Natural Infrastructure Resilience Plan
Planning Commission Briefing

August 22, 2024

Agenda

1. Overview of Plan and Planning Process
2. Review Data Analysis
3. Introduce Draft Implementation Strategies
4. Next Steps

Project Funding – FEMA Flood Mitigation Assistance

- Administered through Va Department of Energy (DOE) through a sub-grant to Va Department of Emergency Management (VDEM)

1. A Natural Infrastructure Resilience Plan

2. An Energy Assurance Plan
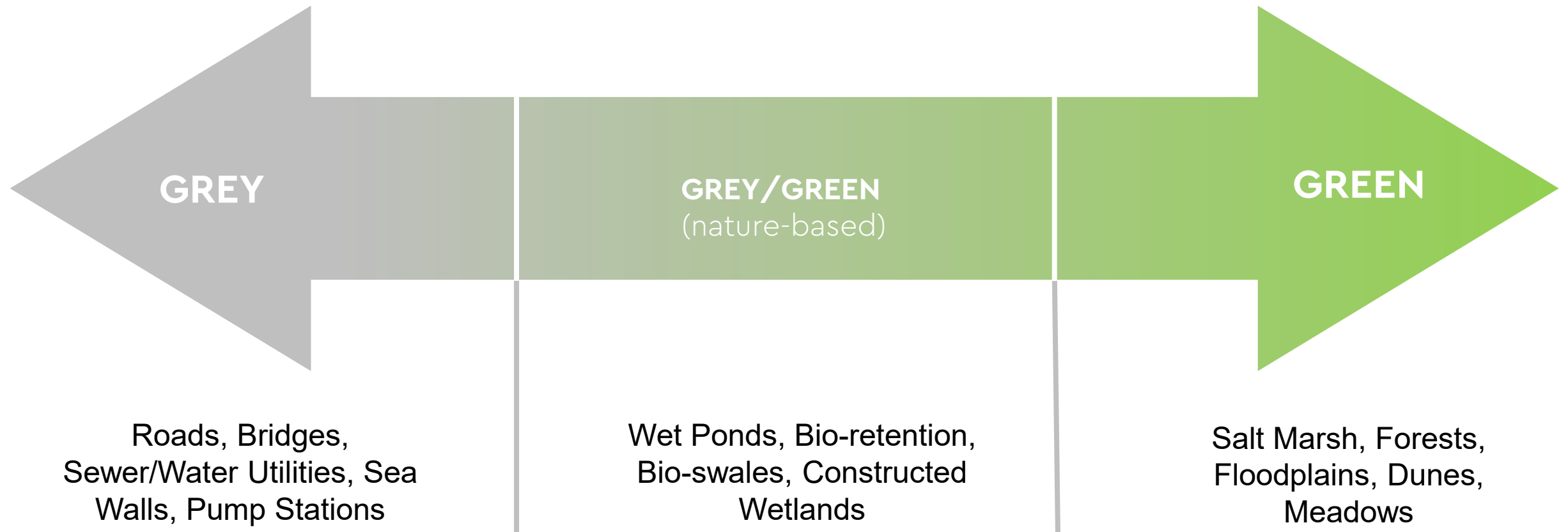
3. Adoption of C-PACE Program

Infrastructure Continuum

GREY

Roads, Bridges, Sewer/Water Utilities, Sea Walls, Pump Stations

GREY/GREEN (nature-based)

Wet Ponds, Bio-retention, Bio-swales, Constructed Wetlands

GREEN

Salt Marsh, Forests, Floodplains, Dunes, Meadows

What is natural infrastructure?

Both Wild   **& Constructed**
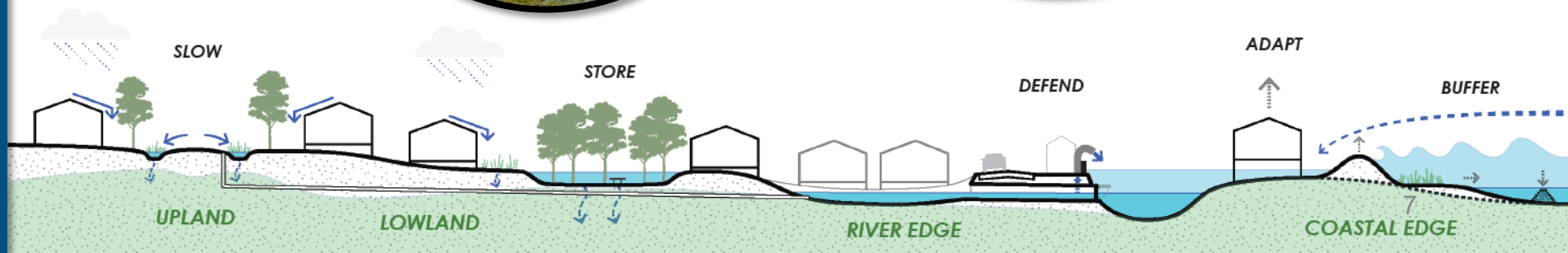
Benefits of Natural Infrastructure

1. Provides cost-effective stormwater management and hazard mitigation

2. Protects and preserves water quality

3. Preserves bio-diversity and wildlife habitat

4. Improves public health, quality of life, and recreation

5. Supports economy

Natural infrastructure can be integrated into our adaptation and mitigation approaches.

Tree Canopy

Green Bulkhead

Living Breakwater

Stormwater Park

Living Shoreline

SLOW

STORE

DEFEND

ADAPT

BUFFER

UPLAND

LOWLAND

RIVER EDGE

COASTAL EDGE

What will the plan do?

1. Review and audit the City's existing **codes and ordinances**.

2. Identify **strategies to increase and protect** natural infrastructure throughout the community – with a focus on stormwater and flooding.

3. Identify **partners** and potential **funding sources** to implement strategies.

How does the plan align with other Resilient Hampton plans?

1. City-wide implementation and analysis

2. Focuses on partnership and collaboration opportunities

3. Emphasis on multi-benefit approaches

A Collaborative Effort

A Collaborative Effort

Community Meetings
- Sept. 28, 2023
- Feb. 8, 2024
- **May 23, 2024** – *Tomorrow*

Steering Group Meetings
- Nov. 11, 2023
- Dec. 14, 2023
- Jan. 11, 2024
- April 16, 2024

Opportunities for Feedback

- Presentations to community groups
- Interactive Online Survey
- Library Display Boards & Surveys
  - **All four branches**
  - **Mid-February – Early March**

"What is your favorite natural asset?"

"Where do you want to walk to?"

"Where do you experience flooding?"

SHARE YOUR THOUGHTS!

Complete a Survey!
Scan the QR Code here to take a 5 minute survey to tell us what natural assets are important to you!

Locate your favorite n...
favorite fishing or bir...
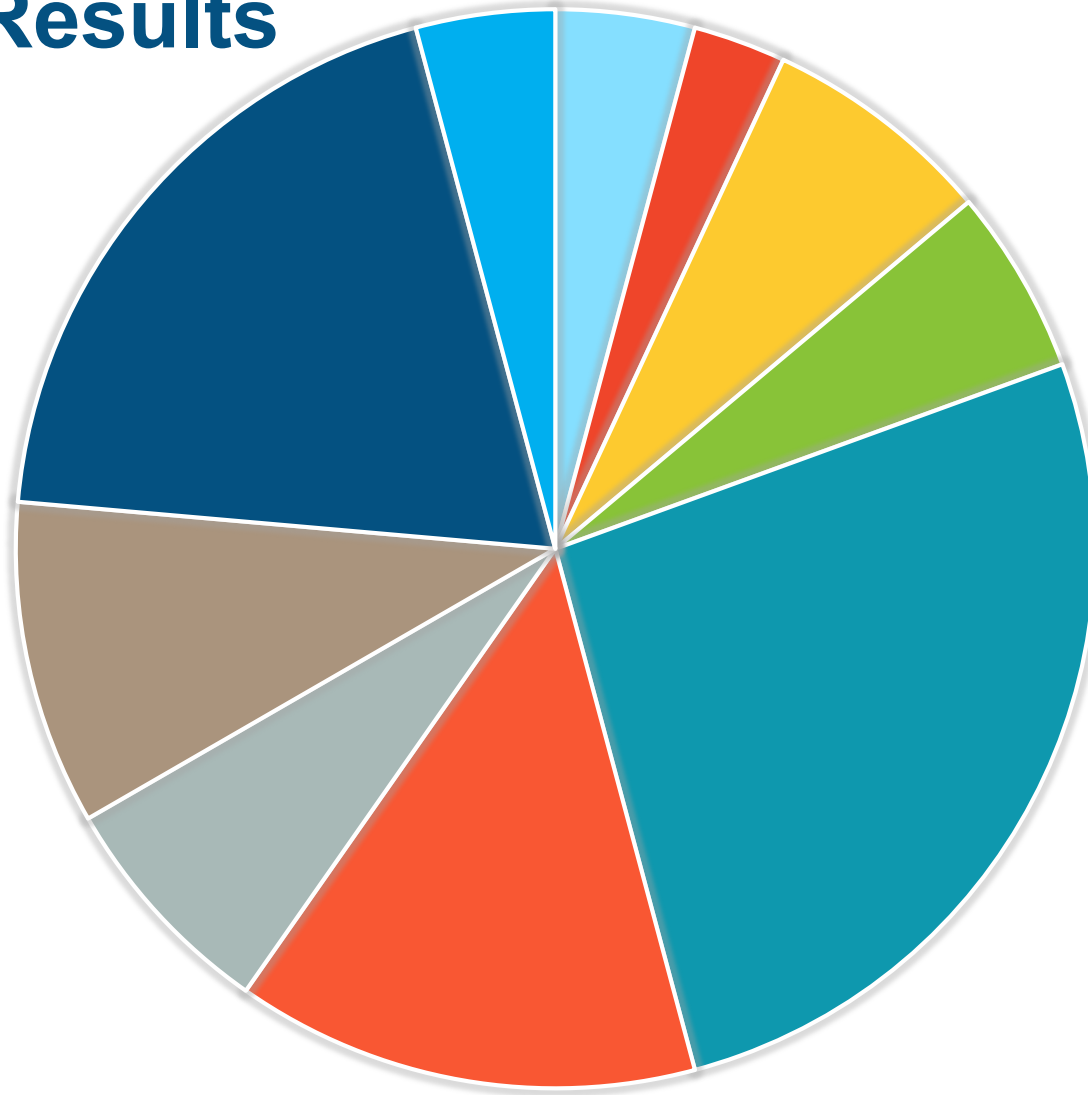favorite place to bike...

Directions:
Expand the map below using the square icon on bottom left.
Zoom into the part of he city where your favorite natural place is located.
Click to drop a point on this location.

Find address or place

Newport News

Joint Base Langley-Eustis

24 ft

Hampton

Newport News

Esri, NASA, NGA, USGS | VGIN, Esri, TomTom, Garmin, SafeGraph, METI/NASA, USGS, EP...   Powered by Esri

No geometry captured yet.

HAMPTON VIRGINIA

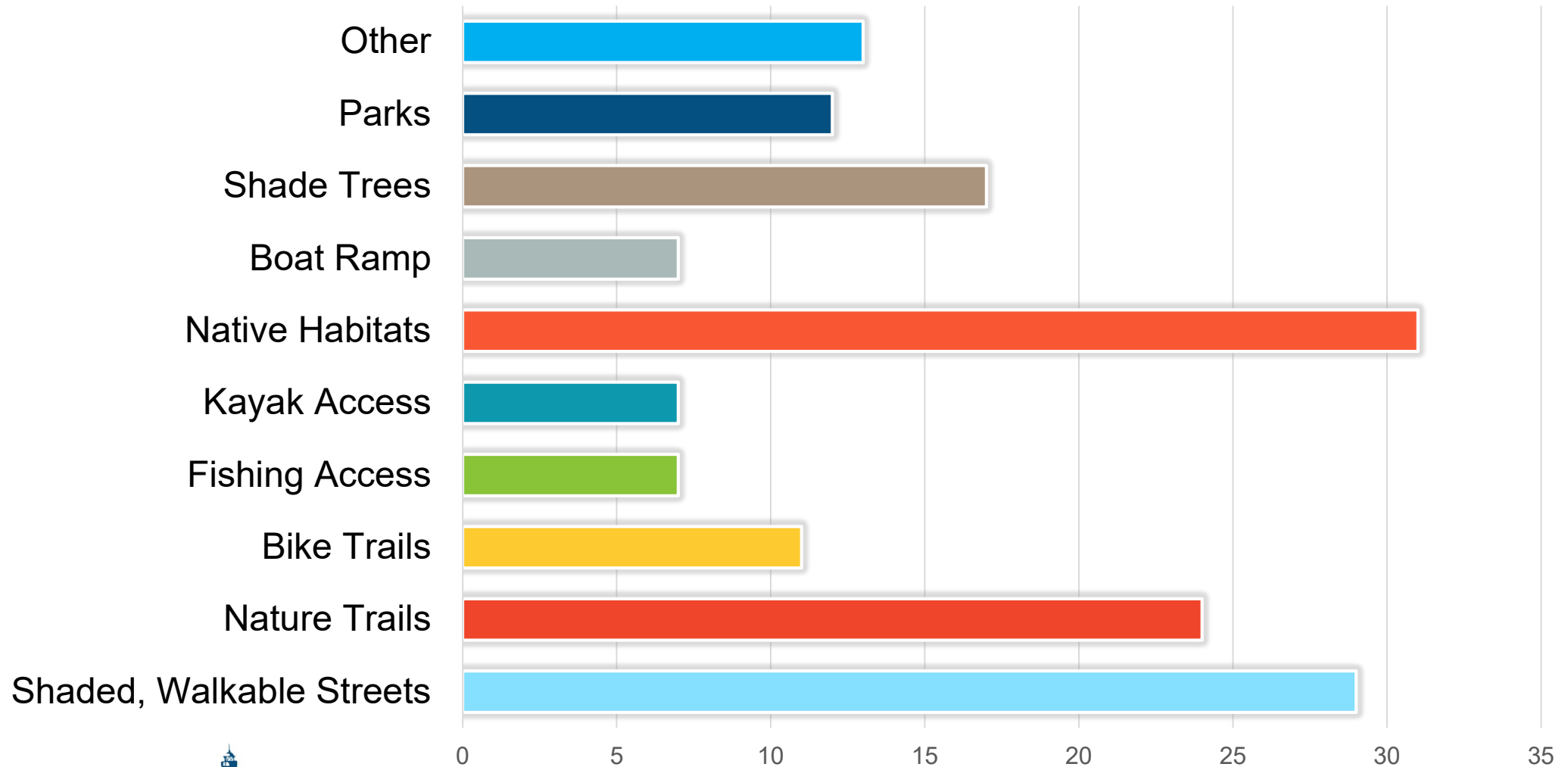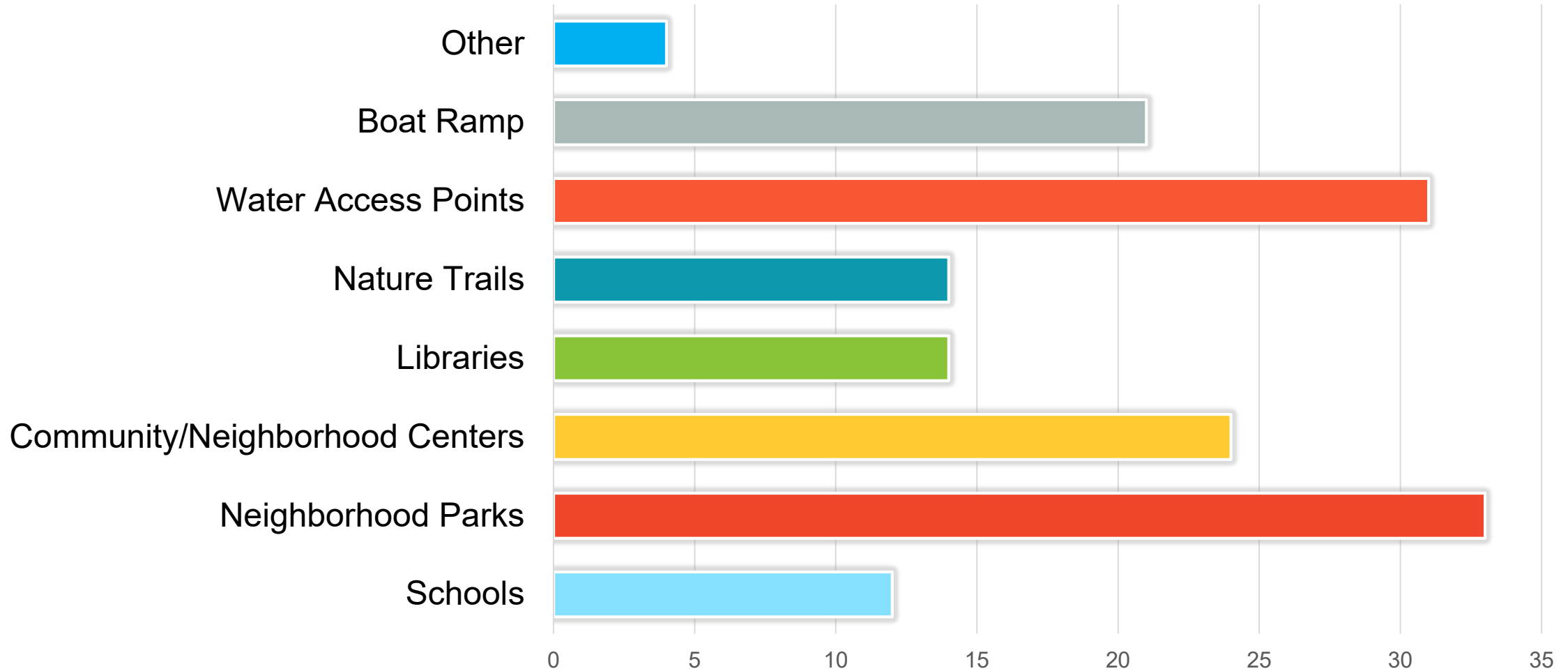RESILIENT HAMPTON

Feedback Results

- District 1 - Northhampton
- District 2 - Magruder
- District 3 - Mercury Central
- District 4 - North King Street
- District 5 - Foxhill
- District 6 - Buckroe
- District 7 - Phoebus
- District 8 - Downtown
- District 9 - Greater Wythe
- District 10 - Aberdeen

Which of these assets do you want to see more of in your community?

Data Analysis

Existing Tree Canopy - Comparisons

Pervious
28%

Canopy
32%*

Impervious
40%
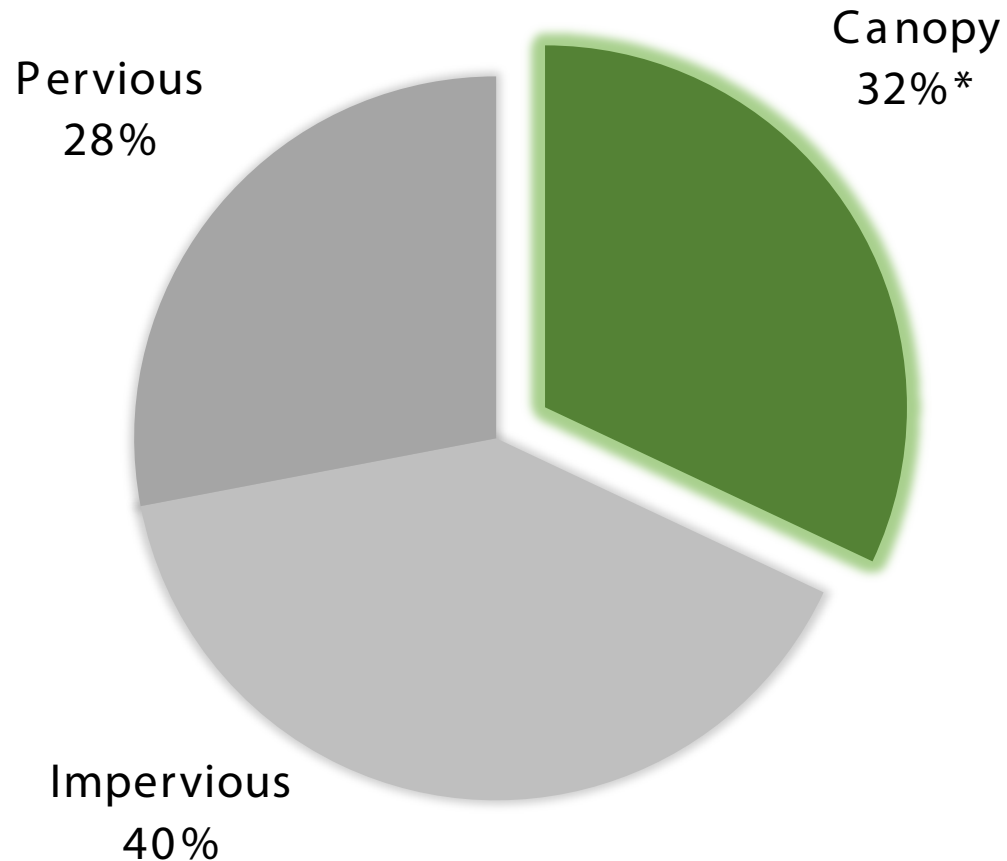
*Percentage excludes JBLE

- Hampton – **32%**
- Norfolk – **26%**
- Richmond – **42%**
- Wilmington, NC – **48%**
- Charleston, SC – **61%**

Existing Tree Canopy

Quantifying Benefits

The City's current tree canopy captures:

- 69,774 lbs/year of **Nitrogen**

- 5,653 lbs/year of **Phosphorus**

- 4,269 tons/year of **sediment**

- 47.3 million gallons of **stormwater runoff** for every 1yr/24-hour rainfall event (which equals 2.94 inches)
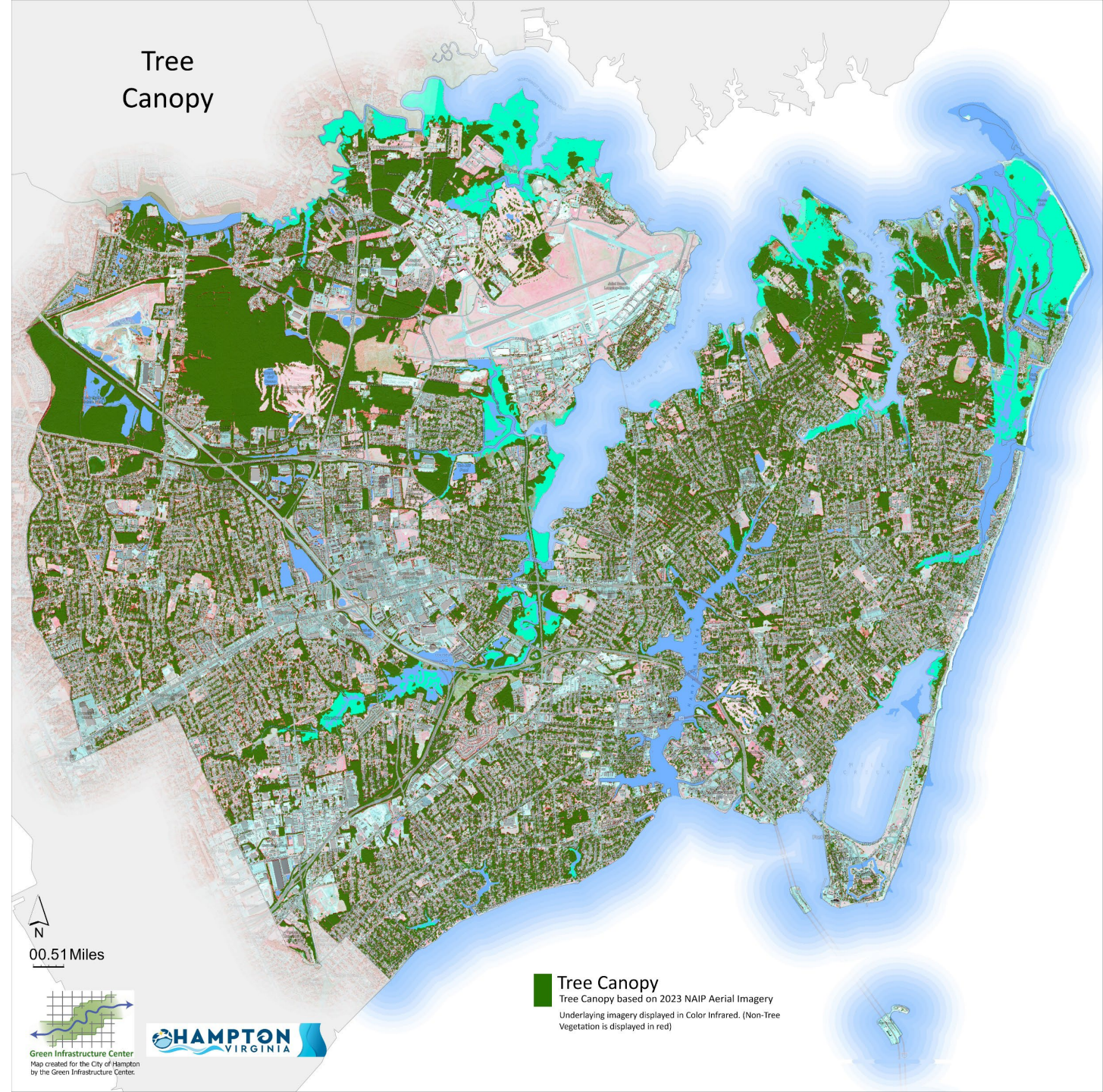
Potential Planting Area

1,905 Acres

Space for:
- **72,715** Small Trees
- **82,159** Large Trees

Potential Planting
Area: Trees

0   0.5   1 Miles

Potential Planting
Area for Trees

Green Infrastructure Center
Map created for the City of Hampton
by the Green Infrastructure Center.
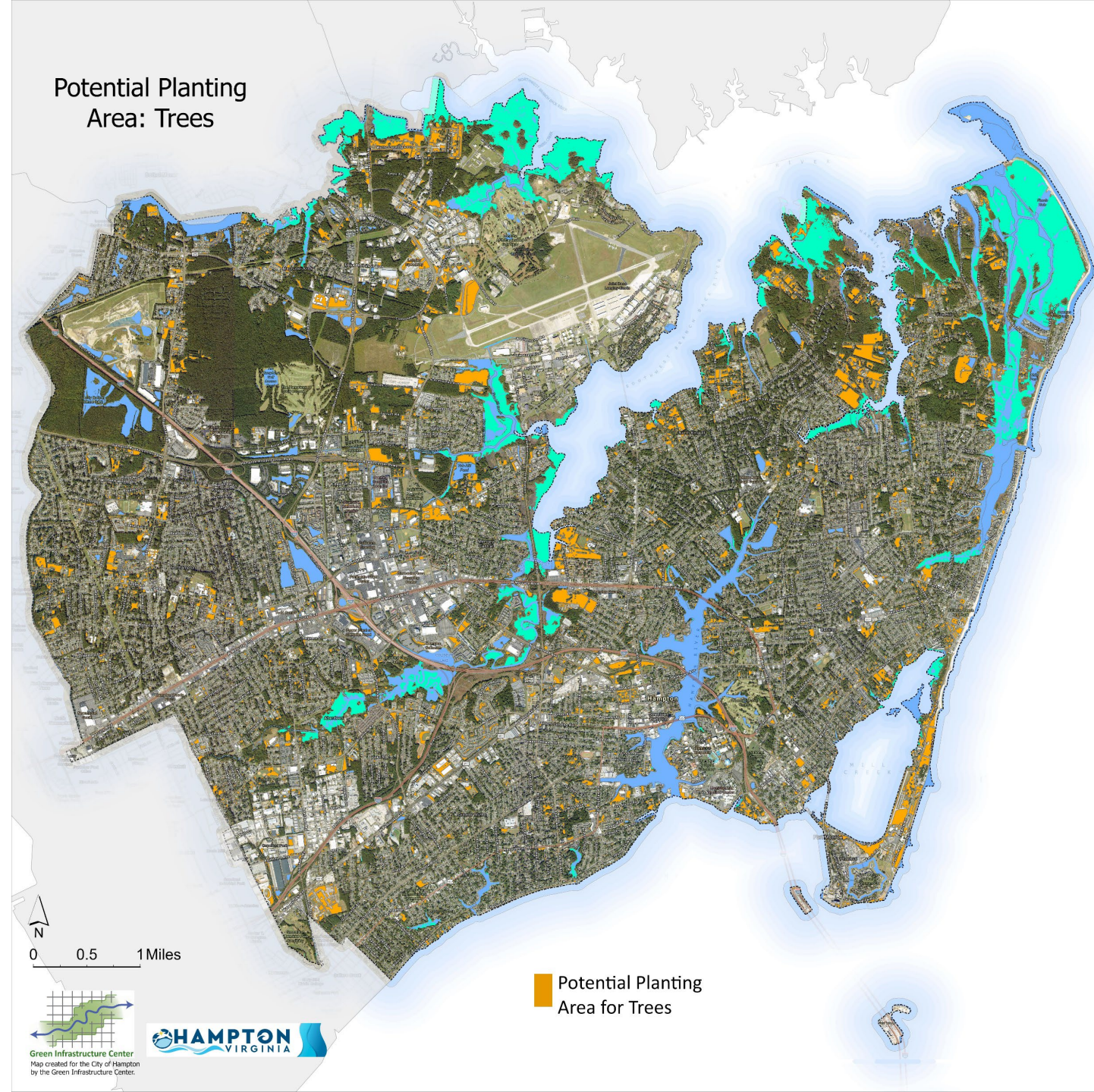
Surface Temperature & Urban Heat

Number of Days Above 100 F
in Hampton, Va*

Historical	Projected Temperatures	
1971 - 2000	2036 - 2065	2070 - 2099
9 days/year	40 days/year	71 days/year

Source: *Killer Heat in the United States: Climate Choices and the Future of Dangerously Hot Days*. Cambridge, MA: Union of Concerned Scientists.

https://www.ucsusa.org/resources/killer-heat-united-states-0

Surface Temperature
July 20, 2022

Surface Temperature in Degrees Fahrenheit
Hotter: 97 F
Cooler: 69 F

Disadvantaged Census Tract (CJST)
Historically Redlined Community (HOLC)
Water
Wetland

0   0.5   1 Miles

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Map created for the City of Hampton by the Green Infrastructure Center.
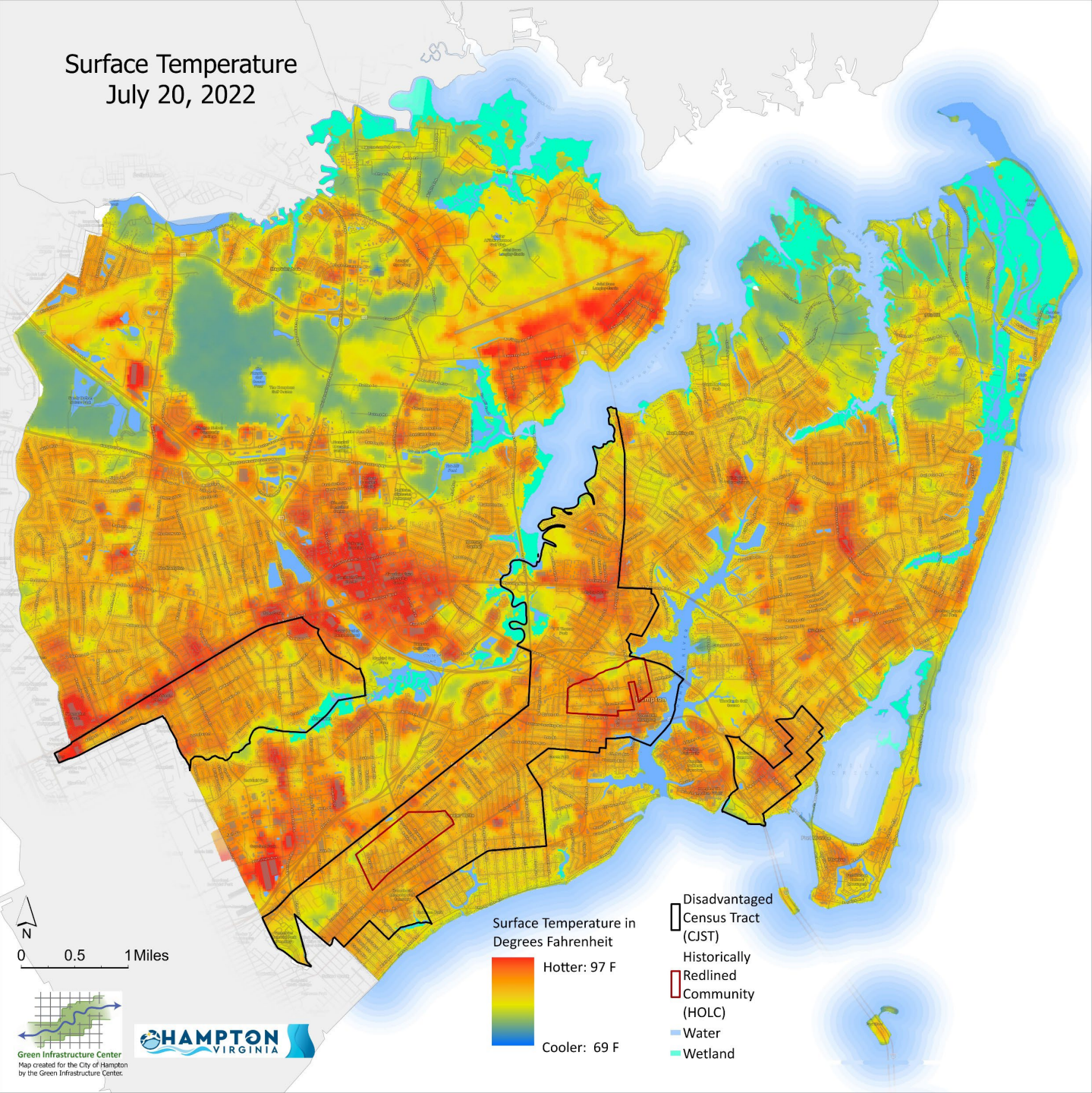
Tree Canopy & Equity

Tree canopy is not distributed equally throughout the city.

Existing Tree Canopy Coverage by Census Block Groups

Tree Canopy Percentage
- 50.1% - 100.0%
- 33.1% - 50.0%
- 25.1% - 33.0%
- 15.1% - 25.0%
- 0.0% - 15.0%
- Water
- Wetland
- Disadvantaged Census Tract (CEJST)
- Historically Redlined Community (HOLC)

N

0   0.5   1 Miles

Green Infrastructure Center
Map created for the City of Hampton by the Green Infrastructure Center.

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Prioritizing Planting by Urban Heat & Income

We can prioritize tree planting in disadvantaged neighborhoods to decrease vulnerability to urban heat.

Heat and Equity Priority Tree Planting Areas

Priority Tree Planting Areas Based on Surface Temperature and Median Household Income

Highest Priority

Lowest Priority

Tree Canopy
Water
Wetland

0   0.5   1 Miles

N

Planning for Impacts from Sea Level Rise

Water

Wetland

Marsh Migration

Land where marsh can migrate (SLR1.5)

Low Lying areas disconnected from water but lower than coast.

Coastal Habitats/Wetlands

Exposed coastal habitats

Sheltered coastal habitats

From NHD Wetlands

Pervious_Behind Structure

Pervious_Behind Soft Shoreline

Marsh Migration

Existing low marsh habitat may be lost to rising waters.
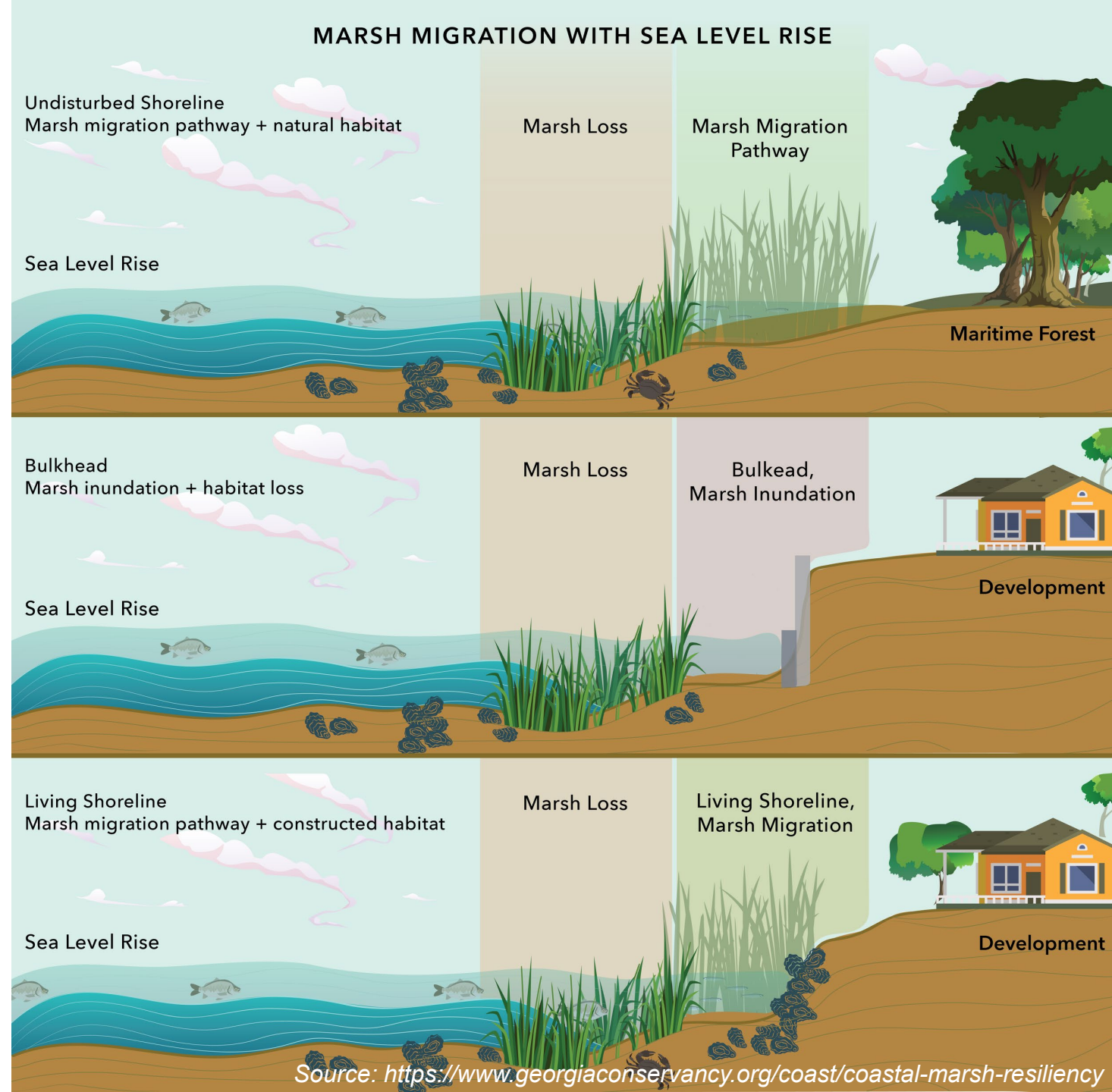
Softened shorelines allow marshes to migrate inland as water levels rise.

MARSH MIGRATION WITH SEA LEVEL RISE

Undisturbed Shoreline
Marsh migration pathway + natural habitat

Marsh Loss

Marsh Migration Pathway

Sea Level Rise

Maritime Forest

Bulkhead
Marsh inundation + habitat loss

Marsh Loss

Bulkead, Marsh Inundation

Sea Level Rise

Development

Living Shoreline
Marsh migration pathway + constructed habitat

Marsh Loss

Living Shoreline, Marsh Migration

Sea Level Rise

Development

Source: https://www.georgiaconservancy.org/coast/coastal-marsh-resiliency

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Take-Aways from Data Analysis

1. Planning for natural infrastructure can be integrated into the work that we are already doing.

2. Hampton's tree canopy supports our local water quality, decreases urban heat, and mitigates stormwater impacts.

3. On average, disadvantaged communities have less tree canopy than the city as a whole.

4. Hampton has the opportunity to increase its tree canopy percentage.

Draft **Implementation** Strategies

Three Visions for Natural Infrastructure

LAND

Hampton's natural and constructed green infrastructure benefits the community through integrated flood mitigation, thriving habitats, and climate resilience.

WATER

Hampton has restored shoreline habitats, wetlands, and riparian buffers that improve water quality, buffer from storm surge, and adapt to sea level rise.

PEOPLE

Hampton's citizens are informed, engaged, and empowered to create a healthy, vibrant, and resilient city.

Land **Goal** 1: Utilize an urban forestry program to manage the city's trees to provide habitat, stormwater infiltration, urban cooling, and recreation.

Strategy 1.1	Hire an urban forester to oversee all tree care, maintenance, and planting on city properties as well as provide outreach and education to the public
Strategy 1.2	Participate in the Tree City USA program
Strategy 1.3	Achieve a tree canopy goal of 33% over 20 years
Strategy 1.4	Target tree plantings to increase tree canopy in vulnerable communities
Strategy 1.5	Promote large tree conservation through a heritage tree program developed with community partners
Strategy 1.6	Promote incentives for tree planting by citizens and businesses

Establishing an Urban Forestry Program

- Purpose – To plant, care, maintain, and preserve urban trees in a proactive manner

- Located within Public Works or Parks, Recreation, & Leisure Services
  - **Norfolk, Va Beach, Chesapeake – Parks & Recreation**
  - **Williamsburg, Newport News – Public Works**

Establishing an Urban Forestry Program - Cost

- Opportunity to be grant funded for several years – Virginia Department of Forestry (DOF) Urban & Community Forestry Grant Program

- Estimated impact on City budget

Salary	$75,000
Benefits	$45,000
Equipment*	$60,000
Programmatic Funding**	$100,000
Total	**$280,000**

*Variable depending on in-house or contractor crew
**Could be used to leverage grant funding

Increasing Tree Canopy **(Mid-Term)**

Canopy Goal	Timeframe in Years	% Trees Planted by City	Annual Trees Planted	Total Trees Planted[1]	Annual Cost[2]	**Cost Over 10 Years**
32%	10	20%	100	1000	$28,000	**$280,000**
33%	10	20%	358	3581	$100,275	**$1,002,745**
34%	10	20%	616	6162	$172,549	**$1,725,491**

[1] Based on 500 public and private tree removals per year
[2] Based on $280/tree planted for installation and maintenance

Increasing Tree Canopy (Long-Term)

Canopy Goal	Timeframe in Years	% Trees Planted by City	Annual Trees Planted	Total Trees Planted[1]	Annual Cost[2]	**Cost Over 20 Years**
32%	20	20%	100	2000	$28,000	**$560,000**
33%	20	20%	229	5990	$64,137	**$1,282,745**
34%	20	20%	499	9981	$100,275	**$2,005,491**

[1] *Based on 500 public and private tree removals per year*
[2] *Based on $280/tree planted for installation and maintenance*

Benefits of Increasing Tree Canopy

A tree canopy percentage of 33% =

+ 2892 lbs/year of **Nitrogen**

+ 236 lbs/year of **Phosphorus**

+ 168 tons/year of **sediment**

+ 1.8 million gallons of **stormwater runoff** for every 1yr/24-hour rainfall event (which equals 2.94 inches)

Land Goal 2: Increase and maintain natural green infrastructure to build resilience and support native habitats.

Strategy 2.1	Protect high quality habitats and connect them with green corridors
Strategy 2.2	Incentivize property owners to use conservation landscaping best practices, including the use of native plants
Strategy 2.3	Create areas of native habitat at parks and schools to reduce mowing, decrease application of herbicides, and increase stormwater infiltration.
Strategy 2.4	Revise the City Code, Zoning Ordinance, Landscape Guidelines, and Design Standards to support natural infrastructure.
Strategy 2.5	Protect the habitats of rare, threatened, and endangered species to improve the City's Community Rating Scale ranking.

Strategy 2.5: Revise the City Code, Zoning Ordinance, Landscape Guidelines, and Design Standards to support natural infrastructure.

Examples

- Adopt a Tree Protection Ordinance

- Update Landscape Guidelines
    - **Promote native species**
    - **Tree planting standards**

- Update Public Works Design Standards
    - **Complete Green Streets Policy**

- Update City Code
    - **Stormwater Fee Credit for tree planting**

Strategy 2.5: Revise the City Code, Zoning Ordinance, Landscape Guidelines, and Design Standards to support natural infrastructure.

Examples

- Update Zoning Ordinance
  - **Limit impervious surface**
  - **Reduce parking minimums**
  - **Modify green area requirements**
  - **Density bonuses for tree preservation or increased setback from environmentally sensitive landscape**
  - **Transfer of Development Rights (TDR) for land conservation**

Land Goal 3: Install and maintain constructed green infrastructure to slow and store stormwater where natural infrastructure practices are less suitable.

Strategy 3.1	Use city owned property as pilot and demonstration sites for natural and constructed green infrastructure
Strategy 3.2	Retrofit publicly owned property to slow and store water and buffer and adapt to rising tides through constructed green infrastructure
Strategy 3.3	Encourage the use of constructed green infrastructure by developers to slow and store stormwater
Strategy 3.4	Partner with local organizations to establish a volunteer stewardship program to assist with maintenance of green infrastructure
Strategy 3.5	Increase city staff and city contractors' understanding of how to maintain constructed green infrastructure

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Water Goal 1: Protect and restore natural shorelines and wetland habitat to ensure the longevity of ecosystem services as tides rise and climate changes.

Strategy 4.1	Expand programs to engage private property owners in adapting to inundation from sea level rise and shoreline erosion
Strategy 4.2	Install living shorelines on public property as demonstration projects, prioritizing locations that support wetlands migration
Strategy 4.3	Restore vegetated riparian buffers to enhance water quality, prevent erosion, and support wetlands migration
Strategy 4.4	Support wetlands at risk from sea level rise by piloting nature-based solutions

Water Goal 2: Enhance water quality and provide flood mitigation through natural infrastructure.

Strategy 5.1	Daylight streams and creeks to provide habitat and store water
Strategy 5.2	Plant buffers along streams, creeks, and ditched to filter and slow stormwater
Strategy 5.3	Acquire or protect flood-prone and environmentally sensitive properties to increase the landscape's natural water storage capacity and restore natural floodplain function
Strategy 5.4	Establish a pilot program to implement conservation landscaping practices and resilient design strategies on acquired flood-prone properties to maximize community benefits
Strategy 5.5	Target tree protection and planting efforts in areas with the highest impact on stormwater retention

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People Goal 2: Expand community awareness and understanding of resilience projects through effective marketing and outreach.

Strategy 6.1	Utilize the Resilient Hampton Engagement and Outreach Plan to promote the benefits of natural infrastructure, while maximizing overlapping messaging to support the City's Community Rating Score
Strategy 6.2	Create an online dashboard to map resilience and sustainability projects across the city
Strategy 6.3	Curate interpretive and educational signage at all public-facing resilience project sites to educate the public about the function and benefit of resilience projects

People Goal 3: Support healthy communities through equitable access to green spaces and natural assets.

Strategy 7.1	Utilize natural infrastructure, such as community gardens and food forests, to address food insecurities and food deserts
Strategy 7.2	Target street greening to soak up stormwater, improve aesthetic values, increase safety, and provide more opportunities for alternative transportation
Strategy 7.3	Identify opportunities to increase or enhance equitable access to natural assets, with a focus on disadvantaged communities

Key Take-Aways

1. Planning for natural infrastructure can be integrated into the resilience work that we are already doing.

2. Implementation requires partners and community participation, but the City has the opportunity to lead the way

3. The multiple benefits provided by natural infrastructure makes Hampton an attractive places to live, learn, work, play

Thank You!

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SCAN TO SIGN UP FOR OUR
NEWSLETTER