



American Lobster Settlement Index | Update 2019

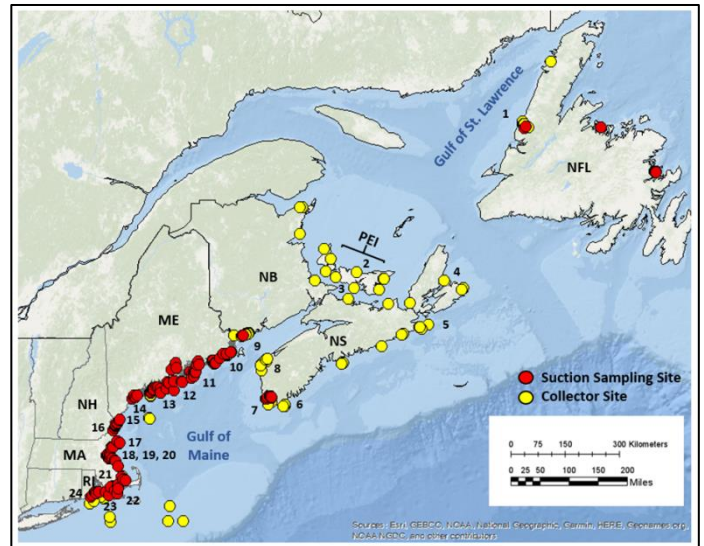
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<http://umaine.edu/wahlelab/current-projects/american-lobster-settlement-index/>

Several months now into the COVID-19 pandemic, we can only look back to the 2019 fishing year with some nostalgia. In calendar year 2019, Canadian lobster landings continued to boast near all-time highs. And while US landings have slipped a bit from their own historic highs, much of those losses have been offset by continued high value. That is, until now. All that changed almost overnight with the onset of the pandemic, as demand for lobster plummeted with shuttered restaurants and overseas commerce, dragging down the price of lobster, much to the distress of fishing communities up and down the coast. As we enter the 2020 summer fishing season, the lobster industry grapples to find a new normal as it accommodates health protocols, readjusts markets and scales back revenue expectations. In kind, state and federal marine resource monitoring programs are equally rethinking sampling programs under shrinking tax revenues and new safety standards. [Last year's Update](#) examined how well ALSI predicted trends in the fishery from Fundy to Rhode Island. Those findings were scientifically vetted and [published](#) last fall. The forecasts are updated each year, but, owing to COVID-19, 2020's catch is likely to be lower than what we would have predicted on the basis of ALSI. In this *Update* we share some much needed good news about settlement trends and ALSI's expanding reach to the north. And, for something new, we showcase data on other species, some of commercial interest, also coming from the ALSI sampling effort.

Settlement 2019: In 2019, the good news was a significant and welcome upturn in settlement in the Gulf of Maine from Penobscot Bay to New Brunswick's Fundy shore, with lesser upticks from Casco Bay to New Hampshire. The stretch of New England coast from Cape Anne, MA, to Rhode Island remained at historic lows, however (**Fig. 1**). In the Gulf of St. Lawrence, the north shore of PEI continued to report some of the highest young-of-year densities on record, even though they fell back from the astronomical peak of 2018 with settlement on par with 2017. Still, Northumberland Strait continued its incremental upward trend of the past few years. Disappointingly, Nova Scotia did not continue its ALSI survey in 2019, excluding one of Canada's most lucrative lobster fishing areas. On the other hand, after an 11 year hiatus, Newfoundland redeployed collectors on its western coast. Although they detected no young-of-year in 2019, what **Fig. 1** does not



Young-of-year lobsters per square meter

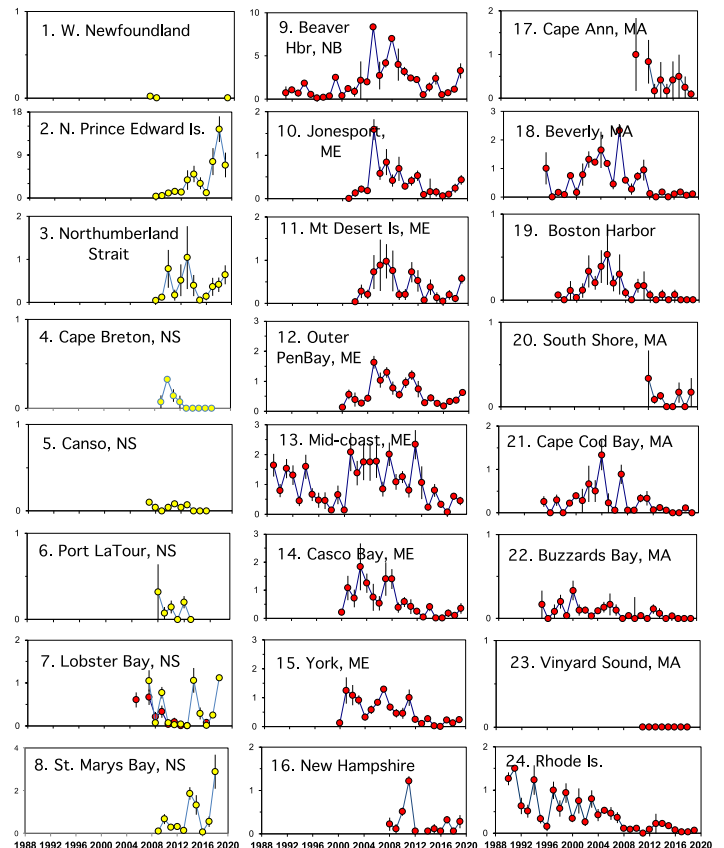


Figure 1. ALSI sampling in New England and Atlantic Canada. Diver-based suction (red) and vessel-deployed bio-collector (yellow) sampling locations and corresponding time series of young-of-year (YoY) settlement for selected groups of sites in 24 study areas from Rhode Island to

reveal is that the collectors contained considerably higher numbers of older juvenile lobsters than were observed in earlier surveys, evidence of heightened levels of settlement in recent years, which bodes well for the future of Newfoundland’s lobster fishery.

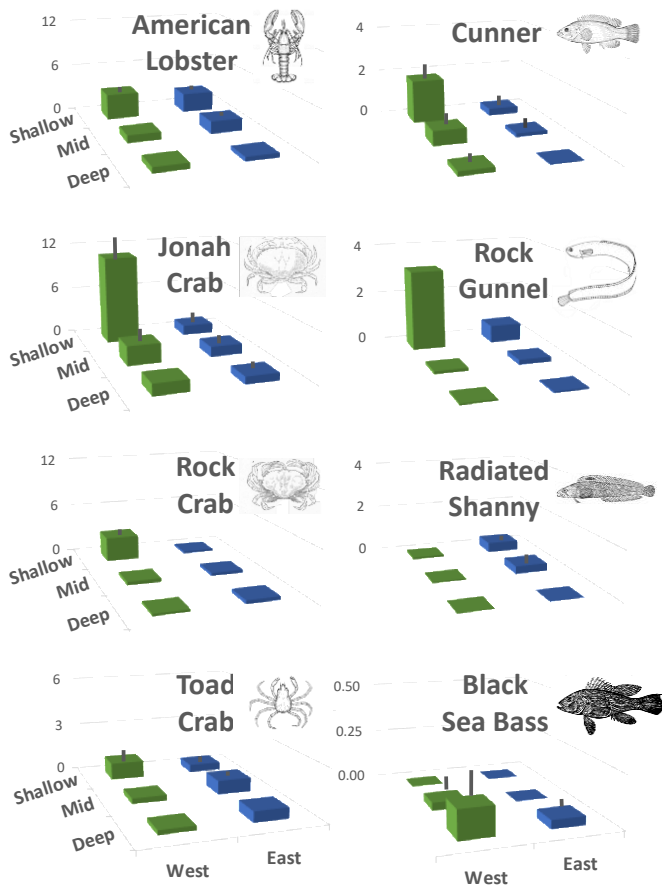


Figure 2. A diverse neighborhood. Densities (number per square meter) of some of the conspicuous crustaceans and fishes found in bio-collectors deployed over three depth strata in eastern and western Maine (Fig 3.). Shallow = 0-20 m, Mid = 21- 40 m, Deep = 41-60 m.

Beyond lobsters: Our rock-filled, vessel-deployed bio-collectors successfully catch not only young lobsters, but other species as well. In fact, they are proving to be a useful tool to compare biodiversity of crustaceans and fishes across regions and depths. Thanks to Ready Seafood Company’s investment in targeted collector deployments at Maine DMR’s Ventless Trap Survey sites in eastern and western Maine, we’re gaining new insight into species distributions in different thermal regimes. For example, for a selection of eight conspicuous species of fishes and crustaceans found in collectors deployed in the eastern and western Gulf of Maine, we see both depth-wise and coast-wise patterns (Fig. 2). Most of these species, including crustaceans like lobster and crabs, and fishes, such as the cunner and the small eel-like rock gunnels, are more abundant in the shallows, especially in the western Gulf of Maine, where waters tend to be warmer during the summer (Fig. 3). But Downeast, where summer temperatures are more uniform across depths – cooler near the surface, but warmer at depth - the distribution of fishes and crabs also tends to be more uniform. In some species, though, the opposite is true. For example, the cryptic rock dwelling radiated shanny fish and toad crab tend to be more abundant in the east than the west. These complementary distributions of species associated with cooler and warmer regimes could be due to different thermal preferences, but we cannot rule out the possibility of shifting competitive advantages between species across these temperature gradients. The complementary depth-wise distribution of the cunner and black sea bass may be a case in point: both are demersal predators that patrol limited territories on the rocky seabed.

The black sea bass is especially interesting. First, it is a relatively recent invader of the Gulf of Maine from the mid-Atlantic that has been gaining ground in a warming ocean. While its densities are relatively low compared to other fishes, finding any young black sea bass in the Gulf of Maine, especially juveniles, is noteworthy. These are some of the first records of juvenile black sea bass in the eastern Gulf of Maine. Second, as a warmer-water species, the depth-wise distribution of black sea bass is surprising. Unlike the other fish taxa, we found the highest density of black sea bass at our deepest, coldest sites, both in the west and the east. Finding young black sea bass at these depths is, to our knowledge, unprecedented. As we continue to deploy collectors and record black sea bass numbers, we hope to gain additional insight into this pattern. As a potentially important commercial fishery for the Gulf of Maine, black sea bass remains a species of interest. And as we face a rapidly changing Gulf of Maine, bio-collector-based sampling will continue to provide a useful window on changes in biodiversity, as well as target species of current and future commercial interest. **θ**

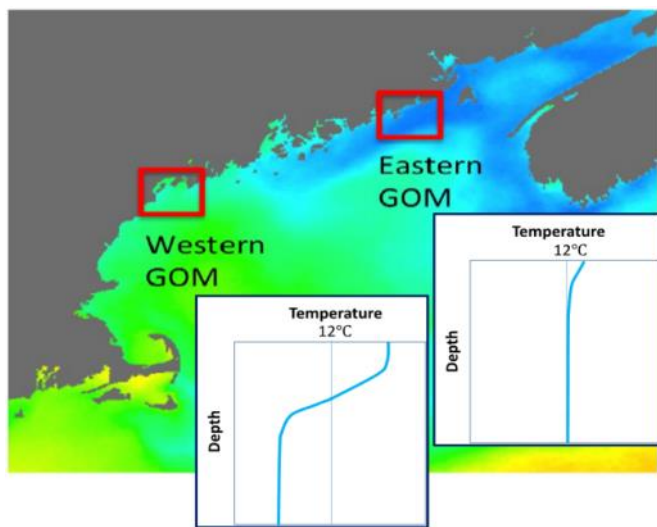


Figure 3. Contrasting thermal regimes. In summer, the western Gulf of Maine develops a warm water layer that does not readily mix with the deeper cold waters below. In the east, temperatures remain almost uniform from surface to bottom due to tidal mixing. Insets show typical west and east vertical temperature profiles. Boxes surround sampling areas represented in Fig. 2.