

NOAA JUVENILE FISH (from page 6)

Rock reefs are particularly important in the central basin of Long Island Sound, where most of the seafloor is flat and composed of sand and shell. Fish also eat the algae and invertebrates growing on the reef. They typically return to the same reefs year after year.

Many of the species studied, including grubby and cunner, are not regularly harvested. This makes it more likely that their declining abundance is related to environmental change rather than fishing. Millstone Power Station in Waterford, Connecticut, also documented a decline in grubby.

Long Island Sound Trawl Surveys Also Observed Changes

The CT DEEP and Millstone Power Station in Waterford, Connecticut, conducted trawl surveys during this time period. Both datasets corroborate the striking increase in black sea bass across Long Island Sound.

The CT DEEP has conducted annual spring and fall trawl surveys across a broad swath of Long Island Sound since 1984.



A scientist holds a juvenile tautog

Fisheries biologist Dave Ellis said, "Around 2010-2012, we started to see a spike in the black sea bass population; we were actually able to track that strong year class for the next several years. Historically, it was normal to see warm water species in the Sound in summer and early fall, but now these fish aren't coming and going; they're year-round residents."

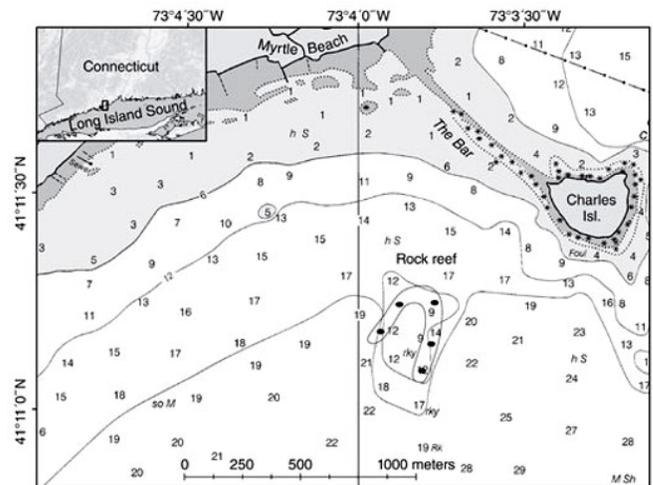
Ellis also noted that prior to the last decade, anglers often had to venture outside of the Sound to find black sea bass. Now they don't have to go far to catch them; they are quickly becoming one of the most popular recreational fish in the area.

Millstone Power Station has been conducting a bottom trawl survey at multiple stations near Niantic Bay in eastern Long Island Sound since 1976 to assess bottom-dwelling fishes and invertebrates. Millstone biologist Steve Dwyer said, "We're seeing cool-water species, including winter spawners such as grubby and winter flounder, become less abundant, and warm-

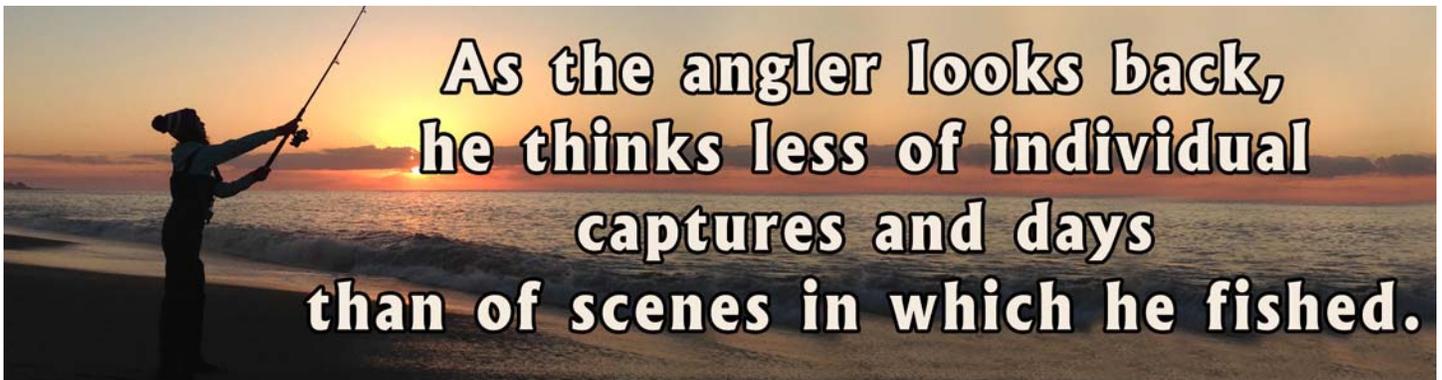
water species like black sea bass that have historically been more predominant in the mid-Atlantic waters, similar to the Chesapeake Bay region, become more abundant. These findings are consistent with other surveys in southern New England. There's value in talking with other scientists in real-time to compare data about what we're seeing."

Paul Clark, a NOAA Fisheries biologist and co-author of the study, also investigated what the increasingly abundant black sea bass are eating. "They tend to be opportunistic feeders," he said, "I've analyzed their stomach contents. In addition to smaller black sea bass, they've been eating cunner, rock gunnel, young tautog, crabs, shrimp, and more." In addition to temperature, predation by black sea bass may be contributing to the shift in fish communities.

The study finds that seemingly subtle temperature increases over time may have contributed to changes in composition and abundance of fish species on a rock reef in Long Island Sound. Several research groups monitoring different parts of Long Island Sound have simultaneously documented the increasing abundance of black sea bass. This likely signals a northward expansion as the warming Sound becomes a more hospitable habitat.



Map of a horseshoe-shaped cobble and boulder reef located near Milford, Connecticut, in Long Island Sound. Black circles indicate where fish traps were deployed to assess changes in the relative abundance of juvenile finfish from June–August of 2004–2008 and 2016.



**As the angler looks back,
he thinks less of individual
captures and days
than of scenes in which he fished.**