

NATURAL RESOURCES CONSERVATION SERVICE CONSERVATION PRACTICE SPECIFICATION

BRUSH MANAGEMENT

(ACRE)

CODE 314

LIFE SPAN 10 YEARS

I. SCOPE

The work will consist of furnishing material and equipment as required to remove, reduce, or manipulate non-herbaceous plants at levels to meet management objectives. **Refer to Conservation Practice Specification Brush Management – Pinyon Pine and Juniper (Code 314A) for guidance of the control and removal of pinyon and juniper trees.**

II. GENERAL REQUIREMENTS

All activities associated with this practice shall comply with federal, state, tribal and local laws and regulations. It is the landowner's responsibility to obtain appropriate permits and/or applications prior to commencing an activity.

Brush management techniques can be targeted for certain portions of a landscape and distributed across landscapes both temporally and spatially such that mosaics of vegetation structures, patch sizes, shapes and age states are created. The areas to be treated shall be shown on the plan maps and the methods used, target species, and timing of treatment are all listed on the practice documentation worksheet and supporting materials. The equipment and tools used must be consistent with soil and site factors, in order to avoid excessive soil erosion, compaction, rutting or damage to the soil surface layer. The treatment method shall protect site resources, such as soils, riparian areas, wetlands, cultural resources, improvements and utilities.

On native rangeland areas, brush management treatments will be used to control, contain, or eradicate undesirable woody and/or succulent vegetation. Use Ecological Site Description (ESD) State and Transition model, to determine if proposed actions are ecologically sound and defensible. If an ESD model is not available, base design criteria on best approximation of native plant community composition, structure, function, and response potential. Treatments need to be congruent with dynamics of the ecological site(s) and are keyed to states and plant community phases that have the potential

and capability to support the desired plant community. Consult the NRCS State Rangeland Management Specialist for the appropriate State and Transition Model.

Prior to treatment all areas to be treated will have the following forms completed:

- NV-CPA-52 Environmental Evaluation
- NV-EVC-01 Cultural Resources Worksheet
- NV-ECS-01 Rangeland Inventory Worksheet
- NV-CPA-314 Brush Management Practice Documentation Worksheet
- NV-ECS-19 Wildlife Habitat Evaluation Guide for Grazed Range
- NV-ECS-34 Species Habitat Evaluation Guide for Sage Grouse when in Sage Grouse Range.

The following are associated conservation practices that are commonly used in conjunction with brush management:

- Prescribed Grazing (528)
- Range Planting (550)
- Pasture and Hayland Planting (512)
- Prescribed Burning (338)

In order to achieve maximum treatment effects for the improvement of wildlife habitat the following conservation practice is required:

- Upland Wildlife Habitat Management (645)

Wildlife and Sensitive Plant Species Considerations

Wildlife needs, including seasonal restrictions, will be considered when applying brush management practices and documented on the NRCS-CPA-52 Environmental Evaluation and supporting documentation. Species that need to be considered include, but are not limited to; pronghorn antelope, sage grouse, raptors, migratory birds, pygmy rabbit, mule deer, elk, as well as wetland or aquatic species that are found in riparian areas, springs, seeps, or meadows near/within the treatment area. In areas of sage grouse leks, nesting, and summer habitat, treatments will only be conducted in the fall or early winter. Consult the NRCS State Biologist if

an on-site evaluation identifies possible wildlife habitat conflicts.

Populations of sensitive plant species and/or habitat as identified on the NRCS-CPA-52 Environmental Evaluation and supporting documentation will be avoided such that associated treatment activities reduce potential impacts to identified resources.

For areas of native rangeland identified as sage grouse range, brush management will not be considered for any woody species unless the percent composition (by foliar cover) of the target species within the present plant community significantly exceeds that listed as potential on the associated ecological site description (approximately double the *average* percent composition listed in the ecological site description). In areas of sage grouse leks, nesting, and summer habitat, mechanical treatments will only be conducted in the fall or early winter.

To provide optimum habitat for sage grouse and other sagebrush obligate species, treatments should be designed to thin the sagebrush canopy, remove patches of sagebrush to provide a mosaic of early seral vegetation within mature sagebrush stands, reduce the competition between mature sagebrush and the herbaceous understory, and increase the vigor, productivity, and diversity of herbaceous species (Connelly et al. 2000).

Where treatment areas are adjacent to perennial streams, native meadows, and other wetland areas, an undisturbed (irregular-shaped) strip of land supporting natural vegetation (approximately 100-feet in width) will be left along each side.

Brush management for areas of seeded rangeland (i.e. introduced wheatgrasses) will be evaluated on a case by case basis in areas of sage grouse habitat. Approval from the State Rangeland Management Specialist and the State Biologist will be needed in this instance.

Grazing Considerations

Where livestock grazing occurs within the treatment area, released vegetation shall be allowed to recover prior to grazing. A minimum deferment of at least one growing season is required. Targeted grazing to control invasive species will be allowed upon approval from the State Rangeland Management Specialist. Timing and sequence of brush management shall be planned in coordination with standards and specifications developed for conservation practice Prescribed Grazing (Code 528). A grazing plan will be developed consistent with the goals of the conservation plan.

III. TREATMENT METHODS AND REQUIREMENTS

A. MECHANICAL TREATMENT

Time of application is dependent upon the physiological life cycle stage of the species to be controlled, rainfall patterns, and seeding practices to follow treatment. Brush management operations will be timed to prevent the exposure of bare soil for long periods of time and to reduce erosion and sediment transport into adjacent water bodies.

Following some mechanical treatments, seeding of herbaceous vegetation will be required. ***Treated areas (brush control and/or seeded) will be deferred from grazing for at least one full growing season following treatment*** to allow for recovery and/or establishment of desirable perennial herbaceous vegetation. In cases where weeds are abundant, a short period of grazing to reduce the weed crop will be allowed during the first two growing seasons. Approval from the State Rangeland Management Specialist and the State Biologist will be needed in this instance.

For additional guidance see Prescribed Grazing (Code 528) and Range Planting (Code 550) conservation practice standards and specifications.

1. Chaining:

Target Species: Big sagebrush and other nonsprouters

Acceptable equipment: Chains – Smooth Chain, Ely Chain

Chaining in one direction with a light, unmodified anchor chain is an effective treatment for thinning a decadent stand of sagebrush. The treatment will be considered with or without artificial seeding, depending on the condition of the herbaceous understory. Revegetation will be considered if there is less than 25 percent composition (by foliar cover), in total, of desired understory species present in the plant community prior to treatment. Fall seeding using fixed-wing aircraft, helicopter and/or rangeland drills is recommended. For additional guidance follow the Range Planting (Code 550) conservation practice standard and specification.

Chaining is accomplished by dragging an anchor chain in a *U*-shape, half-circle, or *J*-shape behind two crawler tractors traveling in a parallel direction. A chain length of 90 to 350-feet with individual links weighing 40 to 150-pounds each is recommended. The chain is attached to each

tractor using a swivel joint to allow for tumbling and turning of the chain. Chains are dragged in a loose pattern to maximize ground contact. A chain length to swath width ratio of 2:1 to 3:1 is most effective.

The Ely Chain is a modified conventional anchor chain where short lengths of railroad iron are welded across each link. An Ely Chain will uproot large shrubs as the welded cross-rail catches the base of a plant. The heavy chain then rolls over the uprooted plants crushing and breaking the branches. An Ely Chain also loosens the surface soil and creates an excellent seedbed for broadcast planting. Refer to the publication The Ely Chain (Cain, 1971) for more information on uses, construction, and operation of an Ely chain.

A Chaining Suitability rating is available for soil map unit components listed for each map unit on the NRCS Web Soil Survey. The chaining suitability ratings represent the relative physical limitations of soil factors upon use of implements suitable for chaining rangeland sites. This rating should be used in conjunction with the Rangeland Seeding rating or the Restoration Potential rating depending upon whether seeding or natural regeneration will be utilized on the site.

Chaining operations can be used on land that is too rough, steep, or rocky for other equipment and commonly occurs on slopes of up to 50 percent. Chaining shall be accomplished on the contour wherever possible. Chaining on the contour reduces power requirements for equipment and soil-disturbance furrows and brush windrows are left on the contour. Debris piles oriented across slope interrupt overland flow and act as sediment traps.

2. Plowing and Disking

Target Species: Big sagebrush, creosotebush, rabbitbrush, horsebrush, tamarisk, black greasewood, willow

Acceptable equipment: standard disk plow, wheatland plow, heavy offset disk (Towner disk), disk chaining, brushland plow, power grubbing, heavy sweep, and root-type plows equipment can be used.

Tillage equipment is only used on sites with relatively stone-free soils and level to moderate slopes with less than a 30 percent gradient.

Equipment will be operated at depths and at angles to ensure complete cutting of taproots and lateral roots of target species. For big sagebrush control, timing of treatment will be conducted when soils are sufficiently dry so that partly covered plants will not initiate re-growth.

Treatment will be sufficient to reduce target species composition as identified on NV-CPA-314. In order to accomplish the desired percent reduction a follow-up treatment may be necessary.

3. Railing and Dragging

Target Species: Big sagebrush and other nonsprouters

Acceptable equipment: Rails, pipe (Dixie) harrow, or other objects of various types and design that are heavy enough to obtain satisfactory kill of target species may be used. Motor grader and bulldozers, where blades are used for surface scalping, are also suited.

This method of control is not effective on crown-sprouting shrubs species such as snowberry, rabbitbrush, black greasewood, and silver sagebrush, or any woody plants that sprout from roots (or root crowns) when the tops are killed.

Railing and dragging equipment are not to be used on any sprouting shrub species except in areas being treated primarily to improve wildlife habitat.

Use of this method is limited primarily to stands of mature big sagebrush having an adequate understory of native grasses and forbs. This method of brush management is not recommended if the site is to be seeded following treatment.

Time of operation is after brush has become dry and brittle but before brush has matured seed. Timing will vary with seasonal conditions and elevation.

4. Cutting

Target Species: Tamarisk, Russian olive, and nonsprouters

Acceptable equipment: Chain saws, bow saws, axes or other appropriate hand tools, will be utilized. Hydraulic shearing blades and saws, hand grubbing

The cutting and disposal of individual plants is adapted to sites supporting a mix of woody species and only certain species are targeted for removal (or retention). This method is also applied to sites where a reduced number of target species is desired.

Downed trees can be salvaged for fuelwood or other uses. Tree tops and limbs that remain following salvage should be lopped and scattered, or piled and burned, depending on the amount of slash produced. Slash burning will be done in openings. Slash may be piled and left for a time to provide wildlife habitat if specified in the plan. Burning of brush/slash piles will require a Prescribed Burn Plan in accordance with conservation practice Prescribed Burning (Code

338) Conservation Practice Standard and Specification.

Stumps will be as cut as low to the ground surface as possible (height less than 6 inches on the uphill side of the stump) with equipment being used.

Resprouting species such as Russian olive and tamarisk will require herbicide treatment to the stump immediately after the final cut. Each stem of trees with multiple stems must be treated individually with herbicide.

5. Beating and Mowing

Target Species: Big sagebrush, snakeweed, rabbitbrush

Acceptable equipment: Flail-type rotary machines (rotobeater), rotary mowers (brush hog), Lawson aerator, roller chopper, circular saw-type equipment or sickle mowers can be used. Shredding or masticating equipment such as the Bull Hog or Hydro-Ax can also be used.

Equipment should be set to operate 4-inches (\pm 2-inches) above the ground level. All equipment should meet OSHA standards for operator protection.

Beating or mowing equipment is not to be used on any sprouting shrub species except in areas being treated primarily to rejuvenate browse plants for improved wildlife habitat.

This method is well suited to areas supporting stands of mature big sagebrush (and other non-sprouting shrub species) having an adequate understory of desirable herbaceous species that will respond to a reduction in shrub competition.

Operations are limited to stone-free areas on level to gently sloping landscapes.

Revegetation should be planned if there is less than 25 percent composition (foliar cover), in total, of desired understory species present in the plant community prior to treatment.

Resprouting species such as rabbitbrush will require additional herbicide treatment. Growing conditions and spray timing must be ideal at the time of treatment. Soil should be moist in the top 4 inches thus a spring application (late April-May) is best when the previous winter precipitation has been above normal. A fall application should be made in years with above normal summer rainfall and rabbitbrush has reached the late to post-flower state (typically late September-October).

6. Brush Raking

Target Species: Big sagebrush, rabbitbrush, and manzanita.

Acceptable equipment: bulldozer with a brush rake attachment is used.

Rakes vary from front-mounted to dump rakes that are towed. Brush rakes shall penetrate deep enough to pull brush roots out of the ground.

Debris shall be pushed into windrows on the contour and allowed time to dry. Burn debris when dry and when weather conditions are favorable. Spread soil that has accumulated with windrowing following burning of dried brush. Burning of brush piles and windrows will require a Prescribed Burn Plan in accordance with conservation practice Prescribed Burning (Code 338) standard and specification.

Revegetation is recommended where 50 percent or more of the soil surface is disturbed or when there is less than 25 percent composition (by-weight), in total, of desired understory species present in the plant community prior to treatment.

7. Pushing

Target Species: Russian olive, and tree-type shrubs with large diameter main stems.

Acceptable equipment: Bulldozer with blade, front-end brush-rake, or grubber is used.

Push over trees when the soils are moist (not wet).

Uprooted trees may be left in place, pushed into piles, or arranged in windrows. Piles and windrows may be burned completely or selectively. Burning of brush piles and windrows will require a Prescribed Burn Plan in accordance with conservation practice Prescribed Burning (Code 338) standard and specification. Piles left intact provide wildlife cover.

Revegetation is recommended where 50 percent or more of the soil surface is disturbed or when there is less than 25 percent composition (foliar cover), in total, of desired understory species present in the plant community prior to treatment.

B. CHEMICAL TREATMENT

Management of woody species by use of chemical treatment methods will be in accordance with conservation practice Integrated Pest Management (Code 595) standard and specification. NRCS will not develop biological or chemical treatment recommendations except for biological control utilizing grazing animals. NRCS may provide clients with acceptable biological and/or chemical references.

In accordance with NRCS policy, NRCS personnel are not authorized to provide recommendations for herbicide use. Landowners will contact local Cooperative Extension Service educator, chemical company representative or an agricultural consultant for specific recommendations. NRCS personnel will use WIN-PST or other approved tools to evaluate environmental risk associated with herbicide recommendations relative to treatment site conditions and potential for herbicide to result in significant environmental impacts.

Land users and applicators using chemical herbicides are cautioned as follows:

Read the entire container/product label – Follow all instructions and heed all precautions on the label. It is the responsibility of the user to use the herbicide according to the label.

Landowners and applicators should be aware of and adhere to the provisions of local, county, state or federal laws and regulations concerning the use of agricultural chemicals.

Required conformance with permits of all local, state and federal regulations for use of chemicals shall be the responsibility of the landowner. Permits for use of chemicals will specify legally required setbacks from water courses, ponds, residences, etc.

Specifications for the kind of chemical, methods, and time of application will be in accordance with the herbicide label and in accordance with the latest:

- University of Nevada Cooperative Extension Service - Weed Control Recommendations;
- Pacific Northwest Weed Control Handbook;
- Weed Control in Natural Areas in the Western United States;
- Montana-Utah-Wyoming Weed Management Handbook.

Guidelines:

- Chemical treatments provide a means of killing certain species (*i.e.*, crown-sprouters) that cannot be efficiently controlled by other methods. At times chemical treatments can be used in conjunction with mechanical methods.
- Herbicides can be used in terrain or rocky areas unsuitable for mechanical equipment.

- When water is used as a carrier, commercial wetting agents (surfactant/adjuvant) shall be used according to manufacturers' recommendation and herbicide label
- Herbicides used for brush management will never be applied over live water, including flowing springs. It is the responsibility of the landowner to ensure that herbicide applications are in full compliance with this requirement.

C. BIOLOGICAL TREATMENT

Grazing with livestock, particularly browsers such as sheep or goats during critical growing stages of target plants can be effective control for certain species. The hoof action associated with winter-feeding of livestock may also effectively reduce some brush species. Specifications for biological treatment will be developed based on the individual problems of the area, and available research data. Specific treatments will address the kind of grazing/browsing animal to be used; timing, duration and intensity of grazing or browsing; desired degree of grazing or browsing use for effective control of target species; and maximum allowable degree of use on desirable non-target species. Management of brush by application of controlled livestock grazing will be in accordance with conservation practice Prescribed Grazing (Code 528) standard and specification.

D. PRESCRIBED BURNING

Management of woody species by application of controlled burning will be in accordance with conservation practice Prescribed Burning (Code 338) standard and specification.

Only NRCS personnel, with required expertise and appropriate job approval authority and certification, are authorized to assist with the planning and implementation of prescribed burns (Nevada Prescribed Burn Policy 2007). A written Prescribed Burn plan will be prepared by a person with the appropriate job approval authority or qualifications (Nevada Revised Statute 527.128).

Each identifiable prescribed burn treatment area requires a separate burn plan. All permits necessary to conduct the prescribed burn will be obtained by the landowner/cooperator.

Burn plans must adhere to all federal, state and local laws regarding outdoor burning, fire control, smoke management, and air quality.

Prescribed burn plans will be coordinated with local fire departments, adjacent landowners, county commissioners, local law enforcement offices and Nevada Highway Patrol, Nevada Division of Forestry, Nevada Department of Wildlife, US Forest Service, and/or the Bureau of Land Management. The prescribed burn plan will be authorized by the entity that is responsible for fire protection in that area (local fire department, Nevada Division of Forestry, US Forest Service, Bureau of Land Management).

NRCS personnel assisting with prescribed burning practice application are to document in the conservation plan file that the landowner has been informed that he/she is responsible for adherence to local, state, and federal laws and regulations pertaining to the use and management of fire and that he/she may be liable for damages and costs for fire suppression by others, should prescribed fire escape from a designated area.

IV. MONITORING

Collecting baseline and post-treatment data is necessary to determine efficiency (% foliar cover removed) and to determine if objectives have been met. Minimum data collected will include photo points and plant composition and ground cover before and after treatment using the line-point method. In addition to the line intercept method other methods may be used. For other methods refer to: Monitoring Manual for Grassland, Shrubland, and Savanna Ecosystems USDA-ARS Jornada Experimental Range, 2005; the National Range and Pasture Handbook USDA-NRCS, 2003; and Sampling Vegetation Attributes USDI-BLM, 1996.

V. OPERATION AND MAINTENANCE

Brush management treatment areas that are not seeded require a *minimum* period of deferment for at least one full growing season from use by domestic livestock. The period of deferment is dependent upon management objectives and the pretreatment density and vigor of desirable plants expected to benefit from application of the brush management practice. Targeted or strategic grazing can often accomplish specific objectives with the timing and duration of livestock (type and class), and training of those animals depending on the species of plants targeted for grazing and those targeted for retention and expansion.

Full benefit to established species released from competition with woody plants is usually realized after the second growing season following treatment (assuming "normal" growing conditions).

Drought following treatment, low vigor of desirable grasses, invasion of the treated area by undesirable plants, and/or other abnormal conditions may make it desirable to extend the deferment beyond the above requirements. If any of these conditions exist, the NRCS conservationist will inform the cooperator of required extended additional deferment periods.

Treated areas should be inspected periodically by the landowner and determination made of "spots" where additional treatment is necessary.

REFERENCES

- Archer, S.R., K.W. Davies, T.E. Fulbright, K.C. McDaniel, B.P. Wilcox and K. I. Predick. 2011. Brush management as a rangeland conservation strategy: a critical evaluation. *In*: Conservation Benefits of Rangeland Practices. Assessment, Recommendations and Knowledge Gaps. USDA Natural Resources Conservation Service. Pp. 105-170.
- Cain, Don. 1971. The Ely Chain: a practical handbook of principles and practices of chaining and vegetative manipulation. USDI-BLM, Ely, Nevada. 32pp.
- Connolly, J.W., M.A. Schroeder, A.R. Sands, and C.E. Braun. 2000. Guidelines for Management of Sage Grouse Populations and Habitats. Wildlife Society Bulletin 28:967-985.
- DiTomaso, J.M. G.B. Kyser et al. 2013. Weed Control in Natural Areas in the Western United States. Weed Research and Information Center, University of California. 544 pp.
- Fairchild, J.A., J.N. Davis, J.D. Brotherson, and USDA Forest Service. 2005. Big sagebrush response to one-way and two-way chaining in southeastern Utah. All U.S. Government Documents (Utah Regional Depository) Paper 455.
- Jordan, G. L. 1981. Range Seeding and Brush Management on Arizona Rangelands. Cooperative Extension Service, Agricultural Experiment Station Publication T81121, University of Arizona, Tucson, AZ.
- Launchbaugh, K. (ed) 2006. Targeted Grazing: A natural approach to vegetation management

- and landscape enhancement. American Sheep Industry Association.
- Montana, Utah, and Wyoming Cooperative Extension Service. 1995. Weed Management Handbook. Montana State University, Bozeman, MT; Utah State University, Logan, UT; *and* University of Wyoming, Laramie, WY.
- Oregon, Idaho, and Washington Cooperative Extension Service. 1995. Pacific Northwest Weed Control Handbook. Oregon State University, Corvallis, OR *and* Washington State University, Pullman, WA.
- Patterson, R. and D. Worwood. 2014. Russian Olive control – Cut Stump Treatment. Utah State University Extension. 3 pp.
- Swanson, S. (editor in chief), B. Bruce, R. Cleary, B. Draugt, G. Brackley, G. Fults, J. Linebaugh, G. McCuin. V. Metschner, B. Perryman, P. Tueller, D. Weaver and D. Wilson 2006. Nevada Rangeland Monitoring Handbook. Second Edition. University of Nevada Reno, Cooperative Extension Educational Bulletin-06-03, 81 pp.
- U.S.D.A. Forest Service. 2015. Field Guide for Managing Rabbitbrush in the Southwest. TP-R3-16-31. 7pp.
- Valentine, J.F. 1989. Range Development and Improvements. Third Edition. Academic Press San Diego, CA.