



University of Maryland, 2113 Animal Science Building
 College Park, Maryland 20742-2317
 Telephone: 301-405-6085, FAX: 301-314-9412
 E-mail: nrac@umd.edu Web: <http://www.nrac.umd.edu>

AQUACULTURE SITUATION AND OUTLOOK REPORT 2009: MARYLAND

Don Webster, University of Maryland Extension
Don Meritt, University of Maryland Center for Environmental Science
Jackie Takacs, University of Maryland Extension
Thomas E. Rippen, University of Maryland Extension
Andy Lazur, University of Maryland Extension
Dan Terlizzi, University of Maryland Extension
Reggie Harrell, University of Maryland Extension

Industry Trends and Outlook

Maryland has a small but diverse aquaculture industry with an annual farm-gate production of approximately \$5 million annually. Growers produce a wide range of finfish, shellfish, aquatic plants, and reptiles. The largest contributing sectors currently are producers of ornamental fish and aquatic plants, although the shellfish industry is poised for significant expansion because of changes in century-old laws that previously prevented farming on many of the most productive areas.

Aquatic plants are produced for wholesale water garden trade, as well as for shoreline stabilization and wetland mitigation. Strong demand is expected for the latter two areas in the future. Producers of water garden plants have begun to cultivate alternative markets for their products such as the use of aquatic plants in the healthy management of stormwater ponds. This has occurred in the face of strong competition in the wholesale nursery business from both foreign and domestic suppliers.

The second largest sector is shellfish production, in particular Eastern oysters (*Crassostrea virginica*) and northern quahogs (*Mercenaria mercenaria*). While disease epizootics have kept bottom leases in the Chesapeake and coastal bays from maintaining their



The University of Maryland Horn Point hatchery provides millions of oysters for aquaculture projects in the Chesapeake region. (Photo: Don Webster)

traditional productivity, growers have evolved techniques to manage their animals in areas of high disease prevalence. Recent development of selected oyster lines, along with the production of triploid animals that focus their energy on growth rather than reproduction, has made it possible to raise native oysters in zones of high disease intensity. Triploid technology also makes it possible to produce a high-quality, half-shell trade animal throughout the summer

Emerging Issues and Critical Needs

- Recent changes to aquaculture laws have led to the acceleration of aquaculture permitting and recognition by key political leaders of the benefits of aquaculture for the economy and the environment.
- Support for extension positions is a critical need at this time in order to continue the work of existing faculty, while developing new programs and initiatives through access to additional funding. This will be important as the State moves ahead in developing its shellfish aquaculture industry and transitioning harvesters to growers.
- Shellfish aquaculture is critical to the health of the Chesapeake and coastal bays due to the importance of biological filtration and nutrient transfer. Solutions for the current oyster disease problem will require species, production systems, and genetic hybrids able to resist disease. Recent announcements of the declining health of the coastal bays will require a substantial increase in shellfish to aid in restoration.
- Encouragement of off-bottom aquaculture businesses will require approval through the U.S. Army Corps of Engineers, Maryland Department of the Environment, and Maryland Board of Public Works. These organizations will need to be more timely in their approach to permitting in order to spur, rather than inhibit, businesses development.
- Continued funding is necessary for research on defined industry problems and culture techniques, where new and innovative species will be a priority.
- Expanding populations mean that conflicts with aquaculture producers will become prevalent, especially in public waters. Conflict management and mediation will be necessary to minimize problems and allow production while protecting the environment.



Maryland Aquatic Nurseries contains acres of ponds and greenhouses for ornamental aquatic plant production. (Photo: Don Webster)

A small segment of the industry still raises products in recirculating systems. These include tilapia, shrimp, and tropical reef and ornamental fish. While the market for live tilapia has peaked in recent years, remaining producers having become adept at business management and marketing to remain competitive. The tropical and ornamental fish business has declined with the economic downturn, but producers still remain optimistic about a stronger market within the year.

Recent trends have included State government interest in modifying laws and regulations that hinder or inhibit aquaculture. Maryland revised its permitting procedure in 2005 to direct initial inquiries for aquaculture through the state Aquaculture Coordinator, who then tracks permits through appropriate agencies, while chairing the Aquaculture Review Board. That body meets regularly to discuss applications, mediate differences between agencies, and allow potential applicants to conduct pre-application meetings with the agencies. A state Aquaculture Coordinating Council (ACC) is charged with recommending policy and legislative initiatives annually to the executive and legislative branches of state government. Other tasks include developing and maintaining current Best Management Practices (BMP) and forming options to initiate Aquaculture Enterprise Zones (AEZ) for the enhancement of shellfish aquaculture.

Interest by Maryland's Governor in rapid expansion of shellfish aquaculture for economic, employment, and environmental benefits, led to legislation passed in the 2009 General Assembly. This changes the status of Maryland's bays from *natural oyster bars* that could not be leased, to *public shellfish fishery areas*, thus allowing vast tracts for private

months when native oysters were traditionally in poor condition after spawning.

cultivation. The bill includes provisions for creating AEZs for off-bottom production and removes many provisions that kept the aquaculture industry small by removing prohibitions against leasing in many county waters as well as allowing leasing by corporations. It replaces current size limitations with production standards and oversight, and increases penalties for theft of private product, which has been a longstanding problem.

Commercial Species List

- Blue crab (*Callinectes sapidus*)
- Clownfish (*Premnas* sp.)
- Diamondback terrapin (*Malaclemys terrapin*)
- Eastern oyster (*Crassostrea virginica*)
- Northern quahog (*Mercenaria mercenaria*)
- Pennaeid shrimp (Penaeids)
- Red swamp crawfish (*Procambarus clarkia*)
- Sea Bream (*Archosargus rhomboidalis*)
- Soft corals (*Alcyonacea* sp.)
- Striped bass and hybrids (*Morone* sp.)
- Tilapia (*Tilapia* sp.)
- Various turtle species (Chelydridae)
- Various aquatic plants
- Various ornamental fish (freshwater and marine)

Addressing Industry Needs

Researchers, extension specialists, resource managers, industry associations, and concerned stakeholders all play a role in addressing industry needs. The following sections outline the new initiatives and recent accomplishments in these areas.

Aquaculture Research

The University System of Maryland (USM) includes thirteen institutions and campuses, with aquaculture research conducted at several facilities.

The Center for Environmental Science includes the Aquaculture and Restoration Ecology Lab (AREL) at Horn Point on the Eastern Shore, which provides Eastern oyster larvae for large-scale restoration projects, as well as quarantine facilities for non-native shellfish and finfish. In 2009, the AREL facility produced over 800 million oyster spat for innovative projects such as managed reserves, that combine ecological and economic benefits in carefully defined and regulated areas. A recent expansion of oyster setting equipment should double or triple output of seed oysters. The facility also provides larvae and spat to commercial aquaculture projects, including two that have been started by innovative groups of watermen in the Chesapeake Bay. The AREL also serves as a base

for endangered species research on the Atlantic sturgeon, and provides facilities for work on tropical ornamental fish such as clownfish. Aquatic vegetation research conducted at AREL is leading to advances in large-scale introduction of depleted plants that are important in maintaining the health of estuaries.

The Center of Marine Biotechnology (COMB) on the waterfront in the city of Baltimore, provides cutting-edge research that has closed the life cycle of the blue crab and provided production information important in the culture of sea bream. Other research teams at COMB work to develop more effective bacteria that are used for biological filtration in recirculating aquaculture systems. This has led to recirculating technology that discharges no water.

The Department of Environmental Science and Technology at the University of Maryland College Park (UMCP) provides research and development in seafood technology and aquaculture production systems, including breeding, selection, and nutrition programs. Researchers have worked closely with extension faculty to apply science to industry problems for many decades. Also located in College Park is the Northeastern Regional Aquaculture Center (NRAC), which provides USDA funding to a range of industry-targeted research and extension projects in the regional states, from Maine through Maryland.

Aquaculture Extension

Maryland has ten full-time extension faculty who work all or in-part on programs that often include seafood and aquaculture. Three regional specialists are located in geographically distinct areas and conduct a wide range of programs. Statewide finfish and shellfish specialists hold joint research and extension

Maryland Aquatic Nurseries produces plants to stabilize shorelines on coir mats for easy planting. (Photo: Don Webster)





Maryland Aquatic Nurseries owner Dick Schuck raises many species of plants for gardens and nutrient uptake. (Photo: Don Webster)

appointments and a resource economist, education specialist, and seafood technologist provide specialization in these areas. Two new extension assistants focus on watershed management, which affects aquaculture water quality and species issues. The program faculty organize state, regional, and national educational programs addressing seafood and aquaculture topics. Staff teach short courses, as well as evening or day-long programs in support of ongoing extension project areas.

The Extension program is administered by University of Maryland Cooperative Extension, with support from the Maryland Sea Grant College Program. The Extension faculty are located at labs and campuses throughout the State in places where they can more easily interact with industry. State specialists have joint research appointments, while regional faculty provide industry liaison and work with researchers in field demonstrations and application of technology. Maryland Cooperative Extension administratively ties the 1862 and 1890 programs together, which gives strong support through both the traditional programs as well as those aimed at minorities.

Aquaculture Education

Maryland Sea Grant's *Aquaculture in Action* program is a year-long, K-12 outreach program emphasizing aquaculture as a dynamic tool for learning. The goal is to create a curriculum that integrates science skills of chemistry, physics, mathematics, ecology, and animal husbandry, using hands-on learning sets. Teachers are assisted through biennial workshops, annual planning and development meetings, yearly fish deliveries and stocking events, and an interactive Web site for consultations and individual project reporting.

The *Aquaculture in Action* program consists of some fundamental pieces that are key to its success in the schools:

- One-week workshops that support teachers with an aquaculture companion manual and materials, and equipment for the construction of a 210-gallon recirculating aquaculture system;
- A one-of-a-kind Web-based component that gives teachers and students the ability to enter project data related to their research in the classroom and communicate with one another about projects and ideas;
- Support throughout the school year including the coordination of obtaining native fish for culture and the release of fish at the end of the school year at Maryland Department of Natural Resources approved locations in Maryland.

Over the last twelve years, the *Aquaculture in Action* program has been incorporated into over 50 schools in Maryland, as well as in the mid-Atlantic region, and been used by over 15,000 students in the context of learning science. In addition, the program has developed into hundreds of student projects and been used as a model by extension and education specialists across the country. Many of the teachers in the program have successfully secured additional funding to expand their school's aquaculture program, and several have been honored with teaching awards such as Maryland "Teacher of the Year" and "Environmental Teacher of the Year."

Aquaculture Resources

Maryland Sea Grant

<http://www.mdsg.umd.edu/>

University of Maryland Cooperative Extension

<http://extension.umd.edu/>

Northeastern Regional Aquaculture Center

The NRAC is one of five Regional Aquaculture Centers established by the U. S. Congress which supports research and outreach efforts to promote the development of the aquaculture industry.

<http://www.nrac.umd.edu>

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Research Contact Information		
Name	Address	Specialty/Title
Reginal Harrell	University of Maryland Department of Environmental Science and Technology (410) 827-8056 rharrell@umd.edu	finfish and aquatic plant research; genetics, stress physiology, ethics
Andy M. Lazur	University of Maryland Horn Point Environmental Laboratory (410) 221-8474 alazur@hpl.umces.edu	finfish research; aquatic plants
Kennedy Paynter	University of Maryland (301) 405-6893 paynter@cbl.umces.edu	shellfish ecology, restoration
Yossi Tal	University of Maryland Center of Marine Biotechnology (410) 234-8875 tal@umbi.umd.edu	aquatic microbiology, marine aquaculture
Fredrick Wheaton	University of Maryland Department of Environmental Science and Technology (301) 405-6511 fwwheaton@umd.edu	aquaculture engineering
L. Curry Woods III	University of Maryland Department of Animal Science (301) 405 7974 curry@umd.edu	striped bass and hybrids
Yonathan Zohar	University of Maryland Center for Marine Biotechnology (410) 234-8803 zohar@umbi.umd.edu	fish reproductive endocrinology, aquaculture

Extension Contact Information		
Reginal Harrell	University of Maryland Department of Environmental Science and Technology (410) 827-8056 rharrell@umd.edu	finfish and aquatic plant breeding and selection; fish health management; bioethics, environmental ethics
Andrew M. Lazur	Maryland Cooperative Extension Horn Point Environmental Lab (410) 221-8474, 8496 alazur@hpl.umces.edu	finfish aquaculture

Extension Contact Information (continued)

Name	Address	Specialty/Title
Douglas Lipton	University of Maryland Department of Agricultural & Resource Economics (301) 405-1280 dlipton@arec.umd.edu	resource economics
Donald Meritt	University of Maryland Center for Environmental Science Horn Point Environmental Laboratory (410) 221-8475 meritt@hpl.umces.edu	shellfish aquaculture
Thomas E. Rippen	Maryland Cooperative Extension University of Maryland Eastern Shore (410) 651-6636 terippen@mail.umces.edu	seafood technology
Jacqueline Takacs	Maryland Cooperative Extension Chesapeake Biological Laboratory (410) 326-7356 takacs@cbl.umces.edu	general aquaculture; education
Dan Terlizzi	Maryland Cooperative Extension Center of Marine Biotechnology (410) 234-8837 dterlizz@umd.edu	water quality
Don Webster	Maryland Cooperative Extension Wye Research & Education Center (410) 827-5377 ext. 127 dwebster@umd.edu	general aquaculture; policy
Fredrick Wheaton	University of Maryland Department of Environmental Science and Technology (301) 405-6511 fwwheaton@umd.edu	aquaculture engineering

Education Contact Information

J. Adam Frederick	Maryland Sea Grant Extension Program Center of Marine Biotechnology (410) 234-8850 frederic@mdsg.umd.edu	aquaculture education
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State Aquaculture Coordinator		
Karl Roscher	Maryland Department of Agriculture 50 Harry S Truman Parkway Annapolis MD 21401 (410) 841-5724 RoscheKR@mda.state.md.us	permit coordination and tracking; chairman of Maryland Aquaculture Review Board; member of Maryland Aquaculture Coordinating Council
Aquaculture Industry Associations		
(inactive at this time)		
Testing Laboratories		
Ana Baya	Regional Animal Health Laboratory Avrum Gudelsky Veterinary Center College Park, MD 20742 (301) 314-6837 ambaya@umd.edu	diagnosis of fish disease and recommendation for treatment
Shawn McLaughlin	Cooperative Oxford Lab 904 South Morris Street Oxford, MD 21654 (410) 226-0078 shawn.mclaughlin@noaa.gov	diagnosis of shellfish diseases

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