Untangling Fish Tales

This past spring, estuarine ecologist Denise Breitburg and her postdoctoral fellow, Richard Fulford (both of the Smithsonian Environmental Research Center (SERC)) brought together 20 ecologists and fisheries biologists from academic institutions, government agencies and the Smithsonian for a three-day workshop to attempt to “disentangle” the effects of eutrophication (excessive nutrient input) and fishing on estuarine food webs.

Around the world overall fish catches are in decline, habitat for many species is shrinking, and environmental organizations and regulators are searching for ways to reverse these trends. Global fish catches peaked in the late 1980s and have been in decline ever since. With such straightforward facts, it is tempting to make the conclusions that overfishing is at the root of diminished fish catch, and agricultural runoff and sewage effluence are responsible for habitat destruction. But over the past decade or so, it’s become clear that very little surrounding these issues is simple and straightforward.

Multiple stressor factors such as nutrient overload and fishing pressure often interact with one another, sometimes masking the effects of one another and at other times amplifying them. Determining the cause and effect of environmental degradation and multiple stressors has challenged researchers around the world.

Nutrient enrichment from sources such as agricultural runoff and sewage usually increases the population of microscopic plant species or phytoplankton. As a result, the phytoplankton-eaters increase in numbers, providing more prey for the larger organisms. This in turn can result in an increase in the numbers of some top consumers. Sometimes these are the commercially valuable fish that managers monitor to determine the health of a system.

At the same time, however, increases in phytoplankton reduce dissolved oxygen levels in deeper waters which diminishes habitat for deepwater organisms. These organisms may then migrate out of the low-oxygen zones and concentrate in other areas where they can become concentrated prey for fishermen, and sometimes artificially boost the survey numbers.

In such instances, it may be difficult to determine if high fish landings are the result of high overall fish populations, the concentration of fish seeking refuge from habitat loss, or the result of increased fishing effort and efficiency.

Researchers and managers agree that despite the difficulties, it is imperative that we learn how to effectively manage both nutrient loading and fishing pressures. “One of the triggers for this kind of workshop was what’s going on with water quality and fisheries management in Chesapeake Bay,” Breitburg said.

“One thing that really came out in this workshop,” Breitburg said, “is that estuaries tend to be pretty resilient to the insults people throw at them.” The nature of estuaries, with their mix of salt and fresh water and widely varying conditions, is exactly what makes them so hardy. Estuarine species tend to be generalists and can withstand a wide range of conditions. Although overfishing can nearly decimate a population, fishing stops when it is no longer a viable source of income. According to Breitburg, “you rarely get a complete local extinction. So, once you take proper management steps for recovery most species rebound.”

Information Highway Hi-Lites

Founded in 1982, the mission of Bat Conservation International (BCI) <http://www.batcon.org/home/default.asp> is “to teach people the value of bats, to protect and conserve critical bat habitats, and to advance scientific knowledge through research”. On their Web site, visitors will be able to learn about their advocacy and outreach efforts, along with learning more about these fascinating and important creatures. The “All About Bats” section is
a fine place to start, as it has a number of illustrated essays that include brief overview of the natural history of bats and suggestions on photographing bats as they fly through the air. Equally compelling is the section is the conservation programs area, which details the various programs BCI operates in various bat habitats, including bridges and caves.


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