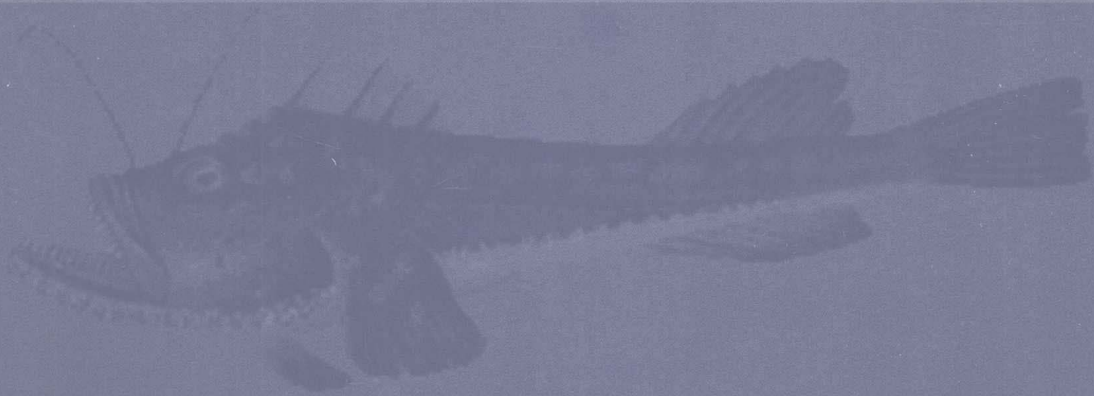
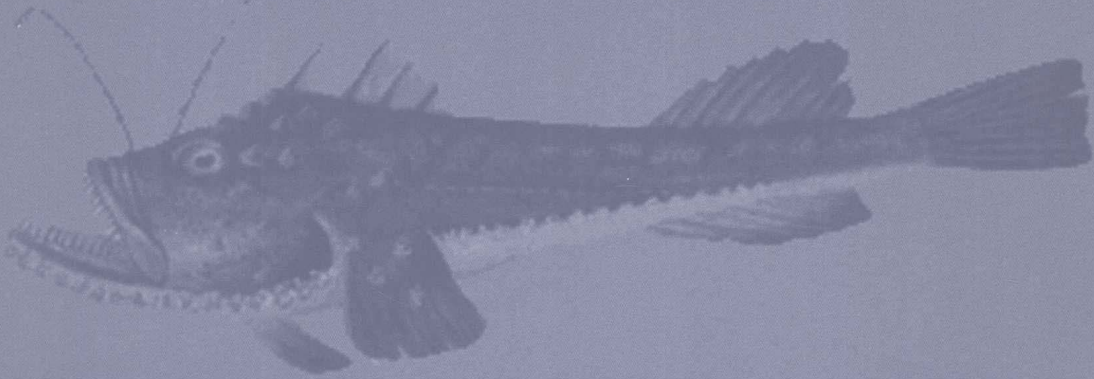


# From Abundance to Scarcity

A History of U.S. Marine Fisheries Policy



*Michael L. Weber*

From  
**Abundance**  
to Scarcity

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# Preface

In 1995, Peter Fricke of the National Marine Fisheries Service (NMFS) asked if I would be interested in writing a history of the agency and its predecessors back to 1940. This history was to accompany a similar history by Theodore Whaley Cart, whose thesis described federal involvement in marine fisheries between 1870 and 1940. Taken together, the two histories were to help the NMFS celebrate the 125 years that had passed since the U.S. Fish and Fisheries Commission was formed in 1870. I accepted the challenge and set about compiling background materials.

It is difficult for me to explain the pleasure I derived from reading annual reports in the Department of the Interior's library. Agency annual reports sound like dull stuff, but for me, they offered a glimpse into the way that political leaders then portrayed their world to the public and to other political leaders. There were times that an annual report startled me, as when I first read of Interior Secretary Stewart Udall's dream of powering coastal upwellings of nutrients with power from submerged nuclear power plants! Much of what I read helped in explaining how we have come to where we are in managing uses of marine wildlife.

Reconstructing the history of the NMFS, created by presidential order in 1970, was somewhat more difficult, for a simple reason: In the early 1980s, the agency ceased issuing annual reports. I do not know what paltry budget savings were generated from stopping the preparation and printing of those reports, but halting a tradition that stretched back more than century presented real difficulties for me as a historian. Fortunately, my career inside and outside the NMFS over the previous two decades gave me some advantage in reconstructing the period after the agency's annual reports ceased.

When I realized that the NMFS was not going to publish my history, I approached Island Press in 1997. About that time, Island Press was showing greater concern about marine issues. Dan Sayre was interested in my proposal, but asked that I reorganize the material thematically rather than chronologically. I happily agreed to do so.

As I set about reorganizing the material I had collected, I became more curious about the people behind the decisions that I read about in reports. So, I began a new line of research. By the time I completed my second round of research, I had interviewed dozens of people both inside and outside government who had been involved in key turning points pertaining to government policy on marine wildlife. I owe a special debt of gratitude to the following people who took the time to share with me their experiences and their insights: Lee Alverson, Lee Anderson, Henry Beasley, E. Curtis Bohlen, Gene Buck, Ken Coons, David Crestin, Lee Crockett, Jim Crutchfield, Scott Dickerson, Roland Finch, William Fox Jr., Peter Fricke, Spencer Garrett, Congressman Wayne Gilchrest, William Gordon, John Grandy, Eldon Greenberg, C. Wolcott Henry III, Ken Hinman, Suzanne Iudicello, Bob Jones, Milton Kaufman, Andy Mager, Roger McManus, Rod Moore, Bruce Morehead, Bill Mott, Paul Paradis, Frank Potter, G. Carleton Ray, Lewis Regenstein, Wendy Rhodes, Richard Roe, Carl Safina, Christine Stevens, Michael Sutton, Lee Talbot, John Twiss Jr., Stanley Wang, Jack Wise, Missy Wittler, and Nina Young.

I should note that I have worked with many of the people whom I interviewed for this book. While at the Center for Marine Conservation from 1980 to 1990, I worked closely with staff there and in other conservation organizations. I also worked with several people at the NMFS, in other agencies, in Congress, and in the fishing industry. From 1990 to 1994, I served as a special assistant to Bill Fox when he was director of the NMFS. In that position, I worked with agency staff, some of whom I interviewed for this book.

Both while at the Center for Marine Conservation and after I began working as a freelance writer in 1994, I worked under contract to some of those I interviewed and received funding for projects from the Munson Foundation and the David and Lucile Packard Foundation, among others. I neither sought nor received funding for writing this book other than the modest amount provided by Island Press.

I did not personally know many other interviewees, whom I contacted based on referrals by others or on my own research. It is fair to say that all my interviewees were authorities in their areas. Whether or not I had tangled with them in the past on this or that policy issue, they all were gracious and open in expressing their views and their recollections. Remarkably, only a few people from whom I requested an interview did not respond.

Many of those whom I interviewed also provided me with materials from their personal files that were enormously helpful. Others who provided information include W.T. Olds, Kate Naughten, and staff at the libraries of the

National Oceanic and Atmospheric Administration and the Department of the Interior.

I also benefited from comments on early drafts of individual chapters. For this, I wish to thank Henry Beasley, Bill Mott, Suzanne Iudicello, Terry Young, and William Schrank. Midway through the project, Peter Fricke generously reviewed the entire manuscript. Finally, Todd Baldwin at Island Press provided me with comments that were concise, challenging, and a sure guide for revising the manuscript. Todd's suggestions on reorganizing the manuscript were particularly valuable in establishing the book's themes. Whatever errors or causes of confusion may remain are entirely my responsibility.

MLW

Redondo Beach, California

# Introduction

There is a new fish just beginning to appear in the markets around where I live. That is to say, it's not a new fish at all, but one that's been nosing about in Atlantic waters from New Foundland [sic] to North Carolina ever since fish began. However, we had not paid it any mind until the price of our usual fish became so astronomical that our fishery people began looking more carefully at their catch.

. . . Its looks are against it, however, and that is probably the reason we've not seen it in our markets here. The trouble is with its head, which is enormous, with a wide mouth full of vicious teeth, and it has a body that tapers abruptly from neck to tail. So dreadful is its appearance thought to be that even in France the fish is always sold without its head. . . .

At any rate, monkfish is what I saw the other day at my fish market—for the first time ever, and so very much cheaper than cod, haddock, sole, swordfish. Not many people know it around here, I was told by the proprietor. . . . As soon as word gets around, though, there will be demands for it, and it will be shipped all over the country, not just to Europe.

Thus did Julia Child introduce monkfish (*Lophius americanus*) to American cooks in a May 1979 article published in *McCall's* magazine. The path-breaking chef, who revolutionized American eating and cooking habits in the 1960s and 1970s, later cooked a 25-pound monkfish on her television program.

"By mentioning monkfish on her show, she introduced it to America. *Time* took a picture, and that's her power. She could take an underused item and after one show, monkfish takes off and it's still popular 20 years later," George Berkowitz of Boston's Legal Sea Foods commented to a Boston Globe reporter in 1997. French restaurants and home cooks in the United States took Julia Child's advice, and market demand for monkfish grew in the late 1970s and early 1980s. The average price that New England fishermen received for monkfish jumped from 35¢ per pound in 1978 to 60¢ in 1981.

As in other marine fisheries in the United States and elsewhere, catching and marketing monkfish soon outstripped understanding and management of the fishery.<sup>1</sup> Within 15 years of Child's article, monkfish populations off New England joined a growing list of overexploited marine wildlife populations.

For many years, New England scallop dredgers and trawlers had caught monkfish, but discarded most of them because there was no market for them. Although Atlantic coast fish markets sometimes sold monkfish as "the poor man's lobster," most monkfish landed in New England were exported to Europe where chefs considered it a delicacy. Government programs helped U.S. fishermen enter European markets for monkfish, as they had done earlier with other species such as skates and dogfish, which had attracted little interest among U.S. consumers.

The rise in monkfish prices, the decline in catches of cod, haddock, and several flounder species, and the National Marine Fisheries Service's (NMFS) promotion of monkfish as an "underutilized" alternative to groundfish caused New England fishermen to take a second look at monkfish in the late 1980s. Trawl fishermen, scallop dredgers, and gillnetters began targeting monkfish. The fishery caught fire in 1987, the year after exvessel prices in New England reached a peak of \$1.29 per pound, more than twice the level just two years before. New England landings of monkfish alone nearly tripled from 2,053 metric tons in 1986 to 5,928 metric tons a year later.

In the late 1980s, average prices paid to fishermen for monkfish received another boost when exporters began supplying Japanese sushi bars with monkfish livers. By 1992, fishermen caught enough monkfish to supply processors with 322 tons of monkfish livers, for which they were paid an average of \$3.66 per pound. During the winter months, fishermen could receive as much as \$13.56 per pound for the pinkish-orange organs. The rise in prices for livers made it financially sensible for fishermen to land monkfish that dealers would have rejected before the market in livers developed.

The fishery might have cooled in the 1990s had the U.S. government not successfully removed trade barriers to South Korean imports of monkfish from the United States. Working through the World Trade Organization, trade representatives from the NMFS, the lead federal agency for marine fisheries management, received approval for the import of frozen monkfish by container load without the involvement of intermediaries. In 1995, Korean importers paid U.S. exporters \$2.5 million for 734 metric tons of monkfish.

The growing foreign demand for monkfish kept prices strong and attracted heavier fishing effort. By 1997, landings of monkfish from Maine to the Car-



olinas reached their peak of 27,967 metric tons, more than  $2\frac{1}{2}$  times the 10,000 metric tons of catch that scientists believed the fishery could take over the long term. Between its 1979 American debut and 1999, monkfish catapulted from 21st in value to 3rd in value among New England fisheries.

But the expansion of the monkfish fishery came at a tremendous biological cost. By 1996, monkfish populations had dropped to their lowest levels since NMFS annual trawl surveys had begun in 1963. Younger and smaller fish dominated catches, as larger, older fish were removed. In some years, the appearance of large groups of young monkfish from successful spawns encouraged more exploitation. The idea of allowing populations to rebuild themselves never caught on.

Part of the problem was that the decision to increase fishing required no justification other than market prices, but the decision to manage, in contrast, required a crisis. Until 1996, the burden of proof fell on those proposing restraints on the growth of fisheries. The presumption that fisheries were sustainable reflected a widespread belief in the limitless bounty of the oceans that found broad support in the scientific community as late as the 1970s. In comparison, little attention was paid to the numerous cases in which individual fisheries were fished out in a race to capitalize on new markets.

The monkfish fishery was under the jurisdiction of the NMFS, but the real power to manage it rested with regional fishery management councils. The lack of unequivocal scientific evidence of decline discouraged fisheries managers at the New England and Mid-Atlantic Fishery Management Councils from beginning to develop a management plan for the monkfish fishery until 1991. By 1994, a working group formed by the New England Fishery Management Council had developed alternative management schemes that proposed more management than fishermen wanted, but that would not end overfishing.

In 1996, after many meetings and public hearings, the councils proposed an amendment to the groundfish management plan intended to bring the monkfish fishery under some control by early 1998. But the complexity of the fishery led to great complexity in the management measures. Not only did some fishermen use different kinds of fishing gear to catch monkfish for market, but also, other fishermen incidentally caught monkfish that they might sell or discard. Each group of fishermen would have to be managed somewhat differently. Equitably allocating catch among these different types was fraught with controversy.

In this sad but common saga, developers, processors, marketers, and fishermen influenced the growth of the fishery far more than fishery managers. Man-

agers adapted slowly to the growing threat of overfishing, while marketers responded with frightening speed and ingenuity. As NMFS administrators and members of the New England and Mid-Atlantic Fishery Management Councils wrestled with conflicting interests, viewpoints, proposals, and legal requirements, marketers sensed an opportunity in the pending restrictions on monkfish catches. In March 1999, a major supermarket chain in California devoted an entire page in an advertising supplement to monkfish. The advertisement noted that monkfish had become so popular that “catches have to be sharply limited.”<sup>2</sup> For this supermarket chain, which distinguished itself by offering “rare tastes,” the pending restrictions on monkfish catches were good news, since consumers were likely to pay more for a fish that apparently was becoming rarer every day.

### *The Management Paradox*

In the last several decades of the twentieth century, in response to such catastrophes as befell the monkfish, Congress amended the country’s principal marine fisheries law, the Magnuson-Stevens Fishery Conservation and Management Act, to require that each of eight regional fishery management councils overseen by the NMFS adopt definitions of overfished populations and overfishing in each of their fishery management plans. Based upon those definitions, the NMFS was required to determine in which fisheries the rate of exploitation jeopardized the capacity of a fishery “to produce the maximum sustainable yield on a continuing basis.”<sup>3</sup>

In its report for 2000, the NMFS was unable to determine the status of more than 600 of the 905 fish populations within the geographical areas of the eight regional fishery management councils. Some of these species were the targets of major fisheries. For example, of 47 rockfish species caught by groundfish fishermen along the Pacific coast, the status of 37 was unknown. More generally, of the 287 fish populations that accounted for the vast majority of landings in the United States, 56 were overfished. In some overfished fisheries, excessive levels of exploitation continued, including yellowtail flounder (*Limanda ferruginea*) and summer flounder (*Paralichthys dentatus*) in the mid-Atlantic, queen conch (*Strombus ginas*) in the Caribbean, snappers and groupers in the South Atlantic, reef fish in the Gulf of Mexico, and several species of tuna, billfish, sharks, and swordfish in the Atlantic, as well as monkfish in New England and the mid-Atlantic.

Some overfished fisheries developed differently than the monkfish fishery.

For instance, some grew without the involvement of some participants mentioned earlier. Sometimes, it was the government (not chefs or retailers) that triggered the growth of a fishery. In other cases, the development of new fishing gear allowed fishermen to catch species that previously could not be caught economically. But with few exceptions, fishery managers became involved in fisheries well after investment, product development, marketing, and other activities were under way.

Thus, the story of the monkfish is not an isolated one. In fact, it is in many ways emblematic of the paradoxical nature of U.S. fisheries management agencies because they work to conserve fisheries even as (and usually after) they encourage their expansion. The pattern could first be seen as early as the nineteenth century, when the U.S. Fish and Fisheries Commission was founded by Spencer Fullerton Baird under the auspices of the Smithsonian Institution to resolve scientific issues surrounding a dispute over groundfish catches. The original functions of the fish commission (and its successor agencies) were to study the fish in U.S. waters, study fishing methods, compile statistics, and propagate food fish.

After Baird's death in 1887, Congress turned the fish commission into an independent agency and severed most of its ties with the Smithsonian Institution. In February 1914, the functions of the commission were placed in the Bureau of Fisheries in the new Department of Commerce and Labor. Management of the fur seal hunt on the Pribilof Islands in the Bering Sea also was transferred to the new Bureau of Fisheries from the Department of the Treasury. In April 1939, the Bureau of Fisheries, together with the Department of Agriculture's Bureau of the Biological Survey, was transferred to the U.S. Department of the Interior as part of Presidential Reorganization Plan No. II.

Under Reorganization Plan No. III of June 1940, the Bureau of Fisheries was merged with the Bureau of the Biological Survey to form the Fish and Wildlife Service in the Department of the Interior. This organization of federal fisheries activities persisted until Congress passed the Fish and Wildlife Act in 1956, which established the U.S. Fish and Wildlife Service with two bureaus: the Bureau of Commercial Fisheries and the Bureau of Sport Fisheries and Wildlife. Management responsibility for cetaceans and pinnipeds was given to the Bureau of Commercial Fisheries, while the Bureau of Sport Fisheries and Wildlife received responsibility for sea otters, manatees, and walrus.

Concern over the competitiveness of U.S. maritime industries and marine research capabilities grew in the 1960s, culminating in the formation of a commission on U.S. ocean policy and government programs. In 1969, the Com-

mission on Marine Science, Engineering, and Resources, which came to be called the Stratton Commission after its chairman (Julius Stratton) issued a report called *Our Nation and the Sea*. Besides thoroughly reviewing U.S. ocean activities, the report made dozens of recommendations. Among the most significant of these recommendations, the Stratton Commission called for the consolidation of most federal ocean activities in an independent agency, modeled somewhat after the National Aeronautics and Space Administration. When the Nixon administration acted in 1970, it did not entirely accept the commission's recommendation. Instead of creating an independent agency, Executive Order 11564 established the National Oceanic and Atmospheric Administration (NOAA) in the Department of Commerce. Most functions of the Interior Department's Bureau of Commercial Fisheries and marine programs of the Bureau of Sport Fisheries and Wildlife were transferred to NOAA's National Marine Fisheries Service (NMFS).

This reorganization of ocean agencies resulted in separate federal management systems for marine, freshwater, and anadromous wildlife. The NMFS was given responsibility for marine fish and shellfish, while the U.S. Fish and Wildlife Service in the Department of the Interior was made responsible for federal management of freshwater fish and shellfish. The two agencies were to share management of anadromous species of fish.

The executive order also divided jurisdiction over marine mammals between the NMFS and the U.S. Fish and Wildlife Service. Under the executive order, the Bureau of Sport Fisheries and Wildlife, which had been responsible for the conservation and management of sea otters, Pacific walrus, polar bears, manatees, and dugongs, remained in the U.S. Fish and Wildlife Service. The Bureau of Commercial Fisheries, which had been responsible for other marine mammal species, was moved to the NMFS. This split jurisdiction was intended to be a temporary arrangement, but plans by the Nixon administration to create a single Department of Natural Resources that would have included all wildlife management were never fulfilled.<sup>4</sup> The temporary arrangement became permanent, and the conflict between conservation and commercial exploitation was thus left unresolved.

### *The Geography of Jurisdiction*

Geographical jurisdiction of the various levels of government over marine wildlife was more stable than the organization of government agencies, al-

though it presented a different set of tensions. Until the 1970s, state governments held jurisdiction over marine wildlife within state waters, which extended 3 miles offshore, except off the Gulf coasts of Florida and Texas, where the seaward boundary was 3 marine leagues (9 nautical miles) offshore. Beyond territorial waters lay the high seas, where nations were free to do as they wished, except as international agreements might constrain them.

Until passage of the Magnuson-Stevens Act, the only marine fisheries that the federal government actually managed were in the territories, principally Alaska and Hawaii. Otherwise, management of fishing was left in the hands of the individual states or of international commissions such as the International Pacific Halibut Commission and the International Whaling Commission.

Lack of coordination was a persistent problem in the management of fisheries that straddled state boundaries. In an attempt to address this problem, Congress established a compact among Atlantic coast states under the Atlantic States Marine Fisheries Commission in 1940. Congress granted similar authority for a compact among Pacific coast states in 1947 and among Gulf of Mexico states in 1949. In 1962, Alaska and Hawaii were added to the Pacific States Marine Fisheries Commission. In the 1980s, failure of middle-Atlantic states to adopt measures for the conservation of striped bass led Congress to authorize the federal government's imposition of a moratorium on fishing for striped bass in the territorial waters of any state that did not adopt the measures proposed by the Atlantic States Marine Fisheries Commission. This authority was later broadened to other shared fisheries in territorial waters.

Fisheries management also was influenced by international competition. In an early effort to protect domestic fishermen from foreign vessels, President Harry S. Truman issued a proclamation in 1945, claiming that the United States had the right to establish special conservation zones on the high seas adjacent to the territorial sea. In these zones, the United States would unilaterally adopt conservation measures if negotiations with foreign nations fishing there failed to reach an agreement.

In 1966, growing concern about the activities of large foreign fishing vessels just beyond state waters led Congress to extend U.S. fisheries management jurisdiction in a so-called contiguous zone between the territorial sea and 12 miles offshore. This action created a management vacuum since Congress did not extend state jurisdiction into the contiguous zone, nor did it provide clear authority for federal agencies to manage fishing in this zone.

By the early 1970s, when the United Nations launched negotiations for a new Law of the Sea, many countries were pressing for international sanction of

fisheries jurisdictions to 200 miles offshore. In 1976, long before the United Nations negotiations concluded in 1982, Congress passed the Fishery Conservation and Management Act. (Later, this legislation became better known as the Magnuson-Stevens Act, reflecting the important roles that Alaska Senator Ted Stevens and Washington Senator Warren Magnuson played in the legislation.) The legislation asserted U.S. jurisdiction over marine fisheries in a fishery conservation zone that extended from territorial waters to 200 miles offshore. By an executive order issued in 1982, President Ronald Reagan renamed this zone the Exclusive Economic Zone, or EEZ, making U.S. terminology consistent with international practice under the United Nations Law of the Sea.

Today, the overlapping of jurisdictions is stable, but still offers the possibility of conflict. As with the tension between conservation and exploitation, the differing agendas of local, national, and international interests have profoundly shaped U.S. marine fisheries policy.

### *From Abundance to Scarcity*

Since the establishment of the U.S. Fish and Fisheries Commission in 1870, federal policy on marine fisheries has reflected prevailing assumptions about the predictability and abundance of marine wildlife populations. Until the 1990s, federal policy and practice were generally based on the belief that the ocean's productivity was almost limitless and could be manipulated for maximum production and utilization. The chief goal of policy was to increase the capacity of U.S. fishing fleets to exploit this abundance. Fishing was assumed to be sustainable in the absence of significant evidence that it was not.

Although passage of the Magnuson-Stevens Fisheries Conservation and Management Act of 1976 marked a federal policy departure in other respects, it continued previous policies that promoted the expansion of exploitation. Indeed, the first 15 years after passage of the Magnuson-Stevens Act saw an unprecedented expansion of fishing capacity and catches by U.S. fleets.

By the 1990s, the collapse of the New England groundfish fishery and the decline of other fisheries in the United States and abroad reinforced shifts in assumptions that had first emerged in the 1970s regarding marine mammals and endangered species. Scientists no longer predicted that the oceans would yield 400–500 million metric tons annually. (Global catches had never exceeded 90 million metric tons.) Rather than viewing the ocean as endlessly productive and predictable, many scientists saw limits and uncertainties that traditional man-

agement had regularly ignored. Rather than using uncertainty as a license to expand exploitation, they insisted that the benefit of any doubt should go to conservation. Policy makers began to recognize that, rather than being limited by the size of fishing fleets, catches now were limited by the amount of fish.

Rather than abundance and predictability, marine wildlife populations seemed to be characterized by scarcity and uncertainty. This history of federal fisheries policy revolves around these two themes of abundance and scarcity.<sup>5</sup>

As described in chapter 1, scientific research was at the root of federal involvement in marine fisheries, although research that could aid in management of fisheries seldom received much support. Rather, the focus of research became location of new fish populations for U.S. fishing fleets. In the 1960s, predictions of almost limitless catches and scientific management of fisheries laid the basis for three decades of government effort to boost the exploitation level of the country's marine wildlife.

Increased catches were prevented by an absence of consumer demand and a lack of capacity to catch and process fish, as described in chapter 2. With passage of the Fish and Wildlife Act in 1956, the federal government launched consistent efforts to assist the fishing industry in overcoming these obstacles through product and technology development, marketing, and financial assistance.

The prevailing belief that humans could manipulate natural systems for maximum production precipitated the burst of dam construction in the Pacific Northwest that began in the 1930s. Chapter 3 describes how the construction of dams and the decline of salmon runs were hastened by assurances from aquaculturists and engineers that the damage from dams could be overcome through technology. In the 1950s and later, less dramatic forms of habitat destruction attracted the government's attention, but federal fisheries agencies were given little leverage to combat those losses.

In the first decade after World War II, the United States entered into several international agreements that aimed at promoting conservation and maximum utilization of marine fisheries. Like most other such agreements, the International Commission for Northwest Atlantic Fisheries (ICNAF), designed to manage fisheries in the northwest Atlantic, suffered major shortcomings. Chapter 4 describes the failure of ICNAF to control foreign fishing off New England in the 1960s and the failure of United Nations negotiations to arrive at a new international law of the sea. These failures contributed to passage of the Magnuson-Stevens Fishery Conservation and Management Act in 1976.

Chapter 5 reviews the federal government's limited role in the management of marine fisheries before the Magnuson-Stevens Act. Until 1976, the federal gov-

ernment's role was largely advisory to the states. Passage of the Magnuson-Stevens Act marked a major change in policy. The complexity of the management system created by the act, weak conservation standards, a pervasive lack of critical information, and the focus of government and industry on expansion of domestic fishing led to weak management of domestic fisheries. By the late 1980s, the New England groundfish fishery was showing unmistakable signs of overfishing.

While some scientists were predicting virtually limitless catches from the oceans in the 1960s, other scientists began urging greater caution and reliance on an ecosystem perspective. At the same time, animal rights activists and others began campaigning to end commercial whaling, which had decimated several great whale populations. As described in chapter 6, U.S. policy on whaling changed rapidly in the late 1960s, leading to the end of U.S. commercial whaling and a campaign for a global moratorium.

Chapter 7 describes the growing concerns of both government and the general public regarding the environment in the late 1960s and early 1970s. Although federal fisheries agencies were concerned about the impacts of pollution, Congress provided them with little authority to counteract the growing problem. At the same time, a campaign by animal rights activists overcame opposition in government agencies and the scientific community and led to passage of the Marine Mammal Protection Act (MMPA) in 1972. In a strong expression of the precautionary approach, which calls for erring on the side of conservation when faced with uncertainty, the MMPA prohibited "taking" marine mammals, with a few exceptions, unless it could be demonstrated that no harm would be done to a population. The legislation placed the NMFS at odds with its traditional constituents—the fishing industry.

In the 1980s, continued campaigning by animal rights advocates and conservationists led to the end of the United States's own fur seal hunt and to a global moratorium on commercial whaling. Chapter 8 describes how activists also pressed a reluctant NMFS to reduce both the drowning of dolphins in tuna nets and the drowning of endangered and threatened sea turtles in shrimp trawls.

Chapter 9 describes the growing recognition of the consequences arising from having to rely on poor information in managing fisheries and their impacts on ecosystems. After a lawsuit by conservation organizations nearly halted many U.S. fisheries, Congress adopted a mechanism for applying the precautionary approach to restrictions on the capture of marine mammals in fisheries. Internationally, the United Nations applied the precautionary approach in calling for an end to high seas drift net fishing, and explicitly included the approach in a treaty on international fisheries adopted in 1995.



The decade after passage of the Magnuson-Stevens Act was marked by rapid expansion of U.S. fleets, growing numbers of overfished fisheries, and economic decline and destructive competition among fishermen. With varying degrees of commitment and success, fishery management councils struggled to overcome these threats to fisheries. As described in Chapter 10, the decline of the New England groundfish fishery in the late 1980s triggered the involvement of conservation organizations that had formed their views in campaigns for marine mammals and endangered species. In 1996, these organizations and some fishermen's organizations succeeded in forcing a major reform of federal fisheries policy through the Sustainable Fisheries Act.

The book's conclusion begins by revisiting management of the Atlantic monkfish fishery, and then reviews the performance of the NMFS, the fishery management councils, and Congress in implementation of the Magnuson-Stevens Act. It discusses the introduction of new values into federal marine fisheries policy by the conservation community, and describes the emergence of international trade and the use of economic sanctions and consumer boycotts in influencing global standards of conduct. Finally, the conclusion reviews recent efforts to reduce fleets that expanded after passage of the Magnuson-Stevens Act and argues that reduction of fleets is the single most important challenge facing reformers.

## *Notes*

1. As used in this book, the word fishery sometimes refers to an exploited population of fish. At other times, it refers to "the interaction between some kind(s) of fishermen using some kind(s) of fishing gear to catch some kind(s) of fish in a certain area during a certain time," in the words of Jack Wise. Fishery management has to do with the latter definition.
2. From a March 1999 advertising supplement of Pavillions supermarkets.
3. 16 U.S.C. 1802 (29).
4. More confusing was the situation with sea turtles. Hours of negotiations led to an agreement that the NMFS would be responsible for sea turtles while in the water. The Fish and Wildlife Service retained authority over management activities while sea turtles were nesting or hatching on land.
5. This book focuses upon fisheries policies and practices that the NMFS and its predecessors carried out, particularly since World War II. Little is said about policies and programs regarding freshwater fisheries, which NMFS's predecessors pursued. Furthermore, the following discussions emphasize policies and practices regarding commercial fisheries, since these dominated the concerns of federal agencies throughout the history of federal involvement in marine fisheries.