Shellfish Sanitation & Recreational Water Quality Section

Harvesting, Storing, and Transporting Shellfish



Shellfish Sanitation & Recreational Water Quality Section

Shellfish Growing Area Program

Shellfish & Crustacea Inspection Program

Recreational Water Quality Program



Section Information

2 Offices with FDA / EPA / State Certified Laboratories

Morehead City

Wilmington Regional Office



Inspection & Certification Program



Inspect and certify shellfish and crustacea processing plants



Recreational Water Quality Program

Monitor coastal recreational waters including ocean beaches, sounds, and bays and post advisories when samples exceed safe standards



Shellfish Growing Area Program

Classify coastal waters for safe shellfish harvesting





What Shellfish?





- Oysters
- Clams
- Mussels
- Scallops



Shellfish Sanitation & Recreational Water Quality

Why all the worry?

• Filters 25 to 50 gallons per day

 Concentrates pathogens



Pathogens, viruses, and toxins that can be present in shellfish



<u>Viruses</u>

- Hepatitis A
- Hepatitis E
- Rotavirus
- Norwalk (Noravirus)

≈85% of seafood illnesses in the US annually are typically tied to consumption of raw shellfish.

Bacterial Pathogens

- Salmonella sp.
- C. botulinum
- Listeria monocytogenes
- Vibrio vulnificus
- Vibrio parahaemolyticus

Natural'	Toxins
PSP	
ASP	
NSP	





FIG. 1.—One of three main sewers emptying untreated sewage into the mouth of a river. This sewage combines with that from several other large cities and flows over extensive shellfish grounds.

Sanitary Survey

An evaluation of the environmental factors that affect water quality in shellfish growing areas

- Bacteriological Water Quality Survey
- Shoreline Survey
- Hydrographic Survey (Dye Study)
- Meteorological Survey (Rainfall)
- Sanitary Survey Report





Bacteriological Survey







Laboratory

FDA/EPA/State Certified

Multiple tube dilution – Fecal Coliform

Enterolert – Enterococcus





Shoreline Surveys

Evaluation of all existing or potential sources of pollution







Shoreline Surveys Point Source Discharges







Failing Septic Systems/Illicit Discharges



Animal Waste







Marinas & Docking Facilities



Poisonous & Deleterious Substances

- Petroleum products
- Pesticides





- Heavy metals
- Chemicals
- Paints







Shellfish Closure Maps

BEAUFORT AREA AND NORTH RIVER AREA

Area E-5 & E-6 (Map 29)

Map 29

PROHIBITED TERRITORY

(Prohibited areas are hatched)

COUNTY: CARTERET



5

CLOSED AREA

I IIII

UNLAWFUL TO TAKE OYSTERS, CLAMS, OR MUSSELS. SHELLFISH MAY CAUSE SERIOUS ILLNESS IF EATEN.



Harvest

- Waters must be open
- Tagging
- Time to Temperature



Temporary Closures 2016 YTD

Shallotte River

• 86 days due to rainfall *

* Portions of river closed



Lockwood Folly River

133 days due to rainfall *

** 2014-23% above average rainfall ** 2015-25% above average rainfall

Q

Harvest

- Waters must be open
- Tagging
- Time to Temperature



Tagging and Labeling

- The Shellstock Tag identifies the product as an "Approved Source" to dealers, wholesalers and retailers.
- Must be Legible/Readable
- Must have complete information
- Tags must be tear resistant and waterproof





Time of Harvest Must be Recorded on Harvest Tags

* When first oyster/clam is pulled from water





Harvest

- Waters must be open
- Tagging
- Time to Temperature



SS-1-2015

North Carolina Department of Environment and Natural Resources

Pat McCrory Governor

Donald R. van der Vaart Secretary

RE: 2015 SHELLFISH TEMPERATURE CONTROLS

Dr. Louis B. Daniel III, Director, Division of Marine Fisheries, hereby announces that effective immediately, the following restrictions will apply to the harvest, transport, and storage of oysters and clams taken from Coastal Fishing Waters:

PROCLAMATION

I. TIME PERIOD AND FISHERIES

The following restrictions are in effect for all commercial syster and clam harvesting operations for the time periods listed below:

- A. Year round for clams;
- B. October through March for oysters.

Relaying and transplanting activities are not considered harvesting operations.

II. TAGGING REQUIREMENTS

It is unlawful to possess oysters or clams in a commercial fishing operation without a harvest tag recording the time of the start of harvest, and information as described in 15A NCAC 03K .0109, affixed to each container of oysters or clams. The time of the start of harvest shall be the time when the first oyster or clam is initially removed from the water.

III. TRANSPORT AND STORAGE RESTRICTIONS

- A. It is unlawful for harvesters to fail to deliver oysters and clams harvested from Coastal Fishing Waters to a licensed shellfish dealer within 12 hours of the time of the start of harvest.
- B. It is unlawful for a licensed shellfish dealer to receive oysters or clams from Coastal Fishing Waters where the interval between the time of the start of harvest on the harvest tag attached to the container holding the cysters or clams and the time of receipt exceeds 12 hours.
- C. It is unlawful for a licensed shellfish dealer to fail to record the following information at the time of receipt of oysters or clams from Coastal Fishing Waters:
 - 1. Harvester;
 - 2. Harvest area;
 - 3. Time of the start of harvest;
 - 4. Quantity and type of shellfish received:
 - Time shellfish were received; and
 - Time shellfish were refrigerated.
 - time sneimsn were retrigerated.
- It is unlawful for a licensed shellfish dealer to fail to place oysters and clams under mechanical refrigeration within two hours of receipt from a harvester.

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IV. GENERAL INFORMATION:

- A. This proclamation is issued under the authority of N.C.G.S. 113-170.4; 113-170.5; 113-182; 113-221.1; 113-221.2; 1438-289.52; and N.C. Marine Fisheries Commission Rules 15A NCAC 03H .0103 and 03K .0110.
- B. It is unlawful to violate the provisions of any proclamation issued by the Fisheries Director under his delegated authority pursuant to N.C. Fisheries Commission Rule15A NCAC 03H .0103.
- C. The National Shellfish Sanitation Program Model Ordinance requires shellfish harvesters to:
- Keep shelifish out of bilge water and protected from contamination from fuel, oil, and other contaminants;
- 2. Shade shellfish when necessary to reduce the chance of temperature abuse; and
- 3. Protect shellfish from adulteration and contamination during transport.
- D. Contact Patti Fowler or Steve Murphey at N.C. Division of Marine Fisheries, P.O. Box 769, Morehead City, NC 28557 252-726-6827 or 800-682-2632 for more information or visit our website at http://portal.ncden.org/web/mf/.
- E. This proclamation supersedes SS-1-2014 dated March 27, 2014. It reestabilishes with no changes the National Shellfish Sanitation Program requirements that mandate measures to control the temperature of oysters and clams after harvest. These measures will reduce post-harvest growth of potentially hazardous, naturally occurring bacteria in these shellfish.

Dr. Louis B. Daniel III, Director DIVISION OF MARINE FISHERIES, DENR

April 24, 2015 10:30 A.M. SS-1-2015

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SS-2-2015

Donald R. van der Vaart

Secretary

North Carolina Department of Environment and Natural Resources

Pat McCrory Governor

1.0

RE: 2015 TEMPERATURE CONTROLS - CLOSED SEASON OYSTER HARVEST

Dr. Louis B. Daniel III, Director, Division of Marine Fisheries, hereby announces that **effective immediately** the following restrictions will apply to the harvest, transport and storage of oysters taken from shellfish leases and franchises in Coastal Fishing Waters:

PROCLAMATION

I. TIME PERIOD

The following restrictions are in effect for all commercial oyster harvesting operations for the time period of April 1 through September 30.

Relaying and transplanting activities are not considered harvesting operations.

II. NOTIFICATION AND TAGGING REQUIREMENTS

- A. It is unlawful for shellfish lease or franchise holders to fail to notify the N.C. Marine Fisheries, Habitat and Enhancement Section by telephone at 800-682-2632 extension 8048 or 252-808-8048 prior to beginning oyster harvest from shellfish leases or franchises during the June through September time period. Only one call for the entire June through September time period is required.
- B. It is unlawful to possess systers in a commercial fishing operation without a harvest tag recording the time of the start of harvest and the information as described in 15A NCAC 03K .0109, affixed to each container of oysters. The time of the start of harvest shall be the time when the first oyster is initially removed from the water.

III. TRANSPORT AND STORAGE RESTRICTIONS

- A. It is unlawful for harvesters to fail to deliver oysters harvested from shellfish leases and franchises in Coastal Fishing Waters to a licensed shellfish dealer within 12 hours of the time of the start of harvest from April 1 through May 31.
- B. It is unlawful for harvesters to fail to deliver cysters harvested from shellfish leases and franchises in Coastal Fishing waters to a licensed shellfish dealer within 5 hours of the start of harvest from June 1 through September 30.
- C. It is unlawful for a licensed shellfish dealer to receive cysters from Coastal Fishing Waters where the interval between the time of the start of harvest on the harvest tag attached to the container of cysters and the time of receipt exceeds 12 hours from April 1 through May 31.
- D. It is unlawful for a licensed shellfish dealer to fail to place oysters under mechanical refrigeration within two hours of receipt from a harvester from April 1 through May 31.
- E. It is unlawful for a licensed shellfish dealer to receive oysters from Coastal Fishing Waters where the interval between the time of the start of harvest on the harvest tag attached to the container of oysters and the time of receipt exceeds 5 hours from June 1 through September 30.

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- F. It is unlawful for a licensed shellfish dealer to fail to place oysters under mechanical refrigeration within 5 hours after start of harvest from June 1 through September 30.
- G. It is unlawful for a licensed shellfish dealer to fail to record the following information when receiving oysters from shellfish leases or franchises in Coastal Fishing Waters:
 - 1. Harvester;
 - 2. Harvest area;
 - 3. Time of the start of harvest;
 - 4. Quantity and type of shellfish received;
 - 5. Time shellfish were received; and
 - 6. Time shellfish were refrigerated.

IV. GENERAL INFORMATION:

- A. This proclamation is issued under the authority of N.C.G.5. 113-170.4; 113-170.5; 113-182; 113-221.2; 143B-289.52; and N.C. Marine Fisheries Commission Rules 15A NCAC 03H .0103 and 03K .0110.
- It is unlawful to violate the provisions of any proclamation issued by the Fisheries Director under his delegated authority pursuant to N.C. Fisheries Commission Rule15A NCAC 03H .0103.
- C. The National Shellfish Sanitation Program Model Ordinance requires shellfish harvesters to:
 - Keep shellfish out of bilge water and protected from contamination from fuel, oil, and other contaminants;
 Shade shellfish when necessary to reduce the chance of temperature abuse; and
 Protect Holffish from adulteration and contamination during transport.
- D. The call-in and record keeping requirements established by this proclamation eliminate the need for the Closed Oyster Season Harvest Permit for Leases and Franchises.
- Contact Pattl Fowler or Steve Murphey at N.C. Division of Marine Fisheries, P.O. Box 769, Morehead City, NC 28557 252-726-6827 or 800-682-2632 for more information or visit our website at https://portal.ncden.org/web/ml/.
- F. This proclamation reestablishes with no changes the National Shellfish Sanitation Program requirements that mandate measures to control the temperature of oysters after harvest. These measures will reduce post-harvest growth of potentially hazardous, naturally occurring bacteria in these shellfish.

Dr. Louis B. Daniel III, Director DIVISION OF MARINE FISHERIES

April 24, 2015 10:30 A.M. 55-2-2015

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Time to Temperature Current requirements

- Oysters harvested June-September
 - 5 hours time limit from start of harvest to refrigeration by dealer (June September)
- Oysters (October May) and Clams year round
 - 12 hours from start of harvest to dealer. Dealer has 2 hours to place under refrigeration



Vibrio vulnificus

- Environmental
- Generally found in <28 ppt salinity in warmer water
- Multiplies rapidly above 55°F
- Serious infections almost exclusively those with compromised immune systems.
- Sepsis infections are rare and sporadic but can be fatal
 - Primary Ingestion (primarily raw or undercooked shellfish)





CONSUMER ADVISORY

Eating raw, or undercooked *oysters, clams or mussels* may cause severe illness. People with the following conditions are at especially high risk: liver disease, alcoholism, diabetes, cancer, stomach or blood disorder, or weakened immune system. Ask your doctor if you are unsure of your risk. If you eat raw, or undercooked shellfish and become sick, see a doctor immediately.





Vibrio parahaemolyticus

- Environmental: wider temperature and salinity range than Vv
- Can affect general population
- Multiplies rapidly above 50°F
- Post-harvest growth can make
 - safe product hazardous
- Causes mild to
 - severe gastroenteritis
- More severe in
 - immune-compromised people
- CDC est. 45,000 cases/yr in US





Vibrio Illnesses on the Rise Nationwide

Centers for Disease Control Trend Data 2010





Vp Outbreaks in 2013 (Confirmed cases)

- Connecticut 20
- Massachusetts 15
- New York 15
- Virginia 4
- Maine 1



Headlines from Summer-2013

- "Virginia has first oyster disease outbreak"
- "Bacterial outbreak roiles Massachusetts oyster industry "
- "Recall represents 'huge hit' for Connecticut oyster growers"
- "Vibrio Outbreak in Washington State, Oysters Recalled"
- "Vibrio Risk Prompts Oyster Recalls, Bed Closures Far North Of The Gulf Of Mexico"



Relationship of Temperature and Vibrio Growth





N.C. SHELLFISH HARVESTER EDUCATION PROGRAM

Beginning in 2015, all commercial shellfish harvesters must complete a **Shellfish Harvester Education Program** prior to obtaining a license to harvest shellfish. This pamphlet will serve as a training document, and shellfish harvesters will be asked to attest that they have read it before receiving a license to harvest shellfish.

Shellfish are filter-feeders and concentrate in their bodies whatever is found in water. This includes

bacteria, viruses and chemicals that can cause human illness when oysters or clams are eaten partially cooked or raw. Even cooked shellfish can contain chemicals that can make people sick. The Division of Marine Fisheries aggressively monitors and enforces shellfish harvest areas to ensure consumers are provided with a safe and quality product. The division's Shellfish Sanitation Program classifies coastal waters for shellfish harvesting based on pollution levels.

Quick References

For coastal waters open to harvesting: http://www.ncmarinefisheries. net/shellfish-closure-maps

For coastal waters temporarily opened or closed: http://www.ncmarinefisheries. net/proclamations-polluted-areas

For the latest regulations for the time from harvest to refrigeration: http://www.ncmarinefisheries. net/commercial-fishing/ shellfishharvester

To speak with a N.C. Shellfish Sanitation Program representative, call: 252-726-7021.



CONTROL MEASURES

Reducing the risk of human illness due to consumption of naturally occurring bacteria, like *Vibrio vulnificus* or *Vibrio parahaemolyticus*, depend on the cooperation of shellfish harvesters and dealers.

The Vibrio bacteria are naturally occurring and may cause illness in those with compromised immune systems, and even the general public, when shellfish are not kept at the proper temperature after harvest. *Vibrios* can be found during warmer months in areas approved for harvest and are not associated with pollution.

Commercial harvest and sale of shellfish (clams, oysters and mussels) is regulated by the N.C. Division of Marine Fisheries and the U.S. Food and Drug Administration under the National Shellfish Sanitation Program.



HARVESTING

For clams harvested year-round and oysters harvested during the open oyster season, fishermen must:

- Record the time of the start of harvest on the harvest tag
- Affix the harvest tag to each shellfish container
- Deliver clams and oysters to a licensed dealer within 12 hours of the time of the start of harvest

For oysters harvested from shellfish leases

from June through September, fishermen must:

- Contact DMF by telephone prior to oyster harvest from leases
- Record the time of the start of harvest on the harvest tag
- Affix the harvest tag to each container
- Deliver oysters to a licensed dealer within 5 hours of the time of the start of harvest

HANDLING

- Shade the shellfish from direct sun exposure
- Keep shellfish out of bilge water, standing water or waste in the harvest boat
- Do not discharge human waste overboard since it can lead to contamination of the shellfish harvest waters
- Use proper culling techniques

TRANSPORTATION

To reduce the risk of growth of bacteria like *Vibrios*, shellfish must be shaded from direct sun exposure while being transported to the dealer. Shellfish are also easily contaminated if placed in vessel bilge water or in standing water or waste in transport vehicles.



Shelifish fishermen must log harvester identification information; the date and time of harvest; the growing area designation and the shelifish harvested on a harvester tag and affix it to each shelifish container.



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Certified Shellfish Dealers

Who needs to be Certified?

- Harvesters who sell their own catch (SS)
- Any dealer that buys from a harvester (SS)
- Any wholesaler or retailer that breaks product down, retags (SS)
- Any wholesaler or retailer that repacks (RP) or shucks (SP)
- Any dealer that buys from other certified dealers and then ships product out of state (RS)



Shellfish Inspection HACCP

- Receiving
- Product Storage



- Time-Temperature in shucking, repacking
- Product Labeling
- Record Keeping





Shellfish Sanitation & Recreational Water Quality

- Refrigerated 45°F or below
- Keep tag 90 days at last point of sale
- Stored off floor and away from other products



After receiving at dealer, shellfish must be held at minimum 45F using mechanical refrigeration (including transport and delivery)







National Shellfish Sanitation Program Time and Temperature Requirements for States

- Time and
 - temperature control
 - After harvest
 - Transportation
- Pre-chilling shellstock
 - Prior to shipment
 - Vibrio plan limits for

summer harvest

 Shipping and receiving documentation





Shellfish Sanitation & Recreational Water Quality PO Box 769 Morehead City, NC 28557 (252) 726-6827

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