

A COMPARISON OF GROUND FISH MANAGEMENT ON
THE EAST AND WEST COASTS OF THE UNITED STATES

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ABSTRACT

The groundfish fisheries of the Atlantic and Pacific coasts of the US are valuable economically and ecologically. The industries in the two locations have faced depleted stocks and increased regulations by the New England and Pacific Fishery Management Councils over the years. Both fisheries contain a varied array of demersal fish in separate ecosystem contexts, and similar gear types are used in both locations. However, the community and geographical structures, composition and interactions of the Fishery Management Councils, industry organization, and activism create a different historical perspective with which to view management failures and successes. In New England, factors such as a greater value of independence, a lack of cooperation and coordination between stakeholders and scientists, and a longer history of fishery decline have contributed to the current management climate. The Pacific groundfishery has experienced a more recent illumination of overexploitation, but there is a longer history of cooperation between states, fishermen, and scientists. In addition, differences in the Pacific Fishery Management Council structure and process have created a distinct management picture. The management measures enacted by the two councils since the implementation of the Magnuson Fishery Conservation and Management Act have differed, but neither has been successful—as evidenced by overexploited stocks. Recently, both fisheries management plans have undergone changes in response to the declines and subsequent lawsuits by stakeholder groups. From comparing the characteristics of the two council systems, their methods, and their participants, important lessons can be learned as fisheries management on both sides of the US continues, out of necessity, to evolve.

LIST OF ACRONYMS

CLF	Conservation Law Foundation
DAS	Days-at-sea
FMP	Fishery Management Plan
ICNAF	International Commission for Northwest Atlantic Fisheries
IFQ	Individual fishing quota
ITQ	Individual transferable quota
MFCMA	Magnuson Fishery Conservation and Management Act
NEFMC	New England Fishery Management Council
NGO	Non-governmental organization
NMFS	National Marine Fisheries Service (currently called NOAA Fisheries)
NOAA	National Oceanic and Atmospheric Administration
NRDC	Natural Resources Defense Council
PFMC	Pacific Fishery Management Council
RCA	Rockfish Conservation Area
SFA	Sustainable Fisheries Act
SSC	Scientific and Statistical Committee
TAC	Total allowable catch

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INTRODUCTION

The groundfish fisheries of the Atlantic and Pacific coasts of the US are valuable economically and ecologically, and both locations have faced depleted stocks over the years and increased regulations by their respective Fishery Management Councils. While both locations have faced serious declines in the health and stability of fish populations, the New England and Pacific Fishery Management Councils have recommended varying management strategies, with different programs implemented. Some argue that, as a result of policy and the human ecology of the process, one coast or the other has had greater success in moving towards a sustainable industry. The lessons and experiences of each council may help move the other towards a stronger, healthier fishery.

WHY COMPARE THE TWO?

While these two multispecies fisheries contain a varied array of demersal fish in separate ecosystem contexts, there are several reasons why they are worth comparing. Besides the fact that fishing was important to the economic and social history of both locations, the fact that both *do* manage multiple species is a starting point (Hanna and Hall-Arber, 2000). The New England Fishery Management Council (NEFMC) manages 15 species and 24 stocks of groundfish under its Northeast Multispecies Fishery Management Plan (FMP). These species include cod, haddock, hakes, and flounders, among others, and they often occur in mixed species aggregations (NEFMC, 2003a; NEFMC, 2003b; NMFS, 1999a). Likewise, the Pacific Fishery Management Council (PFMC) manages a varied group, but with a wider number of species. Under the Pacific Coast Groundfish FMP, the PFMC manages over 80 different species including 64 types of rockfish, 12 flatfish, 6 roundfish, and 6 sharks and skates (PFMC, 2003a).

In addition to targeting multiple species, the groundfisheries in both locations use similar gear types. In the Pacific, the trawl fishery is dominant, but troll, longline, hook and line, pots, gillnets, and other gear are used by fishers (PFMC, 2003a). Trawling is the primary gear type in the Northeast fishery, as well, with otter trawls accounting for 81% of total groundfish landings in 2001, followed by gillnets, hook and line, and bottom longline (NEFMC, 2003a). Beyond heterogeneous gear types, both fisheries are marked by a variety of vessel sizes and types, scales of processing, and marketing strategies (Hanna and Hall-Arber, 2000).

Further, the community and geographical structures, composition and interactions of the councils, and industry organization create a different perspective to view management failures and successes. Fishermen and industry workers on both coasts come from diverse cultural backgrounds, socio-economic statuses, and levels of education (Hanna and Hall-Arber, 2000). Geographically, the NEFMC has responsibility over 5 states (Maine, Massachusetts, New Hampshire, Connecticut, and Rhode Island), while the PFMC manages fisheries offshore of three (Washington, Oregon, and California). Furthermore, the New England coastline is marked by many ports and small islands, in contrast to the relatively smooth Pacific Northwest coastline, marked by fewer ports (Hanna and Hall-Arber, 2000). In terms of fleet size, the Pacific groundfishery in 2003 included 498 limited access permits, while there are approximately 1000 in New England (NOAA Fisheries, 2003; NMFS, 2003). These different scales can impact communication and cooperation in management.

This comparison of groundfish management between US coasts comes at a time when that management has apparently failed in many respects, on both sides. The New England groundfishery declined throughout the 1980s and 1990s due to overfishing, with stocks falling to record lows in the 1990s. Since increased management restrictions have been implemented, beginning in 1994, some stocks have increased while several remain at overharvested levels (NMFS, 1999b). By the end of the 1990s, over 70% of Northeast groundfish species were being overexploited (Murawski and Almeida, 2001). Landings and biomass had both declined drastically (Fig. 1).

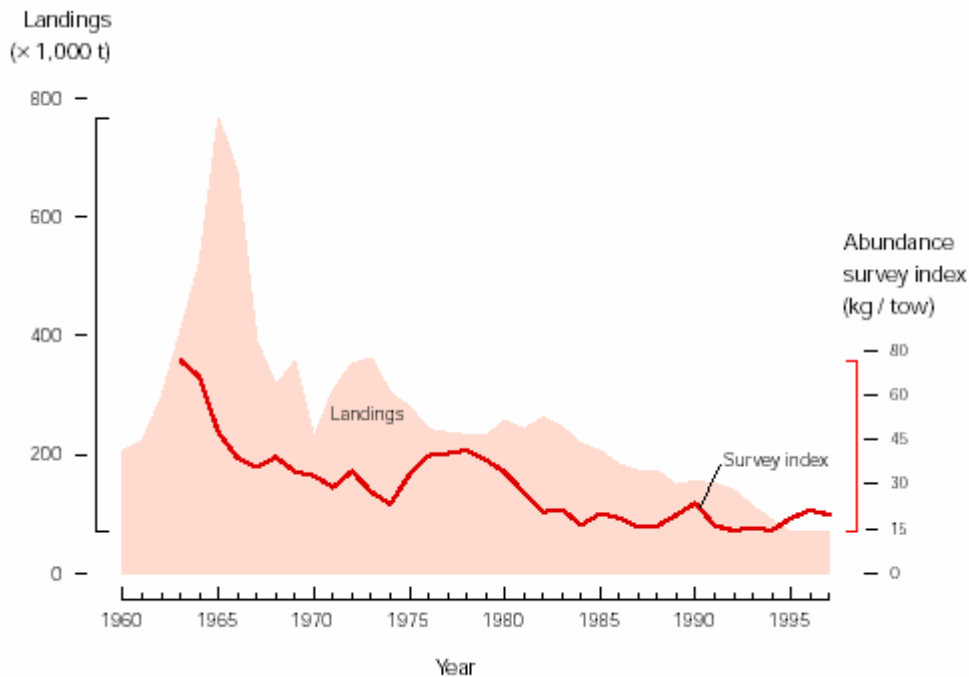


Fig. 1: Landings of principle groundfish and flounders in New England, 1960-1997. (NMFS, 1999b)

In the Pacific, problems of overfishing might not have been apparent as early as in the North Atlantic, but the overall stocks and landings declined in the 1990s (Fig. 2). In 2000, the Secretary of Commerce declared a state of emergency in the Pacific groundfishery (NOAA Fisheries, 2004). The groundfishery there is now under “severe economic pressure” to cope with management requirements to rebuild stocks— National Marine Fisheries Service (NMFS, currently called NOAA Fisheries) has declared nine species of West Coast groundfish overfished (Hanna and Hall-Arber, 2000; PFMC, 2003a). With both FMPs in the process of being amended, it is important to compare the two fisheries and to learn from the management lessons each has to offer.

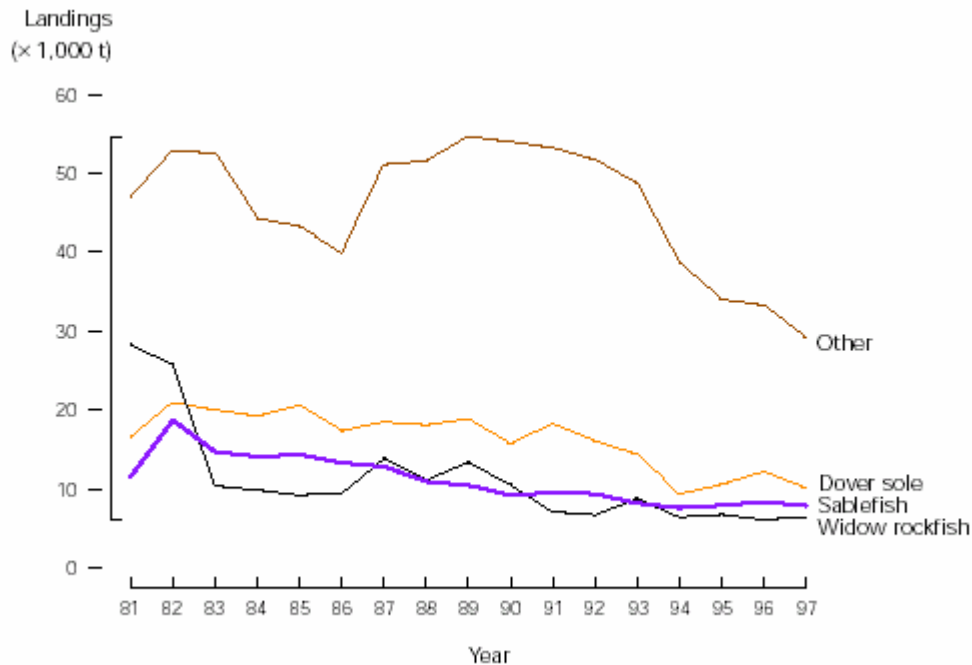


Fig. 2: Landings of Pacific coast groundfish (excluding Pacific whiting), 1981-1997 (NMFS, 1999c)

LEGAL MANDATES

The federal mandates for management of the groundfish industries are the same in both locations, with the same implications for authority and responsibility in management. After WWII and into the 1970s, fisheries on both coasts experienced a marked increase in fishing capacity accompanied by increases in landings and effort by larger, foreign, distant-water fleets. This increase in foreign fishing occurred in both fisheries, but it was more intense in the Northwest Atlantic. By the 1970s, stocks had clearly declined in the Atlantic and there were international conflicts over quotas (Hanna, 2000). This increase in concern over the decline of US fisheries due to foreign fleet harvesting, along with awareness of overexploitation of worldwide stocks and a lack of progress of the Law of the Sea negotiations, led to the passage of the Magnuson Fishery Conservation and Management Act of 1976 (MFCMA) (Cicin-Sain and Knecht, 2000).

The MFCMA introduced four major management features. It established the authority of the federal government to regulate fishing from 3 to 200 miles offshore. It set national standards for fisheries management, including Maximum Sustainable Yield and Optimum Yield, incorporating biological, social, economic, and ecological factors. In addition, it set up a

complex, regional, state-federal system of management, with eight regional fishery management councils. These councils were given the responsibility to craft FMPs for stocks in their regions. However, these councils have no authority under the MFCMA. All FMPs that they author must be approved by the Secretary of Commerce, and therefore the ultimate authority lies with the federal government. The fourth major action was the elimination of foreign fishing out to 200 miles, except under new international agreements. Since 1976, the MFCMA has been amended more than twelve times (Cicin-Sain and Knecht, 2000; Wallace and Fletcher, 2001). Under the act, enforcement of regulations in the federal zone is the responsibility of NMFS, aided by the US Coast Guard (Murawski et al, 1997).

The stated purpose of the MFCMA was one of restoration and conservation. However throughout the 1980s and 1990s fishing pressure continued to increase, as local fishing fleets grew with government investment and loans (Houston et al., 2000). In the 1980s, New England stocks collapsed, and Pacific stocks declined so that total allowable catch (TAC) limits had to be decreased. Thus in the 1990s there was significant public pressure for a change in management. This led to the passage of the Sustainable Fisheries Act (SFA) in 1996, a major amendment to the MFCMA with stronger environmental controls (Hanna, 2000). The SFA called for prevention of overfishing, rebuilding of depleted stocks, designation of Essential Fish Habitat, changes to the FMP approval process, reduction in conflict of interest issues on the councils, and establishment of user fees. In addition, three national standards were added and others were changed, including the modification of maximum sustainable yield by social, economic, and ecological factors and the assessment of management impacts on fishing communities (Cicin-Sain and Knecht, 2000; Hanna and Hall-Arber, 2000).

While the federal legal mandates are the same for both, the Pacific and New England councils have the responsibility to craft individual FMPs. In the Pacific, groundfish are managed under the Pacific Coast Groundfish FMP (PFMC, 2003a). In New England, the regulations come under the Northeast Multispecies FMP (NEFMC, 2003a). Both of these plans have been amended multiple times.

METHODS

I examined management measures and the players in the groundfish management process on the two coasts, primarily through an analysis of peer-reviewed literature and information and documents from the federal government and the regional councils. To gain further information on perceptions of different stakeholder groups as well as a more current perspective from those close to the issues, I spoke with former council members and a former government administrator, fishermen, and environmental advocates from the two coasts. I included the comments and views of these seven people as personal communications in the analysis.

NEW ENGLAND

The New England Fishery Management Council (NEFMC) manages 15 species and 24 stocks of groundfish under its Northeast Multispecies Fishery Management Plan (FMP). These species include Atlantic cod, haddock, yellowtail flounder, winter flounder, windowpane flounder, witch flounder, American plaice, redfish, pollock, white hake, Atlantic halibut, ocean pout, silver hake (whiting), red hake, and offshore hake (NEFMC, 2003a). These multiple species of fish are thought to be interdependent, but three principle species are commercially sought after: cod, yellowtail flounder, and haddock (Hennessey and Healey, 2000). The groundfish species mingle on the ocean floor, and all have different body shapes, sizes, and ages at maturity; this makes targeting a single species with gear a difficult task, often resulting in discards (Hall-Arber and Finlayson, 1997; NMFS, 1999a). Historically, most US groundfish vessels caught fish from Georges Bank, the Gulf of Maine, and southern New England. Most groundfish caught in this area are marketed in the US (Murawski et al., 1997).

After the implementation of the MFCMA, the groundfish stocks continued to decline. Post-1977, US landings of principle groundfish and flatfish (cod, haddock, redfish, silver hake, pollock, and red hake) increased, reaching 218,000 tons in 1980. Landings then declined by 50% to reach 108,000 tons in 1994, with the sharpest drop in 1985 followed by a more gradual decline (Murawski et al., 1997). The groundfishery was supported by cod stocks on Georges Bank and in the Gulf of Maine in the 1980s to the early 1990s. But according to Murawski et al. (1997), “the Gulf of Maine cod stock is markedly depressed and remains overexploited,” while “the Georges Bank cod stock is very small relative to historical levels.” Haddock, pollock, witch flounder, yellowtail flounder, and other groundfish species all followed similar patterns of exploitation and decline (see Fig. 1, p3) (Murawski et al., 1997). As landings declined and increasingly strict management measures were enacted, effort shifted from traditional species to other species. Fishers now pressured species like white hake, monkfish, spiny dogfish, and skates—all of which are not included in the Northeast Multispecies FMP. As of 1997, the monkfish stocks may have already been depleted (Murawski et al., 1997). In an analysis of biological considerations, environmental factors, species interactions, and fishing impacts, Sinclair and Murawski (1997) concluded that the major reason for the decline in groundfish in the Northwest Atlantic is “persistent recruitment overfishing.”

As a general rule, until 1994, groundfish populations decreased. After lawsuits and stricter regulations in the mid-1990s some stocks appear to have begun to recover (Fig. 3). In the face of stock declines and stricter management, harvesting and processing sectors have experienced declines in employment since the 1980s. Buybacks of permits and vessels in the late 1990s further decreased the number of people participating in the fishery (Murawski et al., 1997). However, many stocks remain at overfished levels. Some have estimated that fully rebuilding groundfish stocks could require “a decade or more of highly restrictive management measures; fishing mortality rates will have to be kept at or near zero for many stocks” (Sinclair and Murawski, 1997). The interactions of human players have shaped the management strategies that the NEFMC has enacted, making tradeoffs between biological and socio-economic objectives.

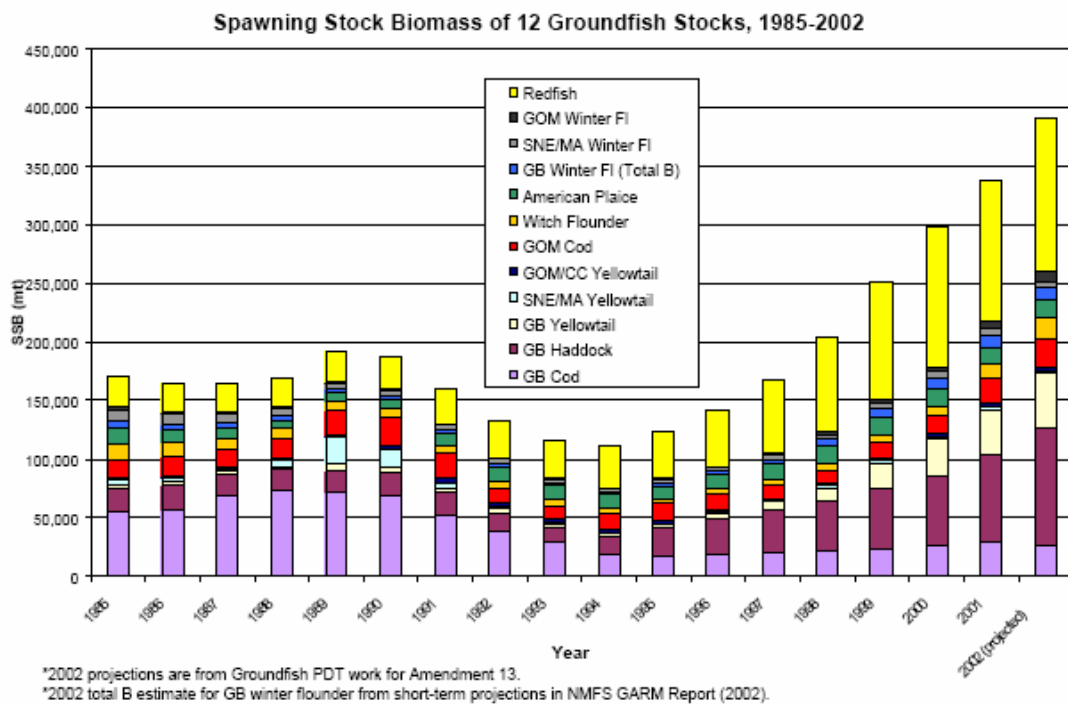


Fig. 3: Biomass of groundfish stocks in New England, 1985-2002. (NEFMC, 2004)

In this section, I will explore the different human players in the groundfish management process in New England. Through an examination of the historical context, cultural ethics, and

political exchanges, the management timeframe becomes clearer. Finally, I will describe current and potential future trends in management.

HUMAN ECOLOGY OF THE POLICY PROCESS

While the groundfish industries in New England and the Pacific fall under the same legal mandates, the FMPs are different because of their unique circumstances and interactions of constituents. One way to view the interaction of players in coastal public policymaking is to look at the “cultural ecology” of the system (Fig. 4). This view looks at the relationship between policymaking, human behavior, and non-human components to a system (Orbach, 1995). In this section, I will examine the various human players in the New England groundfish policy process, beginning with fishermen.

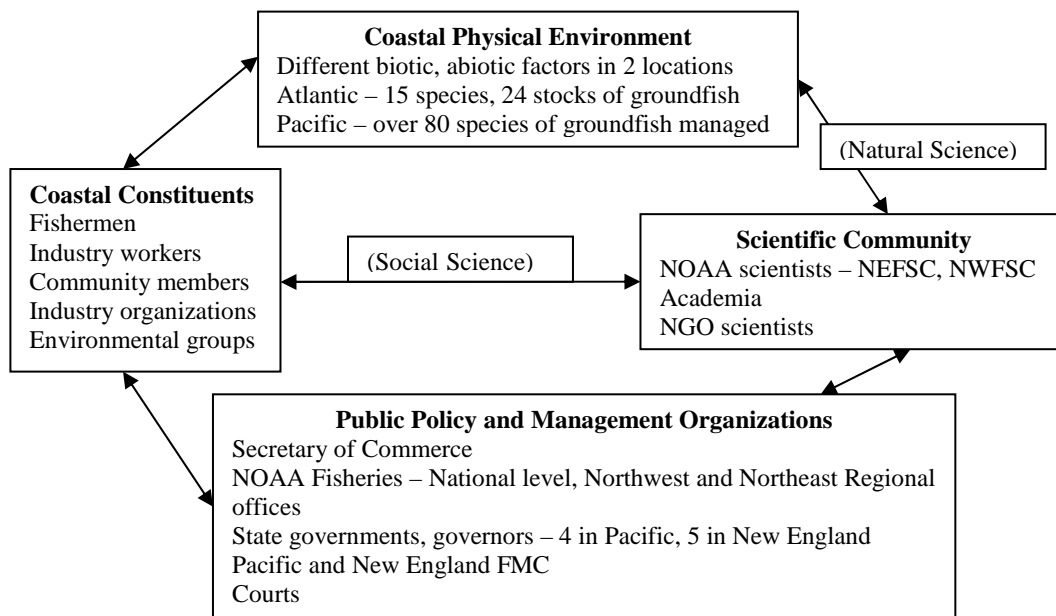


Fig. 4: Cultural Ecology Diagram (adapted from Orbach)

Fishermen

The New England fishers tend to be focused on individual autonomy (Hanna, 2000). This historical value has shaped their attitudes towards fishery management since the MFCMA. According to Hennessey and Healey (2000, p203), in the 1980s the industry “attacked anything that got in the way of their open and unfettered access to the resource.” In the early years of the

regional council system, New England fishermen were part of a culture that fostered “fighting off the feds” (A. Rosenberg, personal communication, 22 March 2004).

While they are individualistic, fishermen are often aligned by state or local community, and there are many small fishing ports in the region (Hanna and Hall-Arber, 2000). In addition, there tend to be stronger ethnic associations among fishermen in New England (Hanna and Hall-Arber, 2000). According to Hall-Arber (2000), immigrant populations with strong fishing heritages settled in many coastal areas in New England, which strengthened bonds in some cases and divided them in others. Today the three major ports in New England can be tagged by the predominant ethnic identification of fishers—“Yankee” in Portland, Portuguese in New Bedford, and Italian in Gloucester (Hall-Arber and Finlayson, 1997). Kinship remains an important aspect of the New England fishery; many fishermen work with or do business with relatives (Hall-Arber and Finlayson, 1997).

Trawls are the dominant gear type, but fishers use handlines, longlines, and gillnets (Hall-Arber and Finlayson, 1997). Their vessels usually range in size from 30 to over 100 feet long. Small-boat captains tend to be more opportunistic, and they are often able to shift gears according to the market and species availability. Smaller vessels tend to dock at smaller ports and fish closer to shore than the larger boats. In New England, most vessels are owner-operated rather than corporately-controlled (Hall-Arber and Finlayson, 1997).

Once foreign fishing was eliminated and stocks continued to decline, the perceived threat to fishermen switched from the foreign fleet to the threat of quotas being allocated to other groups of fishers in terms of location or gear type. This “internal threat” prevented the alignment of fishermen with common objectives (Hanna, 2000). According to Hall-Arber and Finlayson (1997), in the current groundfish crisis, fishermen often claim their gear is the most ecologically sound and accuse other fishers of hurting the resource. In addition, fishermen with smaller catches often argue that the bigger boats that catch the most fish should bear a greater burden under regulations.

Dick Allen (pers. comm., 12 March 2004), who served on the NEFMC from 1986 to 1995, agrees with this assessment. Before the 200-mile limit, fishermen were not competing in the political or regulatory arena. They had a slew of common causes to fight against, like offshore oil development and high insurance rates. After the 200-mile limit was imposed, fragmentation between the groups resulted. Fishers’ willingness to participate in management

declined, and groups of fishers did not work together as much. According to Allen, fishermen in New England are still not aligned with each other, and as a result, management decisions end up being allocation decisions. Divisions by gear type, geographical area, and vessel size are particularly visible. According to a director of a Maine non-profit organization and former fisherman, many large boat organizations “have the money to have lawyers and lobbyists in the room all the time. Small boat guys haven’t been able to play the game” (C. Pendleton, pers. comm., 12 March 2004).

All of these factors play into the divided nature of the New England groundfishery, in terms of goals, competition for quota, and communication.

New England Fishery Management Council (NEFMC)

The NEFMC has the authority to create management measures for the 15 species and 24 stocks of groundfish under the Northeast Multispecies Fishery Management Plan (FMP), which must then be approved by the Secretary of Commerce. The NEFMC has direct control over three other FMPs besides groundfish (Hanna et al., 2000). The NEFMC is composed of 22 total members, a combination of voting or non-voting and appointed or assigned seats (Fig. 5). The voting members include the regional administrator of NMFS, who in New England works at the Gloucester Regional Office, and state officials or their designees from Maine, New Hampshire, Massachusetts, Rhode Island, and Connecticut (NEFMC, 2003c). According to Rosenberg (pers. comm., 22 March 2004), state directors were very involved in management from the start in New England

NEW ENGLAND FISHERY MANAGEMENT COUNCIL	
22	Total Members:
18	Voting Members
• 1	regional administrator at NMFS (or designee)
• 5	principle state officials (or designee)
• 12	members, nominated by governors and appointed by Sec. of Commerce
4	Non-voting Members
•	US Coast Guard
•	US Fish and Wildlife Service
•	US Dept. of State
•	Atlantic States Marine Fisheries Commission

Fig. 5: Membership of the New England Fishery Management Council (NEFMC, 2003c)

In addition, there are 12 voting members nominated by state governors and appointed by the Secretary of Commerce (NEFMC, 2003c). According to the MFCMA, the Secretary of Commerce “shall, to the extent practicable, ensure a fair and balanced apportionment... of the active participants (or their representatives) in the commercial and recreational fisheries under the jurisdiction of the Council” (Okey, 2003). The NEFMC follows a general trend among all regional councils from 1990-2001, with commercial fishing interests holding the most voting seats, followed by recreational and “other” interest groups. Okey (2003) further notes that within the “commercial interests” group on regional councils, representatives are usually skewed towards larger-scale vessels and corporate interests, while smaller-scale vessels are less represented.

Perceived conflict of interest on the NEFMC can create distrust of motives by the different stakeholder groups—small and large boat fishers, processors, recreational fishers, and environmental advocates, in particular. But this perception of conflict of interest is not universal. Many realize that the structure of the councils set forth in MFCMA explicitly called for representation and involvement by commercial and recreational fishers. Says one former fisherman of the council’s decisions, “Ultimately, there is conflict of interest across the board, and I feel like it all evens out in the end” (C. Pendleton, pers. comm., 12 March 2004). Further, Hennessey and Healey assert that a failure in management of groundfish is not related to any “individual or philosophy,” pointing to several changes in NEFMC membership over the years (2000, p208).

Beyond the total council membership, the NEFMC structure includes several committees. Each member of the council serves on at least one Oversight Committee. These committees exist to examine individual FMPs, and their members meet and make recommendations to the full council. Committees also exist for specific purposes, such as enforcement, capacity, gear conflict, habitat, and marine protected areas. Under each Oversight Committee, there are Advisory Panels and Plan Development Teams. Advisory Panels include scientists, fishing industry and environmental organization representatives, and other individuals. These panel members are selected by the chairman of the particular Oversight Committee, and the Executive Committee approves them. The Advisory Panels’ function is to “provide input and assistance” in the development of FMP measures. The Plan Development Teams consists of scientists and

other experts in biology and management of groundfish species, who act as an “extension of the Council staff” in performing analyses and creating documents. In addition, the NEFMC has a Scientific and Statistical Committee (SSC) and a Social Science Advisory Committee (SSAC), each comprised of scientists in relevant fields (NEFMC, 2003c).

To aid in the council’s operations, the NEFMC has its own staff, headquartered in Newburyport, MA. As of 2004, this staff includes an executive director, deputy director, chief financial officer, office manager, secretaries, public affairs officer, several fishery analysts, a senior biologist, and an economist. The staff is appointed by the NEFMC and assigned relevant duties (NEFMC, 2003c).

Hanna and Hall-Arber (2000) describe the style of management used by the NEFMC as “cultural style” management. In the 1970s, New England was experiencing a decline in stocks after heavy foreign fishing. There was little interaction between states, which had diverse interests and goals, and there was low participation in management by fishers (Hanna, 2000). In New England, there was the sense that the role of the NEFMC was to minimize government interference in fisheries management (A. Rosenberg, pers. comm., 22 March 2004). The industry showed an “ethic of individual autonomy,” emphasizing free competition. The diverse fishermen and states did not come together with a common identity after the MFCMA. Therefore, the council had a simple structure with few formal decision-making processes, and it selectively used science in decision-making until the 1990s. The NEFMC has tended to take a “hands-off approach,” valuing individual flexibility for fishers (Hanna, 2000). This style set the tone for management measures implemented over the past two and a half decades.

In the face of declining stocks and increasingly strict management measures throughout the 1980s and 1990s, the NEFMC meetings were often marked by conflict between managers, scientists, and fishers from various sectors. A former NMFS scientist and later administrator noted that NEFMC meetings were “angrier and more difficult” than in other councils, marked by fighting and even the throwing of objects. Interactions have moved away from such confrontations, but they are still tense, because of “the culture” in New England management (A. Rosenberg, pers. comm., 22 March 2004).

Industry Organizations

The commercial groundfishery has supported a wide range of industries, like gear and vessel companies, salt and ice suppliers, fuel suppliers, docks, processors, transportation, and wholesale and retail markets (Hall-Arber and Finlayson, 1997). Industry groups, including fishermen as well as these other sectors, have historically played a large role in shaping groundfish management in New England. According to Hall-Arber (2000, p47), “The management regime in the Northeast US implicitly recognizes organizations.” Organizations are usually formed around geographic regions, sectors of the fishery (including processors), or gear types. According to Allen (pers. comm., 12 March 2004), there has been an apparent decline in the influence and organization of industry groups over the past twenty years. He perceives less cooperation and fewer organizations and permanent staff members than existed in the 1970s and early 1980s. In the recent Amendment 13 discussion in New England, “there was unbelievably high participation from a couple of groups... but it was not across the board.” Many groups were quiet (C. Pendleton, pers. comm., 12 March 2004). Pendleton also perceived that there is an “extreme amount of anger in the industry, but that anger is not being corralled and focused.” Instead, fishers and industry groups continue to fight among one another.

Elected Officials

State governments, governors, and other elected officials have played a large role in the New England fishery. Governors of the five states have the power to appoint members to the NEFMC (which are then approved by the Secretary of Commerce). They also have the indirect power of making public statements regarding local fisheries and their management. Their statements or silence can create quite different responses from sectors of the industry, depending on their stance on the issues. For example, many small-scale Maine fishermen were disappointed with their governor’s response to Amendment 13. Some fishers felt he should have been more vocal that the impacts on coastal communities in Maine would be too great under the proposed plan. Instead, he said nothing (C. Pendleton, pers. comm., 12 March 2004). In past decades, fishermen possessed a “basic political strength,” which led many New England representatives to resist government involvement in fisheries (A. Rosenberg, pers. comm., 22 March 2004).

Legislative intervention is a tool often used in New England. A former manager stated, “Legislators will pass the laws, and when NMFS does what they think the law requires, they get a letter from legislators saying, ‘That’s not what we meant’” (R. Allen, pers. comm., 12 March 2004). In 1990, Massachusetts congressional leaders pre-empted the council by introducing legislation outlining measures and a time frame for restructuring the fishery (Hanna et al., 2000). More recently, Senator Collins of Maine used the appropriations process to introduce a rider that would block funding by Congress to NMFS for any new management measures under Amendment 13 to the Northeast Multispecies FMP (C. Pendleton, pers. comm., 12 March 2004; R. Allen, pers. comm., 12 March 2004.) Some perceive this as a “stall tactic” to make NMFS go back and reassess impacts on Maine communities, as explained by Pendleton. According to Allen, she had sent staff to multiple NEFMC meetings to voice concerns. The rider went through, but Senator Collins is currently introducing new legislation that would reverse the rider, because she was satisfied her concerns were addressed (P. Brooks, pers. comm., 15 March 2004).

Scientists

Much of the science used by the NEFMC comes from NMFS surveys. Scientific advice is given to the NEFMC after semiannual stock assessment workshops, where data from NMFS surveys, state agencies, and other sources is incorporated. Stock assessments face peer review before reports are given to the NEFMC. The process is overseen by a Steering Committee comprised of the executive directors of the NEFMC and the Mid-Atlantic Fishery Management Council, the Northeast Regional Administrator and a Science and Research Director from NMFS, and the Executive Director of the Atlantic States Marine Fisheries Commission (Murawski et al., 1997). NMFS scientists complete analyses of proposed amendments to FMPs. While historically, NMFS focused on the biology of fish stocks, they have moved towards including economists and social scientists in their staff (R. Allen, pers. comm., 12 March 2004).

In New England, fishermen have expressed a widespread distrust of NMFS science. Distrust of science became an issue as early as 1977 under the first Groundfish FMP, when cod quotas were met in August and the fishery was subsequently shut down; fishermen complained they were seeing lots of cod in their nets, disagreeing with the quota based on historical data (Anthony, 1990).

This distrust persisted in some form at the council level. As of 1990, scientists did not sit at the table with the council members at NEFMC meetings. Even when giving lengthy presentations, they had to stand at a microphone, just like fishers or any member of the public who wanted to express an opinion. “It was just another piece of advice” in the council’s eyes, according to Rosenberg (pers. comm., 22 March 2004). He remarked that there is validity to that—hearing other viewpoints. “But there’s also a lot wrong with that”. It took a long time to get a formal role for science in the council process in New England. Today, disagreement remains between stakeholders on the degree of communication of scientific information. Some believe that the process needs to be more transparent to constituents (Hanna et al., 2000).

The failure of the councils to use industry-provided science exacerbated this distrust of government science by fishermen, as did the recent “Trawlgate” incident, where a trawl used in NMFS’s surveys for two years was found to be mis-rigged (Hanna et al., 2000; Malakoff, 2002). Independent researchers said this error did not have a major effect on survey findings, but fishermen voiced loud concerns about the data (NEFMC, 2003d). Said one in the industry, “I won’t ever get over the trawl mistake” (C. Pendleton, pers. comm., 12 March 2004).

According to Allen (pers. comm., 12 March 2004), fishermen expressed discontent on one other major scientific issue in recent years. In the early 2000s, NMFS raised rebuilding targets to levels of abundance higher than ever in recorded history. “The scientists obviously had some reason to do this, but it became a major point of controversy.”

Some blame scientific uncertainty for the decline in New England groundfish stocks, but others think the science itself was strong. According to Hennessey and Healey (2000, p208), scientific uncertainty *along with* “low credibility of scientists among managers and fishers” lead to the weak influence of NMFS science on the management process in New England. An economist with Conservation Law Foundation (CLF) noted that many believe New England has some of the best science on fisheries in the US, built around strong, long-term data sets. “Their knowledge of the groundfish population, in particular, is very, very good” (P. Brooks, pers. comm., 15 March 2004). Still, fisheries science is an inexact discipline, reliant on sampling.

Environmental Advocacy Groups/Courts

Environmental organizations and advocates have played a critical role in spurring changes in groundfish management in New England, most notably through lawsuits directed at

the Secretary of Commerce. Advocacy groups played an increasing role in fisheries management beginning in the late 1980s.

The Conservation Law Foundation (CLF) spearheaded this effort. When CLF got involved in fisheries management in the late 1980s, it was a new focus area for environmental organizations (P. Brooks, pers. comm., 15 March 2004). CLF was likely the only environmental group looking at fish stocks in New England. In the opinion of Dick Allen (pers. comm., 12 March 2004), who served on the NEFMC from 1986 to 1995, “We can credit CLF for bringing about whatever improvement has been made in New England groundfish regulations. The regulations imposed as a result of their lawsuit have worked to start bringing fish back. This only happened because CLF sued and forced their hand.” In 1991, CLF filed their first lawsuit against the Secretary of Commerce. This was the first time an environmental organization had directly challenged an FMP under MFCMA—14 years after the act was passed. “It was truly a landmark lawsuit,” says Priscilla Brooks (pers. comm., 15 March 2004). At the time, according to Brooks, the lawsuit shocked the industry. But 15 years later, environmental organizations all over the country deal with fisheries management concerns in a collaborative manner.

The interactions of these human constituents—fishermen, the NEFMC, scientists, industry organizations, elected representatives, and environmental advocates and courts—are critical to understanding the management process in New England over the course of the 1980s to today.

MANAGEMENT STRATEGIES

One way of looking at trends in fishery participation and management and their contribution to the decline of groundfish stocks is “Ludwig’s ratchet.” Hennessey and Healey (2000) described the course of groundfish management in New England according to this effect. They stated that

...powerful economic and political interests drive fisheries to overcapitalize and overexploit despite scientific evidence that stocks are declining. When the fishery is no longer economically viable, governments provide financial assistance to minimize economic hardship. When stocks increase there is another rush to invest, and the cycle repeats itself. (p187)

The authors cite four steps to the ratchet effect: the possibility of profit, uncertain science and stock projections, increasing investment in the face of uncertainty, and quick investment but slow divestment in response to changes in fish abundance. This tendency for increasing investment, along with the industry's ethic of individual autonomy and the NEFMC's "cultural style" of management, described by Hanna and Hall-Arber (2000), can be traced through the timeline of groundfish management in New England.

Between 1972 and the passage of the MFCMA, many stocks of groundfish were managed by the International Commission for Northwest Atlantic Fisheries (ICNAF) through catch quotas (Anthony, 1990). These quotas were based on advice and analyses from scientists in many countries. While there were significant problems involving cheating and misreporting, enforcement, and exceeding quotas due to non-selective gear, principle groundfish stocks off southern New England and Georges Bank did increase in abundance from 1974 to 1978 (Anthony, 1990).

The US withdrew from ICNAF at the end of 1976. With the passage of the MFCMA, NMFS and the newly formed NEFMC began to develop a preliminary plan for managing groundfish in federal waters (Hennessey and Healey, 2000). Until the early 1980s, when the New England fishery was continuing to expand, quotas were used as a major management method (Hanna, 2000). In fact, Hennessey and Healey (2000) call 1977 to 1982 the "quota management phase"—a time characterized by complex management, over a hundred changes in regulations, and problems with noncompliance. During this period, the quotas used by the NEFMC were drawn from the ICNAF system (Murawski et al., 1997).

The original 1977 FMP for groundfish, the Groundfish Plan, dealt only with Atlantic cod, haddock, and yellowtail flounder (Anthony, 1990). Catch quotas were the direct mortality control, but closed spawning areas, mesh-size restrictions, minimum fish sizes, and trip limits for yellowtail flounder were also included in the plan. However, the NEFMC made changes in the summer of 1977, adding extra restrictions for specific stocks and sectors. According to Anthony, "these were the beginnings of a plan that became so complicated that it could not be enforced" (1990, p179).

Problems with distrust between fishermen, managers, and scientists arose very early in the process. Even when quotas were divided into quarterly allocations to spread out the catch over the year, fisheries were often closed for parts of quarters (Murawski et al., 1997). Good

year classes of cod and haddock in the first year of management meant that the quotas were reached in mid-summer, and the fishery was closed down by the NMFS administrator. This frustrated fishermen who were seeing many fish in their nets, leading to turmoil in the industry. The NEFMC tended to side with the fishermen's perceptions and not NMFS's estimates; they felt that the scientists were wrong in their recruitment assessments, and they did not consult their Scientific and Statistical Committee (Anthony, 1990). The closures also had uneven effects on groups of fishermen, since the fishery was closed before cod typically moved inshore. At the same time, larger vessel owners claimed the quotas were too low for them to remain in business. Therefore, the management system began to exhibit "powerful distributional effects on harvesters depending on their type of vessel, gear, and tradition" (Hennessey and Healy, 2000, p195). Under pressure from fishing interests, the fishery for all three species was reopened for 45 days in November in an emergency period (Anthony, 1990).

Fishing effort increased substantially under the first FMP. The size of the fleet grew from 825 New England vessels in 1977 to 1423 in 1983 (Anthony, 1990). Most effort was focused on cod, haddock, and yellowtail flounder, but other stocks experienced intense pressure, as well. New electronics increased efficiency, and there was an increase in shoreside infrastructure (Anthony, 1990). Government subsidies—particularly the fishing vessel Capital Construction Fund and the Fisheries Obligation and Guarantee Program—encouraged overcapitalization (Hennessey and Healey, 2000). As a result of this increased pressure, the population of the three principle groundfish species declined by 53% from 1979 to 1982 (Anthony, 1990).

The Groundfish FMP had significant problems with incidental takes and enforcement, in addition to its failure to sufficiently decrease pressure on the stocks, so an Interim Plan was implemented in 1982 (Hennessey and Healey, 2000; Sutinen and Upton, 2000). As the beginning of the "indirect management phase" of 1982-1992, this plan showed a change in focus to input controls such as minimum fish sizes, mesh sizes, and closed areas. However, there was still free entry to the fishery, so overexploitation continued (Hanna, 2000; Hennessey and Healey, 2000). Vessel construction and fleet increases, enforcement problems, political intervention, and "indecisive action" by the NEMFC that ignored scientific evidence of declines all marked this period—essentially an open access situation (Hennessey and Healey, 2000).

The NEFMC submitted a new FMP to NMFS in 1985, but it was rejected by the Department of Commerce in 1986 because it did not sufficiently address overfishing. The Atlantic Demersal Finfish Plan (later called the Northeast Multispecies FMP) was resubmitted by the council later that year with slight revisions, and NMFS partially accepted it under pressure from congressmen (Sutinen and Upton, 2000; Hennessey and Healey, 2000). Several congressional delegates had written a letter to the regional administrator of NMFS, asking him to approve the plan in order to protect jobs in the region, so a “fundamentally flawed” plan was approved (Hennessey and Healey, 2000).

The current Northeast Multispecies FMP was implemented in 1986. Its purpose was to reduce fishing pressure on overfished stocks and promote rebuilding to sustainable levels, and it aimed to reach these goals not through quotas, but a group of indirect measures (Murawski et al., 1997; NEFMC, 2003b). The plan’s main features were minimum size limits of fish, closed areas, and minimum mesh sizes (Hennessey and Healey, 2000). It has been amended over the years as stocks have continued to decline, with several different strategies used. As effort continued to increase, the focus on indirect controls that dominated throughout the 1980s and 1990s failed. Exploitation rates of groundfish stocks reached their highest levels in the 1990s. This led to a series of amendments, beginning in 1994 (NMFS, 1999b).

In Amendment 4, the NEFMC admitted that overfishing was occurring, but did not address the rebuilding requirements of the national standards. Still, NMFS approved the plan. In a “landmark” environmental lawsuit, CLF and the Massachusetts Audubon Society sued the Secretary of Commerce, director of NMFS, and the regional director of NMFS for not preventing overfishing of cod, haddock and yellowtail flounder (P. Brooks, pers. comm., 15 March 2004; Hennessey and Healey, 2000). The plaintiffs won, and in 1991 the parties signed a schedule, supervised by a judge, to develop an amendment to stop overfishing of cod and yellowtail flounder within five years and haddock within ten (Hennessey and Healey, 2000).

Thus began the “effort control phase” of management, according to Hennessey and Healey (2000), marked by limits on days-at-sea (DAS) for individual vessels. Amendment 5 went into effect in 1994, subsequent to the CLF suit, and established a moratorium on new permits, DAS limits, a larger minimum mesh size, larger closed areas, and a requirement for a 50% reduction in mortality over five years (Hennessey and Healey, 2000). In December of 1993, NMFS scientists warned the NEFMC that there should be no fishing on Georges Bank

haddock and southern yellowtail flounder, but the council made no changes. Amendment 7, implemented in 1996, was intended to accelerate the measures of Amendment 5 to reduce fishing mortality by 80% from 1993 levels. The amendment included a 50% reduction in DAS allocated to fishers and increased time-area closures to all gear types (Hennessey and Healey, 2000).

While more and more days-at-sea were taken back from New England fishermen, the federal government offered several assistance programs. In 1994, there were programs for loan restructuring, community planning, job counseling, and others. In addition, \$25 million in disaster aid was used by the Department of Commerce to buy back boats and retire permits (Hennessey and Healey, 2000). Despite this massive effort, overcapacity remains a much-cited problem in the New England groundfishery.

Current Trends in Management

Today, the Northeast Multispecies FMP includes a complicated array of measures: seasonal and year-round closures (such as those in the Gulf of Maine and Georges Bank), gear restrictions, trip limits, limited access through permit systems, and restrictions on the number of days-at-sea (DAS) that a given vessel can fish (NEFMC, 2003b). Current primary measures include DAS, closed areas, trip limits, and target total allowable catches (NMFS, 1999a). From the Interim management plan, compliance with closed areas has been good, because enforcement is relatively easy compared to minimum mesh sizes and other indirect measures. These closed areas also seem to be an effective conservation measure. However, exemptions to these closed areas remain hard to enforce (Hennessey and Healey, 2000). Currently there are several areas of permanent closure (Fig. 6), as well as rolling closures throughout the year.

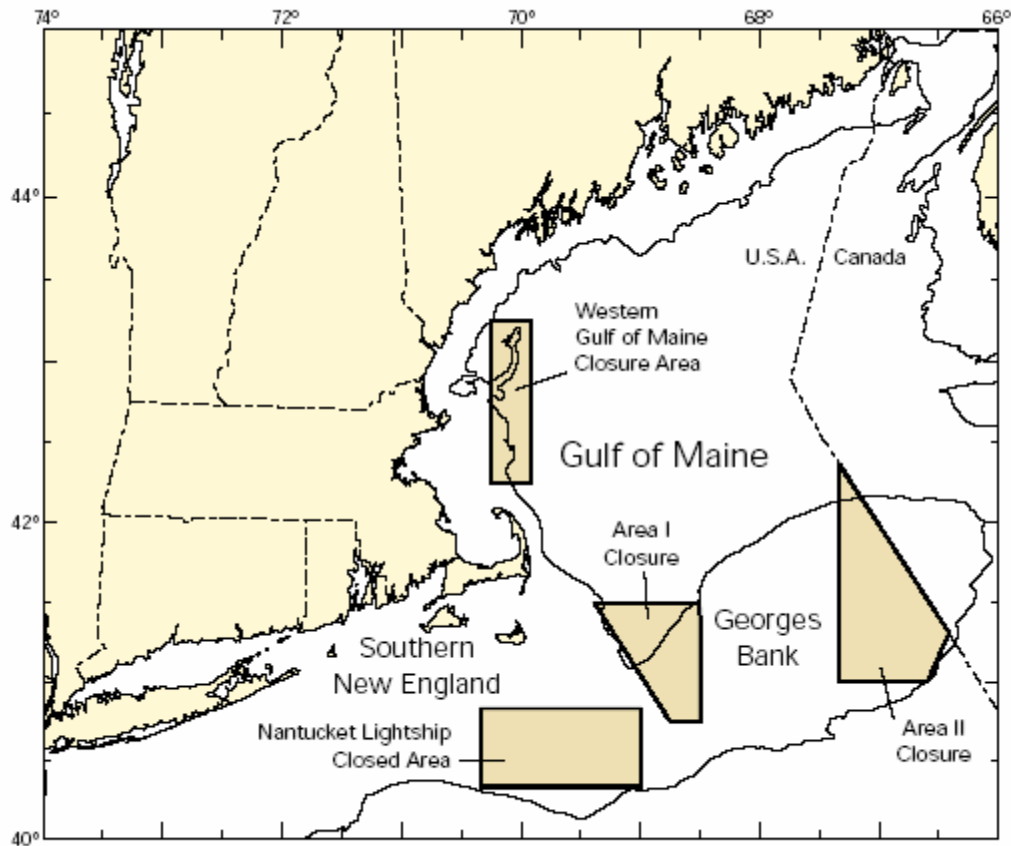


Fig. 6: Closed areas to groundfishing in New England. (NMFS, 1999b)

Still, these measures have not been enough. As the result of another lawsuit by CLF (*Conservation Law Foundation et al. v. Donald Evans et al.*, 2002) and the ruling that NMFS still was not protecting groundfish, a federal judge required Amendment 13. After much public debate, the NEFMC approved Amendment 13 in November 2003 (NEFMC, 2003e; Ortiz, 2003). The accepted alternative was a last minute addition by an industry organization, the Northeast Seafood Coalition, which incorporated elements of the other alternatives set forth by the council (Ortiz, 2003; “Gloucester, Mass., Man...,” 2003). If ratified by NOAA, the plan will be implemented in May 2004. The new regulatory measures are marked by a reduction in DAS, with a certain amount of days (40%) allocated for fishing on healthy stocks only; most fishermen would see a 20% reduction in DAS. Other notable components include special programs to allow targeting of healthy stocks in otherwise closed areas, a separate quota for a hook sector, removal of “excess days” not currently utilized, provisions for DAS leasing, an agreement with Canada for a hard TAC on trans-boundary stocks of cod, haddock, and yellowtail flounder, and

“indefinite closure areas” in the Gulf of Maine and Georges Bank to mobile bottom gear (NEFMC, 2003e).

While the most recent amendment relies heavily on the DAS reductions utilized in the past, the New England fishery may be inching closer to management based on hard quotas. Amendment 13 includes several programs that will rely on hard quota allocations, like the sector allocation and special access programs. “But we’re still a long way off [from hard TACs],” says Priscilla Brooks (pers. comm., 15 March 2004); target TACs are still a primary measure. In addition, there is a trend towards more direct involvement of fishers in management decisions, as well as community-based management. The sector allocation program under Amendment 13, as well as the approval of further exploration of area management, is “a positive step,” according to Brooks (pers. comm., 15 March 2004). She also notes more “creativity” in management in recent years, to allow fisher opportunities to bring in income in “conservation neutral” ways, such as the DAS leasing program.

Still, many think that Amendment 13 is too much for the injured industry to handle. Amendment 13 may be “the breaking point” for many fishermen and communities in New England, according to Pendleton (pers. comm., 12 March 2004). It has also done nothing to repair rifts between sectors of the industry, with some smaller boat interests arguing that special exemptions for particular sectors will have questionable conservation impacts. “It is scary—people in the industry are already stepping up and saying that Amendment 13 won’t work.” For example, steaming exemptions, where the time spent steaming will not count against days-at-sea, might benefit larger vessels on Georges Bank—where cod are scarce. “There are Georges Bank exemptions when cod are in big trouble there. High capacity vessels will be given access, and they’ll say ‘I promise we won’t catch them.’ Yeah right.” (C. Pendleton, pers. comm., 12 March 2004).

The final rule for Amendment 13 will be published by the end of March 2004 – then the responses from different sectors will begin to be heard in earnest. Some in the environmental community notice some “questionable aspects” to the amendment; it is unclear whether it will satisfy the MFCMA for rebuilding stocks, and bycatch and habitat concerns were not addressed (P. Brooks, pers. comm., 15 March 2004). One fishing industry member thinks the environmental sector might say Amendment 13 does not address white hake or yellowtail flounder in the Gulf of Maine (C. Pendleton, pers. comm., 12 March 2004). According to Steve

Roady (pers. comm., 2 March 2004), attorney with EarthJustice, the environmental community generally feels that DAS reductions may not be enough, because there is not a 1:1 effect on populations; at the same time, these reductions hit fishermen hard. In addition, the impacts of closed areas and mesh size limits are hard to quantify, leading many in the environmental community to call for a hard TAC. Whatever management decision is made will include conservation and livelihood tradeoffs. According to Roady (pers. comm., 2 March 2004), “It’s a classic socio-economic and biological problem.” In any case, it seems that the status of the stocks and the interactions of the key human constituents will ensure that Amendment 13 will not be the last amendment for the Northeast Multispecies FMP.

CONCLUSION

Several overarching themes emerge in the analysis of New England groundfish constituents and their impacts on management. First is the emphasis on individual autonomy. The council and the industry were reluctant to use direct mortality controls after the early 1980s. Instead, management focused on indirect measures and DAS reductions. The NEFMC displayed the “cultural style” management described by Hanna and Hall-Arber (2000), valuing individual flexibility for fishers in their measures. The culture of human players in New England likely limited the effectiveness of the council system. According to Hall-Arber and Finlayson (1997), “if the national process for public participation in management differs from local norms and practices, the federal process will lack local credibility.” Further, it has been argued that fishing interests “dominated decision-making to the virtual exclusion of any meaningful influence from scientific assessments of the status of the principle stocks, at least until 1991” (Hennessey and Healey, 2000, p208). Rather than using science to meet conservation goals, until the 1990s the industry and the council valued minimizing government intervention and protection of access to the groundfish resource.

While many argue that the NMFS science in New England was very good, as the time scale and breadth of fisheries knowledge goes, others were not convinced. The New England industry was marked by distrust between managers, fishers, and scientists. For much of the NEFMC’s existence, fishermen did not believe scientists’ assessments of declining stocks. According to Hall-Arber and Finlayson (1997), “There was little understanding of assessment techniques and even less comprehension of the highly technical results reported in academic

journals or presented in stilted oral reports to the New England Council.” But today, most fishers recognize that there is a big problem—stocks have been overfished and the industry faces overcapitalization (Hall-Arber and Finlayson, 1997).

A former council member commented, “I look at the big picture—the science did basically tell us that we’re getting into problems, that there were declines. It was not science that kept us on the slide... But to be fair, there are real problems with the science that NMFS scientists don’t want to admit.” NMFS has the responsibility to arrive at a solid number for the Maximum Sustainable Yield. However, “It is not acceptable for them to say, ‘We don’t know. We can’t estimate abundance given the data.’” Therefore, the numbers that they come up with may not have validity (R. Allen, pers. comm., 12 March 2004). Some in the industry take an understanding stance, but agree the science has shortcomings. In the opinion of Pendleton (pers. comm., 12 March 2004), “The science that NMFS does is good in doing what it was intended to do—long-term tows to get trends over time. But now we’re asking them to tell us the individual numbers of fish in the sea.”

An increasing trend in New England to involve fishers in the science may have benefits for improving trust between fishers and scientists, as well as improving the science, itself. Fishermen tend to realize there is some value to fisheries science, and many now say they want to help the NMFS scientists out and help their data make more sense. According to Allen (pers. comm., 12 March 2004), there are two reasons for this new cooperation. One is legitimate concerns about the validity of the science. The other is that fishers just do not understand how much has to go into gathering scientific data. Scientists and fishermen are working more closely together now, which might build more credibility for the science among fishermen.

Besides infiltrating scientific discussions, distrust has also marked interactions between fishery sectors, industry organization, and environmental advocates. Within the groundfish industry, fishermen who come from different geographic areas, who use different gear types, or who own different size vessels often question the motives of the other parties. Constituents raise questions about whether the decisions of the council are made on the basis of science or allocation; in reality, it is probably both. According to Dick Allen (pers. comm., 12 March 2004), “The primary thing that creates problems in fishery management is that people try to use the fishery management system to allocate fish.” Managers and fishermen talk about biology and environmental issues, but allocation decisions must be made—some win out and some lose.

Allen feels that most fishers and managers don't realize that they fighting for an allocation. They think that they are doing the right thing for the stock. "It's subconscious," Allen said (pers. comm., 12 March 2004). Craig Pendleton got the same impression from fishers in New England. He said, "Many in the industry feel they're still dealing with a tainted point of view. We are participating in an allocation discussion without anyone coming out and calling it that" (C. Pendleton, pers. comm., 12 March 2004). Interestingly, the Pew Oceans Commission (2003) recently recommended the separation of conservation and allocation decisions in fisheries management, which was likely aimed at reducing conflicts, as well as ensuring conservation comes first.

Beginning in the early 1990s, there was a shift in groundfish management—increased conservation measures, with correspondingly increased economic impacts on fishers. Environmental organizations and lawsuits played a large role in spurring changes in fisheries management—particularly the two CLF lawsuits, which brought about important amendments to the FMP. Despite steps towards restoring the groundfish stocks, many in the region do not appreciate the work of environmental groups or recognize that their arguments were valid within the framework and intentions of the MFCMA. According to Allen (pers. comm., 12 March 2004), it is a "sad situation" that some fishers and managers do not realize that the industry was not capable of making those changes without lawsuits. "There has not been much of a learning process." (R. Allen, pers. comm., 12 March 2004). Since the 1994 lawsuit and subsequent measures, many groundfish stocks have made gains towards rebuilding. While this is a good sign for an ailing fishery, many fishermen remain frustrated at seeing more fish in their nets, at the same time they face drastic cuts in DAS in new amendments aimed at recovery of the stocks.

Many are also frustrated with the NEFMC's new focus on reducing fishing capacity. Overcapitalization has plagued the New England fishery, supported by tax breaks and federal aid at times of declining stocks. This ratchet effect, described by Hennessey and Healey (2000), meant that boats continued to be built and fishermen continued to enter an industry where there were less and less fish to go around. In the current climate of Amendment 13 and more reductions in DAS, discussions of more boat buyback programs and other measures to remove fishers from the industry abound. Many fishers express equity concerns about capacity reduction efforts, especially parts of Amendment 13 that would remove people from the fishery who did not use all of their DAS—when their actions (whatever their motives) were more conservation-

oriented than those who fished every day they could (C. Pendleton, pers. comm., 12 March 2004).

The trend towards eliminating excess capacity continues, but other shifts in management may be slowly coming to the region. Despite several years of resistance, there has been a general move in New England toward hard TACs. The NEFMC has tried to keep away from them in groundfish management, “but they are becoming inevitable” (R. Allen, pers. comm., 12 March 2004). Allen predicts that the managers will find that DAS as a management tool will not work, unless they cut the fleet substantially—something not in the foreseeable future. Therefore, he thinks DAS will continue to be reduced until finally fishermen have enough and say they “just want the poundage.” Pendleton agrees (pers. comm., 12 March 2004); he has heard many New England fishers say that the DAS are too low for them to survive, “Just give me a quota.” Then if that quota is too low, they’ll just sell out (R. Allen, pers. comm., 12 March 2004).

Transferable days, a measure included in Amendment 13 recently ratified by the council, have characteristics of individual transferable quota (ITQ) systems. This is an indication of the slow change occurring on the NEFMC and among constituents as the management picture and stock status continues to be bleak. “It will be hard, but there will be pressure to make that shift [to ITQs]” (R. Allen, pers. comm., 12 March 2004). Judging from the historical emphasis on individual autonomy among New England fishermen, a switch to a quota-based system will not come without a fight, especially given the state of groundfish populations. “IFQs [individual fishing quotas] are more palatable when you’re coming from abundance. If you tell a fisher in New England his quota is 100 lbs of cod, that will be pretty scary” (C. Pendleton, pers. comm., 12 March 2004).

But more and more, stakeholders other than fishermen are voicing their opinions. According to Rosenberg, “The constituency on these issues is broadening out.” Not just fishers, but other citizens now place additional pressure on elected officials (A. Rosenberg, pers. comm., 22 March 2004). This will, without a doubt, shape future management measures in New England.

PACIFIC COAST

Groundfish targeted by Pacific Coast fishermen intermingle near the ocean bottom, as do their New England counterparts. However, the multispecies complex managed by the Pacific Fishery Management Council (PFMC) is comprised of more species—over 80, including 64 types of rockfish, 12 flatfish, 6 roundfish, and 6 sharks and skates (PFMC, 2003a). The midwater trawl fishery for whiting brought in the most tonnage in 1997, along with deepwater trawl, longline, and pot fisheries for sablefish. A trawl and hook and line fishery for rockfish and associated lingcod is important along the continental shelf and nearshore reef habitat (NMFS 1999c).

According to Mansfield (2001), the Pacific groundfishery in the 1970s was relatively unimportant in the scale of national commercial fisheries; it was marked by small-scale fishers targeting a few nearshore species and a distant-water foreign fleet targeting Pacific whiting. However, between 1976 and 1990, the industry showed marked growth. During this time period, the domestic catch of Pacific whiting increased by a thousand times (Mansfield, 2001). In 1977, the first year of the PFMC's existence, groundfish landings totaled 60,000 tons. Landings peaked at 116,000 tons in 1982 with the implementation of the Groundfish FMP. After 1989, landings generally declined with recent landings averaging near 56,000 tons (excluding whiting) (Fig. 7) (NMFS, 1999c). According to NMFS (1999c), present yields may be sustainable for some species, but others are depressed. Because many groundfish species live for 40 to 100 years, it has taken a long time for excess biomass to be fished down to the point today where the resource is “fully utilized,” in general (NMFS, 1999c).

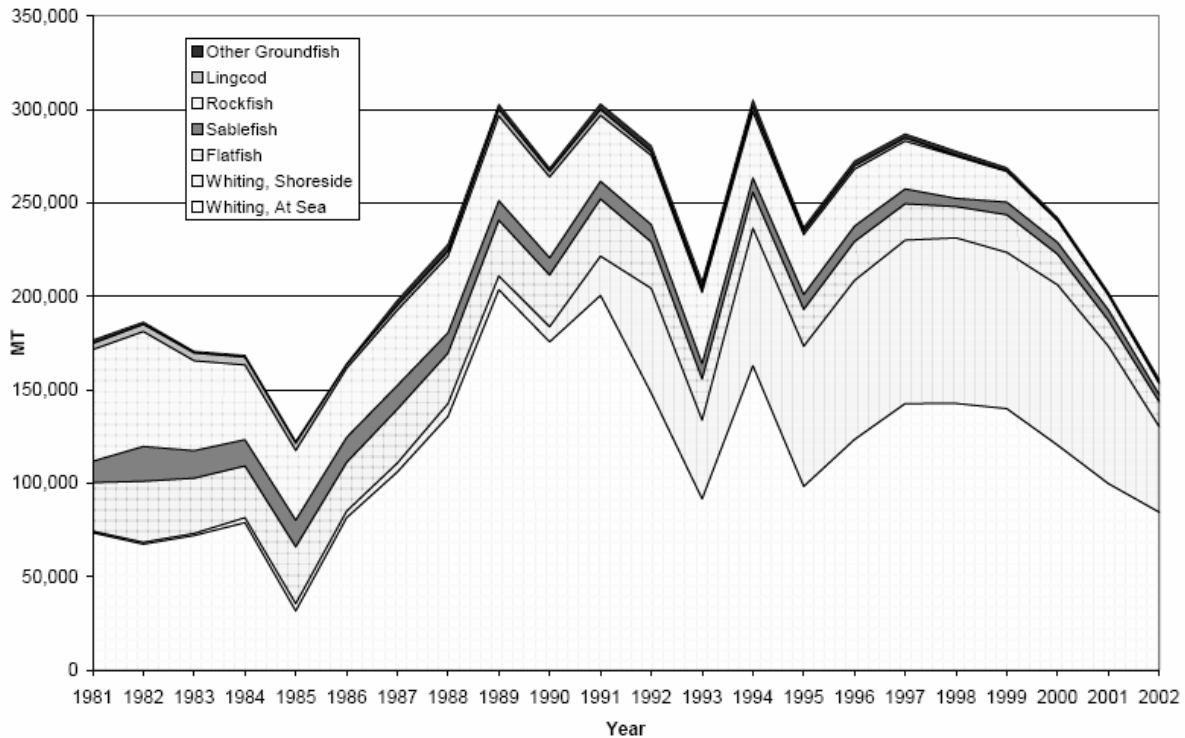


Fig. 7: Pacific groundfish landings (mt) from PacFIN landings data, 1981-2002 (PFMC/NMFS, 2004)

In 1999, NMFS declared several groundfish species overfished; today, the number of species in this category stands at 9. In early 2000, the Secretary of Commerce declared the Pacific groundfish fishery to be in a state of emergency (PFMC, 2003a). Managers, conservationists, and industry members have paid particular attention to rockfish, which along with roundfish, flatfish, sharks, and skates make up the bulk of the West Coast’s multispecies complex (PFMC, 2003a). The focus on rockfish is not a new trend; by 1986, 82% of the PFMC’s groundfish management actions had involved rockfish, though they only comprised 50% of the catch. The rest of the measures were aimed at sablefish (Francis, 1986). These groups of fish generally are slow-growing and long-lived, with a low ratio of production to biomass. As a result, rockfish are especially susceptible to overfishing. Once a stock of rockfish is fished to a level that recruitment is affected, recovery occurs very slowly—even in the absence of any fishing effort (Francis, 1986; PFMC, 2003a).

Despite cuts in allowable catch for depressed species in the late 1990s, the industry found itself in a disaster situation. And while the hardships for the Pacific industry came later than in the New England groundfishery, where declines in abundance were the norm since the early years of the council system, Mansfield (2001) asserts that problems on the West Coast were

building for two decades. She states that overcapacity and overfishing in the Pacific groundfishery resulted from “a concerted effort to develop this fishery.”

In this section, I will examine the socio-political context of the growth of the groundfish industry and the decline of stock. I will describe the state of various stakeholder groups—the PFMC, fishermen, industry organizations, scientists, environmental advocates and courts—in the cultural ecology of the political process, as outlined by Orbach (1995). Next I will trace the timeline of management since the implementation of the regional fishery management council system, as well as current trends in management.

HUMAN ECOLOGY OF THE POLICY PROCESS

Fishermen

West Coast groundfish fishermen live and work along the entire coastline, and so the communities of fishers differ in their gear types, their geographic locations, and the environmental conditions they must face; it is a varied and diverse fishery (Scholz, 2003). Further, fishermen and processors in the groundfish fishery often switch gears or participate in other fisheries, including shrimp, halibut, Dungeness crab, salmon, and albacore tuna (NMFS, 1999c). Some vessels in the North participate in Alaska fisheries for part of the year (PFMC/NMFS, 2004). While the participation of fishermen in the groundfish fishery varies up and down the coast, larger vessels tend to get most of their revenue from fishing along the continental slope; smaller trawlers tend to focus on nearshore fisheries for rockfish on the continental shelf. Tribal fishers in Washington participate in ceremonial, subsistence, and commercial fisheries. The Makah, Quileute, Hoh, and Quinault tribes fish for groundfish, using similar gear for commercial operations and selling fish in the same markets as other fishers on the West Coast (PFMC/NMFS, 2004).

On the West Coast, the fact that the stocks appeared to be healthy until the 1990s meant that a threat of internal competition between fishermen groups was not a factor in the fishery. For the most part, fishermen were able to learn from each other and cooperative research with scientists, and to form common goals for the fishery. However, with the decline in stocks apparent, there has been an increase in competition between user groups for portions of the

catch, as well as distrust among fishermen (Hanna, 2000). Native American tribes in the Pacific Northwest that hold treaty fishing rights is another group whose goals and objectives are taken into account in fishery management decisions (Hanna et al., 2000).

These different user groups are impacted by allocation decisions made by the council. For example, the harvest guideline for sablefish is allocated between Native American, open access, limited entry trawl, and limited entry fixed gear fisheries. For depressed species like lingcod and rockfish, allocation decisions have “the potential to become more contentious” than in the past (NMFS, 1999c). In addition, managers routinely deal with “indirect allocation decisions,” such as decreasing trip limits, which impact larger vessels most immediately (NMFS, 1999c). Here on the Pacific side, the industry may be following in the footsteps of New England by blaming the government for declines and the resulting measures with harsh economic impacts (A. Rosenberg, pers. comm., 22 March 2004).

Pacific Fishery Management Council (PFMC)

The PFMC has the authority to create management measures for the 89 species of groundfish under the Pacific Coast Groundfish Fishery Management Plan (FMP), which must then be approved by the Secretary of Commerce. The PFMC has direct management responsibility over 109 stocks total, including three other FMPs besides Pacific Coast Groundfish (Hanna et al., 2000; PFMC, 2003b). The council historically focused on salmon (A. Rosenberg, pers. comm., 22 March 2004). The salmon problem was the more pressing issue; much of the overall declines in the Pacific fishing industry were due to a decrease in salmon stocks in California and Oregon, and then to a lesser extent, groundfish (Houston et al., 2000).

The PFMC is composed of 19 total members, with 14 of those eligible to vote on council issues (Fig. 8). The voting members include: the regional NMFS administrator from either the Northwest or Southwest Region, depending on whether the issue to be voted upon primarily impacts either Washington and Oregon or California; the principle state fisheries official from each state—Washington, Oregon, California, and Idaho (included because of anadromous salmon); eight members appointed by the Secretary of Commerce including one member from each state; and one tribe representative appointed by the Secretary (PFMC, 2004a).

Interestingly, the non-voting members include a representative appointed by the Governor of Alaska.

PACIFIC FISHERY MANAGEMENT COUNCIL	
19	Total Members:
14	Voting Members
	<ul style="list-style-type: none"> • 1 regional administrator at NMFS (or designee) – NW or SW region • 4 principle state officials (or designee) • 8 members, nominated by governors and appointed by Sec. of Commerce • 1 member representing a Native American tribe with fishing rights in one of the four states, appointed by Sec. of Comm.
5	Non-voting Members
	<ul style="list-style-type: none"> • US Coast Guard • US Fish and Wildlife Service (Columbia Basin Ecoregion Director) • US Dept. of State • Pacific States Marine Fisheries Commission • Representative appointed by the Governor of Alaska

Fig. 8: Membership of the Pacific Fishery Management Council (PFMC, 2003b)

In the past, each of the 4 states could count on an at-large seat—except Idaho, which has had trouble filling council seats in the past. Their at-large seat is usually filled by someone from California, which is generally recognized and accepted because the state covers half the coastline, has a large fishery, and has vocal participants in management (R. Moore, pers. comm., 5 March 2004). In addition, state environmental agency directors have played a large role on the Pacific side (A. Rosenberg, pers. comm., 22 March 2004).

In an examination of membership of the regional Fishery Management Councils, Okey (2003) found that in contrast to the national trend of commercial interests dominating the PFMC’s and other councils’ membership from 1990-2001, recreational, commercial, and “other” interests (including tribal representatives) were equally represented on the PFMC from 1998-2000. Currently, the PFMC is “heavily recreationally-oriented,” with representatives of that sector holding several of the at-large seats. The public seats are currently occupied by: three recreational fishermen from California, one recreational fisherman from Oregon, one recreational fisherman from Washington, one recreational fisherman from Idaho, one commercial fisherman from Oregon, and one representative of commercial fishers from Washington (R. Moore, pers. comm., 5 March 2004).

Some express concern about the impacts of a recreationally-oriented council on the course of groundfish management. In Rod Moore’s perception, however, generally everyone on

the council tries to stay well-versed on all aspects of the fisheries; there is not a tilt toward one sector or another. At the same time, he admitted that on issues of allocation, “folks will vote with their state, sector, or section of the coast” (R. Moore, pers. comm., 5 March 2004).

The staff and committee structures are well-defined and utilized in the PFMC. The PFMC employs a staff to carry out administrative duties and council operations. An Executive Director is accountable to the council, and the remaining staff members report to the Executive Director (PFMC, 2004a). To support the management responsibilities of the council, there are two types of committees—standing committees of council members appointed by the chairman, and ad hoc committees of council members and non-council members created for specific purposes (PFMC, 2004a). The PFMC sets up committees to deal with specific issues such as vessel monitoring systems and, more recently, individual quotas in the trawl segment of the groundfish fishery (R. Moore, pers. comm., 5 March 2004).

In addition to committees, the PFMC appoints advisory bodies to provide expert advice. There are three primary advisory bodies involved in providing advice on groundfish management to the full council: the Groundfish Management Team, the Groundfish Advisory Panel, and the Scientific and Statistical Committee (PFMC, 2003a).

Each FMP involves a Technical Management Team, usually composed of state and federal managers and tribal representatives. The Groundfish Management Team looks at catch rates, makes recommendations on regulations and limits, and analyzes proposed measures. The Groundfish Management Team is involved in management decisions throughout the entire process, presenting information to the full council as well as the Groundfish Advisory Panel (PFMC, 2003a).

An Advisory Panel exists for each FMP, usually including fishermen, environmentalists, and other stakeholders (R. Moore, pers. comm., 5 March 2004). The Groundfish Advisory Panel includes a cross-section of people involved in the industry, including commercial and recreational fishermen (with each major gear sector represented), tribal representatives, processors, environmental organization representatives, and a member of the public. The Groundfish Advisory Panel advises the PFMC on groundfish policies, operating by consensus and position statements to the council (PFMC, 2003a).

The PFMC also utilizes a Scientific and Statistical Committee (SSC). This committee is comprised of a group of scientists from academia, government agencies, and other organizations.

The SSC is in charge of preparing and reviewing FMPs, as well as providing advice on scientific issues to the PFMC. Within the SSC, there is a subcommittee for groundfish (PFMC, 2003a). Additionally, for every stock assessment that is completed by NMFS (approximately once every two to three years), the PFMC sets up a scientific review panel composed of a member of the SSC, an outside reviewer, and representatives from the Technical Management Team and Advisory Panel for that FMP (R. Moore, pers. comm., 5 March 2004).

The Groundfish Advisory Panel, Groundfish Management Team, and Science and Statistical Committee report directly to the PFMC. While the committees differ in composition, the teams are treated as co-advisors (Hanna, 1995). Therefore, according to Hanna, the council's hierarchical structure is "relatively flat," and fishers and other user groups are formally incorporated as participants in management.

Much of the PFMC's actions involve the federal or state governments. On the West Coast, state governments and the PFMC interact frequently. They interact because the state governments set up recreational groundfishing seasons within their 3-mile limits, but also because there are two important fisheries in federal waters that states regulate. One of these fisheries is Pacific shrimp, and the fleet takes groundfish incidentally (R. Moore, pers. comm., 5 March 2004). Therefore, communication between the council and state governments is required. On the federal side, there is a huge political pressure on NMFS regarding their acceptance or refusal of FMPs. The interactions between NMFS and the PFMC have historically been "cordial" (A. Rosenberg, pers. comm., 22 March 2004). The PFMC also interacts with tribal representatives. The Washington tribes that participate in the fishery hold specific allocations for sablefish, black rockfish, and Pacific whiting. For the remaining groundfish stocks, tribal trip limits are established each year through the PFMC process, with the tribe bringing suggested limits to the council (PFMC/NMFS, 2004).

The management style used by the PFMC was influenced by the status of the industry at the council's inception. The conditions on the West Coast were much different than in New England. When the MFCMA passed and the council system was established, there was a relative surplus of groundfish, compared to New England (Hanna, 2000). In addition, the states had a history of cooperation. Fishermen accepted the government role in decision making and participated in cooperative research. Therefore, the council system and the "corporate-style" of management laid out in MFCMA were easily adapted in the Pacific. The resulting management

style of the PFMC was very structured and included regular participation from the industry from the start (Hanna, 2000). In addition, because the domestic fleet was relatively small when foreign fishing was removed, the PFMC displayed a development mentality with the goal of increasing the size and capacity of the fleet (Mansfield, 2001).

Today, the PFMC processes are “pretty open,” as in the rest of the regions (R. Moore, pers. comm., 5 March 2004). As indicated, the PFMC has a well-defined process including committees and provisions for participation. According to Moore, the PFMC processes are “designed to manage the flow of information, allow people to vent, and then give constructive information to the council.” Historically, PFMC meetings were much milder than the heated interactions on the East Coast (A. Rosenberg, pers. comm., 22 March 2004). According to Mansfield (2001), however, “The [Pacific] Council is... embroiled in conflicts of its own, as fishers and fisheries scientists often disagree over the status of individual species of fish and the information used in stock assessments.” Moore (pers. comm., 5 March 2004) has noted a decrease in the participation by local fishers as issues become more complex. Fishers do not see a correlation between the models and their observations, and they become frustrated with the process. Further, while the PFMC holds meetings at central locations, fishers cannot necessarily afford to travel and lose working days to participate.

Industry Organizations

On the West Coast, industry organizations were actively and systematically involved in the Fishery Management Council process from the start (Hanna, 2000). But organizations have been vocal in other aspects of the industry besides management. For example, in the 1970s and early 1980s, many consumers perceived groundfish from the Pacific Ocean to be inferior to their East Coast counterparts, like cod. In response, the Pacific Coast Fisherman’s Wives Association started a fish marketing program targeted at educating retailers and increasing sales (Mansfield, 2001). Another important role has been promoting science; some industry groups—particularly the trawl fleet—use fishing vessels for cooperative research with the government and other scientists (Hanna et al., 2000).

One organization in particular has been recently active in the groundfish management process—the Fishermen’s Marketing Association, based out of Eureka, California. This organization was instrumental in a 2003 buyback program, and its membership is very strong,

particularly in Northern California and Oregon (P. Parravano, pers. comm., 24 March 2004; Wilson, 2003). At the same time, there are currently “a lot of real grassroots movements by a lot of sectors” (P. Parravano, pers. comm., 24 March 2004).

Elected Officials

On the West Coast, there have been no fishery-related congressional riders as have occurred in New England (S. Roady, pers. comm., 2 March 2004). Elected officials have still been influential. After the passage of the MFCMA, many coastal Oregon communities were in the midst of an economic downturn, so some elected officials were vocal in promoting the development of the fishing industry. When the PFMC originated, foreign fishing had been eliminated but the domestic fleet was relatively small. Therefore, both the state and federal governments launched development programs, with politicians and communities hoping that underutilized species could boost employment in all fishery-related industries (Mansfield, 2001).

While congressional representatives have become more involved in Pacific fishery issues in recent years, the level of involvement is not near as large as in other locations. This lack of involvement may have resulted because many problems in the Pacific didn't come to light until after 1996—and the new requirements didn't leave a lot of “wiggle room” (A. Rosenberg, pers. comm., 22 March 2004). Still, some Pacific fisher representatives believe that the government is involved in the regional council system on too many levels—appointing members, providing funding and legal representation, and approving FMPs (Parravano et al., 2002).

Scientists

As in New England, NMFS provides science for groundfish management. On the West Coast, the Northwest Fisheries Science Center (NWFSC) coordinates NOAA's groundfish program (NWFSC, 2004). The groundfish program contains six main parts: annual groundfish surveys using acoustics, fixed gear, and trawls; an observer program that currently places about 40 observers on commercial fishing trips; ecosystem and habitat surveys; stock assessments; socioeconomic assessments; innovative approaches such as new technologies; and cooperative research with fishers (NWFSC, 2004).

Other data noted by the PFMC include industry-collected information on historical catches, catch per unit effort, logbooks, and port sampling (PFMC, 2003a). According to NMFS, the landed catch is well-monitored on the West Coast through a collection of state landings receipts in a computerized database called the Pacific Fisheries Information Network (PacFIN). However, this data may not include detailed information on age, size, or species information for mixed catches (NMFS, 1999c).

The data set for many species does not stretch far into commercial fishing history. In addition, current stock assessment abilities are only strong for predicting abundance for a few species. While the PFMC sets target exploitation rates for the various species, monitoring of some species may only account for one generation. Therefore, many years of data collection are necessary to tell if targets are feasible and what environmental fluctuations must be taken into account (NMFS, 1999c).

The PFMC has a strong history of using science in decision-making, emphasized since the council system began. In addition, the region shows a strong history of cooperative research (Hanna, 2000). But West Coast constituents have expressed frustration with the scientific process. Many feel that data collection and analysis is not transparent enough, despite efforts by the PFMC to publicize scientific analyses at meetings, in print, on the internet, and through reviews of stock assessments (Hanna et al., 2000). Environmental considerations further complicate perceptions; the Pacific environment poses some unique challenges to researchers. According to Moore (pers. comm., 5 March 2004), periodic regime shifts in the Pacific cause fluctuations in productivity. However, these cycles are not well understood—particularly with respect to the effect on larval distribution and recruitment. Moore also described a “data problem.” He explained that the data in stock assessments is often a couple of years behind—2007 management could be using 2002 stock size data, while also being affected by discard observations from the year before. Therefore, the data itself is not “bad data”, but it originates from two different time periods (R. Moore, pers. comm., 5 March 2004).

According to some, the PFMC has a history of listening to scientific advice by one or two scientists and ignoring others. Rosenberg (pers. comm., 22 March 2004) calls this “revisionist history.” He described a strong ethos on the PFMC that “We followed the science and the stocks collapsed,” while they were really only selectively using the science. “They accepted the science that gave them the best answer.” But at the same time, the council genuinely thought

they were doing the right thing (A. Rosenberg, pers. comm., 22 March 2004). The Executive Director of the PFMC believes the council made the most balanced decisions given the uncertainty of the science. In a 2003 speech in Washington, DC, Dr. Donald McIsaac explained, "...the Pacific Council has been accountable to the scientific advice received, and interpreted it in a balanced manner when scientific uncertainties were broad. We now can identify estimates and decisions in the past that were in error, but these erroneous pathways were not intentionally taken at the time" (PFMC, 2003d).

Environmental Advocacy Groups/Courts

Environmental groups increased in participation and influence on the PFMC and advisory committees in the 1980s to 1990s (Hanna, 2000). Following the example of CLF and the Massachusetts Audubon Society's 1991 suit of the Department of Commerce over management in New England, several environmental groups have played a large role in influencing management through the court system. According to Steve Roady (pers. comm., 2 March 2004), attorney with EarthJustice, in the conservation community on the Pacific side there has been "more willingness to take the hard steps."

"The NRDC [Natural Resources Defense Council] has filed so many lawsuits against the Department of Commerce that we call them by number, not name," said Rod Moore of the West Coast Seafood Processors Association (R. Moore, pers. comm., 5 March 2004). In August 2002, NRDC and Oceana won two lawsuits in representation of conservation groups in a California district court, with the ruling that the government did not adequately record information on bycatch or discards, or create adequate FMPs for groundfish recovery. Another court case was won by environmental groups in 2002, when a California district court ruled that NMFS had failed to assess or minimize bycatch (Oceana, 2004; Pacific Marine Conservation Council [PMCC], 2002). However, in a fourth suit, Moore's organization joined NMFS as co-defendants, frustrated with the agency's past court losses, and the defendants won. Right now, the NRDC is up to their fifth lawsuit involving yearly regulations (R. Moore, pers. comm., 5 March 2004).

In addition to bringing court cases against the federal government, environmental advocacy groups have been proactive in West Coast fisheries management by petitioning for endangered status for species like the bocaccio (PMCC, 2002).

MANAGEMENT STRATEGIES

According to Mansfield (2001), the PFMC focused on fisheries development from the early days of their management. In 1982, the year of the first groundfish FMP, the council defined optimum yield as “all fish which are harvested under regulations adopted by the PFMC.” This definition did not set specific numerical yields for individual species, so fishers could go after groups of species that might have differing optimum levels of catch. With this definition, the PFMC “encouraged overfishing of less abundant species in the name of fisheries development” (Mansfield, 2001).

In addition, the government allowed “joint ventures,” in which domestic fishermen would contract with Soviet companies and deliver their catch to processor vessels without ever coming ashore. These ventures, begun in 1972 with two vessels and continuing to over forty when they ended in 1990, provided a transition from foreign to domestic utilization of federal fisheries (Mansfield, 2001). Federal and local programs financed fishing, encouraging new vessels and entrants to the industry. The Fishing Vessels Obligation Guarantee and the Capital Construction Fund, both federal programs, were instrumental in encouraging investment in the groundfishery in the 1980s. Each applied not only to fishermen but also to processors and distributors (Mansfield, 2001).

As fleet capacity increased, many stocks reached full exploitation; the PFMC imposed stricter management limits, and fishermen received lower incomes. In addition, the mid-1980s brought fears of displaced effort from Alaskan fishermen, who faced a rumored limited entry program. These factors combined to lead groundfish fishermen to call for a limit on capacity (Hanna, 1995).

The PFMC put together a Limited Entry Committee in 1987, composed of industry members and others with knowledge of the issue. Several other committees were involved in developing and reviewing proposed plans. After extensive industry participation in the plan’s development, PFMC efforts at public education and awareness, and committee care to address equity concerns, a license limitation plan was adopted in 1991 (Hanna, 1995). However, excluded fisher groups were opposed to the ceiling on capacity, so it was not until 1994 that the limited entry plan with transferable permits was adopted (Hanna, 1995; NMFS, 1999c). The plan established a relatively high limit, in the PFMC’s efforts to appease all fisher groups, but it

was successful in stopping the increase in capacity. According to Hanna (1995), “Discussions held during the long course of program development transformed industry views of the fishery from the open frontier to a restricted resource.”

While the industry eventually saw the resource as finite, originally most groundfish fisheries in the Pacific were, with a few exceptions, open year-round (NMFS, 1999c). This maintenance of year-round fishing activities has been a major objective in management (PFMC/NMFS, 2004). The PFMC accomplished this goal by placing limits on individual vessels, beginning with widow rockfish in 1983. There are monthly cumulative limits for each vessel for many species. These limits are adjusted during the season, and the method proved fairly successful in meeting harvest guidelines in a year-round fishery; however, this method has resulted in a problem with discards (NMFS, 1999c). Other problems developed over the course of PFMC management, including allocation disagreements between Canada and the US that lead to overharvest of Pacific whiting, and a lack of bycatch consideration that occurred because there was no comprehensive observer program (NMFS, 1999c). However, in 2001, the PFMC did implement an observer program (R. Moore, pers. comm., 5 March 2004).

For most of its history, the Pacific Coast Groundfish FMP has been marked by complex goals and measures, though recent changes have aimed to clarify. According to Hanna et al. (2000), the FMP “provides one example of a plan with a large number of objectives that are difficult to quantify.” The Pacific Coast Groundfish FMP has undergone several amendments since it was introduced in 1982. The most notable of these were Amendment 4, which was a complete overhaul of the original plan, and Amendment 6, which created the limited entry program in 1994. Amendment 17, adopted in 2002, established a two-year management schedule, so that measures can be implemented for more than one year. This new cycle will begin in 2005 (PFMC, 2003a).

Since 1996, when nine species were declared overfished (bocaccio, canary rockfish, cowcod, darkblotched rockfish, lingcod, Pacific ocean perch, Pacific whiting, widow rockfish, and yelloweye rockfish), the PFMC has implemented rebuilding measures requiring “more conservative fishing regulations than ever before” (NOAA Fisheries, 2004). The PFMC developed rebuilding plans for four of these species and the Secretary of Commerce approved them under Amendment 16-2 to the FMP. Amendment 16-3 to the FMP was under discussion by the council as of Spring 2004, and it would address the rebuilding requirements of four other

species. The final overfished species, Pacific whiting, may be dealt with in a separate FMP, under a potential Amendment 16-4 (NOAA Fisheries, 2004).

Recent management measures have focused on lessening fishing impacts on several species of rockfish. Many regulations have been based on the idea that different types of rockfish tend to be found in different areas along the West Coast. Particularly, the PFMC has divided rockfish into categories North or South of 40°10' N. latitude, and nearshore, shelf, or slope species (PFMC, 2003c). These divisions for rockfish and other groundfish created the basis for a series of measures leading up to the current management trend of closing areas based on depth (see “Current Trends in Management” section, p42).

There were several precursors to the current focus on depth-based management. The first was the result of the trawlers and processors collaborating to make a recommendation to the PFMC. While the industry was operating on cumulative two-month trip limits to spread the catch out throughout the year, the PFMC implemented their recommendation to vary the trip limit size, according to observations about catch patterns. The intention of the measure was to encourage fishers to focus on “reasonably healthy and well-segregated” fish stocks, since limits were lower when healthy and depleted stocks co-mingled (R. Moore, pers. comm., 5 March 2004). However, there was an unintended consequence. Lured by high trip limits early in the year, a small fleet of vessels that usually fished in Alaska remained off the West Coast to participate in the groundfishery. According to Moore (pers. comm., 5 March 2004), this fleet “came in and scooped up the limit,” inciting anger in traditionally local fishermen; the measure was dropped by the PFMC.

Moore described the second “precursor” to depth-based management, recommended in 1999 and implemented in 2000. This measure involved gear modification on the continental shelf, where species of concern are concentrated. The measure called for a smaller footrope on trawl gear when fishing along the continental shelf, creating an economic disincentive for fishers since nets with smaller footropes rip easier on the rocky bottom and do not allow catches of as many fish (R. Moore, pers. comm., 5 March 2004). A preliminary study by the Oregon Department of Fish and Wildlife indicated that the small footrope regulation “significantly shifted fishing effort away from traditional rockfish grounds” off the Oregon coast (Hannah and Freeman, 2000). In a later document, the PFMC (2003a) acknowledged that the small footrope

rule significantly reduced the bottom trawl catch of rockfish, but remarked that overfished species are still caught incidentally in commercial and recreational gear.

In 2002, NMFS found that the catch of overfished species remained too high, and they planned to shut down the entire trawl fishery. This drew a massive outcry from fishers and the industry. Fishermen were generally distrustful of the science, since they had observed a marked shift in effort offshore to avoid the overfished species, as a result of the footrope gear modification. There was “lots of yelling and screaming” (R. Moore, pers. comm., 5 March 2004). But the council and the industry arrived at new management measures.

Current Trends in Management

As of 2003, Pacific groundfish are managed using a variety of regulations, including harvest guidelines, quotas (“total catch optimum yields”), trip and landing limits, area restrictions, size limits, seasonal closures, and gear restrictions (such as mesh size and trawl footrope size limits) (PFMC, 2003a). With the new stock rebuilding requirements, the groundfish harvest has been significantly reduced. In September 2002, the PFMC adopted strict harvest levels and management measures with large economic implications for fishers (PFMC, 2003b). Because of the multispecies nature of the fishery, the PFMC has had to restrict catches of healthy stocks that associate with the threatened species. As a result of stock declines and stricter management measures, the total revenues from the groundfish fishery have declined by 40 to 50 percent in the past few years (NOAA Fisheries, 2004).

Most notable among these new measures was the implementation of depth-based restrictions “that seasonally move fisheries that catch... overfished stocks out of the depth zones the stocks inhabit” (PFMC, 2003b). The PFMC ultimately decided to adopt this system of rockfish conservation areas (RCAs) following the two “precursors” as described by Moore. The new restrictions continued the footrope gear limitation, but also eliminated fishing in an area (R. Moore, pers. comm., 5 March 2004). Starting in 2002, the PFMC closed off areas where seven species of rockfish are prevalent, based on depth ranges. Currently, an approximately 120,000 km² area is closed off, extending from Canada to Mexico, and representing a particular depth area between two lines where the species tend to be found. When asked if trawler fishermen were happy with this outcome, Rod Moore said, “It’s like getting old—the alternative is worse.” The fishers are not happy, but the alternative is worse—no fishing at all (R. Moore, pers. comm.,

5 March 2004). Rebuilding of overfished stocks is required within ten years by the MFCMA. However, because of the stocks' biology, it could take significantly longer than a decade to rebuild overfished rockfish stocks (PFMC, 2003a).

With large reductions in harvest, the focus of management is now on capacity reduction, due to concerns that current levels of participation cannot be supported by the resource (PFMC, 2003a). A new long-term vision for the fishery, the Groundfish Fishery Strategic Plan, drafted by an ad-hoc advisory committee and intended to guide the council, called for such a reduction in fishery participation (PFMC, 2000). The major recommendation of this report was a reduction in existing capacity of 50% to bring harvest capacity in line with the limits of the resource. The alternatives to this capacity reduction were listed in the report: "shorter fishing seasons, smaller trip limits, high discard rates...Many fishers will not be able to meet their basic financial responsibilities and will be forced from the fishery" (PFMC, 2000, p3-4).

In 2003, the West Coast industry played a large role in planning an inventive boat buyback program to address this capacity issue (Fisheries Marketing Assoc., 2003). NMFS implemented the vessel buyback, which was intended to reduce both the number of vessels and permits involved in the groundfishery. Because of the multiple-fishery nature of the industry, the buyback also reduced the capacity of the Dungeness crab and pink shrimp fisheries. The voluntary program elicited bids by 108 fishermen who wanted to have their boat and permits bought back by the government. In November 2003, NMFS accepted 92 of these bids, retiring 92 vessels and 240 fishing permits (92 of which were groundfish permits). Ten million of the approximately \$46 million program was appropriated by Congress; the remaining \$36 million loan will be repaid by fees on landings for those remaining in the fishery ("Magnuson-Stevens Act Provisions...", 2003; PFMC, 2004b). According to one in the industry, the rockfish depth-based closure and the buyback program have been the "major spikes" in groundfish management on the West Coast (P. Parravano, pers. comm., 24 March 2004).

Currently there is a PFMC committee to examine the feasibility of IFQs for the trawling sector, looking at "the broad issues" of IFQs. The committee met in January 2004, with plans to meet again in spring or summer 2004. However, the committee has already experienced problems with funding; it is very much "in its infancy," said Rod Moore (pers. comm., 5 March 2004). In an information sheet on IFQs, the PFMC (2003e) stated, "The Council is interested in

IFQs as a fishery management tool, but Council staff workload is currently focused on other issues, including groundfish rebuilding plans.”

CONCLUSION

As described by Hanna and Hall-Arber (2000), the historical status of the resource and climate of cooperation and governance led to the “business-style” management used by the PFMC. Industry members and organizations were involved in the council processes and accepted government regulations. Further, the PFMC historically has treated the different groundfish committees and advisory bodies as co-advisors, though they differ in composition (Hanna, 1995). This climate of cooperation grew out of the historical status of the industry and fish stocks when the council system was started.

Upon the elimination of foreign fishing in 1976, there was not a large enough domestic fleet to replace the effort of the foreign factory vessels. Therefore, the focus of the industry, the fishermen, and the PFMC in this new, business-like structure became fishery development. Elected officials were active in the creation of fishery development programs. Joint venture programs and government financing provided an incentive for fishermen to build new vessels and upgrade old ones (Mansfield, 2001). In the meantime, stocks appeared relatively healthy, compared to fisheries elsewhere in the US and the salmon industry on the West Coast.

But according to NMFS (1999c), the decline in surplus biomass occurred over several years, as recommended harvest levels changed frequently because of “imprecise stock assessments, insufficient staff to revise assessments frequently, and natural fluctuations in abundance.” Today, with the fishery in a state of emergency, it is clear that declines have occurred. But distrust and blame games have occurred in the Pacific industry, which has been characterized as having an overall good relationship with scientists—cooperative research has been a hallmark. Some felt that only selected scientists’ data were used by the council, to the exclusion of more pessimistic assessments (A. Rosenberg, pers. comm., 22 March 2004). According to one in the industry, up until a few years ago, nobody believed the science—they said it was not adequate. Now there has been a real change in that view with a lot more engagement and collaboration, which he feels will lead to more understanding, by both sides, of the science as well as what happens on the boat (P. Parravano, pers. comm., 24 March 2004).

While the attitude towards science may be improved through cooperative research, there has been pressure to change what Moore called “the data problem” for some time, to make sure that observer and trawl data comes from the same time periods. However, he says that this would mean more frequent surveys and stock assessments, which requires “money, bodies, time, and research vessels” (R. Moore, pers. comm., 5 March 2004). Given the inexact nature of fisheries science, it seems we are well away from complete trust of scientific analyses from any involved party.

Concerns about science issues have also lead to allocation debates, another feature of the industry. With groundfish one of many important fisheries on the West Coast, some groundfishermen feel their fishery does not get its fair share of scientific research. According to Moore, the federal government pours a huge amount of money into salmon, but groundfish has been the “bread and butter” of coastal fishing communities in the Northwest. “Everyone knows the problem [in the groundfish fishery], but there are no resources or money to fix it. It all goes to salmon” (R. Moore, pers. comm., 5 March 2004).

Not only allocation of money between sectors, but also allocation of the catch between fisher groups—particularly the “big” and “small” boats—plays a role in the decisions of the PFMC. Said Rod Moore, “If you lift the rock, there’s usually allocation underneath” (R. Moore, pers. comm., 5 March 2004). Further, the Alaska fishery is positioned to influence allocation decisions on the Pacific Council, as evidenced by their participation when varied trip limits were set too high. While Hanna (2000) noted that fishermen learned from each other and formed common goals for the fishery after the passage of the MFCMA, she proposed that declines in many stocks has contributed to greater competition and distrust between user groups. NMFS (1999c), too, admitted that allocation decisions over depressed species may become more contentious.

Allocation becomes particularly clear in the quota-based system that has been embraced by the Pacific industry. According to Moore (pers. comm., 5 March 2004), with a multispecies plan, you can’t avoid this kind of management. “Fish do not segregate themselves in the water,” though only a few of the 82 species under the FMP are designated overfished. And because the Pacific groundfishery is a comparably young fishery in the US, there is a greater tradition of government management—particularly using quotas and trip reporting. One said, “We accept quotas as a matter of course” (R. Moore, pers. comm., 5 March 2004). Allowing fishers to

participate in a year-round industry, a major emphasis in PFMC management, has likely contributed to this acceptance of quotas.

While quotas have been accepted by the industry, IFQs have not found widespread support. One significant reason for hesitance is concern over equity issues. According to one industry member, if IFQs go into effect, they will create a disparity among fishermen in terms of marketing and allocation (P. Parravano, pers. comm., 24 March 2004). While the PFMC has created a committee to examine the possibility of IFQs in the trawl sector, the process is moving slowly (PFMC, 2003e).

In the midst of stock declines and council measures to attempt to address them, lawsuits by conservation organizations have played a large role in shaping policies. NRDC, Oceana, and other groups have won a few key court cases in recent years, resulting in more amendments to the FMP that better address the rebuilding requirements for the groundfish stocks. More court battles are currently underway. The rockfish have played a public role in both the environmental advocates' lawsuits and the council's management strategies.

Industry organizations have been instrumental in management on the West Coast much longer than environmental organizations. Cooperative research has been a focus since the early years of council management. More recently, an industry group was instrumental in promoting a boat and permit buyback program (Fisheries Marketing Assoc., 2003).

The 2002 buyback program resulted in 92 vessels removed from the groundfish fleet off the West Coast ("Magnuson-Stevens Act Provisions...", 2003). This emphasis on capacity reduction and the recent depth-based time/area closures to protect overfished species of rockfish have marked recent management in the industry. With powerful impacts on the economics of fishing for participants, these recent measures may have been crucial in bringing conservation concerns and policy choices into focus. According to Parravano (pers. comm., 24 March 2004), "Until a few years ago, the fishermen were all seeing through the same glasses." Some fishermen feel that changes are still necessary with a reduction in the fishing force, and some don't. But in the last few years, there has been a difference in the thickness of the glasses. This change in perception seems to have come in response to increased legislation, increased regulations (specifically, closures) and less boats (the buyback program). "Many are starting to see that things need to change" (P. Parravano, pers. comm., 24 March 2004).

While many in the industry may now agree that new management measures are necessary to protect the declining stocks, those same declines may result in increased conflict in a traditionally more cordial management system.

COMPARISON: Management on the Two Coasts

As shown in Fig. 9, the two fisheries have the same basic human, scientific, and regulatory players in their policy processes. However, the way the constituencies look, their histories of coming together, and their attitudes and interactions with one another differ. The two fishery management councils have two very different approaches to management—as a result of their different user bases, as well as the different species involved (P. Parravano, pers. comm., 24 March 2004).

In terms of structure, there are some important differences between the two councils (Fig. 9). The NEFMC has more members, representing more states than the PFMC. However, the PFMC corresponds with more than one region of NMFS. Therefore, voting members representing NMFS participate from the Northwest or Southwest Region of NMFS depending on the issue at hand. The PFMC also counts a tribal representative among its voting members, as well as a representative of the governor of Alaska as a non-voting member, adding another layer of complexity to that council’s composition.

a. NEW ENGLAND FISHERY MANAGEMENT COUNCIL	b. PACIFIC FISHERY MANAGEMENT COUNCIL
<p>22 Total Members:</p> <p>18 Voting Members</p> <ul style="list-style-type: none"> • 1 regional administrator at NMFS (or designee) • 5 principle state officials (or designee) • 12 members, nominated by governors and appointed by Sec. of Commerce <p>4 Non-voting Members</p> <ul style="list-style-type: none"> • US Coast Guard • US Fish and Wildlife Service • US Dept. of State • Atlantic States Marine Fisheries Commission 	<p>19 Total Members:</p> <p>14 Voting Members</p> <ul style="list-style-type: none"> • 1 regional administrator at NMFS (or designee) – NW or SW region • 4 principle state officials (or designee) • 8 members, nominated by governors and appointed by Sec. of Commerce • 1 member representing a Native American tribe with fishing rights in one of the four states, appointed by Sec. of Comm. <p>5 Non-voting Members</p> <ul style="list-style-type: none"> • US Coast Guard • US Fish and Wildlife Service (Columbia Basin Ecoregion Director) • US Dept. of State • Pacific States Marine Fisheries Commission • Representative appointed by the Governor of Alaska

Fig. 9: Membership of the New England and Pacific Fishery Management Councils (NEFMC, 2003c; PFMC, 2003b)

While staff set-ups are similar (NEFMC, 2003c; PFMC, 2003b), the structures of the councils, themselves, are different in the two locations. Both have committees that include members of the councils, as well as advisory bodies that include outside experts such as scientists, fishing industry representatives, and environmental organization representatives. In New England, the advisory committees of experts are included in the structure *below* the oversight committees, which include only council members. In the language of the PFMC, the ad hoc committees of experts and standing committees of council members seem to be treated as equals (NEFMC, 2003c; PFMC, 2003b). Hanna (1995) further noted the “relatively flat” hierarchy of the PFMC’s advisory body and committee structure. This structure could have important implications for the influence of science on management decisions.

In addition, the two councils differ in their focus. Under the PFMC, there are several important fisheries, including salmon; the NEFMC focuses on groundfish and a few other key fisheries (R. Moore, pers. comm., 5 March 2004). While in New England most of the overall declines in fisheries can be accounted for by groundfish, on the Pacific Coast, salmon declines were mostly to blame. Species of special concern in New England have been cod, haddock, and yellowtail flounder; on the West Coast, coho and Chinook salmon have caused the most worry (Houston et al, 2000). Therefore, according to Houston et al. (2000), “the focus of many government policies has been mostly on groundfish in New England and salmon in the Pacific Northwest.” This focus has not been lost on many Pacific groundfishermen; they have expressed concerns about the amount of research dollars going to salmon versus groundfish (R. Moore, pers. comm., 5 March 2004).

Hanna and Hall-Arber (2000) describe the styles of management used by the councils as “business-style” management in the Pacific and “cultural style” management in New England. The councils look different, they argue, because of different management structures and initial conditions at the implementation of the MFCMA. According to Moore (pers. comm., 5 March 2004), the councils have historically differed in their processes. While the PFMC has a fairly defined process with structured committees and considerable participation, Moore perceived past NEFMC open meetings to be “almost a free-for-all.” The NEFMC committee meetings were also more closed than on the Pacific side. But today, Rosenberg says that on the one hand, it seems like the NEFMC might be becoming more engaged and proactive, while the PFMC,

“they’re not slipping so much,” but there is a blame game beginning to come out (A. Rosenberg, pers. comm., 22 March 2004).

Some have expressed concerns about the over-representation of special interests on both councils. In both cases, commercial fisheries interests accounted for the most appointed members for the majority of the councils’ histories (Okey, 2003). Today, recreational interests dominate the at-large seats on the PFMC (R. Moore, pers. comm., 5 March 2004). Many are concerned that the dominance of commercial or recreational fishermen on the councils and a shortage of other stakeholders, such as environmental advocates and scientists, may lead to management decisions that are skewed in favor of economic, rather than conservation, goals.

At the same time as industry members dominate the council seats, some perceive that the number of active fishermen who participate in the NEFMC and PFMC processes is decreasing. According to Moore, as issues under discussion become more complex and more science-oriented, the average processor or fisher finds a gap between what they see on the water and what the models are telling them. Therefore, there is a level of frustration among fishers; on both coasts, fishermen express the mentality that “the government will stick it to us no matter what” (R. Moore, pers. comm., 5 March 2004).

In addition to the human ecology of the councils, the communities of fishers, themselves, look different on the two coasts. As stated earlier, the fishermen use similar gear types on both coasts, and a range of vessel size classes exist. However, fishers in New England tend to be more individualistic. Further, there tend to be stronger ethnic associations among fishers on the East Coast (Hall-Arber, 2000). Because stocks continued to decline even after foreign fishing was eliminated, fishermen perceived an “internal threat” from fishers of other gear types or locations. Therefore, the groundfishermen did not come together with a set of common objectives (Hanna, 2000). The visible divisions between fisher groups by gear type, vessel size, or home port, along with the decreased stock sizes, led many management debates to become conflicts over allocation. As a result of this culture on the councils and among fishermen, the New England groundfishery is more divided in their goals, communications, and competition for portions of the catch.

Fishermen in the West Coast fishery do not possess the same focus on individual autonomy as their New England counterparts, and they do not hold as strong ethnic associations. However, tribal fishers are present in the fishing community, and fishers from Alaska are

potential participants, diversifying the constituent group. Still, the fishermen on the Pacific side have a history of cooperation and coming together towards common goals (Hanna, 2000). As discussed by Hanna (2000), because groundfish stocks in the Pacific appeared healthy as late as the 1990s, fishermen there did not perceive an “internal threat.” However, as stocks decline and economic measures become stricter, an increase in distrust and competition between users of the resource has appeared (Hanna, 2000).

Industry organizations have played a large role in such policy-making on both coasts, often with representatives sitting on the councils. While one researcher noted that the management regime in New England has always “implicitly” recognized industry organizations (Hall-Arber, 2000), some in the industry today believe that role is declining (R. Allen, pers. comm., 12 March 2004; C. Pendleton, pers. comm., 12 March 2004). Industry groups on the West Coast have traditionally been active in management, as well, and they often took on less contentious roles such as participants and promoters of cooperative research (this trend in collaboration is gaining emphasis in New England, too). Still, many perceive that the West Coast industry is not as powerful in lobbying or promoting management measures as the New England organizations. According to Rosenberg (pers. comm., 22 March 2004), the industry is never that excited about any regulations, but the two coasts differ in terms of the political muscle of the fishermen. It is a difference in history and culture.

Political leaders are also important in both cases, because they want to please their constituents. Governors suggest council members for each Fishery Management Council (NEFMC, 2003c). In the political climate of expansion in the 1980s, elected officials played a large role in promoting development programs and government subsidies that increased the capacity of the fleets (Hennessey and Healey, 2000; Mansfield, 2001). However, legislative intervention has only played a significant role in New England (Hanna et al., 2000; R. Allen, pers. comm., 12 March 2004). With the broadening-out of constituencies in New England, as described by Rosenberg (pers. comm., 22 March 2004), future elected officials may be active in promoting interests of other constituent groups besides local fishermen, such as environmentalists.

Beyond the competition and distrust between fishermen (particularly visible in New England), there are other sources of conflict between stakeholders on the two coasts. NOAA and its scientists play an important role in management for both councils, providing data and

analyses for FMPs. The data set on groundfish in New England is long-term and extensive; on the Pacific side, the ocean environment features complexities that are still not well understood. However, in both locations, fishers perceive the communication of scientific information to be inadequate (Hanna et al., 2000). On the East Coast, this distrust is particularly evident, and was exacerbated by the recent “Trawlgate” mishap. On the West Coast, constituents have expressed concern that the processes of data collection and analysis are not transparent enough. The councils themselves have diverging histories with respect to their use of science. The NEFMC showed a selective use of science in decision-making for most of its history. In contrast, the PFMC emphasized science in decision-making (Hanna, 2000), though some feel that the council was selective in which scientists they chose to listen to.

Over the years, the science on both sides has become more comprehensive. Following the 1996 amendments to the MFCMA and lawsuits by environmental organizations, science has been used to guide the NEFMC to a much greater degree (A. Rosenberg, pers. comm., 22 March 2004). In addition, cooperative research between industry members and scientists has become more popular on both coasts. According to Hanna et al. (2000), industry-provided science has not always been used by the councils, and failure to use this data could result in frustration and decreased cooperation in future research efforts. At the same time, council use of industry-provided or cooperative research could promote a greater stewardship ethic among fishermen.

Environmental advocates have played a large role in both fisheries, especially in recent years. According to Hanna (2000), environmental organizations began to participate more in the PFMC processes in the late 1980s and 1990s. They continue to be influential on the East Coast, as well, especially through litigation. Some credit CLF with bringing about any positive changes in management. Since their 1991 lawsuit, environmental groups on both coasts have regularly challenged FMPs under the MFCMA. Recently, a settlement decision by a federal judge led to the required restructuring of the Northeast Multispecies FMP in the Amendment 13 process (Conservation Law Foundation et al. v. Donald Evans et al., 2002). The NRDC and other groups remain active on the West Coast on issues such as bycatch and protection of depleted stocks.

As the initial conditions of the fisheries in 1977 differed, the rates of stock declines varied, and the groundfish complexes and fishing communities looked very different, management strategies used by the two councils contrast. One major difference has been the Pacific focus on year-round fisheries, compared with an emphasis on reducing DAS in New

England. As of 1999 most fisheries in the Pacific were open year-round with a few exceptions. In addition to DAS restrictions, the NEFMC has used minimum fish sizes, closed areas, gear requirements, seasonal and year-round closures, trip limits, and limited access programs. The Pacific groundfish fishery has a greater tradition of accepting quotas as a management tool (R. Moore, pers. comm., 5 March 2004). The PFMC has also implemented specific closures based on depth, stretching from Canada to Mexico, in order to protect species of rockfish.

Without a doubt, these declines and continually stricter management measures have changed the climate of the industries. Fishery development and overcapacity became issues on both coasts, and ultimately led to the need for conservation decisions with allocation consequences. Mansfield (2001) described a rhetoric of “Americanization” that permeated the fishing industry after the removal of foreign fishing in 1976. While on the East Coast, this Americanization took the form of removing competitors who threatened the stocks, the West Coast did not possess a large enough fleet to take the place of foreign trawlers. Therefore, Americanization on the Pacific side came to mean fishery development (Mansfield, 2001).

The Pacific Coast, although a smaller proportion of its 82 species are overfished, now faces many of the problems that have faced the NEFMC for years. The development-minded Pacific industry chose to participate in a \$46 million buyback program in 2002, in order to allow some fishermen to get out of the industry without going bankrupt, and allow others to remain financially viable (“Magnuson-Stevens Act Provisions...,” 2003). The New England fishers underwent two buyback programs prior to the recent Pacific program—the first a \$2 million pilot program, and the second a \$25 million project (Hanna, 2000). Still, removal of “latent effort” and “excess capacity” remains front and center in the decisions of the NEFMC.

Besides capacity reduction, a focus on allocation emerges as a common theme in recent years on both coasts. Managers must make allocation decisions along with any conservation decision. However, when conservation needs become so great because of depleted stocks, allocation becomes all the more critical. In New England, allocation of the catch incites strong emotions because the size of the catch is so reduced. In the Pacific, competition for parts of the catch has increased among use groups (Hanna, 2000). NMFS (1999) noted that allocation decisions for depressed species may become even more contentious in the coming years. In addition, the unintentional allocation to Alaskan boats is in the minds of fishermen, as is the perceived unfair amount of council resources allocated to the salmon fishery. On the Pacific

side, these concerns about groups outside the groundfishery may allow the community of fishermen to maintain common goals, unlike the majority of their New England counterparts.

Finally, in terms of comparing management strategies, IFQs have not been used in either location, but it will be interesting to see whether the industry turns to these types of management mechanisms, depending on the success or failure of current strategies. On the Pacific side, where there is an acceptance of quotas as a management tool, a committee has already been set up to investigate the issues for the trawl sector. In New England, fishers seem to be disheartened by further reductions in DAS. In addition, the new Amendment 13 measures feature some characteristics of IFQs, like transferable DAS and sector allocations. Therefore, fishers there may be closer to accepting quotas, and eventually IFQs.

According to Anthony (1990, p176), “With a small resource or with one that is heavily overfished, management options are limited. With a sizeable resource, the real underlying objectives of fisheries management, economic and social benefits, could be realized through the FMCs [Fishery Management Councils].” Therefore, if stocks are depleted, conservation requirements—the primary focus of fisheries management—may incite unavoidable economic consequences for the industry.

Ultimately, the shape and look of management on the two coasts may come down to historical differences. The 400-year history of fishing and the emphasis on individual autonomy has led the New England fishery to more strongly resist government management. At the same time, stocks visibly declined soon after the council system was implemented. It was not until an environmental organization sued the government that the NEFMC made significant gains towards rebuilding stocks. Trading off socioeconomic and conservation objectives on the NEFMC in the face of such depleted stocks remains a contentious and somewhat painful process. On the Pacific side, all is not lost. Groundfish stocks appeared relatively healthy until the 1990s. It soon became apparent that stocks had declined with strong economic consequences for the fishery. But the history of the industry has an underlying climate of accepting government regulations—including quotas. While more conflict may arise as increased measures are put into place, the Pacific fishery is arguably still more “resilient,” in the words of Hanna (2000), than its New England counterpart.

MANAGEMENT IMPLICATIONS and RECOMMENDATIONS

There are important lessons to apply to management on the East and West Coasts because of the many similarities that can be drawn between the two groundfisheries. According to one in the industry, there is not a history of much communication between the two councils. However, he reported a lot of dialogue between fishers on the two coasts (R. Moore, pers. comm., 5 March 2004). Fishermen communicate frequently with each other, especially through the Internet. “Just to get the guys to sit down at a computer was a big deal, and they’re doing that now” (P. Parravano, pers. comm., 24 March 2004). Moore said, “E-mail is a wonderful thing” (pers. comm., 5 March 2004). Managers should follow this lead; while keeping differences in mind, they should take advantage of successes and be wary of failures on the other coast.

There have been many causes assigned to the decline in the groundfish stocks. In New England, for example, researchers cite “shortsightedness” of managers and “decoupled benefits and costs” of management schemes as causes of the fishery’s decline (Sutinen and Upton, 2000). Weeks and Parker (2002) suggest that the reason for past management strategies’ failure to prevent overfishing of New England and Pacific groundfish is “a fundamental divergence between conservation goals and the economic and financial goals of communities and participants.” Uncertainty in biological, economic, and social components to the systems lead to “competing precautionary principles” on the side of conservation and economic stability (Weeks and Parker, 2002, p25). With these competing goals in mind, and the recognition that the two ecosystems are different and not completely understood, the experience of rapid depletion in New England should be a lesson to the PFMC—that despite massive increases in fishery regulations, once a stock is overfished it might not be quick to come back. Therefore, erring on the side of ecological precaution could result in shorter-term economic impacts in the future.

The two councils should look at strategies that work and strategies that didn’t. On the East Coast, closed areas seem to have been successful. This should be kept in mind as the PFMC tries to rebuild their depleted species; indeed, it seems they have used this strategy in part, as seen in their new implementation of time-depth closures. Likewise, if these time-depth closures prove effective, the NEFMC might want to consider more dynamic closed areas on the East Coast, according to the movement and life histories of groundfish there.

The emphasis on DAS reduction that has dominated NEFMC amendments over the past ten years or so did not appear to work, as evidenced by the fact that even more cuts are underway with Amendment 13 (NEFMC, 2003e). This should be taken into account by the PFMC as they increase regulations. It should be informative to see how the other Amendment 13 measures take shape, including the sector allocation to hook fishermen. The relatively smaller, well-organized and less divided West Coast fleet might lend itself well to area management or sector allocation, so they should look to the East Coast experience in the next few years to see how it plays out.

Many in the industry feel that new gear technologies are the best option for accomplishing conservation goals while minimizing economic impacts to fishermen. Parravano is one advocate of this solution; he said that retooling fishing gear is “the bridge that will bring [the industry] to the future. It will bring scientists, fishermen, and conservationists together.” (P. Parravano, pers. comm., 24 March 2004).

As cuts in DAS are made in New England, further capacity reduction programs may become essential to help an economically injured fishing industry, allowing fishermen to exit the industry who would otherwise go bankrupt. The NEFMC should be very attentive to the boat buyback program begun in 2002 on the West Coast. Their program included some unique ways of ensuring the diversity of the fleet, so that not all of the small boats dropped out of the industry. This is one concern of many small boat fishermen in New England—that the NEFMC is not considering what they want the fleet to look like. Using management strategies like the buyback program on the West Coast will have implications for who can remain in the fishery and who will go out of business.

Finally, communication between and among fishers, scientists, and government officials is shortcoming in both locations. To fix this, NMFS should make an effort at making science more transparent and accessible to fishermen, who likely do not have the time to read 800-page documents. Meetings should be scheduled at times when fishermen will be able to attend. Further, the composition of the councils should be examined to see if they reflect the interests that they were created to represent, or that they should represent.

In 2003, the Pew Oceans Commission released a report on recommendations for a new ocean policy. The President’s US Commission on Ocean Policy will release its own preliminary report in mid-April, 2004 (US Commission on Ocean Policy, 2004). The two commissions’ suggestions will undoubtedly shape the groundfish management debate in future years.

According to Rosenberg (pers. comm., 22 March 2004), ecosystem-minded measures may become more prominent after the release of the reports; he expects that issues such as habitat preservation and fisheries-mammal interactions will probably become more widely discussed. The Pew report recommended separating conservation and allocation decisions, so that the councils are not deciding the biological goals. Such a change in national ocean policy would fundamentally change the processes of the councils and perhaps the management measures that are chosen to accomplish conservation ends.

Perhaps more often than not, the different regions of NMFS operate distinctly where there could be important lessons learned by example and experience. With the fishery in New England, in particular, at a critical point in the process of redefining the shape of their multispecies fishery management plan, it is important to take into account these trials and errors already made in the past.

WORKS CITED

- Anthony, V.C. 1990. "The New England Groundfish Fishery after 10 Years under the Magnuson Fishery Conservation and Management Act." *North American Journal of Fisheries Management*. 10: 175-184.
- Cicin-Sain, B. and R.W. Knecht. 2000. *The Future of US Ocean Policy: Choices for the New Century*. Washington, DC: Island Press.
- Conservation Law Foundation et al. v. Donald Evans et al. 2002. US District Court, Civil Action No. 00-1134. Order filed May 23, 2002 by Judge Gladys Kessler. Available at <http://www.dcd.uscourts.gov/00-1134b.pdf>
- Fisheries Marketing Association. 2003. Web page. www.trawl.org
- Francis, R.C. 1986. "Two Fisheries Biology Problems in West Coast Groundfish Management." *North American Journal of Fisheries Management* 6(4): 453-462.
- "Gloucester, Mass., Man Writes New Proposal for Regional Fishery Management." 2003. *The Boston Globe* 16 Nov 2003. Accessed 22 Nov 2003 via National Fisherman.com.
- Hall-Arber, M. 2000. "Who Talks the Talk? The Voice of Community in Two New England Fishing Ports." In *Change and Resilience in Fishing*. S. Hanna and M. Hall-Arber, eds. Corvallis, OR: Oregon Sea Grant, 45-55.
- Hall-Arber, M. and A.C. Finlayson. 1997. "Role of Local Institutions in Groundfish Policy." In *Northwest Atlantic Groundfish: Perspectives on a Fishery Collapse*. J. Boreman, B.S. Nakashima, J.A. Wilson, and R.L. Kendall, eds. Bethesda, Maryland: American Fisheries Society, 111-138.
- Hanna, S. 1995. "User participation and fishery management performance within the Pacific Fishery Management Council." *Ocean and Coastal Management* 28 (1-3): 23-44.
- Hanna, S. 2000. "Change and Resilience in New England and Pacific Groundfish Fisheries." In *Change and Resilience in Fishing*. S. Hanna and M. Hall-Arber, eds. Corvallis, OR: Oregon Sea Grant, 13-21.
- Hanna, S., H. Blough, R. Allen, S. Iudicello, G. Matlock, and B. McCay. 2000. *Fishing Grounds: Defining a New Era for Fisheries Management*. Washington, DC: Island Press.
- Hanna, S. and M. Hall-Arber. 2000. "Chapter 1. Introduction." In *Change and Resilience in Fishing*. S. Hanna and M. Hall-Arber, eds. Corvallis, OR: Oregon Sea Grant, 1-7.
- Hannah, R. and M. Freeman. 2000. "A Preliminary Assessment of the Impact of the 'Small

- Footrope' Regulation on the Spatial Distribution of Oregon Bottom Trawl Effort in 2000." Newport, Oregon: Oregon Department of Fish and Wildlife. Accessed 24 March 2004. <http://hmsc.oregonstate.edu/odfw/reports/finfish.html>
- Hennessey, T. and M. Healey. 2000. "Ludwig's Ratchet and the Collapse of New England Groundfish Stocks." *Coastal Management* 28: 187-213.
- Houston, L., F. Johnson, E. Waters, H. Radtke, and J. Gates. 2000. "The Economic Impacts of Reduced Marine Harvests on Regional Economies." In *Change and Resilience in Fishing*. S. Hanna and M. Hall-Arber, eds. Corvallis, OR: Oregon Sea Grant, 25-42.
- "Magnuson-Stevens Act Provisions; Fishing Capacity Reduction Program; Pacific Coast Groundfish Fishery; California, Washington, and Oregon Fisheries for Coastal Dungeness Crab and Pink Shrimp." 2003. *Federal Register* 68 (4 November 2003): 62435-62440.
- Malakoff, D. 2002. "Miscue Raises Doubts About Survey Data." *Science* 298: 515.
- Mansfield, B. 2001. "Property Regime or Development Policy? Explaining Growth in the US Pacific Groundfish Fishery." *The Professional Geographer* 53(3): 384-397.
- Murawski, S. and F. Almeida. 2001. "Aggregate Resource Trends." *Status of Fishery Resources off the Northeastern United States*. NOAA Fisheries, Northeast Fisheries Science Center. Accessed 23 Nov 2003. <http://www.nefsc.noaa.gov/sos/agt/>
- Murawski, S.A., J. Maguire, R.K. Mayo, and F.M. Serchuk. 1997. "Groundfish Stocks and the Fishing Industry." In *Northwest Atlantic Groundfish: Perspectives on a Fishery Collapse*. J. Boreman, B.S. Nakashima, J.A. Wilson, and R.L. Kendall, eds. Bethesda, Maryland: American Fisheries Society, 27-61.
- NEFMC. 2003a. "Frequently Asked Questions about the Groundfish Fishery." Accessed Aug 2003. <http://www.nefmc.org/nemulti/>
- NEFMC. 2003b. "Summary of Plan: Northeast Multispecies (Large Mesh/Groundfish) Fishery Management Plan." Accessed 22 Nov 2003. www.nefmc.org/nemulti/summary/large_mesh_multi.pdf
- NEFMC. 2003c. Web page. www.nefmc.org.
- NEFMC. 2003d. Amendment 13 to the Northeast Multispecies FMP. Public Hearing Summary. Fairhaven, MA. 30 Sep 2003. Accessed 18 Nov 2003. http://nefmc.org/nemulti/a13_public_hearings/fairhaven_ma_summary.pdf
- NEFMC. 2003e. "New England Fishery Management Council Approves Groundfish

- Amendment.” News Release. 7 Nov 2003. Accessed 18 Nov 2003 via http://www.bdssr.com/latest/a13_press_release_11-07-03.pdf
- NEFMC. 2004. “Biomass Chart for 12 Multispecies Stocks.” Accessed 11 April 2004. <http://www.nefmc.org/nemulti/index.html>
- NMFS. 1999a. “Northeast Demersal Fisheries.” *Our Living Oceans: Report on the state of US living marine resources, 1999*. U.S. Dep. Commer., NOAA Tech. Memo. NMFS-F/SPO-41, online version, <http://spo.nwr.noaa.gov/unit01.pdf>.
- NMFS. 1999b. “New England Groundfish.” *Our Living Oceans: Report on the state of US living marine resources, 1999*. U.S. Dep. Commer., NOAA Tech. Memo. NMFS-F/SPO-41, online version, <http://spo.nwr.noaa.gov/olo99.htm>
- NMFS. 1999c. “Pacific Coast Groundfish Fisheries.” *Our Living Oceans: Report on the state of US living marine resources, 1999*. U.S. Dep. Commer., NOAA Tech. Memo. NMFS-F/SPO-41, online version, <http://spo.nwr.noaa.gov/unit15.pdf>
- NMFS. 2003. Microsoft Access Vessel/Dealer Permit Database “Permits_www_may03.mdb”. Updated 21 May 2003.
- NOAA Fisheries, Northwest Regional Office, Sustainable Fisheries Division. 2003. “Limited Entry Permits.” Accessed 23 Nov 2003. <http://www.nwr.noaa.gov/1sustfsh/lep1.htm>
- NOAA Fisheries, Northwest Regional Office Sustainable Fisheries Division. 2004. “Status of West Coast Groundfish.” Accessed 7 April 2004. Last updated 30 March 2004. <http://www.nwr.noaa.gov/1sustfsh/groundfish/gfStatus/>
- NWFSC, NOAA Fisheries. 2004. “West Coast Groundfish Program.” Accessed April 2004 <http://www.nwfsc.noaa.gov>
- Oceana. 2004. “Ensuing Future Fishing in the Pacific.” Ocean Law Project, Urgent Cases. Accessed 10 April 2004. <http://www.oceana.org/index.cfm?sectionID=13&fuseaction=19.detail&caseID=13>
- Okey, T. 2003. “Membership of the eight Regional Fishery Management Councils in the United States: are special interests over-represented?” *Marine Policy* 27: 193-206.
- Orbach, M. 1995. “Social Scientific Contributions to Coastal Policymaking.” *Science and Policy in the Coastal Zone: the California Example*. B. Cicin-Sain, ed. Washington, DC: National Academy Press, 49-61.
- Ortiz, E. 2003. “Panel OKs new options for fishermen.” *Providence Journal-Bulletin* 6 November 2003, B-01.

- Pacific Marine Conservation Council (PMCC). 2002. "Environmentalists Win Suit to Protect Pacific Groundfish. Government Ordered to Stop Wasteful Discard of Dead and Dying Fish." Press Release. 16 April 2002. Accessed 10 April 2004. www.pmcc.org/pressRelease/2002aprilAmendment13.html
- Parravano, P., Z. Grader, and G. Spain. 2002. "Is it Time to Replace the Fishery Management Council System?" *Fishermen's News* August 2002. Accessed 24 Sept 2003 via The Pacific Coast Federation of Fishermen's Associations, www.pcffa.org/fn-aug02.htm
- PFMC. 2000. "Groundfish Fishery Strategic Plan: Transition to Sustainability." Portland, OR: PFMC. Accessed 22 Nov 2003. <http://www.pcouncil.org/groundfish/gfother/stratplan.pdf>
- PFMC. 2003a. "Information Sheet: Groundfish." Accessed 19 Nov 2003. Last updated 12 Sept 2002. www.pcouncil.org
- PFMC. 2003b. Web page. www.pcouncil.org
- PFMC. 2003c. "Information Sheet: Geography of Rockfish." Accessed 20 March 2004. www.pcouncil.org
- PFMC. 2003d. "Executive Director Speaks at National Fisheries Conference." *Pacific Council News*. Portland, Oregon: PFMC, Winter 2003. Accessed 22 March 2004. www.pcouncil.org
- PFMC. 2003e. "Information Sheet: Individual Fishing Quotas." Accessed 19 Nov 2003. www.pcouncil.org
- PFMC. 2004a. "Statement of Organization, Practices, and Procedures." Accessed 8 April 2004. Last updated 10 Feb 2004. www.pcouncil.org/operations/sopp.html
- PFMC. 2004b. "Groundfish Vessel Buyback Program." Accessed 7 April 2004. Last updated 3 Feb 2004. www.pcouncil.org/groundfish/gfbuy.html
- PFMC/NMFS. 2004. "Draft Environmental Impact Statement." Amendment 16-3 to the Pacific Coast Groundfish Fishery Management Plan. March 2004. Accessed 11 April 2004. www.pcouncil.org/groundfish/gffmp/gfa16-3.html
- Pew Oceans Commission. 2003. *America's Living Oceans: Charting a Course for Sea Change*. Summary Report. May 2003. Pew Oceans Commission: Arlington, Virginia.
- Scholz, A.J. 2003. "Groundfish Fleet Restructuring Information and Analysis Project." Final Report and Technical Documentation. Pacific Marine Conservation Council/ECOTRUST. 23 March 2003. Accessed 10 April 2004. www.inforain.org/gfr/
- Sinclair, A.F. and S.A. Murawski. 1997. "Why Have Groundfish Stocks Declined?" In

Northwest Atlantic Groundfish: Perspectives on a Fishery Collapse. J. Boreman, B.S. Nakashima, J.A. Wilson, and R.L. Kendall, eds. Bethesda, Maryland: American Fisheries Society, 71-93.

Sutinen, J.G. and H.F. Upton. 2000. "Economic Perspectives on New England Fisheries Management." *Northeastern Naturalist* 7(4): 361-372.

US Commission on Ocean Policy. 2004. Web page. <http://oceancommission.gov>

Wallace, R.K. and K.M. Fletcher. 2001. *Understanding Fisheries Management: A manual for understanding the federal fisheries management process, including analysis of the 1996 Sustainable Fisheries Act.* Mobile, AL: Mississippi-Alabama Sea Grant Consortium.

Weeks, H. and S. Parker. 2002. "Scientific and Management Uncertainty Create Competing Precautionary Needs for Fishery Managers." *Fisheries* 27(3): 25-27.

Wilson, E. 2003. "Overfishing Hits Industry and Ecology." *Newsdesk.org* 18 August 2003. A service of Independent Arts and Media. Accessed 10 April 2004. http://www.artsandmedia.net/cgi-bin/dc/newsdesk/2003/08/18_fishing_industry