

Wildlife Services

Protecting People
Protecting Agriculture
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National Wildlife Research Center

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Improved Technologies and Nonlethal Techniques for Managing Predation



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Major Cooperators

- Utah Division of Wildlife Resources
- Montana Fish, Wildlife, and Parks
- Utah State University
- Welder Wildlife Foundation

Groups Affected by This Problem

- Livestock producers
- Private citizens

NWRC Scientists Explore Innovative Ways to Protect Livestock from Predators

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 acceptable methods, tools, and techniques.

The development of new predator management tools to reduce livestock losses and protect public safety is a high priority for WS. Livestock predation costs producers approximately \$93 million each year. In fact, for the sheep and lamb industry alone, predators account for approximately 36% of the total losses from all causes. Concerns for public health and safety, as well as animal welfare, have also pressured wildlife managers to seek immediate solutions when predators cause conflicts. Research conducted by scientists at NWRC's field station in Logan, UT, is focused on finding alternative, nonlethal tools and techniques to prevent predatory behavior through the use of disruptive (frightening) and aversive (behaviorally conditioning) stimuli. In addition, NWRC researchers are developing improved methods for capturing predators and monitoring their behaviors and movements.

Applying Science & Expertise to Wildlife Challenges

Capture Devices—Current capture technology consists largely of tools and materials that were developed hundreds of years ago. While effective, some of these capture methods have raised concerns about operating efficiency and animal welfare. In response, NWRC scientists have developed and tested new devices and attractants to more selectively and efficiently capture specific species. For instance, a recent study examined new designs for foot snares, which are often used to manage damage caused by coyotes (*Canis latrans*). Rating the effectiveness and injury caused by different cable foot-restraint devices is important for management and welfare, but data are lacking that show how modifications to the cable restraint affect injuries suffered by a captured coyote. The purpose of the study was to compare injury rates between a standard cable, and chain-loop, and a cable loop modified with a rubber sleeve. Results showed differences in the injury rates of coyotes caught in the three snare types. Chain-loop snares produced the lowest injury rate and sleeved cables caused the highest injury rate. The results suggest that adding a cushioning sleeve to a cable restraint may actually increase injury, and that injuries to coyotes caught in cable foot-restraints are similar to those of coyotes caught in padded steel jaw traps.

As world leaders in animal capture technology, NWRC scientists are also working closely with state fish and wildlife agencies, as well as with countries in the European Union, to develop and test new attractants and capture devices for canids, such as wolves, coyotes, and foxes.

Impacts of Wolves on Beef Calves—NWRC scientists monitored the fate of beef calves on three farms in Minnesota and Wisconsin over a two year period to identify the impacts of wolf kills to local farms. The presence/absence of predators was also studied as an indicator of potential depredations. During this time, four calves were killed by wolves on the study farms. Contrary to expectations, wolves did not appear to be selecting the youngest calves. Researchers also compared the effectiveness of two technologies used to monitor livestock. Radio telemetry collars and ear tags were applied to 511 beef calves. Radio collars and radio ear tags were very helpful for monitoring the calves in wooded areas and rough terrain.

Aversive Conditioning Devices—NWRC researchers are developing and evaluating new aversive conditioning devices, such as fladry, to keep predators away from livestock. Fladry is a method where strips of fabric are hung from cords and strung to encircle



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pastures or areas that need protection from wolves and coyotes. NWRC researchers compared the reactions of 15 groups of captive wolves to barriers made of fladry, electrified fladry, or no fladry. Both fladry and electrified fladry were effective for excluding wolves from a food resource for short durations of time (1-14 days). Electrified fladry was more effective for protecting a food resource from captive wolves. A field study, conducted in cooperation with Montana Fish, Wildlife and Parks and WS Operations, built upon these findings. Nine livestock operations were equipped with either electrified fladry or no fladry. Wolf activity at the ranches was insufficient to determine the effectiveness of electrified fladry for preventing livestock depredations, but anecdotal evidence suggested a potential benefit. Survey information and interviews with ranchers further indicated the complexities of employing such methods, and many elements need to be considered before deciding to deploy (or not to deploy) electrified fladry.

Bear Damage in Urban Areas—NWRC scientists are studying black bear-human interactions in urban environments. In particular, scientists are determining how bear damage is influenced by human actions, bear population trends, and natural and anthropogenic food source dynamics. Forty black bears have been collared and monitored in Colorado near the communities of Aspen, Glenwood Springs, and Vail. Scientists collared 13 conflict bears to evaluate the success of their translocations, and one conflict bear to evaluate the success of on-site aversive conditioning release. GPS collars on bears allowed for the gathering of valuable data about bear resource selection in towns. By backtracking bear movements and over 1,200 GPS locations, scientists obtained confirmed feeding information on over 90 locations. The information will help wildlife managers evaluate current management efforts and identify those that are the most effective at both reducing conflicts and balancing the needs of humans and bears.

Selected Publications:

Baruch-Mordo, S., S. W. Breck, K. R. Wilson, and D. M. Theobald. 2008. Spatiotemporal distribution of black bear-human conflicts in Colorado. *Journal of Wildlife Management* 72:1853-1862.

Darrow, P. A. and J. A. Shivik. 2009. Variable coyote response to behavior contingent stimuli. *Applied Animal Behavior Science* 116:82-87.

Young, J. K., S. N. Glasscock, and J. A. Shivik. 2008. The influence of food abundance and distribution on coyote space use and diet. *Journal of Mammalogy* 89:1094—1104.

Muñoz-Igualada, J., J. Shivik, F. García-Domínguez, J. Lara-Zabía, and L. M. González-García. 2008. Evaluation of cage-traps and cable restraint devices to capture red foxes in Spain. *Journal of Wildlife Management* 72:830—836.

Shivik, J. A., and K. A. Fagerstone. 2007. A broad perspective on current and future research on urban coyotes. *Proceedings of the Wildlife Damage Management Conference* 12:418-420.

Mettler, A. E., and J. A. Shivik. 2007. Dominance and Neophobia in Coyote (*Canis latrans*) Breeding Pairs. *Applied Animal Behaviour Science* 102:85-94.

Heffernan, D. J., W. F. Andelt, and J. A. Shivik. 2007. Coyote exploratory behavior following removal of novel stimuli. *Journal of Wildlife Management* 71:587—593.

Major Research Accomplishments:

- WS designed, fabricated, and evaluated unique electronic animal repellent systems (e.g., fladry) to prevent carnivore predation on livestock.
- WS examined wolf presence at farms in Wisconsin and Minnesota.
- WS developed and tested new capture systems for wildlife.
- WS identified characteristics of bear damage and activity in urban areas