

September 21st, 2022

# WETLANDS WATCH & ALBEMARLE-PAMLICO NATIONAL ESTUARY PARTNERSHIP PROJECT



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Please feel free to ask  
questions throughout!

**Madison Teeter, CFM, CBLP**

# APNEP & WETLANDS WATCH PARTNERSHIP

- Wetlands Watch and the Albemarle-Pamlico National Estuary Partnership (“APNEP”) were partners on a Virginia Institute of Marine Science Center for Coastal Resources Management (“VIMS CCRM”) NOAA grant for a project titled, “Increasing use of natural and nature-based features to build resilience to storm-driven flooding.”
- In joint conversations, APNEP identified a needs assessment, synthesis of available tools and resources for communities and local governments, and additional capacity building work within the shared waterways areas of Virginia and North Carolina to overcome barriers to increased use of natural and nature-based features (NNBFs).



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# APNEP & WETLANDS WATCH PARTNERSHIP

- In addition to working on the NOAA/VIMS project, Wetlands Watch has been working on a tool that encapsulates plans, studies, and funding opportunities for localities interested in funding resilience-based projects in Virginia. During conversations with APNEP about this database, it has been made clear that a tool similar to this could be potentially useful to localities in North Carolina as well.



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# COASTAL VIRGINIA RESILIENCY DATABASE



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Virginia Resiliency Database | Copy base | Airtable

Views: Grid view | Hide fields | Filter | Group | Sort | Extensions

Name	Funding Source	RFPs & Fact Sheets	Projects Funded	Funding Maximum (per...)	Non-Federal Cost Shar...	Pre-Proposal Deadline	Full Proposal Deadline
1 Restoration Fund Grants	Chesapeake Bay Restoration Fund		Habitat Restoration/Enhancement Environmental Education				9/25/2021
2 Green Streets, Green Towns, Green Jobs	Chesapeake Bay Trust		Green Infrastructure Stormwater Management	\$100,000	Preferred		3/4/2021
3 Middle Peninsula Nearshore Habitat Restoration Design	Chesapeake Research Consortium		Habitat Restoration/Enhancement	\$40,000	N/A		1/31/2020
4 Coordination and Collaboration in the Resilience Ecosystem	Climate Resilience Fund		Climate Resilience Community Engagement	\$50,000	None		7/17/2020
5 Virginia Coastal & Estuarine Land Conservation Program	CZM		Land Acquisition	Currently Unfunded			
6 Dam Safety and Floodplain Management Grants	DCR		Flood Mitigation Dam Safety	Varies	50%		2/28/2021
7 Land & Water Conservation Fund	DCR		Land Acquisition Habitat Restoration/Enhancement	\$500,000	50%		7/30/2001
8 Stormwater Local Assistance Fund	DEQ		Stormwater Management Habitat Restoration/Enhancement	\$5,000,000	50%		7/30/2021
9 Clean Water Revolving Loan Fund	DEQ		Stormwater Management Water Quality Improvements	No maximum	N/A		7/30/2021
10 Clean Water Act Section 319 Grant	DEQ		Water Quality Improvements Stormwater Management	\$300,000	30%		8/31/2020
11 Virginia Chesapeake Bay Preservation Act Support	DEQ		Septic Tank Pump-Out Assistance Environmental Assessments	\$100,000	N/A		4/12/2019
12 Virginia Non-Chesapeake Bay Watershed Roundtable Support	DEQ		Stormwater Management Community Engagement	\$15,750	Preferred		3/11/2019
13 Citizen Water Monitoring Grant	DEQ		Environmental Assessments Community Engagement	\$11,000			8/30/2019
14 Community Development Block Grant	VHCD		Land Acquisition Stormwater Management	\$2,500,000	N/A		9/30/2021
15 BUILD Discretionary Grants	DOT		Infrastructure Improvement	\$25,000,000	20%		5/18/2020
16 Wetlands Program Development Grants	EPA		Demonstration Sites Habitat Restoration/Enhancement	\$350,000	25%		1/12/2021
17 Choice Neighborhoods Implementation Grants	HUD		Neighborhood Redevelopment	\$450,000	Varies		9/14/2020
18 Climate Change Health & Equity Initiative	Kresna Foundation		Climate Resilience Environmental Justice	\$100,000	N/A	3/10/2019	4/15/2019

66 records

[Link to Database](#)

# NC RESILIENCY COMPENDIUM DRAFT



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NC: Resiliency Compendium

Tools + Funding Opportunities Plans and Studies Reports Stakeholders

Grid view Hide fields Filter Group Sort Color Share view

	Name	Funding Source	Projects Funded	RFPs & Fact Sheets	Funding Maximum	Non-Federal Cost
1	Coordination and Collabo...	Climate Resilience Fund	Climate Resilience		\$50,000	None
2	BUILD Discretionary Grants	DOT	Infrastructure Impr...		\$25,000,000	20%
3	Wetlands Program Develop...	EPA	Demonstration Sites		\$350,000	25%
4	Choice Neighborhoods I...	HUD	Neighborhood Red...		\$450,000	Varies
6	Climate Change, Health &...	Kresge Foundation	Climate Resilience		\$100,000	N/A
7	Leadership in Community...	National League of Cities	Capacity Building		\$10,000	
7	Resilient Communities Pr...	NFWF	Habitat Restoration...		\$500,000	50%
8	Chesapeake Bay Steward...	NFWF	Water Quality Impr...		\$1,000,000	50%

NC: Resiliency Compendium

Tools + Funding Opportunities Plans and Studies Reports Stakeholders

Grid view Hide fields Filter Group Sort Color Share view

	Name	Attachments	Author(s)	Date	Locality
1	Adaptation Planning in the Town of Nags Head: Vulnerability, Consequences, ...			8/1/2017	Nags Head
2	Climate Ready Estuaries: A Blueprint for Change		The Nicholas Institute for Environmental Policy ...	3/1/2011	
3	NC Climate Risk Assessment and Resilience Plan			6/1/2020	
4	2012-2022 Comprehensive Conservation and Management Plan		APNEP	11/14/2012	



# ADAPTVA

Evidence-based planning for changing climate



## FORECASTS

Forecasting water levels, temperature, and precipitation helps mitigate impacts and plan resilient communities. Access a tide forecast & sea level projections for Virginia



## ADAPTATIONS

Case studies and story maps illustrate how adaptation works, and can be financed, through zoning, planning, engineering, and policy practices.



## TOOLS

Tools assess risk and inform preparation and response to a changing environment. Access flood risk maps, shoreline recommendations, and an interactive comprehensive map of adaptation strategies.



## DATA

Adapt Virginia's comprehensive Geoportal provides easy and convenient ways to access, download, and share geospatial data. Search for data via map or search engine



## PLANNING & POLICY

Management strategies from local and State code to socioeconomic issues and the Community Rating System. Learn about social vulnerability, relevant local ordinances, state legislation, and legal issues.

# NATURAL & NATURE-BASED FEATURES (NNBF) MAP VIEWER 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

## Goals of the Project:

1. Support the preservation and creation of 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:
  - a. Identifying NNBFs that provide multiple benefits
  - b. Identifying target areas for new NNBF creation/restoration



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# NNBF RANKING COMPONENTS

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?

Each NNBF is assigned a normalized score of low, medium, or high for each of these four components.



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# #1: NNBF FLOODING MITIGATION SERVICES

Quantified by examining:

1. Capacity of NNBF to dampen wave energy and allow for floodwater infiltration based on physical characteristics.
1. Opportunity or frequency that the NNBF encounters flooding waters (i.e., the elevation of the feature). Based on 19-year record at a Bay tidal gage.

Capacity \* Opportunity =  
Total Capacity Score



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Feature Type	1 = low, 2 = moderate, 3=high			Total	Normalized Score
	Permeability	Surface Roughness	Vegetation Roughness		
Hybrid Living Shoreline: Marsh Sill*	0	3	0	10	1
Hybrid Living Shoreline: Oyster Sill*	0	3	0	10	1
Hybrid Living Shoreline: Breakwater*	0	3	0	7	0.7
Beach	3	1	0	4	0.4
Dune	3	2	2	7	0.7
Non-Tidal Emergent Wetlands	2	3	2	7	0.7
Tidal Marsh	2	3	2	7	0.7
Wooded	3	2	3	8	0.8
Non-Tidal Forested Wetlands	2	3	3	8	0.8
Non-Tidal Scrub-Shrub Wetlands	2	3	3	8	0.8
Scrub-Shrub	3	3	3	9	0.9

\* total score reflects contribution of planted marsh/beach and structures together

b. Opportunity		
Land Elevation	Percentage of flooding events that reach elevation	Opportunity Score
> 5 feet	0.10%	0.001
> 4 feet	0.30%	0.003
> 3 feet	1%	0.01
> 2 feet	10%	0.1
< 2 feet	100%	1

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

# #2 & #3: NNBF BENEFITS TO BUILDINGS & CRITICAL INFRASTRUCTURE

- Linked NNBFs to buildings that they benefit by creating and analyzing inundation pathways (IPs), which 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.
- Using these IPs, we can find NNBFs that lie between the shoreline and buildings that are in the path of rising water



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Overall NNBF Score for Priority Ranking: <i>Add score for each category</i>			
	low	medium	high
<b>1. NNBF Total Capacity</b> <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)
<b>2. Number of buildings impacted</b> <i>Number of buildings that the NNBF benefits.</i>	0	1 building	>= 2 buildings
<b>3. Critical Facility Benefit</b> <i>Does the NNBF benefit a community critical facility?</i>	no		yes
<b>4. Co-Benefits Potential</b> <i>Potential for NNBF to be used in incentive programs.</i>	0	1 cobenefit	>=2 cobenefits
<b>Score</b>	<b>1</b>	<b>2</b>	<b>3</b>

# #4: EXISTING PROGRAMMATIC INCENTIVES

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



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<b>Overall NNBF Score for Priority Ranking:</b>			
<i>Add score for each category</i>			
	<b>low</b>	<b>medium</b>	<b>high</b>
<b>1. NNBF Total Capacity</b> <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)
<b>2. Number of buildings impacted</b> <i>Number of buildings that the NNBF benefits.</i>	0	1 building	>= 2 buildings
<b>3. Critical Facility Benefit</b> <i>Does the NNBF benefit a community critical facility?</i>	no		yes
<b>4. Co-Benefits Potential</b> <i>Potential for NNBF to be used in incentive programs.</i>	0	1 cobenefit	>=2 cobenefits
<b>Score</b>	<b>1</b>	<b>2</b>	<b>3</b>

# LOCALITY NNBF FACT SHEET



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## Coastal Resilience Summary

JAMES CITY COUNTY, VIRGINIA

### Natural and Nature-Based Features (NNBFs)

Forests, trees, wetlands, beaches, and living shorelines benefit communities by reducing storm wave energy, soaking up floodwaters, improving water quality, providing areas for recreation, creating habitats for important plants and animals, and even lowering flood insurance costs. These **Natural and Nature-Based Features (NNBFs)** have been mapped for areas that are less than 10-feet in elevation and experience tidal and storm flooding, and have been identified for individual buildings.



MAP: James City County coastal areas less than 10-ft elevation, with target areas for new NNBFs

### NNBFs in James City County Coastal Areas

**11,360 acres** All Coastal NNBFs including:

	<b>5,920 acres</b>	Tidal Marsh
	<b>3,550 acres</b>	Wooded
	<b>1,530 acres</b>	Forested Wetland
	<b>210 acres</b>	Scrub-Shrub Wetland
	<b>&lt;1 acres</b>	Hybrid Living Shorelines

Visit [AdaptVA.org](http://AdaptVA.org) to view all coastal NNBFs

### Benefits of NNBFs in James City County

	<b>2,350 acres</b>	of NNBFs that decrease flooding risks for buildings
	<b>11,320 acres</b>	of NNBFs that improve water quality by reducing sediment, nitrogen, and phosphorus
	<b>530 acres</b>	of NNBFs potentially eligible for FEMA Community Rating System credits within both the Chesapeake 100-ft RPA buffer and 100-year flood zones

### Coastal Area Facts

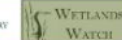
for areas less than 10 ft. elevation

- 14%** of locality area (12,857 acres)
- 1,018** coastal buildings
- 0** critical facilities
- 7** coastal buildings without NNBF benefits
- 5** target areas for new NNBFs

### Chesapeake Bay RPA 100-ft Buffer Overview

across all of James City County

- 12,070 acres** of RPA buffer
- 790 acres** of RPA buffer currently turfgrass that is potentially eligible for water quality credits if converted into NNBF



# NNBF ONE-PAGER



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## Natural & Nature-Based Features Forests & Woodlands



### Description

Forests and wooded areas are covered by upland trees more than 20 feet tall. Most coastal plain upland forests are heavily altered with a mix of native and introduced tree species. Large intact forests are generally limited to conservation lands and military installations in coastal Virginia. Forests and woodlands provide storm and flood mitigation, cleaner water, economic gains, and cultural traditions as ecosystem service benefits.

### Multiple Benefits

- Intercept and slowly release rainfall
- Absorb and store floodwaters
- Reduce bank erosion
- Intercept air pollution
- Regulate stream and air temperatures
- Recreation & tourism

### Forest Restoration Tips

- Protect intact forests & connect forest patches
- Convert riparian buffer turf and impervious areas to forest
- Choose native trees similar to local forests
- Provide layers of plant height between tree canopy and ground
- Allow leaves and sticks to remain for healthy soil and infiltration
- Remove and control invasive plants
- Consult with arborist about tree health and care

### Resources

[A Guide for Forestry Practices in the Chesapeake TMDL](#)

[VA Cooperative Extension Buffers Fact Sheet](#)



### Water Quality BMPs

Ag Forest Buffers  
Ag Forest Buffers w/ Exclusion Fencing  
Ag Tree Planting  
Urban Tree Planting  
Urban Forest Buffers  
Tree Planting - Canopy  
Urban Forest Planting  
Forest Conservation  
Dry Swale



### Community Rating System

#### Credit Potential

#### Wooded Areas in Special Flood Hazard Areas

Wooded areas do not typically earn credit in the CRS Program, unless the area shares space with features that could earn CRS credit.

For example, if the wooded area is located within a tidal marsh, then it could potentially earn credits under **Activity 420: Open Space Preservation, Natural Functions Open Space, & Natural Shoreline Protection.**

Learn More [www.vims.edu/ccrm/research/nature\\_based](http://www.vims.edu/ccrm/research/nature_based)





# DISCUSSION & THANK YOU!



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