Engaging Residents in Resilience Planning- using the ASERT Framework

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Sea Grant
Virginia

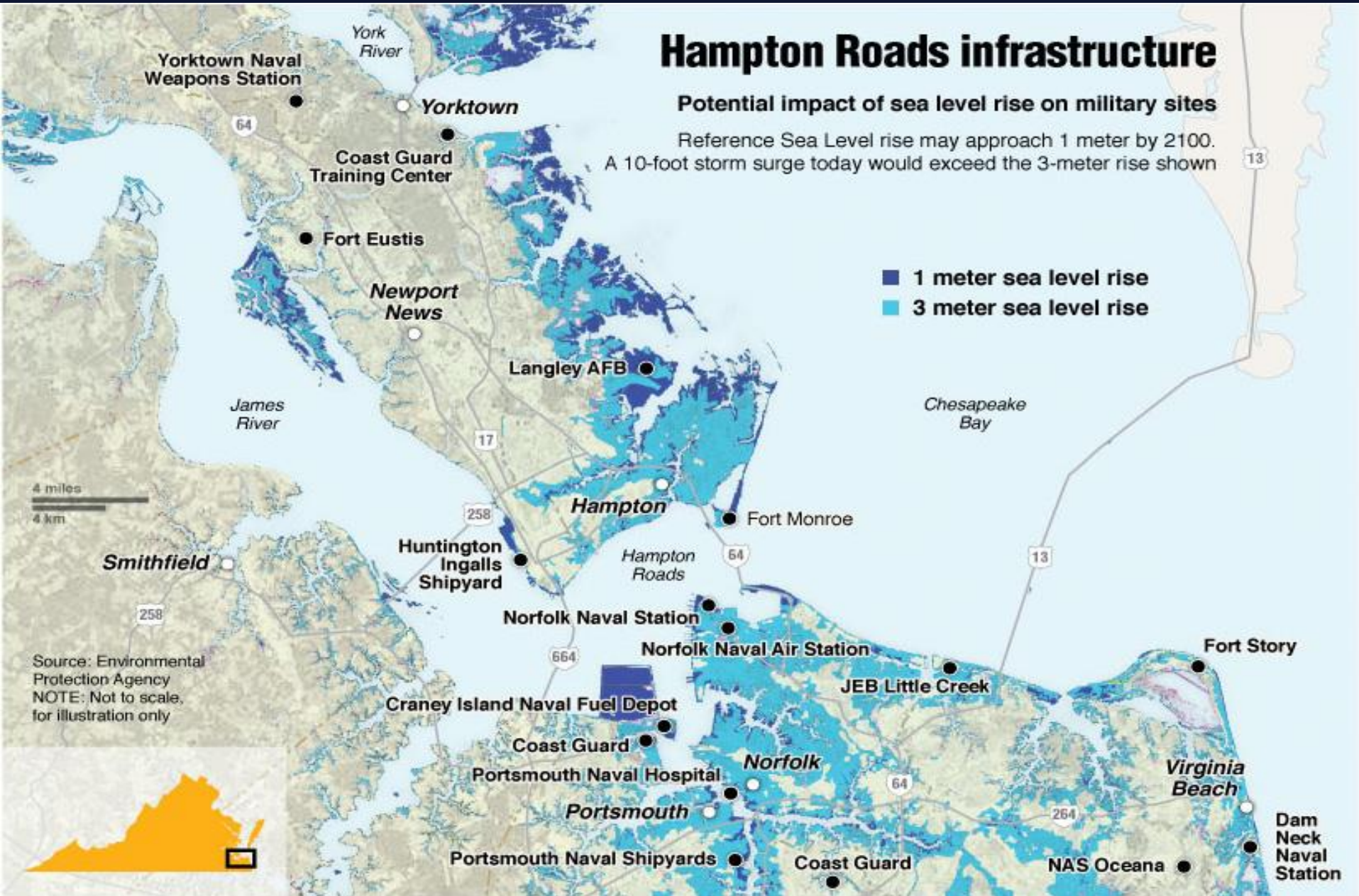**OLD DOMINION UNIVERSITY**
Resilience Collaborative

Hampton Roads infrastructure

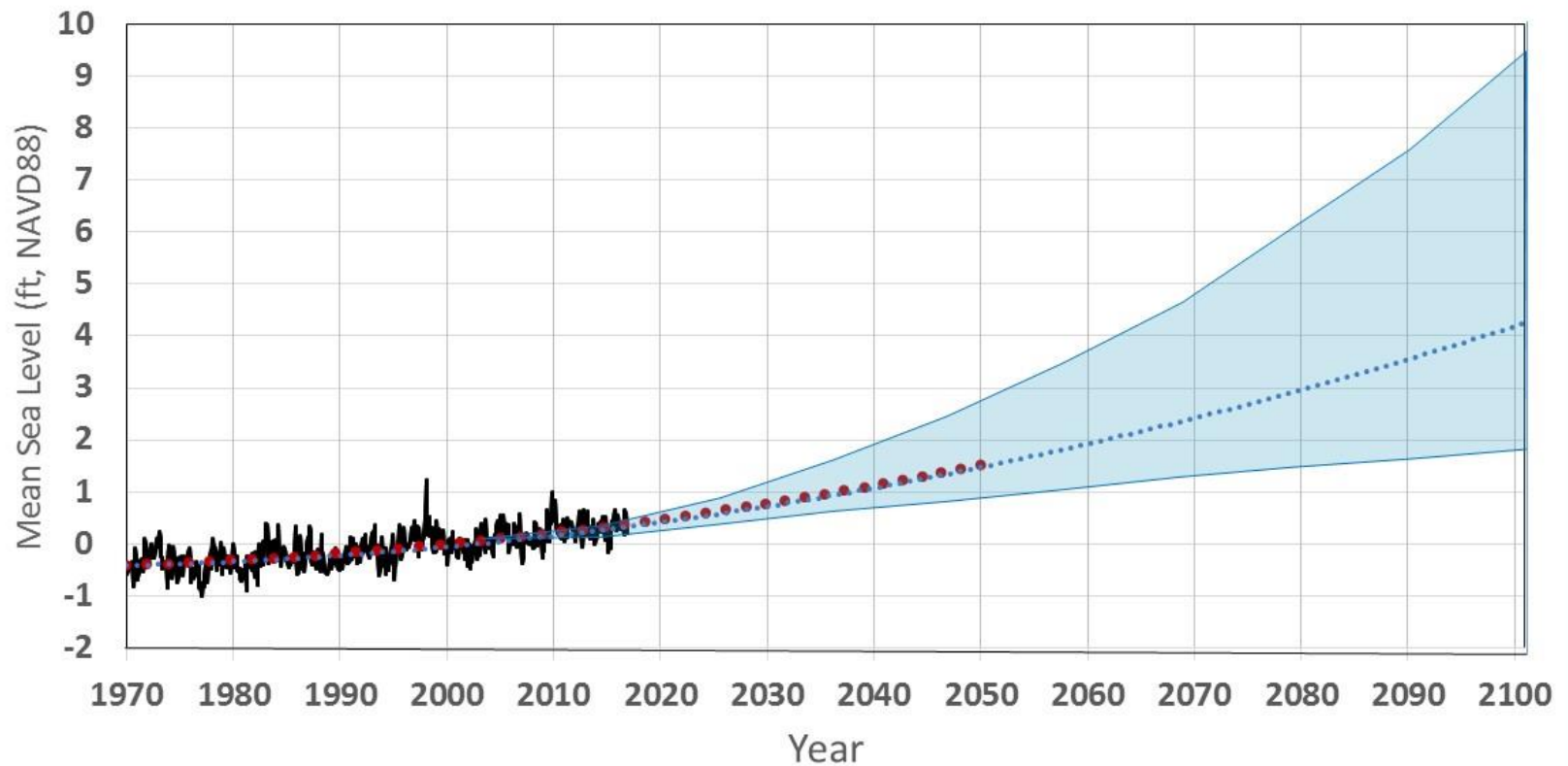## Potential impact of sea level rise on military sites

Reference Sea Level rise may approach 1 meter by 2100. A 10-foot storm surge today would exceed the 3-meter rise shown

■ 1 meter sea level rise
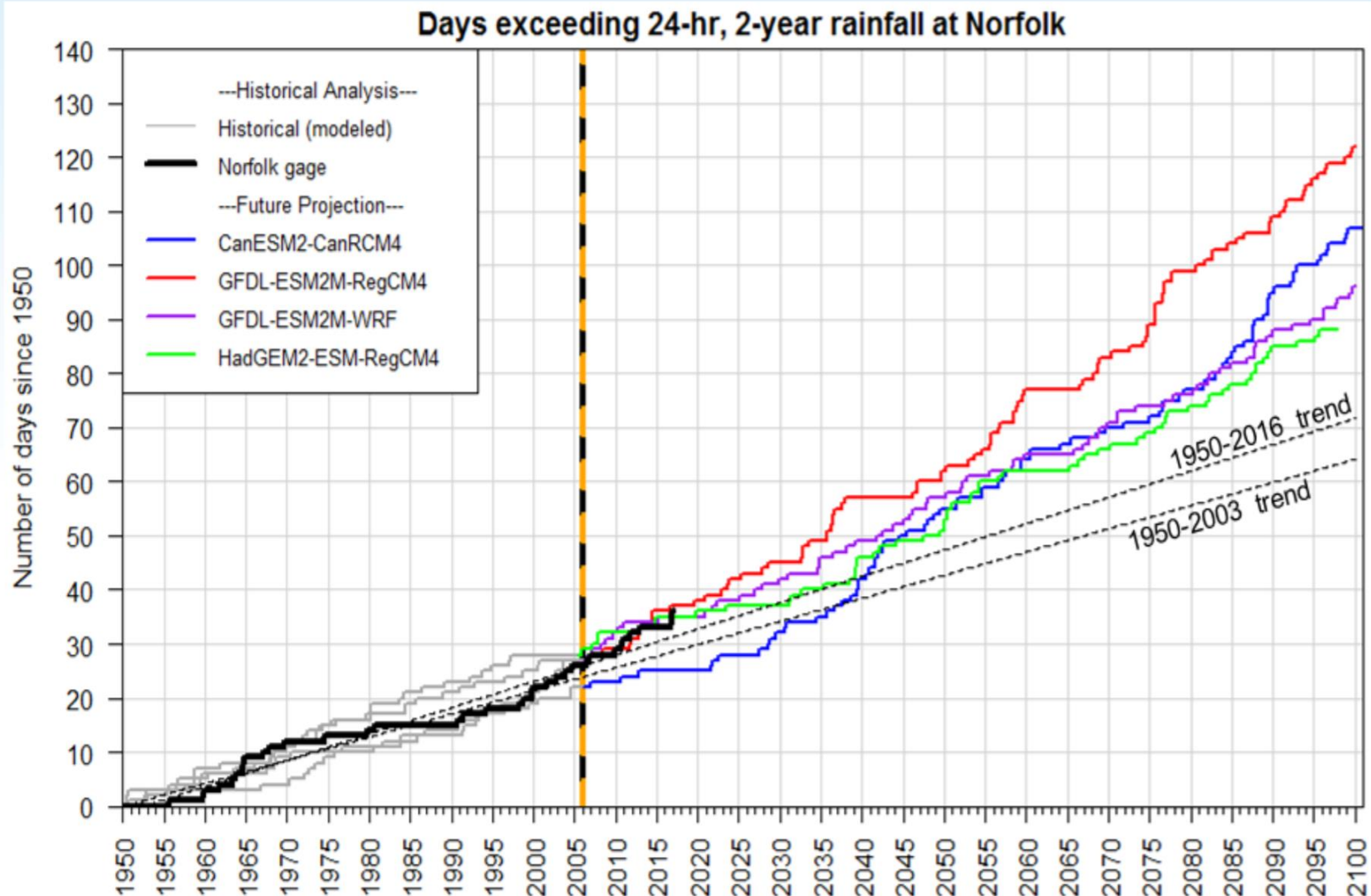■ 3 meter sea level rise

York River

Yorktown Naval Weapons Station

Yorktown

Coast Guard Training Center

Fort Eustis

Newport News

Langley AFB

James River

Chesapeake Bay

Hampton

Fort Monroe

Smithfield

Huntington Ingalls Shipyard

Hampton Roads

Norfolk Naval Station

Norfolk Naval Air Station

Fort Story

Source: Environmental Protection Agency
NOTE: Not to scale, for illustration only

Craney Island Naval Fuel Depot

JEB Little Creek

Coast Guard

Portsmouth Naval Hospital

Norfolk

Virginia Beach

Portsmouth

Portsmouth Naval Shipyards

Coast Guard

NAS Oceana

Dam Neck Naval Station

Sea Level in Virginia
Historic data and projections

Virginia Institute of Marine Science 2017

Rainfall Trend

Days exceeding 24-hr, 2-year rainfall at Norfolk
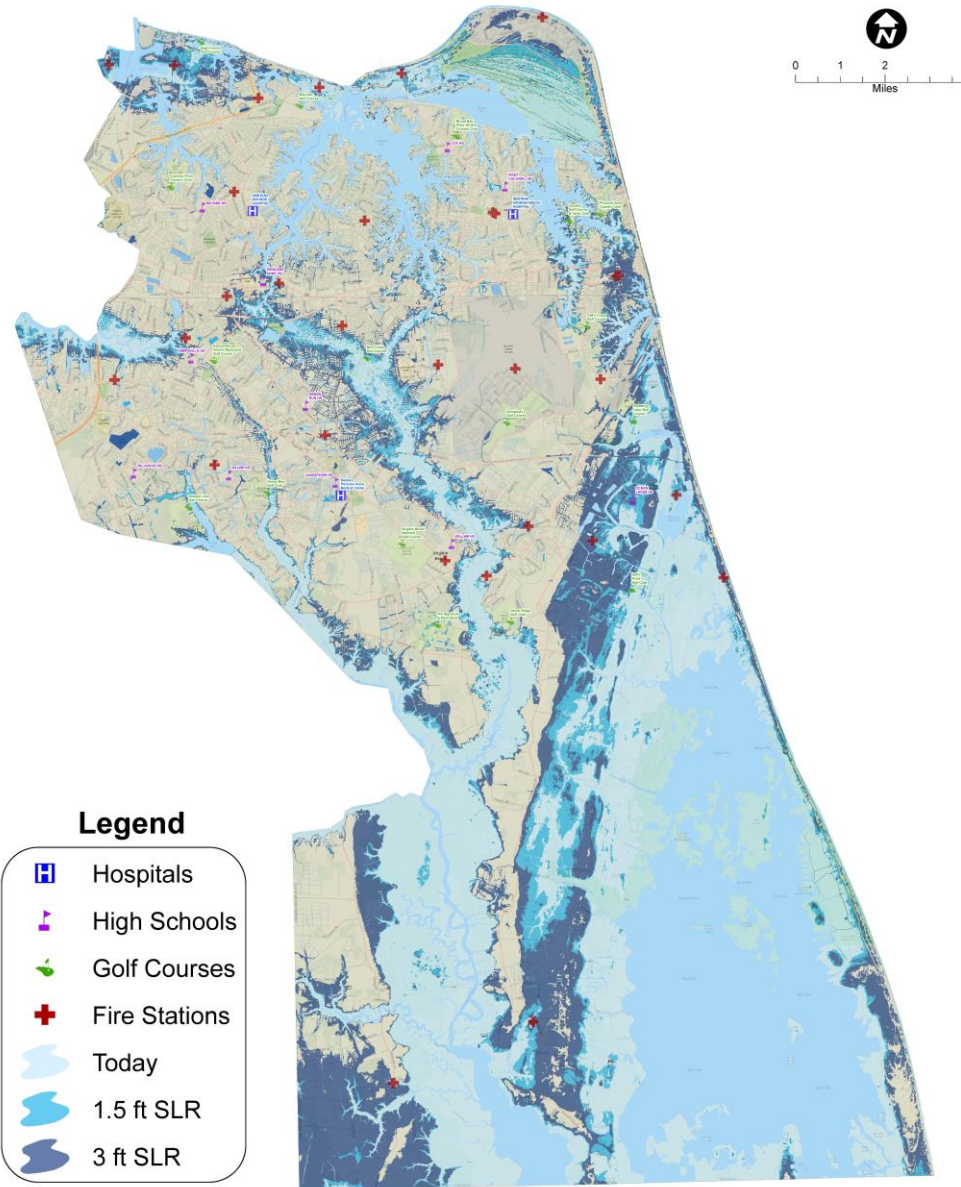
- Upward trend of Annual Maximum Precipitation Series between 3-7% per decade.

Existing and Future Floodplains
100-yr Annual Chance Recurrence Interval

0 1 2 4
Miles

Legend

H	Hospitals
⚑	High Schools
🏌	Golf Courses
✚	Fire Stations
	Today
	1.5 ft SLR
	3 ft SLR

VB Sea Level **Wise**
*A **vibrant** future for Virginia Beach*

🍇 **Dewberry**®

Notes:
1.5 ft SLR scenario anticipated between 2045 and 2100
3 ft SLR scenario anticipated between 2075 and >2100
3 ft SLR scenario includes non-linear surge response
Assumes backflow through stormwater system
Does not reflect additional flooding from precipitation

The Challenge – Engaging Residents in Planning for Flooding and Sea Level Rise

- City of Virginia Beach began comprehensive planning for sea level rise and recurrent flooding (NOAA Coastal Resilience 2015)
  - Assess flood hazards and vulnerability
  - Develop short- and long-term measures to increase resiliency
  - Align with stormwater master plan

- Hurricane Matthew brought significant damage (Oct 2016)

- Public meetings?

Objectives

- Provide an inclusive and engaging process that will allow residents to participate in the resilience efforts in Virginia Beach.

- Provide information about household resilience in an environment that encourages social learning, including curiosity and reflection, to promote behavioral change that will result in improved resilience.

- Allow residents to give real-time perceptions of risk and feedback about resilience activities in Virginia Beach.

- Collect data related to residents' risk perceptions, levels of knowledge and preparedness, to allow for targeted follow-up.

ASERT FRAMEWORK

Action-Oriented Stakeholder Engagement for a Resilient Tomorrow (ASERT)

Discussion/
deliberation

Participatory GIS

Interactive Polling

Gamify Engagement and Outreach

- Minimize conflict by reducing opportunity to 'argue'
  - Focus on **doing,** not talking
  - Interactive activities that bring people together
- Encourage learning and action
  - Rewards and incentives
- Make connections within and across groups
 - Competition
  - Sharing

Conceptual Framework - Gamification

– Engagement and learning as a learner-centered activity

  • Individuals learn through interactions with others and with the environments within which they are located

– Learning as a social process

  • Meaningful engagement and learning when individuals participate in social activities
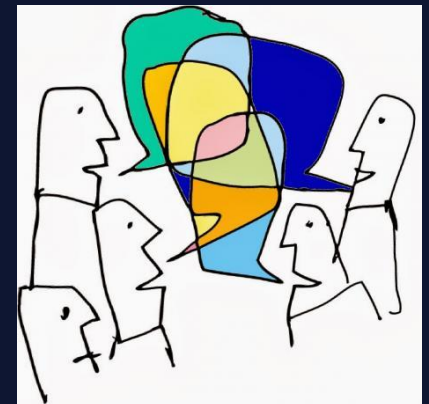
Flood Resilience Game Night/ Fun Afternoon

- Five stations where residents participate in activities and earn stamps on a game card (passport)
- 5 stations
  - Check-in and get passport
  - Residents' perceptions and preferences
    - Flood tolerances
    - Adaptation actions
  - Participatory mapping
    - Travel disruptions
   - Community assets and challenges
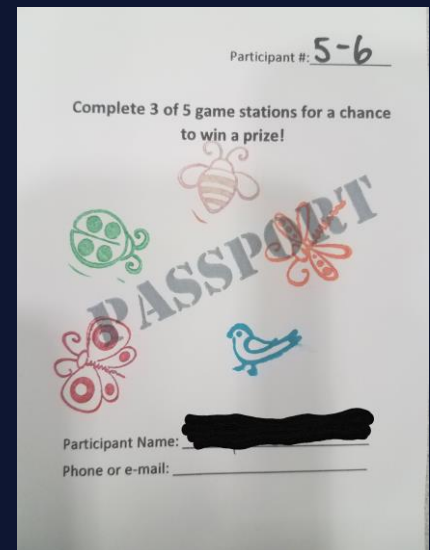
Flood Tolerances – What's Your Comfort Level?

- Residents were asked to respond to images of flooding to assess their tolerance for and comfort level with flooding

Adaptation Actions – Prioritization Activity

- Residents learned about possible approaches that the community or individual property owners might take to prevent flooding

- Completed an online prioritization activity to determine preferences for different adaptation actions/solutions
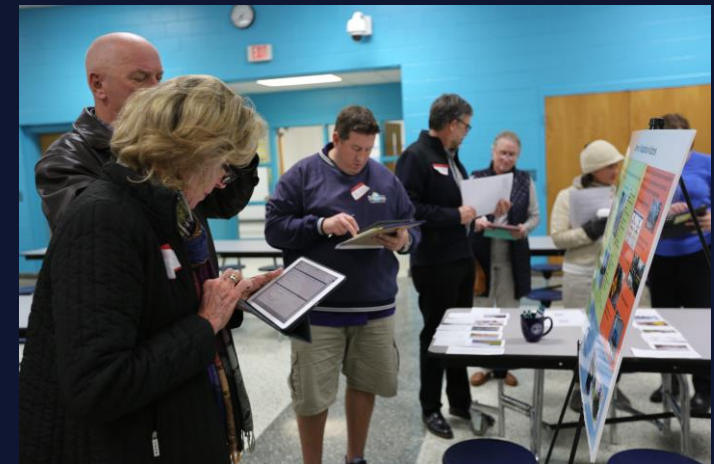
Participatory Mapping

- Large-format printed map of the City
- Interactive electronic map

Regional Map
http://tinyurl.com/resiliencemap
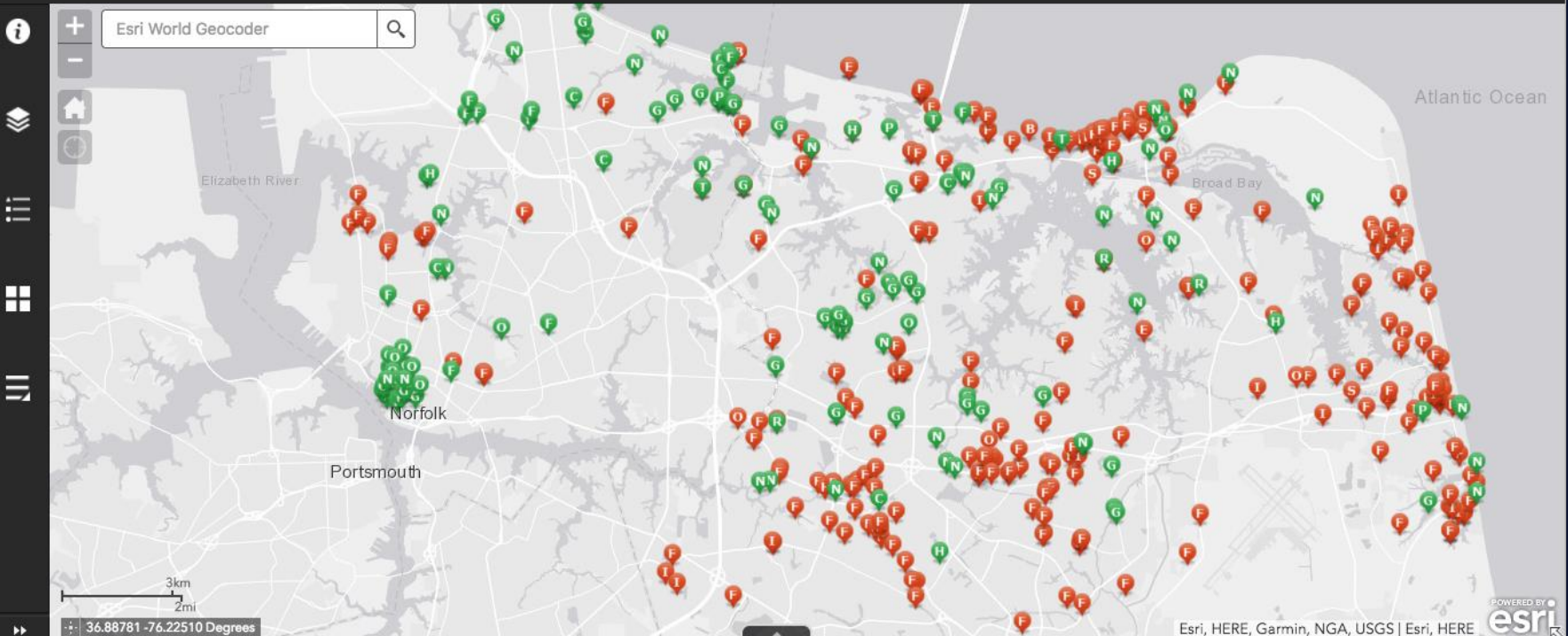
Participants

- 47% female
- 90% white,
  - 3% Black/African American,
  - 3% Multiracial
  - 3% "Other"
- 83% older than 45 years of age
  - 41% 45-64 years
  - 42% 65 years and over
- Highly educated
- 86% lived in HR 11 years or more

Participant perceptions

Rating of personal vulnerability (N=196)

Extremely low	11.73%
Somewhat low	8.67%
Neither low nor high	21.43%
Somewhat high	21.94%
Extremely high	36.22%

When SLR will have an impact on Hampton Roads (N=181)

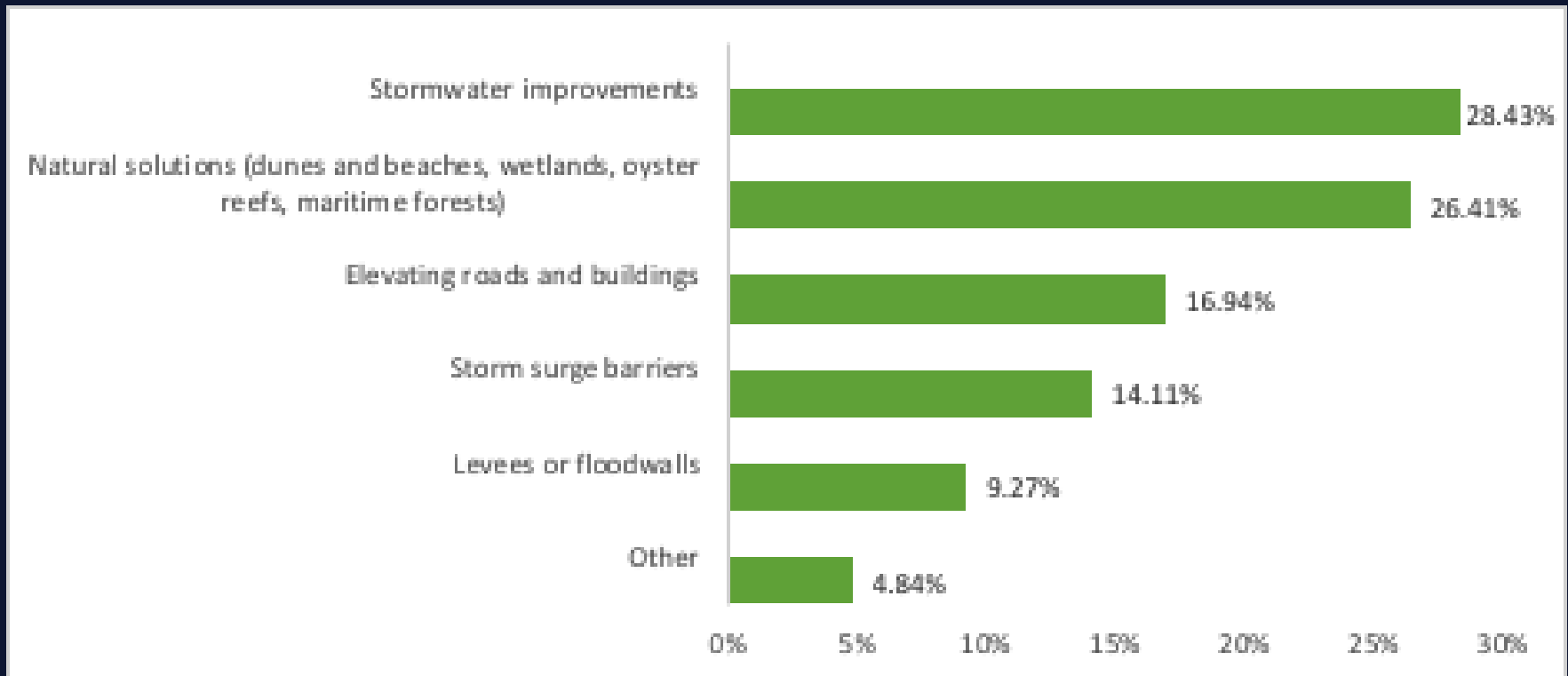| Now	18.78%
1 to 5 years	53.04%
6 to 10 years	11.05%
11 to 25 years	7.18%
26 to 50 years	5.52%
51 to 100 years	4.42%

How well informed about increasing flooding and causes in Hampton Roads (N=191)

| Not at all informed	4.19%
Not well informed	26.18%
Neither uninformed nor informed	14.14%
Well informed	39.27%
Very well informed	16.23%

■ 46% had flood insurance

Adaptation Options for the City

Given a limited amount of public funding, which of the following options would you prefer your local government invest in? Select the top three options.

Option	Percentage
Stormwater improvements	28.43%
Natural solutions (dunes and beaches, wetlands, oyster reefs, maritime forests)	26.41%
Elevating roads and buildings	16.94%
Storm surge barriers	14.11%
Levees or floodwalls	9.27%
Other	4.84%

Adaptation Options for the City

Which planning and management approaches do you prefer your city to focus on? Select the top three approaches.
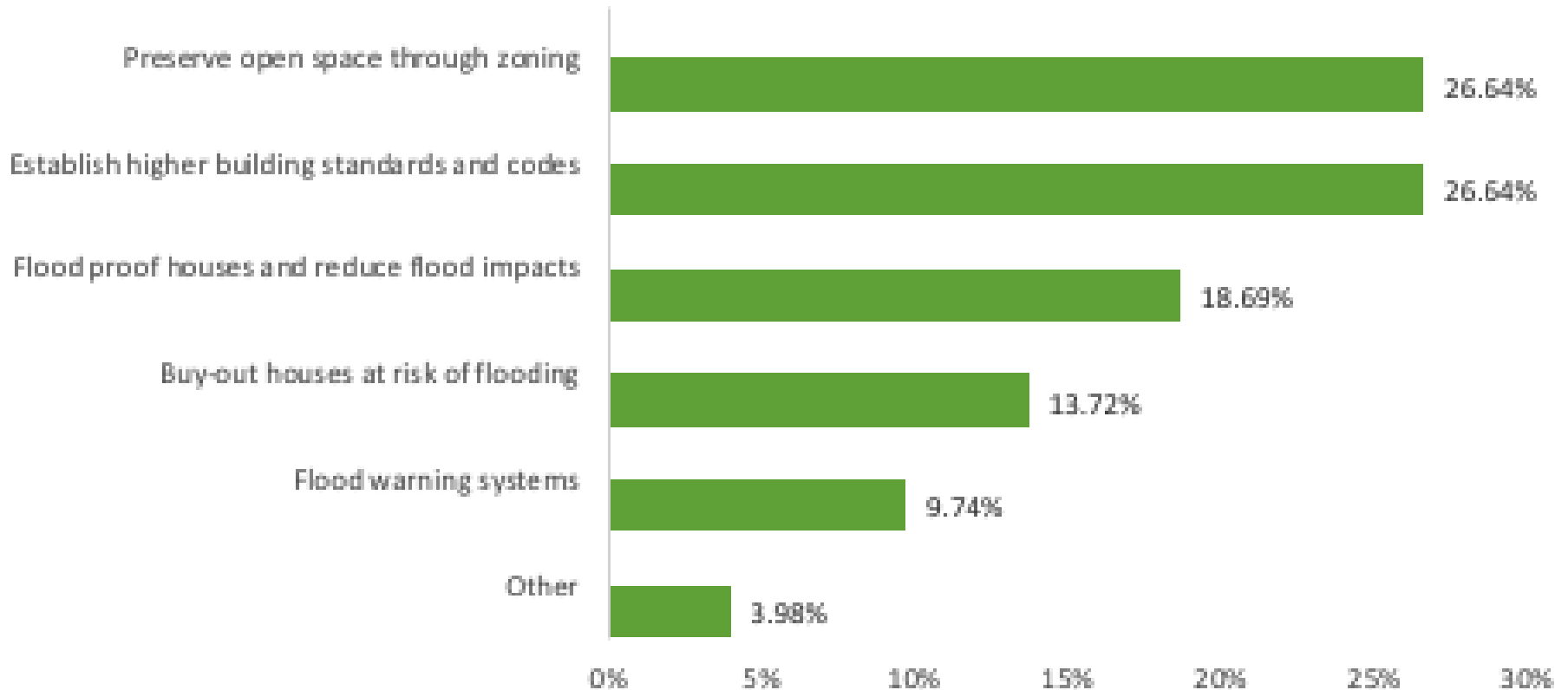
Individual Actions

Actions participants would take to improve flood resilience.

Talk to public officials about allocating resources for implementing adaptation	20.79%
Install rain-gardens or other landscaping designed to hold stormwater	20.00%
Invest in home flood-proofing	16.04%
Buy flood insurance	15.64%
Install cisterns and rain barrels	12.87%
Talk to my family and friends about how to become more resilient	10.69%
Other	7.21%
None	0.40%

Individual Actions

What participants would like to know more about

What the city is doing to address increasing flooding	29.53%
Impacts of increased rain and storms	18.37%
What I can do to adapt and prepare	13.95%
Causes of sea level rise and flooding	12.79%
Nuisance and minor flooding	11.16%
Other	7.21%
Flood insurance	6.98%

What Did We Learn?

- Still need to appeal to a wider audience of residents

- Engaged environment diffused tensions

- Saw sharing, social interaction, exchange of information

- Significant co-creation of knowledge
  - Identified 300+ flood locations
  - Information about preferences

Next Steps

- Web-based
  - Also offered online, web-based option for residents to provide input and to identify assets and challenges
- Follow up with Virginia Beach
- Other locations- rural?

Questions?