COMPETITION BETWEEN MULE DEER AND ELK
Fact Sheet #4

OVERVIEW

Numbers of elk have increased and mule deer (hereafter deer) populations have declined in many parts of western North America during the last several decades. These trends have led many people to question potential competition between the species. However, simply observing that elk and deer eat the same forage does not demonstrate competition. Impacts must take the form of decreased survival or productivity leading to decreased population growth to be important in population dynamics.

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FACTORS INFLUENCING COMPETITION

Competition can occur when a species uses a resource (like forage), making it unavailable to another species (exploitative) or when social interactions keep another species from effectively obtaining some resource (interference). Deer and elk have developed a number of adaptations which influence their capability to compete with each other when resources are limited.

ENERGETICS AND DIET

Deer and elk generally select habitats and behave in a manner that allows them to maximize and conserve energy. In summer deer expend more energy than elk to stay cool because deer pant to dissipate heat whereas elk sweat extensively, a process that requires less relative energetic cost. In winter, moving in deep snow is more difficult for deer than elk. Thus, elk can often use more diverse areas and resources than deer in summer and winter.

Elk are more likely to have a competitive foraging advantage over deer because

1) Deer have a smaller relative stomach volume, so deer need higher quality, more digestible forage, whereas elk can use lower-quality forage, but need large amounts,
2) Elk have a greater vertical reach than deer, allowing them to forage on taller plants,
3) Elk can take advantage of preferred deer foods such as shrubs in winter, but deer rarely make extensive use of common elk forages (like grasses),
4) Deer rely on more rapid digestion than do elk, so plant compounds that slow digestion may be more detrimental to deer, and
5) Elk usually eat a greater variety of plant species than deer and are less selective in which plant parts they consume.

Severe winter weather typically contributes to lower mule deer survival and productivity than for elk. Thus, deer display more pronounced population fluctuations compared to elk. However, deer exhibit higher reproductive potential than elk, breeding more frequently as yearlings and often producing twins. Therefore, deer populations can rebound more quickly after declines if habitat conditions and other factors are favorable.

HABITAT AND HUMAN ACTIVITIES

Habitat changes caused by actions of European settlers led to increased shrub density in areas previously dominated by grasses or dense forests, which produced high quality deer habitat and high deer numbers during the early to

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mid-1900s. Nevertheless, these early and mid-successional habitats that favored mule deer gradually declined in value during the mid- to later 20th century or were replaced by forests or grasslands. Most of these changes tend to favor elk over deer. Evidence from research on the Starkey Experimental Forest and Range in Oregon indicates deer avoid elk and may therefore be excluded from some habitats when elk are present. Such interference competition could reduce deer productivity (such as cases were does are displaced from high quality habitat used for fawning and fawn-rearing).

Human activity can have greater negative influence on deer in several circumstances:

1) Development and encroachment is generally more severe for deer because most development typically occurs on lower elevation winter range and elk tend to winter at higher elevations;
2) For the same reason (as well as greater avoidance of traffic by elk), deer mortality on highways and railways often far exceeds that of elk;
3) Winter feeding may exacerbate competition if higher concentrations of elk reduce forage or range condition; and
4) Human activity, including hunting, may cause elk to shift habitat use to areas of greater cover (shrub or forest) and consume forage normally used by deer.

Both deer and elk may avoid pastures stocked with cattle, and deer may shift away from preferred habitats when cattle grazing is moderate to heavy, particularly in the absence of elk. If livestock grazing displaces both deer and elk, less habitat may be available, and competition between deer and elk could occur or increase.

CONCLUSIONS AND RECOMMENDATIONS

A broad statement that elk are responsible for mule deer declines is certainly not accurate. Several important mule deer populations have declined even without elk being present. Other deer populations have grown and responded well in conjunction with growing elk herds.

If elk are having a negative influence on deer populations, what can managers do to positively influence deer? Acknowledgment that not every piece of land may be able to support large populations of both species is an important first step.

Some options for management include

1) Select some areas (at landscape levels) where management will favor mule deer and others where elk will be favored,
2) Implement actions that return habitats to early successional stages with a lot of shrubs (such as prescribed fire and timber harvest to reduce stand density, and seeding with favored mule deer forages),
3) In areas where elk winter ranges do not overlap deer, improve habitat for elk (enhance grass-dominated ranges and reduce human activity),
4) Consider structuring elk hunting seasons to reduce potential impacts on deer, and
5) Consider reducing elk populations in selected areas (must include adequate monitoring of deer population responses).

Finally, we must recognize that it took several decades of change to end up with degraded mule deer habitat and it may well take decades to reverse this trend. All stakeholders must remain committed to a long-term adaptive management process if we are to reverse mule deer habitat trends of the magnitude we have experienced.

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

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)