

Prioritizing natural and nature-based features (NNBFs) that increase the resilience of coastal communities to flooding

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OFFICE FOR COASTAL MANAGEMENT
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

NNBFs that enhance coastal flooding resilience

Goals

With a NOAA Coastal Resilience Grant, our goals:

1. Support the preservation and creation of natural and nature-based features (NNBFs) as a component of coastal community resilience
2. Incorporate water quality and flood insurance services into the assessment for existing features
3. Support localities' decision-making by:
 - Identifying NNBFs that provide multiple benefits
 - Identifying target areas for new NNBF creation/restoration



NNBFs that enhance coastal flooding resilience

Goals

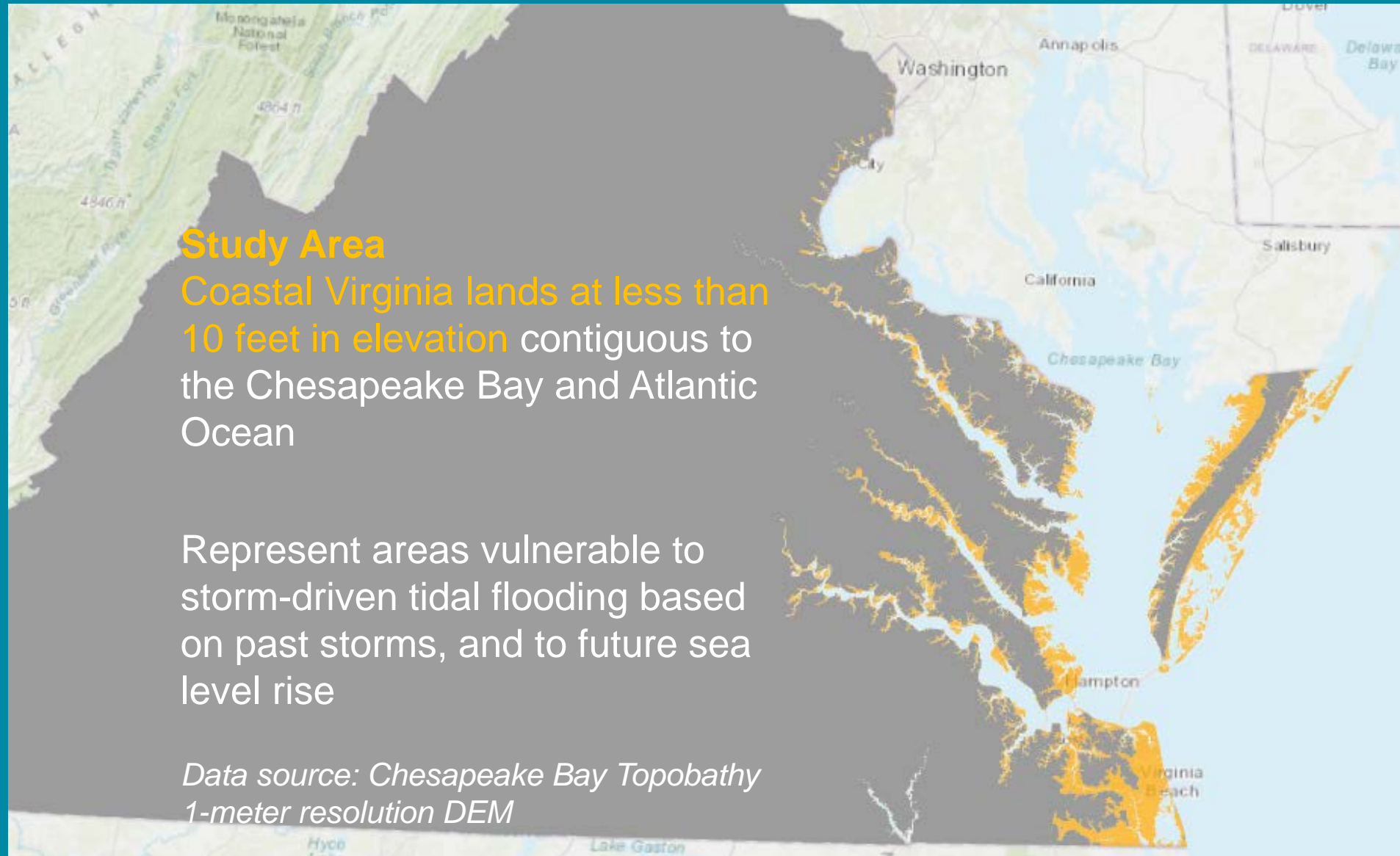
Three primary steps:

1. Map existing natural and nature-based features (NNBFs) and buildings at less than 10 feet elevation in the coastal zone
2. Identify and rank existing NNBFs that provide multiple benefits for communities
3. Identify target areas for new NNBFs to improve flood resilience



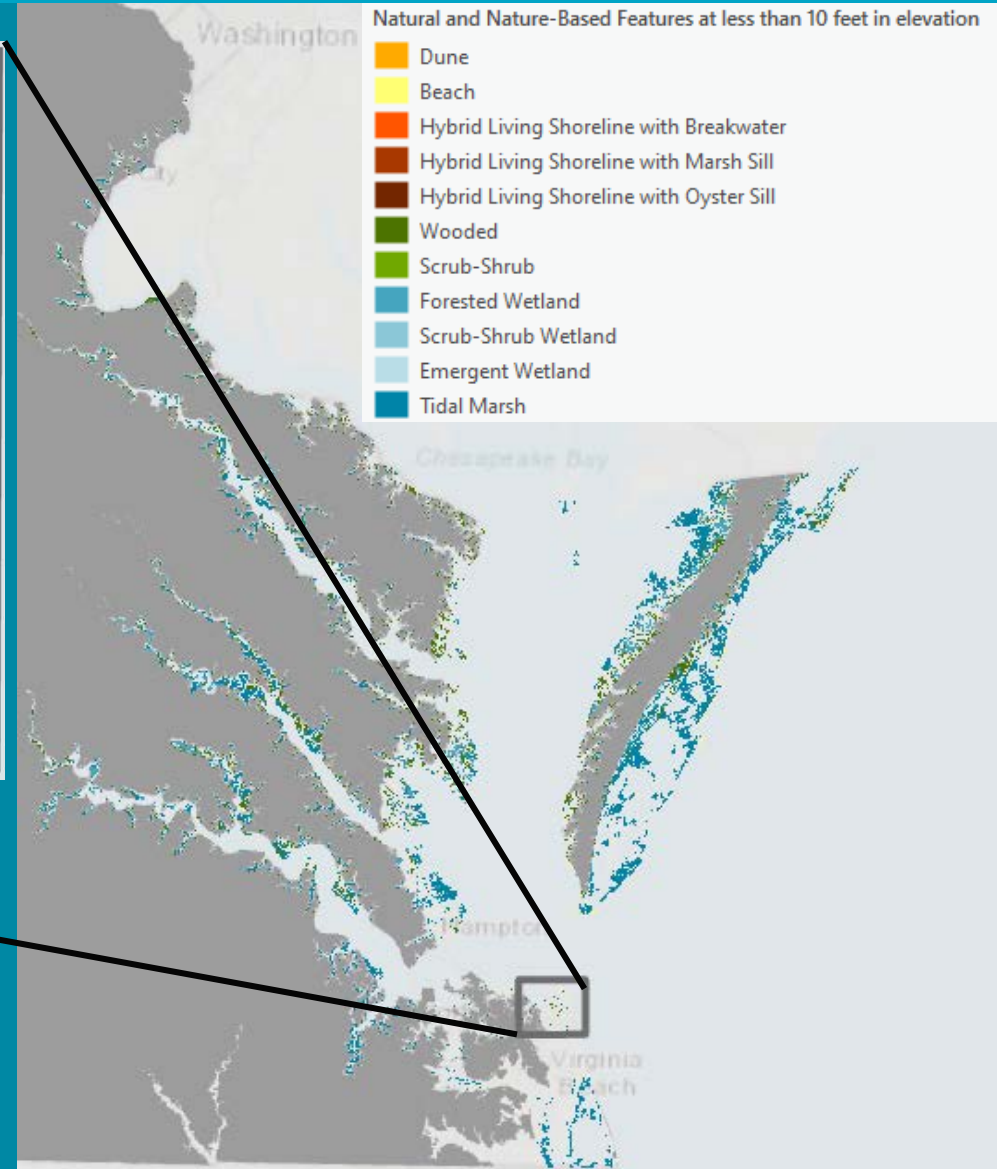
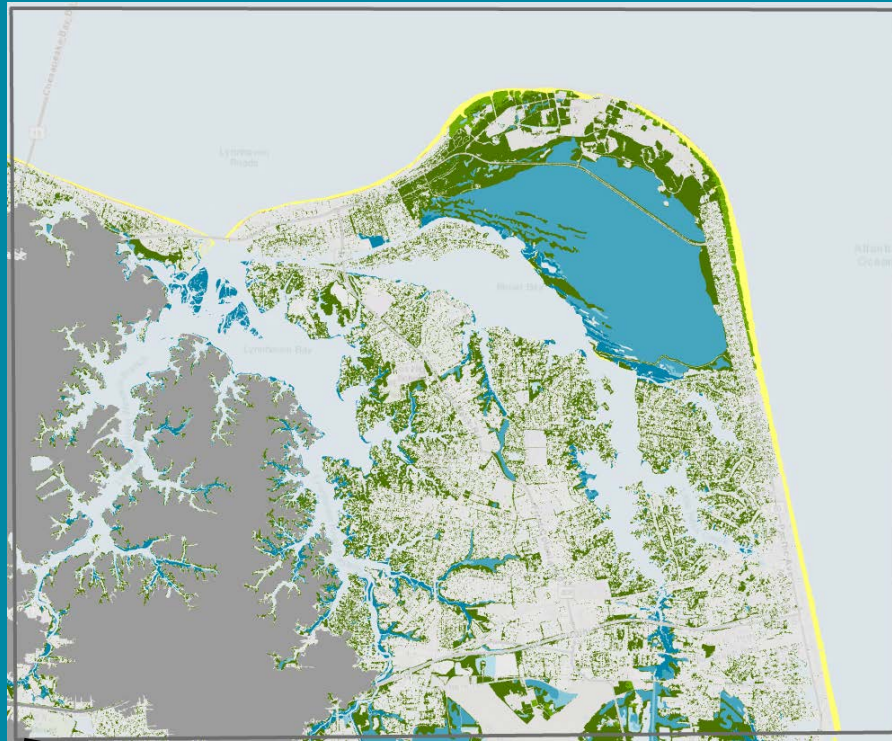
NNBFs that enhance coastal flooding resilience

Map Existing NNBFs and buildings



NNBFs that enhance coastal flooding resilience

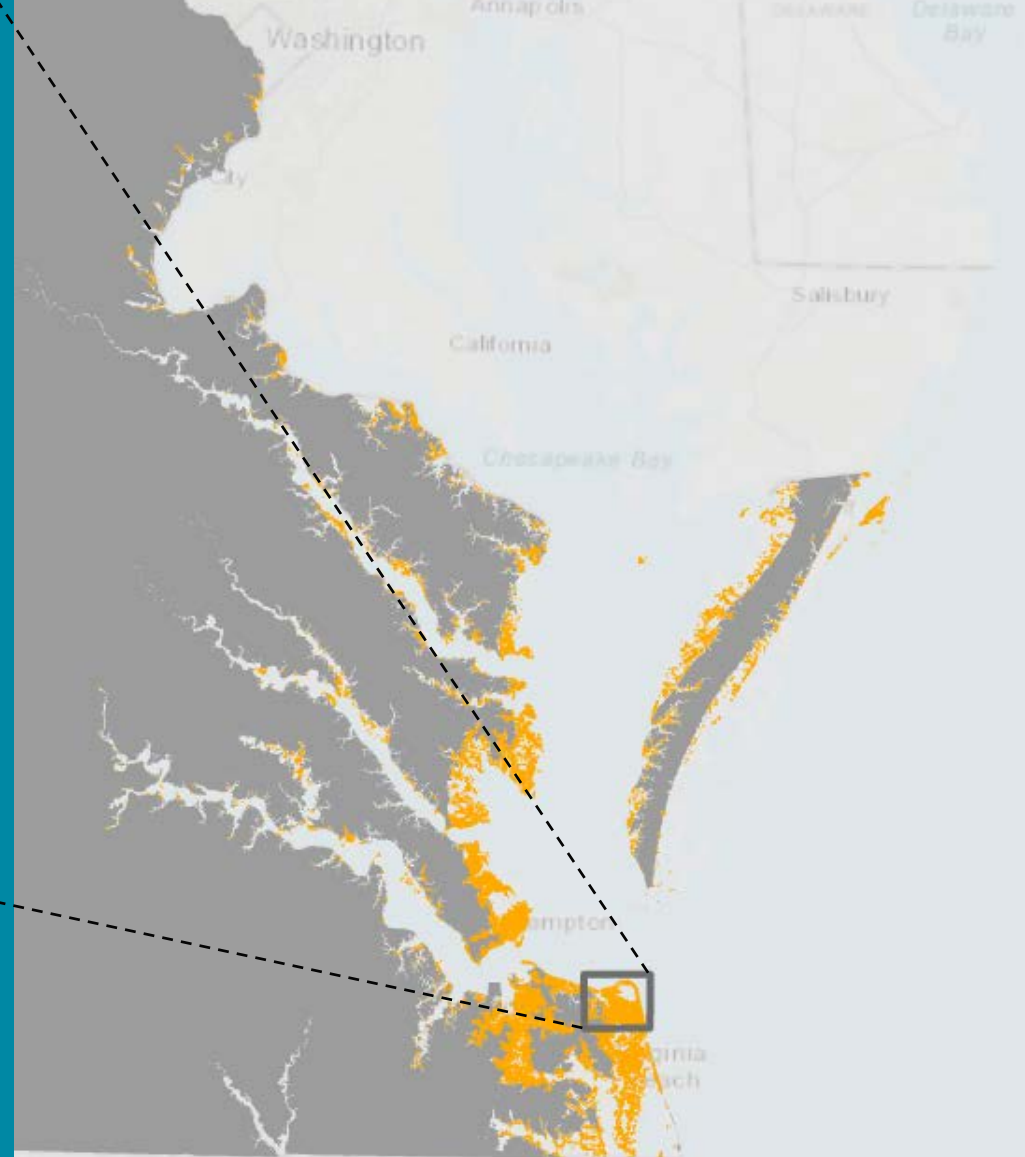
Map Existing NNBFs and buildings



~ 350,000 NNBFs within study area

NNBFs that enhance coastal flooding resilience

Map Existing NNBFs and buildings



**~170,000 primary buildings at
less than 10 feet elevation**

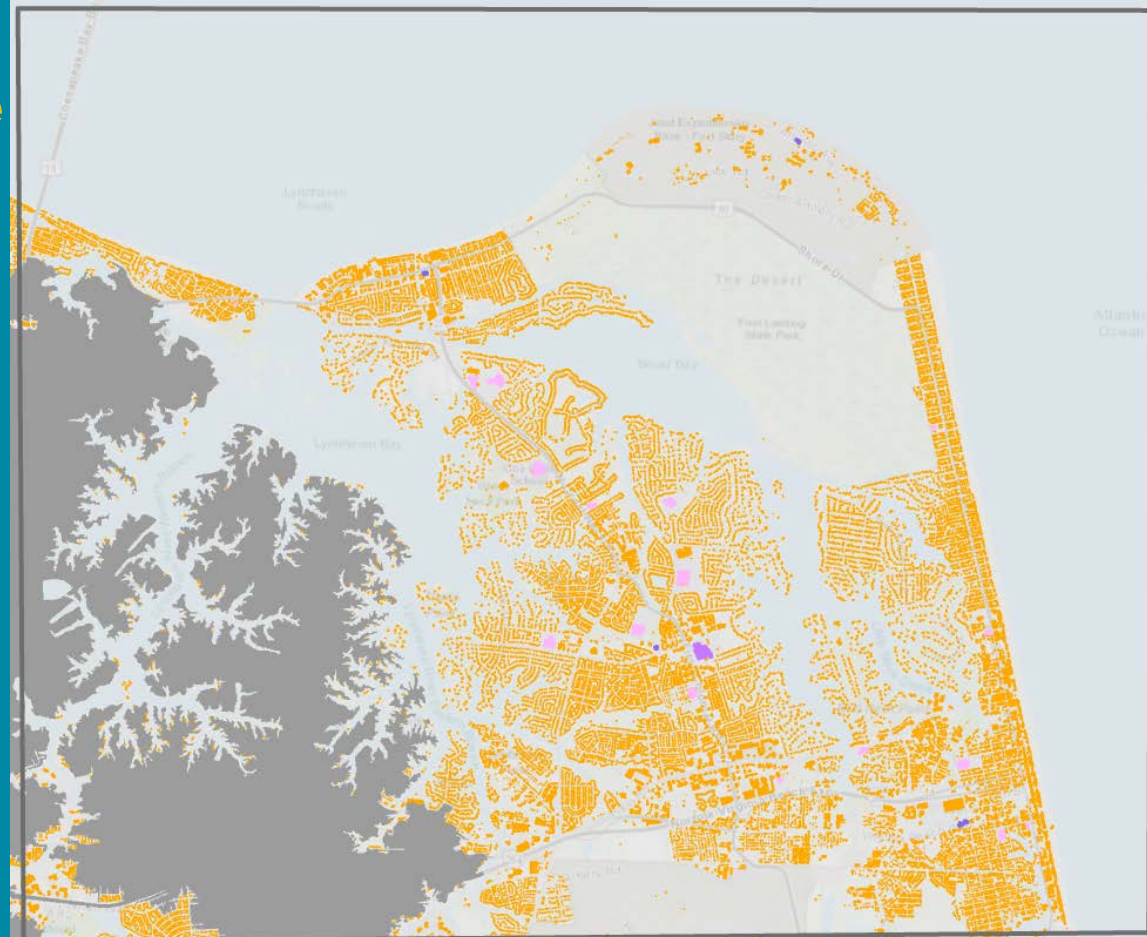
NNBFs that enhance coastal flooding resilience

Map Existing NNBFs and buildings

Identified building footprints that are *critical community facilities*

Critical Community Facilities

- Education
- Emergency Response and Law Enforcement
- Health and Medical



NNBFs that enhance coastal flooding resilience

Identify NNBFs that provide multiple benefits

NNBF Ranking

Four components:

1. NNBF flooding mitigation services
2. How many buildings does the NNBF benefit?
3. Are there any critical community facilities the NNBF benefits?
4. Can the NNBF be used to take advantage of existing programmatic incentives?

Overall NNBF Score for Priority Ranking: <i>Add score for each category</i>			
	low	medium	high
1. NNBF Total Capacity <i>Flooding mitigation potential based on elevation and feature type.</i>	0-0.0008 (1-33 percentile)	0.008-0.4 (33-66 percentile)	>0.4 (66-100 percentile)
2. Number of buildings impacted <i>Number of buildings that the NNBF benefits.</i>	0	1 building	>= 2 buildings
3. Critical Facility Benefit <i>Does the NNBF benefit a community critical facility?</i>	no		yes
4. Co-Benefits Potential <i>Potential for NNBF to be used in incentive programs.</i>	0	1 <u>cobenefit</u>	>=2 <u>cobenefits</u>
Score	1	2	3

NNBFs that enhance coastal flooding resilience

Identify NNBFs that provide multiple benefits



How do we link NNBFs with buildings that they benefit?

Inundation Pathways (IPs)

...depict lowest elevation areas connecting the shoreline to buildings.

IPs represent where rising waters begin to flood onto the land, but *do not represent flooding extent*.

IPs depicted as multicolored lines. Building footprints are outlined in black.

NNBFs that enhance coastal flooding resilience

Identify NNBFs that provide multiple benefits

NNBF flooding mitigation services

Capacity * Opportunity =
Total Capacity Score

Ranking of the potential for each NNBF to
act on and mitigate tidal flooding

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Living shoreline project (marsh with breakwaters in Gloucester County. Photo: K. Duhring, CCRM)

NNBFs that enhance coastal flooding resilience

Identify NNBFs that provide multiple benefits

NNBF Ranking

Four components:

1. NNBF flooding mitigation services
- 2. How many buildings does the NNBF benefit?**
- 3. Are there any critical community facilities the NNBF benefits?**
4. Can the NNBF be used to take advantage of existing programmatic incentives?



Living shoreline project (marsh with breakwaters) in Gloucester County. Photo: K. Duhring, CCRM

NNBFs that enhance coastal flooding resilience

Identify NNBFs that provide multiple benefits

Four components:

1. NNBF flooding mitigation services
2. How many buildings does the NNBF benefit?
3. Are there any critical critical facilities the NNBF benefits?
4. Can the NNBF be used to take advantage of existing programmatic incentives?



Each NNBF is given a score for the benefit provided to buildings and critical facilities

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NNBFs that enhance coastal flooding resilience

Identify NNBFs that provide multiple benefits



Our assumption:

Using these IPs, we can find NNBFs that lie between the shoreline and building and in the path of rising water

For each NNBF, count the number of building IPs that intersect

→ *This NNBF (tidal marsh) benefits 4 buildings*

For each building, count how many NNBFs intersect its' IP

→ *This building receives benefits from 2 NNBFs (a tidal marsh and a wooded area)*

NNBF Types (on this map):

-  Tidal Marsh
-  Wooded

NNBFs that enhance coastal flooding resilience

Identify NNBFs that provide multiple benefits

NNBF Ranking

Four components:

1. NNBF flooding mitigation services
2. How many buildings does the NNBF benefit?
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4. **Can the NNBF be used to take advantage of existing programmatic incentives?**



Living shoreline project (marsh with breakwaters) in Gloucester County. Photo: K. Duhring, CCRM

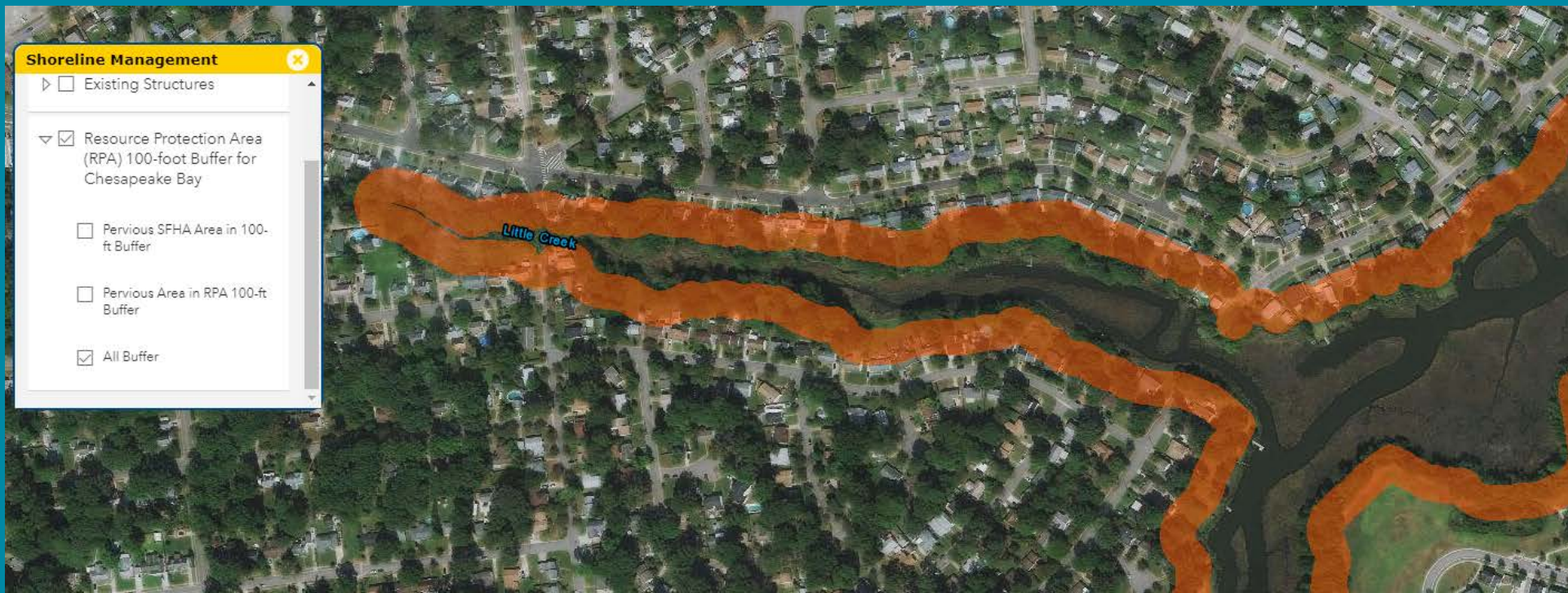
NNBFs that enhance coastal flooding resilience

Identify NNBFs that provide multiple benefits

Chesapeake Bay Resource Protection Area (RPA) 100-ft Buffer

Processing and data sources:

- Individual localities GIS, where available: processed to isolate the 100-ft upland buffer
- Other localities: created a buffer upland of wetlands (NWI, TMI) and streams (NHD), connected to the Chesapeake Bay



NNBFs that enhance coastal flooding resilience

Identify NNBFs that provide multiple benefits

Factor #4: Identify NNBFs that may be used to take advantage of incentives

1. FEMA Community Rating System (CRS) credits. Potentially qualifying NNBFs are in 100-year flood zone and overlay the Resource Protection Area (RPA) or RPA 100-ft buffer
2. Water quality/TMDL credit potential – N, P, TSS reductions. All NNBFs except for beaches and dunes



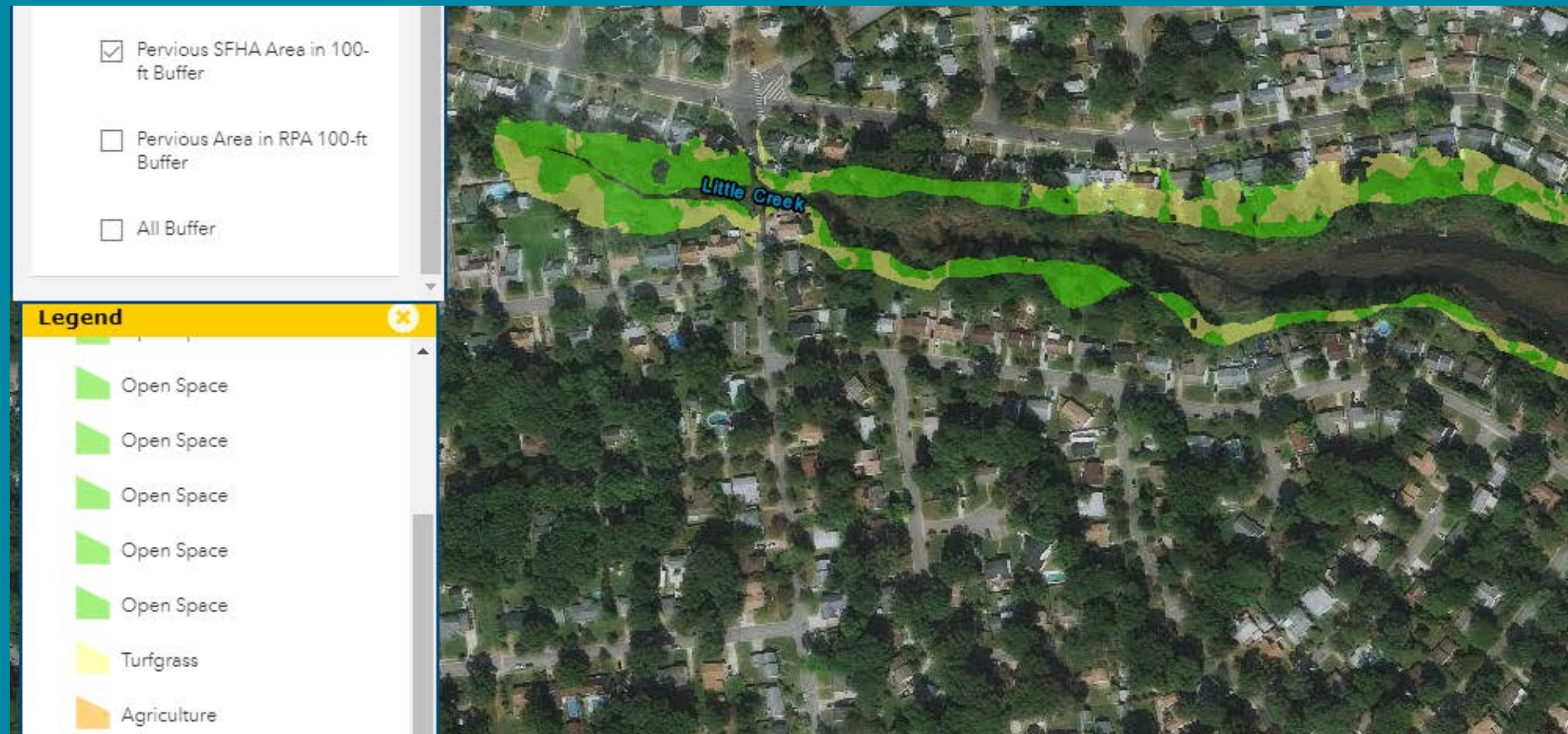
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Identify NNBFs that provide multiple benefits

Chesapeake Bay Resource Protection Area (RPA) 100-ft Buffer

Pervious SFHA Area within the 100-ft RPA Buffer



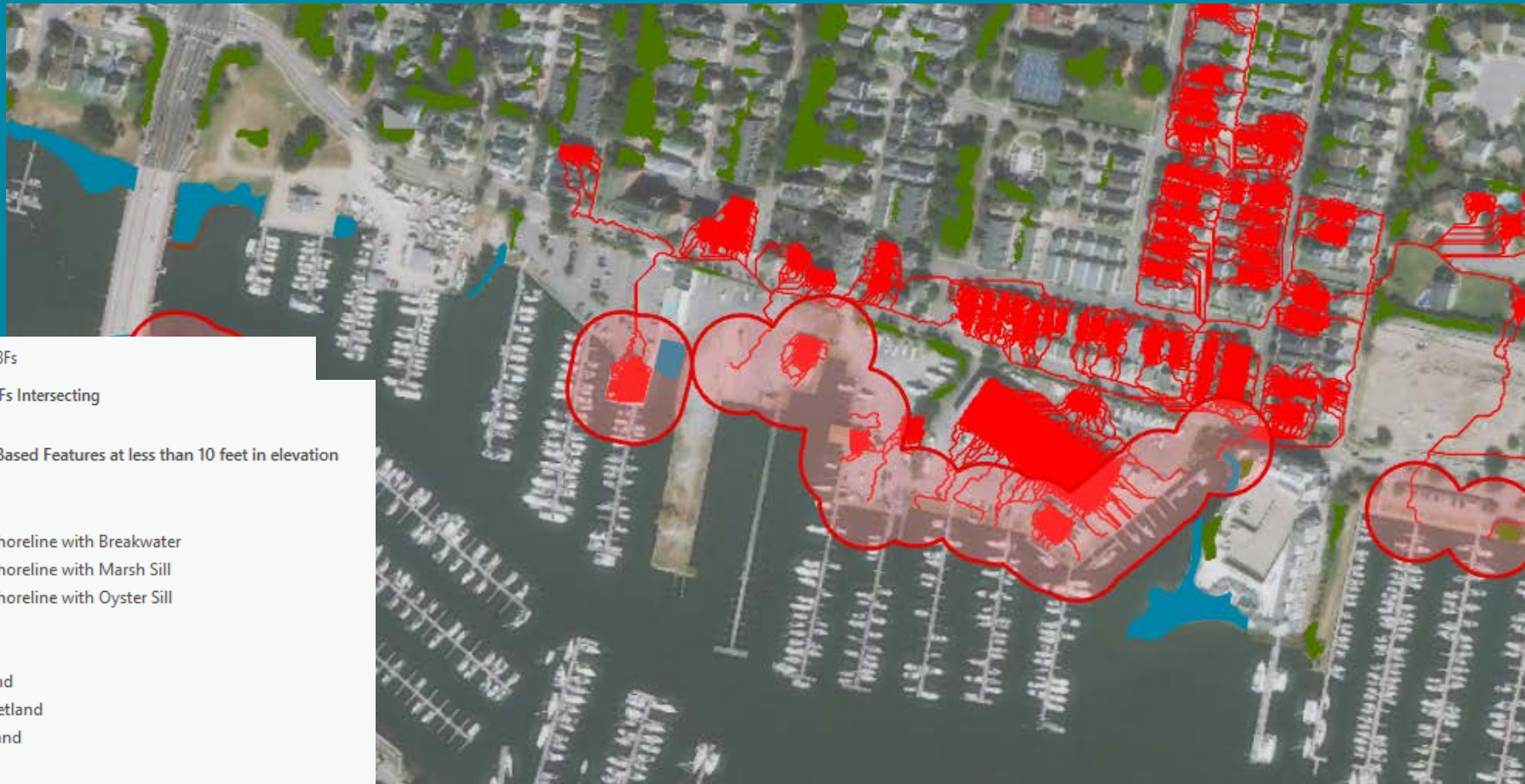
Opportunities to improve coastal resilience

Identify target areas for new NNBFs

Red IPs = 0 NNBF Intersect

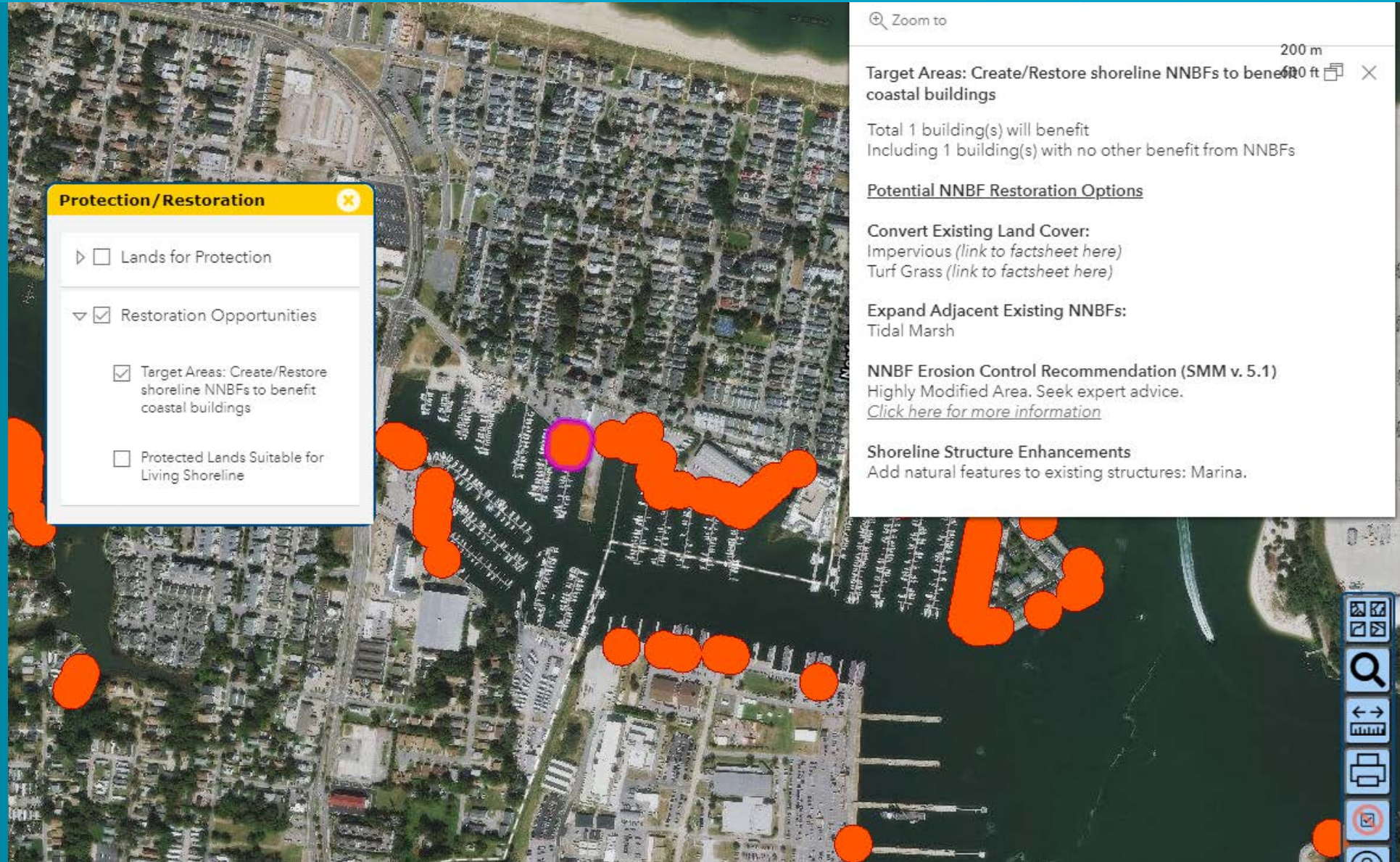
Areas along the red IPs are potential locations for NNBF creation/restoration.

We focused on shoreline locations



Opportunities to improve coastal resilience

Identify target areas for new NNBFs

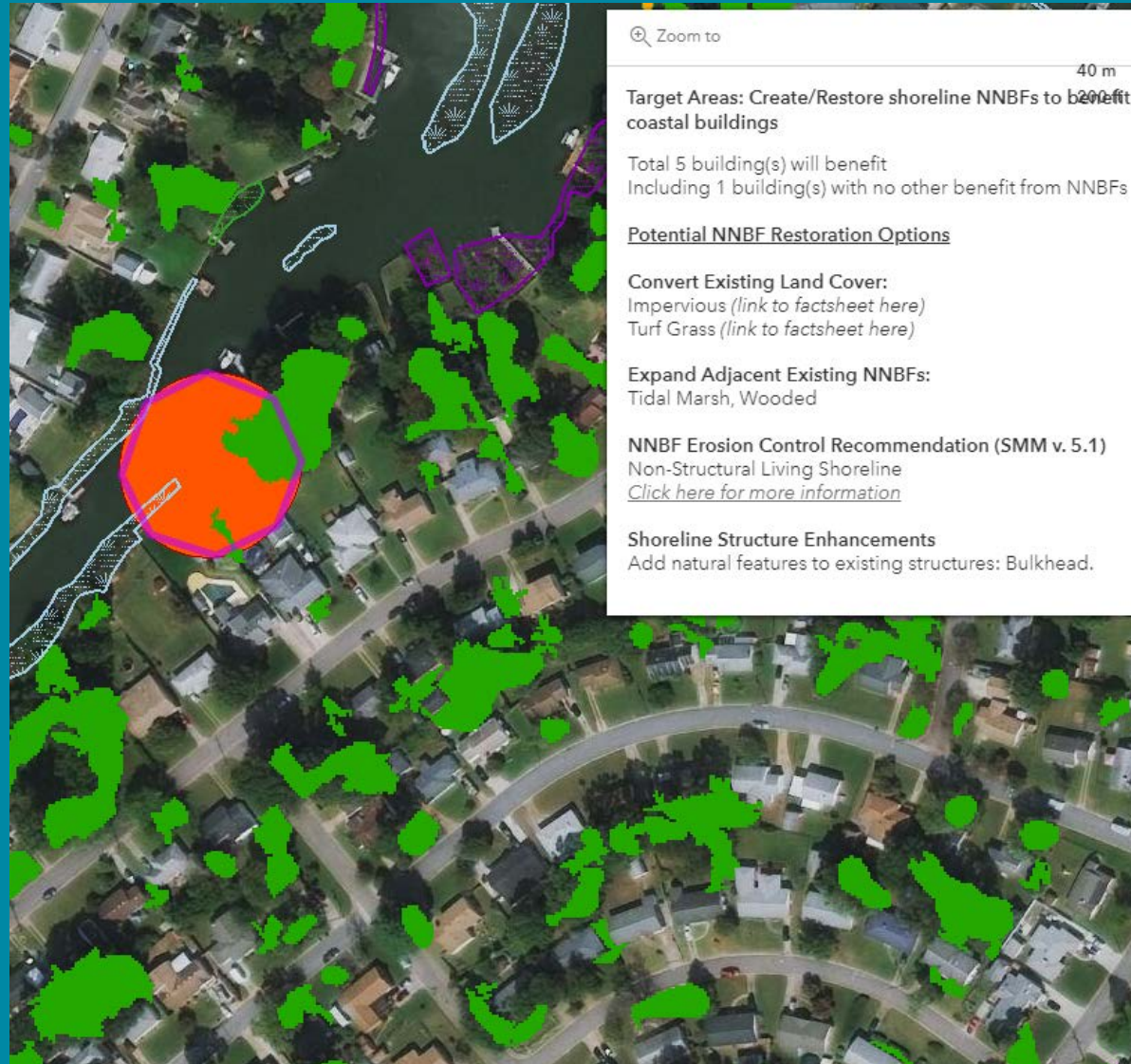


Opportunities to improve coastal resilience

Identify target areas for new NNBFs

Why target areas along the shoreline?

- First line of defense
- Offers programmatic incentives – in RPA
- Other tools available that can help inform NNBF creation (e.g., CCRM Shoreline Management Model)



NNBFs that enhance coastal flooding resilience

Next steps...

- Work with localities to refine and communicate

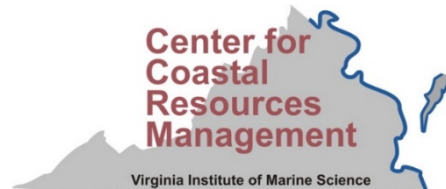
Potential next steps:

- Add sea level rise projections
- Add co-benefits, e.g. RTE species habitats, habitat corridors...
- Incorporate offshore NNBFs: spits, SAV...
- Broaden target areas for NNBF creation to the upland



Thank you!

Questions?
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