

Novel Program Restarts Clam Harvest

One of the largest clam beds in the world closed in 1990 because people could get sick and even die from eating clams contaminated with a deadly marine toxin.

This year, however, a large portion of the area called Georges Bank, 62 miles off the coast of New England, reopened after the Food and Drug Administration (FDA) developed a new approach toward this risk to public health.

One major element involves having an FDA scientist train fishermen to perform sophisticated scientific tests on the clams while at sea, sometimes under extreme conditions.

"This program has almost doubled the number of quahog clams available on the market, and increases the availability of surf clams by about 40%," says David Wallace, a consultant for the seafood industry. "If it hadn't been for the FDA, these multi-billion dollar resources would be going to waste. It's good for fishermen, for consumers and for the economy." (The meat of quahog clams is tougher than surf clams and is often used in chowder, while surf clams often show up in raw bars.)

This is the story of how fishermen, industry representatives, state officials and multiple branches of the federal government worked together to create a novel plan that is allowing clams to be harvested from a major portion of Georges Bank—a vast submerged sandbank that extends from Massachusetts to Nova Scotia.



Fishermen Mikhail Shablin (left) and Robert Clement (right) perform scientific lab tests aboard the F/W Melissa K, making the initial determination about whether the clams they just caught are safe to eat. The men were trained by FDA staff.

A Once Risky Catch

The story begins in the late 1980s, when harvest areas were temporarily closed due to the reports of toxins in surf clams from Georges Bank. After a brief reopening in early 1990, harvest areas were closed again when fishermen clamming on Georges Bank ate contaminated mussels caught while fishing for clams and became extremely ill.

The diagnosis: paralytic shellfish poisoning, caused by a toxin produced by Alexandrium algae. The toxic algae has been cited for centuries and is sometimes referred to as "red tide," even though not all

red tides are toxic, and not all toxic blooms are red.

The toxin concentrates in the flesh of mollusks, including clams and mussels, and doesn't seem to hurt them. But in high enough concentrations, this potent toxin can temporarily paralyze humans. If this happens, the paralyzed person could die of asphyxiation if he or she is not put on life support until the toxins are flushed from the body. Cooking the mollusks does not neutralize the toxins.

FDA officials, who are responsible for the safety of seafood caught in federal waters, could not put scientists on board every clam fishing vessel

far out at sea to test the clams for the toxin. It didn't make economic sense for fishermen to spend the time and money harvesting clams if they might arrive at the harbor, discover they had a boat filled with toxic clams, and then be responsible for safely disposing of them.

The 1990 closure of Georges Bank was a huge blow to the clam industry. The situation became even more dire in 2005, when a massive algal bloom near the New England shores temporarily closed another 15,000 square miles of ocean to clamming.

The clam industry, finding itself in peril, decided to invest the time and money required to find a solution, and began working with state and federal officials. After years of research on a harvesting procedure that could deliver safe clams at the dock, followed by an intense, years-long research and a pilot program, a huge portion of Georges Bank reopened in 2013 to clam fishermen who agreed to work under a new FDA procedure. This includes having fishermen take the FDA-provided training needed to conduct very precise scientific tests of clam samples while out to sea.

"There was a lot of skepticism. How would the fishermen react to listening to days of lectures from a young government scientist? Could they accurately conduct tests that sometimes even challenge lab scientists?" says FDA marine biotoxin expert Stacey DeGrasse, who has provided the FDA training.

"The project, however, is incredibly successful. The fishermen take great pride in performing the on-board lab tests and provide exact, pristine data," says DeGrasse.

The Tale of a Solution

The apex of the crisis in the clamming industry occurred just as FDA was conducting a research project with Woods Hole Oceanographic Institution. This extensive research project provided a greater understanding of the source of the toxins, movement

of the toxins within the marine food web, the role of Alexandrium cyst (seed) beds as sources for future toxic algal blooms, and more.

Continued research efforts in this area focus on identifying effective early warning systems that could be used by state and federal regulators to determine when to open and close fishing areas. The policy side of the project is led by Paul Distefano, a consumer safety office in FDA's Center for Food Safety and Applied Nutrition.

One aspect of the project was aimed at training fishermen to use a field kit to test their product for the presence of dangerous marine toxins.

As one major aspect of the first test procedure, fishermen were first trained how to collect the correct number of representative samples of their catch and to shuck the clams without piercing the flesh. The samples were then mixed together in a kind of upscale blender to get an even, well-mixed consistency. Using household chemicals in the kit, the fishermen then learned to separate out any toxins that might be present. Finally, using something akin to a drugstore pregnancy test, the fishermen would test whether the potency of any toxin was at a dangerous level.

Tests of the field kit began at sea in 2007, but the kits provided too many results that were false positives. A better field kit was needed, and one used by lab scientists was identified. "I had doubts about how this was going to go," says DeGrasse. "The new kit was definitely more complicated, but I figured it was worth a try."

She worked with Abraxis, a test kit manufacturer, to make some adjustments. For one thing, the kit needed to be recalibrated to better target the toxins of concern. It also required modifications to make it usable at sea.

In 2009, after FDA had collected sufficient data, the new Abraxis kits were approved by the Interstate Shellfish Sanitation Conference (ISSC), a consortium of government officials, industry representatives and aca-


demics devoted to seafood safety. For a pilot program, the National Oceanic and Atmospheric Administration (NOAA) agreed to allow one fishing vessel to dredge for clams in the closed waters of Georges Bank for a year, a maximum of one time per week.

DeGrasse trained the fishermen for one day on land, then took the test kit out to sea and did further training on two-to-three-day clamming cruises. Once they were trained, the fishermen performed the onboard testing and sent portions of their samples to FDA for further scientific analyses. Later, when the vessel docked, state officials in Massachusetts performed a bioassay—an even more robust test that measures the overall potency of any toxins present.


That year, on just 37 fishing trips, that single vessel hauled in \$2.7 million worth of surf clams that passed testing for toxins.

"The exciting part came when we put all the data together, and in 2011 the ISSC adopted the on-board screening protocol," says DeGrasse.

This year, NOAA reopened a large portion of Georges Bank to any fishermen who follow the established protocol, which includes on-board testing at sea by fishermen and back-up tests on land by government scientists.

"This has allowed the catch of literally billions of dollars worth of clams that otherwise would have died of old age," said Wallace. "It's a perfect example of how states, federal agencies and industry can work together to find solutions." 

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