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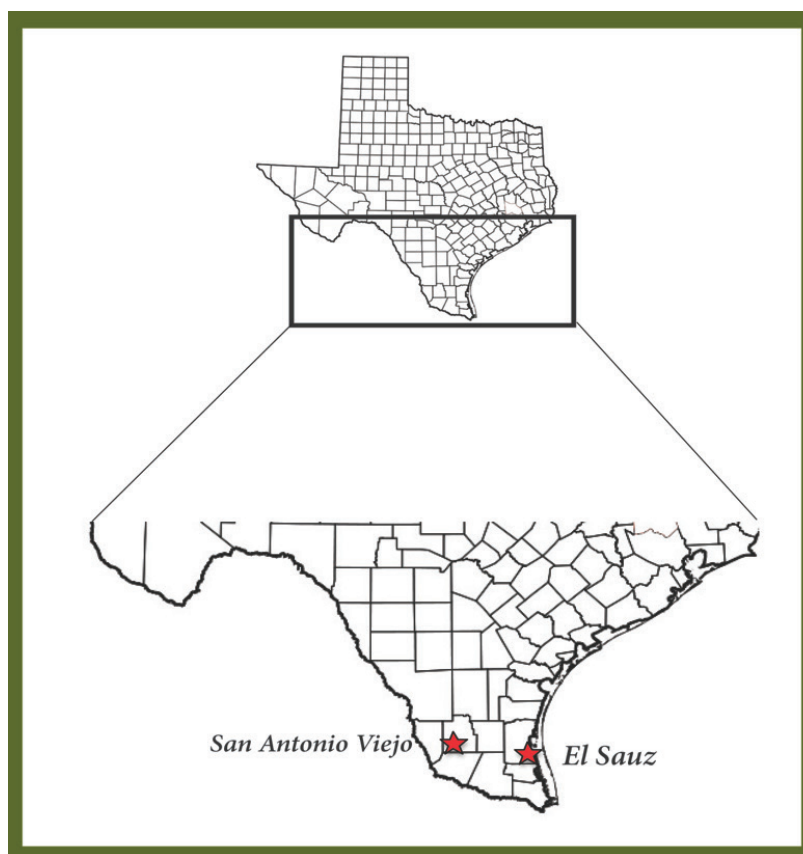
## Drought in South Texas: Implications for Recruitment, Age Structure, and Harvest

by Kory Gann

Aldo Leopold, the father of wildlife management, defined game management as “the art of making land produce sustained annual crops of wild game for recreational use.” The semi-arid rangelands of South Texas experience highly variable precipitation, resulting in fawn survival that is erratic and low when compared to white-tailed deer populations in other regions. Rangelands in South Texas also exhibit an east to west gradation of precipitation that have major impacts on productivity and recruitment of deer populations. Given the traditional definition of game management, how can wildlife managers in South Texas consistently produce adequate numbers of deer for recreational harvest when the environment they work in is so variable? Examination of the productivity and age structure of unmanaged deer populations helps to fully understand the challenge faced by managers in the region.

Reliable recruitment (the number of fawns surviving to 1 year of age) and age-structure data can only come from a random sample of the population, and the best way to obtain a random sample is through a deer capture. Since 2011, CK-WRI researchers have captured deer every autumn on 2 lands owned by the East Wildlife Foundation (Fig. 1). The East El Sauz Ranch consists of 27,385 ac. located along the Texas Gulf Coast in Willacy County, and the San Antonio Viejo Ranch (SAV) is 148,706 ac. located 90 miles inland in Jim Hogg and Starr counties. Both landholdings are working cattle ranches on which the deer are unmanaged and have not been subjected to the harvest, baiting, supplemental feeding, or predator management common across much of South Texas.

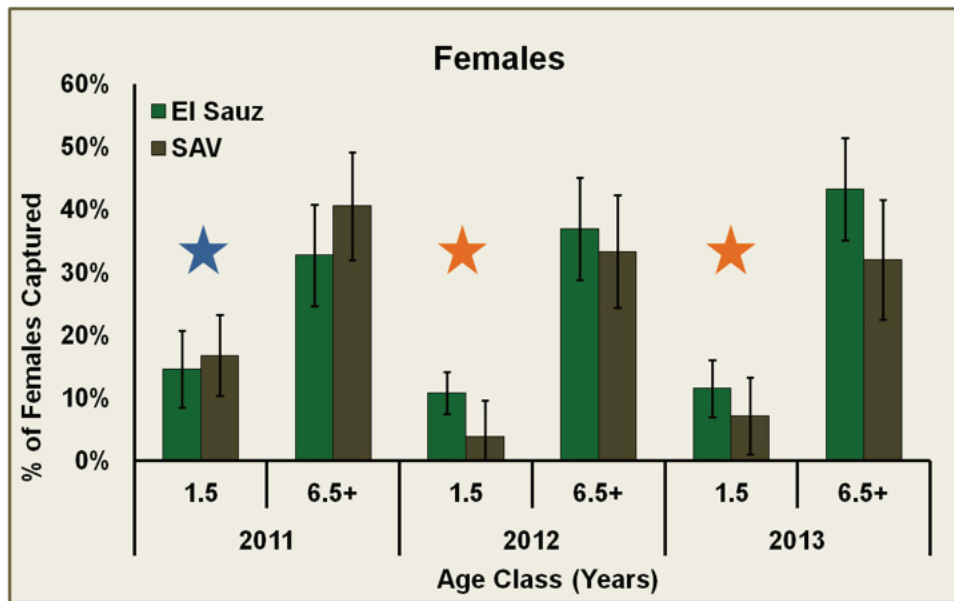
**Figure 1.** Location of study sites, which are both part of the East Wildlife Foundation.



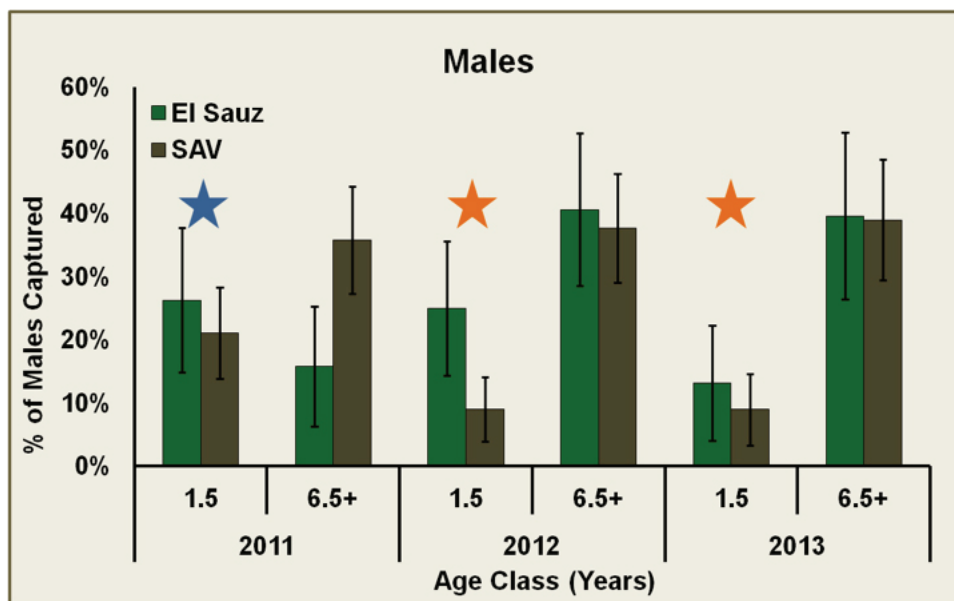
From 2011-2013, researchers captured 569 deer on the East El Sauz Ranch and 775 deer on the SAV. Adult deer were captured as encountered using a net-gun fired from a helicopter, aged by tooth replacement and wear techniques, given small, metal ear tags for future identification, and released. The proportion of yearling deer (1.5 years) in the capture was our measure of fawn recruitment from the previous year. The percentage of 6+ year old deer in the capture was used to determine the proportion of these unmanaged populations composed of mature deer.

Above average rainfall during the spring and summer of 2010 led to high fawn recruitment. As a result, yearling deer composed 15-17% of females and 20-26% of males captured on both properties in 2011 (Figs. 2 and 3). Drought conditions in 2011 and 2012 decreased fawn recruitment on SAV, where yearling deer composed 4-8% of females and 8-9% of males captured in 2012 and 2013. Effects of drought on recruitment were less evident on East El Sauz, where yearling deer made up 11-12% of females and 13-25% of males captured in 2012 and 2013. These results suggest that recruitment of deer in western South Texas may be limited by erratic precipitation, whereas recruitment may be more stable in coastal populations. Frequent drought periods resulting in low fawn recruitment ensure that unmanaged deer populations in western South Texas rarely achieve high densities. However, years with adequate rainfall occur frequently enough to send pulses of fawns into the population, thus keeping unmanaged populations from going locally extinct.

**Figure 2.** Proportion of adult females aged 1.5 and 6.5+ captured from 2011-2013 on 2 East Wildlife Foundation ranches. Blue stars represent moist conditions during recruitment, whereas orange stars represent drought.



**Figure 3.** Proportion of adult males aged 1.5 and 6.5+ captured from 2011-2013 on 2 East Wildlife Foundation ranches. Blue stars represent moist conditions during recruitment, whereas orange stars represent drought.



Deer 6-years old and older composed 30-43% of the females and 16-41% of the males captured on both properties from 2011-2013, suggesting that deer in this age class consistently make up a large proportion of unmanaged populations (Figs. 2 and 3). An example of a similar age structure in an unmanaged South Texas deer population was presented in the May 2011 edition of the Deer Associates eNews. In both examples, the large number of older deer in the populations suggests that survival of deer is high once they are recruited into these populations. In such populations, mature deer act as a buffer to sustain the population through periods of low fawn recruitment and are available for fawn production during periods with adequate rainfall.

So what does this mean for deer managers in western South Texas? If producing a sufficient number of mature bucks for harvest annually is the goal, then consistent recruitment of buck fawns into the population is the key. Management practices such as the provision of supplemental feed and habitat improvements may help mitigate the effects of variable precipitation on fawn recruitment in western South Texas. However, even with intensive feeding programs, recruitment of fawns into a population may still decline during drought.

Another management practice to increase fawn recruitment is to limit the harvest of adult females. During drought, some managers assume they should reduce deer populations due to the poor range conditions. Range conditions during drought may be inadequate for fawn production, but not necessarily for the survival of adult deer. This is primarily because the abundant low-quality browse available during drought periods is adequate to meet nutrient requirements for maintenance, but not fawn production. Given that high survival of adult deer is important to the persistence of deer populations in western South Texas, the last action a manager would want to take during drought would be to increase harvest of adult deer. Low fawn production during drought will ensure that populations do not increase, while reducing or eliminating the doe harvest will ensure that a sufficient number of adult females are available to produce a large cohort of fawns when conditions improve.

If doe harvest is necessary to meet management objectives, the harvest of mature does should be minimized. Although harvesting large, mature does may be great for filling the freezer, it could also have important implications for fawn recruitment. Research conducted at the CKWRI by Randy DeYoung and Aaron Foley showed that ~80% of fawns recruited into the population were the offspring of 3+ year old females, regardless of whether supplemental feeding occurred. Therefore, having a large pool of mature females in the population may also help increase fawn recruitment, thus ensuring mature bucks are available to harvest in the future.

South Texas is a challenging environment in which to manage deer. The east to west rainfall gradient allows for stable fawn recruitment along the coast, but limits fawn recruitment as one moves west across South Texas. High adult survival in unmanaged populations is common across South Texas, but becomes increasingly more important in the western portion of South Texas, where high adult survival is necessary for deer populations to persist. Understanding the relationship between deer populations and the variable environment will help managers make appropriate decisions so they can consistently produce mature bucks for harvest each year.

**About the Author:** *Kory Gann is a PhD student at Texas A&M University-Kingsville. The deer capture data presented in this eNews is part of the East Wildlife Foundation's research program (<http://www.eastfoundation.net>). The research of female deer productivity by age class was funded by T. Dan Friedkin, the Comanche Ranch, the Stedman West Foundation, and the Faith Ranch and done in collaboration with Charles DeYoung, Tim Fulbright, David Hewitt, and Don Draeger. For more on managing deer in variable environments, download this book chapter written by Dr. Charles DeYoung and colleagues.*