



*Larry Hogan, Governor*  
*Boyd Rutherford, Lt. Governor*  
*Mark Belton, Secretary*  
*Joanne Throwe, Deputy Secretary*

October 17, 2018

The Honorable Larry Hogan  
Governor  
State House  
Annapolis, Maryland 21401

The Honorable Thomas V. Mike Miller  
President, Senate of Maryland  
H107 State House  
Annapolis, Maryland 21401

The Honorable Michael E. Busch  
Speaker, Maryland House of Delegates  
H101 State House  
Annapolis, Maryland 21401

**Re:** Submission of Report for Shellfish Aquaculture Leases and Submerged Aquatic Vegetation  
**Agency:** Aquaculture Coordinating Council, Maryland Department of Natural Resources  
**Report Authority:** HB 1200, Chapter 381, Section 2 from 2017 (MSAR 11222)

Dear Governor, President and Speaker:

In accordance with HB 1200, Chapter 381, Section 2 from 2017 the Department of Natural Resources hereby submits the Shellfish Aquaculture Leases and Submerged Aquatic Vegetation report prepared by the Aquaculture Coordinating Council.

If you have any questions about this submission, please do not hesitate to contact Stephen Schatz, Director, Legislative and Constituent Services (Acting) at 410-260-8004 or [Stephen.schatz@maryland.gov](mailto:Stephen.schatz@maryland.gov).

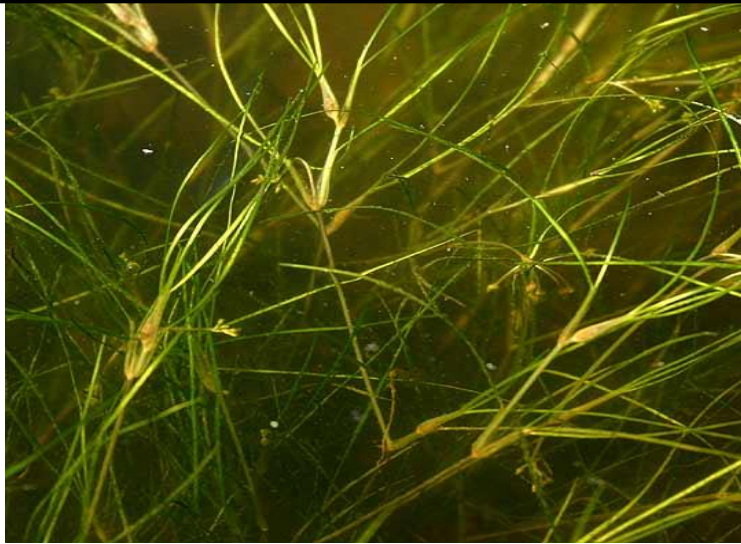
Sincerely,

Mark Belton  
Secretary

enclosure

cc: Sarah Albert, Legislative Library (5 hard copies)

# Report on Shellfish Leases and Submerged Aquatic Vegetation Interactions





Maryland  
Aquaculture Coordinating Council

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

TO: The Honorable Larry Hogan, Governor  
The Honorable Thomas V. Mike Miller, President, Senate of Maryland  
The Honorable Michael E. Busch, Speaker, Maryland House of Delegates

FROM: Mr. Donald Webster, Chairman, Maryland Aquaculture Coordinating Council

DATE: February 1, 2018

SUBJECT: Report on Shellfish Leases and Submerged Aquatic Vegetation Interactions

The Council has provided leadership in developing an aquaculture industry that has brought Maryland national recognition. The dedication of our council members to growth in this sustainable industry continues, and we believe that aquaculture provides significant benefits to our economy and the environment.

The Coordinating Council has fulfilled many of the tasks assigned to it by the General Assembly since it was created in 2005. The council recommends changes to help the aquaculture industry rebuild our depleted shellfish resources and to create opportunities for an increasing number of shellfish aquaculture businesses to become established in our State.

In 2017, the Aquaculture Coordinating Council was requested to assist the Department of Natural Resources in completing the charge to review conflicts relating to shellfish aquaculture leases and the presence of submerged aquatic vegetation, develop solutions to the conflicts and report their findings and recommendations to the Governor and General Assembly. In response to this request, the council approved the establishment of a Submerged Aquatic Vegetation Workgroup to include leaseholders, scientists and stakeholders with diverse backgrounds and expertise to provide an assessment of aquaculture and submerged aquatic vegetation interactions, characterize them, develop recommended solutions and report back to the council with their findings. The findings and recommendations contained in this report have been developed through a collaborative effort between stakeholders and have been reviewed by the department.

There are still challenges to overcome for aquaculture to reach its full potential in our State. The council is pleased to provide briefings if additional information is needed as we work towards developing the recommendations presented in this report.

## **Report to the Governor Larry Hogan and members of the Maryland General Assembly on Shellfish Aquaculture Leases and Submerged Aquatic Vegetation Interactions**

House Bill 1200 and Senate Bill 964 passed and were adopted into law during the 2017 Maryland General Assembly session. This legislation requires the Department of Natural Resources to review conflicts relating to shellfish aquaculture leases and the presence of submerged aquatic vegetation, develop solutions to the conflicts and report their findings and recommendations to the Governor and General Assembly by December 1, 2017. The Aquaculture Coordinating Council was requested to assist the department in completing this charge. Therefore, the council approved the establishment of a Submerged Aquatic Vegetation Workgroup to include leaseholders, scientists and stakeholders with diverse backgrounds and expertise to provide an assessment of aquaculture and submerged aquatic vegetation interactions, characterize them, develop recommended solutions and report back to the council at the November 9, 2017, meeting with their findings. The Submerged Aquatic Vegetation Workgroup's report was approved and adopted by the council at its November meeting. The findings and recommendations contained in this report have been developed through a collaborative effort between stakeholders and have been reviewed by the department. Accordingly, the department is hereby forwarding the following report to Governor Hogan and the members of the Maryland General Assembly as required in HB 1200/SB 964 (2017), MSAR 11222.

### **Introduction**

The Maryland Aquaculture Coordinating Council evaluates laws, regulations and policies regarding interaction between shellfish aquaculture leases and submerged aquatic vegetation. Specifically, while Maryland does not allow new leases to be located within areas of recent submerged aquatic vegetation growth, once a lease is issued and submerged aquatic vegetation encroaches on approved grounds, a leaseholder is prohibited by law from placing shellfish, bags, nets or other structures on submerged aquatic vegetation. Accordingly, the state restricts the ability of leaseholders to engage in shellfish aquaculture activities within the areas of their leases where submerged aquatic vegetation has grown. There is growing concern that the state should have flexibility to assess interactions between shellfish aquaculture activities and submerged aquatic vegetation occurring on leases on a case-by-case basis to determine if a lease should be restricted or if aquaculture activities can continue based on impacts to submerged aquatic vegetation and leaseholders. In 2017, Maryland had 390 active shellfish leases with 49 of these (90 acres) being identified as having potential conflict with submerged aquatic vegetation growth.

### **Format and Workgroup Meeting Objectives**

The Aquaculture Coordinating Council developed the submerged aquatic vegetation workgroup to include scientists with expertise in submerged aquatic vegetation biology, benthic ecology, population dynamics and nutrient cycling. Leaseholders with active shellfish leases on both submerged land and water column leases were included along with members of environmental organizations. The membership decided to hold monthly meetings to be in a position to provide a report to the council before their November meeting. Members were asked to identify the top three issues to be addressed to evaluate conflicts that may arise from the interactions between shellfish aquaculture activities and submerged aquatic vegetation.

### **Membership of the Submerged aquatic vegetation Workgroup**

Workgroup members provided information on their areas of expertise as well as studies or practices to understand interactions between submerged aquatic vegetation and aquaculture. The following were members of the workgroup:

- Mr. Karl Roscher, Maryland Department of Natural Resources, Aquaculture and Industry Enhancement Division
- Ms. Rebecca Golden, Maryland Department of Natural Resources, Living Resource Assessment
- Dr. Reginal Harrell, University of Maryland
- Mr. Donald Webster, University of Maryland Extension; Chair, Aquaculture Coordinating Council
- Dr. J. Court Stevenson, University of Maryland Center for Environmental Science
- Dr. Jeffrey Cornwell, University of Maryland Center for Environmental Science
- Dr. Suzanne Bricker, National Oceanic and Atmospheric Administration
- Mr. Brian Russell, Shore Thing Shellfish, LLC
- Mr. William Cox, Honga Oyster Company
- Dr. Allison Colden, Chesapeake Bay Foundation
- Mr. Larry Jennings, Coastal Conservation Association
- Ms. Sarah Everhart, University of Maryland School of Law

### **Questions to Address**

The following questions were developed by workgroup members to identify issues relating to interactions between shellfish aquaculture and submerged aquatic vegetation to encourage productive discussions and aid in generating recommendations. Questions were consolidated from information submitted by members as many were similar in context:

- Submerged aquatic vegetation and oysters are included the bay model in varying degrees. What does the model say about the nutrient cycling value of each and do ecological services of submerged aquatic vegetation or oyster reefs differ significantly from each other?
- What shellfish aquaculture practices or activities (*e.g.*, deployment, gear maintenance, harvesting) have direct effects on submerged aquatic vegetation growth on leases?
- Will different approaches to oyster aquaculture affect the overall health of submerged aquatic vegetation expansion and is some level of localized impact acceptable depending on species, extent of submerged aquatic vegetation other benefits provided and the status of local submerged aquatic vegetation goals?
- What are critical times for aquaculture lease operations and submerged aquatic vegetation interaction and could we differentiate which species might need protection based on timing and sensitivity?
- How hard is it to harvest from grass beds without excessive disruption and are there Best Management Practices that could minimize effects of leasing activities to submerged aquatic vegetation?
- What is the probability that current Widgeon grass populations will be replaced by more permanent submerged aquatic vegetation species?
- Why can't oysters and submerged aquatic vegetation cohabit at the same time?
- If growers are prohibited from using part or all of their leases, can and should financial compensation be provided?
- Has this issue been addressed in Maryland's coastal bays and, if so, how?
- Can we judge economic loss if harvest occurs when submerged aquatic vegetation is absent in winter or early spring?
- What documentation is available on the problem in specific areas of the bay?
- How will evaluation of conflicts be changed if Virginia Institute of Marine Science aerial surveys are discontinued?

## **Presentations, Literature Reviews and Research Summary**

### **Submerged Aquatic Vegetation and Aquaculture Interactions**

Mr. Roscher and Ms. Golden provided a presentation and overview of Maryland's roles and responsibilities to protect submerged aquatic vegetation and lease law requirements with respect to submerged aquatic vegetation and compliance. They provided statistics on the number of submerged aquatic vegetation/lease conflicts during 2013-17 and information on types and number of restrictions placed on leases where submerged aquatic vegetation conflicts were verified.

### **Maryland Submerged aquatic vegetation: Review of Species, Habitat Preferences and Critical Time Periods**

Ms. Golden presented information on submerged aquatic vegetation biology, historical abundance, species distribution, environmental preferences and critical timing for growth and reproduction for species of concern.

### **Oyster Aquaculture Practices in the Maryland Portion of the Chesapeake Bay**

Dr. Bricker provided a study on oyster aquaculture practices that she and Mr. Matt Parker (University of Maryland Sea Grant Extension Program) conducted, which includes five sites from the Chester River to Tangier Sound. Types of oysters and culture methods studied included low salinity Louisiana strain (LOLA) triploid in bottom cages; LOLA triploid in floating cages; diploid spat on shell; Australian (*i.e.*, SeaPA) longline containers; and Taylor floats. Pros and cons of culture types were discussed such as biofouling tendencies, ease of management, oyster shape and speed of growth. Some harvest methods were explained including those by boat, on foot or by dredge.

### **Demonstration of Gear and Aquaculture Practices in Use in Maryland Waters**

Mr. Cox of Honga Oyster Company and Mr. Russell of Shore Thing Shellfish explained their operations and demonstrated the type of cages they use for their aquaculture businesses. They discussed the pros and cons of certain types of gear and explained how gear is arranged on their leases including separation between cages and lines.

### **Literature Review and Research Summary**

Hannah Catt and Melissa Stefun, University of Maryland Russell Brinsfield summer interns, provided a summary of their research, "Does oyster aquaculture have a detrimental effect on submerged aquatic vegetation growth, or is there a way to grow both in the bay?" The literature review and research summary included two recommendations to help inform the workgroup. This information will be helpful to experts, who can extrapolate information from the available data.

### **Literature Review of Impacts of Shellfish Aquaculture on Submerged aquatic vegetation in the Chesapeake**

Morgan State University PEARL staff literature of existing research exploring interactions between oyster aquaculture and submerged aquatic vegetation. The review shows gaps in research pertaining to gear used in the Chesapeake and indicates that little attention has been provided for husbandry activities, long term data and species recovery time. It shows no consistent metrics between studies quantifying impacts. However, the research shows that variability of the effect of shellfish aquaculture on submerged aquatic vegetation is partially due to differences in oyster density, gear type, temporal variability and spatial distribution.

## **Current Statutory and Regulatory Requirements**

Maryland law (Natural Resources Article Title 4, Subtitle 11A) prohibits shellfish leases from being issued in a submerged aquatic vegetation protection zone. These are defined as areas of submerged aquatic vegetation mapped in aerial surveys by the Virginia Institute of Marine Science in one or more of the five

years preceding application for a lease under this subtitle. It also states that a leaseholder may not place shellfish, bags, nets, or structures on submerged aquatic vegetation.

In addition, section 3.6 of Maryland Shellfish Lease Agreements, the contracts between the State of Maryland and the leaseholder authorizing use of state waters for shellfish aquaculture, states a lessee shall not (a) place shellfish, bags, nets or structures on submerged aquatic vegetation; (b) cover, dredge, or otherwise alter or destroy any submerged aquatic vegetation or tidal wetlands vegetation as a result of the operations or equipment used on the lease.

The state has also adopted water quality standards, Code of Maryland Regulations, COMAR 26.08.02.03-3, for clean water and stable aquatic habitats. Each Chesapeake Bay segment or tributary (i.e., river) has its own set of water quality standards which are designed to protect the aquatic habitats, including submerged aquatic vegetation, found within that segment (defined as designated use). Bay segments that historically or currently support submerged aquatic vegetation have a shallow water designated use category. A bay segment has attained the shallow water designated use if its submerged aquatic vegetation acreage meets or exceeds the submerged aquatic vegetation restoration goal acreage for that particular segment. For the most recent assessment period (2013-2015), 13 of the 61 (21 percent) Maryland segments with a shallow water designated use met or exceeded the standards for submerged aquatic vegetation acreage.

The law passed in 2017 (Senate Bill 964, Chapter 380) provides authority to the department to adopt regulations establishing standards and a process under which the department may assess and evaluate an aquaculture lease on which submerged aquatic vegetation has encroached, to determine if activity on the lease shall be restricted or prohibited due to the circumstances of the encroachment. This law remains in effect until May 31, 2018.

### **Findings**

The findings of the submerged aquatic vegetation workgroup, after due consideration of all factors, are:

#### Literature Reviews

Members discussed literature reviews conducted by Morgan State University Patuxent Environmental and Aquatic Research Lab staff and University of Maryland Russell Brinsfield Interns and found that the literature does not specifically focus on the types of gear used in Maryland or the prevalent species of submerged aquatic vegetation in lease areas. However, it does provide a general overview of impacts to underwater grasses associated with aquaculture gear and leasing activities. Included in the reviews are the following summary points:

- Multiple factors can influence the effect of shellfish culture on surrounding submerged aquatic vegetation and no specific culture method has only positive or only negative effects.
- A mutually beneficial system between shellfish aquaculture and submerged aquatic vegetation is achievable and depends on variables including bottom shading, spatial distribution of gear and the percent of bottom not occupied by shellfish.

#### State Law

Natural Resources Article Title 4, Subtitle 11A provides explicit prohibitions on issuing leases in submerged aquatic vegetation protection zones and restricts leaseholders from placing shellfish or structures on submerged aquatic vegetation. Consequently, leaseholders have been restricted from working in areas of their existing leases where submerged aquatic vegetation has become established after having the leases issued.

However, Natural Resources Article, §4-213 provides a process for the department to authorize or prohibit the removal or eradication of any species of submerged aquatic vegetation or combination thereof for any purpose, including facilitation of boating access. Further, this section exempts activities involved in the harvesting of fish, shellfish or crabs.

The law passed in 2017, Chapter 380 (Senate Bill 964) requires the department to study the conflicts that arise related to aquaculture and submerged aquatic vegetation, and develop solutions to conflicts taking into account benefits provided by both submerged aquatic vegetation and shellfish. This law also provides the department with authority to adopt regulations establishing standards and a process by which the department may assess and evaluate an aquaculture lease where submerged aquatic vegetation has encroached.

#### Points of Agreement between the Majority of Members

The literature reviews conducted, presentations provided at monthly meetings of the workgroup and expertise of its members provided the basis for structured, detailed discussions and understanding of interactions between submerged aquatic vegetation and shellfish aquaculture activities on leases.

Accordingly, members agreed to the following summary points:

- Shellfish aquaculture and submerged aquatic vegetation both provide ecological services and both rely on good water quality to thrive
- Aquaculture and submerged aquatic vegetation can be mutually beneficial and will coexist in proximity to each another
- If current legislative language was changed it would provide the department with explicit discretion when addressing submerged aquatic vegetation conflicts on existing leases
- Research is needed to address gear types and interactions specific to Maryland waters
- Metrics need to be developed for spatial distribution, density of gear used and for shell planting and dredging in areas on leases where submerged aquatic vegetation has grown to assist in establishing regulatory requirements
- Best Management Practices need to be developed for use in establishing industry standards that will reduce the potential impacts to submerged aquatic vegetation on shellfish leases

#### Possible Solutions

Submerged aquatic vegetation workgroup members participated in six meetings over a six-month period. Members were provided with a summary of current state legal requirements to protect submerged aquatic vegetation; two literature reviews detailing past research on submerged aquatic vegetation and aquaculture interactions; presentations on submerged aquatic vegetation biology, growth, distribution and critical factors impacting growth and reproduction; and demonstrations of commonly used aquaculture gear/equipment and lease activities. Members used this array of information to engage in discussions regarding the development of solutions to assist in resolving conflicts arising when submerged aquatic vegetation encroaches into areas approved for leasing. These points of agreement were used to narrow the focus of submerged aquatic vegetation workgroup recommendations to the three topics that would be most beneficial in developing long term resolution to conflicts when implementing policies to protect submerged aquatic vegetation and promote shellfish aquaculture. The options could be implemented in a limited or comprehensive approach.

The workgroup respectfully submits the following solution options for recommendation:

##### **Option 1. Modify Existing Statutory Language**

- a. Natural Resources Article, §4-11A-10 (c)(1) establishes that a leaseholder may not place shellfish, bags, nets, or structures on submerged aquatic vegetation. If this provision is changed it would provide the department with the flexibility to review



aquaculture lease and submerged aquatic vegetation interactions on a case-by-case basis to determine if restrictions should be placed on the lease or if activities can continue based on comprehensive evaluation of actual impacts associated with activities.

To provide discretion to the department, §4-11A-10 (c)(1) could be changed to:  
(c) Prohibited activities. –A leaseholder may not:

(1) Place shellfish, bags, nets, or structures on submerged aquatic vegetation without receiving prior written approval from the department.

- b. A model supporting this action already exists in Natural Resources Article §4-213 which establishes a process for the department to authorize or prohibit the removal or eradication of any species of submerged aquatic vegetation by approving a plan submitted by an applicant. While this recommendation is not endorsing the removal or eradication of submerged aquatic vegetation on shellfish leases, a process similar to that specified in §4-213, could be used as the basis for developing regulations regarding the content and approval of the plan submitted by the leaseholder.
- c. In addition, Section 3.6 of the existing Shellfish Lease Agreement would have to be revised to reflect changes made to statutory language in the Aquaculture subtitle.
- d. Statutory language prohibiting the issuance of new leases in submerged aquatic vegetation protection zones should remain as it stands to proactively avoid submerged aquatic vegetation/lease conflicts where possible.

## **Option 2. Pursue Funding to Conduct Targeted Research**

- a. Research could be conducted with the goal of assessing actual effects to submerged aquatic vegetation produced by the activities and gear/equipment used by Maryland shellfish growers. As stated, there are gaps in existing research regarding species of submerged aquatic vegetation and equipment and/or practices used in Maryland. The goal of this research should be to identify scientific metrics to be used to inform equipment placement, spatial distribution, and responsible harvesting and maintenance activities. Conducting targeted research is a priority action which is integral to addressing these conflicts.
- b. The following suggestions would help obtain quantitative information regarding the success and value of oyster aquaculture juxtaposed or contained within expanding submerged aquatic vegetation beds:
  - What are the ecosystem service values of oyster operations, independent of submerged aquatic vegetation beds, regarding biodiversity, community ecology and water quality improvement? What differences in ecosystem services exist when they are contained within submerged aquatic vegetation populations? Similarly, which is ecologically more valuable - submerged aquatic vegetation or oyster reef operations and, if there a difference, why?
  - Are submerged aquatic vegetation populations more abundant/dense when in conjunction with oyster operations?
  - What form of oyster production operations are least competitive with submerged aquatic vegetation? Which, if any, are most competitive?

- Do certain types of oyster culture operations interfere with submerged aquatic vegetation propagules for future growth and expansion, or, alternatively, do certain oyster operations enhance or protect submerged aquatic vegetation propagules?
- Are there submerged aquatic vegetation species more susceptible to establishment juxtaposed or contained within existing oyster operations?
- With regard to submerged aquatic vegetation conflicts on the lease, is there a threshold (%) of lease that can be occupied by seagrass above which use would be limited? Related to encroachment, what is the effect on associated water clarity? Could encroachment be alleviated in some locations using leases at greater depths?

**Option 3. Identify Metrics and Establish Best Management Practices**

- a. The department could use information and data generated from ongoing research to work in consultation with other stakeholders (submerged aquatic vegetation experts and shellfish aquaculture industry representatives) to identify metrics regarding shellfish aquaculture spatial distribution, density, maintenance and harvesting activities to guide aquaculture practices that have minimal effect on submerged aquatic vegetation. These metrics will be used to develop Best Management Practices for the industry to implement and to establish regulatory criteria for the department to use in addressing submerged aquatic vegetation/leasing conflicts on a case-by-case basis.

**Option 4. Review Implemented Changes Periodically**

- a. Regulatory changes and policies implemented in response to this effort could be considered a “work in progress” as it will take time to conduct the research and develop comprehensive criteria that address submerged aquatic vegetation and leasing conflicts specific to Maryland waters. Accordingly, a review of the regulations, policy changes and Best Management Practices is recommended to be conducted by the department and the Aquaculture Coordinating Council at five year intervals. The review needs to take into consideration the overall impact to submerged aquatic vegetation, which can be directly attributed to leasing activities, and the impact to shellfish aquaculture leaseholders and/or leasing activities, resulting from actions taken to address submerged aquatic vegetation conflicts.

**Acknowledgements**

The submerged aquatic vegetation workgroup thanks Morgan State University Patuxent Environmental and Aquatic Research Lab staff and University of Maryland, Russell Brinsfield summer interns, Melissa Stefun and Hannah Catt, for their work in conducting literature reviews. The information was integral to completing this task. We also extend our appreciation to the Maryland Aquaculture Coordinating Council for assembling the group and providing the members with the opportunity to become engaged in this effort.