



Competitive Enterprise Institute

1899 L Street, NW • 12th Floor • Washington, DC 20036

202.331.1010 • www.cei.org

Advancing Liberty – From the Economy to Ecology

May 17, 2012

No. 178

Give a Man a Fish

The Case for a Property Rights Approach to Fisheries Management

By Iain Murray and Roger Abbott*

The Deepwater Horizon oil spill drew considerable attention to the fragility of our marine ecosystems and to the severity of the damage caused by such manmade disasters—both to the environment and to local economies that depend on the oceans for their livelihoods.

Unfortunately, the serious long-term threat posed by overfishing has received comparatively little attention. Overfishing is international in scope, has been ongoing since the end of the Second World War, and is generally caused by bad government policy.

Some policy makers and environmental advocacy groups are beginning to realize that the solution lies not in further government regulation, but in investing fishermen with property rights. However, government bureaucrats are also attempting to utilize this insight to gain even more power over fisheries, threatening to derail the momentum toward a more rational allocation of ocean resources. That would be bad news for both fish populations and the people who depend on them for their livelihood.

The oceans are an important source of food and income for people around the world. In 2007, proteins from fish accounted for 15.7 percent of the total global animal protein supply.¹ In 2008, an estimated 44.9 million people were directly engaged in the fishing industry (both marine capture and aquaculture).² However, the world's fish stocks are not limitless, and are being depleted rapidly.

Two principal factors are at work. First, the billions of dollars in subsidies bestowed on the fishing industry by many governments makes overfishing profitable, even as per capita fishing yields decline. Second, the absence of property rights over fish in most countries means that there is no incentive for any party to husband this resource. In fact, the absence of property rights, combined with subsidies, creates a perverse incentive to deplete this scarce resource.

* Iain Murray is Vice President for Strategy and the Director of the Center for Economic Freedom at the Competitive Enterprise Institute (CEI). Roger Abbott is a former CEI Research Associate.

Attempts to prevent overfishing by promulgating regulations (which are often at odds with subsidies) have proved both ineffective and impossible to enforce. As long as the incentives are skewed by bad government policy, many fishermen will continue to work around regulations or simply neglect to report some of their catches—a practice known as “black” fishing that is all too prevalent.³ Ending subsidies and extending genuine property rights to fisheries will help solve these problems.

Evidence of Overfishing. According to the most recent fisheries study by the United Nations Food and Agriculture Organization (FAO), 85 percent of world fish stocks for which assessment information is available are either fully exploited or overexploited, depleted, or recovering from depletion.⁴ Specifically, the report states:

Slightly more than half of the stocks (53 percent) were estimated to be fully exploited and, therefore, their current catches are at or close to their maximum sustainable productions, with no room for further expansion. The remaining 32 percent were estimated to be either overexploited (28 percent), depleted (3 percent) or recovering from depletion (1 percent) and, thus, yielding less than their maximum potential production owing to excess fishing pressure, with a need for rebuilding plans. This combined percentage is the highest in the time series. The increasing trend in the percentage of overexploited, depleted and recovering stocks and the decreasing trend in underexploited and moderately exploited stocks give cause for concern.⁵

These figures have remained stable over the past two decades, following a rapid reduction of fish stocks during the 1970s and 1980s, but the changing composition of fish yields is troubling. As the FAO report notes:

[T]he declining global catch in the last few years, together with the increased percentage of overexploited, depleted or recovering stocks and the decreased proportion of underexploited and moderately exploited species around the world, strengthens the likelihood that the production of wild capture fisheries will not be able to increase unless effective management plans are put in place to rebuild overfished stocks.⁶

According to the environmental advocacy group Oceana, the introduction of industrialized fishing has removed 90 percent of the populations of large predatory fish, such as sharks, tuna, and marlin, from the oceans, “a development that could have adverse consequences on marine ecosystems.”⁷

Although our knowledge of current fish stocks is limited, particularly for those off the coast of Africa and India, the widespread damage from overfishing is corroborated by the facts. Fishing yields have remained stagnant over the past decade even as the number of ships has increased. According to the FAO, “[W]orld capture fisheries production ... has almost stopped growing since the mid-1980s.”⁸ For instance, as the Oceana report notes, “[T]he total fishing power of Chinese vessels in the East China Sea increased by a factor of about 7.6 between the 1960s and 1990s, while catch per unit of effort declined over the same period by a factor of three.”⁹

Subsidies Distort Markets. In a free market, declining yields caused by overfishing would discourage market entry and force some fishermen out of the market, while rising prices put downward pressure on consumer demand. However, the billions of dollars in subsidies given each year by governments—especially in Asia and Western Europe—allow fishers who would otherwise operate at a loss to stay in the market. The result is more boats chasing fewer fish, an enormous waste of taxpayer resources. A 2009 World Bank/FAO study found:

In economic terms, some 60 percent of the world’s marine fish stocks were ‘underperforming assets’ in 1974, the year when the Food and Agriculture Organization (FAO) initiated its reports on the state of the world’s marine fish stocks. By 2004, more than 75 percent of the fish stocks were underperforming, at an estimated annual loss of \$50 billion to the global economy.¹⁰

The report estimates, “this cumulative global loss of potential economic benefits is on the order of \$2 trillion.”¹¹

Fishing subsidies are difficult to quantify due to a lack of transparency on the part of many countries, and because they vary in type. The University of British Columbia’s Fisheries Centre divides subsidies into three categories:

- “Good” subsidies that promote research and sound fishery management practices (for example, fish stock monitoring subsidies);
- “Bad” subsidies that contribute directly to overfishing by creating an overcapacity of fishing resources (these include subsidies for new fishing boat construction that lead some fishermen to buy new boats when they might not otherwise do so); and
- “Ugly” subsidies that are potentially both harmful and beneficial (these include subsidies to fishermen to stop fishing temporarily, or conversely keep fishing during economic downturns, which can increase community dependence on government funding).¹²

“Bad subsidies” come in a number of forms, including fuel subsidies, vessel buyback programs, rural fishers’ community development programs, and many others. Fuel subsidies are particularly damaging, because fuel costs are a significant component of overall fishing costs, as much as 60 percent for some Hong Kong commercial fisheries.¹³ Deep-sea fishing, which is very fuel-intensive, is therefore made much more affordable. Environmentally, deep-sea fishing is especially difficult to manage, because it targets migrating fish that travel through international waters and therefore do not fall under the jurisdiction or protection of any particular country or regional authority. According to the Fisheries Centre, \$13.9 billion of bad subsidies are doled out every year, \$8.5 billion of which are fuel subsidies.¹⁴

The United States is among the least bad offenders, spending only several hundred thousand dollars every year in bad subsidies. However, the U.S. could work much harder to push the World Trade Organization (WTO) to phase out and eventually ban such subsidies, which violate the principles of free trade and damage the world’s oceans at the same time.¹⁵

Taking all subsidies together, governments underwrite fishing fleets to the tune of \$30 to \$34 billion a year.¹⁶ The worst offenders are Japan and the European Union, whose Common Fisheries Program has been a disaster for both British fish and British fishermen. Yet the problem is worldwide in scope.

Even “good” subsidies contribute to the problem. Subsidies are given supposedly to support traditional industries, modernize boats and equipment, compensate fishermen to prevent them catching certain kinds of fish, or for research and safety, but the effect is always the same: to make uneconomic fishing economic. For example, a research subsidy will incentivize fishermen to stay out longer and catch more fish where previously bad weather would have forced them back to port. In the United Kingdom, Cornish fishermen have reported having their nets ripped by Spanish vessels,¹⁷ which are subsidized to the tune of €600,000 for two month’s research into the fishing of “non-pressure” stocks like anchovies. The combined effect of the subsidies is to make the world fishing fleet about 250 percent larger than it would be otherwise.¹⁸

Deep sea fishing subsidies are particularly perverse. The deep sea fishing industry receives subsidies worth more than \$152 million a year globally, with most of the subsidies and fleets coming from Japan, Russia, South Korea, and Spain.¹⁹ Without those subsidies, the global industry would operate at an annual loss of \$50 million at its current size,²⁰ because it uses such huge quantities of fuel to operate. It is in the deep seas that the effect of overfishing has been most keenly felt.

The United States has taken a leading role in pushing the WTO to ban or limit harmful fishing subsidies since the Doha round of global trade negotiations in 2001. In November 2007, WTO Chairman Guillermo Valles of Uruguay issued what Mark Linscott, Assistant U.S. Trade Representative for Environmental and Natural Resources, described as a “landmark text, which could be in the form of an annex to the existing WTO Subsidies and Countervailing Measures Agreement and which would prohibit almost all kinds of potentially harmful subsidies.”²¹ However, no agreement has been formally completed yet, due to the “highly technical nature” of the negotiations. The United States should work with its allies in the Trans-Pacific Partnership and push to complete the negotiations in the upcoming WTO meetings in Geneva.²²

Create Property Rights to Promote Stewardship. Ending subsidies that create excess fishing capacity will help reduce overfishing. However, if the demand for fish is high enough and inelastic enough, the problems caused by overfishing may persist, especially since the WTO enforcement process is difficult and time-consuming. Therefore, a complementary reform is also needed: to introduce property rights into the fishing market, and to rely on the understanding that individual actors are always more responsible and careful in managing their own resources than they are with public or other people’s resources.

Private property, as the renowned jurist William Blackstone so well put it, is that “dominion which one man claims and exercises over the external things of the world, in total exclusion of the right of any other individual in the universe.”²³ Generally speaking, private property has been interpreted as constituting a “bundle of rights,” which includes the right to freely exploit one’s property, exclude others from it, and alienate it, so long as one does not cause nuisance or harm to others.

The functionality of private property rights in promoting good stewardship is directly tied to this bundle of features. As Case Western Reserve University law professor (and former CEI analyst) Jonathan Adler describes the situation: “For incentives to work, the property right to a resource must be definable, defendable, and divestible. . . . Even someone indifferent or hostile to environmental protection has an incentive to take environmental concerns into account, because despoiling the resource may reduce its value in the eyes of potential buyers.”²⁴

The effectiveness of private property rights in promoting good stewardship is undermined to the same extent that any element of that “bundle” of rights is undermined. For example, if individuals are barred from selling their fishing rights, they will have less of an incentive to preserve the value of those rights by not overexploiting the resource that belongs to them. If they decide to leave the business and no longer intend on harvesting their resource, they may have an incentive to deplete it. Similarly, if bureaucrats can take away the property right at any time, the right will be less valuable and the attendant incentives will be diminished.

Failure to define property rights generally results in what ecologist Garret Hardin termed “the Tragedy of the Commons” (although H. Scott Gordon of Carleton College, in Ottawa, observed the phenomenon in fishing in the 1950s).²⁵ A tragedy of the commons occurs when no one has any incentive not to deplete a common resource, in the expectation that someone else will deplete it first.

Some economists now question whether the commons necessarily dissolves into tragedy. The work of the 2009 Economics Nobel Laureates, Elinor Ostrom and Oliver Williamson, demonstrates that common property rights can indeed promote the sustainable use of a resource, so long as there are means of preventing freeloading behavior, such as social norms within a tightly knit community.²⁶

However, as Michael De Alessi of the Reason Foundation points out, common private property rights are far more vulnerable than private property rights, for two reasons. First, they frequently are not recognized by judiciaries due to their informal nature, and are thus vulnerable to expropriation by outsiders, including governments. Second, common rights are usually non-alienable, as is the case when they are the historic property of a tribe or clan.

In the modern context of commercial fishing, the best way forward is for government to create rights with similar characteristics to private property rights. The most effective solution to date has been New Zealand’s Individual Transferrable Quota (ITQ) system, which has resulted in the speedy turnaround in the health of that country’s fishing stock.

New Zealand’s Individual Transferable Quota System. Individual Transferable Quota systems operate by capping a country or region’s total allowable catch (TAC) and guaranteeing fishers a share or quota, often as a percentage of the TAC. Once the initial allocation is made, fishing rights take on the features of property rights. They may be exploited to the degree allowed by the quota, and they may be leased, sold, or otherwise transferred to other fishers. Since the shares are owned in perpetuity, fishers have a strong incentive to harvest as many as possible in accordance with the quota without depleting the fish stock. Owners of the most

efficient fishing vessels will have an incentive to buy quotas from those with older, less efficient vessels, thus reducing the total number of vessels in the long run.

Given the novelty of this form of property right, owners of ITQs are likely to be particularly sensitive to the prevailing regulatory climate. Therefore, it is important for government to set up an ITQ market carefully and avoid taxing or interfering with these new property rights in order to maximize the environmental advantages of the system. New Zealand's ITQ arrangement is the most extensive in operation, and it developed considerably over time. It makes for a useful case study, for it illustrates some of the pitfalls that must be avoided in any effort to introduce private property rights into fishing markets.

New Zealand, beginning in 1960, subsidized the development of fisheries, with the result that stocks were severely depleted by the time the Fisheries Act was passed in 1983. Tradable quotas were created in 1986, but these were only valid for 10 years, and were measured in tonnage, which meant that the Fisheries Ministry had to buy back tonnage whenever the TAC was lowered. Also, the fact that the quotas were only good for 10 years reduced their value as a property right. In 1990, the quota was changed from a measure of tonnage to percentage of TAC.

In 1994, the government scrapped both the quotas' 10-year expiration—transforming them into perpetual rights—and plans to levy significant taxes on the quotas. Although fishers technically only have a right to access the fish rather than a right to the fish themselves, their access rights are for all intents and purposes property rights, analogous to the riparian rights of property owners under the common law.²⁷ It is important to note that, owing to rights guaranteed to native Maori populations under the Treaty of Waitangi (1840), these property rights have a strong element of constitutional protection (hence their grant in perpetuity).²⁸

The New Zealand ITQ system behaves as a functioning market should, as confirmed by a 2002 analysis by Motu, a New Zealand-based think tank.²⁹ The Motu study finds that the markets for quotas are very active, “with more than 120,000 leases and 30,000 sales of quotas as of the end of the 1998 fishing year—an annual average of about 8,700 leases and 2,000.”³⁰ The reforms mentioned above led to an increase in transactions: “[T]he total number of leases has risen...from 2,000 in 1986 to 14,500 in 1998.”³¹ Moreover, the study found that, “[T]he value of fish is positively associated with quota prices, as evident by the result that the elasticity of the quota type with respect to the fish export price is positive and statistically significant in both lease and sale price equations. ... Controlling for other factors, there is evidence of increased profitability of the included fisheries since the establishment of the ITQ system.”³²

The Deadliest Catch ... No Longer. Followers of the Discovery Channel series, “The Deadliest Catch,” might remember that in the first season of the show the activities of the crab fishers were more frenetic—and more dangerous, hence the show's title—than in subsequent seasons. That is because Alaskan crab fisheries have moved to an Individual Fishing Quota (IFQ) system. IFQs resemble ITQs but leases are initially allocated to owners and skippers. Previously, regulation had moved inexorably to an open but short fishing season, which led to large numbers of boats all attempting to catch as many crabs as they could while the fishing window was open. In 2005, this “derby” system was abandoned in favor of an IFQ system, with established owners and captains being allocated quotas.³³

As expected, the measure promoted a very quick consolidation of the industry. A fleet of some 250 boats in the 2004 season shrank to about 89 generally larger boats in the 2005 season. Evidence suggests that this large fleet size was ruining the industry.³⁴ Unfortunately, the price signal that should have been apparent as a result of rationalization was obscured by a glut of King Crab in the American market from Russian sources, much of it caught illegally. It is too early to say whether IFQ rationalization has yet had a beneficial effect on the crab fisheries themselves, although the extra time given for “pots to soak” (crab catching pots resting on the seabed) should have resulted in significantly reduced bycatch (smaller crabs that should have time to escape the pots, which previously tended to die even when thrown back after they were landed).

In 2008, researchers Christopher Costello, Steven Gaines and John Lynham investigated the effects of all 121 fisheries where IFQs and other catch share schemes exist around the world for a study published in *Science* magazine, comparing them to the 11,000 fisheries without property rights and controlling for confounding factors such as fish species and ecosystem characteristics. They found that the existence of catch share rights not only precluded fishery collapse but, as in New Zealand, often helped reverse pre-existing collapse.³⁵

Moreover, the authors found that if catch shares had been instituted globally from 1970, then the incidence of fishery collapse would have been reduced by two-thirds. Fish stocks, furthermore, would be rising rather than falling. The evidence is clear: ITQs and similar catch-share schemes should be implemented now on a global basis. Failure to do so represents a gross disregard for the future of our oceanic ecology and resources.

One final point is worth noting. The Individual Transferable Quota system is similar to other market-based trading schemes designed to reduce negative externalities, such as the supposed effects of greenhouse gas emissions, but there are certain important differences. In the case of emissions trading schemes, the government does not create a property right. Rather, it artificially imputes value to an item that would have no value in a free market, in this case emissions permits, which are only worth anything under a government-imposed emissions cap. Thus, cap and trade schemes are restrictive measures that do not promote economic growth.

The creation of individual transferable quotas, on the other hand, is more akin to the “enclosure of the commons,” which dates back to the British enclosure movement of the 18th century. The aim is not to restrict fishing per se, as the aim of cap-and-trade is to restrict the activity that results in emissions. On the contrary, by restoring the health of depleted fishing stocks while reducing the number of vessels, proponents of ITQ hope to increase yields and make the fishing market more sustainable and efficient. The case of New Zealand indicates that if ITQ systems are instituted carefully, this will indeed be the case.

However, some U.S. catch share schemes administered by the National Oceanic and Atmospheric Administration (NOAA) are putting too much power in the hands of bureaucrats to the detriment of the fishing industry. For example, the total allowable catches set by NOAA for the fisheries of the North East Atlantic are widely regarded as too restrictive. A report prepared by Dartmouth College for the Commonwealth of Massachusetts concluded that 14,500 metric

tons (32 million lbs.) of additional ground fish could be brought to market without endangering the sustainability of fish stocks.³⁶

Mayor Scott Lang of New Bedford, Massachusetts, believes that these overly restrictive policies are resulting in significant human hardship. “The regulators at NOAA have enacted draconian policies that include much deeper cuts than what impartial scientists believe are needed to conserve our ocean resources,” he said at a December 2010 meeting of the town’s Ocean and Fisheries Council. “With undue influence from powerful lobbies, they have taken actions that environmental extremists think might be marginally beneficial to some fish stocks, but which we know are hurting people.”³⁷

While politicians cannot be trusted to find the right balance, this suggests that American catch share management is in need of significant reform. It needs to rebalance away from environmental special interests and toward what fishermen bring to the table—intimate knowledge of fisheries. If fishermen are to own fish stocks, they need to be able to make their own assessment of the risks to the stocks from fishing—and reap the rewards when they are correct and take the losses when they are wrong. Making catch share grants in perpetuity, as in New Zealand, would go a long way toward solving that problem.

Fishing communities—which manage the resource and therefore have valuable knowledge about its condition—should be included in the TAC-setting process. The Magnuson-Stevens Act, which forms the basis for NOAA’s catch share programs, should be amended to reflect these concerns. If this were done, U.S. catch shares would become a model for the world to follow.

Conclusion. The saying goes, “Give a man a fish and he will eat for a day. Teach a man to fish and he will eat for a lifetime.” Today, that could be rephrased: “Pay a man to fish and he will eat everyone’s fish. Give a man property rights to fish, and we will eat for life.” Government subsidies and disregard for property rights have led us to the brink of maritime ecological disaster. Ending subsidies and guaranteeing genuine property rights in fish stocks will improve management of fisheries, leading to an improved environment and fish enough for all, indeed.

Notes

¹ United Nations Food and Agriculture Organization, *The State of World Fisheries and Aquaculture 2010*, p. 64.

² FAO Report 2010, p. 6, <http://www.fao.org/docrep/013/i1820e/i1820e00.htm>.

³ “Estimates of the amount of fish caught illegally vary widely, but one senior UK fisheries inspector estimated that it was as high as 50% of the legal quota on species like cod.” (Michael De Alessi, *Fishing for Solutions*, Institute of Economic Affairs, 1998, p.37)

⁴ FAO 2010, p. 8.

⁵ Ibid.

⁶ FAO 2010, p. 42.

⁷ B. Freitas et al., *Too Few Fish: A Regional Assessment of the World’s Fisheries*, Oceana, May 2008, p. 5, <http://oceana.org/sites/default/files/reports/toofewfish41.pdf>.

⁸ FAO 2010, p. 18.

⁹ Oceana, p. 5.

¹⁰ World Bank/FAO, *The Sunken Billions, The Economic Justification for Fisheries Reform*, Washington, D.C.: The International Bank for Reconstruction and Development / The World Bank, 2009, p. xvii.

¹¹ Ibid.

-
- ¹² Ussif Rashid Sumaila and Daniel Pauly (eds.), *Catching More Bait: A Bottom-Up Reestimation of Global Fisheries Subsidies*, Fisheries Centre Research Reports 14(6) 2006, <http://www.fisheries.ubc.ca/publications/catching-more-bait-bottom-re-estimation-global-fisheries-subsidies>.
- ¹³ Ussif Rashid Sumaila, Louise Teh, Reg Watson, Peter Tyedmers, and Daniel Pauly “Fuel price increase, subsidies, overcapacity, and resource sustainability,” *International Council for the Exploration of the Sea*, 2008, p. 832, <http://www.ecomarres.com/downloads/SumailaFuel.pdf>.
- ¹⁴ Sumaila and Pauly (eds.), *Catching More Bait*, p. 47.
- ¹⁵ *Ibid.*, pp. 26-27.
- ¹⁶ *Ibid.*, p. 2.
- ¹⁷ Julie Read, “Bay of Biscay Braced for Tuna War,” *The European*, June 9, 1995.
- ¹⁸ Sumaila and Pauly (eds.), *Catching More Bait*, p. 51.
- ¹⁹ *Ibid.*
- ²⁰ *Ibid.*
- ²¹ Written Testimony of Mark Linscott, Assistant U.S. Trade Representative for Environmental and Natural Resources, before the Senate Subcommittee on International Trade, Customs and Global Competitiveness on July 14, 2010, p. 3.
- ²² Written Testimony of Mark Linscott, “The Trans-Pacific Partnership (TPP) is a potential platform for economic integration across the Asia-Pacific region,” pp. 5-6. The region includes the United States, Singapore, Chile, New Zealand, Brunei, Australia, Peru, and Vietnam.
- ²³ Sir William Blackstone, *Commentaries on the Laws of England*, Book II Ch. 1, Oxford 1765-1769.
- ²⁴ Jonathan Adler, *Ecology, Liberty and Property: A Free-Market Environmental Reader*, Washington, D.C.: Competitive Enterprise Institute, 2000.
- ²⁵ Gordon, H. Scott, “The Economic Theory of a Common Property Resource: The Fishery,” *Journal of Political Economy* Vol. 62 No. 2, April 1954, pp. 124-42, <http://www.econ.ucsb.edu/~tedb/Courses/Ec100C/Readings/ScottGordonFisheries.pdf>.
- ²⁶ On November 12, 2009, Elinor Ostrom and Oliver Williamson were jointly rewarded the Nobel Prize for advancing the field of “economic governance.” See “Nobel Lessons,” by Iain Murray and Roger Abbott, *The Washington Examiner*, October 22, 2009, <http://www.washingtonexaminer.com/opinion/blogs/Examiner-Opinion-Zone/Nobel-Lessons-65588862.html>.
- ²⁷ Property owners do not have an unlimited right to the water that flows through their property. If they divert it or substantially reduce the water flow, they may be compelled to pay damages to those who own land downstream of their property.
- ²⁸ World Bank Senior Fisheries Specialist Michael Arbuckle makes this point regularly when he discusses the New Zealand scheme. See his presentation, “New Zealand’s Catch Share Program,” undated, accessed April 23, 2012, http://www.fisheriesforum.org/sites/www.fisheriesforum.org/files/10917_MA%20CSWS%20Arbuckle.pdf.
- ²⁹ Richard Newell, James Sanchirico, and Suzi Kerr, “An Empirical Analysis of New Zealand’s ITQ Markets,” paper presented at the 2002 conference of the International Institute of Fisheries Economics and Trade, Wellington, New Zealand, http://www.motu.org.nz/publications/detail/an_empirical_analysis_of_new_zealands_itq_markets.
- ³⁰ *Ibid.*, p.4.
- ³¹ *Ibid.*
- ³² *Ibid.*, p.5.
- ³³ National Marine Fisheries Service (NOAA), Alaska Regional Office, “What is crab rationalization?” December 5, 2011, <http://www.fakr.noaa.gov/sustainablefisheries/crab/rat/progfaq.htm#wicr>.
- ³⁴ Scott C. Matulich, “Did Processing Quota Damage Alaska Red King Crab Harvesters? Empirical Evidence,” *Marine Resource Economics* Vol. 23, 2010, pp. 253-271, <http://mre.cels.uri.edu/docs/02-Matulich.pdf>.
- ³⁵ Christopher Costello, Steven D. Gaines., and John Lynham, J., “Can Catch Share Prevent Fisheries Collapse?” *Science* Vol. 321 No. 5896, September 19, 2008, pp. 1678-1681, <http://www.sciencemag.org/content/321/5896/1678.abstract>.
- ³⁶ Associated Press, “Deval Patrick asks for emergency increase in fish catch limits,” November 6, 2010, http://www.csnchicago.com/pages/new_landing_bears?blockID=347395&tagID=50321.
- ³⁷ New Bedford Harbor Development Commission, “Nation’s Top Fishing Port Rallies Around Fishing Families in Need Due to Draconian Federal Fishing Regulations,” press release, December 23, 2010, <http://www.prnewswire.com/news-releases/nations-top-fishing-port-rallies-around-fishing-families-in-need-due-to-draconian-federal-fishing-regulations-112401099.html>.