

# TPWD PRONGHORN TECHNICAL COMMITTEE REQUEST FOR PROPOSAL

**Study Title:** Evaluating Survey Techniques and Sightability for Pronghorn in Texas

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## Introduction:

Prior to the 20<sup>th</sup> century, researchers concluded that pronghorn (*Antilocapra americana*) occurred throughout most of Texas, west of the 97<sup>th</sup> meridian and were estimated to be in the excess of a million animals. At the turn of the century, dramatic land use changes and unregulated hunting caused a marked decline in numbers. The increase in density of woody plants in the southwest also transformed much of the state's grasslands to woodlands or savanna type vegetative communities, which were less desirable for pronghorn.

In 1903, the Texas Legislature established a closed season for pronghorn. However, unregulated hunting continued and numbers continued to decrease below 2,500 animals in the early 1920's. From 1939 to the early 1990's pronghorn had been restored to many parts of their historic range through restocking efforts that involved translocation of approximately 5,500 pronghorn. Many pronghorn were obtained from Wyoming, Utah, and Colorado, but the majority of the transplants were from in-state sources.

Around 1944, Texas Game, Fish, and Oyster Commission (predecessor to Texas Parks and Wildlife Department) personnel began surveying pronghorn throughout Texas with fixed-wing aircraft to monitor populations and issue pronghorn permits to landowners. Populations have fluctuated through time based upon habitat conditions, especially in the Trans-Pecos. Since pronghorn surveys were initiated, the all-time record high occurred in 1987, with about 25,000 pronghorn statewide. Historically, the Trans-Pecos ecoregion supported the majority of the pronghorn in the state; however, since 2008 annual surveys documented more pronghorn in the Panhandle ecoregion than in the Trans-Pecos because of the precipitous decline throughout most of the Trans-Pecos and modification of survey methodology in the Panhandle.

Annual pronghorn surveys are conducted within management herd units, and permits are issued to landowners based upon survey results in each herd unit. Herd units were established using both geographic and man-made barriers to pronghorn movement. Mountain ranges, canyons, railroads, highways and net-wire fences all prohibit, or seriously minimize, pronghorn movement and are typical boundaries for a herd unit. Population estimates are obtained by conducting aerial strip counts of herd units, which comprise the primary range of the species in the Panhandle, Trans-Pecos, and western Edwards Plateau ecoregions. Surveys are conducted annually during the period of early June through mid to late July using fixed-wing aircraft. Aerial surveys are conducted within herd units by flying low altitude (100 feet or less), geo-referenced

parallel strip transects that are equally spaced. Transects may be flown every 1/4-mile (100% count) or every 1/2-mile (50% count). Two observers (observer in front seat and behind pilot) and pilot search for pronghorn. As an investigation in 2010 (to evaluate effectiveness of 1/4-mile vs. 1/2-mile transect belts), observations were documented within 220 (1/4-mile) and 440 (1/2-mile) yards of each side of airplane using a Garmin M5 GPS/PDA and CyberTracker software version 3.220. Observers use a laser range-finder to help calibrate observer's eye for observations within the transect belt. All pronghorn sighted are identified by sex and age when possible. Aircraft (fixed-wing) time expended while conducting surveys is about 150, 165, and 15 hours (330 total hours) in the Trans-Pecos, Panhandle, western Edwards Plateau, respectively. Approximately 90% of the Trans-Pecos herd units are surveyed with about 50% of the Panhandle herd units being flown annually. Using Department owned aircraft the price per hour is \$180 for fixed-wing and \$425 for helicopter, which includes fuel and ferrying.

Literature suggests that undercounting big game species from fixed-wing aircraft is common, even in relatively open habitats. In addition, several factors influence sightability of pronghorn during aerial surveys such as background color of habitat, animal activity, distance from aircraft, brush canopy, etc. and can not be controlled from year to year. These factors can create high variation in yearly pronghorn population estimates and erroneously indicate drastic population declines. Experienced observers understand these lower numbers could be the result of lower sightability of pronghorn and not a population decline. To date, TPWD has no correction factor or sightability model to accurately estimate pronghorn numbers through time. Research indicates that other survey platforms, designs, and methods have the potential to yield more accurate population estimates than 100% coverage counts by fixed-wing. Permit issuance is directly influenced by population estimates; therefore, underestimating numbers will negatively impact permit issuance.

Permits are issued to individual landowners within each herd unit based upon results of survey data. The original policy statement concerning issuance of permits said "To provide for the harvest of buck antelope which are considered surplus to the reproductive requirements of respective herds". Original harvest quotas were calculated to maintain a post-hunting season adult sex ratio of two does per buck. Through time, this ratio increased to allow for greater hunter opportunity, without substantially impacting the resource. Currently, harvest quotas are calculated based upon a percentage (35-45%) of the *observed* standing buck herd in each herd unit to reach our objective of providing greatest hunter opportunity without impacting reproductive potential of herds (the liberal percentage is used with the recognition that observation rates are conservative during surveys).

### **Justification:**

Pronghorn are listed as a "medium priority" species in the 2005 Texas Wildlife Action Plan, but will be moved to a "high priority" species in the 2010 version. In addition, the 2010 Land and Water plan contains four specific goals. Research to improve our survey methodology for pronghorn 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:**

1. Document pronghorn sightability with TPWD's current survey methodology and other proposed survey techniques.
2. Test distance sampling utilizing fixed-wing and helicopter aircraft while comparing results with other survey methods. Distance sampling design must incorporate the ability to identify sex and age classes of pronghorn and meet assumptions of distance sampling methodology.
3. Evaluate the use of airplanes, helicopters, and unmanned aerial vehicles equipped with FLIR and high definition cameras as survey platforms to sample using strip transects and other sampling schemes.
4. Compare different sampling designs to determine if sampling provides more accurate and precise estimates than "total" counts, while providing essential data for issuing permits by herd unit.

There should be at least 2-3 study sites (pronghorn herd units) in each ecoregion (Panhandle and Trans-Pecos) to assess sightability and other techniques. Marking animals with GPS collars would be necessary to determine factors influencing sightability of pronghorn and test distance sampling assumption that all pronghorn are observed on the zero line. Additional VHF collars could be deployed for mark-recount estimates as well as to determine a "known" number of pronghorn within each herd unit for comparing other survey techniques. This data is essential to improve accuracy and precision of our survey methodology for pronghorn.

### **Expected Results:**

Application of techniques that estimate sightability correction factors greatly enhances population statistics. By reducing bias associated with differential sightability and/or applying another survey methodology, TPWD can provide much more reliable data concerning the status and distribution of pronghorn as well as achieve proper, consistent permit issuance rates. The improved accuracy and consistency in survey methodology will improve our ability to monitor populations, establish harvest recommendations and regulations, and provide information to the public concerning the status of pronghorn populations.