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FOOD FISH vs. FISH FOOD

By Ken Hinman

"If you were to make little fishes talk," wrote the Irish poet and playwright Oliver Goldsmith, "they would talk like whales." Yes, and if we catch too many little fishes, some of us worry, we could end up with a whale of a problem - for all the bigger fishes and other sea animals that feed on them.

Take herring, for instance. The Atlantic herring is a small, unassuming fish – it rarely grows to longer than a foot or more than a pound, though it may live for 18 years. What it lacks in size it makes up for in sheer numbers, migrating through coastal and offshore waters in vast schools that stretch farther than the eye can see. The sea herring - as the oceanic variety is commonly called to distinguish it from the river herring that spawn in fresh water streams – is abundant from Labrador to Virginia, where it is preyed upon by numerous and voracious predators, among them larger fish, whales and sea birds.

New England's commercial fisheries for herring date back to the late 19th century. Landings fluctuated around 100 million pounds a year until the 1960s, when large, industrial-scale trawl fisheries based out of Europe descended on Georges Bank and the Gulf of Maine. Schools of herring were suddenly being scooped up in record numbers. Catches topped out at 800 million pounds in 1968. By the late '70s, the standing population had been reduced by 90% and the fishery collapsed.

Worldwide Problem

Actually, herring were just the last victim in a pattern of serial depletion that's since come to be known as "fishing down the food web." The most lucrative species, as far as the commercial market is concerned, are typically larger, predatory fish. Foreign fleets had already exhausted supplies of the most desirable and valuable species - cod, haddock and yellowtail flounder – before they turned their sights on herring.

This downward shift in fishing effort, according to a 1998 study by noted marine biologist Daniel Pauly, is occurring all over the world and it's a double whammy for the resource. First populations of predators decline, then their supply of available prey is reduced, exacerbating efforts to recover them.

After foreign fishermen had been pushed out of U.S. waters by the early '80s, stocks of groundfish started to rebound, as did herring stocks. But by the end of the decade, the booming domestic fishery that supplanted the foreign fleets had depleted

the numbers of cod and other bottom-fish once again. With severe fishing restrictions in place to restore codfish, catches of herring and other forage fish are on the rise again. But this time, with a growing awareness of the fragility of ocean ecosystems, the region's fishermen are joining with marine conservationists in expressing concern about what this could mean for the future of New England's fisheries.

The Importance of Herring

The *Guinness Book of World Records* lists Atlantic herring as the most plentiful fish in the sea. But the list of species that depend on herring for forage is a veritable *Who's Who* of overfished and threatened species: cod, bluefin tuna, white marlin, spiny dogfish, swordfish, humpback whale, etc. Of course, herring are not all these marine predators eat. But other baitfish are under mounting pressure, too.

The herring (*Clupea harengus*) is a member of the family Clupidae. The harvest of clupeoids – herrings, sardines, pilchards, anchovies and menhaden – today accounts for one-third of global landings of fish, according to the Food and Agriculture Organization of the United Nations.

Without question, we're impacting predators directly, as the targets of large-scale fishing operations, and indirectly, by diminishing their food supply. Is this kind of ecological squeeze play sustainable? Or could it lead to widespread collapse of fisheries up and down the food chain, as some scientists, conservationists and fishermen fear?

The New England Fishery Management Council and National Marine Fisheries Service (NMFS), jointly responsible for studying and managing the region's offshore fisheries, contend that herring are abundant and such fears are unfounded. The most recent scientific assessment of herring stocks (1998) concluded that the resource is "very large," and is in fact under-utilized; that biomass (total weight of all fish) is at an historic high and fishing mortality at a record low. As a result, managers are encouraging growth in the fishery. Landings of Atlantic herring in 2001 increased 14% over the previous year, to 260 million pounds, the highest catch since the 1970s.

It's rare for commercial fishermen, especially New England codfishermen, to argue that NMFS studies exaggerate the number of fish. But that's what Angela Sanfilippo, president of the Gloucester Fishermen's Wives Association, thinks. Who are we to believe, she says, "the scientists who say there is an exploding abundance of herring (or) the fishermen who say there is not? Our fishermen have also noticed that there is no longer herring in the bellies of codfish. This is alarming to our fishermen who have always found herring in codfish bellies."

When Ms. Sanfilippo says, "Herring is everything. It is the most important species feeding groundfish, whales and birds," she's motivated by self-interest as much as ecological concerns. She and the fishermen she represents are afraid the expanding herring fisheries might undo the sacrifices they've made (or that have been forced upon

them) to rebuild New England's groundfisheries. They are also unhappy about cod being taken as bycatch in the trawl fisheries for herring. Indeed, an ecosystems approach to marine fisheries means nothing if not taking into account the impacts of management decisions on prey and predators alike, including fishermen.

Commercials Concerned

It's been my experience that fishery managers, even as they reject predator-prey concerns that challenge their actions, are often quick to exploit such issues when it serves their purpose. Indeed the New England Council, in justifying higher allowable catches in 2000, told codfishermen "research suggests that an overabundance of pelagics such as herring and mackerel may have an adverse impact on the recruitment of other valuable species such as cod." In other words, too many herring is bad for the cod recovery. The fishermen didn't buy it and a subsequent scientific report released in 2001, which examined predator-prey relationships, dismissed it as unfounded.

That same report briefly addressed the issue of predation on herring and its importance to the recovery of groundfish, but reached no conclusions. It did, however, confirm that "Atlantic herring in the Gulf of Maine-Georges Bank region serve as a key forage species for predatory fishes, marine mammals and seabirds." It also noted, without comment, that due to declines in certain predator populations (dogfish and cod among them) and increased catches of herring, "fish consumption and fishery removals are about equal now."

The cumulative impact of fishing down the food web is that already stressed predators are competing more and more with large-scale commercial fisheries, a battle they are ill equipped to win. So the question of how much forage to leave in the water as prey for other species is being asked, not just here but in a number of fisheries around the country. What is the impact of increasing harvests of squid on the northeast shelf on the recoveries of swordfish, marlin and other overfished predators? Can intensive harvests of menhaden in Chesapeake Bay support healthy populations of striped bass, bluefish and weakfish?

In each case, much is made of the fact that herring, squid and menhaden are not considered overfished. But "ecosystem overfishing" can occur for species that are not over-exploited in the conventional sense, when reducing that component of the food web adversely impacts other species in the ecosystem. In each case, too, the fishery management plans for these prey species allow for increased landings because current catches are below their "maximum sustainable yields." Such decisions should be made on a multispecies basis, not based on whether or not the U.S. fishing industry has the capacity to catch, process and market more fish.

Multi-Species Approach

The goal of maximizing catches of all species cannot work in an ecosystems context. Ecosystems have a limited carrying capacity that results in bounds on fish

yields, noted the NMFS Ecosystems Principles Advisory Panel in its 1999 Report to Congress. The panel recommends setting catch levels conservatively.

The Councils and NMFS are obliged to make sure that ecological issues are fully addressed in the management of herring, squid and other species under their jurisdiction. They must account for the fact that these are key species in their ecosystems and of great importance, not simply as food fish but as fish food, too. They must be used with caution.

Fishery managers need a process for dealing with predator-prey issues in a comprehensive and deliberative manner, one that ensures that we consider what effect management decisions may have on interdependent species. Right now no such process exists; these and similar concerns are dealt with in a perfunctory way, within a system that is biased toward viewing a species as “under-utilized” if we’re not taking the maximum sustainable yield.

By establishing such a process, even as we work to improve our understanding of food web interactions, we will at least ensure that the right questions are being asked; the necessary information is identified and, if available, considered; and decisions are made on an informed and reasoned basis. Just as importantly, fishermen and other members of the public are more likely to view these decisions as credible, which is a prerequisite for accepting them.

As it is, it’s hard to accept that we are not treading in dangerous waters. The most sensible thing to do would be declare a moratorium on any increase in the catch of forage fish -- at least until such time as key predator populations are restored.