

What can science tell us that fishermen don't already know?

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Abstract

For millennia, fishermen have known that abundances of fish vary from year to year and that these variations could be associated with changes in weather. One hundred years ago, many scientists thought that man could not exhaust the sea's bounty and that climate fluctuations were unpredictable and not related to human activities. Today, we see that fish populations may fluctuate due to fishing, natural weather and climate variability, and human-induced climate change. As our understanding of the earth's system grows and our ability to predict (or at least forecast envelopes of future realities) expands with it, we need to ask, "What is the validity of the quantitative tools developed from this understanding, and how can we use these tools to better manage fish, fisheries, and ecosystems?"

Although empirical relationships between oceanographic conditions and fish and shellfish recruitment are notoriously ephemeral, I will make the case that a process-level understanding of recruitment for individual species is an achievable and important goal for fisheries science. The state of the ecosystem (both physical and biological components) can have profound influences on early-life dynamics, which in turn feed back to the ecosystem via proliferation or collapse of year classes that can shift community structure as they pulse through a system. Understanding the influence of environmental variability on both the ecosystem and single species is necessary for projecting how fished populations will respond to climate change, for developing decision-support tools for ecosystem-based management, and for science to tell us something that fishermen don't already know. Supporting insights and examples will be drawn from the Global Ecosystem Dynamics (GLOBEC) Program and from research on Chesapeake Bay and the Western Atlantic's Middle Atlantic Bight. Perspectives on research needs and priorities will be offered.