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Climate change hurting N.E. cod population, study says



JOHN TLUMACKI/GLOBE STAFF

A cod caught on fisherman Al Cottone's boat.

By David Abel | GLOBE STAFF OCTOBER 29, 2015

The rapid warming of the waters off New England has contributed to the historic collapse of the region's cod population and has hampered its ability to rebound, according to a study that for the first time links climate change

to the iconic species' plummeting numbers.

Between 2004 and 2013, the mean surface temperature of the Gulf of Maine — extending from Cape Cod to Cape Sable in Nova Scotia — rose a remarkable 4 degrees, which the researchers attributed to shifts in the ocean currents caused by global warming.

The study, which was released Thursday by the journal *Science*, offers the latest evidence of climate change — this time, affecting a species once so plentiful that fishermen used to joke that they could walk across the Atlantic on the backs of cod.

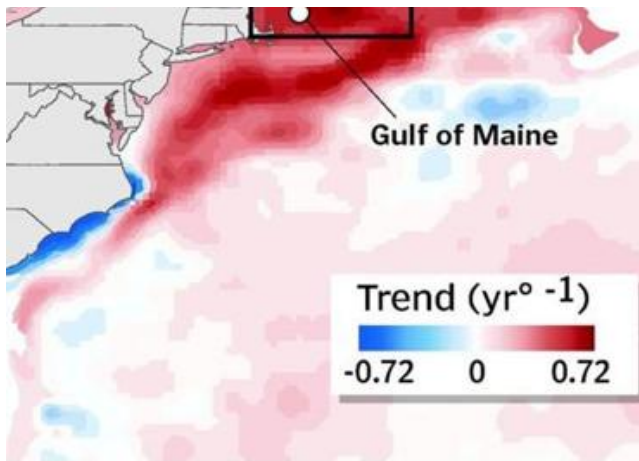
Fisheries management officials have sharply limited cod fishing in hopes of protecting the species, but they estimate the number of cod remain at as little as 3 percent of what would sustain a healthy population. The limits, in turn, have hurt fishermen.

“Managers [of the fishery] kept reducing quotas, but the cod population kept declining,” said Andrew Pershing, the study’s lead author and chief scientific officer of the Gulf of Maine Research Institute in Portland. “It turns out that warming waters were making the Gulf of Maine less hospitable for cod, and the management response was too slow to keep up with the changes.”

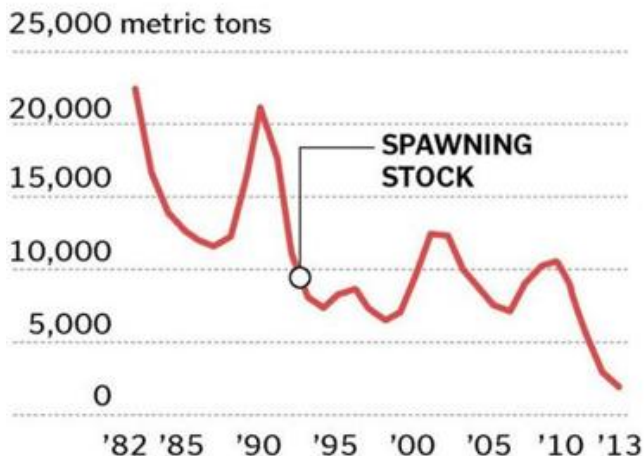
The warming water ...

SEA SURFACE TEMPERATURE TRENDS
(DEGREES FAHRENHEIT PER YEAR), 2004-2013



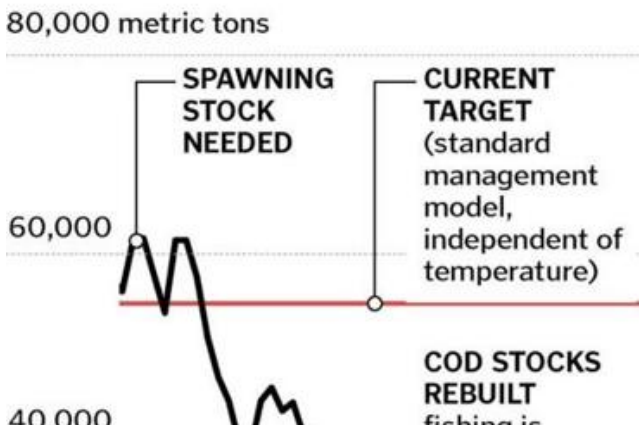


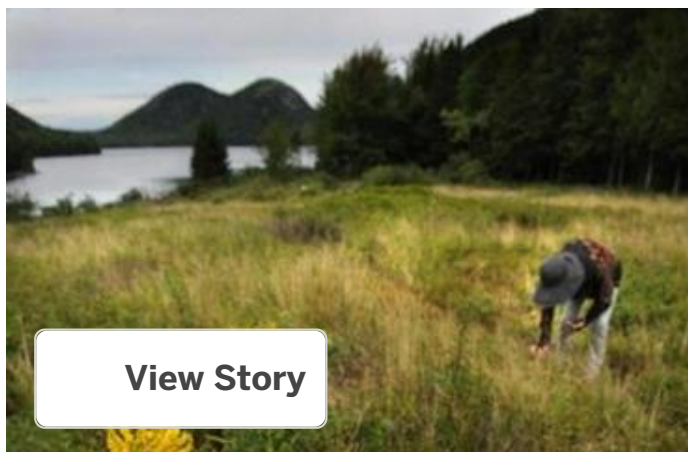
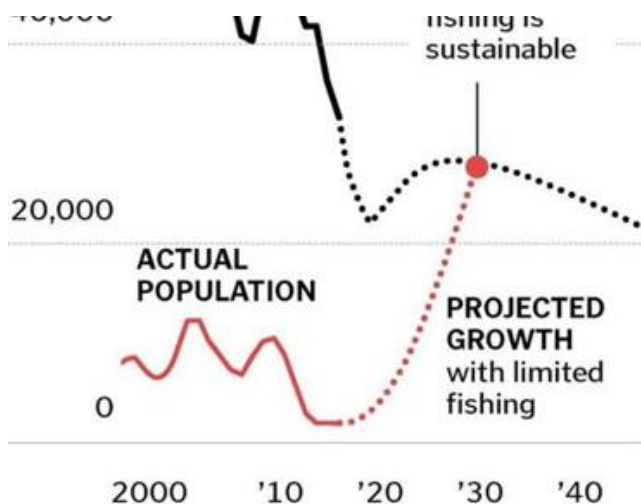
... has reduced cod reproduction ...



... leaving their recovery in doubt

WARM WATER BIOMASS ESTIMATES, based on the average temperature predictions from climate models





In Maine, climate change is taking a toll

Maine, the state with the highest percentage of forested land, is uniquely vulnerable to climate change, scientists say.

How does the government count the fish?

The institute had reported last year that the rise in temperatures in the Gulf of Maine exceeded those found in 99 percent of the world's other large bodies of saltwater. The authors of Thursday's study link the rapid warming to a northward shift in the Gulf Stream and changes to other major currents in the Atlantic and Pacific oceans.

They say the warmer water coursing into the Gulf of Maine has reduced the number of new cod and led to fewer fish surviving into adulthood. Cod prefer cold water, which is why they have thrived for centuries off New England.

The precise causes for the reduced spawning are unclear, the researchers said, but they're likely to include a decline in the availability of food for young cod, increased stress, and more hospitable conditions for predators. Cod larvae are eaten by many species, including dogfish and herring; larger cod are preyed upon by seals, whose numbers have increased markedly in the region.

The researchers also suggest that federal officials have miscalculated the number of cod in the Gulf of Maine. The faulty models, they said, led the officials to allow overfishing, enough that the region's cod catch has fallen 90 percent over the past three decades.

The authors of the study said federal officials should use temperature and climate forecasts "to provide a more realistic picture of the potential size of fish stocks."

Federal officials said they weren't surprised by the findings.

“People have said that fish stocks are impacted by global warming for a long, long time,” said John Bullard, regional administrator for the National Oceanic and Atmospheric Administration, which works with regional officials to set quotas.

Last November, after years of repeated NOAA surveys found a steady decline in the cod population, the agency announced a moratorium on all commercial cod fishing in the region through April. Afterward, officials permitted a small amount of cod fishing — at about 95 percent lower than the quotas had been.

Bullard acknowledged that the agency’s previous estimates were off. “Management decisions made five years ago were wrong,” he said. “We made those decisions with the information what we had.”

Bill Karp, director of NOAA’s Northeast Fisheries Science Center, called the study’s findings “consistent with the many other signals we are tracking.”

He said the agency’s current assessment methodology accounts for climate change, but it doesn’t explicitly quantify those changes.

“We are devoting significant resources to link climate models and fish population models,” Karp said. “The idea is to model not only the effects of temperature but a variety of other oceanographic factors, and how they affect the base of the food chain, larval fish survival, fish growth, and reproductive success.”

Any further action to change quotas or increase the number of areas off-limits to fishing would probably have to first be approved by the New England Fishery Management Council, which oversees the region's industry. NOAA officials could also take emergency action on their own.

In response to the study, council officials said they're considering a more "ecosystem-based" approach to managing the fishery. They also noted that cod quotas are already at record lows and "will almost certainly remain so in the foreseeable future."

"Fishery managers will need to adapt to the host of significant changes caused by the rapid rise in water temperatures in the Gulf of Maine," said Tom Nies, the council's executive director.

A number of fishermen sit on the council, and for years many of them have resisted additional closures and cuts to their quotas for cod, which have been fished for centuries in the region. The massive catch once helped lure settlers to North America and helped finance the American Revolution.

Many of them also dispute NOAA's assessment methodology, arguing that the agency is undercounting the population; many fishermen say they have seen a resurgence of cod in recent years.

"The study is entirely based upon the false premise that cod are actually at a low level," said Vito Giacolone, policy director of the Northeast Seafood Coalition, an advocacy group for commercial fishermen. "Cod are actually quite abundant and seem to be literally everywhere."

Environmental advocates, however, said the study confirms what they have been saying for years: The government has been overestimating the cod population and underestimating their mortality rates.

They also urged the council to reverse decisions they made this summer to lift fishing bans on Georges Bank and other rich fishing grounds in the gulf.

“Science shows us that one of the best ways to help make fish populations resilient to the stress from climate change is to protect the places where they reproduce, grow, and find food,” said Peter Baker, director of northeast oceans for the Pew Charitable Trusts.

The authors of the study said it’s possible that the past two winters, which were unusually cold, may have provided a boost to cod. But they said the numbers remain significantly lower than the historical average and the stocks are likely to continue to struggle as the gulf warms.

They noted that cod are often easier to catch as their numbers drop, because they tend to aggregate near their spawning areas when their population declines.

Pershing said that’s what happened along the Grand Banks off Newfoundland, where cod vanished in the early 1990s after environmental advocates raised concerns for years about their declining numbers.

“It’s really hard to reconcile the different ways that fishermen and scientists see the cod population,” he said. “Systematic surveys and fishing are very different.”

But he shares some common ground with the fishermen.

“We both feel like the current assessment and management system is not equipped to incorporate new information, either in the form of environmental changes like those we discuss or observations from people on the water,” he said.

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