

**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, 2023

Division of Marine Fisheries

**NORTH CAROLINA DEPARTMENT OF
ENVIRONMENTAL QUALITY**

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

Oyster Research and Restoration 2023 Annual Legislative Report

University of North Carolina Wilmington *Oyster Brood Stock Development Program/Shellfish Research Hatchery*

The NC 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, expendable supplies and to obtain/maintain/replace equipment. We also continued to monitor disease in and the genetic diversity of the oyster lines and collect data on water quality. We also replaced the ultrafiltration system in the algae room, as the previously installed system proved inadequate to meet water quality needs.

The 2022 oyster production cycle began in April 2022. Fourteen spawns were executed over the 12-week season, with 11 successful sets (~30,070,000 larvae, a ~58% increase over 2021). Support to the industry and research community continued with over 350,000 seed oysters and 4 million larvae being supplied by the SRH. Additional support to the industry, in the form of seed scallops (~45,000 to date) is ongoing. We continue to work with the industry, and interest in the SRH lines has increased following the superior performance (better growth and survival) exhibited by the hatchery lines relative to the Virginia Institute of Marine Science's Aquaculture Genetics & Breeding Technology Center lines that were deployed in side-by-side trials on several industry farms last year.

Preparations for the 2023 production season are underway. We have ~2,400 oysters conditioning with the expectation that spawning will start mid-March. The odd year lines that will be spawned in 2023 were, for the most part, initiated in 2015. These 2021 oysters are 10-32% larger than their 2015 ancestors and a significant proportion (~82.5%) of oysters in these selected lines reach market size (~3in) in 18 months. In addition to the core breeding program, we plan to follow-up on Commercial Fisheries Research Foundation (CFRF) support research done with colleagues at North Carolina State University (NCSU), University of North Carolina at Chapel Hill (UNC-CH) and the Virginia Institute of Marine Science (VIMS), and plan to spawn oysters that survived the catastrophic mortalities (80-90%) that were observed on multiple industry farms in 2022. By comparing survival of the oyster lines that survived mortality events to those derived from oysters not experiencing mortality, we can test whether we can breed for increased resilience to the causative agent (currently unknown, but under investigation). We are also exploring whether hatchery propagation inadvertently results in less resilient oysters that are more vulnerable to pathogens when deployed onto industry farms. We will do this by comparing the survival of oysters with extensive hatchery histories with those with no history of hatchery propagation. This planned work is being supported by The NC Collaboratory.

We also continue to explore strategies for incorporating modern genomic selection techniques. We have spawns planned that will test pedigree analysis as a strategy for estimating breeding values for oysters, which would allow us to predict an oyster's potential for producing superior performing offspring prior to spawning. This would significantly improve selection efficiencies and result in a more responsive breeding program, particularly when confronted with novel challenges like the mortalities observed across the state in 2022. This is made possible through our participation in the Eastern Oyster Breeding Consortium and with support from the Atlantic States Marine Fisheries Commission.

N.C. Division of Marine Fisheries
Restoration Activities

Cultch Planting

In fiscal year 2022-2023, the net appropriation for cultch planting is \$798,054, all of which is recurring. The division typically purchases shell throughout the year and marl in 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 21,705 bushels of shell at an estimated cost of \$84,149. As of January 25, 2023, the division had purchased 6,605 bushels of oyster shells at a total cost of \$22,017.53, including transportation. To supplement purchased shell, the division anticipates purchasing 173,000 bushels of marine limestone marl for cultch planting at a total cost of \$383,872.50. The combined estimated cost of cultch planting materials (shell and limestone) for FY 22-23 is \$468,021.50. Remaining appropriated funds will be used to support shellfish rehabilitation objectives, including program operations, cultch planting material, material deployments, and equipment replacement and repairs, including retrofit costs for the RV Oyster Creek. The cost of diesel fuel as well as other goods and services related to marine operations have increased substantially over previous fiscal years. Therefore, a larger proportion of annual appropriations for shellfish rehabilitation will be budgeted to account for these increases.

In addition to funding provided for cultch planting, carry forward of appropriations from the previous fiscal year was granted for specific projects. All carry forward funds are expected to be spent during FY 22-23 in accordance with their intended purpose

- RV Stones Bay maintenance and repair - \$33,570
- RV Crab Slough replacement generator – \$10,535
- RV Oyster Creek shipyard haul out – \$612,671

Oyster Sanctuaries

In fiscal year 2022-2023, the revised net appropriation for the Jean Preston Oyster Sanctuary Network is \$1.35M, of which \$750,000 is provided as nonrecurring. The division will continue its partnership with the North Carolina Coastal Federation, splitting material acquisition and deployment costs respectively. To fulfill the obligations of this partnership, the division is prepared to enter a contract to purchase and deliver 16,000 tons of Class B marine limestone marl at a total cost of \$744,000. Approximately 2,000 tons of crushed concrete has been purchased to supplement limestone marl at an estimated total cost of \$75,000. The combined estimated cost of oyster sanctuary materials (concrete and limestone) is \$819,000. Remaining appropriated funds will be used to support shellfish rehabilitation objectives, including program operations, cultch planting material, material deployments, and equipment replacement and repairs, including retrofit costs for the RV Oyster Creek.