

Control Measures For Consumer Safety

With the abundance and varied nature of potential hazards associated with shellfish, it is necessary that control measures be put in place to ensure consumer safety. On the Federal and State level, control measures such as the National Shellfish Sanitation Program (NSSP) are managed to protect consumers. Georgia law (O.C.G.A. 27-4-197) requires that the shellfish operations of the Department of Natural Resources be conducted in compliance with the NSSP. Guidelines of the NSSP establish water quality classifications based upon analytical data and prohibit the taking of shellfish for human food purposes from any areas not classified as "approved." NSSP guidelines (Section C, 2.f) further provide that "Emergency closures shall be made when pollution conditions exist outside the database used to classify the area. Classification of Georgia shellfish waters is based upon a 5-tube decimal dilution analysis as prescribed by the NSSP. Approved status is given only to those waters in which the fecal coliform median or geometric mean Most Probable Number (MPN) of the water does not exceed 14 per 100 ml.

Shellfish harvesters, as well, can practice methods of control to help ensure the quality and safety of their individual product. The following are some examples of control measures that can and have been taken.

Permanently Closed Areas - are classified as such when contamination in an area is caused by polluting sources that have long term affects on adjacent waters. Due to the nature of the contamination, it is unlikely that permanently closed areas will reopen to shellfish harvest.

Temporary Closures - occurs when fecal coliform counts reach unacceptable levels (> 14 MPN) for more than 3 sampling periods. The Georgia Department of Natural Resources has instituted coast wide closures of shellfish harvesting areas. Harvest areas were reopened when fecal coliform counts reached acceptable levels for safe harvest of shellfish. Runoff and associated flooding caused by heavy rains can cause fecal coliform counts to reach levels that require temporary closures.

On-Board Handling - A set of control measures that shellfish harvesters can implement on the safety of their products is on-board handling procedures. Some of the procedures associated with on-board handling are mandated by state and federal rules and regulations. For example, NSSP guidelines require that all shellstock be shaded during the hotter months from the time they are harvested until they are placed under mechanical refrigeration to limit the growth of *Vibrio vulnificus*. Common sense dictates that shellfish should not be exposed to bilge water, battery acid, or gasoline to prevent contamination with these potential biological and chemical hazards.

Personal Hygiene - Shellfish harvesters have a responsibility to observe good personal hygiene and sanitation practices while in a harvest area. If it is necessary to use the bathroom while in shellfish harvesting areas, use an appropriate receptacle like a porta-potty or a covered plastic container, then empty it into an approved on-shore disposal facility. Fecal matter should never be dumped overboard in or near the harvest area. Even under the best conditions, this is fecal pollution, and is prohibited under state and federal laws. If the shellfish harvester is a carrier of a fecal pathogen, however, overboard dumping of infected feces into shellfish growing and harvesting waters could result in sickness and, ultimately, cause the area to be temporarily closed.

By using good judgement, and taking the appropriate actions while handling shellfish, the quality of the product will be ensured, and consumer safety will be protected.



Further Information - The material in this brochure was attained from information found in the following sources. These sources provide additional facts and information pertaining to shellfish related issues:

Sources

- Ahmed, F.E., ed. 1991. Seafood Safety. National Academy Press. Washington, D.C.
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- Oblinger, J.L., ed. 1988. Bacteria Associated with Foodborne Diseases. A Scientific Status Summary. Food Technology. 42:4 (181-200).
- Perkins, B.E. 1997. Aquacultured Oysters. Alabama Cooperative Extension System Circular ANR-1030. MASGP-97-008
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Georgia Shellfish

Product Safety Guidelines for Shellfish Harvesters



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Product Safety Guidelines for Georgia Commercial Shellfish Harvesters



The expanse of marshlands, tidal creeks, and sound systems that make up the Georgia coastline produce an abundance of seafood for residents and tourists alike. Oysters and Clams are two commercially harvested species that yield excellent table fare when managed and handled properly. Producers, harvesters, and processors of many varieties of foods all over the world have lived by the words “Keep it cool, keep it clean, and keep it moving.”

These words of guidance are especially important for commercial shellfish harvesters. Consumer confidence can be destroyed by a single disease outbreak or sickness related to shellfish. To avoid problems with disease and contaminated shellfish, harvesters should constantly be aware of such factors as fecal bacteria levels and viruses in the water, the presence of Marine Biotoxins, chemical hazards, on-board handling, and personal hygiene. By maintaining consumer confidence in your product, better sales and better prices will be the reward.

Diseases Transmitted by Shellfish Contaminated With Fecal Bacteria Or Viruses

There are a number of diseases that are caused by the transfer of fecal bacteria or viruses from infected humans to raw shellfish. These diseases often result from poorly functioning or illegally installed onsite sewage systems with positive outlet discharges emptying into coastal waters near shellfish growing and harvesting areas. A significant number of illness cases are also caused by harvesters infected with these diseases who dump their feces overboard onto shellfish harvesting areas. While these diseases do not directly infect oysters or other molluscan shellfish, the disease causing organisms are filtered out of the affected waters by the shellfish and can accumulate in concentrations great enough to make consumers ill. The following list briefly describes the origins and symptoms of some of these diseases.

Campylobacter jejuni – Widely distributed in the intestinal tracts of poultry, livestock, and warm-blooded domestic animals. It is a very common cause of diarrheal illness in humans, and can result in profuse, sometimes bloody, diarrhea, abdominal pain, headache, weakness, and fever.

Escherichia coli – Also known as E. coli, this bacterium is one of the fecal coliforms. Most types of E. coli are essential inhabitants of the human large intestine. Their purpose is to prevent dehydration by de-watering solid waste before it exits the body. Harmful (pathogenic) forms of E. coli can cause abdominal cramping, watery or bloody diarrhea, fever, nausea, and vomiting, and can cause death among the very young or elderly.

Hepatitis A Virus – Man is the only natural reservoir of the Hepatitis A virus in North America. Symptoms include weakness, fever, and abdominal pain early on, followed by development of yellow jaundice. Although rare, death from Hepatitis A can occur among the elderly and others with underlying diseases.

Norwalk Virus – The main reservoir is man. Symptoms include nausea, vomiting, diarrhea, abdominal cramps and fever.

Salmonella – Several species of Salmonella are naturally found in the intestines of mammals, birds, amphibians, and reptiles, but they are not normally associated with mollusks. However, Salmonella can be transferred to oysters and clams by sewage pollution of coastal waters or contamination after harvest. Salmonella infections cause nausea, vomiting, abdominal cramps and fever.

Shigella – Methods of transfer and illness symptoms very similar to Salmonella. The major difference is that Shigella is found only in the human intestinal tract.

Vibrio cholerae – A naturally-occurring bacterial resident of coastal estuaries, bays and brackish waters that is not necessarily associated with sewage contamination. There are two basic forms of this bacterium: Type O1 and non-O1. Vibrio cholerae is an extremely dangerous organism that can cause death as a result of dehydration from severe vomiting and diarrhea. Vibrio cholerae non-O1 causes mild to moderate cases of diarrhea, abdominal cramps and fever.

Yersinia enterocolitica – Naturally found in soil, water, and domesticated and wild animals. Yersinia causes diarrhea, vomiting, fever, and abdominal pain, often mimicking appendicitis.

Other Diseases Transmitted By Shellfish

In addition to fecal bacteria and viruses, shellfish can accumulate and transmit other biological and chemical hazards. The following list provides brief descriptions of several of them.

Red Tide – Blooms of the algae, Gymnodinium breve, produce three toxins (called brevetoxins) that can result in fish kills and make shellfish toxic to humans. All filter-feeding mollusks, including oysters and clams, can accumulate Red Tide brevetoxin. Among the symptoms of brevetoxin poisoning most frequently experienced are: tingling of the face or other body parts; cold-to-hot sensation reversal; dilation of the pupils; and, a feeling of inebriation.

Vibrio parahaemolyticus – Occurs naturally in estuaries and other coastal areas throughout the temperate zones of the world. As is the case with other marine Vibrio species, this bacterium is more numerous during the warmer months. Thus, most outbreaks occur during the summer and early fall. Symptoms include diarrhea, abdominal cramps, nausea, vomiting, and headache. Fever and chills may also be experienced.

Vibrio vulnificus – Thought to be the most prevalent naturally occurring estuarine bacterium in the Gulf of Mexico. Vibriosis, the disease caused by Vibrio vulnificus, can be acquired either by sustaining a puncture wound in the marine environment or by eating raw oysters that have filtered enough bacteria to cause illness.

Vibriosis can cause symptoms like nausea, vomiting and diarrhea similar to (and commonly mistaken for) many of the previously mentioned fecal-borne bacterial and viral illnesses. In severe cases, this extremely invasive bacterium can cause life-threatening primary septicemia (invasion of the bloodstream and transfer of the infection to other parts of the body not originally affected).

Several factors make certain persons more likely to develop vibriosis. Among them are: Achlorhydria (reduced stomach acidity); AIDS; Alcohol abuse; Cancer (especially patients undergoing chemotherapy); Diabetes; Diseases requiring immunosuppressive drugs; Kidney disease; Liver disease (including cirrhosis); and, Steroid dependency.

Heavy Metal Contamination – Elements like arsenic, cadmium, and lead can be toxic if consumed in sufficient quantities. Because oysters and clams filter heavy metals from the water that they pump through themselves, they can actually accumulate enough of those hazardous elements to become toxic to humans. Arsenic is thought to promote cancerous tumors. Excessive amounts of cadmium can cause liver and kidney damage. And, too much lead can cause permanent damage to the nervous system.

