2020 Massachusetts Vibrio Training

CHRISSY PETITPAS & GABRIEL LUNDGREN DIVISION OF MARINE FISHERIES MASSACHUSETTS DEPARTMENT OF FISH & GAME



V. parahaemolyticus (V.p.)

-Naturally inhabits coastal waters
-Halophilic (can grow/thrive in high salt concentrations)
-Present in higher concentrations during summer
-One of the fastest growth rates of all known bacteria
-Pathogenic strains small percentage of the total *V.p.*-When ingested *V.p.* can cause GI distress
-Infective dose not known

-Onset -24-72hrs



Kozo Makino et al.

Oyster Temp (° F)	Growth Rate (logs/hr)	Doubling Time (hours)
50	0.008	35.8
70	0.100	3.01
90	0.292	1.03
100	0.426	0.71





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2018 *V.p.* Cases 10- Sole Source, 4- MA multi-source, 18- MA + other states



2 Reported illnesses linked to harvest dates 8/30 and 9/6

Resulted in a precautionary 7-day closure of Duxbury, Plymouth, and Kingston Bays (CCB:42-47)

No additional cases were reported and the area was reopened to oyster harvest on 9/22.



"Sole Source" V.p. Cases

Sole Source Cases are cases that can be epidemiologically linked (traced back) to a specific hydrographic, geographic, or growing, area (not an NSSP definition).

Traceback allows:

- Illness response and risk mitigation (closures, targeted controls)
- The ability to identify extent of the problem and potential environmental drivers of illness
- The ability to understand how unique culture and harvest practices may be leading to illness
- The ability to identify the distribution of pathogenic strains (analysis of clinical isolates)
- The ability to identify potential time-temperature abuse

Year	V.p. Illness -MA Single Source	<i>V.p.</i> Illness Multi-Sources within MA	V.p. Illness Multi-Sources (Out-of- state and/or within MA)		
2015	24	3	3		
2016	9	3	1		
2017	14	2	5		
2018	8	10	18		
2019	8	4	3		

Vibrio Control Plan And Implementing Regulations at 322 CMR 16.05

Division of Marine Fisheries Department of Public Health Office of Law Enforcement Local Boards of Health

2020 V.p. Season May 19 - October 19

Only applies to all oysters ≥ 2.5"

322 CMR 16.05 and Harvester Compliance

A	Interview Information:		
1 2 3	Date: Time: Officer/Staff M	Location: Town: Name(s):	Agency:
B	Harvester Information:		
1	Name:	Check One:	Aquaculturist Wild Harvester
2	MA Commercial Shellfish Permit ID#:		
3	Is the Harvester's Shellfish Propagation Perr	mit Endorsed for Off-Site	Culling? Yes No
С	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 Informati	on/	
	 Time of Harvest: 	Yes No	
	b. Time of Icing:	Yes No	
	c Harvest Date:	Yes No	
	d Manual Area	Ver No	
	 narvest Area: 		
	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:		
	d Quantity of Owters		
	a. Quantity of Oysters.	Tes 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 (circle one):	Truck	Dealer's Facility
3	Compliance Assessment:	_	
1	Was Enforcement Action Taken?	Yes No	
2	If Yes, provide Citation Number or Report N	lumber:	
-			Please submit all forms and any questions
	Critical Violation		to: Christian Petitpas Massachusetts Division of Marine Fisheries
	Over for Notes		New Bedford, MA 02744. Office: (508) 742-9766

V.p. Compliance Monitoring at Harvest: **General Tagging Requirements**



All containers of shellfish in transit, wild harvested or removed from an aquaculture license site, seed or market sized, intended for market or not, must bear a tag:

322 CMR 16.03 (1)(a): <u>Tagging Requirement</u>. A tag with the features and harvest information specified in 322 CMR 16.03(1)(a)(2) **must be attached** to all containers of shellfish shellstock **before transport from the harvest site to the landing site**.

For aquaculturally reared product intended for off-site culling **Propagation Permit Conditions** require all containers of shellfish bear a tag or for the lot to be bulk tagged.

V.p. Compliance Monitoring at Harvest: Time of Harvest

All commercial fisherman or aquaculturists must accurately record the time of harvest for each harvester lot of market bound oysters

322 CMR 16.05(2):

<u>Harvester Lot</u> means containers of oysters identified by the harvest tag as having the same time of harvest and consisting of oysters from a single defined growing area gathered by a single commercial fisherman or aquaculturist.

<u>Market Bound Oysters</u> means oysters removed from a designated shellfish growing area by a commercial fisherman or aquaculturist intended for commercial purposes on that calendar day.

<u>Time of Harvest</u> for sub-tidal areas means the time when the first oyster in a harvester lot is taken from the water on a calendar day and for intertidal areas means the time when the first oyster in a harvester lot is exposed during a single low tide cycle or when the first oyster in a harvester lot is taken from the water, whichever occurs first.

-Harvesters must accurately record when oysters are exposed by tide at the time of exposure

-In intertidal areas harvest may only occur on the ebb tide.

Rapid Cooling (Icing)







Oyster Temp (° F)	Growth Rate (logs/hr)	Doubling Time (hours)
50	0.008	35.8
70	0.100	3.01
90	0.292	1.03
100	0.426	0.71

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Ice Slurry Cooling Time



APPLYING ICE TO OYSTERS

Oysters must be fully submerged at or below 45°F to inhibit growth and proliferation of bacteria





V.p. Compliance Monitoring at Harvest: Icing Requirement

322 CMR 16.05 (2) <u>Adequately iced</u> means the amount and application methods of ice described in 322 CMR 16.05(3)

322 CMR 16.05 (3)(a) <u>Icing Requirement</u> All commercial fishermen and aquaculturists shall adequately ice oysters, as defined in 322 CMR 16.05(2) within two (2) hours of time of harvest or exposure or prior to leaving the point of landing, whichever occurs first.

Seasonal Time to Icing Requirements for Certain Growing Areas. From July 1 – September 15, all commercial fishermen and aquaculturists who are harvesting oysters in shellfish growing areas CCB-42, CCB-43, CCB-45, CCB-46, CCB-47 and V-20, shall adequately ice oysters, as defined in 322 CMR 16.05(2), within 1 hour of time of harvest or exposure, or prior to leaving the point of landing, whichever occurs first. Oysters must remain adequately iced until received by a wholesale dealer.



V.p. Compliance Monitoring at Harvest: Icing Requirements

322 CMR16.05 (3)(a) **Oysters must remain adequately iced until received by the wholesale dealer.** To accomplish this, commercial fishermen and aquaculturists must place oysters and ice into a shellfish icing container using one of the following methods:

- 1. Mesh bags containing oysters must be completely surrounded by ice, with at least two inches of ice between the bags and the bottom and sides of the shellfish icing container, and at least three inches of ice on top of the mesh bags;
- Loose oysters placed into a shellfish icing container must be completely surrounded by ice, with at least two (2) inches of ice at the bottom and sides of the shellfish icing container, and at least three (3) inches of ice on top of the loose oysters;
- 3. Oysters held in an ice and water mixture (e.g., ice slurry or cold water dip) must be fully submerged and the ice and water mixture must be at or below 45°F to inhibit growth and proliferation of bacteria.

V.p. Compliance Monitoring at Harvest: Time of Icing

<u>Time of Icing</u> means the time when the last oyster or bag of oysters in a harvester lot is placed in a shellfish icing container and is adequately iced in accordance with the procedure at 322 CMR 16.05(3).

322 CMR 16.05 (3)(c) **Shellfish Icing Tag Requirement:** "...Commercial fishermen and aquaculturists shall record the time of icing on all harvester tags affixed to containers of oysters or record the time of icing on a single harvester tag attached to a shellfish icing container."

A single harvester tag for the purpose of meeting the shellfish icing tag requirements may be used in instances when:

- 1. All oysters in the shellfish icing container are from a single harvester lot;
- 2. The shellfish icing tag is attached to the shellfish icing container at the time of icing and remains attached to the shellfish icing container until received by the primary buyer;
- 3. The shellfish icing tag also includes the time of harvest, harvest date, harvest area, harvester identification and quantity of oysters harvested.

The use of a single harvester tag for the purpose of meeting this shellfish icing tag requirements does not exempt commercial fishermen and aquaculturists from attaching harvester tags, as specified at 322 CMR 16.03, to all individual containers of market bound shellfish.

V.p. Compliance Monitoring at Harvest: Shading Requirements

Yes No

Yes No

E Shellfish Handling:

- 1 Are Oysters Adequately Iced?
- 2 Are Oysters Adequately Shaded?

322 CMR 16.05 (2) <u>Adequately Shaded</u> means the measures required to be taken to protect oysters from direct exposures to sunlight.

322 CMR 16.05 (3)(b) <u>Shading requirement</u>. All commercial fishermen and aquaculturists shall adequately shade oysters, as defined in 322 CMR 16.05(2) **immediately following harvest and until oysters are adequately iced**.

Materials in direct contact with oysters or bags of oysters must be smooth, easily cleanable and impervious to water to avoid cross contamination with bacteria.

Harvesters are encouraged to avoid placing shading materials in direct contact with oysters to allow adequate air flow between oysters and shading materials.

322 CMR 16.07 (3)(a), (3)(b)





V.p. Compliance Monitoring at Harvest: Transport Requirements

F Shellfish Delivery:		322 CMR 16.05 (3)(e)
1 Name of Wholesale Dealer:		
2 Quantity of Oysters:		
3 Oysters Received at (circle one):	Truck	Dealer's Facility

322 CMR 16.05 (3)(e) <u>Restrictions on Transport of Market Bound Oysters to the</u> <u>Primary Buyer</u> All market bound oysters shall be transported by the commercial fishermen, or aquaculturist or his or her licensed employee, **directly to the primary buyer's physical facility or received by the primary buyer at the landing site**. Commercial fishermen and aquaculturists are prohibited from **handling and/or holding** market bound oysters at any unlicensed facility prior to receipt by the primary buyer.

All oysters must be received by the primary buyer and <45° within 10 hours of the Time of Harvest (TOH)

-No off-site culling of market-bound product prior to delivery -No holding overnight for AM delivery when harvesting on late tides

All oyster transactions must be completed by the harvester and an employee of the original dealer. -No unattended drop-offs at dealer facilities

V.p. Compliance Monitoring at Harvest: Logbook Requirements

D	D V.p. Harvest Logbook:				322 CMR 16.07 (3)(d)			
1	Is the Logbook Present?		Yes	No			2014 Massachusetts Vp Control Han Londings of Oysters	Vario parahamniyidine (Vp) Hannes Lophenk
2	Is the Following Information Provided?					0000 6/20/14	Harvest Area Quantity (Pioces) CCB-31 200	Time of Research Time of HMg Original Dealer 0000 0815 A.S.C. Shv835.56
	a. Time of Harvest:		Yes	No 🔄				
	b. Time of Icing:		Yes	No 📃			Re-submergence	of Oysters Containers Containers Containers Containers
	c. Date:		Yes	No		in Out 6/20/14 7/4/14	CC 331 100	Type Number angent Supported in each Cogers 2, 2, Cont of Tasse
	d. Quantity of Oysters:		Yes	No		"Re-submergence Catego	ries: (1) Air drying for antifouling:	(2) Culling activities; (3) Non-compliance at angenet dealer; (4) Recall

322 CMR 16.05 (3)(d) Logbook Requirement. When landing oysters, all commercial fishermen and aquaculturists must have in their possession the Division of Marine Fisheries issued *V.p.* logbook. The commercial fishermen, aquaculturist or his or her licensed employee shall record in indelible ink the date, shellfish growing area, time of harvest, time of icing, quantity harvested (in pieces or bushels) and the dealer who received the product. The *V.p.* logbook shall be filled out by the permit holder, or his or her licensed employee, at the time of landing before the day's harvest is placed in transit or leaves the landing site except that the primary buyer information may be completed upon receipt of the market bound oysters by the primary buyer.

Licensed employees are individuals with *MarineFisheries* issued employee transaction cards linking them to the primary license holder identified on the harvester tags and logbook.

Culling, Sorting, Air Drying and Re-submergence





Restrictions that Apply to Aquaculturists Only: Oyster Culture Activities

Oyster culture activities means activities conducted by some aquaculturists that require the removal of oysters from the waters of the license site (grant) for the purposes of sorting, culling, grading, pitting, over-wintering and/or the removal of fouling organisms to enhance oyster marketability.

Market-sized oysters may be brought onboard barges, boats and other floating structures for the purpose of oyster culture activities, provided:

1. All oyster culture activity that is not conducted on the license site is conducted within the same designated shellfish growing area as the license site;

2. When oyster culture activities exceed two (2) hours from the time of harvest or time of first exposure, all oysters subject to such activities must be returned to the license site, segregated and re-submerged for at least 10-days prior to being harvested for commercial sale...

3. When oyster culture activities do not exceed two (2) hours from the time of harvest or first exposure, all oysters subject to such activities may either be properly tagged and harvested during that calendar day, in accordance with the procedures set forth at 322 CMR 16.00, or returned to the original license site and harvested not before the next calendar day. (need to document how long the activity did take)

Restrictions that Apply to Aquaculturists Only: Off-site culling

322 CMR 16.05 (4)(a) <u>Re-submergence Requirements for **Off-site Culling Practices**</u>. Market-sized oysters may be removed from the original license site for the purpose of off-site culling, provided:

- 1. All removed oysters are returned to and segregated on the license site for at least 10-days prior to being harvested for commercial purposes;
- 2. Off-site culling activities are subject to Aquaculture Propagation Permit conditions
- 3. Prior to the removal of any shellstock from a license site, harvesters are required to notify the local municipal shellfish authority.

-If oysters are removed from the license site for proposes other than marketing on the same calendar day they are required to be re-submerged for 10 days prior to sale.

-In Intertidal areas harvesters may cull oysters on their license sites during low tide without requirement for re-submergence. Oysters not iced within 2 hours of tidal exposure may not be harvested until the following tide.

-Use a stopwatch or mark the time oysters are removed from water when conducting activities that take <2hrs

Re-Submergence of Non-Compliant Oysters

322 CMR 160.05 (5)(b) <u>Re-Submergence of Non-Compliant Oysters</u>: In the event of a recall resulting from the closure of a harvest area due to illness, **only those oysters received from harvesters and stored at a primary buyer's facility may be re-submerged.**

-322 CMR 16.05 (4)(d) Re-submergence of oysters **may only be conducted by the permitted aquaculturists on the license site where the oysters originated**, unless otherwise approved in advance in writing by the Division.

-No holding of wild oysters on aquaculture sites

In the event that the Division or Public Health determines **that a primary buyer is in possession** of oysters that do not comply with the tagging, icing or other requirements set forth at 322 CMR 16.00, such oysters may be returned to the aquaculturists, and re-submerged and segregated on the license site where they originated for 10 days **under the supervision of the local Shellfish Constable.**

Oyster Culture Activities from July 1- Sept 15

Between July 1 and September 15, in shellfish growing areas CCB-42, CCB-43, CCB-45, CCB-46, CCB-47 and V-20, when oyster culture activities exceed the one (1) hour time to icing requirement at 322 CMR 16.05(3)(a)(2), but do not exceed two (2) hours from the time of harvest or first exposure, all oysters subject to such activities must be returned to the original license site and shall not be harvested sooner than the following calendar day.

Restrictions that Apply to Aquaculturists Only: Re-submergence tagging and Logbook requirements

 Logbook Requirements. Aquaculturists shall maintain a record in their V.p. logbook of all market-sized oysters returned to the license site after off-site culling or oyster culture activities requiring re-submergence.
 The V.p. logbook shall be filled out by the permit holder, or his or her licensed employee, when removing product from the license site and at the time of resubmergence when the last market-sized oyster is returned to the license site.



Please Note: Training video has not been updated to reflect the change in re-sumbergence requirement from a 14-days to 10-days

- HARVEST: Individuals commercially harvesting shellfish must have a state commercial fishing permit or other DMF permit endorsed for commercial shellfish harvesting and the companion Shellfish Transaction Card
- Shellfish for direct marketing may only be harvested from waters classified as Approved or Conditionally Approved by DMF and in the "open status".
 - Harvesters should consult with local shellfish authorities or DMF to determine those areas that are open and safe for harvesting
 - Information on shellfish growing area classifications can be found by searching "DSGA" on DMF's website





Therefore, the Division of Maxime Fuberies has changed the status of the below defined areas to 'CLOSED TO SHELLFISHING' to prohibit the taking of shellfish ural subsequent determination by this office seveals that the shellfish are as affer for human constantion.

Pursuant to Maniaclassetts General Laws, Chapter 130, Section 74A, 75, and 322 CMR 7/01 (7), digging, harvesting or collecting and/or attempting to dig, harvest, collect or the prostension of shellful from the below defined areas are prohibited.

 HANDLING: Harvesters shall ensure shellfish are harvested, handled, and transported in a manner to prevent contamination and deterioration. All containers used to hold shellfish shall be clean, free of debris, and fabricated using safe, easily cleanable materials (smooth surface). Shellfish shall be covered or in a closed vehicle during transport to prevent exposure to direct sun light and contaminants.





Basic Harvest and Handling Checklist

- Boats used in harvesting must be kept clean.
 - Shellfish shall be stored on raised areas to prevent contact with bilge water and away from fuel, oil and other chemicals.
 - Shellfish shall be covered to prevent exposure to hot sun and birds. Each harvest boat must have a sanitation device or container with a tight fitting cover and be secured and placed to prevent contamination of shellstock by spillage or leakage.
 - Each container must be indelibly labeled "Human Waste" in contrasting letters at least three (3) inches in height.
 - Containers should be emptied only into a sewage disposal system and cleaned. The overboard discharge of human waste is prohibited in Massachusetts.
 - Dogs, cats and other animals are not allowed on harvest vessels



- All containers of shellfish must be **individually** tagged.
 - The tag shall contain:
 - The full name of the harvester,
 - DMF Commercial Shellfish Permit ID number,
 - Date and time of harvest (time of exposure of first shellfish harvested),
 - The type and quantity of shellstock,
 - The initials MA, the shellfish area name and number, and if applicable the aquaculture site number.
 - The following statement shall be written in bold capitalized type "THIS TAG IS REQUIRED TO BE ATTACHED UNTIL CONTAINER IS EMPTY OR IS RETAGGED AND THEREAFTER KEPT ON FILE FOR 90 DAYS" (322 CMR 16.03).

	HARVESTER TAG				
1	NAME: John Smith				
-	HARVESTER PERMIT #				
0	HARVEST DATE: 77715 TIME 12:05				
	HARVEST AREA: CCB-II TOT 1:55				
	TYPE OF SHELLFISH: OYSTER				
2	QUANTITY OF SHELLFISH:				
157	THIS TAG IS REQUIRED TO BE ATTACHED UNTIL CONTAINER IS EMPTY OR IS RETAGGED AND THEREAFTER KEPT ON FILE FOR 90 DAYS.				

- TRANSPORT: All species of shellfish, regardless of the time of year, should be transported to a permitted wholesale dealer as soon as possible to be placed under refrigeration.
- Shellfish may also be sold to a wholesale dealer at the landing site.
- Shellfish bound for market may not be stored at any unpermitted facility prior to delivery to a permitted wholesale dealer.





- The NSSP and DPH have maximum timelines for delivery of shellfish to a permitted wholesale dealer by the harvester after harvest or exposure.
- Shellfish must be delivered to the dealer on the same day of harvest.
 - In May, June, July, August, September and October shellfish must be delivered to the dealer on the same day of harvest in less than 18 hours from time of harvest or exposure.
 - Only Surf Clams and Ocean Quahogs intended for thermal processing are exempt from these standards.
 - Additional requirements apply to oysters during the V.p. Control season (322 CMR 16.05).

Disposition and Handling of Non-Compliant Oysters and Recalled Oysters

322 CMR 16.05 (5)(a) **Destruction of Non-Compliant Oysters:** In the event that the Division, the local Shellfish Constable or the Office of Law Enforcement determines that a commercial fisherman or aquaculturist is in possession of oysters that are out of compliance with the tagging, icing or other requirements set forth at 322 CMR 16.00, such oysters shall be destroyed.

In the event that oysters distributed into commerce are recalled in the case of illness, such oysters shall be destroyed.

Why destruction?

-One harvesters poor actions can result in potentially life threatening illness, the closure of multiple growing areas, and loss of income for many individuals

Critical Violations

-Incomplete tagging or lack of tags results in destruction as suitability of oysters for human consumption can not be guaranteed.

-Improper icing or lack of ice results in destruction as *V.p.* growth following harvest degrades the suitability of oysters for human consumption

Emerging Issues

- Ice Machines
 - NSSP requirements pertaining to the source of water to make ice and the sanitation ice machines

(system already established for ice from retail and wholesale sources)

- Water testing for wells, cleaning logs, plumbing, maintenance
- Inspection?
- Transplant/ "Wet Storage"
 - Wet storage a "post-harvest" activity conducted by <u>dealers</u>



Don't Forget to Report Landings!!





Grower Harvest and Handling Training

PROPER ICING TECHNIQUE FOR HARVESTERS Ice oysters within 2 hours of time of harvest or prior to leaving the point of landing, whichever occurs first





https://www.mass.gov/service-details/watch-vibrio-training-videos

NOAA Ecological Forecasting Tools

NCCOS Vibrio Guidance Models

b Yes are here. Bathground / Northaust / Hassachusetts / Best Harvest Windows

Massachusetts Forecasts

Best Harvest Window Graphs

Click on a town name on the map to see a graph of Vp doublings in a growing area over the next 40 hours.

The Vp doublings given different cooling strategies are shown for growing areas in Massachusetts. These graphs allow users to determine where and a doubling times will occur in advance to plan harvest and cooling strategies.



NCCOS Vibrio Guidance Models

Ib You are here: Background / Northeast / Massachusetts / Best Harvest Windows / Durbury, HA

Best Harvesting Windows





- Rapid Cooling (Ice Slurry w/in 1 hour)
- Rapid Cooling (Direct Ice w/in 1 hour)
- Rapid Cooling (Ice Slurry w/in 2 hours)
- Rapid Cooling (Direct Ice w/in 2hours)
- 5 hours to refrigeration

https://products.coastalscience.noaa.gov/vibrioforecast/northeast/default.aspx#MS





Harvest Start Time

Post-Harvest Cooling Strategies:

 Blue line (Rapid cooling): Oysters placed into Ice Slurry on vessel within 2 hours of harvest start time; oysters are cooled to an internate temperature of 50°F within 2.5 hours of harvest.

2) Yellow line (5 hours to refrigeration): Oysters are exposed to air temperature on the deck of the vessel for 5 hours and placed into mechanical refrigeration on shore; oysters are cooled to 50°F within 5 hours of being placed under refrigeration.

3) Red Line (7 hours to refrigeration): Oysters are exposed to air temperature on the deck of the vessel for 7 hours and placed into mechanical refrigeration on shore; oysters are cooled to 50°F within 5 hours of being placed under refrigeration.

Questions may be directed to **Chrissy Petitpas:** christian.petitpas@mass.gov or **Gabriel Lundgren:** gabriel.lundgren@mass.gov

