PREDATION REDUCTION TECHNIQUES OF WESTERN OREGON SHEEPMEN NOT USING ORGANIZED CONTROL PROGRAMS

Roger D. Nass[1] and John Theade[2]

This study was conducted under the guidance and support of the U.S. Fish and Wildlife Service, Department of the Interior. The Center transferred to the Animal and Plant Health Inspection Service (APHIS) on March 3, 1986.

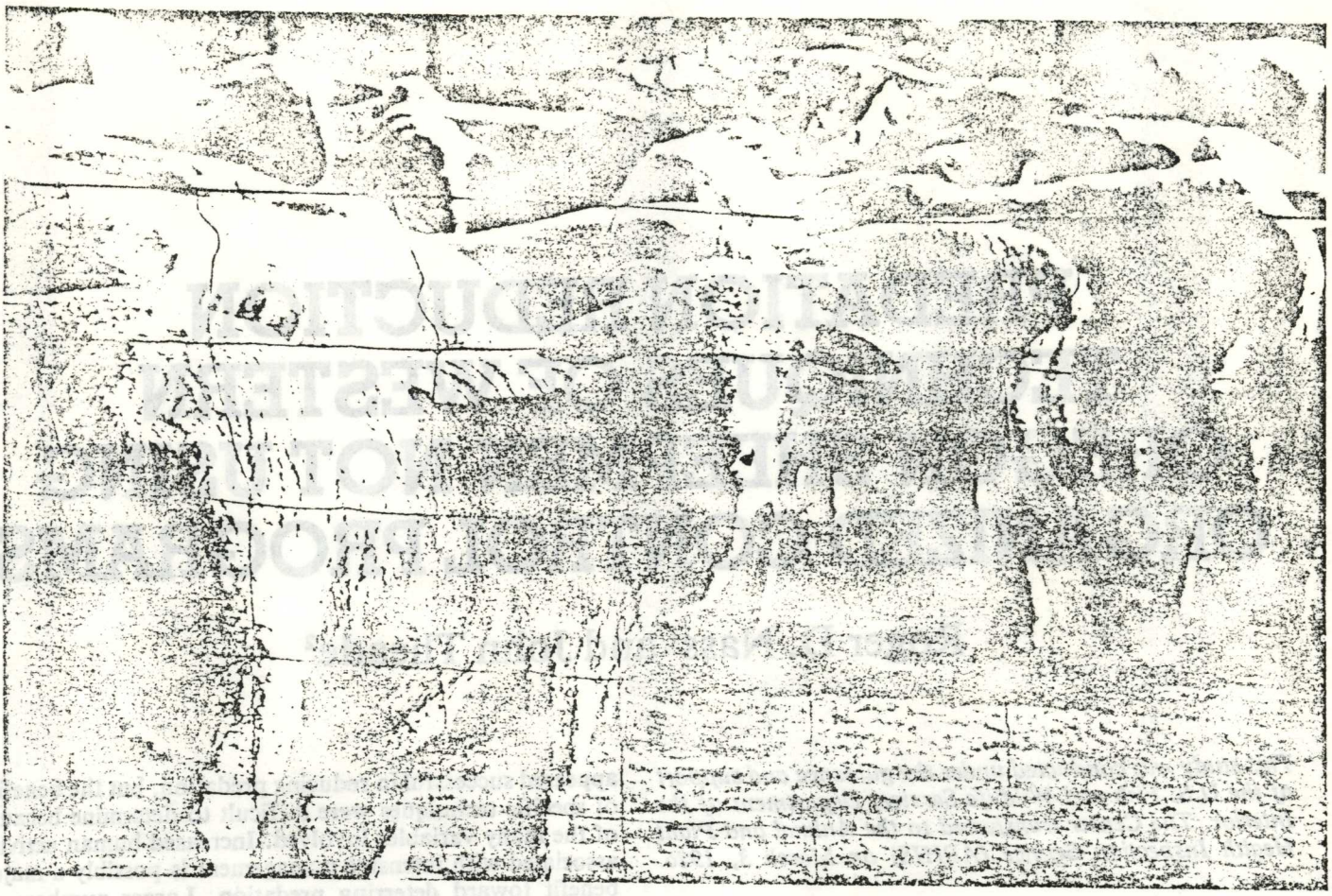
Abstract

Western Oregon sheep producers who were not participating in formal animal damage control programs were interviewed to determine their losses to predators and the techniques they used to prevent or reduce predation. Management techniques included both husbandry and direct control techniques in various combinations. Using woven wire fences, keeping sheep near buildings, shooting coyotes or dogs, and corralling sheep at night were the most common techniques. Eight of the 49 producers lost over 4% of their flocks to predators; however, most (84%) had lost from 0 to 4%. Predator control on adjacent or nearby lands may have indirectly benefitted many of these producers. Higher levels of predation tended to increase the number of techniques used to reduce losses. Predator-proof electric fencing appeared successful in reducing predation, but the benefits of specific techniques were difficult to determine because of the many variables involved. Increased human activity associated with intensive management is possibly a major benefit toward deterring predation. Larger numbers of applied techniques may not be directly related to reducing losses because more action is usually taken by those suffering the highest losses.

Introduction

The objectives of this study were to determine (1) what techniques were used for prevention or reduction of predation on livestock and (2) numbers of livestock lost to predators by domestic sheep producers not participating in any organized county, state, or federal animal damage control programs. Numerous studies (Davenport et al. 1973, deCalesta 1978, Gee at al. 1977, Nass 1977, Nesse et al. 1976) have presented livestock predation data from various locations in the west; however, few provided data regarding which practices are used or are considered effective in reducing or preventing predation problems outside of organized control programs. Boggess et al. (1980), Meduna (1977), and Robel et al. (1981) reported on sheep producers' management practices in Kansas, a state with an extension-type program, and Jones and Woolf (1983) studied predation on swine in Illinois in relation to husbandry practices. Data from producers other than participants in organized control programs will

[1]Research Biologist, Wildlife Research Station, P.O. Box 593, Twin Falls, Idaho 83303-0593, Predator Studies Branch, Denver Wildlife Research Center, Animal and Plant health inspection Service, U.S. Department of Agriculture.
[2]Biological Technician



supplement our overall knowledge of predation and its impact on the sheep industry.

Methods

Personal interviews were conducted with 49 sheep producers, not using the cooperative federal animal damage control program or any other organized program for reduction of predation, from about 300 producers in Polk and Yamhill counties, Oregon. They were selected from a wool sales listing of about 100 names after elimination of those with a recent history of involvement with the federal program.

The producers were asked to identify management or control measures they used specifically for prevention or reduction of predation. Data were also solicited on predation losses, sheep numbers, farm acreages, and historic participation in the federal animal damage control program. A form was used to record data for the most recent production year at the time of the interview and on recent historic losses. Responses about predation losses are presumed to be reliable; producer reliability in correctly reporting or assessing predation was very high for field necropsies, domestic-animal claims, and questionnaires in a recent Iowa study (Schaefer et al. 1981). The large percentage of no loss and low loss producers in the present study tends to rule out any indication of exaggerated predation figures.

Results

The 49 sheep producers were located and interviewed in 1981-82. The area was characterized by farm flock operations; wide variation occurred among flock sizes and farm acreages (Table 1). These producers had kept sheep from 1 to 50 years for supplemental meat, control of tansy ragwort *(Senecio jacobaea)*, supplemental income, or main source of income. Many western Oregon small farm flocks are maintained specifically for control of tansy ragwort which is more toxic to cattle and horses than to sheep (James et al. 1980).

Thirty (61%) of the producers had lost sheep to predators during the previous 3 years. Injuries to other sheep and predation on calves, guinea fowl, turkeys, chickens, geese, and ducks were also reported. Coyotes *(Canis latrans)* and dogs were implicated in predation of all

Table 1

Mean farm size, flock size, and number of sheep killed during 1981-82 season from 49 western Oregon sheep producers not involved with a formal animal damage control program.

	Farm acreage	Numbers of ewes	Numbers of lambs	Numbers of sheep killed	Flock size for producers with losses in past 3 years	Flock size for producers with no losses in past 3 years
n	49	47*	40*	30	28*	19
$\bar{x}$	134	92	84	4.6	143	195
$s\bar{x}$	29	18	15	0.99	28	48
Range	5-1200	4-600	6-450	1-17	6-600	25-700

*Two feeder lamb operations with 2,000 and 5,000 lambs were excluded.

Table 2

Percentages of total sheep lost to predation during a production year for 49 western Oregon sheep producers.

Percent of total sheep lost to predators	0-2	2-4	4-6	6-8	8-10	10-12	16-18	20-22	26-28
Number of producers	35	6	1	1	2	1	1	1	1

species; red fox *(Vulpes vulpes)* and raccoon *(Procyon lotor)* were responsible for some poultry losses. Predation by coyotes was more frequent than by dogs; however, dogs caused higher losses per incident. Only one producer, in business since 1981, reported only dog problems with his sheep. Coyotes and dogs collectively were reported as problems by 12 (24%) of the producers.

Year to year losses on individual farms were extremely variable. Of the 49 producers, 8 had lost over 4% of their flocks to predators during 1 production year; however, the majority (84%) had losses from 0 to 4% (Table 2). Of the 19 (39%) with predation-free flocks during the past 3 years, 8 had never lost any sheep to predators. None of the latter were long-term owners; two lived in suburban areas, and one used a New Zealand-type electric fence. Mean length of sheep ownership for no-loss producers was 3.9 years ($S\bar{x}$ = 1.06) with a range of 1 to 10 years. Six of the eight were involved in sheep production 4 years or less and the 10-year producer lived in a suburb. Using woven wire fences (8), barni at night (4), keeping sheep near buildings (2), and g aggressive dogs (2) were the only techniques com to these short-term, no-loss producers.

Using woven fences, keeping sheep close to buildings, shoot yotes and dogs, and corralling at night were each oned by 20% or more of the 49 producers for pr n or reduction of predation (Table 3). Of 24 techni entioned, 14 were sheep management practices a were predator control techniques. The number of iques used per producer ranged from 0 to 7, b mean did not differ markedly between the vari centage loss categories. The mean number of techni sed was 3.0 (n = 8) in the no-loss

Table 3

Preventive or corrective methods used by 49 sheep producers who were not participating in the federal animal damage control program

Preventive or corrective practice	Frequency	Percent
Woven wire fences	45	92
Keep sheep close to buildings	18	37
Shoot: coyotes, dogs, or both	12	24
Corral at night	10	20
Barn at night	9	18
Electric fence	8	16
Hounds to run coyotes	8	16
Toxicants	7	14
Check sheep daily	6	12
Aggressive farm dogs	5	10
Shed lamb	4	8
Rotate pastures after kills	4	8
Use private trapper	4	8
Trap	4	8
Bell sheep	3	6
Bury dead sheep	2	4
Don't graze woodlots	2	4
Lighted pasture	2	4
Clear natural cover	2	4
Don't graze hill ground	1	2
Light at barn	1	2
Livestock guard dog	1	2
Tin cans with rock	1	2
Dog kennels close	1	2
	160	

category, 3.1 (n = 19) for those with no losses within 3 years, 3.4 (n = 30) for those with losses during the past 3 years, and 3.3 for all producers (n = 49). Combinations of techniques were too diverse to test against differing

predation levels, but increased predation frequencies tended to increase the numbers of techniques used by producers to reduce predation losses. Overall, however, in testing linear fit, the number of techniques used was not correlated with numbers of sheep killed ($r = .15$). Flock size was not correlated with numbers of techniques used ($r = .32$) and weakly correlated with numbers of sheep killed ($r = .44$).

Coyote ranges frequently overlap several of the modest-size farms in this area.

The use of electric fences appeared to prevent or keep predation on sheep to a minimum. Of eight producers using "predator proof" electric fences, only three experienced losses ($\bar{x}$ loss = 0.09%) after fences were installed. Grazing areas were not completely protected in all instances, and problems sometimes occurred when predators crawled under fences, with charger malfunctions, and from fences shorting out. Five producers used other techniques in combination with electric fences; however, it seemed that fences were mainly responsible for the low sheep predation of all eight producers.

None of these producers had requested help from government trappers within the past 2 years, but 19 (39%) of 49 had requested help from the federal program within the past 10 years. Three producers said they would request assistance if predation became a severe problem.

Discussion

These 49 sheep producers had not been using the federal animal damage control program for various reasons, although their resident counties were participating in a cooperative program; some never had a problem, had infrequent problems, did not believe in trapping, lacked space for proper placement of control equipment, considered the program too restrictive, or wanted to solve problems in their own way without outside help. Overall, their predator problems would not be classified as severe, although some experienced significant predation loss.

Most of these producers may have benefitted indirectly by predator control on adjacent or nearby lands where the owners had requested assistance in solving predation problems. Coyote ranges frequently overlap several of the modest-size farms in this area and removal of problem animals may benefit several producers.

The wide variety of management practices or control methods indicated that these producers were addressing predation in a problem-specific manner. Presumably each felt his techniques were problem-oriented and economically feasible. Some techniques, such as woven wire fences, did not provide equal protection to all producers. Most producers (92%) in this study used some woven wire fences; however, the effectiveness in preventing ingress by predators varied from poor to excellent. Post condition and placement, wire condition and dimensions, and terrain features could influence penetration by predators. Only four producers used shed lambing, but many lambed just outside their barns and moved the sheep inside during inclement weather. Shooting or attempted shooting of predators occurred randomly or as a concentrated effort to eliminate specific problem animals. Much the same could be said for all the techniques; just because they were being used did not guarantee equal results or protection from predation.

Night confinement, lighted corrals, fall lambing, disposal of sheep carcasses, and killing predators seemed to have the most potential for reduction of coyote and dog predation in Kansas (Robel et al. 1981). Dogs were also considered a problem by Iowa sheep producers because there, too, they killed greater numbers of sheep per incident, even though coyotes killed more sheep during the season (Schaefer et al. 1981). Many eastern as well as western sheepman have problems with dog predation, especially when flocks are located near communities or populous rural areas (Boggess et al. 1978). Blair and Townsend (1983) reported a 1.3% predation loss of sheep to dogs from a sample of 218 Ohio producers.

Producers may be using techniques that appear successful when actually their losses might be low or insignificant due to other factors.

The benefits of specific predation or reduction techniques are difficult to measure because of the variables involved. Any sample of sheep producers will include those with no or few problems just because of their geographic location in relation to coyote travel lanes, cover, and other physical land features attractive to predators. These producers may be using techniques that appear successful when actually their losses might be low or insignificant due to other factors. Definitive results can be obtained in some instances by comparing losses before and after institution of some management practice, such as erection of an electric fence, or before and after removal of killing coyotes; but generally credit for predation reduction is difficult or impossible to assign to a specific technique because of the variety used at the same time and because of other variable influences. Jones and Woolf (1983) found that swine predation by coyotes was correlated with 6

husbandry variables, but concluded that individual techniques could not be directly related to losses.

Sheep producers in the study area cited many examples of difficulties encountered when attempting corrective action once a killing pattern was established by a coyote. Killing the coyote or moving the sheep were mentioned as the only practical alternatives to further losses. Prevention of established killing patterns may frequently be enhanced by using as many predation reduction techniques as is economically feasible. Increased human activity associated with applying or carrying out the techniques is possibly a major benefit toward deterring predation. Future development or refinement of specific management practices and control methods may help reduce predation on livestock; however, for those producers with predation problems, most data indicate a combination of several techniques is necessary to keep losses within acceptable limits.

Some practices, such as good electric fences, are more valuable than others in reducing predation; however, because ranch layouts and husbandry practices differ so widely, each producer must decide which techniques best fit his management scheme, physically and economically. Increasing the numbers of techniques applied may not be directly related to reducing predation losses because of the foregoing circumstances. With both non-lethal and lethal control measures, more action was taken by those suffering the highest losses.

Acknowledgements

We thank M. Fall, F. Knowlton, S. Linhart, T. Nicholls, D. Otis, E. Pearson, and H. Tietjen, U.S. Fish and Wildlife Service and D. deCalesta, Oregon State University for critically reviewing the study plan or manuscript.

Literature Cited

Blair, B.J., and T.W. Townsend. 1983. *Dog predation of domestic sheep in Ohio.* J. Range Manage, 36:527-528.

Boggess, E.K., R.D. Andrews, and R.A. Bishop. 1978. *Domestic animal losses to coyotes and dogs in Iowa.* J. Wildl. Manage. 42:362-372.

Boggess, E.K., F.R. Henderson, and C.W. Spaeth. 1980. *Managing predator problems; practices and procedures for preventing and reducing livestock losses.* Kansas State Univ. Coop. Ext. Ser. Rep. C-620. 19p.

Davenport, J.W., J.E. Bowns, and J.P. Workman. 1973. *Assessment of sheep losses to coyotes: A problem to Utah sheepmen: A concern to Utah researchers.* Utah State Univ., Agric. Exp. Stn. Res. Rep. 7. 17p.

deCalesta, D.S. 1978. *Documentation of livestock losses to predators in Oregon.* Oregon State Univ. Ext. Ser. Spec. Rep. 501. 20p.

Gee, C.K., R.S. Magleby, W.R. Bailey, R.L. Gum, and L.M. Arthur. 1977. *Sheep and lamb losses to predators and other causes in the western United States.* USDA Agric. Econ. Rep. 369. 41p.

James, L.F., R.F. Keeler, A.E. Johnson, M.C. Williams, E.H. Cronin, and J.D. Olsen. 1980. *Plants poisonous to livestock in the western states.* USDA, Sci. and Ed. Ad., Agric. Bull. 415. 90p.

Jones, J.M., and A. Woolf. 1983. *Relationship between husbandry practices and coyote use of swine in west central Illinois.* Wildl. Soc. Bull. 11:133-135.

Meduna, R. 1977. *Relationships between sheep management and coyote predation.* M.S. Thesis, Kansas State Univ., Manhattan. 140p.

Nass, R.D. 1977. *Mortality associated with sheep operations in Idaho.* J. Range Manage. 30:253-258.

Nesse, G.E., W.M. Longhurst, and W.E. Howard. 1976. *Predation and the sheep industry in California 1972-1974.* Univ. Calif., Div. Agric. Sci. Bull. 1878. 63 p.

Robel, R.J., A.D. Dayton, F.R. Henderson, R.L. Meduna, and C.W. Spaeth. 1981 *Relationships between husbandry methods and sheep losses to canine predators.* J. Wildl. Manage. 45:894-911.

Schaefer, J.M., R.D. Andrews, and J.J. Dinsmore. 1981. *An assessment of coyote and dog predation on sheep in southern Iowa.* J. Wildl. Manage, 45:883-893.