

Options for Managing Maine's Fisheries

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We follow Commissioner Alden's interview with two perspectives on fisheries management prepared by University of Maine faculty, Ralph Townsend and Jim Wilson. Townsend discusses the historic evolution of fisheries management as well as more current trends toward co-management in Maine's groundfisheries. Looking at successful experiences with co-management, he wonders whether current efforts in Maine's lobster industry will be successful without tackling the tough issue of access limitation.

Jim Wilson counters Townsend's concerns. The current policy course set by Commissioner Alden is based on an approach to fisheries management which redefines the sustainability problem as an ecosystem problem. Wilson argues that, within this new paradigm, questions such as "how, when, and where" to fish (or not fish) are much more central than species-specific quota setting, and that these questions not only change the rules under which co-management is implemented but also may improve fisheries management in ways that quota systems have failed, that is the long term conservation of species and habitats.

Traditional Fisheries Management

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Introduction

Fisheries have been an integral part of Maine's history and its economy. Although fisheries have declined in relative importance to Maine's economy (fisheries products now account for about 2 percent of Maine's gross state product), these industries continue to be central to Maine's image as a maritime state. As the interview with Commissioner Robin Alden suggests, Maine seems on the verge of making fundamental changes in how its fisheries are managed. A complex set of forces, many beyond Maine's direct control, require a rethinking of Maine's historic strategy of limited interference in its fisheries. Where Maine will end up after this historic transformation is not at all clear.

A History of Fisheries Management

General acceptance of the idea that marine fisheries require management has occurred quite recently in historic terms. That other renewable resources, such as forests and agricultural resources, require human regulation has been recognized for a much greater part of history. Two factors tended to work against the idea that marine fisheries should be managed. First, the oceans seemed so vast that it was plausible to believe that marine resources were essentially unlimited. Second, even if marine resources required management, management of marine fisheries was an inherently difficult task. The activity of fishing occurs on individual boats far from the shore. Unlike land-based resources, where boundaries could give an owner dominion over a well-

defined set of resources, the use of the ocean was difficult to regulate. Until the 1970s, all of the marine resources beyond a 3- or 12-mile territorial sea was open to exploitation by anyone in the world. The idea of property rights which worked for land-based resources did not easily transfer to the sea.

For many marine fisheries, unregulated harvesting was a plausible, even reasonable, approach for hundreds of years. As long as fishers relied upon the unpredictable and risky power of the wind, human society rarely was able to seriously overfish a marine resource. (An early exception was whales, which were particularly vulnerable to overharvest.) But with the coming of steam power and internal combustion engines, fishers pursued fish over wider and wider areas with boats that increased in size and fishing power. By the early part of the twentieth century, traditional fishing grounds off Europe and North America were showing signs of over-fishing. After World War II, mechanization of fishing vessels accelerated and large industrial fleets began to fish down stock after stock around the world.

In the 1970s, coastal countries began to extend their jurisdiction to 200 miles. The Magnuson Fisheries Conservation and Management Act declared a 200 mile “exclusive economic zone” for the U.S. In areas such as Georges Bank, the exclusion of foreign trawlers created an opportunity for a major expansion of the domestic fishing fleet. This bonanza did not last long, however. Soon it became apparent that domestic boats were just as capable of overharvesting as were foreign boats.

Concepts of fisheries management existed long before passage of the Magnuson Act. Formal theories to explain overfishing had been developed by biologists working in the 1930s through the 1950s. These theories indicated that the appropriate solution to overfishing was to limit total catches to the “maximum sustainable yield.” Biologists used data from scientific studies and from catches to predict what amount of fish could safely be taken from the stock of fish. The basic idea was to limit catches to no more than the amount by which the stock of fish grew each year. Biologists urged governments to set limits on fishing, called “total allowable catches” or “quotas.” Many governments enacted such limits and some fisheries seemed to be preserved by such limits.

Biologists also developed theories to explain why it was desirable to regulate fishing gear to harvest selectively. By using larger mesh in nets or using larger hooks, fishing gear would tend to capture larger, more slowly growing fish and let smaller, more rapidly growing fish escape. Biologists also argued for fishing closures in certain fisheries, as when fish are heavily concentrated on spawning grounds.

But problems became apparent even in some fisheries that were managed by quotas. Some stocks continued to decline even though quotas were in place. Some of the problems were political. Governments did not always enforce quotas to which they had agreed. Sometimes governments disregarded the advice of scientists and set higher quotas in response to political pressures. And a peculiar problem became apparent in a large number of fisheries subject to quota management. Even though catches were limited, more and more fishers entered the fishery. As more fishers pursued a fixed allocation, quotas were exceeded and fishing had to be halted. And as more fishers continued to enter, fishing seasons had to be closed earlier and

earlier each year. In some fisheries, the seasons became a few weeks or even a few days of frenetic competition for the fixed quota.

While this behavior defied explanation at face value, it could be explained by classic economic theory. Fishers continue to enter as long as it is profitable to do so. Consider, for example, 100 fishers who are catching the total quota and earning a net income of \$100,000 per year. Assume that there are another 10 people who know how to fish and who are earning \$35,000 per year at a shore-based job. Those ten people will decide to enter the fishery, even though they will not increase the total catch (which is limited by the quota). By entering they will reduce the catch and income of the fishers already in the fishery, but they can expect to earn much more than \$35,000. In fact, if there are a large number of potential fishers who all earn \$35,000 per year at some other employment, then entry will be attractive as long as income from fishing is higher than \$35,000 per year.

By the 1960s, an economic solution to this dilemma had been proposed. It entailed setting limits on the number of fishing permits issued, an approach known as “limited entry.” Beginning in the late 1960s, some governments began to implement this approach. In some fisheries, limited entry seemed to have the desired effect of stabilizing fishing effort. And, as economists had predicted, the right to fish gained an economic value. The fishing permit that gave fishers the right to fish was a new kind of property, something like the right to use a piece of land, and this property had value and yielded profits.

But, like quotas, limited entry developed problems (Townsend, 1990). Governments often issued many more fishing permits than were warranted. And individual fishers started to build bigger and more powerful boats. It was profitable for each fisher to use the fishing permit on a larger, more powerful fishing vessel in order to catch more fish. In fisheries with over-all quotas, this increased fishing power would catch the available fish in shorter periods. The ever-shorter seasons reappeared. In fisheries without quotas, this increased fishing pressure often resulted in overfishing.

As these problems became clear in the 1970s, another approach to management was proposed. It divided the annual quota into pieces and gave them to individual fishers. If each fisher received an “individual quota,” then the fisher could not increase his or her catch by building a bigger boat. Each fisher would have an incentive to catch the assigned catch at the lowest possible cost, in order to maximize the economic profit. Moreover, if these quotas were transferable, then fishers could trade quota in order to minimize the overall costs. Many economists today support the idea of “individual transferable quotas” or “ITQs.” ITQs have often had exactly the predicted effect: fishers sold their quotas to other boats, so that the total cost of catching the quota was reduced substantially. Rather than continuing the intense short fishing seasons, owners of ITQs tended to catch fish over a much longer season, in order to avoid the low prices associated with gluts on the market.

ITQs have proved to be a very valuable right. In many fisheries, the cost of leasing quota for a single fishing season was 50% or more of the landed value of the catch. That is, if a pound of fish sold for \$4.00, then fishers would pay \$2.00 for the right to use someone else’s right to catch that pound of fish in that year. And if the permanent right was sold (rather than leased), the sales price might be 10 to 20 times the annual lease price.

The reduction in fishing effort was good news to many economists. Very large values of ITQs reflected the value of the stock of fish and the reduced costs of fishing. Just as a piece of land that could produce a very valuable crop at low cost would be very valuable, so too was a stock of fish an asset that could yield large annual returns. While governments historically have simply given away fishery resources, the markets in ITQs indicated that these resources were extremely valuable. A typical open access fishery that landed \$100 million of fish might be able to generate an implied lease value of \$50 million per year. Clearly, public policy based upon the assumption that these were resources of only marginal economic value had to be re-assessed. Many biologists also supported ITQs because they reduced fishing effort dramatically, often eliminated the chaos surrounding intense short seasons, and generally made management more orderly.

However, not everyone saw the rationalization of the fishery under ITQs as a benefit. The reduction in fishing effort meant that some former crew members were no longer needed. In areas where fishing was the primary employer, concerns about unemployment were inevitable.

Co-management and self-governance

Today ITQs remain a very controversial idea in most fisheries. For example, the re-authorization of the Magnuson Act (which is currently being debated in Congress) will probably contain a moratorium on new ITQ programs in federally-regulated fisheries. Some opponents of ITQs are proposing management under which fishers collectively are given greater responsibility for decisions. These proposals have come to be known as “co-management.”

The term “co-management” has been used to cover a wide array of actual and proposed approaches to fisheries governance. (See, for example, the cases in Pinkerton [1989].) At one extreme, some proposals for co-management are essentially more formalized consultative arrangements, under which government agencies still retain the final authority. But the co-management proposals for fundamentally different governance of fisheries involve giving real authority to some organized fishers’ group. The fundamental issue in these alternative governance structures is whether effective and sustainable self-governance institutions can replace centralized, command-and-control regulation of fisheries.

There is very limited experience with self-governance of fisheries within market economies. Japan has a complicated system of fisheries governance that includes local cooperative governance of near-shore fisheries. There are some very unique treaty-based relationships between First Nations and national governments, but which are of limited relevance in non-treaty situations. There has been successful communal governance of fisheries resources in many traditional societies with non-market economies, such as reef governance around various Pacific islands. However, most of these communal governance structures have broken down or been seriously stressed when market-oriented fishing began.

There is, however, considerable experience with collective self-governance of other natural resources. These experiences include the common grazing grounds and common forests of Europe and irrigation and water districts throughout the world. There are also extensive common grazing lands and forests throughout the developing world, but these are often stressed by population growth and by the pressures of market-oriented production. The grazing commons of Europe and the irrigation and water districts provide the most interesting cases, because many of

these institutions have functioned successfully for decades or even centuries within market economies.

The lessons from the self-governing commons of Europe are relatively clear. In stark contrast to Hardin's (1968) "Tragedy of the Commons" model, the grazing commons are not in fact open to anyone. (Stevenson [1991] documents these institutions thoroughly.) The common areas, typically summer grazing grounds, are open only to citizens of the village or town. Moreover, villagers cannot put an unlimited number of animals on the commons. Typically, the right to put an animal on the commons is "stinted," or quantitatively defined on the basis of ownership of other real estate. These rights convey with the sale of that land, and are thus a kind of property right. Similar evidence on creation of rights that are well-defined can be found in the experiences of successful irrigation districts in the U.S. and elsewhere in the world.

These experiences with other resources have important implications for successful co-management of fisheries. There is compelling evidence that limiting access to the resource is an inherent part of successful co-management. (Ostrom [1990] provides a comprehensive review and synthesis of this research.) The users of a resource must be able to limit the overall use of the resource to prevent overexploitation. The users of the resource must be able to ensure that sacrifices made today to improve the resource will be repaid to those who made the sacrifices, and not to some group of new entrants. And if resource users are to successfully negotiate a sustainable management structure, there must be a stable set of institutions and players who can work out their differences without the turmoil of constant change in membership and rules.

This is a crucial issue for fisheries co-management. Many proponents of self-governance envision co-management that maintains open access. Co-management is sometimes promoted as a management alternative that can avoid the difficult social issues (i.e., job displacement) raised by ending open access. However there is compelling evidence that successful co-management of fisheries cannot avoid the question of limiting access. To assume that fisheries resources are so fundamentally different as to invalidate this relationship is implausible.

Some case histories of fisheries

It is a mistake to assume that all fisheries are identical or that all fisheries require essentially the same management approach. Successful fisheries management requires an understanding of both the broad lessons that can be learned from other fisheries and also the specifics of individual fisheries. The differences in experiences among fisheries can be illustrated by a few case histories.

Pacific halibut

The fishery for Pacific halibut in Alaska and Canada has gone through an archetypical evolution of management. The U.S. and Canada, acting through the International Pacific Halibut Commission, began setting halibut quotas before World War II. Those quotas were widely credited with preserving the stock of fish. But each year, more and more fishers chased the same quota, and each year the season was shortened. By the 1980s, the seasons were only two to three weeks long. Because so much halibut was landed in a very short sea-son, most of the catch was frozen. (Frozen halibut has a significantly lower value than fresh halibut in the retail market.) In

the 1990s, individual quotas were implemented in both Canada and Alaska. As predicted, individual quotas ended the race to land fish, and fish were once again landed over most of the year. As fish moved from the frozen market to the higher-valued fresh market, average landed price per pound increased from 50% to 100%. The individual quotas proved to be quite valuable; in Alaska, boats were willing to pay up to 70% of landed value to use quota. Also as predicted, fewer boats and smaller crews were used in the less hectic individual quota fisheries. The crews that did fish, fished longer and earned larger annual incomes from fishing. The total income to crews was roughly the same as before ITQs. (Note that this meant that the crew share of landed value declined substantially, because landed values increased.) Individual quotas benefited some crew, while reducing total crew employment. And the political dimensions of the problems of allocating ITQs are also clear. Alaska's Senator Stevens and Representative Young, who chair the Senate and House committees with fisheries jurisdiction, seem prepared to accept a moratorium on new individual quota programs in the reauthorization of the Magnuson Act. Constituent pressures almost certainly had some influence on their positions.

New England groundfishery

For many observers, the problems with the New England groundfishery illustrate the limitations of the current version of the Magnuson Act. The New England Fishery Management Council was created in 1976 by the Magnuson Act. One of the earliest actions of this Council was to impose quotas for cod, haddock, and yellowtail flounder, three of the major species caught by the groundfish trawler fleet on Georges Bank and in the Gulf of Maine. These quotas were never effective, in part because the National Marine Fisheries Service never committed the resources necessary for effective enforcement. The Council abandoned quota management in 1981 in favor of management based upon larger mesh sizes. But then the Council failed to follow through with the increases in the mesh size that would have been required to protect stocks. Only after the Conservation Law Foundation filed suit did the Council finally move towards reducing fishing effort.

The bleak outlook for this fishery is widely known. Stocks are at historical lows. Most of the U.S. section of Georges Bank has been closed indefinitely. The Council has adopted rules that will close entry and will reduce fishing days per vessel by 50%. Even with these drastic measures, recovery of the stocks may not be insured. And there have been the inevitable efforts to allocate blame for this situation. The majority of the Council members are either heads of state fishery agencies or public members from the fishing industry. Critics of the council process point to the resultant pro-industry bias as one of the inherent limitations. The Council and the regional office of the National Marine Fisheries Service often were antagonists, rather than collaborators, in the process of managing groundfish. Each has blamed the other, and both have blamed the inherently cumbersome regulatory structure imposed by the Magnuson Act and various federal procedural statutes. But critics of New England's particular problems point out that the other seven regional councils, which operate under the same rules, have avoided the morass that seems to plague the New England Council in groundfish (and also in scallops).

Maine lobsters

As Commissioner Alden pointed out, the crisis in the New England groundfishery is not typical of the status of fisheries in Maine. Currently, for example, Maine's lobster fishery is enjoying record landings. The level of exploitation of Maine's lobster fishery is very high; it is among the most intensively fished stocks in the world. Biologists have long predicted, to their embarrassment, that this very high level of fishing pressure would ultimately lead to a collapse of lobster catches. Maine's lobster fishery has been protected by a ban on capturing egg-bearing females, by a minimum size, by a maximum size, and by trap design rules that permit escapement of sub-legal lobsters. These rules on selectivity seem to have protected the lobster stock despite intense fishing pressure. Historically, Maine has also had informal, local rules that partially limited who could fish. Maine has now enacted legislation that incorporates local decision-making, and which would seem to move Maine towards a more intrusive regulatory strategy. Maine's willingness to consider more restrictive regulatory regimes at this time is driven at least in part by concerns over possible federal intervention in lobster regulation and in part by the fear of a domino effect of displaced boats from federally-regulated fisheries moving into lobsters.

Maine sea urchins

Maine's sea urchin fishery seems destined to repeat the boom-and-bust cycle of urchin fisheries around the world. Sea urchins are harvested for their roe (eggs) and the entire output is sold to Japan. In a fishery that did not exist ten years ago, sea urchin landings are now second in Maine only to lobsters in total value. But the last two years have seen the symptoms that have signaled imminent collapse in urchin fisheries elsewhere: declining total landings, smaller urchins with lower roe yields, and pursuit of urchins into deeper waters that yield lower quality urchins. Faced with these signals, Maine initiated a moratorium on new entry and reduced the fishing season slightly. Despite these steps, many observers fear a full-scale collapse.

These fisheries illustrate the diversity of experience seen in fisheries. There are fisheries, like Pacific halibut, that fit the biological and economic theories perfectly; there are fisheries like lobsters that seem to defy some of these theories and show great stability; there are highly unstable fisheries like urchins. And this diverse experience is further complicated by the inherent limitations and uncertainties in our understanding of the marine environment. This diversity and uncertainty creates fundamental problems for the political process of fisheries management. In a political process, the ability to illustrate one's view by "telling stories" can be as compelling as scientifically-tested evidence. Given the diversity of experience in fisheries, almost any viewpoint can find support in anecdotes from particular fisheries.

The choices for Maine

The pressures on Maine's fisheries are likely to continue. The value of seafoods can be expected to continue to increase. Increases in population and in the demand for high quality food have propelled a 200% increase in the real (after inflation) value per pound of Maine's seafood products between 1960 and 1985. Price growth has slowed during the recession of the late 1980s and early 1990s, but there is every reason to expect at least slow growth in real prices of seafood. Higher prices will mean more potential for profits and more interest in fishing.

The worldwide trend toward limited entry and ITQs will also put pressure on Maine's fisheries. There is already evidence that fishers displaced from the seriously depleted groundfish and scallop stocks of the Georges Bank and the Gulf of Maine are turning to Maine fisheries like lobsters and shrimp. And Maine social values have tended to think of the fisheries as an employer of last resort. If the trend towards a growing economic gap between the well-educated and the not-so- well-educated continues, economic pressures may push the economically alienated back to fisheries.

The advice that traditional fisheries management would offer to Maine's policy makers is clear. Maine should move toward ITQs where ITQs are enforceable, and should move towards limited entry and effort controls where ITQs are unenforceable. For fisheries like sea urchins, where the number of buyers is small because the ultimate market is Japan, ITQs would be enforceable and appropriate. For fisheries like lobsters, which can easily be sold in small lots to restaurants and to consumers, ITQs are probably unenforceable. Therefore, traditional management would advise limited entry and trap limits at levels that are well below current levels.

If Maine followed this conventional advice, it is certain that the lease value of ITQ rights and limited entry rights per year would be at least 50% of landed value. That is, Maine's \$250-\$300 million of fisheries landings could be expected to have a lease value of \$125-\$150 million. (To put this figure in some perspective, this is about 8% of the annual state budget, or roughly the amount the state spends on all its institutions of higher education.)

Maine will certainly not follow this advice. That efficient management of fisheries could yield very large economic benefits to a relatively poor state is seemingly irrelevant to state fisheries policy. The philosophy under-lying fisheries management in Maine has historically: (1) been based upon open access; (2) required broad consensus among the affected fisheries interests for enactment of any rules; and, (3) been modestly influenced by biological evidence. Moving to a philosophy that emphasizes efficient use of marine resources is simply inconsistent with this historic philosophy. But one could read into the recent lobster legislation a shift in management philosophy that accepts the need for more activist regulation, but which proposes self-governance as the basis for governance changes.

The general outline of Maine's seeming approach to co-management has some sound elements. Starting the process in the lobster fishery, where the tradition of informal social controls provides a favorable environment, maximizes the chances for success. Moving slowly, by limiting the scope of the problems initially allocated to local lobster councils, seems similarly wise. If the lobster councils do succeed, then this context will certainly be beneficial in other fisheries.

But Maine's effort at co-management has not confronted a fundamental challenge. Many supporters of the lobster co-management approach clearly believe that open access can be largely preserved. As discussed above, this is simply inconsistent with the evidence from co-management experience elsewhere. Co-management cannot avoid confronting the need to limit access if it is to be successful. And any limitation on access will raise the ancillary question of the economic value of the right to fish. Through co-management, fishers and their communities may perhaps be able to reduce the negative impacts on existing social institutions. And the decisions under co-management may be more acceptable than decisions imposed from Augusta.

But co-management is not a silver bullet that will avoid the unpleasant decisions that will accompany an end to open access for fisheries.

Conclusions

Maine, like the rest of New England, has been very slow to adopt the fishery management approaches that have become common in the rest of the world and even in the U.S. Maine would like to think that the traditional fisheries management options of quotas, limited entry, and restrictions on fishing effort are all avoidable.

Maine is perhaps willing to consider co-management as a vehicle towards greater control over fishing activity. The exact meaning of co-management remains vague in this context, as it does elsewhere. But it does seem that Maine is proceeding on the flawed assumption that co-management can side-step the difficult question of limiting access to the resource. This assumption is inconsistent with the experience in self-governance in a wide array of other resources. If Maine really wants to stay on the co-management path, it will ultimately have to face this fundamental issue.

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