

Conservation Practice Fact Sheet

December 2015

Introduction

Brush management can be used to control unacceptable levels of woody species (trees, shrubs, and woody vines) to promote desirable plant growth, provide better forage for livestock, and improve wildlife habitat.

Brush management can be accomplished by using mechanical, chemical, or biological methods, either alone or in combination. To the extent feasible, choose methods that have the lowest potential risk for people, domestic animals, and the natural environment. The use of non-herbicide methods of brush management is generally preferred.

All applicable federal, state, and local permits and approvals must be obtained before implementing brush management.

On sites where erosion is currently occurring, or has the potential to occur, apply brush management in a manner that minimizes soil disturbance. Use additional conservation practices as needed to protect the soil and prevent erosion.

Success of the practice is determined by evaluating regrowth or reoccurrence of the targeted species after sufficient time has passed to monitor the site. Evaluation periods will depend on the species to be controlled, and the methods and materials used. Some brush management activities can be effective when applied within a single year. Others may require multiple years of treatment(s) to achieve desired objectives. If replanting the area is planned, consider how these factors will affect establishing the desired species.

Mechanical Control Methods

Mechanical control is most effective when plants are small and few in number. One or more of the following techniques may be used:

1. **Cut or mow** the main stems and sprouts using axes, power saws, rotary mowers, or similar equipment. Cut as close to the ground as possible.

This method is best used when stems are less than 6 inches diameter at breast height (dbh). Several



An unmanaged pasture can be restored for forage production by implementing brush management.

cuttings may be necessary to kill the plants. It may also be desirable to chemically treat the stumps to prevent regrowth.

Timing: Late June to early August is preferable, when root reserves are low and leaf growth is at its maximum. Early spring is next best. It may be necessary to apply such treatment during both of these periods for species that are difficult to eradicate or where brush is dense.

2. **Girdle** the bark of larger woody plants by cutting a band 1 to 6 inches wide completely around the stem, through the bark and cambium layer. Girdle as close to the ground surface as practical.

Timing: Late fall to early spring.

3. **Uproot, pull, or dig** brush using bulldozers, power equipment, chains, and hand tools.

Timing: Any time of year.

4. Use a **moldboard plow** or **heavy disk** to control brush up to 1 inch dbh.

Timing: Any time when the ground is dry enough to cultivate.

Land owners and managers please note: If you receive financial assistance for brush management, be sure to check with your funding agency/organization for specific management requirements.

Biological Control Methods

Biological brush management is usually accomplished primarily by goats, but may include other livestock. Release of target-specific insects or plant pathogens may also be used. When using species other than grazing animals as control agents, biological control must conform to USDA release standards. All necessary local, state, or other permits must be obtained prior to release of the control agent.

When goats are used to provide biological brush management, the canopy coverage of targeted brush species should be at least 25%, as measured within a 5-foot average height throughout the treatment area. Treatment can be accomplished by using either a one-time flash grazing of the area or a season-long rotational grazing system. The treatment strategy selected may depend on the size of the area, number and length of time the goats are available, and whether additional brush control measures (mechanical and/or chemical) will be used. In the mid-Atlantic region, goat herds may be commercially available to be “rented” and transported to sites for brush management. Typical availability is up to 50 goats, usually for no more than a few weeks per site.



Using goats for biological brush management.

For flash grazing, a stocking rate of 1 goat/acre per 1-3% of canopy cover is typically used to defoliate an area. The total period of time needed for grazing will depend on the density of the vegetation and the size of the treatment area. Large sites may need to be subdivided by temporary fencing into smaller treatment units to maintain the appropriate stocking rate. The goal is to achieve at least 80% defoliation of target species within 1-2 weeks per treatment unit. Additional brush control measures, such as mowing or herbicides, are likely to be needed after initial control with flash grazing.

A rotational grazing treatment can be used when goats are available for most of the growing season. Use the same stocking rate as for flash grazing. The area to be browsed should be divided by fencing into at least 5 paddocks (sized based on the stocking rate and total number of goats available) to maximize browsing effectiveness. Keep the goats together in one herd, and rotate the herd within the 5 paddocks. Initiate browsing as soon as the brush is fully leafed out in the spring, and defoliate until the targeted species have at least 80% leaf removal, usually within 1-2 weeks. Move goats to the next paddock and repeat.

When brush in the initial paddock re-leafs, regardless of where the goats are in the rotation, bring them back to the initial paddock to defoliate the brush again. This should occur in approximately 4-5 weeks. Continue this method to frequently defoliate brush until all paddocks have brush suppressed to at least the 80% threshold by the end of July. Research has shown that defoliation after July has little effect, so plan to have initial defoliation complete before August. Killing brush may take 2 to 3 years of repeated browsing if no other methods of brush control are used.

Most goat herds need protection from predators. An effective perimeter fence and a guard dog are usually necessary. Access to drinking water is also required.

Goat grazing preferences (woody as well as herbaceous plants) include autumn olive, multiflora rose, blackberry, greenbrier, honeysuckle, locust, sumac, willow, mulberry, oak, walnut, wild grape, gooseberry, sericea lespedeza, crown vetch, poison ivy, agrimony, chicory, red clover, ragweed, lamb's quarters, spotted knapweed, pigweed, and leafy spurge.

Less preferred species include cedar, hickory, ironweed, spiny amaranth, curly dock, pokeweed, buttercup, white clover, thistle, burdock, ox-eye daisy, Queen Anne's lace, and garlic mustard. Most grasses are generally not preferred by goats, especially when broadleaved plants are available.

Undesirable or potentially poisonous species include horse nettle, perilla mint, woolly croton, wild cherry (okay if fresh, poisonous if wilted), switchgrass (may cause photosensitivity), and alsike clover (may cause liver damage).

Grazing may not provide complete eradication of a particular species, but can reduce it to a manageable level. When a biological control such as grazing is combined with other control methods such as herbicides, mowing, or burning, elimination of undesirable plants may be possible and less expensive than using one method alone.

Chemical Control Methods

When herbicides are used, site-specific application criteria listed on pesticide labels and contained in Cooperative Extension and other approved pest management references must be followed. For specific herbicide recommendations, contact the appropriate specialist from Delaware Cooperative Extension.

Anyone buying or using a restricted use pesticide must be certified by the Delaware Department of Agriculture (DDA). Anyone in the business of applying pesticides, either restricted use or general use, to the land or property of another must be certified and obtain a Pesticide Business License from the DDA.

Apply herbicides specific for the woody species to be controlled. One or more of the following herbicide application techniques may be used:

1. Use a **foliar spray** for widespread general control. Completely wet the foliage. This method is most effective on plants that are less than 4 inches dbh;

Timing: Apply when the plant is actively growing and leaves are reaching full size. Application between mid-April and mid-June is preferable, with specific timing dependent on the local growing season. Mid-June to the end of September is next best;

2. Use a **basal spray** for selective treatment. Drench the entire tree or shrub base to the point of runoff, from the ground line up the stem for a distance of 15 to 24 inches, depending on the recommendations of the herbicide label. This technique is most effective on plants that are less than 3 inches dbh;

Timing: Any time of year;

3. Use a **stump spray** for treatment of cut stems. Completely saturate freshly cut areas and bark to ground level;

Timing: Any time during the growing season;

4. Use a **soil application** of herbicide when chemicals can be absorbed through the roots of the plant. Apply to the soil in the area under the plant canopy;

Timing: Any time when the ground is not frozen.

Important: Follow the directions and heed all of the precautions on the herbicide container label. Observe all applicable federal and state laws pertaining to the use of herbicides, including applicator licensing requirements. Do not use herbicides over or directly adjacent to wells (domestic, public, or agricultural), ponds, lakes, streams, wetlands, or other waterbodies unless so labeled.

Debris Disposal

Brush must be disposed of in a manner consistent with maintaining a quality environment, and in such a way that the debris does not interfere with the establishment of desired plants and future maintenance of the area.

Acceptable disposal methods may include:

1. **Burning**, if conducted in compliance with local ordinances and permit requirements;
2. **Piling**, especially if providing brush piles for wildlife habitat is desired. One brush pile per acre can provide effective wildlife cover. Place larger material on the bottom of the pile and make the pile at least 10 feet in diameter and 6 feet high;
3. **Chipping, shredding, or mulching**;
4. **Removal** to other areas.

For additional information concerning brush management, contact your local NRCS Service Center or Delaware Cooperative Extension office for specific recommendations concerning your site.

Additional References

Johnson, Quintin, Mark VanGessel, Richard W. Taylor. 2015. *Pasture and Hay Weed Management Guide*. University of Delaware, Cooperative Extension.

Peischel, A. and D.D. Henry, Jr., 2006. *Targeted Grazing: A Natural Approach to Vegetation Management and Landscape Enhancement*. American Sheep Industry Association.

USDA, Natural Resources Conservation Service. 2005. *Prescribed Grazing with Goats*. Conservation Practice Information Sheet, NRCS, Missouri.

Virginia Cooperative Extension. 2015. *Pest Management Guide*. Virginia Tech, Pub. No. 456- 016 and 456-017.

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