

Advancing science-based monitoring that incorporates citizen involvement for oyster habitat restoration projects

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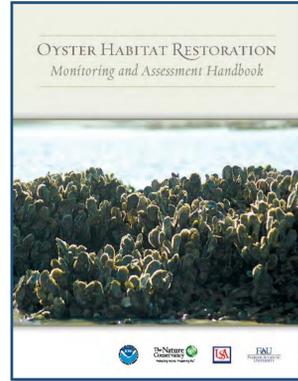
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Introduction

The Nature Conservancy, Charlotte Harbor National Estuary Program and partners have developed a long-term strategy for oyster habitat restoration in the Charlotte Harbor estuary. An essential element of understanding if projects are meeting their intended objectives is to conduct long-term monitoring.

Funding to cover monitoring costs past 1 year post-construction, if at all, can be difficult to find. Likewise, once a project is constructed there is typically little to no opportunity for continued volunteer involvement, despite the fact that most community volunteers have been 'hooked' by their experience with oyster restoration and want to stay involved. The Volunteer Oyster Habitat Monitoring Program (VOHMP) in the Charlotte Harbor estuary was established to fill these gaps. The VOHMP's first project is the Trabue Harborwalk Oyster Project in the City of Punta Gorda, led by The Nature Conservancy in collaboration with our partners.

Applying standardized science-based monitoring protocol to habitat restoration projects is essential for comparison across oyster restoration projects and helps to increase our scientific knowledge of restoration design. The **Oyster Habitat Restoration and Monitoring Assessment Handbook** (Baggett et al, 2014) establishes **Universal Metrics and Universal Environmental Variables** recommended for monitoring of all oyster restoration projects to allow for a systematic comparison among restored sites. This comparison provides the basic science needed to help determine if we are achieving our collective goals in restoring this critically imperiled marine habitat.



The Handbook was used as a guide to develop the Monitoring Plan for the Trabue project.

Restoration Methods

Trabue Harborwalk Oyster Habitat Restoration is a project initiated by The Nature Conservancy in the City of Punta Gorda, located in the Charlotte Harbor Estuary in Southwest Florida. The primary objective of this project is to compare three different methods of oyster reef creation at the project site: bagged fossilized shell, mats with attached recycled oyster shell and loose fossilized shell with a perimeter of bags to minimize movement of the loose shell. The three different methods are being tested to determine which of three reef building techniques is the most productive and effective for increasing oyster populations and attracting additional species to the area – information critical to the broader goal of expanding oyster restoration throughout Charlotte Harbor.



Oyster Bags



Oyster Mats



Loose Shell

Restoration Monitoring Plan

The Trabue Harborwalk Oyster Reef Monitoring Plan was prepared for the project based on the metrics recommended in the Handbook described above. All of the **Universal Metrics** and **Universal Environmental Variables** in the Handbook were included in the project Monitoring Plan. These are:

- reef areal dimensions (project footprint and reef area)
- reef height
- live oyster density
- oyster size frequency
- water temperature
- salinity
- dissolved oxygen



The following **Restoration Goal-Based Metrics** identified in the Handbook were also included in the project Monitoring Plan:

- oyster recruitment and cluster formation
- water clarity/turbidity
- invertebrate use of the reef
- macroinvertebrate infauna
- waterbird utilization of the reefs
- habitat stability
- accretion/erosion between reef and mangrove shoreline
- submerged aquatic vegetation

Project Location & Design

The Trabue Harborwalk Oyster Project is a pilot oyster habitat restoration project designed by The Nature Conservancy. Its location in the Charlotte Harbor estuary, Punta Gorda, Florida, was identified as a highly suitable restoration site in the Charlotte Harbor Oyster Habitat Restoration Plan (2012). This pilot project is the first oyster restoration project implemented in the northern portion of the Charlotte Harbor Estuary.



Volunteer Oyster Habitat Monitoring Program

Volunteers are craving opportunities to help with marine restoration but accessibility is typically a limiting factor. Intertidal oyster restoration projects like the Trabue reefs are in shallow water with no special equipment needed or the need to dive or snorkel, the methods used provide many easy and quick ways for people of all ages and abilities to be involved, and the volunteers have direct access to marine scientists, working hand in hand together, which is a rarity for marine projects.

As an outgrowth of this project, the CHNEP, in partnership with TNC and the FDEP Charlotte Harbor Aquatic Preserves, is developing a pilot Volunteer Oyster Habitat Monitoring Program funded by a Coastal Partnership Initiative grant. The volunteers are being trained as Citizen Scientists to implement the project's monitoring plan and be ready for future oyster restoration projects being planned

In addition to recruiting and training Citizen Scientists to monitor oyster habitat restoration projects, the VOHM program will develop manuals for volunteer coordinators and volunteer citizen scientists, and establish standard operating procedures for monitoring oyster habitat restoration projects.



Oyster Bag Reef (top), Loose Shell Reef (middle) and Oyster Mat Reef (bottom)

Community: An Essential Ingredient to Success

Community involvement is essential to the success of restoration projects and the Trabue project has been no different. Although the project is led by The Nature Conservancy, we work hand in hand with the City of Punta Gorda, Charlotte Harbor National Estuary Program, Charlotte Harbor Aquatic Preserves, and our project funders.



Ribbon Cutting with Project Partners Celebrating Installation of the Reefs



Project Location Map (top) and Project Design (bottom) showing location immediately offshore and readily accessible to volunteers.

Value of Volunteers for Restoration Monitoring

The first year of post-construction monitoring using the VOHMP has proven to be very successful. Involving volunteers results in increased community support while reducing project monitoring costs. The program also provides a cadre of volunteers already trained to monitor future oyster habitat restoration project being planned in the Charlotte Harbor Estuary.



During the first year of post-reef construction monitoring 9 days were dedicated to volunteer monitoring. 25 individual volunteers donated 245 hours of their time monitoring the 9 pilot reefs. The volunteers represent fishing clubs, agencies, other community-based organizations, donors and individuals.

