

# **TPWD MULE DEER TECHNICAL COMMITTEE REQUEST FOR PROPOSAL**

**Study Title:**           **Influence of Agricultural Production on Mule Deer Movements, Behavior, and Survivorship in the Texas Panhandle**

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## **Introduction**

Mule deer can be found in both the High Plains and Rolling Plains ecological regions of the Texas Panhandle where they occupy a variety of habitats from juniper breaks and mesquite dominated rangelands to sand hills and short grass prairie. Mule deer inhabit all counties of the Panhandle Wildlife District, which comprises 56 counties.

Currently, there is very little information available regarding mule deer movements, habitat preferences, and survival in the Panhandle. In addition, influence of agricultural production and the effects of habitat fragmentation on mule deer populations are poorly understood. Using VHF collars, Koerth and Bryant (1982) indicated that home ranges for mule deer bucks ( $n = 2$ ) in the Texas Panhandle averaged about 26 square miles. This study provided limited information on buck movements; however, the sample size was small and no data on does were collected. Research conducted by Koerth et al. (1985) in Oldham and Donley counties indicated the mean home range for does ( $n = 6$ ) was 9.8 square miles. These studies provide the only existent data concerning mule deer movements in the Texas Panhandle, which have minimal validity because of small sample sizes, dated radio-collar technology, and limited study areas.

Since 1980, mule deer numbers have increased in the Panhandle and continue to expand their range across the ecoregion (Gray 2011). Mule deer have become an important source of income to many landowners; however, other land managers (e.g., farmers) consider them a nuisance, and crop depredation complaints have increased over the years. Farming has negatively impacted wildlife habitat through fragmentation, but plantings of grain and legume crops have increased the nutritional plane of many game species. Panhandle mule deer are known to use a variety of agricultural crops seasonally, including cotton, wheat, peanuts, milo/sorghum, alfalfa, corn, and other crops. These crops may put mule deer on a higher nutritional plane resulting in greater body weights, antler growth, and fawn survival. Sowell (1981) found that some mule deer in the Panhandle were getting about 50% of their digestible energy, crude protein, and phosphorous from crops. Localized concentrations of mule deer on a variety of agricultural fields provide landowners with the perception that deer densities are

high; therefore, landowner requests for general season antlerless permits have increased as a result. This perception also promotes false expectations among many landowners regarding the number of bucks that can be harvested during the hunting season.

To date, data is lacking on mule deer movements in the Panhandle, and the extent and influences of their movements are educated conjecture, at best. Eberhardt et al. (1984) considered mule deer non-migratory, but they have been shown to travel long distances in search of more nutritious forage (Garrot et al. 1987). Formulating and implementing mule deer management decisions is difficult when basic movement, behavior, and ecology are largely unknown as they relate to agricultural production.

In addition, concentrations of deer on wheat during winter may also affect TPWD's aerial mule deer surveys conducted by helicopter during January of each year. Transects are randomly selected throughout individual monitoring units to ensure that all portions of each monitoring unit has an equal and independent opportunity of being sampled. Most survey techniques assume that animals are evenly distributed over a specific area; however, if mule deer are concentrated on cropland during January potential bias could affect survey results. The extent of such concentrations could influence the development of a survey methodology solution.

## **Justification**

The 2010 Land and Water plan contains four specific goals. Research to further our knowledge of mule deer movements, behavior, and survivorship in the Panhandle would fall within goal one and associated strategies:

1. Practice, encourage and enable science-based stewardship of natural and cultural resources.
  - TPWD will maintain the highest level of scientific validity and credibility

## **Objectives**

To study the influence of agriculture production on mule deer movements, behavior, and survivorship in the Panhandle. Study design should investigate these main questions:

1. Evaluate sex- and age-specific mule deer movements in relation to agriculture crops and other habitat components yearly and seasonally (e.g., breeding, gestation, parturition, and lactation).
2. Investigate survival and mortality of adult and fawn mule deer.

A minimum of three study sites located in either the NE or NW Panhandle (Canadian River Breaks), western Rolling Plains, and SW Panhandle (Sandhills) should be used and are priority. The use of GPS collars is essential to get data that are more reliable on movements. However, VHF collars could be used to supplement sample size for survival and mortality data. TPWD currently has 30 Lotek 3300L GPS collars that could be refurbished and used for project. Conducting research for a minimum of two years at each study site is necessary to collect meaningful data.

### **Expected Management Implications**

This project will provide new and essential information regarding seasonal movements and survivorship of mule deer in the Texas Panhandle in relation to differing habitats. Results will document positive and/or negative impacts of agriculture production on mule deer biology and habitat. Additionally, results obtained from this research will assist TPWD in improving mule deer survey design (e.g., knowing how far mule deer travel into agriculture areas will help TPWD delineate current mule deer monitoring units within major agriculture areas) and provide support in managing crop depredation complaints without adversely impacting the mule deer resource. Evaluating the effect of habitat fragmentation on mule deer movements and behavior will arm biologists with much needed data to enhance management of Panhandle mule deer. In addition, this knowledge will enable biologists to make better harvest recommendations to private landowners throughout the Panhandle.

TPWD biologists are working with more private landowners each year because of the popularity of the Managed Lands Deer Permit Program (Gray 2011). This program requires TPWD biologists to make annual harvest and habitat recommendations for mule deer; thus, a greater understanding of mule deer home ranges, distribution, survival, and mortality is needed to properly manage this species in the Texas Panhandle.

### **Literature Cited**

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