



Oyster Restoration and Protection Plan for North Carolina

A Blueprint for Action 2021-2025
[FOURTH EDITION]

STRATEGY SUMMARY

Recommendations contained in the 2021-2025 Oyster Restoration and Protection Plan for North Carolina: A Blueprint for Action (the Blueprint) collectively reflect the expertise and valuable input of the Oyster Steering Committee, as well as workgroups who developed strategies relevant to oyster protection, restoration, harvest and education about oysters. These recommendations are made by the North Carolina Coastal Federation, which facilitated the workgroup process with support from The Pew Charitable Trusts. Every effort has been made to reflect the philosophies, knowledge and expertise contributed by the Oyster Steering Committee and Strategy Workgroup participants.

Special Thanks to the following organizations, agencies and businesses that actively participated in guiding the development of the Blueprint's fourth edition.



A complete list of Strategy Workgroup Members and 2015-2020 Oyster Steering Committee members is found in Appendix D of the full Blueprint, available on ncoysters.org/blueprint.



Executive Summary

The vision of the Blueprint is that North Carolina oysters contribute to a healthy coastal environment and a robust coastal economy. This vision is shared among the many partners who developed the Blueprint, which fosters collaboration and ensures partnership and commitment toward its fulfillment.

A diverse group of volunteers involved in growing, harvesting, studying, managing and conserving oysters has worked together since 2003 to protect and restore North Carolina's oyster habitats and fishery. They did this because the eastern oyster, *Crassostrea virginica*, is an ecological and economic treasure for the state. Dramatic declines in oyster abundance, reflected in declining commercial landings over the past century, have been attributed to overharvest and exacerbated by habitat disturbance, pollution, and biological and environmental stressors. Due to the multiple factors that negatively impact oyster survival, the North Carolina Division of Marine Fisheries views this stock as particularly vulnerable to overfishing (NCDEQ, Oyster FMP Amendment 4, 2017).

The 2021-2025 Oyster Restoration and Protection Plan for North Carolina: A Blueprint for Action (the Blueprint) focuses on ways to enhance native oyster populations and promote sustainable aquaculture in the state, addressing specific stakeholder concerns or documented threats to support healthy and productive coastal waters and habitats. The plan recognizes the essential role each partner plays in implementing the efforts outlined and encourages adaptive management of the strategies employed by making necessary adjustments to improve them going forward.

This fourth edition of the Blueprint identifies eight strategies and corresponding actions needed to rebuild the state's oyster resources. The work outlined advances strategies toward a shared vision that fosters collaboration among partners, ensuring oysters in North Carolina perpetuate a healthy and robust environment and economy.

Led by a statewide Oyster Steering Committee, the Blueprint effort parallels and augments the state's Fishery Management Plan for Oysters, Basinwide Planning efforts and Strategic Mariculture Plan; enhances the efforts of the state's Coastal Habitat Protection Plan and regional Albemarle-Pamlico National Estuary Partnership's 2012 Comprehensive Conservation Management Plan; and elements of the Blueprint are elevated through the state's participation in the National Oceanic and Atmospheric Administration's National Shellfish Initiative.

This Blueprint was developed in 2020, when North Carolina - and indeed, the world - experienced unprecedented challenges associated with the COVID-19 pandemic. In addition to the personal and community impacts on the many stakeholders involved in this effort, the state and other resources for implementing the strategies it contains may be strained. Yet the threats to North Carolina's unique ecology, economy and way of life are no less diminished. If anything, the need for oyster protection and restoration - and creative, collaborative management strategies - is more urgent than ever. As we look to the next five years, we are renewed in our commitment

The first three editions of the Blueprint resulted in:

- Restoring nearly 450 acres of oyster habitat for environmental benefits and harvest opportunities.
- Increasing funds for oyster related programs by a factor of 10.
- Documenting the economic benefits of oyster restoration; for each \$1 invested, at least \$4.05 in benefit are realized.
- Maintaining a viable and dynamic level of wild harvest, with a peak of 186,000 bushels in 2010.
- Developing the North Carolina Strategic Plan for Mariculture.
- Growing the shellfish aquaculture industry from \$250,000 to \$5 million and increasing the number of farms in the state tenfold.
- Developing a nationally recognized shell recycling program that collected nearly 250,000 bushels of shell from 2003-2015.
- North Carolina joining NOAA's National Shellfish Initiative.
- Building and strengthening a coalition of more than 25 partners dedicated to the restoration and protection of oysters in the state.

to conserve and manage North Carolina oyster resources toward a brighter future for all stakeholder communities.

One major change to the Blueprint for this edition is identifying living shorelines that include oysters as a distinct strategy to restore and protect oyster habitat. Similarly, oyster shell recycling has been elevated to a strategy unto itself with key actions. Both of these strategies previously were incorporated as part of the sanctuary and cultch planting strategies, respectively. They were elevated to distinct strategies to bring timely attention to them and also because of the level of action that should be taken to advance the work identified.

As the fourth edition of the Blueprint is implemented, a key area of focus will be to consider the ecosystem services provided by oysters as future plans are made. Ecosystem services are defined as the benefits people gain from thriving coastal habitats and clean waters.

There are eight strategies of the Blueprint, which include measures to improve water quality in critical shellfish waters where harvest occurs, restore and manage oyster habitat, recycle oyster shell to build new habitat, improve sustainable wild harvest opportunities, sustainably grow the oyster aquaculture industry and encourage engagement and outreach around oysters in North Carolina. These strategies and their major areas of focus for 2021-2025 are summarized below.

Summary of the Major Strategies in the Blueprint

The eight major strategies of the Blueprint fall into four themes: Protect, Restore, Harvest and Educate. These strategies should not be thought of as independent from one another but instead work in a cohesive fashion to comprehensively support and perpetuate healthy oyster populations in our coastal waters. A full list of actions and subactions can be found in the complete Oyster Restoration and Protection Plan for North Carolina: A Blueprint for Action 2021-20215. ncoysters.org/blueprint2021

Strategies to **PROTECT** oysters include water quality protection and oyster sanctuaries.

Strategies to **RESTORE** oysters include living shorelines and shell recycling for reefs.

Strategies to **HARVEST** oysters include cultch planting, sustainable wild harvest and shellfish aquaculture.

Strategies to **EDUCATE** about oysters include outreach and engagement.



Protect: Water Quality

Water quality refers to the condition and health of our coastal waters. Pristine water quality is critical to oyster's success both to support the estuarine habitat and to ensure oysters are safe for human consumption. Oysters are able to filter water and help maintain water quality and clarity but they need relatively good water quality to start.

About 34 percent of all North Carolina's coastal waters are permanently closed to shellfish harvest because of pollution or lack of monitoring capability, and many more areas are temporarily closed after rain events. When water quality is poor, and shellfish waters are closed, it means that unacceptable levels of bacteria in those waters make the harvest and consumption of oysters unsafe for humans.

In many areas where the landscape has been modified by development, shellfish waters are closed after moderate and severe rains due to stormwater runoff that contains high bacteria levels. Conventional stormwater infrastructure, designed to quickly divert water from urban and agricultural lands, has increased the volumes and rates of stormwater runoff discharging into coastal waters. Increased volume and flow increases the opportunity for runoff to transport bacteria to coastal waters. In the state's prime shellfish growing waters, it is imperative that the volume and rate of runoff resemble levels that occurred naturally before adjacent land use changes occurred.

In addition to potential health impacts for shellfish consumers, poor water quality can indicate that waters are unsafe for recreational uses, such as swimming and boating, which in turn leads to a reduced quality of life and benefit of being at the coast.

Key actions in the next five years include taking major steps to protect and restore water quality in shellfish growing waters that are both critically important and endangered. This will be accomplished by initiating watershed management and water quality improvement plans in two key watersheds: the Newport River and Stump Sound. Additional shellfish growing waters will be considered and prioritized for future work.



Overarching goal: Protect and restore water quality in shellfish growing waters that are both critically important and endangered.

Action 1: Demonstrate success in protecting and restoring two of the state's most important and endangered shellfish growing waters (Newport River and Stump Sound).

Involved Parties: Albemarle-Pamlico National Estuary Partnership, Division of Marine Fisheries, North Carolina Coastal Federation, The Pew Charitable Trusts

Action 2: Create and heavily publicize a prioritized list of additional endangered shellfish growing waters for targeted management and restoration planning.

Involved Parties: Albemarle-Pamlico National Estuary Partnership, Division of Marine Fisheries, North Carolina Coastal Federation, North Carolina State University-Center for Marine Science and Technology, The Nature Conservancy, University of North Carolina Wilmington

Action 3: Adopt state policy for application of stormwater volume matching criteria using Low Impact Development practices when feasible and practical for state funded construction projects and showcase projects located in priority shellfish growing waters.

Involved Parties: Brooks-Pierce, Department of Environmental Quality, Department of Transportation, North Carolina Coastal Federation, The Pew Charitable Trusts

Action 4: Recruit decision makers to help implement strategies to protect and restore water quality in shellfish growing waters.

Involved Parties: Albemarle-Pamlico National Estuary Partnership, Division of Marine Fisheries, North Carolina Coastal Federation, The Pew Charitable Trusts, University of North Carolina Wilmington, as well as members of: Coastal Resources Commission, Environmental Management Commission, Marine Fisheries Commission, and Wildlife Resources Commission, leadership of numerous federal and state agencies including the state Departments of Commerce, Environmental Quality, Cultural and Natural Resources, Transportation and Administration.

Action 5: Encourage government programs to adopt and implement protection and restoration strategies for priority shellfish growing waters.

Involved Parties: Albemarle-Pamlico National Estuary Partnership, Brooks-Pierce, Division of Marine Fisheries, North Carolina Coastal Federation

Action 6: Revise scoring criteria for state-administered grant funding programs.

Involved Parties: Brooks-Pierce, North Carolina Coastal Federation

Action 7: Report progress achieving action strategies in annual State of the Oyster Report.

Involved Parties: Division of Marine Fisheries, North Carolina Coastal Federation, University of North Carolina Wilmington

Protect:

Oyster Sanctuaries

An oyster sanctuary is a restoration strategy that combines protection from harvest with habitat restoration in key coastal waters. Sanctuaries serve as reef habitat and provide reliable oyster larvae to subsidize the wild population and harvested oyster reefs. They are typically 5 to 50 acres in size and are closed to oyster harvest but open to hook-and-line fishing. Sanctuaries serve as an insurance policy for wild oyster populations. Recent research indicates that oyster sanctuaries provide more oysters per area and larger oysters per area than other reef types such as cultch planted and natural, or unenhanced, reefs. Oysters within the 15 oyster sanctuaries in Pamlico Sound contribute nearly 25 percent of all the oyster larvae spawned by the oyster population in the sound, yet occupy a very small overall footprint of oyster reefs, about 6 percent. Current state rules identify oyster

sanctuaries only in the subtidal waters of Pamlico Sound as part of the Senator Jean Preston Oyster Sanctuary Network.

The oyster larvae spawned from sanctuaries seed wild harvest areas. They help to filter and improve water quality in the sound. Sanctuaries create habitat that support recreational fishing opportunities.

Key actions in the next five years include building an additional 100 acres of oyster sanctuary by 2025 in Pamlico Sound, determining in the southern shellfish waters of the state the intent and need for sanctuaries, or an alternate protected reef method, and refining the estimates for how much total acreage of oyster sanctuary is needed to support desired levels of the many benefits oysters provide.

Overarching goal: Establish sufficient acreage of protected oyster reefs to support desired ecosystem services by building fish habitat, supplementing wild oyster stock and filtering water.

Action 1: Build an additional 100 acres of oyster sanctuary in Pamlico Sound by 2025.

Involved Parties: Albemarle-Pamlico National Estuary Partnership, Division of Marine Fisheries, North Carolina Coastal Federation, The Nature Conservancy, The Pew Charitable Trusts

Action 2: Monitor and use the best science available to inform restoration activities.

Involved Parties: Albemarle-Pamlico National Estuary Partnership, Division of Coastal Management, East Carolina University/Coastal Studies Institute, Division of Marine Fisheries, North Carolina Coastal Federation, North Carolina Coastal Reserve and National Estuarine Research Reserve, North Carolina Sea Grant, North Carolina State University Center for Marine Sciences and Technology, The Nature Conservancy, The Pew Charitable Trusts, University of North Carolina Chapel Hill-Institute of Marine Sciences, University of North Carolina Wilmington

Action 3: Determine the need for and feasibility of a protected reef designation in the southern region of the state.

Involved Parties: Division of Marine Fisheries, North Carolina Coastal Federation, The Pew Charitable Trusts, University of North Carolina Wilmington

Action 4: Make restoration of oyster habitat a state mandated activity, building off the state shellfish initiative.

Involved Parties: Albemarle-Pamlico National Estuary Partnership, North Carolina Coastal Federation, The Nature Conservancy, The Pew Charitable Trusts

Action 5: Report out and publicize the results of the sanctuary program in the annual State of the Oyster Report.

Involved Parties: Division of Marine Fisheries, North Carolina Coastal Federation

Action 6: Continue to refine and improve the oyster sanctuary acreage goal through the next five-year Blueprint period.

Involved Parties: Albemarle-Pamlico National Estuary Partnership, Division of Marine Fisheries, North Carolina Coastal Federation, The Nature Conservancy, The Pew Charitable Trusts

Action 7: Determine the feasibility of closing existing natural reefs for protections as sentinel sites.

Involved Parties: Division of Marine Fisheries, North Carolina Coastal Federation, The Nature Conservancy, The Pew Charitable Trusts, University of North Carolina Wilmington



An oyster sanctuary is a restoration strategy that combines protection from harvest with habitat restoration in key coastal waters.



Restore: 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. Implementing living shorelines along eroding waterfront properties where oysters grow is a sound strategy for expanding oyster habitats, reducing shoreline erosion, and protecting and improving water quality.

Key actions in the next five years include expanding the use of living shorelines to become the most commonly used shoreline stabilization method in estuaries that support oyster habitats, ensuring that living shorelines, which incorporate oyster reef materials, are protected from future harvest, and continuing to test alternative materials for oyster and living shoreline restoration, reporting out research findings and collaborating with the Living Shorelines Steering Committee.

Overarching goal: Expand the use of living shorelines to become the most commonly used shoreline stabilization method in estuaries that support oyster habitats.

Action 1: Implement living shorelines to continue to demonstrate their benefits to oysters and soundfront property owners.

Involved Parties: Albemarle-Pamlico National Estuary Partnership, Brooks- Pierce, Division of Coastal Management, Duke University Marine Lab, East Carolina University, North Carolina Aquariums, North Carolina Coastal Federation, North Carolina Sea Grant, The Nature Conservancy, University of North Carolina Chapel Hill Institute of Marine Sciences, University of North Carolina Wilmington

Action 2: Create and promote consumer demand for living shorelines by property owners with a special focus on shorelines that support oyster growth.

Involved Parties: Albemarle-Pamlico National Estuary Partnership, Division of Coastal Management, Duke University Marine Lab, East Carolina University, North Carolina Coastal Federation, North Carolina Sea Grant, University of North Carolina Chapel Hill-Institute of Marine Sciences, University of North Carolina Wilmington

Action 3: Test alternative living shoreline construction materials and methods that increase oyster recruitment.

Involved Parties: Division of Coastal Management, Duke University Marine Lab, East Carolina University/ Coastal Studies Institute, North Carolina Aquariums, North Carolina Coastal Federation, North Carolina Coastal Reserve and National Estuarine Research Reserve, North Carolina Sea Grant, The Nature Conservancy, University of North Carolina Chapel Hill-Institute of Marine Sciences, University of North Carolina Wilmington

Action 4: Protect regulated and permitted living shorelines that grow harvestable oysters.

Involved Parties: Brooks-Pierce, Division of Marine Fisheries, Duke University Marine Lab, East Carolina University, North Carolina Aquariums, North Carolina Coastal Federation, The Pew Charitable Trusts, University of North Carolina Chapel Hill-Institute of Marine Sciences

Action 5: Increase the use of living shorelines instead of bulkheads.

Involved Parties: Albemarle-Pamlico National Estuary Partnership, Duke University Marine Lab, East Carolina University, North Carolina Coastal Federation, University of North Carolina Chapel Hill-Institute of Marine Sciences, University of North Carolina Wilmington



Action 6: Collaborate through the Living Shorelines Steering Committee.

Involved Parties: Albemarle-Pamlico National Estuary Partnership, Brooks-Pierce, Division of Marine Fisheries, Duke University Marine Lab, East Carolina University, North Carolina Aquariums, North Carolina Coastal Federation, The Nature Conservancy, University of North Carolina Chapel Hill- Institute of Marine Sciences, University of North Carolina Wilmington

Action 7: Summarize living shoreline research accomplishments and major findings to date related to oysters.

Involved Parties: Albemarle-Pamlico National Estuary Partnership, Duke University Marine Lab, East Carolina University/Coastal Studies Institute, North Carolina Coastal Federation, North Carolina Sea Grant, University of North Carolina Chapel Hill-Institute of Marine Sciences, University of North Carolina Wilmington

Action 8: Identify and answer living shoreline research questions and gaps as they pertain to oysters.

Involved Parties: Albemarle-Pamlico National Estuary Partnership, Duke University Marine Lab, East Carolina University/Coastal Studies Institute, North Carolina Coastal Federation, North Carolina Sea Grant, University of North Carolina Chapel Hill-Institute of Marine Sciences, University of North Carolina Wilmington

Action 9: Qualify living shorelines for mitigation credits.

Involved Parties: Brooks-Pierce, North Carolina Coastal Federation



Restore: Shell Recycling for Reefs

Oyster shells are a valuable resource since they are used by the Division of Marine Fisheries, nongovernmental organizational partners and others to build new oyster reefs. It is illegal in the state of North Carolina to dispose of oyster shells in a landfill or to use them as mulch in commercial landscaping. Shell recycling is the voluntary collection of shell by restaurants, shucking houses and the public that allows the shell to be used in future oyster reef-building activities. Both shell pickup services and public drop-off sites may be available to facilitate shell recycling efforts. A recycling program provides an organized way to collect the shells giving both restaurants and private consumers a chance to return their shells to the water.

At the height of the state-run shell recycling program, from 2003 until it ended in 2018, recycled shell provided approximately 13 percent of all the substrate needed for state-run reef building projects. Since the program ended, nonprofits and local governments have been working to identify the best way to collect and recycle discarded oyster shells to be reused in restoration projects.

Key actions in the next five years include creating a cohesive oyster shell recycling program along the coast and in specific inland areas to provide 5 percent of material needed to support oyster habitat restoration projects by 2025 and identifying priority reef projects to build with recycled shell, with a target to build 20 acres of new reef.

Overarching goal: Create a coordinated oyster shell recycling program to provide 5 percent of the material needed to support oyster restoration.

Action 1: Collect shell through a partnership and volunteer led shell collection effort.

Involved Parties: North Carolina Coastal Federation

Action 2: Improve shell collection and storage logistics.

Involved Parties: Albemarle-Pamlico National Estuary Partnership, North Carolina Coastal Federation

Action 3: Use recycled shell in reef building activities.

Involved Parties: North Carolina Coastal Federation

Action 4: Communicate the importance of oysters and restoration efforts and engage the public through shell recycling efforts.

Involved Parties: Albemarle-Pamlico National Estuary Partnership, North Carolina Coastal Federation, University of North Carolina Wilmington

Harvest: Sustainable Wild Harvest



Sustainable wild harvest refers to the management of oyster reefs to support oyster harvest. For the Blueprint, sustainable wild harvest is specifically in reference to ensuring adequate oyster reefs to perpetuate the population and therefore perpetuate wild harvest opportunities.

In the 1990s, in response to declining oyster harvest, the state formed a Blue Ribbon Advisory Council on Oysters. Among other conclusions, the council determined that management of the oyster resource was necessary to ensure that oyster populations in the state increase, and that the increased population is managed in a way that supports a sustainable fishery for generations to come. Subsequently, an Oyster Fishery Management Plan was developed by DMF. The plan is informed by the best available science and monitoring. A key element that is missing from habitat management discussions in North Carolina is a fisheries independent stock assessment of the oyster population.

Key actions in the next five years include improving upon the science and monitoring data that informs the Fishery Management Plan by 2025. This will be done by advancing several efforts associated with developing a comprehensive stock assessment for oysters, finalizing sample methodology, updating habitat mapping efforts, examining oyster landings data to understand the harvest trends from wild stock, wild stock relayed from prohibited areas, cultch planted reefs and the influence of recreational harvest and farm-raised oysters, as well as coordinating actions between various state plans, the Coastal Habitat Protection Plan and Fishery Management Plan in particular.

Overarching goal: Sustainably manage natural oyster habitats within public trust areas to perpetuate ecosystem services and wild harvest.

Action 1: Conduct sampling, analyze data and implement the methodology to establish a stock assessment of the oyster population in North Carolina.

Involved Parties: Albemarle-Pamlico National Estuary Partnership, Division of Marine Fisheries, North Carolina State University-Center for Marine Science and Technology, The Nature Conservancy, University of North Carolina Wilmington

Action 2: Develop a fishery independent oyster abundance index to assist with oyster management decisions.

Involved Parties: Albemarle-Pamlico National Estuary Partnership, Division of Marine Fisheries, North Carolina State University-Center for Marine Science and Technology, The Nature Conservancy, University of North Carolina Wilmington

Action 3: Refine oyster landing data collection to provide more information to assist with management.

Involved Parties: Division of Marine Fisheries, North Carolina Coastal Federation, The Nature Conservancy

Action 4: Enhance, maintain and link habitat mapping efforts to develop a substrate budget, guide restoration efforts and support the stock assessment development.

Involved Parties: Albemarle-Pamlico National Estuary Partnership, Division of Marine Fisheries, The Nature Conservancy

Action 5: Examine North Carolina oyster relay practices.

Involved Parties: Division of Marine Fisheries, North Carolina Coastal Federation

Action 6: Incorporate Blueprint recommendations and actions into the Oyster Fishery Management Plan and Coastal Habitat Protection Plan.

Albemarle-Pamlico National Estuary Partnership, East Carolina University, Division of Marine Fisheries, North Carolina Coastal Federation, The Pew Charitable Trusts

Harvest: 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." Cultch is colonized by oyster larvae that attach and grow to harvest size in 18-36 months. Cultch-planted reefs are open to harvest once oysters reach legal harvest size of 3 inches. Cultch-planted reefs supplement wild oyster populations and provide for future recreational and commercial harvest opportunities by replenishing the substrate that oysters need to grow on. In addition, the cultch reefs provide areas for recreational hook-and-line fishing and the oysters inhabiting these reefs filter water thereby providing a water quality benefit.

Key actions in the next five years include building 200 acres of oyster cultch reef to support wild harvest, and studying the existing cultch planting program to determine if improvements can be made to maximize oyster growth on these reefs and the return on investment.

Overarching goal: Use cultch planting to replenish and enhance oyster habitat for commercial harvest and ecosystem services.

Action 1: Conduct cultch planting program study.

Involved Parties: Division of Marine Fisheries, North Carolina Coastal Federation

Action 2: Incorporate cultch planting program evaluation recommendations into program development and implementation.

Involved Parties: Division of Marine Fisheries with Marine Fisheries Commission, North Carolina Coastal Federation, North Carolina State University-Center for Marine Science and Technology

Action 3: Plant cultch to build 200 acres of harvestable oyster habitat over five years.

Involved Parties: Division of Marine Fisheries, North Carolina Coastal Federation, North Carolina Coastal Reserve and National Estuarine Research Reserve, North Carolina State University-Center for Marine Science and Technology

Cultch-planted reefs are built throughout the state's shellfish waters to restore commercially harvested reefs.





Harvest:

Shellfish Aquaculture

Shellfish aquaculture is the growing or farming of shellfish products for the purpose of harvesting and selling to local, regional and global markets. Growing shellfish can be done in many different ways and with many different types of gear. Shellfish aquaculture provides economic development opportunities along the coast. By growing shellfish on private leases, the industry will scale up and have the capacity to supply oyster consumers across the state and country. In addition to the economic benefit of the direct sale of oysters, the farms themselves provide unique tourism opportunities along the coast.

Shellfish leases are granted by the state since they are located in public trust waters. Therefore, it is important that shellfish aquaculture is sited to minimize user conflicts and to maximize the benefits that oysters provide. While the product is growing on the leases, properly sited shellfish and gear can provide many benefits such as filtering water and providing habitat for a wide variety of species.

Key actions in the next five years include growing shellfish aquaculture to a \$45 million industry by 2025. This will include strategic initiatives such as support for new and existing growers, comprehensive marketing and distribution initiatives, as well as research and continued regulatory review and planning to minimize user conflicts.

Overarching goal: Build the shellfish aquaculture industry to create a \$45 million industry by 2025.

Action 1: Support and assist the shellfish growers.

Involved Parties: Carteret Community College, Division of Marine Fisheries, North Carolina Coastal Federation, North Carolina Sea Grant, North Carolina State University-Center for Marine Science and Technology, The Pew Charitable Trusts, University of North Carolina Institute of Marine Sciences, University of North Carolina Wilmington

Action 2: Modernize regulatory scheme and reduce user conflicts.

Involved Parties: Brooks Pierce, East Carolina University-Coastal Studies Institute, Division of Marine Fisheries, North Carolina Coastal Federation, North Carolina Sea Grant, University of North Carolina Institute of Marine Sciences

Action 3: Support aquaculture related research.


Involved Parties: Albemarle-Pamlico National Estuary Partnership, East Carolina University-Coastal Studies Institute, North Carolina Sea Grant, North Carolina State University-Center for Marine Science and Technology, University of North Carolina Institute of Marine Sciences, University of North Carolina Wilmington

Action 4: Monitor and report on industry growth.

Involved Parties: Division of Marine Fisheries, North Carolina Coastal Federation, North Carolina Sea Grant

Action 5: Improve marketing, promotion and distribution of shellfish products.

Involved Parties: North Carolina Sea Grant

A photograph showing three people in silhouette standing on a beach or shoreline at sunset. The sun is low on the horizon, creating a bright orange and yellow glow in the sky and reflecting on the water. The people are looking towards the right side of the frame. The person on the left is wearing a cap and a light-colored shirt. The person in the middle is also wearing a cap and has a bag slung over their shoulder. The person on the right is wearing a dark t-shirt. The water is calm, and the sky has some light clouds.

Provide meaningful and engaging communication content to a variety of target audiences perpetuating an enhanced understanding of the Blueprint, its actions and successes.

Educate:

Outreach and Engagement

Outreach and engagement allows for the involvement of many stakeholders in the development and implementation of the Blueprint. It also involves ensuring a better understanding of accomplishments and work undertaken through this collaborative effort. It includes regular meetings, public forums, a public website, press releases, quarterly newsletter, annual report, social media, school education, field trips and other targeted activities.

The education and outreach actions of the Blueprint are designed to help the public better understand the many important roles oysters play in our estuaries and how the Blueprint comprehensively supports and perpetuates healthy oyster populations in coastal waters. These efforts have provided meaningful and engaging communication content to a variety of targeted audiences, including the state's law and policy makers.

This strategy is the key way that the public is kept informed of the actions of the Blueprint both the successes and lessons learned. It also provides a variety of meaningful ways for the public to become more involved in the implementation of the Blueprint work as well as provide invaluable feedback.

Key actions in the next five years include continuing to engage the statewide Oyster Steering Committee and workgroups in the coordination and execution of the Blueprint, leveraging North Carolina's aquariums, museums and welcome centers, expanding the use of traditional and social media outlets, school engagement, field trips, public forums, and hold workshops to educate and engage a diverse audience in the implementation of the Blueprint.

Overarching goal: Create communication and outreach strategies that engages stakeholders and the general public to actively support the goals, strategies and actions outlined in the Blueprint.

Action 1: Engage the Oyster Steering Committee and members' corresponding organizations to convey the work being done through the Blueprint.

Involved Parties: Albemarle-Pamlico National Estuary Partnership, Brooks-Pierce, Carteret Community College, Crystal Coast Ecotours, Department of Commerce, Department of Cultural and Natural Resources, Department of Environmental Quality, Department of Transportation, Division of Coastal Management, Division of Marine Fisheries, Duke University Marine Lab, East Carolina University/Coastal Studies Institute, LDSI, Inc., Middle Sound Mariculture, National Oceanic and Atmospheric Administration, North Carolina Aquariums, North Carolina Coastal Federation, North Carolina Coastal Reserve and National Estuarine Research Reserve, North Carolina Sea Grant, North Carolina Shellfish Growers Association, North Carolina State University Center for Marine Science and Technology, North Carolina State University College of Veterinary Medicine, Restoration Systems, The Nature Conservancy, The Pew Charitable Trusts, University of North Carolina Wilmington, U.S. Department of Agriculture-Natural Resources Conservation Service, oyster harvesters, local government, contractors and businesses.

Action 2: Use digital and online media to expand the reach of the Blueprint.

Involved Parties: Albemarle-Pamlico National Estuary Partnership, Department of Cultural and Natural Resources, East Carolina University, North Carolina Aquariums, North Carolina Coastal Federation, North Carolina Sea Grant, North Carolina State University-Center for Marine Science and Technology

Action 3: Engage stakeholders beyond the Oyster Steering Committee to help advance the work of the Blueprint.

Involved Parties: Albemarle-Pamlico National Estuary Partnership, East Carolina University- Coastal Studies Institute, North Carolina Aquariums, North Carolina Coastal Federation, North Carolina Sea Grant, North Carolina State University-Center for Marine Science and Technology, University of North Carolina Wilmington

Action 4: Use traditional and print media to expand the reach of the Blueprint.

Involved Parties: Albemarle-Pamlico National Estuary Partnership, East Carolina University, North Carolina Aquariums, North Carolina Coastal Federation



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