

Looking Behind “The Great Lobster Mystery”

Maine’s fisheries have had a rocky past, and the majority of fisheries in the Gulf of Maine have either collapsed or been greatly diminished. The one fishery that doesn’t seem to fit this trend is the lobster fishery. In 1933 the first conservation laws were passed for the benefit and the future of the lobster fishery. But this reason alone can’t explain the record-breaking landings that are seen today. The oceanographic factors that have been observed also have to be taken into consideration. Changes in lobster behavior have been observed by many lobstermen. Questions have also been asked about how the numbers of traps are affecting the lobster population.

It was always thought that when traps rested at the bottom of the Gulf of Maine, a handful of lobsters would slip through the first funnel-shaped opening to feast on the bait. After gorging themselves, the lobsters were thought to have great difficulty finding their way out the final, narrow funnel-shaped exit. For 150 years it was assumed that lobster was caught in this fashion.

It wasn’t until Win Watson and his students, of the University of New Hampshire, installed underwater video cameras on the lobster traps that a new conclusion was drawn. This experiment was done after several trials, where Watson and his team went to different areas, which contained different densities of lobsters, and caught the same amount of lobsters. Watching the time-lapse video after hauling up the traps, Watson and his team of students were stunned, ‘The numbers of lobsters were just amazing,’ Watson recalls” (Woodard, 260). The video captured a huge crowd, day and

night, of lobsters and crabs, but the surprise doesn't end there! The tape showed that lobsters wander in and left the traps freely, coming and exiting through the funnel-shaped entrance. It was found that 94% of lobsters that entered a trap marched out through the escape vents.

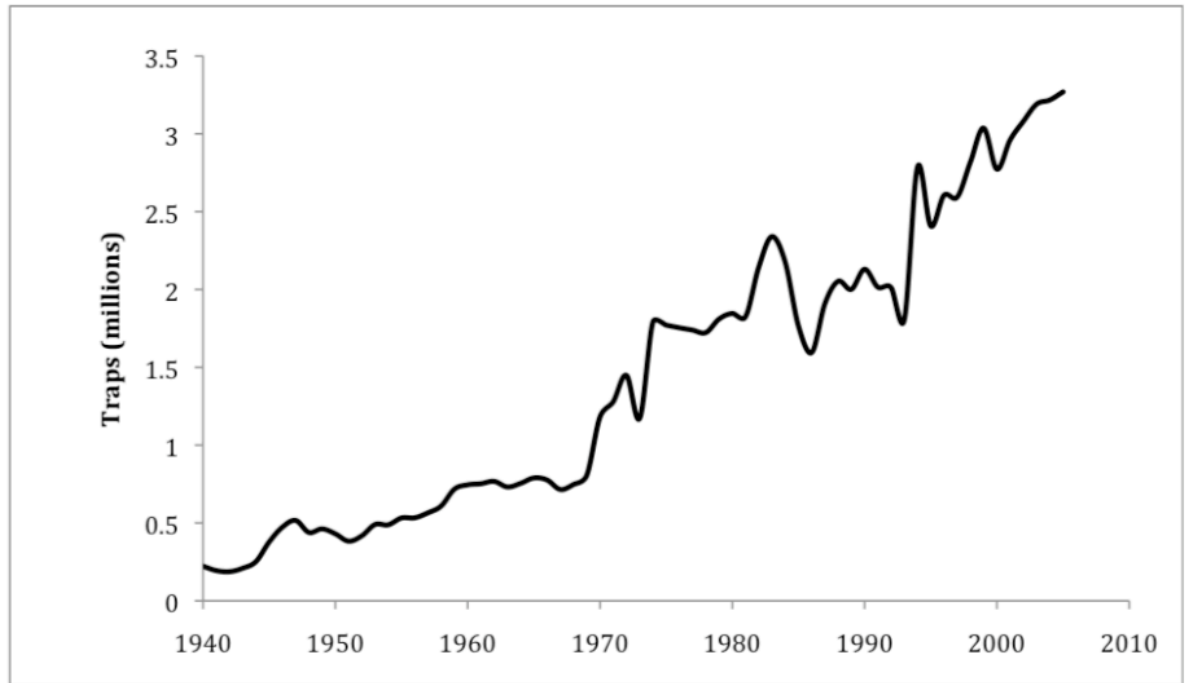
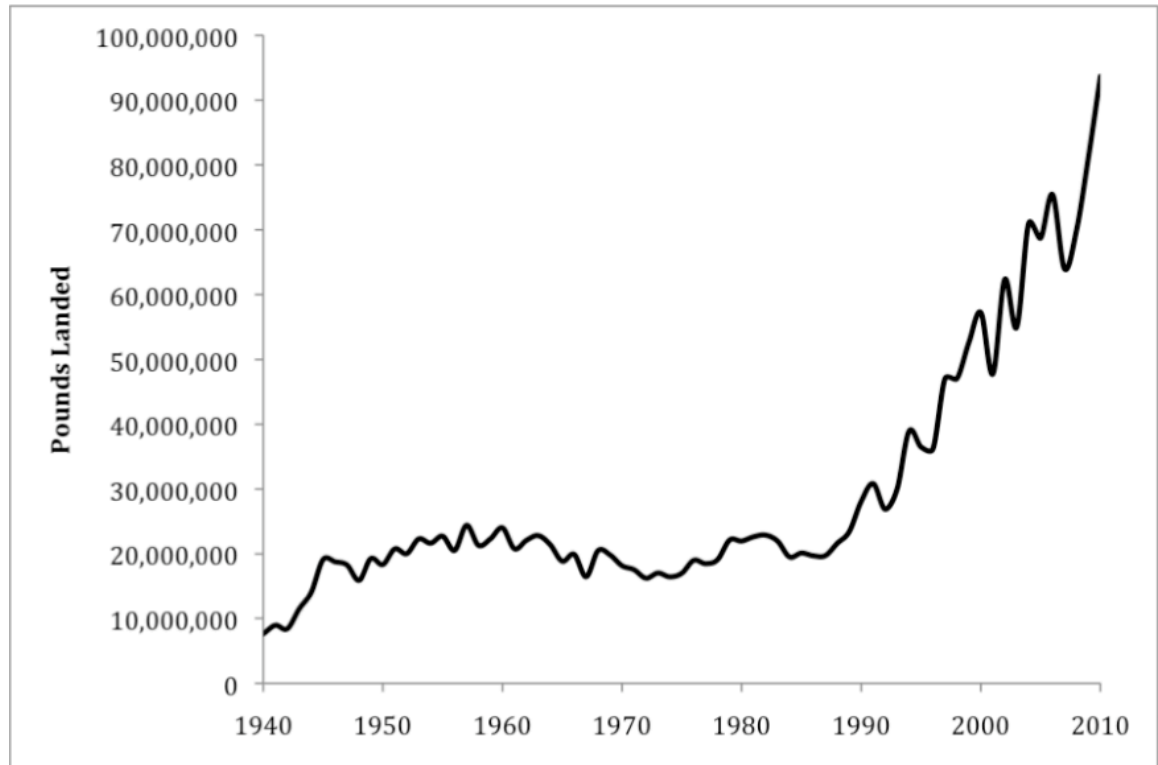


Figure 9: Number of traps in the lobster fishery based on the number of trap tags sold , 1940-2005

(http://dukespace.lib.duke.edu/dspace/bitstream/handle/10161/3651/Mary%20Clark_Final_MP.pdf?sequence=1)

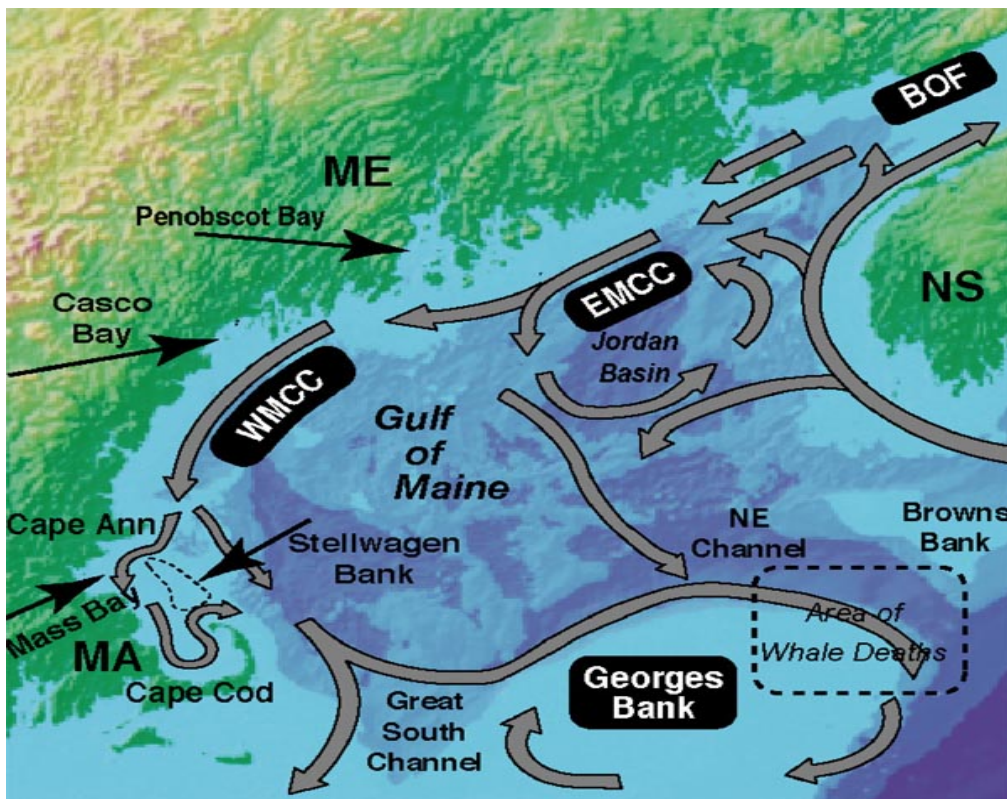


(http://www.umaine.edu/marine/people/sites/ychen/Publication_papers/i0278-0372-26-4-555.pdf)

These results help explain why stock assessments are so far off. They also show that the population of lobsters cannot be calculated accurately based on lobstermen's landings. The lobster fishery may in fact be healthier than previously perceived. "Maine lobstermen are, in effect, ranching lobsters: raising them at feeding stations and occasionally harvesting some of the herd." (Woodard, 261).

Over the past few decades lobstermen have made observations of change occurring over time, such as the shed time of lobsters has become more unpredictable and also the harvest season is becoming longer and longer. Also, where lobsters are found is changing. In the 60s and 70s the majority of lobster were closer inland; in the 80s a shift began to occur and lobsters became more populous offshore. Now it seems some have moved closer inland again in some areas and not in others. Scientists have wanted to

test whether climate changes, such as ocean temperature and shifting currents, had any effect on lobsters, but they found that they cannot because a “comprehensive set of sea temperature records required to test this theory does not exist” (Conkling and Hayden, 11). Satellite images from the National Environmental Satellite Data and Information Service (NESDIS) have shown “very small variations in the way warm and cold water reflect light off the ocean’s surface.” (Conkling and Hayden, 11). In 1995 NESDIS launched a campaign to make sea surface temperature data more available. The Penobscot Bay Collaborative Project was asked to collect more data, because Penobscot is the largest bay on the coast of Maine. Fishermen would also be able to access information from Penobscot Bay Collaborative easily.



http://www.whoi.edu/cms/images/pseud_map_600_83809.jpg

(This shows the currents within the Gulf of Maine by the grey arrows. BOF is the Bay of Fundy. EMCC is the Eastern Maine Coastal Current and WMCC is the Western Maine Coastal Current)

Through the Penobscot Bay Collaborative Project it was found that the Eastern Maine Coastal Current affects the bay and most likely causes “a seasonal transition where, from mid-September until April, surface outflows in the western bay deepen, currents flowing in at depth become stronger”, (Conkling and Hayden, 11). Bob Steneck and Carl Wilson have hypothesized that the Eastern Maine Coastal Current delivers lobster larvae to the region of the mouth of Penobscot Bay. Settlement of the larvae form ‘hot spots’ corresponding closely to an oceanographic “front,” revealed by satellite imagery, where the Eastern Maine Coastal Current turns counterclockwise offshore, leaving post larvae in the upper (warmer) waters at the edge of this front. This information corresponds with studies conducted by Steneck and Wilson, where they mapped out the “cold and hot spot” locations in Penobscot Bay where there was an abundance of lobster larvae. According to Woodard, in his interview in the movie “From the Bow Seat,” the Maine Eastern Coastal Current also shifts every twenty years from closer inland to further offshore and vice versa. This is a possible explanation for why in the past twenty years there have been record-breaking lobster landings of 93+ million pounds. It raises the question of how the lobster fishery will be affected when the Maine Eastern Coastal Current shifts again further offshore with climate change.

In 1929, when the stock market collapsed, the lobster market fell with it. One observer wrote the fisheries commissioner, “Lobsters are very scarce and the price so low that... a fisherman can’t earn enough for a living not to mention keeping up his

gear””(Woodard, 191). It was at this point that lobstermen began to take conservation to heart. It is the reason behind passing Maine fish commissioner Hortio D. Crie’s radical new conservation law through the legislature in December 1933. Based on scientist Francis Herrick’s research, this new “double-gauge” law prohibited the taking of very large and small lobsters. This was done so that the larger lobsters would continue to breed, and the smaller lobsters would be given a chance to spawn. Because this law was passed, in the words of Woodard, “Maine’s lobster fishery stood poised at the beginning of an era of unprecedented prosperity.”(Woodard, 192).

Though this law is not recent, it is, I believe, the most vital reason why the lobster fishery is healthy while other fisheries are still struggling to recover. Later laws and regulations that would come to pass such as the throwing back of female breeders and marking them with the “V-notch” and the 1995 law that gave the control of the fishery to the lobstermen. This is the core reason why the lobster fishery is flourishing; people who have a passion, history, and respect for lobsters run it. It is their livelihood. Conservation is just as important to them as to biologists, and it is this common ground that allows the scientist and the lobstermen to work together to preserve the creature that has so much meaning for the state of Maine.

Bibliography:

- Hayden, Anne. "Researchers study climate change's effects on lobster fishery". The Working Waterfront. February 1, 2008. Island Institute & Working Waterfront.
- "Maine Department of Marine Resources Regulations." *Maine.gov*. State of Maine Department of Marine Resources.
<<http://www.maine.gov/dmr/lawsandregs/regs/>>.6 May 2011
- Incze, L.S., Wahle, R. A., Wolff, N., Wilson, C., Steneck, R., Annis, E., Lawton, P., Xue, H., Chen, Y., 2006. "Early Life History and A Modeling Framework for Lobster (*Homarus Americanus*) Populations in the Gulf of Maine". *Journal of Crustacean Biology*, 26(4): 555–564
 - Woodard, Colin. The Lobster Coast. New York: Penguin, 2004
 - Conkling, Philip, and Anne Hayden. Lobster Great and Small: How Scientists and Fishermen are Changing Our Understanding of a Maine Icon. Rockland, ME: Island Institute, 2004.