



Grazing management and low-stress herding to prevent livestock predation by grizzly/brown bears: a case study in the Rocky Mountains, USA

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Abstract

Low-stress herding is a method to apply strategic grazing management, and possibly to reduce vulnerability to predation by rekindling herd instinct and increasing effective stocking density, facilitating collective anti-predator behaviour—similar to the group-size effect in wild prey species (Barnes 2015a,b).

We collaborated with ranchers and agency partners on a grazing allotment in the Wind River Range of northwestern Wyoming, USA, where permittees were having difficulty implementing a grazing rotation without cross-fences, and cattle had been lost to grizzly bears (North American brown bears; *Ursus arctos*) and other predators including gray wolves (*Canis lupus*). For 3 years, we hosted workshops on low-stress livestock handling, including hands-on practice in the field, and we attempted a grazing rotation through 7-9 mostly unfenced units, with at least one rider on the allotment most days.

In the 3 years prior to the project (minimal grazing management), cattle tended to scatter, and the ranchers lost 0.8-19.1% of calves per year, as well as a few yearlings and adult cattle, to all causes during the summer grazing season. In the year of highest losses, one rancher lost 19.1% of calves, and bear predation accounted for 6.7% of calves (about 1 of every 3 deaths). During the 3 years of the project (rotation by low-stress herding) the cattle self-organized into larger groups, although never a single large group: a modest improvement over previous years (but not all that is possible with low-stress herding). Losses to all causes were 2.8-7.7% of calves per herd per year, as well as a few yearlings and adult cattle, with 0 confirmed predation losses. This reduction in both total and predation losses followed a modest improvement in handling skill, herd instinct, and effective stock density. While we cannot conclusively attribute causality, this result continued for the 3 years of the project.

Introduction

Livestock producers may be able to reduce vulnerability to predation by managing herds in ways similar to the group size effect (prey aggregation), a well-known anti-predator behaviour in wild prey, through

strategic grazing management that involves increased stock density and movement around the landscape (Barnes 2015a,b). Low-stress livestock handling (LSLH) techniques have many benefits including rekindling the herd instinct (Cote 2004; Hibbard and Barnes 2016), which when applied to herding (low-stress herding; LSH) can facilitate strategic grazing management (Barnes 2015b; Barnes and Hibbard 2016) and possibly reduce predation, as theorized by Barnes (2015a). Other LSH practitioners have noted that their methods appear to reduce predation losses through associated behavioural changes (Zarnek 2016) and are transferrable (Louchouart and Treves 2023), and thus are important practices for range riders where potential predators, especially species of conservation concern such as grizzly bears and wolves, are present.

Methods

We collaborated with ranchers and agency partners on a summer grazing allotment on the Shoshone National Forest in the Wind River Range of northwestern Wyoming, USA, where before the project, the two ranches (permittees) who shared the allotment were having difficulty implementing a grazing rotation without cross-fences, and cattle had been lost to grizzly bears and likely other predators including gray wolves. During the project, for 3 years (2014-2016), we hosted workshops on LSLH, including hands-on practice in the field, and we attempted a grazing rotation through 7-9 subunits (with only one cross-fence separating two of the subunits), with at least one rider on the allotment most days.

Ranches differed in initial livestock handling and adoption of the methods. Ranch A believed they were already practicing LSLH, though their methods were more accurately described as relatively skilled conventional handling; one of several individuals from the ranch attended the workshops, and may have made modest improvements in handling, but overall ranch A did not make major changes. Ranch B had practiced conventional handling; both of two individuals attended the workshops and did their best to adopt LSLH. Thus this case study has a design similar to before-after-control-impact (BACI), but more accurately a non-equivalent groups design where ranches A and B are not replicates, and ranch A is not strictly a control treatment, but rather ranch A had a lower level of treatment or impact than ranch B. Before the project, grazing management was relatively extensive and handling was conventional; during the three-year project, grazing management intensified somewhat, and became more low-stress, albeit less so for ranch A than ranch B.

At least one individual from one or both ranches functioned as a range rider on most but not all days, and attempted to combine smaller groups of cattle into larger groups—ideally (but rarely) a single large group—and attempted to follow the grazing rotation to the best of their ability.

To assess the effect of these management changes, we compared livestock loss data from the three years before the project (2011-2013) to the three years during the project (2014-2016), for the herds from ranches A and B (herds A and B). Losses were obtained from U.S. Forest Service (USFS) 'Actual Use' forms submitted by each permittee each year, and were categorized as: confirmed grizzly; suspected predator (possibly grizzly, wolf, black bear, or mountain lion, but not confirmed); sickness or other (including poisonous plants); and unknown (including missing). Confirmation was determined by the Wyoming Game and Fish Department. In one year, missing cattle were recorded by the permittee as suspected predation, but because there was no evidence these were recategorized as unknown.

The project was considered to end after 2016 because of personnel turnover at the conservation organization, one of the ranches, and the USFS.

Results

Grazing management

We were modestly successful at improving grazing management. Before the project, herd A had been more cohesive than herd B. During the project, overall, the cattle tended to be in fewer, larger groups, and there was more mixing of the cattle from the two herds, but they did not form a single socially-cohesive herd. More but not all of the cattle were in the appropriate subunit as intended in the planned rotation. Overall utilization was light and rangeland health was good, with two small areas used slightly more than desired, one by each base herd (M. Buzalsky, USFS, pers. comment). Herd A behaved mostly similarly to before the project. Commensurate with the greater degree of adoption of LSLH on ranch B, herd B made more improvement, in terms of cattle being in larger groups and more often with cattle from herd A.

Livestock losses

Most livestock losses were to sickness or unknown causes, rather than confirmed or suspected predation, both before and during the project. Losses to confirmed grizzly bear predation and suspected predation were substantial before the project, but stopped completely during the project, while losses to sickness and unknown causes continued. (Fig.1)

Before the project, all confirmed predation was in herd B; suspected predation was more prevalent in herd A. herd A had suspected predation of mean 2.1% (range 0-5.0%). Herd B had confirmed predation of mean 2.6% (range 0-6.7%), and confirmed plus suspected predation of mean 2.8% (range 0.6-6.7%).

Total losses were initially lower in herd A than herd B; they increased slightly in herd A, while they decreased substantially in herd B. Before the project, across both herds, total losses were from 0.8-19.1% of calves per herd per year; and lower in herd A (mean 3.2%, range 0.8-5.0%) than herd B (mean 10.6%, range 5.8-19.1%). During the project, total losses were 2.8-7.7% per herd per year; similar in herd A (mean 4.8%, range 2.8-7.7%) and herd B (mean 4.3%, range 3.2-6.0%).

Discussion

We provided training in LSLH, so that two ranches could practice LSH to implement a rotation and possibly reduce vulnerability to predation. One of two ranches (A) made slight improvements, while the other (B) embraced LSLH. Even with imperfect implementation, the two ranches eliminated confirmed (herd B) and suspected (herd A) predation by grizzly bears and other potential predators. It is possible that some of the unknown losses before and during the project were to predation. The herd (B) that had all of the confirmed predation before the project, and whose operators made greater management changes, also experienced reduced total losses to about the level of the other herd (A), while the herd (A) whose operators mostly continued previous practices had a slight increase in total (likely non-predation) losses.

These results are consistent with the hypothesis that LSLH, particularly when used in the form of LSH to increase stock density or group size and facilitate strategic grazing management (Cote 2004; Barnes 2015b; Hibbard and Barnes 2016), can reduce vulnerability to predation, and should be considered an important aspect of range riding in predator habitat (Barnes 2015a; Zaranek 2016; Louchouart and Treves 2023). In this case study, we cannot conclusively attribute causality, but the results are compelling. Future studies should employ rigorous experimental or quasi-experimental design (e.g., BACI), if feasible given the challenges of field conditions.

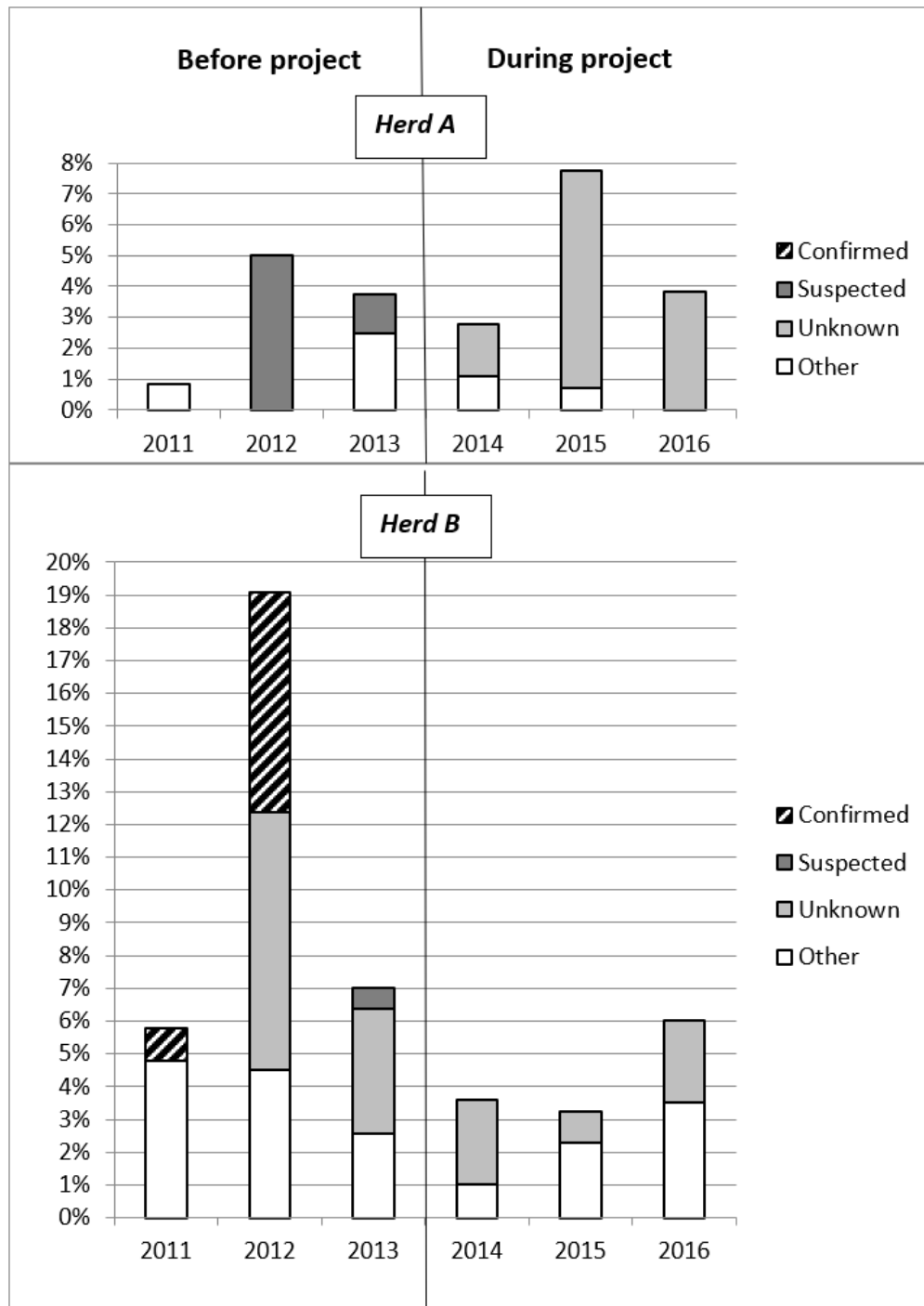


Fig.1. Cattle loss to confirmed (grizzly bear) and probable (bear, wolf, or cougar) predation, unknown causes, and other known losses (sickness), before and during a herding project, in two herds (A, B) that shared an allotment. Operators of both herds received training in low-stress livestock handling, but the methods were more fully adopted by the operators of herd B.

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