9-25-1989

ELK AND CROP DAMAGE IN PENNSYLVANIA

Gary W. Witmer
Pennsylvania State University, DuBois Campus, gary.w.witmer@usda.gov

Rawland Cogan
Pennsylvania Game Commission

ELK AND CROP DAMAGE IN PENNSYLVANIA

Gary W. Witmer[1] and Rawland Cogan[2]

INTRODUCTION

The native eastern subspecies of elk (Cervus elaphus canadensis) was once widespread in Pennsylvania, but was extirpated from the state by 1880 (Bryant and Maser, 1982). About 177 Rocky Mountain elk (C. e. nelsoni) were re-introduced to the state between 1913 and 1926 (Sassaman, 1985). The herd increased as did crop damage complaints. Hunting seasons began in 1923 and continued until 1931. No further hunting was allowed because the herd had declined steadily. A small herd persisted in North-central Pennsylvania, in Elk and Cameron Counties. Elk sightings were rare by 1948, despite 17 years of closed hunting seasons (Sassaman, 1985).

Public concern for this unique natural resource increased and annual monitoring of the herd began in 1971. After a low estimated population size of 38 in 1974, the herd increased and stabilized at 120-140 animals. The herd and its habitat are being managed by the Pennsylvania Game Commission (PGC) and the Bureau of Forestry (BOF). Their primary elk population management goal is to maintain a self-sustaining elk herd to provide viewing and other recreational opportunities for the public (PGC and BOF, 1989). They also have an elk habitat management goal of providing for the life requirements of elk on state lands to minimize impacts on private lands (PGC and BOF, 1989).

Despite the efforts of the PCG and BOF, elk damage to crops continues to occur in Pennsylvania. In this paper, we discuss the current elk-crop damage situation. We also discuss current and proposed methods to reduce crop damage by elk. We thank David DeCalesta and William Drake for thoughtful reviews of the manuscript.

1/Pennsylvania State University, DuBois Campus, DuBois, PA 15801.
2/Pennsylvania Game Commission, P.O. Box 7, Benezette, PA 15821.

THE AREA AND THE PROBLEM

The Pennsylvania elk herd uses an area of about 51,200 ha of which about 19,968 ha (39%) is public land managed by the PGC and BOF. The public land forms a central core and is surrounded by private lands on all sides. The elk range is in the Allegheny Plateau Region at an elevation of 456-608 m. Annual rainfall is about 100 cm. This area is heavily forested and lies in the transition zone between the northern hardwood forest to the north and the mixed oak forest to the south.

Because elk are primarily grazers and preferred forage is limited under the closed deciduous forest canopy, elk rely on openings as primary foraging areas. On public lands, openings are comprised mainly of clearcuts, pipeline or utility right-of-ways, and permanent food plots. However, openings comprise only about 2% of the public lands within the elk range. Openings on private lands within the elk range consist primarily of agricultural lands, clearcuts, and reclaimed strip-mined lands. These openings comprise perhaps 15-20% of the private lands within the elk range. Consequently, there are much better foraging opportunities for elk on private lands than on public lands.

Crop damage complaints, known elk mortality records and a radiotelemetry study all confirm the frequent use by foraging elk of agricultural lands on the NE, NW, W, and SW portions of the elk range. Use of agricultural lands by elk occurs throughout the year. Bull elk are the heaviest users because they are farther ranging and have larger home ranges than cow elk (Drake, 1985a). Elk of all ages and sexes make heavy use of reclaimed strip-mined lands in the south-central portion of the elk range in all seasons except winter (Drake, 1985a). However, use of reclaimed strip-mined lands by elk seldom resulted in complaints or in elk mortality; in fact, many people drive to these areas seeking to view elk.

Elk use of agricultural lands results in substantial mortality: 33% of all known elk mortality has been attributed to crop damage kills (Devlin and Drake, 1987). From 1975 through 1987, damage kills averaged 4 elk per year. On average, another 4 elk are killed each year by poachers. Brainworm (Parelaphostrongylus tenuis) has caused 12% of all known elk mortalities, averaging 1-2 elk per year. Other causes of known mortality (each averaging 4% or less per year) were other diseases, winter kills, dog kills and vehicle kills. Also, about 10% of the dead elk recovered each year can not be placed in any of these categories. The true relationships of mortality factors and effects on the elk herd can not be addressed with confidence because there may be substantial annual mortality that is never reported beyond the 10-12 elk known to have died each year. For example, a calf:cow ratio of only 33:100 has been observed which is very low for an elk herd, suggesting additional losses of young animals. Despite the uncertainties, it appears that crop damage kills are among the leading 2 or 3 factors which are limiting the elk herd size.

The PGC surveyed elk crop damage during 1982, 1983, and 1984. Although occasional damage to gardens and orchards was reported, most damage complaints involved corn, hay, and oat crops. Damage estimates by landowners were relatively high the first year of the survey: the equivalent of 7-20% of acres planted in each crop type were lost for a total lost crop value of $13,600 (Table 1). The PGC was not able to visit most of these damage sites for confirmation of damage estimates as was done in subsequent years, so this estimate may be high. Twelve landowners reported damage in 1982. Crop damage dropped substantially in the next 2 years of the survey. In most areas, damage occurred to only 1-10% of the crops planted for total crop lost values of $4,638 (1983) and $2,223 (1984)(Table 1). Nine landowners reported damage in 1983 and only 5 reported damage in 1984.

Fence damage by elk can be extensive because of the size and herding instinct of elk. Four, three, and zero landowners reported fence damage in 1982, 1983, and 1984, respectively. No value estimates of this damage have been made. Barbed wire fences with 2-, 4-, and 7-strands were broken, and additionally, one or more fence posts were usually knocked down.

Although crop damage can be extensive and expensive, it is encouraging that the overall amount has been declining as has the amount of fence damage (Table 1). This trend may be related to PGC's prompt and thorough surveys of reported damage which tends to reduce the exaggeration of damage estimates by landowners. On the other hand, it could be that efforts to reduce elk damage to crops are being effective. It is possible, however, that a long-term solution has not yet been found (or implemented) because the number of crop damage kills increased to 8 in 1987--well above the annual average of 4 elk killed for crop damage.

POTENTIAL SOLUTIONS

The management plan for the Pennsylvania elk herd specifically calls for the minimizing of elk-landowner conflicts. A number of methods exist to assist in reducing crop damage by large ungulates such as deer and elk. These methods were categorized by DeCalesta (1983): 1) population control (shooting), 2) trapping and transplanting, 3) scare devices, 4) supplemental planting (food plots), 5) chemical repellents, 6) mechanical devices (wire/plastic tubes), 7) fencing, and 8) compensation.

Typically, methods to control damage by elk have only been partially effective (Lyon and Ward, 1982; DeCalesta, 1983). Difficulties in controlling damage by elk are probably related to the large size of elk, their herding instinct, their fidelity to traditional use areas and movement patterns, and their abilty to move long distances. They also command much attention from the public and diverse special interest groups which makes them a politically

sensitive species for wildlife management agencies to work with.

A number of the damage control methods listed have either proven ineffective or prohibitively expensive: trapping and transplanting, scare devices, chemical repellents, mechanical devices, and compensation. This leaves 3 categories of methods, all of which are being used in some form by the PGC and the BOF.

The first method involves population control. Because farmers are not compensated for crop damage by elk (or other wildlife) legal recourse has been to shoot marauding elk. This long-standing practice is likely to continue. It is an adequate short-term solution, but not a long-term one as elk return to the same properties year after year despite the occasional shooting of a member of their group. Another possible form of population control involves a limited, permit hunt of elk near agricultural lands. This approach has been used with some success in western states. We suspect that the idea of a limited elk hunt (with permits issued by auction or lottery) would appeal to many hunters in the state and in surrounding states. Indeed, the PGC reserves the option for a limited elk hunt should more herd control be deemed desirable (PGC and BOF, 1989). There is opposition to this proposal, however, from those who believe the elk should not be hunted. Also, some individuals (living in or near the elk range) believe that if the elk are to be controlled, they are the ones who should do it--not outsiders. Circumstantial evidence of this latter attitude exists: the PGC discussed the possibility of a limited elk hunt during meetings in early 1982. In that year, an all-time high known number of crop damage kills (11) occurred; also, an all-time high known number of illegal kills (15) occurred. This may partially explain the large drop in crop damage in 1983 and 1984 (Table 1). With no more talk of limited elk hunts during meetings, the annual known elk loss in each of these categories returned to 2-5 elk per year the the next 4 years.

A second method of reducing damage involves electric fences. Electric fences, if properly constructed and maintained, can be effective in preventing deer and elk damage to crops (Palmer et al., 1985). A trial fencing of a 21 acre area planted in hay and corn in the elk range was very successful in eliminating damage in a chronic problem area (Drake, 1985b). The fence was a 5-strand, vertical fence. In 1984, the PGC began a program to pay the cost of fencing materials for farmers having chronic damage problems from elk. The farmers have to put up and maintain the fence. Only two landowners of Elk County have taken advantage of this program. Although this approach to crop damage by elk is somewhat expensive, it can be justified in select areas where there are reoccurring problems or high value crops.

The third category of methods being used is to improve the habitat for elk in areas deemed appropriate for them to frequent. The PGC and BOF have put in permanent food plots (usually grass/legume mixtures) which are periodically fertilized and mowed. Clearcuts have also been placed in aspen stands to improve foraging conditions for elk. These habitat improvements to state lands in the center of the elk range receive substantial use by elk, but comprise only a very small amount of foraging area: there are about 80 ha of food plats and about 360 ha of clearcuts. In an area of about 19,968 ha of public forestland, the foraging areas comprise only about 2% of the total area which is much less than what is considered good elk habitat (30% to 60% foraging areas) in western states (see, for example, Witmer et al., 1985). The expense of creating and maintaining food plots has slowed the expansion of this valuable program. Another possible approach would be to acquire private lands near the public forestland for use as elk foraging areas. The best possibility here appears to be reclaimed strip-mined land immediately south of the public lands. These lands, having already been mined, can (in some cases) be purchased at a moderate price and are

already in an early successional stage --the grass/forb stage--primarily because that is the most readily obtained vegetative cover through reclamation. Indeed, elk are making heavy use of these areas already. The PGC is currently evaluating possible purchases (Wm. Drake, pers. commun., 1989). A final approach to improving elk foraging areas is for the PGC to enter into more landowner-state cooperative agreements. Through the Farm Game and Forest Game Programs, landowners can better provide for the needs of wildlife on their lands. Unfortunately, this program is limited to individual or groups of landowners having 1,000 acres of forest or farm land to place in the program. Currently, there are no Farm Game Cooperators in Elk County. There are members of a third program--the Safety Zone Program--and this program may improve elk-landowner relations. Increased enrollment might lead, over time, to a greater number of foraging elk using those private lands where their transgressions are more likely to be tolerated, if not encouraged.

CONCLUDING REMARKS

Although crop damage by elk has occurred in Pennsylvania, the amount of damage has declined in recent years. This decline is probably due to the stabilization of elk numbers and to efforts to hold elk more so on public forestlands by improving habitat conditions. Habitat conditions for elk on public forestlands in central Pennsylvania are still far from optimum due to a significant shortage of foraging areas. Until this situation is alleviated, the potential for crop damage by elk will continue.

LITERATURE CITED

BRYANT, L.D., AND C. MASER. 1982. Classification and distribution. Pages 1-59 in J.W. Thomas and D.E. Toweill, eds. Elk of North America, Stackpole Books, Harrisburg, PA

DECALESTA, D.S. 1983. Elk. pages D-35-D-44 in R.A. Timm, ed. Prevention and control of wildlife damage. Univ. Nebraska, Lincoln.

DEVLIN, D., AND W. DRAKE. 1987. Pennsylvania elk herd-1987. Pennsylvania Bureau of Forestry, Harrisburg. 8pp.

DRAKE, W.E. 1985a. Elk movement in relation to crop damage: Project Final Job Report, Pennsylvania Game Commision, Harisburg. 10pp.

DRAKE, W.E. 1985b. Evaluation of a technique for reducing agricultural crop damage by elk. Project Final Job Report, Pennsylvania Game Commission, Harrisburg. 3pp.

LYON, L.J., AND A.L. WARD. 1982. Elk and land management. Pages 443-447 in J.W. Thomas and D.E. Toweill, eds. Elk of North America, Stackpole Books, Harrisburg, PA.

PALMER, W.L., J.M. PAYNE, R.G. WINGARD, AND J.L. GEORGE. 1985. A practical fence to reduce deer damage. Wildl. Soc. Bull. 13:240-245.

PENNSYLVANIA GAME COMMISSION AND BUREAU OF FORESTRY. 1989. A cooperative Pennsylvania elk management plan for 1989 through 1994. Harrisburg. 5pp.

SASSAMAN, R.L. 1985. A history of Pennsylvania's elk: 1913-1985. Browseline 6:11-12.

WITMER, G.W., M. WISDOM, E.P. HARSHMAN, R.J. ANDERSON, ET AL. 1985. Deer and elk. Pages 231-258 in E.R. Brown, ed. Management of wildlife and fish habitats in forests of western Oregon and Washington. USDA Forest Service Publ. No. R6-F-WL-192-1985, Portland, OR.

Table 1. Estimates of Crop Damage by Elk, 1982-1984, in Elk and Cameron Counties, Pennsylvania.

	Year		
	1982	1983	1984
Acres planted:			
Hay	231	248	145
Corn	283	180.5	110
Oats	175	88	62
No. landowners reporting crop damage:	12	9	4
Acres damaged:			
Hay	47 (20)[1/]	3 (1)	2.8 (2)
Corn	28 (10)	10.9 (6)	5 (4.5)
Oats	11.5 (7)	2.1 (2)	4.8 (7.7)
Estimated lost value:			
Hay	$7,050	$ 675	$ 666
Corn	$5,286	$3,728	$ 927
Oats	$1,264	$ 235	$ 630
Total lost crop value for year:	$13,600	$4,638	$2,223
No. landowners reporting fence damage:	4	3	0

1/ Acreages of crops damaged are not total acreages impacted by elk but are estimates of the acreage which would have been completely destroyed had the crop damage been concentrated. The number in parentheses is the percent of acres planted of that crop, that year, that were damaged.