

## Lobster Fishing: Shifting Cycles and Changing Traditions

**S**teve Lawrence is a lobster fisherman in Kittery, Maine. He grew up in the area, and has been lobster fishing his entire life, similar to his father before him. Steve's son is learning the trade as well; he is already working through the Maine Lobster Apprentice Program to earn his commercial lobster license before his 18th birthday.

### Business

Steve fishes with 800 traps, which is the maximum allowed in Maine. He typically starts setting traps a quarter of a mile offshore, and continues for 15 miles.

Steve currently sells his catch to Island Seafood, a local lobster distributor. He also sells fresh lobster at his dock directly to individual buyers.

### Climate Impacts Seen

Steve notices that winters have been getting milder, with last year, 2013, being more of a typical Maine winter. "This past winter was the most normal winter we have had in the past 5-6 years. Two years ago, I don't think it got cold at all." Steve's observations are supported by analysis of climate data, which shows that winter temperatures in the Durham, NH have risen almost 4° over the past four decades, more than in any other season.<sup>1</sup>

What does this mean for the lobster industry? Steve says that the lobster season has changed significantly. Traditionally people would start to put out traps in the early spring as soon as the weather began to improve. Then, during the month of June, they would take a break. This is because June was

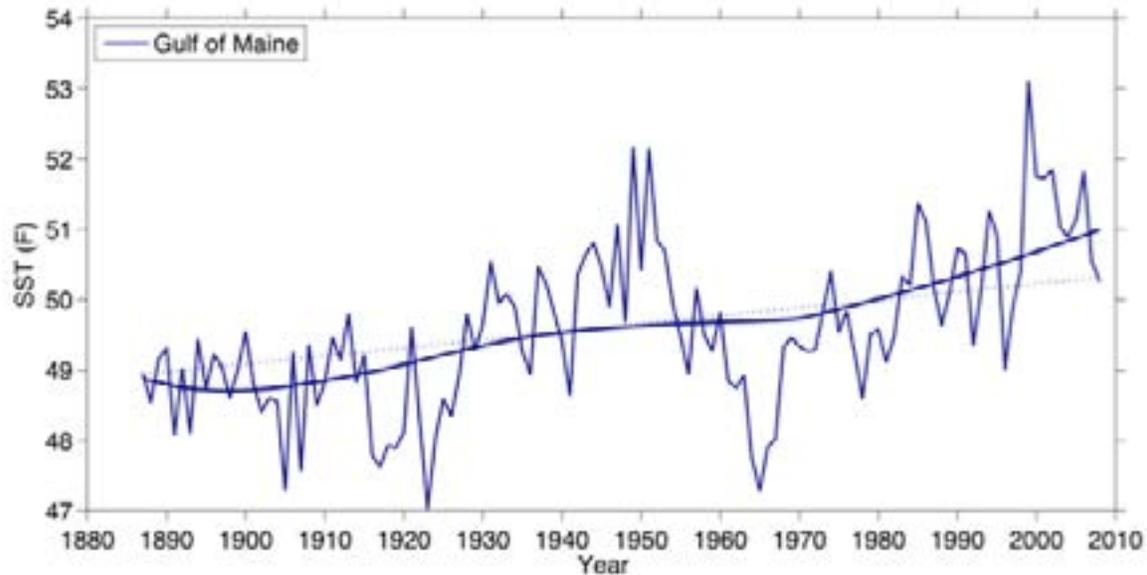


*Steve owns all of his equipment, and only has 2 more years to fully pay off his boat.*

typically the month when lobsters would shed, and decrease activity. Adult lobsters molt, or shed their outer shell, about once a year in order to grow.<sup>2</sup> Several years ago fishermen started seeing softer lobsters (meaning lobsters that had just shed) in February and March. "That was a big joke," says Steve. "We're getting shedders in the winter-time now." About 5 years ago, the lobsters also started shedding in deeper water. Whereas typically lobsters would move in to shallow water to shed, they now began to stay in the cooler waters offshore.

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Mean annual sea surface temperature (°F) in the Gulf of Maine, 1887-2008. Data from the National Oceanic and Atmospheric Administration Extended Reconstructed Sea Surface Temperature (ERSST) V3b ship and buoy observational gridded dataset using grids centered on 290E x 42N, 290E x 42N, and 292E x 44N Figure from Wake et al., (2011); data from Smith et al., (2008)

“That pretty much changed the whole system, the whole cycle of lobster,” says Steve. Both the time and spatial ranges of lobster cycles seem to be altered. Many of the lobsters that traditionally came in along the shore to shed do not come as far as they used to. They stay in deeper waters. Now, lobstermen can also catch lobsters in June, a month when traditionally there was no activity. “Everything is moved up three months.”

Steve says that part of these changes may be due to increased water temperatures. One of the factors in determining lobster shedding is temperature; studies have shown that lobsters in warmer water temperatures grow faster.<sup>2</sup> Interestingly, Steve has noticed that this year, 2014, the lobsters have come all the way to the beach to shed. The year 2014 was also much colder than the past several years. This might explain why the lobsters moved to the shallower (and therefore warmer) waters. “They came in looking for the right temperature to shed. They came all the way this year to where they traditionally go.” It appears to Steve that the colder 2014 winter pushed the lobsters back to a normal trend.

The seasonal unpredictability is a challenge for lobstermen. Catching lobster is mostly about timing and location of traps, says Steve. The actual methods and technology have not changed much over the history of the industry. Varying lobster movement makes it tricky for fishermen to know where to put their traps. For example, those who are fishing farther offshore this year are not catching anything, as most of the lobsters have migrated inshore.

Evolving migration and shedding patterns may not be due solely to temperatures. Steve traces many of the changes back to a big storm and flood on Patriot’s Day in 2007. “This seemed to change the direction that the lobsters migrated,” says Steve. “It seemed to poison the bottom; the mud changed smell.” Since the flood, Steve and other lobstermen have noticed new species growing. For example, the barnacle and sea squirt population have exploded. Sea squirts are invasive filter feeders that attach themselves to hard surfaces, including gear like lobster traps.<sup>3</sup> They can be especially damaging to shellfish farmers. Unfortunately, little is known about the conditions that drive sea squirt population increase.<sup>3</sup>

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**The lobster industry in Maine has increased in recent years; the total landed value in 2013 is estimated at \$364 million, which is \$22 more than the previous year.<sup>5</sup> In Maine alone there are well over 4,000 active commercial lobster fishers.<sup>5</sup> New England leads the U.S. in lobster landings; in 2012 Maine and Massachusetts alone accounted for 94% of lobster harvested.<sup>6</sup>**

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### Challenges

The biggest challenge for Steve and other lobstermen is getting paid a fair price for their catch. Steve says that he has no way to predict whether or not it will be a good season; everything depends on the market price for lobster. He also says that many lobsters are sold at a set price before they are even caught; this may be through a dealer or a supermarket. This means that regardless of how many lobster are caught in a particular year, the fishermen have little control over how much they earn. Meanwhile, costs of lobster fishing have increased. Steve uses herring as bait for his traps, as do the majority of lobstermen. The herring that Steve buys originally come from Portland, ME. Herring prices have increased significantly in the last several years, in part due to a 2007 30% reduction in the quota allowed<sup>4</sup> and concerns of overfishing. Steve remembers when the cost of a barrel of bait was \$22, and compares it to today; he still gets the same price for his lobster, but bait prices are up to \$75 a barrel. Despite a booming lobster industry, many lobstermen are struggling for this reason.



*Steve used to fish with 1,400 traps until regulations reduced the maximum to 800*



*Though he has made his living catching these crustaceans, Steve doesn't like the taste of lobster!*

Use of pesticides also represents a problem for lobster populations, particularly as Kittery experiences increased development. Chemicals such as lawn pesticides and mosquito larva insecticides, when used close to the shore, tend to end up in the bay. These pesticides kill the lobster larva. An interesting characteristic of the lobster industry is the time lapse between destructive events (such as a big storm or an influx of chemicals) and when impacts to population are felt. The animals that lobstermen catch are typically at least 7 years old, so the population decrease after a large death of larva may not be noticed for several years.

Steve describes how the culture of lobster fishing has transformed over the years. He has been fishing in the same general area his entire life, and traditionally lobstermen would respect the territory of fellow fishers. As a new generation of lobstermen takes to the waters, the unspoken rules and traditions seem to be changing. On top of the changes in ecosystem and weather trends, the lobster industry is experiencing an evolving culture from new attitudes and ways of doing business.

### Response

Steve worked with several other people in the area to establish a Community Supported Fishery (CSF) model, which they hoped would help fishermen sell their catch at better prices among other benefits. The CSF model provides weekly shares of freshly

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*Steve says that this season looks to be a good one.*

caught seafood to members who pay an initial fee at the beginning of the season. The experiment was not very successful. One of the reasons was that during the first year, most of the lobsters came early, and weren't worth very much (soft shell lobsters have a lower value). However, those in the CSF had already set the price higher, expecting more mature lobsters with greater value. They had to adjust prices. Steve also says that one of the reasons the CSF did not work well was that lobsters are a luxury. "It's like Ben & Jerry's. It's not fish, it's not good for you." Lobster

is one of the first things that people stop purchasing during an economic squeeze. "[The CSF] was good the first year," says Steve, "but nobody really came back the second year."

Steve has found that selling lobster off of his dock is very helpful, especially when the market price for lobster drops. He can usually charge a higher price for his fresh lobster, and cover more of his costs. Steve only sells what he catches, which he believes has helped build up a loyal customer base (some other lobstermen will buy lobster to resell if they haven't caught enough).

As far as the health of the lobsters, there isn't much that Steve can do. There are regulations that prohibit use of pesticides close to a precipitation event, but many people disregard this. Steve has even taken it upon himself to remind neighbors not to spray, but says that the problem of chemicals in the water continues.

### Making a living

Is lobster fishing a viable livelihood? It can be. Steve learned to manage his finances from his father, who made a good living as a lobsterman and invested his money. Because the lobster season and market can vary so much from year to year, it is important for lobstermen to be able to maintain some type of financial buffer. Steve tries to invest money from the good seasons, and used to be able to deposit a couple thousand dollars every 2 weeks, although now he finds it more difficult to do so. "There are times in this business when you make money, hand over fist. It's absolutely ridiculous," says Steve. "And then there are the starving times. They seem to be longer now."



*Steve's lobster landings vary significantly. During a good month in a plentiful year, he may catch up to 30,000 pounds of lobster. A bad month may be as low as a few hundred pounds.*

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### Resources:

- Steve has found the University of New Hampshire to be very helpful when he has questions about new species or any changes he notices: <http://www.seagrant.unh.edu>
- Steve has worked with researcher Diane Cowan at the Lobster Conservancy: <http://www.lobsters.org/index.html>
- Another issue of concern for scientists and fishermen is the potential impacts of ocean acidification. This issue is one of the priorities of the Island Institute: <http://www.islandinstitute.org/OceanAcidification.php>
- This document outlines some Best Practices for establishing a CSF: <http://nsglc.olemiss.edu/csf-rg.pdf>
- This time series shows the rising sea surface temperatures in the Gulf of Maine.

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## Climate Change and the New England Food System Case Study Series

This case study was researched and written by UNHSI's 2014 Thomas W. Haas Climate Fellow, Ruby Woodside. Ruby's fellowship focused on documenting and communicating climate impacts and adaptation strategies for New England farmers and fishermen. Ruby is currently working on a Masters of Environmental Science and Policy as well as an MBA in Sustainability at Clark University. The fellowship is based at the UNH Sustainability Institute, and hosted in collaboration with Food Solutions New England (FSNE). FSNE is a regional, collaborative network organized around a single goal: to transform the New England food system into a resilient driver of healthy food, sustainable farming and fishing, and thriving communities. Learn more at [www.foodsolutionsne.org](http://www.foodsolutionsne.org).