

Appendix E

Recommendations for Brush Management in West Texas

Woody plants (brush) provide escape cover, loafing cover, nesting habitat, thermal protection, and food (browse and mast) for a number of wildlife species. However, each wildlife species has a particular tolerance range concerning the density and canopy cover of brush. There are instances when the brush density increases beyond a particular species' habitat requirements and preferences. Excessive brush densities can hinder movement, reduce visibility of approaching danger, reduce grass and forbs by competing for moisture and nutrients, and can promote increased predator populations. In such instances, a land manager may want to consider some method of brush management as an option for improving the habitat quality for certain wildlife species. However, managers should avoid excessive removal of woody cover because inadequate cover can be just as detrimental as too much brush.

Several brush management options are available to help accomplish a manager's wildlife objectives. Most of these options fall into 3 categories: herbicides, prescribed fire, and mechanical treatments.

Herbicides

Herbicides may be applied in pellet or liquid form by aircraft (helicopter or fixed-wing) or by ground equipment (backpack sprayer, tractor spray-rig, etc.). Aerial methods allow large acreages of brush to be treated in a relatively short time, and are not limited by rough terrain. Ground-application methods are much more species- and area-specific. Aerial treatments can be applied in strips, as total coverage, or in a variable rate pattern (VRP). The VRP involves aerially applying different rates of herbicide in strips at right angles to each other. This pattern creates numerous small blocks of vegetation ("checkerboard effect") treated with different herbicide rates, ranging from none to heavy and resulting in diversity of vegetation responses. This method has the greatest applicability in areas with dense stands of mixed brush.



Use of helicopters to apply herbicide provides the convenience of aerial application with the added benefits of allowing precision application, virtually eliminating chemical drift, and allowing the landowner to selectively treat very specific areas.

Ground-application methods allow the manager to treat specific undesirable species while avoiding impacts on more desirable woody plants. Herbicides may be stem-applied, foliar- (leaf) applied, or soil-applied. Broadcast treatments are an option, but individual plant treatments provide the

ultimate in selectivity. For low-growth brush, a tractor with a boom-spray rig can be used to target specific areas such as the more responsive deep-soil lowlands, while avoiding less responsive, shallow-soil uplands. Brush management in drainage habitats should be carefully considered because these sites are important in providing food and cover for deer and other wildlife species. The structural features provide areas for midday loafing and bedding, and these moist, fertile sites are very important in producing quality forage. In very broad drainages where mesquite and other shrubs have become too dense, the removal or thinning of shrubs can produce a tremendous herbaceous response. However, it is important to maintain a "buffer" of woody plants along the creek or draw that dissects most drainages (at least 200 feet on each side). This stringer of shrubs and trees will prevent erosion, serve as a travel corridor for various wildlife species, and provide screening cover in an otherwise open habitat. In very narrow drainages, the best option may be to maintain the woody vegetation.

An important disadvantage of herbicides, other than cost, is that the production of some grasses and especially forbs may be suppressed for 1-2 years in treated areas. Although temporary, this can have a significant, short-term effect on deer, quail, and other species that rely heavily on forbs. Another common problem with herbicides, especially broadcast applications, is non-target damage or mortality to desirable woody plants. Unlike other brush management methods, herbicides leave the dead standing remains of woody plants after they have been killed. This may be a problem for some managers. On the other hand, standing shrub "skeletons" can provide an important habitat component for certain wildlife species. Some of the woody debris remaining after herbicide treatment can be eliminated with a prescribed fire (3-5 years later). Once the brush is finally killed by herbicide (sometimes it takes 2 growing seasons), the herbaceous vegetation normally responds with a flush of growth, which provides adequate fuel for a relatively hot burn that will consume smaller shrubs and branches of larger shrubs.

Prescribed Fire

Fire is an excellent wildlife management tool that can be useful in controlling undesirable woody plants or thinning undesirable densities of brush. Unfortunately, the brush species that most often are a problem in west Texas (mesquite, redberry juniper, creosote, and tarbush) are difficult to kill with fire. They generally will resprout from the roots during the following year. However, periodic fire can be a useful tool in controlling the height and canopy cover of brush species, especially mesquite and juniper. With the proper weather conditions and an adequate fuel load, periodic prescribed burning can top-kill these woody plants, and most importantly, prevent the establishment of new seedlings. For example, a very hot fire can kill mesquite seedlings that are less than 3 years old and juniper seedlings that are less than 8 years old. Woody plant reduction will conserve soil moisture and nutrients so that grasses and forbs can increase. The result will be improved cover and food for deer and other wildlife, and a gradually improving fuel load for future prescribed burns.

Most prescribed burns are conducted in late winter (February- March) to suppress woody plants and to improve plant health and plant species composition. Cool-season fires can improve the germination, growth, and vigor of desirable grasses and forbs, but the effects on brush suppression are temporary. Most woody species are only top-killed by cool-season fires and will resprout from the base. The historical expanses of grasslands that once occurred in west Texas were maintained by fires that primarily occurred during hot, dry summers. These summer fires were often caused by lightning strikes, although Native Americans set fires to attract game animals. Grasses certainly require a longer period to recover from a summer fire compared to a cool-season burn, but the long-term benefits may be worth the trade-off. Woody plants are often stressed during dry summers and when this stress is combined with the intense heat of a



summer fire, the result is an increased mortality of large woody plants and a high mortality of young woody plants. Also, seed germination of some of the more desirable plant species (e.g., sideoats grama, bluestems, legumes) is often stimulated by the intense heat associated with a summer fire. Because of the hazardous nature of summer burns, they should be conducted cautiously and only by an experienced fire crew.

In addition to being the most economical method of brush management, fire can also produce a desirable vegetation mosaic because of the discontinuity of fuel (grass) that often exists in arid regions. Although temporary (2-4 months), fire can also increase the palatability and nutrient content of browse as well as herbaceous vegetation. Rangelands in west Texas do not need to be burned more frequently than every 8-12 years, and the appropriate fire frequency will be dictated by the relative fire intensity.

Land managers should seek experienced assistance from Texas Parks & Wildlife Department, the Texas Agricultural Extension Service, or the Natural Resource Conservation Service if prescribed burning is selected as a range improvement tool. Prescribed burning without a detailed prescribed burning plan and preparatory work by the landowner is not advised.

Mechanical Control

Mechanical methods of brush management such as tree grubbing, dozing, roller

chopping, aeration, and chaining are generally recommended over chemical means. These methods are more selective, remove the brush canopy, and promote a variety of forbs and grasses through soil disturbance and decreased competition. Unlike herbicide treatments where forbs are suppressed for a year or two, mechanical treatments produce an almost immediate forb response (provided there is adequate soil moisture). Most brush species will quickly resprout unless their roots are removed through a technique such as grubbing. Top-removal methods such as roller-chopping, discing, and shredding will temporarily improve the palatability and nutritional quality of browse (regrowth) for deer and other browsing animals. Although the improved quality is relatively short-lived (3-4 months), top-removal can increase browse accessibility on taller species (hackberry, bumelia, oaks) for several years by reducing plant height. Because of the regrowth potential of most brush species, top-removal methods are not effective in providing a long-term reduction in the brush canopy or density. However, when prescribed fire is used as a follow-up treatment, the desired effects produced by mechanical brush control can be economically extended for a much longer period than by mechanical treatment alone.

When thinning or removing mesquite or juniper in rolling to rough terrain, management efforts should focus on the deep-soiled flats and lowlands while avoiding the ridges, upper slopes, canyon headers, and draws. The forage production (response) on the lower slopes and flats will be 4-5 times greater (or more) than on rocky, shallow-soiled areas. The shrubs on the upper slopes and ridges serve to stabilize the thin layer of soil that exists on these areas. This type of balance between woody cover and nearby grasslands can be maintained somewhat inexpensively by the use of prescribed fire. The rocky slopes usually don't grow enough fine fuel to carry a fire very far up the ridges (at least not an intense fire); therefore, the shrubs that provide soil protection and cover/food for wildlife are maintained on the upper slopes and ridges. With periodic fire (8-10 years), a good combination of grasses and forbs can be maintained on the deeper soils. When removing brush from flats and lowlands, it is important to maintain a buffer of woody plants along the draws (at least 200 feet on each side). These "stringers" of woody plants will serve as travel corridors for various wildlife species and as key sites for bedding and foraging, and will protect the soil from erosion during heavy rainfall events. When removing mesquite from broad flats and drainages, managers should consider maintaining a few mature mesquite trees. They provide shade for livestock and wildlife, they benefit the soil (nitrogen-fixing legume), the foliage provides fair browse, and the bean crops are excellent forage and highly preferred by livestock and a variety of wildlife species.

General Guidelines for Preferred Amounts of Woody Cover for Selected Wildlife Species¹

WT Deer	50-75%	woody cover
Mule Deer	15-40%	woody cover
Bobwhite quail	5-25%	woody cover
Scaled quail	10-35%	woody cover (includes very small shrubs)
Pronghorn	1-10%	woody cover (includes yucca, cholla, etc.)

Turkey

40-60% (preferably trees and mast-producing woody plants)
(overstory, midstory, and understory)

¹ Each wildlife species will occur in areas with lesser and greater densities of brush cover. These guidelines represent the optimum range of cover for long-term production and survival of each species and correspond with cover amounts in which the greatest number of animals of each species normally occur. However, woody cover is only one of many habitat parameters and will not compensate for the absence of other important requirements.