

Conservation—Native American Style

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“To claim that Indians lived without affecting nature
is akin to saying that they lived without touching anything,
that they were a people without history.”

—*Louis S. Warren*

Introduction

Over the past three decades, the environmental movement has promoted a view of American Indians as the “original conservationists”—that is, “people so intimately bound to the land that they have left no mark upon it” (White and Cronon 1988, 417). References to this image abound:

- “The Indians were, in truth, the pioneer ecologists of this country,” said Secretary of the Interior Stewart Udall.¹
- “I think most people in Indian country hold a set of ideals we should all learn from,” said law professor Charles Wilkinson in a recent speech.² According to Wilkinson, these ideals teach human harmony with the natural environment.
- Calling for an environmental ethic patterned after that of Native Americans, Senator John H. Chafee recently quoted words allegedly spoken by Chief Seattle: “Man did not weave the web of life. He is merely a strand of it.”
- “For many thousands of years, most of the indigenous nations on this continent practiced a philosophy of protection (first) and use (second) of the forest,” says Herb Hammond in the Sierra Club book *Clearcut*. “In scientific terms, we recognize that their use of the forest was ecologically responsible—meaning that it kept all the parts.”³

Appealing as this image of a Native American environmental ethic is, it is not accurate. The spiritual connection attributed to Native Americans frequently does not mesh with the history of Indian resource use. By focusing on this myth instead of reality, environmentalists patronize American Indians, disparaging their rich institutional heritage which encouraged resource conservation. By missing this history of Indian institutions, the environmentalists’ interpretation deprives Indians and non-Indians alike of a full understanding of how we can conserve our natural heritage.

The purpose of this paper is twofold. First, it will put to rest the myth of a unique and romantic American Indian environmental ethic. Second, it will illustrate how American Indians used complex and evolving institutions to conserve scarce natural resources and to survive in a sometimes hostile environment. By institutions, I mean the traditions, rules, laws and habits that guided Indian societies. Though the actual laws and customs vary among societies, all societies have such institutions to guide

them.

A Vision Imposed on Chief Seattle

The impression that American Indians were guided by a unique environmental ethic often can be traced to words widely attributed to Chief Seattle. “All things are connected like the blood which unites one family,” Senator Chafee quotes him as saying. “Whatever befalls the earth, befalls the sons of earth.”

Yet the words in the oft-quoted speech are not actually those of Chief Seattle. They were written by Ted Perry, a scriptwriter. In a movie about pollution, he paraphrased a translation of the speech that had been made by William Arrowsmith (a professor of classics). Perry’s version added “a good deal more, particularly modern ecological imagery,” according to one historian who has researched the subject (Wilson 1992, 1457). Perry, not Chief Seattle, wrote that “every part of the Earth is sacred to my people.” (Perry, by the way, has tried unsuccessfully to get the truth out.)

The speech reflects what many environmentalists want to hear, not what Chief Seattle said. The romantic image evoked by the speech obscures the fact, fully acknowledged by historians, that American Indians transformed the North American landscape. Sometimes these changes were beneficial, at other times harmful. But they were a rational response to abundance or scarcity in the context of institutions that governed resource use. Like Europeans and all people everywhere, American Indians responded to incentives.

For example, where land was abundant, it made sense to farm extensively and move on.

- It was common for Indians such as the Choctaw, Iroquois, and Pawnee to clear land for farming by cutting and burning forests. Once cleared, fields were farmed extensively until soil fertility was depleted; then they cleared new lands and started the process again (see White and Cronon 1988, 419–21).
- From New England to the Southwest, wherever Indian populations were dense and farming was intense, deforestation was common. Indeed, the mysterious departure of the Anasazi from the canyons of southeastern Utah in the thirteenth century may have been due to depletion of wood supplies used for fuel (see Ambler 1989).

Similarly, where game was plentiful, Indians used only the choicest cuts and left the rest.

- When buffalo were herded over cliffs, tons of meat were left to rot or to be eaten by scavengers (see Baden, Stroup, and Thurman 1981).
- Samuel Hearne, a fur trader near Hudson’s Bay, recorded in his journal in the 1770s that the Chipewyan Indians would slaughter large numbers of caribou and muskox, eat only a few tongues, and leave the rest to rot.

Indians also manipulated the land to improve hunting.

- Upland wooded areas from east to west were burned to remove the undergrowth and increase forage for deer, elk, and bison. Indeed, because of this burning, there may have been fewer “old growth” forests in the Pacific Northwest when the first Europeans arrived than there are today.

- In some cases, however, the improvements sought by burning were short term because these human-caused fires altered the succession of forests. In the Southeast, for example, oak and hickory forests with a higher carrying capacity for deer were displaced by fire-resistant longleaf pine which supported only limited wildlife.

Generally, the demand for meat, hides, and furs by relatively small, dispersed populations of Indians put little pressure on wildlife. But, in some cases game depletion resulted from what is known as the “tragedy of the commons.” This term, coined by biologist Garrett Hardin, describes what happens when no one has ownership of a resource and anyone has access to it.

Wild animals represented a “commons.” They belonged to no one until they were killed. If anyone left an animal, in the hope that it would be there later, someone else was likely to kill it. Without ownership, no one had an incentive to protect the animals. Thus, they were overhunted, and wildlife populations fell.

- Anthropologist Paul Martin (1968 and 1984) believes that the extinction of the mammoth, mastodon, ground sloth, and the saber-toothed cat were directly or indirectly due to “prehistoric overkill” by exceptionally competent hunters.
- With the advent of the Europeans, who wanted furs, Indians were able to trap furs and trade them for European goods such as beads, cloth, knives, and firearms. Where there were no institutions that limited entry into the common trapping grounds, fur-bearing populations were decimated (see Carlos and Lewis 1995).

Louis S. Warren drives the final nail in the coffin of the “living in harmony with nature” myth:

to claim that Indians lived without affecting nature is akin to saying that they lived without touching anything, that they were a people without history. Indians often manipulated their local environments, and while they usually had far less impact on their environments than European colonists would, the idea of “preserving” land in some kind of wilderness state would have struck them as impractical and absurd. More often than not, Indians profoundly shaped the ecosystems around them. . . . (Warren 1996, 19)

Getting the Incentives Right

While there were exceptions that led to the “tragedy of the commons,” generally American Indians understood the importance of getting the incentives right. Personal ethics and spiritual values were important, as they are in any society, but those ethics and values worked along with private and communal property rights. These rights strictly defined who could use resources and rewarded good stewardship.

It is sometimes difficult to fit the pre-Columbian Indian institutions into the modern context of law, government, and property rights. For example, the term *nation* is applied to Indian tribes as if the tribes were organized into formal governing structures for the entire group of Indians similar to governments that manage modern nation states. But most Indian tribes were made up of relatively independent groups with little centralized control except at specific times, when the bands might gather for such events as ceremonies or hunts. Similarly, since Indians seldom had a written language, rules could not be codified into formal laws.

The lack of familiar modern institutions, however, by no means implies that Indians lacked rules,

customary or formal. American Indian tribes were able to produce and sustain abundant wealth because they had institutions that made clear who had rights to land, fishing and hunting territories, and personal property. Pre- and post- Columbian Indian history is replete with examples of how property rights conditioned the human interface with the natural environment. Consider the following:

Land and Water Rights: Some Communal, Some Private

Indian land tenure systems varied considerably, “ranging from completely or almost completely communal systems to systems hardly less individualistic than our own with its core of fee simple tenure” (Copper 1949, 1). The degree of private ownership reflected the scarcity of land and the difficulty or ease of defining and enforcing rights. Julian H. Steward (1938, 253) concludes that “Truly communal property was scant” among American Indians.

Because agricultural land required investments and because boundaries could be easily marked, agricultural land was often privately owned. However, unlike most private land ownership today, Indian property was usually held by families or clans rather than individuals.

For example, families among the Mahican Indians in the Northeast possessed hereditary rights to use well-defined tracts of garden land along the rivers. Europeans recognized this ownership, and deeds of white settlers indicate that they often approached lineage leaders to purchase this land. Prior to European contact, other Indian tribes recognized Mahican ownership of these lands by not trespassing (Brasser 1974, 14). Away from the rivers, however, where the value of land for crops was low, it was not worth establishing ownership. As one historian put it, “no one would consider laying out a garden in the rocky hinterlands” (Brasser 1974, 7).

In the Southeast where Indians engaged in settled agriculture, private ownership of land was common. “The Creek town is typical of the economic and social life of the populous tribes of the Southeast,” writes historian Angie Debo.

Each family gathered the produce of its own plot and placed it in its own storehouse. Each also contributed voluntarily to a public store which was kept in a large building in the field and was used under the direction of the town chief for public needs. (Debo 1970, 13–14)

Private garden plots were common in the East, as were large community fields with plots assigned to individual families. Because there were economies of scale in planting and cultivation, these tasks were done communally under the direction of a chief, but harvesting on each plot was done by the owning family, with the bounty stored in the family’s own storehouse.

The Omaha tribe in what is now Nebraska cultivated private garden patches along streams. Plots were allocated on the basis of occupancy, and “as long as a tract was cultivated by a family no one molested the crops or intruded on the ground” (Fletcher and La Flesche 1992, 1:269). When the Omaha obtained the horse, as did other Plains Indians, they became more nomadic, abandoning most crop cultivation. However, their tradition of private garden plots carried over into the reservation era when the tribe again allotted land to families and clans.

The Havasupai in the Southwest also considered ownership of farmland private as long as it was in use, and the Hopi Indians assigned to the various matrilineal clans of the village exclusive rights to the fields. “[E]ach clan allotment was marked by boundary stones, set up at the corners of the fields, with symbols of the clans painted on them” (Kennard 1979, 554), wrote one anthropologist. Another notes that clan lands were marked “by numerous boundary stones . . . placed at the corners and junctions points” and “engraved on their faces with symbols of the appropriate clan” (Forde 1931, 367). The clan allotments were usually assigned to the women and became associated with a specific household through inheritance. To spread the risk associated with lack of rain or sudden flooding, each clan generally had

plots in more than one location.⁴

Dispersal of the lands of each clan over a number of sites is of very great practical importance since it reduces the risk of crop failure; where one group of fields may be washed out there remains the chance that the others may be spared. (Forde 1931, 369)

The Hopi and Zuni branches of the Pueblo Indians living in the Upper Colorado Basin also developed property rights reflecting their environment and production techniques. The Hopi made use of periodic flooding of their lands during the summer months by building small stone walls to check the water flow, increasing soil moisture but preventing flooding of crops. Because flood control and irrigation systems required extensive capital investment and provided economies of scale, construction was communal. Where water flowed constantly from springs on family-owned land and required little or no investment, water rights were privately owned. Florence Ellis (1979, 355) writes:

Technically the irrigated farmlands belonged to the Pueblo as a whole. Through assignment by the Isleta governor, an individual usually obtained a single acre of land [and the necessary water rights], but if the governor or his captains found that the assignee left the land within a year or did not farm it, the plot and accompanying water rights were returned to Pueblo possession and reassigned.

Fruit and nut trees, which required long-term investment and care, were privately owned and usually inherited.⁵ “So important were the piñon resources that groves of trees were considered family property in several locations” within the Great Basin area of the West, says a historian (Fowler 1986, 65). In one case a Northern Paiute reflected that his father “paid a horse for a certain piñon-nut range” (Steward 1941, 440), suggesting that the property rights were valuable and tradable.

Among Indians in California, families owned piñon, mesquite, screw-bean trees, and a few wild-seed patches, with ownership “being marked off by lines of rocks” (Lowie 1940, 303). Though permission to gather food was sometimes given during times of abundance, trespass was not tolerated, “the owner rebuking him [the trespasser] with such words as, ‘Don’t pick pine nuts here! They are not yours, but mine’” (Lowie 1940, 303). John Muir reports that the owner of a piñon tree killed a white man for felling his tree (reported in Steward 1934, 305).⁶

Hunting: Avoiding the “Tragedy of the Commons”

Where Indians depended on hunting and fishing, it was imperative that they controlled access to general hunting territories and to specific harvest sites. Without that control, the hunting grounds would be a commons that would lead to overhunting. The customary rights that governed hunting, trapping, and fishing “were often expressed in terms of religion and spirituality rather than of science as we understand it today,” writes Peter Usher. “Nonetheless, the rules conserved the resource base and harmony within the band” (Usher 1992, 50). Territorial hunting rights in the north arose through use and occupancy. Often outsiders were allowed to use an area for a short period of time.

Hunting groups among the Montagnais-Naskapi of Quebec between Hudson Bay and the Gulf of St. Lawrence recognized family and clan hunting areas, particularly for beaver when it became an important trade item (Rogers and Taylor 1981, 181). Similar hunting groups and rules existed in other regions.

Quoting Indian informants, anthropologists Frank G. Speck and Wendell S. Hadlock (1946, 362) report that for Indians in New Brunswick,

It was . . . an established “rule that when a hunter worked a territory no other would knowingly or willfully encroach upon the region for several generations.” Some of the men held districts which had been hunted by their fathers, and presumably their grandfathers.

They even had a colloquial term that translates to “my hunting ground.”

Frank Speck says that the Algonkian Indians from the Atlantic to the Great Lakes

carried on their hunting in restricted, family hunting territories descending from generation to generation in the male line. It was in these family tracts that the supply of game animals was maintained by deliberate systems of rotation in hunting and gathering, and defended by the family groups as a heritage from some remote time when the country had been given to their ancestors by the Creator. (Speck 1939, 258–59)

This ownership, says Speck (1939, 259), led to

the maintenance of a supply of animal and vegetable life, methods of insuring its propagation to provide sources of life for posterity, the permanent family residence within well-known and oftentimes blazed property boundaries, and resentment against trespass by the family groups surrounding them who possessed districts of their own.

Indian tribes of western North America defended their hunting, fishing, and gathering territories against trespass (see Steward 1938, 254). Steward reports that among Paiute Indians of the Owens Valley in California, “communal groups stayed within their district territory,” (Steward 1934, 252) which was bounded by natural features such as mountains, ridges, and streams. Each distinct Apache band, says Keith H. Basso (1970, 5),

had its own hunting grounds and, except when pressed by starvation, was reluctant to encroach upon those of a neighbor. . . . Each local group had exclusive rights to certain farm sites and hunting localities, and each was headed by a chief who directed collective enterprises. . . .

Customs and norms regulated the harvest. There was a district head man who determined where and when to hunt based on his knowledge from the past.

Fishing: Well-Defined Rights

In the Pacific Northwest Indians had well-defined fishing rights.⁷ To capture salmon returning from the ocean to spawn in freshwater streams, Indians placed fish wheels, weirs, and other fixed appliances at falls or shoals where the fish were naturally channeled (Netboy 1958, 11).

Their technology was so efficient that they could have depleted salmon stocks, but they realized the importance of allowing some of the spawning fish to escape upstream. Robert Higgs (1982, 59) quotes a Quileute Indian born about 1852:

When the Indians had obtained enough fish they would remove the weirs from the river in order that the fish they did not need could go upstream and lay their eggs so that there would be a supply of fish for future years.

In an important case regarding Indian fishing rights in the Northwest, Judge George Boldt noted that “individual Indians had primary use rights in the territory where they resided and permissive use rights in

the natal territory (if this was different) or in territories where they had consanguineal kin.”⁸ In many cases the fishing sites were inherited by sons from their fathers (Higgs 1982, 59).

Relying on salmon as their main source of food, the coastal Tlingit and Haida Indians established clear rights to fishing locations where salmon congregated on their journey to spawning beds. Access to these locations was limited to the clan or house group. In addition to property rights to the salmon streams, these Indians had rights to “bear- and goat-hunting areas, berry and root patches, hot springs, sea otter grounds, seal and seal lion rocks, shellfish beds, cedar stands and trade routes” (Langdon 1989, 306).

The management units could exclude other clans or houses from their fishing territories. When territories were infringed upon, the trespasser was required to indemnify the owning group or potentially face violent consequences (see Oberg 1973 and De Laguna 1972).⁹ Management decisions were generally made by the yitsati, the “keeper of the house,” who had the power to make and enforce decisions regarding harvest levels, escapement, fishing seasons, and harvest methods. This eldest clan male possessed superior knowledge about salmon runs, escapement, and fishing technology and therefore was in the best position to be the “custodian or trustee of the hunting and fishing territories” (De Laguna 1972, 464). Though there is debate over just how powerful the yitsati was (see Olson 1967), it is clear that salmon runs were sustained over long periods by rules made locally.

Unfortunately, the white man’s law usurped these secure Indian fishing rights and replaced them with a system that encourages the tragedy of the commons. It was “economically inferior to the property system originally established by the tribes,” one scholar concludes (Barsh 1977, 23).

Personal Items: Private

Though ownership of land and natural resources varied considerably, personal items were nearly always privately owned. Clothes, weapons, utensils, and housing were often owned by women, for whom they provided a way to accumulate personal wealth. For the Plains Indians, the tepee offers an example. Women collected enough hides (usually between 8 and 20), tanned and scraped them, and prepared a great feast where the hides were sewn together by the participants.

The effort required to produce items of personal use provided an incentive to ensure that they became private property. Weeks or months could be spent collecting buffalo hides for tepees. Time was spent chipping arrow heads, constructing bows and arrows, and weaving baskets. One historian illustrates the point:

Water, seed, and hunting areas, minerals and salt deposits, etc., were freely utilized by anyone. But once work had been done upon the products of natural resources (mixed labor with them) they became the property of the person or family doing the work. Willow groves could be used by anyone, but baskets made of willows belonged to their makers. Wild seeds could be gathered by anyone, but once harvested, they belonged strictly to the family doing the task. . . . (Steward 1934, 253)

In other cases, the raw materials themselves were scarce, and these, too, were private property. Stone from which arrowheads were chipped was personal property obtained through long-distance trade. Special wood for bows was traded; for this to happen the wood had to be privately owned. In short, property rights reflected the degree of scarcity of the good.

Consider trader Charles Larpenteur’s description, written in 1860, of a wealthy Blackfoot man: “It is a fine sight to see one of those big men among the Blackfeet, who has two or three lodges, five or six wives, twenty or thirty children, and fifty to a hundred horses; for his trade amounts to upward of \$2,000 a year” (1898, 401). Converting this amount to 1990 dollars, such a man had an annual income of

approximately \$500,000!

Perhaps the best example of private ownership was the horse, which was acquired by Plains Indians in the latter half of the eighteenth century. The horse revolutionized transportation and hunting. A good horse could be ridden into a stampeding buffalo herd so that arrows could be shot at close range. By following the buffalo, the Plains Indians could live a life of abundance.

The horse became one of the Indian's most important sources of wealth. "A buffalo runner of known ability was worth several common riding horses or pack animals" (Ewers 1958, 78). In Canada in the early 1800s, a buffalo horse could not be purchased with ten guns—a price far greater than any other tribal possession (Barsness 1985, 61).

Given their value, horses were well-cared for and closely guarded. "No system of branding was used, but each person knew the individualities of his horses so that he could recognize them," writes Clark Wissler (1910, 97). Apparently disputes over ownership were few, but if a horse was stolen, the offense was punishable by death. Perhaps more than any other asset, the horse reflects the extent to which Indian culture utilized the institution of private ownership.

Additional Positive Incentives

The above discussion makes clear that property rights were an integral part of Indian culture and that they encouraged resource conservation. But even where activities were communal, positive incentives, including incentives quite similar to ownership, made success possible.

Rabbit hunts among Indians of the Great Basin were conducted communally. These hunts required leadership skills, nets for catching the rabbits, and motivation to succeed. The nets into which the rabbits were driven were privately owned and maintained (Freed 1960, 351). To provide a positive incentive for the communal hunt, the leader of the hunt or the owners of the nets received a bigger portion of the catch (Fowler 1986, 82).

On a buffalo hunt, the successful hunter was "entitled to keep the skin and some choice portion of the meat for his family" (Steward 1938, 253). An elaborate nomenclature was used by the Omaha to describe rewards for those who killed and butchered buffalo. "To the man who killed the animal belonged the hide and one portion of *tezhu'* [side of meat] and the brains." Other portions were as follows: "To the first helper to arrive, one of the *tezhu'* and a hind-quarter; to the second comer, the *u'gaxetha* [includes the stomach, beef tallow, and intestines]; to the third, the ribs [*tethi'ti*]" (Fletcher and La Flesche 1992, 1:273).

The hunters marked their arrows distinctively, so after the hunt, the arrows in the dead buffalo indicated which hunters had been successful (Ewers 1969, 160). Disputes over whose arrow killed the buffalo were settled by the hunt leader. Poorer families followed the hunt and depended on the charity of the hunters for meat (Ewers 1969, 162).

It took strong, well-disciplined horses to run into a stampeding herd and keep up with the buffalo. Four or five buffalo cows might be killed "on a single chase by the best Blackfoot marksman with the best horse under him. Most hunters rarely killed more than one or two buffalo at a chase. Men with inferior buffalo horses had to be satisfied with killing the slower running bulls" (Ewers 1969, 159).

If an owner decided to loan his horse for a chase, payment was expected. Three Calf described to John Ewers (1969, 161) the arrangement his father made when loaning his horse. "There was no agreement in advance for any payment to be made to my father. If the man was selfish and offered my father no meat, the next time he wished to borrow horse, father told him, 'No.'" The chase was dangerous and a loaned horse might be injured. Generally, the responsible borrower who had taken reasonable precautions to prevent injury did not have to pay damages, but the irresponsible borrower was forced to replace the lost horse.

In sum, faced with the reality of scarcity, Indians understood the importance of incentives and built their societies around institutions that encouraged good human and natural resource stewardship. In particular, clearly specified property rights helped encourage conservation of scarce resources. Ethics and spiritual values may have inculcated a respect for nature, but an elaborate set of social institutions that today would be considered private property rights punished irresponsible behavior and rewarded stewardship. As Louis Warren (1996, 22) puts it,

Among other things, Indian history is a tale of constant innovation and change. . . . If there is a single, characteristic Indian experience of the environment, perhaps it is the ability to change lifeways in radical fashion to maintain culture and identity.

Wildlife Management: Lessons Lost and Lessons Learned

Today, there are abundant natural resources throughout Indian country. These resources would be better managed if tribes would return to their rich heritage of positive rewards for good stewardship instead of relying on romantic and sometimes mythical world-views promoted by non-Indian environmentalists.

Wildlife management on Indian reservations offers a distinct contrast between lessons lost and lessons learned from the history of Indian culture and institutions. In many respects, Indians on reservations have tremendous assets. They have asserted sovereign claims to fish and wildlife, both on and off reservations. Relying on treaties signed in the nineteenth century, courts have granted Indians rights to large resources. Indians have rights to half the harvestable salmon and steelhead in the Pacific Northwest. They may use gillnets not available to non-Indian fishers in the Great Lakes. They may hunt walrus and polar bears without regulation by the state of Alaska. In Wisconsin, they have special hunting privileges on public lands, including an 85-day deer season, and permission to hunt from vehicles.

Unfortunately, wildlife managers on most reservations have lost sight of the value of institutions like those described earlier in this paper. After asserting their claims, they have often created a wildlife “commons,” and the consequences have been devastating. Case after case illustrates the decimation of wildlife populations (see Williams 1986, 59–64).

- Indian gillnetting for salmon on the West Coast has wiped out major runs of salmon on the Klamath/Trinity river system.
- Waste is pervasive. The Alaska Fish and Game Department documented one case of 214 caribou carcasses left to rot and “counted 24 caribou left whole—there was a snow machine track to each one. . . . Most had been there a considerable time” (quoted in Williams 1986, 73).
- On most western reservations, big game species are often almost nonexistent. On the Crow Reservation in Montana, for example, there are very few big game animals such as deer and elk, despite the fact that the reservation has excellent habitat. According to a tribal wildlife official, non-Indians are not allowed to hunt on the reservation, but tribal members can hunt year around without limits. The few big game animals that may be found wander in from outside; they are not managed on a sustainable basis.

One writer describes what can happen when wildlife belongs to everyone:

Over the past 25 years Shoshones and Arapahos, equipped with snowmobiles, AFV's and high-powered rifles, have virtually wiped out elk, deer, moose and bighorns on the 2.2 million-acre Wind River Reservation in Wyoming. Repeated motions for modest self-regulation emanating from within the reservation have been defeated by vote of the tribal leaders. . . . in one confined area 31 dead elk were found. In another, a retired Indian game warden mowed down an entire herd of 14. Meat piled up at local dumps. Antlers were exported to the Orient where antlers and horns are ground to a powder and hawked as an aphrodisiac. (Williams 1986, 63)

Lessons Learned: The White Mountain Apache

Fortunately, one wildlife success story in Indian country illustrates the power of incentives. This is the story of the White Mountain Apache of east-central Arizona. The members of this tribe are managing their trophy elk population and other wildlife opportunities on a sustainable basis—and making a profit.¹⁰

The Fort Apache Reservation covers 1.6 million acres with a diversity of habitat from oak chaparral at lower elevations to mixed coniferous forests at higher elevations. This habitat supports about 12,000 free-ranging elk.

To get some idea of the success elk hunters enjoy, consider the reservation's track record. From 1977 to 1995, nontribal hunters have taken ninety bull elk that were recorded in either Boone and Crockett or Safari Club record books. (In comparison, this is about the number of record elk that have been taken from the entire state of Montana since record keeping began in 1932.)

Since 1980, hunters on guided trophy elk hunts have enjoyed a 90 to 95 percent success rate. The average score for antlers has been 366 Boone and Crockett points. (This is a figure comparable to a foursome averaging three under par for a round of golf.)

Yes, the resource base is large, the habitat is prime and, according to reservation biologists, the genetics of the herd are ideal for producing trophy elk. But entrepreneurship played a pivotal role on Fort Apache.

Before 1977, elk hunting on the reservation provided good hunting compared with nearby national forest lands, but it was nowhere near the quality of hunting that exists today. At that time, the state of Arizona issued 700 nontribal elk permits priced at \$150 each for hunting on the reservation. The state permits were required in addition to a tribal license, but the tribe received none of the revenues collected by the state. Each license entitled the bearer to shoot a bull elk regardless of size. Typical of state agencies, this policy maximized the number of hunter opportunities rather than the value of the hunt.

Fortunately for both the tribe and the elk, tribal leaders decided that they could capitalize on the market for trophy elk. In 1977, tribal chairman Ronnie Lupe, with the backing of the eleven-member tribal council, informed the state that the tribe would allow elk hunting without a state permit and would control all hunting and fishing on the reservation. The state opposed this but acquiesced after a federal court decision.

The tribe's first order of business was to reduce the hunting pressure on immature bull elk by ending the general elk hunt and replacing it with a trophy elk hunt. Permits to hunt elk were reduced from 700 to thirty, and the price per permit rose from \$150 to \$1500. Revenues from the sale of these reservation permits went to the tribe's general fund.

The trophy elk hunting program blossomed. Mature bulls as a percentage of all bulls increased to

73 percent, and the number of record-book elk taken rose from three in the final six years of state management to eight per season. In addition to promoting trophy elk production, the tribe also designed a quality hunting experience, free from the crowded conditions on public lands.

The tribe tapped into a mother lode of hunter demand. In 1995, revenues from trophy elk hunting exceeded \$850,000. Sixty-six hunters paid \$12,000 each for a seven-day trophy hunt. A special auction for four additional openings was also held, with an average winning bid of \$24,000 and a high bid of \$30,000. In spite of the \$12,000 price tag, there is a five-year waiting list of hunters willing to pay.

Less expensive hunting opportunities exist, too. These offer a way to maintain the proper bull-to-cow ratio in the herd and help manage other wildlife species. For example, the tribe periodically issues one hundred antlerless permits priced at \$300 each, which have a hunter success rate of 80 percent. The tribe also offers hunting permits for bear (\$150), javelina (\$75), and wild turkey (\$750). It costs \$50 per season or \$5 per day to hunt quail, squirrel, and cottontail rabbit.

In addition to hunting, the tribe manages other resources for amenity values and collects fees. While most reservation lakes and streams are open to bait fishing, certain select waters are restricted to flies and lures. Fish species include native Apache, brown, brook, and rainbow trout, and some arctic grayling. Yearly fishing permits are priced at \$80, summer permits at \$50, and day permits at \$5. There is even a rent-a-lake program which allows Cyclone and Hurrican lakes in their entirety to be rented for \$300 per day, with a 3-day minimum. Fishing has proved lucrative, generating \$600,000 in revenue in 1995.

When revenues from services such as camping, boating, and river rafting are added, amenity-based recreation enterprises generated nearly \$2 million in 1995. These enterprises compare well with the tribe's logging operation, casino, and ski resort as important sources of revenues and jobs. Entrepreneurship and management institutions that conserve wildlife have benefited the White Mountain Apache and the wildlife on its territory.

Back to the Future Through Better Institutions

American Indian history teaches us that we must go beyond calls for spiritual awakenings and find workable institutions that provide positive incentives for good stewardship. Because American Indians adapted their institutions to the resource constraints, they were able to sustain life, often in hostile environments. Property rights were an integral part of American Indians' heritage. Refocusing on these institutions, as the White Mountain Apache have done, offers the best way for Native American cultures to manage their resources on a sustainable basis.

Non-Indians also will do well to stop promulgating myths as a solution to modern environmental problems. Especially in a multi-cultural society where world-views vary widely, devolution of authority and responsibility offers the best hope for resource conservation. Rather than shunning property rights solutions, we should embrace them, as did our predecessors on this continent.

Notes

Notes

1. Quoted in Williams (1986, 30).
2. Wallace Stegner lecture at Montana State University reported in the *Bozeman Daily Chronicle*, April 19, 1996, p. 9.
3. Hammond quoted in Devall (1993, 182).
4. For an extensive discussion of "Hopi Agriculture and Land Ownership," see Forde (1931).
5. See Kennard (1979, 554–57) and Forde (1931) for details.

6. For a more complete discussion of property rights to piñon trees, see Lowie (1940).
7. For a more complete discussion, see Higgs (1982).
8. *United States v. Washington* (1974), 384 F. Supp. 312, 352–53.
9. Consistent with economic theory (see Demsetz 1967 and Anderson and Hill 1975), the Tlingit did not establish territorial claims to streams where species such as the pink or dog salmon were abundant (Olson 1967, 12). They also treated the open ocean as a commons because their technology did not allow over-exploitation of salmon in this environment. However, some bands did claim ownership of bottom fishing grounds for halibut and cod.
10. Information about the White Mountain Apache program comes from tribal officials.

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