

New England Lobster Settlement Index

Update 2006 - Testing New Tools

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The New England Lobster Settlement Index has both reached an important milestone and launched a new initiative. First the milestone: As of the summer of 2006, diver-based suction sampling is entirely conducted by participating state marine resource agency staff (MeDMR, MaDMF, and RIDFW), and is no longer contracted out. Canada's Department of Fisheries & Oceans (DFO) continues to support sampling at the mouth of the Bay of Fundy, in New Brunswick. The long-term goal of the program continues to be the understanding of the causes and consequences of variable larval supply to regional patterns and time trends in adult populations. As for the new initiative, with support from NOAA's Northeast Consortium

(NEC), a fisherman-scientist collaboration has emerged that will allow us to expand our sampling into new waters – if only on a short-term basis - using experimental passive postlarval collectors. This update briefly

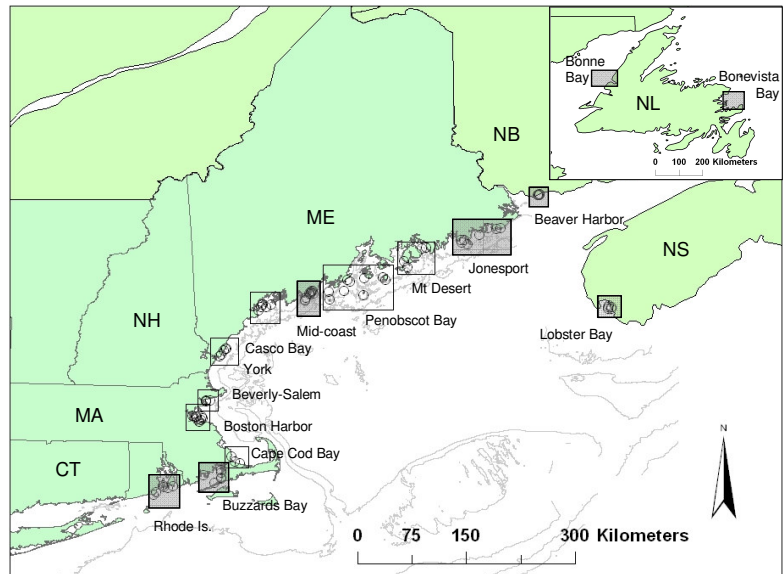


Figure 1. Sampling sites (circles) of the New England lobster settlement index. Initiated in Maine and Rhode Island in 1989-90, the annual survey spans some 65 sites from RI to New Brunswick. Surveys are conducted by divers using suction samplers in shallow rocky nurseries. Boxes surround sites used for regional averages in Fig. 2. Shaded boxes are regions where passive postlarval collectors will be deployed in 2007.

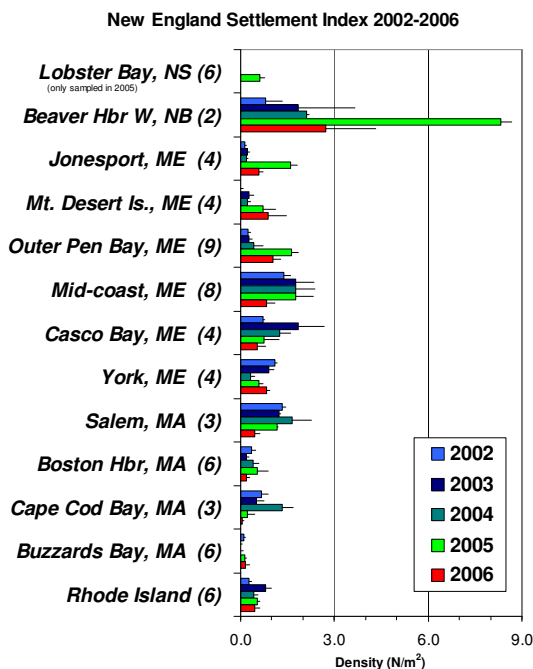


Figure 2. Regional 5-year time series of average lobster settlement throughout New England from 2002 to 2006. Number of sites sampled per region shown in parentheses.

summarizes the 2006 settlement patterns and gives an overview of the new project.

• **2006 Settlement:** Most regions continued the stretch of relatively strong settlement we've seen since 2001, although not as impressive as 2005. That year was remarkable for the pulse of high settlement in eastern sectors. Beaver Harbor, NB, a location that has historically had high settlement, came in with an all-time, all-region record breaker, and eastern Maine for the first time had densities comparable to mid-coast and western Maine. Although not as dramatic in 2006, numbers in eastern Maine and New Brunswick were still above their historic averages. This trend may bode well for continued strong recruitment to the fishery in eastern Maine. From mid-coast Maine to the south and west settlement was either at or below recent levels.

• **Probing the Depths with Collectors:** For years we have been nagged by the persistent question of how deep and how far offshore lobster postlarvae settle. Huge expanses of the seabed remain inaccessible to our diver-based sampling. Scientists studying spiny lobsters in Australia and the Caribbean have used moored passive collectors made of fibrous air conditioner filters and plastic laminates to sample postlarvae. Sadly, such convenient light-weight materials fail to attract postlarval clawed lobsters. Building on earlier success with various types of collectors, two of us (Wahle & Wilson), put our heads



Figure 3. Mimicking nature. Collector on the rail of a lobster boat. This collector was fitted with a fine mesh cover that is being removed after the test to evaluate haul-back losses of postlarval lobsters seeded to the collectors.

together with Boothbay lobsterman, Matt Parkhurst, to develop a design that would lend itself to being deployed with standard commercial trap hauler. The design simply consists of a flat trap-wire mesh tray filled with cobbles and lined with fine screening on the bottom and sides (Fig.3). We did not relish the prospect of lugging scores of hundred-pound trays of rock, nonetheless we heeded Matt's common sense advice: "Make 'em heavy and they'll stay put." The end-result is a design that mimics the natural nursery habitat.

Proof of Concept: With NEC Project Development support, we our collector design to the test. Experiments were conducted in shallow water where divers could assist. We demonstrated that the new collectors effectively sample newly settled lobsters (as well as and crabs and fish) in densities comparable to adjacent long-term monitoring sites sampled by divers (Fig. 4a). By the end of the settlement season (mid-October), newly settled lobsters predominated the contents of the collectors, although a considerable number of larger lobsters had moved in from the surrounding sea bed. Moreover, in two different experiments we found no significant losses of lobsters from the collectors during the haul-back (Fig. 4b). It will therefore not be necessary to incorporate a means to cover the collectors prior to hauling or to devise a correction factor in comparing diver- to collector-based estimates. We are now ready to address our original question regarding the depth range of lobster settlement.

Deep-water Settlement: With renewed NEC support in 2007 and 2008 we will continue our fisherman-scientist collaboration. The objectives of the project are to (1) Determine the depth-wise patterns of lobster settlement in three regions of contrasting oceanography (southern New England shelf, and central and eastern Gulf of Maine); (2) To better calibrate collector-derived data, continue to compare settlement density in collectors to adjacent natural nursery sites sampled by divers; and (3) Evaluate the link between water column thermal structure and depth patterns of settlement. Two new collaborating harvesters (Skip O'Leary, Wakefield, RI, and Norbert Lemieux, Cutler, ME) have joined the team enabling us to deploy 100 collectors in each of the three regions.

The project has also generated considerable interest among colleagues in New England and eastern Canada who also see the potential use of collectors as a tool in stock assessment. To date, Victoria Burdett-Coutts (Memorial Univ., NF), Peter Lawton and John Tremblay (DFO Canada), Remy Rochette (University New Brunswick), Kevin Stokesbury and Peter Milligan (UMass, Dartmouth) have all secured support to complement our efforts. Finally, Jim Manning (NMFS, Woods Hole, eMolt Project) has kindly provided temperature loggers we can attach to collectors to monitor thermal structure in each region. We look forward to the wider collaboration and the greatly expanded geographic coverage it will provide (Fig. 1).

Figure 4. (a) Settlement in collectors versus natural cobble. Average density of newly settled lobster in artificial collectors and in adjacent natural cobble nurseries sampled by suction samplers at two sites in Maine (10 collectors and 12 suction samples per site). There was no statistical difference in densities estimated by the two methods at either site. **(b) No losses on haul-back.** Comparison of the settler numbers recovered in collectors that were covered and not covered with screening prior to haul-back in two different experiments. In seeded collectors, 10 hatchery-reared settlers were artificially placed in each of 20 collectors; the next day 10 of the collectors were covered just prior to hauling. To assess losses after natural settlement, 40 collectors were deployed, 20 of which were covered just prior to hauling at the end of the settlement season. There was no statistical difference in recoveries from screened and unscreened collectors in either experiment.

