

How Far Do Guard Dogs Roam from their Sheep?

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IMPACT STATEMENT

Keeping range sheep 0.25 mile away from trailheads, campgrounds, or picnic areas during weekends, holidays, or other high potential recreation use periods should prevent most encounters between guard dogs and recreationists. The presence of wolves and grizzly bears on the landscape did not influence how far guard dogs roamed from their sheep.

SUMMARY

Direct and indirect losses from predators combine to make predator control an issue of great importance to US livestock producers. Guard dogs are an economical, non-lethal form of predator control. As such, guard dogs are fundamentally important to sustaining food and fiber production by livestock grazing enterprises in the western US. This is especially true as we progress into a future marked by ever-increasing populations of large carnivores. Strategies are needed to mitigate potential conflicts between guard dogs and humans. We studied guard dog behavior in the presence and absence of wolves and grizzly bears. Our results indicate that wolves and grizzlies did not influence how far guard dogs roam from their sheep. Our results also indicate that range sheep producers do not need to incur extra costs by enlarging ungrazed buffers surrounding high-use recreation sites or rural residential areas. The American Sheep Industry Association currently recommends that sheep and associated guard dogs be kept at least 0.25 mile from any trailhead, campground, or picnic area during weekends, holidays, or other high potential recreational use periods. Our results suggest that keeping range sheep 0.1 mile away from recreation sites will markedly reduce the likelihood of recreationists encountering a guard dog. Keeping range sheep 0.25 mile away from recreation sites will likely prevent most, but not all, encounters between guard dogs and recreationists.

INTRODUCTION

According to the USDA National Agricultural Statistics Service, wild predators killed 20,000 Montana sheep and lambs in 2017, a 19% increase from 2016. Sheep and lambs lost to predators cost Montana sheep producers more than \$3.2 million in 2017.

Guard dogs are a non-lethal tool used by Montana sheep producers to deter depredation and to coexist with wild predators. Guard dogs have been used worldwide for centuries, but widespread use of guard dogs did not begin in the western US until the latter 1970s, after passage of the Endangered Species Act and concurrent restrictions on the use of poisons for lethal predator control. Research in the 1970s and 1980s helped develop management strategies for using guard dogs, and guard dogs were proven effective for protecting livestock (mostly sheep) from predation (mostly by coyotes). Very limited research has occurred with guard dogs since the 1980s, but the situation in the western US has changed dramatically in the past few decades, providing new challenges. Two of the biggest changes have been: 1) the expansion of wolf and grizzly bear populations, and 2) the expansion of human recreation and rural residential development on forest and rangeland landscapes. These two changes have converged to threaten the continued use of guard dogs for protecting livestock from depredation.

Beginning in the 1970s, guard dogs in the western US were selected for their aggressive behavior against predators (mostly coyotes) and non-aggression to humans. Many, if not most, sheep and goat ranchers in the West, and increasing numbers of cattle ranchers, could not continue producing livestock without the use of guard dogs. However, increasing concerns about potential conflicts between guard dogs and human recreationists are threatening the continued use of guard dogs. For example, in a widely publicized incident in Colorado, a mountain biker was attacked by two guard dogs on a public land grazing allotment. The rancher was held liable for having dangerous dogs not under control on federal public land. In response, the American Sheep Industry Association (ASI) developed an initial set of Best Management Practices (BMPs) to help sheep producers optimize the use of their guard dogs while minimizing potential conflicts with neighbors and recreationists. One BMP recommends that sheep and associated guard dogs be kept at least 0.25 mile from any trailhead, campground, or picnic area during weekends, holidays, or other high potential recreational use periods. Prior to our study, no published data existed to support or refute this recommendation.

Our objective was to examine how far, and under what circumstances, guard dogs travel away from the sheep they are guarding. We examined whether guard dog behavior was influenced by season (summer vs. fall), sex (male dogs vs. female dogs), time of day (day vs. night vs. dusk/dawn), moon phase, or whether the landscape was cohabited by wolves and grizzly bears.

PROCEDURES

We placed GPS satellite data collars on a total of 20 guard dogs and 31 sheep during summer (May, June, July, August) or fall (September, October, November, early December) across eight ranches and three years (2012, 2013, and 2014). One band of sheep was studied per ranch, with a typical band comprised of 800 to 1000 mature ewes, 1200 to 1500 lambs, and 400 to 500 yearling ewes. All eight bands were herded, and all eight bands grazed within their traditional

summer-fall grazing areas in foothill and mountain rangeland of western and west-central Montana. Three bands were located in landscapes cohabited by wolves and grizzly bears, and five bands were located in areas of historically low to moderate depredation, mostly by coyotes. At least one guard dog and one sheep was collared per band of sheep. For bands with more than one collared sheep, the sheep with the greatest number of recorded GPS locations was used for data analyses. GPS locations were recorded at 5-minute intervals (24 hours per day) with 16-ft accuracy. Later, we aggregated the data by hour and for each guard dog we calculated its hourly average roaming distance (i.e., the hourly average distance between the guard dog and the GPS-collared sheep within the band of sheep that the guard dog was protecting).

RESULTS AND DISCUSSION

Thirteen of the GPS collars on guard dogs, and 26 of the GPS sheep collars provided usable data, whereas seven GPS collars on guard dogs and five GPS collars on sheep failed to record usable data. Altogether, we analyzed 12,223 hourly average guard dog locations (average = 940 hourly average locations per guard dog) across three years and within seven bands of sheep on seven different ranches. Six of the guard dogs protected sheep bands in landscapes cohabited by wolves and grizzly bears, and seven guard dogs protected sheep bands in areas of historically low to moderate depredation, mostly by coyotes. Nine of the 13 guard dogs were male and four were female.

Overall, roaming distance (i.e., distance between the guard dog and the sheep they were protecting) averaged 0.1 mile. Female guard dogs averaged 272 feet farther from their sheep than male guard dogs, and roaming distance of both sexes averaged 138 feet more during summer than fall. Roaming distance did not differ between guard dogs with or without cohabiting wolves and grizzly bears. Guard dogs roamed 131 feet further from their sheep during a full moon than during a new moon. Guard dogs remained closer to their sheep during mid-day and roamed farther away at night, yet average roaming distance of the 13 guard dogs never

exceeded 0.2 mile during any hour of the day or night, with or without a full moon, in either summer or fall. However, the maximum roaming distance recorded of every guard dog exceeded 0.25 mile. Maximum roaming distances varied widely among the 13 guard dogs, ranging from 0.3 mile to 1.2 miles.

All guard dogs stayed relatively close to their sheep, with 75% of guard dog locations within 0.1 mile of their sheep. Only 8% of all guard dog-sheep distances were greater than the 0.25 mile distance that ASI recommends that sheep and associated guard dogs be kept away from trailheads, campgrounds, or picnic areas during weekends, holidays, or other high potential recreational use periods.

Although roaming distances differed between male and female dogs, day vs. night, and full vs. new moons, the differences were slight and may not be meaningful to sheep producers operating on large landscapes. If possible, however, it may be wise to keep sheep further away from recreational sites and rural residential areas when using female guard dogs and at night, especially when the moon is bright. Roaming distances did vary widely among individual dogs, suggesting that sheep producers may wish to purposely select guard dogs that stay closer to their sheep if their sheep regularly graze near recreational sites or near rural residential areas.

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