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.

**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 dispos-
ing 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 tempo-
rarily 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 fed-
eral officials. After years of research
on a harvesting procedure that could
deliver safe clams at the dock, fol-
lowed 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 listen-
ing to days of lectures from a young
government scientist? Could they
accurately conduct tests that some-
times even challenge lab scientists?”
says FDA marine biotoxin expert Sta-
cey 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 Institu-
tion. 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 con-
sumer 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 sam-
plies were then mixed together in a
kind of upscale blender to get an even,
well-mixed consistency. Using house-
hold chemicals in the kit, the fisher-
men 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 bet-
ter field kit was needed, and one used
by lab scientists was identified. “I had
doubts about how this was going to
work;” says DeGrasse. “The new kit was
definitely more complicated, but I fig-
ured it was worth a try.”

She worked with Abraxis, a test kit
manufacturer, to make some adjust-
ments. 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 Shell-
fish 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 Adminis-
tration (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 fisher-
men 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 mil-
lion 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 fisher-
men who follow the established proto-
col, which includes on-board testing at
sea by fishermen and back-up tests on
land by government scientists.

“This has allowed the catch of liter-
ally billions of dollars worth of clams
that otherwise would have died of
old age,” said Wallace. “It’s a perfect
e xample of how states, federal agen-
cies and industry can work together
to find solutions.”

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