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Review of Livestock Management Practices to Minimize Livestock Depredation by Wolves: Applicability to the Southwest

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Review of Livestock Management Practices to Minimize Livestock Depredation by Wolves: Applicability to the Southwest

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INTRODUCTION

Livestock depredation by wolves (*Canis lupus*) is unpredictable in terms of time and place (Fritts et al. 2003). Wolves in Minnesota have been studied far more than wolves in the Rocky Mountains; even less is known about Mexican gray wolves (*C. lupus baileyi*). Wolf-livestock conflicts involving northern wolves have been used as an example to predict expected depredation elsewhere. Differences in terrain, vegetation, ranch size, livestock management practices, abundance and distribution of natural prey, land management practices and wolf behavior associated with learned avoidance of humans and livestock limit the effectiveness of generalizing wolf predation on livestock from region to region (Fritts et al. 1992).

Mexican gray wolves were released into the Blue Primitive Area of Arizona in 1998 and were designated "nonessential-experimental" under section 10(j) of the Endangered Species Act (ESA). This designation allows for greater management flexibility than available under an "endangered" designation. In Arizona and New Mexico, there are currently an estimated 59 wolves, including seven breeding pairs (USFWS et al. 2007). Many of the released wolves were bred in captivity and did not appear to exhibit the same "wildness" characteristic of wolves in the Rockies or Western Great Lakes region (USFWS 1982, Brown 2002). The consequences of this behavior on wolf-livestock interactions is unknown. Because of livestock depredation associated with reintroduced wolves in the Southwest and the limited information for dealing with the problem in this area, we examine livestock management practices from other regions developed to minimize livestock depredation by wolves.

MANAGEMENT PRACTICES

Several non-lethal techniques have worked in certain situations, but none have proven consistently effective (Fritts et al. 1992, Fritts et al. 2003, Shivik 2004). Non-lethal practices to minimize livestock depredation by wolves were developed in regions that use livestock management practices fundamentally different from southwestern U.S. livestock operations. Many practices were developed to be effective for areas too small to be practical in Southwest ranching environments. Although recent research has focused on lessening wolf-livestock interactions, no all-encompassing solution exists (Shivik 2004). Consequently, depredation problems usually require consideration on a case-by-case basis (Bradley and Pletscher 2005) and are complicated by variable patterns in wolf predation.

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Wolf predation on livestock is frequently localized, affecting a limited number of producers who experience a disproportionate share of the losses (Fritts et al. 2003, Breck and Meier 2004). Thus, even a few wolves can cause serious economic loss for livestock producers (Young and Goldman 1944, Gipson 1983). Most studies examining livestock management to minimize depredation by wolves have not used rigorous experimental designs and are typically case studies (Breck et al. 2002, Fritts et al. 2003, Shivik 2004). Research is needed to validate the effectiveness of non-lethal techniques through rigorous scientific inquiry, and should detail the value of such techniques in mitigating livestock depredation by wolves (Shivik 2004). The effectiveness of anti-predation livestock management practices described here has not been effectively tested in the Southwest.

Development of non-lethal management techniques to reduce conflicts associated with wolf-livestock interactions has increased because wolves are protected under the ESA and lethal control methods are often viewed negatively by an increasingly urban public. Non-lethal methods are often costly and limited in their effectiveness as wolves habituate to stimuli. These methods will likely be phased out as wolf populations meet recovery criteria for delisting, allowing livestock producers to shift toward more successful and cost-effective lethal methods (Breck and Meier 2004). However, research into long-term, non-lethal approaches will continue because of strong interest in alternative management strategies (Breck and Meier 2004).

Compensation

The most common non-lethal treatment is to pay producers for documented losses to wolves, while allowing depredation to continue. Compensation programs are temporary, are established to reduce public resistance to introductions, and help increase public acceptance of livestock depredation by wolves (Fritts et al. 2003, Shivik 2004). Compensation does not address causes of depredation, nor does it address management practices to mitigate depredation (Wagner et al. 1997). It is usually used when wolf numbers are low and attempts are being made to establish a population in an area (Mech et al. 1996). As the wolf population increases, however, compensation payments only serve to subsidize wolf depredation (Mech et al. 1996).

While compensation programs do offset costs, some report that the actual value lost to a ranch is far greater than the amount of compensation (Nick Ashcroft, personal communication, 2007). Also, it is difficult to determine the number of livestock injured or killed by wolves and therefore hard to estimate economic losses attributed to wolves. Even with increased agency monitoring it is difficult to confirm losses (Bangs et al. 1998). Oakleaf et al. (2003) studied the impact of wolves on livestock calf survival and their results showed low carcass detection rates. Detection rates suggest that current compensation programs would underpay ranchers experiencing wolf depredation, resulting in payments equal to 1/8 of the actual losses to wolves (Oakleaf et al. 2003).

Compensation is provided only for confirmed wolf-killed livestock. It is often necessary to meet exacting criteria on rapidly degrading evidence before a depredation can be officially attributed to wolves. Therefore, successful confirmation of a wolf kill is highly time dependent; that is, response time of persons authorized to confirm wolf kills is critical in order to document evidence before it degrades. Additionally, it is frequently difficult to differentiate actual predation as opposed to scavenging on livestock that died

from other causes. Confirming the difference requires skilled examination of carcasses, and often even experts disagree.

Translocation

Translocation has been frequently used in management efforts for the recovery of wolves in the northern Rockies, Minnesota and the Southwest (Mech et al. 1996). Wolves are moved away from livestock to mitigate conflicts without impacting wolf restoration. Successful translocation requires areas that are vacant of livestock and available for wolf release (Breck and Meier 2004). Translocation is not always effective because wolves travel quickly and with great stamina, and often return to the areas from which they were trapped. Also, translocation often reduces wolf survival (Bradley et al. 2005). In Minnesota, wolves had to be moved more than 70 km to ensure they did not return to their capture area (Fritts et al. 1984). Because problem wolves may be more likely to habitually prey on livestock, they also may cause similar damage in new areas (Fritts et al. 2003, Shivik 2004). More than 25% of translocated wolves preyed on livestock after release (Bradley et al. 2005).

Translocation is usually phased out in all recovery areas as wolf populations grow (Breck and Meier 2004). Bangs et al. (1998) suggested that control of problem wolves using lethal means, instead of relocation, should result in fewer livestock losses while lowering costs and providing a quicker resolution to problems.

Fladry

Fladry, an ancient system originally used in Eastern Europe and Russia to hunt wolves, uses flags hanging from ropes stretched a short distance above the ground (Musiani and Visalberghi 2001, Musiani et al. 2003). Wolves are captured by driving them along the fladry line, which they do not usually cross, into a corral or net-trap (Shivik 2004). Musiani et al. (2003) found that fladry was useful primarily when livestock were contained in small pastures, but only temporarily protected livestock from wolves.

Shock Collars

Shock collars have the potential to reduce wolf depredation on livestock (Shivik 2004, Schultz et al. 2005). Although still in the experimental phase, tests on captive animals have shown that wolves will change behavior to avoid negative stimuli (shock), although this has yet to be evaluated on a large-scale. One study did evaluate shock collar effectiveness on two different wild wolves and concluded it was successful in keeping a wolf known to prey on livestock off a farm in Wisconsin, although it did not impede other pack members from preying on the farm's livestock (Schultz et al. 2005). Economic costs and logistics make it unlikely that shock collars could be effective, and further research must determine if wolves with shock collars can alter an entire pack's behavior to avoid livestock (Shivik 2004, Schultz et al. 2005).

Disruptive Stimuli

Disruptive stimuli, such as lights and sounds produced by strobes, sirens or pyrotechnics, can frighten and deter animals from areas (Conover 2002, Shivik et al. 2003, Shivik 2004). Flashing highway lights and a combination of a strobe light/siren devices were used on farms in northern Minnesota and were valuable from a public relations standpoint, although their effectiveness was unproven (Fritts et al. 1992).

In Idaho, monitoring of Radio Activated Guard (RAG) boxes has shown their potential to be effective for protecting livestock in small pasture (up to 80 acres) situations (Breck et al. 2002). These

frightening devices consist of a strobe light and tape player with 30 different recorded sound effects that are activated by signals from radio collars on wolves that are close to the RAG box. RAG boxes were effective in dissuading collared wolves from entering areas containing livestock for up to 60 days of pasture monitoring (Breck et al. 2002). However, limitations to such management techniques include potential habituation to such devices, logistics of collaring animals, cost and effectiveness, which has only been demonstrated for small areas (Fritts et al. 2003, Shivik 2004).

Sterilization

Researchers have begun to explore the possibilities of controlling the reproductive potential of wolf populations. Fertility control may be useful in certain situations to limit pup production and wolf density in wolf populations near livestock (Mech et al. 1996, Fritts et al. 2003). It is possible that if sterile males held territories but were unable to produce pups, such territories might contain only about one third as many wolves as fertile pack territories (Mech et al. 1996). However, this method of control is intended for well established wolf populations.

Preventative Herd Management Techniques

Identifiable factors may predispose ranches and farms to wolf depredation on livestock (Mech et al. 2000, Bradley and Pletscher 2005). A better understanding of the circumstances under which wolf depredation occurs could help to develop effective management techniques (Bradley and Pletscher 2005). Bradley and Pletscher (2005) examined wolf predation on cattle in Montana and Idaho and found that larger pastures with more cattle located farther away from residences were more likely to experience wolf predation problems. Also, the presence of elk near pastures was strongly related to livestock depredation by wolves.

In South Africa, "armored" collars have been developed for use on livestock (mainly sheep) to prevent depredation by jackals, which typically attack prey at the throat (Shivik 2004). However, protective collars may work only temporarily as predators are adaptable and quick to learn alternative means of killing (Shivik 2004). The potential effectiveness of this technique in reducing wolf predation on livestock is unknown as wolves frequently attack the rear of livestock.

In small operations, it is common for ranchers to calve their cows near human habitations to assist cows with parturition, which can help reduce livestock losses to wolves (Shivik 2004). However, corralling livestock can cause local damage to the range and increase chances of disease transmission and stress for the animals (Shivik 2004). Some producers have suggested returning beef cattle to barns at night, similar to dairy cattle operations (Shivik 2004). However, the practicality of corralling for large southwestern U.S. ranches is limited.

Removal of livestock carcasses from rangelands has been suggested as a way to reduce wolf predation on livestock by limiting the attractiveness of an area to wolves (Shivik 2004). However, it is unknown whether carcass disposal is truly beneficial (Mech et al. 2000). Bradley and Pletscher (2005) found no evidence indicating that disposal of livestock carcasses affected depredation problems on rangelands.

Riders or herders have shown promise in minimizing livestock depredation by wolves. Human presence may be a key in potential conflict areas. Livestock producers in the northern Rockies have

been using "range riders" to maintain a human presence near livestock. Current research indicates use of range riders may be beneficial in some ways; however, there was no clear evidence that indicated depredation was prevented (USFWS 2006).

SUMMARY

There is no consistently effective non-lethal method available to reduce livestock depredation by wolves (Fritts et al. 2003). Suggested methods for changing livestock management practices are highly site- and herd-specific, often expensive and impractical, only temporarily effective and untested on large, expansive Southwest rangelands. Because of a lack of effective non-lethal techniques, it is important to identify local circumstances that are associated with chronic wolf depredation areas to identify possible mitigation measures. Further, behavioral differences between captive-born and truly wild wolves may complicate the development of mitigation strategies in the Southwest. Many of the prevention techniques developed in other regions depend on fear, or at least avoidance, of humans by wolves. This behavior may be less common in captive-bred wolves or wolves habituated to humans.

Furthermore, wolf management is no longer based upon wolf biology alone, but has developed a sociopolitical dimension (Mech 1995, Mech 1999). Educating the public about wolf biology and management is a potentially effective tool for wolf management (Mech et al. 1996). Fritts et al. (2003) noted that, "In some instances, lawmakers recognize exaggerated claims by the livestock industry but ignore scientific data. On the other hand, some wolf advocacy groups minimize existing and potential problems and misinform their members and the public (Blanco 1998; Mech 2000b). Legislators from urban areas and their constituents may not sympathize with farmers or hunters in distant parts of the nation, or understand the need to manage wolves" (p. 313). It may be necessary to recognize that some areas are not compatible with wolf presence and introductions should be located in areas that minimize conflicts. The Mexican Wolf Recovery Plan (USFWS 1982) recognized the potential incompatibility between wolves and livestock in stating that areas best suited for initial release of wolves should be those with little or no livestock grazing or with federal grazing allotments that could be most economically purchased or otherwise eliminated.

Because wolf-livestock problems are likely to increase in the Southwest as the numbers and range of Mexican wolves increase, development of methods to minimize wolf depredation will become more crucial to ensure continued economically viable livestock production as well as the viability of Mexican wolves in the wild. Information needs for the Southwest include identifying characteristics of areas that may predispose livestock to greater rates of wolf predation, validating the effectiveness of and adapting livestock management practices developed in other regions and developing and testing innovative livestock and wolf management practices to minimize wolf depredation. Because of the unique habitats, livestock and land management practices, elk and deer population status and management programs, and the customs and culture of the Southwest, identifying and implementing methods that incorporate all of these considerations hold the best promise in developing innovative methods that can limit wolf-livestock conflicts in the Southwest.

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NOTES

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