American Lobster Settlement Index | Update 2013

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http://www.umaine.edu/marine/people/sites/rwahle/ALSIPage.htm

A widespread and deepening downturn of lobster settlement over much of the species' range is heightening concerns for the future of the region's lobster fishery, even as new data indicate a rising tide of lobsters in parts of the southern Gulf of Saint Lawrence. Before the full ALSI survey results had been compiled from all regions this spring, news of settlement declines and an uptick in shell disease in Maine prompted the state's marine resources commissioner to launch a series of meetings with the lobster industry to discuss the implications. Despite the settlement downturn, in 2013 Maine logged its second highest lobster landings on record, at 126 million pounds (57,000 MT). Amidst this boom in production, questions remain: why is settlement trending downward, and what does it mean for the industry? This issue of the ***Update*** summarizes the regional ALSI time trends, and includes previously unreported survey time series from vessel-deployed collectors in Atlantic Canada. Finally, setting aside the question of why for now, we take a glimpse at preliminary ALSI-derived fishery recruitment forecasts that may forebode declines in the catches of some of today's most productive areas.

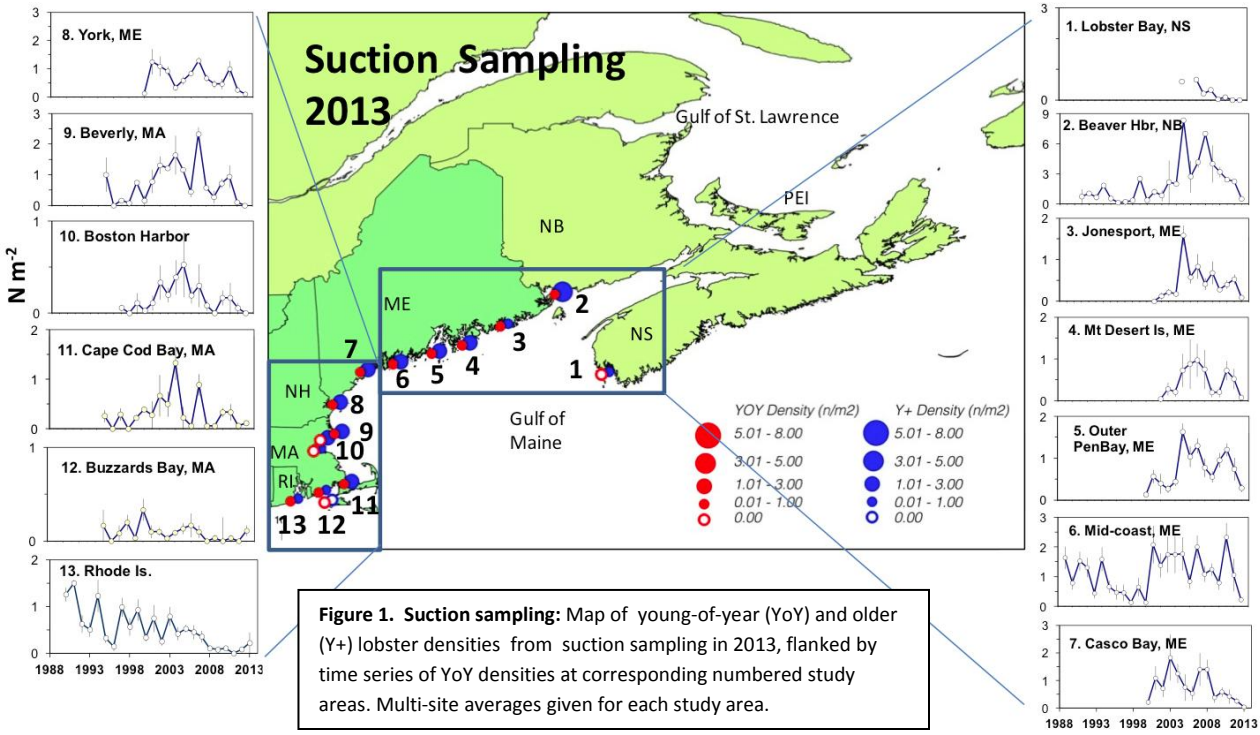

Figure 1. Suction sampling: Map of young-of-year (YoY) and older (Y+) lobster densities from suction sampling in 2013, flanked by time series of YoY densities at corresponding numbered study areas. Multi-site averages given for each study area.

Settlement 2013: The diver-based suction sampling survey, our longest ALSI time series, reveals the precipitous downturn in settlement in the Gulf of Maine, from southwest Nova Scotia to Massachusetts (Fig. 1). The possible exception is Cape Cod Bay where settlement remained nearly even with 2012 levels, but was already as low as ever. Recent trends have reversed the growing contrast of recent years between the settlement upsurge in the Gulf of Maine and the near collapse in southern New England. Although settlement south of Cape Cod remains barely detectable, Rhode Island and Buzzards Bay both reported a small uptick, the second year in a row for Rhode Island, which had bottomed out in 2011. Settlement at new sampling sites near Martha's Vineyard, MA, remains low.

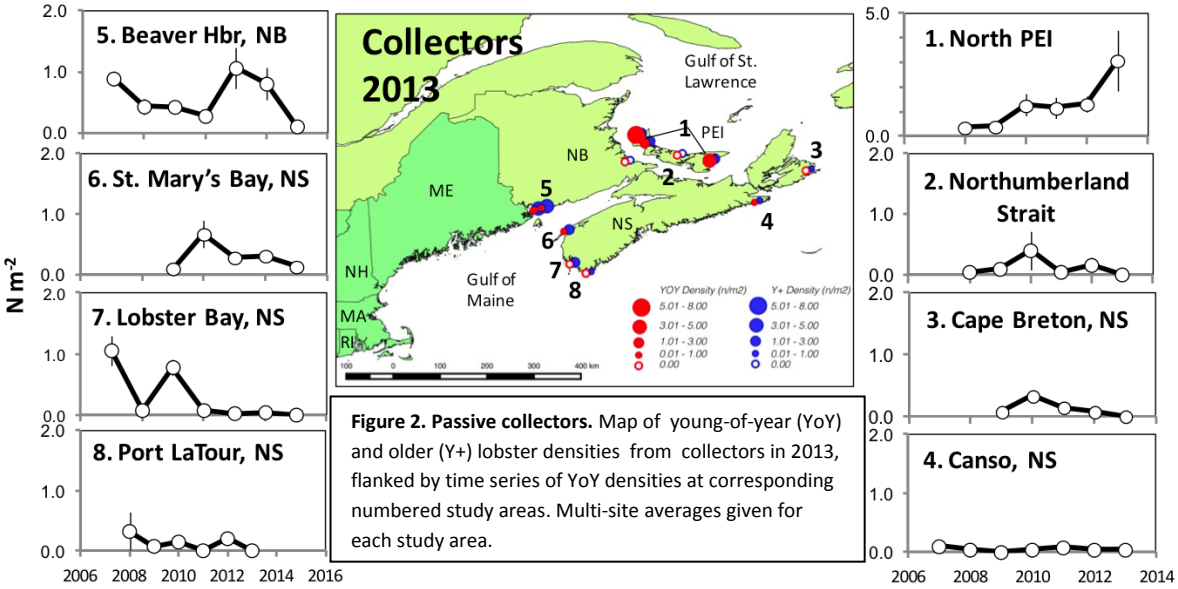

Figure 2. Passive collectors. Map of young-of-year (YoY) and older (Y+) lobster densities from collectors in 2013, flanked by time series of YoY densities at corresponding numbered study areas. Multi-site averages given for each study area.

In much of Atlantic Canada vessel-deployed passive collectors - rock-filled wire mesh trays lined with a fine screen - have been in use as a settlement monitoring tool since 2007. Although collector-based time series are still relatively short, they reaffirm the downward settlement trends observed by suction sampling, and even extend reports of the decline as far as Northumberland Strait on the south side of Prince Edward Island (Figs. 2). In contrast, the north shore of PEI has been seeing steady increases in settlement since surveys began. Previous research has demonstrated that the two monitoring methods produce comparable results.

Forecasting: Stakeholders are asking what the settlement downturn may mean for the future of the lobster fishery. In ***Update 2012*** we illustrated how we track the fate of a year class during its first year. While only a baby step, this analysis showed that the initial settlement signal determines year class strength well beyond a few weeks after larvae settle. But modeling the leap from settlement to fishery recruitment is more uncertain, in part because we need to account for growth and survival over the years it takes lobsters to mature to the fishery. Since growth rates vary, lobsters recruiting to the fishery in any given year may range from 5 to 9 years old, depending largely on temperature and individual variability. Fig. 3 compares our preliminary projections to corresponding landings for three regions with the longest ALSI time series. These locations also represent dramatically contrasting thermal regimes across a large portion of the species' range. The forecasts capture the divergent trajectories of reported landings for the three areas in the recent past. Over the next few years, they suggest a considerable downturn in eastern Maine (still well above the long-term average), a continuing downward slide in RI, but little change in midcoast Maine. Note that the projection gives recruitment trends, not the absolute number of recruits. Uncertainty about changes in growth rate and natural mortality during the post-settlement years could change the outlook. Also bear in mind that a host of environmental and economic factors unrelated to recruitment can alter landings trends, so it will be critical to validate model predictions with abundance data from fishery independent surveys as well as landings. **θ**

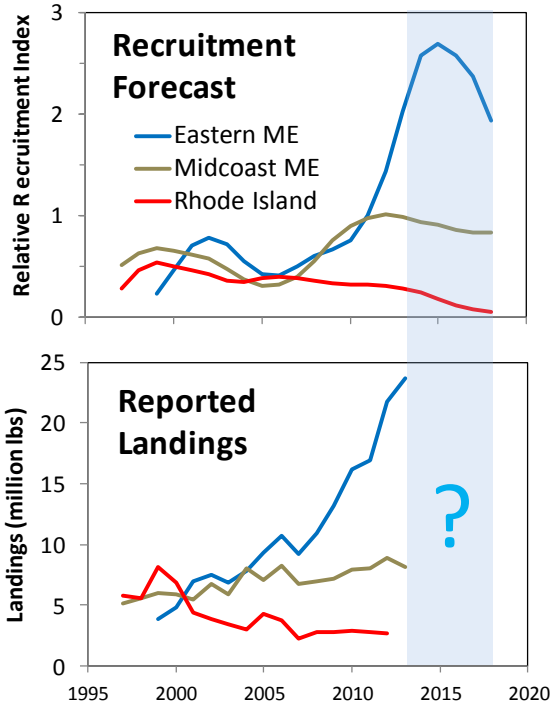

Figure 3. Early warning? Preliminary model projections of fishery recruitment index trends and reported landings through 2018 for 3 regions within the ALSI purview. Because landings mostly comprise newly recruited lobsters, they can be a useful indicator of recruitment, notwithstanding other factors that might influence landings. Projections from settlement time series 2, 8 and 13 in Fig. 1