PREDATION MANAGEMENT FOR LIVESTOCK AND WILDLIFE ENTERPRISES

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Abstract: Predation management, whether for livestock or wildlife protection, is a viable option under certain circumstances. The most important consideration is the availability of the habitat to support the increased number of animals. When predation management is appropriate, an integrated approach that considers the needs of all resources yields the greatest return.

Predation management is, without question, a viable option for livestock owners when livestock are vulnerable to predators. Predation management may be a viable option for the big game or upland game manager if the populations of the desired species are below carrying capacity and predators are limiting the growth of the herds. When, where, and how to implement predation management becomes the art I intend to discuss today.

With apologies to Col.'s Bowie and Travis, I'd like to paraphrase the battle cry of the Texas War for Independence. As wildlife managers, we need to 'Remember the Kaibab.' The Kaibab Plateau in northern Arizona, and its mule deer (*Odocoileus hemionus*) history, should be remembered for the two important lessons it taught us. The first is the classic case of carrying capacity, taught in introductory wildlife classes and even in hunter education today. There are only so many animals that can be sustained on the range without damage to both the range resource and ultimately the wildlife resource. The second lesson, forgotten or even belittled by revisionist biologists, is that predator control can increase wildlife numbers, in the case of the Kaibab, way beyond carrying capacity.

When, where, and how to implement predation management is not often an economic decision. In the case of livestock, the cost of predation management is weighed against the value of livestock potentially lost and an economic decision is usually clear. In the case of wildlife, the costs and benefits may not be so clear. In either case, however, an important but overlooked assumption is necessary. If predation is limiting, and if predation management will benefit the enterprise, the operator (whether a private landowner or a public agency) must have the management options to deal with the surplus.

The livestock operator must balance the numbers of livestock on the range with the conditions, which for much of Texas involves recurring drought interrupted by brief periods of muddy roads. Livestock operations have adapted breeding and marketing strategies to accommodate these changes and any livestock saved from predators can be marketed if the range won't support them. Many species of wildlife aren't as easily managed. While I've never encountered range damage due to an overabundance of bobwhite quail (*Colinus virginianus*), saving white-tailed deer (*Odocoileus virginianus*) from

predators in some parts of the Texas Hill Country may actually be counterproductive, especially if an adequate harvest program cannot be put in place. Economics then must consider ecological economics and overall rangeland health.

All of the comments that follow then involve two basic assumptions. First, predation management has been determined to be a necessary component of the livestock and wildlife enterprise. Second, the operation has the ability to deal with the resulting increase in livestock or wildlife.

PREDATION MANAGEMENT OBJECTIVES AND STRATEGIES

Livestock

Simply put, predation management for cattle, sheep or goats may be necessary if the animals are put into pastures where their vulnerability to predation increases. For cattle, this is usually confined to the calving period, and with the exception of a few losses to mountain lions (*Felis concolor*), most predation management is directed at coyotes (*Canis latrans*). A number of variables (eg., availability of alternative prey, coyote pup-rearing, and an even age structure of the coyote population) may affect predation rates on calves. For open range calving where coyotes can be a problem, whether in west Texas or southern Utah, predation rates in the absence of coyote control can approach 5%, with a 3% rate being considered average. Strategies to protect calves from predators include fall calving (when alternate prey is high and the demands of pup rearing have subsided), increased vigilance by livestock managers in calving pastures, confined calving, and coyote removal immediately prior to calving. With predation management in place, calf losses to coyotes should be <1% (Bodenchuk et al., *in press*).

Sheep and goats are more vulnerable to predators than calves, making predation management a necessary component of this enterprise. Common predators of sheep and goats include coyotes, bobcats (*Felis rufus*), feral hogs (*Sus scrofa*) , golden eagles (*Aquila chrysaetos*) and in some areas, mountain lions. Because both sheep and goats remain vulnerable throughout their lives, year-long predator control is necessary, with increased attention during lambing and kidding season. In the absence of predation management, lamb losses can exceed 29% (Henne 1977) and adult sheep losses can exceed 8% (Munoz, 1977). Goats are even more vulnerable than sheep and losses can conservatively be estimated at 50% without predation management in place (Bodenchuk et al., *in press*). However, with predation management in place, losses can still be expected to approach 5% for lambs, 2% for adult sheep, and 12% for goats.

Some species of exotic wildlife, considered livestock throughout much of Texas, also is vulnerable to predation. The problem of predation becomes more pronounced as pasture size decreases, with some evidence that coyotes especially use the fences to aid in their hunting strategies. Axis deer (*Axis axis*), mouflon (*Ovis musimon*), and blackbuck antelope (*Antilope cervicapra*) all can be negatively impacted by predation, especially during the time when young are born (which can be year round in some cases). Other species, notably gemsbok (*Oryx gazella*) and scimitar horned oryx (*Oryx dammah*) are

likely never affected by predation. Protective strategies for exotic wildlife likely are limited to year-round removal of predators.

Wildlife

As with livestock, a number of factors can influence the extent of predation impacts of wildlife species. The presence or absence of alternative prey can influence the need for big game as a prey source. Also, alternative prey may allow predator numbers to increase substantially, and when prey numbers cycle downward, the increased number of predators may impact a specific resource more than usual. The buck:doe ratio for deer and pronghorn antelope (*Antelocapra americana*) affects the duration of the rut, and hence the duration of the fawning season. A low buck:doe ratio may result in a 3 month rut for mule deer, and a single pair of coyotes may get all of the fawns born in their territory if the fawning season is spread over three months. In extreme dry conditions, the presence of artificial water sources may well carry wildlife through the drought, but may also multiply the effects of predation. Wildlife concentrated around water sources are much more vulnerable to predation than when evenly distributed.

In general, predation has an additive effect to other mortality when prey numbers are low and a compensatory effect when prey numbers are high. That is, when deer numbers, for example, are substantially below the carrying capacity, losses to predators are added to losses to accidents, disease, etc.. When deer numbers are high, losses to predators take the place of losses to other factors and are not noticeable in the overall population.

It is much more difficult to determine when predation management for wildlife protection is necessary. In general, most of the impacts to wild animals is confined to the period of time when young are born, and indices of predation impacts are more commonly used to determine when to implement predator control. Healthy white-tailed deer and pronghorn have a conception rate of about 1.6 fetuses per doe, and observed rates of fawns per doe should approach 1:1. Fawn rates below this may indicate inadequate range conditions (i.e., no need for predator control) or excessive predation. Predation management for either white-tailed deer or pronghorn involve removal of coyotes prior to fawning season, with maximum efficiency if conducted prior to coyote whelping. Where predation is a factor in depressing populations, effective predator control can double fawn production, up to about 1 fawn per doe.

Mule deer, especially in the Trans-Pecos, are less productive than either whitetail or pronghorn, with conception rates of 1.2 fawns per doe. Observed rates of .44 fawns per doe are common, meaning that 2/3 of the fawns are lost to some cause. As with other predation management, removal of coyotes prior to fawning and especially prior to coyote whelping is the most efficient strategy. Effective predation management should double fawn recruitment, again up to about 1 fawn per doe.

Protection of upland game involves the protection of nests and nesting hens. Predators of turkey (*Meleagris galopavo*), pheasants (*Phasianus colchicus*) and quail include bobcats, coyotes and red and gray foxes (*Vulpes vulpes* and *Urocyon cinereoargentus*, respectively), while

skunks (*Mephitis* spp.) and raccoons (*Procyon lotor*) can be efficient nest predators. Removal of these predators prior to nesting is the only effective solution. Where habitat allows, the result of such removals is an approximate doubling of the population.

INTEGRATED WILDLIFE DAMAGE MANAGEMENT

Integrated pest management, as a science, involves the integration of biological, chemical, cultural, and mechanical methods into a single strategy to deal with pest populations. Borrowing from this philosophy, integrated wildlife damage management (IWDM) involves selecting a strategy that best identifies the needs of all resources in an area. Two examples may serve to illustrate this philosophy. In the Trans-Pecos, much of the calving is done during spring, to maximize efficiency of range resources and to capitalize on the market for fall feeders. Effective predation management for calf protection might involve calving in pastures close to people, where increased human activity would reduce coyote presence. Removing coyotes in or near calving pastures immediately prior to calving would increase the effectiveness of a predation management strategy. However, if pronghorn, using the pastures away from the house, are to benefit from an integrated approach, coyote removal needs to be scheduled in those areas throughout the spring. Calving in the pronghorn pastures and conducting coyote control up until pronghorn fawns are born is an integrated approach to solving the needs of both resources.

As a second example, mountain lions occasionally depredate pronghorn. However, their main diet consists of prey other than antelope. If lions are feeding on feral hogs or aoudad (*Ammotragus lervia*), either one of which can cause severe range damage if their populations are unchecked, then removing a lion in the name of pronghorn protection would be contrary to the overall needs of the operation.

Implementing IWDM may be harder than it seems. The trend in land ownership in Texas is away from large tracts and towards smaller properties, increasingly owned by non-resident, non-agricultural interests. While it might be effective to conduct a quail protection program on 400 acres, managing coyotes on a 400 acre checkerboard of cooperating and non-cooperating landowners isn't much of an option. The ability to benefit the resources depends on the ability of landowners to agree on a control program of an appropriate scale.

While predators and predation have shaped both the livestock business and the prey that predators use, the human altered ecosystems we live in today are much different from those in which these species evolved. Further, the objectives humans hold for livestock and wildlife productivity may not be attainable without intervention. Managing predation impacts is necessary and viable if managers have the tools and the ability to manage the consequences of such a program. Remember the Kaibab!

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