



# **OCTOBER 2022 RULEMAKING MEETING**

Office of Environmental Health & Safety

# Discussion Topics

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- Ground Rules/Rulemaking Overview
- Definitions
- Pre-harvest practices & illnesses
- Break?
- Literature and other state control plans
- Questions/Suggestions



# Ground Rules

Be Respectful.

Be punctual and prepared.

Everyone participates



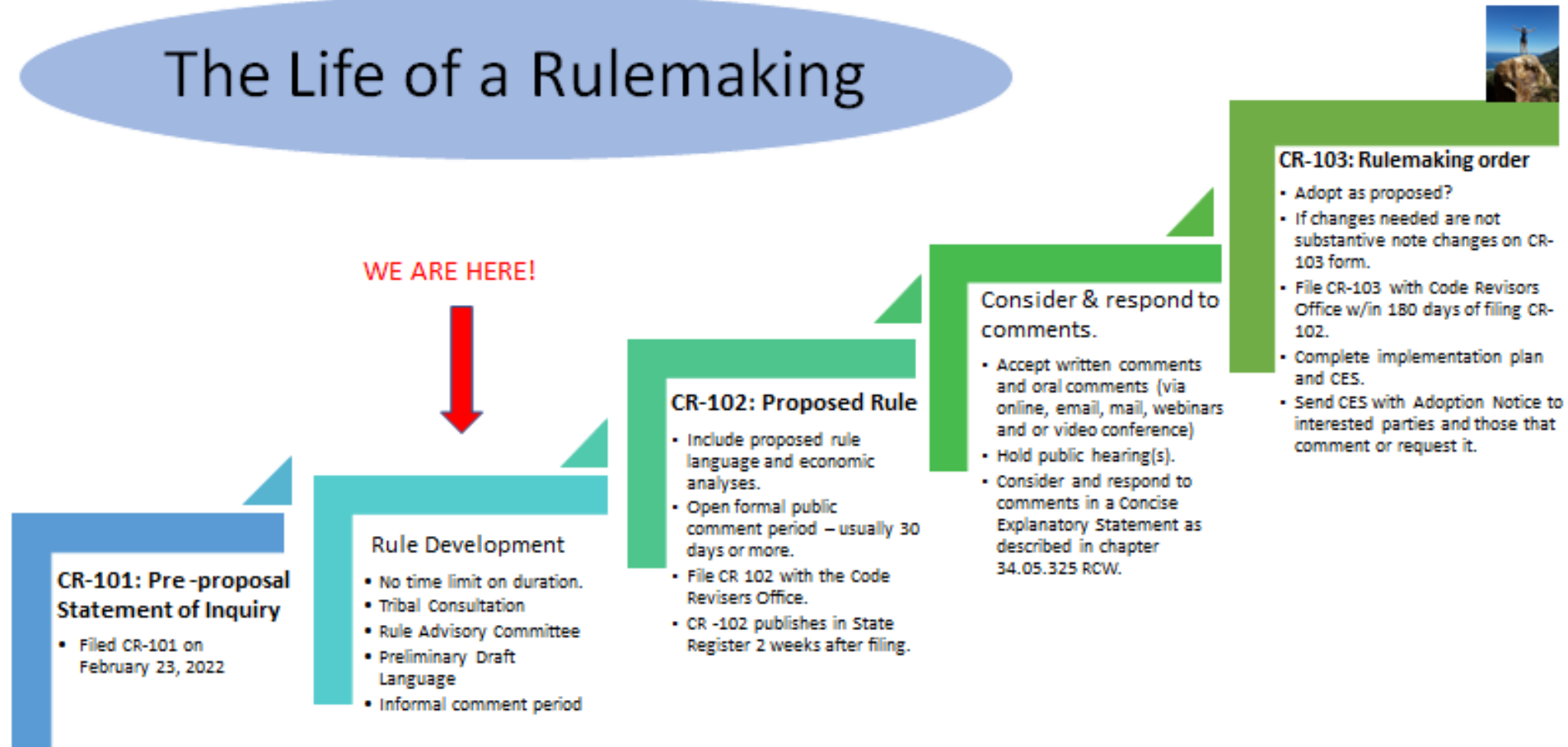
One person speaks at a time.

Disagree? Propose a solution.

Keep discussion relevant.

# Rulemaking Process

## The Life of a Rulemaking



# Definitions

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## **WAC 246-282-010**

"Harvest"- the act of removing shellstock from a harvest site and its placement on or in a container for transport.

- Shellstock that has been bagged and left on the harvest site for later removal is NOT considered harvest.
- Shellstock must be removed from the harvest site for it to be considered harvest.

Pre-harvest is not defined in WAC or MO but is referred to in MO Chapter [II@.07B\(5\)](#)

# Harvest Practices

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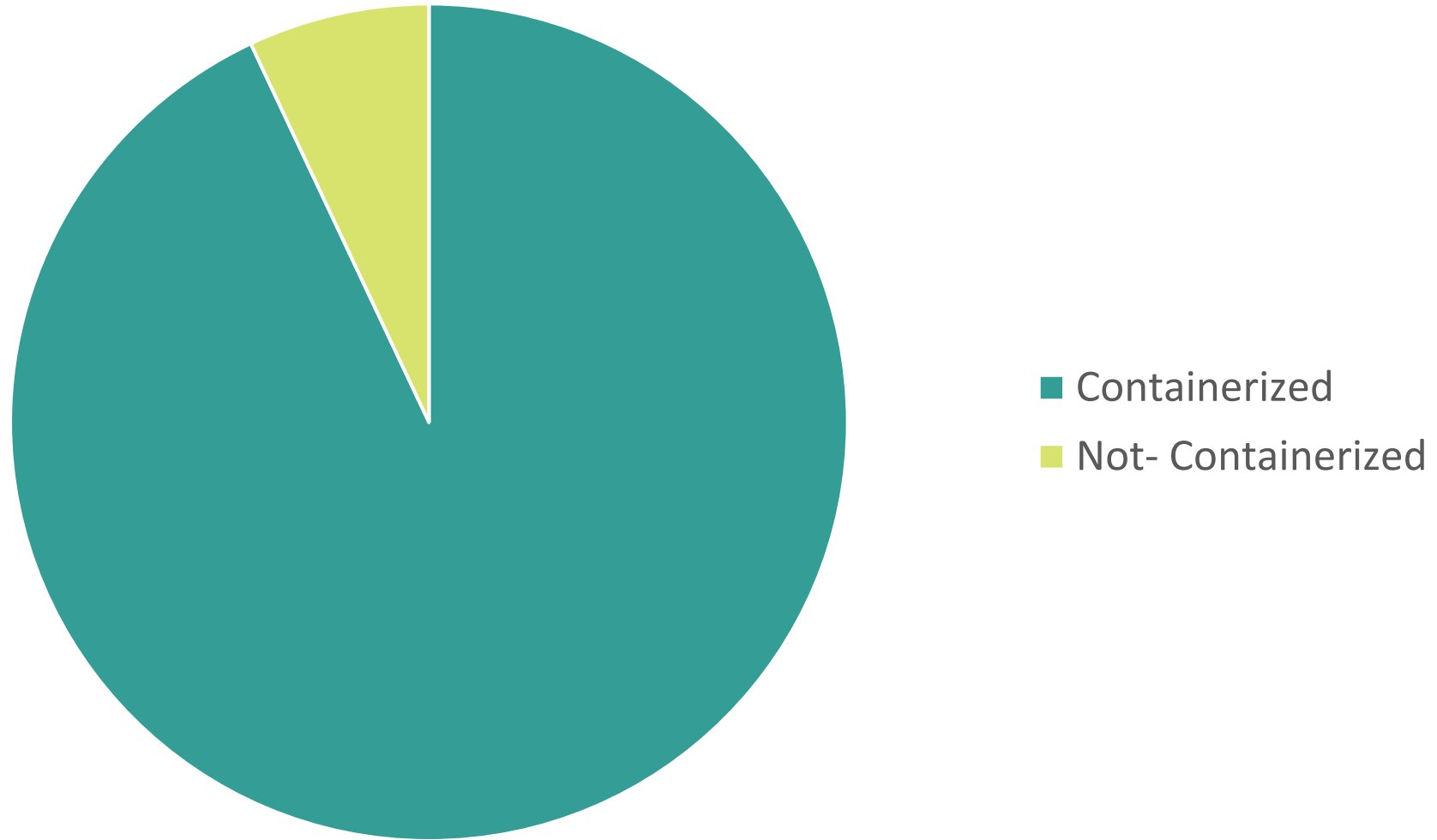
What methods do you use?

# Issue at Hand

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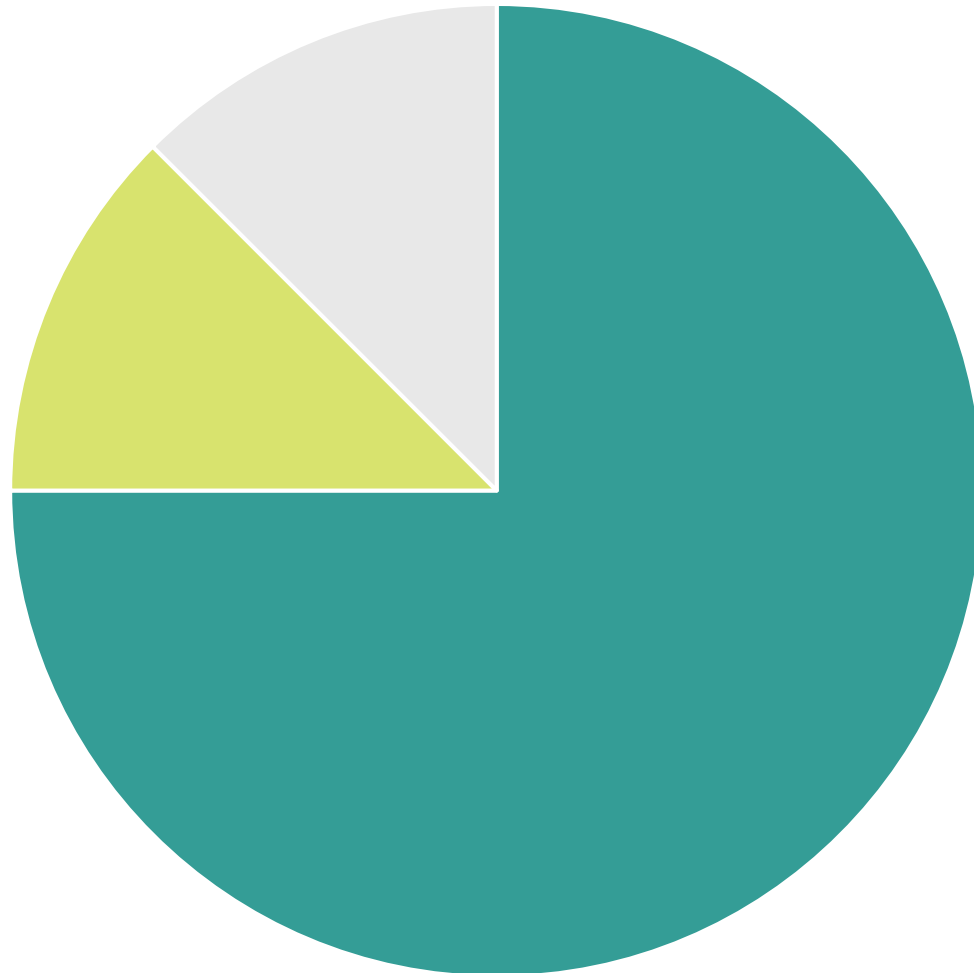
- Bagging for hours potentially at low tide and in the hot sun because no pre-harvest temps are required or taken
- Leaving on the beach at low tide, sometimes through numerous low tides cycles, in containers
- Picking up (harvesting) next morning and recording temps when they are low, is just a snapshot of “harvest temps”
- Time to temperature requirements are met, since harvest temperatures were low and oysters were cooled within time restraints (stopped the growth, but didn't reduce what was already there)

# Vp Illnesses 2019-2022: Containerized Before Harvest





# 2022 illnesses and Time Oysters are Containerized Before Harvest



- Of the operations that measured time and temp during pre-harvest activities, most of them were bagged at midday low tide between 66-89°F and then placed on the beach for “harvest” at a later date.
- As the current Rule stands, they were not out of compliance, but what can we do to ensure this doesn’t continue to happen?

■ 1-2 Days Before  
■ 1 week or less  
■ Greater than 1 week

# The Importance Re-submerging Oysters Properly

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## **As per the interpretive summary of the FDA's *Quantitative Risk Assessment on the Public Health Impact of Pathogenic Vibrio parahaemolyticus In Raw Oysters Re-submersion of Intertidally Harvested Oysters-***

“As an example of a harvest practice scenario, the impact of overnight submersion of oysters was evaluated. The model predicts the levels of *Vibrio parahaemolyticus* in intertidally-harvested oysters, e.g., oysters are placed into baskets and removed after the tide rises, a typical practice in the Pacific Northwest. *Vibrio parahaemolyticus* levels can increase in oysters during intertidal exposure but overnight submersion of the oysters in water has been shown to reduce these levels. **Delaying harvest until near the end of the tidal cycle, just before oysters are exposed again, was predicted to reduce the risk of illness by approximately 90%. Research is needed to determine whether the predicted level of reduction can be achieved when oysters are stacked in baskets.”**

# Questions to Consider in Rulemaking

## Do water temperatures and salinity impact the purging rates of oysters?

- In research conducted by Mu (2022), it was shown that a pre-chilled wet storage system achieved greater depuration efficiency and that a higher (20-25 ppt) salinity and lower (7.5-10°C) temperature range, yielded the most significant depuration results.

Table 3. Changes of *V. parahaemolyticus* levels (log<sub>10</sub> MPN/g) in laboratory-inoculated oysters during depuration at 7.5, 10, and 12.5 °C (Salinity was controlled at 20 ppt).

Time (Day)	Temperature (°C)		
	7.5	10	12.5
0	5.79 ± 0.22 <sup>A</sup>	5.50 ± 0.28 <sup>A</sup>	5.47 ± 0.16 <sup>A</sup>
1	5.31 ± 0.12 <sup>B</sup>	4.86 ± 0.19 <sup>B</sup>	4.72 ± 0.29 <sup>B</sup>
2	4.29 ± 0.11 <sup>C</sup>	3.99 ± 0.37 <sup>C</sup>	4.38 ± 0.00 <sup>BC</sup>
3	3.86 ± 0.19 <sup>D</sup>	3.75 ± 0.19 <sup>CD</sup>	3.86 ± 0.28 <sup>CD</sup>
4	3.01 ± 0.06 <sup>EF</sup>	3.30 ± 0.11 <sup>DE</sup>	3.65 ± 0.19 <sup>DE</sup>
5	2.77 ± 0.12 <sup>F</sup>	2.97 ± 0.00 <sup>EF</sup>	3.57 ± 0.30 <sup>DEF</sup>
6	2.57 ± 0.16 <sup>F</sup>	2.63 ± 0.00 <sup>FG</sup>	3.24 ± 0.16 <sup>EF</sup>
7	2.41 ± 0.05 <sup>F</sup>	2.36 ± 0.00 <sup>G</sup>	3.04 ± 0.12 <sup>F</sup>
Total log reduction	3.38 ± 0.05 <sup>a</sup>	3.14 ± 0.00 <sup>b</sup>	2.44 ± 0.12 <sup>c</sup>
FDA Requirement Achieved (3 log reduction)	Yes	Yes	No

Data with the same letter in the same column are not significantly different ( $p > 0.05$ ).

Table 2. Changes of *V. parahaemolyticus* levels (log<sub>10</sub> MPN/g) in lab-inoculated oysters during depuration at salinity of 15, 20, and 25 ppt. (Temperature was controlled at 10 °C).

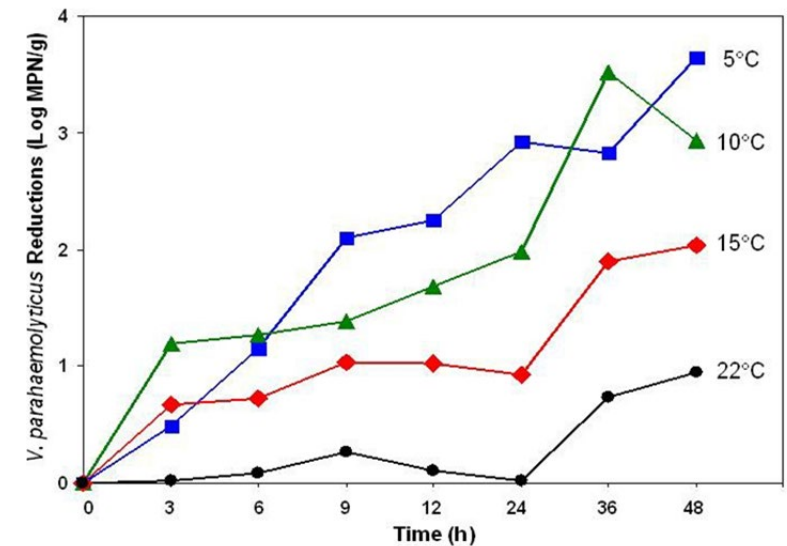
Time (Day)	Salinity (ppt)		
	15	20	25
0	5.18 ± 0.00 <sup>A</sup>	5.50 ± 0.28 <sup>A</sup>	5.41 ± 0.24 <sup>A</sup>
1	4.86 ± 0.19 <sup>B</sup>	4.86 ± 0.19 <sup>B</sup>	4.79 ± 0.22 <sup>B</sup>
2	3.86 ± 0.19 <sup>C</sup>	3.99 ± 0.37 <sup>C</sup>	4.24 ± 0.12 <sup>C</sup>
3	3.65 ± 0.30 <sup>CD</sup>	3.75 ± 0.19 <sup>CD</sup>	3.97 ± 0.00 <sup>CD</sup>
4	3.30 ± 0.11 <sup>D</sup>	3.30 ± 0.11 <sup>DE</sup>	3.66 ± 0.00 <sup>DE</sup>
5	2.97 ± 0.00 <sup>E</sup>	2.97 ± 0.00 <sup>EF</sup>	3.24 ± 0.24 <sup>EF</sup>
6	2.53 ± 0.18 <sup>E</sup>	2.63 ± 0.00 <sup>FG</sup>	2.86 ± 0.19 <sup>FG</sup>
7	2.32 ± 0.00 <sup>F</sup>	2.36 ± 0.00 <sup>G</sup>	2.63 ± 0.00 <sup>G</sup>
Total log reduction	2.85 ± 0.00 <sup>a</sup>	3.14 ± 0.00 <sup>b</sup>	2.77 ± 0.12 <sup>a</sup>
FDA Requirement Achieved (3 log reduction)	No	Yes	Yes

Data with the same letter in the same column are not significantly different ( $p > 0.05$ ).

# Questions to Consider in Rulemaking (Cont.)

## Does containerizing oysters impact depuration efficiency?

- Kelly (2021) notes in their research that, “when there was a significant effect of culture method, typically levels were found to be significantly higher in oysters coming from flip bags, rather than those grown out in beach culture. It was also noticed that oysters were able to recover from elevated *Vibrio* spp. levels in more cases than oysters from flip bags.”
- Jones (2017), demonstrated that oyster depuration rates were not impacted by specific harvest practices of PNW growers, such as containerizing. However, they also noted that temperature affects purging rates in seawater, and lower temperatures were shown to aid in more effective depuration.



# Bagging and Leaving on the Beach

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**WAC Vp Control Plan:** *(d) When a harvester or shellfish dealer places oysters in a container or conveyance but does not remove them from the tide flat as part of their harvest and the harvest exceeds the time to cooling requirements in subsection (11) of this section, then the oysters in the container or conveyance must be **covered by the tide for a minimum of four hours** before harvest can be completed.*

*What are some other states doing?*



# Vp Control Other US States

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**Mississippi-** They have identified that the average monthly maximum water and air temps are triggers for their control measures. The following control measures may be used to reduce the risk of V.v. illness and will be implemented when the triggers exceed the accepted risk (illnesses + high water temps):

- labeling the oysters, "For shucking by a certified dealer or PHP only", when the average monthly maximum water temperature exceeds 70°F or; subjecting all oysters intended for the raw, half-shell market to MDMR approved post-harvest processing when the average monthly maximum water temperature exceeds 70°F
- Reducing the time of exposure to ambient air temperature prior to delivery to the initial certified dealer based on modeling or sampling, as determined by the authority. For the purpose of time to temperature control, time begins once the first shellstock harvested is no longer submerged.

**Alabama-** Puts restrictions on cooling and time allowed from landing to delivery based on temperature, not month of the year. For example, in July, max time on harvest reef for 1 trip is 4 hrs., maximum time allowed from landing to delivery is 1.5 hrs. and maximum time to cool is 6 hrs.

# Vp Control Other US States (Cont.)

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**Virginia-** From May 1-September 30 All oysters shall be placed into trucks or other conveyances equipped with approved temperature-controlled storage, no later than the following designated curfew harvest times, by month:

- May 1 through May 31, by 11:00 a.m.
- June 1 through June 30, by 10:00 a.m.
- July 1 through July 31, by 10:00 a.m.
- August 1 through August 31, by 10:00 a.m.
- September 1 through September 30, by 12:00 noon. Any person harvesting out of curfew requires a special permit and GPS tracking to confirm harvest and transportation times.

They also put restrictions on transport, from the time the vessel or individual leaves the dock or shore until the oysters are placed into trucks or other conveyances equipped with temperature-controlled storage, shall not exceed the following amount of time, by month: 1. 5 hours during the months of May and September; 2. 3 hours during the month of June; and 3. 2 hours during the months of July and August.

# Vp Control Other US States (Cont.)

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**Florida**-Puts restrictions on cooling based on month, and time of day, and cooling method.

For example, in April, oysters that are traditionally cooled must be in the cooler of a certified facility by 11:00am the day of harvest and at or below 55°F, in 8 hours. **11:00am** on the day of harvest within 8 hrs. Oysters that are rapid cooled must be placed in a cooler at the processor by no later than **1:00pm**, within 2 hrs of harvest. For oysters cooled on boat with ice slurry dip, within 1 hour of harvest and stored under mechanical refrigeration or in a cooler surrounded by ice. Oysters must be in the cooler of a certified facility no later than **3:00pm**. Traditional cooling methods are not allowed from May-September. Or label for shucking only.

**Alaska**- This plan consists of three control measures to mitigate the risk of *Vibrio parahaemolyticus* illnesses during the months of June 15- September 15: Water temperature monitoring, control of time from harvest to temperature control, and control of time and internal temperature after refrigeration.

- Control Measure 1: Water Temperature & Salinity Monitoring- Weekly monitoring when water is the warmest (~5pm) if temp  $\geq 60^{\circ}\text{F}$ , notify DEC, monitor daily, or stop harvest.
- Control Measure 2: Control of Time from Harvest to Temperature Control- Within 5 hrs. after first harvested if  $\leq 60^{\circ}\text{F}$ , within 3 if  $\geq 60^{\circ}\text{F}$ , within 1 if  $\geq 68^{\circ}\text{F}$ .
- Control Measure 3: Control of Time and Shellfish Temperature after Refrigeration (original dealer)- Internal temp  $\leq 50^{\circ}\text{F}$ , within 10 hrs after temp control.

# Vp Control Other US States (Cont.)

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## **New Jersey-**

- For subtidal harvest, their maximum hours to refrigeration depend on the months of the year. For example, June 15-July14, 6 hours (including transport) is allowed from the start of harvest until oysters are placed in refrigeration, and "Refrigeration" is defined as a mechanical unit that is chilled to a temperature of 45 degrees Fahrenheit (7.2 degrees Celsius) or colder at the time shellfish are placed in the unit and maintained at that temperature.
- For intertidal harvesting of oysters from June 1-August 31, the maximum hours to refrigeration (including transport) is 4 hours, starting when the first oysters to be harvested are exposed to the air by the receding tide.
- For Tide dependent harvest, June 1-August 31, the maximum hours to refrigeration (including transport) is 4 hours, starting when harvest begins. On each harvest day prior to any harvest activity, the shellfish license holder shall notify the Department's Division of Fish and Wildlife, Bureau of Law Enforcement, to provide the name, location of harvest, and harvest start time.
- All harvesters must record in a permanently bound book, harvest start time, time last shellfish was placed in refrigeration, and shell temp in one container from that day's harvest at off loading and the time.

# Questions?

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All meeting agendas, presentations, and information can be found here:

<https://doh.wa.gov/community-and-environment/shellfish/rules/wac-246-282-sanitary-control-shellfish-rule-revision>

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# References:

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U.S. Department of Health and Human Services “Interpretive Summary: Quantitative Risk Assessment on the Public Health Impact of Pathogenic *Vibrio parahaemolyticus* In Raw Oysters”
2. ISSC, VARB & Other Vp Research. Jessica L. Jones, Ph.D. FDA Gulf Coast Seafood Laboratory Dauphin Island, Alabama.
3. James Kelly. 2021. “Effects of culture methods in the Pacific Northwest on the levels of *Vibrio* spp. in farm-raised oysters (*Crassostrea gigas*).” Master’s Thesis, Auburn University. <https://etd.auburn.edu/handle/10415/7739>
4. J. L. Jones, T. P. Kinsey,\* L. W. Johnson, R. Porso, B. Friedman, M. Curtis, P. Wesighan, R. Schuster, J. C. Bowers. “Effects of Intertidal Harvest Practices on Levels of *Vibrio parahaemolyticus* and *Vibrio vulnificus* Bacteria in Oysters” *Applied Environmental Microbiology*. August 2016 Volume 82 Number 15. <https://doi.org/10.1128/AEM.00721-16>
5. Ruojun Mu 1, Chengchu Liu 2,\* , Salina Parveen 3, Donald Webster 4 and Jie Pang 1,\* . “Controlled Recirculating Wet Storage Purging *V. parahaemolyticus* in Oysters.” *Pathogens*. 11, 553, May 2022, <https://doi.org/10.3390/pathogens11050553>.



Washington State Department of

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