



# Harvester Education for Safe Shellfish

Bob Rheault  
Executive Director  
East Coast Shellfish Growers Association  
[bob@ECSGA.org](mailto:bob@ECSGA.org)



# Why are we here?

For **growers** (dealers and wild harvesters have other rules)

To comply with FDA & ISSC rules

## LEARNING OBJECTIVES:

DEM / ISSC harvest regs.

Vibrio risks and rules

Aquaculture-specific concerns



# Outline

1. Overview of DEM / ISSC harvest regs.
2. Vibrio concerns
3. Specific Rhode Island Vibrio regs.
4. Working in the Commons
5. Aquaculture specific issues



# General Harvest Regulations

## DEM Chapter 14-2

- Permits and Licenses
- General Requirements
- Tagging
- Wild stock restrictions
- Seed from prohibited waters
- Birds



# DEM Permitting & Licensing

- DEM Aquaculture License (\$200)  
Credit card - authorizes sale to a dealer only
- CRMC Lease (assent or permit)  
Grants limited exclusive use of leased area.  
Annual lease fee, Annual report required
- Dealer License (\$200)  
Requires HACCP training, extensive record keeping, facility, allows sales to restaurants & individuals

# DEM General Requirements

- Prevent contamination

Boat and shellfish containers must be clean.

Keep shellfish from contact with bilge water, fuel etc.

- Waste & trash disposal prohibited

- No discharge of sewage or vomit

Porta-potty not required, but waste containers with tight fitting lids are mandatory labelled with 3" high letters: "WASTE ONLY"

**EVERY HARVEST VESSEL NEEDS ONE EVEN IF YOU NEVER USE IT.**

If you vomit overboard you contaminate acres of growing areas and could sicken hundreds



# General Requirements - Tagging

## Tagging

### Dealer tag



Perishable  
Keep  
Refrigerated

**Your Company Name**  
Tel: 1-800-565-3043 Fax: 902-742-8066  
14 Kirk Street, Yarmouth, N.S., Canada B5A 1S7

Cert. No.  
NS-000-SS

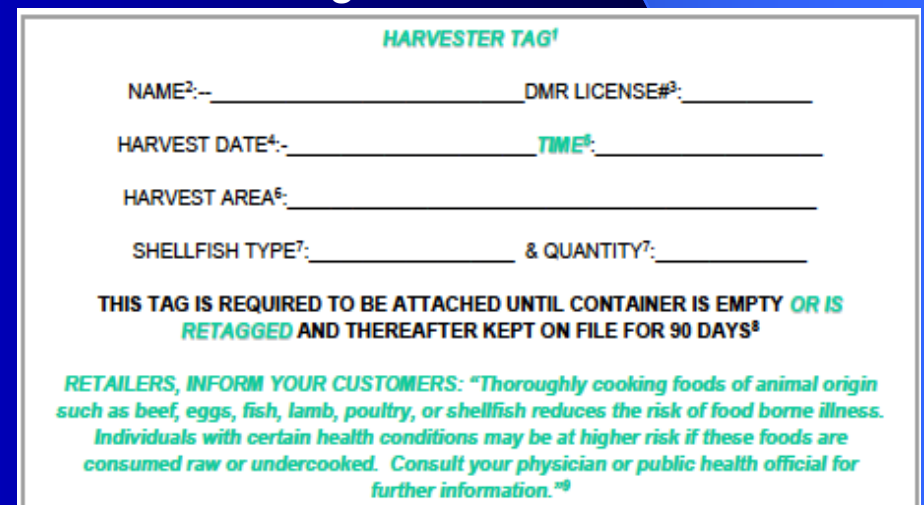
Original Shipper's Certificate No. (if other than above): \_\_\_\_\_  
Harvest Date: \_\_\_\_\_ Shipping Date: \_\_\_\_\_  
Harvest Location: \_\_\_\_\_ Process Date: \_\_\_\_\_  
Type of Shellfish: ☐ Soft Clams; ☐ Oysters; ☐ Mussels; ☐ \_\_\_\_\_  
Quantity of Shellfish: \_\_\_\_\_ Bushels; \_\_\_\_\_ Lbs;

**THIS TAG IS REQUIRED TO BE ATTACHED UNTIL CONTAINER IS EMPTY, OR IS RETAGGED AND THEREAFTER KEPT ON FILE FOR 90 DAYS.**

To:	Reshipper's Cert. No.	Date Reshipped

www.waterprooftags.com  
Form #DPA-100-1  
Printed in Canada

### Harvester tag



**HARVESTER TAG<sup>1</sup>**

NAME<sup>2</sup>: \_\_\_\_\_ DMR LICENSE#<sup>3</sup>: \_\_\_\_\_

HARVEST DATE<sup>4</sup>: \_\_\_\_\_ **TIME<sup>5</sup>**: \_\_\_\_\_

HARVEST AREA<sup>6</sup>: \_\_\_\_\_

SHELLFISH TYPE<sup>7</sup>: \_\_\_\_\_ & QUANTITY<sup>7</sup>: \_\_\_\_\_

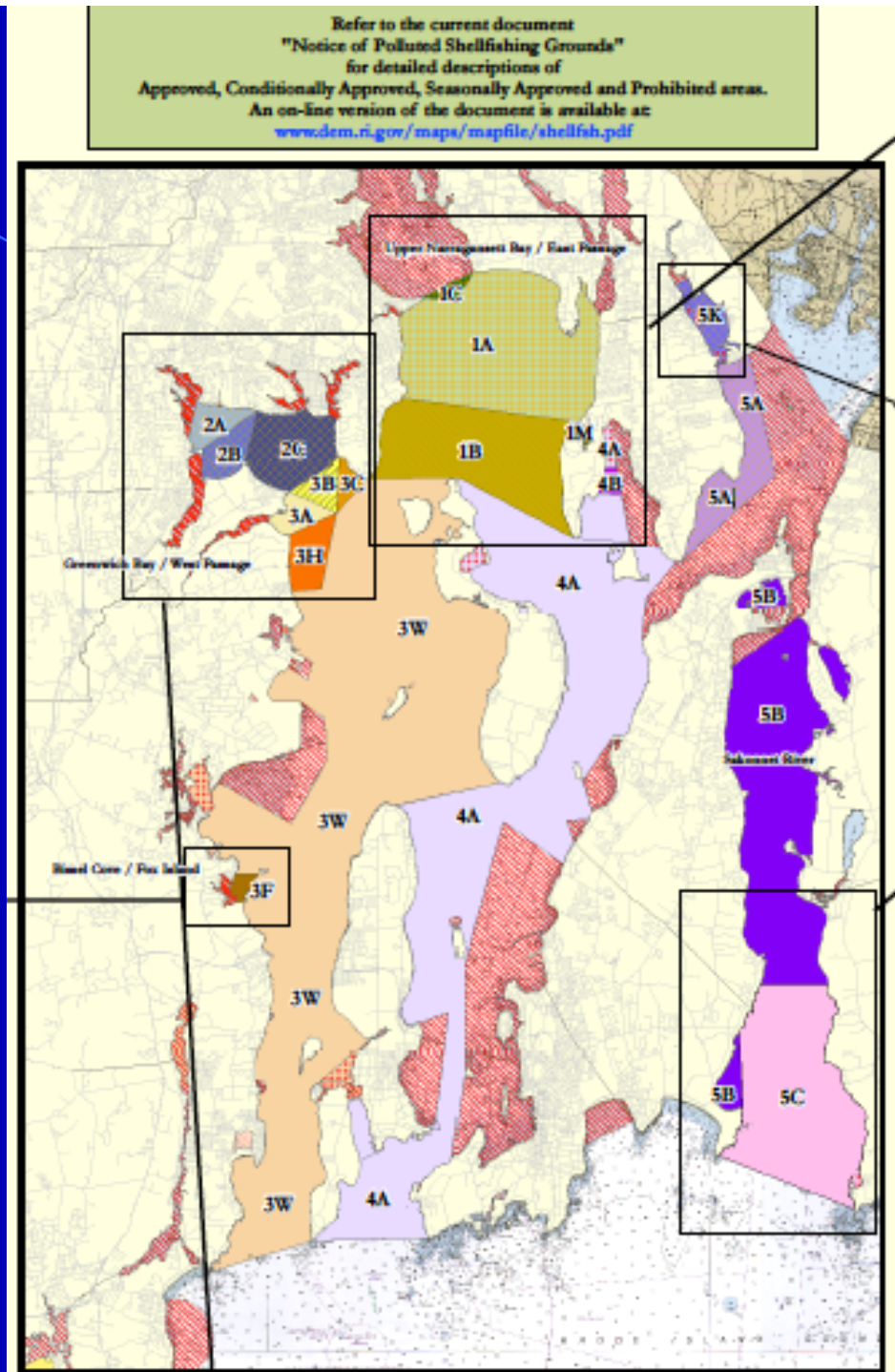
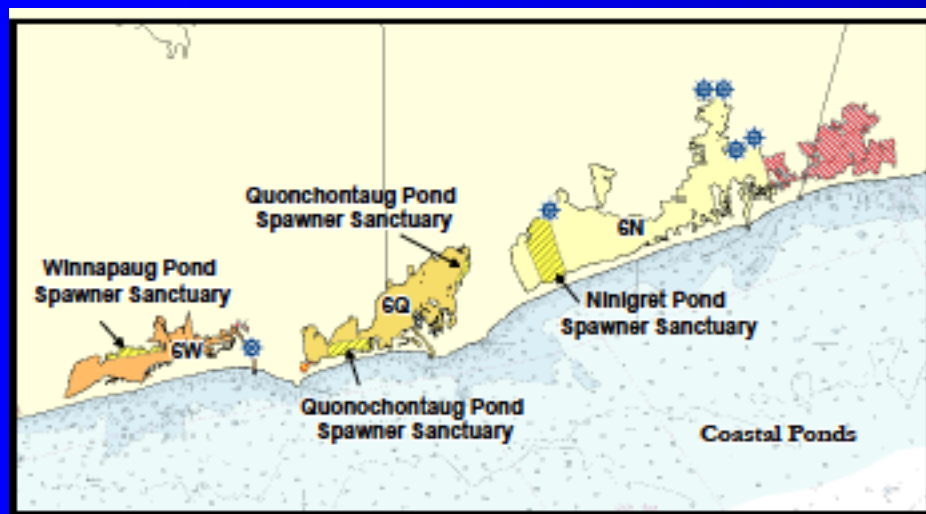
**THIS TAG IS REQUIRED TO BE ATTACHED UNTIL CONTAINER IS EMPTY OR IS RETAGGED AND THEREAFTER KEPT ON FILE FOR 90 DAYS<sup>8</sup>**

**RETAILERS, INFORM YOUR CUSTOMERS:** "Thoroughly cooking foods of animal origin such as beef, eggs, fish, lamb, poultry, or shellfish reduces the risk of food borne illness. Individuals with certain health conditions may be at higher risk if these foods are consumed raw or undercooked. Consult your physician or public health official for further information."<sup>9</sup>

- **Critical violation !**
- On a Harvester tag you **must** indicate **start time** when first shellfish breaks the surface
- One for each container
- Waterproof Tyvek
- Preprint your CRMC assent and lease #
- Bulk tagging is an option that has special rules

# DEM Harvest areas

- For wild harvest report DEM harvest area
- For Aquaculture use your lease or Assent #
- Check DEM site for changes







Regs say:  
Shellstock must  
be free of  
sediment

This is food,  
it is going in  
someone's  
mouth



# Operational Plans

For structures that may attract birds or mammals

- Proposed deterrents, kites, cannons, etc.
- Proposed reconditioning – hold for 48 hours at depth, or similar depuration steps to demonstrate contaminant reduction (perhaps like resubmergence protocols)
- Seasonal harvest restrictions?



# Operational Plans

For seed producers in prohibited waters

- Seed out before max seed size





# Operational Plans

For buyers of seed from prohibited waters

- You need to provide records demonstrating segregation from the rest of your crop and a mechanism to ensure seed are purged for 4-6 months prior to sale.
- If production methods don't allow that then growers should use a seed source from open waters.



# DEM General Requirements

## - wild stock

Only harvest cultured animals from your lease.

Tag all product before you leave your lease.

Don't be in possession of wild product on your lease.

Don't be in possession of wild and cultured product at the same time.



# Outline

1. Overview of DEM / ISSC harvest regs.
2. Vibrio concerns
3. Specific Rhode Island Vibrio regs.
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## Section 2. *Vibrios*



- Naturally occurring bacteria  
not associated with sewage or pollution
- *Vibrio vulnificus*
- *Vibrio parahaemolyticus* = *V.p.*

*Related to:*

- *Vibrio cholera* (sewage related, large outbreaks where sewage treatment is inadequate)

# Vibrio vulnificus

- Rare – 90 cases in US annually
- Few infections outside Gulf of Mexico.
- Only serious for immune compromised individuals (liver failure, diabetes, steroids).
- Half of all illnesses from wound infections.
- *Half of all illnesses are fatal!*
- ~15 deaths a year from shellfish.



# What about *Vibrio parahaemolyticus*?

- Sickens hundreds each year
- More common in higher salinity water when temps are over 75F
- Lots of wound infections
- Also traced to undercooked crab, shrimp and lobster!
- Illnesses more severe in immune compromised individuals
- Few mortalities attributed to Vp alone <1%



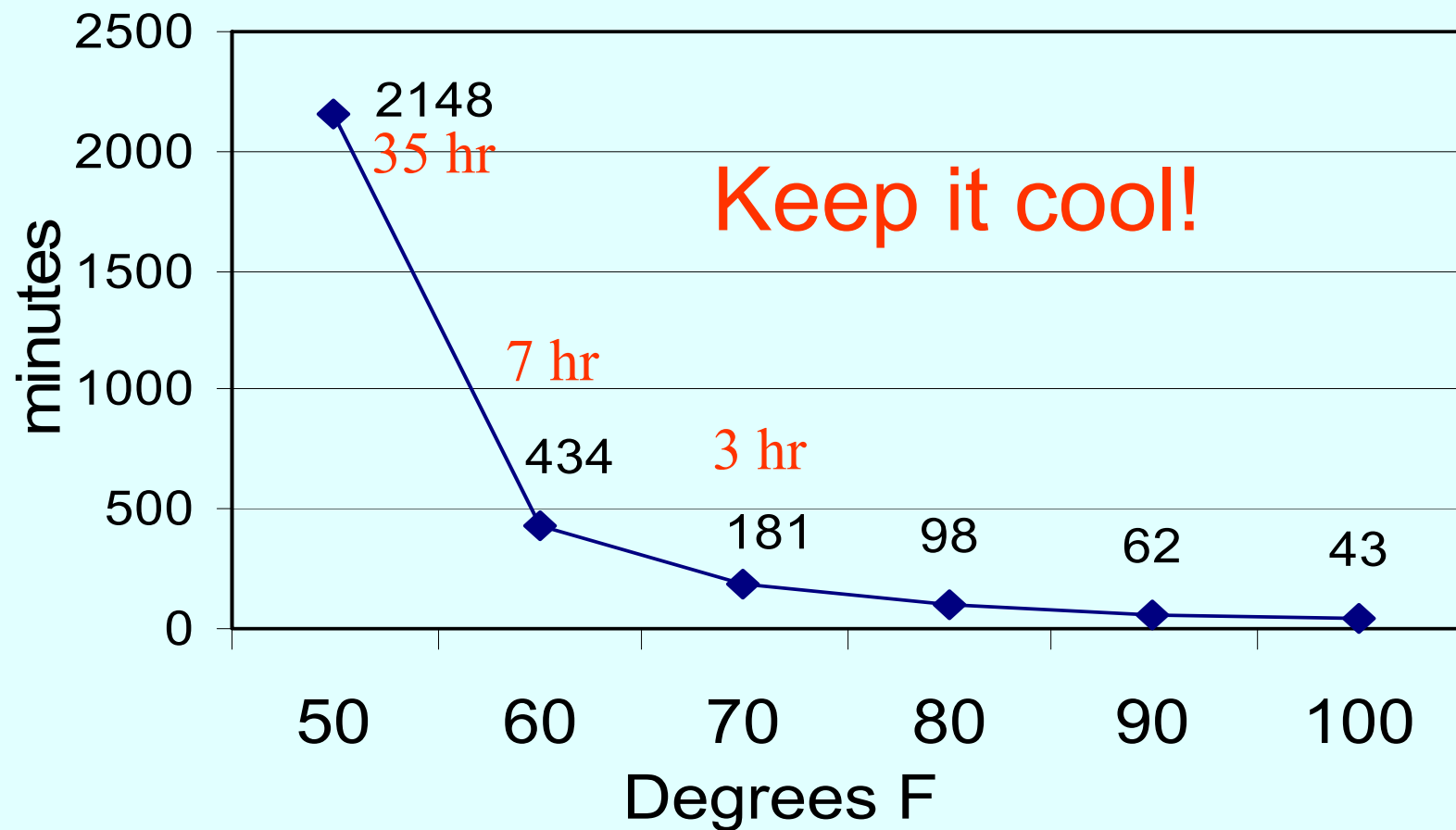
# *Vibrio parahaemolyticus*

- Doubling time is 15-40 minutes at 90°F.
- Growth stops below 50°F degrees.
- Prompt refrigeration is effective.
- Temperature abuse is still a problem.
- Still appear to be a few cases where the levels at harvest are high enough to cause illness.

# *V.p.* in oysters vs. other shellfish

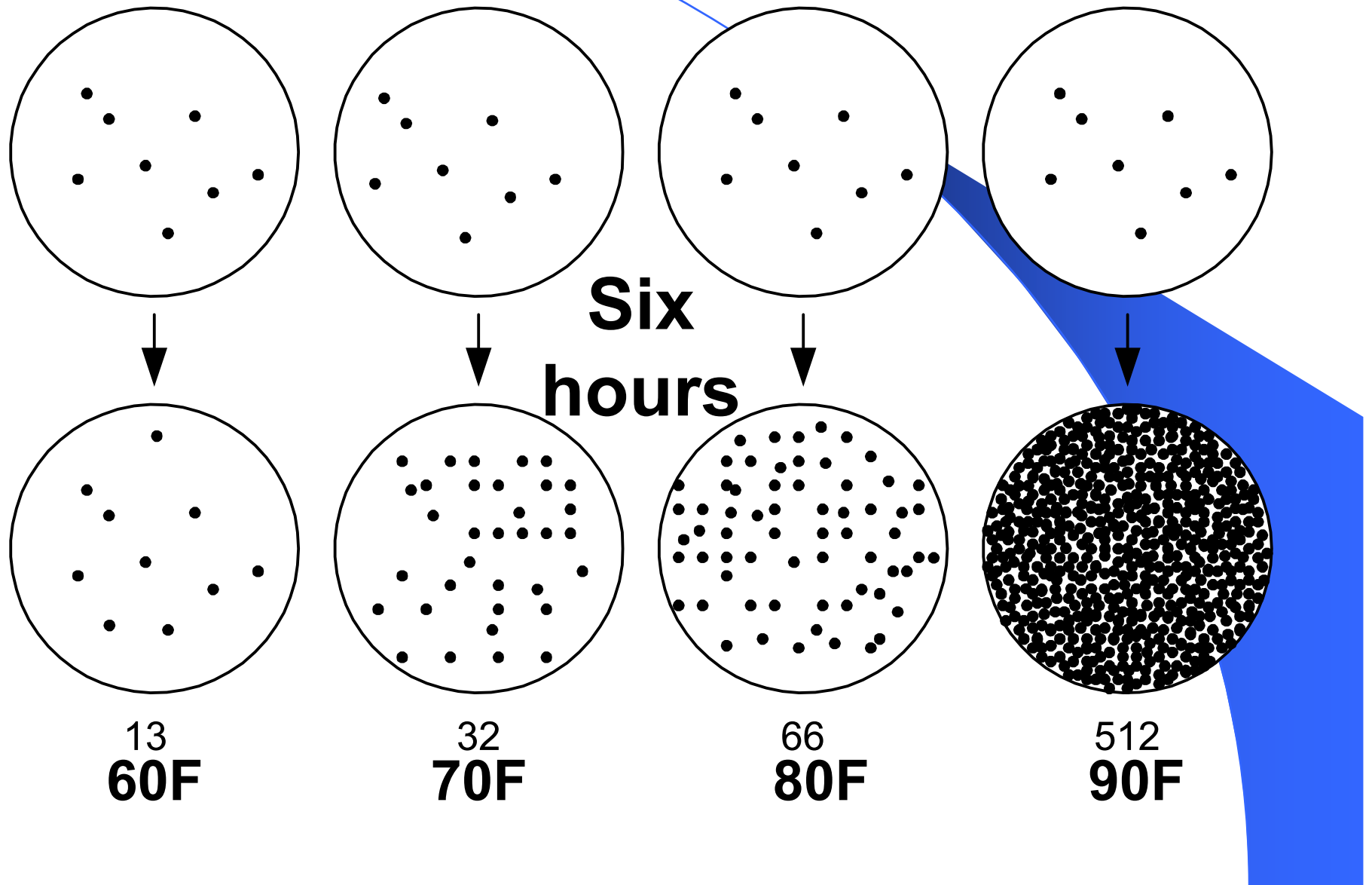
- Why are the regulations different for clams or mussels?
- What do we know about *V.p.* in oysters?
- How does *V.p.* accumulate?
- Can we depurate *V.p.*?

# V.p. Doubling Time





# *Vibrio parahaemolyticus* growth at various temperatures





## New strain of *V.p.* O4:K12

- Far more virulent
- Game changer – dozens of illnesses, bad press, closures and recalls, new regs.
- Tendency to blame others for abuse

# Why are illnesses increasing?

- Warming waters and air temps.
- More oysters being eaten in summer.
- More reporting and better surveillance.
- People are less tolerant of food-borne illness.
- More susceptible consumers.
- New strain – higher attack rate

# V.p. Control Plans triggered by illnesses

- Shade - required
- Reduce time to temperature
- Harvest for shucking or Post Harvest Processing only
- Harvest area closures and recalls triggered by outbreaks







# Brief history of the FDA's approach to Vibrio Management and the industry response

East Coast Shellfish Growers Association  
PCSGA, GOIC

# Industry Action

- Stop getting people sick!
- Aggressive education plan
  - Entire supply chain needs to improve temperature controls from farm to fork.
  - Immune compromised folks should not be eating any raw food – esp. oysters in summer.
- Peer pressure or enforcement to bring this home to the few bad actors.

## "CHAIN OF CUSTODY" TEMPERATURE CONTROLS

Temperature abuse of shellfish can cause low numbers of vibrio present at time of harvest to multiply to dangerous levels. Therefore, it is important for growers to educate everyone who handles shellfish about the importance of temperature control. This includes dealers, wholesalers, truckers, retailers, foodservice workers and consumers. Everyone in this chain needs to be educated about the importance of keeping shellfish under temperature control at all times. Ask them about their protocol and what measures they have in place to assure strict compliance with temperature requirements.



## TRANSPORTATION

Temperature data loggers can be used to track changes in temperature throughout the transportation process, allowing receivers to



see if and when temperature abuse occurred during transit. Many dealers use them to tell whether shippers are abiding by temperature requirements.

In the case of refrigerated trucks that are frequently opened to add other food items, ensure that shellfish are positioned so they stay cool during transport.

## EDUCATE YOUR DEALERS AND BUYERS

Make sure your shellfish are handled properly as soon as they are turned over to the dealer. They can start the cooling immediately by spraying the shellfish with cold water. Don't let the dealer delay putting your harvest into refrigeration, and ensure that they have proper temperature controls in place.

## BE A SHELLFISH PROFESSIONAL

By working proactively to ensure that everyone in our industry is keeping shellfish cool we can reduce illnesses, keep harvest areas open and avoid additional costly regulations.

## FOR MORE INFORMATION CONTACT:

East Coast Shellfish Growers Association  
(401) 783-3360 or [bob@ECSGA.org](mailto:bob@ECSGA.org)  
Visit our website: [www.ECSGA.org](http://www.ECSGA.org)  
or contact your state  
Shellfish Control Authority  
listed at [www.ISSC.org](http://www.ISSC.org)

Made possible with support from:



## From Harvest to Table *THE PERFECT SHELLFISH*





PLACE  
STAMP  
HERE

ECSGA  
1623 Whitesville Rd.  
Toms River, NJ 08755



Working together to deliver fresh shellfish to you!

EDUCATIONAL MATERIALS PRODUCED BY THE ECSGA & FUNDED BY:



## Transporting Tips for Perfect Shellfish

**#1** Shellfish should be thoroughly cold before going on the truck. Dealers should not rely on the truck's refrigeration to bring shellfish temperatures down.

**#2** Shellfish should be loaded into refrigerated trucks in such a way that they are not subjected to warm drafts when doors are opened and other items added.

**#3** Freezing shellfish will kill them, but allowing shellfish to warm up can allow bacteria to multiply, making the shellfish unsafe to eat. The ideal temperature for shellfish is 40°– 45°F.

**#4** If utilizing ice or gel packs in styrofoam or waxed boxes in unrefrigerated trucks (intrastate), use adequate ice or packs to keep the oysters below 45°F for the duration of the trip.

**#5** Upon reaching its destination, make sure shipments of shellfish are acknowledged and promptly placed into refrigeration.

Truckers should be aware that the FDA has issued new guidance in advance of public rulemaking to ensure the proper handling of food during transport.



Shellfish are delicious, nutritious and healthful — if handled properly. That means using appropriate time and temperature controls to slow or stop bacterial growth which will help reduce illnesses.



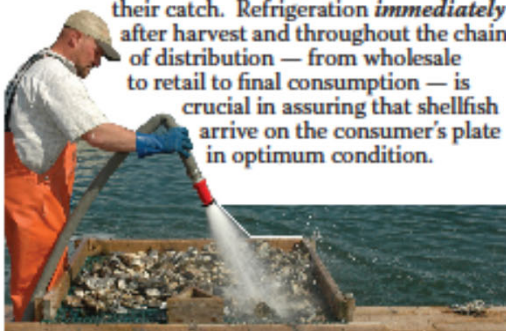
## WHAT ARE VIBRIO BACTERIA?

*Vibrio parahaemolyticus* (Vp.) and *Vibrio vulnificus* (Vv.) are naturally occurring bacteria that proliferate during warm weather. Shellfish can concentrate vibrios as they feed and if the shellfish are eaten raw these bacteria can make your customers ill. Eating raw or undercooked shellfish when Vp. bacteria are present at high levels can cause flu-like symptoms known as gastroenteritis (diarrhea, vomiting, headache, fever and chills). Symptoms can sometimes require hospitalization. Even worse, if an immune compromised individual consumes shellfish contaminated with Vv. it may cause serious illness or possibly even death.

## HOW TO REDUCE OR ELIMINATE ILLNESSES CAUSED BY VIBRIOS

Vibrio bacteria thrive at higher temperatures, and when shellfish are warm the bacteria can multiply at alarming rates. Temperature control is the best way to limit bacterial growth and ensure that producers deliver the safest possible product to consumers. Bacterial growth slows at low temperatures and stops altogether below 45° F.

To reduce or eliminate bacterial growth harvesters should take every precaution to chill their catch. Refrigeration *immediately* after harvest and throughout the chain of distribution — from wholesale to retail to final consumption — is crucial in assuring that shellfish arrive on the consumer's plate in optimum condition.



## HARVEST OPTIONS

During hot weather, depending on conditions in your growing area and harvest practices, the level of vibrios in shellfish at the time of harvest may already be high enough to cause illness even if temperature abuse does not occur. Several harvest methods can reduce or eliminate this risk, including:

- Harvesting shellfish from below the thermocline, where temperatures are several degrees cooler than at the surface.
- Harvesting shellfish before the tide goes out completely. Shellfish on exposed tidal flats can get very warm.
- Collecting shellfish in bags, baskets or cages, and then holding them submerged (preferably in cool, deep waters) until harvest. For this to work properly shellfish must be held in such a way that they can continue filtering water to allow themselves to purge accumulated bacteria.
- Watch for stray shellfish. When emptying cages or baskets be certain no strays get left behind!



## POST-HARVEST TEMPERATURE CONTROL

The sooner shellfish are placed under temperature control (under 45°F) the better. "Harvest" begins at the time the first shellfish is exposed to the air, either on deck or when the tide recedes. At 80°F vibrio levels can double every hour.

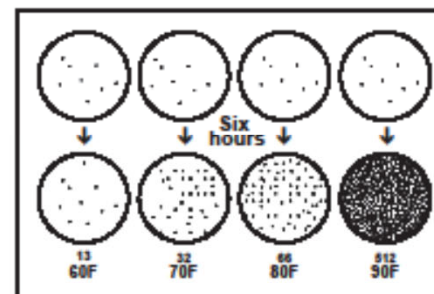
## ACHIEVING AND MAINTAINING TEMPERATURE CONTROL

Temperature can be controlled through mechanical refrigeration, icing, or the use of gel packs. Studies have shown that direct icing can reduce shelf life of clams, especially when growing waters are exceptionally warm, but a layer of cloth between the shellfish and ice can prevent this. Make sure that the container can drain so no shellfish are sitting in ice melt-water.



Regardless of the method of temperature control used, make sure that shellfish in the center of the container get cooled as well. Providing shade to keep shellfish out of the sun can make a big difference. Once the shellfish are landed you can cool them with a spray of cold fresh water from an approved source.

Each state has established harvest protocols to determine the hours of harvest and maximum time to refrigeration in order to minimize bacterial growth.



Growth of *Vibrio parahaemolyticus* at various temperatures.





# Questions so far?

1. Overview of DEM / ISSC harvest regs.
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# RI Vp Control Plan

<http://www.dem.ri.gov/pubs/regs/regs/agric/aquacult14.pdf>

Effective July 1 – September 15

In “Thermally Impacted Areas”

- Harvest early (by 11AM)
- Or Harvest fast  
(to the dealer w/in 2 hours)
- Or bring ice (approved ice)
- Shade required



# RI - VCP

In the bay you have 5 hours to refrigeration because  $V_p$  is less of a problem in cooler waters.

Still need shade.





# Resubmergence

- If you dry your animals to control fouling and they are exposed for more than a tidal cycle (12 hrs) then you need to resubmerge the product for 7 days prior to sale to allow *Vibrios* to purge.

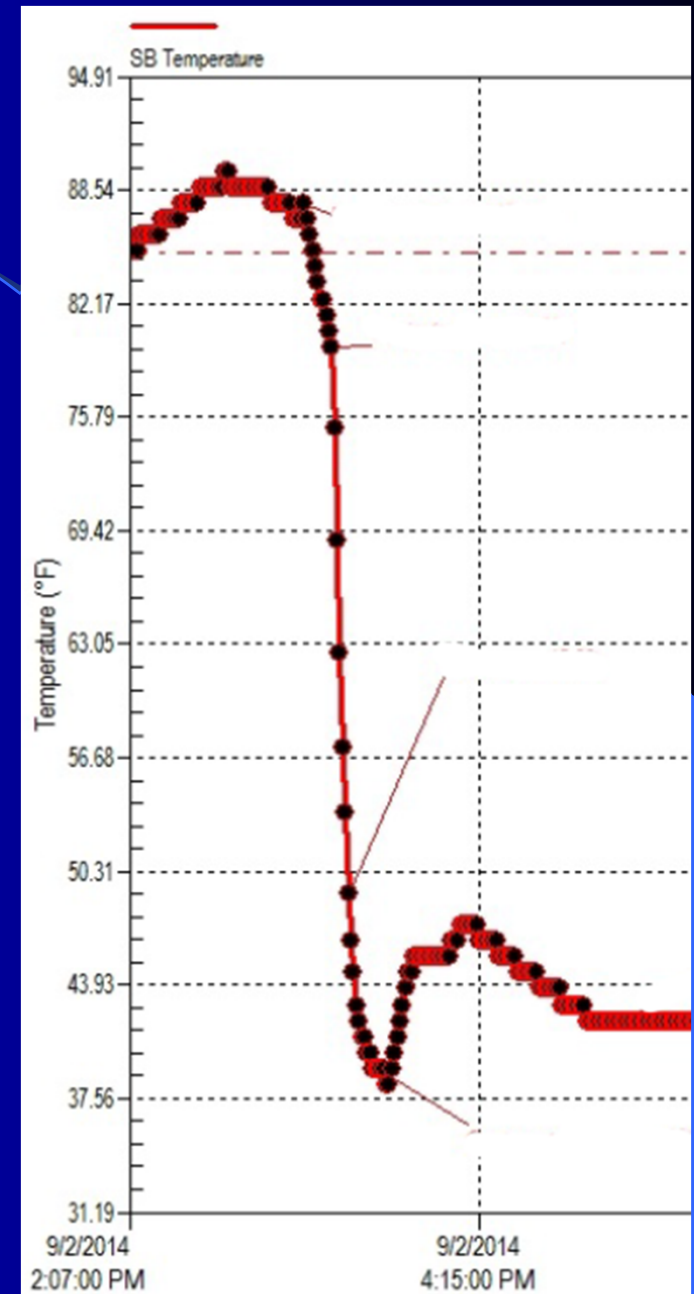


# Cooling Options

Ice slurry dips work best to cool shellfish quickly.

Ice bed is OK.

Reefer on truck is not designed to cool product.





# Keep it cool

- Leave it in the water until the last minute
- If harvested inter-tidally - leave in the water overnight (for lease holders)
- Shade on the boat and in the truck
- Ice (approved)
- Get it to the dealer fast - make sure they put it right in the cooler.
- Talk to your dealer and your trucker

# Be Creative

This is only a critical issue for a few months a year

- Ice, coolers, shade
- Swamp coolers
- Spray with cool water from approved source

- Ideas?

Questions?

# A word about Norovirus

- Norovirus is the major source of food borne illness in the US. It is also HIGHLY contagious!
- Norovirus is not a major problem in U.S. shellfish because we do a good job with sewage treatment.
- Where we run into problems is usually overboard discharge: Typically a boater or harvester catches Noro from a family member and then vomits overboard - contaminating hundreds of acres of growing grounds.
- **IF YOU SEE SOMETHING SAY SOMETHING** - A brief precautionary closure is vastly preferable to dozens of illnesses, recalls and closures

# Please support our research partners

- We have many challenges and unanswered questions.
- We need better tools.



# Outline

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# Working in the Commons

- You do not own your lease.
- Your actions reflect on everyone.
- If you make enemies, you make us all look bad.
- If you get someone sick and cause a closure you are hurting everyone.
- Stay on your lease. Work within your permit. Don't break the law.







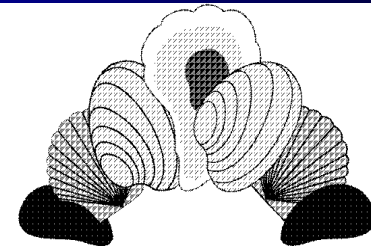
# Working in the Commons

## Expectations and Responsibilities

Download the ECSGA Best Management Practices module [www.ECSGA.org](http://www.ECSGA.org)

- Create a customized farm plan
- Generate marketing materials
- We have identified key do's and don'ts
- Takes less than 15 minutes

Join the OSAA -



**OCEAN STATE AQUACULTURE ASSOCIATION**

They work for you and they deserve your support

# Working in the Commons

## Expectations and Responsibilities

If you see someone else doing something that might cause an illness or reflect badly on the industry....

What will you do?

If an illness is traced to your growing area you could face a closure and recall.

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# Seed Considerations

- Seed imports

Must be approved by CRMC Aquaculture Coordinator

Must be inspected by pathologist for diseases and certificate should come in advance of shipment - Minimum 5-day lead time

- No wild stock seed collection (unless permitted)

- Tips

Order seed early, order excess seed, order from multiple hatcheries or nurseries, consider disease resistant stocks, triploids, larger seed costs more, but small seed is tricky -

Order only what you can grow!





## Seed Considerations

Seed from RI - if from a different “zone”

Must still get approval from CRMC Aquaculture Coordinator  
w/ at least a 5-day lead time.

Must still be inspected by pathologist.

Cannot move from high infection zone to low infection zone.

# Seed Considerations

From uncertified waters

Seed must be cultured in open waters for a minimum of 6-months prior to sale.

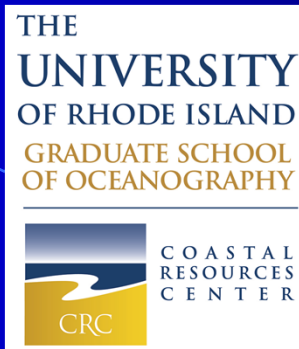
Requires extensive record keeping and an **operational plan** to ensure that seed is kept separate and is not sold prior to the end of the 6-month period.



# ECSGA.org

- Great resource for information
- Check out our Rookie Mistakes to Avoid and save lots of \$\$\$
- Your voice in DC to keep regulators at bay
- Your voice at the ISSC to keep the FDA under control.
- Good advocacy comes at a price....





If you have questions:

Contact: [bob@ECSGA.org](mailto:bob@ECSGA.org)

(401)783-3360

Dave Beutel [dbeutel@crmc.ri.gov](mailto:dbeutel@crmc.ri.gov)

(401)783-3370

ECSGA.org, ISSC.org, DEM.RI.gov

