

New England Lobster Settlement Index: Update 2001

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The New England lobster settlement index is a sampling program supported by Maine, Rhode Island, and Massachusetts to evaluate the strength of lobster year classes as they first arrive by larval settlement in shallow nearshore nurseries. The aim is to use this information in stock assessment and forecasting trends in the fishery. Surveys are conducted by diver-based suction sampling in nearshore cobble-boulder nurseries at the end of the settlement season – late August in southern New England to early October to the north. Because earlier experiments demonstrated that densities of young-of-year lobsters at this time correlate strongly with postlarval supply, they are taken as an index of settlement (Wahle & Incze 1997, Incze et al. 1997).

With sampling now conducted at some 58 sites from Jonesport, Maine to Point Judith, Rhode Island (Fig. 1), the past two years represent the largest sampling effort since the time series' early beginnings, first along Maine's midcoast and Rhode Island in 1989 and 1990, respectively (Incze et al. 1997). In the mid-90's the program expanded to Massachusetts and Maine's Mt. Desert region; then most recently, to the remainder of Maine's seven lobster fishing zones. Over the years the survey has been variously supported by Sea Grant, the National Science Foundation, the lobster industry, and the respective state marine resource agencies. Year-2001 is the first year the program has been mostly state and industry supported. New York is making moves to begin sampling Long Island Sound in the near future.

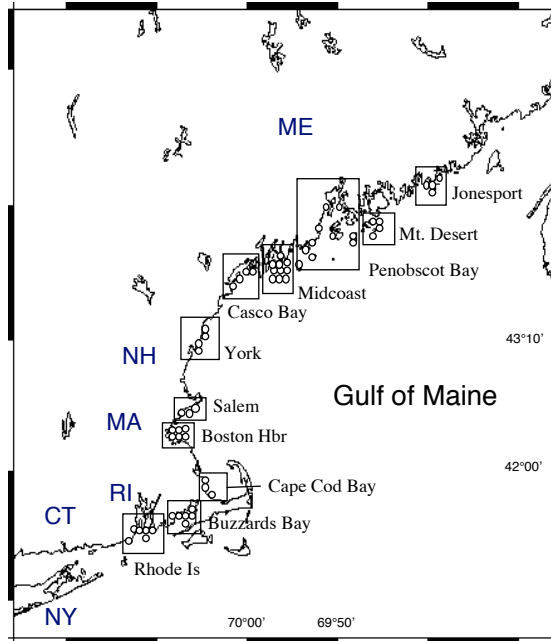


Fig. 1. Sampling sites for the New England lobster settlement index. Boxes surround sites used for regional averages shown in Fig. 2.

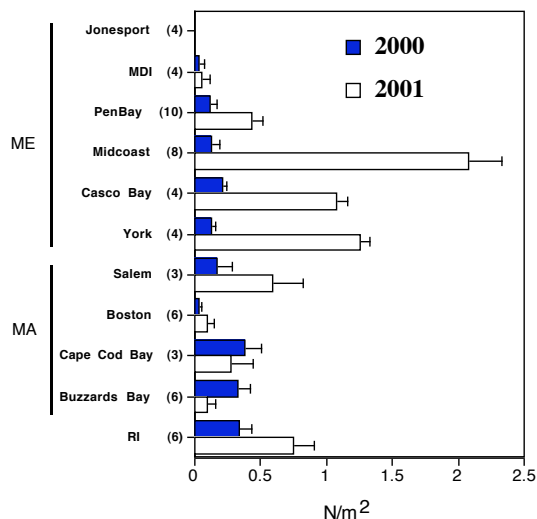


Fig. 2. Regional average lobster settlement throughout New England in 2000 and 2001. In parentheses, the number of sites included in the regional mean.

The expanded sampling along New England's coast over the past two years gives the best picture of the spatial pattern of settlement available to date (Fig. 2). Over the years settlement, juvenile densities, and landings per unit area have consistently been higher in regions to the west and south of Penobscot Bay (Steneck and Wilson 2001). In 2001 an intense burst of settlement was recorded along Maine's midcoast,

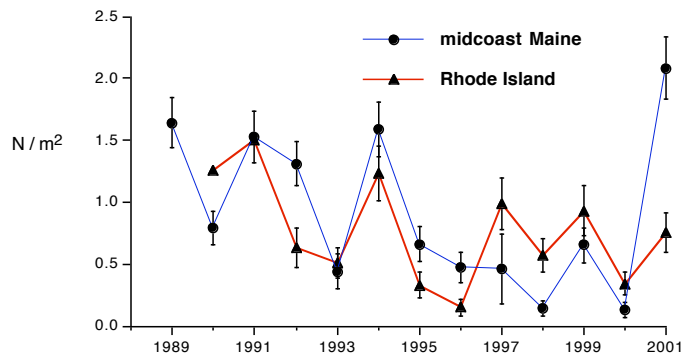


Fig. 3. Lobster settlement index for Maine and Rhode Island, the longest settlement time series available for the species.

just west of Penobscot Bay. More modest increases were seen within Penobscot Bay itself and south of Maine's midcoast.

The longer settlement time series in midcoast Maine and Rhode Island puts recent years in perspective. Settlement along the midcoast in 2001 was the highest in its 13-year history, reversing what was becoming an increasingly worrisome downward trend for

the region (Fig. 3). In Rhode Island settlement was also up, but not as much, and over the entire time series there has been less of a downward trend (Fig. 3). Despite the oceanographic differences between these two regions, strong settlement years in midcoast Maine have also tended to be strong years in Rhode Island. This regional coherence suggests a larger scale oceanic/atmospheric process driving annual settlement trends.

From these longer time series we have been able to demonstrate that settlement strength translates to year-class strength at least in the early years of benthic life (Incze et al. 1997, 2000). The extent to which recent fluctuations in settlement determine subsequent harvests, some 5-9 years later, will depend on whether ecological factors operating in the later years disrupt the linkage. Because lobsters of different ages overlap in size, annual fluctuations in settlement tend to be smoothed by the time lobsters recruit to the fishery. However, the stretch of poor settlement from 1995-2000 was long enough that a decline in landings west of Penobscot Bay seems likely in the near future (Wahle et al. 2000). Signs of an impending decline in that region have been corroborated by an independent time series of pelagic post-larval abundance off the New Hampshire coast (Normandeau Assoc., Inc. unpublished), and diver surveys of older juveniles at a number of stations along the Maine coast (Steneck unpublished). Any positive effect of the exceptional settlement of 2001 may be weak if poor settlement resumes in subsequent years. The best test of the predictive value of the settlement index will be to compare our projections to landings and other indices of mature lobster abundance in coming years. Indeed, this will be a telling decade for the utility of the New England lobster settlement index as a forecasting tool.

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