Perspective

Evidence on Producer Bargaining in the Northwestern Hawaiian Islands Lobster Fishery

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Abstract  Conjectures have been made in fisheries economics that private bargaining to reduce fishing effort might arise among permit holders in regulated fisheries. A case of such spontaneous cooperation in the Northwestern Hawaiian Islands lobster fishery is analyzed.

Key words  Fisheries management, Hawaiian lobsters, Coasian bargaining.

JEL Classification Code   Q22.

Introduction

Coase (1960) argued that incentives exist for joint users of a resource to bargain to maximize their economic gains from the use of that resource. This argument would suggest that private bargaining among users could be a solution to some fisheries externalities. This possibility has largely been treated by economists and managers as a theoretical novelty, with little or no practical significance. This paper documents an example of private bargaining to reduce fishing effort in the Northwestern Hawaiian Islands (NWHI) lobster fishery.

The NWHI Lobster Fishery and its Management

The Northwestern Hawaiian Islands (NWHI) lobster fishery harvested spiny lobsters (Panulirus marginatus) and two species of slipper lobsters (Scyllarides squammosus...
The fleet operated in an archipelago of small islands and reefs that stretches north and west of the main Hawaiian Islands for over 1,000 miles from Nihoa to Kure Atoll (figure 1). The vessels made trips of four to ten weeks to harvest these lobsters. Total landings were small in comparison to many other fisheries, varying from a high of 2.3 million pounds in 1985 to no catches in 1993, 2000, and thereafter (because of closures). However, the catch was quite valuable, with average dockside prices of $5.55 per pound (round weight) for spiny lobsters and $3.94 per pound for slipper lobsters in 1998. (See table 1 for detailed landings and price data and table 2 for historical effort data.) The largest share of the catch was sold as frozen product on the U.S. mainland and, increasingly, in Hawaii. In some years, a considerable share of the catch was sold live in Hawaii, on the mainland of the U.S., and to Asia.

This fishery began in 1976. In 1983, the Western Pacific Regional Fishery Management Council (“the Council”) initiated management of the fishery through its Crustacean Fisheries Management Plan. The Council’s statutory authority is the Magnuson Fishery Conservation and Management Act (known as the Magnuson-Stevens Act [MSFCMA] since the 1996 reauthorization.) Regulation initially was confined to reporting catch and effort data and to biological measures, such as minimum size limits and protection of egg-bearing females. Trap design was also regulated, in part to reduce any potential for incidental mortality of monk seals, an endangered species. Subsequently, vent requirements were added to allow escape of small-sized lobsters.

Boats in this fishery typically operated in other fisheries as well. Most vessels were either longliners based in Hawaii or crab vessels from Alaska, although a variety of other vessel types has also operated in the fishery. Before management, some of these vessels fished the entire year for NWHI lobsters. After management restricted the fishing season in 1991, all vessels operated in other fisheries during the closed season.

In 1991, Amendment 7 to the Crustacean Fisheries Management Plan implemented a limited-entry plan, an annual quota, and a delimited fishing season from July to December. The quota was a per-piece quota, expressed as the sum of spiny plus slipper lobsters caught. It has varied from zero to 1.2 million pieces since 1992. This quota was implemented largely in response to what was believed to be an unusual decline in the lobster biomass. The limited-entry and quota regulations were adopted by the Council in 1991 and were implemented by the National Marine Fisheries Service (NMFS) for the 1992 fishing season. Fifteen boats, with 12 different owners, qualified for permits under these regulations. The regulations allowed the two existing holders of multiple permits to retain those permits, but all other permit holders were restricted to holding one permit.

The general management structure of the NWHI lobster fishery, with an overall quota and limited entry, would be considered sound by most standards. This fishery was small and relatively non-complex. Two primary species were harvested; there are almost no interactions with other fisheries. (Interactions with the monk seal, an endangered species, have been a concern by some non-governmental environmental

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1 Information and data on this fishery can be found in the annual reports on the fishery (e.g., Pooley and Kawamoto 1998) and in the report by the Maine Aquaculture Innovation Center (2000). The regulatory structure is described in the Crustacean Fisheries Management Plan and its amendments (Western Pacific Regional Fishery Management Council, 1982, 1991, 1995). Because this fishery was closed in 2000, we use the past tense in describing it.

2 Polovina and Mitchum (1992) and Polovina et al. (1994) subsequently attributed this decline to a deterioration of the carrying capacity of the environment, which was caused by changes in nutrient levels associated with atmospheric and oceanographic cycles.
Figure 1. Map of Northwestern Hawaiian Islands
### Table 1
NWHI Lobster Landings and Real Value

<table>
<thead>
<tr>
<th>Year</th>
<th>Pounds Landed</th>
<th>Real Price Per Pound ($)</th>
<th>Year</th>
<th>Pounds Landed</th>
<th>Real Price Per Pound ($)</th>
</tr>
</thead>
<tbody>
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<td>1984</td>
<td>935,000</td>
<td>3.72</td>
<td>1985</td>
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<td>4.29</td>
<td>1987</td>
<td>528,000</td>
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<tr>
<td>1988</td>
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<td>4.56</td>
<td>1989</td>
<td>1,267,000</td>
<td>5.33</td>
</tr>
<tr>
<td>1990</td>
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<td>6.37</td>
<td>1991</td>
<td>150,000</td>
<td>6.76</td>
</tr>
<tr>
<td>1992</td>
<td>319,000</td>
<td>5.66</td>
<td>1993</td>
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<tr>
<td>1994</td>
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<td>6.03</td>
<td>1995</td>
<td>191,000</td>
<td>6.24</td>
</tr>
<tr>
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<td>211,000</td>
<td>6.63</td>
<td>1997</td>
<td>104,000</td>
<td>5.38</td>
</tr>
<tr>
<td>1998</td>
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<td>NA</td>
<td>1999</td>
<td>120,000</td>
<td>NA</td>
</tr>
<tr>
<td>2000</td>
<td>--------------</td>
<td>--------------------------</td>
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### Table 2
NWHI Lobster Fishing Effort

<table>
<thead>
<tr>
<th>Year</th>
<th>Vessels</th>
<th>Trips</th>
<th>Average Days Per Vessel</th>
<th>Average Days Per Trip</th>
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<td>38</td>
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<td>62</td>
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<td>1986</td>
<td>16</td>
<td>60</td>
<td>126.0</td>
<td>32.5</td>
</tr>
<tr>
<td>1987</td>
<td>11</td>
<td>38</td>
<td>110.1</td>
<td>30.3</td>
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<tr>
<td>1988</td>
<td>9</td>
<td>28</td>
<td>126.6</td>
<td>39.3</td>
</tr>
<tr>
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<td>45</td>
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<td>32.6</td>
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<tr>
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<td>9</td>
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<td>12</td>
<td>27</td>
<td>70.8</td>
<td>30.4</td>
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<tr>
<td>1993</td>
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<td>41.2</td>
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<tr>
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<td>--------</td>
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</table>

Northwestern Hawaiian Islands Lobsters

organizations. Such interactions have been rare.) All lobsters were landed in Honolulu, so the costs of monitoring quotas were low. Number of traps would provide a relatively good index of fishing effort, and enforcement of trap limits would be simplified by the distant water nature of the fishery. The number of permits, 15, was clearly too high for the stock conditions of the 1990s. Under climatic conditions more favorable for the stocks, 15 permits would probably be only slightly too high, but not wildly inconsistent with the resource. The industry has shown considerable interest in further reducing fishing effort. For example, a survey of the owners of the 15 permits found widespread interest in individual transferable quotas (Maine Aquaculture Innovation Center 2000, p. 67). In comparison to many U.S. fisheries managed under the MSFCMA, the NWHI lobster fishery would seem both well managed and well positioned for further management evolution.

Despite this favorable environment, management of the NWHI lobster fishery has endured a series of implementation problems and faced significant obstacles to further rationalization of fishing effort. We will first describe these problems and then report how the industry bargained its own short-term program of effort reduction.

Implementation Problems in NWHI Lobster Management

The transition in 1992 from unregulated landings and seasons to the Amendment 7 rules was complicated by regulatory delays built into the rule-setting requirements of the MSFCMA. An emergency closure ended in November 1991 and could not be extended, while the new rules did not take effect until January 1992. A window was created in December 1991 for one final short, unregulated season. As the weather in December can be difficult in the NWHI, this window required boats to balance the economic profit from a December trip against the risks associated with possible bad weather. One boat chose to go fishing, and that boat sank with the loss of two lives.

The 1992 limited-entry plan contained a requirement that a permit be used at least once every two years. Each vessel was required to land a minimum of four lobsters per registered trap (approximately 4,000 lobsters for most boats) every other year to meet this requirement. This use-it-or-lose-it provision, which was intended to encourage attrition, had the unintended consequence of forcing some permit holders to fish, even though they would have preferred not to. Of the 12 boats that fished in 1992, at least two would not have fished absent the use-it-or-lose-it rule.3 Paradoxically, one of these two boats sank (with no lives lost). A complete closure in 1993, coupled with very low quotas in 1994, made clear the deficiencies of the use-it-or-lose-it rule. After the 1994 fishing season, the Council rescinded this provision.

Under Amendment 7, initiated for 1992, the harvest guideline was set in a two-step procedure. A preliminary (or forecast) guideline was announced in the spring, prior to the opening of the fishery on July 1. The final harvest guideline was set by August 15 and was based in part upon catch-per-trap-haul from the first month of the season.

In the third year of the guidelines, 1994, the defects of the two-step system became apparent. The preliminary guideline for 1994 was 200,000 lobsters, and five vessels chose to fish. However, the final guideline was revised downward to 20,900 lobsters, and the fishery was closed in August 1994 by emergency rule. Because the vessels had operated for six weeks before the closure was announced, the total catch was actually 130,000 lobsters. Separate concerns by the industry (over the large in-

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3 This information is based on a survey conducted prior to the 1992 fishing season by the first author.
Obstacles to Further Effort Rationalization

The initial effort-limitation program was largely the result of industry initiative. As is typical of limited entry plans, the plan criteria qualified more permits than the resource could support in the short run, and perhaps also in the long run. But, as indicated above, some permit holders have shown an active interest in further effort reduction through, for example, individual quotas.

At least three different approaches to effort reduction seem practical in this fishery: individual transferable quotas, industry-financed permit buyouts, and fractional licenses (Townsend and Pooley 1995). However, political obstacles blocked all these alternatives.

The 1996 reauthorization of the MSFCMA contained a three-year national moratorium on new individual quota plans, which was subsequently extended for two years, until October 2002. This moratorium largely reflected political controversy over individual quota plans already approved in the North Pacific and the Gulf of Mexico and strong opposition to individual quotas in New England. Thus, national political issues unrelated to Hawaii blocked the most obvious effort rationalization approach, individual transferable quotas.

The MSFCMA also contains strict limitations on fees that can be levied on the fishing industry. These limitations apparently make it impossible to include industry-financed permit buyouts in management plans, even if the industry wants such fees. Further, provisions in Amendment 7 made it impossible for the industry to buy out permits outside the management process. Amendment 7 prohibited permit holders from buying any interest in additional permits. (The two owners of multiple permits at the effective date of Amendment 7 were allowed to retain control of their permits.) De facto effort reduction through purchase of idle permits by active boats, which almost certainly would have occurred absent the restriction, was impossible. Novel approaches, such as establishing a jointly owned corporation to buy out permits, were also impossible.

The “Hui”: A Short-term Coasian Bargain

By 1997, the industry was confronted with a classic derby fishery. In that year, nine boats decided to fish. All nine sprinted to the fishing grounds on opening day, and the quota was exhausted in 22 days. (For historical comparison, each vessel would typically make three or more trips of about 30 days each year. See table 2.)

In fishing year 1998, holders of 14 of the 15 NWHI lobster permits agreed that only four of the 14 permits would fish. Holders of the other ten permits received compensation not to fish from those who fished. This agreement was frequently referred to as the “Hui”, which is the Hawaiian word for “group.” In Hawaii, “hui” is used to identify many kinds of business partnerships.

The decision to allow four boats to fish was based on both market and operational considerations. The four boats fishing were the only boats in the fleet with the capacity to hold live lobsters. The industry believed that an opportunity existed to market live lobsters to Asia at very favorable prices. Getting more of the product into the live market (as opposed to the frozen tail market) was seen as a major op-
portunity to increase total value of landings. With four boats, the quota of 286,000 lobsters would be caught between July 1 (the opening date) and the end of September, when weather becomes unpredictable in the NWHI.

The four boats that fished (called “Class 3” boats in the agreement) agreed to place 20% of gross revenues into a pool for payment to the other ten permits. The other ten permits were grouped into two categories. Five permits that did not have a vessel and gear ready to fish were “Class 1 permits” and were allocated one share each in the payout. Five permits that did have a vessel and gear were “Class 2 permits” and were allocated six shares each in the payout. This created 35 shares to divide the 20% pool. This translated into a payment of 0.5714% of gross revenues to each Class 1 permit and 3.4284% of gross revenues to each Class 2 permit. Gross receipts for the four boats that fished were $894,947. This resulted in payments of $5,114 to each Class 1 permit holder and $30,682 to each Class 2 permit holder.

In addition to the overall agreement among the 14 boats, there were additional agreements among the four Class 3 boats. Each vessel agreed to take 25% of the total quota. Moreover, because one of the four boats would not start fishing until about three weeks after the season opened, the other three Class 3 boats agreed to take only 75% of the quota at Necker Island, the most productive fishing ground.

The members of the Hui reported that the agreement was not especially difficult to put together or to administer. One of the key participants reported that it was “a matter of hours rather than days” to negotiate the details of the Hui. The Hui did not require any auditing of its members’ payments; it simply accepted their reported revenues.

The composition of this group undoubtedly made cooperation easier. The 11 owners of the 14 Hui permits are well known to each other. The Hui members have had a wide variety of business transactions in this fishery and in other fisheries over a long period. There were family ties among three permit holders. Two of the 15 permit holders have served on the Council.

The fifteenth permit did not join the Hui. This permit was held by a relatively large, non-fishing business, which had never fished under the permit. There was an effort to enlist the membership of this final permit, and the initial discussions assumed that all 15 permits would be in the Hui. However, this permit was ultimately transferred to a new entrant to the fishery for the 1998 season.

The entry of the non-Hui vessel seemed to create some initial concerns by the Class 3 permits. However, the vessel was relatively small and the new entrant had limited previous experience on the fishing grounds. Ultimately, not all the quota was taken, so this vessel was relatively unimportant.

The Hui suffered some unanticipated setbacks in 1998. One of the four fishing (Class 3) vessels was lost at Kure Atoll on its third trip. This resulted in a devastating loss for its owner, but also reduced the size of the pool to be shared by the non-fishing members of the Hui. This trip was at the end of the season, and the other three Class 3 vessels had already left for fisheries in Alaska. It was not economical for any Class 2 vessel to rig up for one trip at the end of the season, so this quota went uncaught. The high price expected for live lobsters in the Asian market was not realized, in part because of the Asian financial crisis. Total revenues, and therefore the payments to Class 1 and 2 vessels (reported earlier), were perhaps as much as 50% below the most optimistic pre-season estimates.

These disappointing financial results contributed to a failure to continue the Hui in 1999. In 1999, six vessels competed in a derby for the available catch. The fishery was closed in 2000 (and has not yet reopened) because of continued uncertainty related to the harvest guideline and concerns over the impact of fishing on other aspects of the NWHI ecosystem.
Discussion

Management of the NWHI lobster fishery illustrates both the strengths and weaknesses of government regulation of fisheries. By creating a closed set of 12 users of the resource, government management changed the user mindset from one of competitive exploitation to cooperative search for improved management. But, at least in the U.S. context, government intervention brings with it an inflexible and cumbersome regulatory process. The NWHI lobster fishery illustrates too many of those limitations. The rigid timing requirements, intended to insure adequate opportunity for public input, created the unfortunate December 1991 opening. Regulation is all too often forced to “learn by doing.” There is ample evidence that use-it-or-lose-it requirements do not effectively reduce effort, but such requirements routinely appear in management plans as compromises to satisfy some constituencies. Only after the use-it-or-lose-it provision was shown ex post to increase effort did the a priori predictions get credence. Likewise, the problems with in-season quota adjustments should have been predictable. However, the regulatory process accorded wide deference to advice from the scientists who designed the novel mechanism.

Ancillary issues frequently deflect regulation. Political issues in the North Pacific, New England, and the Gulf of Mexico spilled over into Hawaii in the national moratorium on individual quotas. Vague concerns about potential market power completely blocked voluntary consolidation in the industry.

In contrast, the Hui illustrates the low transactions costs of private bargaining as compared to public decision-making. The holders of 14 permits were able to bargain a simple set of rules in a remarkably short period of time. Expensive enforcement mechanisms were entirely avoided. Even in the face of a defector, the Hui functioned for one year.

The experience in the NWHI lobster fishery hints at a fundamentally new direction in fisheries management. Government, with its extraordinary power to reshape institutions, has a powerful role in fisheries management. But when government relies exclusively on regulatory decision-making, the potential benefits are eroded by regulatory inflexibility and ancillary political constraints. Government might do better to define a closed set of users and then devolve decisions about implementation details for resolution by private bargaining among the users.

Private bargaining may have its own limitations. Both intuition and game theory indicate that bargaining becomes more difficult as the number of players increases. The most immediate question may be whether the transactions costs of bargaining limit its applicability to very small fisheries (perhaps with even fewer than the 12 permit holders in the NWHI lobster fishery), or whether larger groups can also devise efficient bargaining mechanisms.

The Hui suggests a potential role for private bargaining in effort reduction. Private Coasian bargains (Coase 1960) may be an underutilized option in fisheries management. Perhaps the path out of massive overcapitalization that characterizes most fisheries lies not in more regulation, rather in less regulation. A more sophisticated understanding of private and public decision-making might lead us to combine their strengths instead of relying entirely on a government-dominated model of fisheries decision-making.

References

Maine Aquaculture Innovation Center. 2000. Study of Northwestern Hawaiian Is-
Northwestern Hawaiian Islands Lobsters


