United States Department of Agriculture

Natural Resources Conservation Service

CONSERVATION PRACTICE STANDARD

PRESCRIBED BURNING

CODE 338

(ac)

DEFINITION

Controlled fire applied to a predetermined area.

PURPOSE

This practice is used to accomplish one or more of the following purposes–

- To control undesirable vegetation
- Prepare sites for planting or seeding
- Control plant disease
- Reduce wildfire hazards
- Improve wildlife habitat
- Improve plant production quantity and/or quality
- Remove slash and debris
- Enhance seed and seedling production
- To facilitate distribution of grazing and browsing animals
- Restore and maintain ecological sites

CONDITIONS WHERE PRACTICE APPLIES

Practice applies on all landuses except annually tilled cropland.

CRITERIA

General Criteria Applicable to All Purposes Burn plan

All prescribed burn plans shall address the following items:

- Location and description of the burn area.
- Description of pre-burn vegetation cover.
- Resource management objectives.

- Required weather conditions for prescribed burn.
- Notification check list.
- Pre-burn preparation.
- Equipment checklist/personnel assignments and needs/safety requirements.
- Post burn evaluation criteria.
- Firing sequence.

- Ignition method.
- Approval signatures
- Evaluation of meteorological and smoke dispersion to reduce public exposure

The procedure, equipment, and the number of trained personnel shall be adequate to accomplish the intended purpose before the burn is ignited.

The expected weather conditions, human and vehicular traffic that may be impeded by heat or smoke, liability (e.g., utility lines) and safety and health precautions shall be integrated into the timing, location and expected intensity of the burn.

Timing of burning will be commensurate with soil and site conditions to maintain site productivity and minimize effects on soil erosion and soil properties such as (structure and soil moisture).

Weather parameters and other data that affect fire behavior will be monitored during the burn. Release of trace gases and particulates can be minimized by the timing and burn intensity to promote complete combustion.

The timing of the burn will be based on, at a minimum: relative humidity, wind conditions, air temperature, and fuel conditions and ventilation category restrictions.

Utilities
Consider the location of utilities such as electric power lines and natural gas pipelines to prevent damage to the utility and avoid personal injury from electrical discharge into smoke or ignition of gasses. Notify utility company personnel before prescribed burn operations are to begin. They can implement contingency plans that minimize hazards to people and resources in and near the burn area.

Burn the entire pasture if feasible. When all of a pasture is not burned, grazing management for the pasture or at least the burned patches will be based on the management goals for the burned area.

In all cases where prescribed fire will be used the Firebreak standard (394) and/or Fuel Break standard
(383) will be used to retard fire spread and create manageable divisions within the main body of the prescribed fire.

Definitions: See the National Wildfire Coordinating Group (NWCG) Glossary of Wildland Fire Terminology; http://www.nwcg.gov/pms/pubs/glossary/a.htm

Fireline
The part of a control line that is scraped or dug to mineral soil. Also called fire trail. May also refer to a “wet line” where water has been used to create a burn boundary in light fuels such as grass.

Firebreak

A permanent or temporary strip of bare land or vegetated land planned to retard fire.

Fuel Break
A strip or block of land on which the vegetation, debris and detritus have been reduced and/or modified to control or diminish the risk of fire spread.

Pile Burning
Where downed trees and brush piles are located near the fire perimeter an increased hazard of fire escape is created. To manage this hazard all brush piles and dead and down trees will be moved to an area well within the black line and mineral lines. Alternatively an expanded firebreak/fuelbreak can be used to separate piles and downed trees from the prescribed burn area.

Sizing Mineral and Black Lines
A rule of thumb on sizing mineral and black lines is 1 – 1.5 times the fuel height for the mineral line and 100 ft – 500 ft for the black line. Black line width depends on fuel load, fuel moisture fuel structure, wind

direction and intensity (The guideline is estimate maximum expected flame length and multiply by three for black line width) At least 2 times this minimal distance will be required for especially large piles or high volatile fuels. Where high volatile fuels are on both sides of the line then a minimum of 700 feet separation will be required.

Grazing Management
Before the burn, grazing rest and management will be implemented to allow the proper amount of fine fuel to be present during the burn. All grazing lands will have the practice Use Exclusion (472) planned immediately following the burn and/or the area burned will be part of a prescribed grazing system that allows partial rest to each pasture or at least the burned patches during the growing season. This rest is extremely important when reducing brush canopy cover and improving forage quality and quantity is the goal. (See 528 - Prescribed Grazing)

A **Fire Prescription** must be developed for each burn area. A Fire Prescription is a description of the acceptable range of:

- Fire Weather
- Fuel and Soil Moisture
- Fuel Quantity
- Fire Behavior Conditions
- Explanation of the desired effects of the practice.

A **Burn Plan** must be developed for each burn area. The minimum contents of the plan are as follows:

- Dimensions and types of firebreak will be designed for each burn and recorded in the burn plan.
- The objectives to be accomplished by a particular burn
- An acceptable range of fire weather, fuel moisture, and fire behavior parameters to safely achieve desired effects (Fire Prescription)
- Burn-specific information on hazards, and contingencies, escape routes and safety zones
- Identification of smoke sensitive areas and determination of meteorological

conditions that will promote smoke dispersal away from them

- Details of pre-burn site preparation, probable ignition patterns, crew assignments, holding positions, and mop-up activities
- Lists of equipment needed for the burn
- List of parties to be notified prior to burning.
- sources of emergency assistance
- A series of high-quality maps showing the burn unit, smoke sensitive areas, ecologically sensitive areas, proposed ignition pattern, and escape routes, safety zones and secondary control lines
- A checklist for burn preparation and crew briefing
- Registration with the Smoke management desk at NMED and notification

Fire Weather
A 24-hour weather forecast will be obtained immediately prior to conducting the burn. This weather forecast can be obtained from the National Weather Service, Albuquerque, NM. (505)244-9148 or NOA Western U.S. Fire Weather Forecast on the Internet at: http://www.srh.noaa.gov/abq/?n=forecasts- fireweather. This webpage has a 24 hour fire weather forecast which must be download twelve hours or less before the burn plan's ignition. During the fire, the weather will be monitored on site by the designated fire weather individual. After the fire is declared out the weather will be monitored for a further 24 hour period at minimum with an eye toward changes in humidity, temperature and wind speed that can cause flare-ups.

Haines Index, for fire weather use. It is used to indicate the potential for wildfire growth by measuring the stability and dryness of the air over a fire. This index has been shown to be correlated with large fire growth on initiating and existing fires where surface winds do not dominate fire behavior.

The Haines Index can range between 2 and 6. The drier and more unstable the lower atmosphere is, the higher the index.

- 2 : Very Low Potential — (Moist Stable Lower Atmosphere)
- 3 : Very Low Potential
- 4 : Low Potential
- 5 : Moderate Potential
- 6 : High Potential———- (Dry Unstable Lower Atmosphere)

Ventilation Category
Burners shall only burn during times when ventilation category is rated as "good" or better. The burner may apply for a waiver of this requirement in writing from the AQB.

State Law
Conservationists planning with land users must adhere to the legal restraints in the New Mexico State Statutes Annotated 1978. (Chapters 30-17-1 and 68-2-8)

FIRE:

http://www.conwaygreene.com/nmsu/lpext.dll/nmsa1978/9a1/f2c6/f861?f=templates&fn=documen

t- frame.htm&2.0#JD_Ch30Art17

FOREST CONSERVATION:

http://www.conwaygreene.com/nmsu/lpext.dll/nmsa1978/9a1/217fa/21812?f=templates&fn=document- frame.htm&2.0#JD_Ch68Art2.

Planners are strongly encouraged to cooperatively plan all prescribed burns with State Forestry. At a minimum State Forestry must be allowed to review all prescribed fire planning on state and private lands. The URL is; http://www.emnrd.state.nm.us/fd/Index.htm

This practice will be applied in accordance with all state and local laws and ordinances. It is the landowners' responsibility to register prescribed burns with the New Mexico Environment Department/Air Quality Bureau and to comply with all federal, state, local and county regulations and ordinances.

Burn registration is mandatory and can be done at the New Mexico Smoke Management Program website. The URL is: http://www.nmenv.state.nm.us/aqb/SMP/smp_index.html

Smoke Management
Smoke impacts must be considered before the burn and must be monitored during the burn. Smoke can impact human health if the plume travels to smoke sensitive areas such as population centers, schools, hospitals, etc. Smoke can also reduce visibility, which can lead to transportation safety problems. Burners are required to follow state law regarding ventilation category restrictions as stated on the New Mexico Smoke Management Program website.

In addition to burn registration, information regarding fire weather, other permitted burns, and a smoke management Guide are available at the website. (See references for the New Mexico Fire Information website, the smoke management guide2001 ed., and the National Smoke Management website).

The simple smoke screening tool, for a given wind direction, will show the downwind region potentially impacted by smoke from a fire. The web-based tool is available at: http://shrmc.ggy.uga.edu/ (select "Smoke Products", then "Smoke Screening"). At a minimum planned burns must be evaluated with this tool to determine potential smoke impacts to human populations. Populated areas within a 15 mile circle of the burn must be notified according to state law prior to ignition.

Safety
Safety precautions are to be planned before the burn as part of the burn plan and monitored during the burn. Protect sensitive wildlife habitat, headquarters, oil and gas sites, power line poles, highly erodible areas, cultural resources or other areas that would be unsafe to burn.

NRCS employees will not act as burn boss or participate in any ignition activity unless specifically authorized as part of their job approval authority.

NRCS employees will act in accordance with all Federal, state, and local laws and within the scope of their work. The job approval authority and/or certification level that has been attained will restrict the extent to which an NRCS employee may provide technical assistance.

To the extent those NRCS employees are acting within the scope of their work and have the proper job approval authority they may assist as follows:

- Assist in development of burn plan.
- Provide resource information such as soils, vegetation, production, maps, photos, climate data etc.

Additional Criteria for Wildfire

Burning timing and intensity will be managed with consideration for wildlife needs such as nesting, feeding, and cover.

Wildlife habitat can be improved, either by reducing the amount of brush, and/or by making it more available. Cooler fires should be used when burning root- sprouting brush species when the intent is to burn the brush back to a height below the normal browse line of wildlife.

Wildlife habitat can be improved for edge dependant species by burns of different sizes, frequencies, and intensities that create mosaic patterns and produce the desired amount of "edge effect." Consult with a Wildlife Biologist to determine the proper interspersion of habitat needs for the species or suite of species of interest.

Native ungulates like elk, deer and antelope can be a significant consideration on sizing and management of prescribed burns in most areas of NM. Where this is true it is important to size the burn area sufficiently to accommodate increased utilization by wild ungulates who will be attracted over long distances to the highly palatable and nutritious forage and browse. Managing the post-burn area must take into account the increased forage/browse demand of wild ungulates. When conducting feed and forage analysis allot sufficient portions of available forage/browse to wildlife unless other diversions (feeding, fencing) are in place to account for the demand.

Additional Criteria for Controlling Undesirable Vegetation

When brush suppression is the objective, the fine fuels should be evenly distributed through out the burn area and of adequate quantity to carry the fire.

Avoid burning within one growing season after heavy seed crops of Big sagebrush. Seedlings of Big sagebrush can come back very quickly to compete with desirable grasses.

Where herbicide is applied to manage brush and/or tree species prior to burning carefully follow label instructions on required delays between chemical application and burning.

Proper herbicide application is an effective follow-up method of control that should be considered on burns carried out to reduce root-sprouting species. (Mesquite, alligator juniper, redberry juniper, oak species, Tamarisk and algerita are vigorous sprouters).

Additional Criteria to Improve Forage Production and/or Quality

Plant response to burning results in increased palatability, quality, quantity, and availability of grasses and forbs. Dead material low in nutrient value is removed, new growth high in protein, phosphorous, and calcium becomes readily available. Grazing management following the burn must be designed to allow for the desired response of forage species and to aid in accomplishing the burn objectives.

Additional Criteria for Wildfire Hazard Reduction

When burning is used to reduce hazardous fuel loads it is not necessary to achieve 100 percent coverage of the entire area. The objective is to break up fuel continuity.

Additional Criteria for Slash and Debris Removal

When burning in slash-strewn areas, ideal 10-hour time-lag fuel moisture (TLFM) content is 7-12%. When the 10 hour time- lag moisture is <6%, areas should not be burned due to volatility. Under these conditions spot fires are almost certain to occur.

Additional Criteria for Soil Erosion reduction

Soil texture and slope influence soil erodibility following a burn. Burning of coarse textured sandy soils or on slopes greater than 20% can increase soil erosion rates for several years post-burn.

Appropriate mitigating practices and measures must be planned and installed to protect the soil resource.

Additional Criteria for Seeding

Burning is a useful pre-treatment to prepare an area for seeding. Broadcast seed or drill following burning before rain has settled the ash. A survey sampling of all vegetation in the burn area must be conducted in the planning phase of the burn plan. If desirable plants occur in the intershrub/intertree areas throughout the stand then seeding may not be required. If inadequate quantities of desirable vegetation are present then seeding must be required. Use the Range Planting (550) standard for seeding or interseeding. Use the Critical Area Planting (342) standard where extensive soil disturbance or physical site modification is planned.

Additional Criteria for Juniper, Pinion and other Conifer fuels

All Dead fuel types are divided into four size classes: 1 hour (flashy fuels), 10 hour (½-inch diameter), 100 hour (3-inch diameter) and 1,000 hour (8-inch diameter). In general, the larger fuels take longer to absorb or lose moisture. They also take longer to extinguish when ignited. The smaller diameter fuels are generally easier to ignite and faster to consume.

Dead fuels are categorized into fuel diameter classes named according to the timelag principle. This principal is based on the fact that the proportion of a fuel particle exposed to weather is related to its size. Small diameter fuels can change rapidly in response to weather changes, while larger diameter fuels are slower to respond. A timelag is the time required for a fuel particle to reach 63% of the difference between the initial moisture content and the equilibrium moisture content (or equilibrium with changed atmospheric conditions). The categories are named for the “midpoint” of the response time of each fuel category: 1- hour fuels respond in less than 2 hours,

10-hour fuels respond in 2 to 20 hours,

100-hour fuels respond in 20 to 200 hours, and 1,000 hour fuels respond in greater than 200 hours.

For optimal prescribed burning conditions, the moisture content of the 10-hour fuel moisture sticks should range from 8 to 20 percent for most locations. If the moisture content is too low, prescribed burns can

become intense and erratic, firebrands will be generated and fire effects may be too severe. If the moisture content is too high, too little fuel may be burned.

Larger downed woody debris are common 100-hour forest fuels. These fuels take longer to

dry, deterring their consumption under most conditions. Likewise, 100-hour fuels are slow to gain moisture, so they can combust after prolonged drought, even with recent precipitation. When 100- hour fuels ignite they can burn for hours, in mixtures of flaming and smoldering combustion. Decay of 100-hour fuels can alter their response and makes them combust more readily than intact fuels. For optimal prescribed burning conditions aimed at consuming the materials , the moisture content of the 100 hour fuel should range from 7 to 20 percent for most locations.

CONSIDERATIONS

General Considerations

Burning should be managed with consideration for wildlife and pollinator needs such as nesting and feeding cover.

Existing barriers such as lakes, streams, wetlands, roads, rocky thin soiled outcrops, and constructed firebreaks are important to the design and layout of this practice and should be used as fuel breaks.

After chaining or dozing of mature juniper, burning is not recommended for 3 to 5 years. The delay will allow juniper seeds to germinate and be killed by the burn.

Uprooted juniper trees can be stacked against live juniper trees. Alternatively, cut juniper branches can be stacked at the bases of live junipers. Once the dead material cures to the desired fuel moisture content it can be burned. In this way numbers of juniper controlled can be increased.

When planning and implementing ignition sequences be aware that fire whirls are readily created by converging fire fronts. Ignition sequences must be planned to minimize or eliminate zones where fires converge near burn area boundaries.

Hydrophobic Soils

Where burned areas include brush piles or downed trees that are expected to burn for a longer than normal period of time or higher intensity a risk of creating hydrophobic soils exists.

These areas are created where soil organic matter is oxidized and an impermeable layer to water intake is created. This layer is easily broken up by animal traffic or hand tools. Seeding of these areas should be considered post burn in the process of breaking up soil caps.

PLANS AND SPECIFICATIONS

Specifications will be prepared by certified individuals and prepared for each site and recorded using approved specification sheets, job sheets, technical notes, and narrative statements in the conservation plan, or other acceptable documentation. All necessary permits must be obtained and a burning plan developed before implementation of the practice.

This standard is not intended to encompass all site-specific situations. Experience and judgment must be used in site-specific instances.

Specifications (burn plan) for burning shall be prepared for each site. Specifications shall be recorded using Conservation Practice Job Sheet 338 for Prescribed Burning.

Organic Producers: If this practice has the potential to affect 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.

OPERATION AND MAINTENANCE

The kinds and expected variability of site factors (e.g., fuel condition and moisture content, weather conditions, human and vehicular traffic that may be impeded by heat or smoke, liability, and safety and health precautions) shall be monitored during the operation of this practice. Sufficient fire suppression equipment and personnel shall be available commensurate with the expected behavior of these factors during the time of burning to prevent a wildfire or other safety, health or liability incident.

Maintenance shall include monitoring of the burned site and adjacent areas until ash, debris and other consumed material is at pre-burn temperatures.

The burn area must be inspected regularly to determine if burn objectives were achieved. Additional supporting practices may need to be applied as maintenance measures post burn. For example a follow- up treatment of Brush management (314) may be required if invasive/increaser brush species begin to re- colonize the burn area.

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NOTES:

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