



2022 STATE OF THE OYSTER REPORT

on the OYSTER RESTORATION & PROTECTION
PLAN FOR NORTH CAROLINA

Prepared by the North Carolina Coastal Federation and Published September 2023

The Oyster Restoration and Protection Plan for North Carolina: A Blueprint for Action 2021-2025 (*Blueprint*) outlines eight strategies and corresponding actions that partners are taking to rebuild the state's oyster resources.

The work outlined in the *Blueprint* covers everything from protecting and restoring the state's important shellfishing waters, to building new oyster reefs, continuing wild harvest while expanding oyster farming activities, and educating the public and other stakeholders about oysters. This annual ***State of the Oyster Report***, provides a brief overview and highlights the activities and accomplishments of the diverse partners involved in this work for the year 2022.



Water Quality

Pristine water quality is critical to the health of oysters both to support the estuarine habitat and to ensure oysters are safe for human consumption. The Shellfish Sanitation and Recreational Water Quality Section of the North Carolina Division of Marine Fisheries (DMF) monitors water quality and reports on changes in closures. Priority actions identified in the *Blueprint* to protect and restore the critical shellfish growing areas of the state included developing watershed restoration plans for Stump Sound and the Newport River. An additional major focus of the *Blueprint* was to identify and prioritize additional waterbodies in the state in need of restoration and protection to ensure our wild and farmed oyster resources are protected for both their harvestability and habitat benefits. Water quality closure metrics and progress made on these water quality protection and restoration efforts in 2022 include:

- The final report detailing the development of the Stump Sound Watershed Plan was submitted to the North Carolina Land and Water Fund. The plan will be submitted to the State Division of Water Resources for review in fall 2023 to be approved as an official watershed restoration plan.
- The Newport River watershed restoration plan development is underway. The Federation was awarded \$1.6 million from the NC Land and Water Fund Flood Risk Reduction Program to design and implement the restoration of 1,100 acres of ditched and drained timberlands to wetlands within the Newport River watershed. The entire 1,400-acre tract was purchased by the North Carolina Coastal Land Trust and will be transferred to the North Carolina Coastal Federation. The tract includes 1,100 acres of timberland and 300 acres of high-quality wetland habitat.
- The North Carolina Soil and Water Conservation Commission joined the state’s three environmental commissions in adopting a resolution calling for increased funding to expand the state’s cost-share programs. Excessive amounts of nitrogen and phosphorus are entering the State’s coastal waters and contributing to costly water quality problems, according to the resolution. Additional cost-share funds will assist landowners in implementing efforts to reduce nutrient runoff from rains and storms.
- The North Carolina Department of Environmental Quality’s Division of Coastal Management developed a set of Principles and Guidelines for Financial Support prioritizing nature-based strategies. The NC Land and Water Fund appropriated \$15 million in the FY 2021-22 State budget to establish a flood risk reduction grant program to prioritize the design, implementation, and preservation of nature-based infrastructure. This approach reduces the volume of polluted runoff entering shellfish waters.

Shellfish Classification Acreage

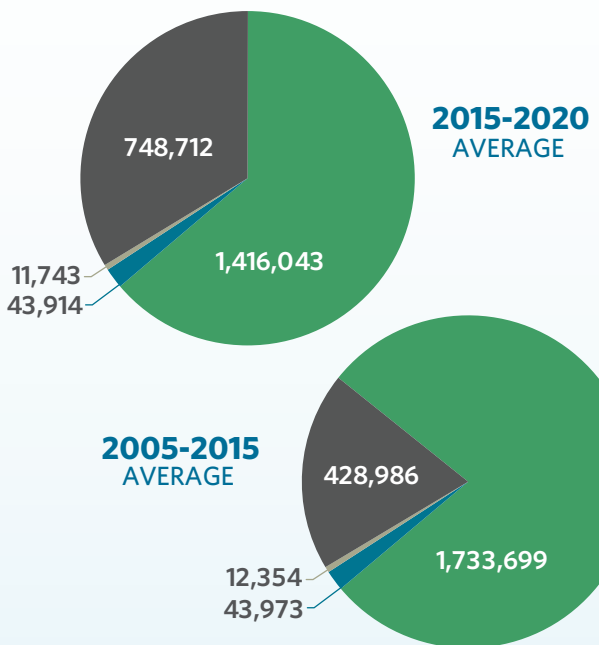
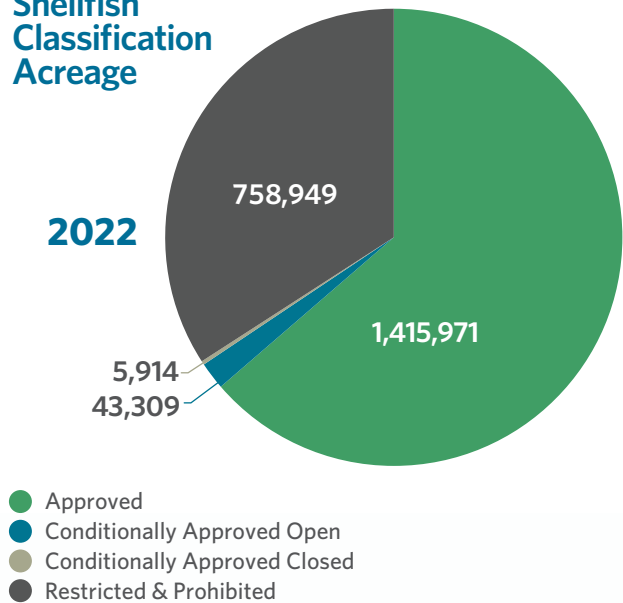
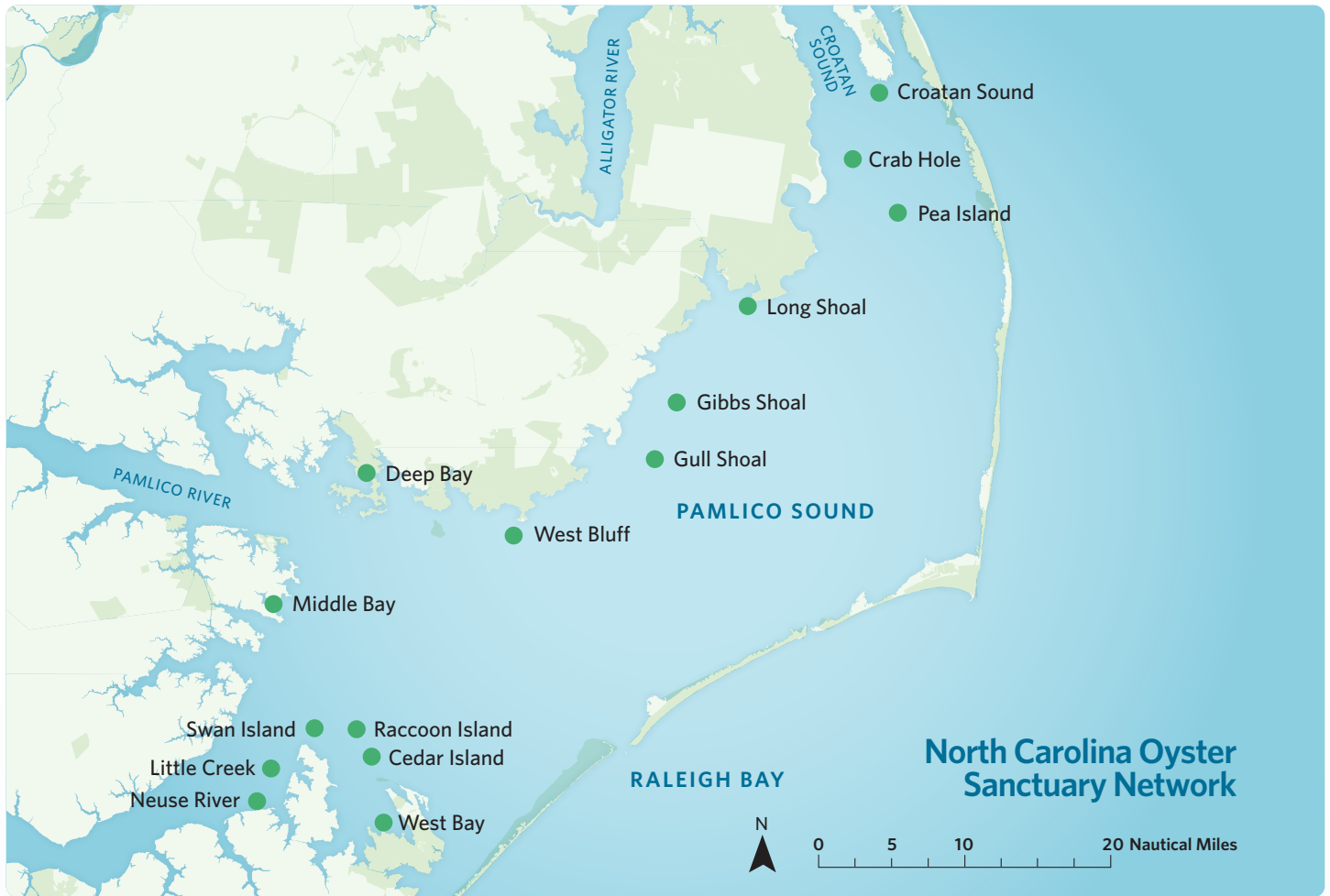


Figure 1: The Shellfish Sanitation and Recreational Water Quality Section of the Division of Marine Fisheries monitors the health of the state’s waters for public safety. Closures are issued based on harmful bacterial levels or stormwater inputs in sensitive areas. Note: in 2015, 314,710 acres were administratively closed in the Albemarle Sound due to staff cuts and the closure of laboratory space for processing water quality samples.

(Data courtesy: Andy Haines, DMF Shellfish Sanitation and Recreational Water Quality, Environmental Program Supervisor, June 27, 2023.)



Oyster Sanctuaries

Oyster sanctuaries are a restoration strategy that combines protection from harvest with habitat restoration in key coastal waters. The idea is that these protected reefs contribute larvae to the wild oyster population, improving harvest conditions. They also serve as an insurance policy for the state’s oyster population while providing important fisheries habitat. The *Blueprint* outlines a goal to build an additional 100 acres of oyster sanctuary by 2025.

2022 Progress Includes:

- There were 18.5 acres of new habitat constructed at Cedar Island Oyster Sanctuary using 18,000 tons of limestone marl through a partnership between DMF and the Federation. Another sanctuary, Gull Shoal, was constructed by the Division of Mitigation Services. Both reefs will be adopted into the Jean Preston Oyster Sanctuary Network once all mitigation objectives are satisfied.
- The Federation and DMF received notice that their \$14.9 million grant proposal to achieve the goal of 500 acres of oyster sanctuary by 2025 was recommended for funding by NOAA.

This new grant (the fourth partnership grant of its kind between the Federation and DMF) will begin in late 2023 and extend through 2026.

- The Federation and DMF attended the 2022 Restore America’s Estuaries conference in New Orleans, Louisiana where DMF’s sanctuary program was recognized for its national significance and leadership in oyster restoration efforts. The Federation presented at the conference and DMF staff participated in workshops and meetings with fellow oyster restoration practitioners.
- The Nature Conservancy examined the business of oyster restoration in coastal states and released a white paper in August 2022 (Hall and DeAngelis, 2022). The paper proposes ways to increase efficiencies in habitat restoration. From their national review of organizations conducting oyster restoration they concluded: **Oyster restoration is a huge industry with \$80 million being invested in restoration efforts and \$200M in benefits realized.**

In order to cut costs and further increase efficiencies they recommended:

- Insourcing and training: hire internally or consult early in the process. Employing in-house engineers can save

25-50 percent of costs and involving contractors early in the process saves anywhere from 5-25 percent because they can recommend alternatives to project design and implementation. The Division and partners regularly consult with contractors up front in developing project concepts and already internally designs the restoration projects.

- Leverage economies of scale: making bigger reefs achieves more benefit and saves mobilization/demobilization costs.
- Commercial collaboration: leverage shared resources (i.e. shared labor)

Project timelines can be reduced by 50 percent if these efficiencies are implemented.

Living Shorelines

Living shorelines are environmentally friendly shoreline stabilization techniques that help reduce shoreline erosion while simultaneously protecting and restoring valuable habitat. When constructed in areas suitable for oyster settlement and growth, they provide intertidal habitat for oysters. The *Blueprint* outlines a goal to expand the use of living shorelines to become the most commonly used shoreline stabilization method in estuaries that support oyster habitat.

2022 Progress Includes:

- Constructed a total of 7,129 feet, roughly 1.35 miles, of living shorelines at 35 sites using granite rocks, recycled oyster shells, marl, QuickReef, vertical sills, and OysterCatcher materials. Of these projects, 94 percent were constructed in oyster growing waters, building an additional 0.93 acres of oyster habitat.

- Exploring innovative options for living shoreline construction materials that do not rely on plastics was a goal of the *Blueprint*. Options vastly expanded in 2022 to include products from Atlantic Reefmaker, Coastal Technologies Corp, EConcrete, Living Shoreline Solutions/Sea & Shoreline, Native Shorelines, Natrx, Ready Reef, Sandbar Oyster Company and SoxErosion. The majority of these materials provide hard surfaces for effective oyster larval attachment.
- A goal of the *Blueprint* was to prevent harvest of oysters from living shorelines. However, it was concluded that the Marine Fisheries Commission and Coastal Resources Commission do not have authority in statute to limit the harvest of oysters that naturally recruit onto living shorelines. Furthermore, Shellfish Sanitation does not have the authority to close an area to harvest unless there is a bacterial issue. The only recourse, currently, is for the landowner to contact local law enforcement or possibly make an insurance claim if harvesting occurs that damages the integrity or function of the structure.

Shell Recycling

Oyster shells are a valuable resource used to build new oyster reefs. Voluntary shell recycling efforts collect shells to use in oyster restoration activities. The *Blueprint* outlines a goal to create a coordinated oyster shell recycling program to provide 5 percent of the material needed to support oyster restoration. Once achieved, this would translate to recycling roughly 16,750 bushels of shell annually.

2022 Progress Includes:

- Statewide shell recycling partners collected a total of 7,544 bushels of shell from the Triangle to the Coast. Native Shorelines, a private business focused on building living shorelines, recycled 4,524 bushels in the Triangle; the Federation recycled 2,820 bushels along the coast; and Ghost Fleet Oyster Co., a private oyster farm in Hampstead, NC, recycled 200 bushels from restaurants they sell to.
- The Federation established four new public drop off locations to collect oyster shells. This brings the total to 25 public shell drop-off locations in eight out of 20 coastal counties. Shell recycling exists in Brunswick, New Hanover, Onslow, Pender, Pamlico, Craven, Carteret, and Dare counties.
- On the Outer Banks, three restaurant partners were added to the Restaurant to Reef Oyster Shell Recycling Program: Dirty Dick's Crab House, Mulligan's Grille in Historic Cottage Row, and The Black Pelican.
- All of the shells collected were used in reef-building activities. Specifically, 1,900 bushels of recycled shell were used by DMF, valued at \$5,700, in cultch-planting efforts in Onslow County. The remainder were used in living shoreline projects.



Sustainable Wild Harvest

Maintaining a sustainable wild oyster fishery is important to North Carolina. Ensuring wild harvest remains sustainable refers to the idea that there are adequate oyster reefs to perpetuate the population and therefore perpetuate wild harvest opportunities. A stock assessment is needed to support oyster fisheries management goals and policies. Establishing a methodology to inform a stock assessment for the population is a major focus of the current *Blueprint*.

2022 Progress Includes:

- In developing the stock assessment methodology a yearlong, multipronged study, funded by The Nature Conservancy and carried out by researchers at North Carolina State University in partnership with DMF and commercial fishers, has been implemented. The study's goal is to design a population survey method for subtidal and intertidal oysters that is statistically robust, fishery independent, and have coastwide application. To date, the following efforts have been conducted:
 - Part 1: Subtidal Research (2018 – 2021)
 - Part 2: Intertidal Research (2020 – Present): Evaluating change over time via Drone imagery, Sentinel sites and Satellite imagery
 - Part 3: Dredge Discard and Survivorship (2019 – 2021): Cage study, Discard study

Researchers are analyzing collected data and preparing a final report.

- The Oyster Fishery Management Plan (FMP) is the state's guiding document that sets out harvest and licensure requirements for oyster management. DMF began the process for updating the Oyster FMP in fall 2022. This includes setting up an internal project delivery team and identifying issues to be covered in the update.



2022 CULTCH PLANTING

277,859	37	9
BUSHELs	ACRES	SITES

Data courtesy Abby Williams, NC Division of Marine Fisheries cultch planting biologist, August 2023

Cultch Planting

Cultch planted reefs are built throughout the state's shellfish waters to restore commercially harvested reefs. These reefs are built with limestone marl, recycled shell or other suitable materials, collectively referred to as "cultch." Goals for the state's cultch planting effort outlined in the *Blueprint* are to build 200 acres of cultch planted reefs to support wild harvest and to study the existing program-making recommendations to improve the program's return on investment.

2022 Progress Includes:

- DMF implemented a new reef monitoring protocol that provides them with more robust data to track the success of their cultch planting efforts.
- DMF acquired the R/V Oyster Creek, a barge that will expand their capacity and the geographic reach of their cultch planting efforts.
- Approximately 37 acres of cultch reefs were built.
- The Federation and DMF partnered to evaluate the state's cultch planting efforts in order to identify opportunities or areas of improvement for the program.
 - Internally, DMF evaluated how they can pioneer new cultch planting strategies.
 - Externally, DMF and the Federation hosted a series of four virtual workshops, hearing from oyster habitat and enhancement managers in Maryland, Louisiana, Texas, Florida, South Carolina and New Jersey about their work.
 - DMF and the Federation hosted an in-person workshop at the Restore America's Estuaries Conference, 40 attendees were present, to discuss lessons learned and continue discussions about oyster enhancement.

2022 WILD HARVEST

54,331	80%	Harvest from private leases was 3 times that of wild harvest.
BUSHELs	OCCURRED FROM CORE SOUND SOUTH TO THE STATE LINE	

Data courtesy Meredith Whitten, NC Division of Marine Fisheries biologist, August 2023

Shellfish Aquaculture

Shellfish aquaculture, or shellfish farming, allows growers to meet demand for shellfish products, provides economic development opportunities along the coast, and when properly sited, leases can provide many environmental benefits such as filtering water and providing habitat for a variety of estuarine species. The *Blueprint* outlines a goal of growing the shellfish aquaculture industry to a \$45 million industry by 2025.

2022 Progress Includes:

- The Federation and its partners focused on advancing plans for a mariculture hub in Carteret County. The hub will support the logistical requirements of shellfish farmers, providing them with essential amenities such as water access, docking facilities, gear storage, as well as product storage and refrigeration capabilities. These needs were identified as the highest priorities in a feasibility study finalized in 2018. To advance the hub:
 - The Federation secured a \$200,000 grant for hub construction from the Golden Leaf Foundation.
 - Carteret County Commissioners granted the Federation use of the land for the hub’s location along the North River.
 - The Federation is seeking additional funding to construct the hub from the US Economic Development Administration and state legislature.

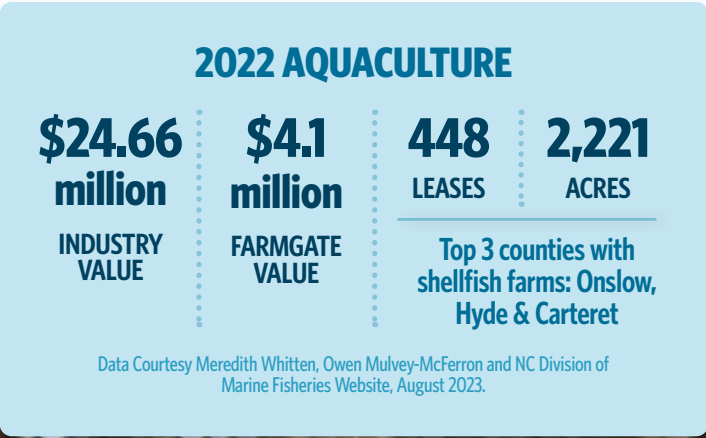
The mariculture hub stands to revolutionize the shellfish farming industry in the region, bolstering efficiency, sustainability, and economic growth for all involved stakeholders.

Outreach and Engagement

Outreach and engagement allow for the involvement of many stakeholders in the development and implementation of the *Blueprint*. The *Blueprint* identifies an overarching goal of creating communication and outreach strategies that engage stakeholders and the general public to actively support its goals, strategies and actions.

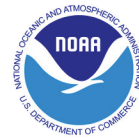
2022 Progress Includes:

- The staff at the North Carolina Aquarium on Roanoke Island worked to advance a new display that focuses on oysters as an important coastal habitat, food source and their ability to contribute to improved water clarity by filtering. Assuming sufficient grant funds are secured in 2023 to support the development of the display, the aquarium expects to open the new display by summer 2025.
- North Carolina Sea Grant, the Federation and the North Carolina Shellfish Growers Association, partnered to grow the NC Oyster Trail, an ecotoursim effort, to include 75 businesses statewide, adding 15 new sites. This effort aims to educate tourists on the value and importance of North Carolina oysters and oyster farms.
- Carteret Community College provided two trainings through their NC Shellfish Farming Academy. They have now offered this training seven times. In 2022, the course reached 22 new or established shellfish farmers. Seventeen participants graduated, roughly 78 percent of the enrollment. Several of those that have completed the course have submitted shellfish lease applications, with some being approved already.
- North Carolina Sea Grant, North Carolina Shellfish Growers Association and the Federation continued a webinar series for shellfish growers focused on timely topics to help growers. One webinar covering Storm Preparedness was held in 2022.





Partners involved in the *Blueprint* effort in 2022 included:



FOR MORE INFORMATION:
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