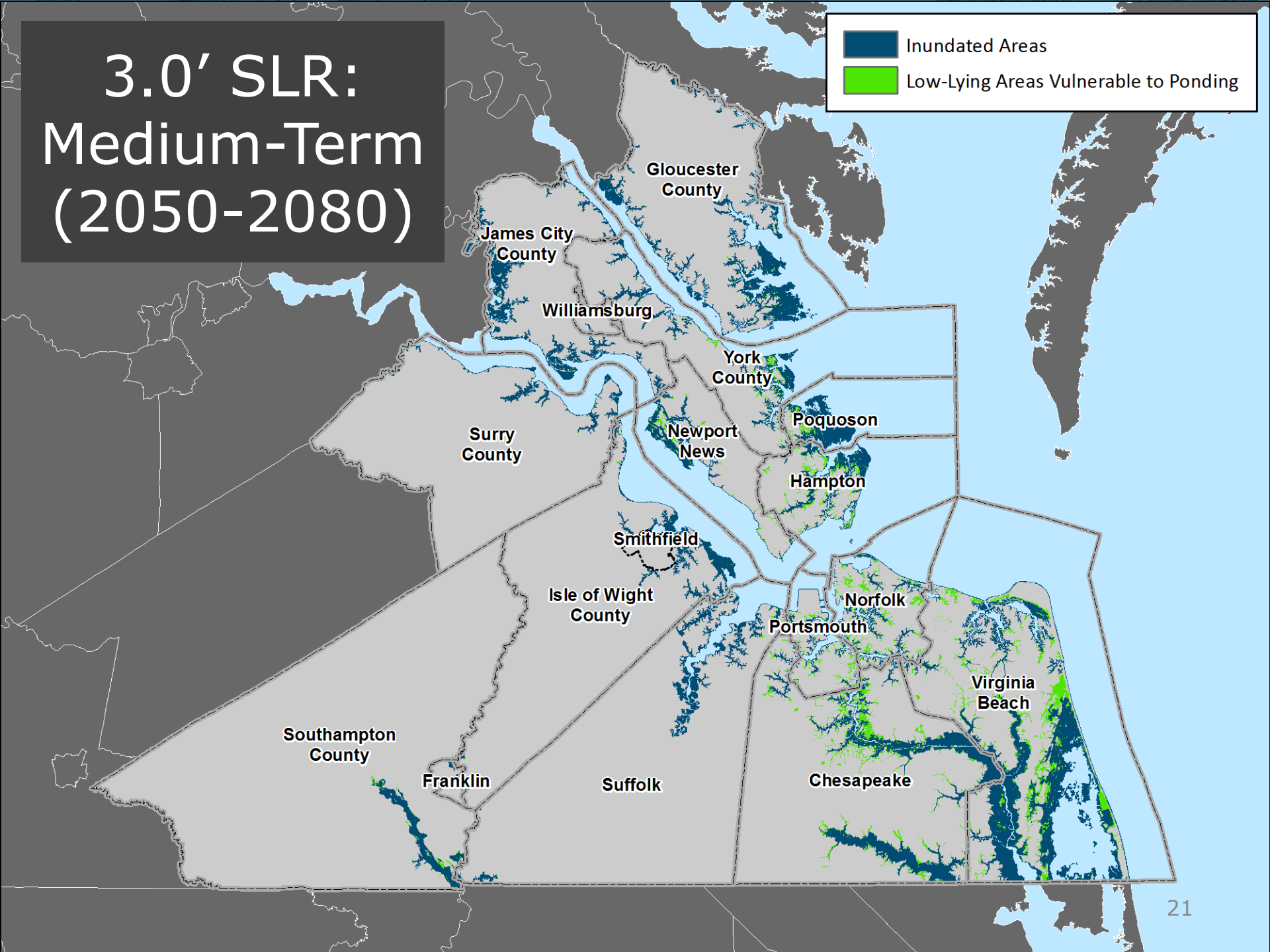


1.5' SLR: Near-Term (2018-2050)

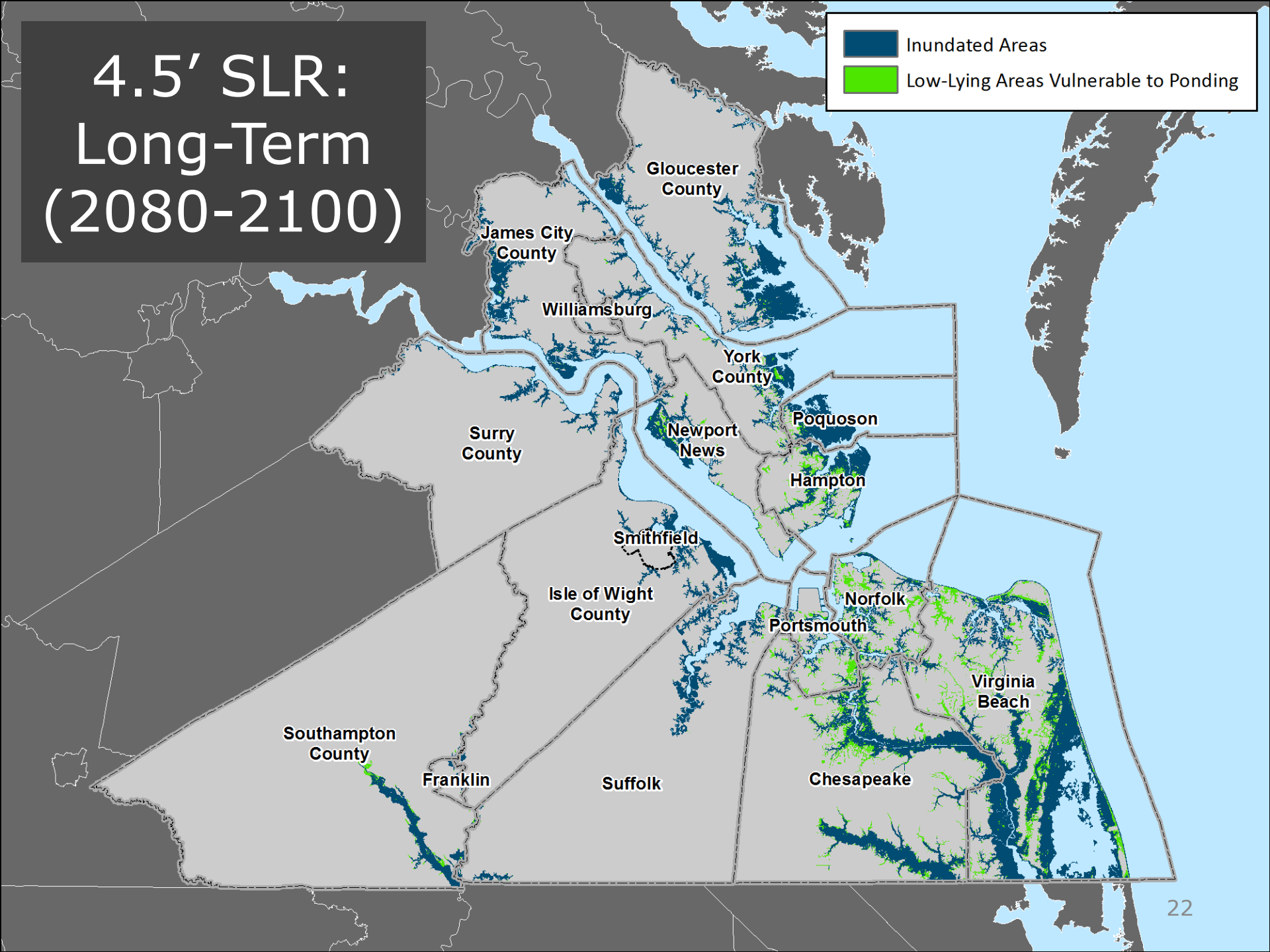
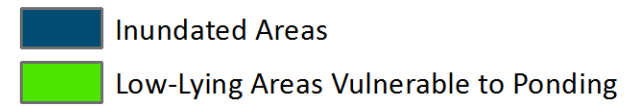


3.0' SLR: Medium-Term (2050-2080)

- Inundated Areas
- Low-Lying Areas Vulnerable to Ponding



4.5' SLR: Long-Term (2080-2100)



Design Standards

- Use SLR planning scenarios to develop Design Flood Elevations

$$\begin{array}{ccccccc} \text{Design} & & & \text{Base} & & & \\ \text{Flood} & = & & \text{Flood} & + & \text{Freeboard} & + & \text{SLR} \\ \text{Elevation} & & & \text{Elevation} & & & & \end{array}$$



Design Standards

- Type of Construction
- Feasibility
- Location
- Cost
- Criticality
- Lifespan

Local Floodplain Management Ordinance

CASE STUDY: HAMPTON, VIRGINIA



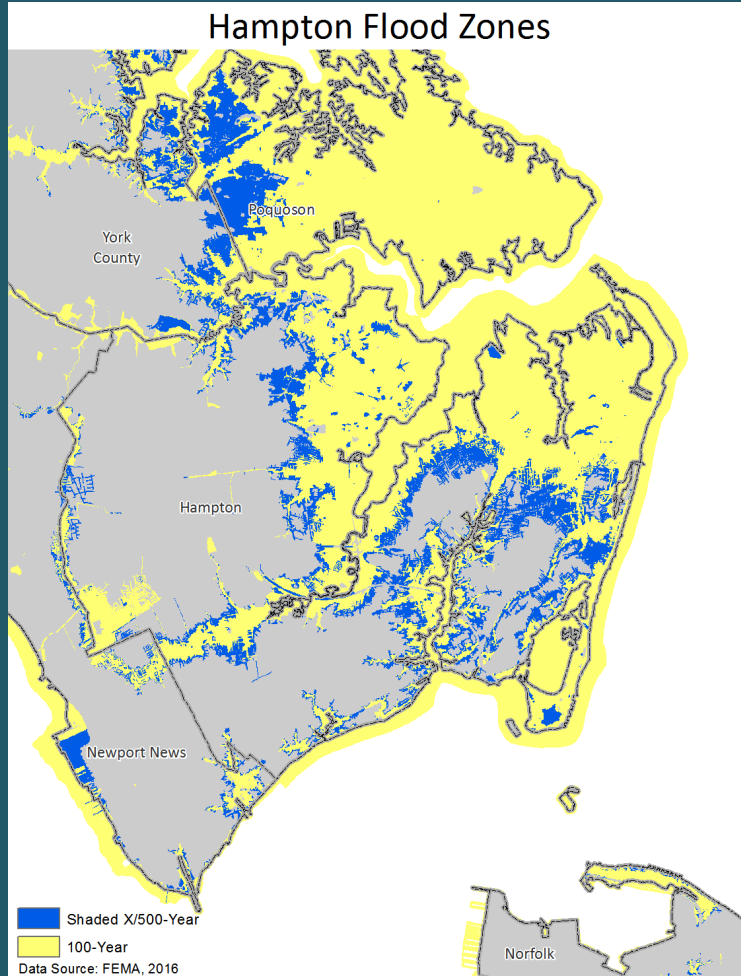
Hampton, VA

- DCR – Floodplains maintains a model ordinance for localities to use when establishing or updating their floodplain management ordinances
- Baseline standard is for the “floodplain” to include areas vulnerable to the 1% annual chance flood (A, AE, VE, etc.)
- Localities have some flexibility when adopting a program:
 - Freeboard
 - Other floodplains
 - A community “**may identify and regulate local flood hazard or ponding areas that are not delineated on the FIRM.** These areas may be delineated on a “Local Flood Hazard Map” using best available topographic data and locally derived information such as flood of record, historic high water marks, or approximate study methodologies.”

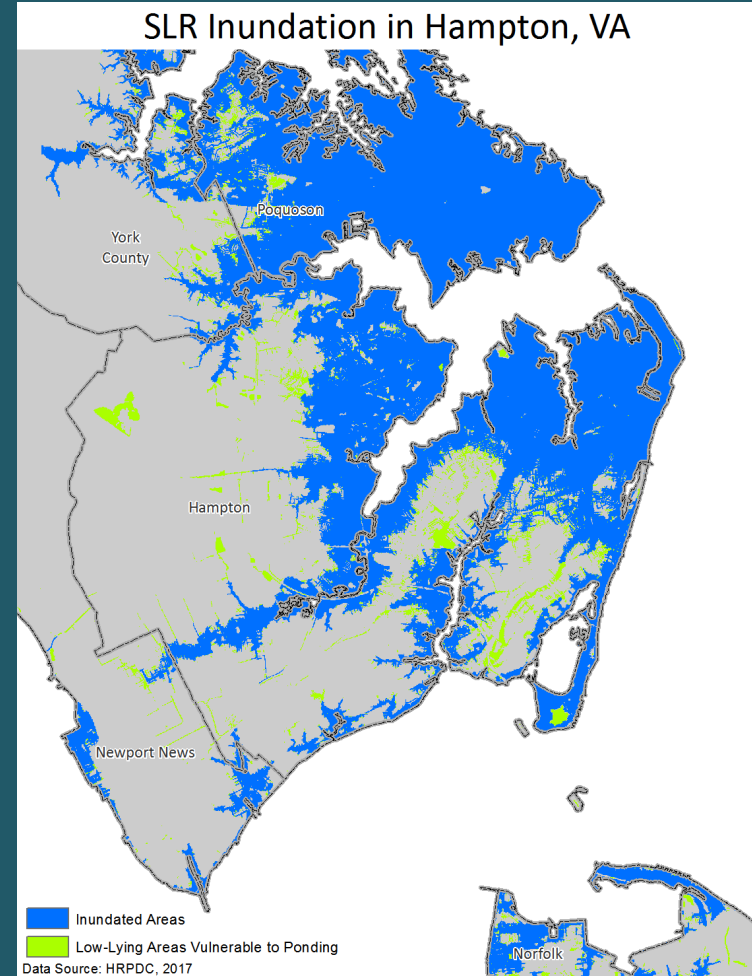
Hampton, VA

- Zoning Ordinance, Chapter 9, Article IV – Flood Zone Overlay
- Freeboard: (Sec. 9-34 (1) (a))
 - The freeboard shall be three (3) feet. The freeboard, in addition to the base flood elevation, shall constitute the design flood elevation.
- Other floodplains: (Sec. 9-33 (1) (h))
 - Other flood areas shall be those areas identified as X (Shaded) or X500 on the FIRM for which there is a one-fifth percent (0.2%) annual chance of flooding.
 - (i) **All new construction as of September 10, 2014 shall have the lowest floor, including basement, elevated or flood-proofed to one and one-half (1.5) feet above the highest grade immediately adjacent to the structure** except as described below:
 - (aa) When fill is placed to raise a structure at least one and one-half (1.5) feet above the highest existing grade immediately adjacent to the structure, as shown on a development plan prepared and stamped by a certified land surveyor or professional engineer.

Hampton, VA



100-Year and 500-Year Floodplains



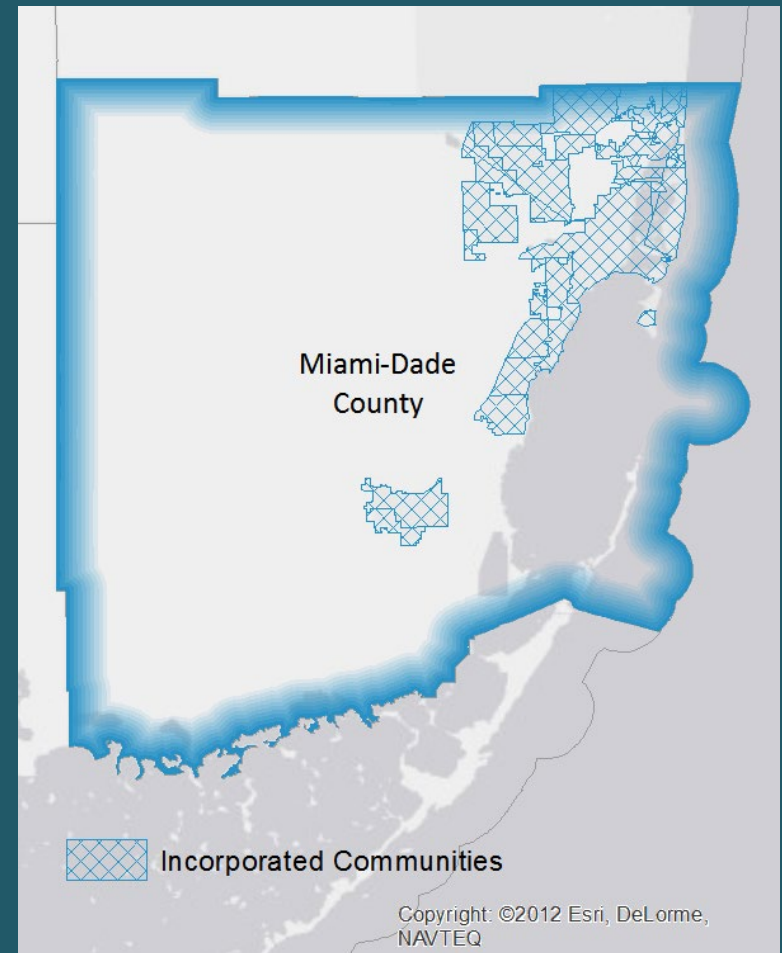
7 Feet of Sea Level Rise

Local Comprehensive Plan

CASE STUDY: MIAMI- DADE COUNTY, FLORIDA

Miami-Dade, FL

- Miami-Dade County, Florida
 - 2.7 million residents
 - 34 municipalities (18 cities, 6 towns, 10 villages)
 - Total land area: ~1,900 square miles
 - CRS Class 5 – unincorporated areas only
- Part of the Southeast Florida Regional Climate Change Compact
 - As of 2016, has implemented 89 of the 110 recommendations
- Comprehensive Plan extensively addresses coastal hazards
 - Land Use
 - Coastal Management
 - Conservation, Aquifer Recharge and Drainage
 - Transportation
 - Water, Sewer and Solid Waste
 - Capital Improvements





Miami-Dade, FL

- Land Use Element Example
 - **LU-3G: Miami-Dade County shall, by 2017, analyze and identify public infrastructure vulnerable to sea level rise and other climate change-related impacts.** This analysis shall include public buildings, water and waste water treatment plants, transmission lines and pump stations, stormwater systems, roads, rail, bridges, transit facilities and infrastructure, airport and seaport infrastructure, libraries, fire and police stations and facilities.
- Coastal Management Element Example
 - **CM-9H: Rise in sea level projected by the federal government, and refined by the Southeast Florida Regional Climate Change Compact, shall be taken into consideration in all future decisions regarding the design, location, and development of infrastructure and public facilities in the County.**

Miami-Dade, FL

- Transportation Element Example
 - **TC-6A: The County shall avoid transportation improvements which encourage or subsidize increased development in coastal high hazard areas**, environmentally sensitive areas II-17 identified in the Coastal Management and Conservation, Aquifer Recharge and Drainage Elements, and areas of high risk of significant inland flooding.
- Capital Improvements Element Example
 - **CIE-2B: Replacement of infrastructure in coastal high hazard areas will be at or below existing service capacity** except where such replacement will improve hurricane evacuation time, mitigate storm damage, or meet regulatory requirements.

Miami-Dade, FL

- In May 2014, the Miami-Dade Board of County Commissioners adopted Resolution No. R-451-14, which directs the mayor to require all county infrastructure projects to consider the potential impacts of sea level rise for planning, design, and construction
- **“It is the policy of Miami-Dade County that all County infrastructure projects...shall consider sea level rise projections and potential impacts...in order to ensure that infrastructure projects will function properly for fifty (50) years or the design life of the project, whichever is greater.”**

QUESTIONS?

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