

Wildlife as an Economic Staple: An Example from the San Carlos Apache Reservation

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Abstract.—The San Carlos Apache Reservation consists of 730,000 hectares in eastern Arizona, the majority of which is ecologically similar to portions of northern Sonora and, to a lesser extent, Chihuahua. To preserve, protect, and enhance wildlife populations, the San Carlos Recreation and Wildlife Department has found that it is very important to demonstrate the economic value of wildlife, and to capitalize thereon. Prior to construction of a casino on the reservation, approximately 15% of the general fund of the Tribe came from hunting, fishing, and recreation permits. Permit sales totaled about \$1.1 million in 1994, including about \$435,000 from big game tags. The Recreation and Wildlife Department was more profitable than the tribal cattle associations and ranches, suggesting that Mexican ranchers in some areas may profit by converting from cattle operations to wildlife or wildlife/cattle operations. Conversion entails a series of inventories, cattle carrying capacity adjustments, marketing, and sound wildlife harvesting principles. A higher ratio of plant:animal biomass is required for trophy wildlife production than for beef production. Converting from cattle to large mammal operations may result in improved range conditions, greater profit, and less work.

Resumen.—La Reservación Apache San Carlos localizada en la parte Este de Arizona consiste de una area de 730,000 hectareas. Para preservar, proteger y promover las poblaciones de fauna silvestre, El Departamento de Recreación y Fauna Silvestre ha encontrado que es muy importante demostrar el valor económico de la fauna silvestre y lograr una capitalización a partir de ésta. Antes de la construcción de un casino en la reservación, aproximadamente 15% de los ingresos de la tribu se originaban de la venta de permisos de caza, pesca y recreación. La venta de permisos en 1994 alcanzó \$1.1 millones, de los cuáles \$440,075 fueron de permisos de caza mayor. El Departamento de Recreación y Fauna Silvestre fue mas productivo que todas las asociaciones ganaderas y ranchos en la reservación. Estos datos

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indican que los ganaderos en el suroeste podrían obtener mas ganancias convirtiendo sus ranchos de una economía netamente ganadera a una donde se incluya la participación de la fauna silvestre. Dicha conversión incluiría una serie de inventarios, ajustes en la capacidad de carga, mercadeo y la aplicación de buenos principios de manejo y cosecha de las especies de fauna. Se requiere una relación de biomasa mas alta de plantas y animales para la producción de trofeos que para la producción de carne. La conversión de una economía netamente ganadera a una economía donde se incluyan especies mayores de fauna podría traducirse en mejores condiciones del rancho, mayor ganancia y menos trabajo.

INTRODUCTION

The San Carlos Apache Reservation consists of 730,000 hectares in eastern Arizona. Elevations on the reservation range from 580 meters to 2,500 meters above sea level, corresponding with plant communities from Sonoran Desert to mixed conifer forest. Extensive plains, rolling hills, rugged mountains, and deep canyons are found at all elevations. Therefore, the reservation has some of the most biodiversity of any contiguous landholding in the United States. Many of the plant communities found on the reservation are also found on ranches in northern Mexico, especially Sonora, and to a lesser extent, Chihuahua.

Approximately 250 species of birds and 75 species of mammals inhabit the reservation. Of primary economic importance are the 10 big game and 8 small game species (not including waterfowl). In addition to this variety, big game populations on the reservation are noted for high quality, as judged by horn, antler, and body sizes. The largest antlers ever recorded for elk (*Cervus elaphus*) were shed and found on the reservation in 1987, and the pending Boone and Crockett world record non-typical bull was taken in 1997. A state record desert bighorn sheep (*Ovis canadensis mexicana*) was taken in 1988, but the world record was taken in 1989 about a mile south of the reservation boundary. The Pope and Young world record Coues deer (*Odocoileus virginianus Couesii*) was taken on the reservation in 1988. Other record class animals that are taken on the reservation include pronghorn (*Antilocapra americana*), black bear (*Ursus americanus*), and mountain lion (*Felis concolor*).

Wildlife populations on the reservation are managed by the San Carlos Apache Tribe's Recreation and Wildlife Department (Czech 1990). The policies of this department are formulated by a Recreation and Wildlife Commission, consisting of five tribal members. Management via Commission has been recognized as a key to successful wildlife management on Indian reservations in the United States (Pearson 1989).

The San Carlos Recreation and Wildlife Department consists of a Law Enforcement Division, a Wildlife Management Program, an Information Branch, and a Planning Branch (Czech 1993). The goal of the Department is to preserve, protect, and enhance wildlife populations and their habitat on the reservation, for the benefit of the Tribe and for the benefit of the ecosystem itself.

ECONOMIC CHARACTERISTICS OF SAN CARLOS WILDLIFE MANAGEMENT

To preserve, protect, and enhance wildlife populations, the Recreation and Wildlife Department has found it very important to demonstrate the economic value of wildlife, and to capitalize on some of this value. Otherwise, the tribal government cannot justify adequate financial support for wildlife management activities on the reservation. The Recreation and Wildlife Department is one of the few profitable tribal enterprises. In 1994, approximately 15% (i.e., 1.1 million dollars) of the general fund of the Tribe came from the hunting, fishing, and other camping permits sold by the Department.

The most important revenue source is fishing, which brought in close to \$550,000 in 1994. Most of the fishing occurs on the 2,300 hectare San Carlos Lake. The tribe is assisted in fisheries management by the U.S. Fish and Wildlife Service.

Almost as important to tribal revenue is big game, which accounted for approximately \$440,000 of revenue in 1994 (Table 1). In 1993 the Department sold the three highest-priced elk tags in the United States, for \$43,000 each. The demand for San Carlos elk hunts is due primarily to the records mentioned above. Other important game species include javelina (*Tayassu tajacu*) and turkey (*Meleagris gallopavo*). Mule deer (*Odocoileus hemionus*), potentially one of the most valuable big game species at San Carlos, are reserved entirely for tribal member hunting.

Small game permits bring in about \$100,000 per year, with quail (*Callipepla* spp.) being the most popular. Trapping brings in \$4,000 per year, and other types of outdoor recreation permit sales amount to \$20,000.

ECOLOGICAL IMPLICATIONS OF MANAGING WILDLIFE FOR REVENUE; ELK AS A CASE STUDY

To grow trophy-sized animals of any species, every factor contributing to size must be present in an adequate amount. In the case of San Carlos elk, the basic mineral requirements are present in the soils and waters. San

Carlos winters are mild relative to those of other North American elk ranges (Thomas and Toweill 1982). Perhaps most importantly, the San Carlos Recreation and Wildlife Department manages for the optimum antler-producing social structure. The bull:cow ratio used is 70:100 as recommended by Bubenik (1988). Management for high quality is common among American Indian tribes (Eskew 1994, Czech 1995).

Elk and cattle are grazers and therefore direct competitors for feed. All else equal, the more elk desired, the less cattle can be grown. Assuming that the market for elk hunting is as stable as it appears, the replacement of a domestic cow with an elk cow is an economically wise move.

With cattle, the product is beef. With elk, the product is antlers. To produce beef, grass is required. To produce antlers, grass is required, and then muscle tissue. Antlers are analogous to a higher trophic level. They could be considered an ecosystem "luxury." A steer in lean condition can be sold, but the bull elk in lean condition will not grow a set of trophy antlers and will have little economic value. Therefore, the successful game rancher cannot allow the range to be overgrazed into as poor a condition as the cattle rancher can. The same principle applies to most big game animals. Having trophy wildlife as the primary product from a rangeland, then, will result in better range conditions and the corresponding ecological benefits.

Table 1. Revenue from big game permits sold on the San Carlos Apache Reservation in 1994.

Species	Revenue in dollars
Bear	40,325
Elk	160,000
Pronghorn antelope	5,000
Turkey	35,000
Coues deer	71,750
Javelina	107,500
Mountain lion	20,500

MARKETING HUNTS

Many hunting and fishing conventions, shows, and meetings are held in the United States. Examples include annual conventions of the Rocky Mountain Elk Foundation, the Foundation for North American Wild Sheep, and Safari Club International. These conventions commonly get 5,000 visitors in one weekend. Many of the booths are represented by

American outfitters who come to sell hunts. Some of these outfitters are ranchers as well. There are usually a few representatives from Mexico.

Annual conventions have auctions at which hunts are sold to the highest bidder. The most expensive hunting permits in the United States are sold at these auctions. For example, at the 1993 Convention of the Foundation for North American Wild Sheep, held in Reno, Nevada, a desert bighorn sheep tag was auctioned for \$303,000. Four bighorn tags were sold at the auction for over \$100,000 each.

ECONOMIC FRINGE BENEFITS OF CONVERTING A CATTLE OPERATION INTO WILDLIFE PRODUCTION

In addition to permit sales, other revenue opportunities exist in the production of wildlife that do not exist with the production of cattle. For example, the privilege of going into a rutting herd of elk with a camera is easier to sell than the privilege of going into a herd of cattle with a camera.

For every dollar spent on permit sales on the San Carlos Apache Reservation, about as much is spent on other items related to the outdoor experience. Many of the services that are purchased by outdoorsmen are not available on the reservation. If these services were available, tribal revenue would be higher.

Some of the most important goods and services that are purchased by outdoorsmen on the reservation include groceries, gasoline, guiding services, maps, and souvenirs. Unavailable goods and services in high demand include sporting goods such as binoculars, fishing poles, guns and ammunition, bait and tackle, and boat storage facilities.

Usually the traveling sportsman, especially the international trophy hunter, is wealthy enough to purchase expensive goods and services. The San Carlos Recreation and Wildlife Department has considered expanding its line of low-inventory, high-priced types of souvenirs such as paintings, sculptures, etc.

SUGGESTIONS FOR THE SONORAN RANCHER

As a prerequisite to converting cattle forage to wildlife production, the rancher should check on the availability of hunting licenses and tags for the area encompassing the ranch. The rancher will be selling access to the ranch, and perhaps services related to the hunt, but only the Secretaría del Medio Ambiente Recursos Naturales y Pesca (Secretary of the Environment, Natural Resources, and Fisheries) has the authority to sell hunting licenses and tags. If there is a closed or highly restrictive hunting regime,

then it may not be economically feasible to convert from cattle to wildlife production. Normally it will be feasible, however, and we recommend the following steps to diversify a typical Sonoran ranch to include the marketing of hunts:

1. Make a rough inventory of the big game and small game populations on the ranch.
2. Make a rough inventory of the carrying capacity for game species. Ranchers who find this task implausible may request assistance from a government biologist, or hire a wildlife consultant.
3. Estimate how much competition each game species will have with cattle, and adjust stocking rates according to the ratio of cattle:wildlife desired. For example, the culling of one adult cow may increase carrying capacity by 6-7 mule deer (Holechek 1988). When range is overgrazed, however, more than the equivalent share of cattle should be culled, because better range conditions are needed to make money from wildlife.
4. Determine what portion of the hunting market is to be targeted. Examples include "world class trophy hunter," "record book trophy hunter," "mixed bag hunter," "Mexican experience hunter," etc.
5. Estimate the sustained annual yield for each of the species, given the market targeted. For those beginning a hunting operation, a greater number of good quality hunts may be more effective at building a clientele than a slight number of top quality hunts.
6. Market the hunts using the technique most appropriate for that portion of the market targeted. For example, to sell a small number of highly priced hunts, conventions of elite hunting groups should be visited. To sell a greater number of lesser-priced hunts, conventions that cater to blue collar hunters are more productive. The rancher will not be selling hunting licenses or tags, but access or opportunities to hunt.
7. Sell hunting opportunities according to the sustained annual yield estimate derived in step #5. Ranchers who hunt may want to guide the hunts and therefore obtain more of the profits.

SOME AMERICAN ORGANIZATIONS THAT MAY OFFER HELP

Large outdoor groups such as the National Wildlife Federation, Rocky Mountain Elk Foundation, and Ducks Unlimited offer financial assistance for landowners that are going to conduct habitat improvement projects for wildlife. These groups may provide assistance to ranchers who intend to

convert cattle forage to wildlife production. Gordon (1997) provided a directory of conservation organizations in the United States.

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BIOGRAPHICAL SKETCH

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