

In past articles that I have had the pleasure of writing and sharing, I have very briefly touched on predators and how they interact with our game species populations. Predator species such as coyotes and bobcats are the more iconic animals that come to mind when the word predator is thrown around. You know, the ones that we are all worried about when it comes to conserving our more sought after game species like white-tailed deer. The same question seems to be a reoccurring theme. Do predators such as coyotes and bobcats impact my white-tailed deer population? And if so, does intense predator removal efforts work to increase my white-tailed deer numbers?



*Coyote in Texas (Canis latrans). By: David Satterwhite*

The answers to the questions above are not easy ones and are quite different from one landowner to the next. I would like to begin by saying that predators such as coyotes, bobcats, hawk species and others have been living on this earth for as long as the white-tailed deer, quail, and other game species. With that information, I am pretty optimistic that these predator species will not take your game species populations to extinction. We can all take a deep breath and relax. Thank goodness.

Predators like coyotes and bobcats are a natural part of the Texas ecosystem that play a role in its function just as all animals. Coyotes are general omnivores and make up most of their diet with meat. Moreover, the carnivorous aspect of the coyote diet changes throughout the year depending upon season and species abundance. During the winter months, Lamar Windberg studied the diet composition of coyotes in the southern reaches of

Texas. He found that roughly 40-54% of their diet was comprised of rabbits (Windberg, L. A. and C. D. Mitchell, 1990). Species of rodents were the second highest percentage to make up the winter diet selection. At this time period in the year, Windberg found that very little of the coyote’s diet was made up of white-tailed deer.

During spring and summer months, a coyote’s diet can be seen shifting to be more composed of white-tailed deer than any other time of the year. This shift can be explained by seasonality as adult female white-tailed deer begin to give birth to young, making deer fawns an easy target if found by a coyote. Such information can be drawn from the immense amount of data collected from studies over the past half century.

In 1962 at the Rob and Bessie Welder Wildlife Refuge in south Texas, R. S. Cook found 50% of fawn mortality occurred within the first 1-12 days of the fawn’s life. The majority of this mortality was recorded to be caused by coyote predation (Cook et al. 1971).

Similar information can be drawn from a study conducted by B. K. Carroll from 1971 to 1973 in Lavaca and Gonzales counties in Texas. Over the three year study, 43% of the mortality on new born fawns during the spring and summer was accounted for by predation from coyotes and bobcats. He also noted a significant correlation between a declining deer population on poor range and fawn survival (Carroll B. K. and D. L. Brown, 1977).

<b>Study</b>	<b>Year(s)</b>	<b>Location</b>	<b># Fawns in Study</b>	<b># Fawns Killed by Coyotes</b>	<b>% Mortality</b>
Cook et al.	1965-1966	Sinton, TX	81	40	50%
Carroll and Brown	1971-1973	Lavaca County, TX	60	10	17%
Carroll and Brown	1971-1973	Gonzales County, TX	60	18	26%
DeYoung	1984-1986	LaSalle and Web County, TX	15	3	20%

*Summary of Fawn Mortality by Coyote Studies from 1965 through 1986. By: Nicholas Kolbe*



*Bobcat in Texas (Lynx rufus)*

From the information presented above, it seems, at least for Mr. Wiley Coyote, that coyotes shift their diet composition towards what is available on the range throughout the year. What about bobcats in Texas? What species are cornerstones in their dietary make up?

Bobcats are more of a hyper carnivore meaning almost all of their diet is composed of meat. A study conducted by Samuel L. Beasom and Rebecca A. Moore in 1971-72 investigated the stomach contents of 125 bobcats across the two years. Beasom found that prey consumption differed between his two study years. In 1971 the study recorded over 21 species consumed. Of the 21 species, 80% of the consumed prey were cotton rats, white-tailed deer and cottontail rabbits with the primary prey being cotton rats. In 1972, the

study recorded only 6 different species consumed and over 96% of which were cotton rats and cottontail rabbits (Beasom, S. L., R. A. Moore, 1977).

Another study by Blankinship in 2000 found that white-tailed deer occurred in only 2.7% of year round bobcat scat between 1993-1998. However, deer had as high as 20% occurrence for May, June, July and August in 1994 (Blankinship, T. L. 2000, C. DeYoung).

It seems as though, from the studies presented, that both coyotes and bobcats will manipulate their diet to take advantage of parturition of white-tailed deer on the range from late spring through the summer. It is no surprise then, that landowners and managers who intensely manage for white-tailed deer implement concentrated predator control efforts to try and remove predation from their fawn crop of the year. This bodes the question, does intense removal of predators impact the survival rate of your game species like white-tailed deer?

Beasom from 1971 to 1972 evaluated the impact of predation on productivity of white-tailed deer in south Texas by removing predators from an experimental area and comparing the results to a control area where no coyote removal efforts occurred. Between 1971 and 1972, 188 coyotes and 120 bobcats were removed during predator removal efforts on approximately 5,400 acre experimental area from February 1st through June 30th. In 1971, aerial counts revealed a fawn:doe ratio of 0.47 in the intense culling experimental area compared to 0.12 in the controlled area where no predator control occurred. A similar correlation occurred in 1972 as the experimental area produced a fawn:doe ratio of 0.82 compared to 0.32 on the control area (Beasom, S.L. 1974). Beasom did note that rainfall amounts differed greatly between the two data collection years and, more than likely, influenced ratio numbers.

Another study by Guthery and Beasom conducted a similar experiment between 1975 and 1976. One hundred and two coyotes were removed from a study area in Zavala County. Following removal efforts, fawn recruitment in the experimental area was compared to a controlled area where no coyote removal efforts occurred. Guthery and Beasom found that fawn:doe ratios did not differ between the two areas, but



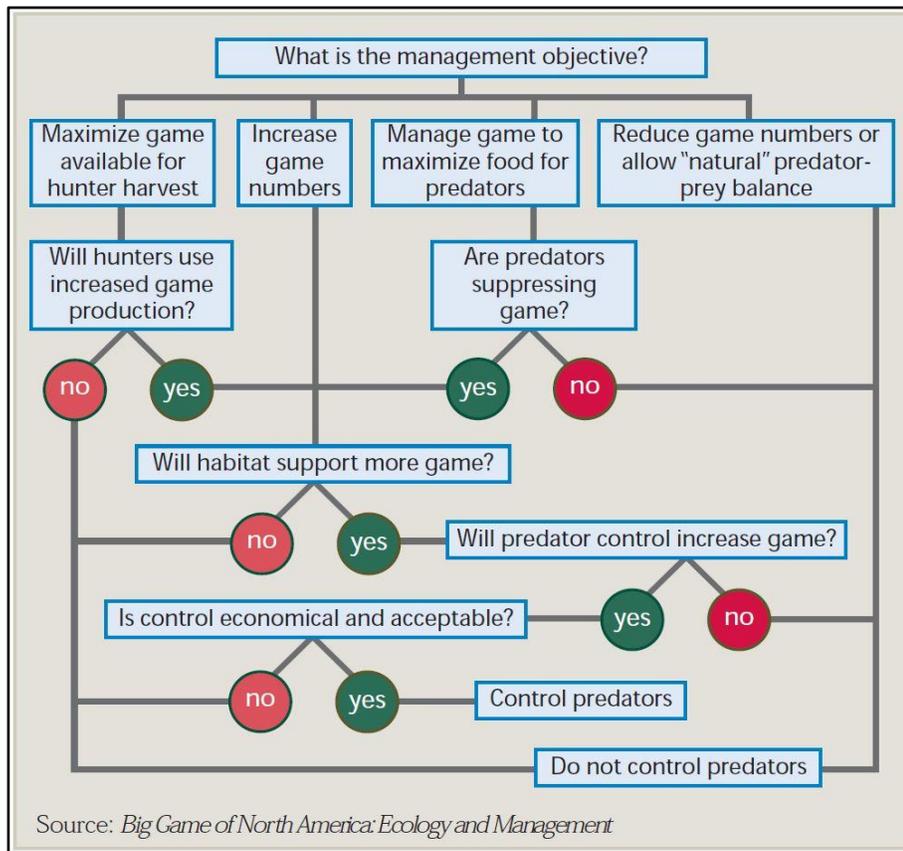
*White-tailed deer fawns (Odocoileus virginianus). By: Lukasz Kondraciuk*

the number of fawns produced per unit area was 70% and 43% greater where coyotes were reduced during their respective years (Guthery, F. S., S. L. Beasom, 1977).

Lastly, Kie removed coyotes from a 966 acre fenced area and compared the white-tailed deer population density to an adjacent population from 1972-1976. Initially the white-tailed deer population in the fenced area expanded, mainly attributed to the increased fawn survival. The numbers inside the fenced area continued to expand until nutrition and disease factors began to limit expansion and a decline in numbers was observed (Kie et al. 1979).

From the presented research, it seems that intense removal of predator species like coyotes and bobcats is beneficial to allow your white-tailed deer population to increase. Many of the studies above indicated an increase in fawn recruitment and, thus, overall increase in population of white-tailed deer following intense predator removal before and during white-tailed deer parturition. By alleviating predation pressure from your fawn cohort, fawns are able to be recruited into the adult cohort of the population where predation from coyotes and bobcats is very low.

With all of this information, we should all grab our snares and rifles and begin controlling these two native Texas predators, right? Not so fast. Before implementing intense predator control efforts like those discussed in the above research, a few items need to be addressed.



Decision making flow chart. By: Texas A&M AgriLife Extension

best decision possible regarding management of your game species population. For example, if you as a manager or a landowner are putting in an ample amount of effort, time and money to remove predators but are still not seeing a response in deer density, you could possibly have another limiting factor such as nutrition acting upon your population that is of greater influence than predation.

As a recommendation, consider keeping useful data that provides insight into these limiting factors for better decision making. Useful data to consider keeping would be record of overall health of your white-tailed deer. Quantitative and qualitative information such as rump fat, kidney fat or simply a “on the hoof” health score can begin to provide you with body condition information of your white-tailed deer population. This data can then be a useful figure to reference when making a decision regarding management and whether or not to implement intense predator removal efforts.

Nutrition information in the form of browse and forb vegetation on the range is another data point that I believe is very useful to keep record of. I know most in Texas that highly manage their white-tailed deer utilize a source of supplemental feed. However, understand that the vegetation on the range is a cornerstone for your white-tailed deer’s diet,

It is important to understand the population dynamics of your target species and how it is influenced by environmental factors. The factors that I am referencing here are known as “limiting factors”. Limiting factors are elements within your environment which hinder your population from increasing past a certain threshold. Limiting factors are items such as intra- and inter-specific competition, nutrition, space, cover, disease, predation, and others. Carroll and Brown (Carroll B. K. and D. L. Brown, 1977) noted anecdotal observations at the end of their study that a strong correlation was seen between fawn survival and a deer population located on poor range; the poor range condition being the limiting factor at play. Another scenario presented itself by Kie in his 1979 publication stating that white-tailed deer numbers increased until lack of nutrition and disease became a common theme and, as a result, the population declined.

Recognizing and tracking these limiting factors will allow you to make the

even with supplemental feed present. Tracking changes in browsing pressure and vegetation diversity using vegetation surveys like stem counts or line transects can provide you with indirect information into your white-tailed deer population's health. For example, when keeping this type of data, you may begin to notice increased browsing pressure on some of your more mediocre browse plants like huisache, amargosa or persimmon. Increased browsing pressure on these species would indicate your deer density is beginning to become elevated as white-tailed deer begin to browse species they would not normally consume in high amounts. At this point, predator control would probably not be the answer as predator control would increase your population. A reduction in population density or implementation of a habitat management practice would be more influential in this case to either remove animals from the range or increase food supply, respectively.



*Coyote control in Texas. By: 365 White-tails*

Lastly, implementing intense predator control does come at a cost. DeYoung noted at the end of his article stating that "In most situations, it will be very expensive to duplicate this intensive control" referencing the studies detailed herein (DeYoung, CKWRI). In my mind, this statement is twofold. First, predator control, in most cases, will not be a one year practice. When one niche in the environment is vacant, Mother Nature tends to be quite good at finding a way to make up the difference. For this circumstance, when coyotes are removed from a specific area, more coyotes from the surrounding area tend to "fill in" and fill the niche void left behind (Beasom 1974, Heffelfinger et al. 1990). There is also data presented in the Journal of Wildlife Management that supports the idea that when coyotes are intensely controlled, litter size and pregnancy rates of coyotes tend to increase. Therefore, efforts will need to be reoccurring to preserve the results, if successful, from intense predator control. Which brings up the most obvious second point as stated by DeYoung. The direct cost to implement these intense management strategies is high. Trapping equipment, bait, aerial contract cost and others are all expenses that will be reoccurring and begin to add up with long-term control efforts.

Recognizing all of the factors present that influence your white-tailed deer population is vital to making the correct decision on whether to predator control or not. Keeping important data figures such as population density trends, animal condition scores and vegetation data will greatly assist when making management decisions. Without understanding what limiting factor(s) is (are) most present and influencing your target species, conducting intense predator removal efforts like the ones presented herein may not work to your full advantage.

## “ACHIEVING MANAGEMENT GOALS THROUGH KNOWLEDGE AND EXPERIENCE”

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