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An Overview of the Economic Benefits of Cooperatives and Individual Fishing Quota Systems

James Sanchirico

Prepared for the U.S. Senate Committee on Commerce, Science, and Transportation Subcommittee for Oceans, Atmosphere, Fisheries, and Coast Guard

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RESOURCES FOR THE FUTURE

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Summary of Testimony

The purpose of my remarks is to provide a brief overview of the economic benefits of cooperatives and individual fishing quota systems for the management of marine commercial fisheries. Before discussing specific benefits from implementing cooperatives and individual fishing quota systems, it is instructive to provide the baseline from which we are measuring these benefits.

As the committee is fully aware, the marine species residing in U.S. territorial waters and the men and women who make their livelihood from them are at a critical juncture.

- Many species are overexploited and face additional threats from land-based pollution, habitat damage, and climate change.
- The vessels and fishing power of many U.S. fisheries exceed levels that would maximize economic returns to society.
- Competition for fish leads to low wages, dangerous working conditions, and ever shorter fishing seasons. Short seasons with large catches, in turn, force fish processors to invest in facilities that can handle large quantities but run at partial capacity for most of the year, creating boom-and-bust cycles in local employment. With supply gluts, most fish are processed and frozen, even though consumers seem to prefer fresh fish throughout the year.
- Economically depressed fisheries are vulnerable to short-term thinking and risk-taking, and fishery participants cannot afford to invest in long-term sustainability.

These conditions are not fated, however. Without secure access to the resource, individual rational actors will compete with each other to capture as much of it as possible. Operating under so called “rule of capture” incentives, whereby resources are not “owned” until onboard a vessel, results in the popular phrase, “too many boats chasing, too few fish”, which is an outcome that is in nobody’s best interest. In other words, a tragedy of the commons ensues.

Policies that address the rule of capture incentives include individual fishing quotas and cooperatives. That is, the allocation of shares of the total allowable catch reduces the incentives to race for fish, as participants have greater certainty about their catch levels, and the ability to buy and sell shares provides flexibility for participants to adjust the scale of their operations.

Overall Economic Benefits

Around the world, fisheries managed with individual fishing quotas or cooperatives experience profit rates ranging from 20 percent to 60 percent.

Benefits of ownership of the catch shares include:

- *Reduced incentive to race for fish, resulting in longer seasons.*
- *Slowed pace of fishing, improving the ability to optimize onboard processing facilities, resulting in increases in the product recovery rate per pound of fish caught.*
- *Incentives shifted from maximizing the quantity of fish caught to maximizing the value of the catch.*

Benefits of the transferability of the catch shares include:

- *Reduced number of vessels and fishing capacity.*
- *Greater flexibility provided for participants to match quota holdings with catches.*
- *Incentives provided that lead to the total allowable catch being caught at the lowest possible costs, as higher-cost (less efficient) vessels find it more profitable to sell or trade their shares than to fish them.*

One of the most powerful forces of change created by catch-share programs is a constituency whose wealth is a function of the health of the marine environment. Wealth creation, in turn, will lead to improved stewardship, sustainability, and further innovation to increase value.

To summarize, in many fisheries, stocks are overfished, habitats are degraded, fishermen are scraping by from one season to the next, and the public is receiving very little return from its marine assets. This does not have to be the case. There is a large and growing body of evidence that management tools, such as cooperatives and individual fishing quotas, are a means to achieving sustainable marine populations, fishing communities, and returns on our natural assets.

An Overview of the Economic Benefits of Cooperatives and Individual Fishing Quota Systems

James Sanchirico

Written testimony prepared for the U.S. Senate Committee on Commerce, Science, and Transportation Subcommittee for Oceans, Atmosphere, Fisheries, and Coast Guard

Good afternoon, Chairman Cantwell and members of the committee and thank you for the opportunity to speak to you today. I am James Sanchirico, an associate professor at the University of California at Davis and a University Fellow at Resources for the Future, a nonpartisan, independent research organization specializing in environment, energy, and natural resource issues. The opinions I offer today are my own and should not be attributed to the University of California, Resources for the Future, or the NOAA Science Advisory Board, of which I am a member.

The purpose of my remarks is to provide a brief overview of the economic benefits of cooperatives and individual fishing quota systems for the management of marine commercial fisheries.

I use the vernacular individual fishing quota systems (IFQs) rather than dedicated access privileges (DAPs) or limited access privilege programs (LAPPs) to describe management (cap-and-trade) systems in which a share of the total annual allowable catch is allocated to fishing participants.

Before I begin to discuss specific types of benefits from implementing cooperatives and IFQs, it is instructive to provide the baseline from which we are measuring these benefits.

As the committee is fully aware, the marine species residing in U.S. territorial waters and the men and women who make their livelihood from them are at a critical juncture.

- Many species are overexploited and face additional threats from land-based pollution, habitat damage, and climate change. Still unknown is the extent to which our actions affect the nature of food webs and ecosystems, with consequences yet to be determined.
- The vessels and fishing power of many U.S. fisheries exceed levels that would maximize economic returns to society.
- Competition for fish leads to low wages, dangerous working conditions, and ever shorter fishing seasons. Short seasons with large catches, in turn, force fish processors to invest in facilities that can handle large quantities but run at partial capacity for most of the year, creating boom-and-bust cycles in local employment. With supply gluts, most fish are processed and frozen, even though consumers seem to prefer fresh fish throughout the year.
- Economically depressed fisheries are vulnerable to short-term thinking and risk-taking, and fishery participants cannot afford to invest in long-term sustainability.

These conditions are not fated, however. There is a body of research dating back to the 1950s that highlights the cause of these symptoms.[1] Without secure access to the resource, individual rational actors will compete with each other to capture as much of it as possible. Operating under so called "rule of capture" incentives, whereby resources are not "owned" until onboard a vessel, results in the popular phrase, "too many boats chasing, too few fish", which is an outcome that is in nobody's best interest. In other words, a tragedy of the commons ensues. I would argue, however, that the problem is more complicated than just too many boats chasing and too few fish. Rather, our marine commercial fisheries are better described as having too many boats, too much fishing power, too little wealth, too few top predators, too much habitat damage, too much human and capital at risk, too few resources for monitoring and enforcement, and so on.[2]

Policies that address the "rule of capture" incentives include IFQs and cooperatives.

- IFQ programs are analogous to other cap-and-trade programs, such as the sulfur dioxide allowance-trading program. They limit fishing operations by setting a total allowable catch (TAC), which is then allocated among fishing participants, typically based on historical catch. In most IFQ fisheries throughout the world, participants are able to trade their perpetual right to a share of the TAC and their annual catch equivalent. The initial allocation process and market rules are designed and implemented by the Regional Fishery Management Councils.

- Cooperatives, such as the Pacific Whiting Conservation Cooperative, the Montauk Tilefish Association, and the two in the North Pacific Pollock Fishery, are formed around a fishing sector that has received an allocation of the allowable catch and has a fixed set of participants. The allocation of the cooperative's allowable catch to each member along with any trading between the members is done through private negotiations and rules as outlined in their charter.

While each policy is slightly different from an instrument design perspective and the respective roles of government intervention, the key point is that both treat the cause rather than the symptoms of insecure rights to our marine resources.[3] That is, the allocation of shares of the TAC reduces the incentives to race for fish, as participants have greater certainty about their catch levels, and the ability to buy and sell shares provides flexibility for participants to adjust the scale of their operations.

After discussing the overall economic benefits, I divide up the discussion of the societal benefits from these instruments into the gains from ownership of a share and the gains from trading the shares. I also provide examples of those gains being realized. Because there are virtually no

[1] See, for example, H. Scott Gordon, *Economic Theory of a Common Property Resource: The Fishery*, 75 JOURNAL OF POLITICAL ECONOMY 124 (1954); Garrett Hardin, *The Tragedy of the Commons*, 162 SCIENCE 1243 (1968); and James Sanchirico and Susan Hanna, *Navigating U.S. Fishery Policy into the 21st Century*, 19 MARINE RESOURCE ECONOMICS 395 (2004).

[2] For a historical perspective on how the U.S. arrived at the current state of our marine fisheries, see J.N. Sanchirico and J.E. Wilen. Global Marine Fishery Resources: Status and Prospectus. INTERNATIONAL JOURNAL OF GLOBAL ENVIRONMENTAL ISSUES. Vol 7, No. 2/3 (2007).

[3] See, for example, James E. Wilen, *Why Fisheries Management Fails: Treating Symptoms Rather Than Causes*, 78 BULLETIN OF MARINE SCIENCE 529 (2006).

differences between a cooperative and an IFQ-managed fishery along these two dimensions, I will not make a distinction between the benefits arising from a cooperative or IFQ fishery.

Overall Economic Benefits

- Between 1990 and 2003, the value of IFQ fisheries in New Zealand (NZ) more than doubled, while at the same time fish stocks were rebuilding.[4]
- The profit rate for 33 of NZ IFQ fisheries between 1990 and 2003 was estimated to be 20 percent, with significant variation between fish stocks, where high-valued stocks experienced greater rates than low-valued stocks, everything else being equal.[5]
- Icelandic IFQ fisheries were estimated to yield a profit rate of 25 percent.[6]
- The British Columbia (BC) Pacific Halibut Fishery is estimated to have profit rates on the order of 60 percent.[7]
- In fisheries without sufficient economic data to measure profit changes, total revenues of fisheries under an IFQ or cooperative have more than doubled.[8]
- In NZ IFQ fisheries, approximately 30 percent of the cost of monitoring and enforcing, including scientific research, is funded by the quota owners.

Benefits of ownership of the catch shares include:

- *Reduced incentive to race for fish, resulting in longer seasons*
    - In the BC Halibut Fishery, the season length went from 10 days the year before the implementation of the IFQ (1990) to 260 days the year after.[9]
    - In the U.S. Pacific Halibut fishery the season length prior to implementation of the IFQ (1994) averaged 2-3 days. After implementation, the season length increased to an average of 245 days.
    - The season length went from 75 days in 1998 to 149 days in 1999 after the creation of the cooperatives in the North Pacific Pollock fishery, even though the offshore sector had a reduction in their allocation of the TAC. A similar result occurred in the Pacific Whiting Cooperative.[10]

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[4] See, R. Newell, K. Papps, and J. N. Sanchirico. Asset Pricing in Created Markets for Fishing Quota. AMERICAN JOURNAL OF AGRICULTURAL ECONOMICS. Vol. 89 No. 2 (2007); Newell, R., J. N. Sanchirico, and S. Kerr. Fishing Quota Markets, J. OF ENVIRON. ECONOMIC. MANAGEMENT, Vol. 49 No. 3 (2005); J.N. Sanchirico and R. Newell. Catching Market Efficiencies: Quota-based Fishery Management, RESOURCES, No. 150, Spring (2003).

[5] NEWELL ET AL. *supra* note 4.

[6] R. Arnason. The Icelandic Individual Transferable Quota System: A descriptive account." MARINE RESOURCE ECONOMICS Vol. 8, No. 3 (1993).

[7] James E. Wilen. Property Rights and the Texture of Rents in Fisheries *in* Evolving Property Rights in Marine Fisheries (ed. D. Leal). Rowman and Littlefield Publishers. Oxford. UK (2005).

[8] Redstone Strategy Group and Environmental Defense Fund. Assessing the potential for LAPPs in U.S. Fisheries. (2007) (Available at http://www.redstonestrategy.com/documents/2007-03-26%20Assessing%20the%20Potential%20for%20LAPPs%20in%20US%20Fisheries.pdf)

[9] M. Herrmann. Estimating the induced price increase for Canadian Pacific halibut with the introduction of the individual vessel quota program. CANADIAN JOURNAL OF AGRICULTURAL ECONOMICS Vol. 44 No. 2 (1996).

[10] R. Townsend. Producer Organizations and Agreements in Fisheries: Integrating Regulation and Coasean Bargaining in Rents in Fisheries *in* Evolving Property Rights in Marine Fisheries (ed. D. Leal). Rowman and Littlefield Publishers. Oxford. UK (2005).

- *Slowed pace of fishing, improving the ability to optimize onboard processing facilities, resulting in increases in the product recovery rate per pound of fish caught*
    - The Pacific Whiting Cooperative experienced increases in product recovery from 17 percent to 24 percent, which corresponds to approximately 10 million more pounds of seafood from the same catch.[11]
    - North Pacific Pollock Cooperatives product recovery rate went from 19 percent in 1998 to 30 percent in 2007.[12]
- *Incentives shifted from maximizing the quantity of fish caught to maximizing the value of the catch.*
    - The product mix shifts to more valuable products, which results in higher net value per pound of fish caught
        - Since the creation of the cooperatives in the Pacific Pollock fishery, the share of catch going to produce fillets has increased.[13] The shift to higher-valued end products was also evident in the Pacific Whiting Cooperative.
        - The NZ Red Snapper fishery moved from mainly a frozen product to the live fish market in Japan.[14]
        - In the BC Halibut fishery, fresh product increased from 42 percent of the catch to over 90 percent after implementation.[15]
        - Iceland's demersal fisheries experienced total revenue increases of $6 million dollars in 1984 due to higher quality fish.[16]
    - Changes to the types of fishing methods (gear), timing, and location of fishing improve the quality and value of the fish caught
        - A skipper in Canada's fishing quota system is quoted as saying how participants have the opportunity to fish when prices are high or "work the market more."[17]
            - Surveys of Canadian fish processors working with the BC Halibut fishermen support this statement. For example, they noted that fishermen were calling in to find out the expected price of fish before heading out to sea.[18]
        - NZ fishermen reported shifting fishing trips to later in the season when prices were traditionally higher.[19]

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[11] G. Sylvia, H. Munro Mann, and C. Pugmire. Achievements of the Pacific whiting conservation cooperative: rational collaboration in a sea of irrational competition *in* Case Studies in fisheries self-goverance (Eds. R. Townsend, R. Shotton, and H. Uchida) FAO FISHERIES TECHNICAL PAPER No. 504. Rome, FAO. 2008.

[12] Pollock Conservation Cooperative and High Seas Catchers' Cooperative Final Joint Annual Report 2006 to the North Pacific Fishery Management Council, January 31, 2007.

[13] *Id.*

[14] R. Boyd and C. Dewees. Putting theory into practice: individual transferable quotas in New Zealand's fisheries. SOCIETY & NATURAL RESOURCES Vol. 5, no. 2 (1992).

[15] K.E. Casey et. al. The Effects of Individual Vessel Quotas in the British Columbia Halibut Fishery. MARINE RESOURCE ECONOMICS Vol. 10 no. 3 (1995); HERRMANN *supra* note 9.

[16] ARNASON *supra* note 6.

[17] Knudson, T. 2003. "Harvesting the Sea" Sacramento Bee (available online at http://www.sacbee.com/static/live/news/projects/denial/)

[18] CASEY ET AL. *supra* note 15.

[19] BOYD AND DEWEES, *supra* note 14.

- North Pacific Pollock fishermen report being able to better target females during the roe season[20]
- NZ fisheries experienced changes from trawl or seining to long-lining or gill netting to improve on-board handling and quality of the caught fish.[21]

Benefits of the transferability of the catch shares include:

- *Reduced number of vessels and fishing capacity.*
  - In the first year after the implementation of the Pollock Cooperative, only 16 out of the 20 vessels fished; only 6 out of 10 fished in the Pacific Whiting fishery post-implementation of the cooperative.[22]
  - New Zealand fisheries have seen a reduction in quota owners on the order of 35 percent since the program's inception in 1986. As of 2003, the majority of the reductions were in mid-size firms.[23]
  - The Mid-Atlantic Surf Clam and Ocean Quahog fishery has seen over a 54 percent decline in the number of vessels.[24]
- *Greater flexibility provided for participants to match quota holdings with catches.*
  - The Pacific Whiting Cooperative reported lower rates of bycatch post implementation.[25] Whether the reduction is due to the formation of the cooperative, however, is not clear as the other non-coop sectors have also seen a decline.[26]
  - Annual trades or leases of catches for the median fish stock are on the order of 40 percent of the total allowable catch in New Zealand, 30 percent in Iceland, and 40 percent in South East Australian trawl IFQ fisheries.[27]
- *Incentives provided that lead to the TAC being caught at the lowest possible costs, as higher-costs (less efficient) vessels find it more profitable to sell or trade their shares than to fish them.*
  - Unfortunately, the fact that very little economic data and even less data on the costs of fishing in IFQ and cooperative fisheries exist precludes me from providing examples on the realized costs savings, although the substantial values of quotas are indicative of both cost savings and revenue increases.
  - There are, however, some *ex ante* predicted estimates of the potential cost reductions, which are on the order of 50 percent of total revenues in the Mid-Atlantic surf clam and ocean quahog IFQ and cost reductions ($8 million)

[20] WILEN, *supra* note 7.
[21] BOYD AND DEWEES, *supra* note 14.
[22] TOWNSEND, *supra* note 10.
[23] J.N. Sanchirico and R. Newell. Analysis of Concentration and Consolidation in NZ Fishing Quota Markets: A REPORT TO THE NEW ZEALAND MINISTRY OF FISHERIES, June 2003.
[24] S. Wang. The Surf Clam ITQ Management: An Evaluation. MARINE RESOURCE ECONOMICS Vol. 10, No. 1 (1995).
[25] TOWNSEND, *supra* note 10.
[26] SYLVIA, *supra* note 11.
[27] J.N. Sanchirico, D. Holland, K. Quigley, and M. Fina. Catch-quota balancing in Multispecies Individual Fishing Quotas. MARINE POLICY Vol. 30 No. 6 (2006).

greater than two times the potential revenue gains ($3 million) for 1993 in the Gulf of Mexico Red Snapper fishery.[28]

One of the most powerful forces of change created by catch-share programs is a constituency whose wealth is a function of the health of the marine environment. In an IFQ fishery, the asset value from owning quota in perpetuity provides incentives to invest in the long-term sustainability of the fishery and the income to the members of the cooperative provides similar incentives.[29] For example, Iceland Cod quota owners lobbied the government to create no-take marine reserves off of the northern coast of Iceland to protect spawning areas; New Zealand quota owners invest in scientific and value-added research, and have voluntarily shifted fishing efforts away from spawning areas.

Wealth creation will lead to improved stewardship, sustainability, and further innovation to increase value.[30]

To summarize, in many fisheries, stocks are overfished, habitats are degraded, fishermen are scraping by from one season to the next, and the public is receiving very little return from its marine assets.

This does not have to be the case. We have a large and growing body of evidence that management tools, such as cooperatives and individual fishing quotas, are a means to achieving sustainable marine populations, fishing communities, and returns on our natural assets.

Thank you.

[28] Q. Weninger. Assessing efficiency gains from individual transferable quotas: an application to the Mid-Atlantic surf clam and ocean quahog fishery. AMERICAN JOURNAL OF AGRICULTURAL ECONOMICS Vol. 80 No. 4 (1998); Q. Weninger and J. R. Waters. Economic benefits of management reform in the northern Gulf of Mexico reef fish fishery, JOURNAL OF ENVIRONMENTAL ECONOMICS AND MANAGEMENT Vol. 46, No. 2 (2003).

[29] While the same incentives exist under both policies, they are arguably not as strong under a cooperative, as there is less long-term certainty. See, for example, the discussion in SYLVIA *supra* note 11 regarding the issues with respect to the Pacific Whiting cooperative.

[30] WILEN, *supra* note 3.