Annual Update

Large-Scale Oyster Restoration in Support of the Chesapeake Bay Agreement Oyster Goal

Stephanie Reynolds Westby, NOAA

Susan Conner, USACE- Norfolk District

Policy Drivers

- Executive Order 13508
- 2014 Chesapeake Bay Agreement

Restore oyster populations in 10 tributaries by 2025

Oyster Metrics

- NOAA, USACE, DNR, VMRC, Army Corps, UMD, VIMS + 17 consulting scientists;
- Developed Bay-wide, consensus definition of 'restored reef' and 'restored tributary';
- On-the-ground restoration is now being planned & built to meet these metrics

Fish GIT Established

- MD & VA Oyster Restoration Workgroups

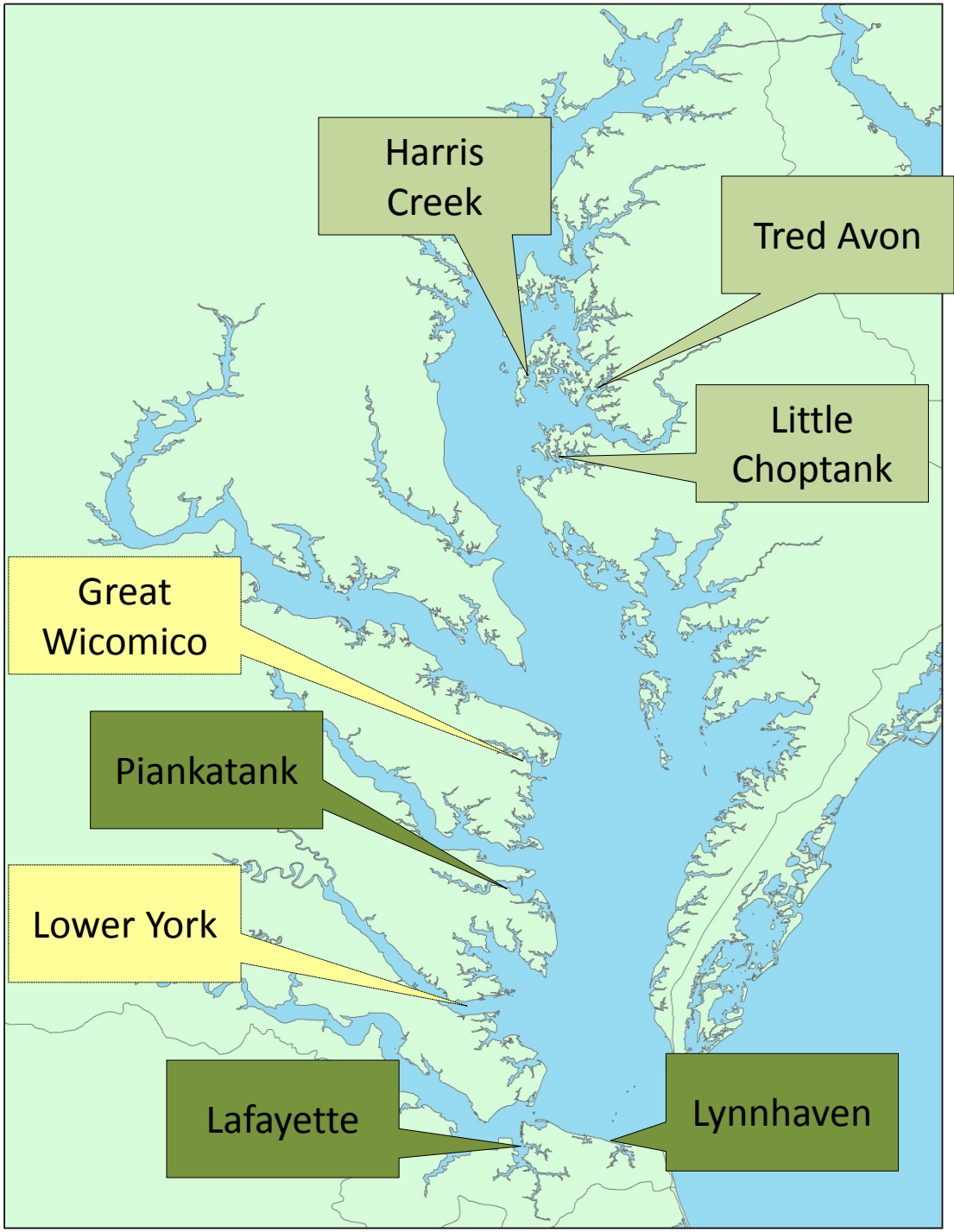
Maryland

Selected Tributaries:
- **Harris Creek**
- **Little Choptank**
- **Tred Avon**

Virginia

Selected Tributaries:
- **Lafayette**
- **Lynnhaven**
- **Piankatank**

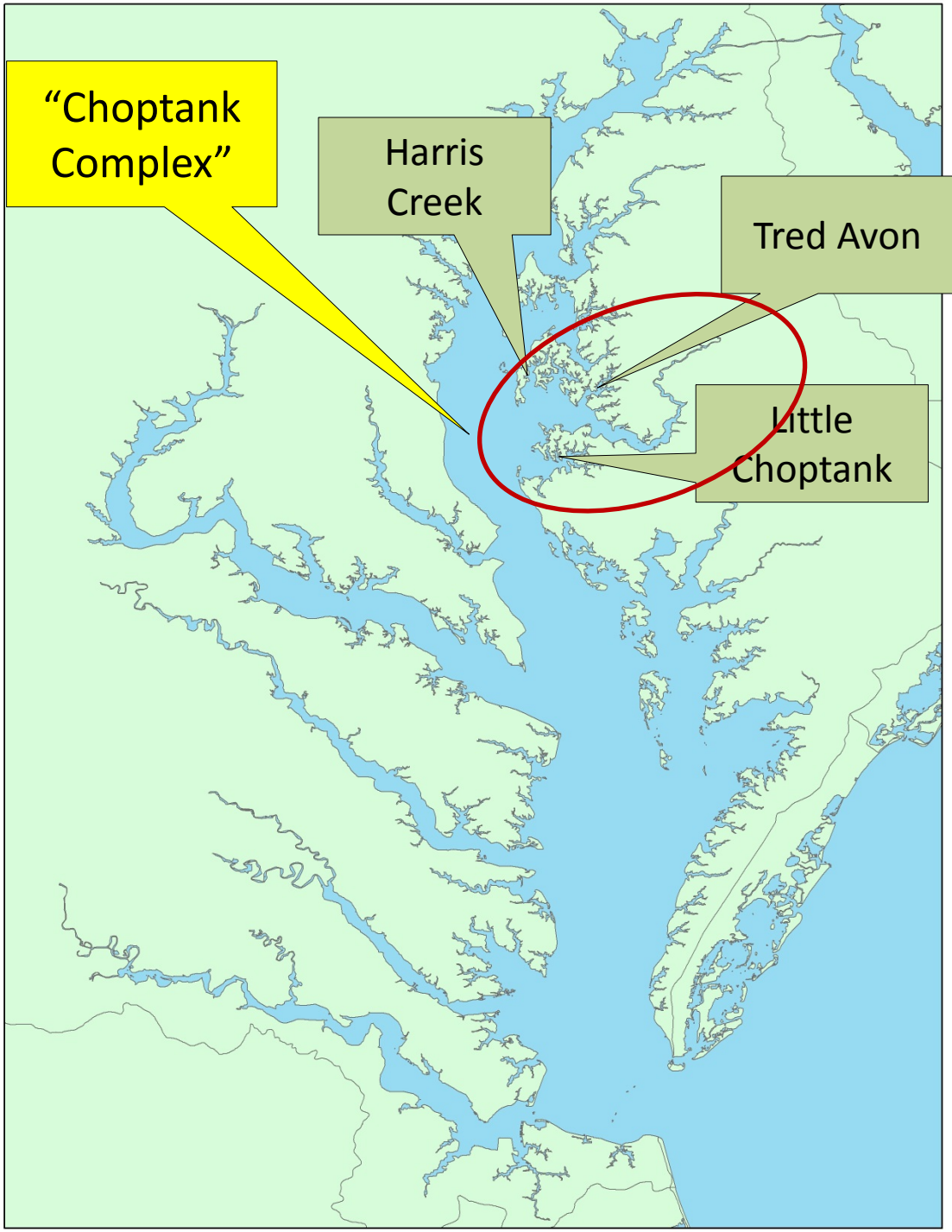
'Preliminarily Selected' Tributaries:
- **Great Wicomico**
- **Lower York**

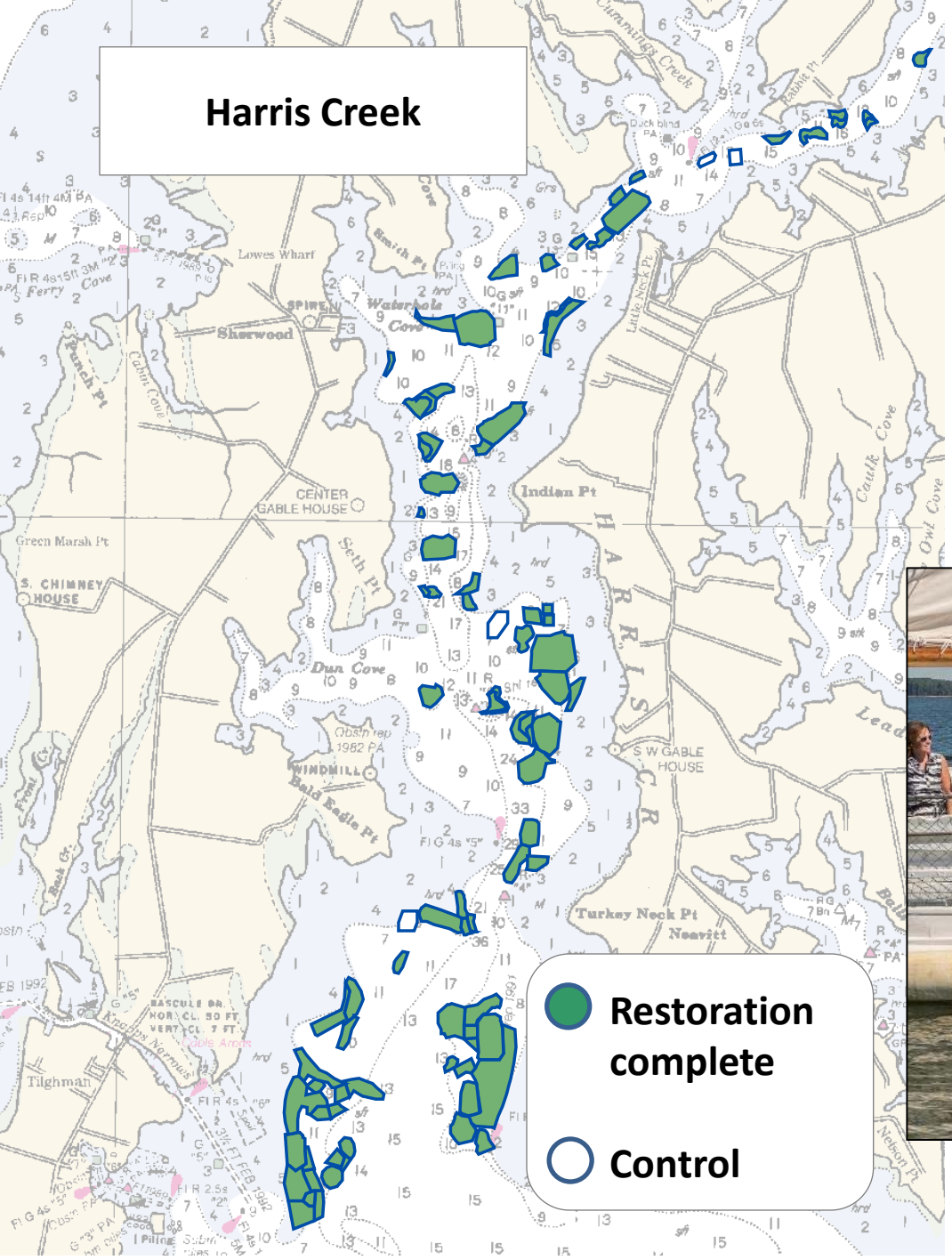


Maryland

Maryland Interagency Oyster Restoration Workgroup

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

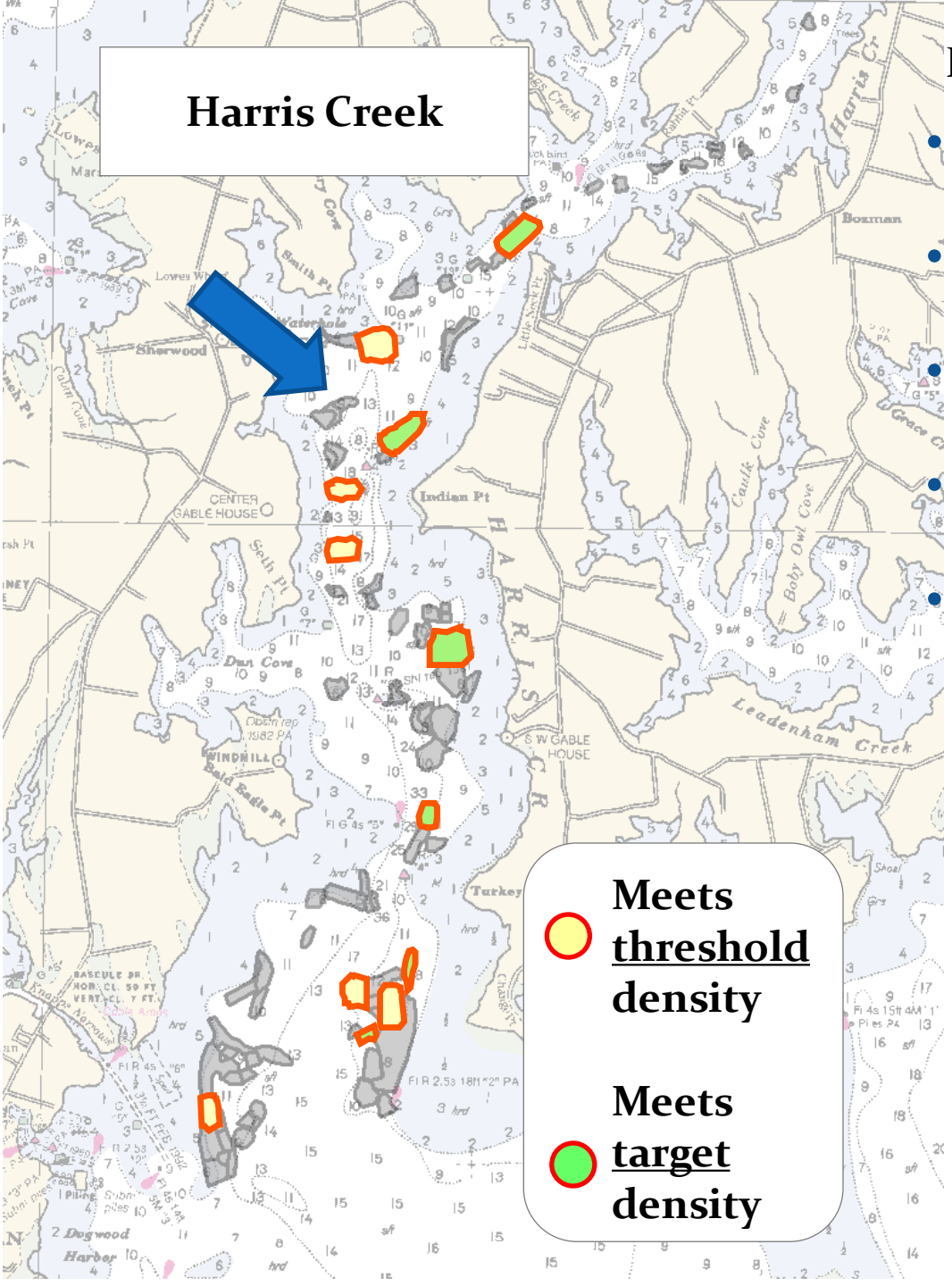




Initial Restoration Treatment Complete Sept 2015

- Started in 2011
- 350 acres
- 2 billion oyster seed

(produced by University of MD & Chesapeake Bay Foundation)

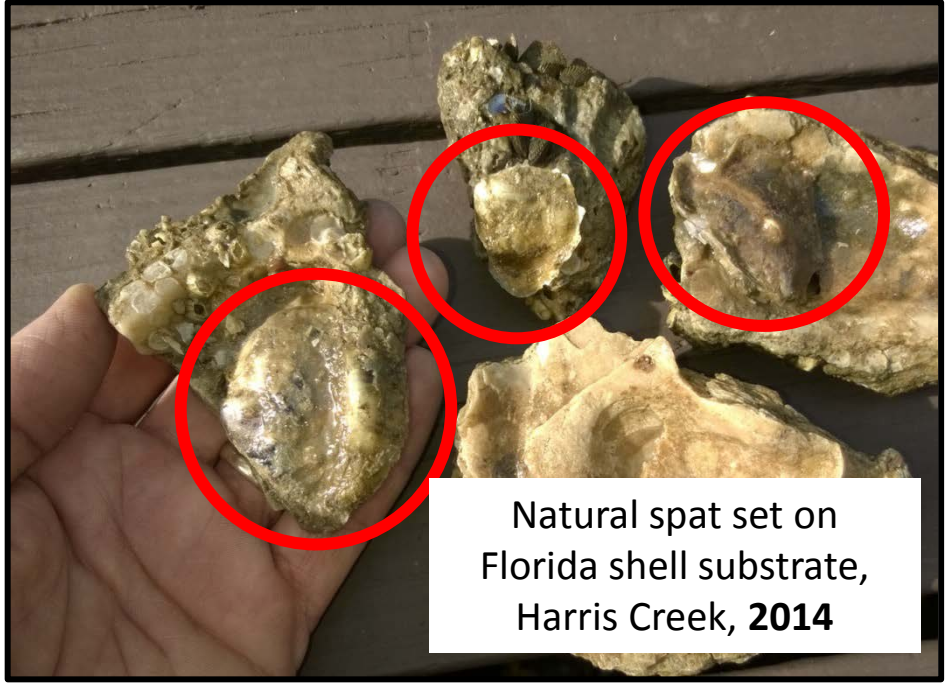


Monitored in Fall 2015

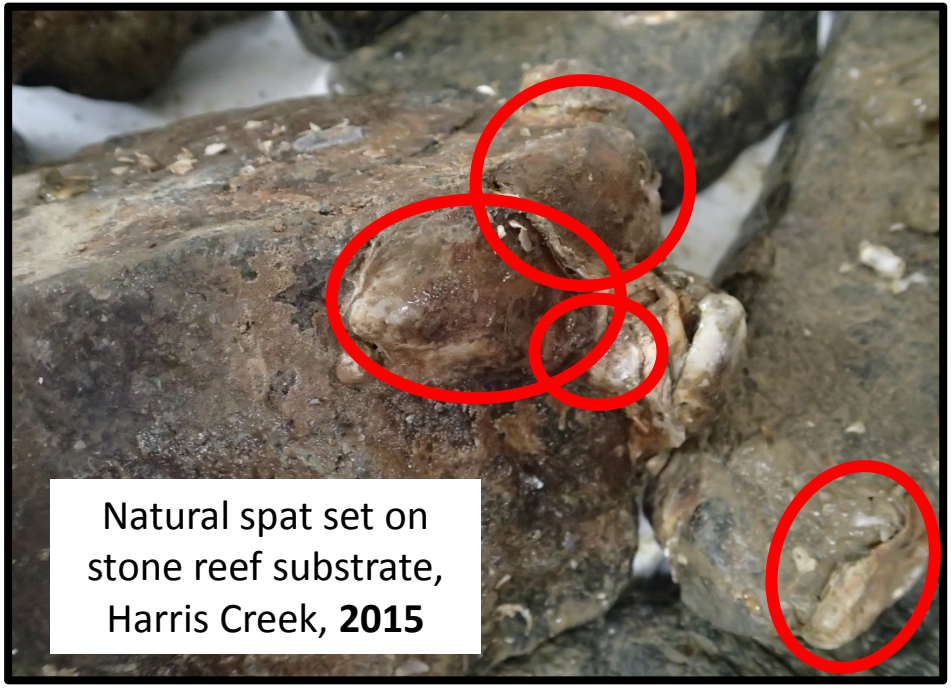
- Plan: monitor each reef 3 yrs post restoration
- 12 reefs (100 acres) planted in 2012 were monitored in 2015
- All 12 meet threshold density (15 oys/ m^2)
- Half meet target density (50 oys/ m^2)
- Second cohort (planted in 2013) currently being monitored

Stone reef monitored fall 2015:

- Planted in 2013
- 3x higher density than any other monitored site.

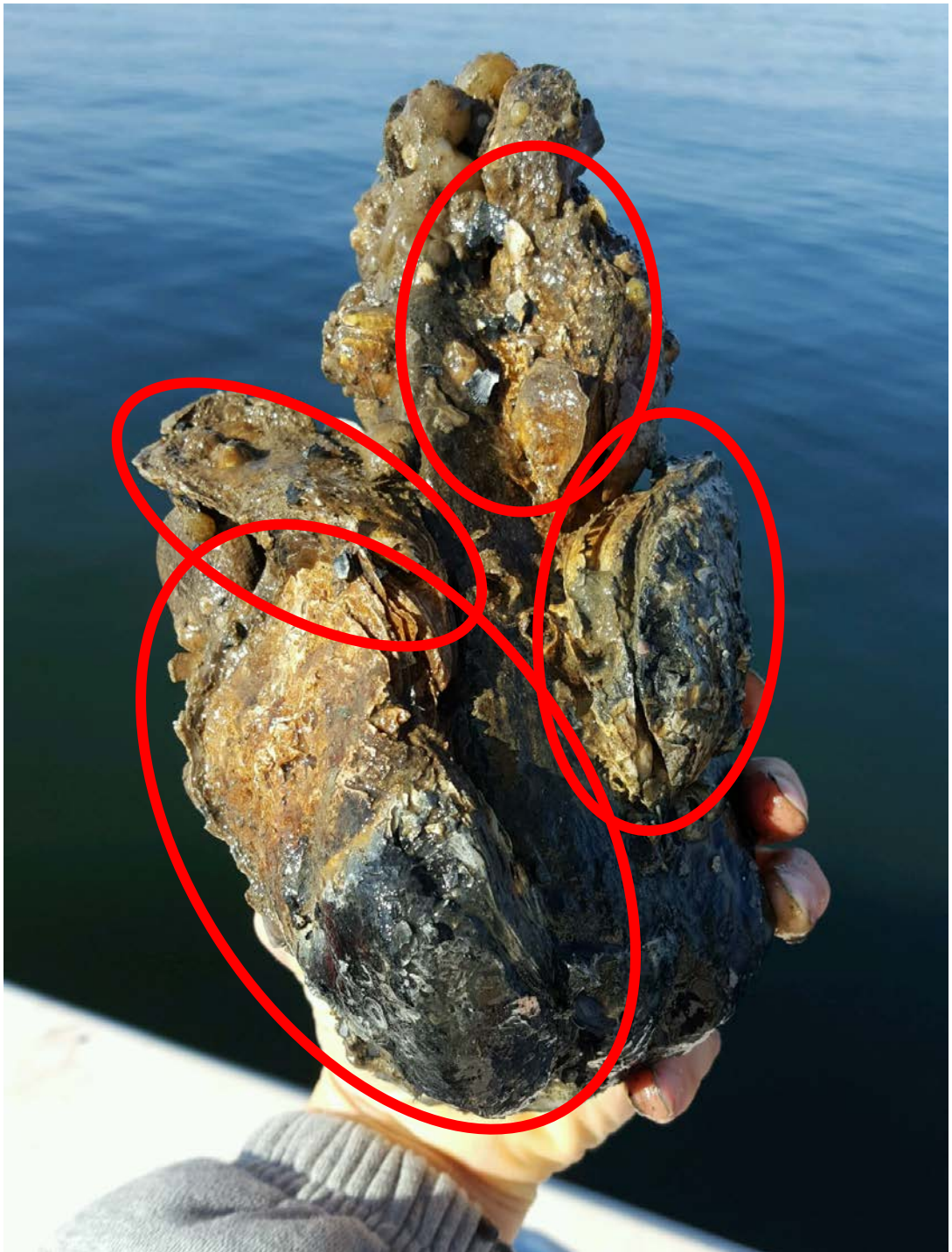


Natural spat set on Florida shell substrate, Harris Creek, **2014**



Natural spat set on stone reef substrate, Harris Creek, **2015**

Natural spat set on stone reef substrate. Harris Creek, **2016.** Photo by ORP.

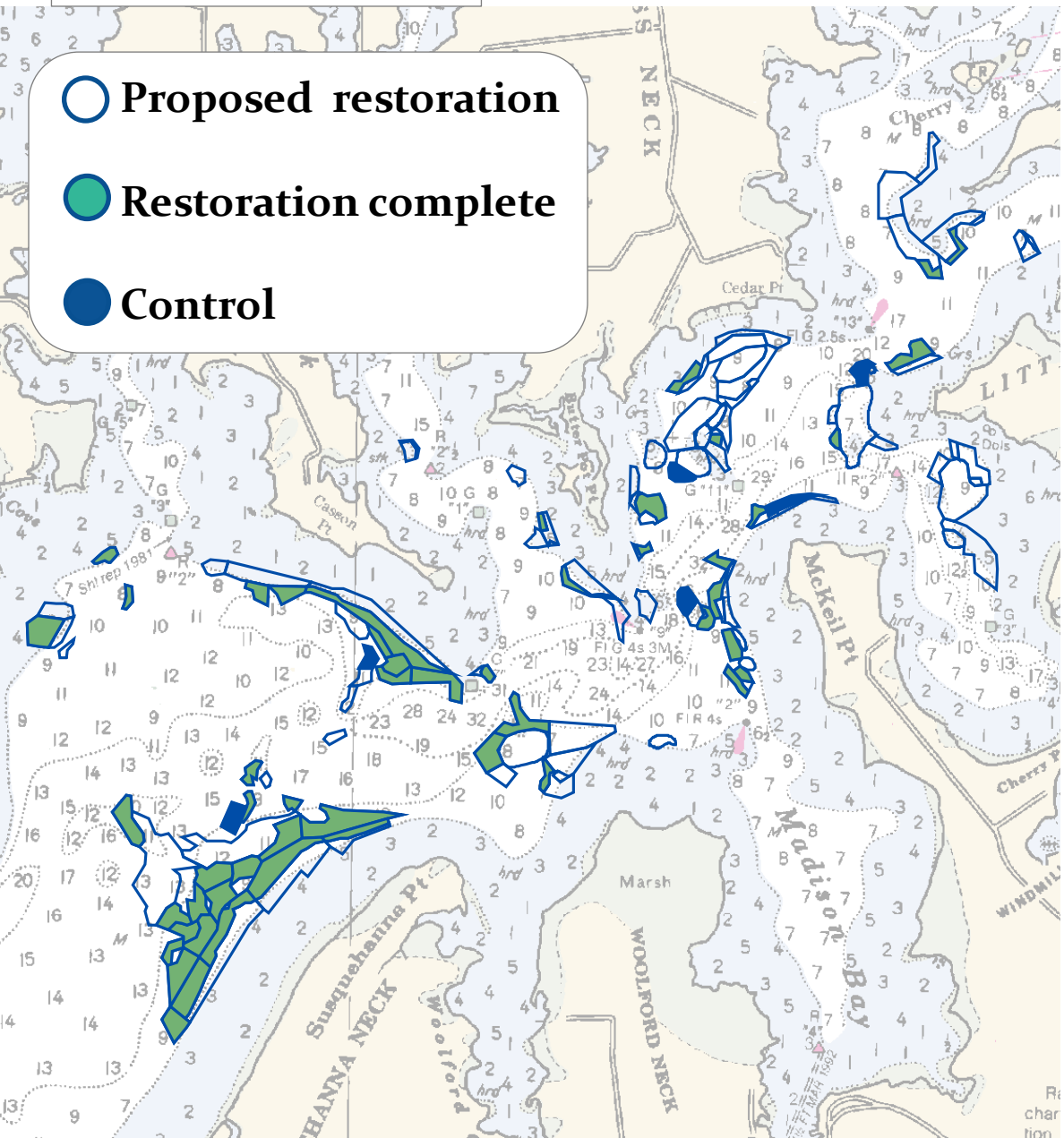


Mature oysters on granite, Harris Creek restoration site

12/5/2016 (yesterday)

Photo by USACE-Baltimore District

Little Choptank River



Tributary Plan ('Blueprint')

- Oyster Metrics goal = 340-680 acres
- Restoration target = 442 acres (45 of which already meet the Oyster Metrics oyster density target)

Implementation

- Restoration complete on 178 acres
- 814 million spat on shell planted (produced by University of MD & Chesapeake Bay Foundation)

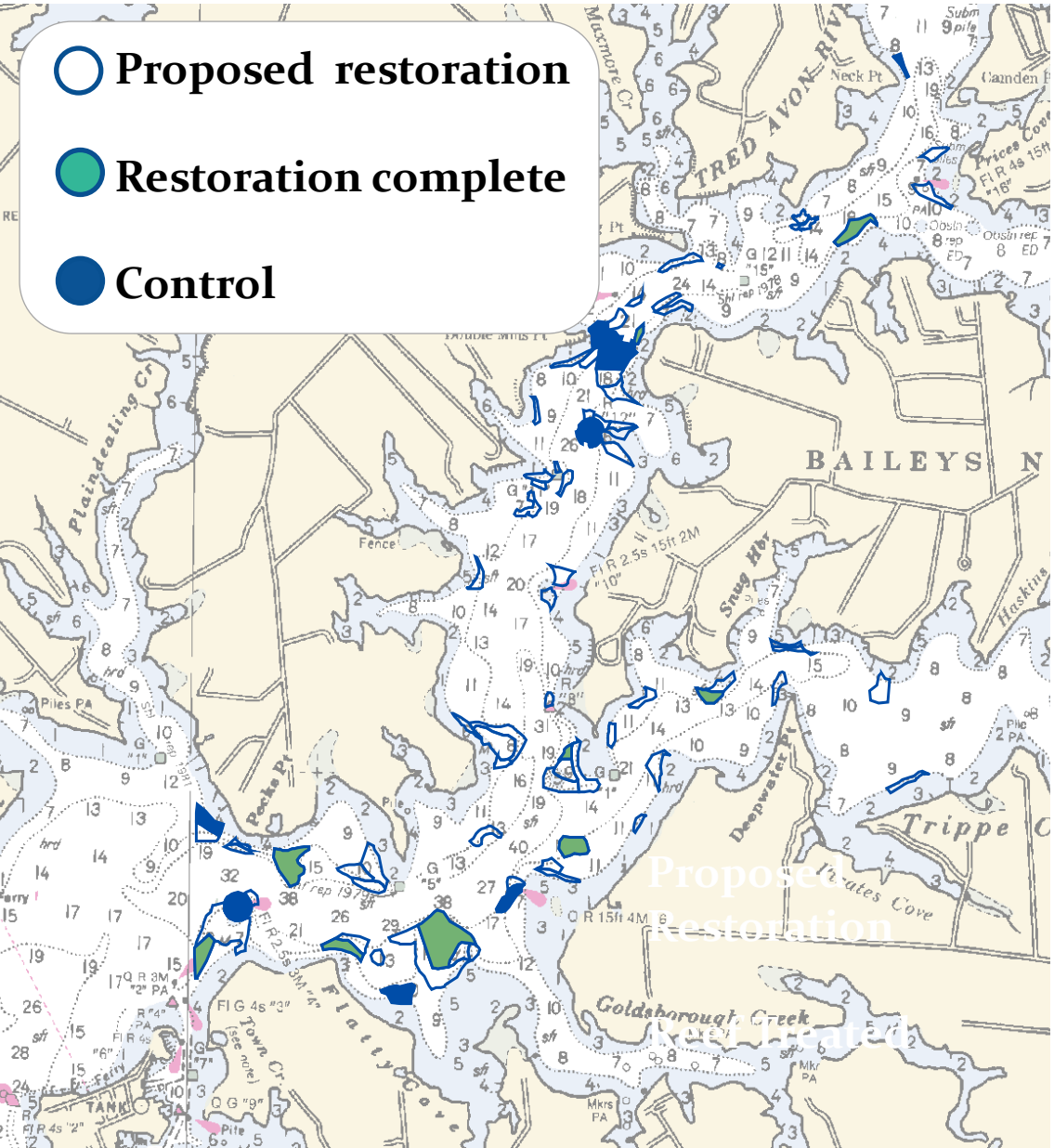
Photo:
Oyster Recovery Partnership


Photo:
Oyster Recovery Partnership

Natural spat set on stone (top) and Florida shell (bottom). Little Choptank River, Nov 2015. Photos by ORP.

Little Choptank Restoration Site
January 2016
(go pro554)

Tred Avon River



Draft Tributary Plan ('Blueprint')

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

Implementation

- Restoration complete on 35 acres;
- 153 million spat on shell planted (produced by University of MD & Chesapeake Bay Foundation)

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

Poaching…?

- The extent of poaching, and/ or its impact on restoration progress, can not be quantified at this time.

- Arrests have been made in Harris Creek for poaching, http://news.maryland.gov/dnr/2014/01/17/nrp-blotter-21/

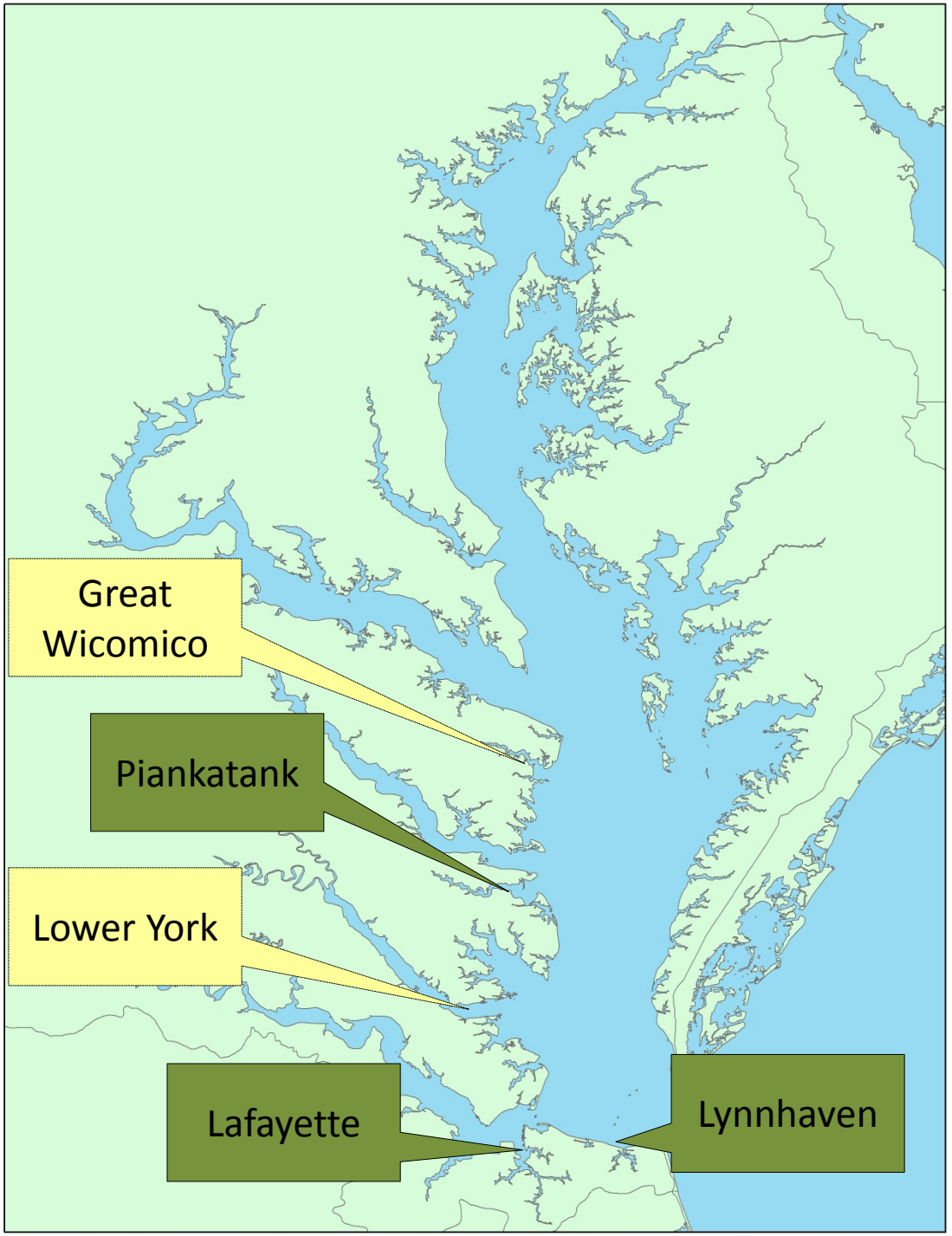
Brick weight, attached to a float (bottle), retrieved from a restored Harris Creek reef during monitoring operations.

Hand tongs retrieved in the Harris Creek oyster sanctuary during monitoring operations.

Virginia

Selected Tributaries:
- **Lafayette**
- **Lynnhaven**
- **Piankatank**

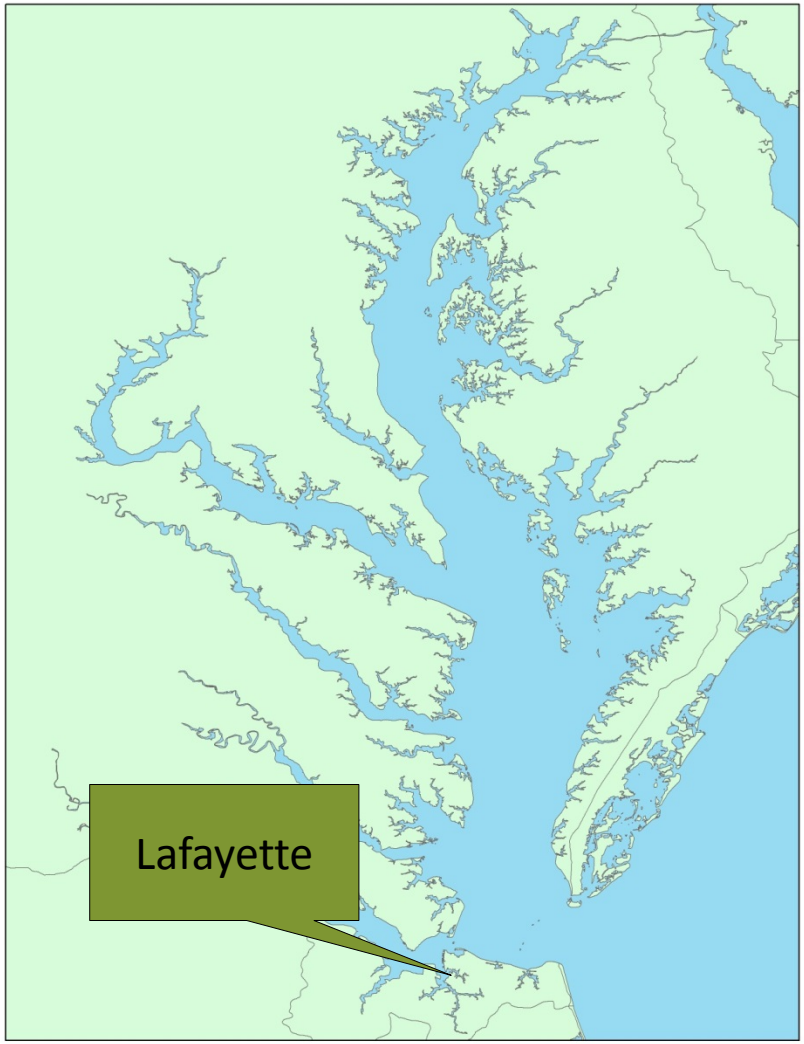
'Preliminarily Selected' Tributaries:
- **Great Wicomico**
- **Lower York**



Lafayette River

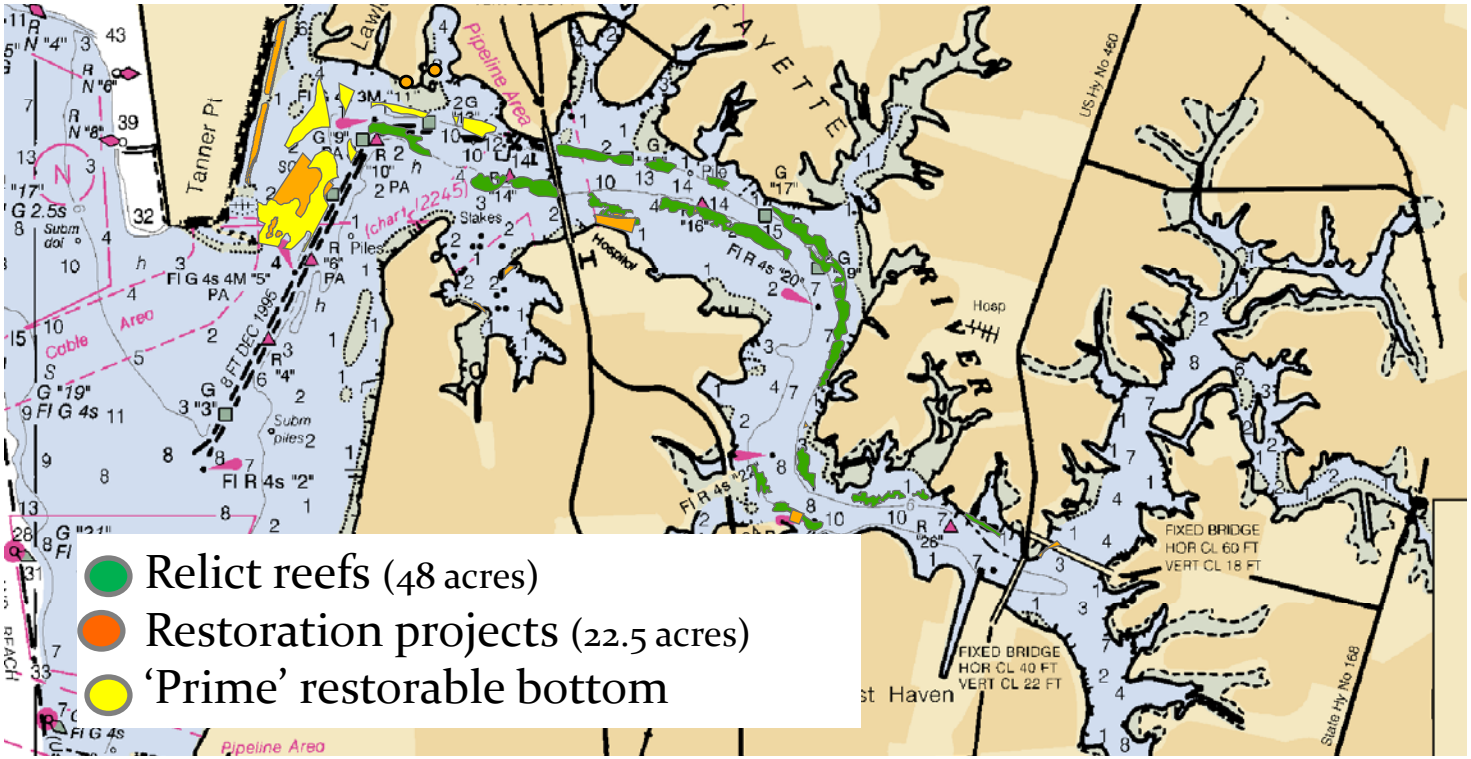
Workgroup Members:

- NOAA (chair);
- Chesapeake Bay Foundation;
- Christopher Newport University;
- City of Norfolk;
- Elizabeth River Project;
- Virginia Institute of Marine Science;
- Virginia Marine Resources Commission;
- U.S. Army Corps of Engineers, Norfolk District



Lafayette River

- Oyster Metrics goal = 73- 146 acres acres
- Restoration target = 80 acres (approx. 70.5 acres have already either been restored, or are ‘relict reefs’ which meet Oyster Metrics density criteria)
- Need restoration on 9.5 more acres to reach 80 acres
- Cost estimate = $1.35 million
- 2016:
  - Elizabeth River Project constructed a .5 reef in 2016
  - Chesapeake Bay Foundation, with volunteers, planted 4.5 million spat-on-shell



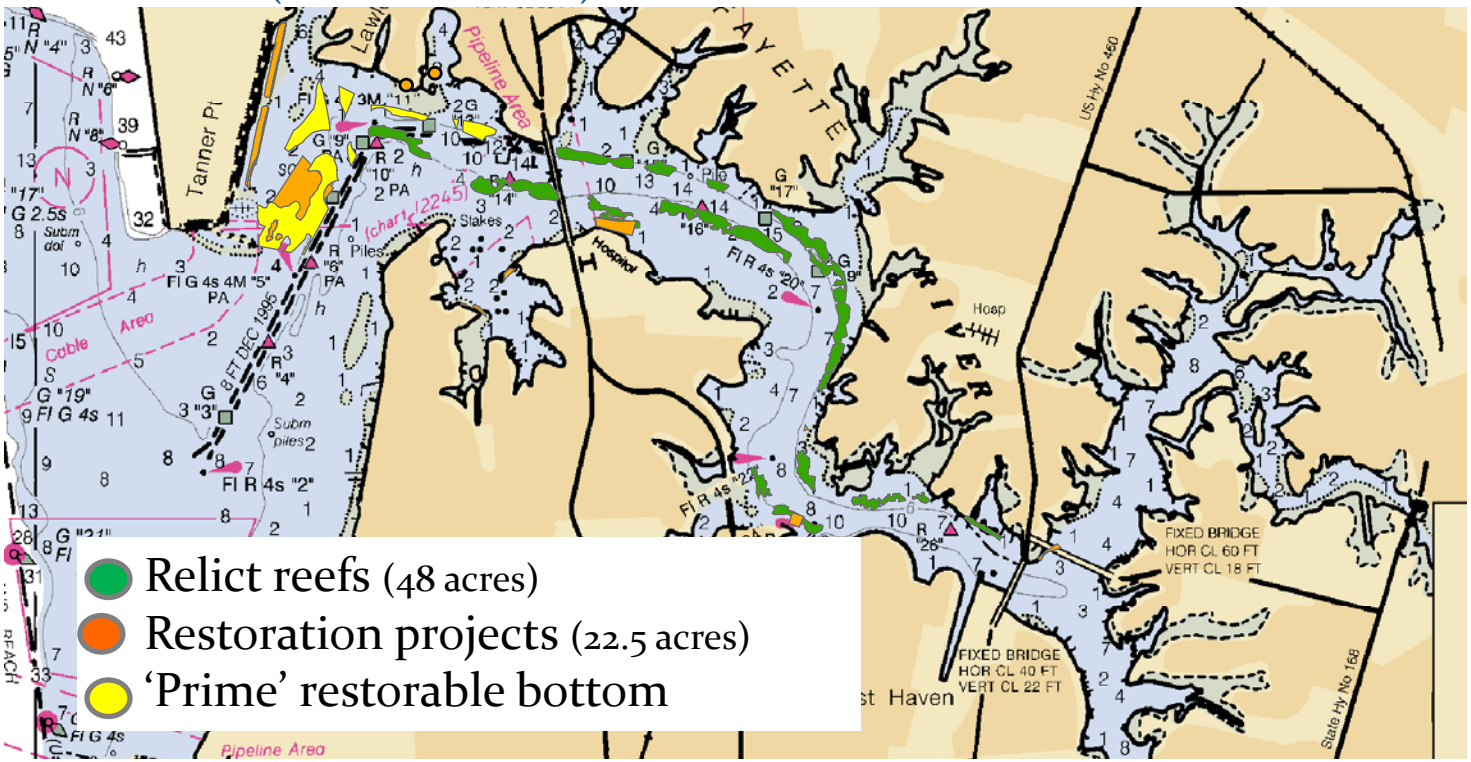
Lafayette River

2017 Outlook:

- City of Norfolk to construct 1.44 acres of reefs (already captured in the 70.5 acre complete)

- Elizabeth River Project top construct 1 acre reef (NOAA funded, via National Fish and Wildlife Foundation)

- CBF to place 600 reef balls (NOAA funded)



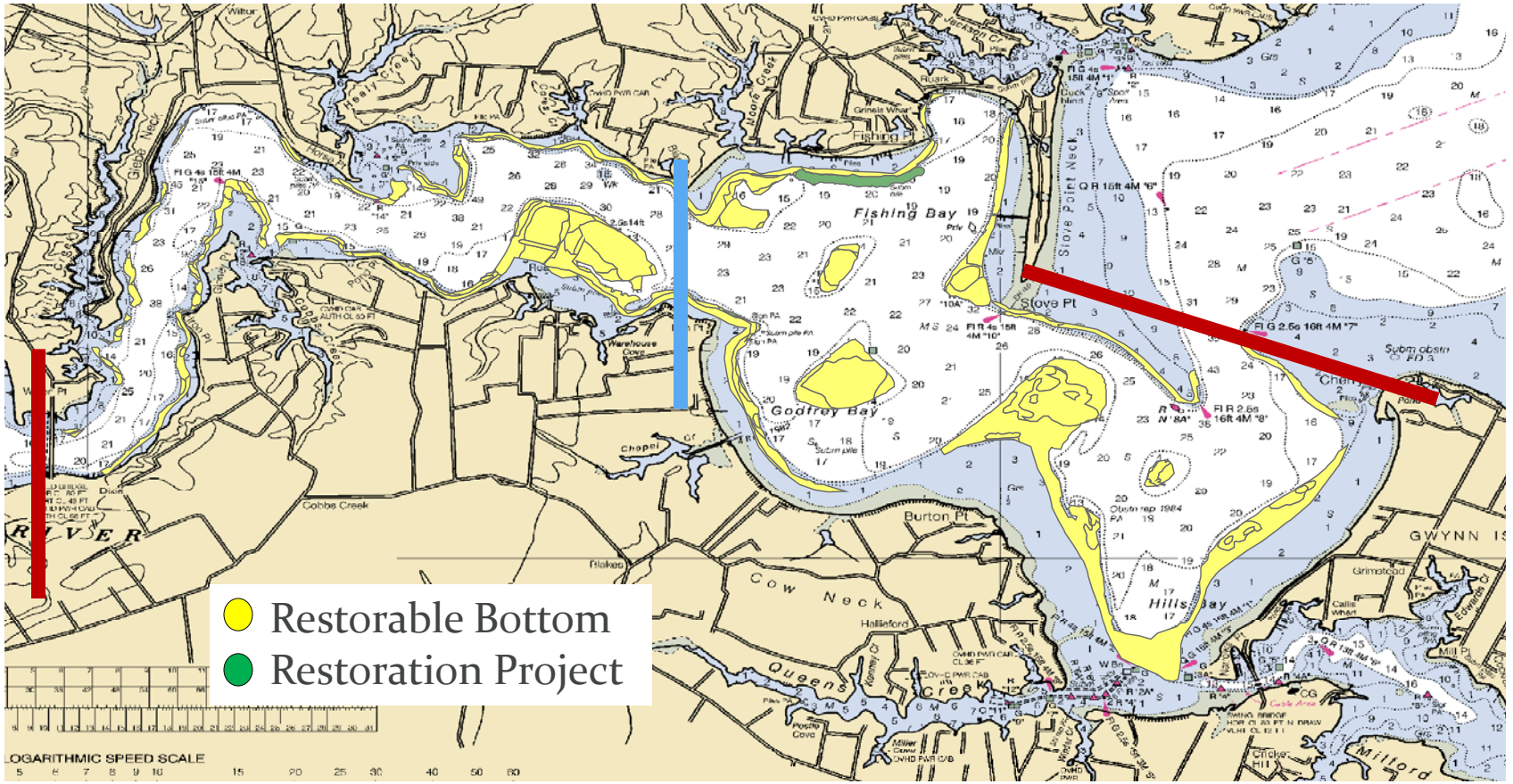
Piankatank River

Workgroup Members:

- NOAA (chair);
- Chesapeake Bay Foundation;
- Christopher Newport University;
- The Nature Conservancy;
- Virginia Institute of Marine Science;
- Virginia Marine Resources Commission;
- U.S. Army Corps of Engineers-
  Norfolk District

Piankatank River

- Oyster Metrics goal = 500- 1000 acres
- Restoration target = To Be Determined
  - Need population survey to determine amount of acreage the is currently 'functioning as restored' (meets Oyster Metrics density criteria)
- Recent/ planned construction:
  - TNC constructed 21.5 acres in 2014; 3.5 acres in 2015;
  - USACE- Norfolk to construct approx. 25 acres spring 2017.

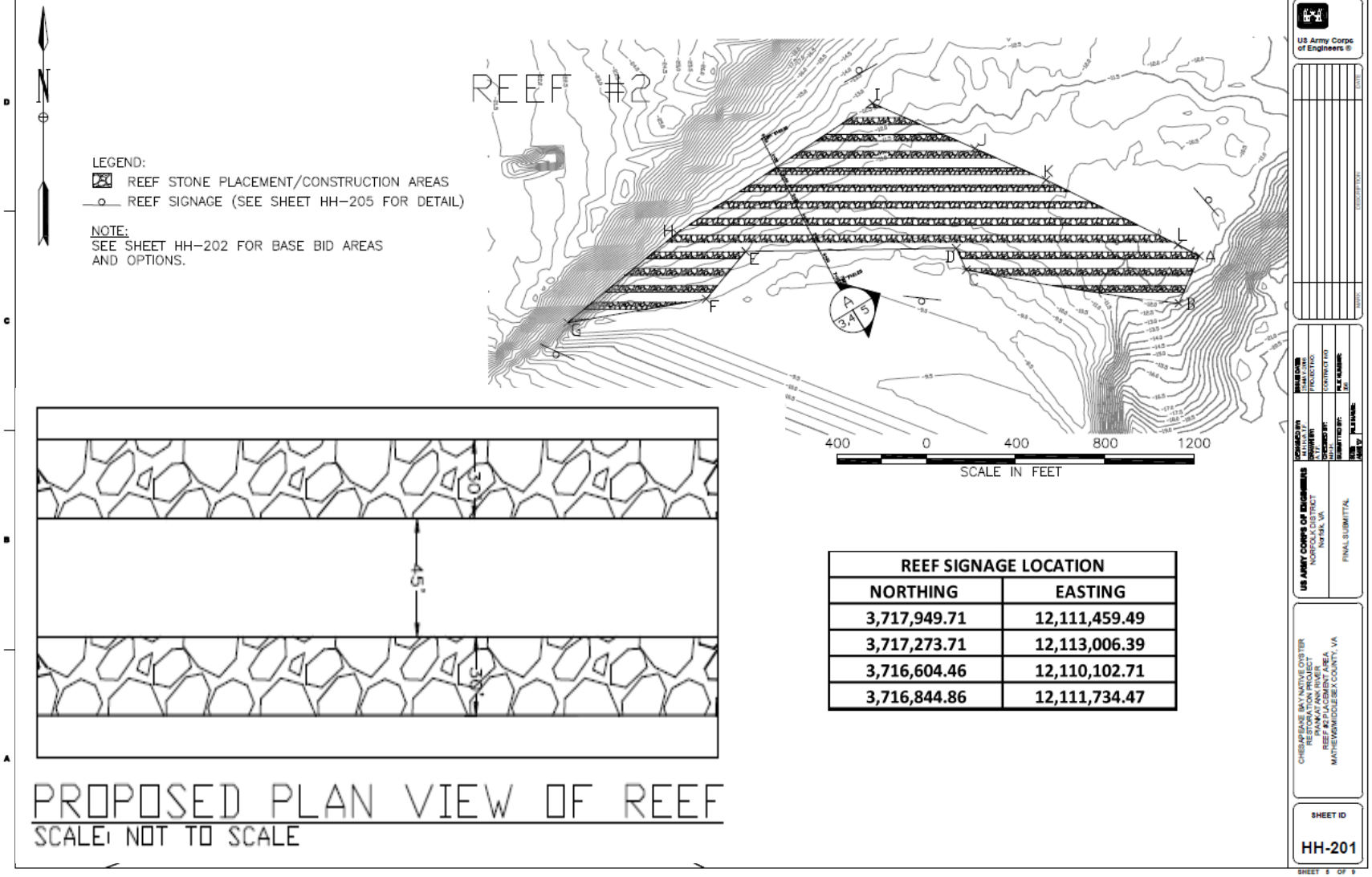


Chesapeake Bay Native Oyster Recovery
Piankatank River

- Complete engineering designs
- Construction Phase 1 Project contract (award January 2017)
- Construct project – spring 2017
- Start design work for next project construction phase

Chesapeake Bay Native Oyster Recovery
Piankatank River

- Innovative spatial design
- Functioning reef ecosystem
- Maximize ecological benefits per unit cost
- Improve connectivity and habitat for benthics and all fishery species
- 25 acres
  - 45 feet apart
  - 30 feet wide
  - 12-18 inches high
  - Future potential for reef balls, etc.
  - Improve flow; reduce sedimentation

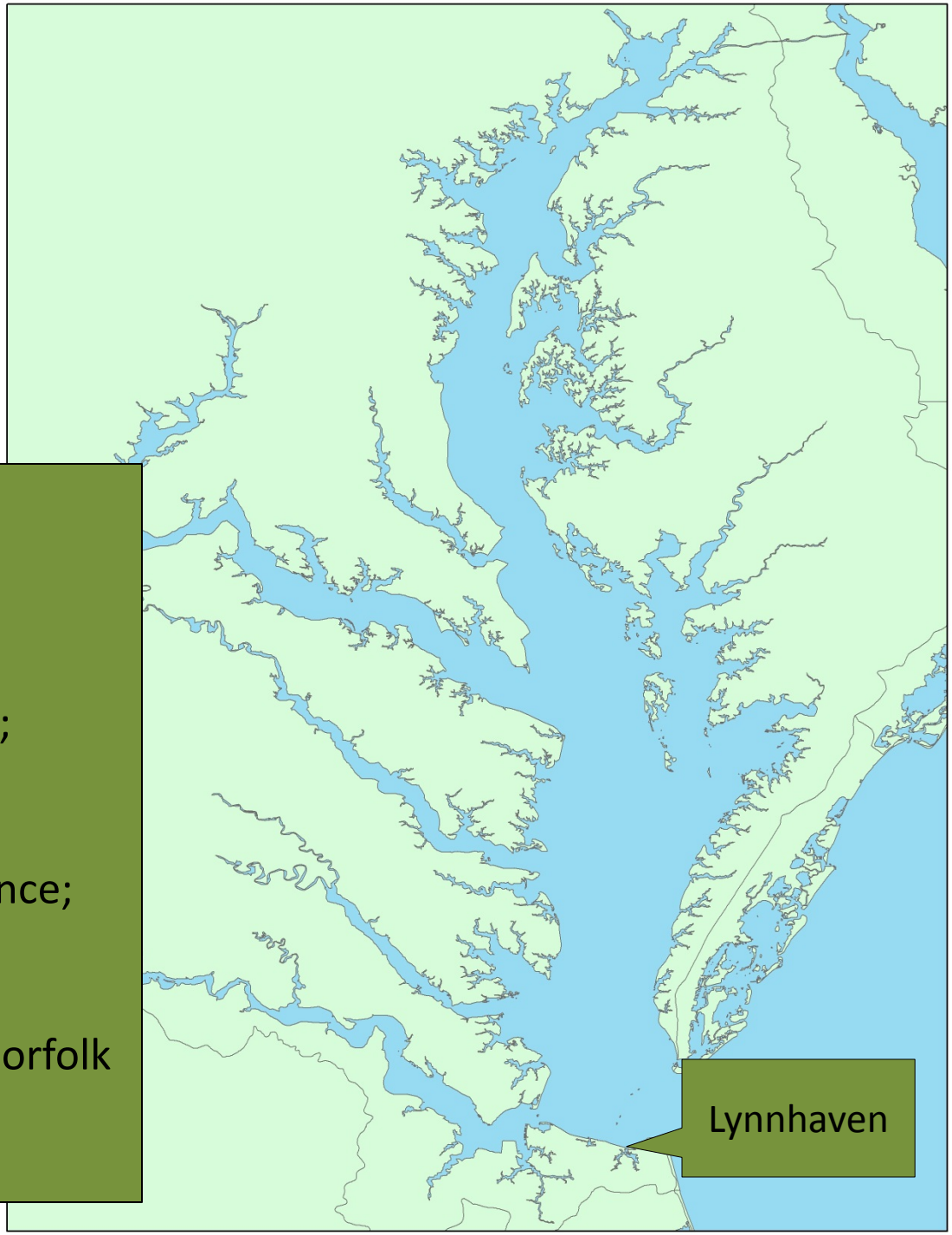


REEF SIGNAGE LOCATION	
NORTHING	EASTING
3,717,949.71	12,111,459.49
3,717,273.71	12,113,006.39
3,716,604.46	12,110,102.71
3,716,844.86	12,111,734.47

Lynnhaven River

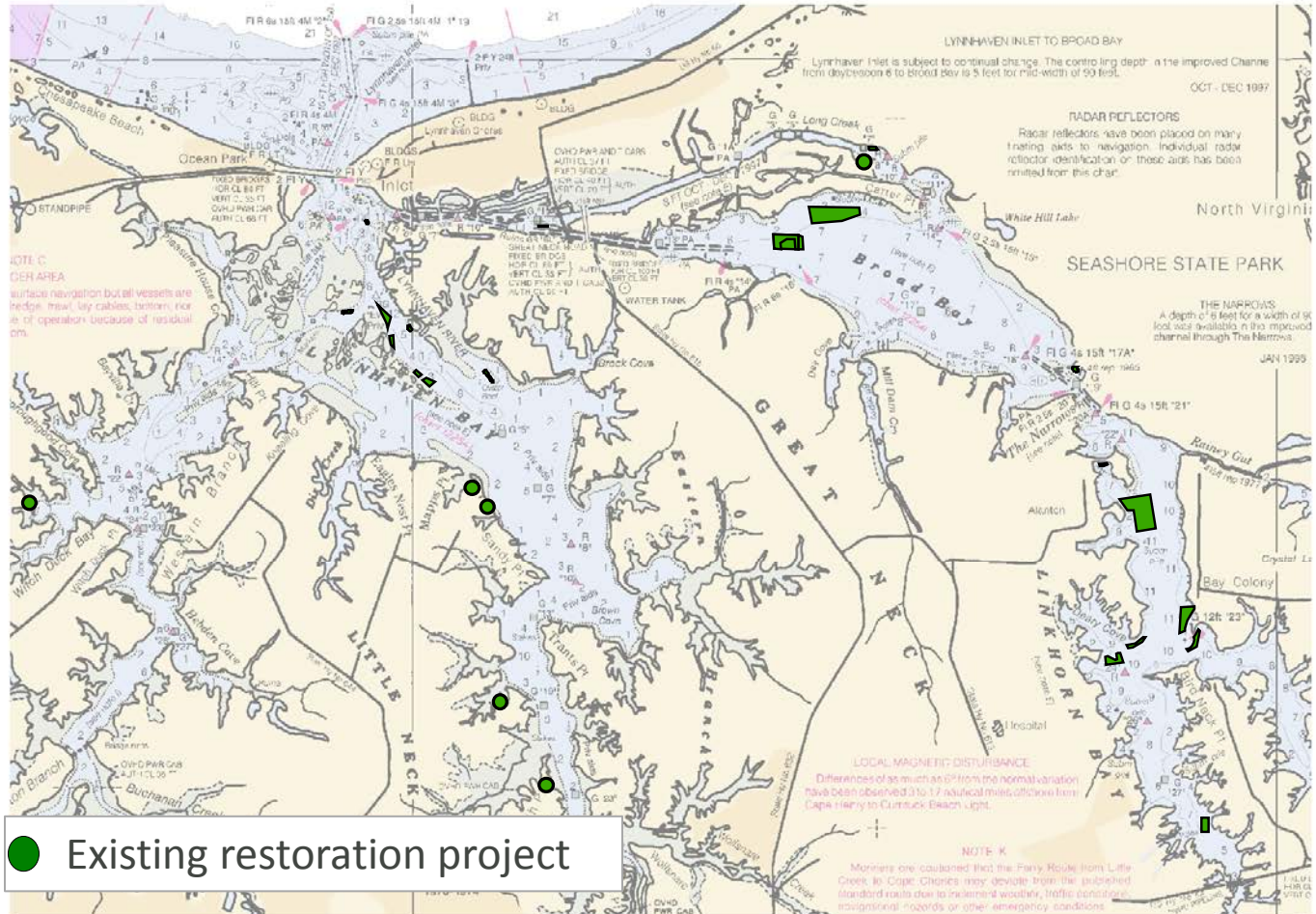
Workgroup Members:

- NOAA (chair);
- Chesapeake Bay Foundation;
- Christopher Newport University;
- City of Virginia Beach;
- Lynnhaven River Now;
- Virginia Institute of Marine Science;
- Virginia Marine Resources Commission;
- U.S. Army Corps of Engineers- Norfolk District



Lynnhaven River

- GIS geodatabase assembled, including catalog of existing restoration projects
- Developed draft Restorable Bottom Assessment to begin determining Oyster Metrics acreage restoration goal
- Note: USACE Master Plan gives Lynnhaven gool of 90-200 acres (percent of historic);
  Oyster Metrics acreage goal still being developed.



Lynnhaven River

Prime Restorable Bottom Analysis:

Oyster restoration projects will not occur:

- 200-250’ buffer around navigation channels and aids
- 100’ buffer around homeowner, marine, and public piers, docks and boat ramps
- Not yet defined buffer around submerged cables and pipelines
- No buffer recommended around private aquaculture leases

Lynnhaven River Basin Ecosystem Restoration

PROJECT PURPOSE:

- Environmental Restoration and Protection

AUTHORIZATION:

- Resolution of the Committee on Transportation and Infrastructure of the U.S. House of Representatives, Docket 2558

PHASE:

- Preconstruction, Engineering, and Design

Lynnhaven River Basin Ecosystem Restoration

PROJECT FEATURES:

- Reef Habitat (31 acres)
- Wetland Restoration (38 acres)
  - Princess Anne High School
  - Great Neck North
  - Great Neck South
  - Mill Dam Creek
- Submerged Aquatic Vegetation (94 acres)

Lynnhaven River Basin Ecosystem Restoration

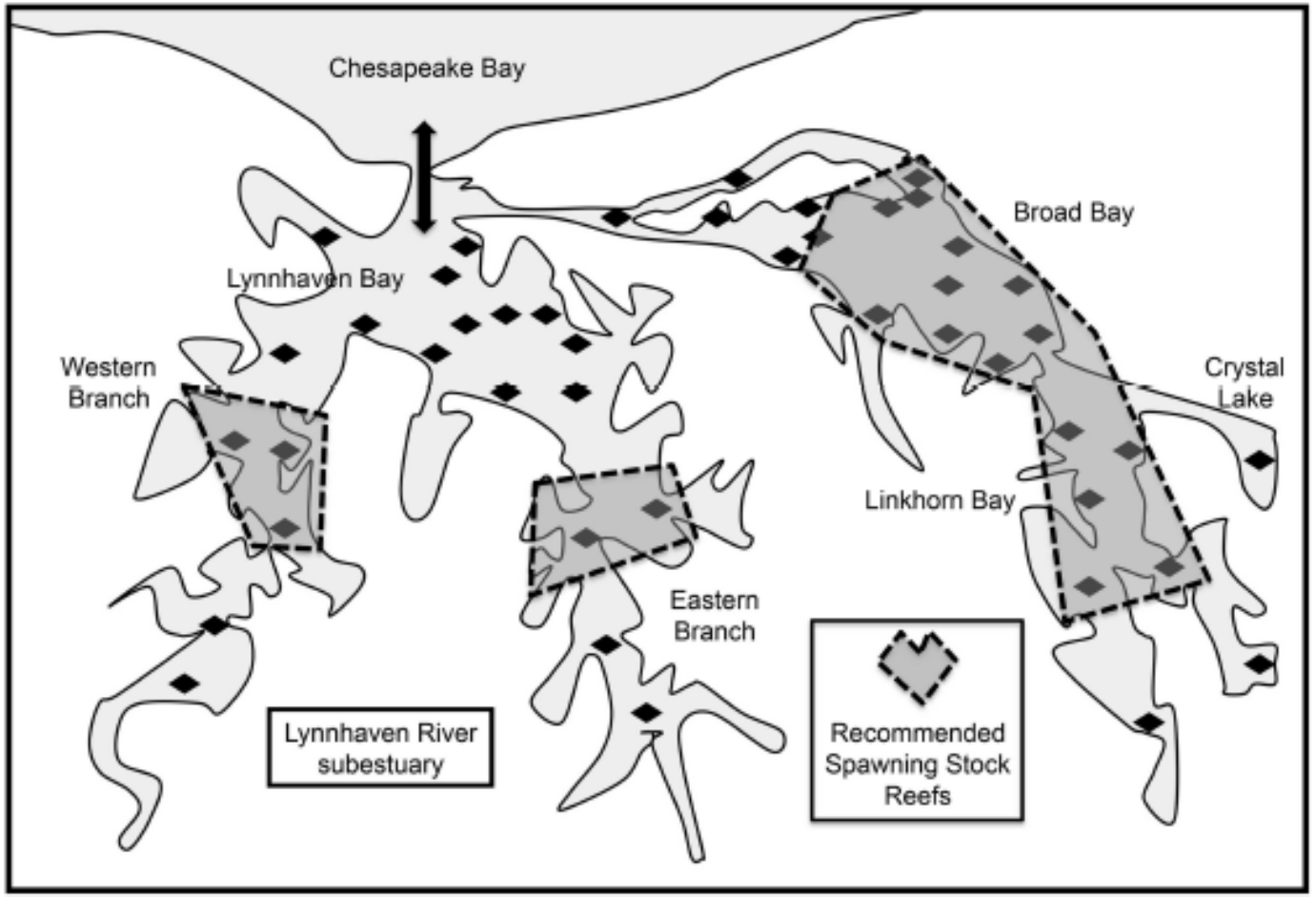
PHASE 1:

1. Reef Habitat (10 acres)

2. Wetland Enhancement (6 acres)
   - ❑ Princess Anne High School

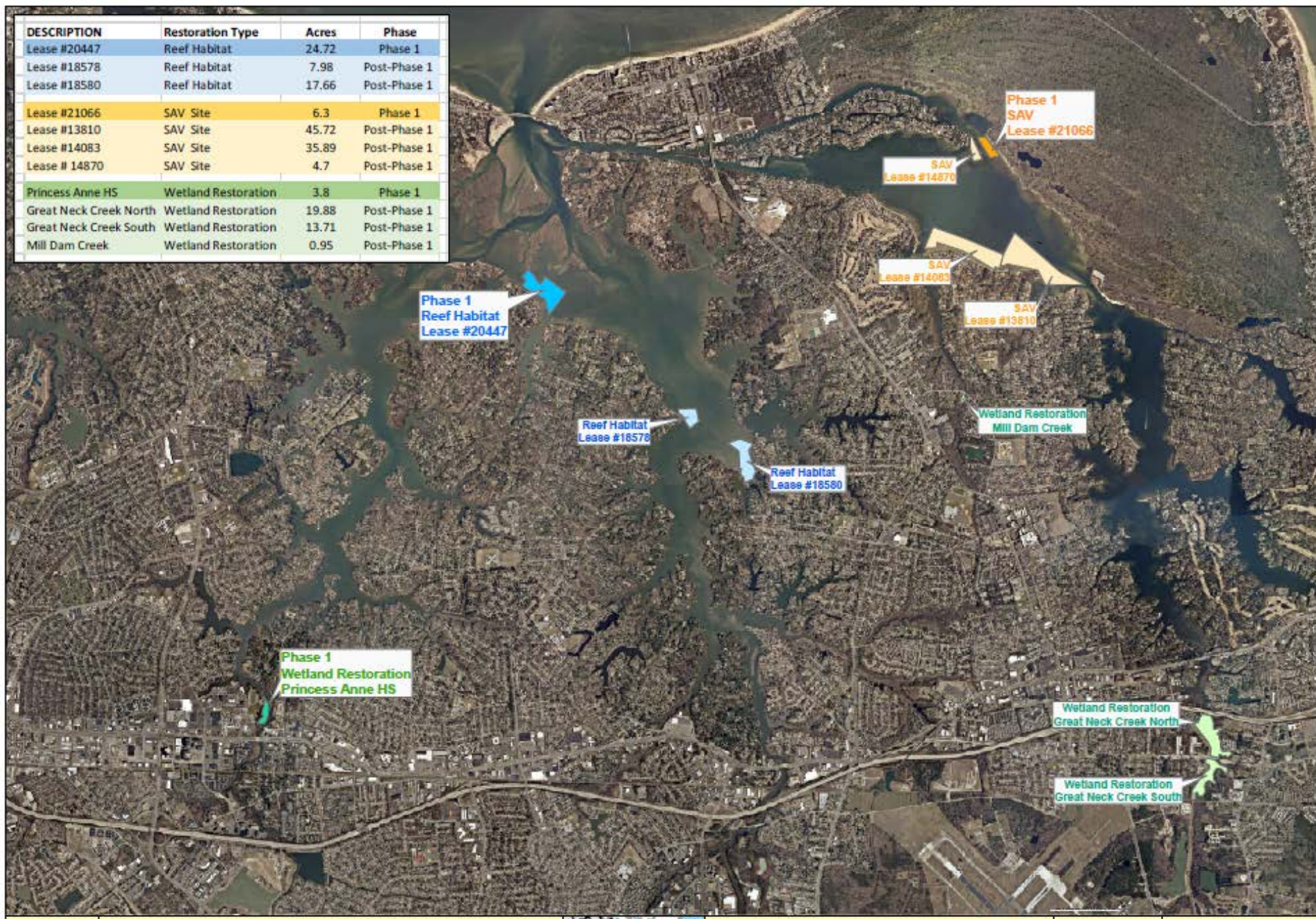
3. Submerged Aquatic Vegetation – Broad Bay (6 acres)

Lynnhaven River Reef Habitat Selection Criteria



(Lipcius et al. 2015)

DESCRIPTION	Restoration Type	Acres	Phase
Lease #20447	Reef Habitat	24.72	Phase 1
Lease #18578	Reef Habitat	7.98	Post-Phase 1
Lease #18580	Reef Habitat	17.66	Post-Phase 1
Lease #21066	SAV Site	6.3	Phase 1
Lease #13810	SAV Site	45.72	Post-Phase 1
Lease #14083	SAV Site	35.89	Post-Phase 1
Lease # 14870	SAV Site	4.7	Post-Phase 1
Princess Anne HS	Wetland Restoration	3.8	Phase 1
Great Neck Creek North	Wetland Restoration	19.88	Post-Phase 1
Great Neck Creek South	Wetland Restoration	13.71	Post-Phase 1
Mill Dam Creek	Wetland Restoration	0.95	Post-Phase 1



US Army Corps of Engineers
Norfolk District

Lynnhaven River Basin Ecosystem Restoration:
Limits of Proposed Phase 1 Sites and Post-Phase 1 Sites
Virginia Beach, VA

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

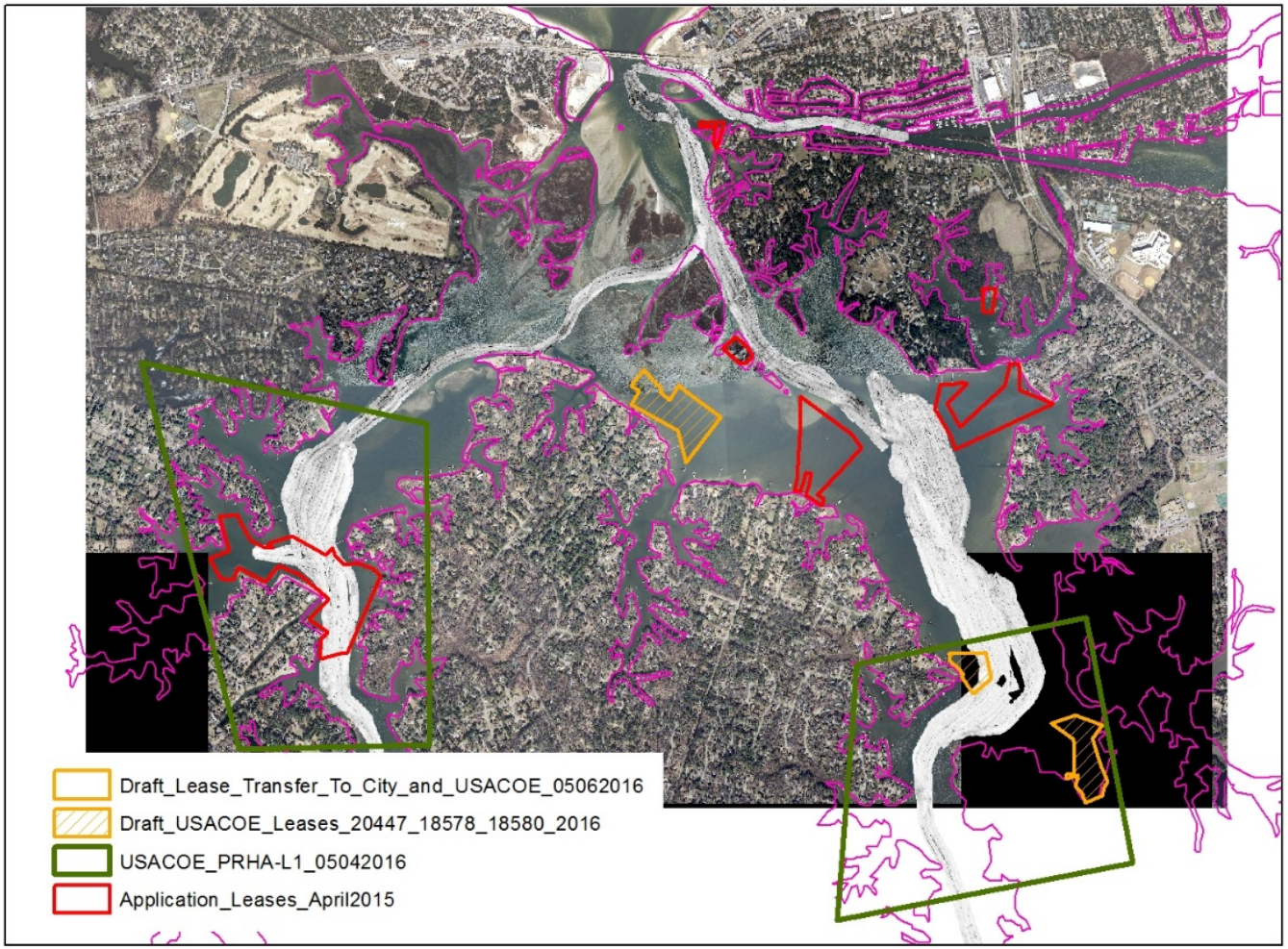
Imagery Source:

Project Manager: Kristin Mazur
E-mail: Kristin.M.Mazur@usace.army.mil
Phone: (757) 201-7257

Prepared by: Keith Dodge
Geospatial Section

Map File:

Lynnhaven Reef Habitat Restoration Next Steps



Lynnhaven Reef Habitat Restoration Next Steps

- ❑ Conduct geotechnical surveys
- ❑ Draft engineering designs
- ❑ Coordinate with resource agencies and stakeholders
- ❑ Conduct informational meeting with the public
- ❑ Obtain project permits
- ❑ Continue coordination of plans with Virginia Beach Schools and Lynnhaven River Now

Virginia

‘Preliminarily Selected’ Tributaries:

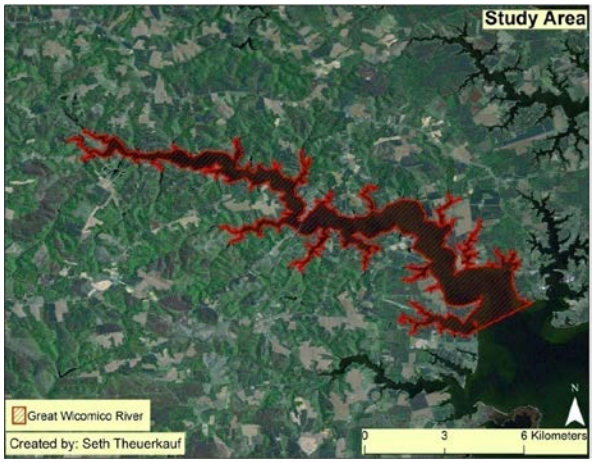
- **Great Wicomico**
- **Lower York**

Great Wicomico

85 acres of sanctuary reefs originally constructed
Approximately 61 acres meeting metrics for success

2015 Rehabilitation of the Low-Relief and Poached Reefs

- 13 acres
- VMRC collected the healthy oysters
- Brought low-relief up to high-relief

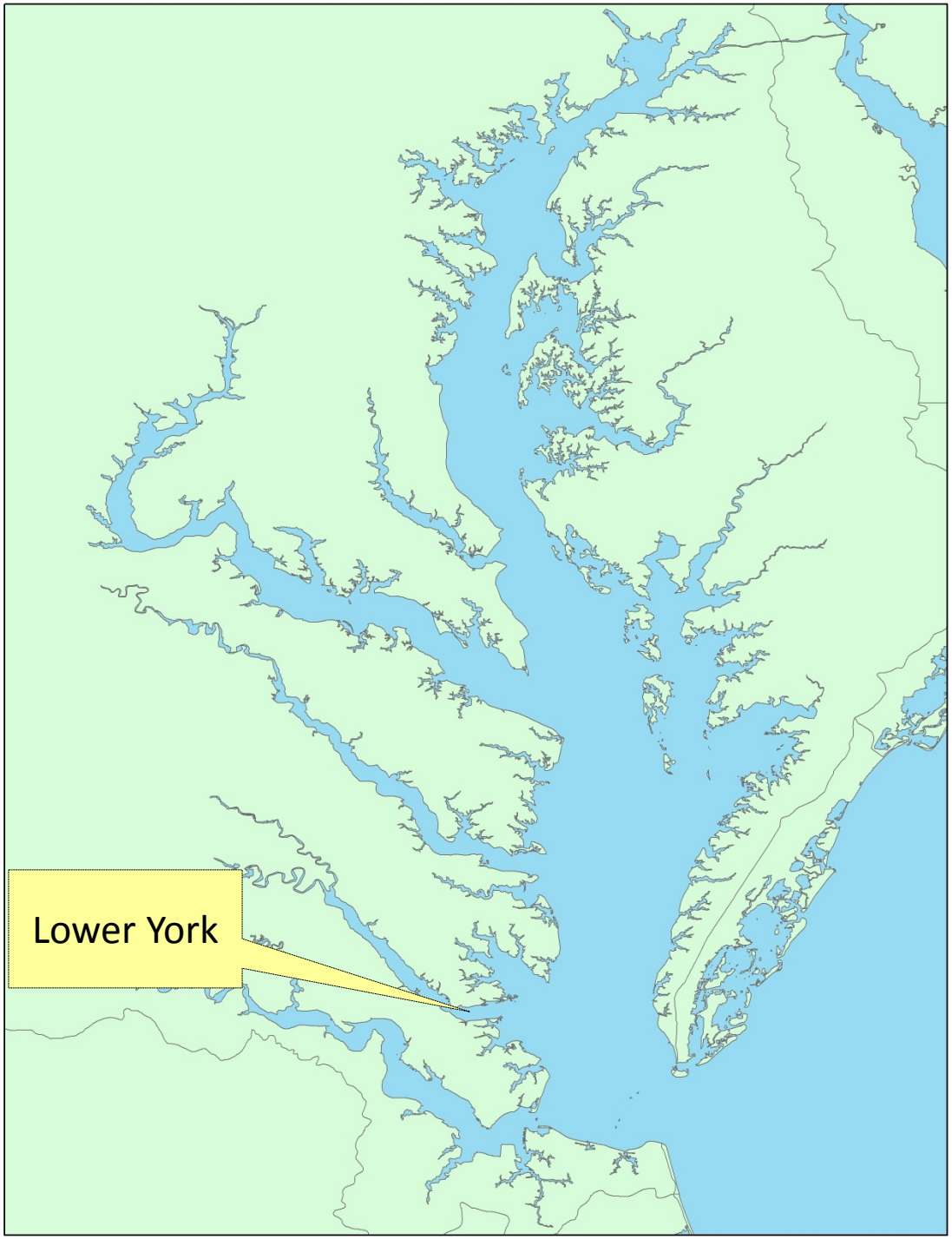


Tier 1 Tributaries/Areas	Restoration Target (Acres)	Approximate acres restored
Great Wicomico River	100 - 400	~61
Lower Rappahannock River	1,300 - 2,600	
Piankatank River	700 - 1,300	~30 at present; ~55 by summer 2017
Mobjack Bay	800 - 1,700	
Lower York River	1,100 - 2,100	
Pomocoke/Tangier Sound	3,000 - 5,900	
Lower James River	900 - 1,800	
Upper James River	2,000 - 3,900	
Elizabeth River	200 - 500	
Lafayette (sub-trib of Elizabeth)	80	11 acres sanctuaries, 60 acres relic in Lafayette
Lynnhaven River	90 - 200	63 acres sanctuary plus natural areas and aquaculture

Lower York

Info here:

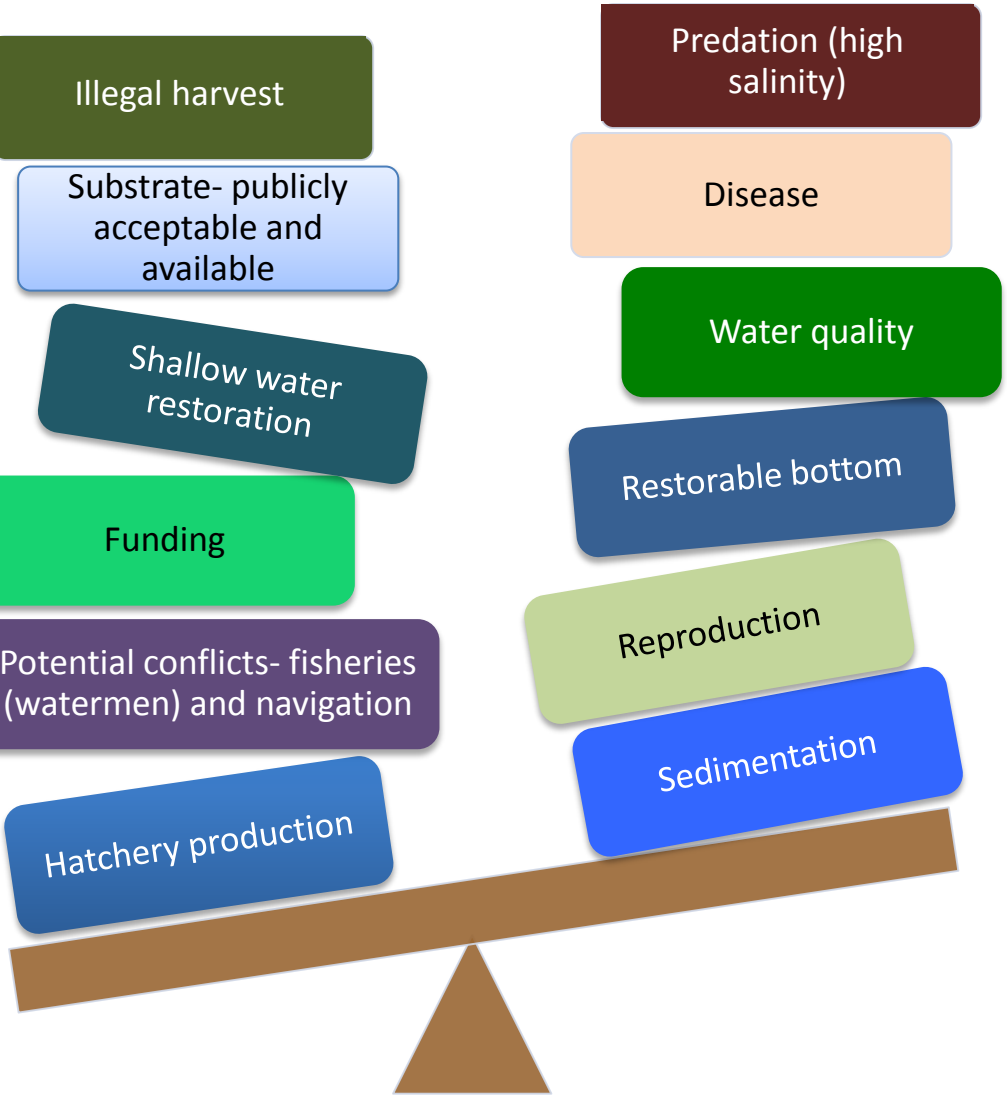
- **Preliminarily selected**
- **Potential future restoration work**



Challenges and Limitations

Socio-economic and political

Natural



Interpretation of metrics: credit for acres restored