



RELATIONSHIPS AMONG MULE DEER AND THEIR PREDATORS

Fact Sheet #1

OVERVIEW

Relationships between predator and prey abundance are complex and not easily described. Under certain conditions, predators may influence fluctuations in mule deer populations and affect the goals that managers set for a specific population. Only by understanding the complexity of predator and prey relationships will it be possible to determine if or when management of predators will be effective in helping mule deer populations.

BACKGROUND

Mule deer are prey for many large predators of western North America. In the western U.S. and Canada, those predators are primarily mountain lions, coyotes, and bobcats, although black bears, wolves, grizzly bears, and feral dogs will also take mule deer. Predators can have a limiting or regulating effect on mule deer populations. However, many factors interact to influence mule deer abundance, and predation is only one part of the equation. Predator control is simply the removal of predators. Predation management is any activity that may influence the relationship between predators and their prey, including habitat enhancement to increase prey security and lethal removal of predators. In most cases, reducing the number of predators to increase mule deer populations is inefficient and cost prohibitive. Therefore, predator control should only be instituted when circumstances indicate a high likelihood of management success, and where specific and measurable objectives can be applied and carefully monitored.

THE INFLUENCE OF PREDATORS

The influence of predators on mule deer populations is variable and based on several factors that include:

- 1) Relationship of the mule deer population to the carrying capacity of the habitat,
- 2) Overall habitat condition,
- 3) Abundance and distribution of alternate prey populations, and
- 4) Number, abundance, and distribution of predator species that inhabit mule deer range.

When mule deer populations are close to carrying capacity, predation tends to have less influence on the population, and reductions in predator numbers are unlikely to result in an increase in the mule deer population. When habitat conditions are favorable, mule deer have better nutrition and more cover, which reduce susceptibility to predation. Likewise, winter habitats with deep snow can limit mobility and increase vulnerability to predation. When alternate prey species occupy the same habitats as mule deer, predator populations have more prey from which to select. In those instances when mule deer numbers decline, predators may switch to other prey, thereby reducing effects of predation on remaining mule deer. Conversely, this ability to switch prey may maintain stable or high predator numbers, which can in turn limit mule deer population growth when below their carrying capacity. In mule deer range with multiple predators, those predators may compete with one another, which may influence predator abundance (e.g., increased coyote numbers may result in decreased bobcat numbers). In short, the relationships between predator and prey are complex, difficult to isolate and characterize, and rarely result in simple management solutions.



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Society places varying values on predators and the role that they play in an ecological setting. Wildlife management agencies typically develop outreach plans that include media releases, public meetings, and educational campaigns to help people understand not only predator-prey relationships, but also differing views about predator-management programs. A common misperception among hunters is that simply removing some predators will lead to increased mule deer numbers. In practice, predator removal to benefit mule deer populations is only effective under a few specific conditions.

USING SCIENCE TO GUIDE MANAGEMENT

In reviewing scientific research on predator control, there were similarities in cases where predator control was effective at improving deer populations. In general, predator control has been effective when:

- 1) Predation was identified as a limiting factor,
- 2) Predator control was implemented when deer populations were below habitat carrying capacity,
- 3) Control efforts reduced predator populations sufficiently across the landscape to yield results (e.g., expected to be about 70% of a local coyote population),
- 4) Control efforts were timed to be most effective (just prior to predator or prey reproduction),
- 5) Control occurred at a focused scale (generally <math><250\text{ mi}^2</math>).

Many factors must be considered prior to implementing a predation management program, including:

- 1) Development of a management plan that identifies:
 - a. Current status of mule deer populations relative to carrying capacity,
 - b. Factors that may be playing a role in reducing mule deer populations,
 - c. Deer population objectives desired through predation management,
 - d. Desired population reduction goals for the predator species,
 - e. Scale of the predator control effort,
 - f. Timing, method, and budget for predation management efforts,
 - g. Public outreach plan.
- 2) An adaptive-management plan should include how predator and prey populations will be monitored to determine when goals have been achieved or how management programs can be adjusted.

More information on mule deer can be found at www.muledeerworkinggroup.com

Ballard, W. B., D. Lutz, T. W. Keegan, L. H. Carpenter, and J. C. deVos, Jr. 2001. Deer-predator relationships: a review of recent North American studies with an emphasis on mule and black-tailed deer. *Wildlife Society Bulletin* 29:99-115.

*A product of the Mule Deer Working Group - Sponsored by the Western Association of Fish & Wildlife Agencies - Approved July 2013
Produced with support from the Mule Deer Foundation (www.muledeer.org)*