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B.W. O'Gara
University of Montana, Missoula, MT

W. Rightmire
University of Montana, Missoula, MT

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WOLF, GOLDEN EAGLE, AND COYOTE PROBLEMS IN MONTANA

by B. W. O'Gara[1/] and W. Rightmire[2/]

ABSTRACT

The average annual reported loss of sheep and lambs to predators in Montana from 1982 through 1986 was 46,000 animals worth $1,980,000. During recent years, coyote predation has been the single most important cause of death for lambs. Coyotes accounted for 80% of the predator kills during 1985 and 72% during 1986, and 8,321 coyotes were killed by ADC during those 2 years. Aerial gunning accounted for more than half of the kills. During the first year of a study on a ranch in western Montana without predator control, coyotes killed 8% of the ewes and 27% of lambs. Predation by golden eagles was exceedingly high on some ranches during 1974 and 1975 after a West-wide crash of jack rabbits. No large-scale eagle predation has been reported since 1975, but the problem is extensive. During 1985, 2,500 lambs were reportedly killed by eagles and 2,000 kills were reported in 1986. Scarecrows have proven of some value in preventing eagle predation, and net gunning from a helicopter could provide quick, but expensive, removal of depredating eagles. However, restrictions on legal control of eagles apparently cause some ranchers to conduct their own control program. Wolves are making a comeback in northwestern Montana. Being classified as an endangered species complicates control. Five cattle and 10 sheep were documented as wolf kills during 1987, and 6 wolves were captured or killed at a cost of about $38,000.

INTRODUCTION

Western States

During the early 1900's, most people considered predators vermin, to be extirpated by any means possible. Changes in attitudes accompanied a recognition of the beneficial role of predators in natural ecosystems and an increasingly emotional attachment of many people to wildlife, particularly predators. By the 1960's, environmental groups and much of the general public were opposed to almost any type of predator control.

President Nixon issued an Executive Order in 1972, banning the use of toxicants for predator control on federal lands and by federal agencies. Subsequent action by the U.S. Environmental Protection Agency severely limited the availability of chemical toxicants for state and private predator control. These initiatives were followed by complaints from stockmen, especially sheep ranchers, of high losses to predation. Published reports of sheep losses (Nielson and Curle 1970, Reynolds and Gustad 1971) relied on information supplied by sheep producers, and the results were contested or ignored by opponents of predator control.

Eight field studies, supported by the U.S. Fish and Wildlife Service during the mid-1970's, indicated that losses were indeed substantial (Henne 1975, Klebenow and McAdoo 1976, Brawley 1977, DeLorenzo and Howard 1977, Munoz 1977, Nass 1977, Tigner and Larson 1977, McAdoo and Klebenow 1978).

Researchers on ranches without predator control reported 29.3, 14.7, 13.7, 24.4, and 6.3% of the annual crop of lambs lost to predators. Those on ranches with predator control reported 4.0, 1.4, and 3.4% of the lambs lost to predators. During all of these studies, coyotes (*Canis latrans*) were the principal and sometimes the only predators involved. Bobcats (*Lynx rufus*), black bears (*Ursus americanus*), dogs, red foxes (*Vulpes vulpes*), golden eagles (*Aquila chrysaetos*), and ravens (*Corvus corax*) killed limited numbers of sheep and lambs.

By the 1980's, the public had generally accepted selective predator

1/Montana Cooperative Wildlife Research Unit (USDI Fish and Wildlife Service; Montana Department of Fish, Wildlife and Parks; University of Montana; and Wildlife Management Institute cooperating), University of Montana, Missoula, MT 59812.
2/Present address: P.O. Box 1938, Billings, MT 59103.

control as vital to the sheep industry. The pendulum of public opinion, that had swung from "all predators are bad" to "all predators are good" seemed to be swinging toward middle ground. We hope it stays there.

By an act of Congress (Public Law 99-190) on 19 December 1985, the Animal Damage Control (ADC) program was transferred from the U.S. Department of Interior's Fish and Wildlife Service (FWS) to the U.S. Department of Agriculture's Animal and Plant Health Inspection Service (APHIS). The program was transferred intact, and included both operations and research branches. Funding, cooperative agreements, and responsibilities were also transferred intact. Management of those species that are statutorily regulated by the FWS will be handled by permits from FWS in accordance with Congressional intent of the transfer.

Montana

The Montana Animal Damage Control program is a cooperative effort conducted pursuant to the Animal Damage Control Act of 2 March 1931 (43 Stat. 1468; 7 U.S.C. 426-426B) as amended and Chapter 27 of Title 3 and Chapter 19 of Title 47 revised Codes of Montana.

A master project agreement is in effect between the FWS (determined to be valid for APHIS until updated) and the Department of Livestock, State of Montana. A special field agreement is in effect between the ADC program and the Montana Wool Growers Association. These agreements define the cooperative responsibilities of each entity, funding arrangements, and administrative guidelines for the program.

The average loss of sheep and lambs to predators during the last 5 years (1982-1986) was 46,000 animals worth $1,980,000. The loss during 1974 (shortly after the banning of 1080, sodium monofluoroacetate, and before other control methods had been adjusted to the new situation) was 143,500 sheep and lambs worth $3,655,700.

RESULTS AND DISCUSSION

Coyotes

Attention is often focused on the large number of coyotes killed by ADC throughout the West, but the sporting/fur take, which is substantially larger, draws little attention. For instance, during 1978, 172,427 coyote pelts were marketed by western trappers and 91,573 coyotes were killed by federal and state ADC agents. The fur harvest varies year-to-year according to the price of pelts while the ADC take remains fairly constant (USDI Fish and Wildlife Service 1978).

Although 75 badgers (*Taxidea taxus*), 49 black bears, 20 bobcats, 1,488 red foxes, 2 mountain lions (*Felis concolor*), 20 raccoons (*Procyon lotor*), 2 grizzly bears (*Ursus arctos*), and 25 porcupines (*Erethizon dorsatum*) were taken by ADC agents in Montana during 1985 and 1986, efforts were expended primarily on coyote control. Three black bears, both grizzlies, and 22 bobcats were released (either on site or translocated). The following efforts were expended taking the above animals plus 8,321 coyotes: 2,350 trap years, 1,884 M-44 years, 2,440 snare years, 1,833 hours of fixed-wing flight time, and 1,468 hours of helicopter flight time. Denning also accounted for 226 coyotes. M-44's and snares were used only on private land, and more than 95% of the trap years were on private land. About 80% of the flight time was also expended over private lands. Thus, only a small percentage (5% of trapping and 20% of aerial gunning) of the control was focused on public lands and only the most selective methods were used there.

Of the 8,321 coyotes taken by various methods, 37% were taken via helicopter, 16% each by fixed-wing aircraft and leghold traps, 12% by M-44's, 10% were shot from the ground, 6% were taken in snares, and 3% were killed by denning. Research in Montana indicated that aerial gunning selectively took sheep-killing coyotes (Connolly and O'Gara in press).

Personnel (supervisory, pilot, clerical, and field) to operate the ADC program in Montana during 1985 and 1986 involved 26 and 25 man-years. Expenses during the same time were about $2,200,000, with approximately 61% pro-

vided by APHIS, 10% by counties, 24% by the Montana Department of Livestock (primarily helicopter time), and 4% from the sale of pelts.

Sheep and cattle losses in Montana, estimated by USDA through multiframe sampling and interviews, amounted to 93,800 head with a value of $4,520,600 during 1985 and 1986. Losses to coyotes confirmed by ADC agents during those years involved 3,497 lambs, 511 adult sheep, 182 calves, and 1 cow.

During recent years, coyote predation has been the single most important cause of death for lambs in Montana. Coyotes accounted for 80% of the predator kills during 1985 and 72% during 1986, and confirmed kills represented animals worth $1,990,000 in 1985 and $1,488,260 in 1986. What losses would be in Montana without predator (principally coyote) control is problematical. A study conducted during the mid-1970's indicated it could be staggering (O'Gara et al. 1983).

Mortality suffered by domestic sheep was studied on the Eight Mile Ranch in western Montana from 15 March 1974 through 30 September 1976. Shed lambing, open pastures, and intensive searches kept losses from unknown causes to <1% of the herds each year. Adult ewes suffered 3.2-5.3% non-predator deaths and lambs suffered 7.5-11.1%. During the same time period, predators killed from 1.5 to 8.4% of the ewes and from 12.5 to 26.8% of the annual lamb crops. Coyotes were responsible for 97.6% of all predation. Kills per day were highest during early May to early June. Leaving carcasses in pastures had no discernible effect on the number of new kills. Coyotes appeared to attack sheep as they were encountered, regardless of their health. Of the 1,223 sheep killed by coyotes, 73.6% were killed by neck-throat wounds. Coyotes wounded, did not feed on, or ate <25% of over half of the sheep they killed. Coyotes were sighted chasing, feeding upon, or within 100 m of sheep 131 times, but only 2 kills were observed from attack to death. This study showed higher losses to predation than any in the literature, but it came closer to having no control than the others, and it had fewer deaths to unknown causes.

The unexpected magnitude of predation on the Eight Mile Ranch necessitated alterations in the study plan. By the autumn of 1975, the researchers were faced with the possibility of not having enough funds to pay for all the kills. Hence the decision was made to experiment with control methods. Snares, M-44's, helicopter gunning, and toxic collars containing sodium cyanide reduced levels of predation. Toxic collars containing Diphacinone (Connolly et al. 1978) were used on target lambs during late March of 1976 before lambs were moved to pastures. Snares, leghold traps, M-44's, aerial gunning, and guard dogs were then used. Only the dogs stopped coyote predation, but they also harassed sheep (Linhart et al. 1979). The number of coyotes killed by puncturing 13 toxic collars is unknown, only 1 was recovered; but active dens, pairs, and pups were not seen after the collars were used. Also, 8 of the 12 coyotes later taken by other methods were yearlings, and the only adult female killed was not lactating.

Golden Eagles

Raptor enthusiasts and sheepmen are often at odds over the severity of golden eagle depredations or the fact they even occur. Golden eagles are efficient predators and predation on lambs in Montana is well documented (O'Gara 1978, 1981). We have also documented golden eagle predation on calves, colts, mule and white-tailed deer (*Odocoileus hemionus* and *O. virginianus*), and pronghorns (*Antilocapra americana*).

Most livestock depredation problems occur at lambing time and are relatively short-term, although economic losses can be great. Severity of golden eagle predation on lambs is influenced by density of natural prey, availability of carrion, weather, ranching practices, vegetative cover, and topography, as well as the age, density, and distribution of eagles in an area. Interactions of these factors with economic, social, and

political values contribute to emotionally charged, opinionated disagreements.

The shooting of golden eagles, from the ground and air, was common throughout the West until the Bald Eagle Act of 1940 was amended in 1962, providing protection for the golden eagle. This amended Act allowed the shooting or trapping of golden eagles when serious depredations to the livestock industry were determined but prohibited shooting from aircraft or poisoning, except for research purposes. Until 1970, governors could, at the discretion of the Director of the FWS, obtain "blanket" permits for killing golden eagles in specified areas (usually a county or block of counties) for a specified period of time. In 1970, then Secretary of Interior Hickel sent a memorandum to the director of FWS including the following statement: "'Blanket' permits as such will no longer be issued. This action is not intended to preclude the issuance of necessary permits for scientific exhibition, or religious purposes, or the issuance of individual permits where, after investigation and report to me, I conclude that such individual permit is necessary" (Federal Register 1976: 50355). However, no individual permits have been issued, and since 1970, ranchers have had essentially no recourse if faced by serious eagle predation. Public pressure is directed at "saving" every golden eagle. Some ranchers apparently reason that they can expect no relief if eagle problems develop during the lambing season, so it is safest to shoot eagles whenever the opportunity presents itself. Such shooting probably endangers young bald eagles more than would any authorized control method. Ignoring the problem is not a good solution for either eagles or ranchers. Eagle predation is not very serious on an industry-wide basis, but a few ranchers have sustained serious losses. Thus, many ranchers' perception is that eagle predation is more serious than it really is. Unfortunately, that perception determines ranchers' actions. We have found that eagles can be caught rapidly with a net gun and helicopter (O'Gara and Getz 1986). This knowledge should reassure ranchers that they can get help in case of severe predation.

The potential for extensive golden eagle depredation on lambs in Montana exists when jack rabbit (Lepus spp.) populations are low and lambing seasons are cool and wet. Such conditions were present during 1974 and 1975 on 2 ranches near Dillon, in southwestern Montana, when eagle predation on lambs was estimated at $38,000 and $48,000 (O'Gara 1978). Little depredation documentation was attempted during 1975-1982 and 1984. Compared to 1974 and 1975, depredations were evidently low on those ranches from 1976 through 1985, and docking percentages approached normal (rancher-acceptable) levels.

Conclusive data were unavailable, but communications with biologists from 17 western states indicated that jack rabbit populations crashed throughout the West during 1972-1973 and the hares remained scarce through 1974 and 1975. The lambing seasons of 1974 and 1975 were cool and wet, and Richardson's ground squirrels (Spermophilus richardsonii) and yellow-belly marmots (Marmota flaviventris) were relatively inactive, especially during early mornings when eagles were hunting. Few alternative prey species were available, whereas lambs were abundant. Jack rabbits apparently increased during and after 1976, and, although local populations have since crashed, another West-wide decrease has not occurred. Although no intensive eagle predation has been reported in Montana since 1975, the problem remains extensive. During 1985, 2,500 lambs worth $114,800 were reportedly killed by eagles, and in 1986, 2,000 kills worth $93,000 were reported.

Four hundred and thirty-two golden eagles were trapped on the Dillon ranches from 1975 through 1983 and translocated to areas where the chances of depredation were deemed small. This program cost $112,771, had little demonstrated effect on depredation, and may have functionally transplanted the problem, not solved it. Harassment of eagles by chasing with a small airplane, discharging rifles, and firing explosive shotgun shells close to eagles

failed to stop depredation, reduce the number of birds present, or alter their distribution.

Human-like scarecrows placed on high knobs and ridges, accompanied by harassment, appeared to reduce depredation and displace eagles from the lambing bands during 1984. Eagle-killed lambs were easily found from the air in 1983 (O'Gara 1983), but none were observed during ground searches or 21 flights in 1984 (O'Gara et al. 1984). O'Gara verified 5 eagle-killed lambs brought in by ranchers before scarecrows were erected in 1984. Sheep bedded on high knobs and ridges, and many eagle-killed lambs were found on and near bedding grounds during 1974 and 1975. Placement of scarecrows on or near bedding grounds made them visible and in close proximity to sheep during morning hours. If lambs were "protected" for the first 2 hours of daylight, eagles usually killed other prey before the sheep left the vicinity of the scarecrows.

During 1985, an intensive study, including instrumented eagles, indicated that eagles avoided scarecrows and that scarecrows, combined with harassment and increased human activity, reduced depredation. This combination kept eagle sighting rates to a minimum, redistributed birds, and reduced depredations.

High proportions of immature birds were observed during 1974 through 1985 on the Dillon ranches, 76% of the eagles captured there were immature birds, and young eagles appeared to be responsible for killing more lambs during 1974-1975 than did adult eagles (O'Gara 1981). Young eagles or birds in poor condition, not tied to nesting territories, may congregate in areas of food abundance (Gober and Lockhart 1979). Fourteen golden eagles, predominantly immature birds, were observed feeding simultaneously on 1 sheep carcass in 1985.

No single predator control technique will work in every situation. However, given the constraints on direct control of eagle numbers, we conclude that scarecrows, combined with harassment, offer the most feasible means of protecting lambs under range lambing conditions in southwestern Montana. Scarecrows are inexpensive to construct, place, and maintain. They should be erected just prior to lambing and removed soon after to minimize habituation by the eagles.

Wolves

Gray wolves (*Canis lupus*) are classified federally as an endangered species in the conterminous United States (except for Minnesota where the species is listed as threatened). The Endangered Species Act of 1973, as amended, requires Federal agencies to carry out recovery programs for listed species and to ensure that agency actions do not jeopardize the continued existence of listed species or adversely modify or destroy their critical habitat. The Act also directs the development and implementation of recovery plans for listed species.

The revised Northern Rocky Mountain Wolf Recovery Plan identifies 3 wolf recovery areas in central Idaho, northwestern Montana, and the Greater Yellowstone area. These 3 areas consist primarily of National Park and designated wilderness lands with relatively few livestock allotments and abundant wild prey. Because livestock allotments and private lands are common outside the wolf recovery areas, the Northern Rocky Mountain Wolf Recovery Plan calls for a zone system for wolf management and a responsible wolf control plan. Documented cases of wolf depredation on legally present livestock will trigger management and control actions following prescribed protocol.

Singer (1975*a* and *b*) and Kaley (1976) collected 130 reports of wolf observations for Glacier National Park (GNP) and vicinity beginning in 1910. The area around GNP and south along the Rocky Mountain Front has consistently produced more reliable reports than any other part of Montana.

During the spring of 1979, a female wolf was captured and radio-tagged by the Wolf Ecology Project, University of Montana, near the U.S.-Canadian border in the North Fork Flathead River drainage (Boyd 1982, Ream and Mattson 1982).

During the almost 2 years she was intensively monitored, no evidence was found of other wolves occupying the Flathead drainage (Boyd 1982, Ream et al. 1985). In the fall of 1981, larger tracks (1 foot was 3-toed) were found in the area. During that winter, a pair of wolves was tracked in the snow in GNP and followed into British Columbia, and in the spring of 1982, 7 wolf pups were observed several miles north of the U.S.-Canadian border. Since 1982, there has been an increased number of wolf tracks, sightings, and sign in the North Fork area, particularly south of the Canadian border (Ream et al. 1985). During the winter of 1983-84, wolves were observed and photographed in GNP, and tracks were found 25-30 km south of the Canadian border. In the winter of 1984-85, an estimated 7-10 wolves were present in the area (Ream et al. 1985). Two wolves, a young male and an alpha female, were captured and radio-collared in 1985. The female, a member of a pack of 5-6 wolves, was trapped north of the Canadian border and radio-collared. She was later observed nursing 7 pups. One of her 7 pups was shot by hunters in October 1985, and soon after, the pack of 12 (6 adults and 6 pups) moved south into GNP and remained there. A female pup was captured and radio-collared in September 1985, and 2 more pups captured in September slipped out of their radio collars soon after. During the winter of 1985-86, Wolf Ecology Project personnel estimated 15-20 wolves inhabited areas in and near GNP, including the pack of 12 animals, a probable pair on the east side of the Park, a radio-collared wolf, and several other lone wolves.

By mid-1987, 8 wolves were radio-collared and 3 successful dens were known. At least 15 new pups were present, and project personnel estimated about 30 wolves in the area.

Moose (Alces alces) was the primary prey species found in scats from the winter of 1984-85 when the pack restricted its movements primarily to the British Columbia-U.S. border area and northward. White-tailed deer and elk (Cervus elaphus) were the secondary and tertiary prey species, respectively. After the pack shifted its home range southward into GNP, white-tailed deer, mule deer, and elk were represented in scats in that order.

Most wolf reports received outside of the North Fork of the Flathead area during 1985-86 were from the east side of GNP, but reports also were received from the Swan/South Fork of the Flathead, northwest Montana, and Middle Fork Flathead areas.

Through most of the winter of 1986-87, wolves were periodically observed feeding on elk in the St. Mary's area on the eastern edge of GNP. Park personnel positively identified 5 wolves. Tribal game wardens also positively identified 5 wolves within 16 km of St. Mary's on the Blackfoot Indian Reservation. During March, a rancher reported a cow killed by predators on his ranch within the Blackfoot Reservation. The cow had been dead for several days, and most of the sign had been obliterated by snow by the time ADC received the report. The cow was apparently killed by a wolf but, due to a lack of undisputable evidence, no control action was initiated.

Also during March 1987, the APHIS-ADC supervisor for Montana was issued a regional blanket permit for wolves by the U.S. Fish and Wildlife Service Region Six Office in Denver. The letter accompanying that permit is quoted in part:

"If verified wolf depredation occurs on lawfully present domestic livestock, control actions will be undertaken to trap and relocate the offending animal(s) or, if this is not possible, the animal(s) may be lethally controlled. Such control actions will serve to enhance the overall survival of the wolf by demonstrating to those concerned about the impact of wolf recovery on the livestock industry that responsible federal agencies will act quickly to resolve depredation problems. Timely response to depredation problems will serve to alleviate the perception of government inaction which often results in the indescriminate killing of wolves by ranchers or other individuals. In addition, control actions

will focus on removal of only offending wolves, and in doing so will resolve wolf-human conflicts by taking the minimum number of wolves necessary. Thus, by enhancing the survival chances of those animals now present in Montana, the control program will actually contribute to the ultimate recovery of the wolf in the Northern Rocky Mountains.

. . . .

"Control/capture efforts will be limited to within 1 mile (1.6 km) of the depredation site, unless the offending animal can be identified, and will be limited to a period of 10 days. If wolf depredation recurs in the area within 3 months, control actions may be resumed for up to 21 days.

. . . .

"Lethal control (shooting, M-44's) will be used only if attempts to live-capture a problem wolf are unsuccessful and wolf depredations continue in the area. M-44's will be used in accordance with established Animal Damage Control guidelines and in coordination with the Helena Endangered Species Field Office."

Subsequently in 1987, 5 cattle and 10 sheep were killed by wolves on the Blackfoot Reservation. Six wolves were captured or killed during 1,124 trap nights between 8 May and 11 September at a cost of about $38,000. At least 1 wolf remains on the Reservation, but no further control actions are planned unless more wolf predation is documented.

ADC personnel found that: (1) #4 Newhouse traps do not have large enough jaws to consistently capture and hold these wolves, and therefore ADC ended up using #114 Newhouse traps (no longer produced) and a Braun coil spring trap made in British Columbia; (2) the FWS wolf control guidelines were patterned after the Minnesota guidelines, and they did not fit the Montana situation --a radioed wolf involved in killing livestock was as much as 10 km away the next morning--perhaps the long daily movements of wolves were related to the openness of the habitat or to the fact that another wolf pack was not present to restrict movements; (3) "target" animals need better definition--a pup weighing 28 kg and an adult weighing 31 kg are difficult to differentiate from the air; (4) this wolf pack moved from the St. Mary's area in GNP where elk were available to an area where wild ungulates were much less numerous; and (5) grizzly bears in thick cover increase wolf control difficulties geometrically and were a major factor in the costs of this effort--after trapping a grizzly, ADC tried to draw wolves into the open with bait stations, for trapping, aerial hunting, netting, etc.

Allowing wolf predation to continue during efforts to capture offending animals can only lead to animosity and possible private control by ranchers. Interested conservation organizations have conceded that control (including lethal) is necessary to recovery, and government officials must be sensitive to the problems of the livestock industry.

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