

Coastal Wetlands Resilience: Co-benefits in restoration, protection and targeting

Resilient Coastal Wetlands and Communities Workshop
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Wetland Resilience

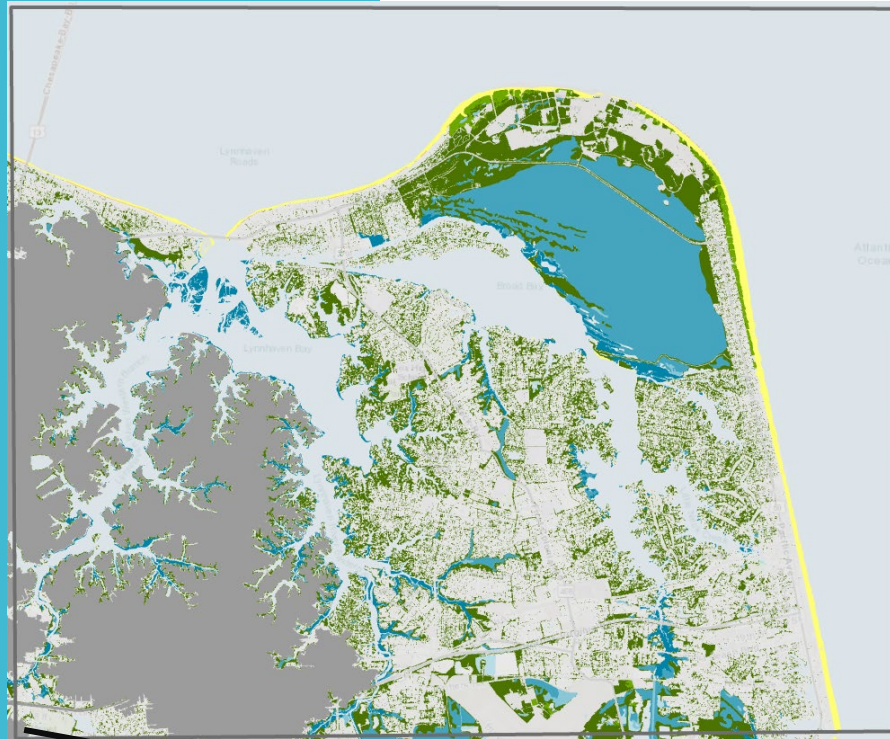
Engage Multiple Approaches:

- Legal
 - Quasi-legal Chesapeake Bay Program
Total Maximum Daily Load
- Protection/ Preservation
- Planning
- Projects at all scales
 - Restoration, creation, rehabilitation
- Incentives
- Technical Assistance
 - Decision-support Tools

Wetland Protection, Preservation and Restoration/ Creation Decision Support Tools

- Rank existing coastal wetlands in Virginia for Co-benefits
→
 - Protect and Preserve existing wetlands
- Identify targets for wetland restoration/ creation
 - New wetlands for Co-benefits possible
- Identify targets for Living Shorelines
→
 - Promote Nature-based approaches to gain wetland area
- Rank living shorelines for co-benefits

Map Existing Natural and Nature-based Features and buildings in Coastal Virginia

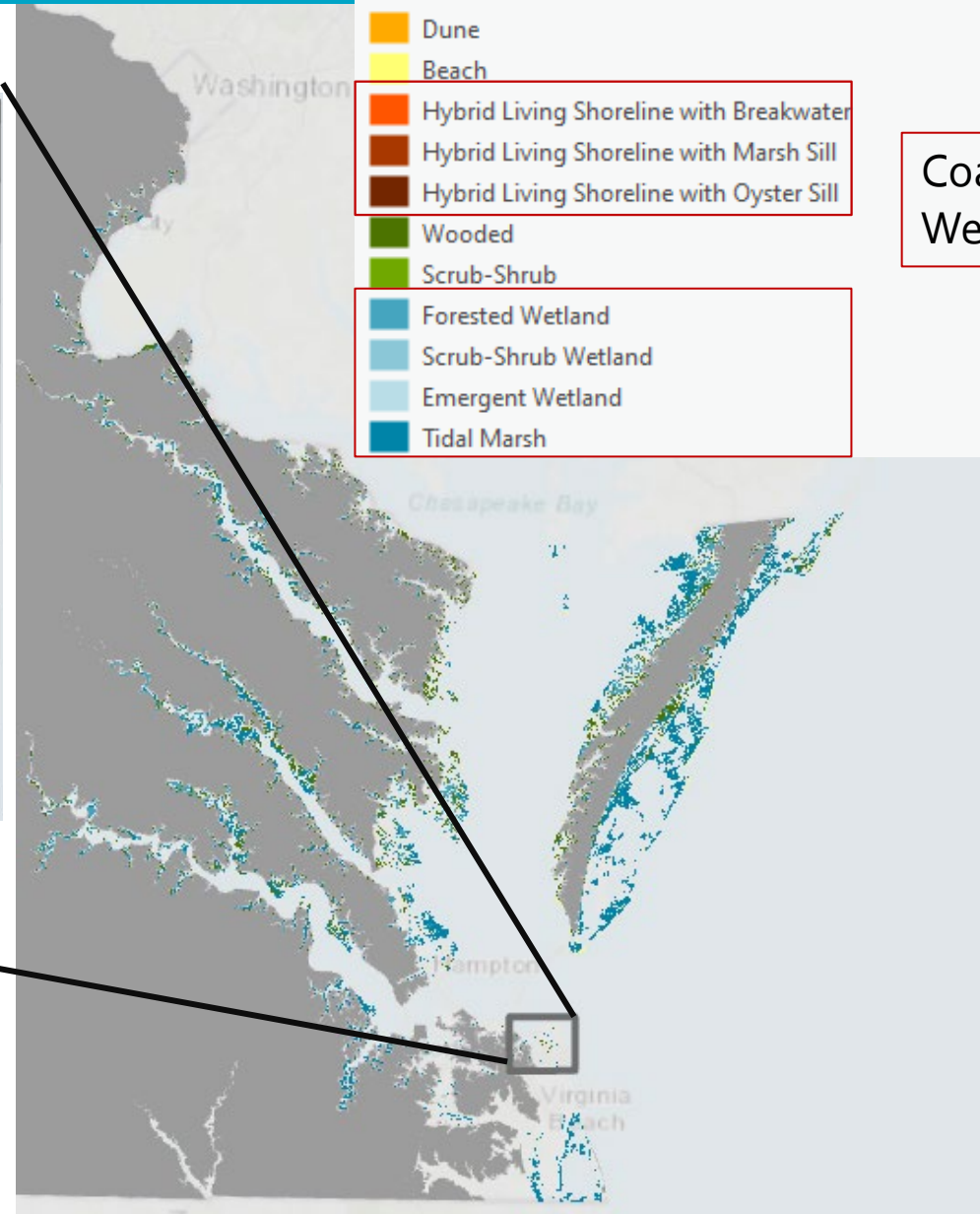


~ 350,000 NNBFs within study area

Natural and Nature-Based Features at less than 10 feet in elevation

- Dune
- Beach
- Hybrid Living Shoreline with Breakwater
- Hybrid Living Shoreline with Marsh Sill
- Hybrid Living Shoreline with Oyster Sill
- Wooded
- Scrub-Shrub
- Forested Wetland
- Scrub-Shrub Wetland
- Emergent Wetland
- Tidal Marsh

Coastal Wetlands



Identify NNBFs that provide multiple benefits



Building footprint

Inundation Pathway (IP)

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

NNBF flooding mitigation services

Capacity * Opportunity =
Total Capacity Score

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



Overall NNBF Score for Priority Ranking:
Add score for each category

	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

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

Co-Benefits: CRS and Water Quality

1. FEMA Community Rating System (CRS) credits. Potentially qualifying NNBFs are in 100-year flood zone Special Flood Hazard Area and overlay the Resource Protection Area (RPA) or RPA 100-ft buffer

- Undeveloped set-aside lands in the Special Flood Hazard Area (SFHA).
- Land must have some level of protection: Regulatory or Property ownership
- Resource Protection Area Buffer considered Regulatory Protection
- CRS Potential = all open space in SFHA and the Resource Protection Area 100 foot buffer

2. Water quality/TMDL credit potential – N, P, TSS reductions. All NNBFs except for beaches and dunes

- NNBFs provide water quality services to varying degree dependent on intrinsic factors and location
- Within the study area and proximal to the shore
- Assumed all NNBF features other than beach and dune provide service
- Existing Chesapeake Bay Program approved BMPs for tidal and nontidal wetlands and riparian buffers

Overall NNBF Score for Priority Ranking: <i>Add score for each category</i>			
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Protection/Restoration



☑ Lands for Protection

Coastal NNBFs Ranked: Benefits to Coastal Buildings ...

Conservation Lands/Easements ...

▶ Restoration Opportunities

Legend



Lands for Protection

Coastal NNBFs Ranked: Benefits to Coastal Buildings

NNBF Ranked

-  Most Benefits
-  Many Benefits
-  Some Benefits



🔍 Zoom to

Coastal NNBFs Ranked: Benefits to Coastal Buildings



Type of NNBF: Tidal Marsh

This Tidal Marsh feature provides the **Most Benefits** to buildings and communities, including:

- **High rank** for the natural capacity of NNBF to mitigate coastal flooding
- **High rank** for the number of buildings on land less than 10 feet in elevation that the NNBF benefits (*93 buildings*)
- **Low rank** for the number of critical community facilities on land less than 10 feet in elevation that the NNBF benefits (*0 critical community facilities*)
- **High rank** for the NNBF to be used for incentive programs (2 out of 2: The NNBF has water quality benefit of nitrogen, phosphorus, and/or sediment reduction, and all or a portion of the NNBF has potential to earn credit in the CRS Program.)

Protecting Existing Coastal Wetlands

Fort Monroe





Find address or place

Protection/Restoration

- Lands for Protection
 - Coastal NNBFs Ranked: Benefits to Coastal Buildings
 - Conservation Lands/Easements

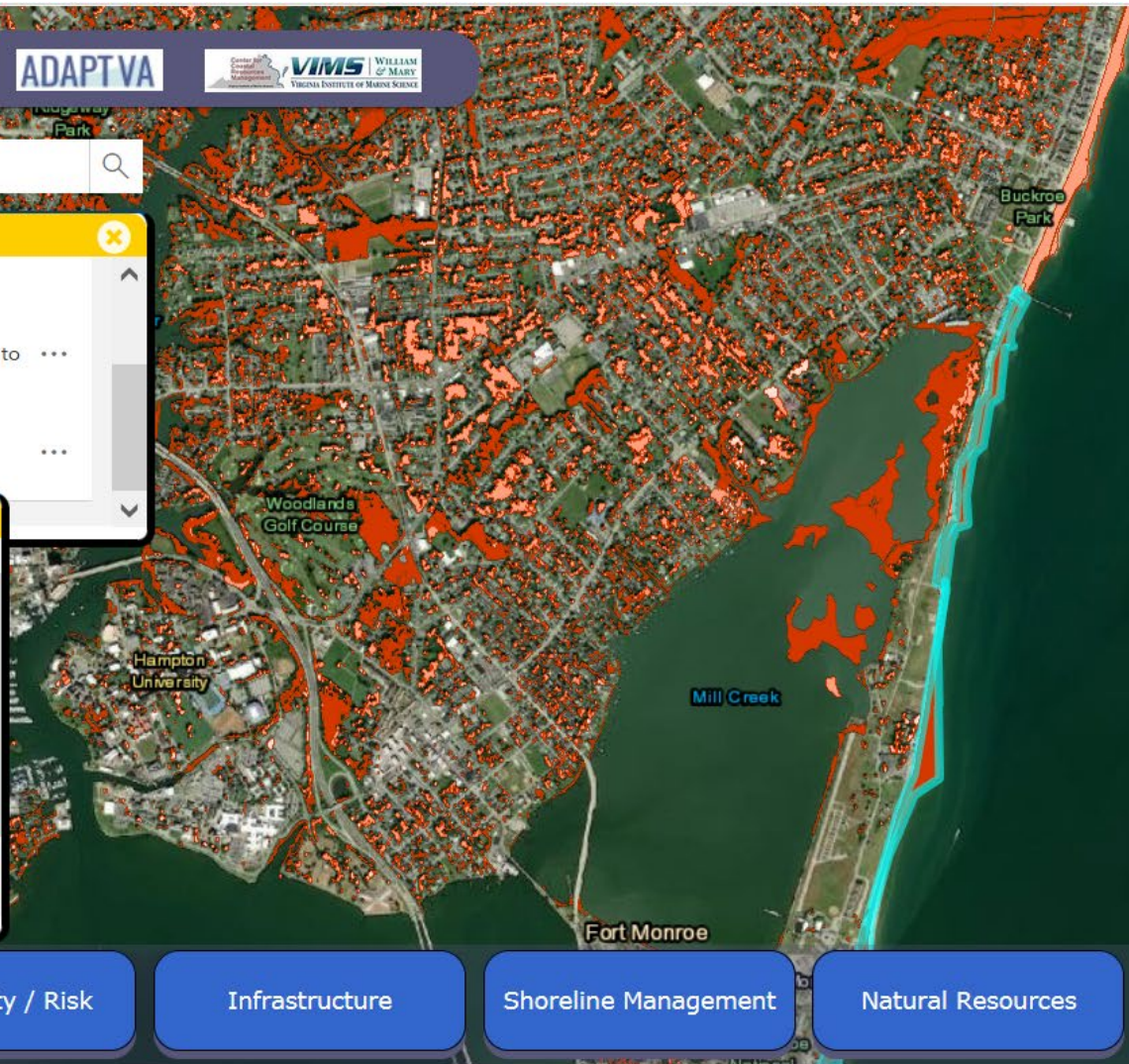
Legend

Lands for Protection

Coastal NNBFs Ranked: Benefits to Coastal Buildings

NNBF Ranked

- Most Benefits
- Many Benefits
- Some Benefits



Zoom to 1 of 4

Coastal NNBFs Ranked: Benefits to Coastal Buildings

Type of NNBF: Beach [Fact Sheet](#) (opens in a new tab)

This Beach feature provides **the Most Benefits** to buildings and communities, including:

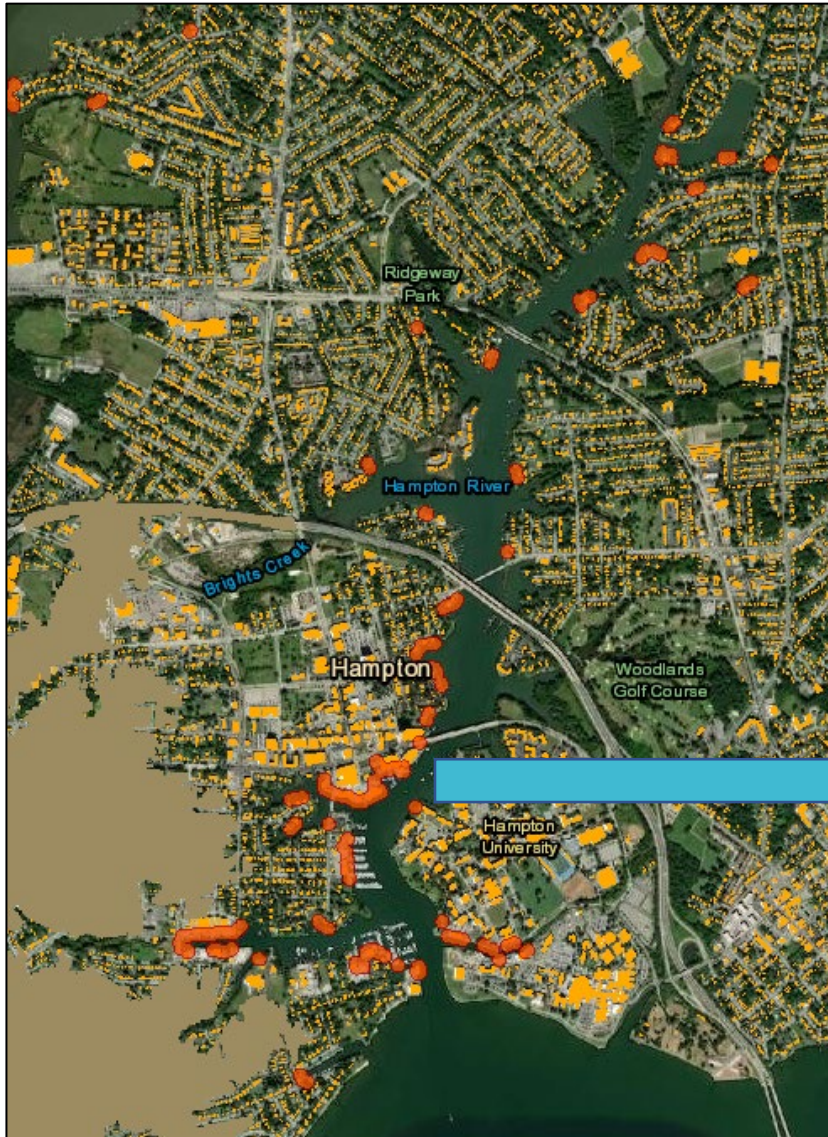
- Medium rank** for the natural capacity of NNBF to mitigate coastal flooding
- High rank** for the number of buildings on land less than 10 feet in elevation that the NNBF benefits (*9 buildings*)
- Low rank** for the number of critical community facilities on land less than 10 feet in elevation that the NNBF benefits (*0 critical community facilities*)
- Medium rank** for the NNBF to be used for incentive programs (1 out of 2: The NNBF or portion of the NNBF has potential to earn credit in the CRS Program.)




Sea Level Rise / Flooding / Storm Surge | Vulnerability / Risk | Infrastructure | Shoreline Management | Natural Resources | **Protection / Restoration Opportunities** | Legend | Tools | How To

Int-High SLR scenario | 1/1/2020 | 2010 2020 2030 2040 2050 2060 2070 2080 2090 2100

NNBF Targets for vulnerable buildings and communities



Target Areas: Create/Restore shoreline NNBFs to benefit coastal buildings 

Total 208 building(s) will benefit
Including 78 building(s) with no other benefit from NNBFs

Potential NNBF Restoration Options

Convert Existing Land Cover:

Impervious
Turf Grass

Expand Adjacent Existing NNBFs:

[Tidal Marsh](#), [Wooded](#)
(pdf links open in a new tab)

NNBF Erosion Control Recommendation (SMM v. 5.1)

Highly Modified Area. Seek expert advice.

[Click here for more information](#)

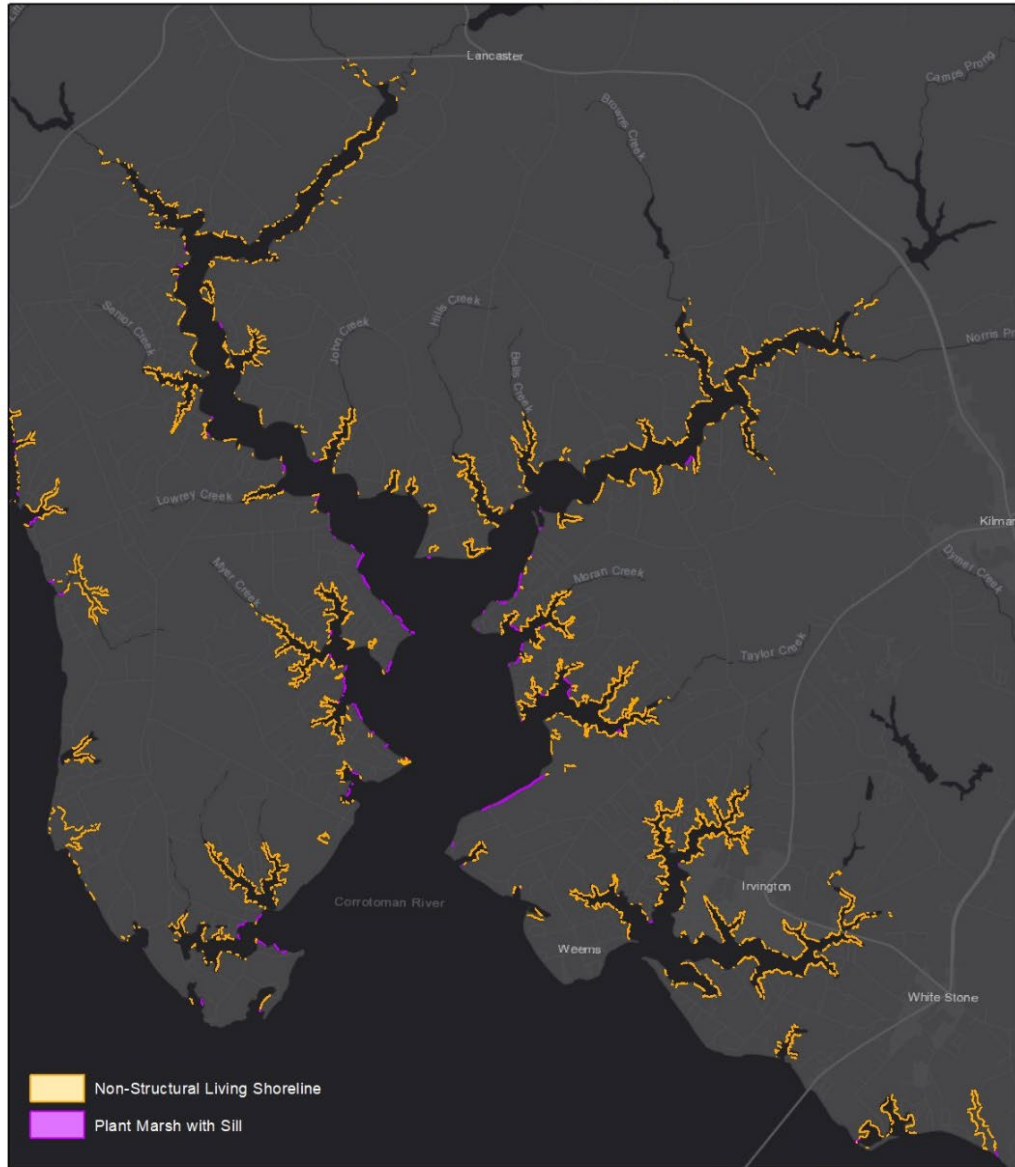
Shoreline Structure Enhancements

Add natural features to existing structures: Bulkhead, Marina, Unconventional, Wharf.

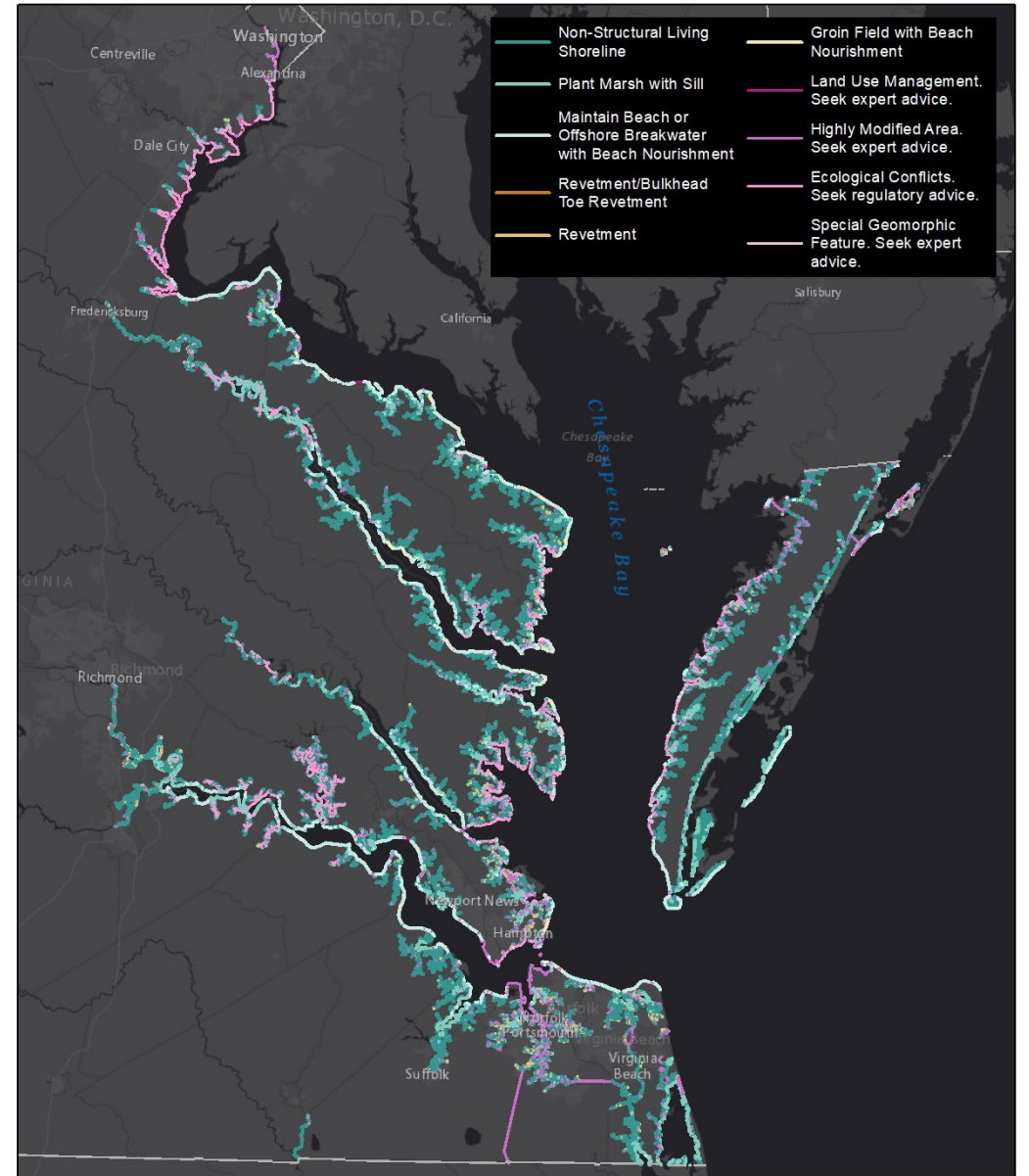
Ranking Living Shorelines: Shoreline Management Model

- GIS analytical model uses bio-physical criteria to derive a recommended management approach reflective of State policy for Living Shorelines
- Javascript coding is applied to run the analysis
- Criteria:
 - Fetch
 - Marsh, Beach presence
 - Existing structures
 - Nearshore bathymetry
 - Landuse
 - Proximal infrastructure
- Output - One of Eleven Shoreline BMPS
- Complete for all Virginia

Living Shoreline Modeled Extent in Corrotoman River, Lancaster County, Virginia



Virginia Preferred Shoreline BMPs



Living Shoreline Ranking Factors

- Water Quality: Load Reduction Potential = Length (all are same width)
- Habitat Continuity
 - High = connects tidal or nontidal wetlands
 - Medium= connects wooded, beach, dune
- Benefits Buildings
 - Protects 2 or more, or critical facility(ies)
- Benefits to socially vulnerable communities
 - High, moderate, low

Find address or place

Protection/Restoration

Restoration Opportunities

- Target Areas: Create/Restore shoreline NNBFs to benefit coastal buildings
- Living Shorelines: Suitable Areas for Marsh Ranked for Co-Benefits
- Protected Lands Suitable for Living Shoreline

Zoom to

Areas Suitable for Marsh Living Shorelines

This layer shows locations where the Shoreline Management Model (SMM) recommends living shorelines with marsh. A Non-Structural Living Shoreline is recommended at this location.

This potential living shoreline site is 1184 feet long by 8 feet wide, and provides the most benefits:

Nutrient Reduction Potential	High
Habitat Continuity Benefit	High
Benefits to Local Buildings	High
Benefits to Socially Vulnerable Communities	Low

More information about the SMM and recommendations for other shoreline segments can be found in the Shoreline Management panel.

Legend

Restoration Opportunities

Living Shorelines: Suitable Areas for Marsh Ranked for Co-Benefits

Rank of Benefits Provided

-  Most Benefits Provided
-  Many Benefits Provided
-  Some Benefits Provided

Sea Level Rise / Flooding / Storm Surge

Vulnerability / Risk

Infrastructure

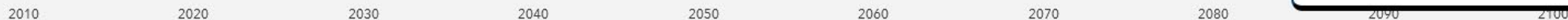
Shoreline Management

Natural Resources

Protection / Restoration Opportunities

Int-High SLR scenario

1/1/2020



How To

Identify target areas for New NNBFs: Tidal & Nontidal Wetlands

Why target the shoreline?

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

Hampton River, Hampton

