

**NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD**

BRUSH MANAGEMENT

(Ac.)

CODE 314

DEFINITION

The management or removal of woody (non-herbaceous or succulent) plants including those that are invasive and noxious.

PURPOSE

- Create the desired plant community consistent with the ecological site;
- Restore or release desired vegetative cover to protect soils, control erosion, reduce sediment, improve water quality, or enhance stream flow;
- Maintain, modify, or enhance fish and wildlife habitat;
- Improve forage accessibility, quality, and quantity for livestock and wildlife; and
- Manage fuel loads to achieve desired conditions.

CONDITIONS WHERE PRACTICE APPLIES

On all lands except active cropland where the removal, reduction, or manipulation of woody (non-herbaceous or succulent) plants is desired.

This practice will not be used for removal of woody vegetation by prescribed fire (use Conservation Practice Standard (CPS) Prescribed Burning (338)) or removal of woody vegetation to facilitate a land use change (use CPS Land Clearing (460)).

CRITERIA

General Criteria Applicable to All Purposes

Brush, as used in this standard, includes woody half-shrubs, shrubs, and trees that

invade areas on which they are not part of the natural plant community or that occur in amounts significantly in excess of that natural to the site.

Brush management should not be applied on sites with less than 25 percent canopy cover unless large numbers of young brush plants are already present and will dominate the plant community at greater than 25 percent or more canopy cover by the end of the planning horizon.

Brush management may be applied to the following species: ponderosa pine (*Pinus ponderosa*); eastern redcedar (*Juniperus virginiana*); Rocky Mountain juniper (*Juniperus scopulorum*); sand sagebrush (*Artemisia filifolia*); silver sagebrush (*Artemisia cana*); snowberry (*Symphoricarpos* spp.); Russian olive (*Elaeagnus angustifolia*); smooth sumac (*Rhus glabra*); cactus (*Opuntia* spp.); Siberian elm (*Ulmus pumila*); and saltcedar (*Tamarix ramosissima*). Species not contained in this list may be treated after consultation and approval by the state rangeland management specialist.

Brush management will be designed to achieve the desired plant community based on species composition, structure, density, and canopy (or foliar) cover or height.

Brush management will be applied in a manner to achieve the desired control of the target woody species and protection of desired species. This will be accomplished by mechanical, chemical, or biological methods either alone or in combination. When prescribed burning is used to control brush, the CPS Prescribed Burning (338) will be applied.

To manage trees for silvicultural purposes, use CPS Forest Stand Improvement (666).

The NRCS will not develop biological or chemical treatment recommendations except for biological control utilizing grazing animals. In such cases, CPS Prescribed Grazing (528) is used to ensure desired results are achieved and maintained. The NRCS may provide clients with acceptable biological and/or chemical control references.

The CPS Prescribed Grazing (528) shall be applied to ensure desired response from treatments whenever the treated area will be grazed by domestic livestock.

Follow-up treatments may be necessary to achieve objectives.

Additional Criteria for Creating the Desired Plant Community Consistent with the Ecological Site

Use applicable Ecological Site Description (ESD) state and transition diagrams, to develop specifications that are ecologically sound and defensible. Treatments must be congruent with dynamics of the ecological site(s) and keyed to state and plant community phases that have the potential and capability to support the desired plant community.

Additional Criteria for Restoring or Releasing Desired Vegetative Cover to Protect Soils, Control Erosion, Reduce Sediment, Improve Water Quality or Enhance Stream Flow

Choose a method of control that results in the least amount of soil disturbance if soil erosion potential is high and revegetation is slow or uncertain leaving the site vulnerable to long-term exposure to soil loss.

In conjunction with other conservation practices, the number, sequence, and timing of soil disturbing operations shall be managed to maintain soil loss within acceptable levels using approved erosion prediction technology.

Additional Criteria to Maintain, Modify, or Enhance Fish and Wildlife Habitat

Brush management will be planned and applied in a manner to meet the habitat requirements for wildlife species of concern as determined by an approved habitat evaluation procedure.

Areas of critically important wildlife habitat shall be addressed when planning this practice. Brush management will not be applied on steep escarpments, riparian areas, ravines, woody draws, and on areas containing shrubs and trees desirable for the wildlife species of concern.

Some common woody plants that are valuable for wildlife food and cover include: American elm, American plum, bearberry, boxelder, bur oak, chokecherry, cottonwood, currant, dogwood, green ash, hackberry, hawthorn, Juneberry, gooseberry, rose, leadplant, aspen, sandcherry, buffaloberry, skunkbush sumac, wild grape, and willow.

Leaving a 5 to 15 percent canopy cover of existing brush species within the treated area either as a block or a mosaic of treated and untreated areas will decrease the potential of any negative impacts to wildlife associated with this practice.

Brush on land where wildlife is a primary or important use should be manipulated to provide optimum wildlife habitat and to facilitate wildlife management as outlined within a wildlife habitat management plan.

Conduct treatments during periods of the year that accommodate reproduction and other life-cycle requirements of target wildlife and pollinator species and in accordance with South Dakota (SD) Biology Technical Note No. 15 and CPS Upland Wildlife Habitat Management (645).

Additional Criteria to Improve Forage Accessibility, Quality and Quantity for Livestock and Wildlife

Timing and sequence of brush management shall be planned in coordination with specifications developed for Prescribed Grazing (528).

Additional Criteria to Manage Fuel Loads to Achieve Desired Conditions

Control undesirable woody plants in a manner that creates the desired plant community, including the desired fuel load to reduce the risk of wildfire and facilitate the future application of prescribed fire.

CONSIDERATIONS

Consider using CPS Integrated Pest Management (595) in support of brush management.

Consider the appropriate time period for treatment. Some brush species are more susceptible to certain treatments at specific times during the year.

Consider impacts and consequences to obligate species (species dependent on the target woody species) when significant changes are planned to existing and adjacent plant communities.

Consider impacts to wildlife food supplies, space, and cover availability when planning the method and amount of brush management.

Consider present and future land use opportunities, expected effect on wildlife habitat, potential recreation impacts, aesthetic changes, positive and negative onsite and offsite environmental impacts, possible hazards, costs, grazing management, technical requirements, and maintenance.

Timing and sequence of brush management in a pasture and/or the entire operating unit should be planned to ensure required forage is available.

Consider soil erosion potential and difficulty of vegetation establishment when choosing a method of control that causes soil disturbance, when slopes are steep, or when understory vegetation is not immediately adequate.

In situations where desirable understory vegetation is not present in adequate amounts to meet objectives, consider seeding using the CPS Critical Area Planting (342).

Mechanical, chemical, and biological methods of brush control may be used singly or in combination depending on such factors as the kind of land (site), topography, brush species, ability of target species to resprout, the size, abundance, and distribution of brush species, hazards associated with treatment, objectives of the land user, and costs in relation to expected benefits.

When conducting mechanical brush control methods, any potential impacts on cultural resources will be considered.

If primary use of rangeland is for domestic livestock, then the objectives may be to manipulate numbers, species, and distribution of brush species to approximate that of natural conditions. If use is also for wildlife, the objective may be to maintain more brush species than is natural to the site and to manage the brush in a pattern on the land that favors both livestock and wildlife.

State issued licenses may be required when using chemical pesticide treatments.

For air quality purposes, consider using chemical methods of brush management that minimize chemical drift and excessive chemical usage and consider mechanical methods of brush management that minimize the entrainment of particulate matter.

PLANS AND SPECIFICATIONS

Plans and specifications for the treatment option(s) selected by the decision maker will be recorded for each field or management unit where brush management will be applied.

Prepare brush management plans and specifications that conform to all applicable federal, Tribal, state, and local laws. These documents will contain the following data as a minimum:

1. Goals and objectives clearly stated.
2. Pre-treatment cover or density of the target plant(s) and the planned post-treatment cover or density and desired efficacy.
3. Maps, drawings, and/or narratives detailing or identifying areas to be treated, pattern of treatment (if applicable), and areas that will not be disturbed.
4. A monitoring plan that identifies what should be measured (including timing and frequency) and that documents the changes in the plant community (compare with objectives) will be implemented.

For Mechanical Treatment Methods: Plans and specifications will include items 1 through 4, above, plus the following:

- Types of equipment and any modifications necessary to enable the equipment to adequately complete the job;
- Dates of treatment to best effect control;
- Operating instructions (if applicable); and
- Techniques or procedures to be followed.

For Chemical Treatment Methods. Plans and specifications will include items 1 through 4, above, plus the following:

- Acceptable chemical treatment references for containment and management or control of target species;
- Evaluation and interpretation of herbicide risks associated with the selected treatment(s);
- Acceptable dates or plant growth stage at application to best effect control and reduce reinvasion;
- Any special mitigation, timing considerations or other factors (such as soil texture and organic matter content) that must be considered to ensure the safest, most effective application of the herbicide ; and
- Reference to product label instructions.

For Biological Treatment Methods: Plans and specifications will include items 1 through 4 above, plus the following:

- Acceptable biological treatment references for containment and management or control of target species;
- Kind of grazing animal to be used, if applicable;
- Timing, frequency, duration and intensity of grazing or browsing;
- Desired degree of grazing or browsing use for effective control of target species;
- Maximum allowable degree of use on desirable non-target species;
- Special mitigation, precautions, or requirements associated with the selected treatment(s).

Species Specific Treatment Recommendations

SDTG Notice SD-309 Section IV NRCS-OCTOBER 2010

Ponderosa pine – the preferred method of controlling pine encroachment is prescribed burning. Burning prior to the time trees reach a height of six feet will provide excellent control, insure adequate fine fuels, and reduce hazards associated with prescribed fire in a least cost manner. Mechanical methods such as cutting individual trees or dozing are effective but labor and cost intensive.

Chemical methods are also available but are generally cost prohibitive. In areas where applicable, the thinning of ponderosa pine to commercial timber production levels may provide an additional source of income while maintaining desirable understory vegetation. See CPS Forest Stand Improvement (666) for information on thinning.

Eastern redcedar and/or Rocky Mountain juniper – the preferred method of controlling cedar or juniper encroachment is prescribed burning. Burning prior to the time trees reach a height of five feet will provide excellent control and ensure adequate fine fuels to carry a fire. Mechanical methods such as cutting individual trees, dozing, chaining, and cabling are effective but labor and/or cost intensive. Chemical methods are also available but generally less cost effective than prescribed burning.

Sand and silver sagebrush – chemical control methods are preferred due to these species' ability to sprout from roots and plant bases following treatments, such as, prescribed burning or mechanical treatments such as blading. Utilizing alternative grazing animals such as sheep and goats can be effective in controlling this species.

Snowberry – effective control of snowberry is typically only achieved with a combination of mechanical and chemical control methods. Snowberry is very effective at sprouting from roots and plant bases following treatments such as prescribed burning or mechanical treatments such as blading. Utilizing alternative grazing animals such as sheep and goats can be effective in controlling this species. There is some evidence that hoof action associated with winter feeding of livestock, salt and mineral placement, and intensive prescribed grazing directly within colonies of this species will reduce its density.

A combination of utilizing grazing/browsing animals and chemical control should reduce snowberry to tolerable levels.

Russian-olive and Siberian elm – chemical control methods are generally most effective. Mechanical control methods such as dozing, cabling, or sawing individual trees work well but are labor and cost intensive. There is some evidence these species may sprout following burning. Stumps of individually sawn trees should be chemically treated to prevent sprouting. Control of these species is most effective where trees are under five feet in height.

Smooth sumac – chemical control methods are preferred due to this species ability to sprout from roots and plant bases following treatments such as prescribed burning or mechanical treatments such as blading. Control of these species is most effective where trees are under five feet in height. As with snowberry, a combination of mechanical and chemical control methods will likely prove most effective.

Cactus – chemical control methods generally produce the best control. Dense stands of cactus can be reduced by blading just below the surface into windrows; however, windrows should be turned the following year to prevent bladed pads from re-establishing. This may work best in the winter when the ground is frozen. If adequate fine fuels are present, prescribed burning can provide excellent control.

Saltcedar – a combination of mechanical and chemical control methods is typically the most effective way to control saltcedar. Stump cutting followed by application of herbicide to the stumps is one method. Another approach is to cut the saltcedar off at the ground and then apply herbicide to young sprouting vegetation in the next season. A similar approach is to apply a prescribed burn followed by a herbicide control. With any method where the vegetation is mechanically removed, the vegetation should be removed from the area and destroyed. If water levels can be controlled in the area, a 24-month period of inundation has also been shown to be effective in killing saltcedar. Biological

control with species of leaf beetle and a mealybug may be possible but it is not clear yet if these species can overwinter in SD.

OPERATION AND MAINTENANCE

Operation. Brush management practices shall be applied using approved materials and procedures. Operations will comply with all local, state, and federal laws and ordinances.

Success of the practice shall be determined by evaluating post-treatment regrowth of target species after sufficient time has passed to monitor the situation and gather reliable data. Length of evaluation periods will depend on the woody species being monitored, proximity of propagules (seeds, branches, and roots) to the site, transport mode of seeds (wind or animals), and methods and materials used.

The operator will develop a safety plan for individuals exposed to chemicals including telephone numbers and addresses of emergency treatment centers and the telephone number for the nearest poison control center. The National Pesticide Information Center (NPIC) telephone number in Corvallis, Oregon, may also be given for non-emergency information: **1-800-858-7384**

Monday to Friday

6:30 a.m. to 4:30 p.m. Pacific Time

The national Chemical Transportation Emergency Center (CHEMTRAC) telephone number is: 1-800-424-9300.

- Follow label requirements for mixing/loading setbacks from wells, intermittent streams and rivers, natural or impounded ponds and lakes, and reservoirs.
- Post signs, according to label directions and/or federal, state, Tribal, and local laws, around fields that have been treated. Follow restricted entry intervals.
- Dispose of herbicides and herbicide containers in accordance with label directions and adhere to federal, state, Tribal, and local regulations.
- Read and follow label directions and maintain appropriate Material Safety Data

Sheets (MSDS). The MSDS and pesticide labels may be accessed on the Internet at: <http://www.greenbook.net/>.

- Calibrate application equipment according to recommendations before each seasonal use and with each major chemical and site change.
- Replace worn nozzle tips, cracked hoses, and faulty gauges on spray equipment.
- Maintain records of brush/shrub control for at least two years. Herbicide application records shall be in accordance with United States Department of Agriculture Agricultural Marketing Service's Pesticide Recordkeeping Program and state-specific requirements.

Maintenance. Following initial application, some regrowth, resprouting, or reoccurrence of brush may be expected. Spot treatment of individual plants or areas needing retreatment should be completed as needed while woody vegetation is small and most vulnerable to desired treatment procedures.

Deferment periods required after this practice is applied will be for two years (treatment and following year). The deferment period will be for a minimum of 60 percent of the growing season each year. The growing season is considered to be April 1 to October 31.

Review and update the plan periodically in order to:

- Incorporate new IPM technology;
- Respond to grazing management and complex plant population changes; and
- Avoid the development of plant resistance to herbicide chemicals.

REFERENCES

- Branson, F. A, G. F. Gifford, K. G. Renard, R. F Hadley, and E. H. Reid, ed. 1981. Rangeland Hydrology, 2nd ed., Society for Range Management, CO.
- Heady, H. F. and D. Child, 1994. Rangeland Ecology and Management, Westview Press, CO.
- Holechek, J. L., R. D. Pieper and C. H. Herbel. 2000. Range management principles and practices, 5th edition. Prentice Hall, NJ.
- Krausman, P. R., ed. 1996. Rangeland Wildlife. Society for Range Management, CO.
- Monsen, S. B., R. Stevens, and N.L. Shaw, comps. 2004. Restoring Western Ranges and Wildlands, Volume 1. Gen. Tech. Rep. RMRS-GTR-136-1, USDA, Forest Service, Fort Collins, CO.
- United States Department of Agriculture, Natural Resources Conservation Service. 2003. National Range and Pasture Handbook. Washington, DC.
- United States Department of Agriculture, Natural Resources Conservation Service. 2008. General Manual: Title 190 – Ecological Sciences, Part 404, Pest Management. Washington, DC.
- Valentine, J. R., 1989. Range Developments and Improvements, 3rd ed. Academic Press, MA.
- Vavra, M., W. A. Laycock, R. D Pieper, eds. 1994. Ecological Implications of Livestock Herbivory in the West. Society for Range Management, CO.