American Lobster Settlement Index

Update 2011

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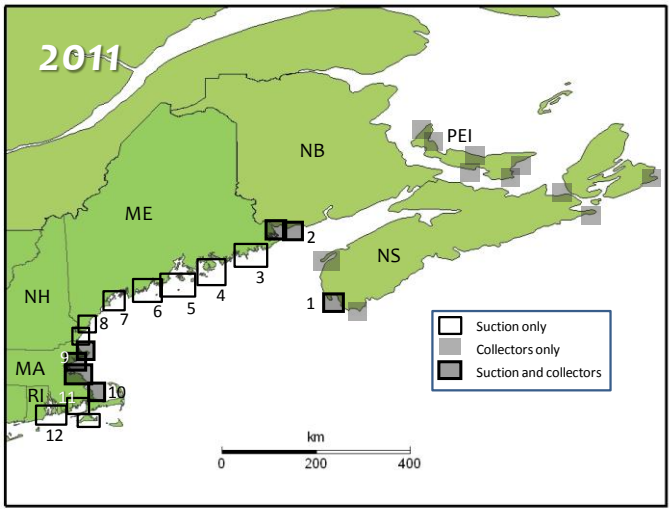
Year 2011 marks a historic coincidence in the time course of the American Lobster Settlement Index that illustrates the ever widening gap between northern and southern New England lobster stocks: Just as mid-coast Maine's settlement index reached an all-time high the Rhode Island time series dipped to a disturbing all-time low. In this same year, Maine's lobster fishery again boasted the highest landings on record, exceeding the hundred million pound threshold, while the threat of a fishing moratorium still looms in the memory of southern New England lobstermen. In this issue of the ***Update*** we recap the regional time trends and take a closer look at the increasingly worrisome situation in southern New England lobster nurseries.

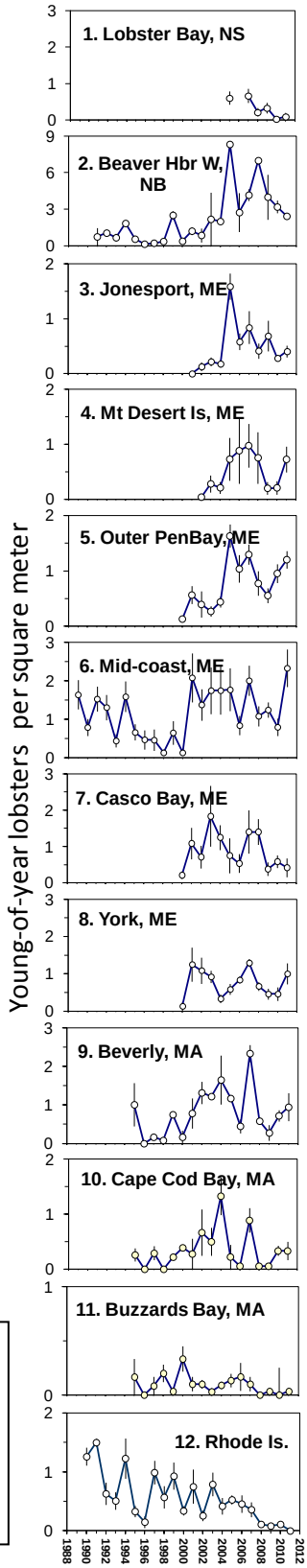
Settlement 2011: Diver-based suction sample monitoring for the study areas with the longest time series continue to show strong settlement to the north and vanishingly low settlement south of Cape Cod (Figs. 1 & 2). Most newsworthy is that for the first time in the 22 year time series, the six annually monitored sites in Rhode Island produced no settlers. It is important to be clear that this does not mean there was no settlement in the region; but it does mean that settlement densities are falling below detectable levels with the current sampling effort. Gulf of Mainers shouldn't be complacent. Although most of the study areas in the Gulf of Maine from Mt. Desert southward have seen considerable upturns in the last year or two, eastern Maine and the lower Fundy region have fallen off the highs we saw 4 to 6 years back. The time trend also agrees with the Lobster Bay, Nova Scotia, study area most recently added to the mix. The surge in Gulf of Maine lobster landings over the past decade has mostly occurred in eastern Maine, New Brunswick and southwest Nova Scotia. The implications of the downturn in settlement for this region's fishery remain unclear.

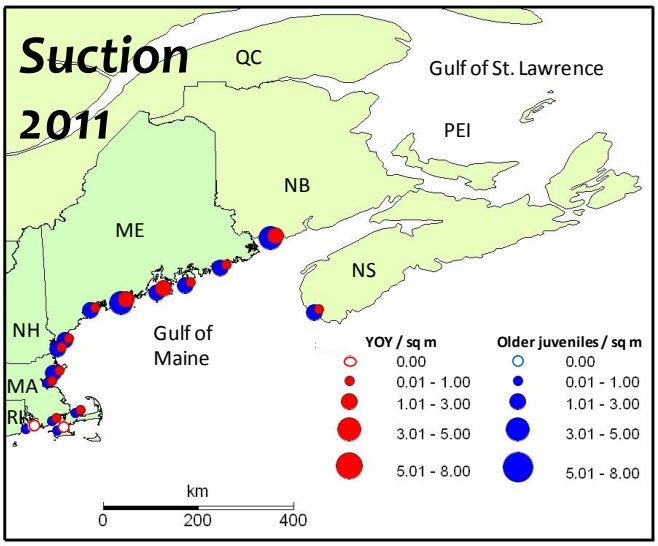
Vessel-deployed, collector-based settlement monitoring has become well established in the southern Gulf of St. Lawrence, eastern Nova Scotia and the lower Fundy region (Figs. 1 & 3). This large scale fisherman-scientist collaboration has the potential to generate an especially important time series for Atlantic Canada. One emerging pattern is the consistently strong settlement on Prince Edward Island's



← **Figure 1.** Lobster settlement data were collected in 2011 by suction sampling, passive collectors, or both. Numbered boxes surround suction sampling sites used for study area averages in Fig. 2.

→ **Figure 2.** Complete time series of settlement, expressed as mean densities of young-of-year (YoY) lobsters at 12 study areas with the longest suction sampling time series.





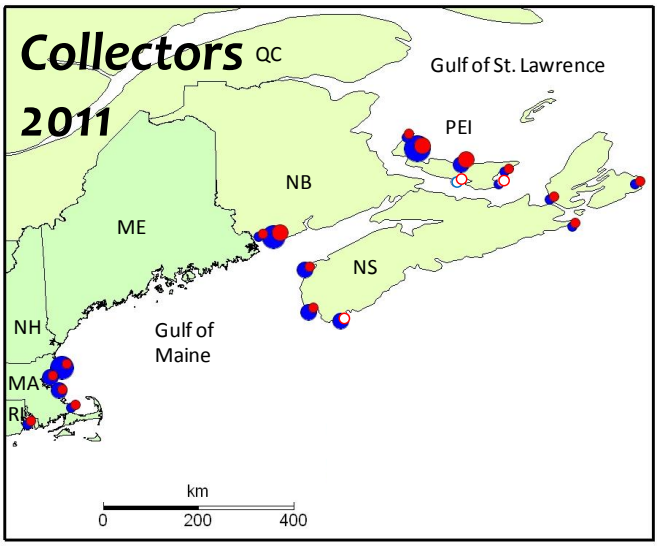


Figure 3. Spatial patterns. Average densities of young-of-year (**red**) and older juvenile lobsters (**blue**) found in suction samples (**left**), and collectors (**right**) deployed in 2011. Symbols represent multi-site averages for each study area.

north side and weak settlement on the south side (Fig. 3). Northumberland Strait, between PEI, Nova Scotia and New Brunswick, may become an area of concern as physiologically stressful temperatures above 20°C (68°F) match those threatening southern New England nurseries. Keeping monitoring going should be a top priority.

Growing concern for southern New England nurseries: In 2011, with support from the Commercial Fisheries Research Foundation, UMaine lobster scientists teamed with RI Div. Fish & Wildlife, and RI Lobstermen's Association to initiate the first comprehensive re-survey of Narragansett Bay lobster nurseries since 1990. Divers conducted both suction sampling and visual surveys, revisiting all the location sampled in 1990 along the Bay's north-south estuarine gradient, plus a few others of interest to the industry. In 1990 dense populations of juvenile lobsters, comparable in number to those of mid-coast Maine at the time, were found on Rhode Island's outer coast and well into the mouth of the Bay (Figs. 1 & 4). The 2011 re-survey drove home the sobering realization of how much nursery populations had declined. Even with this intensified sampling, no young-of-year (YoY) lobsters were found in suction samples taken at any site. Supplemental sampling by collectors deployed at all the suction sampling sites produced only a single YoY. These findings are consistent with collector, suction sampling, and brood stock surveys, in Rhode Island Sound and Buzzards Bay, led by Bob Glenn of MA DMF under a previous CFRF project (see *Comm. Fish. News*, March 2012). The jury is still out as to the key factors at play, but evidence is accumulating that the combination of both warming sea temperatures and shell disease are increasing mortality and forcing remaining broodstock to deeper, cooler, offshore waters where hatching larvae are less likely to end up in coastal nurseries.

Looking Ahead: With the Atlantic Coastal Cooperative Statistics Program, ALSI will launch a Web portal later in 2012 to streamline data entry, reporting and outreach of settlement index results. This will set the stage for a more comprehensive assessment of the predictive power of the index for time trends in the fishery region-by-region over the next two years. **Θ**

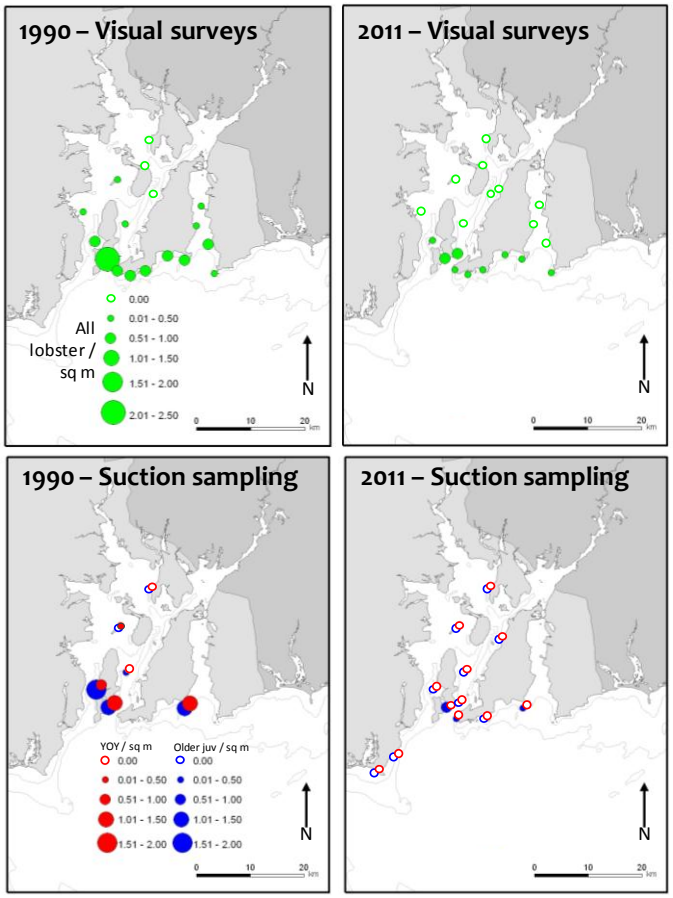


Figure 4. Shrinkage of Narragansett Bay lobster nurserys, 1990 to 2011. Diver-based visual surveys (top panels) and suction sampling (bottom panels). Suction sampling does a better job of resolving YoY lobsters, not shown in visual surveys.