Chesapeake Bay Program
Science. Restoration Partnership.

Sustainable Fisheries GIT: Oyster Restoration

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Overviw of Oyster Restoration Framework

Through the Chesapeake Bay Watershed Agreement*, the Chesapeake Bay Program has committed to…*

Goal: *Sustainable Fisheries*

Outcome: *Oyster Restoration*

Continually increase finfish and shellfish habitat and water quality benefits from restored oyster populations. Restore native oyster habitat and populations in 10 tributaries by 2025 and ensure their protection.

Chesapeake Bay Oyster Metrics

- *State and Federal agencies, plus consulting scientists, developed Bay-wide, consensus definition of a 'restored reef' and a 'restored tributary per the Chesapeake Bay Agreement Oyster Outcome.*
- *Called 'Oyster Metrics' or 'GIT Metrics'*
- *On-the-ground restoration is now being planned & built to meet these Metrics.*

Key Steps for Tributary Restoration

- Survey and characterize the river bottom
- Survey and characterize existing oyster population
- Define 100% of ‘currently restorable oyster habitat’
- Set a restoration target (50% to 100% of ‘currently restorable oyster habitat’)
- Draft a tributary restoration plan
- Identify funding
- Implement and monitor restoration progress and success

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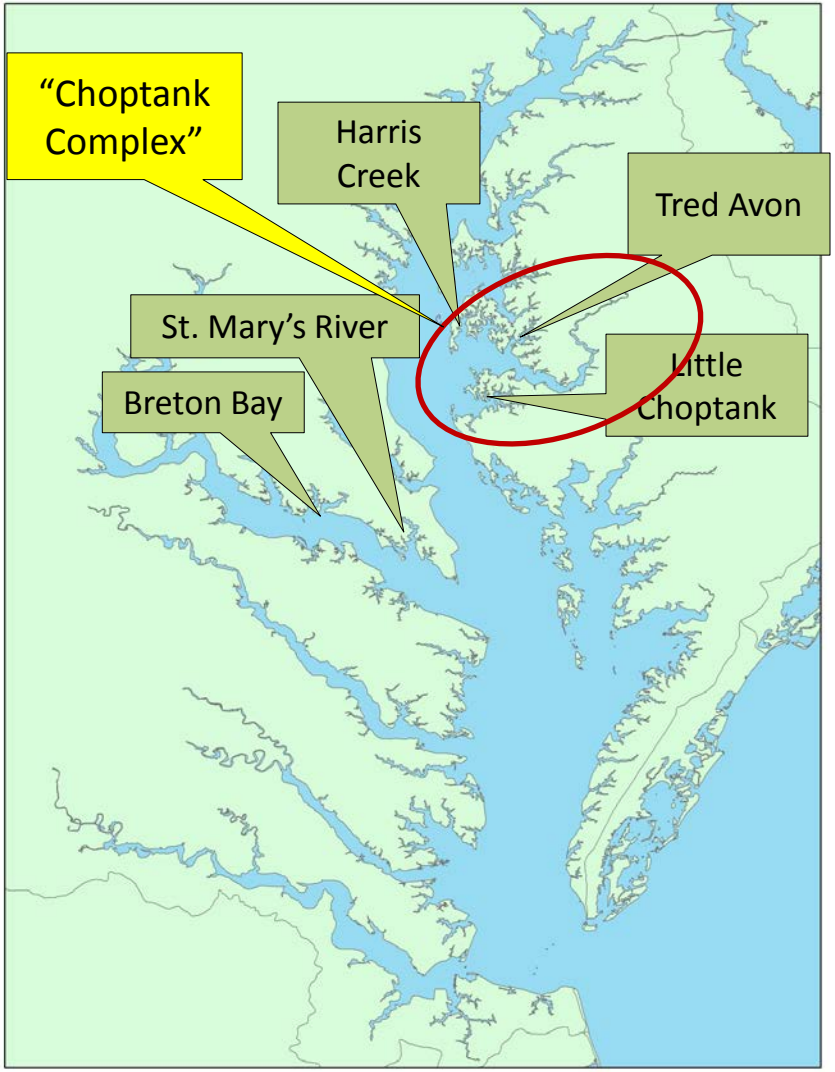
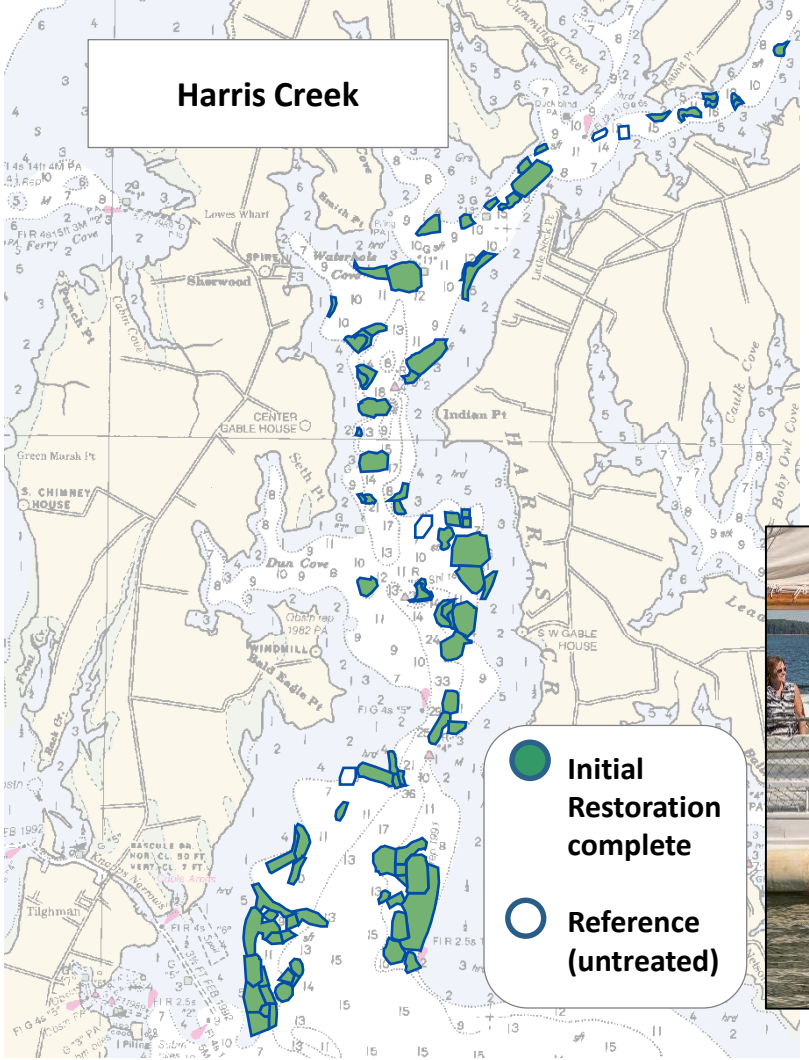
Progress in Maryland

Maryland

Maryland Interagency Oyster Restoration Workgroup

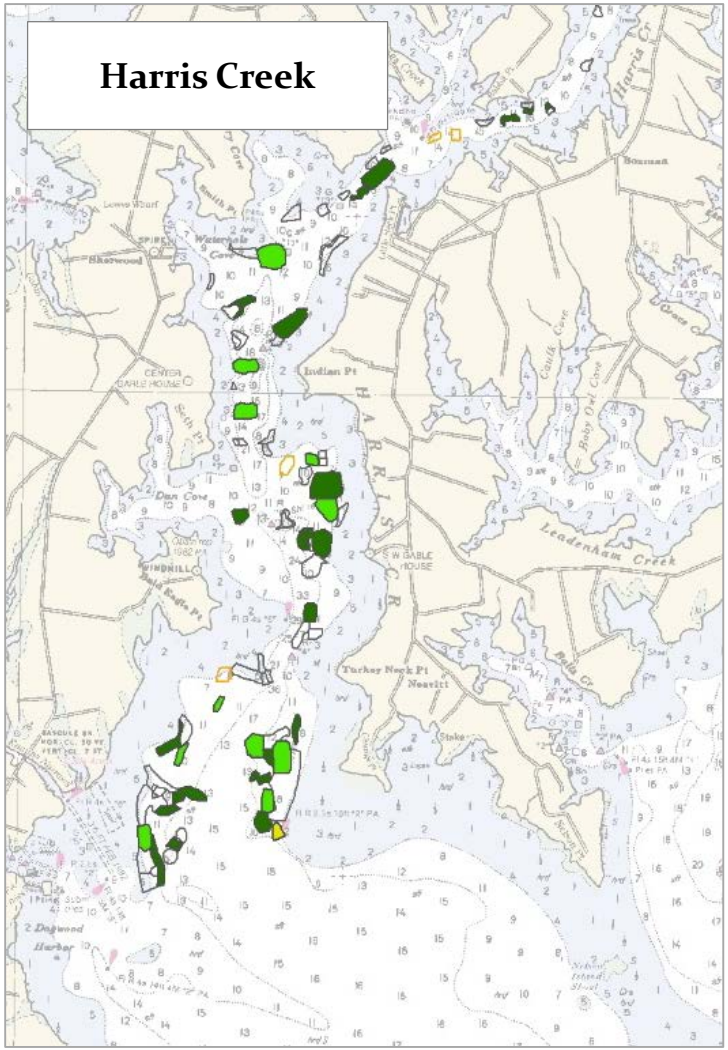
- NOAA *(chair)*
- Army Corps of Engineers-Baltimore District
- MD Dept. Natural Resources
- Oyster Recovery Partnership
- Trib-specific consulting scientists





Initial Restoration
Complete Sept 2015

- Started in 2011
- 350 acres
- 2.5 billion oyster seed (produced by Univ of MD & Chesapeake Bay Foundation)
- $28.34 million



Monitoring:

Each reef monitored three years and six years post restoration

- Built 2012 = monitored in 2015;
- Built 2013 = monitored in 2016;
- Built 2014 = being monitored now.

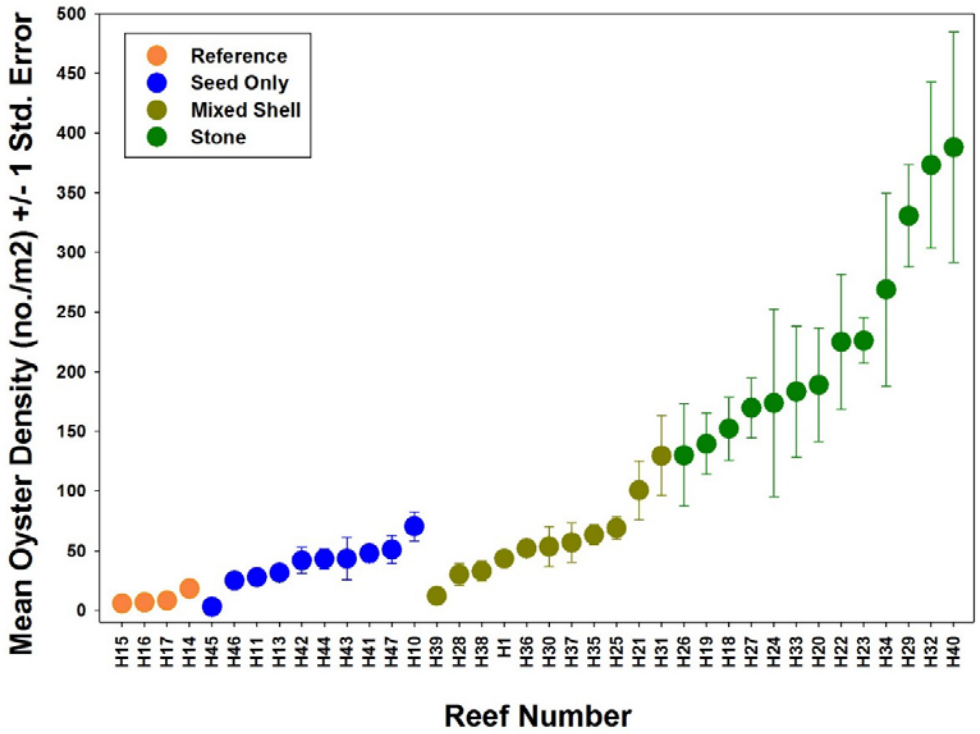
Results:

192 acres monitored to date (2015 & 2016 combined)

- 98% meet Oyster Metrics minimum threshold for biomass & density
- 60% also meet Oyster Metrics target for biomass & density;
- 2% fail to meet minimum threshold

Harris Creek

Mean oyster density on each Harris Creek 2013 cohort reef (monitored in 2016) by restoration treatment type



Reefs constructed using a stone base average over three times the oyster density found on the shell-base reefs.

2016 monitoring report: https://chesapeakebay.noaa.gov/images/stories/pdf/2016oysterreefmonitoringreport.pdf

2015 monitoring report: https://chesapeakebay.noaa.gov/images/stories/habitats/hc3ydcheckinjuly2016.pdf

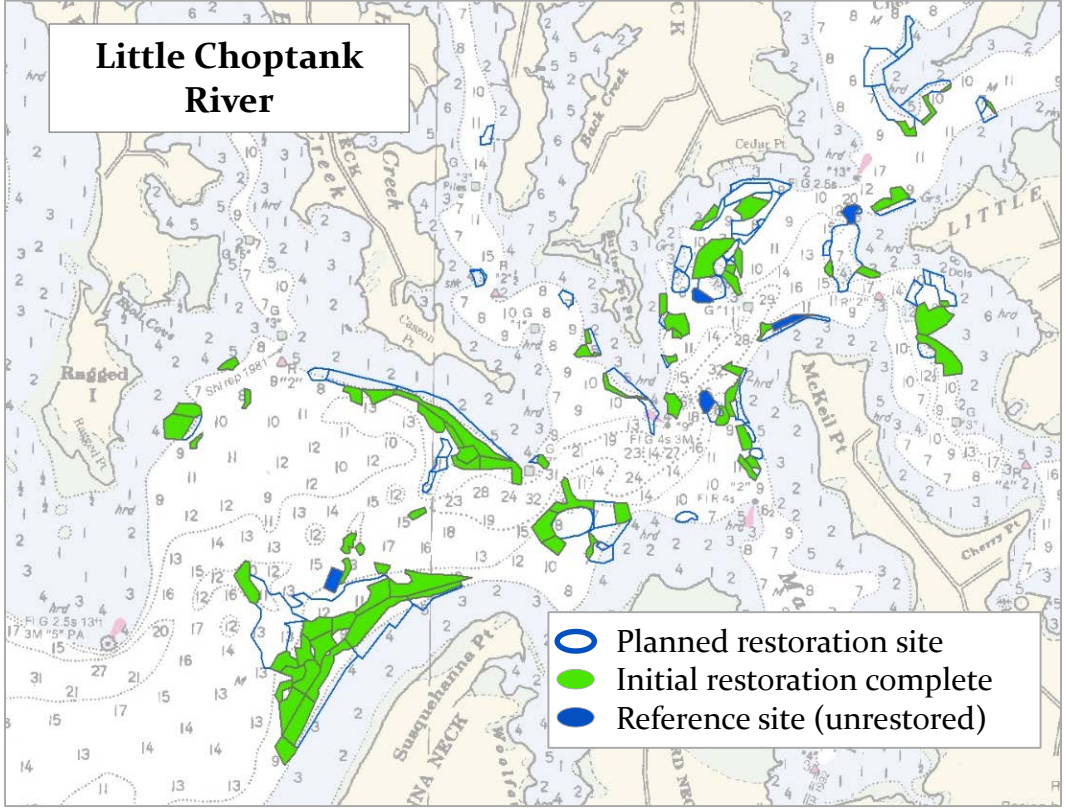
Mature oysters on stone substrate base, Harris Creek restoration site

11/15/2017

Photo by Oyster Recovery Partnership

- Harris Creek alone is the largest sanctuary oyster restoration project in the United States.

- Scientists/ resource managers have visited from:
  - China
  - New Zealand
  - Australia
  - Germany
  - Denmark
  - The Netherlands
  - The United Kingdom



Tributary Plan ('Blueprint')

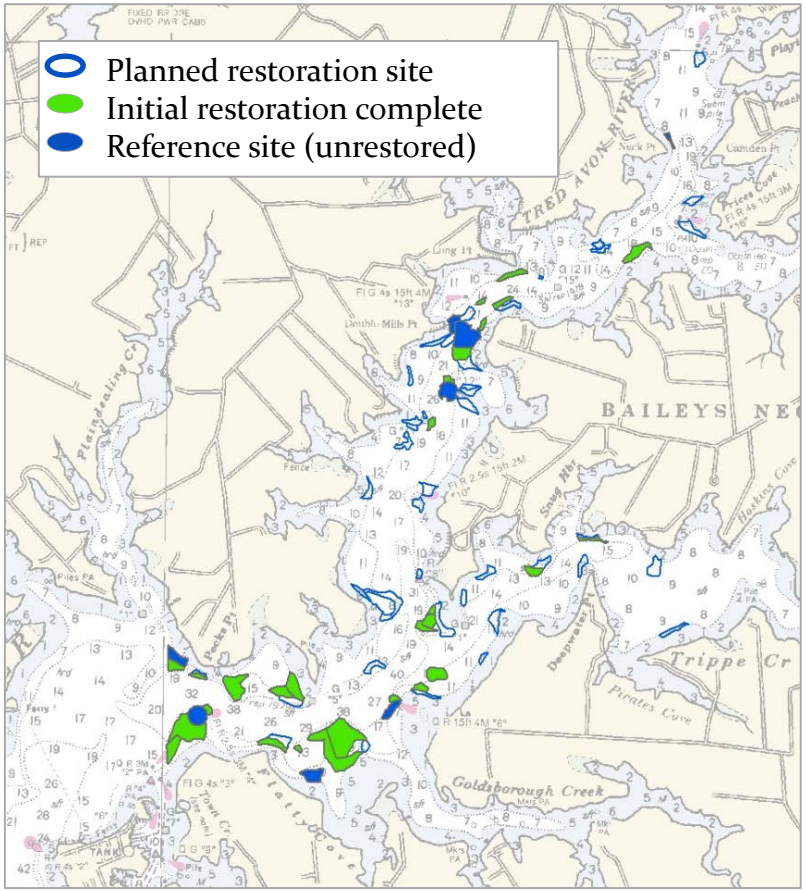
- Oyster Metrics goal = 340-680 acres
- Restoration target = 440 acres

Implementation

- Restoration complete on 239 acres
- 1.1 billion spat on shell planted (produced by University of MD & Chesapeake Bay Foundation)


Photo:
Oyster Recovery Partnership

Tred Avon River



Draft Tributary Plan ('Blueprint')

- Oyster Metrics goal = 125- 250 acres
- Restoration target = 147 acres

Implementation

- Restoration complete on 80.8 acres;
- 380 million spat-on-shell planted (produced by University of MD & Chesapeake Bay Foundation)

Before *(Tred Avon River)* and After *(Harris Creek)*

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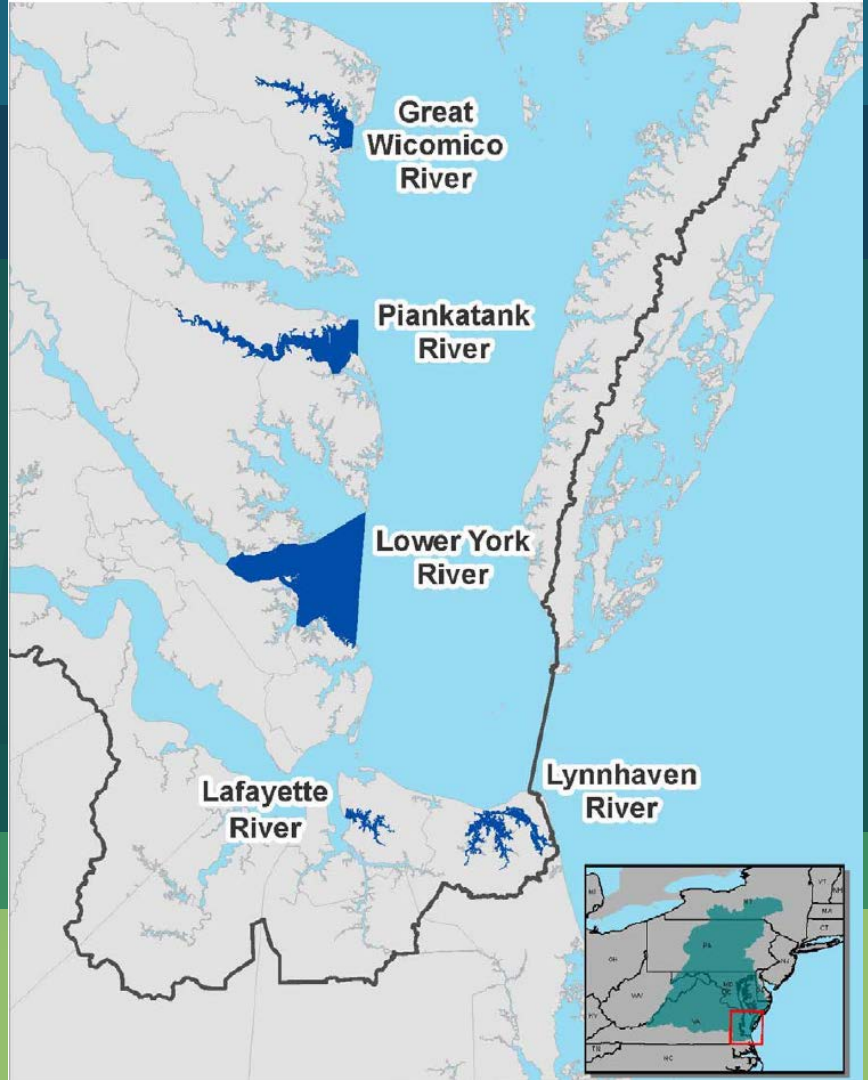
Progress inVirginia

Virginia Oyster Restoration Map:

- Five Selected Tributaries: Piankatank, Lynnhaven, Lafayette, Great Wicomico, and Lower York.
- 2017 Restoration efforts focused on Piankatank, Lafayette, and Lynnhaven Rivers.
- Stakeholders include:

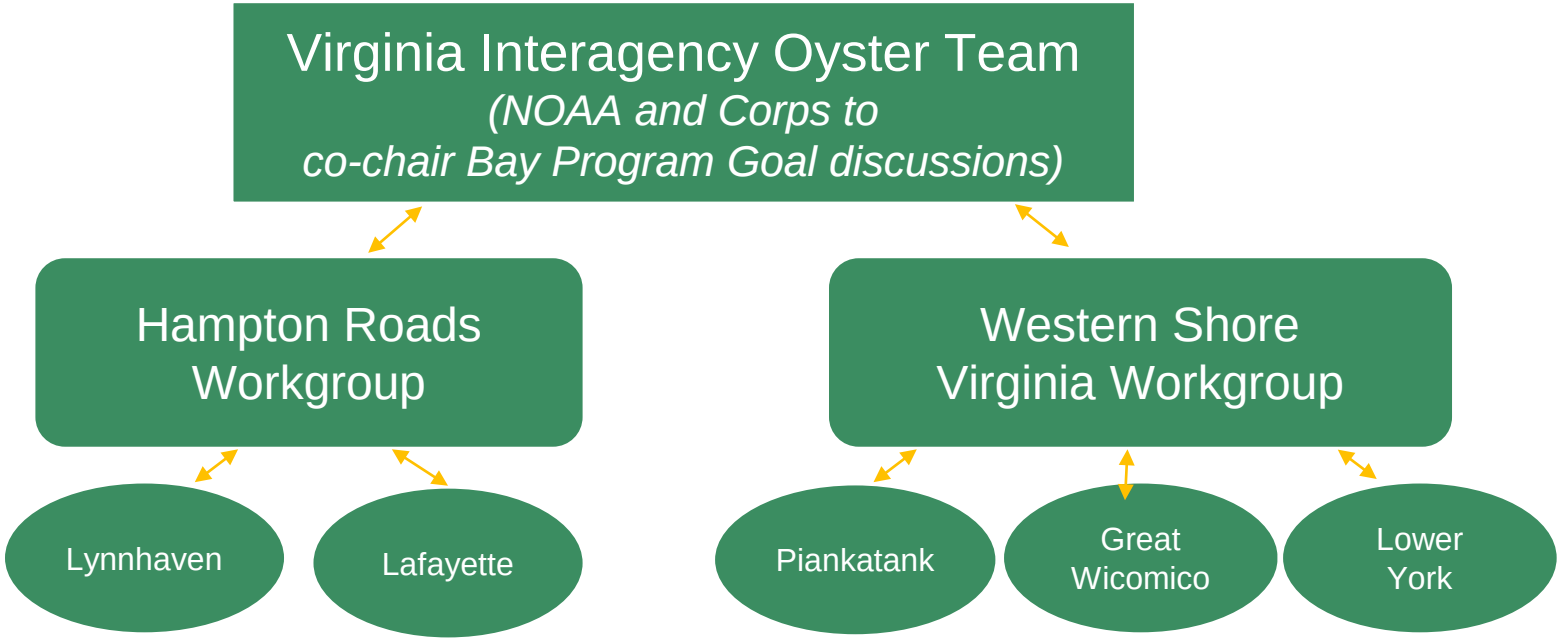


Restructuring of Virginia's Tributary Teams

Old Structure 5 Separate Groups	New Structure 2 Separate Groups
Lafayette Lynnhaven	Hampton Roads Workgroup
Piankatank Great Wicomico Lower York	Western Shore Virginia Workgroup

Chesapeake Bay Program Oyster Restoration Outcome 10 tributaries by 2025

Sustainable Goal Implementation Team: Fisheries Goal



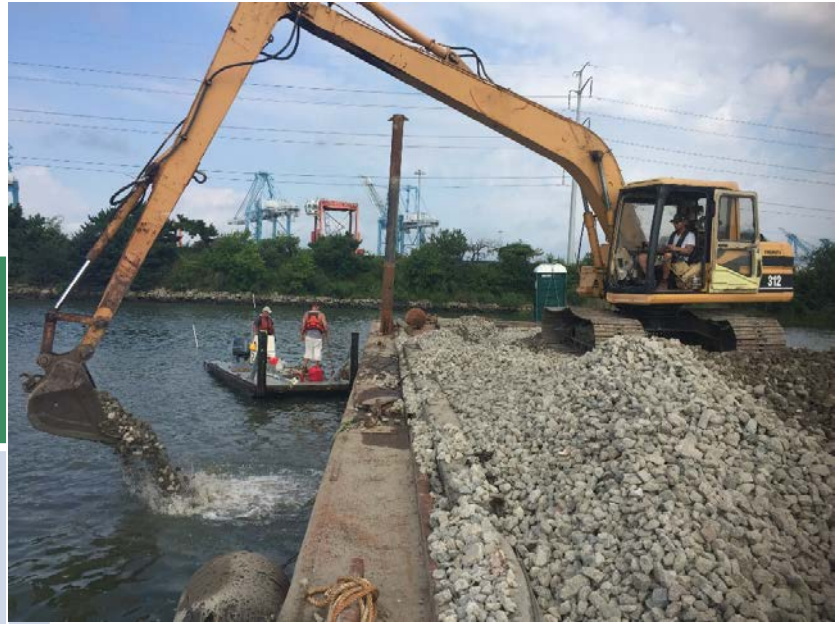
Decision Making Structure for Virginia Workgroups

- Current workgroups have overlapping members.
- Progress toward various milestones will occur simultaneously in multiple tributaries.
- Efficiencies in time and resources are anticipated for agencies.
- Workgroup progress on restoration milestones will be reported at the Virginia Interagency Oyster Team Meeting to ensure a standardized approach.

NOAA and USACE will report progress toward the CBP goal to the Sustainable Fisheries Goal Implementation Team

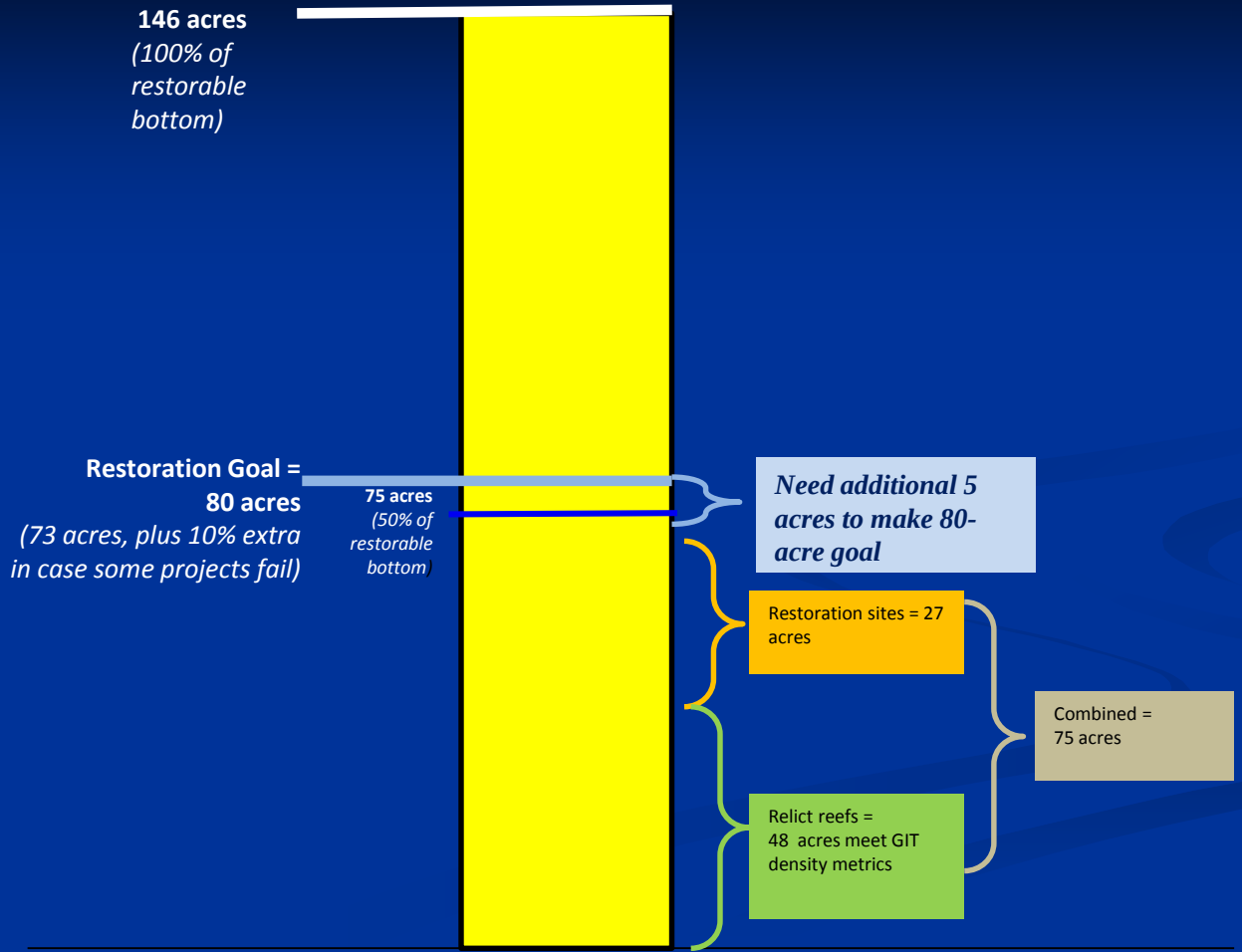
Lafayette River

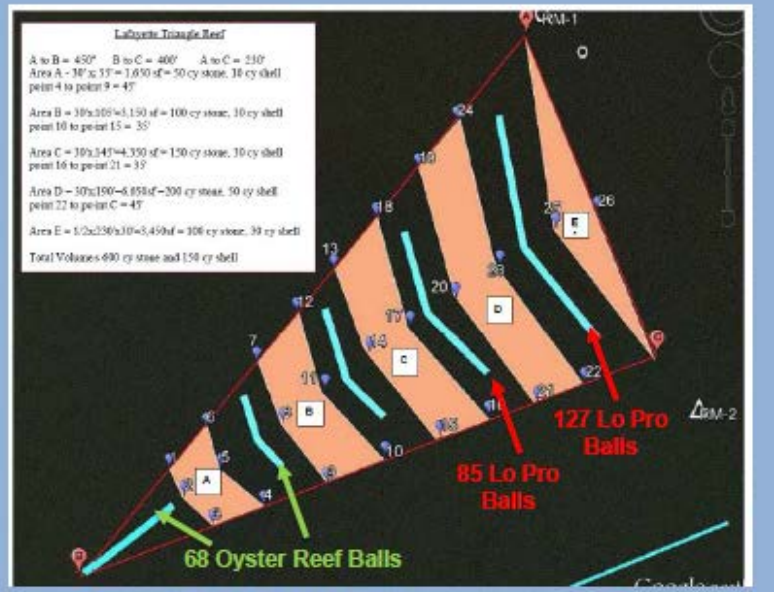
Restoration Goal	Total Restored	Remaining
80 acres	75 acres *(Relict = 48; Restoration Projects = 27)*	5 acres



- The Lafayette River Geodatabase was developed by the Workgroup with spatial information relevant to oyster restoration.
- Elizabeth River Project (ERP) and Chesapeake Bay Foundation (CBF) constructed 1.4 acres with National Fish and Wildlife Foundation Hurricane Sandy Resilience Program (FY 2016 funding)
- ERP and CBF constructed 4.5 acres of reef habitat (crushed concrete and reef balls) with funding from NOAA.
- ERP and CBF received $400K to construct remaining 5.0 acres with National Fish and Wildlife Foundation Funding from the Chesapeake Bay Program

Lafayette River Oyster Restoration Goal





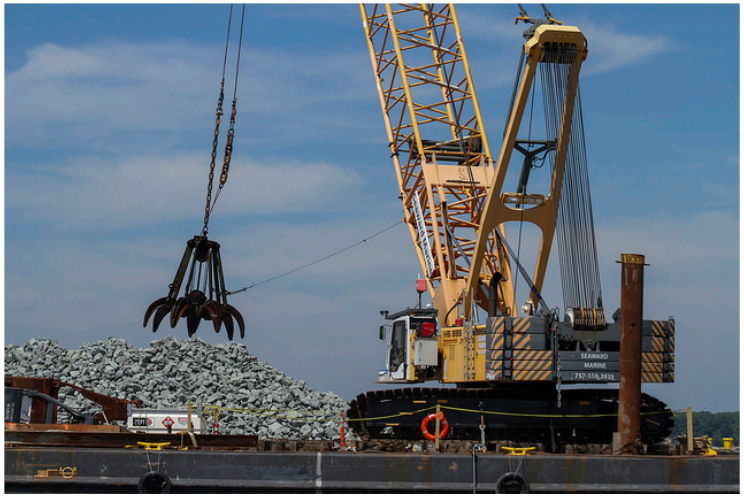
Bay Ball 21"T x 30"W
Lo Pro 18"T x 24"W
Oyster 12"T x 18"W

CHESAPEAKE BAY FOUNDATION
Saving a National Treasure

Restoring the Lafayette River

Piankatank River (25 acres)

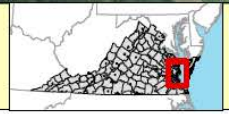
Restoration Goal	Total Restored	Restored in 2017	Remaining
TBD	253 acres *(Baseline = 203 ; restoration projects = 50)*	25 acres	TBD



- In 2017, USACE constructed a 25-acre granite reef with spaced, linear rows.
- VCU added 300 bushels of spat-on-shell to the Fishing Point Reef constructed in 2015.
- The Piankatank Geodatabase was updated with the latest information from USACE and VMRC.
- The Piankatank Oyster Workgroup analyzed VOSARA data to determine the tributary contains 203 acres of successful, existing reefs.

US Army Corps of Engineers
Norfolk District

Chesapeake Bay Oyster Recovery Project
Piankatank River, Virginia
May 2017



0 600 1,000 2,000 3,000 Feet
0 250 500 1,000 Meters

Projection:
Virginia State Plane
South Zone - NAD 83
U.S. Survey Feet

Base Map:
ESRI Online Imagery

Project Manager: Kimberly A. Prisco-Baggett
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Phone: (757) 201-7873

Prepared by: Karin Dridge
Geospatial Section

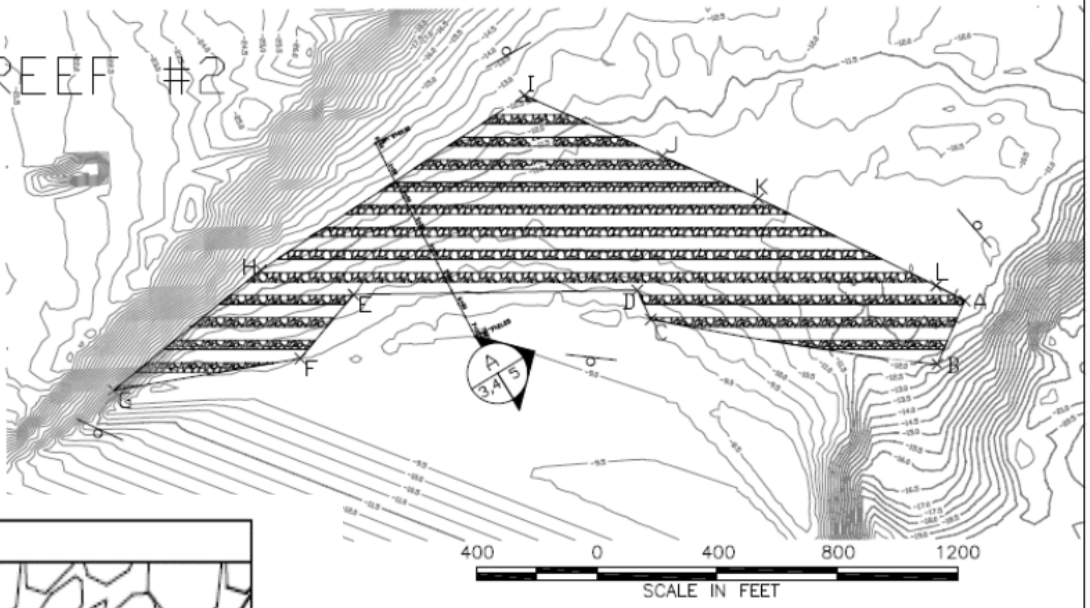
Map File: Piankatank_Sites_May_2017.mxd
Map Date: May 17, 2017

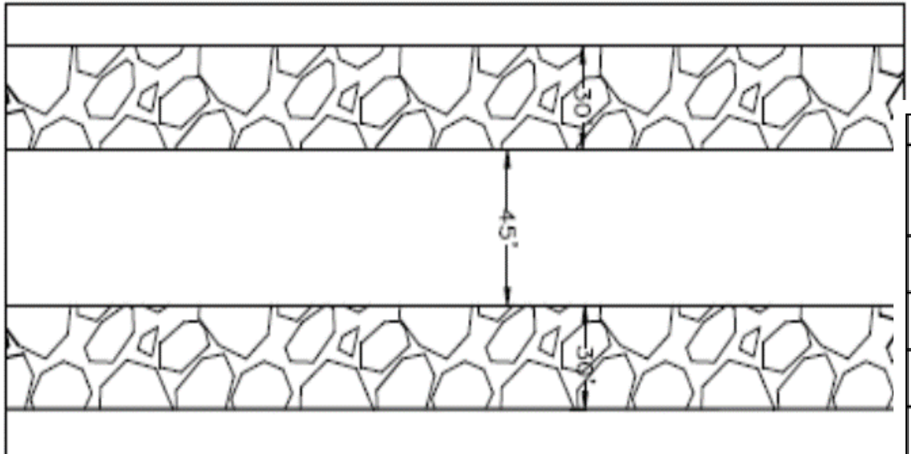
LEGEND:

REEF STONE PLACEMENT/CONSTRUCTION AREAS

REEF SIGNAGE (SEE SHEET HH–205 FOR DETAIL)

NOTE:
SEE SHEET HH–202 FOR BASE BID AREAS AND OPTIONS.





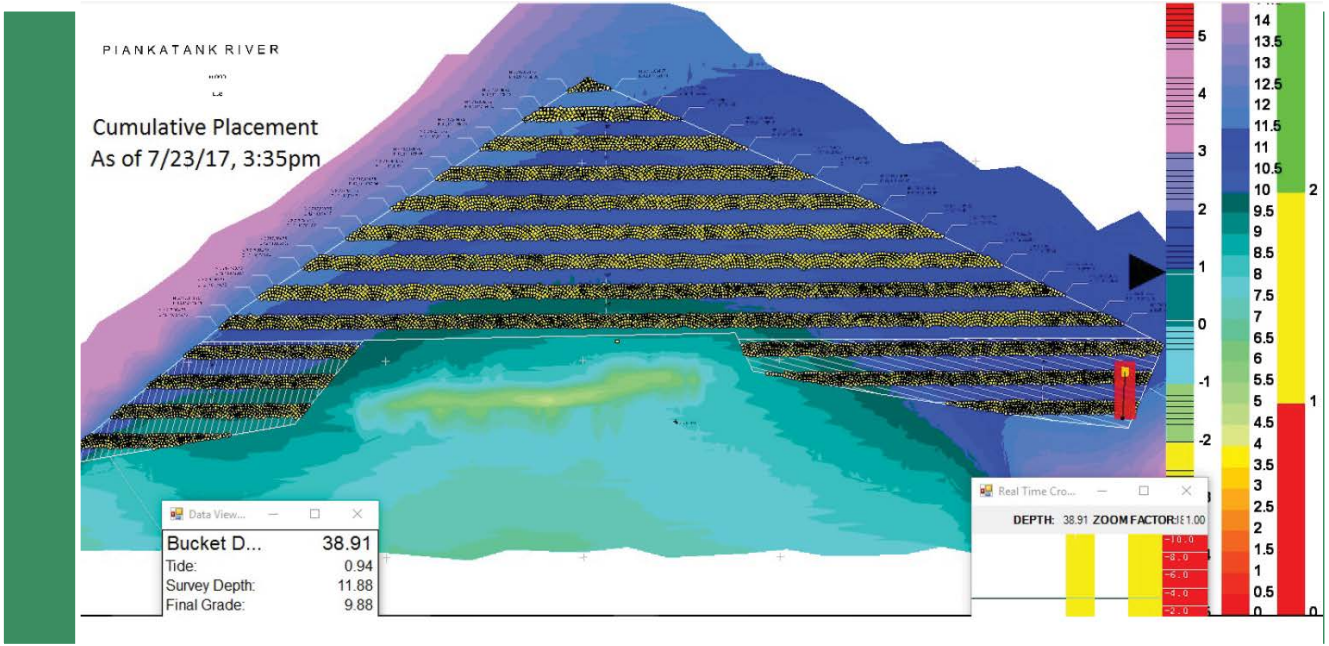
REEF #2 STONE QUANTITIES				
	TOTAL REEF ACREAGE	ACREAGE OF STONE PLACEMENT	CUBIC YARDS	TONS
Base Bid	18.60	7.10	11,400	20,500
Option 1	3.80	1.80	2,800	5,100
Option 2	2.80	1.20	1,900	3,400
TOTAL:	**25.20**	**10.10**	**16,100**	**29,000**

US Army Corps of Engineers ®

Norfolk, VA

FINAL SUBMITTAL

Piankatank River



Employed the use of “Clamvision” for tracking placement by the contractor.

Piankatank River

Stakeholders from the entire Chesapeake Bay Watershed dedicating the reef in the Piankatank (June 2017).

Piankatank Reef Facts

25 acres of reef coverage in a spaced linear alignment
29,034 tons of quarried granite used
9.5 barges loaded to complete the project
Each barge load=3,400 tons of granite

Project Duration May 17 – July 24 (about 9 weeks)
Total Cost: $2,082,699

Lynnhaven River (2 acres)

Restoration Goal	Total Restored	Restored in 2017	Remaining
TBD	56 acres	2 acres	TBD

- Lynnhaven River Now constructed 2 acres of reef habitat in the Western Branch of the Elizabeth River.
- NOAA completed survey work in high priority restoration areas in shallow areas of the eastern and western branches. An estimate for restorable oyster habitat was developed.
- Currently restorable oyster habitat will be determined and a Restoration blueprint will be created

Great Wicomico River

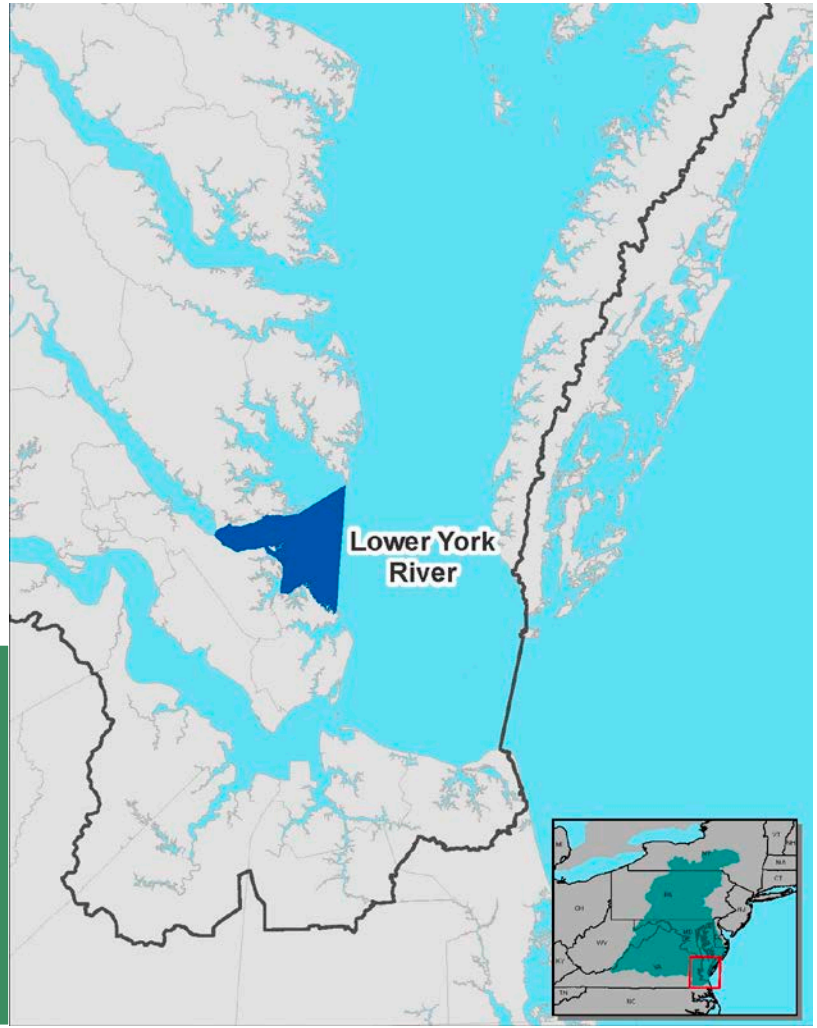
Restoration Goal	Total Restored	Restored in 2017	Remaining
TBD	61 acres	0 acres	TBD

- Selected as one of the next tributaries for oyster restoration in Virginia.
- In 2003 and 2004, USACE used shell to create 85 acres of reef habitat.
- To date 61 acres meet the Oyster Metrics Success criteria. Reef rehabilitation and adaptive management has occurred over time.
- The population of oysters in Great Wicomico has been self-sustaining since 2004.

Lower York River

Restoration Goal	Total Restored	Restored in 2017	Remaining
TBD	TBD	0 acres	TBD

- The Western Shore Virginia Workgroup plans to initiate oyster restoration planning in the York in 2018.



Virginia Outlook 2018

Lafayette – ERP and CBF plan to construct the final 4.5 acres in the Lafayette to achieve preliminary "Restoration" status.

Piankatank – Population surveys and monitoring are planned. Currently restorable habitat will be determined by the Workgroup and a Restoration Blueprint will be created describing goals, the process, and cost estimates.

Lynnhaven - The USACE plans to conduct monitoring/survey work. USACE and the City of Virginia Beach are planning a multipurpose restoration project in the Lynnhaven River to restore 31 acres of reef habitat – funding is uncertain but not likely for 2018.

Great Wicomico – The USACE plans to conduct monitoring/survey work.

Lower York – Tributary planning will begin in 2018. NOAA plans to conduct oyster habitat survey work.

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Summary of Progress Bay-Wide Progress

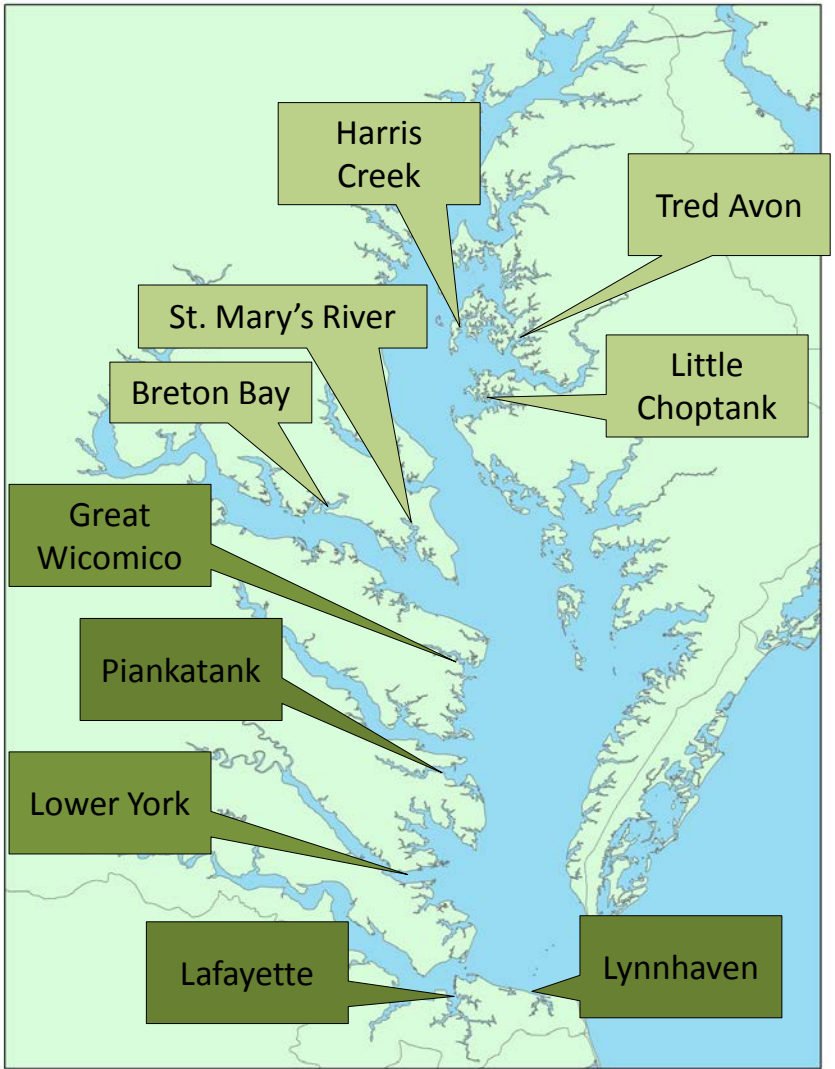
What is our Bay-wide progress?

Maryland

Selected Tributaries:
- **Harris Creek**
- **Little Choptank**
- **Tred Avon**
- **St Mary's *(recommended)***
- **Breton Bay *(recommended)***

Virginia

Selected Tributaries:
- **Lafayette**
- **Lynnhaven**
- **Piankatank**
- **Great Wicomico**
- **Lower York**



What is our Bay-wide progress?

- Ten tributaries selected/ recommended Bay wide.
- Four completed restoration plans
- Initial restoration complete in one tributary; 2nd expected in 2018.
- 803 acres of restoration projects Bay wide (133 in VA; 670 in MD)
- Monitoring phase started in one tributary; 98% of monitored reefs there meet Oyster Metrics success criteria three years post restoration.

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Challenges:

Challenges

- Funding and cost-share limitations.
- Availability of substrate for reef construction.
- Real Estate access can lead to project delays
- Poaching of restored reefs and funding availability for enforcement of reef protection
- Oyster disease and water quality issues
- Continued partnerships

Discussion

Extra Slides

Presentation template by SlidesCarnival.

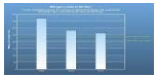
Agreement Goals and Outcomes

Sustainable Fisheries

- Blue Crab Abundance
- Blue Crab Management
- Oyster
- Forage Fish
- Fish Habitat

Vital Habitats Goal

- Wetlands
- Black Duck
- Stream Health
- Brook Trout
- Fish Passage
- Submerged Aquatic Vegetation (SAV)
- Forest Buffer
- Tree Canopy



Water Quality Goal

- 2017 Watershed Implementation Plans (WIP)
- 2025 WIP
- Water Quality Standards Attainment and Monitoring

Toxic Contaminants Goal

- Toxic Contaminants Research
- Toxic Contaminants Policy and Prevention

Healthy Watersheds Goal

- Healthy Waters

Stewardship Goal

- Citizen Stewardship
- Local Leadership
- Diversity

Land Conservation Goal

- Protected Lands
- Land Use Methods and Metrics Development
- Land Use Options Evaluation

Public Access Goal

- Public Access Site Development

Environmental Literacy Goal

- Student
- Sustainable Schools
- Environmental Literacy Planning

Climate Resiliency Goal

- Monitoring and Assessment
- Adaptation Outcome

https://www.facebook.com/smithsonian.serc/videos/vb.108894722462749/1600116880007185/?type=2&theater