

Brush invasion competes with desirable forage for moisture, light, and nutrients, and can be a major limitation to rangeland production. Dense brush stands obstruct grazing, reduce livestock performance, and interfere with livestock handling. Removing trees and brush from rangeland can increase forage production and livestock carrying capacity.

Eliminating all woody plants, however, is not always practical, necessary, or desirable. Isolated trees provide shade for livestock and can improve grazing distribution. Trees and shrubs shelter livestock from wind and snow, furnish suitable areas for calving, and provide food and cover for wildlife. Clearing woody plants along streams and ravines can increase soil erosion, reduce water quality, and destroy wildlife habitat. Because of the potential aesthetic, economic, and recreational value of wildlife, scattered stands of woody plants are compatible with livestock production.

Historically, woody plants were confined to riparian areas along creeks, streams, and rivers where soil moisture was high. Three factors prevented woody plants from encroaching into the prairie: recurrent fires, continuous grazing pressure from numerous herbivores, and periodic drought. Suppressing fire and replacing native herbivores with domestic livestock contributed to brush species progressively invading grazingland.

Management Decisions

Brush invasions frequently are ignored until they become severe. Control can be difficult and expensive, and the cost of attempting to eradicate a species usually exceeds any benefits gained. The decision to treat brush must balance the expected value of potential benefits with the cost of control.

Depending on management objectives, leaving some brush areas for wildlife or erosion control may be more economically feasible than trying to reclaim the land for grazing. On areas that potentially could produce economic returns, undesirable woody plants should be reduced to tolerable levels, then managed to prevent further encroachment.

Because woody species differ in their response to control attempts, accurate identification of the target plant is important to successful management.

Brush Control Methods

Prescribed Burning

Prescribed burning is the most economical and important tool for managing brush, especially in the eastern half of Kansas. In the absence of fire, woody species progressively invade and eventually dominate tallgrass prairie. Mulch provides favorable conditions for the germination of many woody species, particularly when a wet spring follows a dry year.

Effective control of woody plants with fire depends upon the species, amount of fuel, when the burn occurs, and burning frequency. Nonsprouting species such as eastern redcedar are readily killed by a single burn if they are less than five feet tall and adequate fuel is available. Resprouting species, however, require two or three consecutive years of prescribed burning at the proper time for successful control.

The best time to control most species with fire is when the plant reaches its low point in food reserves. That normally occurs in mid- to late-April when dominant warm-season perennial grasses (e.g., big bluestem and Indiangrass) are one to two inches tall. Smooth sumac and leadplant, however, have root reserve cycles similar to warm-season perennial grasses and are unharmed by late-spring burning.

Prescribed burning is most successful in controlling woody species if fuel is abundant and environmental conditions are favorable for a hot fire. Head-fires pushed by a 10–15 mph wind are necessary to damage large trees. Dense brush stands may require an initial herbicide treatment before fire can carry through the area. Resprouting brush then can be suppressed with a systematic burning program.

Mechanical

Mechanical brush control is labor intensive, expensive, and generally only feasible for small or scattered patches. Nonsprouting trees can be killed any time if cut off at ground level. Resprouting species, however, need to be cut when their root reserves are low. Mowing in late-April will control woody plants such as buck-brush, but smooth sumac must be cut in early June.

Two or three consecutive years of cutting at the proper time are required to kill most woody species.

Resprouting of some trees, such as hedge and honeylocust, can be prevented by applying a herbicide to the stump immediately after cutting.

Dense stands of trees or brush can be cleared with bulldozers; however, surviving roots may resprout. Bulldozing also destroys desirable plant species, and reseeding usually is necessary to prevent erosion.

Herbicides

Most woody plants are susceptible to properly applied herbicides. Herbicide effectiveness depends upon using the proper chemical at the correct time and rate. Each species has a period when it is most susceptible. Environmental factors such as precipitation, temperature, and wind also affect herbicide activity.

Herbicides should not be applied unless registered for use on the site and target brush species. Application equipment should be accurately calibrated to obtain maximum control and prevent environmental damage. **Follow label instructions carefully** and use herbicides with caution. Consult your county Extension office for the latest herbicide recommendations.

Herbicides can be applied several ways, but methods used in combination with mechanical control are time consuming and only practical for individual trees or minor invasions.

Broadcast spray. Foliar herbicides may be applied either with ground equipment or aircraft. Ground equipment sprays are suited for individual plants or scattered brush stands, but aerial applications are necessary for dense stands, large areas, or rugged terrain.

Timing is critical for successful brush control. Normally, foliar herbicides are applied in the spring after leaves have fully expanded and plants are actively growing. Good spray coverage is important. Dense brush stands require high application volumes to ensure coverage on understory plants. To be effective, foliar herbicides must be absorbed and translocated. Consequently, optimum control requires thoroughly wetting the leaves and favorable growing conditions.

Soil Applied. Applying pellet, granular, or liquid herbicides to the soil surface in a grid pattern or evenly spaced under the drip line controls many brush species. Treatment should be timed to coincide with anticipated rainfall in early- to late-spring. Soil applied herbicides should not be applied when the soil is frozen or saturated with water.

Basal bark. Applying a herbicide and diesel oil mixture (see label instructions) to the lower portion of the trunk will control many species. Large trees or species with thick bark may not be susceptible to this treatment. The entire circumference of the trunk up to 18 inches above ground should be soaked. Basal bark sprays are most successful from mid-July to mid-January, but should not be applied when the bark is wet or when the temperature is below freezing.

Girdle or Frill. For trees larger than five inches in diameter, grooves or notches can be cut in the trunk. Herbicides applied to the cuts will penetrate the sapwood and control most species.

Cut stump. Cutting woody species at ground level and immediately applying the proper herbicide to the cut surface will usually prevent resprouting.

Grazing Management

Woody plant seedlings and sprouts are stunted by livestock browsing in moderate or heavily stocked pastures. Consequently, woody plants seem to spontaneously appear if livestock are removed from heavily grazed range. Deer and goats consume large amounts of browse. Cattle, however, normally do not eat mature woody plants except for occasional variety. An exception is yucca, which can be controlled in western Kansas with continuous grazing by cows during winter.

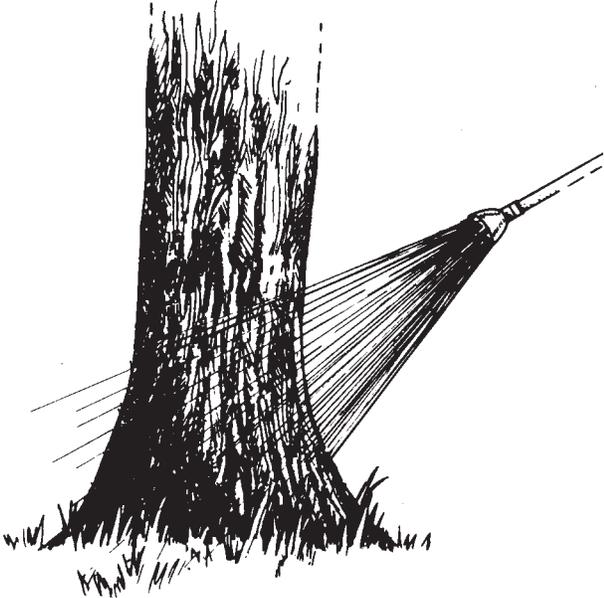
Which Method To Use?

Selecting a brush control method depends on the plant species, size of invasion, topography, economics, adjacent land use, and management objectives. Combinations of methods often are less costly and more effective than a single method, particularly with mixed brush species. Prescribed burning followed by herbicide applications on the regrowth improves control of persistent species. Because successful brush control normally requires follow-up treatments, applying herbicides to prevent sprouting is more efficient than repeatedly killing regrowth.

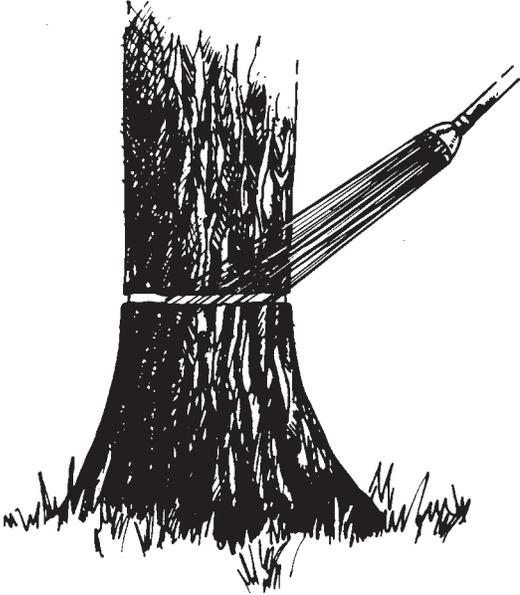
Summary

Brush management is an important factor in properly managing rangeland. The key to brush management is recognizing potential problems and controlling them before they become severe. Once brush is reduced to tolerable levels, good grazing and pasture management can limit recurrence.

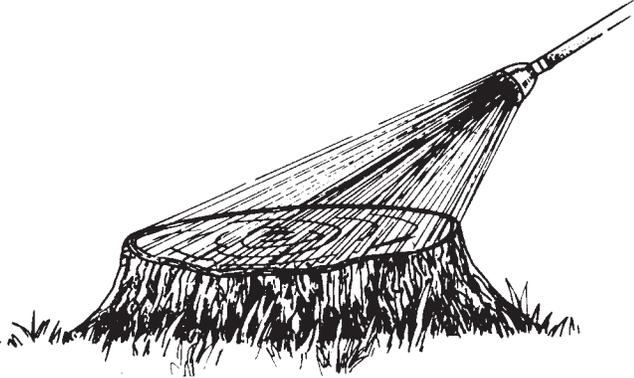
Basal bark



Girdle or Frill



Cut stump



Related Publications

Prescribed Burning Safety (L-565)

Prescribed Burning: A Management Tool (L-815)

Prescribed Burns: Planning and Conducting (L-664)

Rangeland Weed Management (MF-1020)

Chemical Weed Control for Field Crops, Pastures, Rangeland and Noncropland (Report of Progress issued annually)

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