USACE Native Oyster Restoration Master Plan

Angie Sowers, USACE-Baltimore

Sustainable Fisheries GIT

April 16, 2012

US Army Corps of Engineers
BUILDING STRONG®

Presentation Outline

- USACE Oyster Restoration Program
- Native Oyster Restoration Master Plan
  - Goals and Purpose
  - Plan Formulation
  - Results
  - Recommendations
- Path Forward
- Questions

USACE Oyster Restoration Program

Established in Section 704(b) of the Water Resources Development Act of 1986

- 75% Federal, 25% non-Federal funding
- First year of funding = FY1995
- Initially focused on Maryland; first report was in 1996, with cooperation agreement signed in 1997
- Maryland project sponsor is Maryland Department of Natural Resources
- Project has received up to $1-5 million Federal per year for MD+VA

Amended in 1996, 2000, 2002, 2006, and 2007

- Added Virginia to project location
- Increased authorization limit to $50 million
- Identifies specific type of construction activities
- Purpose : To establish sanctuaries and harvest management areas
- USACE activities to be consistent with other plans and strategies

Construction Summary
Maryland
1997-2011

- 459 acres of substrate placed
- 22 additional acres at Harris Creek to be constructed May-June 2012

- Locations:
  - Magothy, Severn, and Patuxent Rivers
  - Chester and Choptank Rivers (includes Harris Creek), Eastern Bay
  - Kedges Strait

- Material Used:
  - Dredged fossil shell (1997-2006)
  - Alternative substrate (2009-2011)

- Periodic project monitoring

Construction Summary
Virginia
2001-2011

- 389 acres of substrate placed

- Locations:
  - Rappahannock (Section 510 authority)
  - Tangier/ Pocomoke Sounds
  - Great Wicomico and Lynnhaven Rivers

- Material Used:
  - Dredged fossil shell (2001-2011)

- Periodic project monitoring

Native Oyster Restoration Master Plan

Long-Term Restoration Goal:
Throughout the Chesapeake Bay, restore an abundant, self-sustaining oyster population that performs important ecological functions such as providing reef community habitat, nutrient cycling, spatial connectivity, and water filtration, among others, and contributes to an oyster fishery.

Operational Goal:
Identify tributaries/regions most likely to develop sustainable populations of oysters with the implementation of reef construction, seeding, and other oyster restoration activities.

Purpose

Implementation

- The master plan ensures that USACE-implemented oyster restoration is conducted in a logical, science-based, and cost-effective manner with the greatest potential for success in achieving the restoration goal.

Strategic Plan

- The master plan will present a strategic plan for pursuing long-term, wide-scale restoration throughout the Bay that complements the States' oyster restoration programs as well as other Bay-wide restoration efforts and future uses of the Chesapeake Bay.

Oyster Locations

- It will not define specific projects for specific locations; locations will be determined in future tributary plans.

Plan Formulation Process

1. Develop formulation white papers

2. Adopt salinity-zone, disease, and reproduction strategies

3. Identify distinct sub-segments of the Chesapeake Bay for evaluation and prioritization

4. Determine the appropriate scale at which restoration should be undertaken

5. Tributary evaluation and prioritization:

A layered formulation evaluation	Identify Tier I and II Bay segments

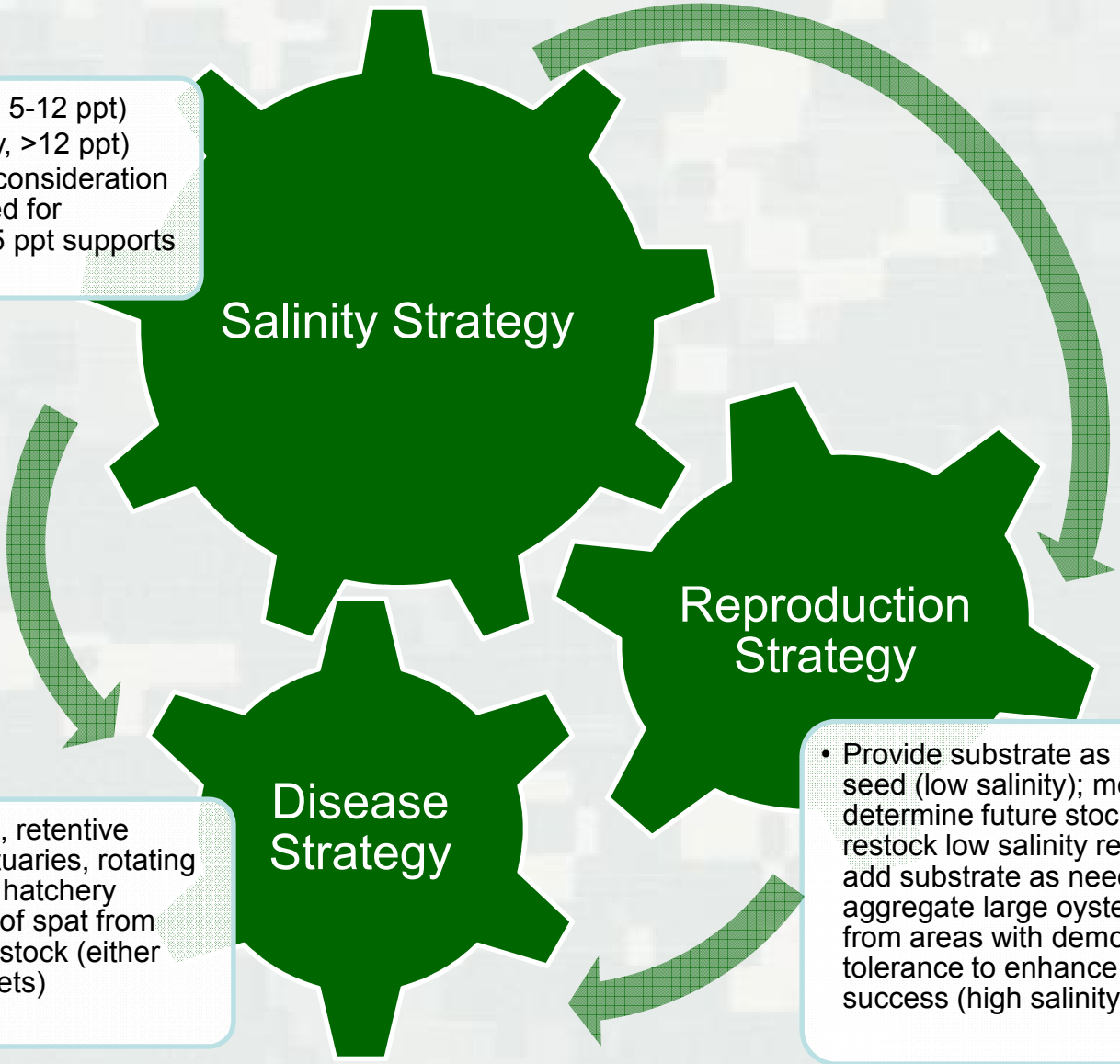
Step 1- Develop White Papers

- Scale
- Disease
- Populations – bayscape setting
- Populations - individual reefs
- Physio-chemical factors
- Hydrodynamics
- Reproduction

- ➢ Significance to oyster restoration and master plan
- ➢ Scientific basis and state of knowledge
- ➢ Application to the master plan
- ➢ Reviewed and coordinated with resource agencies

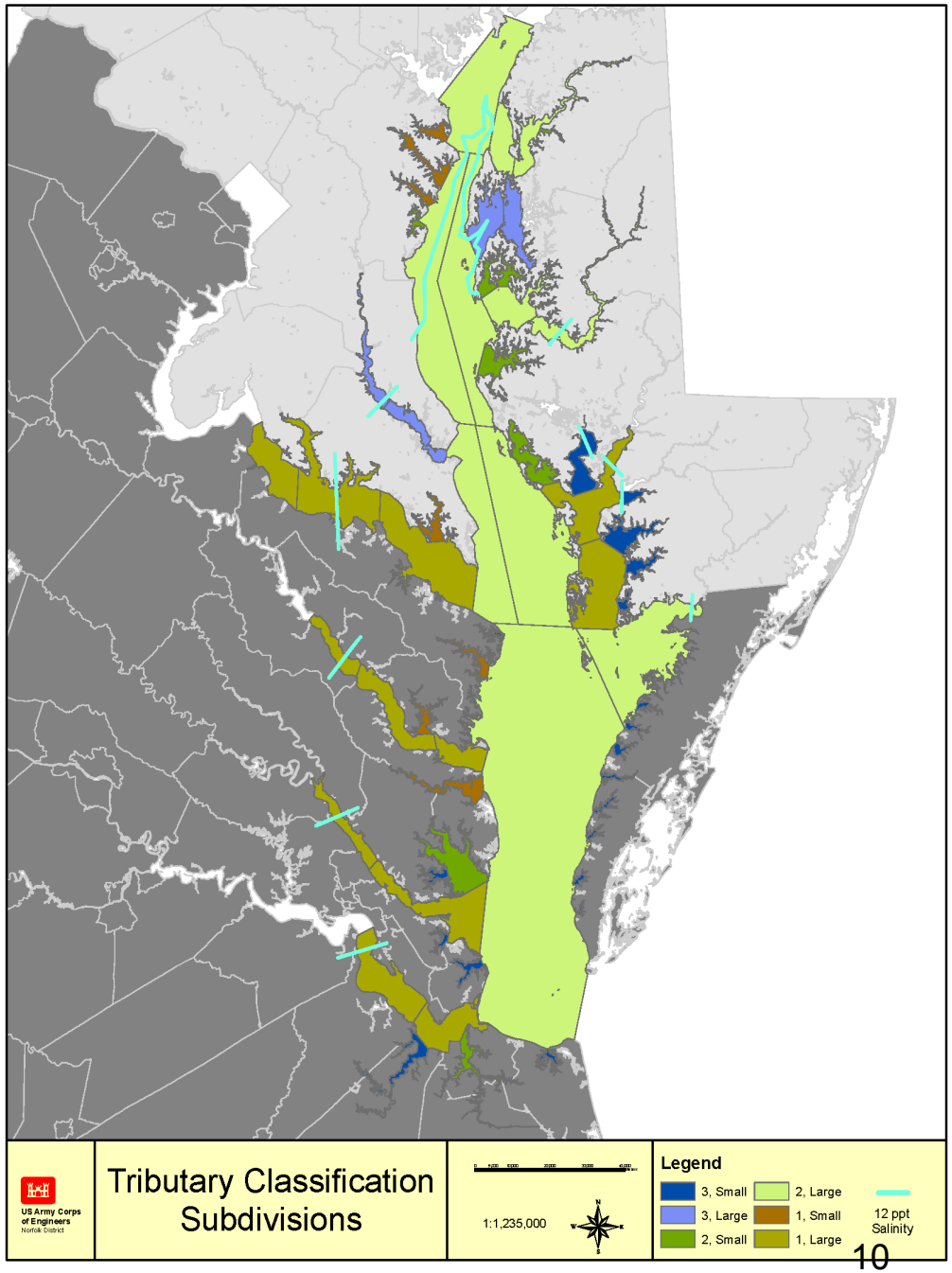
Step 2: Salinity-Based Approach

- Zone 1 (low salinity, 5-12 ppt)
- Zone 2 (high salinity, >12 ppt)
- Plans will take into consideration that >8 ppt is needed for reproduction, but >5 ppt supports growth



- Incorporates sanctuaries, retentive systems such as trap estuaries, rotating broodstock approach for hatchery production, and planting of spat from disease-resistant parent stock (either from hatcheries or wild sets)

- Provide substrate as needed and seed (low salinity); monitor to determine future stocking needs; restock low salinity reefs at 2-3 years; add substrate as needed; Stock and aggregate large oysters harvested from areas with demonstrated disease tolerance to enhance fertilization success (high salinity)



Step 3: Distinct Sub-Segment Delineations

34 Maryland segments
29 Virginia segments

Step 4: Scale

Scale = the approximate number of acres of functioning habitat in a given tributary or sub-region required to develop a self-sustaining oyster population. No "one size fits all."

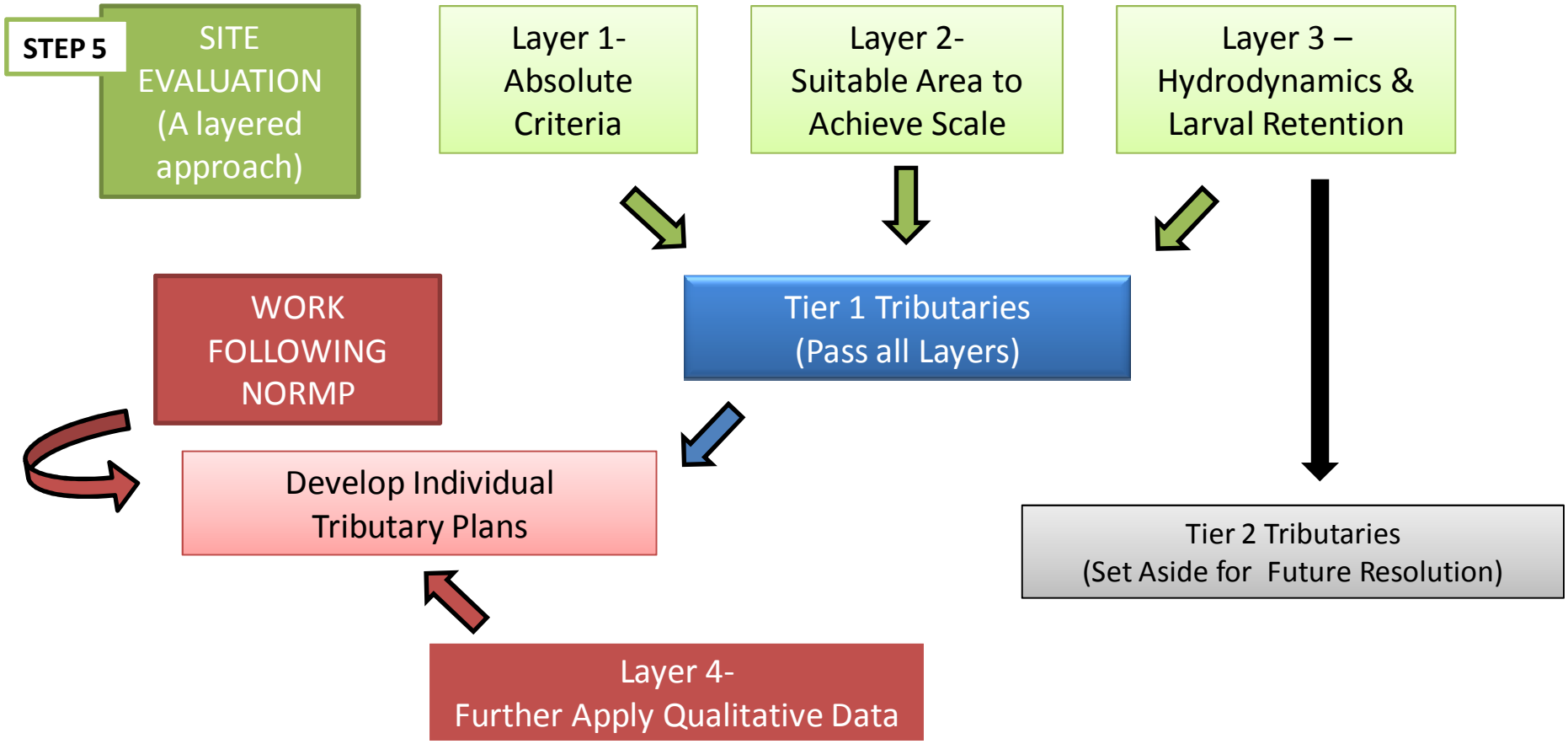
What do we know???

- Past restoration efforts have been too small to impact system
- Need to concentrate resources

Define historic habitat baseline

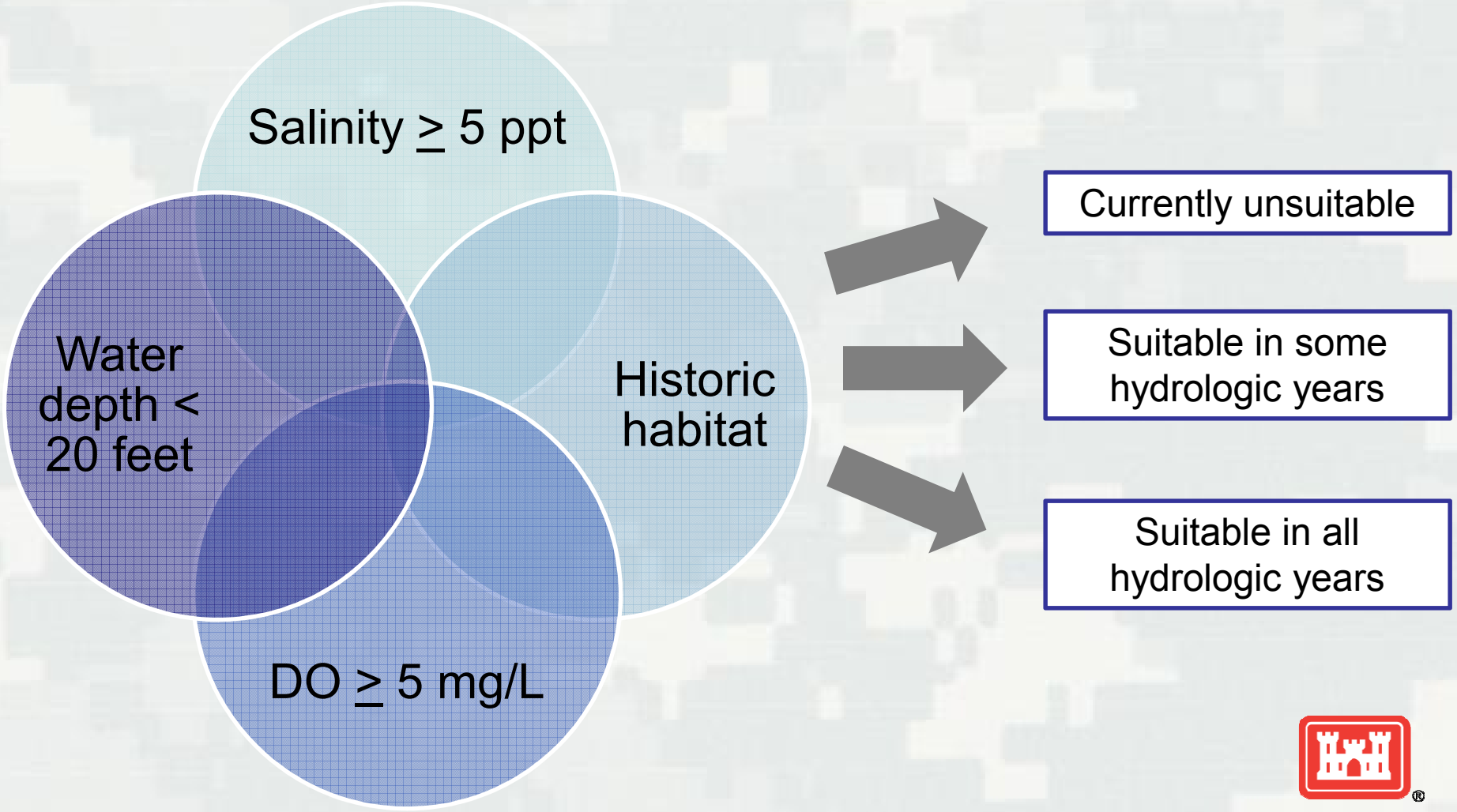
Identify the percent of historic habitat that needs to be restored to achieve goals.

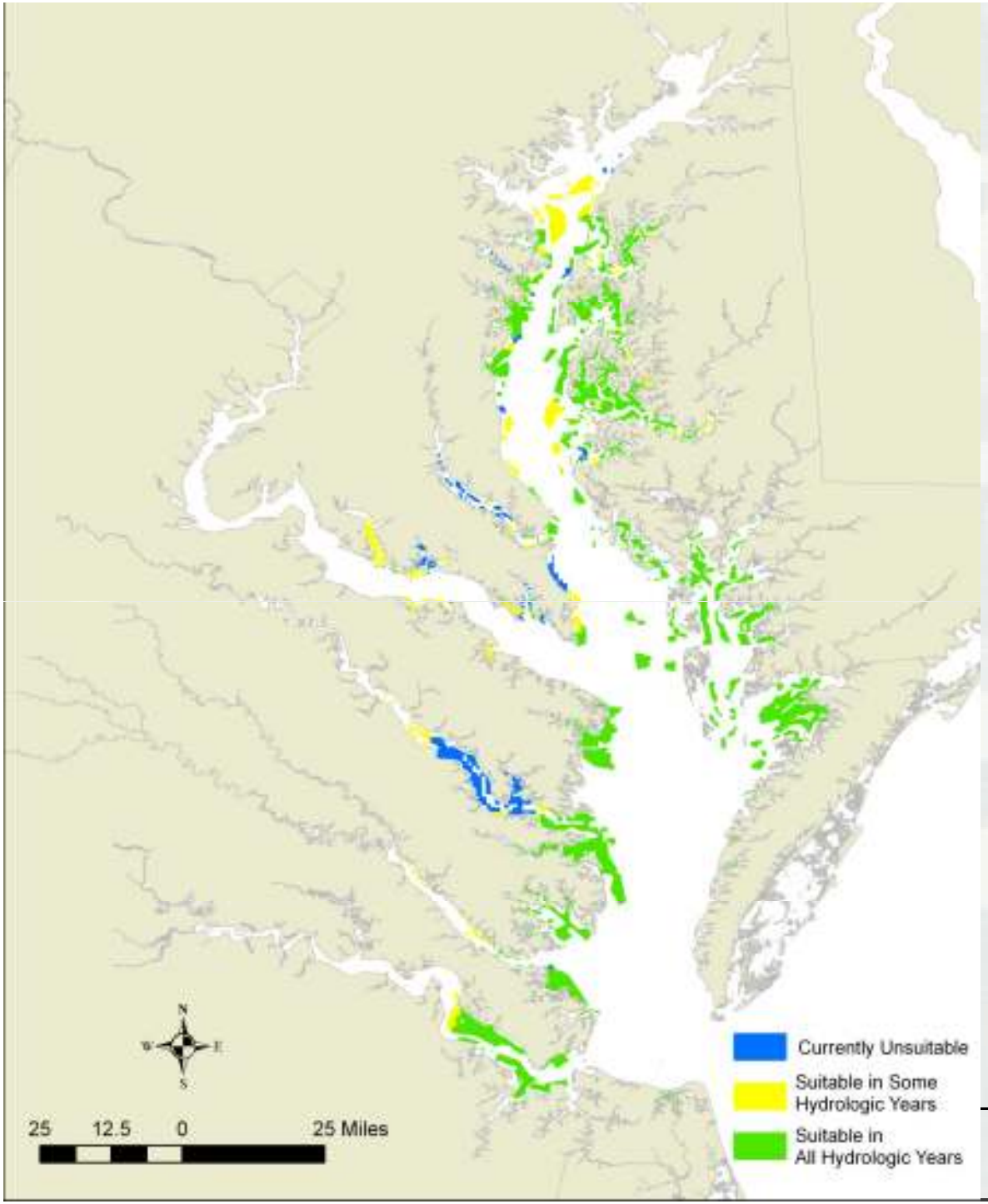
Restoration goal = **20-40%** of historic (corrected) habitat


STEP 5
SITE EVALUATION (A layered approach)
Layer 1- Absolute Criteria
Layer 2- Suitable Area to Achieve Scale
Layer 3 – Hydrodynamics & Larval Retention
WORK FOLLOWING NORMP
Tier 1 Tributaries (Pass all Layers)
Develop Individual Tributary Plans
Tier 2 Tributaries (Set Aside for Future Resolution)
Layer 4- Further Apply Qualitative Data

Step 5: Tributary Evaluation and Prioritization

Absolute Criteria





Suitability Analysis Results within Yates/Baylor Boundaries

- Salinity
  - Surface
  - Bottom
- Bottom DO
- Water Depth
- Yates and Baylor Grounds

Total Suitable Area

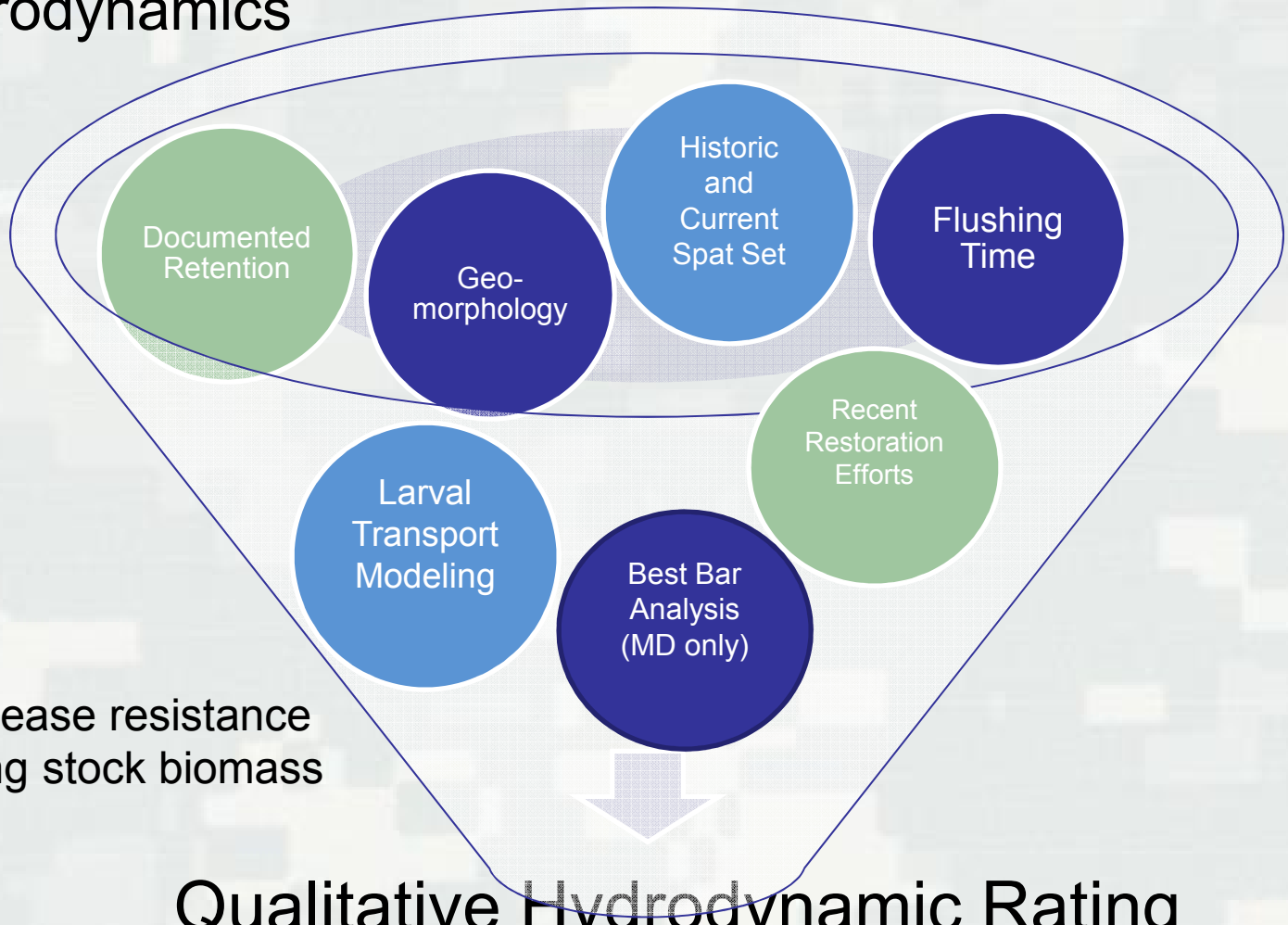
MD= 132,000 acres

VA= 121,000 acres

BUILDING STRONG®

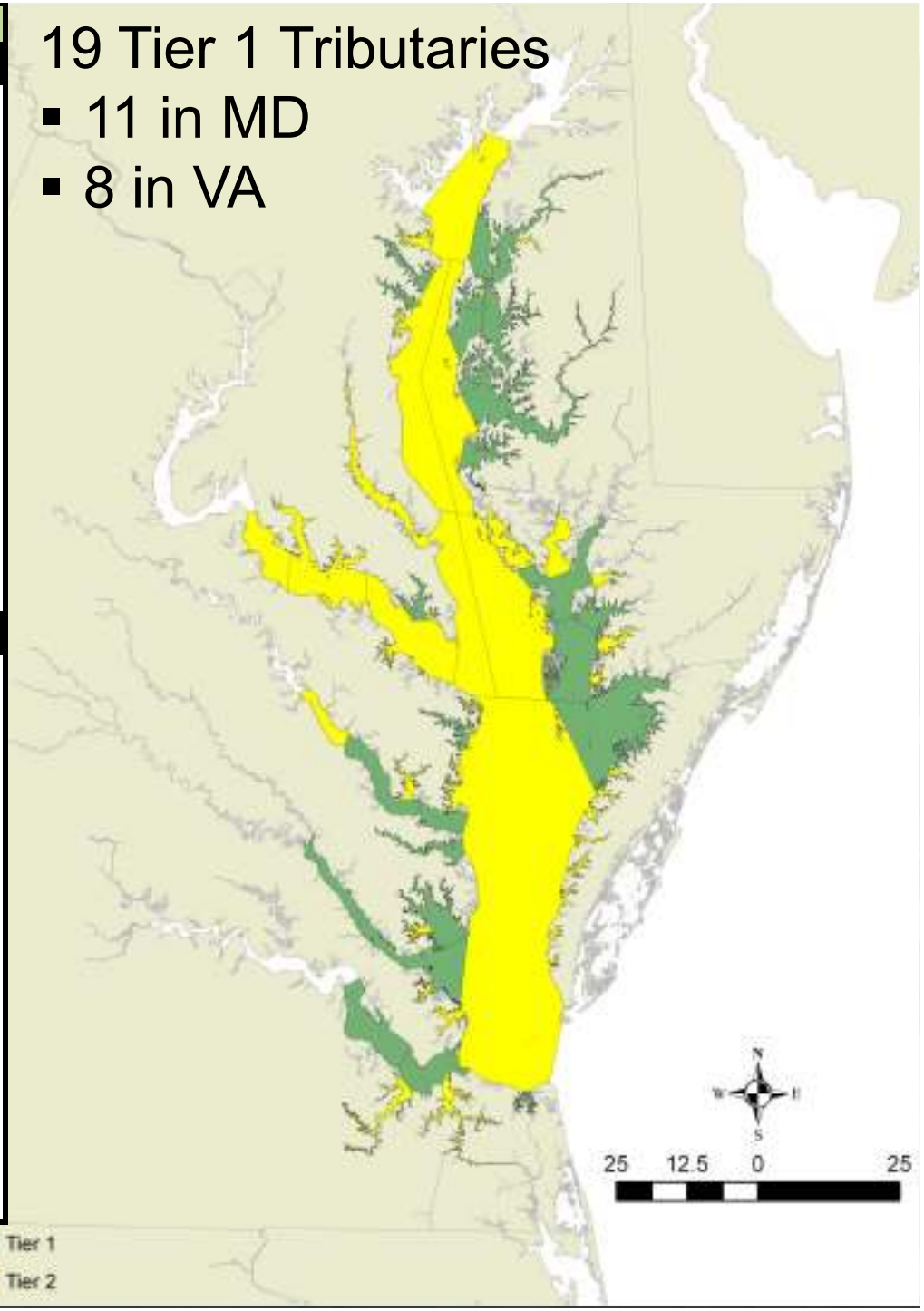
Step 5: Tributary Evaluation and Prioritization

- Layer 3: Hydrodynamics



Significant for
1. Larval retention
2. Development of disease resistance
3. Rebuilding spawning stock biomass

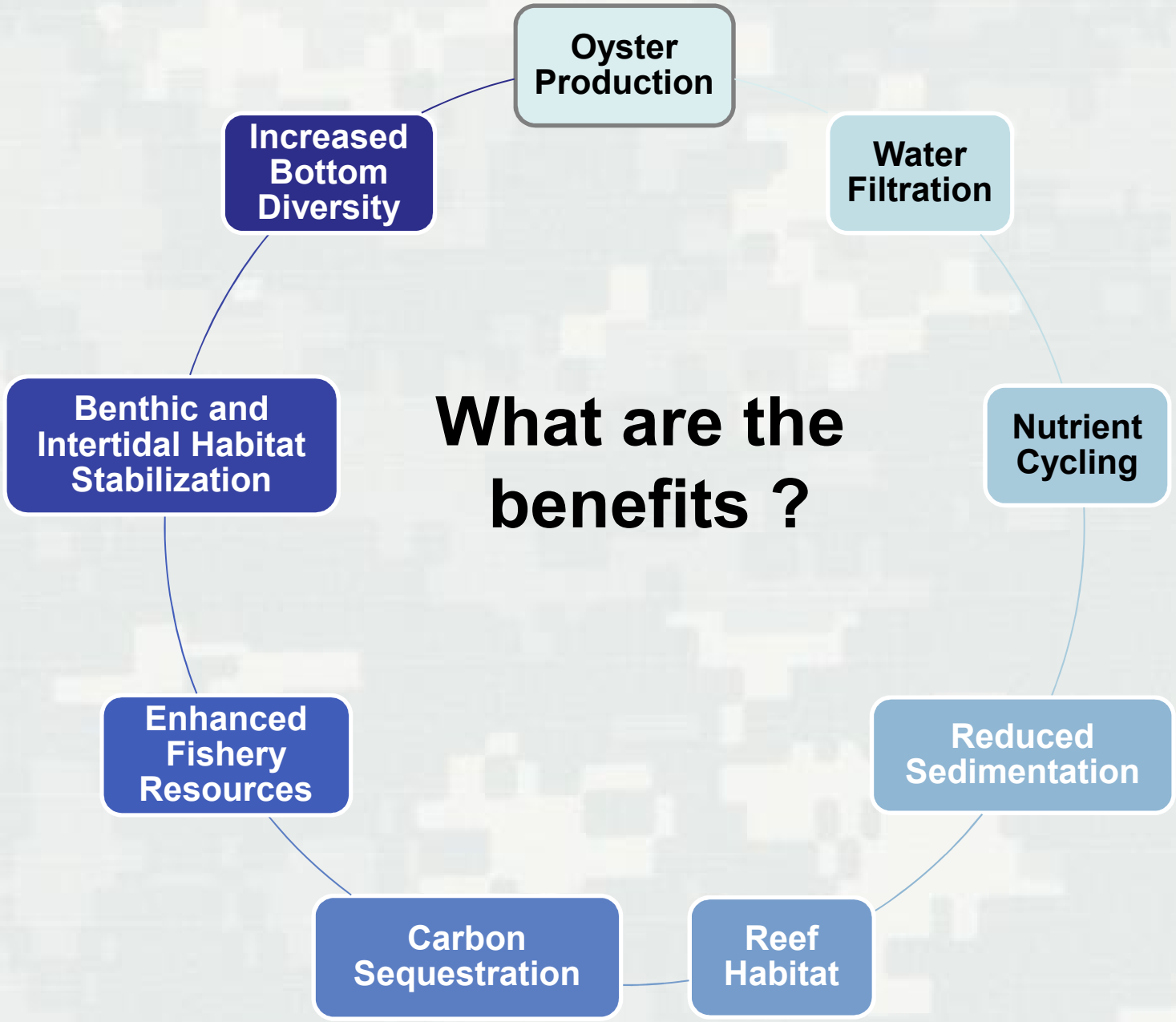
Tier 1	Tier 2
Maryland	
· Severn R (S)	· Magothy R (S)
· South (S)	· Rhode R
· Chester R (S)	· West R
· Eastern Bay (S)	· Corsica R (S)
· Choptank R (S)	· Honga R
· Harris Creek (S)	· Potomac R
· Broad Creek	· Fishing Bay
· Little Choptank (S)	· Monie Bay
· St. Mary's R (S)	· Big Annemessex R
· Tangier Sound (includes Nanticoke R (S))	· Little Annemessex R
	· Patuxent R (S)
· Manokin R (S)	· All MD Mainstem Segments (S)
Virginia	
· Rappahannock R (lower, middle)	· VA Mainstem
	· Little Wicomico R
· Great Wicomico R (S)	· Cockrell Creek
· Piankatank R	· Corrotoman R
· Mobjack Bay	· Severn R
· York R	· Poquoson R
· Pocomoke/Tangier Sound	· Back R
	· Onancock Creek
· James R	· Nassawaddox Creek
· Lynnhaven R	· Hungars Creek
	· Cherrystone Inlet
	· Old Plantation Creek
	· Elizabeth R
	· Nansemond R



What Will Large-Scale Restoration Cost???

- Large-scale restoration is still in the learning mode
- Cost estimates for restoration need to include habitat construction, seeding, and monitoring
- Costs expected to be spread over multiple years for a given tributary
- Cost range for a tributary reflects the low and high acreage target and the lowest and highest priced alternate substrates.
- Example of a tributary cost estimate to achieve the restoration target:
  - Smallest Tier 1 MD tributary = South River, 90 to 200 acres, $16 million to $48 million
  - Largest Tier 1 MD tributary= Tangier Sound, 1,800 to 3,600 acres, $154 million to $652 million
- Estimates are conservatively high – existing habitat is not included in most estimates; some areas may need only seed (no substrate)
  - Once quantified in a tributary plan, these considerations would reduce the effort needed to reach restoration targets

What are the benefits ?



Master Plan Recommendations

Specific Tributary Plan	• Develop with restoration partners • Parameters to consider identified in master plan • Additional surveys = population, bottom condition, hydrodynamic, larval transport, and recruitment
Construction	• Construct a portion of target (25, 50, or 100 acres) per year • Funding dependent • Continue until success metrics reached
Target Higher Salinities for Development of Disease Resistance	• Initial efforts in mesohaline-polyhaline salinities • Special attention given to mid-river reefs
Reef Design Recommendations	• Bar morphology, reef fragmentation, reef height, reef topography, orientation to flow, water depth, distance between reefs, etc.

Master Plan Recommendations (Continued)

Research Needs	• Quantification of benefits, larval transport, development of disease resistance and transmission, site selection with respect to water currents and bottom topography, etc.
Use Adaptive Management	• Such as additional stocking of disease resistant oysters, moving of disease resistant spat-on-shell, addition of fresh substrate, measures to reduce predation, etc.
Monitoring Protocols	• Monitoring element, type of data recorded, method of monitoring, monitoring objective
Concentrate Resources and Funding	• Necessary to establish self-sustaining populations
Follow Success Metrics Defined by Oyster Metric Workgroup	• Biomass, density, and shell accretion

What is the Future of USACE Program?

Master plan will open up USACE's MD restoration program to additional tributaries (currently only eight areas covered by NEPA)

Work with NOAA and other agencies toward achieving E.O. 13508 goal of restoring 20 tributaries by 2025

Focus will be on restoring one tributary at a time

Large-scale oyster restoration will only succeed with the cooperation of all agencies and organizations involved. Resources and skills must be leveraged to achieve the most from restoration dollars.

Partners in Restoration

Oyster Recovery Partnership
ORP

Activity (3)	Step 1	Step 2	Step 3	Step 4	Step 5	Step 6
	Site Selection	Bottom Survey	Reef Construction	Ground Truth	Produce & Plant Oysters	Post Planting Monitoring
Partners / Roles	Project Coordination - ORP					
	All	NOAA, MGS ($) DNR, NOAA	Watermen, Corporation ($) NOAA, USACE, DNR	UMD, ORP ($) NOAA	UMCES, ORP (1)(2) ($) DNR, UMCES, NOAA	UMD, DNR, Morgan, USNA ($) NOAA, DNR, USACE
	Enforcement & Management Agency – NRP / DNR					
	Permits / Regulations – USACE Regulatory / DNR / MDE					
	Data Collection & Management – DNR / ORP / NOAA					

Notes: (1) In 2009, DNR (Piney Point), Morgan State, ORP & watermen conducting remote setting pilot projects; (2) Based on salinity regimes, oyster reefs may only receive shell rehabilitation (no spat) in higher salinity waters where a natural spat set could occur; (3) For aquaculture projects, watermen to be trained on all steps with guidance and technical support by partners; the steps may be modified to minimize watermen costs.

State Agency, Non-Profit, Federal Agency, University, Corporation

Thank you for your time.

Questions?