



## First Ever Estimate Of Cod Fishery In 1850s By UNH Researchers Reveals 96 Percent Decline On Scotian Shelf

Study provides insight for officials setting ecosystem goals, rebuilding fishery remnant

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DURHAM, N.H. — Once a dominant species, the volume of cod on the Scotian Shelf, a rich fishing ground off the coast of Nova Scotia, has plunged 96 percent since the 1850s, according to an article in the March issue of *Frontiers in Ecology* by Census of Marine Life researchers. In fact, just 16 small schooners of the pre-Civil War era could hold all adult cod currently estimated in the once-rich Scotian Shelf.

Census of Marine Life researchers, who include University of New Hampshire researchers Andrew Rosenberg, professor of natural resources in the Institute for the Study of Earth, Oceans and Space, and W. Jeffrey Bolster, associate professor of history, announced the first-ever estimate of cod levels in the 1850s, created using old schooner catch records and observations, coupled with modern modeling tools. They say their findings have profound implications for contemporary policy makers trying to rebuild fishery “remnants” and restore the marine ecosystem.

Roughly 1,000 scientists from more than 70 countries are involved in the \$1 billion Census of Marine Life, support for which comes from government agencies concerned with science, environment, and fisheries in a growing list of nations as well as from private foundations and companies. For more information: [www.coml.org](http://www.coml.org).

“Managing the remnants of the ocean’s resources is a critical issue worldwide, but evidence for what constitutes a healthy fish population remains controversial,” the researchers said. “As we attempt to rebuild these fisheries, our decisions should reflect real and realistic goals for management, not just recently observed catch levels.”

According to the article, the 150-year perspective challenges ‘conventional wisdom’ as to what constitutes a rebuilt cod stock in a productive marine environment.

In recent debates in New England over management of George’s Bank and Gulf of Maine cod stocks, for example, many argued that 1980s stock levels should be considered fully rebuilt. However, “this contradicted the evidence of basic cod biology, which suggested that cod stocks

would only be rebuilt at higher levels.

“Our historical analyses indicate that recent levels of biomass and catch may grossly under-represent the productive potential of commercially important species,” the researchers said.

The article also emphasizes the importance of understanding ecosystem trends and determining baseline levels of marine species that existed prior to the industrialization of fishing. To date, declines have only been vaguely described for predatory fish species and complex coral reef systems around the world.

To estimate long ago fish levels, researchers used 1850s New England schooner records of daily catch locations and fleet activity on the fishing grounds. Fishers then, using handlines, had “negligible incentive to falsify records” and, combined with ancillary documents, their logs “provide a solid, reliable basis for stock assessment.”

Using a mathematical formula, the researchers estimate cod biomass on the Scotian Shelf was 1.26 million metric tons in 1852, compared with less than 50,000 metric tons today, the adults within which represent 3,000 metric tons, or 6 percent. The study notes the estimate of 1850 cod biomass is “quite conservative” as the old fishing logs only record adult cod.

The estimated abundance of cod in 1850 is consistent with earlier research led by fellow Census of Marine Life scientist Ransom Myers that estimated how much cod could be sustained in the North Atlantic ecosystem.

“This has important implications for ecological models,” the researchers said. “Either cod comprised a much larger fraction of the total ecosystem biomass 150 years ago or the marine ecosystem was far more productive then.

“An important, and often overlooked, scientific question raised by our historical analyses is, where has all this productivity gone? One obvious possibility is that other species are now far more productive than they were 150 years ago, when biomass accumulated in stocks of cod and other demersals (fish found on or near the seafloor) that were previously dominant components of the ecosystem.

“Alternatively, the marine ecosystem may now be far less productive than in the past, because of a variety of natural and anthropogenic changes. Put directly, has exploitation and overexploitation fundamentally altered the structure of the ecosystem and have primary ecosystem goods and services been lost because of these changes? Thinking historically about the role of human activity in marine ecosystems opens up new data sources and promising avenues of inquiry that may begin to address fundamental ecological questions about the nature and magnitude of productivity. Stock rebuilding programs should consider longer term, high biomass goals for full restoration.”