PWD Yorktown – Environmental Division Natural Resources Conservation Program

REPI Project Profile: Land Restoration, Shoreline Protection and Base Resilience at Naval Weapons Station Yorktown, Virginia

Prepared for:
Chesapeake Bay Commission
5 September 2024

Presented by:
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Naval Weapons Station Yorktown

Military Mission

Naval Weapons Station Yorktown (WPNSTA) and Cheatham Annex (CAX) provide quality support for ordnance storage, maintenance, logistics, research and development and support services, expeditionary logistics training and operations, warfare training for Sailors, Marines and other Services; and to serve as a premier recreational destination for service members and dependents.

Installation Overview

History:

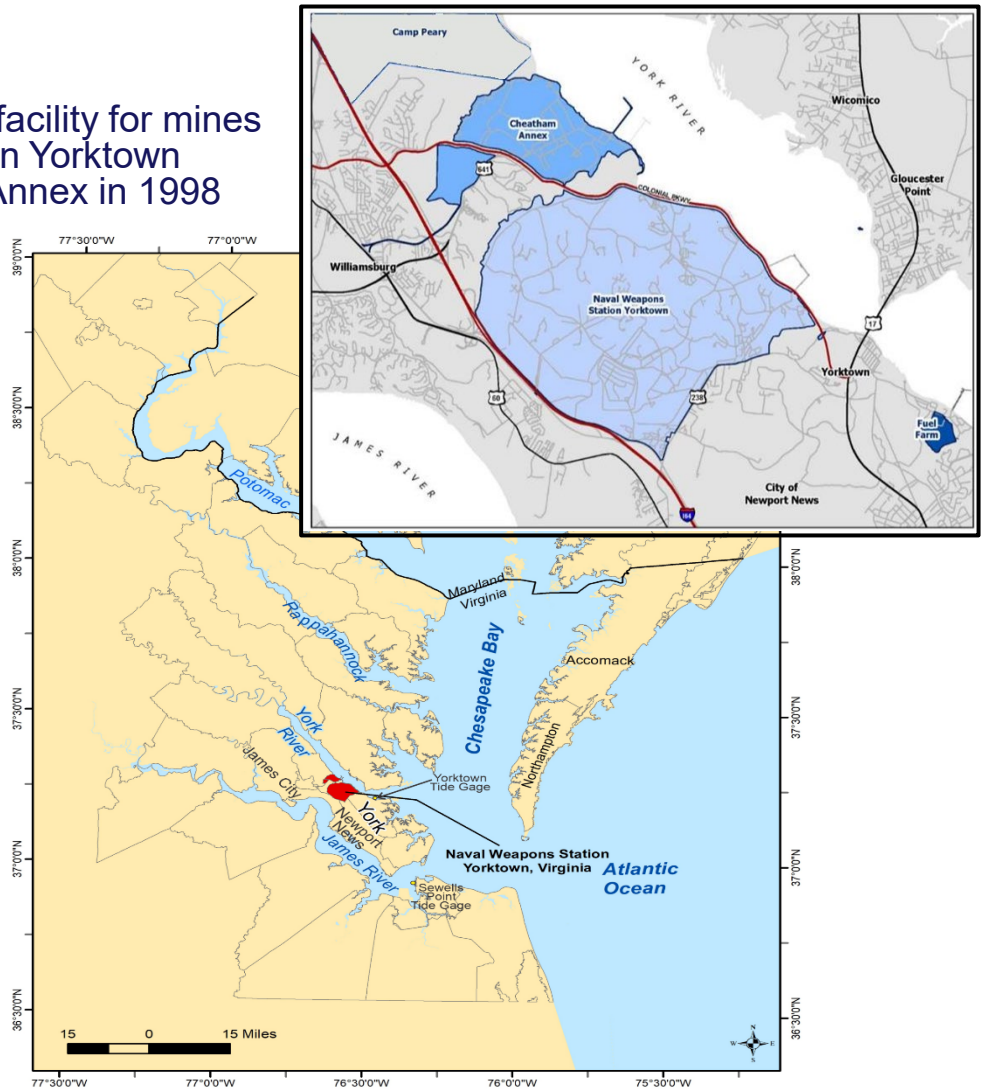
- Procured August 7, 1918 for storage and testing facility for mines
- Name changed in 1958 to Naval Weapons Station Yorktown
- Consolidated Fleet Supply Center at Cheatham Annex in 1998
- ~23,000 tons of ordnance annually

Attributes:

- Personnel Assigned: ~5,964
- Area of Responsibility: ~14,894 ac
- Facilities: 1,360
- Housing Structures: 362
- Piers: 2 (supply, ordnance)
- Landing Zones: 2
- Training Areas: 13
- Plant Replacement Value: ~$2.64B

Primary Tenants: 37

- Navy Munitions Command
- Marine Corps Security Force Regiment
- Military Sealift Command
- Naval Expeditionary Logistics Support Group
- Naval Ophthalmic Support and Training Activity

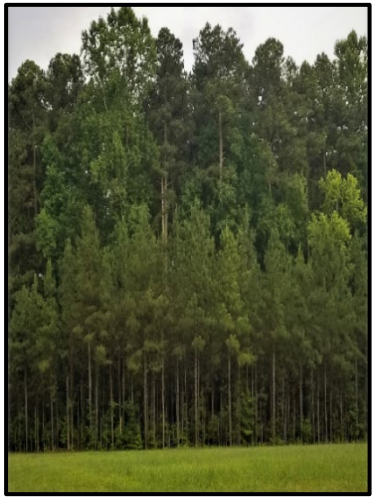


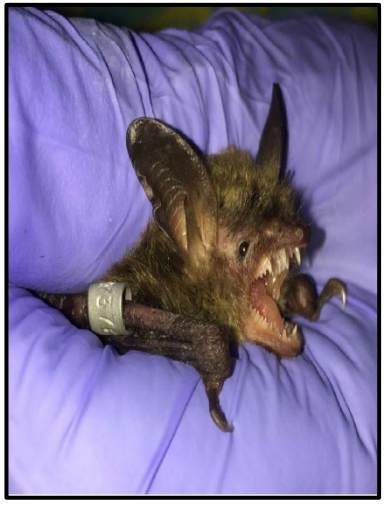
WPNSTA Yorktown
Natural Resources Overview

- 8,765 ac of forested/woodland
- 7,436 ac of estuarine habitats
- 2,963 ac of emergent wetlands
- 1,482 ac of nearshore area
- 186 ac of agriculture
- 96 species at risk

- 61 successional habitat areas (≤ 5 ac)
- 32 mi of shoreline
- 13 vernal pool habitats
- 12 federally protected species
- 8 ecological areas (<3,337 ac)
- 4 state protected species

WPNSTA Yorktown Integrated Natural Resources Management Plan, Oct 2023




REPI Program Overview

- The REPI program fosters multi-agency initiatives and collaboration to preserve compatible land uses near military installations and ranges. These cost-sharing partnerships with state and local governments and private conservation organizations.
- Three-pronged justification:
    1. Limit development or use of the property that is incompatible with the installation's mission and/or;
    2. Preserve habitat to relieve current or anticipated environmental restrictions on military activities and/or;
    3. Maintain or improve military installation resilience
- Funded by annual appropriation.

REPI Program Overview

- The REPI program has the authority to address climate change hazards and increase military installation resilience under 10 U.S. Code (U.S.C.) § 2684a(a)(2)(B)(ii).

- This authority allows the Military Services and partners to develop off-base natural infrastructure solutions designed to protect critical infrastructure, military personnel, and testing or training operations from climate change impacts.

- When executing a resilience project, installations may also leverage the Intergovernmental Support Agreement (IGSA) or Sikes Act Authorities.

REPI Program Overview

IGSA (Section 2679 of title 10, U.S.C.):

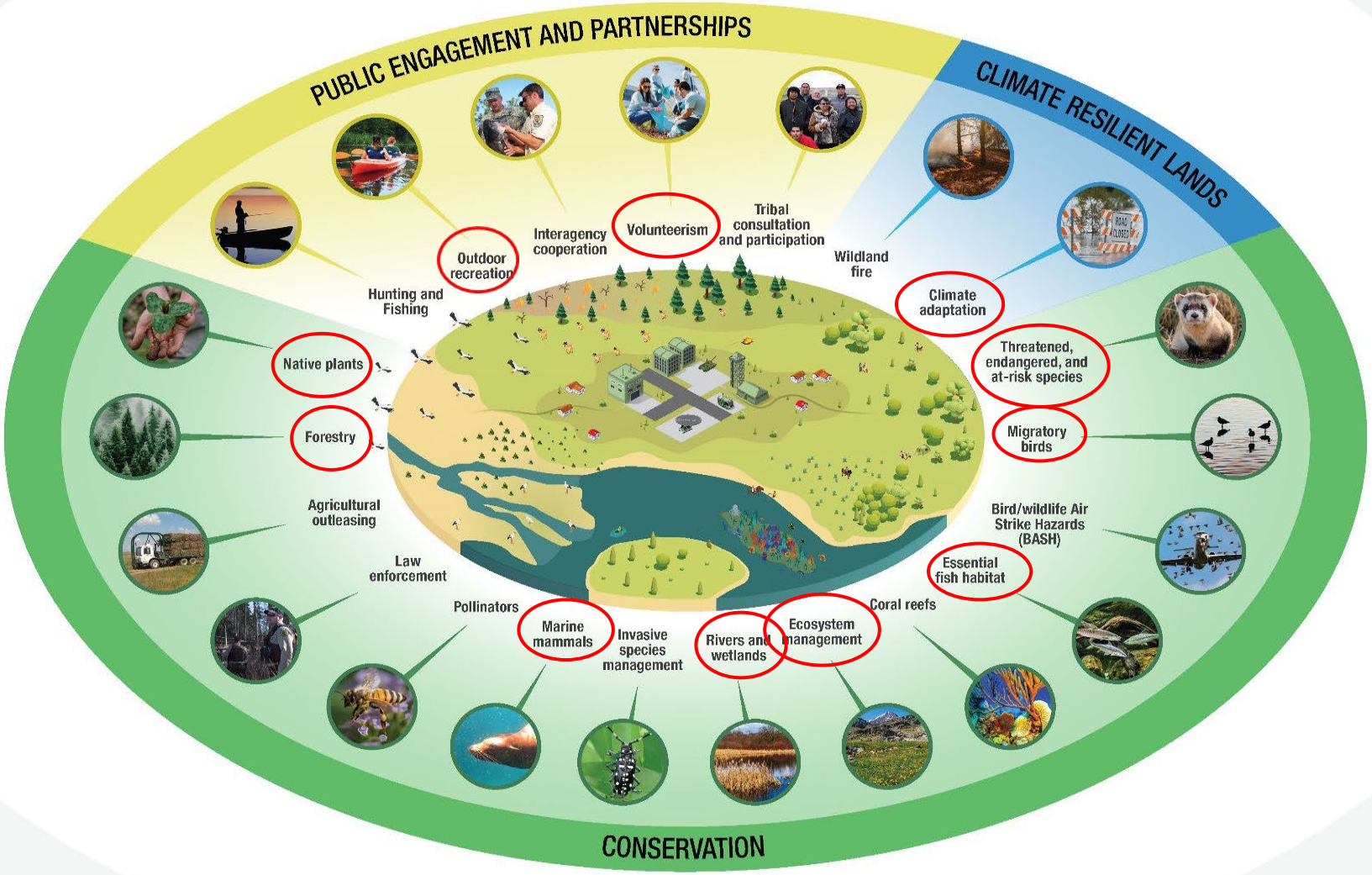
- Authorizes the Military Departments to enter into agreements with eligible entities to provide, receive, or share installation support activities.
- Under REPI, this authority may be leveraged to fund state and local governments to conduct off-installation natural resource management or military installation resilience improvements that enhance mission effectiveness or create efficiencies.

REPI Program Overview

Sikes Authority (16 U.S.C.670c-1):

- Primary authority governing DoD management of natural resources on installation.
- May be leveraged to maintain natural infrastructure in support of installation resilience.
- In 2008, amended to allow for maintenance and improvement of natural resources off installation.
- In 2014, amended to allow for “management endowments” intended to cover the future costs of natural resources management.

DoD Natural Resources Overview



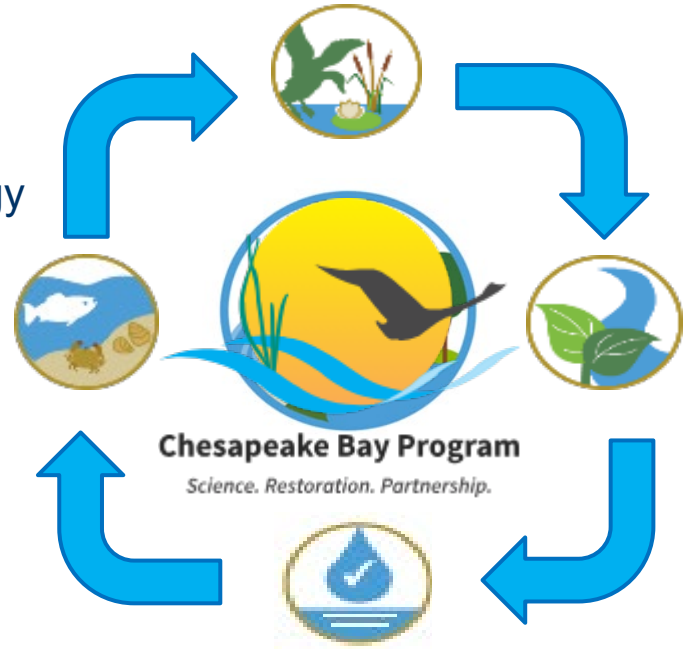
REPI Program Project Overview

Purpose: The full project implemented nearly 4,000 linear feet of living shoreline protection features and restored approximately 3 acres of land. The project not only enhances installation climate resiliency by protecting critical pier and road infrastructure but is also part of a larger collaborative effort to restore and protect the York River shoreline as well as ecosystem services.

REPI Funds: $5M **Partner Contributions**: +$10M

Military, Community, & Chesapeake Bay Benefits:

- ✓ Protects pier infrastructure from erosion & wave energy
- ✓ Protects ordnance handling capabilities
- ✓ Protects shoreline and nearshore areas
- ✓ Restores land and marsh habitats
- ✓ Improves force protection
- ✓ Improves water quality
- ✓ Reduces sedimentation
- ✓ Restores oyster populations
- ✓ Enhances recreational and commercial fisheries/seafood
- ✓ Enhances ecosystem services
- ✓ Encourages coordination among federal, state, and local partners



Project Partners

VIMS | William & Mary

Virginia Institute of Marine Science

DoD Chesapeake Bay Program

USA ★ USMC ★ USN ★ USAF ★ DLA

Defending Our National Treasure

National Oceanic and Atmospheric Administration

NOAA

U.S. Department of Commerce

ORC

National Fish and Wildlife Foundation

NFWF

National Park Service

Virginia Marine Resources Commission

CBTRUST

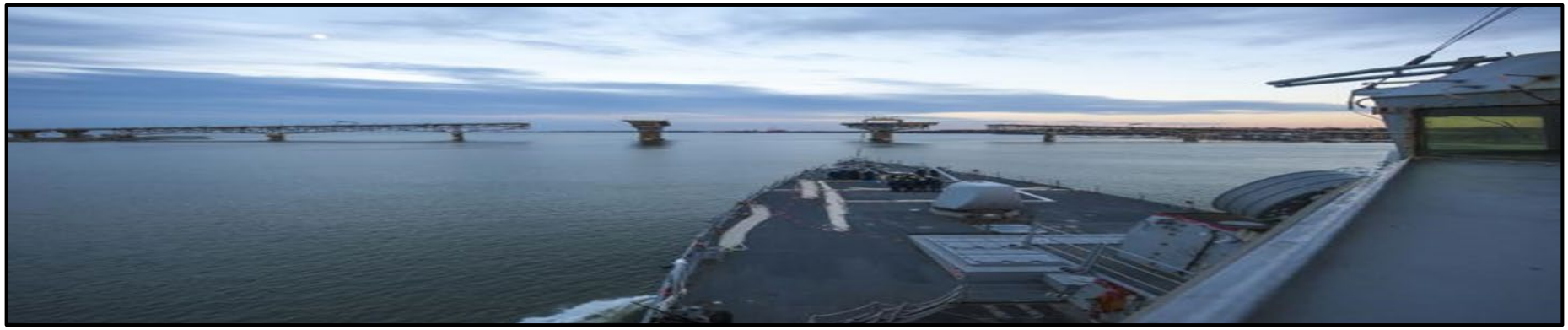
Chesapeake Bay Trust

PEW

Christopher Newport University

Applicable Plans and Programs

- Colonial Parkway Shoreline Management Plan, 2006
- WPNSTA Yorktown Encroachment Action Plan, 2013
- York County Shoreline Management Plan, 2014
- Chesapeake Bay Watershed Agreement, 2014
- WPNSTA Yorktown Installation Development Plan, 2016
- WPNSTA Yorktown Integrated Natural Resources Management Plan, 2018 & 2023
- DoD National Defense Strategy, 2018
- Virginia York River Oyster Recovery Plan, 2019
- Climate Adaptation for DoD Natural Resource Managers, 2019
- Virginia Coastal Resilience Master Plan, 2020
- DoD Climate Adaptation Plan, 2021
- WPNSTA Yorktown Shoreline Management and Coastal Resilience Plan, 2023
- NOAA Virginia Middle Peninsula Habitat Focus Area, 2023



Project Action Area

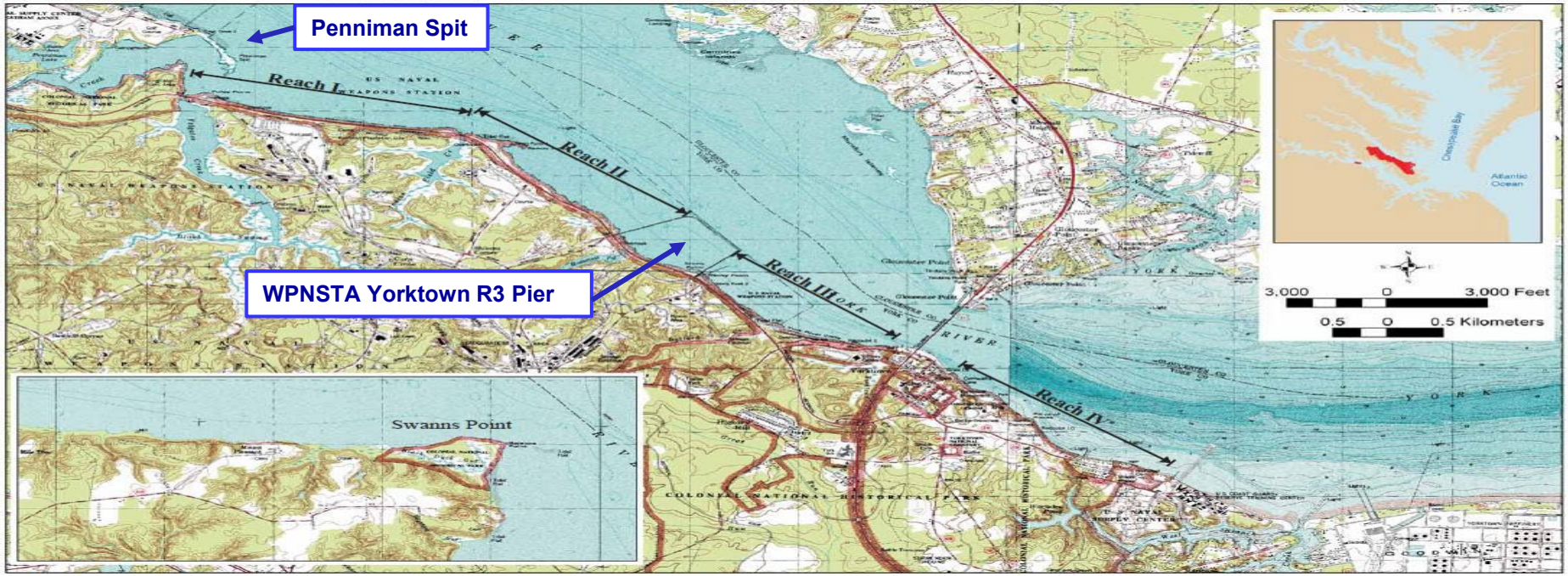


Photo Credit: National Park Service

Photo Credit: National Park Service

Colonial National Historic Park Shoreline Protection & Enhancement Areas

Project Action Area

NOAA FISHERIES

Middle Peninsula Habitat Focus Area

Project Action Area

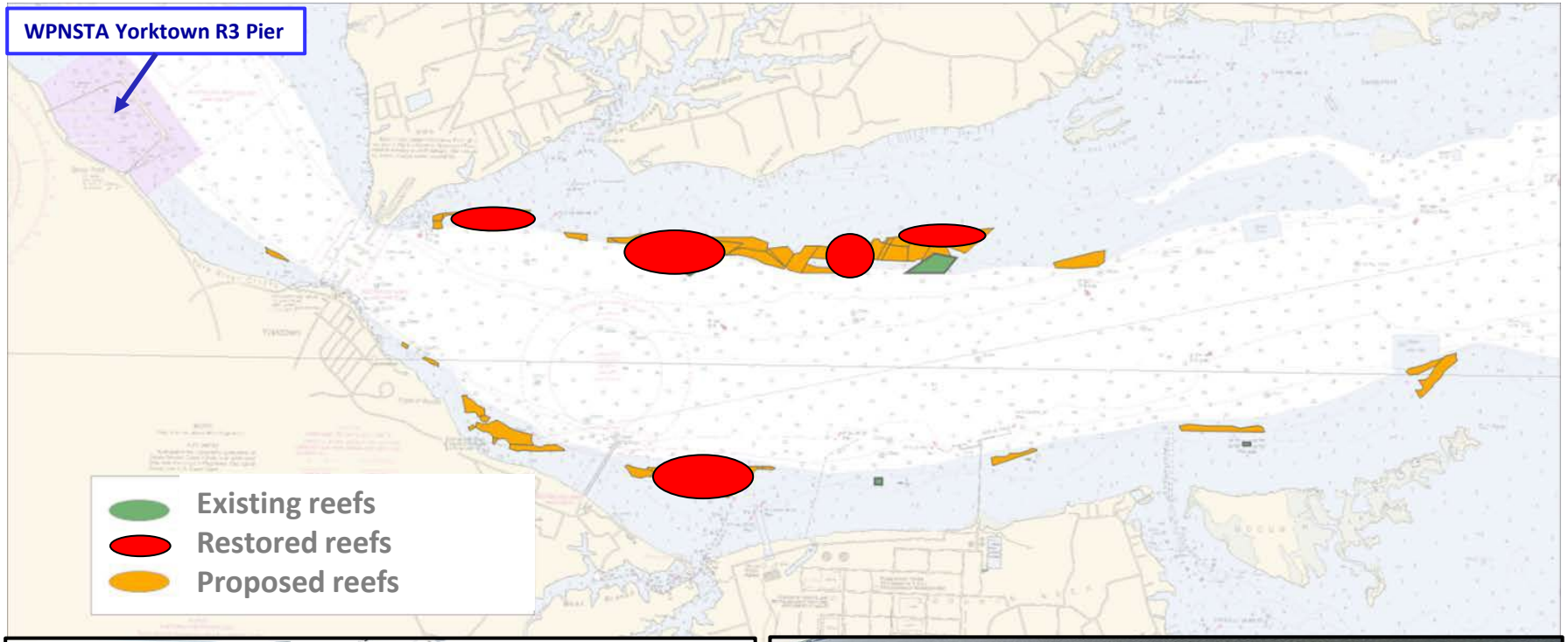


Photo: NOAA Chesapeake Bay Office

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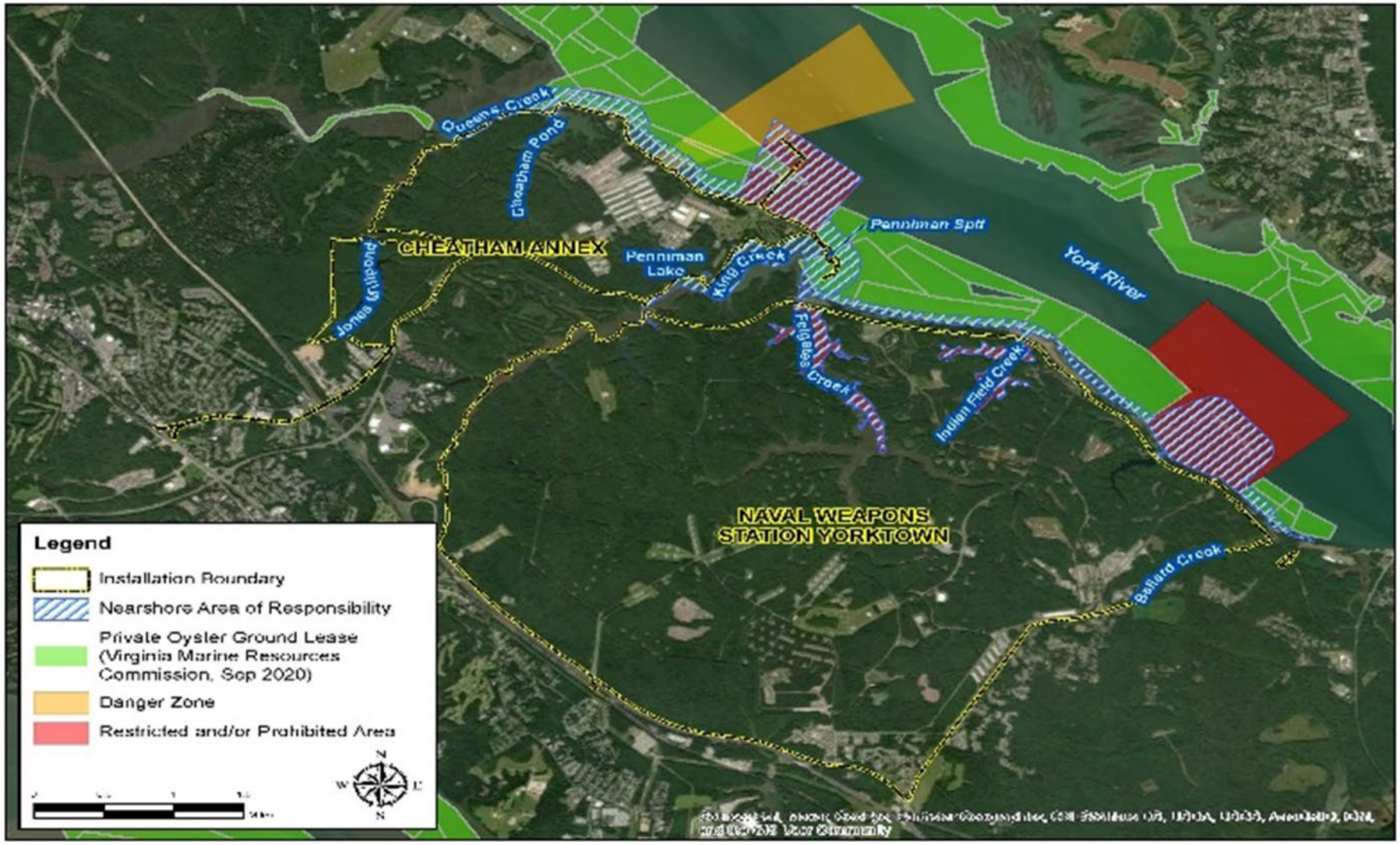
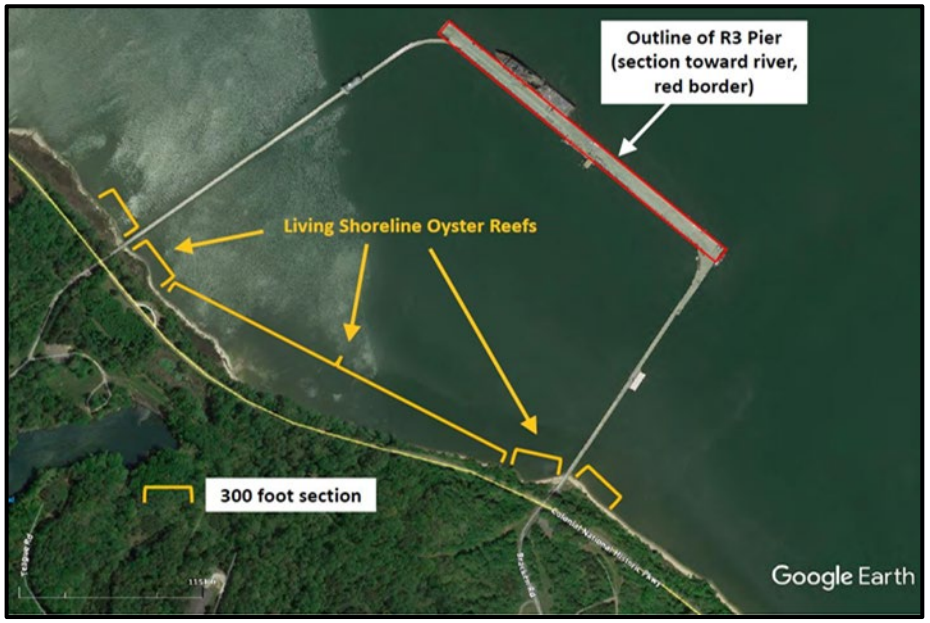
Lower York River Oyster Restoration Area

Project Action Area



Project Location: R3 Pier Shoreline



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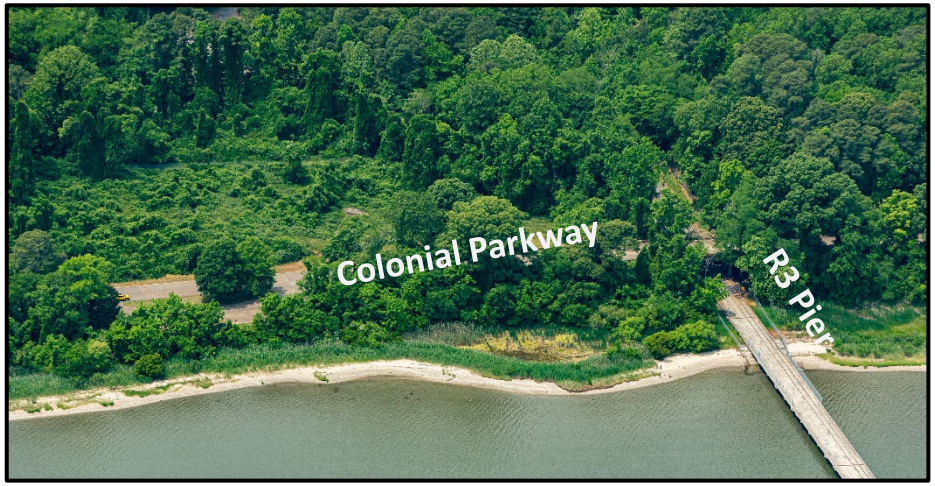
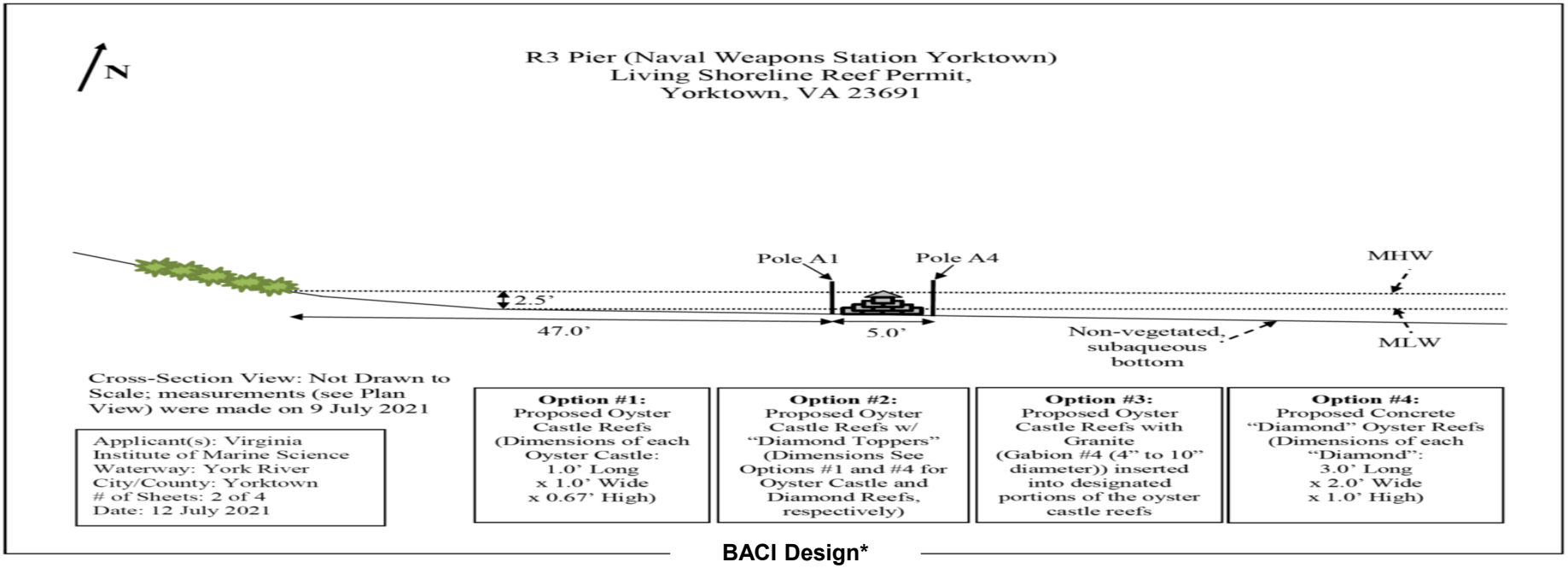



Eroding Shoreline Colonial Parkway

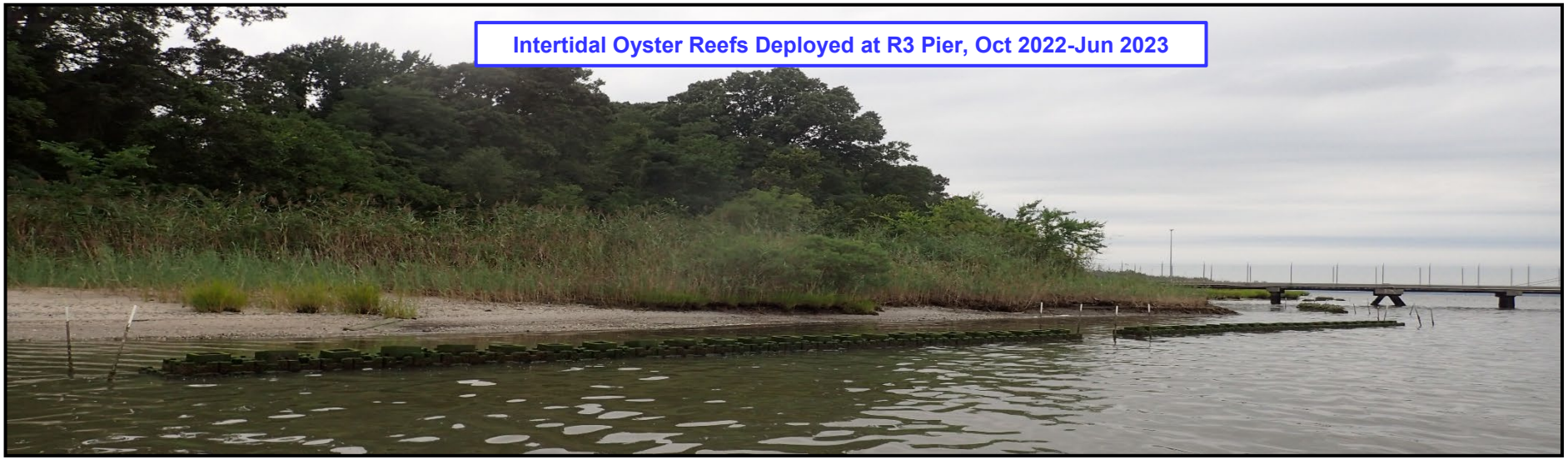

Eroding Shoreline R3 Pier

Phase 1: Living Shoreline Intertidal Oyster Reefs

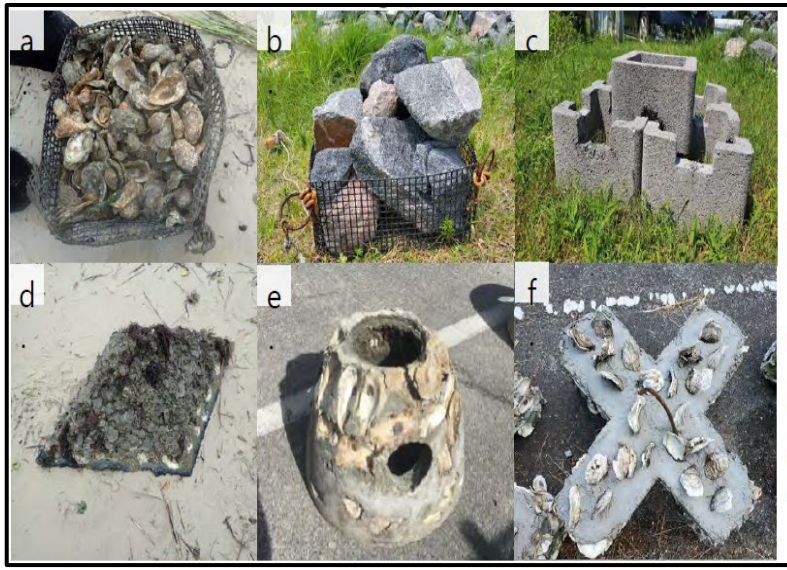


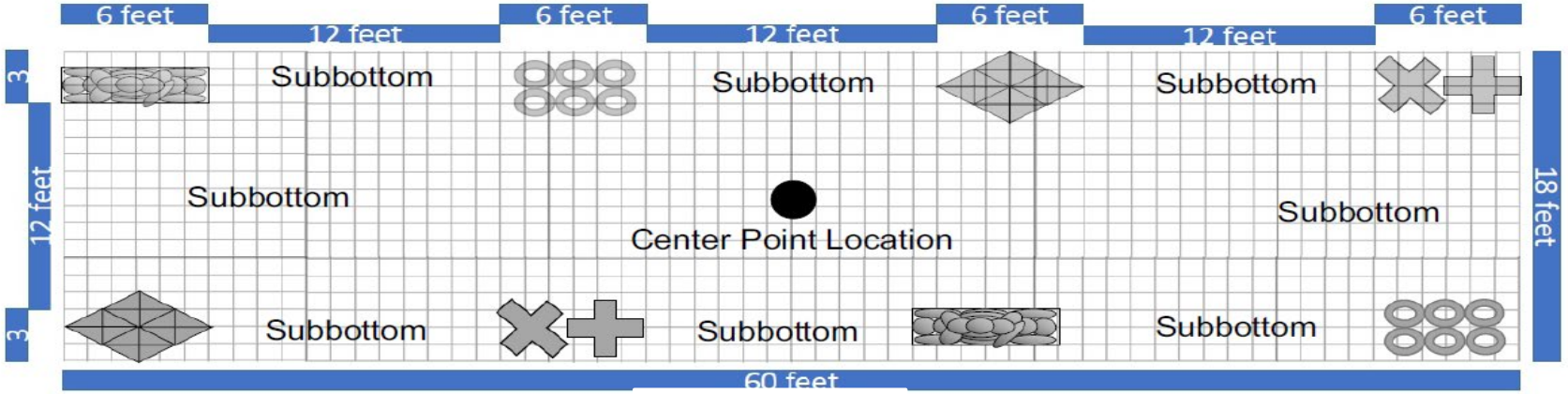
BACI Design*

Phase 1: Living Shoreline Oyster Reefs



Phase 1: Living Shoreline Sudtidal Oyster Reefs





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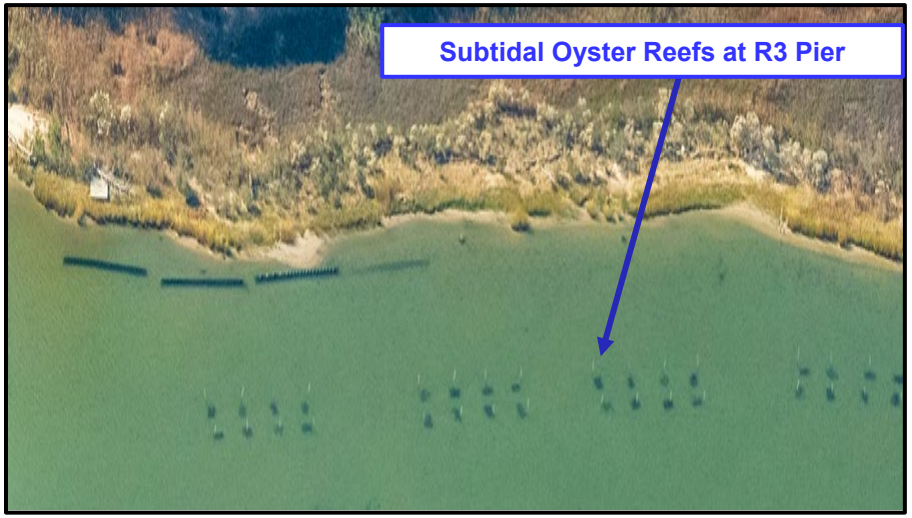

Phase 1: Living Shoreline Oyster Reefs

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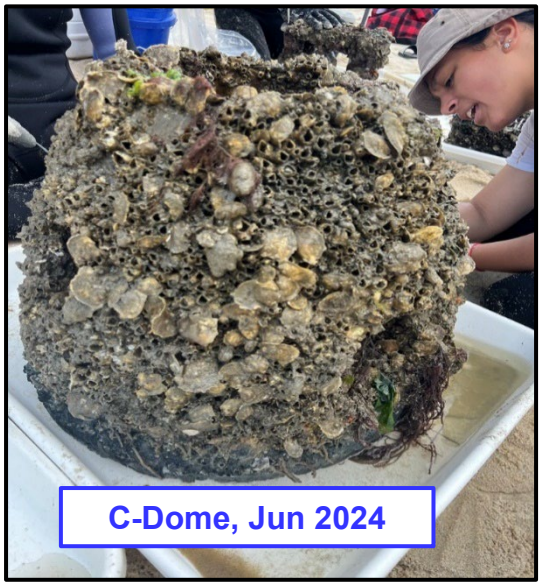

C-Dome, Jun 2024


Diamond, Jun 2024


X-Reef, Jun 2024

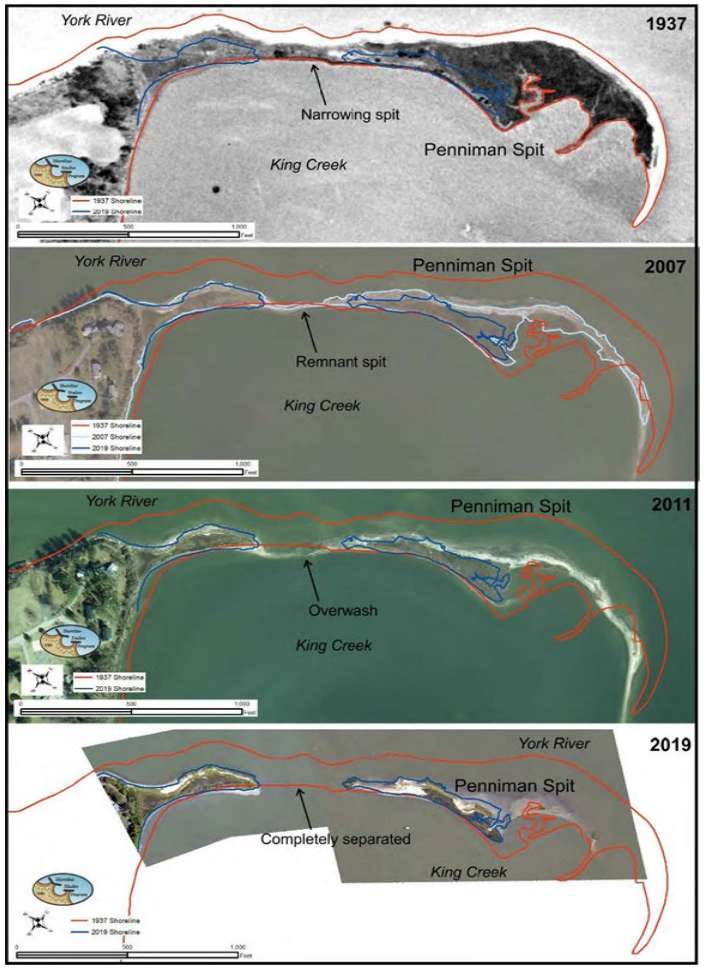

Castel, May 2024


VMIS Field Crew

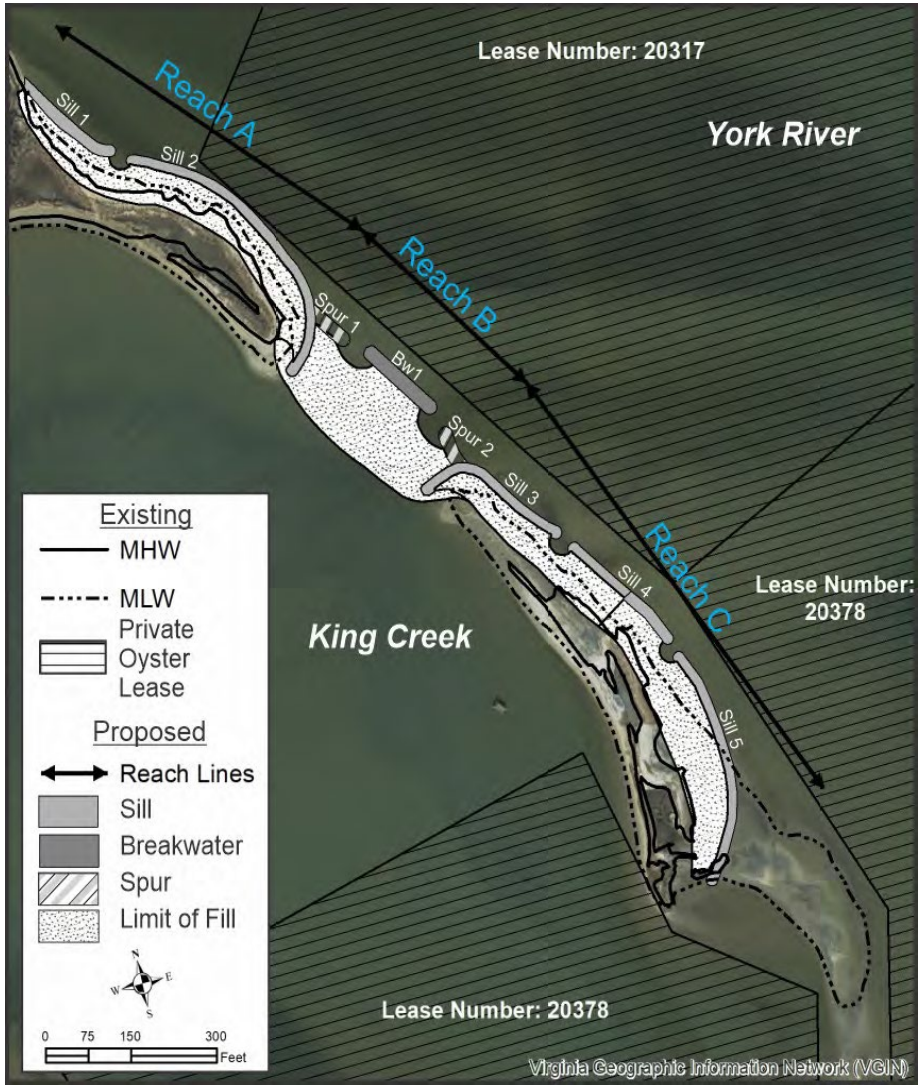
- *High density of oysters, 715-3,800 indiv./m^2*
- *High biomass density, 50-513 g AFDQ*

Project Location: Penniman Spit

Special Interest Area, York County Shoreline Management Plan 2014
86% loss in area above MLW, 1937-2019



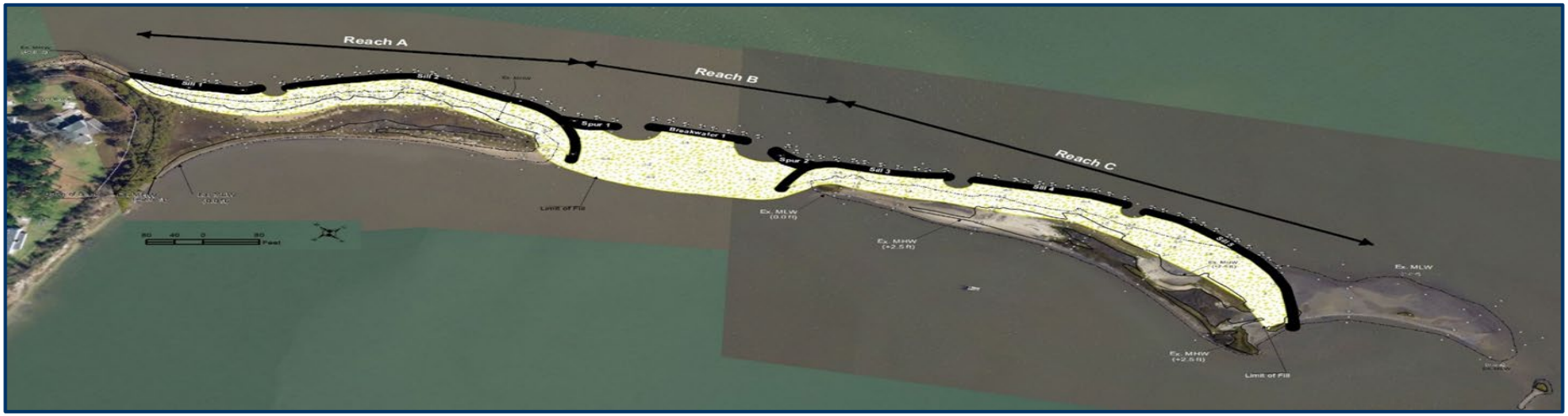
Phase 2: Penniman Spit Hybrid Living Shoreline

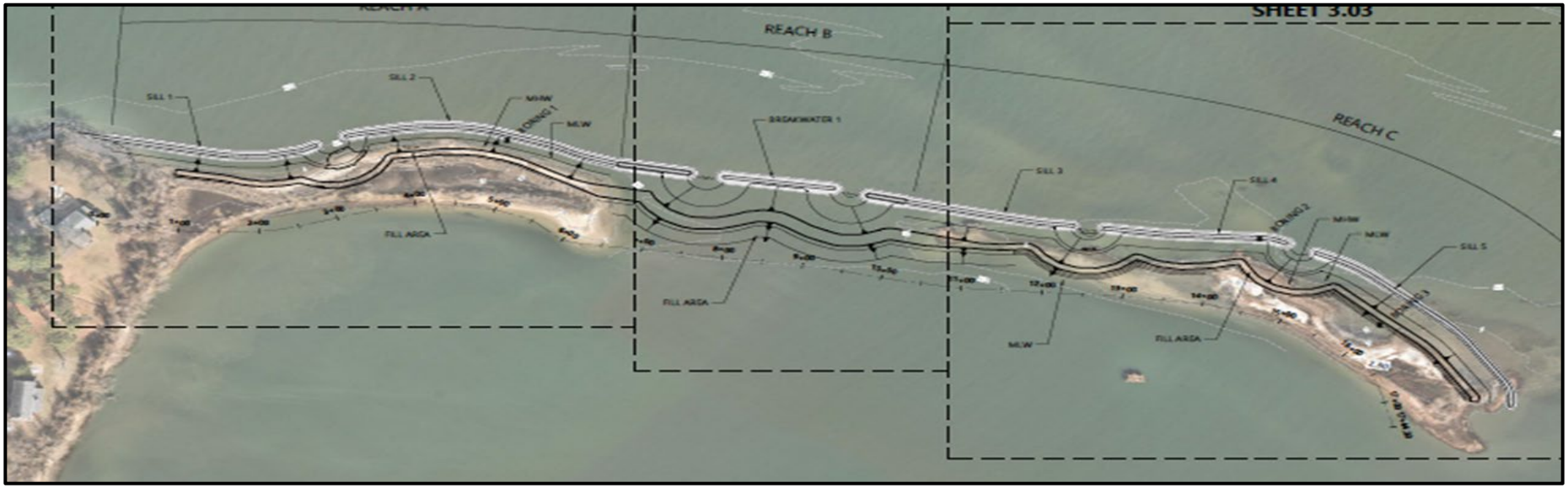


Climate Resiliency Adaptation Design:

- 5 rock sills with 5 gaps
- 1 rock breakwater
- 2 rock spurs
- Sand fill and marsh grass plantings
- Intertidal oyster reefs, 675 lnft
- Subtidal oyster reefs, 576 sqft
- High marsh restoration, 1 acres
- Low marsh restoration, 2 acres
- ~1,200 tons of carbon sequestered

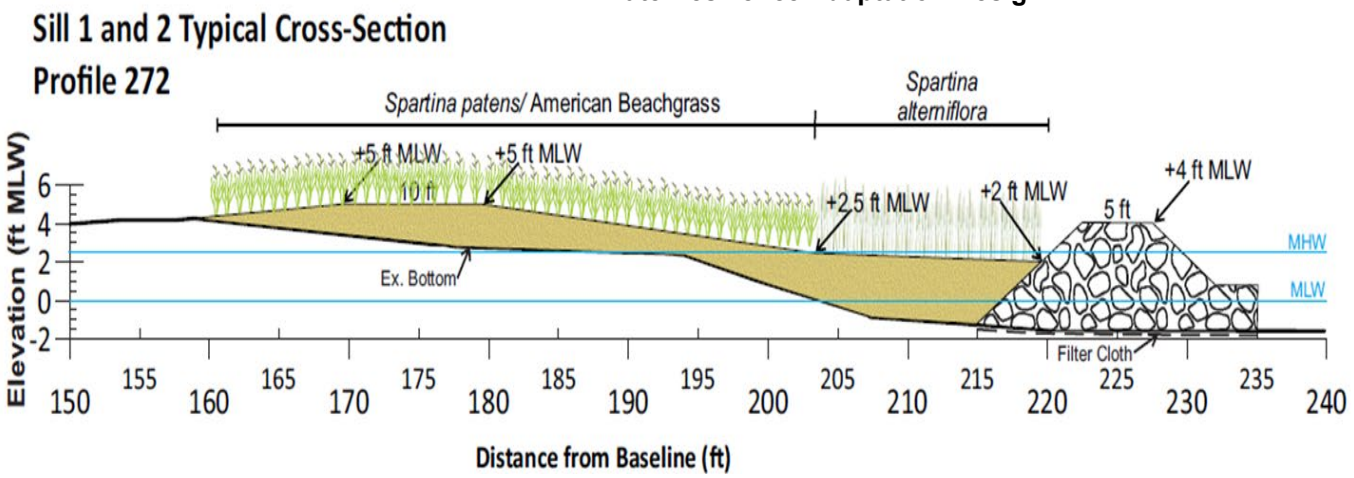
Phase 2: Penniman Spit Hybrid Living Shoreline





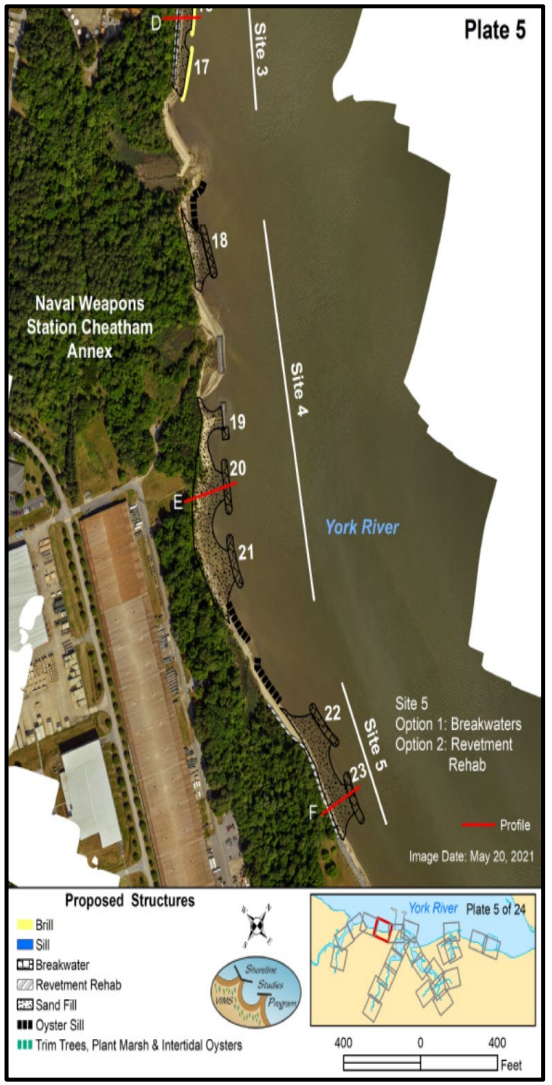
Phase 2: Penniman Spit Hybrid Living Shoreline

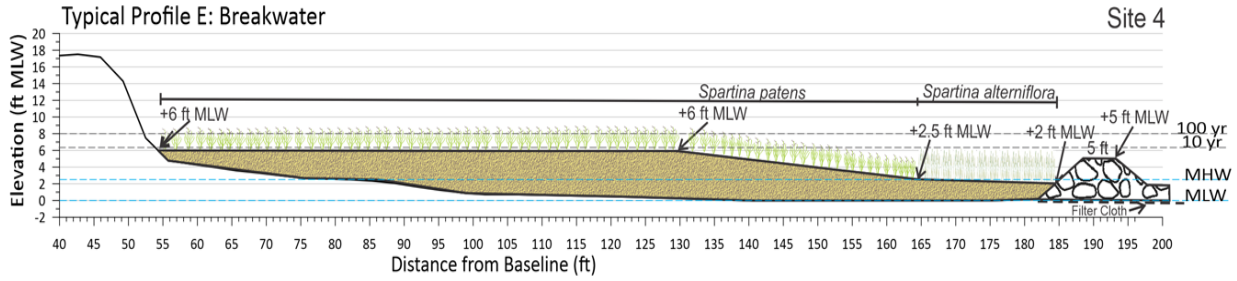
Climate Resilience Adaptation Design*

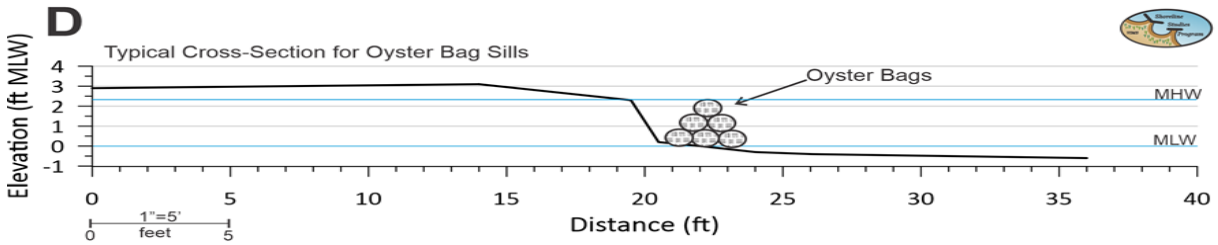


Phase 2: Penniman Spit Hybrid Living Shoreline

Phase 3: Monitoring & More Protection







Hybrid Living Shoreline Recommendations

Reach	Site #	Structure #	Structure Type	Length (ft)	Width (ft)	Typical Profile
Queen's Creek	1	1	Sill	230	17	A
Queen's Creek	1	2	Sill	270	17	A
Queen's Creek	1	3	Sill	275	17	A
Cheatham Annex	2	4	Brill	300	19	B
Cheatham Annex	2	5	Brill	235	19	B
Cheatham Annex	2	6	Brill	525	19	B
Cheatham Annex	2	7	Brill	195	19	B
Cheatham Annex	2	8	Brill	170	19	B
Cheatham Annex	2	9	Brill	155	19	B
Cheatham Annex	2	10	Brill	200	19	C
Cheatham Annex	2	11	Brill	200	19	C
Cheatham Annex	2	12	Brill	215	19	C
Cheatham Annex	2	13	Brill	215	19	C
Cheatham Annex	2	14	Brill	240	19	B
Cheatham Annex	2	15	Brill	280	19	B
Cheatham Annex	3	16	Brill	215	20	D
Cheatham Annex	3	17	Brill	215	20	D
Cheatham Annex	4	18	Breakwater	205	19	E
Cheatham Annex	4	19	Breakwater	45	19	E
Cheatham Annex	4	20	Breakwater	205	19	E
Cheatham Annex	4	21	Breakwater	210	19	E
Cheatham Annex	5	22	Breakwater	210	20	F
Cheatham Annex	5	23	Breakwater	210	20	F
Cheatham Annex	6	24	Brill	240	19	B
Cheatham Annex	6	25	Brill	165	19	B
King Creek	7	26	Sill	120	16	G
King Creek	7	27	Sill	160	16	G
King Creek	7	28	Sill	155	14	H
King Creek	7	29	Sill	110	14	H
R3 Pier	8	30	Sill	140	15	I
R3 Pier	8	31	Sill	130	15	I
R3 Pier	9	32	Sill	120	15	J

Oyster Recommendations by Reach	Length (feet)
Queens Creek	
Oyster Sills	888
Intertidal Oysters	3,996
York River to Cheatham Annex	
Oyster Sills	595
Intertidal Oysters	2,437
King Creek	
Oyster Sills	5,266
Intertidal Oysters	5,898
Felgates Creek	
Oyster Sills	2,158
Intertidal Oysters	15,480
Indian Field Creek	
Oyster Sills	348
Intertidal Oysters	9,956

Naval Weapons Station Yorktown Shoreline Management and Coastal Resiliency Plan, Sep 2023

Total Cost: $9M - $12M; Design, Permit,& Build

Nature-Based Coastal Resilience In Action

Werowocomoco Sills

Through Time

7 years post- construction

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Virginia Institute of Marine Science

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Mr. Tony Danesi, USN
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VIMS Marine Conservation Biology Community Ecology Lab Field Staff