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# A Future for U.S. Fisheries

*Current policies have slowed but not stopped the depletion of fish stocks.*

*A new approach based on restoration is needed.*

**F**or the fishing industry in the United States, and for the fishery resources on which the industry depends, there is good news and bad news. Bad news still predominates, as many commercial fishers and their communities have suffered severe financial distress and many fish stocks have declined considerably in numbers. Poor management by the National Marine Fisheries Service (NMFS), which regulates the fishing industry, and some poor choices by many fishers have contributed to the problems. But there are some bright spots, small and scattered, that suggest that improvements are possible.

Starting with the bad news, the federal government's fisheries management remains primitive, simplistic, and, in important cases, ineffectual, despite a fund of knowledge and conceptual tools that could be applied. In many regions—New England and the Pacific Northwest, among others—failed management costs more than the receipts

from fisheries. This does not suggest that management should be given up as a lost cause, leaving the industry in a free-for-all, although this strategy might, in fact, be cheaper and not much less effective.

As a key problem, most management efforts today are based primarily on catch quotas that regulate how much fishers can harvest of a particular species in some set period, perhaps a season or a year. The problem is that quotas are set according to estimates of how much of the resource can be taken out of the ocean, rather than on how much should be left in. This may sound like two sides of the same coin, but in practice the emphasis on extraction creates a continual bias on the part of fisheries agencies and unrealistic short-term expectations among fishers. For example, a basic tenet of these approaches is that a virgin fish population should be reduced by about two-thirds to make it more “productive.” But this notion is belied in the real world, where it has been proven that larger breeding populations are more productive.

The failure of this approach is readily apparent. The Sus-

tainable Fisheries Act of 1996, reaffirmed by Congress in 2006, states that fish populations may not be fished down below about one-third of their estimated virgin biomass. It also states that in cases where fish stocks already have been pushed below that level, they must be restored (in most cases) to that level within a decade. On paper, this act looked good. (Full disclosure: I drafted the quantitative overfishing and recovery goals and triggers mandated by the act.) Unfortunately, the NMFS wrote implementing regulations interpreting the mandates as meaning that overfishing could continue for some time before rebuilding was required. This too-liberal interpretation blurred the concept and delayed benefits. In its worst cases, it acknowledged that fish populations must be rebuilt in a decade but said that overfishing could continue in the meantime.

Clearly, the nation needs to take a different approach, based solidly on science. As a foundation, regulatory and management agencies must move from basing their actions on “how much can we take?” to concentrating on “how much must we leave?” The goal must be keeping target fish populations and associated living communities functioning, with all components being highly productive and resilient.

The nation must confront another reality as well. So many fisheries are so depleted that the only way to restore them will be to change the basic posture of regulations and management programs to one of recovery. Most fish populations could recover within a decade, even with some commercial fishing. But continuing to bump along at today’s depleted levels robs fishing families and communities of income and risks resource collapse.

### **Ingredients for success**

Moving to a new era of fisheries management will require revising some conventional tools that are functioning below par and adopting an array of new “smart tools.” Regulations that set time frames for overfishing and recovery can play a valuable role, if properly interpreted. For example, traditional catch quotas must be based firmly on scientific knowledge about fish stocks, and they must be enforced with an eye toward protecting the resource. Newer tools, adapted to specific environments and needs, would include:

**Tradable catch shares.** In this approach, now being used in some regions in varying degrees, fishery managers allot to fishers specific shares of the total allowable catch and give them the flexibility and the accountability for reaching their shares. Thus, fishers do not own the fish; rather, they own a percentage of the total allowed catch, which may fluctuate from year to year if management agencies adjust it up or down.

In expanding the use of such programs, managers must establish the shares based on the advice of independent scientists who are insulated from industry lobbying. Managers also should allot shares only to working fishers, not to corporations or processors. Of course, finding equitable ways of determining which fishers get catch shares will be critical. Methods of allocating shares may vary from location to location, but the key is ensuring an open process that accounts for fishers’ legitimate interests and maintains conservation incentives. In many cases, fewer fishers will be eligible to keep fishing. But those not selected would likely have been forced out of business anyway by the combination of pressure from more successful fishers and reduced fish stocks.

By significantly reducing competition that breeds a race for fish, this approach offers several benefits. For one, it makes for safer fishing. Fishers who own shares know that they have the whole season to fill their quota regardless of what other boats are catching, so they are less likely to feel forced to head out in dangerous weather. In addition, owning a share helps ensure (other factors permitting) that a fisher can earn a decent living, so local, state, or regional politicians will feel less pressure to protect their fishing constituents and push for higher catch quotas. At the same time, marginal operators granted shares would no longer feel trapped, because they would have something to sell if they wished to exit the fishery. By promoting longer-term thinking among fishers and politicians alike, catch-share programs help foster a sense of future investment in which quota holders will benefit from high or recovered fish populations.

The impact of tradable catch shares can be seen in experiences in several regions. In Alaska, where fisheries managers once kept a tight cap on the halibut catch, the fishing season shrank to two days annually because there were so many competing boats. After managers introduced tradable catch shares, the number of boats fell precipitously and the season effectively expanded to whenever the fishers wanted to work toward filling their shares. Safety improved markedly, and the halibut population remained robust. In New England, where the industry resisted tradable shares, the story ended differently. Managers allotted individual fishers a shrinking number of days at sea, which progressively crippled their economic viability, gave them no option to exit the fishery short of foreclosure, and kept fishing pressure so high that the fish stocks never recovered.

**Area-based fisheries.** Although this concept may be relatively new in Western fisheries management, it has underpinned the management of fishing in Pacific islands for millennia. In practice, this approach is most applicable where fish populations spawn in localized areas and do not

migrate far from their spawning area. For example, consider the case of clams, which spawn in limited areas and never move far away. In many regions, clamming is regulated on a township-by-township basis. Thus conserving clams off one port will benefit that port, even if (especially if) the next port eliminates its own clam beds. This model holds promise for greater use with various fish species as well. In New England waters, cod once spawned in many local populations, many of which are now extinct. Overall regional quotas and regional mobility of boats contributed to their extinction. Had managers established local area-based restrictions, these populations might well have been saved, to the benefit of local communities.

In implementing area-based fisheries, managers will need to move deliberately, being mindful of what is scientifically supported and careful not to unduly raise people's expectations. If managers move too hastily, the restrictions may meet a lot of social skepticism and may not work as well as advertised, setting back not only the health of the fish stocks but also the credibility of the managers and scientists who support such actions.

**Closed areas.** In recent years, fisheries managers have decided that some stocks are so threatened that the only choice is to close all or part of their habitat to fishing. Such efforts are to be applauded, although they have been too few and too limited in scale to achieve major success. Still, the lessons are instructive, as closures have been found to result in increases in fish populations, in the size of individual fish, and in greater diversity of species.

On Georges Bank in the north Atlantic, for example, success has been mixed, but tantalizing. Managers closed some of the grounds in an effort to protect northern cod, in particular, whose stocks had become severely depleted. So far, cod stocks have not rebounded, for a suite of reasons. But populations of several other important species, notably haddock and sea scallops, have mushroomed. These recovered populations have yielded significant financial benefits to the region, although in the case of sea scallops, fishing interests successfully lobbied to be allowed back into the closed areas, hampering full recovery of the resource.

**Mixed zoning.** In many resource-based industries, even competing interests often agree on one thing: They do not want an area closed to them. Yet regarding fishing, conservationists too often have insisted that protected areas be closed to all extraction, and their single-minded pursuit of all-or-nothing solutions has made it easy for commercial interests to unite in demanding that the answer be nothing. A more nuanced approach is needed.

A comprehensive zoning program should designate a

mix of areas, including areas that are entirely open to any kind of fishing at any time, areas that are closed to fishers using mobile gear, areas that are closed to fishers using gear that drags along the seafloor, areas that are closed in some seasons, and areas that are fully protected no-take zones. Such integrated zoning would better protect sensitive seafloor habitats and aquatic nursery areas from the kinds of activities that hurt those areas, while allowing harmless activities to proceed. For instance, tuna fishing could be banned in tuna breeding or nursery areas, yet allowed in ocean canyons, even those with deep coral and other important sedentary bottom communities. This type of zoning would also be most likely to gain the support of competing interests, as each party would get something it wants.

**Reduction of incidental catch.** Almost all methods of commercial fishing catch undersized or unmarketable individuals of the target species. Few of these can be returned alive. Fortunately, a number of simple changes in fishing methods and gear, such as the use of nets with larger mesh size, have been developed that can reduce incidental kill by more than 90%, and the government should adopt regulations that require use of these cleaner techniques. In some cases, however, it may be appropriate to require fishers to keep all fish caught—no matter their size, appearance, or even species—in order to reduce the waste that otherwise would result.

Commercial fishers also often catch creatures other than fish, with fatal results. For some creatures, such as sea turtles, capture may endanger their species' very survival. Here, too, advances in fishing technology are helping, but regulators must pay increased attention to finding ways to reduce this problem.

**Protection based on size.** Managers may be able to protect some fish stocks by setting regulations based on graduated fish sizes. This approach, taken almost by default, has led to a spectacular recovery of striped bass along the Atlantic coast. At one time, this population had become deeply depleted, and reproduction rates had fallen precipitously. But one year, environmental conditions arose that favored the survival of eggs and larvae and led to a slight bump in the number of young fish. After much rancor and debate, federal fisheries managers forced states to cooperate in shepherding this class of juveniles to adulthood. They did this primarily by placing a continually increasing limit on the minimum size of fish that fishers could keep. Over the course of more than a decade, the limits protected the fish as they grew and, ultimately, began reproducing. The limits also protected fish hatched in subsequent years, and they, too, grew into adulthood. This simple approach—protecting fish until they have had a chance to reproduce—did

more to recover a highly valued, highly sought species than all of the complex calculations, models, and confused politics of previous management efforts.

**Subsidy reform.** The federal government provides various segments of the fishing industry with major subsidies that have resulted in a number of adverse consequences. Improperly designed and sized subsidies have propped up bloated and overcapitalized fisheries that have systematically removed too many fish from the seas. Of course, some subsidies will remain necessary. But in most cases, subsidy amounts should be reduced. Also, many subsidies should be redirected to support efforts to develop cleaner technologies and to ease the social pain that fishers and their communities might face in adopting the improved technologies.

**Ecologically integrated management.** Perhaps the worst mistake of traditional fisheries management is that it considers each species in isolation. For example, simply focusing on how much herring fishers can take from the ocean without crashing herring stocks does not address the question of how much herring must be left to avoid crashing the tuna, striped bass, and humpback whales that feed on herring. Management regulations must be revised to reflect such broader food-web considerations.

**Sustainable aquaculture.** During the past quarter-century, many nations have turned increasingly to aquaculture to supplement or even replace conventional commercial fishing. Although not at the head of this effort, the United States offers various forms of assistance and incentives to aid the development of the industry. But fish farming is not a panacea. Some operations raise unsustainable monocultures of fish, shrimp, and other aquatic species. Some destroy natural habitats such as marshes that are vital to wild fish. Some transfer pathogens to wild populations. Some pollute natural waters with food, feces, or pesticides necessary to control disease in overcrowded ponds and pens.

As the nation expands fish farming, doing it right should trump doing it fast. Generally, aquaculture will be most successful if it concentrates on raising smaller species and those lower on the food chain. Fish are not cabbages; they do not grow on sunlight. They have to be fed something,

and what most fish eat is other fish. Just as the nation's ranchers raise cows and not lions, fish farmers should raise species such as clams, oysters, herring, tilapia, and other vegetarian fish, but not tuna. Farming large carnivores would take more food out of the ocean to feed them than the farming operation would produce. The result would be a loss of food for people, a loss of fish to other fisheries, and a loss to the ocean. Done poorly, aquaculture is as much of a ticking time bomb as were overcapitalized fisheries.

### **Working together**

Given the magnitude of the problems facing the nation's commercial fishers and fisheries, the various stakeholders must draw together. Although some recent experiences may suggest otherwise, fishers and scientists need each other in order to succeed. Fishers might lack the training to understand the scientific techniques, especially data analysis, that underpin improved management tools, and scientists might lack the experience required to understand the valid concerns and observations of fishers. But without more trust and understanding, adversarial postures that undermine wise management will continue to waste precious time as resources continue to deteriorate and communities and economies suffer. This need not be the case.

Similarly, fishers, fishery managers, and scientists should work together to better inform the public about the conditions and needs of the nation's fishing industry and fish stocks. Consider the example of marine zoning. The less people understand about fishing, the more they insist that closed, no-take marine reserves are the answer. Similarly, the less people understand about conservation, the more they insist that traditional methods of fisheries management, which typically ignore the need for reserves, are adequate tools for protecting fish stocks. As in many other areas, knowledge breeds understanding—and very often solutions.

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