

Vibrio parahaemolyticus Control Plan

June 1 – August 31, 2016



New Jersey Department of Environmental Protection

Division of Water Monitoring and Standards / Division of Fish & Wildlife

and

New Jersey Department of Health

Consumer, Environmental and Occupational Health Service

Seafood / Shellfish Project

A. Introduction

Vibrio parahaemolyticus (*Vp*) nationally reported illnesses rates per 100,000 population have tripled since 1996. *Vp* has become a significant problem for both regulators and the shellfish industry. Despite the implementation of *Vp* Control Plans by States and industries and diligent efforts to implement such plans, shellfish related illnesses continue to occur.

New Jersey did have two confirmed illnesses of *Vp* in 2015; one was Shell Rock oyster beds in the Delaware Bay and one from Great Bay on the Atlantic Coast. Trace back showed the case from the Delaware Bay was caused by poor post-harvest handling. These sporadic illnesses did not result in an outbreak or closure.

During the 2015 *Vp* season, the New Jersey Department of Environmental Protection's Bureau of Marine Water Monitoring (BMWM) conducted a *Vibrio* study that was designed to investigate the effectiveness of rapid cooling using an ice slurry for 10 minutes. Samples were analyzed for total *Vp*, the virulent genes of *Vp* (*trh* and *tdh*), and *Vibrio vulnificus* (*Vv*), using PCR.

Oyster samples from sub-tidal harvest were collected from Delaware Bay. For sampling, BMWM shadowed industry practices and collected oysters on a weekly basis from May through August. Some oysters were immediately placed in an ice slurry for 10 minutes, others were kept unrefrigerated with shading for 50 minutes, 2 hours and 50 minutes, and 4 hours and 50 minutes, with each then being placed in the ice slurry for 10 minutes. Another sample was placed into mechanical refrigeration after 5 hours of shading. Meat and shell temperatures were recorded at each step. Temperature data loggers were immediately placed in oysters after harvest and recovered prior to analysis.

Data suggests that *Vibrio* levels are not always highest during months with the highest water and air temperatures. Highest levels of *trh*, *tdh* genes occurred during late June through early July. Continuous temperature loggers indicate that ice slurry is an effective means of rapidly cooling oysters (with in shell meat temperature < 41 degrees F in 10 minutes). There is no significant difference in *Vibrio* levels at initial harvest, 1 hour shading, and 3 hours shading followed by the ice slurry. Five (5) hours shading followed by ice slurry showed a marked increase in *Vibrio* levels. *Vibrio* growth continued during mechanical refrigeration. Rapid cooling using an ice slurry prior to refrigeration is more effective at retarding *Vibrio* growth than going directly to mechanical refrigeration.

B. Background

Vibrio parahaemolyticus (*Vp*) is an organism that occurs naturally in coastal waters. It is not related to pollution, which means that traditional controls for shellfish sanitation related to growing water classification are not effective. Instead, the occurrence of this pathogen in elevated levels appears to be related to water temperature and post-harvest handling. *Vp* levels increase rapidly when shellfish are exposed to temperatures greater than 70 degrees Fahrenheit.

Vp is a curved, rod-shaped, Gram-negative bacterium found in the marine and estuarine environment. When shellfish, usually oysters, are eaten raw or undercooked with high levels of *Vp* it may result in gastrointestinal illness in humans. Symptoms typically resolve within 72 hours, but can persist for up to 10 days in immunocompromised individuals.

Procedures for dealing with *Vp* have been developed over the past several years through the Interstate Shellfish Sanitation Conference (ISSC) and are part of the National Sanitary Shellfish Program Guide for the Control of Molluscan Shellfish (NSSP Guide).

New Jersey's *Vibrio parahaemolyticus* Control Plan (VPCP) addresses program coordination, response to potential outbreak, post-harvest time and temperature controls, hours of harvest for tidal and intertidal, and Hazard Analysis and Critical Control Points (HACCP) plan requirements. In addition, the VPCP recommends additional best management practices to be implemented to further minimize risk from *Vp*.

C. Coordination of New Jersey Agencies Responsible for Shellfish Sanitation

The requirements for the authority set forth in the NSSP Guide are accomplished through a coordinated effort of four agencies in New Jersey. These agencies, their physical locations, their role in shellfish sanitation, and their relationship to one another are shown below.

Implementation of the VPCP requires cooperation and communication among these agencies.

1. New Jersey Department of Environmental Protection (NJDEP)

Bureau of Marine Water Monitoring
Division of Water Monitoring and Standards
P.O. Box 405
929 Stoney Hill Road
Leeds Point, NJ 08220
609-748-2000
(Water monitoring, shellfish classification charts, special permits)

Bureau of Shellfisheries
Division of Fish and Wildlife
P.O. Box 418
360 North Route 9
Port Republic, NJ 08241
609-748-2020
(Licensing, shellfish leases, resource management)

Bureau of Law Enforcement – Marine Region
Division of Fish and Wildlife
P.O. Box 418
360 North Route 9

Port Republic, NJ 08241
609-748-2050
(Patrols, enforcement, inspections)

2. New Jersey Department of Health (NJDOH)

Seafood and Shellfish Project
Division of Consumer Environmental and Occupational Health
P.O. 369
Trenton, NJ 08625-0369
609-826-4935
(Inspections, certified dealers, depuration, illness reporting and investigation)

The following agencies have primary responsibility for decision making and implementation of the following aspects of the VPCP:

NJDEP Bureau of Marine Water Monitoring

- Develop and coordinate the VPCP.
- Analyze water and air temperature data and conduct sampling, in to order conduct a risk assessment as the basis for developing a VPCP to control a naturally occurring pathogen.
- Develop control strategies to minimize potential *Vp* illnesses.
- Close affected growing areas if outbreaks are epidemiologically associated.

NJDEP Bureau of Law Enforcement – Marine Region

- Prevent illegal harvest by enforcing closure of implicated growing areas.
- Ensure compliance with harvest and transport restrictions including harvest hours and times.
- Enforce vessel requirements including, but not limited to, shading of harvested oysters.

NJDOH – Seafood and Shellfish Project

- Ensure compliance with time and temperature restrictions including, but not limited to, harvester landings, certified dealer and transport.
- Inspect and enforce certified dealers and ensure required cooling times and temperatures are met.
- Epidemiologically confirm, document, and conduct trace back for each *Vibrio* (*Vp* and *Vibrio vulnificus*) illness consumption case as reported in State or from other authorities. Initiate, communicate, and monitor oyster recall(s) if a growing area is implicated as a result of an illness or due to post harvest mishandling, initiating a firm specific related recall.
- Notification to NJDEP and FDA of a confirmed *Vp* illness outbreak.
- Notify the shellfish industry and local health jurisdictions in the State of the potential for illnesses due to *Vp* prior to historical times of onset or at a minimum of once a year.

- Issue a health advisory to the public about the potential problem and advise the industry to educate wholesalers, retailers, and consumers about the potential problem.

D. Outbreak Response (*Vibrio parahaemolyticus*)

In the event of confirmed cases of shellfish related food borne illnesses caused by the naturally occurring marine bacterium *Vp*, the New Jersey Department of Environmental Protection (NJDEP) and the New Jersey Department of Health (NJDOH) shall follow the guidelines of the latest version of the National Shellfish Sanitation Program Model Ordinance and the VPCP.

E. NJDEP – Bureau of Marine Water Monitoring *Vibrio parahaemolyticus* Sampling

In 2016, BMW will continue to sample and run analysis on oysters from the Delaware Bay harvest areas during the *Vp* season to evaluate the oyster tissue levels of *Vp* from these waters. In addition to the oyster sampling and analysis, background levels of *Vp* in hard clams from the Atlantic Coast waters will be studied. Other States have reported illnesses linked to hard clams (*Mercenaria mercenaria*), and these may be required to be included in the VPCP in the future. If it becomes necessary to incorporate hard clams into the VPCP, then having background levels for New Jersey hard clams will be useful in developing the control measures.

F. Harvest, Transport and Temperature Control Measures

1. In order to minimize growth of *Vp* which occur with elevated water and air temperature conditions during harvest, the following conditions are placed on the commercial harvest and handling of oysters from all New Jersey waters from June 1 through August 31, 2016:
2. Definitions - For the purposes of this VPCP the following terms are defined as:
 - a. *Refrigeration* means mechanical units on harvest vessels or on vehicles used for the transportation of oysters to a certified dealers establishment, which is pre-chilled to a temperature of 45 degrees Fahrenheit (7.2 degrees Celsius) or colder. All efforts will be made to maintain a temperature of 45 degrees Fahrenheit (7.2 degrees Celsius) or colder during harvest and/or transport.
3. General Conditions – These conditions apply to all oyster harvest in all State waters during June 1 through August 31, 2016.
 - a. All existing regulations regarding the harvest, transport and temperature controls remain in effect unless specifically modified by this VPCP.

- b. No product may be shipped the same day as harvest without approval from NJDOH.
- c. NJDOH maintains the requirement for mechanical refrigeration when travel time from the landing site to the certified dealer is 1 hour or more.
- d. If an oyster harvester places his catch directly in refrigeration on his harvest vessel, the “hours to refrigeration” and the time “oysters must be in refrigeration” contained in the Table F4 below do not apply. All on board mechanical refrigeration and continuous monitoring devices must be inspected and approved by the NJDOH.
 - i. Harvesters that place their catch directly in refrigeration shall fly a minimum 18” X 18: orange flag with a black diagonal stripe on their vessel so the Bureau of Law Enforcement – Marine Region is aware that “hours to refrigeration” and the time “oysters must be in refrigeration” do not apply.
 - ii. Oyster vessels actively harvesting oysters during the *Vp* season with adequate and approved refrigeration may, within a one-hour interval, utilize and fill up to 24 individual bushel baskets on the shaded deck of the harvest vessel prior to placing the oysters into refrigeration in an appropriately tagged oyster cage as required by N.J.A.C. 7:25A-2.3, for the purpose of limiting the number of times the unit doors are opened and closed to maximize cooling.
 - iii. Harvest vessels who intend to place their catch directly in refrigeration, must notify the Bureau of Law Enforcement – Marine Region at 609 748-2050 prior to their first trip during the VPCP season. The notification shall include: vessel name, NJ registration or US Coast Guard documentation number, and contact information.
- e. Shading of the product, with adequate air flow between the shade and the oysters, must be in place on both the boat, pursuant to *N.J.A.C. 8:13*, and during overland transport to the initial NJ certified dealer, unless there is refrigeration on the harvest vessel or transport vehicle.
- f. Harvesters shall employ the use of a hand held laser thermometer on board. The harvester/s will record the time and product temperature (shell and/or meat) of the product at offloading each day.
 - i. Harvesters will record the offloading product temperature daily and report that temperature to the first receiving certified dealer.
 - ii. Harvesters will keep a daily offloading temperature and time of offloading, and start time of harvest time log for the *Vp* season on the boat in a bound journal.
 - iii. If the harvester is also the first receiving certified dealer, offloading temperatures will be kept at the certified dealer's establishment.
 - iv. Harvesters shall submit a copy of the temperature journal to BMW by September 15, 2016.
- g. The first certified dealer will record the receiving temperature of all product when it is received from the harvester at the truck or at the establishment.

4. Hours of Harvest – Sub Tidal (state-wide)

Dates	Hours to Refrigeration ¹	Start of Harvest ²	Oysters must be in Refrigeration ³
June 1 - June 14	7	6:00am	1:00pm
June 15 - July 14	6	6:00am	12:00pm
July 15 - August 31	7	6:00am	1:00pm

1 Hours to refrigeration are the total number of hours (inclusive of any transport time) from the beginning of harvest until the product is placed in refrigeration.

2 Time harvest may begin.

3 Oysters must be in refrigeration no later than the time indicated for the appropriate month, regardless of when harvest began. No oysters may be on a harvesters' boat, unless in refrigeration, beyond these times.

5. Harvest from Intertidal Waters and Tide Dependent Harvest (June 1 through August 31)

a. Harvest and transport to refrigeration of oysters from the intertidal waters of New Jersey or low tide dependent harvest of oysters is limited to four (4) hours (inclusive of any transport time).

i. Intertidal Harvest: The four-hour time period begins after the first oysters to be harvested are exposed to the air by the receding tide.

ii. Tide Dependent Harvest: The four-hour time period begins for tide dependent harvest when oysters harvest actually begins. The Bureau of Law Enforcement – Marine Region must be notified at the start of harvest each day.

b. Based on NJDEP studies, it is recommended that business practices be modified for intertidal harvesters/growers to minimize the time oysters are exposed prior to refrigeration. This includes, but is not limited to:

i. Culling and sorting of market-sized oysters within the four-hour time limit used for harvest and returning the product to the water for 48 hours. This will minimize the potential for increased *Vp* levels in oyster tissue due to sun and warm air temperature exposure and ensure the effectiveness of 48-hour re-submergence. Immediately following the 48-hour re-submergence, the market-sized product can be harvested and transported to refrigeration according to the requirements in section 5a above.

ii. Harvest and transport of oysters to refrigeration prior to cleaning and maintaining oyster cages.

iii. Priority should be given to oyster harvest and transportation.

6. Additional Recommended Best Management Practices.

The following Best Management Practices are recommended, but not required by the 2016 VPCP.

*Method, if used, is required to be validated, inspected and approved by NJDOH.

- a. Evaporative Cooling* – wet or mist oysters with waters (in the Approved classification), stored under required shading to reduce temperatures through evaporative cooling.
- b. Rapid Chilling* – In between dredges, cool oysters in a container of ice and sea water (from Approved classification). The slurry is the most effective way of rapidly cooling shellfish. When the next dredge is brought in transfer oysters in the slurry to a shaded area or into a refrigerated unit.
- c. Icing* – Layer bushel baskets, bushel bags, or oysters in cages with ice to reduce shell temperatures during transport to landing.
- d. Reduce time to refrigeration to 5 hours – Keeping the time to refrigeration to a maximum of 5 hours, especially when air temperatures exceed 70 degrees Fahrenheit, is the most effective way to maintain *Vp* levels low without direct refrigeration.
- e. If using onboard refrigeration, limit the number of times the unit doors are opened and closed to maximize cooling.
- f. Offload boats quickly, get product on a pre-chilled refrigerated vehicle efficiently, and get the product to the certified dealer as soon as possible.
- g. Shading of shellfish by methods, such as the use of a UV resistant tarp; NJDEP studies suggest that solar radiation can increase the temperature of the shellfish and cause an increase in *Vp* levels.

7. Prohibitions for all Harvesters and Certified Dealers

- a. Off-loading of oysters from boats directly onto interstate trucks intended for same day interstate shipment is prohibited.
- b. No product shall be shipped the same day it was harvested without prior approval from NJDOH.

8. Certified Dealers - Annual Evaluation of the Forced-Air Unit

- a. Certified dealers shall annually conduct an evaluation of their forced-air unit operation.
- b. The annual evaluation shall contain the following:
 - i. Operating and in good repair;
 - ii. Unit is capable to hold a maximum day's harvest amount while providing adequate circulation of cold air;
 - iii. Unit is capable to hold day's harvest while holding other products;
 - iv. Compressor is sized adequately and can cool product down to fifty (50) degrees F or less (40 degrees F is optimum) in 10 hours as required in the NSSP Guide;

- v. NJDOH wholesale temperature requirement is 45 degrees F in 12 hours (overnight), to ship from a certified dealer. No product may be shipped the same day as harvest without approval from NJDOH;
- vi. NJDOH requires verification of adequate refrigeration and cooling prior to certification for *Vp* season; and
- vii. Continuous temperature recording unit at the initial certified dealer able to continuously record the ambient temperature of the product with back-up alarm.
- c. The NJDOH has resource information in order to assist your purchase and installation of a recording thermometer on your forced air unit. The cost is inexpensive to install this device.
 - i. The NJDOH will not certify the Certified Shellfish Dealer operation unless a continuous recording thermometer is installed on your forced air unit. This will allow NJDOH to inspect and insure that your forced air unit is operational and maintaining appropriate temperatures.

9. HACCP PLANS

- a. Certified Dealers shall record the time and the temperature of the product when it is offloaded and received by the Certified Dealer. This can be done by utilizing a laser (infrared) thermometer (gun type) and “shooting” the temperature of the shell or by placing a probe thermometer between the shells and checking the meat.
- b. After being held overnight and before releasing the product for interstate shipment you are to record the time released and the temperature of the product. Product shall not be released for intrastate and/or interstate shipment until 5am after overnight holding. No product may be shipped the same day as harvest without approval from NJDOH.
- c. The implementation of the HACCP Plans includes monitoring records to indicate the time and temperature as indicated above, the establishment of Critical Limits and Corrective Actions when Critical Limits are Not Met.
 - i. Please alter your HACCP plan for your establishment to state that this will be performed.