Quarterly Progress Meeting: Oyster

Step 1: Summarize your outcome.

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.

Filter-feeding oysters and their reefs can improve water quality and provide habitat for invertebrates and fish. These native bivalves are an iconic Chesapeake Bay species that has been decimated by pollution, disease and historic overharvesting. Restoring and protecting oyster reefs in Bay tributaries would reestablish the species and provide important ecosystem services to the Bay.

To achieve this outcome, state, federal, NGO, and academic partners are working together to select and restore 10 tributaries in Maryland and Virginia tidal waters. Science based restoration includes reef construction and seeding aimed at meeting success metrics.

Lead and Supporting Goal Implementation Teams (GITs): Sustainable Fisheries GIT

Participating Partners:
Participating partners include:

- Maryland Department of Natural Resources
- Virginia Marine Resources Commission
- NOAA Office of Habitat Conservation
- U.S. Army Corps of Engineers
- The Nature Conservancy
- Virginia Institute of Marine Science
- University of Maryland Center for Environmental Science
- Oyster Recovery Partnership
- Elizabeth River Project
- Chesapeake Bay Foundation
- City of Norfolk
- Lynnhaven River NOW
- City of Virginia Beach
- Oyster Reefkeepers

Progress:

Step 2: Explain the logic behind your work toward an Outcome.

The attached logic table (available as an Excel spreadsheet) explains the reasoning behind our work toward an Outcome. The table indicates the status of our management actions and denotes which actions have or will play the biggest role in making progress.

Step 3: Craft a compelling narrative.

What are our assumptions?

(1) Are you on track to achieve your Outcome by the identified date?

a. What is your anticipated deadline? What is your anticipated trajectory?

- Expected deadline is 2025. At the current trajectory the outcome will not likely be met by the deadline.
- Only six of ten tributaries have been selected and restoration is complete in one.

b. What actual progress has been made thus far?

- Six Chesapeake Bay tributaries have been selected for oyster restoration: Harris Creek and the Little Choptank and Tred Avon rivers in Maryland, and the Lafayette, Lynnhaven and Piankatank rivers in Virginia.
- Each tributary is at a different level of progress in a process that involves developing a tributary restoration plan, constructing and seeding reefs, and monitoring and evaluating restored reefs. The last phase of this process—reef monitoring and evaluation—will determine success in meeting this outcome. Monitoring and evaluation will not be complete until after 2025, as a tributary must be monitored at three- and six-year intervals after reef construction and seeding are complete before it can be deemed restored.

Oyster Reef Restoration Progress Dashboard

Tributary	Tributary Restoration Plan	Reef Construction and Seeding	Monitoring and Evaluation	Completed/Target Acreage (2015)
Harris Creek (Md.)	Complete	Complete	In Progress	350/350
Tred Avon (Md.)	Complete	In Progress		2.6/147
Little Choptank (Md.)	Complete	In Progress		85.8/440
Piankatank (Va.)	In Progress	In Progress		25/TBD
Lynnhaven (Va.)	In Progress	In Progress		63/TBD
Lafayette (Va.)	In Progress	In Progress		70/80

In Maryland, 563.9 acres of oyster reefs are considered "complete." While most of these reefs have undergone restoration as part of our progress toward this outcome, others are naturally occurring and already meet our criteria for a restored reef. According to an April 2017 restoration update, about 370 acres of oyster reefs remain to be restored, including 112 acres in the Tred Avon and 262 acres in the Little Choptank.

- The Harris Creek restoration plan originally called for 377 acres of reefs to be restored. This target was later revised to 350 acres. Between 2011 and 2015, 350.9 acres of reefs were built and seeded with 2.07 billion spat, marking the completion of the initial restoration phase for this tributary. In 2016, four reefs were seeded with 61.3 million spat to ensure each reef received its full complement of seed oysters. A 2016 analysis of the "first cohort" of Harris Creek reefs (seeded in 2012) showed that all reefs met the minimum criteria for success in oyster weight and density, and half met even higher weight and density targets. In addition, all 12 reefs were home to oysters of different ages, which can indicate a healthy oyster population.
- The Tred Avon River draft restoration plan calls for 147 acres of reefs to be present in the sanctuary. In 2015, 18.6 acres of reefs were built, 2.6 of which were seeded. In 2016, 32.4 acres of reefs were seeded with more than 142 million spat. (No new reefs were built.) In 2017, the U.S. Army Corps of Engineers plans to construct eight acres of shell substrate reefs and partners plan to seed about 50 acres as hatchery production allows.
- The Little Choptank River restoration plan calls for 440 acres of reefs to be restored. Of this total, 40 acres already meet our definition of a restored reef. Between 2014 and 2015, 148.4 acres of reefs were built, about one-third of which were seeded. In 2016, 132.2 acres of reefs were seeded. In 2017, partners plan to seed about 120 acres. An additional 118 acres still need to be built and are pending permit approval.

In Virginia, 158 acres of oyster reefs are considered "complete." Some of these reefs have undergone restoration as part of our progress toward this outcome, while others have undergone previous restoration work or, due to naturally occurring reefs and oysters, already meet our criteria for a restored reef. According to an April 2017 restoration update, nine and a half acres of oyster reefs remain to be restored in the Lafayette River. Restoration targets for the Piankatank and Lynnhaven rivers are being finalized.

- In the Lafayette River, partners have set a restoration target of 80 acres of reefs. Of this total, 70.5 acres already meet our definition of a restored reef, due to past restoration work and a decades-long harvest closure that has allowed some reefs to self-restore. Partners have determined which areas of the river are best suited for the nine and a half acres of restoration work that remains and have worked with the Virginia Marine Resources Commission to ensure past projects and self-restored reefs will remain protected from leasing. In 2017, the Chesapeake Bay Foundation and Elizabeth River Project plan to build four acres of reefs with funding from the National Oceanic and Atmospheric Administration, but are still seeking funding to support the completion of the remaining five and a half acres.
- In the Lynnhaven River, partners are working to develop a restoration target. Due to past restoration work, 63 acres of reefs already meet our definition of restored, and 2016 surveys indicate these reefs have been self-sustaining since 2008. In 2017, the National Oceanic and Atmospheric Administration will conduct additional surveys in high-priority restoration areas.

- In the Piankatank River, partners have set a target to restore between 500 and 1,000 acres of reefs. Between 2014 and 2015, 25 acres of reefs were built; an additional 25 acres will be built in 2017. The Piankatank is also home to 55 acres of sanctuary reefs and 118 acres of harvest reefs. An oyster population survey—expected to take place in 2017—will help determine whether existing reefs meet our restoration criteria and can be included in this tributary's completed acreage total.

c. What could explain any existing gap(s) between your actual progress and anticipated trajectory?

- Establishing restoration goals and targets has taken longer than expected in some Virginia tributaries delaying restoration.
- Restoration was put on hold for period of time in Maryland while some stakeholder concerns were evaluated.
- Funding
- Availability of substrate for reef construction.
- The process of selecting the other four tributaries (two in each jurisdiction) is underway and taking some time to finalize.

Are we doing what we said we would do?

1. Which of your management actions have been the most critical to your progress thus far? Why? Indicate which influencing factors these actions were meant to manage.

- Developing tributary restoration plans has been important. These plans set clear restoration goals and targets specific to the tributary, identify roles of each partner, and estimate funding needs.
- The tributary plans take time to develop and take into account ecological conditions (e.g., salinity, present-day spat set, water quality, wave energy, river basin morphology), and political factors (e.g., state oyster management policies, user group conflicts).

2. Which of your management actions will be the most critical to your progress in the future? Why? What barriers must be removed—and how, and by whom—to allow these actions to be taken? Indicate which influencing factors these actions will be meant to manage.

- There are three key actions selecting the remaining tributaries, completing tributary restoration plans for already selected tributaries and fully implementing restoration according to the restoration plans.
- Continued leadership by Maryland and Virginia to finalize tributary selection process
- Develop refined approaches to facilitate establishing acreage goals and targets in Virginia
- Continued joint funding and coordination among key partners to fully implement restoration plans.
- Continued monitoring efforts

Are our actions having the expected effect?

1. **What scientific, fiscal or policy-related developments or lessons learned have changed your logic or assumptions (e.g., your recommended measure of progress; the factors you believe influence your ability to succeed; or the management actions you recommend taking) about your Outcome?**
    - Science:
        - Establishing restoration goals and targets has taken longer than expected in some Virginia tributaries delaying restoration.
        - The process of selecting the other four tributaries (two in each jurisdiction) is underway and taking some time to finalize.
        - Availability of substrate for reef construction.
    - Policy:
        - Restoration was put on hold for period of time in Maryland while some stakeholder concerns were evaluated.
        - Availability of substrate for reef construction.
    - Fiscal:
        - Continued funding and cost share requirements
        - success in working with non state and federal partners

2. What would you recommend changing about your management approach? What new content will you include in your updated work plan?

- Finding ways to better link restoration to aquaculture
- Future - Incorporating results of MD's oyster stock assessment
- Shell budget analysis/tool being developed by Roger Mann
- Oyster Reef Ecosystem Services Results

3. What opportunities exist to collaborate across GITs? Can we target conservation or restoration work to yield co-benefits that would address multiple factors or support multiple actions across outcomes?

- Working to improve water quality in watersheds surrounding tributaries with large-scale oyster restoration will help ensure conditions are conducive to sustaining the restored oyster populations. Other factors such as disease, poaching, shell dissolution should also be considered.
- Oyster BMP Expert Panel
- USACE Comprehensive Plan (target project that enhance the oyster work)

How should we adapt?

1. **What is needed from the Management Board to continue or accelerate your progress? Multiple asks of the Management Board should be prioritized where possible.**

- Approve proposed near-term actions by the Oyster Interagency Teams:
    - Work with Budget and Finance Workgroup to develop a finance system to support oyster restoration outcome that considers (and is not limited to) sources of revenue from outside any traditional or existing revenue streams; identify how existing resources can work in concert to ensure the oyster restoration is more effective; and identify how we will know financing efforts are successful in achieving the oyster restoration outcome.

    - Work with Communications Team to underscore international and regional significance of oyster restoration.
        - Brief Executive Council on oyster restoration success
- Reaffirm support from agencies to continue supporting oyster restoration
- Facilitate streamlined review and decisions for the Oyster Best Management Practice Expert Panel.
    - We also commend the work of the Oyster Best Management Practice Expert Panel to draft recommendations for the nitrogen and phosphorus assimilation in oyster shell and enhanced denitrification crediting protocols related to oyster aquaculture and/or restoration practices.

What is our financial status? What are our future financial needs?

(1) What are the anticipated sources of funding/resources (monetary or non-monetary)/financing opportunities outside the CBPO that you anticipate would support this work? In other words, who else cares?

- Current efforts are funded mostly by NOAA, USACE and the states. Nature conservancy is funding some work in Virginia. These organizations have also supported staff resources to the planning, implementation and monitoring of restoration projects.
- Oyster restoration is included as a priority in the NFWF Stewardship Fund.
- Opportunities could include oysters as BMPs and nutrient trading, working with departments of transportation and pursuing mitigation funding strategies.

(2) How did those sources of financing work in concert with other financing mechanisms or funding sources?

- Each partner funded critical elements of the projects.
- NOAA supported hatchery and spat on shell production in Maryland and some reef materials in Virginia. NOAA also provided monitoring funds and staff to provide habitat surveys, spatial analyses, and planning-coordination.
- USACE provided funding to acquire reef substrate materials and construct reefs.
- Maryland funded reef planting activities.

(3) What were the specific metrics used to determine project and/or funding success? Are those metrics currently incorporated into the current Management Strategy/Outcome/Workplan Action Item?

- Specific success criteria were developed by scientists and managers. See this Oyster Metrics report for full details (http://www.chesapeakebay.net/channel_files/17932/oyster_restoration_success_metrics_final.pdf)
- The Oyster Metrics Report outlines a monitoring protocol to measure progress toward the established targets and thresholds. The report calls for required monitoring of specific parameters including the structure of the restored reef, population density and total reef population/biomass estimate. Successful completion of the monitoring protocols is contingent upon adequate funding and human resources available each year.
- Monitoring of tributaries will take place for six years after implementation is complete to gather data that will be used to determine if the tributary has been successfully restored. Participation and support is necessary from all restoration partners, including federal and state agencies,

nonprofits and research institutions. A tributary cannot be declared “restored” until this long-term monitoring protocol is complete and the success metrics have been met.