

KEYNOTE ADDRESS: MAKING PREDATOR MANAGEMENT DECISIONS

GUY CONNOLLY, USDA-APHIS-Wildlife Services, 12345 West Alameda Parkway, Lakewood, CO 80228.

Abstract: Predator control is appropriate in game management when it will produce substantial increases of game at reasonable cost, the extra game production is worth more than the monetary and non-monetary costs of producing it, and the increased game production will be used. Predator control projects for game management should include monitoring of predator and game populations to determine if control was achieved and if expected benefits were realized. Control costs have escalated in recent decades, making it ever more difficult to justify predator control for game management. Public opinion is less supportive of predator control for game management than for protection of livestock or rare and threatened wildlife species.

Predator control is one of several tools or techniques used by ranchers and wildlife managers to increase game populations. Because predator control is expensive and controversial, careful consideration is recommended before ranchers or wildlife managers embark on control projects. This paper offers one wildlife biologist's perspective of the issues that should be considered in making predator control decisions for game management.

My ideas, together with the factual basis underlying them, were first put down in writing about 20 years ago (Connolly 1978, 1981). In preparation for this meeting, I reviewed recent literature and found that the general principles identified 2 decades ago remain valid, at least for mule and black-tailed deer (*Odocoileus hemionus*) (Ballard et al. 2001). However, there have been important changes economically and politically. Predator control work for any purpose, including game management, is increasingly difficult

to justify. Not only have the costs (labor, fuel, vehicles, aircraft) of field operations escalated, but the uses of some methods have been restricted or, in some places, banned altogether.

Most of my predator control experience has been as a research biologist with the Denver Wildlife Research Center, which is the research arm of the Federal/Cooperative wildlife damage management program. Nationally, this program is managed by USDA/APHIS/Wildlife Services; its Texas component is the Texas Wildlife Damage Management Service. My participation in this symposium is sponsored by Wildlife Services, which for many years has devoted major effort to predator control for the protection of other wildlife.

In Fiscal Year 1999, Wildlife Services nationally carried out a total of 104 cooperative projects for the protection of 84 different species of threatened and endangered wildlife species in 26 states plus

Puerto Rico and the Virgin Islands (USDA 2000). Wildlife Services also cooperates in many projects to protect game species. Some of these projects are described by other speakers at this symposium.

FACTORS TO CONSIDER IN PREDATOR CONTROL FOR GAME MANAGEMENT

Biological Factors

1. Game numbers in relation to carrying capacity. Is there room in the habitat for more game, if we can produce it? How much room is there? How many more animals will the ranch, or the management unit, support?

The idea of carrying capacity is basic and logical: any land area has a finite carrying capacity for a given animal species. Wildlife managers have been taught that deer herds must be managed to keep them within the carrying capacity. In my day, we learned this in college. But we didn't learn in school how to check out the ranch and determine if the deer herd is at carrying capacity, or above or below carrying capacity. Even after years and years of research, we still don't have a good, practical way to do this.

Some states, like Colorado and Utah, address the concept of carrying capacity in their management plans by establishing deer herd objectives--that is, specific numbers of does, bucks and fawns, for each management unit. These objectives, of course, are only as valid as the science underlying them, together with the quality of herd monitoring that is done to estimate deer numbers each year. Where such herd management objectives are in place,

predator control would only be considered when deer numbers are below the objective. How far below? This can only be decided case by case.

Whether you balance deer numbers with carrying capacity by managing for herd objectives or in some other way, decision makers should be convinced that there is room for more deer before they embark on predator control or any other expensive management aimed at increasing deer numbers.

Managers should address this subject in specific numbers: how many more deer or bobwhite quail (*Colinus virginianus*) can we reasonably expect to add to the population if we do effective control? How many more fawns? How many of them might survive to become adults? How many more bucks will be available to hunters? At the planning stage, of course, we can't be precise about these things, but we can and should explicitly scope out the reasonable range of what is possible as part of the decision process.

2. If the habitat has room for more game, what are the limiting factors? Why are game numbers below the carrying capacity? All the possibilities should be considered before we put the blame on predators. The fact that predators eat deer, even a lot of deer, doesn't mean that predation is the limiting factor. This information is a good place to start, but remember that coyotes (*Canis latrans*) and mountain lions (*Felis concolor*) have always eaten deer. This is natural and normal. Predators are most likely to be limiting deer numbers when the ratio of predators to deer is abnormally high. This situation is most likely to arise in herds reduced to low levels

by other factors, such as severe winters, drought, disease, or overhunting.

Economic Factors

1. Predator control feasibility. Is it possible to remove enough predators to do any good? This issue is key, because if the answer is no we'd be better off to save our money and not do predator control. When I ask if effective predator control is possible, I mean can it be done with the available money, methods, and manpower? I suspect there are many situations today where predator control would be desirable, but is out of the question economically. That is, we just can't afford to do enough control in that situation to help the game significantly.

2. Monitoring. When we decide to do predator control, it's important also to decide up front how predator and prey populations will be monitored. Monitoring is particularly important when public money is involved. Monitoring costs should be included in the economic analysis as an integral part of the control program.

Predator monitoring is needed to determine whether or not predator control was actually achieved. There have been cases where managers removed a few predators and then concluded that predator control wouldn't help the deer, when in fact they really didn't have predator control. Effective control of predator populations, particularly coyotes, requires more than a superficial effort that just skims off the easy ones.

On the prey side, of course the deer or other game need to be monitored too to find out if they increased as expected after predator control was done. I recommend

that deer herds be monitored with estimates of real numbers rather than just with herd composition ratios. It is pretty well established that herd composition counts alone don't tell you if deer are increasing.

2. Benefit:cost analysis. If we can afford effective predator control, as discussed above, we also should try to determine if the benefits of control will equal or exceed the costs. Not all costs or benefits of predator control can be stated in dollars, but they can be identified and listed for consideration. One obvious non-monetary cost is the opposition of people who don't like predator control. On the other hand, a rancher doing coyote control for game protection might gain the good will of neighboring sheep or goat ranchers. This would be a genuine, though non-monetary, benefit.

Benefit:cost analyses of predator control don't show up very often in the game management literature. However, an analysis of coyote control to protect pronghorn antelope (*Antilocapra americana*) in Arizona found that the benefits of that program exceeded the costs (Smith et al. 1986). And in South Texas, Beasom (1974) found that predator control for turkeys (*Meleagris gallopavo*) and white-tailed deer (*Odocoileus virginianus*) could be justified if the increased game production was sold to hunters.

3. Alternatives to control. Before expensive predator control programs are launched, the alternatives to control should be considered. The alternatives, in my mind, would include accepting the consequences of doing no control. An example of this was documented about 25 years ago in an Idaho mule deer herd where

researchers found heavy predation by mountain lions. In fact, lions and other predators were taking about as many deer as hunters were taking each year. Managers in this case decided that some lion predation was acceptable. Rather than implementing lion control, managers opted to allocate the harvest between human and nonhuman predators by adjusting hunting regulations for both deer and lions (Case 19 in Connolly 1981).

On some ranches where the objective is to produce game for sale to hunters, an alternative to predator control might be to market coyote hunting. This would transform the coyote from a liability into an asset.

Political Factors

Public opinion is important, even for privately-funded control projects on private lands, because the wildlife in each state, both predators and game animals, belongs to the citizens of that state. Wildlife management decisions are made on behalf of the people by duly elected legislators and governors, or by specially appointed bodies such as state wildlife commissions. Through laws and regulations made by these public officials, the people have a significant amount of control over the management of wildlife on both public and private lands. This is as it should be in a democracy.

Small scale, privately funded predator control projects on private lands usually draw little public notice or opposition. However, publicly-funded activities are more likely to attract attention, even more so if they are on public lands. If proposed by Federal agencies, predator

control projects require formal, environmental evaluation including solicitation and consideration of public opinion as prescribed by the National Environmental Policy Act (NEPA). Strong opposition, of course, may cause proposed predator control projects to be modified or even canceled.

Most people accept that predators sometimes need to be managed to achieve wildlife management objectives, but they do not unconditionally support hunting and trapping of predators. A recent survey of public attitudes toward management of medium-sized predators to enhance avian recruitment found that support for predator control is higher if the objective is to protect rare or native species than to protect introduced upland game birds. This report also noted that older Americans were more supportive of predator control than were younger people, indicating a trend toward a public that is becoming more skeptical of traditional approaches to natural resource management (Messmer et al. 1999).

When coyote control is needed to protect domestic sheep (*Ovis aries*), some control methods are more socially acceptable than others. A 1976 survey of public attitudes found nonlethal approaches such as repellants, guard dogs, and birth control to be more acceptable than lethal methods. Among the lethal methods, fast-acting poisons and ground shooting were more acceptable than aerial gunning or denning. Steel leghold traps and slow-acting poisons were least acceptable (Arthur 1981). These findings were confirmed in a more recent survey. Non-lethal predation control methods in general were deemed more humane than lethal methods and, among lethal methods, leghold traps and

shooting animals from aircraft were perceived as less humane than ground shooting or predacides. Citizens want to participate in the formation of wildlife management policy but they respect wildlife professionals' judgement in specific management situations (Reiter et al. 1999).

One could argue that many people interviewed in these surveys might not have the same opinions if they personally had to pay the costs of damage control by the more expensive methods they seem to prefer. Nevertheless, the bottom line in public opinion studies is that predator control, particularly with lethal methods, is not popular. And predator control to produce game animals for hunter harvest is less acceptable than control to protect domestic livestock or threatened and endangered wildlife. Proponents of predator control for game management should recognize valid public concerns and be prepared to respond to them.

A COMMENT ON ETHICS

This note is directed to professional wildlife and range managers, who face a difficult challenge in balancing their clients' needs with their obligations to protect and conserve wildlife and its habitat. Wildlife professionals, I believe, should recommend and support predator control where appropriate as vigorously as they oppose it when it's inappropriate. The well known wildlife ecologist, Robert McCabe (1985), touched on this subject in a philosophical article looking back on his long teaching and research career at the University of Wisconsin. He wrote that predator control sometimes is necessary to maintain a given number of a prey species. Managing for a predator-prey balance is foolhardy when the

predator virtually eliminates the prey. Wildlife management has long been ingrained with the concept that predation creates only minor losses among its prey base. It has been almost sacrilegious to consider the values of predator control or to speak of lethal methods to do so. But to default on the use of predator control to avoid public criticism from an emotionally charged minority is an error in moral as well as professional judgement. I agree with Dr. McCabe.

CONCLUSION

I believe that predator control is justified when it will produce substantial increases of game at reasonable cost, when the extra game production is worth more than the monetary and non-monetary costs of producing it, and when the increased game production will be used. When public money is involved, all of these points should be evaluated in writing before any decision is made to proceed with control. Control projects should include monitoring of predator and prey populations to determine if effective control was achieved and if the expected benefits were realized.

LITERATURE CITED

- Arthur, L. M. 1981. Coyote control: the public response. *Journal of Range Management* 34:14-15.
- 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 emphasis on mule and black-tailed deer. *Wildlife Society Bulletin*:(In press).
- Beasom, S. L. 1974. Intensive short term

predator removal as a game management tool. Transactions of the North American Wildlife and Natural Resources Conference 39:230-240.

Connolly, G. E. 1978. Predators and predator control. Pages 369-394 in J. L. Schmidt and D. L. Gilbert, editors. Big Game of North America. Stackpole Books, Harrisburg, Pennsylvania.

Connolly, G. E. 1981. Limiting factors and population regulation. Pages 245-285 in O. C. Wallmo, editor. Mule and black-tailed deer of North America. University of Nebraska Press, Lincoln, Nebraska.

McCabe, R. A. 1985. Along the way: a profession and its society in retrospect. Wildlife Society Bulletin 13:337-344.

Messmer, T. A., M. W. Brunson, D. Reiter, and D. G. Hewitt. 1999. United States public attitudes regarding predators and their management to enhance avian recruitment. Wildlife Society Bulletin 27:75-85.

Reiter, D. K., M. W. Brunson, and R. H. Schmidt. 1999. Public attitudes toward wildlife damage management and policy. Wildlife Society Bulletin 27:746-758.

Smith, R. H., D. J. Neff, and N. G. Woolsey. 1986. Pronghorn response to coyote control--a benefit:cost analysis. Wildlife Society Bulletin 14:226-231.

United States Department of Agriculture (USDA). 2000. Wildlife Services program highlights, Fiscal Year 1999. Miscellaneous Publications No. 1564, USDA Animal & Plant Health Inspection Service, Washington DC. 24pp.