



MOUNTAIN LION FOUNDATION

LIVING WITH LIONS PROJECT

Promoting Non-Lethal Predator Control Alternatives

REVIEW OF NON-LETHAL TECHNIQUES

The historical management of mountain lions and other large carnivores in the United States has been a largely lethal endeavor. Currently, pumas are hunted in all western states except California. However, the 1990 ballot initiative that prohibited sport hunting in California requires the issuance of a permit that allows the killing of mountain lions that depredate on domestic livestock and pets or pose a threat to public safety. In 2000, at least 149 pumas were killed in California for depredation purposes. The Mountain Lion Foundation and the California Department of Fish and Game (Steve Torres, California DFG, personal communication) are concerned about the impact of depredation kills on puma populations.

Lethal control has been the favored management technique of federal and state wildlife agencies, though in most cases it is ineffective and ecologically unsound. Lethal control does not address the underlying cause of human/cougar conflicts, which is the presence of an attractive prey animal (e.g., livestock, domestic animals) in the habitat of an adaptable and opportunistic carnivore. The large size of livestock and their lack of anti-predator behavior provide a sizable meal for relatively little effort, especially if the livestock are unaccompanied on open range far from human activity, as occurs on public lands throughout the West. Sheep, which are much smaller than cattle, are particularly vulnerable to mountain lions and other predators. Further, livestock consume and trample the vegetation needed by the cougar's traditional prey such as deer, forcing mountain lions to prey on livestock to survive. In developed areas, ornamental landscaping may attract deer, which in turn attract mountain lions who may prey on domestic cats, dogs and other domestic animals. Because lethal control does not address the underlying causes of conflicts, it does not lead to long term solutions. Further, lethal control disrupts the social structure of mountain lion populations, which may actually increase conflicts.

Nonlethal management provides an effective and ecologically sound alternative to lethal control for reducing conflicts between humans and pumas. Numerous studies document the success of nonlethal methods with a variety of carnivores, especially coyotes. While the scientific literature is deficient with regards to the effectiveness of nonlethal methods with mountain lions (a reflection of the relatively low impact of mountain lion predation on livestock), the evidence strongly suggests that many of these methods are effective with mountain lions. These methods fall into three categories: animal husbandry, behavioral modification, and habitat manipulation.

ANIMAL HUSBANDRY

Guard Dogs

Livestock guarding dogs have proven to be one of the most effective strategies for reducing livestock predation by mountain lions and other large carnivores. Introduced to the United States in the early 1970s from Europe where they have been used for thousands of years, guard dogs were being used in at least 35 states by the mid-1980's (Lorenz 1985).

When properly trained, livestock guarding dogs have reduced predation on livestock by 60-93% (Pfeifer and Goos 1982, Coppinger et al. 1988) and are well received by ranchers (Green and Woodruff 1988, Andelt and Hopper 2000). A study in Idaho, Oregon, Washington, and Wyoming found that 90% of the guard dogs used had reduced or maintained low predation rates on livestock (Green and Woodruff 1990). In Colorado, guard dogs were highly effective in reducing livestock predation by coyotes and 96% of surveyed ranchers indicated they would recommend guard dogs to other livestock producers (Andelt and Hopper 2000). Andelt and Hopper (2000) reported that the average estimated value of open range sheep saved per dog per year from predators was \$3,610, a figure which greatly exceeded the purchase price of a guard dog (reported at \$240 for pups and \$690 for adults) and their annual maintenance cost for food, veterinary care, and miscellaneous of \$250. There may also be costs associated with the initial training of guard dogs.

Training guard dogs is imperative, as farmers have suggested that problems with livestock guard dogs are generally the fault of untrained humans, not the guard dogs. Dogs should start working with livestock at an early age (8–12 weeks) and should be placed immediately where they will be working. Pups should not be raised in the home or yard. Guard dogs may not become completely effective until two or three years of age, so expect puppy problems. Basic obedience training is a must.

The most popular dog breeds used as guard animals include Akbash, Great Pyrenees, and Komondor. While no difference in performance among breeds has been reported among producers using only one breed (Green and Woodruff 1988, Andelt 1999), Akbash dogs may be the most effective in deterring predation in fenced pastures and rangelands (Andelt 1999). The most successful guard dogs are attentive, trustworthy, protective, and aggressive. Their effectiveness can be limited by arid climate, scattered livestock, rough terrain, heavy vegetative cover, abundant carnivores, and poor training. It is important to use a sufficient number of guard dogs for the conditions. Multiple dogs can cover more ground, protect more sheep, and deter more predators.

Confinement

Confinement is one of the simplest and most effective ways to reduce predation by large predators (Wade 1973, Robel et al. 1981). Ranchers that kept sheep in corrals day and night have significantly fewer losses than those that do not. However, because this practice is not feasible for all operations, it may be more practical to confine livestock in corrals at night, when mountain lions are most active. While this method may not be convenient for large, open-range operations, it may be economically beneficial if losses are concentrated in a specific area. Portable fencing can work well for open-range operations.

Shed Lambing

The practice of lambing, calving, and kidding in sheds protects young from both predation and inclement weather (Wade 1973, Boggess et al. 1980). Ewes and lambs are typically confined to corrals next to the lambing shed for as long as two weeks after birth. Shed lambing can also lead to higher lamb survival because ranchers can treat sick lambs and “mother” orphaned ones. By moving pregnant ewes or goats to barns or other enclosures where they can be monitored, predation can be virtually eliminated and veterinary help be provided for the birthing problems that often arise.

Fall Lambing

Adjusting the lambing or calving time of a rancher's animals can be an effective way of limiting, or even eliminating predation. Livestock losses are typically highest from late spring through September as coyote packs provide food to young pups. If livestock producers change to an autumn calving or lambing program, the opportunity for coyotes to prey on young livestock can be significantly reduced.

Multi-species Stocking

Raising sheep and cattle together—called "flerds"—has proven to be an effective way to deter predation. When carnivores approach such flerds, the cattle encircle the more vulnerable sheep, which discourages the predator from attacking. If the risk of getting injured is high (as from being kicked by a full-grown cow or gored by horns), most predators will reconsider preying on livestock.

Herders

Historically, the use of herders who stayed with the sheep flock day and night greatly reduced predation and the presence of predators near livestock (Davenport et al. 1977, Tigner and Larson 1977, Nass et al. 1984). When an increasing number of sheep ranchers began relying on public subsidized lethal predator control, herders were often the first to go. Today, some ranchers continue to implement herding in their livestock husbandry practices because of its effectiveness in reducing or eliminating predation and an increasing number are implementing community-based shepherding systems where neighbors take turns caring for and tending livestock.

Selecting Appropriate Livestock

Certain breeds of livestock have specific needs or weaknesses that must be considered in relation to habitat, terrain, and grazing conditions. Before obtaining new livestock, ranchers should evaluate their grazing habitat and select breeds that are appropriate for that habitat and resident carnivore species. Knight (1994) noted that some ranchers experiencing chronic mountain lion predation have shifted from sheep to cattle production, and in areas with high predation some have changed from cow-calf to steer operations.

BEHAVIORAL MODIFICATION

Frightening Devices

Researchers have developed several devices designed to frighten or deter large carnivores from attacking livestock, though these are generally effective when livestock are confined in small pastures. One such frightening device is the "Electronic Guard," produced by the U.S. Department of Agriculture, which consists of a blinking strobe light and warbling type siren that activates for 7–10 seconds every 6–7 minutes at night. While we are not aware of any studies examining the efficacy of frightening devices such as the Electric Guard with mountain lions, their effectiveness has been documented with coyotes (Linhart et al. 1982, 1984) and wolves. Another type is the propane gas exploder, which has shown some ability to temporarily deter coyotes from preying on domestic livestock for 31 days to 6 weeks (Pfeifer and Goos 1982, Andelt 1996). While frightening devices may produce only variable and short-lived benefits if maintained in the same location (Bomford and O'Brien 1990), altering their placement, varying

the frequency of sound and light bursts, and utilizing larger numbers of devices can retard habituation by carnivores. Most recently, the use of electronic guard type devices that are triggered by close proximity of radio-collared gray wolves deterred depredation on livestock in the Northern Rockies (John Shivik, USDA Wildlife Services, personal communication).

Aversive Conditioning

Aversive conditioning is a promising technique that has the potential to reduce human conflicts with mountain lions. Currently used with black bears in California, New Jersey, and British Columbia with great success, aversive conditioning is implemented by police officers (often the first responders to “nuisance” wildlife calls) and wildlife managers who carry 12 gauge shotguns and kits containing a range of lethal and less than lethal rounds, including pepper spray, screamers, bangers, bean bag rounds, rubber slugs. Bears engaging in unnatural behavior, such as foraging in dumpsters and walking on streets during the day, are conditioned until they leave the area. The intent is not to drive bears out of the community, only to teach bears to respect humans. Successfully “educated” bears keep out bears living in the surrounding forests via maintenance of their home ranges. While bears and mountain lions differ behaviorally, these techniques may be modified or use with mountain lions and need further study. At present, Becky Pierce, a CDFG biologist, is developing a study to aversively condition mountain lions with dogs to deter predation on endangered Sierra Nevada bighorn sheep.

HABITAT MANIPULATION

Brush Clearing

Mountain lions prefer to hunt and stay where escape cover is close by. Removal of brush and trees within ¼ mile (0.4 km) of buildings and livestock concentrations may result in reduced predation (Knight 1994).

Fencing

Electric and non-electric fences have been shown to prevent or significantly reduce the incidence of predation on livestock (deCalesta and Cropsey 1978, Gates 1978, Thompson 1979, Dorrance and Bourne. 1980, Linhart et al. 1982, Wade 1982, Shelton 1984, Shelton and Gates 1987; Nass and Threade, 1988) and could thereby lead to a reduced demand for depredation permits. There are three general designs of anti-predator fencing: netwire and barbed wire, electric fences, and combinations of the first two designs. To discourage lions, fencing should be at least 10 feet high, and be constructed of either heavy woven wire or of alternating hot and grounded electric wires charged with at least 5,000 volts (Knight 1994). Climbing can be discouraged by a wire overhang or single electric wire at the top of the fence.

While permanent fencing is an excellent option for small pastures, it is impractical on the vast public lands of the west where the high costs make it untenable for most ranchers, and where its presence impedes the movements of other wildlife species, including pronghorn antelope and mule deer (Howard 1991). Hence, fencing should not be constructed in a manner that blocks migration corridors for wildlife. Larger operations should consider fencing a smaller area in which to confine sheep at night, or to confine ewes and lambs for the first month or so after birth. Temporary or portable fencing can be used to keep livestock together so that they can

be guarded more effectively. Portable electric fencing is easy to set up and allows herders and guard animals to monitor livestock and intruders.

The effectiveness of fencing is influenced by a variety of factors, including density and behavior of mountain lions, terrain and vegetative conditions, availability of prey, size of pastures, season of the year, design of the fence, quality of construction, maintenance and other factors. Their benefits can be maximized if used in conjunction with other methods, such as the use of guard dogs or llamas: fencing can keep mountain lions out of a pasture while keeping guard animals in. Fencing has additional advantages, including greater control of grazing and impacts on vegetation, eliminating the need for herding, and reducing parasitic infestations by minimizing contact with adjacent herds.

CONCLUSION

Nonlethal methods of deterring mountain lions from coming into conflict with humans provide an ecologically benign alternative to lethal control. These techniques, best used in combination (e.g., fencing and guard dogs; animal husbandry and frightening devices) can significantly reduce human/mountain lion conflicts while retaining the social integrity of mountain lion populations and maintaining their keystone role in the ecosystem.

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