

Vibrio parahaemolyticus Control Plan

June 1 – August 31, 2017



New Jersey Department of Environmental Protection
Division of Water Monitoring and Standards / Division of Fish & Wildlife
and
New Jersey Department of Health
Public Health and Food Protection Program
Seafood / Shellfish Project

A. Introduction

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

In 2016 New Jersey had three confirmed illnesses of *Vp*; the impacted shellfish were traced back to Shell Rock oyster beds, Ship John oyster beds, and the Cape Shore area in the Delaware Bay. These sporadic illnesses did not result in an outbreak or closure.

During the 2016 *Vp* season, the New Jersey Department of Environmental Protection's Bureau of Marine Water Monitoring (BMWM) continued routine sampling for vibrio concentrations in oyster tissue from the Delaware Bay and conducted a study to evaluate background vibrio concentrations in hard clam tissue from bays along the Atlantic Coast. Oyster samples from subtidal harvest were collected weekly from Delaware Bay harvest areas from June through August. Hard clams were collected twice from 13 locations in Atlantic Coast bays, from Sandy Hook to Cape May, during the months of June and July. Both oyster and clam samples were taken from the water and immediately placed on ice, to represent the ambient vibrio concentrations in the shellfish tissue. Oyster and hard clam tissue samples were analyzed using Polymerase chain reaction (PCR) for total *Vp*, the virulent genes of *Vp* (*trh* and *tdh*), and *Vibrio vulnificus* (*Vv*).

Data suggests that vibrio concentrations in oyster tissue are not always highest during months with the highest water and air temperatures. Highest levels of the virulent *trh* and *tdh* genes occurred during late June, consistent with previous year's results. Hard clams also showed a similar pattern, but exhibited lower vibrio concentrations than oysters. The average levels of *tdh* and *trh* in hard clams was half of the average for oysters, and the total *Vp* and *Vv* levels were significantly lower, by 20 and 450 times, respectively. Total *Vp* and *Vv* have shown to be correlated to salinity, typically higher levels in lower salinities, and the salinity difference of the oyster areas sampled and the hard clam areas sampled is the likely reason for the differences. The average salinity for the areas of oyster areas were 16.2 PSU and the hard clam areas were 29.4 PSU.

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 post-harvest handling, especially sunlight and warm air temperatures. *Vp* levels increase rapidly when shellfish are exposed to temperatures greater than 70 degrees Fahrenheit, after removed from the water.

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 Shellfish Sanitation 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 (BMWM)
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, 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
Public Health and Food Protection Program

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 NJDEP and NJDOH shall follow the guidelines of the latest version of the National Shellfish Sanitation Program’s Guide for the Control of Molluscan Shellfish and the current VPCP.

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

In 2017, BMWB 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* and *Vv* from these waters. In addition to the oyster sampling and analysis, levels of *Vp* and *Vv* in retail samples from various shipping locations will be studied. These samples will be analyzed by Pulsed-field gel electrophoresis (PFGE) to evaluate the different genetic strains present. Oyster tissue samples from different areas of the country will be obtained and analyzed by PFGE on isolates from *Vp* illnesses implicating NJ product. This data will gather information on the comparison of isolates from illness reports and the link to harvest areas.

F. Harvest, Transport and Temperature Control Measures

N.J.A.C. 7:12-8.6 *Vibrio parahaemolyticus* Control Plan time to temperature control requirements for harvesting oysters

1. If a shellfish license holder is conducting subtidal harvesting of oysters, the shellfish license holder shall comply with the following hours from harvest to refrigeration:

Dates of harvest	Maximum hours to refrigeration ¹	Start of harvest ²
June 1 - June 14	7	Sunrise
June 15 - July 14	6	Sunrise
July 15 - August 31	7	Sunrise

¹ Hours to refrigeration means the total number of hours (inclusive of any transport time) from the start of harvest until the oysters are placed in refrigeration.

² For purposes of the start of harvest under this subsection, sunrise shall mean the time of sunrise in Trenton, New Jersey. The sunrise time shall apply regardless of where a harvester intends to harvest or is harvesting shellfish. The Trenton sunrise timetable is included in the NJ Hunting and Trapping Digest available from the Department’s Division of Fish and Wildlife and on-line at <http://www.state.nj.us/dep/fgw>.

- a. A shellfish license holder conducting subtidal harvesting who places harvested oysters directly in refrigeration on the vessel is not subject to the maximum hours to refrigeration in the table at F.1. above. However, the shellfish license holder shall:
 - i. Notify the Department's Division of Fish and Wildlife, Bureau of Law Enforcement, Marine Region, at 609-748-2050 prior to June 1 that the harvester will be using, on the vessel, refrigeration that is approved by the Department of Health; and
 - ii. Fly a flag that is a minimum size of 18 inches by 18 inches, orange, and bearing a black diagonal stripe.
2. If a shellfish license holder is conducting intertidal harvesting of oysters from June 1 through August 31, the maximum hours to refrigeration (inclusive of any transport time) is four hours, starting when the first oysters to be harvested are exposed to the air by the receding tide.
3. If a shellfish license holder is conducting tide-dependent harvesting of oysters from June 1 through August 31, the maximum hours to refrigeration (inclusive of any transport time) is four 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, Marine Region, at 609-748-2050 to provide the name of the shellfish license holder, location of harvest, and harvest start time.
4. Each shellfish license holder harvesting oysters shall record on each harvest day, in a journal with permanently bound pages, the harvest start time, the time the last-harvested shellfish was placed in refrigeration, and the shell temperature of the shellfish in one container from the day's harvest at offloading, including the time the temperature was measured.
 - a. To measure the shell temperature, the shellfish license holder shall use a handheld laser thermometer.
 - b. The shellfish license holder shall provide each harvest day's information to the certified dealer on the transaction record.
 - c. The shellfish license holder shall submit to the Bureau at the address in N.J.A.C. 7:12-1.1(l) a copy of the journal by September 15 of each year.

G. Additional Recommended Best Management Practices

1. The following Best Management Practices are recommended, but not required by the 2017 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.

2. 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.

3. 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 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.

4. 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.