CATCH SHARES FOR CRUSTACEANS

The Atlantic Red Crab Fishery: Science, Business and the Road to Catch Shares

Conversations about fisheries in New England often center on some of the oldest, largest and most valuable fisheries in the nation, such as groundfish, American lobster, Atlantic herring and sea scallop. However, one fishery in the region that is smaller, younger and generally receives less attention is worthy of a closer look for the model it has developed that integrates science, business planning and cooperative harvest: the Atlantic red crab fishery.

Description of the Fishery

The red crab fishery is less than 40 years old[1], much younger than other centuries-old fisheries in New England. In the 1970s, an experimental fishery began that led to erratic effort and landings by a largely opportunistic fleet over the 1980s and 1990s due to the absence of a consistent market. A small directed fishery began in earnest during the 1990s, with a management plan crafted at the request of the industry in 2002. Currently, there are four active vessels in the fleet.

Fishing for red crab is done using traps. The species primarily inhabits deep and cold waters at the edge of the continental shelf. Juveniles, females and males segregate into different depth strata with some overlap among them along the thin, winding strip of ocean at the shelf break that comprises the fishing grounds. The fishery is restricted to males, with a small incidental take of females allowed. The depth differences enable more sex-selective fishing.

Management has been based on a combination of days-at-sea allocations and trip limits, collectively set to achieve a target total allowable catch (TTAC). The original 2002 management plan estimated MSY at 2,830 metric tons (mt), with a TTAC set slightly below at 2,688 mt. However, a 2008 stock assessment could not estimate MSY with confidence due to the data-poor nature of the fishery[2], but determined that the long-term average catch of 1,775 mt is sustainable. This became the acceptable biological catch (ABC) for the fishery.

Improving the State of Science

Setting an ABC for the red crab fishery was limited by scientific constraints. Its comparative youth, small fleet and low overall value have resulted in relatively low scientific investment in the fishery over its history. Status of the resource is assessed largely on the basis of two fishery-independent abundance surveys conducted in 1974 and again from 2003-2005, along with an incomplete record of landings and size- and sex-frequency data. Several aspects of life history and behavior are estimated using information for similar species in other regions[3].

These scientific constraints create two opposing concerns. On the one hand, MSY cannot be determined with adequate confidence, resulting in use of average landings to set the ABC. This essentially freezes catch at that average by continuing it with no possibility at present to raise the ABC and sustainably extract greater value from the resource if warranted.

On the other hand, the implications of a male-only fishery for reproductive behavior are unclear. Mating among red crabs is dependent upon relative size of the two animals. A larger male is needed to form a protective "cage" around the egg-bearing female, but the stock has experienced a pronounced shift in male size structure that might compromise this role. An experimental fishery for females currently underway could reduce pressure on males, but concerns about increased harvest of females exist as well. Furthermore, the ecosystem functions of red crabs, and therefore the ecosystem effects of fishing, are unknown, owing to the deep, distant and dark environment they inhabit that is difficult to observe and study.

To overcome these scientific limitations, rather than decry the state of science, the industry has shown itself to be a model of cooperative research. The fleet has worked with scientists from the Northeast Fisheries Science Center, University of Maine, Gulf of Maine Research Institute, and other research centers to write grant proposals, provide direct funding to supplement grants, offer vessels as platforms for field work, and provide insights to scientists on field logistics and biology. The result has been nearly continuous industry involvement in research over the past decade – indeed, probably greater per capita participation in research than any fleet – and a tremendous increase in our understanding of this data-poor fishery. For example, red crab vessels assisted an important 2008 study that first documented changes in the stock since the onset of fishing, allowing us to better gauge impacts, fishery potential and research needs[4].

Innovative Business Planning

Soon after the directed fishery for red crab emerged, sales by the fleet's parent company, Atlantic Red Crab, Inc.[5], became directed to a single buyer to create a single dish served at a single restaurant chain. This meant that effort and landings were dictated solely by popularity of that dish. Eventually, sourcing from alternative suppliers and then phasing out the dish led to a steady decline in orders, effort and landings. This fate is not unlike that experienced by the fishery for Atlantic menhaden in Chesapeake Bay, which also services one primary market – fish oil – and therefore is largely beholden to the whims of that market. In March 2010, the sole vessel owner in the Chesapeake menhaden fishery reported significant declines in earnings due to decreased demand for fish oil[6].

To avoid repeating this fate in the wake of the drastic market downturn it faced, rather than shut its doors, Atlantic Red Crab, Inc. made a significant investment in a sophisticated shoreside receiving and processing facility located in New Bedford, Massachusetts. This course of action might seem counter-intuitive following substantial market loss, but the company paralleled its investment with a strategic plan of market diversification aimed at stabilizing its business by reducing reliance on any single market sector. To accomplish this diversification, Atlantic Red Crab entered into partnership with seafood distributor Slade Gorton in March 2010[7].

The new facility enables Atlantic Red Crab to produce a wider range of products designed to serve a wider range of retail and wholesale buyers, and the Slade Gorton partnership will allow the fishery to better access those markets. But, Atlantic Red Crab took an additional step to improve its marketability by seeking and obtaining certification from the Marine Stewardship Council (MSC)[8]. MSC certification should increase the appeal of red crab to conservation-minded consumers, enabling the fishery to tap into 'green' markets. Importantly, MSC certification carried with it very specific requirements beyond those in the formal management plan, including increasing the average size of males in the catch, which will help alleviate some of the biological and ecological concerns imposed by the data-poor nature of the fishery.

Harvest Planning and a Case for Catch Shares?

One important aspect of the fishery's evolving model is that, although technically not a catch share fishery, it has many of the same features, behaviors and advantages. The four vessels in the fleet have formed a cooperative, sharing profits and coordinating the timing, location and volume of harvest to most efficiently meet market demand[9]. For example, the fleet has divided its narrow strip of fishing grounds roughly into thirds, and the four vessels take turns working each third with at least one out of the rotation at any given time. This prevents the boats from getting in one another's way, allowing more careful and selective fishing with fewer gear entanglements that would cause undue habitat damage. It also allows for a more strategically planned supply of product to market to meet real-time demand.

This cooperative arrangement provides a strong foundation for conversion to catch shares. Investments in science and innovative business planning are helping the industry build a robust and sustainable model, but effort controls and trip limits impose unnecessary constraints. Management on the basis of total catch rather than days-at-sea would increase flexibility for the fleet, allowing it to maximize efficiency and value. Allocation and monitoring, often the two most significant challenges in building a catch share system, would be comparatively simpler for the small, integrated and centralized fleet. Should the fishery go that route, its commitment to science and forward-thinking business strategies will show how a well-rounded approach can complement catch shares to create a productive, responsible and sustainable fishery.

Sources

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