

**NATURAL RESOURCES CONSERVATION SERVICE**

**CONSERVATION PRACTICE STANDARD**

**PRESCRIBED BURNING**

(Ac.)

**CODE 338**

**DEFINITION**

Applying controlled fire to a predetermined area.

**PURPOSES**

To control undesirable vegetation.

To prepare sites for harvesting, planting, or seeding.

To control plant disease.

To reduce wildfire hazards.

To improve wildlife habitat.

To improve plant production quantity and/or quality.

To remove slash and debris.

To enhance seed and seedling production.

To facilitate distribution of grazing and browsing animals.

To restore and maintain ecological sites.

**CONDITIONS WHERE PRACTICE APPLIES**

On rangeland, forestland, native pasture, pastureland, wildlife land, hayland, and other lands as appropriate.

**CRITERIA**

**General Criteria Applicable To All Purposes**

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.

Comply with applicable federal, state, and local laws and regulations during the implementation of this practice.

**Personnel and Equipment**

The personnel and equipment will be sufficient to conduct the burn and accomplish the intended purposes of the burn plan, as well as, control any potential escape of the burn. Generally, a minimum of five people will be required to conduct a burn. This number will increase as the complexity (i.e., size, quality, and quantity of fire lines, fuel loading, fuel condition, etc.) increases. Equipment needs are variable, depending on the complexity of the burn and fuel types. It is desirable to have at a minimum, one engine capable of applying at least 20 gallons per minute and with a minimum of 200 gallons of capacity. A tractor equipped with a disk or chisel is desirable to have on standby. All personnel at the fire must have Personal Protective Equipment, and hand tools such as shovels, fire rakes, backpack pump sprayers, and drip torches are recommended.

Conservation practice standards are reviewed periodically, and updated if needed. To obtain the current version of this standard, contact your Natural Resources Conservation Service [State Office](#), or visit the [electronic Field Office Technical Guide](#).

**SDTG Notice 291**  
**Section IV**  
**NRCS-OCTOBER 2009**

### **Weather and Physical Characteristics**

Weather conditions will be monitored for three days in advance of planned burn dates. Fire crews and equipment need to be on standby status to take advantage of favorable burning conditions.

The National Weather Service will be contacted for a spot weather forecast prior to the burn. Burning will be postponed if a front is forecast to arrive within 12 hours of the planned burn times. Monitor onsite weather conditions immediately before and during the burn. Burning will be postponed if weather conditions are expected to fall outside of the prescribed burning plan prescription prior to completion of the burn. Burning will also be postponed if unfavorable weather conditions are predicted to occur within two hours of the predicted completion time of the burn, depending on risk factors within and surrounding the burn unit including: potential for re-ignition, difficulty in mop-up, surrounding volatile fuels, smoke management, etc.

Fire danger categories of very high or extreme issued by the National Weather Service will restrict or prohibit prescribed burning.

Wind must be steady from 5 to 18 miles per hour. Gusty winds and/or winds shifting greater than 45 degrees from the prevailing wind direction will be avoided. Calm conditions (less than five miles per hour) should be avoided. For management of woody species, a 10 to 15 miles per hour wind, low humidity, and high temperature is preferred provided they fall within the parameters of the burn prescription.

Wind direction must be planned to carry smoke away from major roads or highways, bridges, airports, and occupied residences. When burning within one mile of an airport, secure necessary permission from airport authorities.

Relative humidity will be between 25 and 60 percent (generally relative humidity should be from 25 to 40 percent for normal prescribed burning operations, depending on stated burn objectives).

Air temperature will be between 60 and 80 degrees Fahrenheit. This does not apply when burning wetlands in the fall or winter.

Other temperature and humidity parameters apply when burning firebreaks. Refer to the Conservation Practice Standard (CPS) Firebreak (394) when planning and installing firebreaks.

Temperature inversions prevent vertical rise of smoke, causing it to remain in the lower atmosphere. Burning will be avoided during temperature inversions.

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

Fuel load directly affects the rate of spread, intensity, and desired outcomes of any burn. Fuel load should be sufficient in both vertical and horizontal arrangement to achieve the desired effects as outlined in the burn objectives. Adequate fuel loading is very important when objectives include grass seeding establishment, cool-season grass control, and woody species control.

### **Burning Techniques, Firebreaks, and Mop-up**

Firebreaks will be utilized to contain the fire in the area to be burned. Vegetative, nonvegetative, burned firebreaks, and/or natural barriers will be used alone or in combination to control the fire. On all downwind sides of the area to be burned, a backing fire will be used to strengthen mowed, tilled, wet line, roads, or natural barrier firebreaks. No head fires will be set until all firebreaks are in place and of sufficient width. Refer to the CPS Firebreak (394) for criteria to design specifications for firebreaks.

Burning technique will be determined by the type of fuel, management objectives, and firebreaks. A head fire (burning with the wind) produces a fast moving fire, which carries rapidly. Head fires are best for the control of weeds, woody species, and removal of excess litter. A backing fire (burning into the wind) is a slow moving hot

fire. Backing fires are best for the construction of firebreaks and for burns designed to alter the existing plant community, including control of nonnative cool-season grasses. Where adequate fuel loads are present, a slow, hot backing fire can work well to control nonnative cool-season grasses and woody plants with stems less than one-half inch in diameter. For instance, a slow moving, hot backing fire conducted in a mixed stand of cool-season and warm-season species when the cool-season species are actively growing and the warm-season species are still dormant, will stress the cool-season plants and benefit the warm-season species.

Mop-up the fire before leaving the scene making sure that all fire is out before everyone leaves the site of the burn.

## **ADDITIONAL CRITERIA**

### **Criteria to maintain or restore the ecological site; or to improve plant production quantity and/or quality.**

Generally, frequency of burning should not be more than once every four years, to stimulate vigor and production of warm-season grasses, or to maintain diversity of mixed grass communities.

Time of burning should be just prior to or soon after dormancy break of the target desired species in the spring. A rule-of-thumb is to burn when desired species have less than one inch of new growth. When sufficient fuel loads are available, burning to control undesirable cool-season species should take place as late in the spring as practical and timed to prevent damage to the desired target species.

Key species to be maintained or restored will be identified in the burn plan.

### **Criteria to enhance seed and seedling production.**

Burning to enhance seed production will be done at an interval that is known to maximize the benefits for species being managed.

Burning to enhance seedling production, as in the case of the establishment of a native grass planting, should be conducted annually for the first 5 years, and every 2-3 years during years 6-10. Burn timing should occur when nonnative cool-season species (e.g., smooth brome grass, Kentucky bluegrass) reach the three-to-four-leaf stage or approximately six inches of height. During the first five years, grass establishment will likely take precedence over other objectives such as weed control, nesting habitat, etc.

### **Criteria to facilitate distribution of grazing and browsing animals.**

Frequency of burning will be based on the extent and duration of grazing responses, but should generally not be more than once every four years. A rule of thumb for native grassland management is to burn 15-25 percent of the area each year in a rotation.

Key grazing areas and key species should be adjusted in relation to grazing responses.

Time of burning should be generally just prior to or soon after dormancy break of key species in the spring.

### **Criteria to improve plant production quantity and/or quality (reduce excess plant litter), prepare site for harvesting, planting, or seeding, and to reduce wildfire hazards.**

Burning for maintenance of grass stands under long-term retirement programs, or ungrazed forestland should be carried out once every three to four years, depending upon the amount of litter accumulation and the vigor of the stand. Burning for maintenance of ungrazed wildlife areas will follow the disturbance intervals as defined in the CPS Upland Wildlife Habitat Management (645).

Burning to reduce excess plant litter prior to seedbed preparation for grass seedings should be carried out immediately prior to seeding.

Burning to reduce wildfire hazards should be based on local situations and the priority of protection needed.

**Criteria to control undesirable vegetation (suppress woody plant invasion).**

Time of burning to suppress deciduous, resprouting species, such as western snowberry, should be in late summer or early fall when the target species are most susceptible to root damage. Deciduous woody species can also be effectively controlled with spring burning if sufficient fuel loads are present to create heat and retention time on the plant cambium.

Timing of burn should occur on onset of buds or early in the leaf stage. Coniferous species, such as cedar or pine, should be burned after the desirable herbaceous species start growth. Coniferous species are more susceptible to fire when they are small, from one to three feet tall.

Frequency of burning should be based on regrowth of target species, weighed against forage and/or wildlife habitat considerations.

Target species to be suppressed will be identified in the burn plan.

Potential fire damage to nontarget species will be recognized.

**Criteria to improve wildlife habitat or to enhance wetland diversity.**

Frequency of burning will follow the recommended disturbance intervals as described in CPS Upland Wildlife Habitat Management (645), when the land is managed for the sole purpose of wildlife habitat. In other cases, burning should not be more than once every four to five years to maintain diversity of upland habitat and once every two to three years to maintain diversity of wetland habitat.

Time of burning should be based on the objectives of habitat manipulation for targeted wildlife species. Spring burns tend to enhance many warm-season grasses, but may be detrimental to cool-season grasses and annual forbs. Spring burns usually increase stem density of re-sprouting woody species, while summer burns tend to reduce vigor and produce root mortality. In some cases, winter burns may be most effective in enhancing wetland plant diversity.

Time of burning to enhance grassland habitat should be in the spring, just prior to or soon after dormancy break of the desired wildlife preferred species. A rule-of-thumb for grasses is to burn when the desired species have less than one inch of new growth.

Limited habitat in the home range of the targeted wildlife species should limit the burn area to one-third to one-half of the total area managed for wildlife habitat.

Key animal species and habitat component to be improved or enhanced will be identified in the burn plan.

Potential fire damage to nontarget plant and animal species will be recognized.

**CONSIDERATIONS**

Information on the effects of fire on individual plant and animal species can be found on the Internet at the following Web site: <http://www.fs.fed.us/database/feis/index.html>. The site is called the "Fire Effects Information System" and is maintained by the United States Forest Service.

Precautions are needed to avoid air contamination from toxic substances or poisonous plants, which may exist in the area to be burned. Smoke from burning poison ivy and other poisonous plants can be toxic to susceptible individuals and animals.

Precautions are needed near high voltage electrical transmission lines to prevent electrical discharge, due to high concentrations of carbon particles suspended in smoke columns. Burning plans will be designed and applied so large fire fronts or high dense smoke columns will not cross under or contact high power electrical transmission lines.

Precautions may be needed to avoid impacts to threatened and endangered plant and animal species. Please refer to the South Dakota Technical Guide (SDTG), Section I, Subsection Threatened and Endangered Species, for a listing of potential impacts from prescribed burning.

Assure that easements, leases, or contracts do not contain a “no burning” clause on areas planned for prescribed burning.

Prescribed burning specifications must adhere to all applicable Natural Resources Conservation Service (NRCS) policies contained in the General Manual and National Range and Pasture Handbook, as well as, state and local regulations, such as SD Codified Laws Chapter 34-35, Range and Forest Fire Prevention, and SD Air Pollution Control Program, Chapter 74:36:06:07 – Open Burning Regulations. All necessary approvals, permits, and variances must be obtained by the landowner prior to conducting the burn.

Post burn deferments and grazing return intervals following a prescribed fire need to be considered and incorporated into the burn plan and grazing plan. In some cases, grazing may need to be excluded for at least one full growing seasons, such as when poor growing conditions follow the burn, or if the health and vigor of the plant community is low. In other cases, grazing may occur in the same year as the burn when conditions are more favorable.

Under good growing conditions, good plant vigor, and static or improving trend, grazing can begin as soon as grasses reach normal range readiness or six to eight inches of new growth for pasturelands.

Most state, local, and federal agencies and fire departments have equipment and personnel available to assist in the planning and application of this practice. Use of these resources is strongly encouraged.

Tractors and disks are beneficial when controlling fire in cropped areas or grassland plantings but they should be avoided if possible when applying prescribed burning on native grasslands. Refer to the CPS Firebreak (394) for establishment of firebreaks in various situations.

Burning should be managed with consideration for wildlife needs such as nesting, feeding, and cover. Nesting season burns are acceptable when burn timing is critical to meet desired

objectives. For example, nesting season burning when establishing grass plantings, controlling undesirable species, or enhancing plant vigor are acceptable. Size of burn, percent cover to be removed, and available nesting habitat adjacent to the burn area should also be considered when conducting nesting season burns.

Existing barriers such as lakes, streams, wetlands, roads, and constructed firebreaks are important to the design and layout of this practice.

Notify adjoining landowners, local fire departments, and public safety officials within the airshed prior to burning.

Consider cultural resources when planning this practice.

Smoke impacts should be considered before the burn and monitored during the burn.

## PLANS AND SPECIFICATIONS

A written burn plan will be prepared by certified individuals. Specifications for applying this practice shall be 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 before implementation of the practice.

As a minimum, a burning plan will include:

Description of the burn area including location (i.e., county, township, range, section, quarter section), and present vegetation cover.

Detailed maps of burn unit and surrounding areas.

Objective and timing of burn.

Complete description of firebreak condition, surrounding fuels condition, and access points to burn unit and surrounding areas.

Acceptable conditions for prescribed burn.

Preparation of the area for burning.

Equipment/personnel needs/safety requirements.

Special precaution areas.

Firing technique.

Contingency plan.

Mop-up plan.

Emergency response contacts and phone numbers, and nearest medical facility.

Adjacent landowner contacts and notification check-off.

The prescribed burn plan must be signed and dated by the landowner or operator accepting responsibility for liability under the plan, and verifying that the landowner has obtained all necessary permits and other related clearances.

## **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 such time as ash, debris and other consumed material is at pre-burn temperatures.

Post burn evaluations, as identified in the prescribed burn plan, must be completed to determine whether the objectives of the burn were achieved.

To achieve benefits of the prescribed burn, other practices in the conservation management system need to be carried out as planned.