

## CHAPTER 25

# Save That Species

Codfish off the New England and eastern Canadian coasts were once so abundant, it was said, that a person could walk across the sea on their backs. The fish grew into six-foot-long, two hundred-pound giants, and generations of families from coastal communities knew they could count on the fish for a prosperous livelihood. Indeed, the northwestern Atlantic became known as the world's premier cod fishery (a **fishery** is an area where it is commercially feasible for fish or other aquatic animals to be harvested). Slowly over time, however, nature's bounty began to disappear. Fishing became more difficult, the number of fish caught each year diminished, and the average size of the fish shrank. In recent years, the problems accelerated. Between 1970 and 2000, the catch dropped more than 75 percent, and the typical fish caught these days weighs but twenty pounds. As a result, the Canadians have closed down their cod fishery, and the American fleet is a ghost of its former self.

### FISHERY COLLAPSE IS WIDESPREAD

The cod is not alone in its demise. The world's ocean fisheries are in decline. Since 1950, nearly 30 percent of all fisheries have collapsed, and some scientists project that in forty years, *all* of the world's fisheries could disappear. The problem, it is widely agreed, is a failure of humans to manage fisheries in a way that is consistent with both maximum economic benefit and long-term survival of ocean fish stocks. Of course, this wide agreement just begs the real question: Why have humans been able to manage wheat farms and cattle ranches, but failed so miserably in managing fisheries?

The answer starts here: In almost all of the world's fisheries, the governmentally established rules of fishing are such that to "own" a fish, someone must catch the fish, that is, remove it from the water, at which point it typically dies within minutes. This is unlike the rules for cattle, pigs, chickens, or sheep, of course, under which to own an animal one need only put a brand on it, or surround it with a fence, or enclose it in a building. The peculiar rules imposed by governments on most fisheries lead to a peculiar and destructive set of incentives.

When the decision is made to harvest any living animal, biological issues are important in accurately gauging the true cost of the harvest. In particular, if harvest does *not* take place (i) the animal will continue growing, yielding a larger effective harvest in the future and (ii) it may reproduce, leaving offspring that will also contribute to a larger future yield. For cattle, pigs, and so forth, the harvesters (ranchers and farmers) take both of these facts into account, waiting until growth and reproduction rates have reached the point that it makes sense to harvest the animals now rather than waiting.

But with ocean fish, each harvester knows that if she doesn't take the fish now, the future benefits (from growth and reproduction) will be enjoyed by someone else who happens to catch the larger fish or its offspring later on. The fishers respond quite rationally to this incentive. They "race to fish," catching the fish before the fish have a chance to grow more fully and often before they have had a chance to reproduce. This causes declining fish stocks and, eventually, collapse of the fishery.

### THE FAILURE OF COMMAND AND CONTROL

Based on a growing body of evidence, however, it has become apparent that a simple change in the way fisheries are managed has the power to stop and even reverse these declines. Traditional management of fisheries by government is referred to as a "command and control" system, because in an effort to control the fishers, the government issues a series of commands about allowable behavior. These management systems limit, for example, the number of fishers, the size of boats they may use, the type of fishing gear, and season length, all in an effort to keep total harvests down. Although such systems historically have held sway around the world, even the best of them suffer from a profound misalignment of **incentives**: The self-interest of the individual harvester is generally inconsistent with actions that would both maximize the value of the fishery and ensure its sustainability.

Because individuals don't own any fish until they harvest them, they are motivated to outcompete other harvesters, taking fish that are too small and too young for long-term sustainability. The results are twofold. In the short run, the fishers harvest too many fish, and in the long run, they successfully lobby the government for more lenient rules, adding to the destruction. So far, no government has figured out how to use a command and control system to prevent excessive harvests, reduced stocks, and eventual collapse.

In recent years, the failure of command and control fishery management has become increasingly clear, but the question has been: Is there a viable alternative? Economists have suggested that catch shares assigned to individual harvesters offer such an alternative because property rights systems, of which catch shares are an example, are generally the most effective way to conserve resources.

### CATCH SHARE SYSTEMS

Catch share systems combine two features. First, based on biological and other scientific criteria, a **total allowable catch (TAC)** size is determined. Then members of the fishing community (individuals or cooperatives, for example) are assigned shares of the TAC. Typically, the shares are granted to existing fishers in proportion to their historical fishing patterns. The shares, often called **individual transferable quotas (ITQs)**, can then be used, sold, or leased to others. No one is permitted to harvest in excess of the amount specified in the harvester's **quota**. The catch shares give fishermen enforceable, transferable **property rights** to the fish, much as they have such property rights to their boats and gear. These owners of rights then have an incentive to protect and maintain the value of the fishery, just as they do to protect and maintain their other property.

Numerous studies of the use of catch shares show that this system can dramatically improve both the biological and the economic health of fisheries. Alaska, British Columbia, Iceland, and New Zealand all represent locations where catch shares, such as ITQs, are regarded as having succeeded. Recent research covering more than eleven thousand fisheries around the world reveals that catch shares are effective worldwide. In fact, the outcomes for fisheries with and without catch share systems have been studied systematically, accounting for factors (such as ecosystem characteristics and fish species) that might have played a role in the health and viability of the fish stocks. This research approach amounts to conducting a statistically controlled experiment—and the results are striking.

### THE POWER OF INCENTIVES

A conventional measure of collapse for a fishery is a decline in catch to a level that is less than 10 percent of the maximum recorded catch for that fishery. By this criterion, an average of more than fifty fisheries have reached collapse each year since 1950, in a worldwide pattern that seems to be pointing toward the demise of all fisheries. But in fisheries, when a catch share system is implemented, the process of collapse halts—completely. Moreover, in many of the ITQ fisheries, recovery of fish stocks begins soon after implementation, even as fishermen continue to profitably catch fish.

It is now estimated that had ITQs been implemented in all fisheries beginning in 1970, the incidence of collapse would have been cut by two-thirds. Moreover, instead of watching fisheries collapse today, we would be seeing them getting healthier, even as they were supporting harvesters and nourishing consumers. Most importantly, it appears that the power of ITQs to prevent and even reverse fishery collapse applies to species and ecosystems throughout the world.

### CAN WE SAVE THE WHALES, TOO?

Could a catch share system help protect whaling stocks around the world? In principle, the answer is “yes,” although three aspects of whales would make the task more difficult. Consider, for example, blue whales, which are believed to migrate thousands of miles each year. A blue whale, which can weigh almost one hundred tons, is difficult to kill even with the most modern equipment. Nevertheless, intensive hunting gradually reduced the stock from at least three hundred thousand to, at present, somewhere between five thousand and twelve thousand. Since 1965, international treaty has banned all hunting of the blue whale, although sporadic hunting of blues by some nations, such as Brazil, Chile, and Peru, has continued.

The enormous range of the blue whales means that enforcing rules for their capture—and this includes a catch share system—would likely be quite expensive. It is one thing to enforce catch limits over several thousand square miles. It is quite another to enforce them over millions of square miles. The second difficulty with designing a catch share system for blue whales is that because of the long-standing ban on hunting and the sharp restrictions on hunting before that, little is known about their population or whether that population is shrinking or growing. Hence, setting the correct TAC would be extremely difficult.

The final tricky issue of designing a catch share program for whales is that they are a “charismatic” species—that is, people seem

to get satisfaction out of simply knowing they are out there swimming around. (We doubt, for example, whether you have ever seen a bumper sticker that says “Save the cod.”) Thus, whales are said to have “existence value”—some people get great satisfaction just out of knowing that they exist, satisfaction that would be irreparably lost if the whales were hunted to extinction. Clearly, although harvesters and biologists might be quite knowledgeable about growth and reproduction rates of all sorts of fish and ocean-going mammals, they are unlikely to know the value that Uncle Fred or Aunt Jane in Peoria place on the survival of the blue whale species. So people worry that a catch share system for whales might yield an unacceptably low stock of whales. As we’ll see in a moment, however, the biologists and harvesters of whales might not have to know anything at all about Uncle Fred or Aunt Jane to make sure that there are plenty of whales to keep them happy and the whales healthy.

### SERVE THE BISON

Ted Turner, the founder of CNN and former owner of the Atlanta Braves baseball team, has thirteen ranches spanning two million acres. Ted also owns fifty-five thousand head of bison spread out over many of these ranches. Simply put, Ted owns more bison than anyone else in the world. His bison holdings are obviously nowhere near as big as the enormous herds that once dominated the American plains. But they are big enough to ensure genetic diversity among the animals and also to make it a good bet that bison are not going to become extinct at any time in the foreseeable future.<sup>1</sup> There are no doubt many reasons Ted has so many bison hanging around, but of one of them we can be certain: He turns thousands of head into burgers and steaks every year, both for his own chain of restaurants and for many hundreds more restaurants that serve bison on their menus. And although Ted raises the most bison in America, there are plenty of other bison ranchers out there doing much the same thing and for the same reason. In North America alone, bison stocks are about four hundred thousand, with another one hundred thousand head scattered across the rest of the world.

So, just acting in their own self-interests, Ted and his fellow ranchers are able to keep bison stocks plenty big enough to ensure the survival

<sup>1</sup> Note that we don’t claim that this or any system can prevent extinction *forever*. Only about 0.02 percent (about one in five thousand) species that have ever existed are currently extant. There is no evidence to date that any species—*Homo sapiens* included—has any claim on immortality.

of the species and thus big enough to satisfy the desires of Aunt Jane and Uncle Fred that the bison continue to exist. Moreover, Ted's herds are big enough to *simultaneously* satisfy the existence value demands of a million (or even seven billion) people around the world, all without any of these demanders putting up a penny of their own money (unless they stop by for a burger, of course).

In effect, this is exactly what is happening in fisheries around the world where catch share systems are at work. The incentives of the harvesters to keep stocks large enough for profitable fishing are *also* sufficient to protect the fish from any threat of extinction. It thus seems likely that catch share systems have the potential to save the whales, too. Indeed, the consistent ability of catch share systems to enable recovery of fish stocks and of the profits from harvesting illustrates a compelling general message: The clear assignment of enforceable property rights remains the most effective way we know to protect other species from the depredations of *Homo sapiens*.

#### DISCUSSION QUESTIONS

1. Has there ever been a problem with the extinction of dogs, cats, or cattle? Why not?
2. Some people argue that the best way to save rare species is to set up private game reserves to which wealthy hunters can travel. How could this help save endangered species?
3. Is government *ownership* of animals needed to protect species from extinction?
4. In the United States, most fishing streams are public property, with access available to all. In Britain, most fishing streams are privately owned, with access restricted to those who are willing to pay for the right to fish. Anglers agree that over the past thirty years, the quality of fishing in the United States has declined, while the quality of fishing in Britain has risen. Can you suggest why?
5. Aquaculture is the business of raising water-dwelling animals, including fish, mollusks (such as oysters), and shell fish (such as shrimp) in enclosed areas. For fish, this means raising them in large net pens. Do you suppose there is a problem with "overfishing" with aquaculture? What is a key difference between aquaculture animals and wild animals that plays a role in your conclusion?

6. Although much credit is given to buffalo hunters for causing the near extinction of bison, there was another factor at work. Cattle are easily herded by men on horseback and readily contained by barbed-wire fences. Bison simply break through ordinary barbed wire and kill (by goring) horses used in any attempt to herd them. Explain how these characteristics of bison helped seal their fate on the Great Plains.