The 1080 Livestock Protection Collar for Predator Control

Jerry H. Scrivner and Dale A. Wade

The Environmental Protection Agency (EPA) granted the U.S. Fish and Wildlife Service (USFWS) registration of the 1080 Livestock Protection (LP) Collar for restricted use in predator control in July 1985. The LP collar is designed to kill coyotes that attack sheep and goats. When coyotes attack the throats of collared animals, they usually puncture toxicant-filled pouches on the collar and receive a lethal dose of the toxicant (Compound 1080).

Properly fitted Livestock Protection Collar on a 35-pound Spanish/Angora kid.

Past Use of the LP Collar

The LP collar was designed by Roy McBride of Alpine, Texas. In 1974, the USFWS patented the collar in McBride's name in return for which McBride granted royalty-free use of the collar to the U.S. Government (Connolly 1980). Connolly (1980) reviewed the USFWS involvement with the LP collar. In 1974-75, staff from the Denver Wildlife Research Center conducted pen and field tests using collars filled with sodium cyanide. While the cyanide collar proved effective against captive coyotes, it was ineffective against wild coyotes, possibly because of the repellent properties of the toxicant.

In 1976, the Denver Wildlife Research Center tested collars containing diaphacinone in pen and field operations. These collars were effective in pen trials, but in the field trials coyotes often continued to kill sheep during the period (6-16 days) between dosing and death; therefore, a faster-reacting toxicant was sought.

In 1978, the Denver Wildlife Research Center began field tests with 1080 in the LP collar in Montana, Idaho, and Texas. From the results of 21 tests, Connolly (1979) concluded that the collar was effective in taking problem coyotes and recommended that the USFWS seek registration for Compound 1080 for operational use in the LP collar.

In 1979, collars were used at 7 test sites in Montana, Idaho, and Alberta; however, by late 1979 all collars were withdrawn from the field except at 3 test sites near Meridian, Texas. During 1979, the Denver Wildlife Research Center devoted more effort to assessment of primary and secondary hazards of collar use.

Although the collar was beginning to receive favorable publicity, USFWS research on the collar was hampered when, on 8 November 1979 (Andrus 1979) and 15 January 1980 (Andrus 1980), Secretary of the Interior Cecil Andrus stated that "there will be no further research or development of potential uses of Compound 1080" by the Department of Interior (USDI) on lands administered by the USDI. However, the Secretary also emphasized that research should be continued "on toxicants displaying species specific characteristics and delivery systems which use patterns that are selective for target individuals" (Andrus 1979).

In response to the statements by Andrus, the Western Regional Research Coordinating Committee (1980) stated that "there is no known compound which is as selective and has such a significant research base as Compound 1080" and that the Committee "strongly supports research, development and use of Compound 1080, until more selective, safer, and efficient toxicants are available." The Committee further stated that "the toxic collar.. is without question one of the most selective methods where it can be applied to remove killer coyotes preying on sheep and goats."

Evaluation of Collars

Secretary of the Interior Andrus initially contacted the Texas A&M University System on 6 May 1980 and inquired whether the University was interested in participation with the USDI in a cooperative research effort on the efficiency and safety of 1080 in the LP collar as a predator control

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method. Texas A&M's reply was in the affirmative and the University's application to the EPA for an Experimental Use Permit to conduct field studies with the 1080 LP collar was approved.

The EPA permit allowed the University use of Compound 1080 on as many as 20 test sites; 14 were subsequently selected. The test sites were identified through direct contact with ranchers, Texas Department of Agriculture, and Texas Rodent and Predatory Animal Control Service personnel. The Texas Department of Agriculture and the University cooperated in selecting suitable sites. Ranchers were selected according to severity of coyote predation, the history of predation, and husbandry practices.

Two methods of data collection were used. One method depended on cooperating ranchers as principal data collectors. Information on the efficacy and safety of the 1080 LP collar was recorded for use by University personnel. This phase of the study was primarily "extensive" in nature, because University personnel were not involved in day-to-day use of the collars and in data collection. Thirteen ranches were involved in this portion of the project.

The second phase of the project was more "intensive" in nature. A graduate research assistant or technician resided at the cooperating ranch and was directly involved with most events related to collar use. This included, but was not limited to, collar application, herd manipulation, animal searches, and data collection.

At the beginning of each test, personnel from the Texas A&M and the Texas Department of Agriculture met with each rancher individually to review requirements for participation in the cooperative collar-use project. Toxicity of Compound 1080 and potential hazards of its use were reviewed and discussed. Ranchers were instructed on correct collar use in order to direct attacking coyotes to collared animals; however, since each rancher was confronted with different problems, some flexibility was employed in adjusting methods to suit each situation. University personnel filled collars with a specific concentration of toxic solution and provided these to the ranchers. Ranchers purchased the collars and paid for other normal operating expenses, including use of animals and management required for the test.

Generally, the collars were found to be an effective method for use in conjunction with other control measures. Three methods of targeting depredating coyotes to collared animals were most effective. One method involved placing a small herd of collared animals in a pasture prior (at least several weeks) to introducing uncollared animals. Another method involved placing a few collared subadults in a herd of uncollared adults. The third method involved the nightly release of a small flock of collared animals into a pasture in which predation on uncollared animals had occurred.

Whichever target strategy was employed, efforts were made to isolate the target flock from nearby uncollared animals which might serve as alternate prey. When nontarget livestock were not isolated, the effectiveness of targeting was *greatly* reduced. For example, due to a lack of available pasture, one rancher placed a few collared lambs with a large number of uncollared ewes and lambs. The probability of coyotes attacking collared animals was significantly reduced and a number of uncollared animals were killed for each collared animal killed.

The primary factors limiting collar effectiveness were the following: (1) coyotes attacked livestock elsewhere than at the throat, (2) damaged or lost collars due to wires, thorns and other objects, and (3) collars pulled out of position by brush or other objects.

A researcher demonstrates the use of supplemental feed to examine collared Angora goats in a target flock pasture.

Cost of Collar Use

From February 1981 to November 1982, data regarding cost of collar use was gathered on 12 of the ranch sites (Table 1). During this time, ranchers used the collars for an average of 30 weeks. Herd size on all ranches varied during the study but averaged about 600 head.

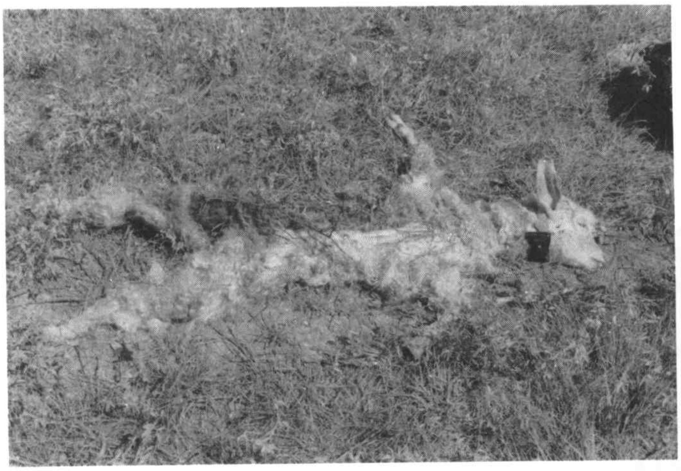
Table 1. Average costs resulting from use of 1080 Livestock Protection Collars on 12 ranches in Texas. Collars were on livestock for an average of 30 weeks.

	Average no. per ranch	Value per unit ($)	Value per ranch ($)
Collared animals killed or missing	5 head	32.00/head	160
Collars punctured or missing	7 collars	18.00/collar	126
Transportation	475 miles	0.2253/mile	107
Labor	162 hours	3.65/hour	591
Feed	—	—	81
Miscellaneous[1]	—	—	19
Total			1,084

[1]This includes a lock box to contain collars, ear tags for collared animals, ear tag applicators, and warning signs. These costs were estimated by the authors.

Because of the experimental nature of these LP collar projects, some costs were probably higher than would be the case where collars are registered for general use. Cooperating ranchers generally recognized the need to gather reliable data regarding collar use and efficacy and therefore probably spent more time working with collared livestock than would be spent under normal field use.

The need to expose collared animals in order to take depredating coyotes is essential and most are sacrificed, this is generally considered a disadvantage of using collars. However, it can also be argued that the loss of collared animals may represent no additional cost to ranchers, because some animals will be killed whether or not they are collared if coyotes enter a pasture to kill livestock.



A collared 25-pound Angora kid killed and fed upon by a coyote.

In addition to the collared livestock killed by coyotes, another cost was that of the collars, which were about $18.00 each. Ranchers purchased an average of 19 collars each.

At times, labor costs were also significant; this primarily involved periodic checking and adjusting of collars and managing livestock to direct predation toward collared animals. Adjusting collars was particularly important on young, growing animals to prevent collars from becoming too tight. Labor also included gathering animals specifically for application or removal of collars. This often required considerable time but was usually done infrequently enough to account for a relatively small part of the total labor required. Labor requirements were reduced by handling collared livestock during periods when they were gathered for other purposes such as shearing or drenching.

Supplemental feed for collared livestock was an additional cost. As a rule, corn or a protein supplement were used to attract collared animals to permit examination of collars and the animals. Occasionally, livestock were fed during periods when they were penned for observation to assure that collars were properly fitted.

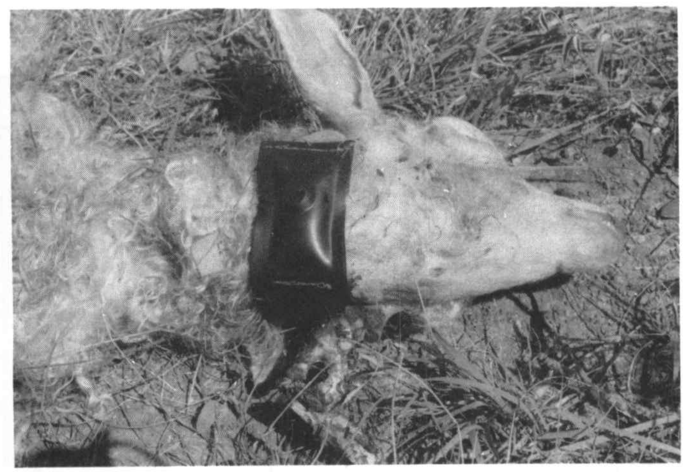
Minor miscellaneous costs included purchase of lock boxes to contain collars, ear tags for collared animals, ear tag applicators, and warning signs regarding collar use for posting entrances to test sites.

Of 11 ranchers questioned regarding the cost effectiveness of the LP collar, 8 thought the collar was cost effective, 2 did not, and 1 was uncertain (1 of the 12 ranchers did not respond to this specific question). It was concluded that the LP collars were probably cost effective when predation was a consistent problem. They also may be cost effective at low predation levels if their use is limited to periods when predation occurs.

Conclusions

Based on these tests and other research, 1080 LP collars deserve further consideration for use in predation control. However, the use of collars is not a solution to coyote predation on sheep and goats. Instead, collars offer an additional tool which may be used with other control methods to help alleviate losses.

The ability to manage livestock to direct predation at collared animals as well as the history of predation losses should be examined for each case to determine the potential



This close-up view shows that the right collar packet was not punctured by the coyote's teeth, despite the collar being in the correct position. Tooth punctures were made ahead of the collar.

However, the left packet on the collar was punctured by the coyote's teeth and, presumably, the coyote died, since coyote kills in the goat herd ceased for a time.

utility of collars. If predation is severe and if livestock can be managed to direct predation at collared animals, collars can be a safe, cost-effective control tool.

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Viewpoint: Vehicular Recreation Use on Public Lands

Stu Bengson

Vehicular recreation, commonly referred to as off road vehicle (ORV), use of public lands is a very 'hot' issue these days. Discussions of public land management invariably focus on "ORV impacts" with heated conversation of the pro's and con's.

What is vehicular recreation? Vehicular recreation, unheard of prior to the 1960's, is the fastest growing form of outdoor recreation in America. In 1976 there were an estimated 5 million ORV motorcycles, 2.8 million 4WD's, more than 2.2 million snowmobiles, and 250,000 "dune buggies." Total sales of these vehicles in the past 7 years were in excess of 12 million. It is estimated that 4 out of 5, 4 × 4 owners will use their vehicles occasionally for outdoor recreational purposes. Overall, in 1977, there were some 43.6 million Americans (25% of the total recreational public) involved in vehicular recreation with as much as 40% of this total in four-wheeling.

All these vehicular recreationists need somewhere to go, which leads to recreational use of the public lands. This creates a very high demand on some areas and presents the land use manager with various management problems and conflicts. The center of the controversy over OVR use on public lands is "environmental impacts." Without question, the unmanaged, unregulated use of the public lands by recreational vehicles has caused much damage to some areas. There are other examples where well-managed and regulated OVR use can be accommodated. One study showed that more than 60% of the public had no objections to 4-wheel drive or ORV use in a specific area. Another study showed that only 4% of the public objected to ORV uses.

Everyone involved with the "ORV controversy" has read or heard of the many reports, texts, etc., that have "documented" the severe impacts of ORV use. Sheridan & Carroll's 1979 CEQ Report and Webb & Wilshires 1983 book on "ORV Management" are prime examples of the 'biased' information that is presently being used to develop management and policy strategies for vehicular recreation. What is needed are some **real** unbiased, studies on the true impacts, needs and problems of recreational vehicle use on public lands.

One solution is the proper management with reasonable and practical regulation. Vehicular recreation is here to stay and will continue to grow. Closing one area only shifts the problem to other unregulated and unmanaged areas. Many areas of the West have documented hundreds of thousands of ORV recreational visitor days use. Proper ORV use in an area can be a benefit. It is not uncommon for a major "ORV event" to draw 18,000 visitors and generate $125,000 in revenue. Vehicle recreation accounts for about $28 million annual revenue in one economically depressed area in Colorado. A 1984 California study placed ORV values at $45/person/day. Total ORV recreation in California in 1985 was estimated at over 52 million visitor days which would equal $2.3 billion.

One study shows that only 2% of the recreational lands are designated for ORV use. A National Park Service study showed that 7% of the recreational use was with ORVs while 3% was hiking. A 1985 Forest Service study shows that 29% of the recreational use was motorized while only 7% was backpacking. A 1985 BLM study shows that 57% of the recreational use is ORV related. Only 10 states have any kind of ORV management plan and only 19 states have designated ORV areas. Some of the biggest problems with proper ORV management are inadequate funds, user conflicts, and misuse of the land.

There is an increasing appetite for more "wilderness" areas. At present, about 27% (some 188 million acres) of the Federal public recreational lands are classed or being managed as some form of wilderness area—closed to vehicular recreation. Since 1984, an additional 6 million acres of new Wilderness lands have been legislated. These closures remove thousands of miles of motorized trails from vehicular recreational use. Today there are over 350 designated "National Recreational Trails" totaling 105,000 miles, only 98

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