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Improved Technologies and Nonlethal Techniques for Managing Predation

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National Wildlife Research Center Scientists Explore Innovative Ways to Protect Livestock from Predators

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

The need for acceptable and effective 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. 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 and Expertise to Wildlife Challenges

Capture Devices and Attractants—

Capture technology has been largely reliant on 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 in order to more selectively and efficiently capture specific species. For instance, a recent study examined the capture efficiency, selectivity, and injuries caused by cage traps, Collarums™, padded jawed traps, and a new throw-arm cable restraint invented by WS employees.

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.

Aversive Conditioning Devices—Research is being conducted to develop aversive conditioning devices to keep predators away from livestock. For example, predator-activated conditioning collars, much like those used to train dogs, have been field tested on wolves in an effort to prevent livestock-attack behaviors. Currently, one



research study is investigating the use of food conditioning to repel bears from campgrounds and another is examining a new approach, electrified fladry, which combines an animal's fear of a novel stimulus with conditioning from an unpleasant electric shock. In an initial study, NWRC scientist tested electrified fladry on 36 wolves in 10 groups. Eight groups of wolves crossed the normal fladry barrier, but only 2 crossed the electrified fladry.

Monitoring Capture Sites—The NWRC field station in Logan, UT, is assisting with the distribution, operation, and evaluation of trap monitors for use by WS operations. The devices, which can be used with any type of trap, consist of small radio transmitters that emit unique pulse rates when animals are captured. Preliminary evaluations indicate that trap monitors can improve the Agency's efficiency by eliminating unnecessary travel to and from trap sites.

Major Research Accomplishments:

- WS examined the use of aversive conditioning for repelling bears from campgrounds.
- WS designed, fabricated, and evaluated unique electronic animal repellent systems to prevent carnivore predation on livestock.
- WS promoted the development of real-time, satellite-driven animal and capture-device monitor prototypes.
- WS developed and tested new capture systems and site monitor technologies for wildlife.

Groups Affected by This Problem:

- Livestock producers
- Private citizens

Major Cooperators:

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

Selected Publications:

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

Shivik, J. A. 2006. Why vultures are birds and snakes have venom: macro- and micro-scavenger competition. *BioScience* 56:819-823.

Breck, S.W., N. Lance, P. Callahan. 2006. A shocking device for protection of concentrated food sources from black bears. *Wildlife Society Bulletin* 34:23-26.

Breck, S.W., N. Lance, J. Bourassa. 2006. Limitations of receiver/data loggers for monitoring radio-collared animals. *Wildlife Society Bulletin* 34:111-115.

Young, J. K., W. F. Andelt, P. A. Terletzky, and J. A. Shivik. 2006. A comparison of coyote ecology after 25 years: 1978 vs. 2003. *Canadian Journal of Zoology* 84:573-582.

Shivik, J. A. 2006. Tools for the Edge: What's New for Conserving Carnivores. *BioScience* 56:253-259.

Shivik, J. A., D. J. Martin, M. Pipas, J. Turman, and T. DeLiberto. 2005. Initial comparison: jaws, cables, and cage-traps to capture coyotes. *Wildlife Society Bulletin* 33:1375-1383.

Vercauteren, K. C., J. A. Shivik, and M. J. Lavelle. 2005. Animal-activated frightening device ineffective for urban elk and mule deer. *Wildlife Society Bulletin*. 33:1282-1287.