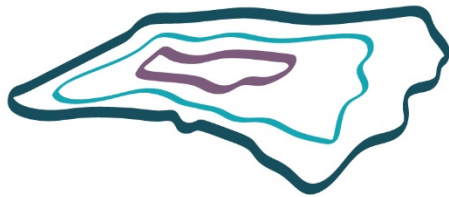


NORTH CAROLINA STRATEGIC PLAN FOR SHELLFISH MARICULTURE: A VISION TO 2030



NORTH CAROLINA OYSTERS

— A SOUND CHOICE —

FOREWORD, EXECUTIVE SUMMARY, AND
FINAL RECOMMENDATIONS

*PRESENTED ON JANUARY 10, 2019 TO THE NORTH
CAROLINA GENERAL ASSEMBLY JOINT LEGISLATIVE
OVERSIGHT COMMITTEE ON AGRICULTURE, NATURAL,
AND ECONOMIC RESOURCES*

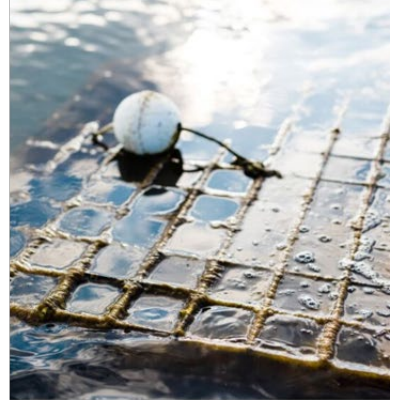


Photo credit clockwise from top left: Suspended oyster culture by Bax Miller; Single oyster by Bax Miller; Suspended oyster cage with buoy by Bax Miller; Floating bags on a water column lease by Chuck Weirich; Sacks of single oyster by Chuck Weirich.

Cover photos: Shucked raw oyster by Paul Manley

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Submitted to the North Carolina General Assembly and the North Carolina Policy Collaboratory on December 30, 2018.



FOREWORD

Commissioning the Shellfish Mariculture Advisory Committee

In 2016, the North Carolina General Assembly passed legislation (S.L. 2016-94 Section 14.11.(d)) directing the North Carolina Policy Collaboratory to convene stakeholder meetings aimed at advancing efforts to bolster North Carolina's shellfish industry. Senate Bill 257 (Section 13.13.(b)) amended this legislation, adding a mandate for the North Carolina Policy Collaboratory to prepare a Shellfish Mariculture Plan by December 31, 2018. Specifically, this report was required to address the following:

1. A summary of available and relevant information on shellfish mariculture.
2. An analysis of existing programs, policies, rules, and laws that govern or affect shellfish mariculture operations within the State, including an examination of workforce training and marketing programs that could facilitate the growth of shellfish mariculture within the State.
3. A summary of shellfish mariculture plans from other states and countries, including a comparison of how these entities (i) promote and manage shellfish mariculture, (ii) reduce barriers to entry for potential participants in shellfish mariculture, and (iii) offer incentives to encourage entry into shellfish mariculture.
4. Analysis of siting strategies that reduce potential user conflicts impeding the siting of shellfish mariculture operations and that protect riparian property owners and the public trust uses of estuarine waters for navigation, fishing, and recreation.
5. Evaluation and consideration of enforcement mechanisms necessary to protect shellfish mariculture operations from theft and degradation and to ensure that shellfish mariculture operations make productive and fair use of public trust coastal waters dedicated to these operations.
6. Opportunities for local traditional fishermen to effectively compete for shellfish mariculture sites in public waters and participate in enterprises in or near their own communities.
7. Examination of environmental policies that protect or enhance shellfish mariculture operations.
8. Consideration of the most appropriate substrate for cultch planting, with consideration of regional differences in bottom conditions within the State that may require different substrates to maximize shellfish sustainability.
9. Strategies to mitigate or eliminate shellfish pests such as MSX, Dermo, blister worms, and boring sponges.
10. Any other issues deemed relevant by the Collaboratory to grow and support shellfish mariculture.

Additionally, Section 13.13.(d) of Senate Bill 257 directed the North Carolina Policy Collaboratory to work in conjunction with the Economic Development Partnership of North Carolina, the North Carolina Department of Commerce, the North Carolina Department of Natural and Cultural Resources, and any other relevant stakeholder groups to provide conceptual plans and recommendations for the economic development and promotion of the State's shellfish industry. Plans and recommendations for creating a North Carolina Oyster Trail and a North Carolina Oyster Festival were specifically requested.

Shellfish Mariculture Advisory Committee Formation and Structure

To fulfill the mandates laid out in Senate Bill 257, the North Carolina Policy Collaboratory formed the Shellfish Mariculture Advisory Committee (SMAC) to generate a report of findings and recommendations to the General Assembly. The SMAC membership represents academia, regulatory agencies, non-governmental organizations, and industry stakeholders to develop recommendations that would promote the growth of a socially, ecologically, and economically responsible shellfish mariculture industry (Appendix A). The SMAC began meeting in early 2017 to discuss avenues to support the existing North Carolina shellfish industry, identify barriers to industry growth, and generate recommendations aimed at overcoming natural, business, and management challenges. Consulting other states' and countries' strategic plans for shellfish mariculture and, based on expert opinion of members within the group, the SMAC identified five major areas of concentration requiring legislative action around which they based working groups: 1. Key Business Metrics and Climate; 2. Industry Governance & Leadership/Promotion; 3. Siting Shellfish Mariculture; 4. Water Quality; and 5. Applied Research and Development. Work-group findings have been synthesized and integrated to generate a final pool of 21 major and 4 supplementary recommendations. SMAC's overarching goal has been to leverage a broad base of expertise to generate a comprehensive plan to grow the industry while balancing the needs of diverse North Carolina stakeholders to whom coastal public trust waters belong. The recommendations that were generated, which form the core of this report, are intended to inform the North Carolina General Assembly on legislative actions that can address many of the current constraints on the responsible growth of shellfish mariculture in the State. This report presents a strategic vision for a decade (to 2030) of sustainable growth of the shellfish mariculture industry that we hope will be embraced by the North Carolina General Assembly, industry participants, and North Carolina residents.

EXECUTIVE SUMMARY

North Carolina possesses over 1.4 million acres of coastal waters with biological and physical characteristics that make it uniquely well suited for shellfish mariculture. In addition to an abundance of prime growing waters, North Carolina has a long history of shellfishing, thereby provisioning the State with entire communities of citizens with the potential to run successful mariculture operations. North Carolina is also a leader in coastal research with many universities and technical colleges, non-governmental organizations, and management agencies actively engaged in interdisciplinary marine sciences and with the capacity to address research needs of a growing shellfish mariculture industry. A burgeoning local seafood movement occurring within North Carolina suggests new potential markets exist for the 278 shellfish mariculture leases currently in the State to serve. This growing industry is still identifying new distribution networks and ways to integrate with established commercial infrastructure, which currently supplies wild-caught seafood to profitable markets at State, regional, and national scales (Newsome 2014). Given additional support to develop new markets and expand market share within and outside of North Carolina, there is the potential to grow the industry well beyond its current farm-gate sales of \$2.5 million, which generate approximately \$7.5 million in economic activity based on a conservative 3x multiplier, to a valuation of \$100 million dollars in total economic activity (\$33 million farm-gate sales) by 2030.



The research hatchery at UNCW. Credit: Chuck Weirich, North Carolina Sea Grant.

Validating this potential, North Carolina’s shellfish mariculture industry has grown appreciably in recent years. Between 2011 and 2017, the number of water column leases and acreage rose from 2 leases with a cumulative footprint of 6 acres to 46 leases with a cumulative footprint of 211 acres (North Carolina Division of Marine Fisheries). In that same period, the number of active bottom leases has remained relatively stable at ~230. While the increase in water column leases has had little impact on the production of hard clams, which are almost exclusively cultured on bottom, production and farm-gate value of mariculture-grown oysters has jumped from 11,330 to 32,515 bushels and ~\$530,000 to ~\$2,400,000, respectively, between 2011 and 2017. Indeed, there is rapidly growing interest in entering the shellfish mariculture industry in North Carolina, demonstrated by the nine-fold increase in bottom lease applications and 12-fold increase in water column leases applications between 2012 and 2017.

There is strong empirical evidence that North Carolina is positioned to dramatically increase its national market share of farmed shellfish and become a “Napa Valley of Oysters” given the recent growth of this industry locally, including the launching of a National Oceanic and Atmospheric Administration Shellfish Initiative in North Carolina, infrastructure investments that the State already has and continues to make, and diversity of growing environments and resultant oyster flavor merroirs across the State. Over the next decade, North Carolina shellfish

mariculture farm-gate sales could increase by nearly an order-of-magnitude, and attain overall economic impact on par with, or greater than, some of our State's 20 most valuable land-based crops.

Simultaneously, the growth of the shellfish mariculture industry can support the sustainable development of our coast, as oyster farming represents an addition of oysters to our sounds and estuaries that reduces harvest pressure on wild shellfish stocks, increases water filtration, mitigates nutrient loading, and supports enhanced biodiversity via the provision of structurally complex habitat (meaning both the oysters themselves, as well as, potentially, the bag/rack gear used to hold oysters). These are ecosystem services somewhat unique to shellfish farming among other plant and animal crops.



North Carolina Oyster Singles. Credit: Bax Miller

Despite these positive signs, North Carolina has not yet made the leaps evident in some other states relative to shellfish mariculture growth, resulting in significant opportunity costs accruing for our resident fishermen, businesses, and seafood connoisseurs. As such, North Carolina sits at a crossroad relative to operating under the status quo in supporting this nascent industry, or making bold decisions and, as necessary, adopting innovative strategies to realize the potential of shellfish mariculture to support traditional and entrepreneurial fishermen, coastal communities, tourism, and the estuarine environment unique to this State.

We also recognize that North Carolina requires a model for growth that suits the unique attributes of our coastal waters and communities, and that we seek responsible growth and adaptive management to respect both the investments already made by current shellfish growers, as well as the complex issues associated with public trust waters. Most notably, the recommendations comprising this report advocate for a model of growth in which North Carolina shellfish growers are supported to strive for high unit-area production to meet the State's farm-gate sale targets. This stands in stark contrast to states characterized by low unit-area productivity across leases, necessitating large footprints across public trust bottoms to support the seafood industry in those states. North Carolina is also positioned to benefit from the growth of both oyster and hard clam production, given the diverse grow-out setting and techniques available to seafood farming operations.

Continuing and accelerating the forward momentum of the shellfish mariculture industry in North Carolina needed to attain goals related to job creation (e.g., 33 million in farm-gate sales would be expected to directly support 1000 on-the-water jobs) and economic impact is contingent on leveraging the significant expertise within the North Carolina Department of Agriculture and Consumer Services to promote mariculture products in local, national, and international markets; establishing an efficient and well-staffed regulatory framework; safeguarding our precious natural resources; and providing avenues to make North Carolina competitive in shellfish mariculture research and development.

There should be optimism that North Carolina is willing and eager to make investments to grow environmentally responsible jobs along the coast as proven by recent action: appropriations to establish and support a research shellfish hatchery at the University of North Carolina Wilmington (UNCW), refunding of the northern Shellfish Sanitation Laboratory, recurring appropriations for a shellfish pathologist position at North Carolina State University's Center for Marine Science and Technology (CMAST), and funding for a Carteret Community College's (CCC) Aquaculture Technology Program.

With all of these factors converging, the time is now for several important decisions at the State level to responsibly nurture shellfish mariculture as part of a strategic plan to 2030, such as:

- What economic programs should exist to support shellfish growers, analogous to land-based farmers (e.g. loans, crop insurance)?
- What regulatory and promotional frameworks are needed to account for the unique needs and opportunities of farming shellfish in North Carolina estuaries?
- What are the production and overall acreage needs of leases to reach the goal of \$33 million in farm-gate sales by 2030?
- What statutory considerations are needed to cope with the potential for increasing conflicts related to lease siting and the diverse uses/users of public trust resources?
- What environmental concerns and solutions would enhance the ability of shellfish growers to generate a safe, reliable supply of shellfish product?
- How can research support be directed to address the most pressing shellfish mariculture industry needs related to seed security, grow-out techniques, disease and other stressor resistance, distribution, lease siting, socio-economics, etc.?

To address these challenges and identify potential solutions aimed at growing the shellfish mariculture industry, this report provides background information on the history of shellfish mariculture and its current status in North Carolina to contextualize our findings and recommendations. The recommendations are divided into two sections: Major Recommendations and Supplemental Recommendations. Major Recommendations are those which are most critical to responsible growth of the shellfish industry and around which we have been able to build substantial consensus. Supplementary Recommendations represent actions that may be valuable for responsible growth of the shellfish industry, but which due to the complexity of those topics and need for further consensus building, require further vetting. Importantly, beneficial outcomes from many of the recommended actions contained in this report are contingent on the implementation of other recommendations. Therefore, we intend for the legislature to view these recommendations as a holistic framework rather than a patchwork of selected actions.

SUMMARY OF MAJOR RECOMMENDATIONS

The following 21 Major Recommendations are organized within seven themes in response to priorities identified by the North Carolina General Assembly (S.L. 2016-94 section 14.11.(d)). Detailed rationale for each Major Recommendation follow in the body of this report.

Vision for Industry Development

Recommendation #1:

Achieve \$100 million annual shellfish mariculture value (\$33 million dockside sales) by 2030.

Supporting Shellfish Growers

Recommendation #2:

The North Carolina General Assembly should appropriate \$30,000 to support the North Carolina Shellfish Growers Association's efforts to develop a pilot Federal Crop Insurance program for farmed shellfish.

Recommendation #3:

Establish a low-interest loan program to provide start-up and expansion capital to shellfish growers.

Recommendation #4:

Establish eligibility of shellfish growers in future disaster relief fund appropriations to the North Carolina Department of Agriculture and Consumer Services.

Marketing and Promotional Needs

Recommendation #5

Commission a market analysis specific to North Carolina's shellfish mariculture products.

Recommendation #6

Appropriate recurring funding to establish a Shellfish Mariculture Advisory Panel at the North Carolina Department of Agriculture and Consumer Services to facilitate the fulfillment of their mandate to promote shellfish mariculture (Article §106-759). Most critically, this

panel should develop an annual report regarding areas of success and disappointment across the industry to guide adaptive management.

Recommendation #7

Appropriate funding for the North Carolina Department of Agriculture and Consumer Services and the North Carolina Department of Commerce to develop a North Carolina Oyster Trail.

Efficient Regulatory Structure

Recommendation #8

Appropriate recurring funding to establish a Shellfish Mariculture Governance Advisory Committee to the North Carolina Marine Fisheries Commission.

Recommendation #9

Appropriate recurring funding to establish a new section, the Shellfish Leasing Section, at the North Carolina Division of Marine Fisheries.

Defraying costs of Shellfish Leasing Section: Increase non-refundable shellfish lease application filing fee to \$500 dollars; establish a fee schedule for lease surveys payable to the Division of Marine Fisheries; shift financial responsibility for advertising for public scoping from agency to the applicant; and increase annual rent.

Statutory Changes

Recommendation #10

Amend North Carolina General Statute §113-202 to afford the Secretary of the Department of Environmental Quality substantial discretion in balancing public trust uses.

Recommendation #11

The North Carolina Division of Marine Fisheries should designate appropriate tracts as Shellfish Enterprise Areas (SEAs) containing multiple, connected parcels available for shellfish mariculture and managed by the Division of Marine Fisheries.

Recommendation #12

In Pamlico Sound, the Secretary of the North Carolina Department of Environmental Quality should be granted discretion to grant up to three (total) 50-acre (each contiguous) water column or bottom leases, each obtained by a single lease application. These lease tracts must be separated from each other, and from shore, by at least 250 yards. Otherwise, current lease size maximums, including overall acreage possession limits for any single entity, should be retained throughout the State, and no more than three large water column or bottom leases may be established in Pamlico Sound until 2025.

Recommendation #13

Increase utilization requirement and strictly monitor and enforce “use it or lose it” policy for shellfish leases. Specifically, water column leases should be required to produce a minimum of 100 bushels acre⁻¹ annually averaged over the previous three-year period beginning in year five of the lease. Alternatively, water column lease holders may provide evidence of purchasing 45,000 shellfish seed acre⁻¹, annually. Bottom lease holders should be required to produce a minimum of 40 bushels acre⁻¹ annually averaged over the previous three-year period beginning in year five of the lease. Alternatively, intensive culture bottom operations may provide evidence of purchasing 30,000 shellfish seed acre⁻¹, annually. Free-on-bottom operations may also fulfill their utilization requirement by planting a minimum of 250,000 remote-set spat acre⁻¹ year⁻¹.

Recommendation #14

Institute higher minimum fines and mandatory restitution for those convicted of stealing or damaging property on shellfish leases. Elevate charges for theft from any contained culture (e.g. cages, bags) or free-on-bottom operation (including clams under netting) to a felony with a minimum fine of \$2,500 and mandatory restitution to the property owner. For those convicted who hold a commercial license, first offenses will result in a one-year loss of license, and second offenses will result in a permanent loss of license.

Recommendation #15

Amend North Carolina General Statute §113-203 to allow nursery of shellfish in waters classified as prohibited.

Maintaining and Improving Water Quality

Recommendation #16

Appropriate funding for staff positions at the North Carolina Department of Environmental Quality to promote proper operation and maintenance of permitted stormwater systems and thereby increase water quality protection.

Recommendation #17

Revise scoring criteria for State-administered grant funding programs to elevate projects that protect growing waters and provide additional funding for habitat restoration in high-priority shellfish growing areas.

Recommendation #18

Adopt a State policy that requires the use of Low Impact Development (LID) practices for any State-funded construction project where use of such practices is feasible and practical.

Model this policy after the existing federal policies that require use of LID for federal construction projects.

Addressing Research Needs

Recommendation #19

Establish a recurring appropriation to fund a Shellfish Mariculture Grant Program, administered by North Carolina Sea Grant, that funds research projects aimed at informing an economically, ecologically, and socially beneficial shellfish mariculture industry.

Recommendation #20

Establish a Mariculture Resource Grant program, administered by North Carolina Sea Grant with significant collaboration from the North Carolina Shellfish Growers Association, that funds grower-led projects aimed at increasing return on investment, broadening industry participation, increasing product safety, environmental quality, and facilitating crop diversification.

Recommendation #21

Appropriate funds to support an Aquaculture Business Agent at North Carolina Sea Grant to aid the existing Marine Aquaculture Extension Specialist in meeting the ever-growing needs of the shellfish mariculture industry.