

**NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD**

BRUSH MANAGEMENT

(acre)

CODE 314

DEFINITION

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

PURPOSES

- Create the desired plant community consistent with the ecological site and associated state and transition model.
- 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.
- 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. to address one or more of the purposes above.

This practice does not apply to removal of woody vegetation by prescribed fire (use Prescribed Burning (338)) or removal of woody vegetation to facilitate a land use change (use Land Clearing (460)).

For management of herbaceous species management see Herbaceous Weed Control (315).

CRITERIA

General Criteria Applicable To All Purposes

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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, burning, or biological methods either alone or in combination. When prescribed burning is used as a method, the Prescribed Burning standard (338) will also be applied.

When the intent is to manage trees for silvicultural purposes, use Forest Stand Improvement (666).

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

Follow-up treatments may be necessary to achieve objectives.

Treatment is generally considered to be maintenance and not needed or desirable when native brush and/or succulent species canopy cover or density is less than 3% or less than 5 plants per acre.

Non-native or noxious brush and/or succulent species are appropriate for treatment at any level of cover or density. The exception to this are areas where treatment would open the area to invasion by other non-native plants with the potential to take control of the site or where post treatment soil erosion is expected to be severe. In these cases mitigating practices must be installed.

Evaluate soil erosion potential, local weather conditions, local environmental conditions and difficulty of vegetation establishment when choosing a method of management that causes soil disturbance.

For grazing lands, Prescribed Grazing (528) shall be applied before and after planned treatment to ensure desired results are

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achieved and maintained for the practice lifespan or Use Exclusion (472) shall be applied to ensure desired response from treatments. See Practice Standards & Specifications 528 and/or 472 for grazing management requirements after Brush Management.

Brush management will be planned and applied in a manner that it will not adversely affect threatened or endangered species or their habitats.

Alternatives will be developed that avoid or minimize adverse effects on State Species of Concern and their habitats, and decision makers will be encouraged to adopt such alternatives.

Evaluate the appropriate time period for treatment. 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.

Reseeding of native species will be necessary where less than 20% similarity index to the ESD plant community is present or where less than 5% basal cover of desired species remnants are present pre-treatment. Use practices Range Seeding (550) where no significant soil disturbance or landscape shaping is present. Use Critical Area Planting (342) where significant soil disturbance or landscape shaping is present.

The method of brush and/or succulent species management with the least potential hazard to man, animals, and the environment, will be used meeting the conservation needs and objective of the operator including cost effectiveness. The need for brush and/or succulent management is governed by the land-use objectives, alternatives in management, the kind and amount of infestation by brush and/or succulent species, as well as considerations of the anticipated impacts upon the environment, cultural resources, and landscape.

If this practice has the potential to effect land managed under the USDA standards for Organic production, then treatment alternatives must be included that meet standards for the National Organic Program (NOP):

<http://www.ams.usda.gov/AMSv1.0/nop>

Ultimately each Cooperator is responsible for selecting and implementing an alternative that

meets management objectives, including adherence to NOP standards or other guidelines that may apply.

Brush management **will be applied** only to sites:

- 1 With treatment area soils having potential for producing the desired plant community
- 2 When brush invasion/infestation exceeds the Reference State and Reference Community density and/or production and/or cover for the site. (Refer to the Ecological Site Description (ESD)).
- 3 With grazing management practices and other maintenance measures that ensure maximized treatment success and longevity.
- 4 When non-brush pastures of the operating unit are already under grazing management or will have a grazing management plan implemented that assures an improving trend.
- 5 In a manner that it will not adversely affect threatened or endangered species, their habitats and/or critical habitats

Brush management **will not be applied** to sites:

1. Where removal will result in sustained accelerated erosion.
2. Where the benefits are disproportionate with the costs and the objectives of the landowner and NRCS.
3. Where removal of Pinion-Juniper woodland is to be conducted on lands that match the definition of "original Pinion – Juniper Site" as described on page 8 of woodland Technical Note No. 1 (revised April 2, 1981. RE: Pinyon-Juniper Management.)
http://www.nm.nrcs.usda.gov/technical/tech-notes/forestry_wood/wood-1.pdf
4. Where grazing management is inadequate on non-brush areas of the operating unit and a restoration grazing plan can not be agreed upon with the cooperator.
5. When there will be long term negative impact to environmental, cultural or landscape resources.

Treatment will be designed prior to implementing the practice and will meet the recorded land-use objectives including environmental, cultural and landscape considerations:

- 1 When objectives include recreation area improvement. Refer to specifications for practice 562 - Recreation Area Improvement.
- 2 In areas of mixed stands of brush for which approved methods have been established, priority of treatment will be for the target species or group of species where predicted treatment effects will have the most effect on producer objectives.
- 3 Methods will be selected to achieve the desired density of undesirable target species with least harm to non-target species.
- 4 It may be desirable to plan more than one control method for the same species or a control for two or more species under certain conditions.
- 5 Refer to Practice 645 - Wildlife Upland Habitat Management for pertinent wildlife planning considerations.

The computation technique used will be documented to substantiate the degree of infestation (Table 1) for the brush to be manipulated. The following techniques will be used.

To determine canopy cover of shrub and tree species use; New Mexico Range Technical Note No. 28 (Rev. September 1970), describes a method to determine canopy cover using the canopy cover intercept method. Please use this method where canopy cover intercept is listed as the inventory method in table 1.

<http://www.nm.nrcs.usda.gov/technical/tech-notes/range/range28.pdf>

To determine plants per acre or canopy cover % of shrub species: Three 1/10 acre plots (each plot to measure 6.05' x 720' or 12.1' x 360 or 66' x 66' or 37.25 feet in radius circle) placed in an area representative of the proposed treatment area is acceptable where the average of the three is used. See "Belt Transect for measuring perennial invasive plants and woody species" portion of the Agricultural Research Service, Jornada Experimental Range - Monitoring Manual for

Grassland, Shrubland and Savanna Ecosystems

http://usda-ars.nmsu.edu/monit_assess/PDF_files/Quick_Start.pdf

To determine density of tree species The National Forestry Handbook, 2004 describes the use of the zig zag transect for determining tree density. This method is only to be used on Juniper or mixed pinion/juniper/ or mixed p/j/ponderosa stands.

ftp://ftp-fc.sc.egov.usda.gov/NSSC/National_Forestry_Handbook/nfh_2004.pdf

The average tree spacing is found by dividing the total of distances from tree to tree in the zigzag transect by the number of trees sampled in the same transect.

The number of trees per acre = 43560/Avg. tree spacing squared. Only enough data needs to be gathered in the zigzag transect to yield the average tree spacing for a representative stand sample area. Minimum of 20 trees per transect and at least 1 line per density class in the specification.

Alternative method to determine density of tree species 1/10 acre plots (each plot to measure 66' x 66' or 37.25 feet in radius circle) Minimum to characterize the treatment unit is 1 plot placed in an area representative of each density class in the specification.

Additional Criteria for creating the desired plant community consistent with the ecological site and associated state and transition model.

Use applicable Ecological Site Description (ESD) State and Transition models, 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. If an ESD is not available, base specifications on the best approximation of the desired plant community composition, structure, and function.

Brush management on native rangelands shall be planned in such a way as to not remove more native woody and succulent species than what is listed in the "Percent Canopy Cover by Height Class" section of the desired state and

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plant community phase in the Ecological Site Description for the site. Where woody and succulent species are controlled to levels below what is called for in the ESD Reference State then "Create the desired plant community consistent with the ecological site and associated state and transition model." Cannot be used as a purpose.

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 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.

Conduct treatments to avoid critical periods of the year that accommodate reproduction and other life-cycle requirements of target wildlife and pollinator species and in accordance with specifications developed for Wetland Wildlife Habitat Management (644) and Upland Wildlife Habitat Management (645).

Brush Management will be planned and applied in a manner to meet the habitat requirements of the wildlife species or suites of species of concern. These species will be listed on the job sheet. See specifications and record on job sheet all special patterns of treatment and rates of application used to improve wildlife habitat.

Reduced chemical rate applications may be used under this purpose. (An example of this would be ½ pound per acre of A.I. Tebuthiuron applied under the supplemental label instructions versus what is currently considered the full rate of ¾ pound per acre or more).

Planners are to be aware of the soil and weather variables that will constrain the effectiveness of this low rate strategy and convey them to clients considering this alternative. Clients using these reduced rates are potentially accepting a lower kill rate than standard.

Additional Criteria for the Chemical Management of Shinnery Oak in Lesser Prairie Chicken and Sand Dune Lizard Habitat

Criteria for the application of brush management on shinnery oak is found in Biology Technical Note 53.
http://www.nm.nrcs.usda.gov/technical/tech-notes/bio/bio53a_rev09-8-11.pdf

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

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

The prescribed grazing plan will include provisions that account for periods of forage unavailability in pastures while those areas recover from Brush Management treatments.

Additional Criteria for Managing 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, facilitate the future application of prescribed fire.

A variety of management activities can be used to control undesirable woody plants and reduce wildfire hazards at the same time.

See the Firebreak (394) and Fuel Break (383) practices standard and specification for criteria and considerations that will aid in designing a management strategy to reducing wildfire hazards.

Additional Criteria for Chemical Pesticide Use:

The Cooperator must be supplied a copy of the specification including the required environmental conditions for effective product application and the cooperator will be advised on:

- 1 Federal, state and county laws and regulations governing the use of herbicides and labeling. The uses for which a herbicide has been registered are included in the information provided on the label of the commercial product. By reading the label, determine the proper uses for which the product is intended. Herbicides approved for specified uses in New Mexico are listed in the, **Chemical Weed and Brush Control for New Mexico Rangelands, NMSU Cooperative Extension Service • Circular 597.** Additional information on treatment for specific species can be found in the "**New Mexico Brush Busters**" publications or the specification for this standard. Refer to the label on the commercial product for detailed information concerning dosage application and precautions. Certain precautions may be noted in the publication that are not included on the label but are applicable to local conditions in New Mexico.
- 2 It is legal to use registered mixtures of herbicides; however, only a few mixtures of herbicides are registered.
- 3 Proper certification to apply the herbicide.
- 4 Note that label data on herbicides are maximal values and also represents manufacturers guaranteed product efficacy rates. Lower marginal rates except as specifically mentioned in this standard and specifications must be approved by the ASTC/Technical Services.
- 5 Environmental Risk Analysis (WIN-PST) and interpretation of analysis and identification of appropriate mitigation techniques must be integrated into the conservation plan and discussed with the operator.

Additional Criteria for Prescribed Burning:

Fire is a natural part of several ecosystems and prescribed burning can be used effectively to reduce or remove species such as sagebrush or juniper. When prescribed burning is used on root-sprouting brush species such as oak, maple, rabbitbrush, yellowbrush, horsebrush, or willows, follow-up with other methods will be necessary for effective control. Proper herbicide application is an effective follow-up method.

Burning can be used without seeding where desirable fire tolerant plants make up 15 percent or more of the total composition. When seeding is needed, burning is an appropriate pretreatment to prepare the area for seeding.

If this method is used, the standards and specifications for Prescribed Burning (338) will apply.

Additional Criteria Relating to Degree of Reduction (Percent Kill):

The degree of reduction will depend upon the method of treatment selected, the objectives of the cooperator, and the environmental consequences. The Ecological Site Description (ESD) can be used to set a target level of brush reduction.

A general guideline is to expect 80% or more of the target species canopy or density to be killed within the treatment area at the conclusion of all treatments. In some cases other resource considerations (such as wildlife habitat needs or socio-economic concerns) may dictate a lesser percentage of density reduction. All such decisions must be recorded in the Brush Management job sheet.

The percent of target species reduction can be calculated by conducting a series of transects in the pre treatment state and comparing that to the post treatment numbers in the same transect lines. See table 1 in the Specification of the proper transect method for each target species.

CONSIDERATIONS

Consider the appropriate time period for treatment. 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.

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 cumulative effects and spatial relationship impacts to wildlife food supplies, space, and cover availability when planning the method and amount of brush management. For instance, many brush management chemicals also cause short term suppression of the forb community.

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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.

Consider consulting with a biologist to assess impacts to species when planning block treatments. In general, treatments that create a mosaic are more desirable.

If seeding is necessary use applicable practices (e.g. Range Planting (550), Pasture and Hay Planting (512), Critical Area Planting (342)) to identify seedbed preparation, species, rates, timing, etc.

If woody vegetation is to be removed by prescribed fire, use Prescribed Burning (338) in place of this standard, if woody vegetation is to be removed to facilitate a land use change, use Land Clearing (460) in place of this standard.

It is the policy of the Natural Resources Conservation Service (NRCS) to encourage the use of pest-control methods having the least potential hazard or adverse impact on man, animals, and the environment.

NRCS conservationists have the responsibility to document plans in sufficient detail to predict the effects of the proposed brush management upon the environment, cultural resources, and landscape.

Conservationists are to:

- 1 encourage cooperators to fully consider present and future land use opportunities in relation to brush management, including expected effect on wildlife habitat, potential recreation use, and ecological site;
- 2 determine that the landowner understands the technical requirements, possible hazards, and costs of the practice and that the landowner will apply the kind of grazing management and maintenance measures that will insure success; and;
- 3 help land users understand the environmental impacts of brush management, positive and negative, on-site and off-site.

While the final decisions to proceed on any practice or management system rests with the land user or landowner, the conservationist

must provide complete, factual information in order to assist the decision maker to:

- 1 Understand the extent and value of all of the resources which would be impacted.
- 2 Evaluate both the short-term and long-term, on-site and off-site, impacts of proposed actions.
- 3 Select the alternative, which has the greatest positive impacts on social, economic, and environmental resources.
- 4 Recognize the opportunity to select an alternative with high potential for improving multiple resources.
- 5 Recognize the difficulty of vegetation establishment when choosing a method of control that causes soil disturbance.
- 6 Recognize that the timing and sequence of brush management in a pasture and/or the entire operating unit should be planned to ensure needed grazing management.
- 7 In areas where significant impacts from elk grazing and deer browsing can be expected post treatment planners should consider treatment sizing and feasibility of success and discuss this with the client.

In order to accomplish these planning considerations, the conservationist should prepare evaluations of the potential impacts of the selected action or alternative upon:

- 1 Current and potential future forage production.
- 2 Current and potential future wood products.
- 3 Current and potential levels of erosion and water quality.
- 4 Current and potential future values of wildlife habitats and wildlife populations.
- 5 Current and potential future recreational uses.
- 6 Current and potential future impacts on the landscape; expressed as the visual impact and sensitivity level of the landscape as a function of the viewing public.
- 7 The kinds and amounts of grazing management and maintenance measures which will be needed to ensure the success of vegetation changes. These

evaluations will be thoroughly discussed with the decision maker.

Degree of Infestation: Infestation is based on the percent of crown canopy of the dominant and associated species, or on the number of plants per acre. See Table I for a definition of the degree of infestation for certain species.

A heavy infestation indicates that brush is thick enough to suppress a quality plant cover and hinder movement of some classes of livestock.

A medium infestation indicates that brush is significantly limiting quality plant cover.

A light infestation indicates brush presence is recognizable but not in sufficient quantity to appreciably limit quality plant cover.

For some land uses, brush may be desirable. For others, it may be desirable to reduce some species to prevent later infestations that may require more costly measures.

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, 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. If hazards to treatments are to be disclosed by the client to any contractors. These are to include power lines, underground utility, towers, etc...
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.

5. Any mitigation planned for environmental, cultural, or landscape resources.
6. Prescription for deferment and or prescribed grazing.
7. Check-out procedure and certification of completion.
8. Follow up measures, if needed

For Mechanical Treatment Methods: Plans and specifications will include items 1 through 8, 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)
- Techniques or procedures to be followed

For Biological Treatment Methods: Plans and specifications will include items 1 through 8, 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)

For Chemical Treatment Methods: Plans and specifications will include items 1 through 8, above, plus the following:

- Acceptable chemical treatment references for containment and management or control of target species

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- Acceptable dates or plant growth stage at application to best effect control and dampen 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
- Reference to product label instructions
- Herbicide name (Chemical name not trade name)
- Rate of application in Pounds of Active Ingredient per acre.
- Spray volume in gallons per acre.
- Mixing instructions (if applicable)
- Any special application techniques, timing considerations or other factors that must be considered to ensure the safest, most effective application of the herbicide. This will include soil and air temperature, plant phenology, and wind speed parameters where this information is critical to treatment effectiveness.
- Reference to label instructions
- Where an aerial applicator is used then GIS generated files of the planned treatment areas MUST be supplied to applicator as well as GPS generated files of the completed treatment areas MUST be supplied to NRCS by the applicator.
- Application Monitoring and check-out procedure and certification of completion. It is mandatory that NRCS Field Office staff be assured that all chemical Brush Management operations are conducted according to these standards and specifications. Accordingly; on the ground monitoring of Chemical Brush Management treatments by qualified field office staff is required where chemical product labels prescribe specific environmental conditions that impact product efficacy such as wind speed, soil temperatures, plant phenology and air temperatures. New Mexico BLM has offered this monitoring service where their treatment monitoring operations are in proximity to private operations. If on-site monitoring by NRCS or BLM staff can not be accomplished then the cooperators and the chemical applicator can continue with the treatment and assume all responsibility for correctly applying the treatment and effectiveness and must supply all required treatment monitoring documentation to NRCS. Such documentation will be stored in the NRCS customer file. Clients always have the ability to suspend treatments until all parties are satisfied that all criteria and considerations can be met.
- Ultimately the Cooperative is responsible for the proper implementation of the conservation practice. The cooperators generally contract with the applicator and has the responsibility to ensure that the applicator applies these specifications accordingly. Any deviations recommended and/or implemented by the cooperators and/or applicator, which are outside the prescribed environmental conditions that impact product efficacy such as wind speed, soil temperatures, plant phenology, and air temperatures, are the sole responsibility of the cooperators. Any major deviations, which may result in less than agreed to levels of control, can result in this practice not being certified as completed.
- It is required that all aerial chemical applicators conform to the NAAA Operation SAFE configuration that was produced for that airframe number. Where applicators do not have NAAA Operation SAFE data or the equipment is not configured in the same manner as was tested and certified on the SAFE card then the cooperators and the chemical applicator can continue with the treatment and assume all responsibility for correctly applying the treatment and effectiveness and must supply all required treatment monitoring documentation to NRCS. Such documentation will be stored in the NRCS customer file.
- Aerial Chemical Applicators using an Electrostatic Aerial Spray System will rigorously conform to the supplemental chemical label instructions and rates and weather parameter constraints that are contained on the label. Requirements for

system daily maintenance and cleaning will also be adhered to.

- Documentation of the use of environmental risk analysis tools (such as WIN-PST Soil Pesticide Interaction Loss Potential and Hazard Rating Report) in formulating alternatives with the client.

Any selected alternative that will potentially have a negative impact on water resources. (e.g., WIN-PST “Extra High”, “High” or “Intermediate” soil/pesticide loss or human risk ratings). Must have an appropriate set of mitigation techniques planned and implemented to address risks to humans and non-target plants and animals.

Any selected alternative that models in WIN-PST with an “Extra High” rating for an identified water resource concern requires the planning and implementation of all possible mitigation in addition to applicable IPM that optimizes the use of this pesticide to the maximum extent possible.

For biological treatment: methods, plans and specifications will include:

- Kind of biological agent or grazing animal to be used
- Timing, duration, and intensity of grazing or browsing
- Desired degree of grazing or browsing use for effective management of target species
- Maximum allowable degree of use on desirable non-target species
- Special precautions or requirements when using insects or plants as management agents
- See Prescribed Grazing (528) Specification titled: “Supplement 1 – Brush and Weed Pest Management with Goats” for details on Brush Management using Goats.

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

For Chemical applications the Cooperator must be advised to do the following:

- 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). 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.

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- Maintain records of Brush/shrub control for at least two years. Herbicide application records shall be in accordance with USDA Agricultural Marketing Service's Pesticide Recordkeeping Program and state-specific requirements.

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 regrowth or reoccurrence 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.

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

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.

Where this practice is used to restore grazed range or wildlife land it must be understood that Brush Management is an accelerating practice used to restore an ecological site's plant community to the desired natural range of variation. Once this is achieved it takes more than spot spraying to maintain site health.

Proper management of the desired plant community will maintain this practice for its' planned life span. See Prescribed Grazing (528) for guidance on plant community maintenance on grazed lands and Upland Wildlife Habitat Management (645) for

guidance on plant community maintenance where wildlife habitat is the major concern.

After the natural range of variability for the site has been restored, Prescribed Fire (338) can be used in addition to management practices to maintain the desired plant community.

Where it is not otherwise specified, the treatment and the time interval between treatments will be determined by the conservationist and the decision maker.

Areas where brush has been manipulated must be managed in a way that is compatible with the treatment and land-use objectives.

The NRCS conservationist will present alternatives for the protection period needed to provide the greatest benefit to the species to be increased.

1. Grazing management will meet prescribed grazing standards and specifications (528)
2. Drought following treatment, low vigor of desirable grasses, and invasion of the treated area by undesirable plants and other abnormal conditions may require extension of the protection period beyond the minimum required under the above conditions. The NRCS conservationist is expected to encourage the cooperators to extend the protection periods whenever the above conditions exist.
3. The degree to which the key forage species will be used following protection/deferment will be in accordance with specifications for prescribed grazing.
4. Areas of significant size disturbed by mechanical brush treatment will be reseeded unless it is determined that natural revegetation by desirable species will occur within a reasonable period, normally two or three years. In the Southern Desert Land Resource Area, seeding may be feasible only on selected sites, usually having over 13 inches of precipitation. Site selection will be made by the cooperators with the assistance of the NRCS conservationist.
5. When seeding is necessary, prescribe specifications for seeding practices at the time brush management is planned. It is recommended that native species be used when appropriate. It is recommended that species composition and content be as

close a match as possible to the Eco-System description (ESD) for the area.

6. Follow-up treatment may be necessary.

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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.
- Range Technical Notes -- #17 through 22, 32, 35, and 45 (Interagency Reports 1, 2, 3, and 4)
<http://www.nm.nrcs.usda.gov/technical/tech-notes/range.html>
- Chemical Weed and Brush Control for New Mexico Rangelands, NMSU NMSU Cooperative Extension Service • Circular 597
http://aces.nmsu.edu/pubs/_circulars/CR_597
- Brush and Weed Control on New Mexico Ranges, NMSU, Agri Exp. Sta. Guide B-806
http://aces.nmsu.edu/pubs/_b/b-806.html
- Methods of Controlling Pricklypear Cactus, NMSU, Agri Exp. Sta. Guide B-800
- Snakeweed Control With Herbicides, NMSU, Agri Exp. Sta. Bulletin BL-706
- Snakeweed: Problems and Perspectives, NMSU, Agri Exp. Sta. Bulletin-BL-751.
- Vegetation Change Following Big Sagebrush Control With Tebuthiuron, NMSU, Agri Exp. Sta. Bulletin BL-764
- Juniper Control with Soil-Applied Herbicides, NMSU, Agri Exp. Sta. Bulletin BL-772
<http://aces.nmsu.edu/pubs/research/horticulture/BL772.pdf>
- Management of Mesquite, Creosotebush, and Tarbush with Herbicides in the Northern Chihuahuan Desert, NMSU, Agri Exp. Sta. Bulletin BL-775.
- Mesquite Control in New Mexico, NMSU, Agri Exp. Sta. Circular-CR-505.
- Considerations for Prescribed Burning, NMSU, Agri Exp. Circular-CR-522.
- 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.
- http://aces.nmsu.edu/pubs/_circulars/Cr-522.pdf
- 1994 Summary of Range Brush Control Research, NMSU, Agri Exp. Sta. RITF-RITF-38.
- Guidelines for Prescribed Fire In New Mexico, New Mexico State Forestry, January 1992.
- NM State Forestry COMMERCIAL TIMBER HARVESTING REQUIREMENTS
http://www.emnrd.state.nm.us/fd/documents/19-20-4_NMAC_eff09142007.pdf
- NM NM State Forestry Forest Practices Guidelines
<http://www.emnrd.state.nm.us/fd/ForestMgt/documents/ForestPracticesGuidelines2008.pdf>
- John P. Taylor and Kirk C. McDaniel, 1998, Restoration of Saltcedar (Tamarix sp.)-Infested Floodplains on the Bosque del Apache National Wildlife Refuge, Weed Technology 12:345-352.
- Keith W. Duncan & Kirk C. McDaniel, 1998, Saltcedar (Tamarix spp) Management with Imazapyr, Weed Technology, 12:337-344.
- Collaborative Conservation Strategies for the Lesser Prairie-Chicken and Sand Dune Lizard in New Mexico. Findings and Recommendations of the New Mexico LPC/SDL Working Group
http://nwcoss.org/Resources/LPC_SDL_Conservation_Strategy_CD.pdf
- When in Lesser Prairie-Chicken (LPC) and Sand Dune Lizard habitat refer to NRCS-NM Biology Tech note #53 for treatment criteria and directions.
http://www.nm.nrcs.usda.gov/technical/tech-notes/bio/bio53a_rev09-8-11.pdf

Guidelines for Aerial Spraying Mesquite in New Mexico May 2008

<http://age-web.nmsu.edu/mesquite/Aerial%20Spraying%20of%20Mesquite.pdf>

"New Mexico Brush Busters" publications:

Mesquite Control: Individual Treatments BC-1

http://aces.nmsu.edu/pubs/_b/BC-1.pdf

Mesquite Control: Aerial Application BC-2

http://aces.nmsu.edu/pubs/_b/BC-2.html

Juniper Control: Individual Plant Treatments BC-3

Snakeweed Control: Aerial Application BC-4

http://aces.nmsu.edu/pubs/_b/BC-4.pdf

Additional NMSU published Guides:

Control Cholla Cactus Guide B-804

http://aces.nmsu.edu/pubs/_b/b-804.pdf

Brush and Weed Control on NM Ranges Guide B-806

http://aces.nmsu.edu/pubs/_b/b-806.pdf

Control Perennial Snakeweeds Guide B-815

http://aces.nmsu.edu/pubs/_b/b-815.pdf

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