January 2020

Update to the Sustainable Fisheries GIT

Oyster Restoration Progress under the '10 Tributaries' Initiative

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Overviw of Oyster Restoration Framework

2014 Chesapeake Bay Watershed Agreement Oyster Outcome:

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 Oyster Outcome.*
- *Called 'Oyster Metrics' or 'GIT Metrics'*
- *On-the-ground restoration is now planned & built to meet these Metrics; monitored relative to them.*

Key Steps for Tributary Restoration

- Develop GIS geodatabase of spatial data
- Survey and characterize the river bottom and oyster population
- Define 100% of ‘currently restorable oyster habitat’ (‘CROH’)
- Set a restoration target (50% to 100% of ‘CROH’)
- Draft a tributary restoration plan (‘Blueprint’)
- Identify funding
- Implement and track restoration work
- Monitor success
- Adaptively manage

State-specific Updates

- All numbers are PRELIMINARY; end-of-year accounting underway

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Progress in Maryland

Photo: Oyster Recovery Partnership

MD Oyster Restoration Workgroups

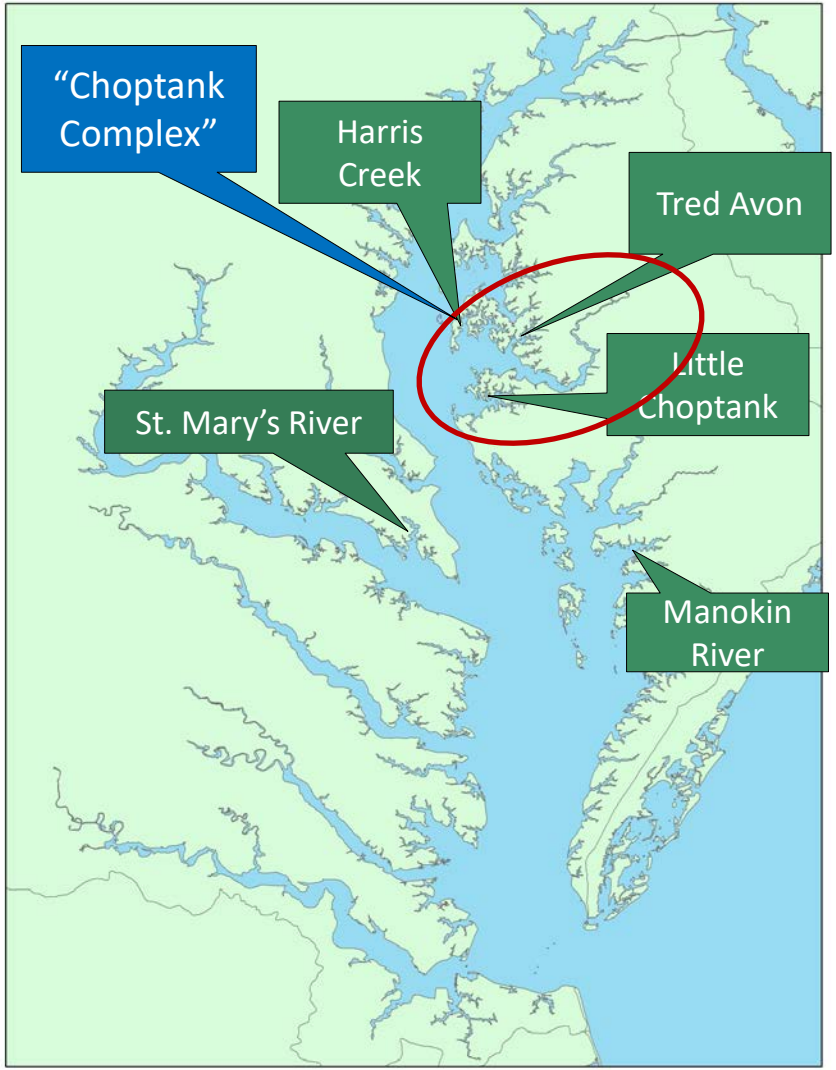
Sustainable Fisheries Goal Implementation Team

Community Consultants

MD Interagency Oyster Restoration Workgroup

Scientific Consultants

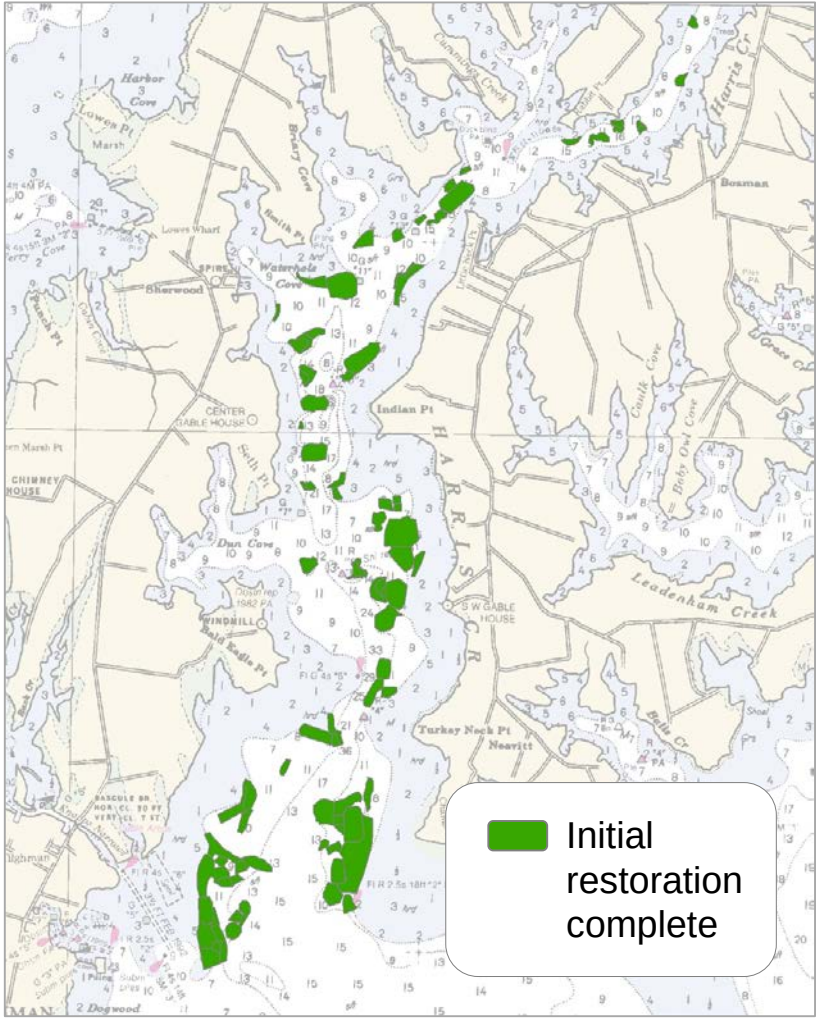
MD Target Tributaries for Large-Scale Oyster Restoration



Harris Creek: Restoration Status

Restored under the '10 Tribs' initiative	**350 acres** *(completed in 2015)*
Oyster seed planted	**2.49 billion**
Funds spent on in-water implementation*	**$28.56 million**

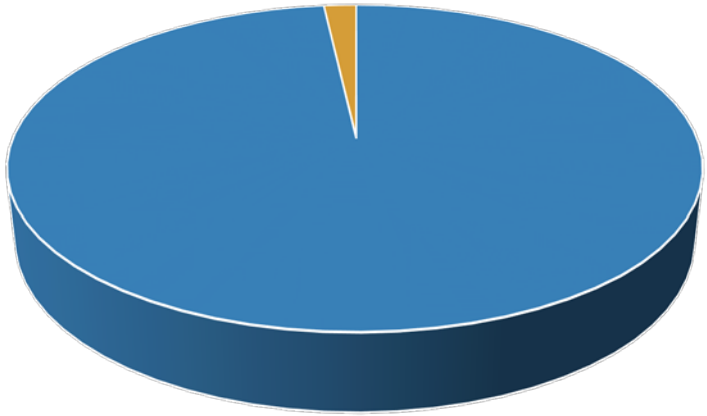
**Funds expended on reef construction and seeding.*
Associated costs, such as benthic surveys, oyster population surveys, planning, permitting, and monitoring are not reflected.



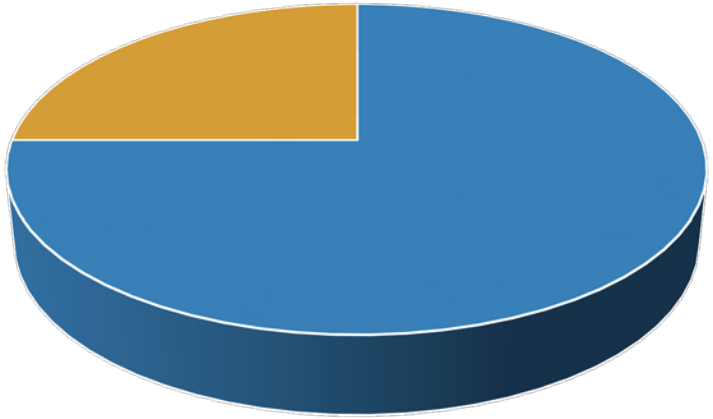
Harris Creek: Monitoring

- 3-year-old reefs monitored in 2015, 2016, 2017, 2018.
- 6-year-old reefs monitored in 2018.
- 2019 monitoring underway.

Harris Creek
Monitoring Results 2015- 2017



- 98% (55 of 56 restored reefs monitored) met minimum threshold oyster density & biomass



- 75% (42 of 56 restored reefs monitored) met higher, target oyster density & biomass

Harris Creek: Ecosystem services and Economic Impact

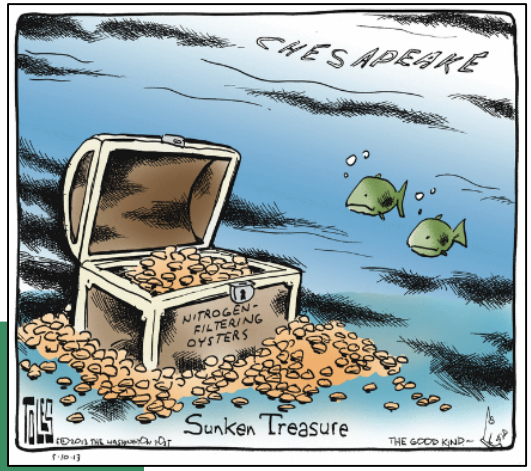
Graphic: M. Lisa Kellogg, VIMS

Nitrogen and phosphorous reductions:

- Restored reefs annually remove nitrogen and phosphorous equivalent to:
  - ≈ 20,000 bags of 10-10-10 fertilizer, [1]
  - ≈ 12 stacks of fertilizer bags equal in height to the Washington Monument[1]
- Estimated $3 million annually in nitrogen and phosphorous reductions[1]

1. M.L. Kellogg, M.J. Brush, J.C. Cornwell. 2018. An Updated Model for Estimating the TMDL Related Benefits of Oyster Reef Restoration. Virginia Institute Marine Science and University of Maryland (funded by NOAA, Nature conservancy, Oyster Recovery Partnership)

Choptank Complex Ecosystem services and Economic Impact



Regional Economic Impacts from Commercial Fisheries ***(Harris, Little Choptank, Tred Avon combined)***

- Fully mature reefs (10 years post restoration) relative to pre-restoration status, are predicted to[2]:
  - Generate 160% increase in blue crab harvest
  - Increase annual dockside fisheries by $11 million (‘direct effect’)
  - Increase annual total regional economic impact by $23 million (‘direct + indirect + induced effects’)
  - Generate 319 annual jobs

2. S. Knoche et al. 2019. Final Report, Morgan State University PEARL (funded by NOAA)

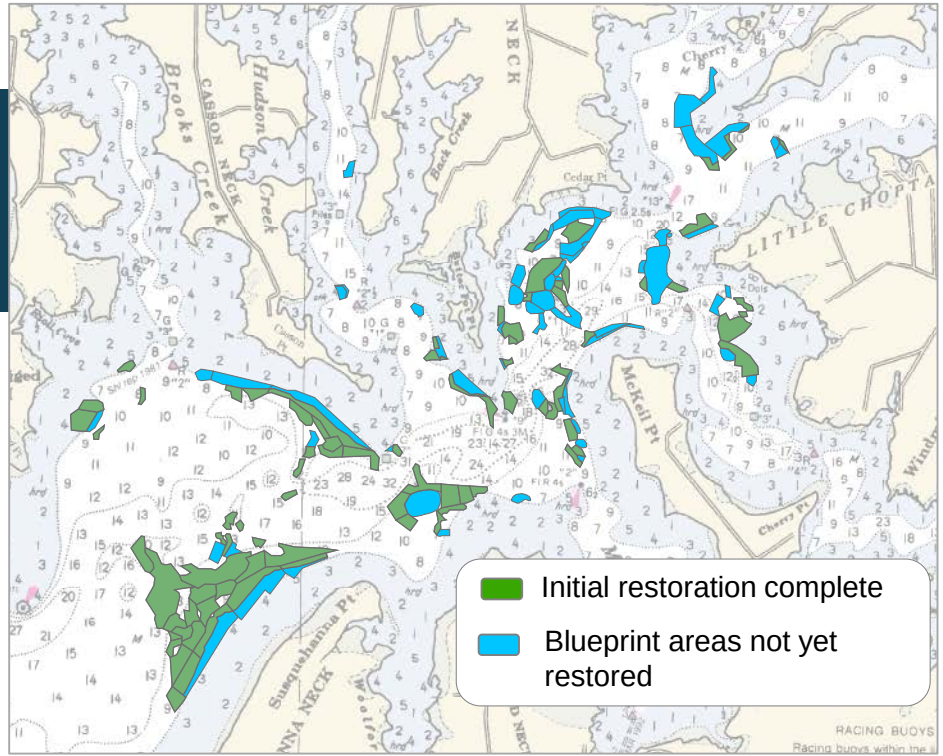
Harris Creek: International Recognition

- Harris Creek alone is the largest sanctuary oyster restoration project in United States; likely the world.
- Scientists/ resource managers have visited from: New Zealand, Australia, South Korea, China, Germany, Denma The Netherlands, Scotland, England
- Featured in ‘Restoration Guidelines for Shellfish Reefs’

Image: Reddit

Little Choptank River

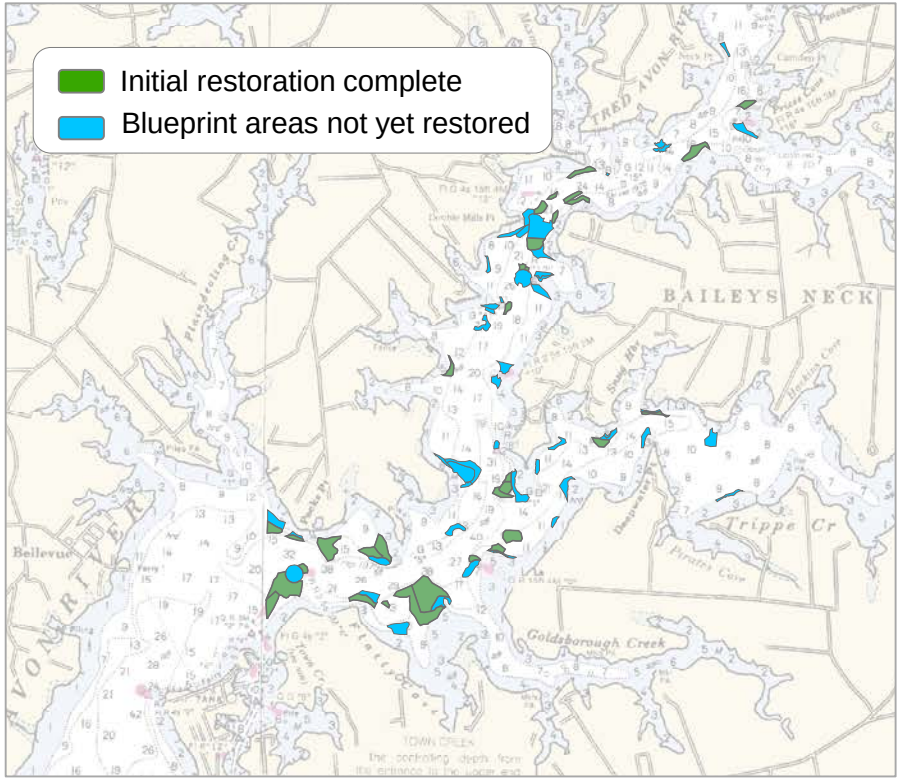
Blueprint goal	**440 acres** *(343 acres = min threshold)*
Restored under the '10 Tribs' initiative	**351 acres** *(8 acres in 2019)*
Oyster seed planted	**1.69 billion** *(45 million in 2019)*
Funds spent on in-water implementation*	**$22.59 million** *($1.15 million in 2019)*
Remaining	***7 acres are planned for 2020 seeding***



**Funds expended on reef construction and seeding. Associated costs, such as benthic surveys, oyster population surveys, planning, permitting, and monitoring are not reflected.*

Tred Avon River

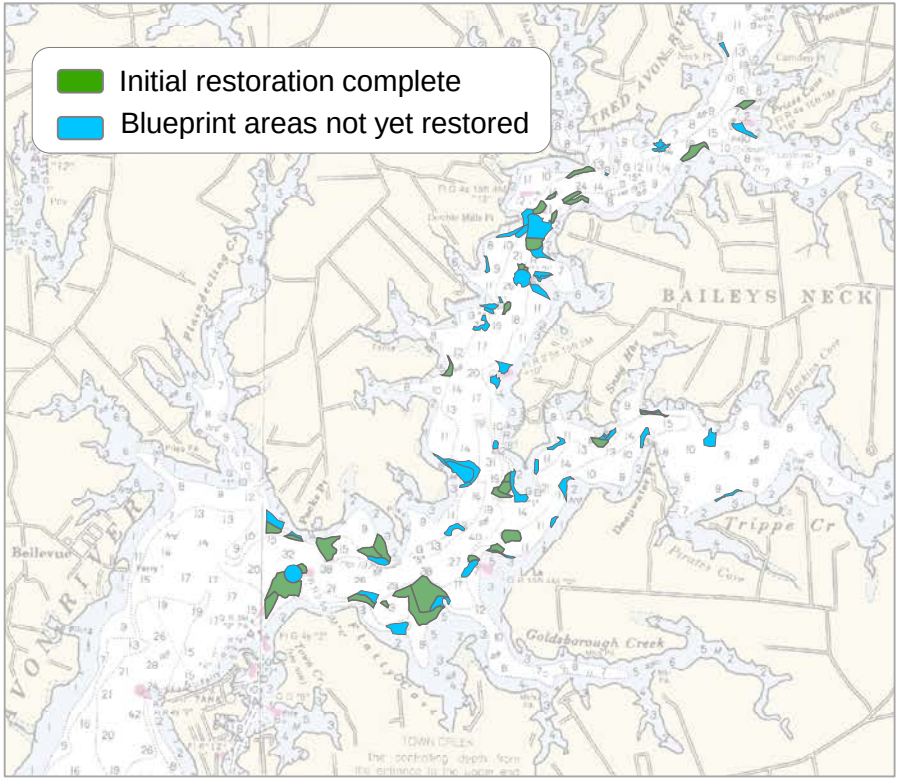
Blueprint goal	**147 acres** *(125 acres = min threshold)*
Restored under the '10 Tribs' initiative	**87 acres** *(3 acres in 2019)*
Oyster seed planted	**440 million** *(23.48 million in 2019)*
Funds spent on in-water implementation*	**$5.87 million** *($605,000 in 2019)*
Remaining to meet the Blueprint goal	**60 acres** *(38 acres to meet min threshold)*



**Funds expended on reef construction and seeding.*
Associated costs, such as benthic surveys, oyster population surveys, planning, permitting, and monitoring are not reflected.

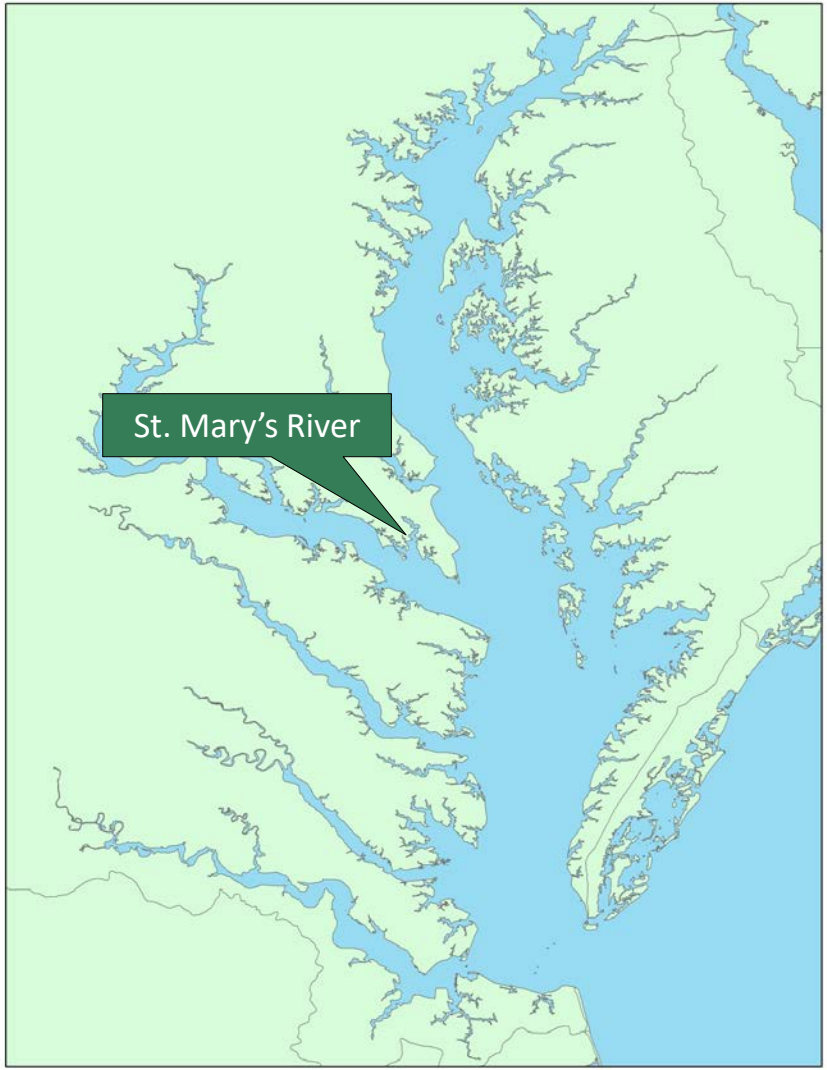
Tred Avon River

- 38 more acres needed to meet the 50% minimum threshold ‘CROH’
- Approx. 40 acres of substrate reef construction are pending USACE funding. The earliest restoration could occur would be Dec 2020.



St. Marys River

- GIS geodatabase established
- Pre-restoration sonar and oyster population surveys complete
- Workgroup developed a *draft* Blueprint and set a *draft* goal of 60 acres *(35 acres 'premet')*
- DNR applied for permit to construct substrate reefs *(approx. 10 acres)*
- Oyster plantings to start in spring/ summer 2020



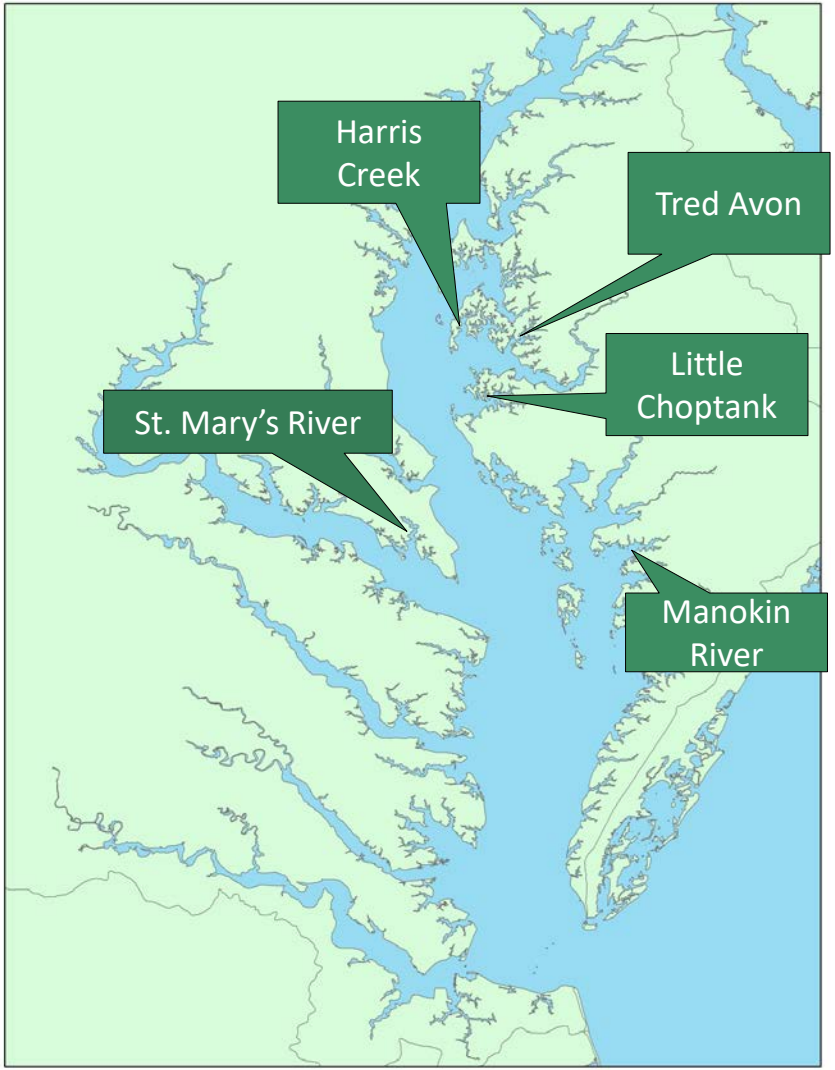
Manokin River
(designated in June 2019)

- GIS geodatabase established
- Pre-restoration oyster population survey ongoing
- Pre-restoration sonar survey wrapping up
- Draft restoration goal set of 441 acres *(20 acres 'premet')*
- Oyster plantings may start as early as summer 2020

Maryland Progress Summary

- 5 tributaries selected
- 3 Blueprints complete; remaining 2 are in draft form
- 1 tributary complete; 2nd likely in 2020
- Plantings likely starting in the 2 final tributaries in 2020 (St Marys and Manokin)
- 788 acres restored to date under the '10 tribs' initiative
- $57.02 million dollars spent on in-water* restoration

**Funds expended on reef construction and seeding. Associated costs, such as benthic surveys, oyster population surveys, planning, permitting, and monitoring are not reflected.*



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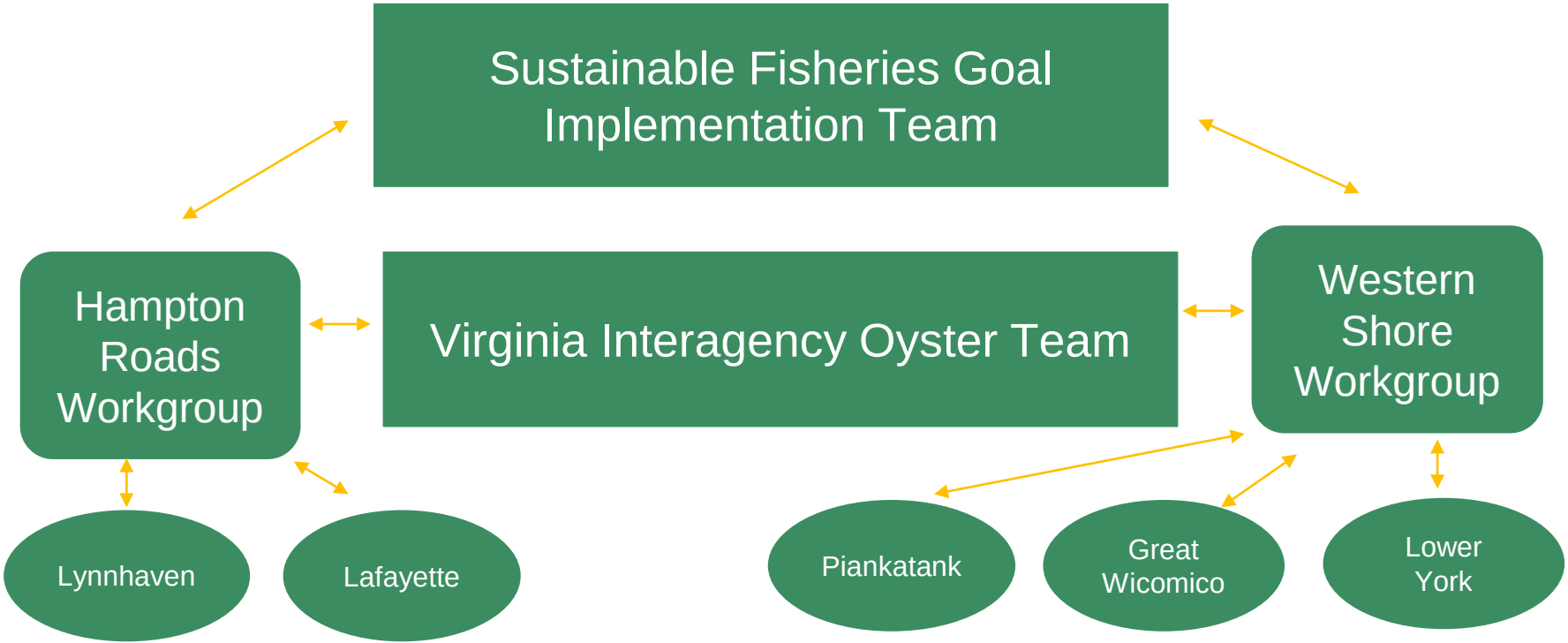
Progress inVirginia

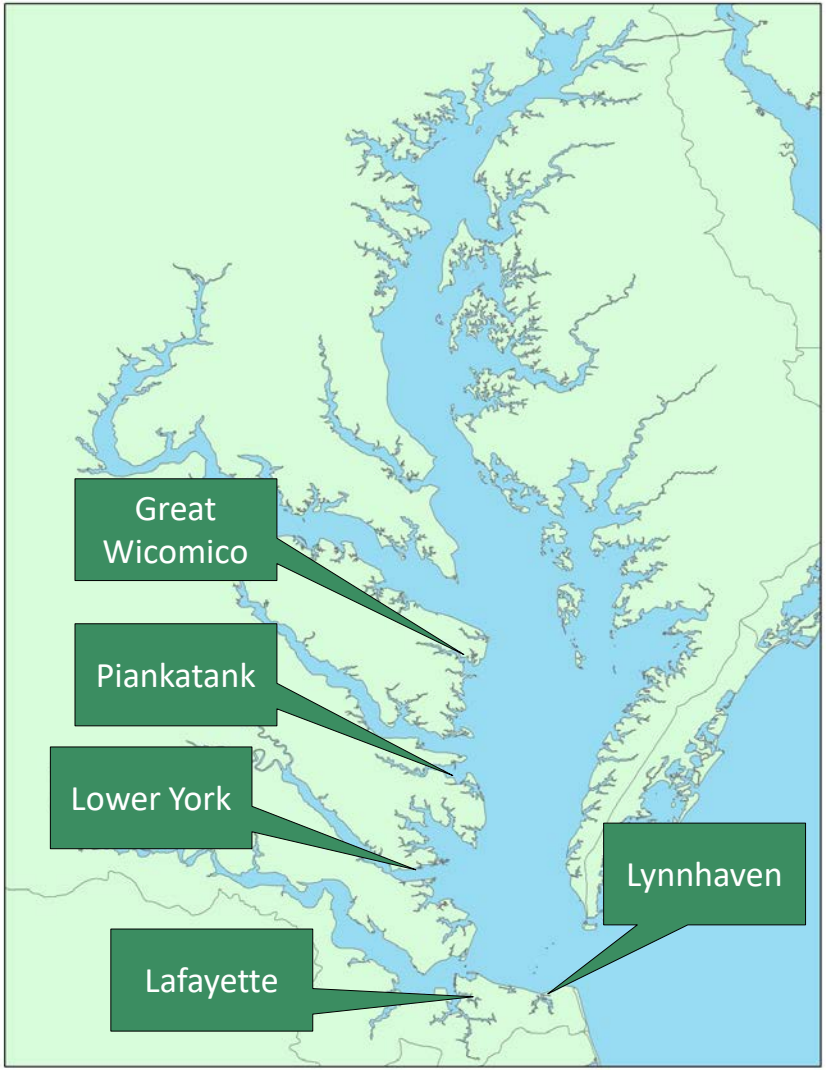
Virginia Oyster Restoration Workgroups



Virginia Oyster Restoration Workgroups

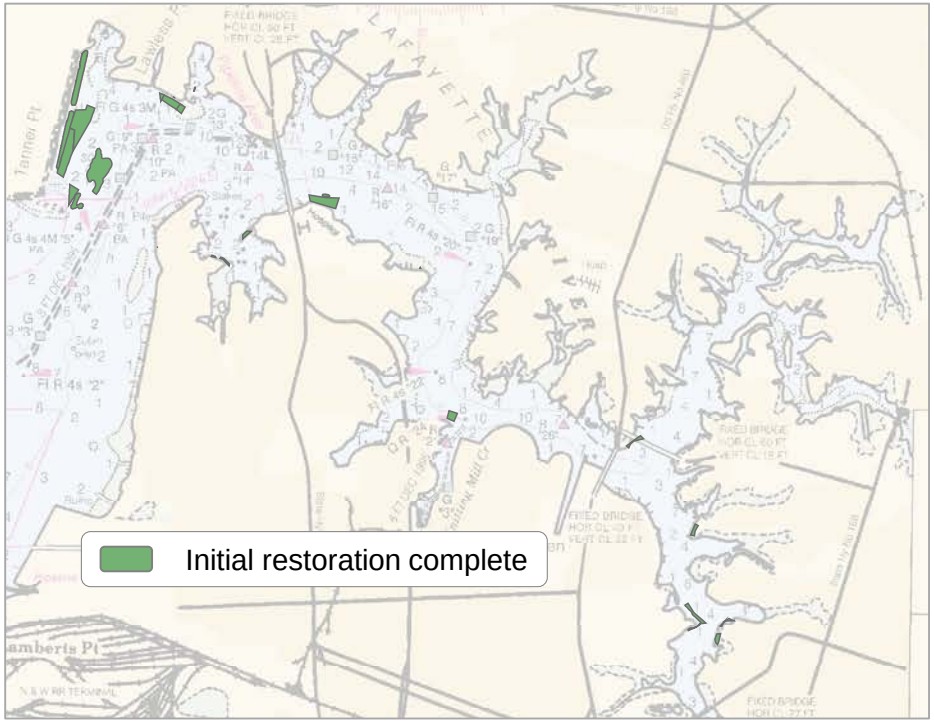
Members include:

Virginia Target Tributaries for Large-Scale Oyster Restoration



Lafayette River

Blueprint goal	**80 acres** *(70 acres 'premet')*
Restored under the '10 Tribs' initiative	**12 acres** *(Trib completed in 2018)*
Funds spent on in-water implementation*	**$716,000**



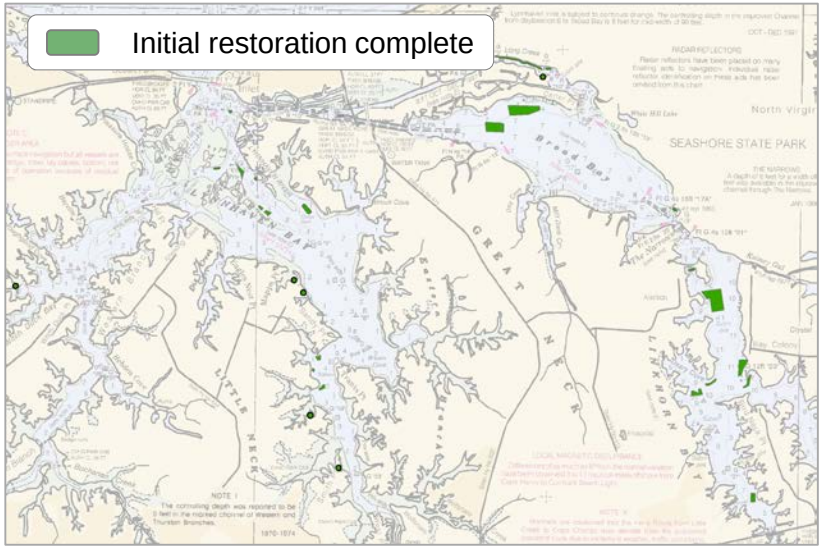
**Funds expended on reef construction and seeding.*
Associated costs, such as benthic surveys, oyster population surveys, planning, permitting, and monitoring are not reflected.

Lafayette River

- Entering the monitoring phase.
- Developing a monitoring plan for the river.
- Monitoring has been done by various partners on some reefs; working to ensure a cohesive, consistent approach to see how reefs perform relative to Oyster Metrics success criteria.

Lynnhaven River

Blueprint goal	**152 acres** *(91 acres 'premet')*
Restored under the '10 Tribs' initiative	**16 acres** *(14 acres in 2019-VMRC)*
Funds spent on in-water implementation*	**$775,000** *($575,000 in 2019)*
Remaining to meet Blueprint goal	**45 acres**



2019 reef construction not reflected

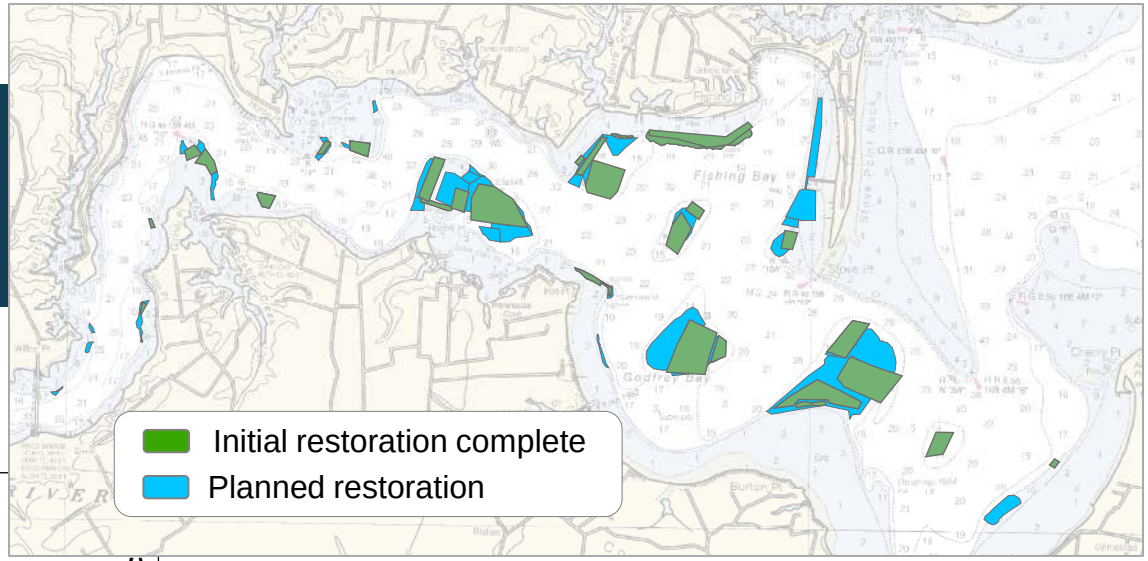
**Funds expended on reef construction and seeding.*
Associated costs, such as benthic surveys, oyster population surveys, planning, permitting, and monitoring are not reflected.

Lynnhaven River –


Photo: CBF/ ERP

- USACE plans to construct up to 8 acres of reef as part of the Lynnhaven River Basin Ecosystem Restoration project.
- CBF and LRN plan to construct an additional 11-13 acres of reef habitat (10-12 acres of crushed concrete & 1 acre shell reef) with funds from the National Fish and Wildlife Foundation.
- Monitoring results will be released in early 2020 that will inform future adaptive management and restoration actions.

Piankatank River



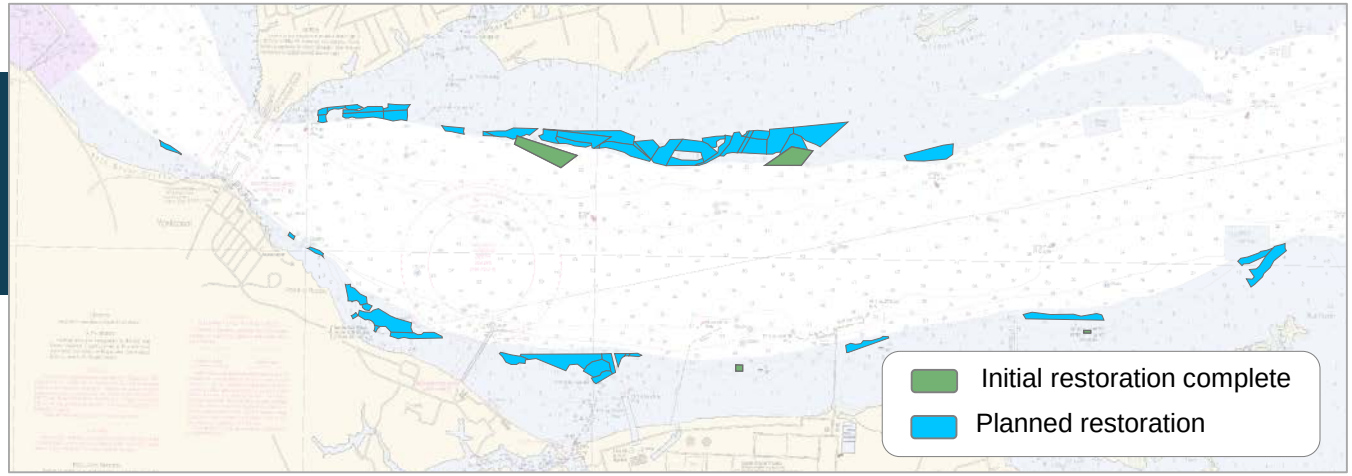
Blueprint goal	**438 acres** *(210 acres 'premet')*
Restored under the '10 Tribs' initiative	**114 acres** *(47 acres in 2019)*
Funds spent on in-water implementation*	**$3.52 million** *($813,300 in 2019)*
Remaining to meet Blueprint goal	**114 acres**

**Funds expended on reef construction and seeding.*
Associated costs, such as benthic surveys, oyster population surveys, planning, permitting, and monitoring are not reflected.

Piankatank River

- USACE plans to construct up to 156 acres, pending funding.
- VMRC (with NOAA and VMRC funding) plans to construct approx. 33 acres in 2020, with additional funds likely over the next three years. First priority will be to complete the Piankatank, then move to other VA target tributaries.
- Monitoring of older restoration projects shows oyster populations are meeting Oyster Metrics density and biomass success criteria.

Lower York



Blueprint goal	**200 acres** *(2 acres'premet')*
Restored under the '10 Tribs' initiative	**33 acres** *(all in 2019)*
Funds spent on in-water implementation*	**$153,600** *(all in 2019)*
Remaining to meet the Blueprint goal	**165 acres**

**Funds expended on reef construction and seeding.*
Associated costs, such as benthic surveys, oyster population surveys, planning, permitting, and monitoring are not reflected.

Lower York

- Blueprint completed in 2019 (this makes 4 of 5 Blueprints complete in VA).
- In 2019, VMRC constructed the first reefs in the Lower York under the ‘10 Trib’ initiative.

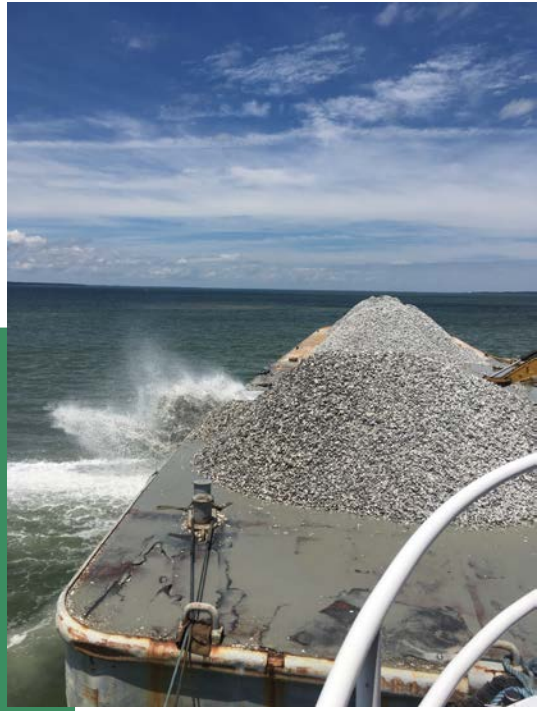


Photo: VMRC

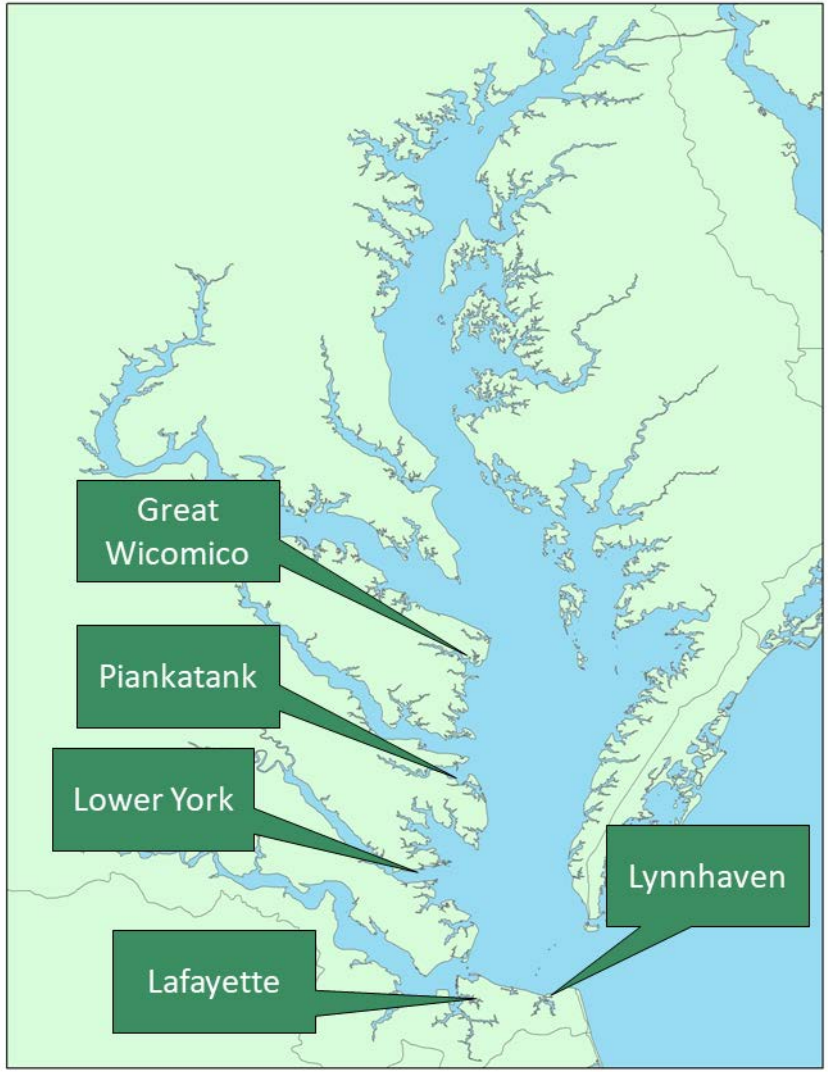
Great Wicomico

- GIS geodatabase established.
- Pre-restoration sonar survey completed in 2019.
- Previous restoration projects: in 2003 and 2004, the Corps/VMRC used shell to create 85 acres of reef habitat. Reef rehabilitation and adaptive management has occurred over time. Most reefs have sufficient oyster densities to be considered ‘premet’.
- Blueprint development planned in 2020.
- Monitoring results from 2019 will be reported in early 2020 to provide an accurate assessment of the existing habitat and baseline acreage.

Virginia Progress Summary

- All 5 tributaries selected
- 4 Blueprints complete (5th likely in 2020)
- 1 tributary complete (Lafayette)
- 174 acres restored to date under the ‘10 tribs’ initiative
- $5.17 million dollars spent on in-water restoration under the ‘10 tribs’ initiative
- 546 of the 870** planned acres listed in VA Blueprints are considered restored (either restored under the ‘10 tribs’ initiative or ‘premet’)

***One trib does not yet have a Blueprint restoration goal*



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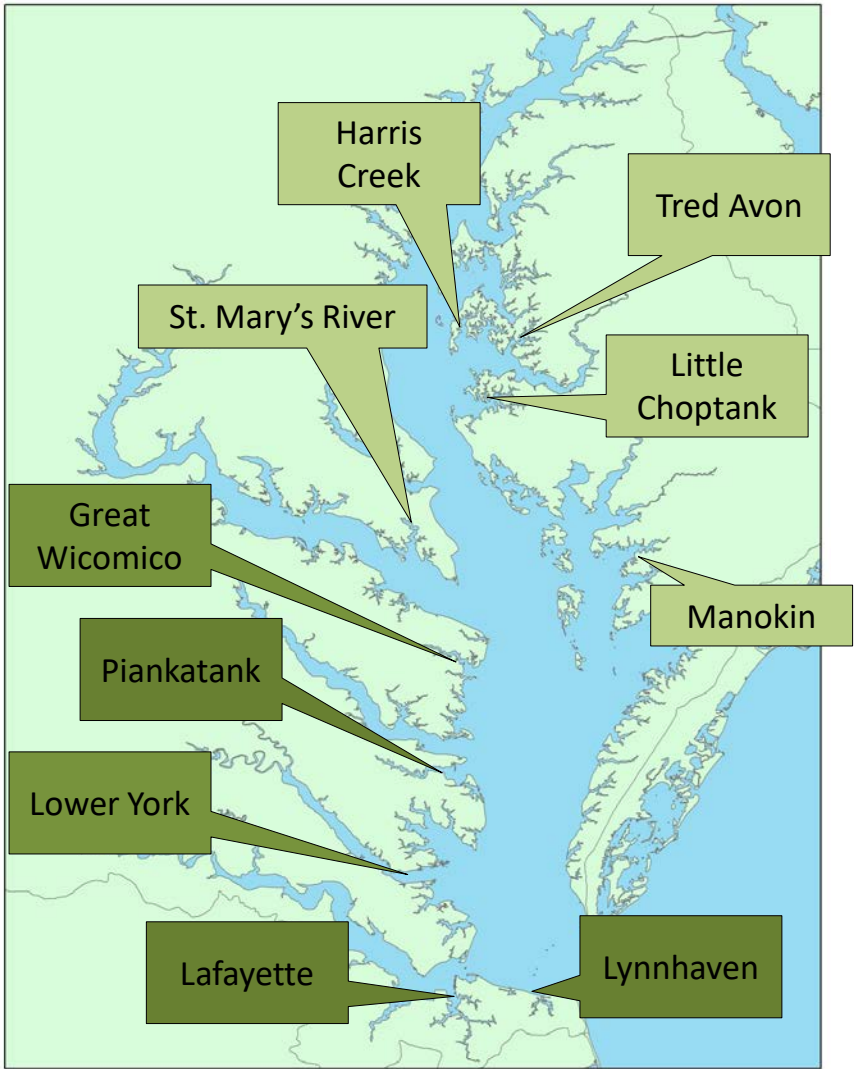
Summary of Bay-Wide Progress

Bay-wide progress summary

- Ten tributaries selected Bay-wide.
- Seven Blueprints complete; two more are in draft form.
- All Blueprints expected to be complete by end 2020.



Bay-wide progress summary

- Initial restoration complete in two tributaries (Harris Creek; Lafayette)
- Third expected in 2020 (Little Choptank)
- Approx 962 acres of restoration Bay wide under the ‘10 Tribs’ initiative
- $62.19 million spent on in-water* restoration under the ‘10 Tribs’ initiaitve
- Monitoring phase under way in three tributaries (Harris; Little Choptank; Tred Avon); monitoring plans under way in Lafayette.
- 98% of MD monitored reefs meet Oyster Metrics min. threshold success criteria three years post restoration.

**Funds expended on reef construction and seeding. Associated costs, such as benthic surveys, oyster population surveys, planning, permitting, and monitoring are not reflected.*

Questions & Discussion