

# Connecticut Lobstermen Volunteer to Help Measure Temperature Trends in Long Island Sound

by Penny Howell and Colleen Giannini

One of the most popular and valuable animals living in Long Island Sound is the American lobster. Lobsters are most abundant in waters off Maine and Canada, with the Sound marking this species' southern-most in-shore boundary. The Sound's lobster population reached record high abundance in 1999 but suffered a massive die-off in the fall of that year and their numbers in the Sound have continued to decline for the last decade. Following the die-off event, six years of research concluded that high bottom water temperatures were a principal cause. These stressful temperatures were only 1-2°C (2-3.5°F) warmer than the Sound's long-term average, but were above what is now known to be the upper thermal stress threshold (20°C or 68°F) for lobster and possibly other cold-adapted species. The cause of rising water temperature is not known but global climate change has been implicated as a factor. Although the Connecticut



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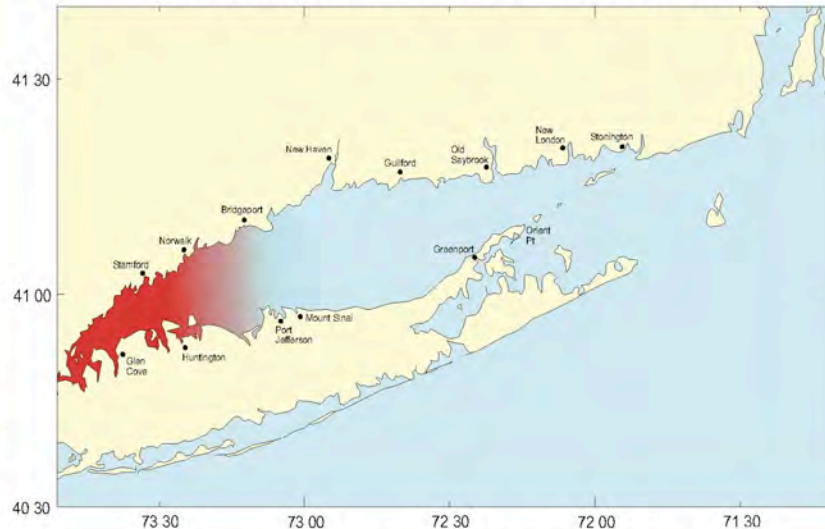
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Department of Environmental Protection (CT DEP) has been taking bi-weekly and monthly temperature readings throughout the Sound since 1991, it became clear that more frequent hourly readings were needed to link the physiological response of lobsters and other temperature-sensitive animals to changing conditions in the Sound. That's when the commercial lobstermen stepped forward to help out.

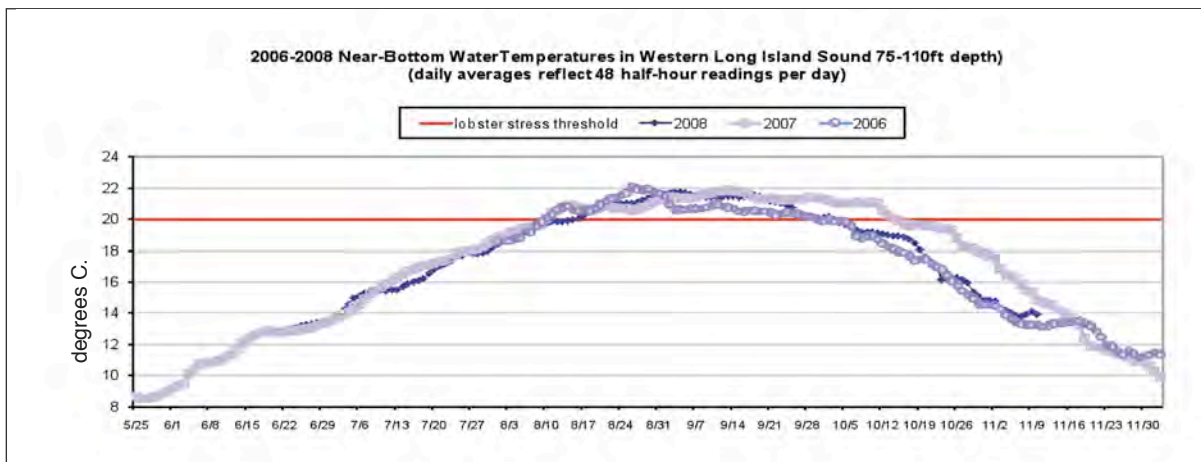
Since 2006 five lobstermen have volunteered to strap a temperature probe in their lobster traps so that continuous readings directly in the lobster's environment could be logged over the entire summer and fall when water temperatures are highest. These traps are in active use so the lobstermen are routinely hauling the trap and checking on the condition of the probe between readings. This volunteer effort has provided half-hourly temperature readings in three areas: the western and central basins where the die-off was most severe, and in Fishers Island Sound where temperatures are lower but where lobsters are suffering from an external shell disease. With three years of data in hand, the good news is that these

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### PRINCIPAL AREA AFFECTED BY LOBSTER DIE-OFF IN 1999



Note: Although some die-off was seen as far east as Guilford CT, the most severe conditions were located west of Norwalk.



This is a sample CT DEP plot showing the temperature records taken at a particular depth and location. At any place where the blue or purple lines, representing different years, rise above the straight red line, lobsters suffer heat stress.

readings show amazingly consistent near-bottom water temperature at each of the locations. The bad news is that the readings also show that even in the deep water of Fishers Island Sound average daily temperatures were above the thermal stress threshold of 20°C (68°F) for 4-16 days each year during 2006-2008. This threshold was exceeded for 48-66 days each year at the central basin sites and for 55-73 days at the western basin sites.

This new information, added to data gathered in the DEP monitoring programs, has helped clarify the negative response to rising temperatures shown by the Sound’s lobster population since 1999. Dr. Jim O’Donnell and his students at UConn are using these data to create 48-hour temperature maps of the Sound and calculate a cumulative “stress-area” index for each year. In the

nine years since the die-off that have been analyzed, this stress index has been above average for six of them. These cooperative studies involving the commercial lobstermen, the DEP, and marine researchers have helped to focus further monitoring of the Sound’s changing physical environment as well as guide rebuilding strategies for its favorite crustacean.

#### About the Authors:

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