



# Spike 20P and Its Effects on Mule Deer Habitat



Photo by Reagan T. Gage

Photo by Louis A. Harveson

LEFT : FROM A MOUNTAINSIDE PERSPECTIVE, it is easy to discern between Spike 20P treated areas (l) and non-treated areas (r). Note the curvilinear, non-treated riparian habitats that meander across the landscape. RIGHT : RIPARIAN HABITATS provide much needed browse and forbs for desert mule deer.

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IN HIS BOOK *GAME MANAGEMENT*, ALDO LEOPOLD identified five tools available to the resource professional to manage habitat: the ax, plow, cow, match and gun. Although the wildlife profession has come a long way since Leopold wrote *Game Management*, the tools available to resource professionals have not changed too much. Most habitat management practices still use the same tools with a modern twist. However in the Trans-Pecos, few of these tools are available for their use because of the lack of rainfall and the topography that occurs in this desert environment. Even for the premier big game species of West Texas – the desert mule deer – habitat management strategies are lacking. The simple concept of providing adequate food, cover, and water in this arid, rugged region of West Texas can be challenging.

One tool that was not available to Leopold is the use of herbicides. Herbicides are typically considered a last resort prescription, and

most wildlife professionals view herbicides negatively for several reasons. First, herbicides are expensive relative to other management tools. Second, herbicides have historically been non-selective and have negatively affected wildlife foods. This process is referred to as forb shock, which can set back perennial and annual forbs for 2-3 years, which can have detrimental effects on wildlife. Third, the perceptions of herbicides has a negative connotation (e.g., poison), which may inadvertently impact their utility by biologists.

However, herbicides have changed considerably during the last 20-30 years: they are more selective, there is more research regarding application requirements, and their price is becoming more affordable. Further, in many instances, herbicides may be the only option available to resource managers because of present vegetative conditions, slope limitations, lack of fuel, or the climate. Many former grasslands of the Trans-Pecos are good examples of this –



they do not have an adequate fuel load to carry a fire, they occur on shallow soils or sloped terrain, or they have been converted to shrublands.

Spike 20P (or tebuthion) is a common herbicide that is growing in popularity in the Trans-Pecos ecoregion. Resource specialists commonly prescribe Spike 20P as an option for controlling invasive brush species and increasing grass production. Despite the increased interest in Spike 20P, few data are available regarding its impact from a mule deer's perspective.

To evaluate the impacts of the herbicide Spike 20P on mule deer habitat, we partnered with private landowners. The study took place on Boracho Peak Ranch, which lies 20 miles east of Van Horn, Texas. Boracho Peak Ranch is a working cattle and wildlife ranch owned and operated by Hughes and Betsy Abell. The ranch consists of Chihuahuan desert grasslands with varying topography and receives about 15 inches of rain annually.

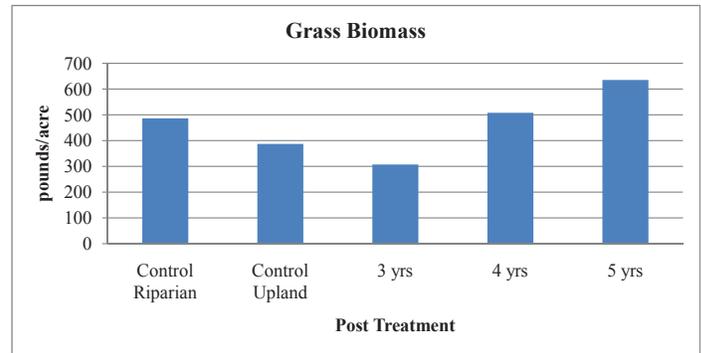
Spike 20P (20 percent active ingredient tebuthiuron) was applied at a rate of 0.75 lb./acre by a fixed wing aircraft during winters of 2005-2006, 2006-2007, and 2007-2008, for a total treated area greater than 50,000 acres. Riparian areas with higher brush diversity were left untreated, as well as steeper slopes, which are more prone to erosion. Each year following application, light rains allowed the pelleted herbicide to dissolve into the soil.

Because Spike was applied during different years, we arranged our study design so that we could evaluate the response of vegetation (forbs, browse, grasses) across two controls (areas not treated with herbicide) and three treatments (areas treated with herbicide). Control areas included riparian areas (dry creeks and canyons) and untreated upland sites (primarily creosotebush-tarbrush flats). Treatment areas were also dominated by creosotebush and tarbrush and included sites with 3-, 4-, and 5-years-post herbicide application.

We compared forb diversity and abundance, grass production, and brush composition and kill rate by measuring 60 50-meter transects across the five treatments (~12 transects/treatment). Vegetation data was recorded in summer 2009 and 2010 and winter 2010 (results presented are from summer 2010).

Spike treated areas were effective in controlling creosotebush and tarbrush, resulting in 94-100 percent mortality of individual plants. Likewise, canopy cover of brush was reduced from approximately 17 percent on control sites to 2 percent on treated sites. The reduction of brush species allowed grasses to flourish following herbicide treatment, which increased from 388 pounds/acre (control site) to 635 pounds/acre (5-year-post treatment).

Spike treated areas showed noticeable reduction in forb diversity (number of forb species observed) between control sites. Forb diversity was similar between 3-, 4-, and 5-year-post treated sites, which was 60 percent less than forb diversity on control sites. Based on our data, forbs had not recovered to pretreatment levels even



after five years following herbicide application.

Riparian areas (which were not treated) had the highest value to wildlife with respect to forb and brush diversity and abundance. Browse assessment also supported the importance of riparian habitats compared to other habitats evaluated for desert mule deer.

Our study demonstrates the effectiveness of controlling two invasive brush species using Spike 20P, resulting in high mortality rates of creosotebush and tarbrush, followed by a substantial increase in grass production. However, the effectiveness of Spike 20P may come at a price to important wildlife foods including annual and perennial forbs and important browse species (e.g., range ratany, sumac species). We noted forb shock on our treated sites that still had not recovered after five years to pretreatment levels.

If resource managers are interested in applying Spike 20P to reduce invasive brush species in the Trans-Pecos, they need to consider the habitat needs of desert mule deer and other important wildlife species. We recommend: (1) using mosaic patterns rather than uniform application; (2) avoiding riparian and other diverse habitats when applying Spike 20P; (3) deferring (according to the product label) livestock grazing for a minimum of two growing seasons, and (4) contacting your local natural resource specialist for specific application rates that are best suited for your goals. 🐾

