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## Ecology, Behavior, and Management Methods for Predators to Protect Livestock and Wildlife

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### National Wildlife Research Center Scientists Study Predation Behavior and Ecology

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. NWRC's field station in Logan, UT, is the leading coyote ecology research complex in the world.

Data on predator population dynamics, ecology, and behavior are necessary to understand predation patterns on livestock, game species, and threatened and endangered species. 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 scientists use a multi-disciplinary approach to study interactions among predators, and the impact of predators and predator removal on ecosystems and wildlife population dynamics. Results from their studies are fundamental to selective predator management. The information gathered will also be used to guide WS' operational programs, and to provide necessary information in the National Environmental Policy Act (NEPA) process.

### Applying Science and Expertise to Wildlife Challenges

**Understanding Predator-Prey Systems**—Through field studies, knowledge of the interactions between predators and prey (livestock, native prey, or other predators) will aid in regulatory compliance for WS, particularly with regard to NEPA and Endangered Species Act regulations. At the NWRC field station in Logan, UT, current studies include determining the population ecology and evaluating survey methods for swift foxes; examining interactions between coyotes and kit foxes; investigating swift foxes as an indicator species of ecosystem health; determining interactions among wolves, coyotes, and mule deer and their influence in the abundances of these species; examining the interactions between wolves, coyotes, and pronghorn; and investigating the predation patterns of jaguars on livestock and native prey species.



**Basic Predator Biology and Management Methods**—NWRC studies investigating prey cycles and nutrition are revealing patterns in coyote population regulation and are focusing on the basic causes of coyote depredation. Other studies are examining the abilities of coyotes to avoid capture and other management techniques. Results are aiding in the development of new management techniques.

**A Manual on Methods for Protecting Livestock from Predators**—In 2005, NWRC scientists published "Lines of defense: coping with predators in the Rocky Mountain region." This document describes the latest advances in methods and strategies for protecting livestock from predation. The document provides information in a useful and practical format that can be used by producers and scientists alike.

### Major Research Accomplishments:

- WS demonstrated that coyotes can exert significant negative impacts on smaller predators (swift fox, kit fox) and may decimate populations under appropriate conditions.
- WS examined the impacts not only of predators on livestock, but of predators on each other.
- WS showed that wolves regularly traveled out of reserves and used areas frequented by livestock.

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**Groups Affected By These Problems:**

- Livestock producers
- Wildlife managers
- Environmental organizations
- Land management agencies

**Major Cooperators:**

- Utah State University
- The Berryman Institute
- U.S. Army

**Selected Publications:**

Blejwas, K. M., C. L. Williams, G. T. Shin, D. R. McCullough, and M. M. Jaeger. 2006. Salivary DNA evidence convicts breeding male coyotes of killing sheep. *Journal of Wildlife Management* 70: 1087-1093.

Chavez, A. S., and E. M. Gese. 2006. Landscape use and movements of wolves in relation to livestock in a wildland-agriculture matrix. *Journal of Wildlife Management* 70:1079-1086.

Gese, E. M. 2006. The mesocarnivores of Yellowstone National Park: observed and potential responses to wolf reintroduction. Pages 90-97 (Japanese) and 256-262 (English) in *Wildlife in Shiretoko and Yellowstone National Parks: lessons in wildlife conservation from two World Heritage Sites*. Edited by D. R. McCullough, K. Kaji, and M. Yamanaka. Shiretoko Nature Foundation, Hokkaido, Japan.

Kitchen, A. M., E. M. Gese, L. P. Waits, S. M. Karki, and E. R. Schauster. 2006. Multiple breeding strategies in the swift fox, *Vulpes velox*. *Animal Behaviour* 71:1029-1038.

Mitchell, B. R., M. M. Makagon, M. M. Jaeger, and R. H. Barrett. 2006. Information content of coyote barks and howls. *Bioacoustics* 15: 289-314.

Bartel, R. A., and F. F. Knowlton. 2005. Functional feeding and numerical responses of coyotes, *Canis latrans*, to fluctuating prey abundance in the Curlew Valley, Utah, 1977-1993. *Canadian Journal of Zoology* 83:569-578.

Chavez, A. S., E. M. Gese, and R. S. Kranich. 2005. Attitudes of rural landowners towards wolves in northwestern Minnesota. *Wildlife Society Bulletin* 33:517-527.

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Gantz, G. F., and F. F. Knowlton. 2005. Seasonal activity areas of coyotes in the Bear River Mountains of Utah and Idaho. *Journal of Wildlife Management* 69:1652-1659.

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Gese, E. M., S. P. Keenan, and A. M. Kitchen. 2005. Lines of defense: coping with predators in the Rocky Mountain region. *Utah State University Cooperative Extension Service, Logan, Utah*.

Kitchen, A. M., E. M. Gese, L. P. Waits, S. M. Karki, and E. R. Schauster. 2005. Genetic and spatial structure within a swift fox population. *Journal of Animal Ecology* 74:1173-1181.

Kitchen, A. M., E. M. Gese, S. M. Karki, and E. R. Schauster. 2005. Spatial ecology of swift fox social groups: from group formation to mate loss. *Journal of Mammalogy* 86:547-554.

Stoskopf, M. K., K. Beck, B. B. Fazio, T. K. Fuller, E. M. Gese, B. T. Kelly, F. F. Knowlton, D. L. Murray, W. Waddell, and L. Waits. 2005. Implementing recovery of the red wolf – integrating research scientists and managers. *Wildlife Society Bulletin* 33:1145-1152.

VerCauteren, K. C., R. A. Dolbeer, and E. M. Gese. 2005. Identification and management of wildlife damage. Pages 740-778 in *Techniques for Wildlife Investigations and Management*, 6th edition. Edited by C. E. Braun. The Wildlife Society, Bethesda, Maryland.