



## **SHELLFISH ADVISORY PANEL**

**9:30AM**

**Thursday, March 2, 2023**

**Via Zoom**

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1. Introductions and Remarks (9:30 – 9:45)
  - a. Director's Remarks
  - b. Review of March 2, 2023 Business Meeting Agenda
  - c. Review and Approval of November 15, 2022 Draft Business Meeting Minutes
2. Update on Bulk Tagging Considerations (9:45 – 10:15)
3. ISSC 2023 Biennial Meeting Proposals (10:15 – 11:00)
4. Surf Clam Management Update (11:00 – 11:30)
5. Sub-Committee on Municipal Aquaculture Site License Transfers (11:30 – 11:45)
6. Other Business (11:45 – 12:00)
  - a. Panel Member Comments
  - b. Public Comments
  - c. Adjourn

**SHELLFISH ADVISORY PANEL**  
**NOVEMBER 15, 2022**  
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**HANOVER, MA**

**In attendance:**

*Shellfish Advisory Panel:* Daniel McKiernan, Chair (DMF); Lisa Rhodes (DEP); Sean Bowen (DAR); Jim Peters (Indian Affairs); Eric Hickey (DPH); Josh Reitsma, Allen Rencurrel, Dale Leavitt, Renee Gagne, Ron Bergstrom, Jim Peters, Steve Kirk, Alex Hay, Bill Doyle. *Absent:* Jim Abbot; Bob Colby; Amy Anne Croteau; Michael DeVasto; Mike Trupiano; Lisa Engler (CZM); and House and Senate Chairs on Environment, Natural Resources, and Agriculture

*Division of Marine Fisheries:* Kevin Creighton, Jeff Kennedy, Chrissy Petitpas, Tom Shields, Jared Silva, and Matt Camisa

*Members of the Public:* Mark Begley

**INTRODUCTIONS AND ANNOUNCEMENTS**

DMF Director Daniel McKiernan, who serves as the Shellfish Advisory Panel's (SAP) Chair, called the November 15, 2022 business meeting to order. He provided a brief history of the SAP and an overview of their mission and purpose. He explained his intention to convene the SAP at least three times annually (winter, fall, and spring) to brief the public body on the status of DMF's Shellfish Program, critical shellfish management issues in Massachusetts, and happenings at the Interstate Shellfish Sanitation Conference (ISSC).

Today's meeting would feature: an update on the Special Review Procedure (SRP) for Massachusetts Environmental Protection Act (MEPA) review of aquaculture siting; a report from the SAP's Bulk Tagging Sub-Committee; discussion on the upcoming ISSC meeting in March 2023; and a briefing on a series of issues being worked on by DMF's Shellfish Program.

**REVIEW OF NOVEMBER 15, 2022 BUSINESS MEETING AGENDA**

No changes to the agenda were requested.

**REVIEW AND APPROVAL OF MAY 20, 2022 DRAFT BUSINESS MEETING MINUTES**

There were no changes to the draft May 20, 2022 SAP business meeting minutes. **Dale Leavitt made the motion to approve the May 20, 2022 business meeting minutes. Ron Bergstrom seconded the motion. The motion passed unanimously.**

## **SPECIAL REVIEW PROEDURE FOR MEPA REVIEW OF AQUACULUTRE SITING**

Chairman McKiernan reminded the SAP they reviewed the draft SRP at the May 20, 2022 business meeting. The draft document was filed in the August 2022 Environmental Monitor. Six comments were received. The comments were generally supportive of the process, but there was some additional interest in further streamlining the process to a single application. DMF was skeptical the process could be rendered down to a single application, particularly given federal oversight by the Army Corps of Engineers (USACE).

The final SRP was adopted by MEPA on September 9, 2022. There was one change from draft to final and this was to include eel grass maps as part of the SRP filing. GIS shapefiles depicting DEP's eel grass maps are contained in the online ShelfAST tool and can be used to meet this requirement.

The SRP is currently valid for only one year and will expire on September 9, 2023. During the interim period, the various state agencies involved in this process will review it and determine if it should be adopted on a more permanent basis. DMF highlighted one potential issue with its formal adoption is the ability to assess cumulative environmental impacts of aquaculture.

Chrissy Petitpas provided some additional details on how the SRP process streamlines MEPA aquaculture siting. For projects up to two acres, and only a DMF action is required, then MEPA can follow the SRP and a formal MEPA review is not required. For projects greater than two and less than 10 acres, and only a DMF action is required, then an alternative aquaculture description form is sent to MEPA for review—this is a paired down version of the ENF filing process. If the project is 10 acres or more, or requires an additional state action (e.g., c. 91 permitting), then the full MEPA ENF filing process is required.

Chrissy also noted that through the development of the SRP it came to the state's attention that DEP requires c. 91 permitting of bottom anchored gear that is set year-round. There remains uncertainty as to how to address this matter. Additionally, DMF and MEPA are working on several nuanced issues related to environmental justice review.

Chairman McKiernan asked Chrissy to further explain the two-acre threshold for SRP review. Chrissy explained that most new aquaculture sites in Massachusetts are between one and two acres, so in most cases the SRP will cover these new sites. However, larger and more intensive projects would still be subject to more extensive MEPA review and public processes.

Josh Reitsma and Seth Garfield raised concerns about potential c. 91 permitting for aquaculture projects. Chrissy acknowledged it would be a heavy lift to get all existing year-round operations permitted and she was uncertain as to how this may impact

existing grant holders. DMF was working with DEP to better understand potential impacts.

The Chairman took comment from the public. Mark Begley stated his interest in a single application process for the Commonwealth. DMF and DEP were hopeful the process could be streamlined into a single state application. However, it was noted that even if this were to occur it's likely federal and municipal governments would retain their separate applications.

## **REPORT ON BULK TAGGING SUB-COMMITTEE**

Chairman McKiernan stated an early priority established by the SAP was for the Commonwealth to further investigate expansion of bulk tagging allowances. At present, bulk tagging is only authorized for aquaculturists who are wholesale dealers and acting as the primary buyer for their own product. Accordingly, Dan established a sub-committee of the SAP to help the state work on the issue. The sub-committee included Alex Hay, Amy Croteau, Bill Doyle, Michael DeVasto, Seth Garfield, Dale Leavitt, Sean Bowen (DAR), and Michael Moore (DPH). The sub-committee met on November 9, 2022 to address this issue. DMF was now turning to the full SAP to review the sub-committee's work and provide feedback to DMF to inform final decision making for 2023.

DMF shellfish policy analyst, Tom Shields, was tasked with coordinating DMF's review of the bulk tagging question and the SAP's Bulk Tagging Sub-Committee. Tom surveyed other coastal states regarding their allowances for bulk tagging. The results of this survey were shared with the sub-committee and are described in detail in the November 4 memo. The sub-committee then reviewed the concepts shared by other states at their November 8 meeting. Tom stated the sub-committee's preference was to explore expanding bulk tagging opportunities for aquaculturists only and to consider a program model similar to what is allowed in Maine and Rhode Island.

DMF Shellfish Program Lead, Jeff Kennedy, added that DMF could potentially expand bulk tagging opportunities for harvesters through a pilot program implemented by a Letter of Authorization and Statement of Permit Conditions. A pilot program enables DMF to be nimble, address issues as they evolve, and fine tune the program in real time. On the dealer end, DPH needed further time to review its regulations and determine how a potential program could be accommodated. Eric Hickey suggested there may be a framework to do so through Intermediate Processing Plans.

Alex Hay thought expanding bulk tagging would ease the regulatory burden on harvesters. However, he expressed concerns that it may negatively impact traceability in commerce and create complications for wholesale dealers. Alex thought DMF's approach to the subject was thoughtful and he was optimistic a viable program could be developed.

Sean Bowen asked if DPH could authorize the activity through critical control points in the dealer HACCP plans. Eric Hickey stated there may be several ways for DPH to authorize the activity, but Intermediate Processing Plans were likely the best option.

Dan McKiernan asked if there was consensus among the SAP that any pilot program should be limited to shellfish aquaculturists and not include wild harvesters. There were no objections. Alex Hay noted that wild harvesters may fish multiple shellfish growing areas during a single tide, which would complicate bulk tagging.

### **INTERSTATE SHELLFISH SANITATION CONFERENCE UPDATE**

Jeff Kennedy reviewed the structure of the ISSC and explained how the body functions. The Conference meets biennially to review ongoing proposals and new proposals addressing shellfish sanitation. New proposals are sent to task forces where committees or work groups may be assigned to further study the question. Then, once the work is complete, the task force makes a recommendation to the General Assembly who votes on the recommendation. If the US Food and Drug Administration (FDA) does not concur with the General Assembly then the issue is sent to the Executive Board for resolution. Eric Hickey represents the regulatory interests of Region I (RI-ME) on the Executive Board. Eric Hickey then further detailed the interface between the Executive Board and the General Assembly.

The ISSC was scheduled to meet in Baton Rouge, LA from March 18, 2023 through March 24, 2023. Jeff reviewed the various task forces, committees, and sub-committees that are expected to meet. New proposals were due to the ISSC by close of business on November 18, 2022. The SAP would review relevant ISSC proposals at their late winter meeting in advance of the March conference.

### **FDA 2022 PEER AND RARM REVIEWS**

FDA conducts an annual Program Element Evaluation Report (PEER) for each coastal state's shellfish sanitation program. For DMF, this includes a review of the so-called "Growing Area Classification Element." For 2022, FDA focused on shellfish growing areas in Buzzards Bay and Chatham where there are classification issues related to mooring areas and wastewater treatment plants.

FDA recently provided the draft 2022 Peer to DMF. Jeff Kennedy did not see many areas of substantial concern. The peer highlighted two deficiencies that DMF was able to readily address. Additionally, eighteen other areas were highlighted by FDA as new and emerging areas of concern for DMF to begin to work to address.

One of the bigger emerging challenges is related to the frequency of water quality sampling and DMF's designation of certain growing areas as so-called "remote areas". There are more than 300 growing areas in Massachusetts and DMF designates about

40 shellfish of these areas as being remote. Many of these areas are difficult for DMF staff to routinely access (e.g., waters around Nantucket and Martha's Vineyard, Outer Cape Cod). With a remote area designation, DMF is only required to sample water quality twice per year, rather than five times. FDA is questioning the remote classification of most of these areas. If these areas were to lose their "remote" status, it would become difficult for DMF's shellfish classification program to adequately sample the area. Accordingly, DMF may have to close certain areas that cannot be sufficiently sampled.

Dan asked about FDA's evaluation of Chatham waters, particularly as it pertains to the impact of mooring areas on growing area classifications. Jeff stated Chatham is likely going to be the standard for how to address potential mooring area challenges. Ron Bergstrom provided a brief history on how Chatham developed its mooring area rules.

Steven Kirk asked about the status of DMF's shellfish classification program. Matt Camisa stated DMF currently has eight full-time classification biologists. Five are dedicated to sampling the South Coast, South Shore, Cape and Islands and three are dedicated to the North Shore. Jeff Kennedy stated that staff are currently maxed out maintaining existing shellfish growing classifications. Expanding sampling, particularly for offshore sites, poses a substantial resource challenge.

Jeff added New Bedford's wastewater treatment plant evaluation will likely trigger a reclassification of many areas in Buzzards Bay and around the Elizabeth Islands. The reclassification of certain areas from "Approved" to "Conditionally Approved" will require monthly sampling. Jeff noted Massachusetts' shellfish growing areas are small when compared to other states. Alex Hay and DMF staff then discussed the potential for DMF to reclassify current growing areas into larger growing areas to reduce the sampling burden.

Seth Garfield asked about the length of shellfish closures in Buzzards Bay related to the discharge from New Bedford's combined sewage overflows. Jeff stated that FDA requires a baseline 21-day closure for raw sewage overflows. DMF was looking to use Male Specific Coliphage (MSC) testing to determine if the state could justify a shorter closure period. DMF intended to discuss this work in greater detail under the next agenda item.

Similar to the PEER Review, FDA also conducts an annual review of the state's *Vp* Control Plan. This is referred to as the *Vp* Risk Assessment and Risk Management Evaluation (RARM).

Chrissy Petitpas addressed the harvester side of this year's RARM. She indicated FDA only highlighted one issue. This issue pertained to the use of residential ice machines and the ability to inspect these machines to ensure conformity with sanitation requirements (e.g., backflow prevention, cleaning, food grade tubing). To address this, DMF has required the submission of affidavits and schematics; however, FDA continues to want the states to conduct on-site inspections.

Eric Hickey addressed the dealer side of this year's RARM. The first issue was related to truck refrigeration. Massachusetts' *Vp* Control Plan relies on icing at harvest to cool shellfish and then shellfish are required to be brought down to temperature at the dealer facility within 10-hours. Trucks are used principally to keep product cold, not to cool product. However, FDA was concerned that trucks were accepting product before they were at temperature. In some instances, trucks had to idle for 45 minutes before they reached the temperature standard. Second, there was some concern that individual dealer HACCP plans were not up-to-date with the current *Vp* Control Plan. Lastly, DPH may need to adjust its protocols/documentation for reporting *Vp* and other shellfish-borne illnesses (e.g., norovirus).

On the trucking issue, Alex Hay noted that dealer trucks are heading back and forth from the dealer facility to the landing site. Accordingly, they were not running for the extended periods of time necessary to bring refrigeration down to temperature to chill shellfish. Rather, chilling was accomplished by icing and then at the dealer facility. Eric agreed and added that Massachusetts also has idling laws that may prevent a dealer from running the vehicle as necessary to bring the refrigerator unit down to temperature.

Chrissy and Eric then briefly discussed the 2022 *Vp* season. FDA was generally satisfied with the way Massachusetts handled *Vp* outbreaks. While there were a large number of *Vp* illnesses this year, most of them involved oysters from a variety of sources and growing areas. Accordingly, DMF did not need to close any areas due to *Vp*. Chrissy then briefly discussed *Vp* surveillance work with the University of New Hampshire being funded by an FDA grant.

Seth Garfield asked about *Vp* in quahogs. Chrissy stated there was one confirmed case in 2022. This was likely the result of quahogs harvested for personal consumption and temperature abuse likely occurred. Seth asked if this may lead to a potential *Vp* Control Plan for quahogs. Chrissy stated this was not yet a concern as DMF has not had to close any areas due to a *Vibrio* outbreak in quahogs. Chrissy added that she would share DMF's *Vp* risk assessments for oysters and quahogs with the SAP.

Jim Peters questioned how information regarding best handling practices was conveyed to the recreational fishing public and tribal members. Director McKiernan explained that DMF relies on municipalities to educate and manage recreational fisheries. Renee Gagne noted Chatham provides education information to recreational harvesters with their permit. Dan noted this may be an issue for tribal members because they are not required to obtain municipal permits, so they do not have this opportunity to interface with the local agent and obtain educational materials. Chrissy noted this was an area for enhanced education and outreach.

Alex Hay, Eric Hickey, and Chrissy Petitpas discussed potential public health risk posed by *Vv* and shellfish consumption. Eric Hickey noted it is uncommon to traceback *Vv* illness to shellfish consumption.

Seth Garfield and Eric Hickey discussed shellfish recall protocols for *Vp.* outbreaks. Eric described how ISSC is used as a clearing house to distribute information.

Chrissy and Eric also noted that FDA reviewed DMF and DPH's handling of the DSP bloom in Nauset estuary this past summer and were satisfied with how it was handled by both agencies.

## **WASTEWATER TREATMENT PLANT MODELING AND MSC STUDY UPDATE**

Chairman McKiernan provided some background information on this agenda item. Recent FDA Peers have focused on growing area classification around wastewater treatment plants. FDA requires the area around the outfall be classified as Prohibited and closed to shellfish fishing until a 1,000:1 dilution standard can be met. In many instances, this produces substantial spatial closures. This has been an area where DMF's shellfish classification program has been found deficient, and as a result, DMF has been required to downgrade classifications and close certain adjacent waters. As a result, there is substantial interest in developing site-specific data that may allow for the application of a lesser dilution standard thereby avoiding potentially large spatial closures.

DMF has contracted out work to Dr. Chen at the University of Massachusetts School for Marine Science and Technology to model local hydrography and the distribution of effluent from the wastewater treatment plants. Then the accusation of MSC in effluent in surrounding areas is being measured as an indicator of risk. Based on MSC concentrations, another dilution standard may be applied and when modeled this may reduce the spatial extent to which shellfish fishing may be impacted.

Jeff Kennedy provided a brief presentation on the work done for the North and South Rivers. DMF anticipates it may be able to use a 300:1 dilution standard for the Scituate wastewater treatment plant. This may allow DMF to open areas of the North and South River in the wintertime. This same approach will be applied to other growing areas adjacent to wastewater treatment plants. However, the extent to which this may impact the scale of closures may be influenced by how the sewage is treated; UV plants (like Scituate) reduce the presence of MSC to a greater degree than plants that use chlorine (like New Bedford).

Steve Kirk asked how other states were addressing this challenge. Jeff explained that Massachusetts is unique given its urban coastline and the volume of effluent being pumped out into near coastal waters by wastewater treatment plants. Accordingly, DMF was on the cutting edge of developing new tools to better assess risk and scale shellfish closures.

There was some discussion among the SAP members and DMF staff about performance standards and using tools such as citizen's science and in situ monitoring.



## **SURF CLAM MANAGEMENT UPDATE**

Chairman McKiernan provided some background information regarding the history of Provincetown's efforts to limit surf clam dredge fishing in waters around Herring Cove through its Conservation Commission and municipal Wetlands Protection Act authority. In recent weeks, a surf clam fishing interest filed a Notice of Intent (NOI) with the town to conduct dredge fishing activities in the regulated area. DMF was concerned about the precedent this may set for this fishery and asked the applicant to petition the town for a continuance on the review of its NOI application.

In the interim, DMF wanted to rekindle discussions with DEP and other personnel from the Secretariat of Energy and Environmental Affairs regarding how to best address this issue and harmonize regulatory authorities. Dan was also hopeful that the Provincetown Center for Coastal Studies would release their study into the impacts of surf clam dredging in Herring Cove.

Allen Rencurrel stated the area off Herring Cove was productive to surf clam dredging. He also did not expect the local attitude to the surf clam question would change and advocated a state action to solve the management issue.

Alex Hay stated he attended local Conservation Commission meetings on the subject and reported that there was some confusion regarding the fishing gear, specifically that hydraulic dredge gear was being misconstrued as being similar to hydraulic excavation gear used to dig channels.

Ron Bergstrom asked if the state had discussed this with municipal authorities. Dan stated DMF was waiting for the CCS study to be presented. McKiernan was hopeful the study would shed some light on the potential issues at play in Herring Cove and would inform future decision making. Ultimately, DMF was interested in resolving the authority issue at the state level and then working with the municipality to address relevant environmental concerns through DMF regulation.

Dan further discussed the NOI application with Lisa Rhodes from DEP. Lisa suggested DMF reach out to DEP's Southeast Regional Office to coordinate further discussions.

Jared Silva, Dan McKiernan, and Ron Bergstrom then discuss home rule over shellfish and how this does not apply to the commercial surf clam fishery.

## **OTHER BUSINESS**

Steve Kirk provided an update on The Nature Conservancy's (TNC) oyster reef restoration program in Massachusetts. With the collapse of the oyster market during COVID, DMF enabled TNC to purchase oysters from growers for restoration purposes. TNC was interested in more broadly pursuing restoration projects in Massachusetts and the USDA's Natural Resource Conservation Service is willing to fund the work. This

model was previously used in Rhode Island where it was well received. TNC was now looking to identify potential restoration sites in Massachusetts.

Chairman McKiernan asked if TNC had any communities in mind. Steve stated they have parameters for what constitutes a good site, but do not have a list of communities. Steve noted TNC needs to engage with stakeholders to flush out a potential project. Effectively, they would like to build a playbook for how to identify sites; have municipalities apply to DMF to conduct the restoration project; and obtain, relay, plant oysters. Dan and Steve then discussed state law and how it may limit the ability for a municipality to close an area for restoration.

Seth Garfield asked about the ability for DMF to reconsider the direct icing standards in the *Vp*. Control Plan. Chrissy Petitpas noted this is something DMF can consider for the future but is not likely something that can be accomplished for 2023. Eric Hickey suggested harvesters use an ice slurry. This method is less prescriptive than direct icing and is more effective for rapid cooling. Eric and Chrissy then provided some additional background. FDA requires there be enough ice to immediately begin cooling. However, when implementing the *Vp*. regulations, industry sought a more prescriptive direct icing metric to ensure compliance and codify best practices. FDA's best guidance for direct icing was to ice the bottom of the container and they layer ice between bags. Based on this, DMF established the standard of two inches of ice around bottom and sides of the container and three inches of ice between and on top of the bags.

Bill Doyle asked about the possibility for DMF to reconsider the seasonal (July 1 – September 15) one-hour time-to-icing requirement for the Three Bays and Katama Bay. Bill noted other areas of the state have a two-hour time-to-icing requirement. Chrissy and Eric agreed this is a prescriptive aspect of the state's *Vp*. Control Plan and DMF likely cannot amend the rule, as it was required based on seasonal *Vp*. illness outbreaks from these areas. Ron Bergstrom asked how these standards were developed. Chrissy stated the standards were based on work conducted by her predecessor, Chris Schillaci.

Eric Hickey noted the state's oyster industry has had its challenges with the implementation of the *Vp*. Control Plan over the years. However, the industry is seen as a leader nationwide. Jeff Kennedy added that despite some of the difficulties with the *Vp*. Control Plan, the oyster aquaculture industry is growing and doubled in size over the past five years. Alex Hay acknowledged that some of the *Vp*. Control Plan requirements are demanding, but it has been to the benefit of the industry; Massachusetts produces a high quality of product with a strong reputation. Industry has also effectively controlled *Vp*. illnesses and ameliorated potential loss of consumer confidence and insulated harvesters and dealers from litigation stemming from such illnesses.

Bill Doyle asked about the potential cost for Massachusetts to invest in a *Vp*. lab to better identify *Vp* strains. Chrissy Petitpas stated this is not a pressing need for Massachusetts, as UNH's lab is sufficient to conduct this work. Renee Gagne noted that

while enhanced lab capacity may not be a critical need for *Vp.*, it is likely a critical need for biotoxin monitoring. Ron Bergstrom discussed potential lab capacity in Barnstable County. Steve Kirk noted enhancing in-state lab capacity was a goal set forth in the MSI's Strategic Plan and it was something the SAP should advocate for.

### **MEETING DOCUMENTS**

- November 15, 2022 Business Meeting Agenda
- May 20, 2022 Draft Business Meeting Minutes
- Shellfish Advisory Panel Bulk Tagging Sub-Committee Memo
- Certificate Establishing a Special Review Procedure for Aquaculture
- 2022 FDA Peer Review of the Growing Area Classification Element
- 2022 FDA Program Element Evaluation Report of the Risk Assessment and Risk Management Element

### **UPCOMING MEETINGS**

9:30AM  
March 2, 2023  
via Zoom



# The Commonwealth of Massachusetts

## Division of Marine Fisheries

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Commissioner

DANIEL J. MCKIERNAN  
Director

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### MEMORANDUM

TO: Shellfish Advisory Panel (SAP)

FROM: Daniel J. McKiernan, Director

DATE: February 27, 2023

SUBJECT: **Decision on Bulk Tagging Pilot Program for Shellfish Aquaculturists**

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#### Decision

I do not intend to move forward with a pilot program to allow shellfish aquaculturists to bulk tag market bound product. I understand the potential benefits such an allowance may provide to shellfish aquaculturists, particularly given the cumbersome seasonal time-to-temperature controls required by the state's *Vp* Control Plan. However, state regulators at the Division of Marine Fisheries (DMF) and the Department of Public Health (DPH) have to balance these benefits with potential impacts the change may have on other seafood industry stakeholders; public health, seafood traceability, and product recall; and enforcement and compliance. After a thorough review, I have determined expanding bulk tagging opportunities would likely shift the enforcement and compliance burden from commercial fishers to primary buyers<sup>1</sup>; weaken the public health protections afforded through shellfish traceability and recall; and result in larger quantities of shellfish subject to potential seizure and disposal. The negative impacts this would have on the Commonwealth's seafood industry are disproportionate to the benefits it would provide to a select group of commercial shellfish aquaculturists.

While I do not support expanding current bulk tagging allowances for commercial fishers, I do support other initiatives to make commercial shellfish harvest and handling practices more efficient to the benefit of the industry.<sup>2</sup> There are emerging systems (e.g., Bluetrace) that allow for shellfish tags to be printed on waterproof paper directly from a smart phone while in the field. Enhancing the accessibility and affordability of such technologies would enable commercial fishers to more efficiently tag product—particularly during the *Vp* control season when there are tight time-to-temperature controls—without negatively impacting the benefits of the current tagging program. DMF is available to assist in such an effort, and if supported by the industry, we would endeavor to seek financial support (working with our state partners at the Massachusetts Department of Agricultural Resources) for the industry to obtain this technology.

#### Background

The National Shellfish Sanitation Program's (NSSP) Model Ordinance (MO) requires the tagging of shellstock throughout commerce allowing for product to be traceable from the harvester to the consumer.

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<sup>1</sup> Primary buyers are those wholesale seafood dealers who are authorized to purchase shellfish directly from commercial shellfish fishers.

<sup>2</sup> Encouraging the use of emerging tagging technology at point-of-harvest is consistent with actions recommended in the Massachusetts Shellfish Initiative's Strategic Plan (Goal 3.3).

Accordingly, in the event of shellfish related illnesses, tagging plays a crucial role in determining the origin of the product and aiding potential recalls. Pursuant to its authority under state law (G.L. c. 130, et seq.), DMF regulates shellfish tagging by commercial fishers (inclusive of both wild harvesters and shellfish aquaculturists) at 322 CMR 16.05(2)(c). DPH then regulates the tagging of shellfish at seafood dealers under their regulations at 105 CMR 500.021. With one limited exception for so-called “grower-dealers”<sup>3</sup>, DMF and DPH regulations require commercial fishers tag each container of shellfish and prohibit primary buyers from purchasing shellfish directly from commercial fishers unless each container is individually tagged. These regulations are consistent with the MO and ensures Massachusetts shellfish product may be sold into interstate commerce.

Bulk tagging is a practice whereby a commercial fisher may apply a single shellfish harvester tag to a lot (e.g., tote, vat, wrapped pallet) of shellfish harvested from the same shellfish growing area, on the same date, and with the same time of harvest. Bulk tagging represents a potential alternative to applying a single shellfish harvester tag to each container in the lot. Bulk tagging is authorized by the MO, provided it sufficiently identifies the origin and harvest date of each individual container within a lot and there is no opportunity for co-mingling of other shellfish product within a lot. Bulk tagging is favored by some commercial fishers because it reduces the regulatory burden (i.e., frequency of tags required), and in turn, makes commercial shellfish harvest and handling activities more cost and time efficient. This is particularly important during the *Vp* control season when commercial fishers are required to ice all market-bound oysters within 1-2 hours of first exposure.

In 2016, DMF initiated a pilot program to allow grower-dealers buying their own cultured product to bulk tag shellfish during transport from the landing site to their dealer facility. Bulk tagging for this sector involves only product harvested at a single time of harvest, by a single aquaculturist operating within a single growing area, and transporting this product directly to their own wholesale dealer facility. This pilot program was considered successful as it reduced the regulatory burden on industry without creating new enforcement and compliance challenges. It was codified in regulation in 2019 at 322 CMR 16.05(2)(c). To date, only shellfish aquaculturists participating in oyster culture have partaken in the program; DMF has not issued Bulk Tagging LOAs to any grower-dealer operation involving the culture of other shellfish species (e.g., bay scallops or quahogs).

With the success of the grower-dealer bulk tagging program, there was interest in DMF investigating the opportunity for other commercial fishers to bulk tag shellfish. In fact, this issue was identified as a priority by the SAP at their inaugural November 2021 business meeting. Accordingly, DMF developed a comprehensive approach to evaluating such an allowance. At the March 1, 2022 SAP business meeting, DMF initiated a sub-committee of SAP members to help the agency investigate the potential to expand bulk tagging allowances<sup>4</sup>. Then during the summer and fall of 2022, DMF surveyed other coastal states to better understand their shellfish tagging programs and bulk tagging allowances, should they exist. DMF then convened a virtual meeting of the Bulk Tagging Sub-Committee on November 9, 2022 to review this survey work and begin to discuss how it may be applicable in Massachusetts. The sub-committee’s preference was for DMF to consider the models established in Maine and Rhode Island and explore initiating a bulk tagging pilot program for aquaculturists who are not wholesale dealers. DMF reviewed these findings with the full SAP at their November 15, 2022 business meeting and there were no objections to this approach. Over the winter, DMF held a series of impromptu conversations with primary buyers, a virtual public stakeholder scoping meeting, and internal state government meetings with colleagues at DPH and the Massachusetts Environmental Police (MEP). These conversations provided me with a better understanding of the practical, regulatory, enforcement, and compliance challenges

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<sup>3</sup> Grower-dealers are commercial shellfish aquaculturists who also are wholesale shellfish dealers authorized as a primary buyer.

<sup>4</sup> The Bulk Tagging Sub-Committee consisted of Alex Hay, Amy Croteau, Bill Doyle, Michael DeVasto, Seth Garfield, Sean Bowen, Deal Leavitt, and Michael Moore.

associated with the current tagging program and any expansion of bulk tagging allowances. This comprehensive process has greatly informed my decision making on this subject.

### **Rationale**

The NSSP's MO establishes requirements for Intermediate Processing Plans by seafood dealers<sup>5</sup>. These Plans create the procedure for applying dealer tags to shellfish during washing, packing, staging, and storing shellfish at the dealer facility and are the mechanism by which a primary buyer may receive bulk tagged shellfish from a commercial fisher. Plans may be individually approved by the state regulatory authority (DPH in Massachusetts), or that regulatory authority can establish minimum requirements and prescriptive limitations by regulation or policy for all dealers. The purpose of the plans is to prevent the comingling of shellfish and the preservation of lot integrity and traceability.

If DMF were to advance a pilot program allowing bulk tagging by all shellfish aquaculturists, each primary buyer accepting bulk tagged product would have to develop and submit to DPH an Intermediate Processing Plan for their approval. These processing plans will have to describe how bulk tagged product is accepted, segregated, and handled to ensure lot integrity and traceability that is currently assured by tagging each individual container.

The expense and responsibility of these Intermediate Processing Plans would fall on the dealer sector. Receiving bulk tagged product may alter the way primary buyers receive, handle, transport, and inventory product. It also changes how shellfish tagging is enforced (by MEP officers and DPH inspectors) and managed and is likely to create new enforcement challenges. Accordingly, the concerns about expanding the bulk tagging program are multi-faceted. In the several paragraphs below, I will summarize the more frequent and worrying concerns raised, which ultimately influenced my decision making here.

Dealers have expressed concerns regarding the challenges they would face to meet Intermediate Processing Plan requirements when receiving multiple harvester lots in succession. This includes multiple harvesters arriving at a dealer after a tide to offload product and the dealer receiving product from multiple harvesters at the landing site. As a result, some primary buyers have indicated they would likely pay less for bulk tagged oysters to cover the costs of these new responsibilities. To manage this burden on dealers, DMF has considered allowing bulk tagging only if the product is in a wrapped pallet or in an insulated vat. However, aquaculturists have indicated that such an approach is not viable<sup>6</sup>.

I am also concerned about enforcement. At present, if non-compliance with shellfish tagging is observed, then there are several actions that may be taken individually or severally.<sup>7</sup> Minimally, this may include the embargo and potential disposal of non-compliant product. Currently, when this occurs, it typically only involves a small number of containers and a small quantity of shellfish. However, with a shift to bulk tagging, non-compliance events will inevitably involve a larger quantity of shellfish subject to embargo and potential destruction. Additionally, the quantity of non-compliant shellfish in play in a bulk tagging scenario raises the stakes in terms of public health risk and makes it more likely that violators may be subject to criminal charges or permit sanctions. This has created concerns among primary buyers who argue they will face a disproportionate risk and burden under a bulk tagging program.

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<sup>5</sup>Chapter X. General Requirements for Dealers, .05 Shellstock Identification. D. Tagging of a Lot of Shellstock during Intermediate Processing (p. 93-94).

<sup>6</sup> Insulated vats are likely cost prohibitive given their cost is upwards of \$1,200 per unit. Wrapping pallets on the water or at the landing site is not practical in most cases, and even if it were, it would likely offset any time savings afforded by allowing bulk tagging.

<sup>7</sup> The non-compliant product may be seized and disposed of by MEP or DPH; MEP may issue a non-criminal or criminal citation; DMF may initiate an administrative hearing on the fishing and dealer permit; and DPH may issue a critical violation or critical deficiency and initiate an administrative action such as a corrective action plan.

I am also concerned about the efficacy of a pilot program that has the potential to disincentivize the involvement of our most conscientious industry participants. Facing the above-described challenges, some primary buyers have indicated they may not participate in this program because of the impacts it may have on their business or the risk of non-compliance. Non-participation then puts these dealers at an economic disadvantage and may impact existing relationships between dealers and harvesters disrupting the oyster market. It may also push more product into the hands of less capable, less conscientious, and less careful seafood dealers while at the same time exacerbating existing dealer-level shellfish tagging challenges that DMF, DPH and MEP are already wrestling with.

Lastly, a bulk tagging pilot program will require additional state resources to develop and administer a program; review harvester handling and tagging plans, as well as dealer Intermediate Processing Plans; and retrain field staff on how to properly inspect and enforce bulk tagging. The additional burden posed by this program is not insurmountable, but it needs to be considered in balancing the overall benefit of this program. In this instance, I do not think the benefit of the pilot program is such that it warrants the necessary deployment of these limited resources.

# Bulk Tagging Decision

## **Decision:**

DMF will not move forward with a pilot program to allow shellfish all aquaculturists to bulk tag market bound product.

## **Rationale:**

- Shifts enforcement and compliance burden from harvesters to dealer sector, requiring participating dealers to develop Intermediate Processing Plans.
- Complicates maintaining lot integrity at point-of-sale when dealer is receiving multiple harvester lots in succession.
- Aquaculturists have indicated wrapping pallets & insulated vats are not viable solutions to ensure lot integrity at point-of-sale.
- May be subject to more substantial actions in instances of non-compliance given quantity of shellfish involved (e.g., embargo, criminal penalties, permit sanctions).
- Risk may disincentivize participation by most conscientious dealers impacting shellfish markets and potentially worsening compliance.
- Administrative burden on state management and enforcement agencies.







# 2023 Select ISSC Proposal Review

Jeff Kennedy

[jeff.kennedy@mass.gov](mailto:jeff.kennedy@mass.gov)

Shellfish Program Lead

Massachusetts Division of Marine Fisheries

<https://mass.gov/dmf>

# National Shellfish Sanitation Program (NSSP)

- FDA Cooperative Program
  - w/Federal Agencies-States-Industry
- A Public Health document for the sanitary control of the harvest and handling of bivalve molluscan shellfish in the US
- Ensures shellfish will be safe and sanitary if produced in accordance with NSSP guidelines



# Goal of NSSP

To promote and improve the sanitation of shellfish moving in interstate commerce

- through federal & state cooperation
- by creating uniformity of State Shellfish programs



# Purpose of ISSC

- Provide a formal structure for State regulatory authorities to participate in establishing regulatory guidelines and procedures to ensure uniform state application of the NSSP
- Provide a process for states and industry to settle disputes over application of the NSSP with FDA, between states and between a state and industry



# ISSC Participants

- State shellfish regulatory officials
  - producing (*coastal*)
  - non-producing (*in-land*)
- FDA and other federal agencies: NOAA (*NMFS, NOS*), EPA, CDC
- Shellfish Industry – *harvesters, growers, dealers*
- Foreign governments



# ISSC Accomplishments

- Updated 1965 Manuals in 1986 & 1987
- FDA published 7 revisions between 1986 & 1995
- ISSC/FDA published “*Model Ordinance*” 1999
- ISSC/FDA publish 11 revisions of the “Guide for the Control of Molluscan Shellfish”
  - 2000, 2002, 2003, 2005, 2007, 2009, 2011, 2013, 2015, 2017 & 2019

## National Shellfish Sanitation Program (NSSP)

### Guide for the Control of Molluscan Shellfish 2019 Revision



# ISSC Organization

- [Constitution](#), Bylaws, and Procedures (*Roberts Rules*)
- Executive Director - Office Staff
- Executive Board (*18 members*) -> Executive Board Chair
- Executive Committee
- Task Force (*9 members*):
  - I Growing Area, Patrol
  - II Harvesting, Handling, and Distribution
  - III Administrative
- Committees – standing and as needed
- General Assembly – voting delegates (state regulators)



# Proposal (Issue) Submission and Consideration

- Ninety days prior to Biennial Meeting; specified format
- Sixty days prior to meeting Proposals sent to membership
- Proposal Review Committee
- Send proposal to appropriate Task Force (I, II, or III)
- For each proposal the Task Force can recommend the conference:
  - approve; no action, modify, send the proposal to committee





# Proposal Submission and Consideration (cont')

- Committees send recommendations on referred proposals back to Task Force (usually from previous years)
- General Assembly votes: yes/no, cannot modify
- FDA concurs or not, within ninety days
- Executive Board may act or deliberate with FDA
- Actions become effective with next revision of the NSSP unless executive board stipulates earlier date





**ISSC**

Interstate Shellfish Sanitation Conference  
4801 Hermitage Rd , Suite 102- Richmond , VA 23772  
Phone 804-330-6380  
Website [www.issc.org](http://www.issc.org) - Email [issc@issc.org](mailto:issc@issc.org)

**2023 TENTATIVE AGENDA**

Saturday, March 18, 2023

12:00 PM	Business Office Opens
12:00 PM - 4:00 PM	Registration & Selected Committee Meetings
3:00 PM - 3:45 PM	Orientation for New Attendees (Open to Everyone)
4:00 PM - 5:30 PM	Opening General Assembly
6:30 PM - 8:00 PM	Chairman's Welcome Reception

Sunday, March 19, 2023

8:30 AM - 9:00 AM	Committee Chair Meeting
9:00 AM - 9:00 PM	Committee Meetings

Monday, March 20, 2023

8:00 AM - 8:30 AM	Executive Board Elections
8:30 AM - 11:00 AM	Committee Meetings
11:00 AM - 12:30 PM	Executive Board Meeting
1:00 PM - 6:00 PM	Task Force Meetings (consideration of new proposals)

Tuesday, March 21, 2023

8:30 AM - 6:00 PM	Task Force Meetings
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Wednesday, March 22, 2023

9:00 AM - 12:00 PM	Symposium
1:00 PM - 6:00 PM	Task Force Reports Available for Review
7:00 PM - 9:00 PM	Regional Caucuses

Thursday, March 23, 2023

9:00 AM - 12:00 PM	Closing General Assembly
12:30 PM - 1:30 PM	Executive Board Luncheon
1:30 PM - 4:00 PM	Executive Board Meeting

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# Select Task Force I Proposals

- 17-100 Clarifies definition of marina
- 19-101 Creates new lab status – conditionally conforming
- 19-108 Reduce min time seed grown in Prohibited from 120 -> 60days when wtemps above 50F
- 19-123 Marine Biotoxin Control – Public Health Explanations
- 19-124 Marine Biotoxin Control – Guidance Document
- 19-144 Assessing WWTP Viral Impact on GA using MSC
- 19-145 Establish guidance for shellfish cleansing studies



# Task Force I Proposals (cont')

- 23-100 Mooring Area re-definition >20 boats with MSD
- 23-102 Re-defines/clarifies seed from Prohibited area + enhancement
- 23-104 Timeframe for action to close GA due to Vp illness 60->30days
- 23-108 Clarify only MSC can be used to reduce reopening the GA in less than 21 days
- 23-109 *Massages* MO section on GA reopening criteria
- 23-110 Adds Restricted classification as option for w/i marina





# Task Force I Proposals (cont')

- 23-111 Reduces min closure for relay product from 60->14 days if if only impacted by microbial contaminants
- 23-112 replace current language in MO 'sewage and bodily fluids' with 'sewage and vomitus'
- 23-121 request mooring area guidance document
- 23-123 clarify how P90 is calculated for depurated endproduct
- 23-124 new Marina and Mooring Area Guidance document



# Select Task Force II Proposals

- 17-225 Clarifies Surf Clam/Ocean Quahog T/T requirements
- 19-220 Pre-chilling Vehicles
- 19-231 Adding Shipping CCP
- 19-227 Proper Use of Backflow Preventers
- 23-201 Reducing Plant Inspection Frequency



# Select Task Force III Proposals

- 13-301 Establish GA classification evaluation criteria
- 17-305 Establish section “Responsibilities of the FDA”
- 17-204 Add in-field compliance criteria for CoH element evaluation
- 23-301 Limiting use of Guidance Documents in evaluations
- 23-305 Clarifies/Expands Biotoxin Management Criteria
- 23-306 Clarifies steps in FDA/state disagreements and UI process



- ISSC Website- <https://www.issc.org/>
- NSSP- <https://www.issc.org/nssp-guide>
- *Interstate Shellfish Sanitation Conference*  
4801 Hermitage Rd Ste 102  
Richmond, VA 23227
- *Phone: (804) 330-6380*

2023 ISSC Biennial Meeting

Members Sign In

calendar | forms | links | employment | training | contact

INTERSTATE SHELLFISH  
**ISSC**  
SANTATION CONFERENCE

Dedicated to assuring shellfish are a safe food.

Committees ICSSL Membership SSCA NSSP Guide Conference Administration Document Library Laboratory General Information

**Upcoming Events**

MARCH 18

2023 ISSC Biennial Meeting  
Ends Thursday, March 23, 2023  
All Day

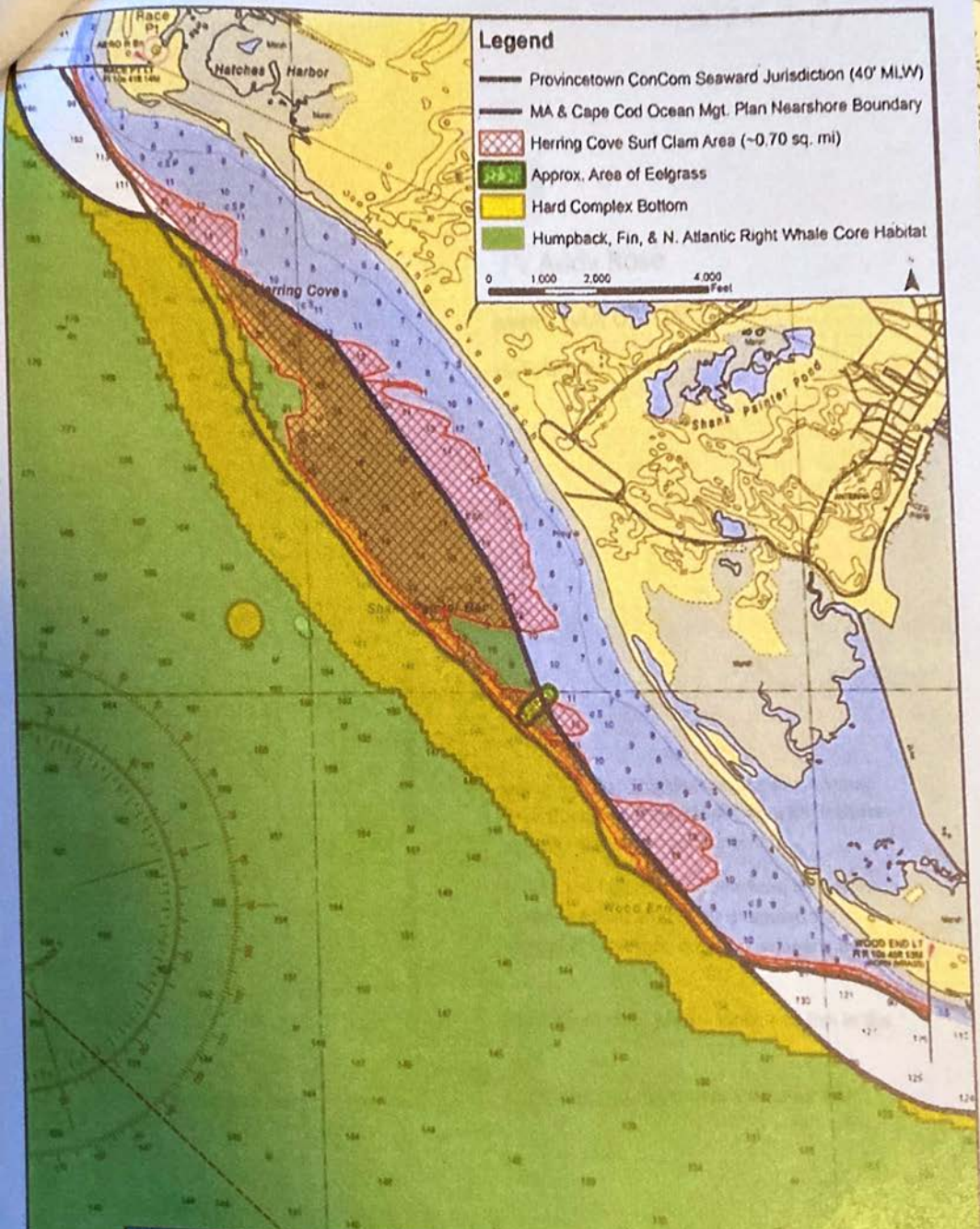
**News & Notices**

Notices of illness outbreaks, shellfish closures, reopenings and recalls.  
Modified 2/28/2023

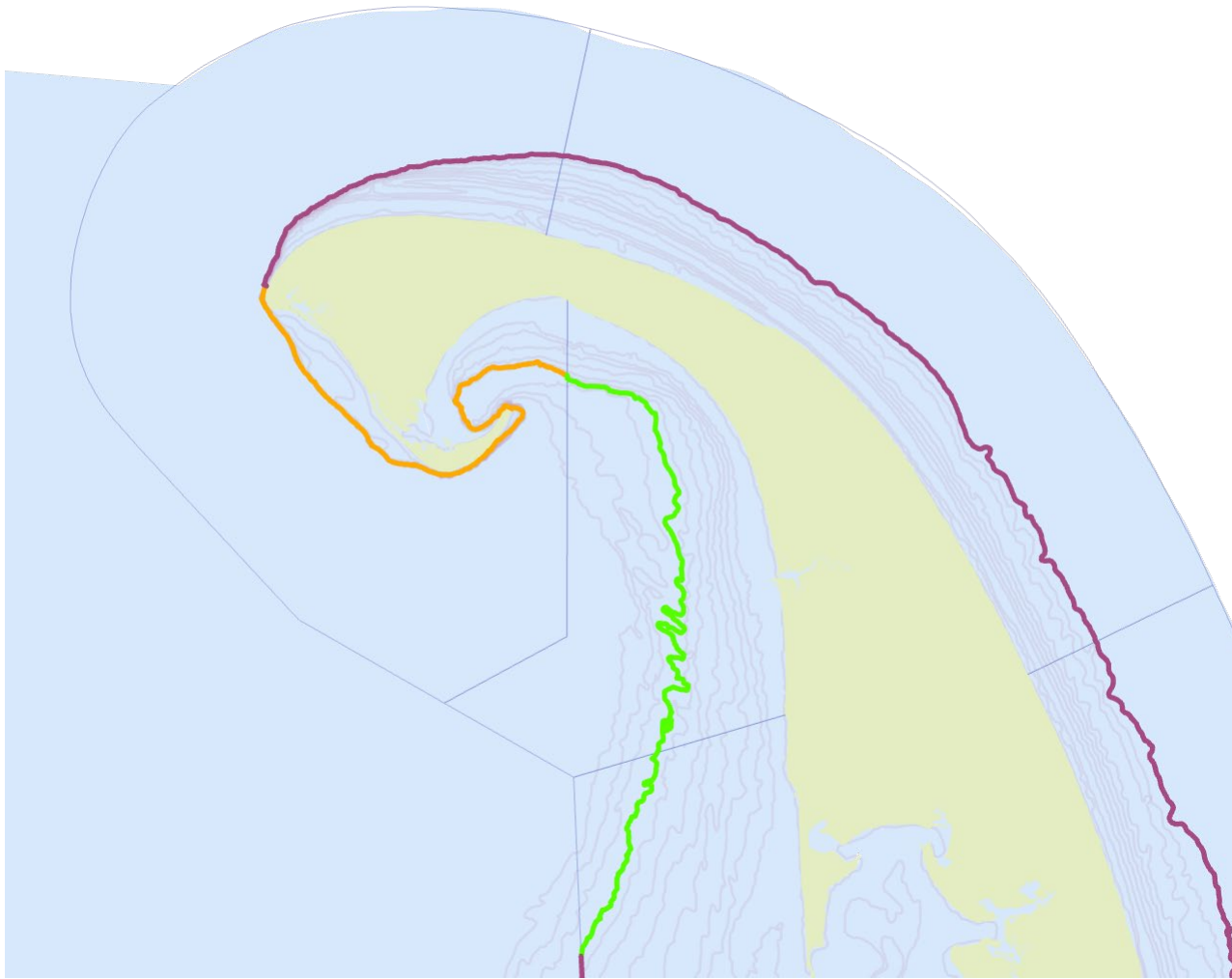
# Questions/Discussion



Cape Cod National Seashore - Permit Application



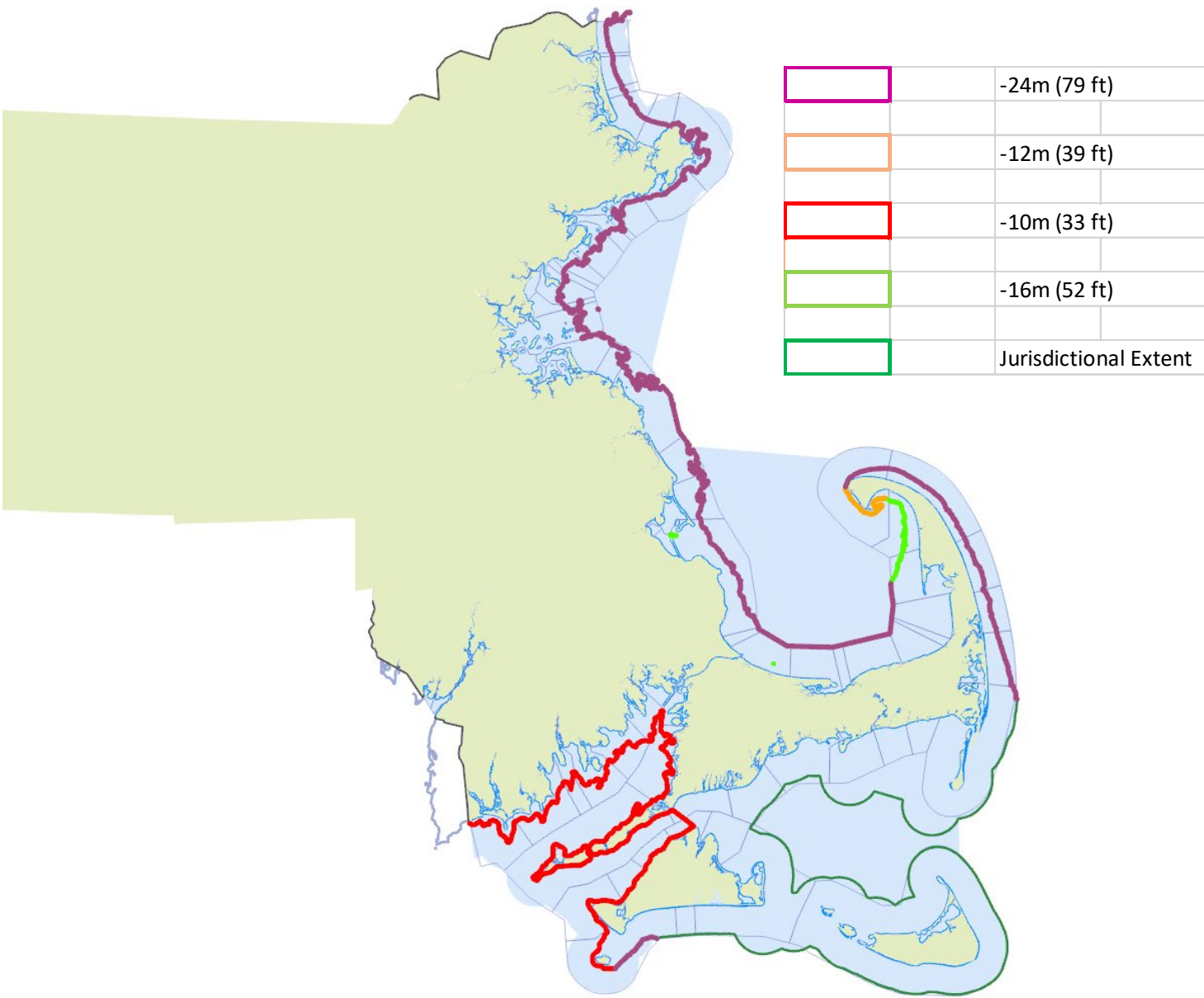
**Adjacent Special, Sensitive, or Unique (SSU) Resource Areas within the Boundary of the MA Ocean Plan**








	-24m (79 ft)
	-12m (39 ft)
	-10m (33 ft)
	-16m (52 ft)
	Jurisdictional Extent

310 CMR 10.25(2)

Nearshore Areas of Land under the Ocean means that land extending from the mean low water line to the seaward limit of a municipality's jurisdiction, but in no case beyond the point where the land is **80 feet below the level of the ocean at mean low water**. However, the nearshore area shall extend seaward only to that point where the land is **30 feet below the level of the ocean at mean low water for municipalities bordering Buzzard's Bay and Vineyard Sound (west of a line between West Chop, Martha's Vineyard and Nobska Point, Falmouth)**, **40 feet below the level of the ocean at mean low water for Provincetown's land in Cape Cod Bay**, and **50 feet below the level of the ocean at mean low water for Truro's and Wellfleet's land in Cape Cod Bay**.



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# The Commonwealth of Massachusetts

## Division of Marine Fisheries

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[www.mass.gov/marinefisheries](http://www.mass.gov/marinefisheries)



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Lt. Governor

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Commissioner

DANIEL J. MCKIERNAN  
Director

---

### MEMORANDUM

TO: Shellfish Advisory Panel (SAP)

FROM: Daniel J. McKiernan, Director

DATE: February 24, 2023

SUBJECT: **Sub-Committee to Investigate Municipal Rules Governing the Transferability of Aquaculture License Sites**

---

I am moving to establish a voluntary sub-committee of the SAP to review municipal rules governing the transferability of aquaculture license sites. The transferability of aquaculture license sites was identified by the Massachusetts Shellfish Initiative Strategic Plan as a topic the SAP should consider addressing and was listed as a work priority by the current legislatively appointed SAP at their inaugural November 2021 business meeting.

Under G.L. c. 130, §§52, 57, and 58 municipalities are granted the authority to regulate and permit certain shellfish fishing activities within their waters (“home rule”), including the issuance of shellfish aquaculture license sites. This home rule mandate is important as it allows communities to manage their shellfish resources and fisheries consistent with the character of the community and fosters opportunities for municipalities to develop innovative management strategies best suited to their communities. Inevitably, this management approach results in some disparities across communities, including adjacent communities sharing a body of water, or in some rare instances, for shellfish aquaculturists conducting business in multiple communities.

As the shellfish aquaculture industry has matured, some aquaculturists have sought a more standardized approach to shellfish aquaculture management across municipalities to enhance stability and equity in their businesses. This has created tension with some municipal home rule proponents who want to maintain local control over their resource and fishery. One area where this tension has been apparent is with regards to the transferability of aquaculture site licenses, as evidenced by the polarized reaction to the 2019 proposal to amend G.L. c. 130, §§57 and 58 to achieve more consistency across municipal shellfish license transfer programs.

I do not have any intention to use the SAP as a means to amend home rule authorities. Rather, I want to convene a sub-committee to compile and review all municipal regulations governing aquaculture license site permitting and transfers and engage with municipal officials and industry members to document what may (or may not) be working. In the future this may help inform a series of best management practices that municipalities may consider when adopting or amending their aquaculture license permitting and transfer regulations. If successful, this approach may be applied to other areas of municipal shellfish and shellfish aquaculture management.

# SAP Sub-Committee to Investigate Municipal Aquaculture License Site Transfer Rules

## **Sub-Committee Charge:**

Compile and review all municipal regulations governing aquaculture license site permitting and transfer rules and engage with municipal officials and industry members on what may (or may not) be working. Work may potentially result in development of best management practices municipalities may consider but will not weigh in on home rule authorities.

## **Background:**

- Issue identified priority issue for SAP to address.
- Some in industry seek more lenient transfer restrictions with fewer constraints on recipients.
- Aquaculture industry seeks more standardized approach across municipalities to enhance stability and equity.
- Home rule management promotes innovative management programs best suited to individual communities but leads to disparate rules across communities.
- Complexities arise when disparate rules exist across municipalities sharing a body of water or when a single business is working in multiple municipalities.
- Polarized response to 2019 proposed legislation to amend G.L. c. 130, s.s. 57 and 58.

## **Prospective Sub-Committee Members:**

Bill Doyle, Dale Leavitt, Amy Croteau, and Renee Gagne.



# Next SAP Meeting

## **Tentative Scheduling**

- 4PM on April 27, 2023
- SMAST East. 836 S. Rodney French Blvd. New Bedford.

## **DMF Deliverables and Agenda Items**

- Outcomes from ISSC biennial meeting
- Review of *Vp* Control Plan for 2023
- Update on Surf Clam Management & Wetlands Protection Act jurisdiction on shellfish dredging
- Periodic review of DMF shellfish regulations (322 CMR 16.00)
- Other Items of import to SAP members?



**COMMONWEALTH OF MASSACHUSETTS**  
**2022 *Vibrio Parahaemolyticus* (*Vp*) Oyster Risk Assessment**

**DIVISION OF MARINE FISHERIES**

**DEPARTMENT OF PUBLIC HEALTH**

Pursuant to National Shellfish Sanitation Program (NSSP) requirements, every state from which oysters are harvested commercially shall conduct an annual *Vibrio parahaemolyticus* (*Vp*) and *Vibrio vulnificus* (*Vv*) risk evaluation. The evaluation shall consider the risk of *Vp* or *Vv* infection from the consumption of oysters harvested from an area and evaluate whether illness is reasonably likely to occur. For this risk assessment, “reasonably likely to occur” shall mean that the risk constitutes an annual occurrence. This report provides an evaluation of past *Vp* and *Vv* illness occurrence, shellfish production, environmental conditions, and harvest practices that may have an impact on *Vp* and *Vv* illness occurrence and efforts the State Control Authorities have taken through the 2021 Massachusetts *Vibrio* Control Plan and implementing regulations to mitigate such risk. As a result of this assessment, the State of Massachusetts has determined the risk of *Vp* illness associated with the consumption of commercially harvested oysters from Massachusetts harvest areas is reasonably likely to occur from May 19<sup>th</sup> through October 19<sup>th</sup>, and a *Vp* control plan for this period continues to be warranted. Due to the lack of *Vv* cases epidemiologically linked to the consumption of commercially harvested oysters from Massachusetts harvest areas, the state does not currently feel *Vv* illness is reasonably likely to occur and a *Vv* control plan is not required.

**1. Confirmed *Vp* Cases**

The Massachusetts Department of Public Health (DPH) and MA Division of Marine Fisheries (DMF) investigated thirty-three (33) confirmed *Vp* illnesses involving consumption of raw oysters in 2021 (Table 1). Sixteen (16) of these illness investigations were single-source trace backs to one of several MA shellfish growing areas. The highest number of single-source illnesses were from Katama Bay (V20), with 6 cases. Three cases were harvested from Buzzards Bay growing areas, 5 cases were harvested from various Cape Cod Bay growing areas, one case from the Elizabeth Islands and a single case was from a Mount Hope Bay (MHB4) growing area. One of the Buzzards Bay illnesses and the MHB4 illness were associated with recreational self harvest. Three multi-source illness tracebacks involved oysters from only MA growing areas, nine cases implicated both in-state and out-of-state growing areas and five illnesses involved only out-of-state oysters. Eight additional investigations and trace backs were completed for illnesses associated with raw oyster consumption that were confirmed *Vibrio* genus, but species was not identified. Two involved single-source trace backs to MA growing areas (CCB45 and V20), two implicated multiple in-state growing areas, two involved out-of-state sources (NY, RI and Canada) and two were lost to trace back.

No growing area closures occurred during the 2021 *Vibrio* season.

<b>Table 1. 2021 <i>Vp</i> Illnesses (Raw Oysters) Traced Back to Specific Growing Areas</b>	
	<b>MA Growing Areas or State/Country for Out-of-state Traceback</b>
<b>MA Single-source (16)</b>	BB36 (1 case); BB37 (2 cases); CCB23 (2 cases); CCB31 (1 case); CCB41 (1 case); CCB45 (1 case); E10 (1 case); MHB4 (1 case); V20 (6 cases)
<b>MA Multi-source (3)</b>	[CCB45 & SC28]; [CCB31, CCB45 & V2]; [V2 & V20];
<b>Both Out-of-state and In-state Multi-source (9)</b>	[BB18, CCB45, CCB42 & WA]; [BB1, CCB23 and WA]; [CCB11, V20 & ME]; [BB37, CCB11, CCB31, CCB45, SC28 & ME]; [BB1, V2, V20, ME & Canada]; [BB1, CCB11, CCB45, WA & ME]; [CCB11, SC61, WA & ME]; [CCB11, CCB23, CCB31, CCB45, SC21, V2, V20, RI, ME, WA & Canada]; [SC28, RI & ME]
<b>Out-of-state Only (5)</b>	[VA & NY]; [CT]; [Canada & RI]; [RI]; [Canada & NY]

Prior Year Summaries

2020

DPH and DMF investigated sixteen (16) confirmed *Vp* illnesses involving consumption of raw oysters in 2020. Fifteen illness investigations including trace back were completed for those confirmed *Vp* illnesses (Table 2). One illness associated with consumption of raw oysters at a residential Labor Day party was lost to follow-up because individuals involved were unable or unwilling to provide information regarding the source of the consumed oysters. Katama Bay (V20) in the Town of Edgartown on Martha’s Vineyard was the harvest area for 7 of the 8 single-source *Vp* illnesses.

Three additional investigations and trace backs were completed for illnesses associated with raw oyster consumption that were confirmed *Vibrio* genus, but species was not identified. These three illnesses had single-source trace backs to Dennis North Coastal (CCB23), Nauset Harbor (OC2) and Katama Bay (V20).

No growing area closures occurred during the 2020 *Vibrio* season.

<b>Table 2. 2020 <i>Vp</i> Illnesses (Raw Oysters) Traced Back to Specific Growing Areas</b>	
	<b>MA Growing Areas or State/Country for Out-of-state Traceback</b>
<b>MA Single-source (8)</b>	CCB45 (1 case); V20 (7 cases)
<b>MA Multi-source (4)</b>	[CCB23 & CCB45]; [CCB11 & CCB14]; [V2 & V20]; [V2 & V20]
<b>*Out-of-state Multi-source and Single-source (3)</b>	[CCB45 & Out-of-state (PEI, ME)]; [Single-source: NH]; [Single-source: ME]

\*Includes out-of-state only tracebacks and tracebacks implicating out-of-state plus MA growing areas.

2019

MA DPH and DMF investigated twenty-seven (27) confirmed *Vp* illnesses in 2019 involving individuals who consumed raw shellfish. Illness investigations including trace back were completed for fifteen (15) of the illnesses, each associated with raw oyster consumption (Table 3). There were twelve (12) *Vp* illnesses that were lost to follow-up as ill individuals were not able or willing to provide adequate information to conduct a trace back, including two (2) illnesses associated with consumption of raw hard clams (quahogs). One (1) illness was reported from an individual who consumed self-harvested clams and could not identify the harvest area. One (1) illness was reported from an individual who consumed clams of unknown source given to him by a friend. Each of these cases is included in those raw shellfish consumption cases lost to follow-up.

<b>Table 3. 2019 <i>Vp</i> Illnesses (Raw Oysters) Traced Back to Specific Growing Areas</b>	
	<b>MA Growing Areas or State/Country for Out-of-state Traceback</b>
<b>MA Single-source (8)</b>	BB37 (1 case); CCB45 (1 case); V20 (6 cases)
<b>MA Multi-source (4)</b>	[CCB14 & CCB20]; [CCB11 & CCB14]; [CCB11, CCB13 & SC49]; [BB1, BB36 & BB37]
<b>*Out-of-state Multi-source (3)</b>	[CA, VA, WA, Canada, Mexico]; [WA-multiple growing areas]; [BB4, CCB11, CCB31, SC21, ME, Canada]

\*Includes out-of-state only tracebacks and tracebacks implicating out-of-state plus MA growing areas.

Four additional confirmed *Vp* cases were linked to the consumption of fully cooked seafood products including fish, shrimp, lobster, and scallops. Additionally, DPH and DMF reported three (3) total confirmed *Vibrio cholerae* illnesses for 2019 involving individuals who consumed raw oysters and for which investigations were conducted. Two (2) illnesses were linked to a single MA growing area (a different area for each case) and one (1) illness was linked to multiple MA growing areas.

No growing area closures occurred during the 2019 *Vibrio* season.

### 2018

MA DPH investigated forty (40) foodborne *Vibrio* illnesses in 2018. Thirty-two (32) of these illnesses were laboratory-confirmed cases of *Vibrio parahaemolyticus* and eight (8) illnesses were *Vibrio* sp. detected by Culture-Independent Diagnostic Tests (CIDT). Thirty-one (31) of these cases were linked to shellfish consumption. Additionally, one (1) case was linked to raw crab, one (1) case was linked to cooked shrimp and/or cooked salmon, and seven cases (7) were lost to follow up. Trace back information revealed that thirteen (13) cases were exclusively linked to the consumption of oysters harvested in MA. Four (4) of these cases were attributed to multiple growing areas within MA and nine (9) cases were attributed to a single growing or hydrographic area. Five (5) cases were linked to Western Cape Cod Bay (CCB42-45); one (1) case was linked to Brewster North Coastal (CCB20); one (1) case was linked to Cotuit Bay (SC21); one (1) case linked to Barnstable Harbor (CCB31); and one (1) case linked to Pleasant Bay (SC61).

Additionally, there were eighteen (18) cases with complete trace back information that identified shellfish harvested from growing areas in Massachusetts and other states/Canadian provinces. The remaining two (2) cases with complete trace back information were linked to growing areas in other states.

### 2018 Closures

On 9/15 DMF instituted a precautionary 7-day closure of all commercial oyster harvest from Duxbury, Plymouth, and Kingston Bays growing areas (CCB42-47) due to notification from DPH of two cases linked to harvest dates between 8/30 and 9/6. No additional cases were reported and the area was reopened to oyster harvest on 9/22.

### 2017

MA DPH received reports of 34 laboratory-confirmed cases of *Vibrio parahaemolyticus* in 2017, of which one was comorbid with *Vibrio fluvialis*. Twenty-nine cases were linked to shellfish consumption (oysters 23, clams 2, oysters and clams 4). Additionally, one case was linked to crustaceans, three reported seafood or shellfish consumption but were unable to provide specifics, and one case reported travel associated infection.

Traceback information revealed that 18 cases were exclusively linked to the consumption of oysters or clams harvested in Massachusetts. Of these 18 cases, one case was linked to recreationally harvested oysters and one to recreationally harvested clams. Two cases were attributed to multiple growing areas within Massachusetts. Fourteen cases were singularly attributed to one growing area: three cases were linked to Western Cape Cod Bay (CCB42-45); one case was linked to Dennis North Coastal (CCB23); three cases were linked to Katama Bay on Martha's Vineyard (V20); two

cases linked to Oyster Pond River (SC49); two cases linked to Wellfleet Harbor (CCB11-14); two cases linked to Eastern Cape Cod Bay (CCB17 and/or CCB20) ; and one case linked to Barnstable Harbor (CCB31).

The remaining cases with complete traceback information included one case that was attributed to a Massachusetts resident who consumed oysters in another state and the case was reported to the corresponding state's health department, and traceback yielded oysters harvested out of state. Four cases involved shellfish harvested from both Massachusetts and other states; state SSCAs were notified of the potential attribution to their growing areas. One of the cases linked to consumption of clams turned out to be a fully cooked product after follow-up investigation.

### 2017 Closures

On 9/29 the DMF instituted a 14-day closure of all commercial oyster harvest from Katama Bay growing area (V20) due to notification from DPH of two cases linked to a single harvest date (9/12). No additional cases were reported and the area was reopened to oyster harvest on 10/13.

### 2016

MA DPH received reports of 28 laboratory-confirmed cases of *Vibrio parahaemolyticus* in 2016, of which 2 were comorbid with *Vibrio alginolyticus* and 1 was comorbid with *Vibrio fluvialis*. Seventeen cases were linked to shellfish consumption (oysters 16, and clams 1). Two cases were linked to wound infections; one was linked to lobster consumption, three were linked to other infections; and five were lost to follow up as the individuals were unable to provide an adequate food history or were unreachable by epidemiologists.

Traceback information revealed that 13 cases were exclusively linked to the consumption of oysters or clams harvested in Massachusetts. Three cases were attributed to Massachusetts residents who consumed oysters in other states and the cases were reported to the corresponding state's health department and one case involved oysters harvested from both Massachusetts and Virginia. State SSCA's were notified of the potential attribution to their growing areas when possible. Three cases were attributed to multiple growing areas within Massachusetts. One case was linked to the consumption of hard clams harvested from Wellfleet harbor (CCB11). Nine cases were singularly attributed to one growing area: four cases were linked to Western Cape Cod Bay (CCB45); two cases were linked to Katama Bay on Martha's Vineyard (V20); two cases linked to Dennis North Coastal (CCB23); and one case linked to Barnstable Harbor (CCB31).

### 2015

MA DPH investigated reports of 56 laboratory-confirmed cases of *Vibrio parahaemolyticus* in 2015. Of these, 28 cases were traced back to individual Massachusetts growing areas: 4 cases were linked to Barnstable Harbor (CCB31); 1 case linked to Wellfleet harbor (CCB11) and 1 case linked to Popponesset Bay (SC19). Ten cases were linked to Western Cape Cod Bay (CCB42-45) and 12 cases were linked to Katama Bay on Martha's Vineyard (V20). Timing and frequency of confirmed illnesses resulted in mandatory closures of three growing areas.

## 2015 Closures

On 8/25 the DPH and DMF exercised their authority as described at Section D.5., of the 2015 Massachusetts *Vp* Control Plan to institute a precautionary closure of all commercial oyster harvest from Katama Bay (V20). Harvest dates resulting in the closure are as follows: 7/6, 7/7, 7/8, and 7/20. During the initial closure period additional cases were reported with harvest dates of 8/8, 8/14, and 8/18 and as a result DPH and DMF extended the closure by an additional 7 days with both closures running concurrently for a total of 14 days.

On 9/23 DPH and DMF exercised their authority as described at Section D.5., of the 2015 Massachusetts *Vp* Control Plan to institute a closure of all commercial oyster harvest from Western Cape Cod Bay growing areas (CCB42-45). Harvest dates resulting in the closure are as follows: Duxbury Bay (CCB45) 8/4, 8/18, 9/2, 9/6 and Plymouth Bay (CCB42) on 8/31. During the initial closure period two additional cases were linked to the area with harvest dates of 9/2 and 9/5 resulting in an extension of the closure to meet the mandatory 14-day closure requirement under the 2013 NSSP MO.

## 2014

Twenty-four cases of *Vp* illness were reported to Massachusetts state officials in 2014. Of these, 11 cases were traced back to a single Massachusetts growing area, with four of these cases were attributed to V20, Katama Bay in Edgartown. Another three cases were associated with CCB23, Dennis North Coastal in Cape Cod Bay. Two illnesses were attributed to area CCB45, Duxbury Bay. One illness was linked to OC2, Nauset Harbor in Orleans, and another single illness to SC49, Oyster Pond River in Chatham. The remaining 13 of the 24 cases were attributed to either out-of-state growing areas and/or multiple Massachusetts growing areas as possible sources of oysters. No cases were epidemiologically linked to the consumption of commercially harvested hard clams from Massachusetts harvest areas.

## 2013

During 2013, DPH investigated 58 reported *Vp* cases. Of these, 33 cases were traced back to one or more Massachusetts-only growing areas. In 19 of these cases there was some link to Duxbury Bay in Duxbury, involving three adjacent/contiguous state designated shellfish growing areas. Another 12 cases were linked to Katama Bay in Edgartown. One illness was attributed to area CCB23, Dennis North Coastal in Cape Cod Bay, and area SC61, Little Pleasant Bay in Orleans, was the single source in another illness. Of the remaining cases, 25 of the 58 cases were also linked to out-of-state growing areas as possible sources of oysters. No cases were epidemiologically linked to the consumption of commercially harvested hard clams from Massachusetts harvest areas.

## 2012

For 2012, Massachusetts investigated nine confirmed individual sporadic cases of *Vp* traced to consumption of commercially harvested oysters from Massachusetts growing areas. An additional five sporadic cases were traced back to multiple sources that included some of the same Massachusetts growing areas, as well as sources in other states. As a result of the multiple sources, the specific origin of oysters related to the illnesses could not be conclusively determined. No cases were epidemiologically linked to the consumption of commercially harvested hard clams from Massachusetts harvest areas.



In 2011, there were two illnesses linked to Eastern Cape Cod Bay, a region with similar tidal characteristics where oysters are exposed during lower tidal stages to sun and air temperature for several hours. An illness outbreak (two or more illnesses) epidemiologically linked to oysters harvested at the same time from an area triggers a Control Plan for the area under NSSP standards. In previous years, there have been sporadic *Vp* illnesses involving shellfish from a combination of in-state and out-of-state sources. This was the first time two illnesses have been solely associated with the same Massachusetts source. Another sporadic case was reported in the fall of 2011 linked to oysters commercially harvested from Duxbury Bay. No cases were epidemiologically linked to the consumption of commercially harvested hard clams from Massachusetts harvest areas.

Pulsed-Field Gel Electrophoresis (PFGE) and Genetic Analyses of Illness Clinical Isolates

Results from clinical isolates collected from illness cases between 2011 and 2016 identified several lineages causing infections in the northeast and revealed that the majority of *Vp* cases linked to Massachusetts have resulted from 2 distinctive pathogenic strains: an ecologically invasive strain endemic to the Pacific sequence type (ST) 36, causing more than 70% of the infections; and a resident strain (ST631) that causes approximately 15% of infections (Figure 1; Xu et al., 2015; Unpublished data).

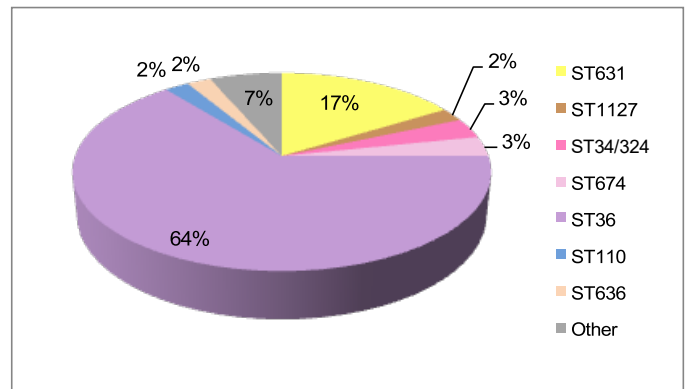


Figure 1. chart showing Strain types implicated in MA *Vp* cases Xu et al., 2016

2. Environmental Monitoring

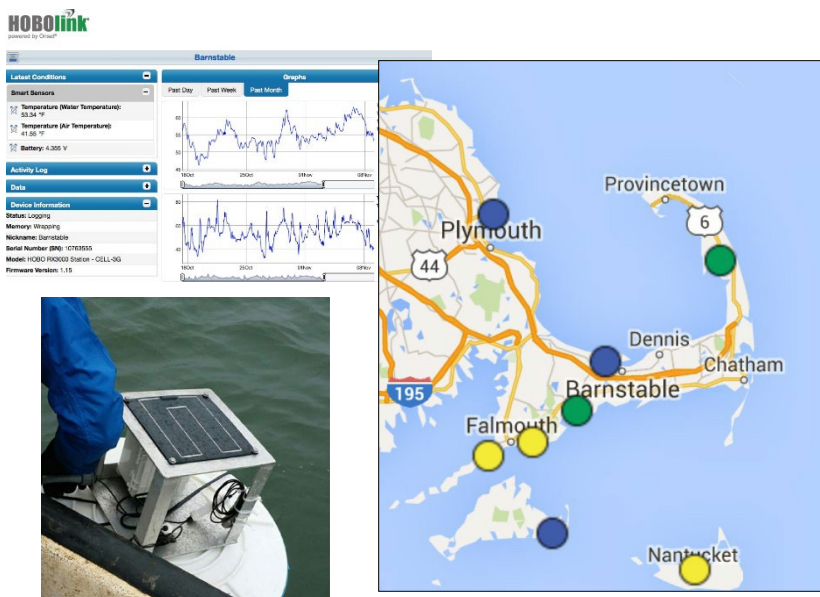


Figure 2. Temperature monitoring locations/online data image capture

As a result of Massachusetts’ unique bathymetry and hydrographics there can be significant variability in environmental conditions between shellfish growing areas. *Vp* sampling stations and environmental monitoring locations were selected to capture, to the extent possible, this variability but may also have been chosen based on historic illness occurrence and shellfish production levels.

MA DMF monitors environmental conditions (e.g. water temperature, air temperature Figure 2) and has monitored *Vp* levels in select shellfish growing areas across the Commonwealth at various times (Figure 3).

DMF does not monitor for *Vv*. These data are used in the annual Massachusetts *Vp* risk assessment, as well as to correlate environmental conditions leading up to the occurrence of confirmed *Vp* illnesses and to forecast periods of increased *Vp* risk.

### Water and Air Temperature

In 2021, all Massachusetts oyster production areas met or exceeded the 2019 NSSP Model Ordinance limit (Chapter 2 @.07.B.2.c) of average water temperatures exceeding 60° F for a thirty-day period in waters bordering the Atlantic (NY and north). DMF deploys shaded air temperature monitors in select growing areas and additional air temperature data is collected from National Weather Service (NWS). NWS sites are not on the water; therefore, it can be assumed that the recorded temperatures are higher than those that would have been observed at the oyster culture/harvest sites. A number of DMF air and water temperature sensors can be accessed remotely (Figure 2 blue circles). These data provide close to real-time information for harvesters, public health officials, environmental police officers, shellfish managers, and the general public. The information can be accessed via an interactive map available on the DMF website. Most shellfish growing areas exceed average monthly daytime water temperatures of 60°F during the months of June through October. The current *Vibrio* Control Plan season encompasses these months. The map also includes additional sensors operated by other entities (yellow and green circles). Additionally, coordination with the NOAA Forecasting Center facilitated the development of risk assessment models that simulate *Vp* doubling times under forecasted environmental conditions for select growing areas within Massachusetts.

<https://products.coastalscience.noaa.gov/vibrioforecast/northeast/massachusetts/msbestharvest.aspx>

### Salinity

There are few large streams bringing fresh water into Cape Cod Bay, Nantucket Sound, and Vineyard Sound harvest areas. The limited fresh water input, proximity of harvest sites to the open-ocean and relatively large tidal range in most harvest areas results in relatively well-mixed saline waters statewide; with average salinities in Cape Cod Bay between 29-33 psu and Buzzards Bay sites ranging from 25-29 psu.

### Tides

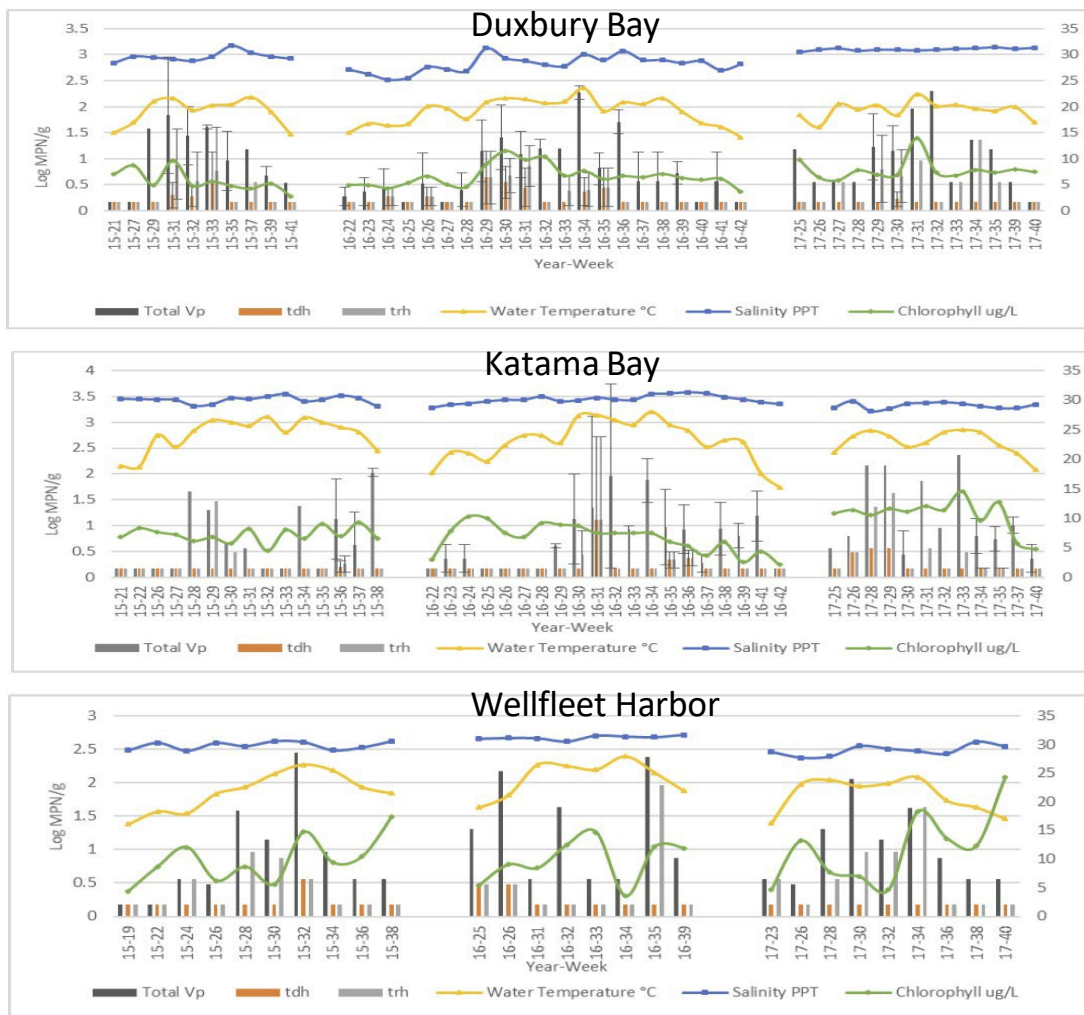
Eastern Cape Cod Bay harvest areas have tidal amplitudes with a mean range varying from 10 feet in Wellfleet to 9.5 feet at Beach Point, Barnstable Harbor, and 9.1 feet in Provincetown. On extreme minus or moon tides, the tides can be 1 to 2 feet lower than average. The significant tidal range and bathymetry of these areas result in exposure of oysters at harvest sites on most low tides. Harvest areas in Western Cape Cod Bay (Duxbury, Plymouth, Kingston) have a similar tidal amplitude as those in Eastern Cape Cod Bay, but as a result of the varied bathymetry, site-specific exposure times can vary. Harvest sites in Plymouth and Kingston Bays may fully expose on average and minus tides, whereas Duxbury Bay harvest sites often only expose on large moon tides. Throughout Buzzards Bay, the mean tidal amplitude is 3.1 to 4.0 feet; on the South Side of Cape Cod and on Martha's Vineyard, it is between 1 and 2 feet at oyster harvest sites; and about 3 feet at a maximum on Nantucket; the majority of these harvest areas do not get exposed during low tide. Harvest in areas that are exposed during low tide is authorized only during the ebb portion of the tidal cycle during the *Vibrio* Control Season (May 19 - Oct 19).

### Levels of *Vibrio Parahaemolyticus* in Shellfish Growing Areas

In 2013 DMF began collecting oyster shellstock samples from select growing areas to determine the level of background *Vp* bacteria in shellfish tissue. These samples were analyzed using the MPN to AP gene probe method for the enumeration of *tlh* and the hemolysin gene *tdh* as described in the FDA Bacterial Analysis Manual. These initial efforts were limited to late season samples from Duxbury Bay and Katama Bay. Efforts were expanded in 2014 to include bi-weekly shellstock samples from three (3) high-production growing areas: Barnstable, Dennis and Wellfleet; with

sampling efforts in Katama Bay stopped due to logistical issues and Duxbury samples being conducted in partnership with FDA’s Gulf Coast Seafood Laboratory. In 2015 DMF continued the use of the MPN to AP gene probe method for background environmental sampling and expanded its efforts to include biweekly sampling of Katama Bay and Duxbury Bay, as well as Dennis and Wellfleet.

In 2015 DMF also piloted the use of the *trh* AP gene probe and the MPN-real-time PCR method targeting total *Vp* and both hemolysin genes *tdh* and *trh* (Kinsey et al., 2015; Schillaci Master of Science Thesis). Figure 3 below shows total and potentially pathogenic (*tdh*+ and *trh*+) *Vp* plotted with salinity, water temperature and chlorophyll concentrations in three growing areas generally representing the source of greater than 50% of the harvested oysters in Massachusetts. The majority of confirmed single-source *Vp* cases in the state have been traced to Katama Bay, Wellfleet Harbor, and the Duxbury/Plymouth/Kingston Three Bays System. There is considerable variability in total and potentially pathogenic *Vp* in these growing areas and a clear relationship with salinity and chlorophyll concentration was not observed. However, there was a positive relationship between total and potentially pathogenic *Vp* and water temperature, though not a tight correlation. With few exceptions, confirmed *Vp* cases generally coincided with months of peak *Vp* levels and highest water temperatures (June-September).



**Figure 3. Temporal variation (year-week) of environmental parameters (right axis) and mean Total *Vp*, *tdh* and *trh* levels (left axis) in oyster samples collected from Duxbury Bay, Katama Bay and Wellfleet Harbor 2015-2017. Adapted from the Master of Science Thesis of Christopher Schillaci, UNH.**

### 3. Harvest and Culture Techniques

Private growers on licensed aquaculture sites conduct ninety-five percent of commercial oyster harvests in Massachusetts. Culture and harvest methods depend almost entirely on water depth and tidal amplitude at the harvest location. Oyster culture in intertidal harvest areas, such as those in Eastern Cape Cod Bay, is primarily conducted using rack and bag or cage culture with site access primarily limited to two hours on either side of low tide when the sites are exposed by the tide. This exposure can result in *Vp* growth and harvest in these areas is strictly controlled and limited to outgoing tides. In subtidal areas oysters are primarily grown in cages (floating or on bottom) or bottom planted and harvested with a dredge. In subtidal areas harvesters generally expose oysters in lots and ice each lot prior to harvesting the next lot.

To address the concern of post-harvest growth of *Vp* in oysters, Massachusetts requires all market-bound oysters to be immediately shaded upon harvest and during the state's *Vibrio* Control season (May 19-October 19) adequately iced within 2 hrs of the time of exposure or harvest or prior to leaving the point of landing, whichever occurs first. In 2016, DMF reduced the time to icing in Western Cape Cod Bay (Duxbury, Kingston and Plymouth Bays) and in Katama Bay in Martha's Vineyard from 2hrs to 1hr from the time of harvest or exposure during the highest risk period (July 1- Sept 15). The amount and distribution of ice is clearly defined in the *Vibrio* Control Plan (VCP) to ensure adequately iced oysters are rapidly cooled to an internal temperature of <50°F to prevent the further proliferation of *Vp*. DMF now requires oyster growers to report their source of ice on their propagation permit renewal applications. Harvesters who make their own ice using an ice machine at their residences are required to provide DMF with ice machine model and installation schematics, a cleaning log and water quality test results that confirm safe drinking water standards if the source of water is a private well. DMF conducted a preliminary validation of the icing methods allowed under the VCP. Results suggest oysters placed in an ice slurry as defined by the VCP (ice water mixture held at or below 45°F) reached an internal temperature of 50°F between 8- 15 minutes of submersion. An alternative method allows for bagged or loose oysters directly placed on ice (2 inches on the bottom, sides and between bags and 3 inches on top of bags). This approach achieved an internal temperature of 50°F between 35-40 minutes of icing. Oysters are required to remain adequately iced until received by the original dealer and placed under refrigeration. All commercial oyster harvesters (wild harvesters and aquaculturists) are required to record harvest growing area, quantity of oysters harvested, time of harvest, time of icing and dealer buying product in their state-issued *Vibrio* logbook (see Appendix Figure D for sample logbook page) prior to leaving the landing site and transiting to a permitted wholesale dealer facility.

Aquaculturists in Massachusetts may conduct air drying and culling activities which expose oysters to time-temperature abuse outside of the time to icing requirements of the VCP. Such activities are required to be logged in the state-issued *Vibrio* logbook and prior to harvest oysters are required to be segregated on the culture site and re-submerged for a minimum of 10 days to allow any *Vp* growth that may have occurred during such activities to purge prior to harvest. In 2016-2019 DMF conducted a validation of its re-submergence period in two harvest areas where such practices are common. Oysters were exposed to air drying for ~48 hours and samples of abused oysters were taken at various re- submergence intervals and compared to un-abused background samples. Samples over years and locations all show abused oyster samples return to background levels within 7 days of re-submergence (See Appendix Figure C (1)). DMF conducted *Vibrio* research in August of 2020 involving a temperature- abuse experiment on cultured oysters in Plymouth Harbor. To assess the impact of 48 hours of exposure to ambient air temperatures (typical of air drying practices for anti-fouling purposes) on the abundances of total and potentially pathogenic *Vp*, oysters from both sub-tidal and inter-tidal "treatments" were exposed (abused) for 2 days then resubmerged at their respective source locations. *Vp* genes indicative of total and pathogenic

*Vibrio* were measured in oysters in initial, abused (day 0) and after 2, 4, 6 and 8 days of resubmergence. Total *Vp* increased in abused oysters by three orders of magnitude and returned to environmental concentrations on day 8 of resubmergence in the sub-tidal treatment and day 6 of resubmergence in the inter-tidal treatment. Genes indicative of pathogenicity increased 2-3 orders of magnitude in the temperature abuse treatment and returned to environmental concentrations on day 6 of resubmergence in the sub-tidal treatment and day 4 of resubmergence in the inter-tidal treatment. Inter-tidal oysters purged their accumulated *Vibrio* burdens faster than the sub-tidal oysters. Given these results, DMF concluded that the current 10-day resubmergence requirement in the *Vibrio* Control Plan is sufficiently protective of public health in both sub-tidal and inter-tidal aquaculture grant sites. See Appendix Figure C (2) for a graphical presentation of results. The current year Massachusetts VCP is posted online on the DMF website: <https://www.mass.gov/service-details/review-the-vibrio-control-plan>

During the *Vibrio* Control Season, local Shellfish Constables and MA Environmental Police Officers increase compliance monitoring patrol efforts. Citations are given to harvesters guilty of committing critical violations of the *Vibrio* Control Plan. See Appendix Figure E for a copy of the *Vibrio* Compliance Control Form.

#### **4. Quantity of Harvest and Use**

In 2021, the Massachusetts oyster industry rebounded to greater than prepandemic levels with over 68 million pieces landed after experiencing an ~41% decline in landings value in 2020 due to restaurant closures associated with the COVID-19 pandemic response. Statewide during the 2021 *Vp* season, there were 408 harvesters in 32 coastal municipalities that commercially harvested oysters. Commercial oyster landings are independently reported by both harvesters and wholesale dealers to DMF in the Standard Atlantic Fisheries Information System (SAFIS). Harvester reporting is conducted on a monthly basis and dealer reporting on a weekly basis. Such reports are either submitted electronically or on paper forms. Dealers are required to report electronically. Harvester trip-level reports submitted on paper forms require manual entry and there is often a one to two-month lag time in when data submitted on paper forms are available for analysis. Statewide oyster landings by month for 2021 are presented in Appendix Figure A. When possible, oyster landings data are converted to pieces to standardize reporting. The data also includes the harvest method employed, time and date of harvest, the harvest area, and information on the dealer and harvester.

The majority of the oysters produced by private growers in Massachusetts and a high percentage of summer wild-caught oysters are consumed in the raw half-shell market in both intrastate and interstate commerce. Those not used for raw consumption (mostly wild-caught Wellfleet oysters) are shucked and cooked locally, usually as fried oysters. Currently no reliable information on a regional average for serving size is readily available.

#### **5. Industry Education and Outreach**

Prior to the 2019 *Vibrio* Control Season, four education and outreach meetings were scheduled throughout the state strategically located to accommodate the communities with the most commercial oyster harvesters and landings volume. Due to the COVID-19 pandemic, in-person meetings were not possible in 2020 and 2021. Instead, in 2020 harvesters were directed to review a video of the 2019 education and outreach meeting in the Town of Eastham that was posted by the municipality and is linked to on DMF's *Vibrio* Control web page: <https://www.mass.gov/service-details/review-the-vibrio-control-plan> and in 2021 a virtual meeting with presentation and question and answer period was advertised and open to the public. Additionally, a revised pdf of training slides was also posted to DMF's *Vibrio* webpage. DMF and DPH have also produced industry



training videos to educate oyster harvesters on the state's *Vibrio* Control Plan requirements and best harvest and handling practices to minimize *Vibrio* illness risk. These videos are hosted on DMF's YouTube channel and linked to on DMF's *Vibrio* Control web page. [Watch Vibrio training videos | Mass.gov](#)

## 6. CONCLUSIONS & RECOMMENDED ACTIONS

The occurrence of *Vp* illnesses per million oysters landed (Appendix Figure B) remains low following the implementation of stricter time-temperature icing controls in 2016 for the areas with elevated illness occurrence (Katama Bay and Plymouth, Duxbury and Kingston in Western Cape Cod Bay). Monitoring efforts have documented a high level of compliance with required *Vibrio* control measures. DMF and DPH will continue to collect and analyze state-specific data to inform decisions regarding *Vp* risk management measures and validate existing controls.

Due to the lack of *Vv* cases epidemiologically linked to the consumption of commercially harvested oysters from Massachusetts harvest areas, the state does not currently feel *Vv* illness is reasonably likely to occur and a *Vv* control plan is not required for oysters.

In order to protect public health and the oyster industry, the following are recommended for the 2022 *Vp* Season:

- a. Continue to implement a *Vp* Control Plan for all commercial oyster harvest in Massachusetts during the *Vp* risk period. The time period of the *Vp* Control Season shall be May 19<sup>th</sup> through October 19<sup>th</sup>. DMF and DPH recommend no changes to the *Vp* Control Season for 2022. No major changes to the VCP is recommended for the 2022 *Vibrio* Control Season.
- b. Continue to require rapid icing as a post-harvest temperature control. The plan shall require harvesters state-wide to ice oysters within 2 hours of harvest. From July 1<sup>st</sup> – Sept 15<sup>th</sup> harvest occurring in areas deemed to present increased *Vp* risk (Western Cape Cod Bay and Katama Bay) shall be required to ice oysters within 1 hour of the time of harvest or exposure.
- c. Continue to require Original Dealers to implement Hazard Analysis Critical Control Point (HACCP) Plans that adhere to the Critical Control Point Requirements in DPH's *Vp* HCCP Template (Appendix Figure F).
- d. The *Vibrio* Working Group should clarify icing requirements in the 2022 VCP for transactions occurring at the landing where product is received by a permitted wholesale dealer and immediately placed in a refrigerated truck. There is currently confusion as to whether that situation calls for the harvesters' or dealers' definition of "adequately iced".
- e. Continue compliance monitoring and enforcement of the *Vp* Control plan and implementing regulations. Increase monitoring efforts when environmental conditions are projected to present an elevated risk of *Vp* occurrence (above average air temperatures, large tides, periods of increased production).
- f. For harvesters identified as using private ice machines, follow up on machine sanitation and ensure water quality testing within 6 months prior to use for rapid cooling of oysters.
- g. Require all oysters received by the original dealer/shipper to be cooled to 45° F or less within ten hours of harvest or exposure.

- h. Continue to require other controls such as shading of oysters immediately after harvest until adequately iced and accurate record keeping in the *Vibrio* Logbook to aid in illness response.
- i. Continue to collect state-specific data to evaluate the effectiveness of *Vp* controls.
- j. Continue to offer industry education and outreach opportunities to maintain the high level of compliance with requirements of the *Vibrio* Control Plan

**Appendix:**

**A. 2021 Monthly Oyster Landings by Month**

MA Shellfish Ex-Vessel Value by Species and Month, 2021

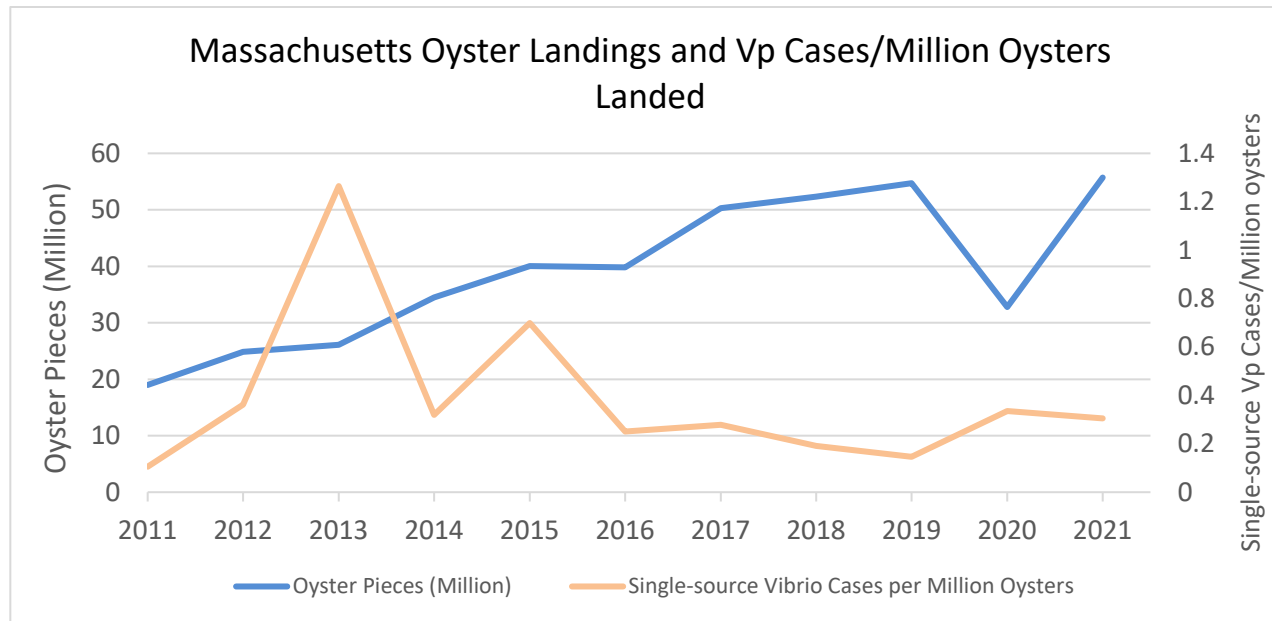
SPECIES	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
OYSTER, EASTERN	2,855,859	5,208,586	5,360,678	4,766,677	5,866,384	7,718,020	7,788,108	6,961,055	6,088,308	5,154,360	5,245,430	5,481,018	68,494,484

MA Shellfish Ex-Vessel Value by Species and Month, 2021

SPECIES	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
OYSTER, EASTERN	\$1,012,787	\$1,309,402	\$1,751,292	\$1,904,141	\$2,408,368	\$3,368,298	\$3,418,594	\$3,064,613	\$2,665,139	\$2,202,466	\$2,213,766	\$2,300,947	\$27,619,814

SOURCES: SAFIS Dealer Database, ACCSP Data Warehouse 06302022 ED

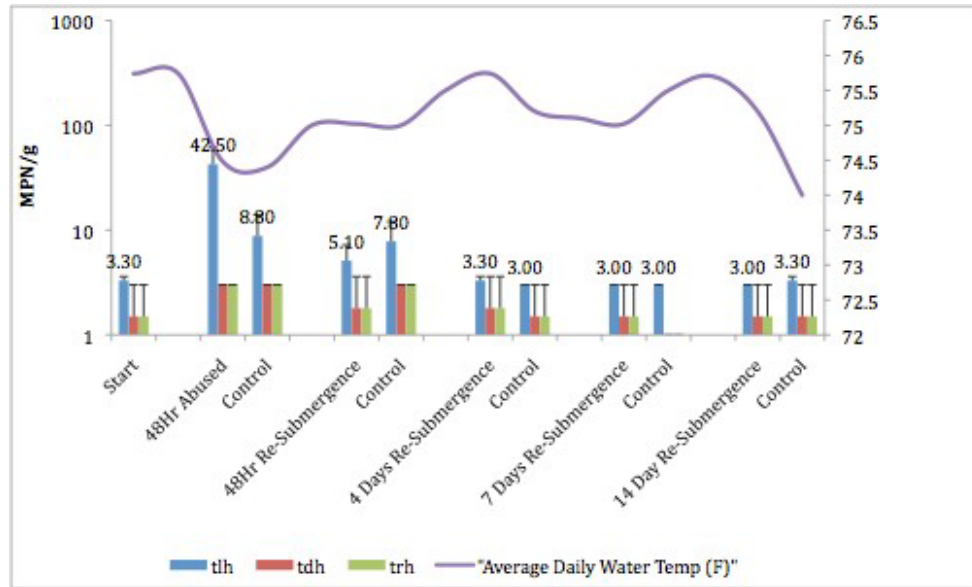
**B. Confirmed *Vp* Cases per Million Oysters Landed**



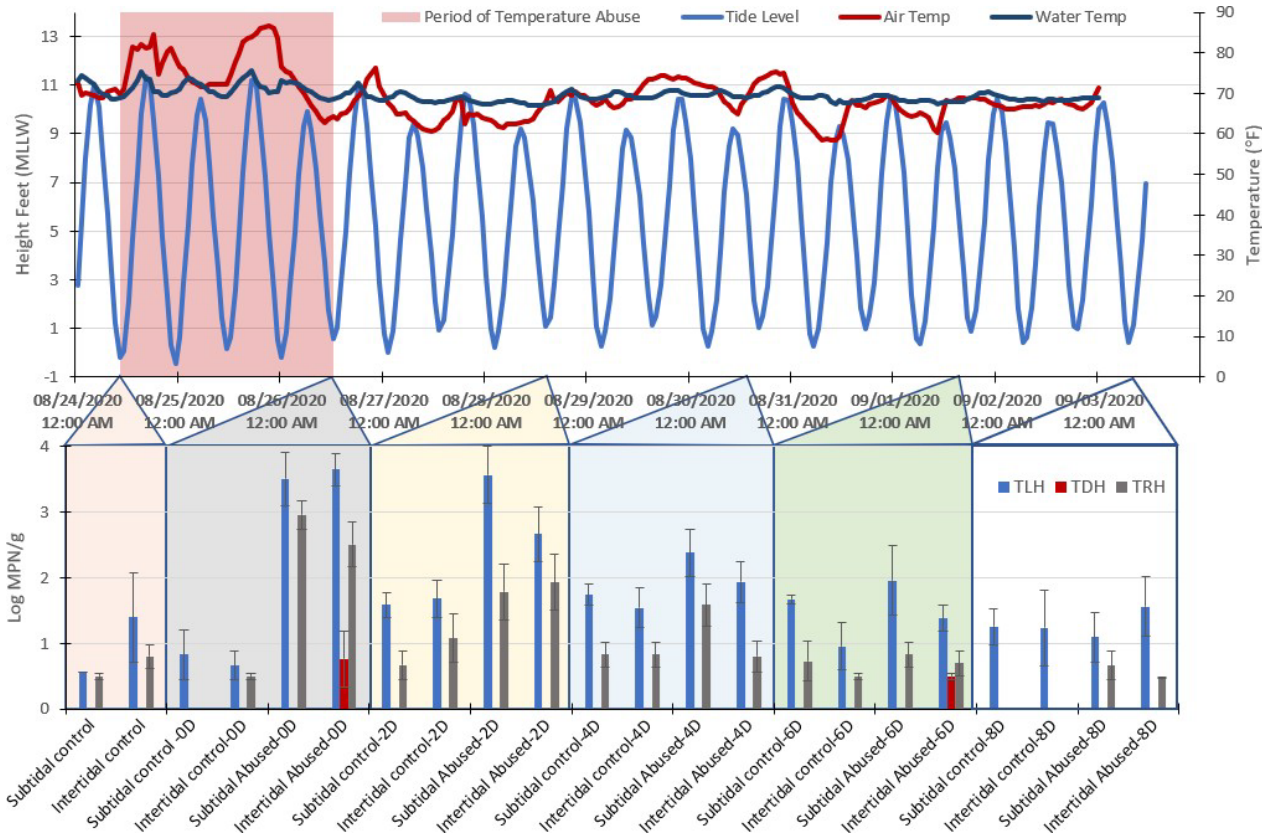


### C. Experimental Results of *Vibrio* in Oysters Following Temperature Abuse and Re-submergence

#### 1.



2.



TLH VP MPN/g

	Pre Abuse	0D	2D	4D	6D	8D
Subtidal control	3.6	10	42	59	47	22
Subtidal Abused		4625	6128	330	169	17
Intertidal control	82	5	59	45	13	37
Intertidal Abused		5237	753	111	26	63

TDH VP MPN/g

	Pre Abuse	0D	2D	4D	6D	8D
Subtidal control	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD
Subtidal Abused		<LOD	<LOD	<LOD	<LOD	<LOD
Intertidal control	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD
Intertidal Abused		9.6	<LOD	<LOD	3.1	<LOD

TRH VP MPN/g

	Pre Abuse	0D	2D	4D	6D	8D
Subtidal control	3.1	<LOD	5.3	7.3	6.8	2.9
Subtidal Abused		1018.0	98.7	49.7	7.3	5.2
Intertidal control	6.7	3.1	15.5	7.3	3.1	<LOD
Intertidal Abused		437.0	143.7	7.1	5.5	<LOD

**D. Example Page from 2021 State-Issued *Vibrio* Logbook**

Massachusetts <i>Vp</i> Control Plan			<i>Vibrio parahaemolyticus</i> ( <i>Vp</i> ) Harvest Logbook			
<u>Landing of Oysters Bound for... ..Market or Direct Human Consumption</u>						
Date	Harvest Area	Quantity		Time of Harvest- First Exposure	Time of Icing	Original Dealer: (Write "PC" if Personal Consumption)

<u>Re-submergence of... ..Cultured Oysters</u>								
Date		Harvest Area	Quantity		Containers		Category	Notes
Removed from Site	Re-submerged				Type	Number		

\*Re-submergence Categories (1) Air drying for anti-fouling;

(2) Culling activities; (3) Non-compliance at original dealer; (4) Recall

E. 2021 *Vp* Compliance Monitoring Form

**Massachusetts Division of Marine Fisheries 2021 *V.p.* Compliance Monitoring Form**

**A Interview Information:**

1. Date: \_\_\_\_\_ Location: \_\_\_\_\_  
 2. Time: \_\_\_\_\_ Town: \_\_\_\_\_  
 3. Officer/Staff Name(s): \_\_\_\_\_ Agency: \_\_\_\_\_

**B Harvester Information:**

1. Name: \_\_\_\_\_ Check One:  Aquaculturist  Wild Harvester  
 2. MA Commercial Shellfish Permit ID#: \_\_\_\_\_  
 3. If Aquaculturist, is Shellfish Propagation Permit Endorsed for Off-site Culling? Yes  No   
 4. If Aquaculturist on grant site but not harvesting check here:

**C Shellfish Tagging:** 322 CMR 16.05 (1)(a), 16.07 (3)(c)

1. Are All Containers Properly Tagged?  Yes  No   
 2. Do the Tags Include the Following Information?  
     a. Time of Harvest:  Yes  No   
     b. Time of Icing:  Yes  No   
     c. Harvest Date:  Yes  No   
     d. Harvest Area:  Yes  No   
     e. Harvester ID:  Yes  No

**D *V.p.* Harvest Logbook:** 322 CMR 16.07 (3)(d)

1. Is the Logbook Present?  Yes  No   
 2. Is the Following Information Provided?  
     a. Time of Harvest:  Yes  No   
     b. Time of Icing:  Yes  No   
     c. Date:  Yes  No   
     d. Quantity of Oysters:  Yes  No   
 3. If Aquaculturist, Does Logbook Indicate Oysters are Currently Being Re-submerged?  Yes  No   
 If Yes and Compliance Check Occurring on Grant Site, are Re-submerged Lots Correctly Tagged and Segregated?  Yes  No

**E Shellfish Handling:** 322 CMR 16.07 (3)(a), (3)(b)

1. Are Oysters Adequately Iced?  Yes  No   
 2. Are Oysters Adequately Shaded?  Yes  No

**F Shellfish Delivery:** 322 CMR 16.07 (3)(e)

1. Name of Wholesale Dealer: \_\_\_\_\_  
 2. Quantity of Oysters: \_\_\_\_\_  
 3. Oysters Received at (check one):  Truck  Dealer's Facility

**G General Sanitary Harvest Compliance:** 322 CMR 16.04 (2)

1. Is Sanitation Device/Container Secured Onboard Vessel?  Yes  No  NA   
 2. Are Pets/Animals Onboard Harvesting Vessel?  Yes  No  NA

**H Compliance Assessment:**

1. Was Enforcement Action Taken?  Yes  No   
 2. If Yes, provide Citation Number or Report Number: \_\_\_\_\_

**Critical Violation**

Over for Notes

Regulatory Authority: M.G.L. c. 130 §§ 17(11) and 17A.

Please submit all forms and any questions to: Christian Petitpas  
 Massachusetts Division of Marine Fisheries  
 706 South Rodney French Blvd.  
 New Bedford, MA 02744.  
 Office: (508) 742-9766  
 Mobile: (617) 413-2329

F. *Vibrio parahaemolyticus* HACCP Template

*Vibrio parahaemolyticus* HACCP Form - Original Dealer

Critical Control Point	Significant Hazard	Critical Limits for each Control Measure	Monitoring				Corrective Actions	Verification	Records
			What	How	Frequency	Who			
Receiving  May 19th - October 19th 2022	Naturally occurring <i>vibrio parahaemolyticus</i> bacteria	Oysters shall be adequately iced, with time of icing indicated on the shellfish tag or the harvester icing tag. Icing must occur within two (2) hours of harvest or exposure by tide.  OR  Oysters harvested from shellfish growing areas CCB- 42, CCB-43, CCB-45, CCB-46, CCB-47 and V-20, between July 1 – September 15, 2022 shall be adequately iced within one (1) hour of time of harvest or exposure, or prior to leaving the point of landing, whichever occurs first.	Harvester Tag  Adequately iced as specified in the 2022 <i>Vibrio</i> Control Plan	Visual	Each bag or container upon receipt OR each shellfish icing container.	Trained Employee	Reject any lot not properly tagged and/or adequately iced. When rejected, document name of harvester, harvest area, harvest date, date and time of delivery, and harvester's DMF Shellfishing Permit number. Report to DMF OR, if received, place on hold and report to Food Protection Program. Discontinue receipt of oysters from harvester until compliance is met.	Review and sign weekly	Receiving Log  Corrective Action Log  Cooling Monitoring Record Corrective Action Log

Critical Control Point	Significant Hazard	Critical Limits for each Control Measure	Monitoring				Corrective Actions	Verification	Records
			What	How	Frequency	Who			
Cooling	Pathogen Growth <i>vibrio parahaemolyticus</i> bacteria-	The internal temperature of oysters shall be cooled to 45°F or less within ten (10) hours of harvest or exposure by tide and prior to release for shipment	Internal temperature of oysters	Thermometer	Each Lot	Trained Employee	Ensure that oysters not cooled to an internal temperature of 45°F or less within ten (10) hours of harvest or exposure by tide are not directed to the raw market. Document the deviation in the Corrective Action Log, place any noncompliant oysters on hold, recall any noncompliant oysters that have been shipped, correct root cause of the Critical Limit deviation and notify the Food Protection Program of the action taken.	Weekly thermometer calibration  Review and sign weekly	Cooling Record  Corrective Action Log  Calibration Log
Critical Control Point	Significant Hazard	Critical Limits for each Control Measure	Monitoring				Corrective Actions	Verification	Records
			What	How	Frequency	Who			
Storage	Pathogen Growth  <i>Vibrio Parahaemolyticus</i> bacteria	Cooler temperature not to exceed 45°F	Cooler Temperature	Thermometer	Two (2) times daily OR one (1) time daily when utilizing continuous monitoring	Trained Employee	Dispose of oysters place in cooler incapable of maintaining an ambient air temperature of 45°F or less, held at unrefrigerated temperatures greater than 45°F, or not adequately iced; document the deviation in the Corrective Action Log; and correct root cause of the Critical Limit deviation.	Weekly thermometer calibration  Review and sign weekly	Cooler temperature record  Corrective Action Log  Calibration Log

**COMMONWEALTH OF MASSACHUSETTS**  
**2022 *Vibrio Parahaemolyticus* (*Vp*) Hard Clam Risk Assessment**

**DIVISION OF MARINE FISHERIES**

**DEPARTMENT OF PUBLIC HEALTH**

Pursuant to National Shellfish Sanitation Program (NSSP) requirements, every state from which hard clams are harvested commercially shall conduct an annual *Vibrio parahaemolyticus* (*Vp*) and *Vibrio vulnificus* (*Vv*) risk evaluation. The evaluation shall consider the risk of *Vp* or *Vv* infection from the consumption of hard clams harvested from an area and evaluate whether illness is reasonably likely to occur. For this risk assessment, “reasonably likely to occur” shall mean that the risk constitutes an annual occurrence. This report provides an evaluation of environmental conditions and harvest practices that may have an impact on *Vp* illness and *Vv* occurrence, and efforts the State Control Authorities implemented through the 2021 Massachusetts *Vibrio* Control Plan and associated regulations to mitigate such risk. Cases of *Vp* epidemiologically linked to the consumption of commercially harvested hard clams from Massachusetts harvest areas did not indicate a level of risk that warranted *Vp*-specific control measures for hard clams in the 2021 Massachusetts *Vibrio* Control Plan. Due to the lack of *Vv* cases epidemiologically linked to the consumption of commercially harvested hard clams from Massachusetts harvest areas, the state does not currently feel *Vv* illness is reasonably likely to occur and a *Vv* control plan is not required.

**1. Confirmed *Vp* Cases**

The Massachusetts Department of Public Health (DPH) and MA Division of Marine Fisheries (DMF) investigated thirty-three (33) confirmed *Vp* illnesses involving consumption of raw oysters in 2021 (Table 1). There were three (3) single-source *Vp* illnesses associated with the consumption of hard clams. Two illnesses were from the consumption of quahogs that were recreationally self harvested in shellfish growing areas BB32 and CCB31, respectively. The third illness case implicated single-source commercially harvested little neck hard clams traced back to growing area CCB9.

No growing area closures occurred during the 2021 *Vibrio* season.

<b>Table 1. 2021 <i>Vp</i> Illnesses (Raw Oysters) Traced Back to Specific Growing Areas</b>	
	<b>MA Growing Areas or State/Country for Out-of-state Traceback</b>
<b>MA Single-source (16)</b>	BB36 (1 case); BB37 (2 cases); CCB23 (2 cases); CCB31 (1 case); CCB41 (1 case); CCB45 (1 case); E10 (1 case); MHB4 (1 case); V20 (6 cases)
<b>MA Multi-source (3)</b>	[CCB45 & SC28]; [CCB31, CCB45 & V2]; [V2 & V20];
<b>Both Out-of-state and In-state Multi-source (9)</b>	[BB18, CCB45, CCB42 & WA]; [BB1, CCB23 and WA]; [CCB11, V20 & ME]; [BB37, CCB11, CCB31, CCB45, SC28 & ME]; [BB1, V2, V20, ME & Canada]; [BB1, CCB11, CCB45, WA & ME]; [CCB11, SC61, WA & ME]; [CCB11, CCB23, CCB31, CCB45, SC21, V2, V20, RI, ME, WA & Canada]; [SC28, RI & ME]
<b>Out-of-state Only (5)</b>	[VA & NY]; [CT]; [Canada & RI]; [RI]; [Canada & NY]

Growing area maps online at <https://www.mass.gov/service-details/shellfish-classification-areas>

Previous Year Summaries

2020

MA DPH and DMF investigated sixteen (16) confirmed *Vp* illnesses involving consumption of raw oysters in 2020. There was a single confirmed *Vp* illness associated with the consumption of raw hard clams (quahogs) by a New York resident visiting Massachusetts. The case was lost to follow-up and no shellfish growing area was implicated. Fifteen illness investigations including trace back were completed for those confirmed *Vp* illnesses (Table 2). One illness associated with consumption of raw oysters at a residential Labor Day party was lost to follow-up because individuals involved were unable or unwilling to provide information regarding the source of the consumed oysters. Katama Bay (V20) in the Town of Edgartown on Martha’s Vineyard was the harvest area for 7 of the 8 single-source *Vp* illnesses. Three additional investigations and trace backs were completed for illnesses associated with raw oyster consumption that were confirmed *Vibrio* genus, but species was not identified. These three illnesses had single-source trace backs to Dennis North Coastal (CCB23), Nauset Harbor (OC2) and Katama Bay (V20).

No growing area closures occurred during the 2020 *Vibrio* season.

<b>Table 2. 2020 <i>Vp</i> Illnesses (Raw Oysters) Traced Back to Specific Growing Areas</b>	
	<b>MA Growing Areas or State/Country for Out-of-state Traceback</b>
<b>MA Single-source (8)</b>	CCB45 (1 case); V20 (7 cases)
<b>MA Multi-source (4)</b>	[CCB23 & CCB45]; [CCB11 & CCB14]; [V2 & V20]; [V2 & V20]
<b>*Out-of-state Multi-source and Single-source (3)</b>	[CCB45 & Out-of-state (PEI, ME)]; [Single-source: NH]; [Single-source: ME]

\*Includes out-of-state only tracebacks and tracebacks implicating out-of-state plus MA growing areas.

2019

MA DPH and DMF investigated twenty-seven (27) total confirmed *Vp* illnesses in 2019 involving individuals who consumed raw shellfish. Illness investigations including trace back were completed for fifteen (15) of the illnesses, each associated with raw oyster consumption (Table 3). There were twelve (12) *Vp* illnesses that were lost to follow-up as ill individuals were not able or willing to provide adequate information to conduct a trace back, including two (2) illnesses associated with consumption of raw hard clams (quahogs). One (1) illness was reported from an individual who consumed self-harvested clams and could not identify the harvest area. One (1) illness was reported from an individual who consumed clams of unknown source given to him by a friend. Each of these cases is included in those raw shellfish consumption cases lost to follow-up.

<b>Table 3. 2019 <i>Vp</i> Illnesses (Raw Oysters) Traced Back to Specific Growing Areas</b>	
	<b>MA Growing Areas or State/Country for Out-of-state Traceback</b>
<b>MA Single-source (8)</b>	BB37 (1 case); CCB45 (1 case); V20 (6 cases)
<b>MA Multi-source (4)</b>	[CCB14 & CCB20]; [CCB11 & CCB14]; [CCB11, CCB13 & SC49]; [BB1, BB36 & BB37]
<b>*Out-of-state Multi-source (3)</b>	[CA, VA, WA, Canada, Mexico]; [WA-multiple growing areas]; [BB4, CCB11, CCB31, SC21, ME, Canada]

\*Includes out-of-state only tracebacks and tracebacks implicating out-of-state plus MA growing areas.



Four additional confirmed *Vp* cases were linked to the consumption of cooked fish, shrimp, lobster, and scallops. Additionally, DPH and DMF reported three (3) total confirmed *Vibrio cholerae* illnesses for 2019 involving individuals who consumed raw oysters and for which investigations were conducted. Two (2) illnesses were linked to a single MA growing area (a different area for each case) and one (1) illness was linked to multiple MA growing areas.

No growing area closures occurred during the 2019 *Vibrio* season.

## 2018

MA DPH investigated forty (40) foodborne *Vibrio* illnesses in 2018. Thirty-two (32) of these illnesses were laboratory-confirmed cases of *Vibrio parahaemolyticus* and eight (8) illnesses were *Vibrio* sp. detected by Culture-Independent Diagnostic Tests (CIDT). Thirty-one (31) of these cases were linked to shellfish consumption. Additionally, one (1) case was linked to raw crab, one (1) case was linked to cooked shrimp and/or cooked salmon, and seven cases (7) were lost to follow up. Trace back information revealed that thirteen (13) cases were exclusively linked to the consumption of oysters harvested in MA. Four (4) of these cases were attributed to multiple growing areas within MA and nine (9) cases were attributed to a single growing or hydrographic area. Five (5) cases were linked to Western Cape Cod Bay (CCB42-45); one (1) case was linked to Brewster North Coastal (CCB20); one (1) case was linked to Cotuit Bay (SC21); one (1) case linked to Barnstable Harbor (CCB31); and one (1) case linked to Pleasant Bay (SC61).

Additionally, there were eighteen (18) cases with complete trace back information that identified shellfish harvested from growing areas in Massachusetts and other states/Canadian provinces. The remaining two (2) cases with complete trace back information were linked to growing areas in other states.

### 2018 Closures

On 9/15 DMF instituted a precautionary 7-day closure of all commercial oyster harvest from Duxbury, Plymouth, and Kingston Bays growing areas (CCB42-47) due to notification from DPH of two cases linked to harvest dates between 8/30 and 9/6. No additional cases were reported and the area was reopened to oyster harvest on 9/22.

## 2017

MA DPH received reports of 34 laboratory-confirmed cases of *Vibrio parahaemolyticus* in 2017, of which one was comorbid with *Vibrio fluvialis*. Twenty-nine cases were linked to shellfish consumption (oysters 23, clams 2, oysters and clams 4). Additionally, one case was linked to crustaceans, three reported seafood or shellfish consumption but were unable to provide specifics, and one case reported travel associated infection.

Traceback information revealed that 18 cases were exclusively linked to the consumption of oysters or clams harvested in Massachusetts. Of these 18 cases, one case was linked to recreationally harvested oysters and one to recreationally harvested clams. Two cases were attributed to multiple growing areas within Massachusetts. Fourteen cases were singularly attributed to one growing area: three cases were linked to Western Cape Cod Bay (CCB42-45); one case was linked to Dennis North Coastal (CCB23); three cases were linked to Katama Bay on Martha's Vineyard (V20); two cases linked to

Oyster Pond River (SC49); two cases linked to Wellfleet Harbor (CCB11-14); two cases linked to Eastern Cape Cod Bay (CCB17 and/or CCB20) ; and one case linked to Barnstable Harbor (CCB31).

The remaining cases with complete traceback information included one case that was attributed to a Massachusetts resident who consumed oysters in another state and the case was reported to the corresponding state's health department, and traceback yielded oysters harvested out of state. Four cases involved shellfish harvested from both Massachusetts and other states; state SSCAs were notified of the potential attribution to their growing areas. One of the cases linked to consumption of clams turned out to be a fully cooked product after follow-up investigation.

### 2017 Closures

On 9/29 the DMF instituted a 14-day closure of all commercial oyster harvest from Katama Bay growing area (V20) due to notification from DPH of two cases linked to a single harvest date (9/12). No additional cases were reported and the area was reopened to oyster harvest on 10/13

### 2016

MA DPH received reports of 28 laboratory-confirmed cases of *Vibrio parahaemolyticus* in 2016, of which 2 were comorbid with *Vibrio alginolyticus* and 1 was comorbid with *Vibrio fluvialis*. Seventeen cases were linked to shellfish consumption (oysters 16, and clams 1). Two cases were linked to wound infections; one was linked to lobster consumption, three were linked to other infections; and five were lost to follow up as the individuals were unable to provide an adequate food history or were unreachable by epidemiologists.

Traceback information revealed that 13 cases were exclusively linked to the consumption of oysters or clams harvested in Massachusetts. Three cases were attributed to Massachusetts residents who consumed oysters in other states and the cases were reported to the corresponding state's health department and one case involved oysters harvested from both Massachusetts and Virginia. State SSCA's were notified of the potential attribution to their growing areas when possible. Three cases were attributed to multiple growing areas within Massachusetts. One case was linked to the consumption of hard clams harvested from Wellfleet harbor (CCB11). Nine cases were singularly attributed to one growing area: four cases were linked to Western Cape Cod Bay (CCB45); two cases were linked to Katama Bay on Martha's Vineyard (V20); two cases linked to Dennis North Coastal (CCB23); and one case linked to Barnstable Harbor (CCB31).

### 2015

MA DPH investigated reports of 56 laboratory-confirmed cases of *Vibrio parahaemolyticus* in 2015. Of these, 28 cases were traced back to individual Massachusetts growing areas. 4 cases were linked to Barnstable Harbor (CCB31); 1 case linked to Wellfleet harbor (CCB11) and 1 case linked to Popponesset Bay (SC19). Ten cases were linked to Western Cape Cod Bay (CCB42-45) and 12 cases were linked to Katama Bay on Martha's Vineyard (V20). Timing and frequency of confirmed illnesses resulted in mandatory closures of three growing areas.

## 2015 Closures

On 8/25 the DPH and DMF exercised their authority as described at Section D.5., of the 2015 Massachusetts *Vp* Control Plan to institute a precautionary closure of all commercial oyster harvest from Katama Bay (V20). Harvest dates resulting in the closure are as follows: 7/6, 7/7, 7/8, and 7/20. During the initial closure period additional cases were reported with harvest dates of 8/8, 8/14, and 8/18 and as a result DPH and DMF extended the closure by an additional 7 days with both closures running concurrently for a total of 14 days.

On 9/23 DPH and DMF exercised their authority as described at Section D.5., of the 2015 Massachusetts *Vp* Control Plan to institute a closure of all commercial oyster harvest from Western Cape Cod Bay growing areas (CCB42-45). Harvest dates resulting in the closure are as follows: Duxbury Bay (CCB45) 8/4, 8/18, 9/2, 9/6 and Plymouth Bay (CCB42) on 8/31. During the initial closure period two additional cases were linked to the area with harvest dates of 9/2 and 9/5 resulting in an extension of the closure to meet the mandatory 14-day closure requirement under the 2013 NSSP MO.

## 2014

Twenty-four cases of *Vp* illness were reported to Massachusetts state officials in 2014. Of these, 11 cases were traced back to a single Massachusetts growing area, with four of these cases were attributed to V20, Katama Bay in Edgartown. Another three cases were associated with CCB23, Dennis North Coastal in Cape Cod Bay. Two illnesses were attributed to area CCB45, Duxbury Bay. One illness was linked to OC2, Nauset Harbor in Orleans, and another single illness to SC49, Oyster Pond River in Chatham. The remaining 13 of the 24 cases were attributed to either out-of-state growing areas and/or multiple Massachusetts growing areas as possible sources of oysters. No cases were epidemiologically linked to the consumption of commercially harvested hard clams from Massachusetts harvest areas.

## 2013

During 2013, DPH investigated 58 reported *Vp* cases. Of these, 33 cases were traced back to one or more Massachusetts-only growing areas. In 19 of these cases there was some link to Duxbury Bay in Duxbury, involving three adjacent/contiguous state designated shellfish growing areas. Another 12 cases were linked to Katama Bay in Edgartown. One illness was attributed to area CCB23, Dennis North Coastal in Cape Cod Bay, and area SC61, Little Pleasant Bay in Orleans, was the single source in another illness. Of the remaining cases, 25 of the 58 cases were also linked to out-of-state growing areas as possible sources of oysters. No cases were epidemiologically linked to the consumption of commercially harvested hard clams from Massachusetts harvest areas.

## 2012

For 2012, Massachusetts investigated nine confirmed individual sporadic cases of *Vp* traced to consumption of commercially harvested oysters from Massachusetts growing areas. An additional five sporadic cases were traced back to multiple sources that included some of the same Massachusetts growing areas, as well as sources in other states. As a result of the multiple sources, the specific origin of oysters related to the illnesses could not be conclusively determined. No cases were epidemiologically linked to the consumption of commercially harvested hard clams from Massachusetts harvest areas.

In 2011, there were two illnesses linked to Eastern Cape Cod Bay, a region with similar tidal characteristics where oysters are exposed during lower tidal stages to sun and air temperature for several hours. An illness outbreak (two or more illnesses) epidemiologically linked to oysters harvested at the same time from an area triggers a Control Plan for the area under NSSP standards. In previous years, there have been sporadic *Vp* illnesses involving shellfish from a combination of in-state and out-of-state sources. This was the first time two illnesses have been solely associated with the same Massachusetts source. Another sporadic case was reported in the fall of 2011 linked to oysters commercially harvested from Duxbury Bay. No cases were epidemiologically linked to the consumption of commercially harvested hard clams from Massachusetts harvest areas.

Pulsed-Field Gel Electrophoresis (PFGE) and Genetic Analyses of Illness Clinical Isolates

Results from clinical isolates collected from illness cases between 2011 and 2016 identified several lineages causing infections in the northeast and revealed that the majority of *Vp* cases linked to Massachusetts have resulted from 2 distinctive pathogenic strains: an ecologically invasive strain endemic to the Pacific sequence type (ST) 36, causing more than 70% of the infections; and a resident strain (ST631) that causes approximately 15% of infections (Figure 1; Xu et al., 2015; Unpublished data).

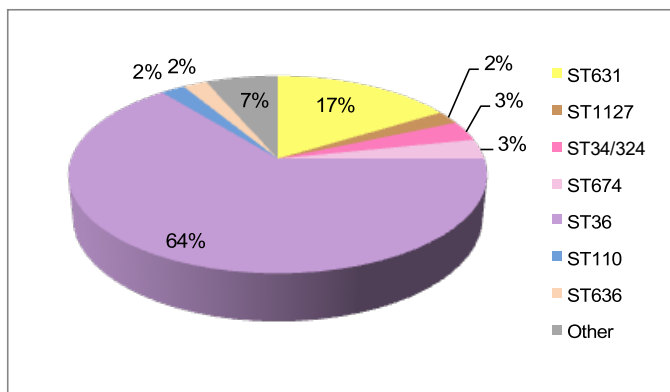


Figure 1. chart showing Strain types implicated in MA *Vp* cases Xu et al., 2016

2. Environmental Monitoring

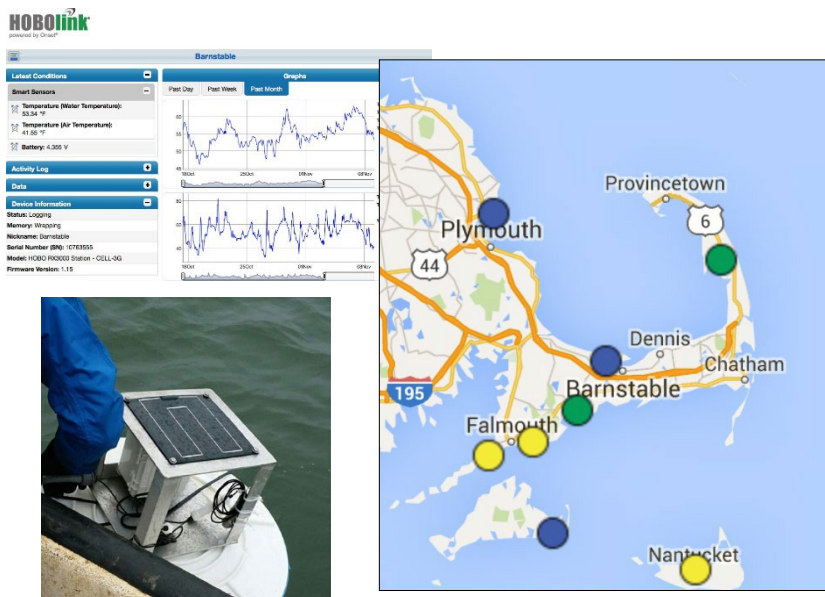


Figure 2. Temperature monitoring locations/online data image capture

As a result of Massachusetts’ unique bathymetry and hydrographics there can be significant variability in environmental conditions between shellfish growing areas. *Vp* sampling stations and environmental monitoring locations were selected to capture, to the extent possible, this variability

MA DMF monitors environmental conditions (e.g. water temperature, air temperature Figure 2) and has monitored *Vp* levels in select shellfish growing areas across the Commonwealth at various times (Figure 3).

DMF does not monitor for *Vv*. These data are used in the annual Massachusetts *Vp* risk assessment, as well as to correlate environmental conditions leading up to the occurrence of confirmed *Vp* illnesses and to forecast periods of increased *Vp* risk.

but may also have been chosen based on historic illness occurrence and shellfish production levels.

### Water and Air Temperature

In 2021, all Massachusetts shellfish production areas met or exceeded the 2019 NSSP Model Ordinance limit (Chapter 2 @.07.B.2.c) of average water temperatures exceeding 60° F for a thirty-day period in waters bordering the Atlantic (NY and north). DMF deploys shaded air temperature monitors in select growing areas and additional air temperature data is collected from National Weather Service (NWS). NWS sites are not on the water; therefore, it can be assumed that the recorded temperatures are higher than those that would have been observed at the oyster culture/harvest sites. A number of DMF air and water temperature sensors can be accessed remotely (Figure 2 blue circles). These data provide close to real-time information for harvesters, public health officials, environmental police officers, shellfish managers, and the general public. The information can be accessed via an interactive map available on the DMF website. Most shellfish growing areas exceed average monthly daytime water temperatures of 60°F during the months of June through October. The current *Vibrio* Control Plan season encompasses these months. The map also includes additional sensors operated by other entities (yellow and green circles). Additionally, coordination with the NOAA Forecasting Center facilitated the development of risk assessment models that simulate *Vp* doubling times under forecasted environmental conditions for select growing areas within Massachusetts. <https://products.coastalscience.noaa.gov/vibrioforecast/northeast/massachusetts/msbestharvest.aspx>

### Salinity

There are few large streams bringing fresh water into Cape Cod Bay, Nantucket Sound, and Vineyard Sound harvest areas. The limited fresh water input, proximity of harvest sites to the open-ocean and relatively large tidal range in most harvest areas results in relatively well-mixed saline waters statewide; with average salinities in Cape Cod Bay between 29-33 psu and Buzzards Bay sites ranging between 25-29 psu.

### Tides

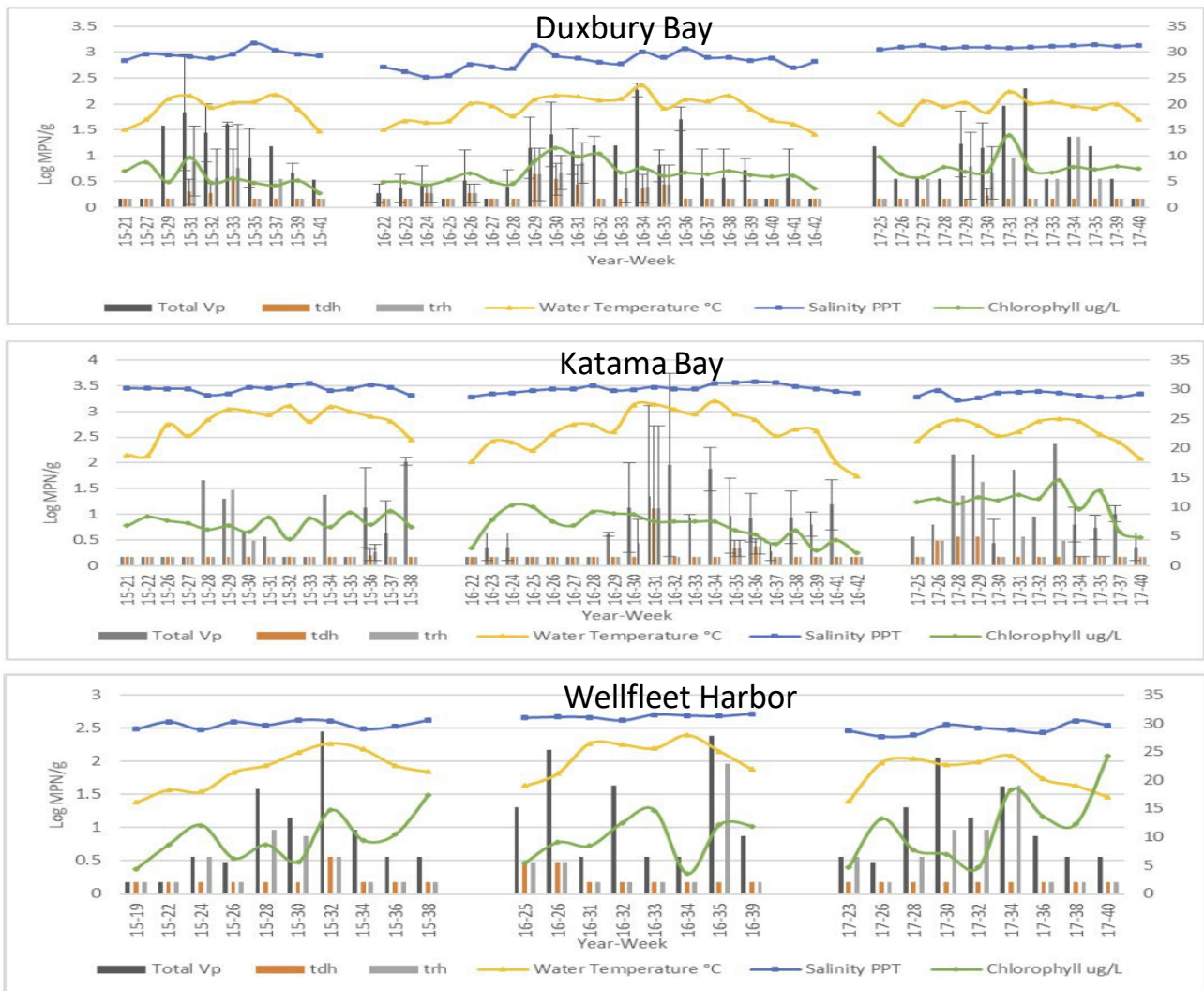
Eastern Cape Cod bay harvest areas have tidal amplitudes with a mean range varying from 10 feet in Wellfleet to 9.5 feet at Beach Point, Barnstable Harbor, and 9.1 feet in Provincetown. On extreme minus or moon tides, the tides can be 1 to 2 feet lower than average. The significant tidal range and bathymetry of the area result in exposure of vast intertidal flats at harvest sites on most low tides. Harvest areas in Western Cape Cod Bay (Duxbury, Plymouth, Kingston) have a similar tidal amplitude as those in Eastern Cape Cod Bay, but as a result of the varied bathymetry, site-specific exposure times can vary. Harvest sites in Plymouth and Kingston Bays may fully expose on average and minus tides, whereas Duxbury Bay harvest sites often only expose on large moon tides. Throughout Buzzards Bay, the mean tidal amplitude is 3.1 to 4.0 feet; on the South Side of Cape Cod and on Martha's Vineyard, it is between 1 and 2 feet at oyster sites; and about 3 feet at a maximum on Nantucket; the majority of these harvest areas do not expose during low tide.

### Levels of *Vibrio Parahaemolyticus* in Shellfish Growing Areas

Massachusetts does not regularly sample hard clams for *Vp*. Starting in 2013 DMF collected oyster shellstock samples from select growing areas to determine the level of background *Vp* bacteria in shellfish tissue. These samples were analyzed using the MPN to AP gene probe method for the enumeration of *tlh* and the hemolysin gene *tdh* as described in the FDA Bacterial Analysis Manual. These initial efforts were limited to late season samples from Duxbury Bay and Katama Bay. Efforts were expanded in 2014 to include bi-weekly shellstock samples from three (3) high-production growing areas: Barnstable, Dennis and Wellfleet; with sampling efforts in Katama Bay stopped due to

logistical issues and Duxbury samples being conducted in partnership with FDA’s Gulf Coast Seafood Laboratory. In 2015 DMF continued the use of the MPN to AP gene probe method for background environmental sampling and expanded its efforts to include biweekly sampling of Katama Bay and Duxbury Bay, as well as Dennis and Wellfleet.

In 2015 DMF also piloted the use of the *trh* AP gene probe and the MPN-real-time PCR method targeting total *Vp* and both hemolysin genes *tdh* and *trh* (Kinsey et al., 2015, Schillaci Master of Science Thesis). Figure 3 below shows total and potentially pathogenic (*tdh*+ and *trh*+) *Vp* plotted with salinity, water temperature and chlorophyll concentrations in three growing areas generally representing the source of greater than 50% of the harvested oysters in Massachusetts. The majority of confirmed single-source *Vp* cases in the state have been traced to Katama Bay, Wellfleet Harbor, and the Duxbury/Plymouth/Kingston Three Bays System. There is considerable variability in total and potentially pathogenic *Vp* in these growing areas and a clear relationship with salinity and chlorophyll concentration was not observed. However, there was a positive relationship between total and potentially pathogenic *Vp* and water temperature, though not a tight correlation. The majority of confirmed *Vp* cases generally coincided with months of peak *Vp* levels and highest water temperatures (June-September).



**Figure 3. Temporal variation (year-week) of environmental parameters (right axis) and mean Total *Vp*, *tdh* and *trh* levels (left axis) in oyster samples collected from Duxbury Bay, Katama Bay and Wellfleet Harbor 2015-2017. Adapted from the Master of Science Thesis of Christopher Schillaci, UNH.**



## 6) Harvest and Culture Techniques

Private growers on licensed aquaculture sites conduct approximately 20% of commercial hard clam landings in Massachusetts, with the vast majority coming from wild harvest. Clam culture is primarily conducted in intertidal harvest areas, such as those in Eastern Cape Cod Bay, using attached bottom netting with site access primarily limited to two hours on either side of low tide when the sites are exposed. Wild harvest from shore is conducted in a similar manner as cultured product with hand rakes at or on either side of low tide. Wild harvesters also utilize clam dredges dragged by commercial fishing boats in deeper water. Regulations at 322 CMR (Code of Massachusetts Regulations) 16.00: Shellfish Sanitation, Harvest, Handling and Management require appropriate sanitary handling and that the time of harvest be recorded on all harvester tags for all species year-round for the purpose of adhering to the NSSP time-temperature matrix (Section II - Chapter VIII Control of Shellfish Harvesting): 18 hrs (May-Oct). *Vibrio*-specific harvest controls on hard clams were not required in the 2021 *Vibrio* Control Plan.

## 7) Quantity of Harvest and Use

Statewide during the *Vp* risk period, there were over 341 harvesters in 26 municipalities commercially landing hard clams from Massachusetts growing areas. Greater than 3.7 million pounds of hard clams were landed in Massachusetts in 2021 (Appendix). Commercial clam landings are independently reported by both harvesters and wholesale dealers to DMF in the Standard Atlantic Fisheries Information System (SAFIS). Harvester reporting is conducted on a monthly basis and dealer reporting on a weekly basis. Such reports are either submitted electronically or on paper forms. Dealers are required to report electronically. Harvester trip-level reports submitted on paper forms require manual entry and there is often a one to two-month lag time in when data submitted on paper forms are available for analysis. Such data includes landings by pieces, bushels or pounds and price paid to the harvester. The data also include the harvest method employed, product grade, date of harvest, the harvest area, and information on the dealer and harvester. Statewide hard clam landings by month for 2021 are presented in the appendix.

Average price paid varies by grade. As smaller grades have value as both cooked and raw product, identifying the final disposition is difficult. Larger grades are almost exclusively directed to the cooked market thus it can be assumed reported landings of “chowder” and “cherry stone” clams are not being consumed raw.

## CONCLUSIONS & RECOMMENDED ACTION

As *Vp* cases epidemiologically linked to the consumption of commercially harvested hard clams from Massachusetts harvest areas are rare and do not exceed NSSP thresholds for “outbreaks”, Massachusetts does not currently feel time-temperature controls beyond those required in Section II - Chapter VIII of the NSSP MO are required for hard clams. *Vibrio*-specific harvest controls on hard clams were not required in the 2021 *Vibrio* Control Plan and no changes are recommended for the 2022 *Vibrio* Control Plan. The current year Massachusetts VCP is posted online on the DMF website: <https://www.mass.gov/service-details/review-the-vibrio-control-plan>

Due to the lack of *Vv* cases epidemiologically linked to the consumption of commercially harvested hard clams from Massachusetts harvest areas, the state does not currently feel *Vv* illness is reasonably likely to occur and a *Vv* control plan is not required for hard clams.

## Appendix:

### Monthly Hard Clam Landings (Live Pounds), 2021

SPECIES	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
CLAM, QUAHOG, NORTHERN	183,672	113,783	219,845	197,322	348,833	453,739	527,906	545,773	343,332	301,596	271,051	221,780	3,728,633

### Monthly Hard Clams Ex-Vessel Value, 2021

SPECIES	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
CLAM, QUAHOG, NORTHERN	\$260,529	\$163,735	\$285,750	\$371,047	\$613,933	\$724,353	\$909,723	\$964,731	\$518,540	\$432,525	\$339,799	\$326,172	\$5,910,836

SOURCES: SAFIS Dealer Database, ACCSP Data Warehouse 06302022 ED





# 2023 Select ISSC Proposal Review

Jeff Kennedy

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Shellfish Program Lead

Massachusetts Division of Marine Fisheries

<https://mass.gov/dmf>

# National Shellfish Sanitation Program (NSSP)

- FDA Cooperative Program
  - w/Federal Agencies-States-Industry
- A Public Health document for the sanitary control of the harvest and handling of bivalve molluscan shellfish in the US
- Ensures shellfish will be safe and sanitary if produced in accordance with NSSP guidelines



# Goal of NSSP

To promote and improve the sanitation of shellfish moving in interstate commerce

- through federal & state cooperation
- by creating uniformity of State Shellfish programs



# Purpose of ISSC

- Provide a formal structure for State regulatory authorities to participate in establishing regulatory guidelines and procedures to ensure uniform state application of the NSSP
- Provide a process for states and industry to settle disputes over application of the NSSP with FDA, between states and between a state and industry



# ISSC Participants

- State shellfish regulatory officials
  - producing (*coastal*)
  - non-producing (*in-land*)
- FDA and other federal agencies: NOAA (*NMFS, NOS*), EPA, CDC
- Shellfish Industry – *harvesters, growers, dealers*
- Foreign governments



# ISSC Accomplishments

- Updated 1965 Manuals in 1986 & 1987
- FDA published 7 revisions between 1986 & 1995
- ISSC/FDA published “*Model Ordinance*” 1999
- ISSC/FDA publish 11 revisions of the “Guide for the Control of Molluscan Shellfish”
  - 2000, 2002, 2003, 2005, 2007, 2009, 2011, 2013, 2015, 2017 & 2019

## National Shellfish Sanitation Program (NSSP)

### Guide for the Control of Molluscan Shellfish 2019 Revision



# ISSC Organization

- [Constitution](#), Bylaws, and Procedures (*Roberts Rules*)
- Executive Director - Office Staff
- Executive Board (*18 members*) -> Executive Board Chair
- Executive Committee
- Task Force (*9 members*):
  - I Growing Area, Patrol
  - II Harvesting, Handling, and Distribution
  - III Administrative
- Committees – standing and as needed
- General Assembly – voting delegates (state regulators)



# Proposal (Issue) Submission and Consideration

- Ninety days prior to Biennial Meeting; specified format
- Sixty days prior to meeting Proposals sent to membership
- Proposal Review Committee
- Send proposal to appropriate Task Force (I, II, or III)
- For each proposal the Task Force can recommend the conference:
  - approve; no action, modify, send the proposal to committee





# Proposal Submission and Consideration (cont')

- Committees send recommendations on referred proposals back to Task Force (usually from previous years)
- General Assembly votes: yes/no, cannot modify
- FDA concurs or not, within ninety days
- Executive Board may act or deliberate with FDA
- Actions become effective with next revision of the NSSP unless executive board stipulates earlier date





**ISSC**

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**2023 TENTATIVE AGENDA**

Saturday, March 18, 2023

12:00 PM	Business Office Opens
12:00 PM - 4:00 PM	Registration & Selected Committee Meetings
3:00 PM - 3:45 PM	Orientation for New Attendees (Open to Everyone)
4:00 PM - 5:30 PM	Opening General Assembly
6:30 PM - 8:00 PM	Chairman's Welcome Reception

Sunday, March 19, 2023

8:30 AM - 9:00 AM	Committee Chair Meeting
9:00 AM - 9:00 PM	Committee Meetings

Monday, March 20, 2023

8:00 AM - 8:30 AM	Executive Board Elections
8:30 AM - 11:00 AM	Committee Meetings
11:00 AM - 12:30 PM	Executive Board Meeting
1:00 PM - 6:00 PM	Task Force Meetings (consideration of new proposals)

Tuesday, March 21, 2023

8:30 AM - 6:00 PM	Task Force Meetings
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Wednesday, March 22, 2023

9:00 AM - 12:00 PM	Symposium
1:00 PM - 6:00 PM	Task Force Reports Available for Review
7:00 PM - 9:00 PM	Regional Caucuses

Thursday, March 23, 2023

9:00 AM - 12:00 PM	Closing General Assembly
12:30 PM - 1:30 PM	Executive Board Luncheon
1:30 PM - 4:00 PM	Executive Board Meeting

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# Select Task Force I Proposals

- 17-100 Clarifies definition of marina
- 19-101 Creates new lab status – conditionally conforming
- 19-108 Reduce min time seed grown in Prohibited from 120 -> 60days when wtemps above 50F
- 19-123 Marine Biotoxin Control – Public Health Explanations
- 19-124 Marine Biotoxin Control – Guidance Document
- 19-144 Assessing WWTP Viral Impact on GA using MSC
- 19-145 Establish guidance for shellfish cleansing studies



# Task Force I Proposals (cont')

- 23-100 Mooring Area re-definition >20 boats with MSD
- 23-102 Re-defines/clarifies seed from Prohibited area + enhancement
- 23-104 Timeframe for action to close GA due to Vp illness 60->30days
- 23-108 Clarify only MSC can be used to reduce reopening the GA in less than 21 days
- 23-109 *Massages* MO section on GA reopening criteria
- 23-110 Adds Restricted classification as option for w/i marina





# Task Force I Proposals (cont')

- 23-111 Reduces min closure for relay product from 60->14 days if if only impacted by microbial contaminants
- 23-112 replace current language in MO 'sewage and bodily fluids' with 'sewage and vomitus'
- 23-121 request mooring area guidance document
- 23-123 clarify how P90 is calculated for depurated endproduct
- 23-124 new Marina and Mooring Area Guidance document



# Select Task Force II Proposals

- 17-225 Clarifies Surf Clam/Ocean Quahog T/T requirements
- 19-220 Pre-chilling Vehicles
- 19-231 Adding Shipping CCP
- 19-227 Proper Use of Backflow Preventers
- 23-201 Reducing Plant Inspection Frequency



# Select Task Force III Proposals

- 13-301 Establish GA classification evaluation criteria
- 17-305 Establish section “Responsibilities of the FDA”
- 17-204 Add in-field compliance criteria for CoH element evaluation
- 23-301 Limiting use of Guidance Documents in evaluations
- 23-305 Clarifies/Expands Biotxin Management Criteria
- 23-306 Clarifies steps in FDA/state disagreements and UI process



- ISSC Website- <https://www.issc.org/>
- NSSP- <https://www.issc.org/nssp-guide>
- *Interstate Shellfish Sanitation Conference*  
4801 Hermitage Rd Ste 102  
Richmond, VA 23227
- *Phone: (804) 330-6380*

2023 ISSC Biennial Meeting

Members Sign In

calendar | forms | links | employment | training | contact

INTERSTATE SHELLFISH  
**ISSC**  
SANITATION CONFERENCE

Dedicated to assuring shellfish are a safe food.

Committees | ICSSL | Membership | SSCA | NSSP Guide | Conference Administration | Document Library | Laboratory | General Information

**Upcoming Events**

MARCH 18

2023 ISSC Biennial Meeting  
Ends Thursday, March 23, 2023  
All Day

**News & Notices**

Notices of illness outbreaks, shellfish closures, reopenings and recalls.

Modified 2/28/2023

# Questions/Discussion

# SAP Sub-Committee to Investigate Municipal Aquaculture License Site Transfer Rules

## **Sub-Committee Charge:**

Compile and review all municipal regulations governing aquaculture license site permitting and transfer rules and engage with municipal officials and industry members on what may (or may not) be working. Work may potentially result in development of best management practices municipalities may consider but will not weigh in on home rule authorities.

## **Background:**

- Issue identified priority issue for SAP to address.
- Some in industry seek more lenient transfer restrictions with fewer constraints on recipients.
- Aquaculture industry seeks more standardized approach across municipalities to enhance stability and equity.
- Home rule management promotes innovative management programs best suited to individual communities but leads to disparate rules across communities.
- Complexities arise when disparate rules exist across municipalities sharing a body of water or when a single business is working in multiple municipalities.
- Polarized response to 2019 proposed legislation to amend G.L. c. 130, s.s. 57 and 58.

## **Prospective Sub-Committee Members:**

Bill Doyle, Dale Leavitt, Amy Croteau, and Renee Gagne.



# Bulk Tagging Decision

## **Decision:**

DMF will not move forward with a pilot program to allow shellfish all aquaculturists to bulk tag market bound product.

## **Rationale:**

- Shifts enforcement and compliance burden from harvesters to dealer sector, requiring participating dealers to develop Intermediate Processing Plans.
- Complicates maintaining lot integrity at point-of-sale when dealer is receiving multiple harvester lots in succession.
- Aquaculturists have indicated wrapping pallets & insulated vats are not viable solutions to ensure lot integrity at point-of-sale.
- May be subject to more substantial actions in instances of non-compliance given quantity of shellfish involved (e.g., embargo, criminal penalties, permit sanctions).
- Risk may disincentivize participation by most conscientious dealers impacting shellfish markets and potentially worsening compliance.
- Administrative burden on state management and enforcement agencies.





# Blish State Boat Ramp





# Town Owned Property, Barnstable Harbor Marina



# Distance from Blish to "Grassy Knoll"





# Distance from Millway to “Grassy Knoll”





# Pictures of Blish on busy summer days





# Pictures of the public beach, the full marina and people spilling out of whalewatch





# A backup at Blish once it's at capacity, below the "Grassy Knoll" a safer place to conduct time sensitive transactions





# Added security besides the HM booths, Cameras at Blish: one is fixed, one is PTZ

Massachusetts 2012 Vp Control | Post Attendee - Zoom | Town of Barnstable (All) UI3

Not secure | webcams.townofbarnstable.us/ui3.htm?cam=BPTZ

Coordinate Convert... | One Call Now - Login | Town of Barnstable... | LiquidFiles | Login - My AcuRite | Home | Blue Iris Login | Shellfish Managem... | NestStory | Chapter 130 | 322 CMR | Mass.gov

Town of Barnstable (All) | Live View | Clips | Timeline

PTZ | Blish PTZ 03/02/2023 09:31:53

Toggle 3D Positioning

1	2	3	4	5
6	7	8	9	10
11	12	13	14	15
16	17	18	19	20

Profile

1 Active

Schedule

Default

Current Group


BlishPTZ-8081

Streaming Quality

1080p VBR

Server Status

CPU	21%
MEM	25%
DISK	33%
FPS	10



9:31 AM 3/2/2023

# Camera at Barnstable Harbor Marina, one is fixed, one is PTZ

Massachusetts 2012 Vp Control | Post Attendee - Zoom | Town of Barnstable (All) UI3


Not secure | webcams.townofbarnstable.us/ui3.htm?cam=BHStill-43

Coordinate Convert... One Call Now - Login Town of Barnstable... LiquidFiles Login - My AcuRite Home Blue Iris Login Shellfish Managem... NestStory Chapter 130 322 CMR | Mass.gov

Town of Barnstable (All) Live View Clips Timeline

PTZ

03-02-2023 10:30:06



BarnInnerHarbor-43

Server Status

CPU	47%
MEM	26%
DISK	33%
FPS	20

Type here to search

9:30 AM 3/2/2023



# Barnstable Harbor Marina PTZ camera overlooking the "Grassy Knoll"

Massachusetts 2012 Vp Control | Post Attendee - Zoom | Town of Barnstable (All) UI3

Not secure | webcams.townofbarnstable.us/ui3.htm?cam=BHPTZ-42

Coordinate Convert... One Call Now - Login Town of Barnstable... LiquidFiles Login - My AcuRite Home Blue Iris Login Shellfish Managem... NestStory Chapter 130 322 CMR | Mass.gov

Town of Barnstable (All) Live View Clips Timeline

PTZ

Toggle 3D Positioning

2	3	4	5	
6	7	8	9	10
11	12	13	14	15
16	17	18	19	20

Profile

1 Active

Schedule

Default

Current Group


BHarbor-PTZ42

Streaming Quality

1080p VBR

Server Status

CPU	18%
MEM	25%
DISK	33%
FPS	15



The live view shows a wide-angle shot of a marina area. In the background, there is a large, dark-colored building with a gabled roof. In the foreground, there is a paved area with a large, rectangular structure made of blue and white panels, possibly a boat ramp or a storage area. The ground is a mix of grass and dirt, with several bare trees scattered throughout. The sky is overcast.

Windows Taskbar: Type here to search | 9:31 AM 3/2/2023