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OVERVIEW AND ASSESSMENT OF
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APPLICATORS

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Abstract: Wyoming's legislation funding predator control has progressed from a bounty system, to a mill levy system, to the current fee assessment per head. The Wyoming Department of Agriculture administers an M-44 predator control program for private and commercial applicators' use with livestock depredators. As predatory impacts on livestock have increased, use of M-44 has also broadened. The M-44 is a mechanical device utilizing a spring-activated ejector, that propels the dry toxicant sodium cyanide into the mouth of the target species when pulled. Death of the animal is accomplished by inhalation of hydrogen cyanide which forms when sodium cyanide comes into contact with saliva. Wider use of the M-44 device and increasing skill of applicators is steadily increasing the take of predators. Successful use of the M-44 device increases with knowledge of predator habits, use in the proper location, and use of appropriate scent for the season and area.

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Key words: livestock, M-44, predator control, Wyoming.

ABOUT WYOMING

Located within the Great Plains and the Rocky Mountain Physiographic Regions, Wyoming is the ninth largest state in the Union. The majority of the state's 253,596 km² is public land, with 47.5% of the total land area managed by the federal government. Six percent of the lands within Wyoming are state lands, 4% are Indian Trust Lands, and the remaining 42.5% are privately owned (Wyo. Dep. Agric. 1985). Because of land ownership patterns, predator control in Wyoming is often a complex and emotional issue.

Early Wyoming settlers obtained title to public lands under several Federal Acts; the Pre-exemption Act of 1841, the Homestead Act of 1862, the Timber Culture Act of 1873, and the Desert Land Act of 1877. By combining the options available under these acts, it was possible for settlers to obtain title to 453 ha of public land.

Most of Wyoming's agricultural land area is rangeland. Livestock and their products contribute approximately 81% of the total farm and ranch cash receipts. Currently, Wyoming is ranked third in the U.S. in production of sheep and lambs (Wyo. Dep. Agric. 1985).

WYOMING'S PREDATOR CONTROL HISTORY

Livestock grazing has always played an important role in Wyoming's history and economy. Wyoming's rangeland was first utilized by cattle trailed up from Texas as the northern climates warmed, and later sheep were brought in for grazing. Livestock, the original driver of the territory's economy, brought with it the need for predator control. Early predator control was generally conducted by trappers who were in the business of fur trading. Later, trappers were commercially hired and paid either by the government or private ranching operations, a practice that continues today. In 1942, sheep numbers peaked

at close to 4,000,000, substantially higher than the current 800,000 head.

On 3 December 1869, the Wyoming Territorial Legislature enacted the first predator control legislation regulating sale or distribution of poisons. Other early legislation (11 December 1875) included an act for the "protection of sheep" and provided bounties of \$0.50 on wolves (*Canis lupus*). This piece of legislation then grew into other acts that paid bounties on eagles (*Aquila chrysaetos*, *Haliaeetus leucocephalus*), hawks (Accipitridae, Falconidae), bobcats (*Felis rufus*), lynx (*Felis lynx*), bears (*Ursus* spp.), mountain lions (*Felis concolor*) and coyotes (*Canis latrans*). These acts provided funding for bounties and continued until 1945, when the law was changed to a mill levy system to fund predator control. This mill levy system was then changed on 21 March 1990 to a per head fee assessment on livestock owned in the state. Producers are now charged a fee of up to \$0.80 per head for sheep and \$0.20 per head for cattle.

Various amendments were made to the laws through the years. Some of the notable changes include the statutory authority of the Wyoming Department of Agriculture (WDA) to permit aerial gunners and pilots, and to provide rodent and predator control supplies to livestock producers at approximate cost. The M-44 program is one of those programs maintained by WDA.

Wyoming Game and Fish (WGF) Statutes define "predatory animal" to mean coyote, jackrabbit (*Lepus* spp.), porcupine (*Erethizon dorsatum*), raccoon (*Procyon lotor*), red fox (*Vulpes vulpes*), wolf, skunk (*Conepatus* sp., *Mephitis* sp., *Spilogale* spp.), or stray cat. Primary statutory authority for predator control is delegated to WDA by the Wyoming Predatory Animal Control Law, W.S. 11-6-101 through 11-6-108 and 11-6-201 through 11-6-210.

THE M-44 PROGRAM

In 1974, Wyoming was issued an experimental use permit by the Environmental Protection Agency (EPA) to conduct research on use of the M-44 device to control coyotes. The M-44 is a mechanical device utilizing a spring-activated ejector, that propels dry sodium cyanide from a 2.5 cm (1 in), 1.1 cm (0.44 in) diameter plastic capsule into the mouth of the target species when pulled. Death of the animal is accomplished by inhalation of hydrogen cyanide which forms when sodium cyanide comes into contact with saliva.

Based on new research and prior data, EPA issued full registration to allow use of sodium cyanide in the M-44 to WDA in 1976. The WDA is the sole registrant to private and commercial applicators of sodium cyanide capsules used in the M-44 in Wyoming. Current labeling allows the M-44 in Wyoming to be used for control of coyotes, red fox, gray fox (*Urocyon cinereoargenteus*), and wild dogs (*Canis familiaris*) that depredate livestock, poultry, and federally designated threatened or endangered species.

The Department also conducts all certification and licensing for M-44 applicators. To be licensed to use the M-44, applicants must attend a 1-day school to receive proper training and successfully pass a written exam. Active users of the M-44 are also inspected yearly to determine their compliance with labeling requirements and EPA restrictions.

Under Wyoming's M-44 label, no private or commercial applicator is allowed to place M-44's on federal land. With 47.5% of Wyoming under federal management, United States Department of Agriculture, Animal and Plant Health Inspection Service, Animal Damage Control (ADC) plays an active role in controlling predators. Often federal land is intermixed with private land. Recent changes to the various Environmental Assessments (EAs) written for federal lands have restricted ADC's use of the M-44 on federal lands, primarily because of public misconception and lack of knowledge about the M-44. This has brought about a renewed interest in private landowners to seek certification for their own use of the device, and an increase in the number of commercial applicators. Many commercial applicators have previous experience as trappers and are making predator control an integral part of their livelihood.

CURRENT STATUS

Wyoming has 230 certified applicators, but only 40 of

these are considered active users of the device (those applicators who have purchased sodium cyanide within the last 3 yr.). Currently there are 160 private and 70 commercial licensees. Each year Wyoming certifies or re-certifies approximately 65 applicators at various training sessions around the state.

Livestock losses from predation are generally the reason producers seek certification for using the M-44. Losses in Wyoming have steadily increased over the last 4 years. Cattle and calves are affected by predation, but not to the extent of sheep and lambs. For purposes of this paper, we will focus only on sheep and lamb losses, as the most notable use of the M-44 by private and commercial applicators is for sheep and lamb protection.

The percentage of total sheep death loss from predators, number of sheep lost to predators, and the corresponding economic impact of these losses rose substantially from 1991-1993 (Table 1) (Wyo. Agric. Stat. Ser. 1992, 1993, 1994). The value of sheep lost to coyotes alone increased from \$1,700,000 to \$3,100,000 in 1993 (Wyo. Agric. Stat. Ser. 1992, 1993, 1994).

As losses increased, the incentive for ranchers to seek alternative predator control measures such as the M-44 also increased. This has resulted in an increase in the number of people seeking M-44 certification. It should be noted that Wyoming ranchers implement an integrated pest management approach when dealing with predators, but as with any repeatedly used method, control measures tend to lose effectiveness over time. As an example, most ranchers employ the use of guard dogs in their operations, but "several sheep producers reported a diminishing effectiveness of their dogs against coyotes" (U.S. Dep. Agric. 1993).

As the number of M-44 devices in use increased from 1991-1994 (Table 1), the take of predators has increased correspondingly. A total of 11 coyotes and 44 red fox were taken in 1992 and increased to 234 coyotes and 191 red fox in 1994. The statewide distribution of M-44 use has also expanded, from 7 counties in 1992 to 12 counties in 1994.

In evaluating the reported results, 3 main factors play an important role in use of the M-44 and the number of predators taken. First, Wyoming is experiencing an increasing coyote population and increasing livestock losses. Second, the number of M-44's used is increasing because of this loss. Thirdly, the experience level of applicators using the M-44 device is increasing.

Table 1. Predator impacts on sheep production and levels of M-44 use in Wyoming 1991-1994.^a

| Year | Losses from predators (%) | No. sheep lost | Value of sheep lost (in millions \$) | No. M-44's in use/month (X) | No. of predators taken with M-44 |
|------|---------------------------|----------------|--------------------------------------|-----------------------------|----------------------------------|
| 1991 | 52 | 67,900 | 2.3 | very few | 10 |
| 1992 | 60 | 86,300 | 3.3 | 20.6 | 55 |
| 1993 | 74 | 97,500 | 4.2 | 123.9 | 242 |
| 1994 | 72 ^b | 96,000 | 4.2 | 305.2 ^b | 425 |

^aWyo. Agric. Stat. Ser. 1992, 1993, 1994.

^bAverage based on the first 11 mon. of 1994.

The first and second factors generally go hand in hand. Coyotes are found in every county of Wyoming, where 10 years ago this was not the case. Coyotes are being reported in areas of the state that in recent history never contained any populations. Reported livestock losses are at an all time high, with individual losses approaching 50% of lamb crops. Many ranchers faced with extreme losses are using M-44's on a larger scale. In addition, many of the EAs written for federal lands restrict use of the device; the private sector is attempting to control the situation by using the device on private lands to compensate for non-use on federal lands. The third factor, increasing experience levels, can be assessed overall by reviewing number of takes versus number of devices placed, and reviewing records of individual applicators.

Review of individual reports indicates increasing success rates. The first year the new applicator uses the device, their success rate is generally low. By the second and third years of use, their success rate usually doubles. This could also be due to increased predator populations. However, upon comparison of reports from inexperienced and experienced applicators in the same region, those with 2 or more years of experience had a higher success rate than those using the device for the first time. One example of this was an applicator in Natrona County, whose first year of use consisted of 62 sets, taking 2 coyotes and 2 fox for a 6.5% success rate. Two years later, this same individual has increased his success rate to 55%.

To determine why this is occurring, a written survey was conducted to confirm conversations with applicators. Results indicated that applicators need to learn coyote habits in their area, where to properly place the device, and which lure to use for appropriate season and/or weather. This learning period usually consisted of the first year the M-44 was used. Previous year's knowledge is then used to increase their success rate in following years.

M-44 APPLICATOR SURVEYS

In order to gain a background of the experience of the active private and commercial applicators of the M-44, 35 surveys were mailed out. Basic questions regarding the M-44 were asked, such as what type of lure was used, if draw stations were used, their experience in using M-44's and trapping, and their impression of the device. Of the 35 surveys mailed, 14 were returned (40% response), 8 from private applicators (all ranchers) and 6 from commercial applicators (professional trappers).

Survey results indicate that all applicators use commercially made lures (98% use various O'Gormans), 1 also uses a homemade lure, 3 use draw stations 50% of the time, 2 use draw stations 100% of the time and 9 indicated that they do not use a draw station. The average number of years of

experience with M-44's was 4.5 for private applicators and 2.7 for commercial applicators; 11 of the respondents indicated they were experienced trappers. Experienced trappers had an average of 15 years experience. The predominant topography where the device was used included rolling hills, followed by plains, mountains, and foothills.

General comments received indicate that 12 of the respondents consider the device a handy, useful and effective tool; 11 stated that to be effective a good location and proper scent is required; 5 responded that knowledge of coyotes is needed; 4 considered patience and flexibility as an asset; 3 felt that high coyote populations were necessary for the device to be effective; 2 considered the device safe to use; and 1 responded that the device should be allowed for use on federal lands to be truly effective in reducing predation.

SUMMARY

Coyote distribution in Wyoming has expanded dramatically in the past decade. Livestock losses, especially sheep, were reported at an all time high, with individual losses approaching 50% of lamb crops in some instances. Environmental assessments written for federal lands now restrict the use of M-44's. As a result, M-44 use in Wyoming has increased dramatically over the last 3 years in an effort to alleviate losses. Wider use of the M-44 device and increasing skill of applicators is steadily increasing the take of predators. For successful use of the M-44 applicators must: 1) know about coyote habits, 2) use in the proper location, and 3) use appropriate scent for the season and area. Not everyone will be successful with the M-44, but with time and experimentation applicators will gain the necessary experience for effective use of the M-44.

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