

Oyster Bed Restoration

A DOI Nature-Based Solutions Roadmap Fact Sheet



Oysters are a type of bivalve shellfish that reside in most coastal regions in the continental United States. As ecosystem engineers, thousands of oysters form large reefs as they attach to a hard substrate or to other oysters.¹ Oysters inhabit both salt and brackish waters in coastal areas, providing valuable shelter for other marine species. While oysters spend most of their life cycle attached to a shell, they begin their lives as free-floating larvae. Oysters are a cornerstone of coastal ecosystems and fisheries, providing structural protection to the coast as well as improving water quality.²

TECHNICAL APPROACH

Oyster reef restoration projects seek to improve the conditions for oyster reef foundation by providing hard substrates for the oysters to latch onto. Restoration location (intertidal or subtidal) and technique used should be selected based on the desired outcome, such as shoreline stabilization or increased oyster harvest.^{3,4} Techniques include:

- Subtidal cultch placement: cultch material (substrate) is placed along the bed of the waterbody for oysters to attach to
- Subtidal structurally complex reef: using materials like reef balls, oyster pyramids, concrete structures, rocks, and limestone structures to create a substrate for oyster colonization
- Intertidal reef creation: relies on reef structures placed in the intertidal zone

All reef construction techniques may be paired with larval oyster seeding or placement of adult oysters

BENEFITS

Climate Threat Reduction

- Sea level rise adaptation and resilience
- Reduced flooding
- Storm protection

Social and Economic

- Reduced erosion
- Mental health and wellbeing
- Property and infrastructure protection
- Jobs
- Resilient fisheries
- Cultural values
- Food security

Ecological

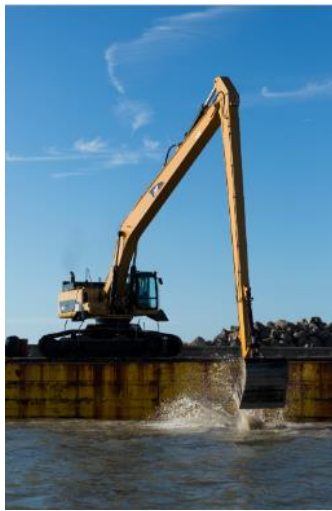
- Improved water quality
- Enhanced biodiversity

SITE SUITABILITY FACTORS

- ✓ Healthy native shellfish populations
- ✓ Water depth at least 1 foot at low tide
- ✓ Firm bottom
- ✓ Water temperatures typically ranging between 68-90 degrees F (though oysters can survive short periods of temperatures outside that range)
- ✗ Salinity below 5 ppt
- ✗ Soft mud
- ✗ Prevalence of pathogens and diseases
- ✗ Water depth greater than 26 feet
- ✗ Poor water flow

EXAMPLE PROJECT

The Half Moon Reef Oyster Restoration Project in Matagorda Bay, Texas is one of the largest oyster restoration projects in the United States. The project was led by The Nature Conservancy with partnership from the Texas General Lands Office, US Fish and Wildlife Service, US Army Corps of Engineers, and Texas A&M University. The project constructed over 50 acres of structurally complex reef using limestone.



Placing materials for reef construction. Photo credit: [Texas GLO Grants](#)

REFERENCES

- 1 NRC. n.d. "Oyster Reefs." *Naturally Resilient Communities*. <https://nrcsolutions.org/oyster-reefs/>
- 2 NOAA. 2022. "Oyster Reef Habitat." *National Oceanic and Atmospheric Administration Fisheries*. <https://www.fisheries.noaa.gov/national/habitat-conservation/oyster-reef-habitat>
- 3 Olander, Lydia, Christine Shepard, Heather Tallis, David Yoskowitz, Kara Coffey, Christine Hale, Rachel Karasik, Sara Mason, Katie Warnell, Katya Wowk. 2020a. "GEMS Phase I Report: Oyster Reef Restoration." *Nicholas Institute for Energy, Environment and Sustainability, The Hart Research Institute and The Nature Conservancy*. <https://nicholasinstitute.duke.edu/sites/default/files/publications/GEMS-Phase-I-Report-Oyster-Reef-Restoration-corrected.pdf>
- 4 Olander, Lydia, Christine Shepard, Heather Tallis, David Yoskowitz, Kara Coffey, Christine Hale, Rachel Karasik, Sara Mason, Katie Warnell, Katya Wowk. 2020b. "General Oyster Reef Restoration." *Nicholas Institute for Energy, Environment and Sustainability, The Hart Research Institute and The Nature Conservancy*. <https://nicholasinstitute.duke.edu/eslm/general-oyster-reef-restoration>

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KEY RESOURCES

Title and Link	Site Suitability	Design and Construction	Monitoring Guidance	Example Projects
Oyster Restoration	✓	–	✓	✓
Oyster Habitat Restoration Monitoring and Assessment Handbook	–	✓	✓	–

LEARN MORE

Visit the DOI Nature-Based Solutions Roadmap for more information on oyster bed restoration, other nature-based solutions, and principles and considerations broadly relevant for nature-based solutions projects. The oyster bed restoration summary includes additional details on each section included in this fact sheet, plus information on operations and maintenance, common barriers, and more resources and example projects.

Explore the Roadmap



Full Roadmap Document



Oyster Bed Restoration Section

www.nicholasinstitute.duke.edu/roadmap