

Influence of Precipitation on Mule Deer Populations

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article & photos by Louis A. Harveson

Drought is a way of life for most west Texas ranchers. By all accounts, the drought of the 1990s was more severe than even the legendary droughts of the 1950s or 1930s. Wildlife populations ebb and flow with precipitation, but the relationship isn't always that simple.

Because mule deer numbers experienced an all-time low during the early 2000s, we wanted to evaluate the effects precipitation had on this prominent big-game species. In 2005, researchers with the Borderlands Research Institute worked with Texas Parks and Wildlife Department (TPWD) to investigate the influence of precipitation on mule deer populations in west Texas. A brief summary of our projects is listed below.

We obtained TPWD long-term survey data from 1977-2003. Mule deer population estimates were derived from spotlight surveys. Five to 10 spotlight routes were traveled in each west Texas county in September through October. Individual deer were identified by gender and age (adult or juvenile) and produced information on densities, sex ratios, fawn production, and buck quality.

Meteorologists and climatologists commonly use Palmer indices when assessing drought conditions. Unlike raw precipitation levels, Palmer indices take into account other variables that better quantify droughts, including evaporation, soil runoff, duration of precipitation episodes, and other climatic conditions. We compared the long-term demographic data on our mule deer herds with the precipitation indices using simple statistics and then evaluated the biological relationships.

Mule deer herds in the Trans-Pecos averaged 157,000 individuals and varied considerably from year to year and ranged



Fawn productivity is affected by drought, which can influence the ability of mule deer does to produce twins.

from 99,000 to 222,000 deer. Fawn production (fawn:doe) was also highly variable with an average of 48 percent and ranged from 12 to 87 percent. Rainfall levels in the Trans-Pecos ranged from six to 21 inches and averaged 13 inches. The strong relationship between mule deer numbers and rainfall are evident in the graph. Precipitation levels could explain 42 percent of the variation in mule deer numbers.

In general, long-term drought eventually takes its toll on the west Texas mule deer herd. Our data also support the idea that the strongest influence drought has on mule deer occurs in the winter and spring months, when rainfall is especially sparse.

For west Texas, most of our rain falls in summer and fall, resulting in a flush of annual and perennial forbs important to mule deer. As winter approaches, the

availability of forbs decreases and mule deer start increasing their use of browse. We believe that in drought years, forbs become even rarer, forcing deer to subsist almost entirely on browse. Freestanding water also becomes less available, making the digestion of the coarser browse more difficult. Deer commonly reduce forage intake when freestanding water or water available through other sources diminishes. This may ultimately compromise a deer's ability to meet its nutritional requirements resulting in higher susceptibility to predation, disease, starvation, or other causes of death.

Precipitation levels also accounted for 40 percent of the fawn production. From our analysis, fawn production was most influenced by droughty conditions that occurred in spring. Spring is usually the driest season for the Trans-Pecos and is

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Making sure water sources are fully operational may lessen the effects of drought on your mule deer herd.

also one of the most important for pregnant does. Other studies have demonstrated that poor nutrition in spring can affect the ability of does to carry fawns to term, their ability to produce twins, and fawn weight (which affects fawn survival). Late winter or early spring precipitation, usually in the form of snow, will generally produce above-average fawn crops.

What can a manager do to combat

drought? Even when rainfall controls about 40 percent of your deer herd and fawn production, you still have the opportunity to work with the remaining 60 percent. In drought conditions, I recommend reevaluating the basic habitat needs of your wildlife: food, cover, and water. Ensure valuable forb and browse resources are available for your deer. This may mean modifying the habitat to promote forb growth (you probably need to do this

before the rains stop) or minimizing competition with other wildlife and livestock. Conservative stocking rates can also help ensure adequate cover critical to fawn survival. Creating more water sources (troughs, guzzlers, etc.) and ensuring they are operational during critical years of droughts may also mitigate your losses. Lastly, you will certainly need to adapt your harvest rates to allow your herd to recover. 🦌

