ONE LAST CHANCE

The Economic Case for a New Approach to Fisheries Management in New England

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THE PEW ENVIRONMENT GROUP

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New England's economy was built on the teeming fishing grounds off its shores, turning the region into an international powerhouse by the eighteenth century.

The advance of technology increased the efficiency of fishing operations. Unfortunately, misguided management decisions gave an illusion of prosperity that persisted until recently; as fish dwindled, the dollars kept flowing. Today, over half of the historic fish populations are desperately overfished, a mere shadow of what they were, and the recent decade has witnessed a mass exodus of fishermen from the historic fishing industry.

Now, the news reminds us repeatedly of the demise of this iconic industry. What happened to the fish that supported the fishermen and their families, poured money into our coastal communities and put food on our tables? And is there any hope for a brighter future?

This report chronicles the rise and fall of groundfish (cod, haddock and flounder) and describes what happened to the New England fishing economy as a consequence. It critiques the days-at-sea management system and the downward spiral it created.

Yet, in a change from the doom and gloom that has surrounded fishermen in these last few decades, this report also analyzes prospects for the future of the fisheries, taking inspiration from other successful and sustainable fisheries around the world. It finds that there is indeed hope for both the fish and the fishermen.

In 2006, federal law mandated the implementation of a new system of sustainable management. This includes science-based catch limits to rebuild fish populations and prevent overfishing, and accountability measures like monitoring, so fishermen and regulators know exactly how much fish is being caught. As a result, fishing can stop once reasonable catch limits have been reached.

Here in New England, community-based, fishermen-run cooperatives called sectors have been proposed as a way to provide fishermen with the flexibility to set their own fishing guidelines so they can run their businesses more efficiently and profitably while fish populations rebuild. The authors of this report examine this solution and compare it to other fisheries management alternatives. Their findings are compelling and offer the first concrete evidence that New England fishery management does indeed have a viable solution on the table.

It is time to act. There is much work to be done to prepare for the changes ahead. It will require commitment to a sustainable future and a lot of elbow grease, but there is no time for delay. The future of New England's fisheries is now.

Peter Baker
Manager, New England Fisheries Campaign
Pew Environment Group

The History of New England Groundfishing: Exploitation of a Bounty

In 1629, a minister in Salem, Massachusetts, wrote of New England that "the abundance of sea fish are almost beyond believing" (cited in Kurlansky 1997, p. 70). Four centuries of New England history, culture and economic development are grounded in the harvest of halibut, cod, haddock and other fish (White 1954; Northeast Fisheries Science Center 2004, period 6, p. 1). "By the eighteenth century, cod had lifted New England from a distant economy of starving settlers to an international commercial power" (Kurlansky 1997, p. 78). At the turn of the twentieth century, New England fishermen still earned 75 percent more for their labor than those in other U.S. fisheries (McFarland 1911). From 1929 to 1950, 76–87 percent of all U.S. fresh and frozen fish flowed through New England ports (White 1954, p. 15).

The New England fishery is also an archetype of mismanagement. Historical records show repeated patterns of boom-and-bust overexploitation and collapse (Edwards 1999). Species that provided a historical foundation for economic growth in New England—Atlantic halibut, cod, flounder and others—have been fished to decline, biological collapse or commercial extinction. "One by one, many of the most productive stocks have collapsed in the wake of ever-advancing harvesting technology, and failure of the management system to take steps necessary to rebuild the populations" (Northeast Fisheries Science Center 2004). There are few examples of substantive and long-term recovery. After decades of intensive management, New England faces unprecedented low abundance for most stocks and continuing decline of the fishing industry (Northeast Fisheries Science Center 2004; Edwards 1999).

Declines in landings and productivity were reported at least as early as the mid-1800s and by the 1950s were considered a grave concern.

MCFARLAND 1911; WHITE 1954

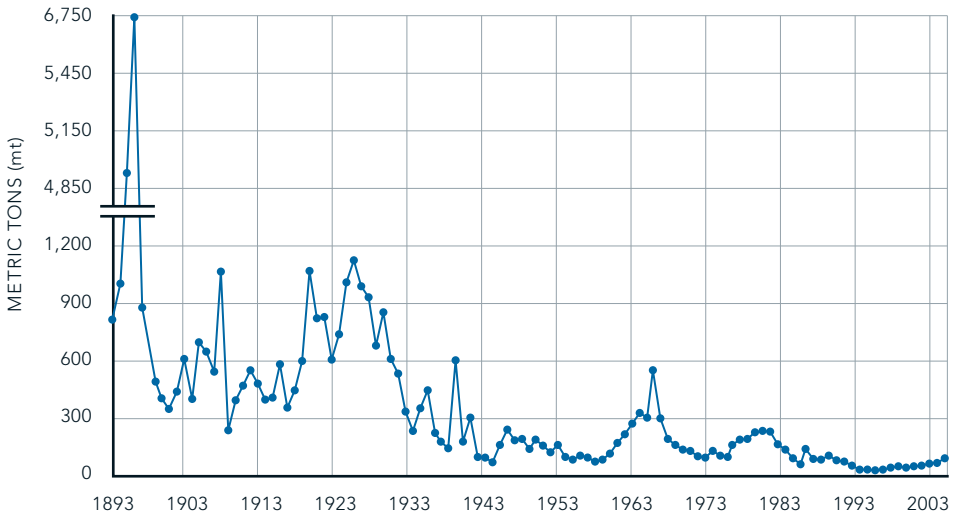
These Patterns Are Not New

Patterns of overexploitation continue today. Atlantic halibut, for example, shows the classic boom-and-bust harvest cycle with harvests collapsing by the mid-1940s. Record low harvests continue today (Figure 1), with vessels allowed to land only a single halibut per trip. Similar patterns are found in Georges Bank and Gulf of Maine cod landings (Figure 2), and in more recent biomass and landings of pollock, yellowtail flounder and witch flounder, among others. Even with the somewhat more successful rebuilding of Georges Bank haddock, overall trends are negative. National Marine Fisheries Service data show a continual downward trend in overall groundfish landings and inflation-adjusted revenues, with the sole exception being a temporary increase due to the exclusion of foreign factory trawlers from the 200-mile Exclusive Economic Zone in 1976 and strong year classes of cod and haddock in the late 1970s and haddock in the early 2000s (Figure 3).

Socioeconomic consequences of fishery decline are seen across New England. In the 1950s Gloucester, Massachusetts, supported about 2,000 working fishermen; by the mid-1990s the number had declined by 80 percent to only 400 (Kurlansky 1997). Occupational opportunities within the New England fishing industry continue to decline, "with more people leaving the industry then entering it" (NEFMC 2006, p. 344). Recent assessments point to deterioration in the social structure, family life, sense of community and financial resiliency of fishing communities.[1] Fishery management is marked by tensions and legal conflict; lawsuits often challenge regulatory decisions. Government funds for disaster relief, capacity reduction and other support now help sustain the industry. Most of the fish processed in locations such as Gloucester is now imported from Canada, Iceland and Norway (NEFMC 2003). Recent years show little sign of reversal in these long-term negative trends.

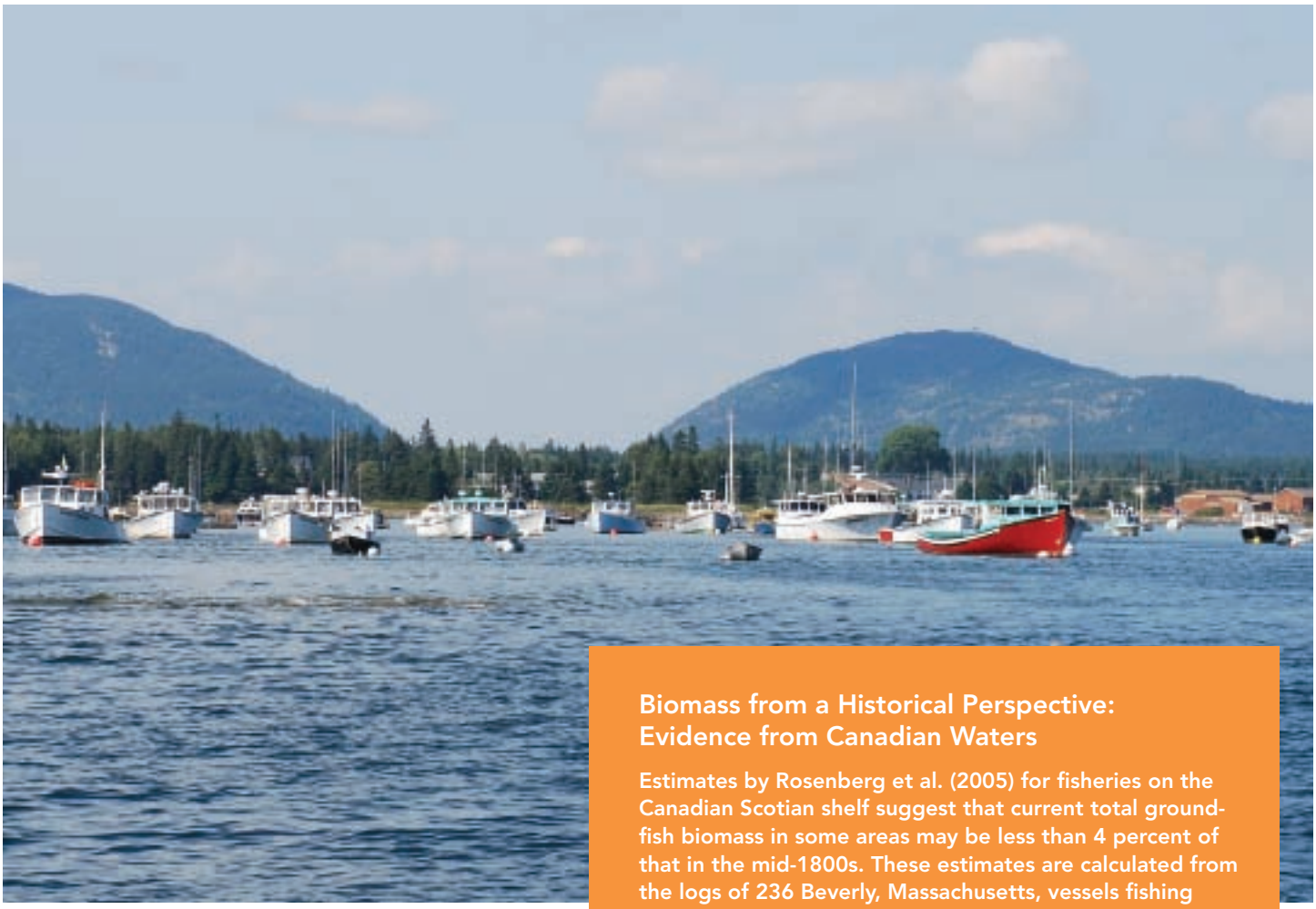
FIGURE 1

Atlantic Halibut Total Catch from the Gulf of Maine and Georges Bank, 1893–2005



"In the current policy debate about rebuilding depleted fisheries…, it is important to recognize that fisheries for key commercial species like cod were far more productive in the past."

ROSENBERG ET AL. 2005, P. 78

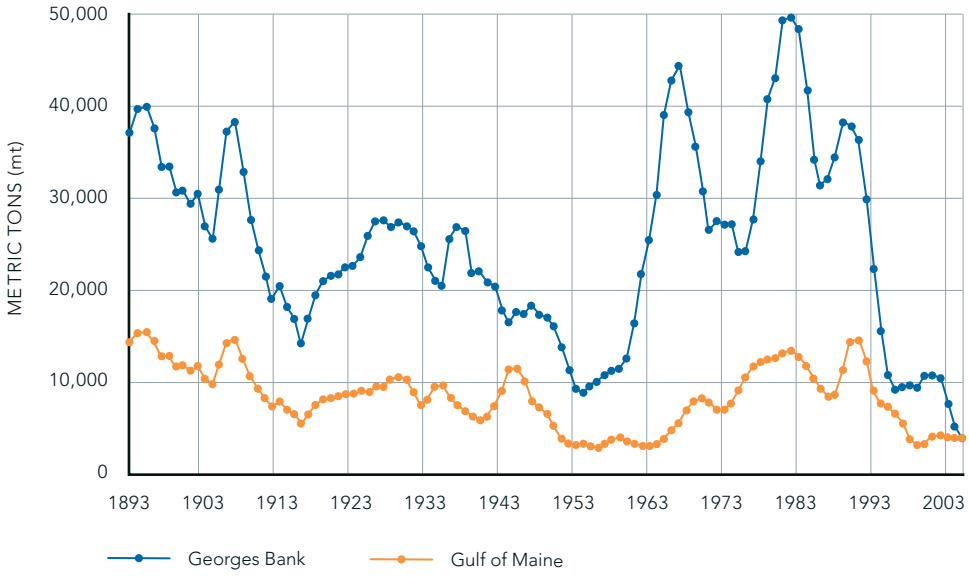


Biomass from a Historical Perspective: Evidence from Canadian Waters

Estimates by Rosenberg et al. (2005) for fisheries on the Canadian Scotian shelf suggest that current total groundfish biomass in some areas may be less than 4 percent of that in the mid-1800s. These estimates are calculated from the logs of 236 Beverly, Massachusetts, vessels fishing solely on the shelf (an area now in Canadian waters, but historically fished by New Englanders).

FIGURE 2

Atlantic Cod Total Commercial Landings from the Gulf of Maine and Georges Bank, 1893–2005 (3-Year Moving Average)



Economics and New England Fisheries: The Cause of a Crisis

The current condition of New England commercial fisheries is not a surprise. New England groundfisheries, like many at-risk fisheries worldwide, are managed through a byzantine set of effort or input controls that mandate when, where and how fish may be caught. Amendment 13 to the Northeast Multispecies Fishery Management Plan lays out the basis for most of the regulations currently in place for New England groundfish. The Amendment 13 document—over 1,300 pages long with its considered alternatives and various analyses—details restrictions on the number of days fished, fishing areas, trip limits, fish sizes and gear. Economics and historical patterns predict the outcome of such regulations: weak control over harvests; boom-and-bust cycles with decline of both harvests and stocks, long-term dissipation of economic benefits; and eventual deterioration of the fishing industry.

Effort controls fail because they do not directly control the quantity of fish that is caught and do not promote stewardship. Instead, these controls make catching fish more difficult and expensive in the hope that this will reduce catch to a desired level. Despite the best of these attempts, resilient fishermen repeatedly find new and more effective ways to catch fish, even while complying with ever more restrictive rules and regulations. Fishermen faced with increasingly strict days-at-sea limits, for example, can use more effective gear, fish longer and harder during available days, or take fewer safety precautions. Voluntary steps that might otherwise be taken to protect the environment or prevent unintentional killing of non-targeted fish or wildlife (called bycatch) are often abandoned. Economists term these and other unintended responses to effort controls "effort substitution."

The result is predictable: fishermen striving to harvest as many fish as possible, as quickly as possible, in the fishing days and areas available. Even with most New England groundfish stocks overfished, measures to further restrict effort have met with "strong opposition [from] fishermen" (NEFMC 2003, pp. I-878). Fishermen have "no plans to reduce their own effort [and many have] made investments … to increase their current catch per day" (Olson and Clay 2001, p. 5). Resulting patterns threaten both fish stocks and profits. Fisheries under effort controls are less productive, safe and sustainable than those managed using more effective methods. They are more damaging to ecosystems and often provide lower quality products. If nothing is done to correct the situation, these fisheries decline and often collapse. This is the history of New England fisheries.

Repeating History

"Many of the problems currently faced by the industry were foreseen as early as the first decade of the [twentieth] century. Increasingly efficient fishing methods, competition between fleet sectors employing various gears, inability to act in harmony with international partners, and the failure to heed scientific advice sound like current themes, but in fact have been echoed repeatedly since the turn of the century[....] A continuing trend over the past century has been the overexploitation and eventual collapse of species after species."

NORTHEAST FISHERIES SCIENCE CENTER 2004, P. 1

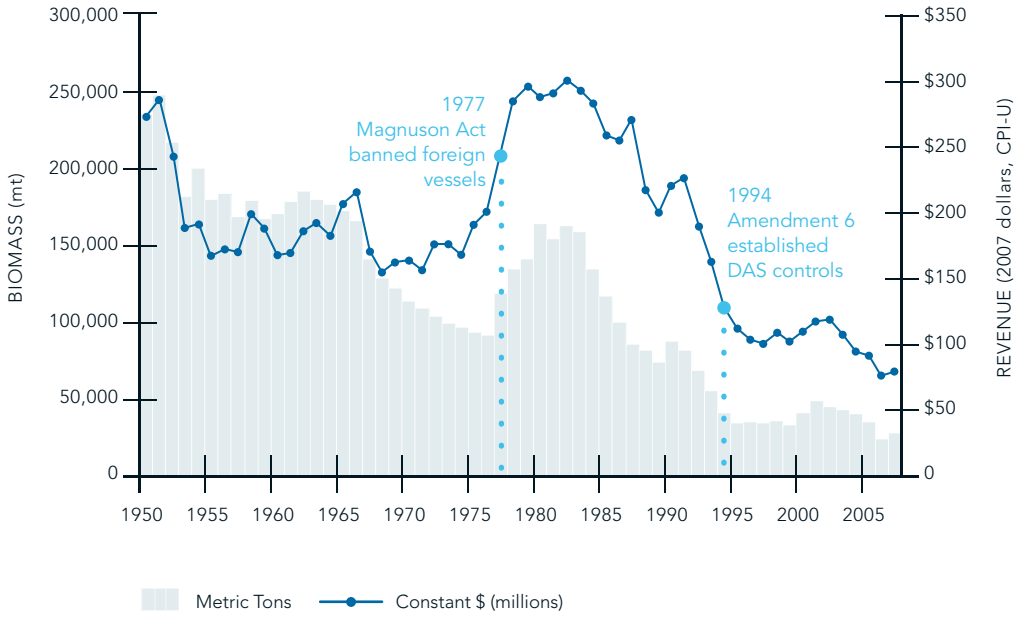
The Worst of All Worlds

"We're putting an awful lot of costly regulatory constraints on fishermen that aren't working, so we're kind of ending up in the worst of all possible worlds."

JAMES WILSON, UNIVERSITY OF MAINE MARINE SCIENCE CENTER (QUOTED BY NATIONAL PUBLIC RADIO (WGBH) 2009)

FIGURE 3

Total New England Commercial Landings of 12 Groundfish Species, 1950–2007



Days-at-Sea Regulation and Effort Controls in New England: Have They Worked?

Since 1994, the central mechanism used to control the harvest of New England groundfish has been limits on the number of fishing vessels combined with complex restrictions on the number of days-at-sea that each vessel may fish, trip limits restricting the amount of harvest during each trip, and year-round and seasonal area closures. Since inception, days-at-sea regulations have struggled with fundamental problems. After 15 years with many updates and revisions, days-at-sea regulations have achieved neither biological nor economic goals (Georgianna et al. 2008).

Nearly 80 percent of the groundfish stocks were overfished (15 out of 19 stocks), subject to overfishing, or both (NFSC 2008).[2] From 2004 to 2007, the number of stocks both overfished and subject to overfishing increased 64 percent, from 7 to 11 stocks. The number of stocks neither overfished nor subject to overfishing declined. Fishing revenues have fallen for many species, continuing historical trends. From 2004 to 2006, for example, revenues from New England cod and haddock declined 21 percent, while revenues from flounder declined 14 percent (National Marine Fisheries Service 2006).

From an economic perspective, the failure of days-at-sea and other effort controls to achieve sustainable, profitable fisheries is a logical consequence of the fundamental nature of effort controls and the ways that these controls have been implemented. Other than the Northeast U.S., there are only two other uses of days-at-sea to manage major fisheries—the mixed trawl fishery in Scotland and demersal fisheries in the Faroe Islands—with results and problems similar to those found in New England (Georgianna et al. 2008; Rossiter and Stead 2003; Jákupsstovu et al. 2007). No multispecies fishery has ever prospered or been rebuilt successfully under days-at-sea limits.

Too Many or Too Few Days?

According to the estimates of Edwards and Murawski (1993), and despite severe economic difficulty in the New England fishery, there are still too many allocated days-at-sea. In addition, because of the way days-at-sea are allocated, some vessels are severely restricted, while others are given more days-at-sea than they use. Figure 4 shows the difference between allocated and used days-at-sea over time in New England. Although this difference has narrowed as days-at-sea have become more restricted and leasing and transfers have been allowed, there are still days that remain unused.

Why would a vessel not use all of its days-at-sea? In some cases, vessels have chosen to abandon the fishery or spend time fishing for other species. In other cases, vessels were allocated more days-at-sea than they had used in the past (Georgianna et al. 2008). Some experts worry that if stocks begin to recover, some of these latent days-at-sea will be brought back into the fishery, placing additional pressure on stocks.

"It's time for things to change. Days-at-sea have led to discarding and waste and put too many fishermen out of business. Sectors are the last chance for our industry in New England."

Glen Libby, Midcoast Fishermen's Association, Port Clyde, Maine, FV Skipper

Why Have Days-at-Sea Limits Failed in New England and Elsewhere?

Days-at-Sea Limits Encourage Waste

When vessels only have a limited number of days-at-sea, it creates a perverse incentive to catch fish as quickly as possible during available days.[3] Responsible fishermen who could otherwise take the time to fish in a safe, profitable and ecologically conscientious manner are induced to put aside these goals in an attempt to catch as many fish as possible in the few days they have available. Fishermen are given little incentive to avoid overfished stocks and target healthier populations; in order to reduce pressure on overfished stocks, effort controls become so restrictive that it is no longer possible to harvest an optimal quantity of the few remaining healthy stocks. The result is inefficient, costly, unsafe and more damaging to the environment. As fish stocks and profits decline, perverse incentives only increase.

Days-at-Sea Allocations Have Not Promoted Sustainability

Since the beginning of the days-at-sea program in New England, both access and effort have been over-allocated (Thunberg 2000). Optimal fishing effort for New England groundfish has been estimated to be approximately 22,000 days (Edwards and Murawski 1993). By comparison, original allocations provided nearly 250,000 days-at-sea to the New England fleet—ten times the optimal level (Georgianna et al. 2008).[4]

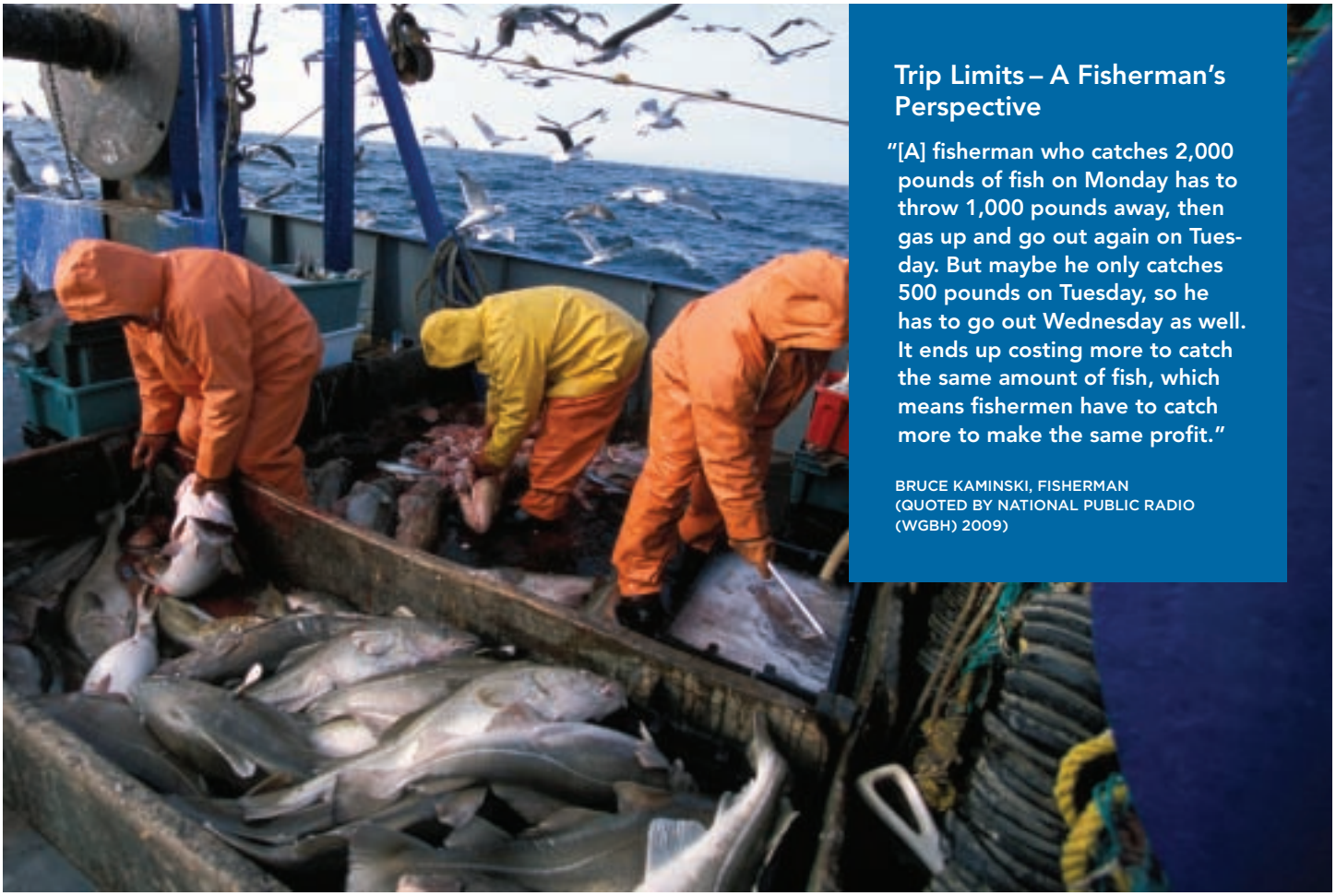
Since 1994, days-at-sea have been continually reduced and restricted in a largely unsuccessful effort to rebuild fish stocks.[5] Increasingly restrictive limits have been placed on other forms of effort in recurring attempts to prevent effort substitution. This trend of continually tightened regulations, paired with long-term economic waste and decline, is a common characteristic of fishing effort controls that have failed worldwide (Edwards 1999; Morgan and Gary 1997).

Days-at-Sea and Effort Controls Eliminate Profits

Days-at-sea limits encourage costly fishing behaviors in an attempt to harvest fish more quickly. Trip limits require that fishermen return to port more often or with their vessels only partially filled, further increasing per unit costs. When fishermen instead choose to keep fishing for other species, they must discard species that exceed the trip limit (the fish are usually killed in the process). The result is a large quantity of legal but wasteful regulatory discards. Gear restrictions can also prevent fishermen from using cost-effective fishing methods. Low fish stocks depress catch-per-unit effort (fishing effectiveness) and revenue. The result is a dissipation of profits from the fishery. Repeated allocations of government disaster relief funds to the New England fisheries highlight the precarious economic situation that has resulted.

Harvest Goals Were Too Optimistic

The success of fishery management depends on accurate science. Even using contemporary methods, many past stock assessments and models were "in error or did not fully account for uncertainty" (NEFMC 2009, p. 414). As a result, even when days-at-sea and other effort controls were able to maintain harvests within established regulatory limits, too much fishing and harvest still occurred. The result was continued overfishing on most stocks and a failure to meet periodic rebuilding targets.[6] As a consequence, the January 28, 2009, draft of Amendment 16 to the Northeast Multispecies Fishery Management Plan calls for further reduction in fishing mortality. If this is accomplished using effort or input controls, it will result in even more restrictive and costly limits on the activities of fishermen.



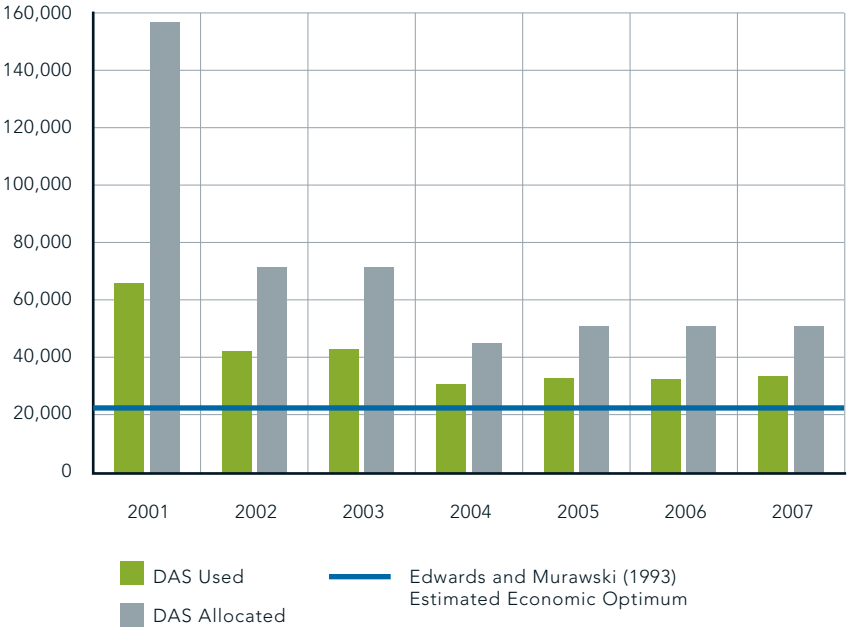
Trip Limits – A Fisherman's Perspective

"[A] fisherman who catches 2,000 pounds of fish on Monday has to throw 1,000 pounds away, then gas up and go out again on Tuesday. But maybe he only catches 500 pounds on Tuesday, so he has to go out Wednesday as well. It ends up costing more to catch the same amount of fish, which means fishermen have to catch more to make the same profit."

BRUCE KAMINSKI, FISHERMAN
(QUOTED BY NATIONAL PUBLIC RADIO (WGBH) 2009)

FIGURE 4

Category "A" Days-at-Sea Allocated and Used, 2001–2007



Economics 101: Perverse Incentives

A perverse incentive is an unintended motive, often created by a government regulation, that encourages more of an unwanted or negative behavior. Effort controls in fisheries often create perverse incentives that encourage less stewardship, more wasteful fishing and faster decline of fisheries.

Evidence from Worldwide Fisheries: Can We Do Better?

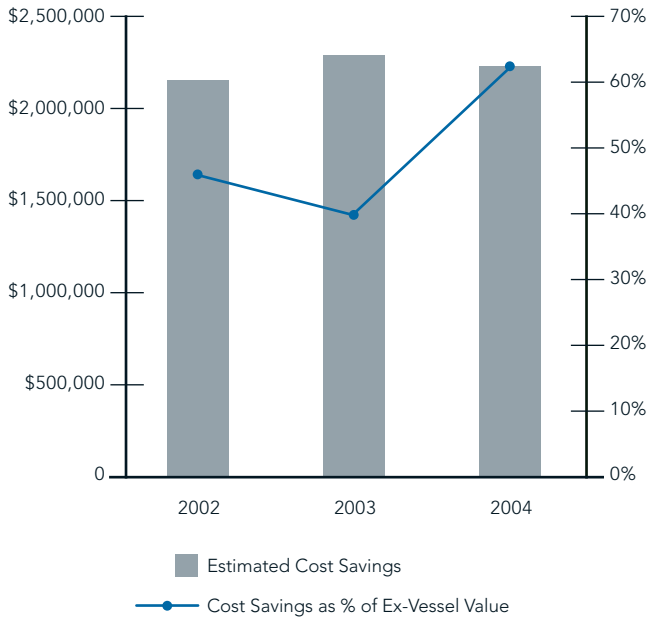
A recent report by the National Academy of Public Administration concludes that the U.S. fishery management system has "increasingly struggled under the burdens of conservation, environmental protection, over-exploitation and increased statutory and policy mandates."

NAPA 2002, P. IX

The management system also tends to put in place regulations that fishermen view as complex, cumbersome and inappropriate. Many countries have encountered similar difficulties and have concluded that heavy government involvement in fishery management, particularly using effort controls, is burdensome and ineffective. These countries have responded by devolving much of the responsibility of management to organizations of fishermen, sharing accountability with fishery participants. Examples of shared management, called co-management, abound in Canada, the United Kingdom and elsewhere. Co-management often increases compliance with fishery regulations, decreases enforcement costs and increases satisfaction with management (Sutinen and Johnston 2003; Townsend et al. 2008).

FIGURE 5

Estimated Cost Savings Attributable to Chignik Salmon Cooperative, 2002–2004



The Alaskan Pollock Conservation Cooperative: Increasing Quality and Profits

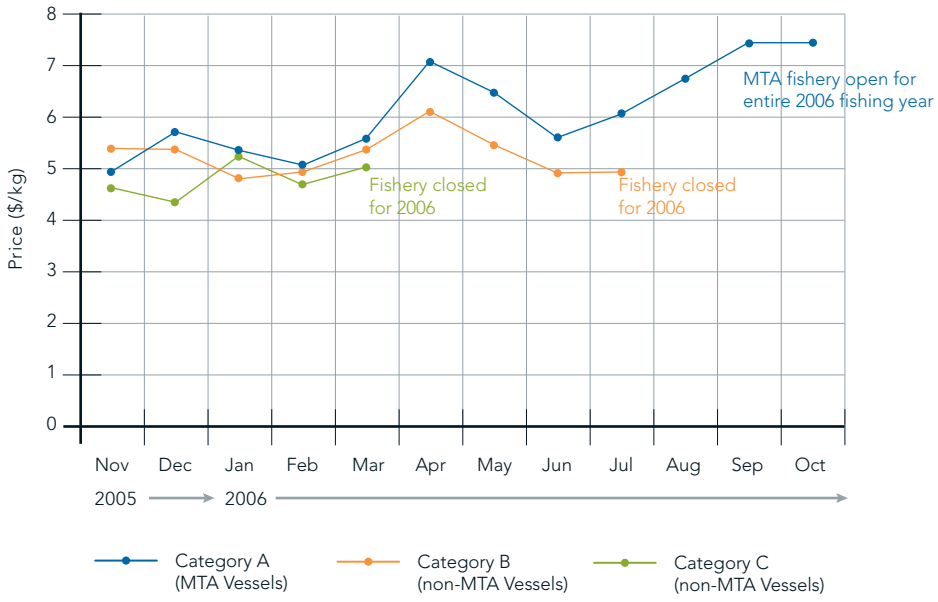
The American Fisheries Act allowed creation of the Alaskan Pollock Conservation Cooperative (PCC) in 1998. Wilen and Richardson (2008) detail the outcomes of the PCC. These include greater profits and product value. Since its inception, the PCC has increased efficiency and returns by fine-tuning fishing operations, coordinating operations and tailoring product mix to market conditions. Catcher vessel and processor operations are able to increase the quality of raw fish by slowing operations, thus enhancing value. Reduction in derby fishing is illustrated by a 40 percent decline in daily catch per vessel. Product recovery (the proportion of usable product from raw fish) increased from 19.5 percent prior to the cooperative to 24.6 percent in the first year of the PCC, with subsequent gains to over 30 percent.

Benefits of a Voluntary Cooperative: The Montauk Tilefish Association

The Montauk Tilefish Association (MTA) comprises a small number of vessels that together harvest the majority of U.S. Northwest Atlantic tilefish. The owners of these vessels (Fishery Management Plan Permit Category A) voluntarily formed the Montauk Tilefish Association (MTA) to coordinate fishing, cooperatively managing combined landings for all MTA vessels. The existence of competing tilefish vessels (Permit categories B and C) that fish non-cooperatively under their own group limits provides a natural experiment contrasting a cooperative and non-cooperative fishery. As noted by Pinto, DaSilva and Kitts (2006, p. 837) "Since forming the Association, [MTA] vessels have never fished more than their allocation, have not shortened their fishing season, and have maintained their share agreements." Analysis of data from Rountree et al. (2008) shows that 2006 prices received by MTA vessels exceeded those received by non-association vessels by an average of 20 percent, due to the ability of Association vessels to coordinate harvests year-round (Figure 6). Season length in 2006 was 13–30 weeks longer for MTA vessels compared to non-MTA vessels, and formation of the MTA has made fishing safer (Rountree et al. 2008). "[MTA vessels] have gone from becoming a threat to the resource to becoming stewards and managers" (Rountree et al. 2008, p. 145).

FIGURE 6

Montauk Tilefish Association (MTA) Prices, Fishing Year 2006



Experience worldwide has demonstrated the benefits of directly limiting harvests (*i.e.*, output controls). Quotas are established for a portion of the allowable catch and allocated to individuals or groups (through limited access privilege programs, LAPPs) (Costello et al. 2008; Heal and Schlenker 2008). Those holding quotas decide how and when to harvest their allocated quantity, with fewer government restrictions other than limits on total catch. In some cases, allocated harvest quantities can be transferred or leased between groups, further increasing the potential for economic benefit. A National Research Council study of such programs concludes that "allocation of permits to harvest a portion of [allowable harvest] is a management tool with high potential for efficiency and stewardship". It can be successful in fisheries where other types of regulations fail "to prevent a race for fish and overharvesting, and in which economic efficiency, safety, and product quality suffer" (NRC 1999, p. 12).

Experience with co-management and LAPPs provides evidence of the benefits that can be achieved, particularly when the advantages of both approaches are combined. Such coordinated efforts are often called fishery harvest cooperatives; in New England they are called sectors.

Harvest Cooperatives and Sectors: A Way Forward

Although different types of harvest cooperatives or sectors exist, most share a similar structure. A self-organized group of fishermen is given a renewable privilege to harvest a specific quantity and type of fish. This quantity is usually given as a percentage of a sustainable total allowable catch (TAC) of individual stocks. The group is given the accountability to manage its members and ensure that harvest limits are not exceeded. This gives responsibility and authority to fishermen to develop fishing approaches best suited to their particular component of the fishery. Government oversight ensures that the total group harvest remains within specified limits. In return for maintaining total catches within specified limits, the cooperative or sector can opt out of many of the restrictive and wasteful effort controls—such as days-at-sea, seasonal closures and trip limits—previously imposed upon individual fishermen.[7]

Performance of Harvest Cooperatives

Harvest cooperatives exist in many fisheries worldwide and have a history of positive results. There are many reasons why cooperatives tend to outperform other management alternatives. Strong, renewable harvest privileges encourage sustainable and profitable use of fishery resources, as well as greater stewardship. Accountability provides incentives for cost-effective and responsive management as well as greater compliance. Cooperation among fishermen provides opportunities to fine-tune fishing and processing operations, coordinate fishing to reduce costs and environmental impacts, and tailor product timing and mix to suit market conditions.

These advantages are not just hypothetical—results of harvest cooperatives such as the Montauk Tilefish Association, Alaskan Pollock Conservation Cooperative, Pacific Whiting Conservation Cooperative and others demonstrate clear biological and economic benefits. These include longer seasons, increased sustainable landings and profits, reduced bycatch and waste, higher product quality and recovery rates, and safer fishing.

Cooperatives also increase satisfaction among fishermen. Knapp (2008) reports that 70 percent of fishermen had either very or somewhat positive feelings regarding the Chignik Salmon Cooperative in Alaska, at least in part due to cost savings, improved product quality and numerous innovations brought about through the cooperative (Figure 5).[8] Similar benefits are found in other examples of fishery self-governance in other parts of the world (Townsend et al. 2008).

The End of a Derby: The Pacific Whiting Conservation Cooperative (PWCC)

In 1997 the PWCC put an end to the derby fishing that had previously pervaded the whiting fishery. Before the PWCC, companies used all permitted vessels to harvest as rapidly as possible; high catch rate per unit time was the primary goal. After the PWCC, rapid harvest became less important, shifting the focus to goals such as market timing, product quality and economic efficiency. In the first year, the cooperative witnessed an approximately 260 percent increase in season length, from 33 to 83 days. Since then, average season length for the catcher-processor sector has ranged from 82 to 197 days. There have been measurable improvements in safety. The PWCC has also allowed owners to invest in equipment that improves product yield and quality rather than maximizing capacity for rapid processing. As a result, product recovery has increased going from 17 percent to 24 percent in the first year of the cooperative alone. These and other outcomes are detailed by Sylvia et al. (2008).

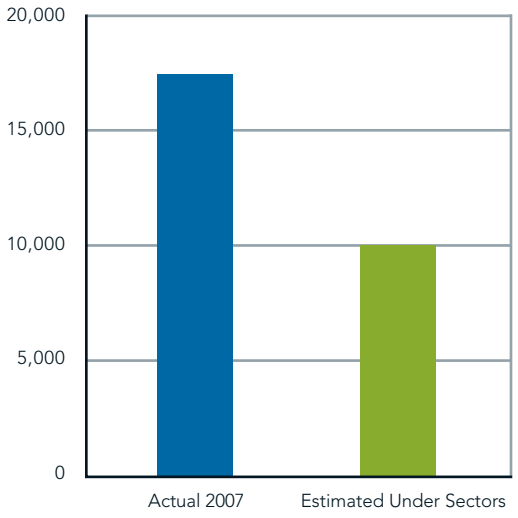
New England Sectors: Modeling the Benefits and Reducing the Barriers

Although multispecies New England groundfish sectors would not be identical to single-species harvest cooperatives,[9] many of the same advantages apply. Despite these advantages, as of early 2009 there were only two sectors approved by the New England Fishery Management Council—the Georges Bank Cod Hook Sector and the Georges Bank Cod Fixed Gear Sector. Unlike cooperatives elsewhere, these sectors operate under most of the effort controls imposed on the non-sector groundfish fleet, including days-at-sea limits. The primary benefits of membership for these sectors include exemption from cod trip limits and certain seasonal area closures (Holland 2007). Although exact effects of these sectors can be difficult to separate from those caused by other events, results suggest many positive outcomes. These include an increase in total fishing revenues per vessel in the Cod Hook Sector from 2005 to 2007 and a reduction in regulatory discards from the Fixed Gear Sector.[10] The Fixed Gear Sector was able to nearly triple cod landings and revenues relative to prior averages, and increase per-day landings from 460 to 740 lbs., reflecting more efficient operations. At the same time, both sectors have kept harvests within mandated limits.

Beyond these and other quantitative benefits, anecdotal evidence suggests broad satisfaction with sectors and support for wider applications (Venkataraman 2009; National Public Radio (WGBH) 2009). Reflecting this support, the January 28, 2009, draft version of Amendment 16 to the Northeast Multispecies Fishery Management Plan includes more extensive provisions for New England sectors. As reported in the draft Amendment, the holders of nearly 650 groundfish permits (the majority of active groundfish vessels) have expressed initial interest in joining one of 19 sectors.[11]

FIGURE 7

Projected Effort Reductions under New England Sectors: Days-at-Sea Required for Trawl Portion of Groundfish Harvest



Community Groundfish Management on the Canadian Scotian Shelf

"Giving communities the flexibility to devise appropriate management applications has virtually eliminated all the criticism and lobbying of previous planning approaches. The approach allows community solutions to the problems of fish management, including many aspects of monitoring and enforcement, transfers of quota and catch history and conservation of the resource."

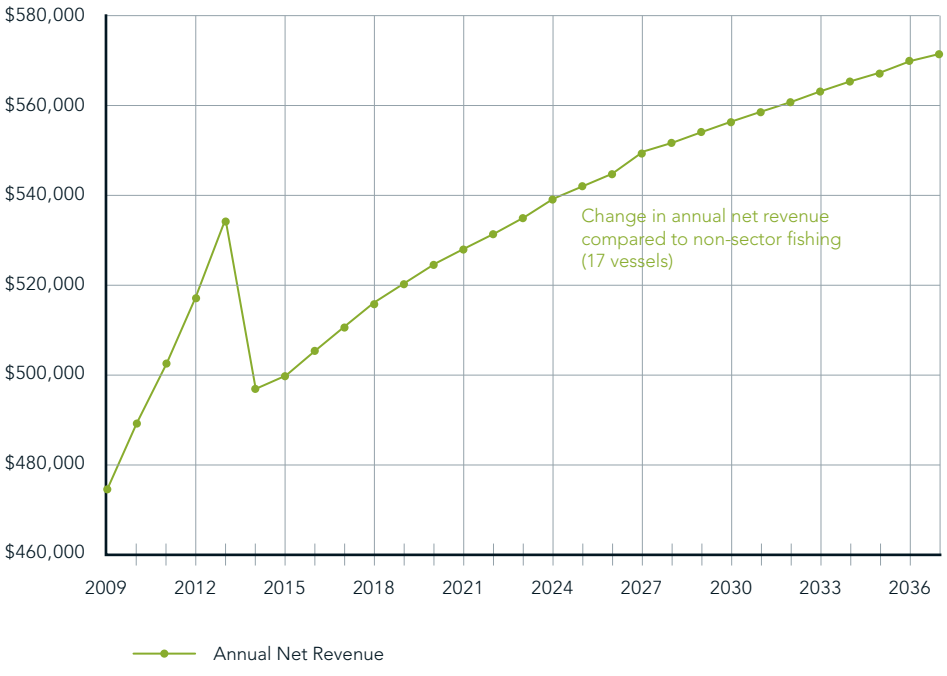
PEACOCK AND ANNAND 2008, P. 109

Although outcomes will depend on the ways in which sectors are regulated and implemented in New England, economic models suggest some of the potential benefits that participants could expect. Holland (2007) reports two economic case studies of prospective community-based groundfish sectors in Portland and Port Clyde, Maine.[12] Although the costs of establishing and operating sectors depend on many factors, the predicted gain in revenues is substantial, ranging from 16 percent to 28 percent in the Portland sector and 44 percent to 79 percent in the Port Clyde sector (Figure 8). Predicted total net revenue increases from establishment of the two Maine sectors range from $6.2 million to $7.4 million. A similar analysis reported in draft Amendment 16 suggests that New England groundfish trawl vessels could reduce fishing effort by 60 percent under sectors without any loss of harvest (Figure 7). These gains in efficiency are similar to those seen in other fisheries operating under comparable management systems (Michelin 2008).

Increased catch of healthy fish stocks, reduced regulatory discards, and other sector benefits result from the exemption of sectors from restrictions including days-at-sea, rolling closures, and trip limits. These exemptions can allow sector vessels to harvest more efficiently and with reduced ecological impact.[13] Additional gains (not included in these estimates) might be realized through reduced operating costs and improvements in product quality, marketing and harvest timing, outcomes found repeatedly in harvest cooperatives elsewhere (Townsend et al. 2008). These findings suggest that "sector management can provide substantial gains in net revenues … and that these gains far outweigh the costs of establishing and operating a sector" (Holland 2007, p.3).

FIGURE 8

Hypothetical Port Clyde Groundfish Sector Projected Annual Net Revenue Gain



Advantages of Sectors in New England

"Sectors offer fishermen the opportunity to: increase efficiency by increasing flexibility of when and where to fish; manage fishing operations to meet social as well as economic objectives of the sector; concentrate on increasing quality and value of fish caught without concern for lost fishing time; make targeting and location decisions without concern for lost fishing time; avoid having to return to port or discard fish because a trip limit is reached for one species; and transfer (share, trade or consolidate) catch privileges among sector members to reduce fishing costs."

HOLLAND 2007, P. 2

Tradeoffs Between Sectors and Individual Fishing Quotas: Results Depend on the Fishery

"[I]t is difficult to discuss the implementation of these programs without consideration of the specific nature of each fishery and the social and economic communities associated with it…, Each region is unique in terms of its biologic, social, and economic characteristics."

NATIONAL RESEARCH COUNCIL 1999, P. 4

"Sectors allow me to plan my business in a way that trip limits and days-at-sea never did. There's a lot more flexibility when you combine your resources and manage your fishery as a community than when it's managed at the federal level."

Eric Hesse, Cape Cod Commercial Hook Fishermen's Association, Chatham, Massachusetts, FV Tenacious II

Sectors can also provide greater stewardship incentives. These are related to fishermen's ability to realize clear and direct benefits from ecologically responsible behavior. For example, if sectors stay within their annual quotas, they are assured that their quotas will not be reduced in the following year as a consequence of overharvest by other vessels. This provides an incentive to maintain harvests within limits, regardless of the activity of non-sector vessels.

Despite the advantages of sectors, their financial viability depends in part on regulatory, administrative and other burdens imposed by management regulations (Michelin 2008; Holland 2007). These influence the costs of implementing and operating a sector. Preliminary scenarios suggest that the economic benefits[14] of New England groundfish sectors relative to the status quo could range from -$19.5 million to +$91.8 million, depending on factors including the discount rate and operating costs (Michelin 2008). Based on these and other results, Michelin (2008) finds that "under a set of reasonable assumptions, industry will be able to cover the cost of operating the sector program," but emphasizes the importance of programs that are "economically viable, within different ecological and social contexts" (pp. 28, 31).

Regulations must balance a need for adequate monitoring, environmental protection, enforcement and compliance with the imposition of costs that might prohibit otherwise beneficial sectors. Costs that would be borne by sectors under the January 28, 2009, draft Amendment 16 (p. 442) include "one-time costs such as the costs to organize, acquire office equipment and space, prepare and submit a proposal, prepare the initial supporting NEPA document, and prepare and submit annual reports," as well as "continuing costs [related to] the day-to-day administration of the sector, monitoring requirements, and preparation of periodic updates to the operations plan and supporting NEPA document." These could represent a substantial impediment to sector formation (Holland 2007). Although evidence from models of New England groundfish sectors (Michelin 2008; Holland 2007) and fisheries outside New England suggests that new revenues from sectors and other harvest cooperatives can far exceed new costs, avoidance of unnecessary costs can be an important step in enhancing the economic feasibility of sectors in New England. Mechanisms for reducing the regulatory burden on sector organizers, while ensuring that environmental and other important public interests are maintained, are a crucial element of sector development and oversight.

Orienting Management around Community Need

The Fundy Fixed Gear Council, established in 1996, manages inshore, fixed gear groundfishing on the Nova Scotia side of the Bay of Fundy. Among other successes, this community-based cooperative has been credited with promoting compliance with fishing plans and encouraging survival of the local fishing fleet. This and other cooperatives have helped orient fishery management around community needs in the Canadian Maritimes.

CHARLES ET AL. 2007

Alternatives to Sectors

Regulatory alternatives to harvest cooperatives or sectors include: (1) the status quo; (2) non-allocated, fishery-wide TACs;[15] (3) more restrictive effort controls; and (4) individual harvest privileges such as individual fishing quotas (IFQs). All of these are inferior to sectors for one or more important reasons. The status quo (no change in current regulations) would continue the negative trends outlined above, with ongoing losses in fishery resources, economic benefits and fishing communities. Non-allocated TACs, in turn, may encourage extreme and wasteful fishing derbies, leading to outcomes such as the two-day season for Alaska halibut in 1994 prior to the successful implementation of IFQs (NRC 1999). Increasingly more restrictive effort controls might succeed in reducing harvest, but they would do so through even greater and more wasteful restrictions on the fishing industry, further depressing any potential for economic recovery.

Individual fishing quotas are among the most promising of the alternatives to sectors. Like harvest cooperatives, IFQs have been applied successfully in many fisheries worldwide, with positive biological and economic outcomes (NRC 1999; Costello et al. 2008; Heal and Schlenker 2008). An important advantage of IFQs is that management costs borne by fishermen are often lower than those under sectors or cooperatives. However, sectors offer many advantages not often provided by IFQs. These include the ability to coordinate harvest timing and location, product mix and marketing to increase net benefits.[16] Sectors also provide an opportunity to coordinate fishing activity among sector members to minimize fishing costs. Economic advantages of coordinated efforts are found in many fisheries (Townsend et al. 2008). Such advantages provide the potential for greater economic benefits under sectors than might be possible under IFQs. Individual sectors' members can also be held liable for regulatory infractions of the sector as a whole, creating strong incentives for internal enforcement. This may reduce monitoring and enforcement costs relative to IFQs, thereby increasing profitability if these costs are recovered from industry.

Finally, harvest cooperatives or sectors are often perceived to be more equitable and community-friendly; there are fewer concerns about quota consolidation by corporations or individuals and the potential transfer of harvest shares to vessels operating elsewhere. Unlike other management approaches, sectors can "provide the means for a community and its fishermen to retain or regain access to the groundfish fishery and to ensure that the community benefits from this access" (Holland 2007, p. 2), preserving fishing heritage. As noted by the National Research Council (1999, p. 2), however, there is no "one-size-fits-all" approach to fisheries. Mechanisms such as sectors and IFQs should be evaluated case-by-case to determine methods best suited to specific fisheries.

Sectors: Balancing the Benefits and Costs

Harvest cooperatives and sectors shift some regulatory, monitoring and enforcement costs from government to the fishing industry. Is this burden too onerous? Evidence suggests that the benefits of harvest cooperatives often far outweigh new management costs covered by fishermen. For example, the cooperative that harvests clams in British Columbia (geoducks)—the Underwater Harvesters Association (UHA)—now bears a substantial portion of fishery management costs. However, "the increase in value of the fishery and improvements in management have warranted these costs," with an increase in average landed price of geoduck from $0.17/lb to over $9.50/lb and a decline in fishing costs. "This voluntary organization has worked because harvesters see that their fishery and industry is better off with the association."

JAMES 2008, PP. 404-406

New England Fisheries: Prospects for a Brighter Future

The potential benefits of improved fishery management in New England are well-established. Over 15 years ago, Edwards and Murawski (1993 p. 437) estimated that improved management of New England groundfish could result in a "sevenfold increase in the size of the harvestable resource and a threefold increase in sustainable yield," along with an increase in sustainable economic value of $224 million per year (adjusted to 2009 dollars). Analysis conducted in 2003 suggested that the cumulative net present value of rebuilding relative to the status quo is close to $300 million (2003 dollars), but could exceed $400 million to $500 million in some scenarios.[17] Far from approaching these goals, the fishery has instead experienced continued declines in fish stocks, landings and revenues.

A transition to more responsible management, including sectors with annual catch limits, provides a potential path to such benefits. The advantages of cooperatives and sectors are supported by economic theory, empirical models and the experience of fishermen. The capacity to generate sustainable positive outcomes has been demonstrated by similar approaches worldwide. Positive results from current groundfish sectors, together with models of potential sectors, show that similar benefits can be realized in New England. Four centuries of New England fisheries provide no evidence that continued effort controls will restore either prosperity or sustainability. There are many ongoing challenges to fishery management and no easy solutions. Appropriately designed sectors or harvest cooperatives, however, offer a potential future of more responsible, profitable and sustainable fisheries.

Photography Credits

COVER
David Hills (fishingpix.net): Greg Walinski, FV Alicia Ann, offshore in Chatham, Massachusetts.

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David Hills: Fish Hooks, Chatham, Massachusetts.

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Fishermen's Voice: Peter Baker.

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David Hills: Ocean view of Rye Beach, New Hampshire.

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John D. Crawford: Bass Harbor, Down East Maine.

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David Hills: Bluefish caught with a Florida style gillnet in Cape Cod Bay.

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PAGE 12
Montauk Point Lighthouse overlooks the Atlantic Ocean. Montauk Long Island, New York.

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David Hills: Vessel rounding Monomoy, heading into the Atlantic Ocean from Nantucket Sound.

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David Hills: Fisherman landing hook caught haddock at the Chatham, Massachusetts fish pier.

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David Hills: Eric Hesse, FV Tenacious II, Cape Cod Commercial Hook Fishermen's Association, Harwichport, Massachusetts.

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David Hills: Wheel of the FV Alicia Ann, Chatham, Massachusetts.

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David Hills: Ed Foster loads boxes of dressed groundfish aboard FV Miss Fitz, Chatham, Massachusetts.

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David Hills: Greg Walinski, FV Alicia Ann, Chatham, Massachusetts.

Endnotes

1 New England Fishery Management Council (2006; 2003, Appendix I) and Olson and Clay (2001).

2 A stock that is subject to *overfishing* has a fishing harvest rate above the level that provides for the maximum sustainable yield or stock recovery. A stock that is overfished has a biomass level below a targeted biological threshold specified in its fishery management plan.

3 In more technical terms, it creates incentives to maximize revenue within the allocated number of fishing days rather than maximize the economic profits that could otherwise be obtained from harvesting a given amount of fish more slowly and efficiently.

4 Allocation mechanisms were based on vessel fishing history (either individual or fleet averages); these mechanisms caused many vessels to be given more days-at-sea than they had fished in prior years (Georgianna et al. 2008; Thunberg 2000).

5 Note that differential counting of days-at-sea was introduced in 2004, such that multiple days were counted for each day used in certain fishing areas, further reducing effective days for vessels operating in these areas.

6 As noted in the January 28, 2009, draft of Amendment 16 to the Northeast Multispecies Fishery Management Plan (p. 414), these harvest limits were based on stock assessment information available at the time they were established. As new information was incorporated, these limits were found to be incompatible with planned rebuilding for most stocks.

7 Agencies may still apply regulations to protect habitat and promote other important ecological or economic goals.

8 Despite support from most fishery participants, the Cooperative was dissolved by a 2006 Alaska Supreme Court ruling that it violated an Alaska law provision requiring permit holders to operate their own vessels (Knapp 2008).

9 For example, under sectors, the total annual allocation given to a sector is based on the aggregate shares of the permits (vessels) in that sector. Members coordinate harvest to stay within the allocation; the sector and its members are held collectively accountable for keeping catches below the allocation. A sector cannot buy and sell quota (e.g., to other sectors) in permanent form, only as a one-year catch entitlement. Sector membership can change from year to year, with the sector's annual harvest allocation adjusted according to current members' aggregate permit shares.

10 January 28, 2009, draft of Amendment 16 to the Northeast Multispecies Fishery Management Plan, p. 272 and 415.

11 These include the two currently operating sectors and seventeen proposed sectors.

12 Projections are based on projected rebuilding and TACs from Amendment 13, the most up-to-date at the time.

13 Sector provisions in the January 28, 2009, draft of Amendment 16 to the Northeast Multispecies Fishery Management Plan (p. 88-89) allow potential exemption from a broader range of effort controls than is the case for the two currently operating sectors.

14 Net present value.

15 Total allowable catch limits enforced by closing the fishery when total harvest limits are reached.

16 IFQs do not preclude such coordinated efforts, but they are much more likely under sectors.

17 Pages I-xii and I-602 of Amendment 13 to the Northeast Multispecies Fishery Management Plan.

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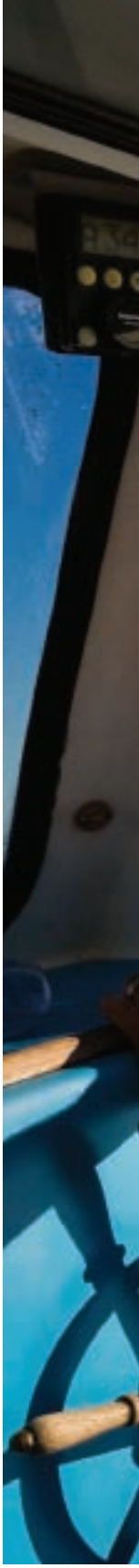

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