Wildlife Services

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Predator Damage Management

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Groups Affected By These Problems:

- Environmental organizations
- Land management agencies
- Livestock producers
- U.S. citizens, urban and rural residents
- Wildlife managers

Major Cooperators:

- Colorado Parks and Wildlife
- Montana Fish, Wildlife and Parks
- U.S. Army
- U.S. Forest Service
- Utah Division of Wildlife Resources
- Utah State University
- Welder Wildlife Foundation
- Wildlife Conservation Society
- Wyoming Animal Damage Management Board
- Wyoming Department of Agriculture
- Wyoming Department of Game and Fish

National Wildlife Research Center Scientists Study Predation and New Ways to Protect Livestock and People

Wildlife Services' (WS) National Wildlife Research Center (NWRC) is the only Federal research organization devoted exclusively to resolving conflicts between people and wildlife through the development of effective, selective, and socially responsible methods, tools, and techniques.

Data on carnivore population dynamics, ecology, and behavior are necessary to understand predation patterns on livestock, game species, threatened and endangered species, and conflict with humans in urban areas. These data are also needed for effective depredation management, but significant gaps of knowledge exist with regard to predator-prey, predator-livestock, and predator-predator relationships. NWRC uses a multi-disciplinary approach to study interactions among predators and the impact of predators and predator removal on ecosystems, wildlife population dynamics, and livestock predation.

The development of new predator management tools to reduce livestock losses and protect public safety is a high priority for NWRC. Livestock depredation costs producers approximately $138 million each year. For the sheep and lamb industry alone, predators account for approximately 36 percent of the total losses from all causes. Concerns for public health and safety, as well as animal welfare, have resulted in wildlife managers seeking methods to reduce the risk of conflicts associated with predators. Research conducted by scientists at NWRC's field station in Logan, Utah, is focused on finding new tools and techniques to reduce conflicts with carnivores. In addition, NWRC researchers are developing improved methods for capturing carnivores and monitoring their behaviors and movements.

Applying Science and Expertise to Wildlife Challenges

Livestock Protection Dogs in Areas with Wolves and Grizzly Bears. — Livestock protection dogs have been used in the United States for decades as a non-lethal tool to protect livestock from coyote depredation. NWRC research is investigating whether select breeds of livestock protection dogs, such as larger breeds still used in Europe, are effective at reducing livestock losses to larger carnivores. Field work began in January 2013 and will continue for several years. The goal of the study is to identify the best breed(s) of livestock protection dogs to guard herds from grizzly bears and wolves and methods to maintain this non-lethal tool for producers.

Cameras Record Selectivity of M-44s. — Non-target or accidental take of wildlife during wildlife damage management activities is a concern for WS professionals, natural resource managers, and conservationists alike. To ensure non-target take is low, experts work to make tools as selective and effective as possible. The M-44, or sodium cyanide ejector, is one such tool that researchers continue to study and refine. Used to lethally remove coyotes and other canids for the protection of livestock or other resources, the spring-loaded device is designed to be staked into the ground. When the top of the device is baited with an attractant, it prompts a bite-and-pull response. Once activated, the device sprays the toxicant into the animal's mouth. NWRC researchers used motion-activated cameras to record the number of target and non-target animals triggering M-44s, as well as those that were attracted to and investigating the devices. Nineteen different species were observed at M-44 sites on 1,697 occasions, including coyotes, sheep, cows, and deer. Of all the species investigating the device, only canids were able to trigger it. M-44s were triggered 39 times: 36 times by coyotes, 2 times by feral dogs, and 1 time by a red fox. No non-canid species triggered the devices suggesting a very high selectivity towards canids. Researchers note the development of coyote-specific lures would further improve the selectivity of M-44s.

Changing Predation Rates of Coyotes Using Sterilization. — Research indicates coyotes are more likely to kill larger prey (e.g., lambs and sheep) when their energetic demands are higher, such as when they are provisioning pups. Previous NWRC research has shown that surgical sterilization of coyotes reduces their predation rates on domestic sheep. To see if a similar change in coyote predation occurs with pronghorn antelope, NWRC and Utah State University researchers radio-collared pronghorn fawns found within coyote territories where some coyotes were surgically sterilized and others were given sham sterilizations (i.e., remained reproductively intact). The researchers also estimated the availability of

alternative prey and coyote densities and estimated pronghorn fawn survival rates. Results indicated that sterilization of coyotes resulted in reduced predation on pronghorn fawns. Fawn survival increased by 242 percent in areas where coyotes were sterilized versus sham-treated. No differences were found in the abundance of rabbits and rodents, coyote densities, or fawn sex, birth weight, and age across the coyote territories. A more formal analysis on factors contributing to costs and efficacy is needed, however, for wildlife managers seeking an alternative to lethal removal of coyotes, sterilization may be a viable management action.

Use of Urban Areas by Black Bears. — For American black bears, little is known about how bears use urban areas, when and why bears enter urban areas, and the best ways to manage human-bear conflicts. Using six years of location and activity data from bears in Aspen, Colorado, NWRC researchers and partners evaluated the degree to which bears use urban areas and the factors that explain variations in use. Bear locations, movements, activity patterns, survival, and reproduction were modeled with bear characteristics and natural food availability. Results showed that bear locations and activity patterns were dependent on the availability of natural foods (good or poor food years), whereby bears became more nocturnal and used areas of higher urbanization in poor food years but switched back to natural areas in subsequent good food years. The findings suggest that bear use of urban areas is reversible and fluctuates with the availability of natural food resources, and that removal of urban bears in times of food failures has the potential to negatively affect bear populations.

Western Gray Wolf and Western Coyote Hybrids. — Using artificial insemination, NWRC researchers and partners attempted to produce hybrids between captive male, western gray wolves and captive female, western coyotes to determine whether coyotes can produce and nurture viable offspring. The results contribute new information to an ongoing debate over whether the eastern wolf (Canis lycaon) is a unique species that could be subject to the U.S. Endangered Species Act (ESA) or instead a coyote-wolf hybrid. The presence of self-sustaining hybrids can complicate the debates and rulings related to species designation for listing under the ESA. Of the nine coyotes inseminated, three became pregnant and one produced and nurtured hybrid pups indicating that it is possible for the two species to produce offspring. Additional studies are needed, however, to determine whether behavioral differences may prevent the two species from interbreeding.

Patterns of Human-Coyote Conflicts in the Denver Metropolitan Area. — In many cities throughout North America, human-coyote conflicts are an emerging problem. NWRC and Colorado State University researchers analyzed more than 4,000 reports of coyote observations and conflicts in the Denver Metropolitan Area (DMA). The reports included signs of a coyote presence (such as track, scat, vocalizations); sightings; encounters; incidents (defined as confrontations in which a coyote bares its teeth, growls, or threatens a human); attacks on pets; and attacks on humans. A strong seasonal pattern emerged: the number of both observations and conflicts was highest from December to March and lowest from July to September. The conflicts were disproportionately more common in open space areas, commercial development sites, and suburban housing areas, likely because there were more opportunities for people, pets, and coyotes to cross paths. This pattern reflects not only space use of coyotes, but also how many humans are available to interact with them and report conflicts. These findings help target management efforts, particularly those involving education and outreach.

Selected Publications:

Baruch-Mordo, S., K.R. Wilson, D.L. Lewis, J. Broderick, J.S. Mao, S.W. Breck. 2014. Stochasticity in natural forage production affects use of urban areas by black bears: implications to management of human-bear conflicts. PLoS ONE 9(1): e85122. doi:10.1371 / journal.pone.0085122.

Poessel, S.A., E.M. Gese, and J.K. Young. 2014. Influence of habitat structure and food on patch choice of captive coyotes. Applied Animal Behaviour Science 157:127-136. doi: 10.1016 / j.applanim.2014.05.001.

Poessel, S.A., S.W. Breck, T.L. Teel, S. Shwiff, K.R. Crooks, and L. Angeloni. 2013. Patterns of human-coyote conflicts in the Denver Metropolitan Area. Journal of Wildlife Management 77:297-305. doi: 10.1002 / jwmg.454.

Seidler, R.G., E.M. Gese, and M.M. Conner. 2014. Using sterilization to change predation rates of wild coyotes: A test case involving pronghorn fawns. Applied Animal Behaviour Science 154:83-92. doi: 10.1016 / j.applanim.2014.02.006.

Shivik, J.A., L. Mastro, and J.K. Young. 2014. Animal attendance at M-44 sodium cyanide ejector sites for coyotes. Wildlife Society Bulletin 38(1):217-220. doi:10.1002 / wsb.361.

Major Research Accomplishments:

- WS researchers are conducting a multi-year study to identify larger European breeds of livestock protection dogs to guard herds from grizzly bears and wolves.
- WS researchers used motion-activated cameras to record the number of target and non-target animals triggering M-44s, a tool used to lethally remove canids. Results showed only canids were able to trigger the device.
- WS research showed that pronghorn fawn survival increased by 242 percent in areas where coyotes were sterilized.
- WS research observed black bear use of urban areas is reversible and fluctuates with the availability of natural food resources, and that removal of urban bears in times of food failures has the potential to negatively affect bear populations.
- To determine whether coyotes can produce and nurture viable offspring as a result of mating with wolves, WS researchers and partners deposited wolf semen into nine coyotes yielding three pregnancies and a total of six hybrid pups. The results contribute new information to an ongoing debate over whether the eastern wolf is a unique species that could be subject to protection under the U.S. Endangered Species Act.
- A WS analysis of human-coyote conflicts in the Denver Metro Area showed the conflicts were disproportionately more common in open space areas, commercial development sites, and suburban housing areas, likely because there were more opportunities for people, pets, and coyotes to cross paths. Furthermore, researchers identified a strong seasonal pattern with coyote observations and conflicts being most prevalent from December to March.

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