



CREATING MARINE ASSETS PROPERTY RIGHTS IN OCEAN FISHERIES

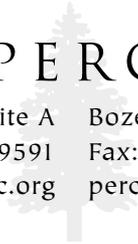
BY ROBERT T. DEACON

CREATING MARINE ASSETS PROPERTY RIGHTS IN OCEAN FISHERIES

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BY ROBERT T. DEACON
University of California, Santa Barbara

Series Editor Roger Meiners



PERC

2048 Analysis Drive, Suite A Bozeman, Montana 59718
Phone: 406-587-9591 Fax: 406-586-7555
www.perc.org perc@perc.org

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TABLE OF CONTENTS

- 01 INTRODUCTION

- 04 RELEVANCE FOR FISHERIES POLICY

- 08 GAINS FROM COORDINATION:
THE CHIGNIK EXPERIENCE

- 19 MARKETS PROTECTING MARINE
ENVIRONMENTS

- 25 PROPERTY RIGHTS AND EFFICIENCY
IN FISHERIES MANAGEMENT

- 28 CONCLUSION

- 29 NOTES

- 33 REFERENCES

TO THE READER

A thousand years ago Basque fishermen were engaged in international fishing, reports Mark Kurlansky in his book *Cod*. And they were not the first to exploit the cod stocks off the coasts of Greenland and Canada; the Vikings had been involved in the race to fish before that.

Regardless of their diligence, the Basques, with their small boats, had little impact on fish stocks. But modern technology—floating fish factories—allows the first to find a school of fish the chance to vacuum the ocean. Decades of exploitation of fish and other marine life has caused the collapse of some fisheries.

To prevent destruction of sustainable stocks of marine life, there must be limits on the thousands of boats vying for the harvest. Governments have imposed a host of regulations. Such controls have had little or no success. The race has often become one of ever-fancier technology that lets the swiftest capture the fish. The race is wasteful and the results are hazardous to the environment and those involved in the catch.

In this PERC Policy Series, Robert Deacon considers how economic incentives can solve this problem. Marine life can become an asset to be nourished over time, not consumed in a wasteful race. Deacon draws on a large literature on the subject, but focuses on a novel management experiment in Alaska and one developing along the California coast. He makes the case that economic theory can provide guidance for getting people who fish for a livelihood to agree on how best to protect fish stocks and reduce environmental damage.

This essay is part of the Policy Series of papers on timely environmental topics. This issue was edited by Roger Meiners with Mandy-Scott Bachelier supervising production and design.

INTRODUCTION

Marine scientists are sounding alarms over the collapse of commercially valuable fish stocks and the destruction of marine habitats by bottom trawling and other harvesting practices. The fact that these trends persist in fisheries that have been managed for decades indicates that traditional management approaches do not hold the key to reversing these trends.

An alternative approach that bases fisheries management on property rights, or “limited access privileges” in the ocean, can shift the incentives of resource users away from destruction and toward stewardship.¹ As explained in what follows, a broad application of this approach holds promise as a solution to the problems of sustaining fish stocks and minimizing damage from commercial fishing.

Rights-based management regimes were initially instituted to improve the economic performance of fisheries. While currently applied only to a small fraction of the world’s fisheries, these systems have been successful where adopted. Under traditional approaches, the harvests of individual fishing firms are based on the rule of capture, which leads to a race to fish and, thereby, depletion of fish stocks. Regardless of whether industry harvests are constrained by limits on total allowable catch, by limitations on entry, or only by licensing requirements, the success of the fisher is determined by the ability to catch fish before one’s rivals. As case studies have amply documented, this has led to overinvestment in fishing vessels, shortened fishing seasons,

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excessive catch, high processing costs due to the pulse nature of harvests, unnecessarily dangerous fishing conditions, and low product quality. The response has been an almost universal focus on conserving stocks that has led to depressed economic conditions in fishing communities. Economists and fisheries scientists generally agree that traditional management strategies

have failed both to protect stocks of marine life and to generate the highest rate of return.

The most prominent property rights approach is the individual catch share. Depending on how they are administered, these may be called individual transferrable quotas (ITQs), individual fishing quotas, or individual vessel quotas. Catch share systems are designed to end the race by establishing individual ownership to portions of the allowed catch, giving each shareholder a secure harvest right. Experience with these regimes has been positive; enhanced fishery profits are directly evident in positive prices for quota allocations and indirectly evident in higher unit values for fishery products, longer and safer fishing seasons, and improved catch per vessel. Many studies indicate that markets for catch shares are both competitive and efficient in regimes where they are tradable. Additionally, fishers vested with secure harvest rights have incentives for stewardship of the resource and more efficient management, neither of which exists in the traditional race to fish. While clearly producing gains, however, the application of property rights principles in the catch share systems has been incomplete.

This essay explores the potential for further gains by a more complete application of the property rights approach. As we will

see, allowing individual rights holders to combine their harvest rights into harvesters' associations, or to cede certain aspects of individual rights to centralized coordinators, can be advantageous—as illustrated by the Chignik Salmon Cooperative in Alaska, which operated between 2002 and 2004. This innovative association coordinated the deployment of its members' efforts across space and time, cooperated in the provision of shared inputs, and shared information on stock locations. It achieved efficiencies unheard of in traditionally managed salmon fisheries. The fact that the Chignik co-op came under attack by nonmembers, and was eventually declared illegal by the courts, is grim evidence that gaining the support of all fishery participants can be difficult to achieve.

We will also see how a more complete treatment of fishing rights as “property,” with a potential for encumbering these rights, can achieve conservation objectives. Although marine environments generally are not owned, existing institutions grant fishers' rights to use these environments in specified ways. If these rights can be placed under easement, now a common strategy on land, then a new avenue is opened for conservation groups or government decision makers to use a market approach to achieve conservation objectives.

A vehicle for exploring this possibility is an initiative by the Nature Conservancy (TNC) and the Environmental Defense Fund (EDF) to purchase federal trawling permits and trawling vessels from commercial fishers in Morro Bay, California. This purchase, completed in 2007, is intended to reduce bycatch² and seafloor damage from bottom trawling. While TNC retired some of these vessels and permits, others were

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leased back to the fishers who owned them originally, but with lease restrictions requiring them to use lighter gear and constrain fishing to avoid environmentally sensitive areas. The Nature Conservancy's action involved purchase and ownership of vessels and permits and, in this sense, was not a true conservation easement. Nevertheless, it points to the potential for applying a powerful tool for terrestrial conservation to a marine setting.

RELEVANCE FOR FISHERIES POLICY

A highly publicized article in *Science* projected the global collapse by the year 2048 of all groups of marine organisms now commercially fished, due primarily to overfishing (Worm et al. 2006).³ The authors recommended implementation of marine reserves, fishery closures, and restrictions on catch, effort, and gear to stave off the catastrophe. Such recommendations have long been mainstays of traditional fisheries management, leaving little reason to hope that the authors' gloomy forecast will be avoided. Traditional (or no) management is still the norm for most of the world's fisheries, which has proven unable to either conserve fish stocks or allow fishers to capture profits.

The Newfoundland cod stock is a sad example of a resource that was decimated, despite active management. Basque fishers harvested this stock well before Columbus's famous voyage, and sustainable harvests continued until the latter half of the 20th century. Hilborn et al. (2003) succinctly describe how the stock fared beyond that point, under traditional management:

The destruction [that] began with large foreign fleets moving onto the Grand Banks, was temporarily stopped in 1977 when Canada declared a 200-mile limit that excluded most foreign fishing, and then continued with the building

of Canada's own offshore fleet, a fleet that was much too large based on overly optimistic scientific assessments of long-term sustainable yield. Ultimately, it was the Canadian fleet, with Canadian scientists providing advice and Canadian managers in charge that led to the demise of this fishery. In theory, it was a management system the world could admire . . . [but] it failed totally. (2003, 360)

Despite the depressing forecasts of fishery collapse and evidence of mismanagement, there is a glimmer of hope. A re-analysis of the data that indicated the global demise of fisheries by 2048 found that trends in the 121 fisheries managed with property rights institutions (catch shares) are strikingly different than the 11,000-plus commercial fisheries operating under traditional or no management (Costello, Gaines, and Lynham 2008). Prior to the advent of catch shares, the fisheries now operating under some form of property rights all followed the same downward trends that led to the dismal forecast. Once catch shares were introduced, the rate of decline in the stocks halted, and actually reversed by some estimates.

Under catch share management, fishers acquire secure property rights to specific harvests. As owners, they acquire stewardship incentives that are missing in the traditional race to fish. In New Zealand, Iceland, and Canada the introduction of such regimes has motivated commercial fishers to lobby for reduced catch targets to allow stock rebuilding, to promote improved catch monitoring, and to cooperate on research.⁴ In New Zealand and elsewhere, associations of catch share holders have promoted more stringent size regulations, instituted

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training programs to reduce incidental mortality, and directly invested in replenishing stocks.

Catch share regimes perform well in eliminating waste and creating value. When implemented in the British Columbia and Alaska halibut fisheries, seasons were extended from a few days to most of the year, reducing the size of the fleet needed for the harvest, and allowing most of the catch to be sold fresh rather than frozen.⁵ Financial returns in fisheries adopting these systems improve dramatically due to elimination of redundant effort, removal of restrictions on fishing methods, and enhanced product value (higher quality fish for market) due to longer, slower-paced fishing seasons (Leal 2002; Wilen 2004).⁶ Where quota rights are tradable (ITQs), the evidence indicates that quota markets are efficient and competitive (Newell, Sanchirico, and Kerr 2005). By the same token, failure to fully define harvest rights, e.g., by restricting transferability or permanency of rights, has been shown to dilute the gains achieved (Grafton, Squires, and Fox 2000).

Shifting from traditional management to a property rights approach can benefit marine environments. A key environmental concern is bycatch. According to a recent survey, 26 percent of the world's catch is discarded each year; in the shrimp and prawn trawl fisheries, discards are estimated at five times the amount actually landed.⁷ A study of 10 fisheries in the United States and Canada found that bycatch declined an average of 40 percent following the implementation of catch shares, partly due to a slower pace of fishing.⁸ Leal, De Alessi, and Baker, (2005) point out that shortened seasons in the traditionally managed Gulf of Mexico red snapper fishery led to large out-of-season catches, which are discarded. This fishery recently transitioned to catch shares, giving reason to hope for longer seasons and reduced discards, as occurred in the Alaska halibut fishery after catch shares were introduced.⁹ Another environmental concern is seafloor degradation, coral destruction,

and other damage caused by bottom trawling, dredging, and trapping. While avoiding sensitive habitats or using different gear can minimize this damage, appropriate incentives typically are missing, even in catch share systems.

Catch share systems have achieved impressive gains, but the pace of implementation has been disappointing; as of 2008, nearly 99 percent of the world's commercial fisheries and roughly 85 percent of worldwide catch are not managed with catch shares.¹⁰ To a degree, this is due to contention over allocation of initial shares and resistance by "highliners" who generally oppose constraints on their traditional rights to fish.¹¹ Paying attention to these issues when deciding how rights are assigned could lead to more widespread adoption of property rights regimes that enhance catch and protect the environment.

The central premise elaborated below is that the standard way of administering catch share systems may fail to capture efficiency gains for two reasons. First, relying solely on individual catch rights, and transactions in these rights as a management tool, may miss gains from coordinating the actions of individual fishers and from providing shared inputs. These gains can be enhanced by allowing individuals to combine their catch rights, or to assign some rights to centralized managers. Second, truly treating commercial fishing rights as "property" suggests using private agreements, negotiated among conservation groups and fishers, to achieve conservation goals. Such agreements would offer compensation to fishers who agree to avoid fishing practices that harm the marine environment—conservation easements in the oceans. Examples of both property rights extensions are elaborated in what follows.

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GAINS FROM COORDINATION: THE CHIGNIK EXPERIENCE

A group of commercial fishers successfully petitioned the Alaska Board of Fisheries in 2001 to allocate a portion of the 2002 sockeye salmon catch from the Chignik fishery to them collectively, with the intent of fishing this allocation as a voluntary cooperative. The Chignik commercial salmon fishery is one of Alaska's oldest, dating to the 1880s, and the catch is almost entirely sockeye. The fishing grounds are located on the Alaska Peninsula (see Figure 1). Sockeye salmon migrate toward spawning grounds drained by the Chignik River and become more concentrated as the migration proceeds. Since 1974, the fishery has operated under limited entry, with approximately 100 permits in force in 2005. The management regime specifies a biologically determined escapement goal and monitors the returning stock to make sure the overall catch is consistent with this goal.¹² The harvest is controlled by closing the fishery during parts of the migration season, thereby encouraging a race to fish during the open season.

The impetus to form the co-op arose in part from a decline in salmon prices, largely attributed to competition from farmed salmon, and a consequent decline in the value of Chignik fishing licenses. Between 1990 and 2001, license values fell from \$417,000 to \$186,000. In addition, many saw the fleet's overcapitalized state and the wastes inherent in competitive fishing as a cause

of depressed economic conditions. Competitive fishing also made it difficult to enhance quality by handling the catch more carefully, which would differentiate the Chignik catch from farmed salmon. Finally, the formation of cooperatives in the North Pacific

The Chignik commercial salmon fishery is one of Alaska's oldest, dating to the 1880s.

Figure 1:
Map of Chignik Management Area



The co-op was allocated 69.3 percent of the 2002 sockeye salmon harvest.

pollock and Pacific whiting fisheries in the late 1990s provided precedents.

Of the 100 active permit holders, 77 joined the co-op for the 2002 season and by 2004 that number

increased to 84 (Knapp 2008). In accordance with a management plan, the co-op was allocated 69.3 percent of the 2002 sockeye salmon harvest and the Alaska Department of Fish and Game (ADF&G) managed this allocation by specifying different open dates for the co-op and independent fleets.¹³

The co-op was incorporated as the Chignik Seafood Producers Cooperative and adopted bylaws that specified equal distribution of the net proceeds from fishing.¹⁴ License holders could opt into the co-op, but had to do so by a specified date prior to the start of the season. Once joined, a member could not opt out until after the season ended. Governance was by an elected board of directors. The board selected members to fish on the co-op's behalf. The selection criteria were experience, skill, vessel condition, expected cost, and intent to give preference to local laborers as crew. The board was also authorized to negotiate contracts with processors.

Different incentives for different fleets

The incentives of the cooperative and independent fleets differed in three important ways. First, because the independent fleet's capacity far exceeded what was needed to harvest the allowed catch, the regulator was forced to shorten the season to a fraction of the time the stock is available. This leads to a race to fish while the season is open, followed by periods of unproductive idleness.¹⁵ A cooperative seeking to maximize the profit of its entire membership can do better by slowing the rate of fishing and extending the season. This also allows it to concentrate effort

among its most efficient members; nonfishing members can apply their inputs to other valuable activities in or out of fishing.¹⁶

Second, because salmon migrate in a predictable direction over the season and generally become more concentrated in the process, an independent fisher must decide between intercepting the stock where it is closest or most concentrated, or intercepting it further out at sea. Fishing can be “better” on the outside because others have not yet fished the stock, but transportation cost is higher. Acting independently, some fishers will travel the extra distance even though this behavior is collectively wasteful. A co-op managed to maximize its members’ profits will wait until the stock is at its closest or densest, to minimize harvest cost.

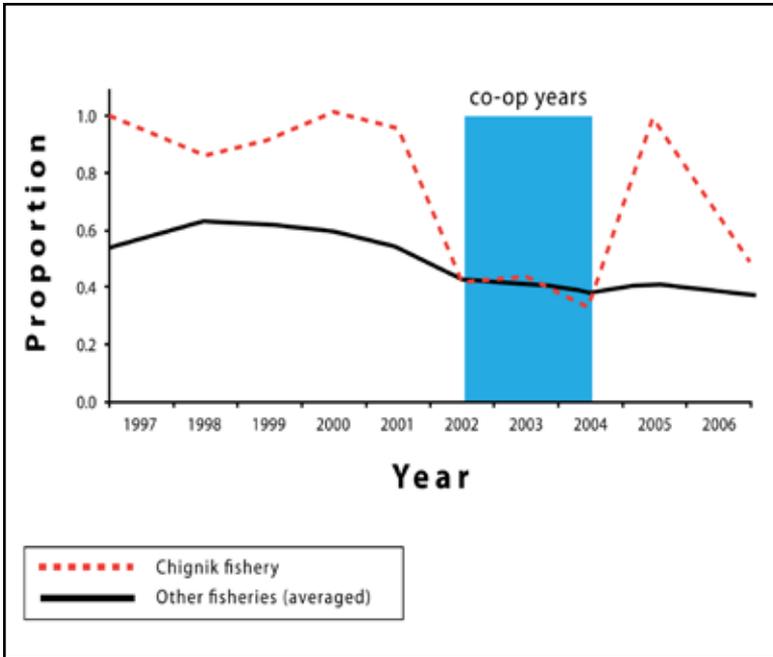
Third, independent fishers have no incentive to share in the provision of information and other public goods or to coordinate their actions. They are notorious for concealing the locations of fish concentrations and it is not uncommon for fishers to jockey for an advantageous position on the fishing grounds. This can be beneficial for members of a fleet fishing independently, but is wasteful for the fleet as a whole. A cooperative can increase its members’ profits by sharing information on stock locations, coordinating members’ actions to reduce conflicts and capitalizing on opportunities to complement one another.

How the fleets operated

On the first point—slowing the rate of fishing and lengthening the season—evidence shows that the proportion of permits fished in the Chignik fishery was substantially below historical levels during the three years that the co-op operated (2002–2004), as shown in Figure 2.¹⁷ The comparison to

A cooperative can increase its members’ profits by sharing information on stock locations.

Figure 2:
Proportion of permits fished in Alaska’s Purse Seine Fisheries



Source: Deacon, Parker, and Costello (2008)

trends in neighboring fisheries demonstrates that this change was not driven by unusual market, weather or regulatory conditions. Within the co-op, less than 30 percent of the members actually fished in any year; by comparison, nearly all independents fished in all years.¹⁸ The co-op paid the members who actually fished between \$47,000 and \$60,000 per season, plus the cost of fuel and insurance (Knapp 2008). All co-op members received equal shares of the co-op’s net revenue, amounting to \$15,000 to \$28,000 per season (Knapp 2008). Consistent with the slower pace of fishing, the season was lengthened. The fishery had operated roughly 80 days per year prior to the co-op, but the season lengthened by roughly 32 days during 2002–2004.

Slowing the pace of fishing allowed the co-op to handle the catch more carefully, resulting in higher quality fish and higher prices. During the co-op years, the average price paid for Chignik salmon was 17 cents per pound above average prices paid in other years and in other fisheries.¹⁹ The slower pace of fishing, and special fish-handling equipment, enabled the co-op to deliver live fish to the processing facility.

Data on daily catch locations are consistent with the second point. The co-op coordinated its members' actions to avoid fishing outside and focused its effort where the stock is most concentrated. The cooperative fleet made 100 percent of its catches "inside"—in the management zone nearest the stock's ultimate destination—in the years it operated. Combining data from the co-op and independent fleets, the proportion of fish caught inside was 27 percent higher during 2002–2004 than in earlier years.²⁰ The following account from a co-op founder makes clear that this was a conscious operating policy:

We had originally planned to employ a couple of large seiners to fish out on the capes [outside], but we realized that the extra running time would increase costs and reduce product quality. Harvesting in the close proximity and concentrated harvest area of the Chignik Lagoon was simply the most efficient and quality conscious method to pursue.²¹

Anecdotal accounts of the cooperative's strategy for exploiting the stock at locations and times of maximal concentration are more impressive than the numbers. The same co-op member gave the following description:

Instead of [a co-op member] making four or five sets

during the flood [high tide] for 200–300 [fish] a haul, he now could wait till the Lagoon drained out. At low tide [the channel] became a slow, meandering river of concentrated sockeye. And now, fishing for the entire co-op, he could make one giant drag for 3,000 to 5,000 fish.²²

An additional coordination benefit was an ability to precisely control a day's catch, something independent fishers cannot accomplish. With independent fishing, the fishery manager must forecast the rate of catch and announce a closing time calculated to meet the escapement target, an imprecise process at best. On days the co-op fished, the manager could hit the escapement target precisely, simply by requesting that the co-op cease fishing when the desired number of fish was caught (Pappas and Clark 2003).

The third incentive difference related to cooperation on shared information and infrastructure. A description of the co-op's operating methods for information sharing is enlightening:

Around Chignik [prior to the co-op] a few fathers and sons shared info on the radio, but essentially no one else had a formal group that shared strategy and information. [Once the co-op began fishing] it took about three days to get with the new program. Then the guys had it pegged. I was amazed how these competitive, individualistic fishers could figure out how to work so well together so fast.²³

The co-op also deployed public infrastructure in the form of "fixed leads," essentially stationary nets placed along the fish migration route to funnel the stock toward waiting purse seiners.²⁴ The leads altered the style of fishing and dramatically reduced the number of vessels required to achieve a given catch.

The Co-op and the Alaska Supreme Court

In 2002, two of the more successful Chignik fishers, both independents, filed suit in Alaska Superior Court against the Alaska Board of Fisheries. The plaintiffs argued that the board exceeded its authority in allocating a quota of salmon to the cooperative and that the regulation promulgating the co-op was inconsistent with the Alaska Limited Entry Act. The plaintiffs initially lost on summary judgment but won on appeal before the Alaska Supreme Court (Deacon, Parker, and Costello 2008). The Supreme Court recognized and approved of the co-op's efficiency, but found that the board, while authorized to allocate fish "between" fisheries, had no authority to allocate "within" a given fishery.²⁵ This eliminated exclusivity, the foundation of the co-op's success. The Court also disallowed the co-op's practice of concentrating all fishing activity among its most efficient members. The Court ruled that a permit holder must be "an individual who will fish," and disallowed "corporations, companies, partnerships, firms, associations, organizations, joint ventures, trusts, societies, or any other legal entity other than a natural person" from exercising permits.²⁶ The co-op attempted to modify its practices during 2005 to be consistent with the Court's ruling, but was unsuccessful and ceased operation.

There is evidence that the co-op's participants regarded it as a success. A survey conducted after the first year of operation found that 55 percent of co-op members who fished and 73 percent who didn't fish believed the co-op made them better off financially (Knapp, Siver, DeRoche, and Hill 2003).²⁷

Independents, however, believed they were disadvantaged by the co-

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