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## *Bye, Bye, Bison*

The destruction of animal species by humans is nothing new. For example, the arrival of human beings in North America about 12,000 years ago is tied to the extinction of most of the megafauna (very large animals) which then existed. The famous LaBrea Tar Pits of southern California yielded the remains of 24 mammals and 22 birds that no longer exist. Among these are the saber-toothed tiger, the giant llama, the 20-foot ground sloth, and a bison that stood seven feet at the hump and had six-foot-wide horns.

Although many experts believe that human hunting was directly responsible for the destruction of these species, and that a combination of hunting and habitat destruction by humans has led to the extinction of many other species, the link is not always as clear as it might seem at first glance. For example, it is estimated that only about 0.02 percent (1 in 5000) of all species that have ever existed are currently extant. Most of the others (including the dinosaurs) disappeared long before humans ever made an appearance. The simple fact is that all species compete for the limited resources available, and most species have been out-competed, with or without the help of *Homo sapiens*. Just as important is that basic economic principles can help explain why various species are more or less prone to meet their demise at the hands of humans, and what humans might do if they want to delay the extinction of any particular species.<sup>1</sup>

Let's begin with the passenger pigeon, which provides the most famous example of the role of human beings in the extinction of a

<sup>1</sup> We say "delay" rather than "prevent" extinction because there is no evidence to date that any species—*Homo sapiens* included—has any claim on immortality.

species. At one time these birds were the most numerous species of birds in North America and perhaps in the world. They nested and migrated together in huge flocks and probably numbered in the billions. When flocks passed overhead, the sky would be dark with pigeons for days at a time. The famous naturalist John James Audubon measured one roost at 40 miles long and 3 miles wide, with birds stacked from treetop down to nearly ground level. Although the Native Americans had long hunted these birds, the demise of the passenger pigeon is usually tied to the arrival of the white man, which increased the demand for pigeons as a source of food and sport. The birds were shot and netted in vast numbers; by the end of the nineteenth century, an animal species that had been looked on as almost indestructible because of its enormous numbers had almost completely disappeared. The last known passenger pigeon died in the Cincinnati Zoo in 1914.

The American bison only narrowly escaped the same fate. The vast herds that roamed the plains were an easy target for hunters; with the advent of the railroad and the need to feed railroad crews as the transcontinental railroads were built, hunters such as Buffalo Bill Cody killed bison by the thousands. As the demand for the fur of the bison increased, it became the target for more hunting. Like the passenger pigeon, the bison had appeared to be indestructible because of its huge numbers, but the species was soon on the way to becoming extinct. Despite the outcries of the Native Americans who found their major food source being decimated, it was not until late in the nineteenth century that any efforts were made to protect the bison.<sup>2</sup>

These two episodes, particularly that of the bison, are generally viewed as classic examples of humankind's inhumanity to our fellow species, as well as to our fellow humans, for many Native American tribes were ultimately devastated by the near demise of the bison. A closer look reveals more than simply wasteful slaughter; it discloses exactly why events progressed as they did and how we can learn from them to improve modern efforts to protect species threatened by human neighbors.

<sup>2</sup> For the bison's cousin, the eastern buffalo—which stood seven feet tall at the shoulder, was twelve feet long, and weighed more than a ton—the efforts came too late. The last known members of the species, a cow and her calf, were killed in 1825 in the Allegheny Mountains.

Native Americans had hunted the bison for many years before the arrival of white men and are generally portrayed as both carefully husbanding their prey and generously sharing the meat among tribal members. Yet the braves who rode their horses into the thundering herds marked their arrows so it was clear who had killed the bison. The marked arrows gave the shooter rights to the best parts of the animal. Tribal members who specialized in butchering the kill also received a share as payment for processing the meat. Indeed, the Native American hunting parties were organized remarkably like the parties of the white men who followed: *Once they were killed*, the ownership of the bison was clearly defined, fully enforced, and readily transferable. Moreover, the rewards were distributed in accord with the contribution that each had made to the overall success of the hunt.

Matters were different when it came to the ownership rights to living bison herds. Native Americans, like the whites who came later, had no economically practical way to fence in the herds. The bison could (and did) migrate freely from one tribe's territory into the territory of other tribes. If the members of one tribe economized on their kill, their conservation efforts would chiefly provide more meat for another tribe, who might well be their mortal enemies. This fact induced Native Americans to exploit the bison, so that the herds disappeared from some traditional territories on the Great Plains by 1840—before Buffalo Bill was even born.

Two factors made the efforts of the white man—the railroad hunters—more destructive, hastening the disappearance of the bison herds. First, the white population (and thus the demand for the meat and hides) was much larger than the Native American population. Second, white men used firearms on the bison—a technological revolution that increased the killing capacity of a given hunter by a factor of 20 or more, compared to the bow and arrow. Nevertheless, the fundamental problem was the same for the white man and Native American alike: The property rights to live bison could not be cheaply established and enforced. To own a bison one had to kill it, and so too many bison were killed.

The property rights to a scarce good or resource must be clearly defined, fully enforced, and readily transferable if that resource is to be used efficiently—that is, in the manner that yields the greatest net benefits. This is true whether the resource in question is the

American bison, the water in a stream, or a pepperoni pizza. If these conditions are satisfied, the resource will be used in the manner that best benefits both its owner and society.<sup>3</sup> If they are not satisfied—as they were not for bison on the hoof or passenger pigeons on the wing—the resource generally will not be used in the most efficient manner. In the case of animal species that are competing with human beings, this sometimes means extinction.

In modern times, the government has attempted to limit hunting and fishing seasons and the number of animals that may be taken, by imposing state and federal regulations. The results have been at least partially successful. It is likely, for example, that there are more deer in North America today than there were at the time of the colonists—a fact that is not entirely good news for people whose gardens are sometimes the target of hungry herds. In effect, a rationing system (other than prices) is being used in an attempt to induce hunters and fishermen to act as though the rights to migratory animals were clearly defined, fully enforced, and readily transferable. Yet the threatened extinction of many species of whales illustrates that the problem is far from resolved.

The pattern of harvesting whales has been the subject of international discussion ever since World War II, for migratory whales are like nineteenth-century bison: To own them, one must kill them. It was readily apparent to all concerned that without some form of restraint, many species of whales were in danger of extinction. The result was the founding of the International Whaling Commission (IWC) in 1948, which attempted to regulate international whaling. But the IWC was virtually doomed from the start, for its members had the right to veto any regulation they considered too restrictive, and the commission had no enforcement powers in the event a member nation chose to disregard the rules. Moreover, some whaling nations (such as Chile and Peru) refused to join the IWC, so commission quotas had little effect on them. Some IWC members have used nonmember flagships to circumvent agreed upon quotas,

<sup>3</sup>This does not mean that all species will be permanently protected from extinction, for reasons that are suggested in Chapter 3, "Flying the Friendly Skies?" It does mean that extinction will be permitted to occur only if the benefits of letting it occur exceed the costs.

while others have claimed that they were killing the whales solely for exempt "research" purposes.

The story of the decimation of a species is well told in the events surrounding blue whales, which are believed to migrate thousands of miles each year. This animal, which sometimes weighs almost 100 tons, is difficult to kill even with the most modern equipment; nevertheless, intensive hunting gradually reduced the stock from somewhere between 300,000 and 1 million to, at present, somewhere between 600 and 3000. In the 1930-1931 winter season, almost 30,000 blue whales were taken, a number far in excess of the species' ability to replenish through reproduction. Continued intense harvesting brought the catch down to fewer than 10,000 by 1945-1946, and in the late 1950s the yearly harvest was down to around 1500 per year. By 1964-1965, whalers managed to find and kill only 20 blue whales. Despite a 1965 ban by the IWC, the hunting of blues continued by nonmembers such as Brazil, Chile, and Peru.

Humpback whales have suffered a similar fate. From an original population estimated at 300,000, there remain fewer than 5000 today. Like the blues, humpbacks are now under a hunting ban, but the lack of monitoring and enforcement capacity on the part of the IWC makes it likely that some harvesting is still taking place. IWC conservation attempts designed to protect finbacks, minke whales, and sperm whales have also been circumvented, most notably by the Russians and Japanese, who simply announced their own unilateral quotas.

Whales are not the only seagoing creatures to suffer from an absence of clearly defined, cheaply enforceable, and transferable property rights. 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, 200-pound giants, and generations of families from coastal communities knew they could count on the fish for a prosperous livelihood. The problem was that the fish had to be hauled from the sea before rights to it could be established. The result was overfishing, which led to declining yields and shrinking fish. Over the last 30 years alone, the catch has dropped more than 75 percent, and the typical fish caught these days weighs but 20 pounds. As a result, the Canadians have virtually closed down their cod fishery, and the American fleet is but a ghost of its former self.

The cod is not alone in its demise. In the northeastern Atlantic, haddock, mackerel, and herring are all in serious trouble. Along the West Coast of the United States, lingcod, rockfish, and bocaccio are in trouble as well. Worldwide, 30 percent of fish stocks, including orange roughy, shark, swordfish, and tuna, are declining due to overfishing, and another 40 percent or more of the commercial stocks are on the verge of trouble.

A number of nations have taken legislative action in the hope of stemming the decline. Beginning in 1996, for example, the U.S. National Maritime Fisheries Service was required to begin working with eight regional fishing councils around the country to come up with plans to stem the demise of traditional fish stocks. Yet not all the councils are actually following the plans they have laid out, so the overfishing continues. A more promising approach may be seen in Britain, where under the terms of European Union rules, the catch of all major fish stocks are limited by quotas, which specify the amount of fish that legally may be taken. The British innovation has been to make those quotas transferable—that is, the rights to catch specific numbers of fish can be purchased and sold just like any other good. The quotas assign rights to fish, and their transferability ensures that the lowest-cost, most sensible means of taking those fish will be used. With quotas set at levels consistent with the long-term survival of the fish, and the elimination of the pressure to “catch it or lose it,” fish stocks in the affected areas have begun a turnaround.

The Canadian province of British Columbia has started a similar program covering its halibut fishery, with equally promising results. Since 1923 management of the Pacific halibut fishery has been regulated jointly by the United States and Canada. Yet despite stringent controls, which included limits on the number of vessels that could fish, and reductions in the length of the season, the halibut stock showed signs of collapse by the late 1980s.

Joint efforts by fishers and the Canadian Department of Fisheries and Oceans led to the creation of a system of individual vessel quotas (IVQs) in 1991. Existing license holders now own a percentage of the total allowable catch. In effect, each vessel owner has secure property rights to a specified poundage of fish each year, and the result has been to change their incentives and behavior drastically.

The allocation of individual vessel quotas eliminated the need for a short fishing season, originally created in a futile effort to halt overfishing. Prior to IVQs, the short season forced the fishers into the same prime areas at the same time, resulting in damaged and lost fishing gear and "ghost fishing," in which lost fishing gear continued to catch fish. From six days in 1990, the season has been lengthened to 245 days, with fishers allowed to choose when they will take the catch that belongs to them. Vessels no longer conflict with one another, preventing substantial losses of gear and fish each season. Moreover, before the individual quotas, vessels had extra crew on board to ensure the most rapid possible harvesting of fish. Under IVQs, the total number of crew members in the fleet quickly dropped by about 20 percent.

Before quotas, vessel owners felt compelled to fish regardless of weather conditions, because the loss of even a day of fishing could make the difference between profit and loss for the season. Now that pressure has been eliminated, greatly enhancing the safety of the fishers. The longer fishing season also has enabled fishers to sell higher quality and fresher fish. Prior to IVQs, only about half the catch could be sold as fresh fish, which are more valuable; now nearly all of it is sold fresh, yielding better product for consumers and higher profits for producers.

The IVQs are transferable (although with some restrictions) and the transferability has added to the benefits of the system. For example, the number of vessels has been reduced, because smaller, less efficient fishers have sold or leased their licenses to more efficient operators. This has decreased capital costs and helped reduce total crew in the fleet. Similarly, average vessel size has risen, increasing the safety of the crews. Transferability also gets the quotas into the hands of the "highliners," the skippers who are best at finding the fish and harvesting them in the lowest-cost manner. And, finally, the best news of all is reserved for the halibut themselves. Since the introduction of IVQs, fishers no longer need to harvest the halibut to establish rights to them, so they no longer have an incentive to overfish. As a result, halibut stocks in the Pacific fishery have begun to grow rapidly—one more illustration that the clear assignment of enforceable, transferable property rights remains the most effective way we know to protect other species from the depredations of *Homo sapiens*.