

MARYLAND AQUACULTURE COORDINATING COUNCIL

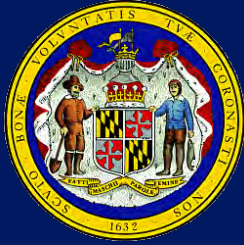
FY 23

Natural Resources Article § 4-11 A-03.2(c)(1)(i)

Prepared by the Maryland Aquaculture Coordinating Council

November 2025

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2023

Maryland Aquaculture Coordinating Council

Annual Report 2023

Report on Council activities with recommendations for advancing Maryland aquaculture
Presented to the Governor of Maryland, Chair of the Senate Education, Health and Environment
Committee and Chair of the House Environment and Transportation Committee

Cover: USDA funded a five year project to develop robotics and advanced technology for modern oyster aquaculture. Photo shows UMD engineers developing remote controlled craft for surveying leases to assess oyster population, growth and health. This will increase production and provide benefits to the Economy, Employment and Environment.



Tawes State Office Building
580 Taylor Avenue, B-2
Annapolis, Maryland 21401

TO: The Honorable Wes Moore, Governor
The Honorable Paul Pinsky, Chair, Senate Education, Health and Environmental Affairs
Committee
The Honorable Kumar Barve, Chair, House Environment and Transportation Committee

FROM: Donald Webster, Chair, Maryland Aquaculture Coordinating Council

DATE: July 1, 2023

SUBJECT: REPORT OF THE AQUACULTURE COORDINATING COUNCIL

I am pleased to present the 2023 report of the Maryland Aquaculture Coordinating Council. The Council provides leadership to develop our aquaculture industry which has already brought national attention and recognition to Maryland. The dedicated members of the Council identify issues and develop solutions to expand our industry. We believe aquaculture provides strong benefits for economic growth and expanded employment for our residents, while benefitting the environment and providing our state and nation with quality products.

The Coordinating Council has carried out many of the tasks assigned to it by the General Assembly since its creation in 2005. We research issues and recommend changes to laws, policies and regulations to help our industry advance, creating opportunities to increase business creation and expansion. The Council's specified and broad-based membership includes representatives of industry, state agencies, General Assembly, University System of Maryland and support organizations which provides a strong model for progress by working together.

We see opportunities to establish and grow new businesses and encourage others to transition to aquaculture to assure success in the future. Many already in the seafood industry are well suited for aquaculture production and many have transitioned to the industry to date. We look forward to further expansion of production to provide economic growth for communities while improving water quality for healthy Chesapeake and coastal bays.

Challenges remain for aquaculture to reach its full potential in Maryland. Therefore, we submit our latest recommendations for your consideration and look forward to continuing strong collaboration with our elected leaders to help us move ahead. The Council will be pleased to provide briefings to you, your staff or members to provide additional information to develop the recommendations presented in this report. On behalf of the Council, thank you for the support you have provided to the aquaculture industry, as well for your foresight and confidence in creating and supporting the Maryland Aquaculture Coordinating Council.

Executive Summary

The Aquaculture Coordinating Council (ACC) was created by the Maryland General Assembly in 2005 and charged with assisting the development of all types of commercial aquafarming by studying and making recommendations for changes required to attract investment and promote economic and employment growth in the industry. The Council provides a forum for state agencies, institutions, non-governmental organizations, political leaders and business leaders to discuss issues while providing strong and diverse expertise through its designated categories of membership to meet its legislative mandate to “advance Maryland aquaculture”.

Support for development of shellfish aquaculture has resulted in 7,600 acres being placed in active production. Watermen and entrepreneurs have brought advances in production methods and equipment, business development and marketing to create new companies and brands, expand sales and build support industries. These businesses include equipment fabrication, hatcheries, vessel construction and provision of supplies. Aquafarms have expanded and invested in planting, raising and harvesting millions of shellfish.

While shellfish aquaculture remains a principal area of growth for the state, recent interest has been shown by international companies to invest in Recirculating Aquaculture Systems (RAS) for producing high quality salmon. This will increase availability of this popular seafood and minimize the carbon footprint created when air shipping fish.

Maryland has other aquaculture businesses that produce a range of products. These include aquatic plants for water gardens, pond management and shoreline stabilization. Finfish producers raise tilapia, largemouth bass, catfish, hybrid striped bass, shrimp, koi, bluegill and ornamental species as well as marine corals. Species of turtles are raised as well as crawfish. Permits for businesses producing these species span the state, from Allegany to Worcester counties.

Council members have broad and diverse experience in aquaculture that aids in creating solutions for identified needs. The following issues have been identified as current impediments and must be addressed for continued growth and opportunity for aquaculture in our state. We respectfully submit the following for consideration:

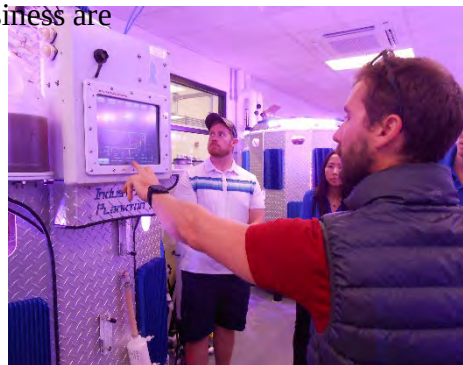
Summary of 2022 Recommendations

I. Water Quality Monitoring: The Maryland Department of Environment (MDE) is responsible for carrying out federal (Title 21 CFR Part 123) and state (Natural Resources Article 4-742 Maryland Annotated Code) laws mandating bacteriological monitoring and investigation into pollution sources to ensure that shellfish are harvested from unpolluted waters. MDE conducts intensive shoreline surveys to identify and mitigate pollution sources that may affect shellfish harvesting waters. Historic expansion of shellfish aquaculture has led to year-round harvest that increased the number of monitoring stations needed to ensure adequate spatial

coverage to protect public health. This has significantly increased personnel hours required for surveys. The Council requests additional human and operational resources to effectively carry out timely support for its monitoring and data collection mandates.

II. Protection of Property: The Natural Resources Police (NRP) provides a strong presence to protect our marine resources. However, their ranks have been reduced and their responsibilities have increased during the past two decades, leading to concern for their ability to protect natural shellfish stocks and assist private growers in keeping crops secure. When NRP was merged with the Park Rangers in 2005, a total of 353 NRP and law enforcement park rangers were in the unit. Immediately after the merger, 35 PINS were abolished or transferred to other agencies leaving the NRP with more statewide responsibility and even fewer officers. Currently, NRP has an authorized strength of 275 with 9 vacancies. Only 192 positions are sergeants and below assigned to uniformed, field patrol. These are the officers that are actually seen out in the field on a daily basis. NRP must be able to respond quickly and effectively to problems and theft has repeatedly been identified as a principal one in surveys. Support for NRP assets is required for Maryland to meet the challenge of attracting private capital to invest and expand aquaculture crops to meet the growing demand for seafood. The Council requests additional funds for law enforcement for a strong and visible force and urges that new assets be provided to this vital force.

III. Aquaculture and Commercial Fishery Development Grants: Legislation that created the Aquaculture Coordinating Council provided specific tasks. Item ii directed the Council to *“Establish and monitor a grant program for the implementation of appropriate projects that support the economic health of the State aquaculture industry”*. To date, funds have not been provided for this purpose. With industry growth, new equipment and methods are needed to produce quality products. However, those in business are often unable to allocate funds to develop ideas for applied research that would result in more efficient equipment, higher output, lower input costs and development of new markets. Providing funds for these purposes can keep Maryland producers at the forefront of the industry nationally. Additionally, watermen often have ideas for innovation that could aid them in their businesses. We request that funds be provided for the Council to develop an Aquaculture and Commercial Fisheries Development Grant Program. This would be organized and operated similar to one that has been effectively used in Virginia for several decades for aquaculture and fisheries projects. It would be managed by a committee of institutional and industry representatives. Project grant funds would not be allowed for salaries, purchases of vehicles or vessels and the results would be required to be documented and made publicly available for others to apply to their businesses.



Phytoplankton lab, Ferry Cove Oyster Hatchery

Members of the Maryland Aquaculture Coordinating Council

Mr. Donald Webster, University of Maryland Extension, Chair

Ms. Kathy Brohawn, Maryland Department of the Environment, Vice Chair

Senator Katherine Klausmeier, Maryland Senate

Delegate Dana Jones, Maryland House of Delegates

Mr. Robert Witt, Tidal Fish License

Mr. William Kilinski, Tidal Fish License

Ms. Victoria Brown, Shop Cove Seafood LLC, Tidal Fish License

Mr. William Cox, Honga Oyster Company, Industry

Mr. Scott Budden, Orchard Point Oyster Company, Industry

Mr. John Barnette, Industry

Mr. Stone Slade, Maryland Department of Agriculture

Mr. Ewing McDowell, Maryland Department of Commerce

Ms. Kim Coulbourne, Maryland Department of Health

Dr. Brian Callam, Maryland Department of Natural Resources

Capt. Catherine Medellin, Maryland Natural Resources Police

Dr. Jeffrey Cornwell, UMD Center for Environmental Science

Dr. Reginal Harrell, University of Maryland

Mr. Colby Ferguson, Maryland Farm Bureau

Mr. Ward Slacum, Oyster Recovery Partnership



Maryland Aquaculture Coordinating Council

2023 Annual Report

Aquaculture Coordinating Council - Legislative Background

The Aquaculture Coordinating Council was created in 2005, the result of a recommendation by a legislatively mandated Task Force on Seafood and Aquaculture. It has a designated membership that includes Maryland agencies involved in permitting, regulating, policing and advancing the industry. It includes representatives of the University System of Maryland, appointed members of aquaculture and commercial fishing industries and non-governmental organizations. The Council is charged by the General Assembly with designated tasks to develop all segments of the industry including finfish, shellfish and aquatic plants. Tasks assigned to the Council included:

- *Develop Best Management Practices for aquaculture on or before December 31, 2006;*
- *Investigate and, to extent feasible, enhance the area of State waters available to private lease for aquaculture and the seafood industries;*
- *Support the aquaculture industry in its efforts to implement innovative procedures and to comply with associated regulations;*
- *Provide for the establishment of Aquaculture Enterprise Zones in the Chesapeake and coastal bays;*
- *Formulate and make proposals to the Governor and Senate and House committees responsible for the Environment, for advancing Maryland aquaculture, including recommendations for a fee structure to reduce State expenditures on aquaculture programs;*
- *Establish and monitor a grant program for the implementation of appropriate projects that support the economic health of the State aquaculture industry;*
- *Conduct applied studies of projects and products that will expand the aquaculture industry in the State;*
- *Conduct market tests to determine acceptability and potential demand for new aquaculture products;*
- *Implement pilot projects and small commercial demonstrations to resolve outstanding quality of production issues and to educate industry representatives, regulators, and other partners;*
- *Enhance the awareness of innovative aquaculture products and programs among commercial buyers and the general public; and*
- *Regularly review State regulations impacting aquaculture and make recommendations to the Aquaculture Review Board regarding any necessary or advisable regulatory changes.*

(Ref: Annotated Code of Maryland 4-11A-03.2)

Engaging our Citizens

The Aquaculture Coordinating Council meets bi-monthly with workgroups addressing specific topics that meet in the interim. All meetings are open to the public through broadly advertised notices. Time is provided for public input at all meetings to assure non-Council member input. This outreach has aided growth in attendance, which has increased representation from growers and other stakeholders.

The Council uses contact with citizens to identify potential new members who may be interested in serving. Maryland law requires three Aquaculture Industry representatives and three Tidal Fish License (TFL) holders to be appointed to the Council. These members serve staggered three year terms and may be appointed for two consecutive ones before being required to take at least one year off before becoming eligible for appointment again. Two members (one in each category) rotate from the Council annually. Since its formation, the Council has been fortunate to have had superior representation from those in the appointed categories, with many being elected to leadership. Building a strong aquaculture community created opportunity to identify new growers for Council appointments. Members help identify problems and areas of concern and work to strengthen Maryland aquaculture to create economic growth and employment for our citizens while aiding the environment.

Government Support

State and federal agencies support development and advancement of Maryland aquaculture through dedicated programs and activities. Research institutions provide investigation into methods to solve identified problems with results transferred to industry through extension education programs and support material. Non-governmental organizations are heavily engaged in supporting aquaculture due to positive environmental benefits that accrue from production.

Department of Natural Resources

Aquaculture permit consolidation was moved to DNR in 2012 through creation of the Aquaculture and Industry Enhancement Division within DNR's Fishing and Boating Services Unit. Division staff provide a range of services including: coordination with the U.S. Army Corps of Engineers, Baltimore District, for required federal permits; coordination of the State Aquaculture Review Board; verification of lease operation to ensure active use requirements are met; verification of oyster harvest for nutrient credit trading; field visits and habitat surveys to ensure compliance with application requirements, permit conditions and environmental regulations; annual billing for lease rent; annual issuance of harvester cards; facilitation of lease transfers, renewals and amendments; permitting for importation of shell, larvae, and seed from out-of-state sources; permitting for shellfish nursery facilities; permitting for non-shellfish aquaculture facilities; coordination of legal issues for lease application protests with the Office of the Attorney General; administrative



support to the Aquaculture Coordinating Council; and, coordination with the Natural Resources Police and the Maryland Department of the Environment and Maryland Department of Health, to ensure compliance with the National Shellfish Sanitation Program, a federal/state cooperative program recognized by the U.S. Food and Drug Administration and Interstate Shellfish Sanitation Conference for the sanitary control of farm-raised and wild-harvested shellfish produced and sold for human consumption.

Development of the oyster industry in particular has been bolstered in recent years by the construction and permitting of new privately operated oyster hatcheries and shellfish nursery facilities in Maryland. Commercial shellfish hatcheries in Maryland complement other private hatcheries in the Chesapeake region, as well as the output from DNR-run Piney Point Aquaculture Center at Piney Point in St. Mary's County and the University of Maryland Center for Environmental Science Horn Point Oyster Hatchery in Cambridge. The former specializes in oyster production and services to support the aquaculture industry and habitat restoration, while the latter has been essential in building the industry through its high larval output and



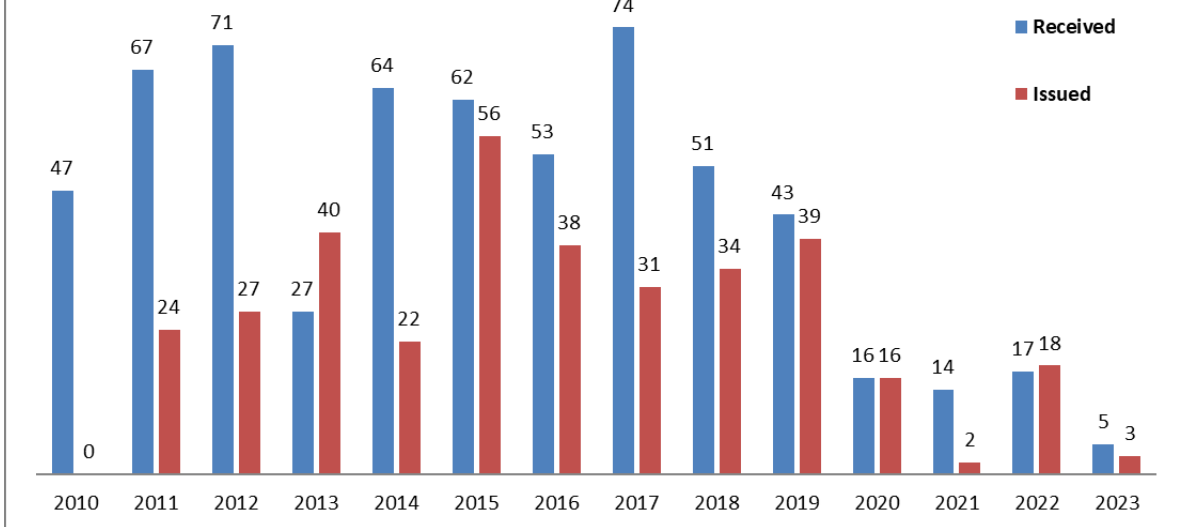
Upweller units for producing single oyster seed

research and education programs. Shellfish nurseries are generally smaller in scale and operated by individual growers. Nurseries are permitted by the Department and may consist of land-based (*e.g.*, pier or wharf) units and/or in-water structures (*e.g.*, remote setting tanks, upweller/downweller units, or floating cages) to cultivate shellfish seed to a maximum size of 1-inch from hinge to bill.

Aquaculture loan and grant programs available to growers through the Maryland Agricultural & Resource Based Industry Development Corporation (MARBIDCO) have played an important role in the continued growth and support of the industry. Additionally, DNR helped facilitate purchase of aquaculture oysters used in restoration projects through The Nature Conservancy Supporting Aquaculture and Restoration (SOAR) program.

There has been strong interest in shellfish aquaculture leasing from September 7, 2010, when the new leasing program was implemented, through to the present. Over that period, the Department received an average of 47 shellfish lease applications and issued an average of 29 new leases per calendar year:

Commercial Shellfish Lease Applications Received and Issued by State of Maryland by Calendar Year (Sept. 2010 - June 2023)



Shellfish Lease Activity Sept 2010 – June 2023	Total Lease Sites	Total Acreage
All shellfish lease applications submitted	611	11,685.8
Submerged Land Leases executed	225	6,102.1
Water Column Leases executed	128	689.5
All new shellfish leases executed	353	6,791.6
Applications process as Lease Amendments	13	64
Shellfish Lease Applications in process	91	1,991

Two types of commercial shellfish leases are offered in Maryland: Submerged Land Leases (SLL) and Water Column (WC) Leases. SLL used for oyster cultivation typically operate using traditional spat-on-shell bottom culture methods, with the vast majority of these using hatchery produced larvae to set on oyster or clam shells for planting. In certain water bodies, a reliable natural oyster spat set often contributes to submerged land lease production when growers maintain suitable cultch on bottom. Currently, SLLs are being used only for oyster production, though clams have been cultured on SLLs in the past. WC leases use intensive gear such as cages, floats, or other gear to raise single shellfish principally for restaurants and raw bars. Juvenile shellfish (i.e., seed) used to plant water column leases are sourced from in and out-of-

state shellfish nursery facilities, following shellfish import regulations when necessary. Currently, one WC lease is used to culture bay scallops (*Argopecten irradians*)

As of June 2023, there were a total of 767 persons who were issued a Shellfish Aquaculture Harvester Permittee Card for the year, which is representative of the number of leaseholders who are managing or co-managing lease operations. A total of 1,869 persons had been issued a Shellfish Aquaculture Harvester Registration Card as well, which is a proxy for the number of individuals acting as field employees for lease operations. There are also further uncounted industry employees who provide direct support to lease operations, such as administrative staff, packers, truck/delivery drivers, sales or marketing staff, etc., who may not hold a harvester card.

SHELLFISH AQUACULTURE LEASE SUMMARY (through June 2023)

County	SLL - Number	SLL – Acres	WC - Number	WC – Acres
Anne Arundel	24	370.05	2	7.5
Calvert	11	132.4	7	37.5
Charles	5	88.6	1	7.9
Dorchester	88	2,642.6	26	182.85
Kent	1	44.8	1	4.9
Queen Anne’s	2	20.4	4	3.71
St. Mary’s	83	810.63	33	206.31
Somerset	36	1,005.8	5	19.7
Talbot	67	720.09	10	40.3
Wicomico	48	1,157.5	0	0
Worcester	2	15.2	13	52.9
Total	365	7,008.07	102	563.57

Shellfish Aquaculture Harvest

The annual harvest from shellfish leases increased significantly during the years after 2012, when the first products regulated under the modern leasing program began to be harvested. Annual increases of thirty to fifty percent were seen, with an average during the period of approximately thirty-five percent. However, severe freshets in 2018 and 2019 that drastically slowed product growth and negatively impacted survivability, as well as coast-wide larvae and seed shortages in 2019, likely resulted in depressed annual harvest totals in those years. In early

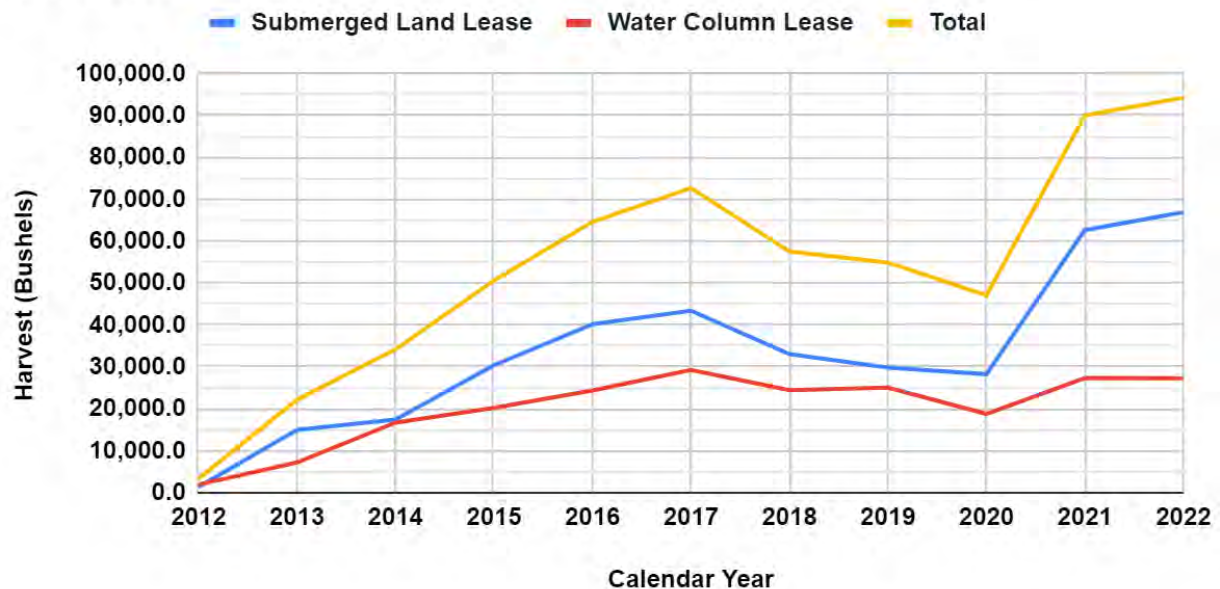
2020, the onset of the COVID-19 pandemic caused national shutdowns of restaurants with impacts throughout the food chain. Harvests during that period dropped due to constriction of consumer demand and shrinking processing. Many growers showed innovation by developing methods of direct marketing to consumers through shipment or sales at farmers markets. While overall harvests were constricted, ecological growing conditions were more favorable in 2020 and 2021, and growers continued to plant their leases. Farm-raised oyster harvest totals continued to rebound in 2022, to a new high of 94,257 bushels. A modest farm-raised bay scallop harvest was also reported in 2021 (116.7 bushels), from water column leases located in the Coastal Bays. Farm-raised clam harvest has not been reported from a shellfish lease since 2017.

**Annual Maryland Farm-Raised Shellfish Harvest in Bushels by Species and Lease Type
(Submerged Land Lease – SLL and Water Column Lease – WC)**

Year	Species	SLL	WC	Total
2012	Clams	44.2	0	44.2
2012	Oysters	1,417.2	1,917.4	3,334.6
2013	Clams	58.0	0	58.0
2013	Oysters	14,965.2	7,232.0	22,197.1
2014	Clams	205.0	0	205.0
2014	Oysters	17,430.5	16,724.4	34,154.9
2015	Oysters	30,407.5	20,229.0	50,636.5
2016	Oysters	40,195.3	24,414.2	64,609.5
2017	Clams	64.1	0	64.1
2017	Oysters	43,424.8	29,295.9	72,720.7
2018	Oysters	33,067.4	24,475.5	57,542.9
2019	Oysters	29,849.5	25,054.0	54,903.5
2020	Oysters	28,276.8	18,804.1	47,080.8
2021	Oysters	62,655.5	27,373.1	90,028.6
2021	Scallops	0	83.4	83.4
2022	Oysters	66,946.0	27,311.4	94,257.3
2022	Scallops	0	116.7	116.7

Annual Farm-Raised Oyster Harvest in Maryland

2012*-2023



Non-commercial Leasing Programs

In addition to commercial shellfish aquaculture leases, Maryland statute provides for a Demonstration Lease program, which is meant to provide an opportunity for education, research and not-for-profit based institutions and companies to obtain a lease in state waters. Demonstration leases are limited in size to five acres, and must be used for research, education, and/or to expand knowledge related to the ecological benefits of growing shellfish. The Department established regulations for demonstration leasing in 2015. In October 2021, a new lease type called an Enterprise Lease became effective in statute to provide an opportunity for prospective aquaculturists to research and/or test the feasibility of certain types of gear and native or naturalized aquatic plant species for commercial purposes that cannot be authorized through a commercial shellfish or demonstration lease. An Enterprise lease is limited to two acres in size and may not exceed a term of five years. The state has not yet adopted regulations to implement this program.

Non-Shellfish Aquaculture

The Division also issues standard Aquaculture permits for non-shellfish operations for the culture of various fish and aquatic plant species. Currently there are 20 active permits held for re-circulating tank and/or pond systems for commercial and hobby operations as well as research projects. The permitted facilities are located throughout the State in Allegany, Anne Arundel, Baltimore, Caroline, Carroll, Cecil, Charles, Frederick, Harford, Kent, Montgomery, Prince George's, Talbot, Washington, Wicomico and Worcester Counties and Baltimore City. The species produced at the facilities have included various native fish, hybrid striped bass, channel

catfish, tilapia, shrimp, turtles, koi, marine corals, ornamental fish and aquatic plants. Reported production for 2022 is detailed in the table below:

Species	Amount	Unit
Water Lilly	1,847	Individual
Bog plants	2,287	Individual
Tilapia	727	Individual
Crawfish	145	Pounds
Largemouth Bass	1,727	Individual
Red-bellied Turtle	14,000	Individual
Yellow-bellied Turtle	3,200	Individual
Red-eared Sliders	3,500	Individual
Bluegill	1,480	Individual

Department of Agriculture

The Maryland Department of Agriculture operates the Seafood Marketing unit that creates demand for our quality products. One of their programs is the “Oyster Pledge” that includes an innovative



logo to help boost sales. Restaurateurs sign the pledge to become listed on the MDA website as a participant and the website notes the significant environmental benefits that come from consuming oysters. An innovative Maryland map can be accessed by the public that shows restaurants and growers with their location, owner and contact information.

Department of the Environment

The Maryland Department of the Environment is charged with regulating shellfish harvesting waters by identifying and eliminating pollution sources, collecting water samples across wide geographic areas for bacteriological examination by the Maryland Department of Health Laboratory Administration and collecting shellstock samples for analysis for potential bacteriological contamination and chemical toxicants. Sanitary surveys ensure waters used to raise shellfish are properly classified and regulated and field crews maintain constant vigilance through monitoring water quality and observations to assure all waters are properly classified. These are posted on Shellfish Harvesting and Closure Area Maps on their website for access by the public. Field crews also monitor specific waters when shellfish lease applications are filed for locations near to shorelines or where surface gear may attract birds or mammals. MDE employees are engaged with counterparts through the nation in the National Shellfish Sanitation Program which develops regulations to ensure that only safe products reach consumers.



Department of Health

The Maryland Department of Health, Office of Food Protection (MDH OFP), is engaged in inspecting food handling and processing facilities. They are an integral part of the National Shellfish Sanitation Program recognized by the US Food and Drug Administration and Interstate Shellfish Sanitation Conference for sanitary control of shellfish produced and sold for human



consumption and to improve sanitation of shellfish moved in interstate commerce. Primary shellfish dealers must be trained in safe food handling procedures including Hazard Analysis Critical Control Point (HACCP) methods and the recordkeeping required, to receive Shellfish Shipper certification. Training for this is usually offered at least annually in partnership with University of Maryland Extension specialists. MDH staff also provide one-on-one education to dealers while conducting pre-operational inspections of processing facilities to assure only safe shellfish are distributed from Maryland shellfish dealers.

Department of Health – Laboratories Administration

The Division of Environmental Sciences of the Maryland Department of Health Laboratories Administration supports the National Shellfish Sanitation Program (NSSP) by testing shellfish waters and shellstock samples for microbial pathogens. This long-standing program has been continuously active for 40 years headed by a single scientist with that long tenure. Maryland's NSSP testing is performed at the Eastern Shore Regional Laboratory, which is strategically located in the coastal community it serves, and the Central Laboratory, which tests >10,000 shellfish water samples each year. Both laboratories rigorously maintain certification under the NSSP program, and are supported, in part, by annual equipment grants competitively secured from the Association of Food and Drug Officials with funds provided by FDA.

Maryland Agricultural and Resource-Based Industry Development Corporation

Since the creation of the Maryland Shellfish Aquaculture Financing Fund in 2011, MARBIDCO has approved 88 loans to 52 borrowers totaling \$5,606,837 for projects located in 10 tidewater counties. Projects include 31 Submerged Land Leases, 47 Water Column (cage or float) Leases and nine that were bottom and water column projects. Seventy-four (74) loans were made to commercial watermen (TFL holders) and 82 loans are fully drawn. Borrowers in good standing have an opportunity for forgiveness of 40% (up to a maximum of \$100,000) or 25% (\$100,000 to \$300,000) of the loan principal balance amount.



In 2012, a special finance program was established for commercial watermen to develop remote setting systems for production of seed oysters. MARBIDCO has approved six loans in this program totaling \$179,983, of which four are fully drawn. Growers who have taken advantage of this program have not only used the systems to produce seed oysters for their leased grounds but have sold spat on shell to the state for placement on public harvest grounds to keep that important part of the oyster industry viable.

USDA, Natural Resources Conservation Service

The Environmental Quality Incentives Program (EQIP) provides financial and technical assistance to agricultural producers to address natural resource concerns and deliver environmental benefits such as improved water and air quality, conserved ground and surface water, increased soil health, reduced soil erosion and sedimentation, improved or new wildlife habitat, mitigation against drought and increasing weather volatility. In Maryland, this program has been applied to shellfish farms providing financial and technical assistance to aquafarmers to implement structural and management practices to optimize the environmental benefits of aquaculture production.



The EQIP program has operated for many years providing grants to oyster farmers using bottom culture methods to develop beneficial underwater habitat. Program grant funds are used to renovate substrate or emplace new foundation material that is then planted with hatchery produced spat on shell to emulate a natural oyster reef. This provides benefits from biofiltering while the enhanced habitat attracts other beneficial species. The program has been highly effective in Maryland and has resulted in a significant number of acres of submerged land leases being developed with approved beneficial practices leading to important environmental improvement of our waters.

Oyster Recovery Partnership

The Oyster Recovery Partnership supports the growth and development of Maryland's oyster aquaculture industry with emphasis on advancing benefits of restorative aquaculture. ORP's primary focus is to improve production, business efficiency and marketing. During FY 2023 ORP supported existing and new leaseholders by providing setting tanks, oyster shell and training to produce spat on shell under ORP's "Remote Setting and Training" (RST) Program. A total of 17 participants set 218.7 million larvae on 10,675 bushels of shell. This resulted in ~65.6 million spat deployed to Maryland leases. Most sets were triploid (165 million triploid larvae compared to 53.7 million diploid larvae). ORP also engages leaseholders with independent setting systems to produce spat to enhance oyster bars included in Maryland's public fishery. Several million spat were produced and planted on public grounds during FY23. As a member of the ACC, ORP chaired and managed a workgroup to evaluate alternate materials to use for Maryland spat production. Demand and competition for oyster shell has increased and jeopardizes future growth of Maryland's on-bottom aquaculture and other oyster production industries. The workgroup was charged to identify and evaluate substrate options that could be used to replace oyster shell in spat setting. A series of meetings were convened to discuss issues and options related to oyster shell and alternate materials. The final report summarized workgroup activities and recommendations to advance potential use of alternatives in oyster production in Maryland. ORP also promoted Maryland's aquaculture industry and its products through social media, live events highlighting specific farms and through promotional campaigns in partnership with the Maryland Department of Agriculture Seafood Marketing Department.



The Nature Conservancy – Shellfish Oyster Aquaculture Recovery (SOAR)

During the past two years, the Covid pandemic resulted in significant problems throughout the United States and world for many industries. With human contact restricted, restaurants and other businesses closed and markets for food products were affected. The aquaculture industry and Maryland shellfish farmers were caught in this problem. During fall of 2020, The Nature Conservancy and Pew Charitable Trusts offered funds to purchase oysters from growers for transfer to sanctuaries. This provided cash to farmers with the animals used for their environmental benefits of nutrient cycling and providing habitat for other species.



The Maryland program was developed by TNC in cooperation with DNR and UMD Extension to provide information to the industry and engage interested growers. The program had two rounds of purchases with Maryland being one of seven states in the northeast included in the program. In Round One, 857,851 oysters were purchased while Round Two purchased 399,993 oysters, for a total of 1,257,844 oysters. These were placed on 17 acres of sanctuaries in St. Mary's, Eastern Bay and the Nanticoke. Several growers stated that these funds allowed them to keep their employees paid during that time, while traditional markets were depressed.

University of Maryland

University of Maryland Extension (UME) in the College of Agriculture and Natural Resources is a key component of the Land Grant System providing education for agriculture and rural life. Profitable success in aquaculture requires development of skills in production methods as well as business management. UME has decades of experience training industry through programs that include workshops, demonstrations, short courses and conferences. Mailed program notification is sent to all leaseholders and through web and Facebook pages. Support material includes technical manuals, fact sheets, videos and spreadsheets in print and electronic form.

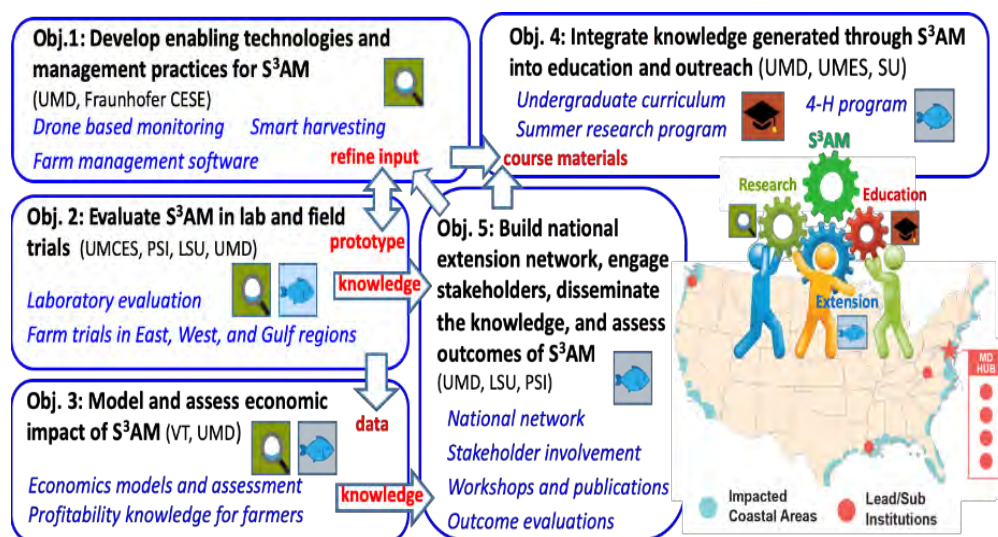


The UMCES Horn Point Oyster Hatchery participates by producing larvae and seed to support industry expansion and their facilities are used to conduct training programs. This allows students to understand hatchery operations as well as setting and nursery units. Single seed oysters are produced in downwellers and raised in small and large upwellers to a size where growers can handle them. HPL has fifty four setting tanks used for production of spat on shell for planting bottom leases and produces large quantities for sanctuaries and public oyster areas. A limited number of tanks are available for growers to use to produce seed for leases. A demonstration oyster farm has been operated at HPL for a decade with a variety of gear used on water column leases. The farm has been used for extension educational programs and research with publication in extension bulletins.

A Remote Setting Training program operated through the Extension project since 2011 provides tanks, pumps and aerators in over 30 locations around the Bay. These are available for growers to use for two-week periods during summer to learn how to produce spat on shell seed to plant bottom leases and comply with “active use” requirements for lease retention. This program normally services over 40 growers annually who produce spat in about 200 sets. Once trained, participants construct their own systems based on their lease size and planting requirements.

S3AM - Research for the Future

The University Of Maryland College Of Engineering obtained funding for a five year, \$10 million project from the US Department of Agriculture in 2020 to research advanced technology and robotics applied to bottom cultivation of oysters. The project, known as Smart, Sustainable Shellfish Aquaculture Management (S3AM) will develop improved methods to assess lease sites and underwater drone technology to monitor crops to assess size, condition and health of the shellfish. Other plans will develop a water quality monitoring network to assess conditions for efficient operation and another will create efficient harvest gear for oysters while avoiding the negative environmental effects of towed dredges. The program includes undergraduate education at the University of Maryland Eastern Shore and Salisbury University and a 4-H component to complement the current award winning robotics work of Extension. The USDA project is national in scope with an Advisory Board of researchers, extension faculty and growers from all US coastal areas to guide research. Faculty will conduct implementation studies in a range of coastal environments with a vision to create technology to move oyster aquaculture to the twenty-first century with parallels to modern land-based agriculture. The goal is to develop better planting methods, implement mechanized processing and create added-value products to expand production for national marketing through large-scale distribution while making Maryland known as a center for applied, high caliber aquaculture research.



S3AM - The Smart Sustainable Shellfish Aquaculture Management Project funded by USDA

Issues and Recommendations

The Aquaculture Coordinating Council has identified key issues affecting the advancement of Maryland aquaculture and provides recommendations developed through their meetings. For 2021, the Council respectfully submits the following for consideration:

I. Water Quality Monitoring

Issue: The Maryland Department of Environment (MDE) is responsible for carrying out federal (Title 21 CFR Part 123) and state (Natural Resources Article 4-742 Maryland Annotated Code) mandating bacteriological monitoring and investigation into pollution sources to ensure that shellfish are harvested from unpolluted waters. In addition, MDE conducts intensive shoreline surveys to identify and mitigate pollution sources that may impact shellfish harvesting waters. Continued expansion of the oyster aquaculture industry has resulted in year-round oyster harvest that can increase the number of monitoring stations needed to ensure adequate spatial coverage to protect public health. This has also increased personnel hours for shoreline surveys, and equipment and operational resource needs to support their monitoring and data collection.

MDE's Compliance Division tracks the hours devoted to aquaculture. These have risen in recent years due to the addition of new monitoring stations specifically for aquaculture. The critical need at this time is replacement of an aging vessel that is at the end of its serviceable life where making needed repairs is no longer cost-effective relative to replacement. This is critical for the safety of our field crews using a boat that is water logged and dangerous to operate.

Recommendation: The Council recommends additional state funds for MDE shellfish programs, particularly for a replacement vessel in this fiscal year, and continue to track federal funding to ensure fiscal gaps are addressed. These programs have been effective in assuring that Maryland's shellfish industry remains competitive nationally while maintaining its excellent reputation for safe and wholesome products. It is critical for Maryland's economic and public health needs to support MDE shellfish monitoring programs.

II. Protection of Property

Issue: The Natural Resources Police (NRP) provides a strong presence to protect our marine resources. However, their ranks have been reduced during the past two decades, leading to concern for their ability to protect natural shellfish stocks and assist private growers in keeping crops secure. When NRP was merged with the Park Rangers in 2005, a total of 353 NRP and law enforcement park rangers were in the unit. Immediately after the merger, 35 PINS were abolished or transferred to other agencies. Currently, NRP has an authorized strength of 260 with 26 vacancies and more to come. Only 188 positions are sergeants and below assigned to uniformed field patrol. These are the officers that are actually in the field on a daily basis. NRP must be able

to respond quickly and effectively to problems and theft has repeatedly been identified as a principal one in aquaculture industry surveys. Support for NRP assets is required for Maryland to meet the challenge of attracting private capital to invest and expand aquaculture crops to meet the growing demand for seafood. The Council has urged political leaders to provide enhanced funds for law enforcement for a strong and visible force and urges that new assets be provided to this vital unit.



Natural Resources Police enhancement has been requested as a high priority need to protect private property of Maryland shellfish growers

Recommendation: Increase support for Natural Resources Police to deter theft of public and private shellfish by providing the force with enhanced technological equipment

and personnel that can bolster enforcement activities. NRP developed a Strategic Plan for FY2015-FY2019 that specifically addresses staffing needs. Funds should be allocated to support staffing recommendations as detailed in that document.

III. Aquaculture and Fisheries Resource Grant Program

Issue: Legislation creating the Aquaculture Coordinating Council provided a series of charges for it. Item ii directed the Council to “*Establish and monitor a grant program for the implementation of appropriate projects that support the economic health of the State aquaculture industry*”. To date, this important charge has not been implemented because funds have not been provided. With the growth of shellfish aquaculture, new equipment and methods must be introduced to produce quality products. However, those in business are often unable to allocate funds to develop innovative ideas for applied research that could result in more efficient gear, higher production, lower input costs and identification and establishment of new markets. Providing funds for this purpose will keep Maryland producers at the forefront of the industry nationally. Virginia operates a program that provides a strong model for Maryland, with grants provided to both commercial fisheries and aquaculture participants to develop new and innovative ideas. The results of these project must be made available to the public for others to utilize them.

Recommendation: The Council’s vision is for an Aquaculture and Fisheries Innovation Fund to be established at \$100,000 annually and overseen by an Advisory Board comprised of seven individuals representing state agencies, University of Maryland faculty and industry. Applicants would be required to be actively engaged in Maryland wild harvest or aquaculture industries. Proposals would be submitted to the Board at specified times with broad distribution of the announcement of availability for applications. Funds would not be allowed for the purchase of vessels, vehicles or payment of salaries. The intent of the

program is for those in production to create improvements in their operations without incurring personal cost and risk during that development. The program would fund supplies, improve equipment and provide support for developing innovative products or methods to be used for all forms aquaculture and commercial fishing operations.

Proposals would be reviewed by the Advisory Board with external reviews requested if required for additional input. At the conclusion of a project, a report would be required from the recipient which would be in the public domain for availability by other users. Participants would be encouraged to provide information on their projects through UMD Extension programs.

To create the Aquaculture and Fisheries Resource Grant Program, the Council recommends appropriating \$100,000 to initiate it. The Council envisions being able to form an Advisory Board and have the program active within six months of the allocation being provided.

The members of the Maryland Aquaculture Coordinating Council formally request that the Governor and legislative leaders consider the recommendations in this report when formulating their budgets and we urge support for them. The Council looks forward to continuing its work in the development of Maryland aquaculture for the **ECONOMIC GROWTH, INCREASED EMPLOYMENT** and **ENVIRONMENTAL BENEFITS** that derive from a healthy and thriving aquatic farming industry.



Partners for Aquaculture Development

Maryland Agencies

Department of Health

Department of Commerce

Department of Agriculture

Department of the Environment

Department of Natural Resources

Natural Resources Police

MD Agriculture & Resource Based Industries Development Corporation

University System of Maryland

University of Maryland

University of Maryland Extension

University of Maryland Center for Environmental Science

Federal Agencies

USDA Natural Resource Conservation Service

US Army Corps of Engineers, Baltimore District

National Oceanic & Atmospheric Administration

Non-Governmental Organizations

Maryland Farm Bureau

Oyster Recovery Partnership

Chesapeake Bay Foundation

Coastal Conservation Association - Maryland



For additional information, contact:

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