Report to North Carolina's Fiscal Research Division and House and Senate Appropriations Committees on Agriculture, Natural, and Economic Resources

Oyster Research and Restoration Activities

March 1, 2025

Division of Marine Fisheries

NORTH CAROLINA
DEPARTMENT OF ENVIRONMENTAL QUALITY

Pursuant to S.L. 2017-57, Sec. 13.12

Oyster Research and Restoration
2025 Annual Legislative Report

University of North Carolina Wilmington (UNCW)
Oyster Broodstock Development Program/Shellfish Research Hatchery

The North Carolina General Assembly provides support for the UNCW Shellfish Research Hatchery (SRH) through the Department of Environmental Quality. UNCW uses these funds to support a selective breeding program targeting the development lines of oysters that perform well (fast growth, high survival) in North Carolina waters. This year's funds were allocated to support personnel (~60%), expendable supplies (~16%) and to obtain/maintain/replace equipment (~17%). We also continued to monitor disease in and the genetic diversity of the oyster lines and collect data on water quality (~7%).

The 2024 oyster production cycle began in March 2024. Twenty-three spawns were executed over the 15-week season, with 21 successful sets (~56,000,000 larvae, a ~4% increase over 2023). Support to the industry and research community continued with over 680,000 seed oysters and 1 million larvae being supplied by the SRH. Additionally, 32,000 seed scallops and over 770,000 seed clams were provided to the industry in 2024. Preliminary reports from multiple deployments across the state show the oyster lines are competitive and often better performing than other commercially available lines of oysters, leading to interest from industry in a path towards making the SRH lines commercially available.

Preparations for the 2025 production season are underway. We have ~800 oysters conditioning with the expectation that spawning will start mid-March. Another 1,400 oysters are scheduled to be brought in from the field next week. The odd year lines that will be spawned in 2025 were, for the most part, initiated in 2015. These 2023 oysters are 10-40% larger and exhibit higher survival (23-58%) than their 2015 ancestors and a significant proportion (~96%) of oysters in these selected lines reach market size (~3in) in 18 months. We anticipate continuing our experiments with chemical production of triploids as a pathway to a pure North Carolina line of tetraploids. We produced three lines in 2024, and at an age of 6 months, the triploid lines are exhibiting a 5-30% increase in growth relative to the diploid lines. These chemical triploid lines are the first step in the process for generating tetraploid oysters, which are necessary for commercial scale production of natural triploids. The latter are desired by industry because of their faster growth and superior condition in the summer months. We hope to produce tetraploids during the 2026 spawning season. These will be the first tetraploids derived from NC oysters.

In addition to the core breeding program, we continue to work with colleagues at North Carolina State University (NCSU) and University North Carolina Chapel Hill (UNC-CH) on the recurring mortality that has troubled the industry in recent years. We have provided sentinel oysters to our colleagues at NCSU and UNC-CH for deployment in central North Carolina and have conducted our own sentinel deployments in southeastern estuaries to get a better understanding of the breadth and severity of the problem. Substantial mortalities in our deployments during the 2024 growing season were noted at two locations where survival was less than expected in some lines (38-54% in Nelson Bay and 26% in Stump Sound). Preliminary results from Nelson Bay suggest that a line of oysters generated from survivors of the 2022 mortalities survived better (83%) relative to the controls (68%). We also evaluated whether prolonged hatchery propagation erodes field resilience by comparing lines with differing numbers of generations of hatchery propagation. Early findings suggest that the line that experienced five generations of selective breeding survived better than oysters without any hatchery background (74% vs 59%). While these results are limited in scope (a few lines in a few locations), they are encouraging that informed breeding can reduce the impacts of these mortality events on the

industry. Efforts to identify the cause of the mortalities and the genetic basis of resilience are ongoing and will inform future breeding plans to provide more resilient oysters for North Carolina aquaculture.

North Carolina Division of Marine Fisheries (NCDMF)
Restoration Activities

Cultch Planting

In fiscal year 2024-2025, the net appropriation for cultch planting is $798,054, all of which is recurring. The NCDMF typically purchases shell throughout the year and marl in January or February, thus some of the expenditures for this fiscal year have not yet been incurred. By the end of the fiscal year, the division estimates purchasing a grand total of 5,102.3 bushels of shell at an estimated cost of $18,822.41. As of January 27, 2025, the division had purchased 4,137.72 bushels of oyster shells at a total cost of $16,250.91, including transportation. To supplement the purchased shell, the NCDMF is under contract to purchase approximately 11,200 tons or approximately 248,889 bushels of marine limestone marl for cultch planting at a total estimated cost of $563,500. The combined estimated cost of cultch planting materials (shell and limestone) for FY 24-25 is $582,322.41. The remaining funds will be used to support program operations, including vessel and heavy equipment fleet maintenance and reef construction costs such as fuel, mobilization, staff travel, and administration. Of note, the cost of diesel fuel, as well as other goods and services related to marine operations have increased substantially over the last several fiscal years, at a rate faster than reef-building material commodities. Therefore, an increasing proportion of these appropriations is necessary to support fleet operations.

During fiscal year 2024-2025, the General Assembly also provided a recurring annual appropriation for the RV Oyster Creek to support two FTEs and operating costs. Those positions were filled in spring 2024 (FY 2023-2024).

Oyster Sanctuaries

In fiscal year 2024-2025, the revised net appropriation for the Jean Preston Oyster Sanctuary Network is $850,000, all of which is recurring. This fiscal year, the Department of Environmental Quality and NCDMF will continue in year two of a three-year partnership with the North Carolina Coastal Federation to construct two new oyster sanctuaries. To fulfill the obligations of this partnership, the NCDMF has completed a contract to purchase and deliver 13,000 tons of Class A granite rock at a total cost of $767,000. One additional material purchase will be made at that level during fiscal year 2024-2025. Also under the aforementioned partnership, with funds provided by the general assembly during fiscal year 2023-2024, the North Carolina Coastal Federation will reimburse the NCDMF for expenses to support the project, up to $900,000 over three years beginning in fiscal year 2023-2024. On October 1, 2024, and December 18, 2024, the NCDMF requested reimbursement for $40,090.85 and $246,698.71, respectively, for project-related expenses in Q1 and Q2. These expenses included heavy equipment acquisition, temporary staff, stockpile site infrastructure, and fuel. We expect additional expenses this fiscal year for temporary staff, stockpile site infrastructure, and fuel, up to an estimated $50,000 for the remainder of Q3 and Q4. At this time, there is $355,641.30 remaining for reimbursement of expenses related to this project, which is scheduled to occur through September of 2026.