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–

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

CONDITIONS WHERE PRACTICE APPLIES

This practice applies on all lands as appropriate.

CRITERIA

General Criteria Applicable to All Purposes

All prescribed burns shall address the following items:

- Location and description of the burn area.
- 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

Prescribed burning is a complex management tool and should be used by only those who are trained and experienced in its use. It is used to accomplish certain planned objectives.

The procedure, equipment, and the number of trained personnel shall be adequate to accomplish the intended 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.

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).

Weather parameters and other data that affect fire behavior should be monitored during the burn.

Carbon release should be minimized by the timing and burn intensity.

Consider the location of utilities such as electric power lines and natural gas pipelines to prevent damage to the utility and avoid personal injury.

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

Prescribed burning must comply with applicable laws and regulations, including the state's Best Management Practices (BMPs).

Measures Land Managers Should Take Before Burning

1. Notify the Alabama Forestry Commission and obtain a permit to burn.
2. Get a 4-day weather forecast from the U.S. Weather Service.
3. Prepare necessary firebreaks before starting fires.
4. Follow Alabama BMPs in establishing firebreaks.
5. Have on hand the help, tools, and equipment needed to keep fires under control.
6. Thoroughly inspect fuel (burnable vegetation) conditions.
7. Notify adjacent landowner of intent to burn prior to burning.
8. Remove dead snags and trees adjacent to firebreaks.
9. Have a professional who is certified in prescribed burning develop a prescribed burning plan and provide onsite supervision while burning is done.

CRITERIA FOR BURNING TECHNIQUES

1. Backfire: The backfire technique consists of backing fire into the wind. The fire is started along a prepared base line such as a road, plowed line, stream, or other barrier. Backfires proceed backward at a rate of 1 to 3 chains per hour. This technique is the safest type of prescribed fire. It produces minimum scorch, the least smoke, and can be used in heavy fuels.
   Some disadvantages are the slow burning rate of the fire and the need for plowing interior lines at frequent intervals, usually every 10 to 20 chains when prescribed burning in forestland. Stronger wind speeds are needed for smoke dissipation and reducing crown scorch.

2. Strip-head fire: The strip-head fire involves setting either a line of fire or a series of lines upwind from a firebreak so that no line of fire can develop into a high intensity fire before it hits either a firebreak or another line of fire. Strips are usually about 1 to 3 chains apart. Frequently, a combination of strip-head fire and backfire is used. Occasionally, on small areas with light and even fuel distribution, a head fire may be allowed to move over the entire area without stripping. Strip-head fires need enough wind to carry the fire at a ground speed of 2 to 5 mph.

3. Flank fire: The flank fire technique consists of treating an area with lines of fire set into the wind at right angles. This method is often used to secure the flanks of either a strip-head fire, backfire, or other types of fire. This burning method can stand little variation in wind direction. It is useful on either a small area or to facilitate burning a large area in a relatively short time.
4. Ring-fire: As with other burning techniques, a base-control line is made secure with back and flank fires. Once the base line is secured, the entire burn area is circled with fire and allowed to sweep over the area. This type of fire is conducive to developing strong and often violent convection columns that can cause spot fires at distances of up to 1 mile downwind. This method should be used only when weather conditions are stable.
5. Spot-fire: This technique employs a series of small spot fires which burn in all directions as they come together, minimizing the possibility of any one spot fire gaining enough momentum to start a hot run. Most spot fires are started by aerial ignition devices. This allows large acreages to be burned in a short period of time. The base line should be secured before burning and the entire perimeter should be secured as the burning progresses.

CRITERIA FOR DESIRED CONDITIONS

1. Wind: The length of time the wind blows in one direction is important. Northwesterly winds are the most reliable. Easterly winds are not as reliable as those from other directions. The preferred windspeed is 6 to 15 mph when burning rangeland or pastureland and 1 to 3 mph (within the stand) when burning forestland.
2. Relative Humidity: The preferred humidity is 30 to 55 percent for most burns. For wildlife it is better to burn when humidity is high than when it is low. Preferred humidity is 60 percent or greater, although lower humidity may be utilized to force fire through areas that otherwise would not burn.
3. Fine Fuel Moisture: The preferred range is 10 to 20 percent. Use the higher end of range if litter layer is more than 3 inches deep. Do not burn if moisture is below recommended moisture content.
4. Temperature: Preferred temperature may range from 40 to 80 degrees F when burning rangeland or pastureland. The preferred temperatures for most forestland burning are 20 to 60 degrees F. Temperature above 80 F may be desired for hardwood control and site preparation. The lethal temperature for cambium and unprotected tissue is about 145 degrees
5. Burning on high temperature days is particularly difficult where damage to crop trees is to be minimized. A steady wind in the stand will help keep the fire moving and reduce cambium damage.
6. Time of burn: Burning shall be planned so that the job can be completed in a standard workday. Generally, burning during daylight is recommended because at that time winds tend to be constant and steady and because daytime burning is easier to supervise. From mid-day to mid-afternoon is usually the best time to begin. Smoke management is much more difficult when burning is done late in the day or at night.

CRITERIA FOR TYPES OF BURNS

1. Forage Production: Native pasture, rangeland, pastureland, hayland, and/or grazed forestland should be burned in February or March to improve forage quality and to help control undesirable woody vegetation and annual broadleaf weeds. The upper surface of the soil in grasslands should be sufficiently moist to allow rapid forage regrowth, but fine fuels should be dry enough to carry the fire. The area to be burned should be of high vigor and should have adequate fuel to carry the fire with continuity. Burns can be made as often as needed to improve forage quality and/or control woody vegetation.
2. Wildlife Purposes
   a. Quail, Turkey and Small Game Habitat:
      Prescribed burning should be done during January through March to prevent killing new spring plant growth and interfering with nesting season. Burning should usually be done every two years. Annual burning is applicable in areas of rapid vegetation growth. Unburned areas should always be retained so that sufficient cover is available for nesting. Quail prefer to nest in year-old dead grass. It is a good practice to retain cover on upland areas and burn low-lying areas to

discourage nesting on sites which may be flooded. To keep from burning an entire tract, divide it into burn units and burn adjacent tracts alternately. Retain areas such as plum thickets for escape cover by ringing with a firebreak. For most quail and turkey habitats, a backfire into a 5 to 8 mph steady wind is recommended. A head fire may be needed to reclaim areas choked with hardwood sprouts. For prescribed burning to produce the desired effects, open woodland which permits understory vegetation to flourish is necessary.

b. Deer Habitat: Prescribed burning should be done from January through March to encourage growth of hardwood sprouts and succulent herbaceous plants. Burning should be done on a 2 to 4 year rotation. Excluding fire for 5 or more years on predominantly pine sites will greatly reduce habitat quality. Forage abundance in pine plantations can be improved with prescribed burning if management includes thinning to prevent canopy closure.

c. Growing Season Burns: Growing season fires are employed to remove dense hardwood understories when temperatures exceed 80 F. Fire at this season is prescribed only for such removal if hardwoods cannot be controlled by early spring fire. Growing season fires may destroy nests, eggs and the young of game birds as well as non-game birds. Burning should be avoided during nesting periods if possible.

3. Forest land Management: The best results from prescribed burning in forests appears to be when burning intervals are 2 to 3 years. Research has shown that annual burns on certain soils may cause a decrease in annual growth for certain species.

   Prescribed burning for fuel reduction, disease control, forage improvement, aesthetics, and access should preferably be done in the winter months. The best conditions for a burn usually occur 1 to 3 days after the passage of a cold front which has produced 1/2 to 1 inch of rainfall. Northwesterly winds and low temperatures usually accompany this dry, cold air.

   Prescribed burning for hardwood control should be done during the growing season and burning for site preparation should be done during the summer or early fall. Growing season burns to control undesirable plants is recommended only after the rough is reduced by at least one winter burn, especially if there is a heavy accumulation of fuel.

CRITERIA FOR SMOKE MANAGEMENT

1. Prepare written “Prescribed Burning Plan” well in advance. Make smoke management a part of your prescription.
2. Cut low stumps and fell dead snags when there are smoke-sensitive areas down-drainage.
3. Secure and use latest weather forecast.
4. Minimize amount of logging debris by close utilization. Leave debris scattered instead of piling.
5. Favor small piles over windrows. Pile debris when dry and shake out dirt.
6. Burn debris when it is dry.
7. Burn piled debris when surface winds are low to moderate and transport winds are high.
8. Complete debris burns before October.
9. Take the necessary precautions to keep stumps and snags from burning.
10. Check moisture of fine fuel and lower litter by feeling with your hands and use test fire to check fire behavior and smoke dispersion.
11. Burn when visibility is good and when transport wind speed is 9 mph or greater or dispersion index is greater than 40.
12. On large, continuous blocks, do not light the entire block at one time. Burn during the middle of the day or early afternoon and when fine fuel moisture is low.
13. Burn when atmosphere is “slightly unstable” to “unstable”. Burn when mixing height is at least 1,700 feet or dispersion index is greater than 40 (3,000 feet or dispersion index greater than 60 for helicopter burns or burns of 300 acres or more.)

14. Favor backing fires, but don't burn after dusk, but if burns must be done at night, take these precautions:
    a. Use backing fire,
    b. Be sure surface winds are over 4 mph at site,
    c. Be sure the relative humidity is under 80% (the lower, the better),
    d. Be sure no temperature inversions exist.
15. If the type and condition of the fuel produces large amounts of residual smoke, stop ignition by 3:00 p.m., especially if close to open bodies of water.
16. Mop-up for residual smoke as well as control of fire. Priority should be given to smoke sensitive areas.

CONSIDERATIONS

Landowners inexperienced in the use of prescribed fire should seek professional assistance.

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

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 and threatened and endangered plants and animals when planning this practice.

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.

As a minimum, a burning plan will include: (SEE LIST UNDER GENERAL CRITERIA)

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 materials is at pre-burn temperatures.

REFERENCES

Alabama Cooperative Extension Service. January 1997. Prescribed Burning in Alabama Forests. Circular ANR-331.

USDA, Forest Service. 1989. A Guide forPrescribed Fire in Southern Forests. Technical Publication R8-TP11.

The National Wildfire Coordinating Group (NWCG) 2001. The Smoke Management Guide. http://www.fs.fed.us/pnw/pubs/ottmar-smoke-management-guide.pdf