

**NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE GENERAL SPECIFICATION**

**PRESCRIBED BURNING
(Ac.)
CODE 338**

GENERAL SPECIFICATIONS

Procedures, technical details, and other information listed below provide additional guidance for carrying out selected components of the named practice. This material is referenced from the conservation practice standard for the named practice and supplements the requirements and considerations listed therein.

Landowners burning on forest land must notify the Arkansas Forestry Commission prior to igniting the fire (1-800-830-8015). This is a requirement of state law.

PRESCRIBED BURN PLAN

A prescribed burn plan is required prior to the implementation of the burn. This plan will be formulated by a trained and qualified individual. All NRCS conservation plans will indicate the need for the prescribed burn plan. See Job Sheet JS-338 for the prescribed burn plan worksheets.

TIMING OF PRESCRIBED BURNS

Seasonal timing of prescribed burns is critical to the success of the desired objective. Burning should be avoided if possible during the nesting period of April 1 through July 15.

1. Forage Production Burns

Native pasture, rangeland, pastureland, and/or hayland can be burned to improve forage quality and to control undesirable woody vegetation and annual broadleaf weeds.

The area to be burned should be of high vigor

and should have adequate fuel to carry the fire with continuity. 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.

Native warm season grasses can be burned prior to April 1 to stimulate earlier growth, control cool season grass invasion, and control weeds. Burning should be considered every three years for optimum productivity.

There are times that cool season grasses can be burned to remove residual dry matter that is not going to be grazed during the winter season. This will be done in January or late February before the cool season grasses begin to green up.

2. Forestland Management Burns

Prescribed burning for forestland fuel hazard reduction, disease control, forage improvement, aesthetics, and access should 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 ½ to 1 inch of rainfall. Northwesterly winds and low temperatures usually accompany this dry, cold air.

Young pine trees must be larger than 3 inches in basal diameter and at least 15 feet in height to avoid excessive fire damage. Air temperatures will be less than 45 degrees when burning in young pine stands.

For best results, burns for control of unwanted hardwood species in pine stands should be done during the growing season, and burning for site preparation purposes 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.

Prescribed burns in upland hardwood stands should be very cool backfires to avoid damage to the residual stands (hot fires will cause cambium damage and butt rots in the trees). Landowners will always be warned of the potential for this damage when burns are planned in upland hardwoods. Burns will be avoided in hardwood forests where timber values may be degraded.

Bottomland hardwood forests and riparian forest buffers are not normally burned due to damage to the macroinvertebrate food chain. This is especially important when waterfowl management is one of the client's objectives.

Three to five year intervals between forest management burns will achieve the best results. Annual burns can cause a decrease in growth for some tree species.

3. Wildlife Habitat Burns

Wildlife habitat for various animal species can be greatly enhanced through the use of prescribed burns. The type and intensity of the burn will result in different habitat responses.

- Quail, Turkey, and Small Game: Prescribed burning to enhance habitat for game birds and small game should be done during January through March to avoid the nesting season and to prevent killing new spring plant growth.

Best results are obtained if the fire is spotty and leaves a mosaic of burned and unburned areas. This can be achieved by burning during times of medium to moderately high fuel moisture.

Retain unburned areas such as plum thickets or blackberry patches for escape cover by

ringing with a firebreak. These areas will resprout after a burn, however.

Better habitat will result from burning 1/3 of the acreage every year in a rotation rather than burning the entire area at once every 3 years.

More frequent fires in low-lying areas subject to flooding during the nesting season will discourage nesting in these areas by removing preferred cover.

- White-tailed Deer: Prescribed burning should be done during January through March to encourage growth of hardwood sprouts and succulent herbaceous plants. A fire frequency of 3 to 4 years is desirable.

Excluding fire for 5 or more years on predominantly pine sites will greatly reduce habitat quality. Optimal forage abundance can be achieved by using prescribed fire in conjunction with Forest Stand Improvement (Code 666) for thinning activities.

- Red-Cockaded Woodpeckers: Prescribed burning is basic to the management, conservation, and recovery of red-cockaded woodpeckers (an endangered species in Arkansas). The burning should mimic natural fire regimes as close as possible, but it must be carefully planned and conducted to reduce the likelihood of damage to nesting and foraging habitat for the birds.

Land managers should work toward a prescribed burning program of early to mid-growing season burns conducted at 1 to 5 year intervals. Habitat with excessive hardwood midstory should be restored to one with herbaceous ground cover by burning at a frequency of 1 to 3 years. Longer burning intervals are appropriate only for habitat that can be maintained in recommended herbaceous ground cover at those longer intervals.

IGNITION TECHNIQUES

Various ignition techniques can be used to accomplish a burn objective. The technique chosen must be correlated closely with burning objectives, fuels, topography, and weather factors.

1. Backfire

The backfire technique consists of backing fire into the wind. This technique requires a strong and steady wind, especially if there is a heavy fuel load. The fire is started on the windward side of a firebreak. After the fire is safely burning away from the firebreak, then additional firebreaks upwind can be backfired until the entire area has been ignited.

This type of fire backs into the wind at a rate of 100 to 200 feet per hour and is therefore the safest type of prescribed fire. It produces minimum scorch damage and less smoke than other types of ignition.

It can be used in heavy fuels and is well suited to young pine stands.

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. The strips are usually 75-150 feet apart. Strip-head fires need just enough wind to carry the fire at a ground speed of 2 to 5 mph.

It is a technique that permits burning large areas in a short time and is generally more economical because more acreage can be burned at once and because fewer interior firebreaks are needed.

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.

Tree crown scorch can occur where the lines burn together. Consider alternative techniques if the fire-free interval exceeds 3 years.

This method may be used in medium-to-large pine sawtimber or in flat fuels such as hardwood leaves. It can be used in annual pine plantation maintenance burns after initial fuel reduction has been accomplished.

3. Flank Fire

The flank fire technique consists of treating an area with lines of fire set into the wind at right angles. This burning method can stand little variation in wind direction. The technique requires considerable knowledge of fire behavior, particularly if used by itself. It is often used to secure the flanks of other types of fire. It is useful on either a small area or to facilitate burning a large area in a relatively short time.

Flanking fires are best used in medium-to-large sawtimber with light-to-medium fuel loads.

4. Ring Fire

The ring fire ignition method is used on areas where a relatively hot fire is needed to reduce or eliminate logging slash and debris. This technique should never be used for underburning because of the likelihood of severe tree damage as the flame fronts merge.

A baseline is secured with back and flank fires, and then the entire burn area is circled with fire. This method should be used only when weather conditions are stable because it is conducive to developing strong convection columns that can cause spot fires up to 1 mile downwind.

5. Spot fire

Spot fire ignition requires considerable experience by a prescribed burner. The method uses a series of small spot fires which burn in all directions as they come together. This minimizes the possibility that any one spot will gain sufficient momentum to start a hot run.

A base line should be secured before burning, and the entire perimeter should be secured as the burning progresses. A skilled crew can treat a large area in a short time using this technique.

Severe tree crown damage can result if the fuel is too dry.

FIREBREAKS

Firebreaks will be planned as appropriate for the site. The firebreaks may be natural or constructed. See the practice standard for Firebreak (Code 394).

SMOKE MANAGEMENT

Smoke sensitive areas that may be affected by a prescribed burn include heavily traveled roads, airports, hospitals, nursing homes, schools, populated areas, and poultry or cattle operations. These areas may require special burning considerations.

When prescribed burning has been determined to be the appropriate management practice, the planner will take measures to keep the smoke's impact on the environment within acceptable limits. The recommended procedure to accomplish this objective follows a 5-step screening system:

1. Determine category day
2. Determine screening distance
3. Determine trajectory of smoke plume
4. Identify smoke sensitive and other impacted areas
5. Evaluate the results

1. Determine Category Day

Obtain the fire weather forecast, category day, and surface inversion lifting temperature (SILT) from the Arkansas Forestry Commission (800-830-8015). This information is available by 9 a.m. each day.

Category Day	Guidelines
1	No burning
2	No burning until after 11 a.m. and not before surface inversion has lifted. Fire should be burned out by 4 p.m.
3	Burn only after surface inversion has lifted
4	Burn anytime
5	Unstable and windy. Excellent smoke dispersion. Burn with extreme caution.

2. Determine Screening Distance

Categorize the burn into one of the following categories:

- Backing fire
- Head fire
- +1000 acres
- Piles/windrows.

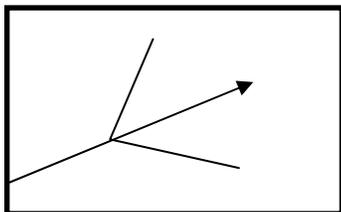
Use the following table to determine the number of miles downwind from the burn that will be affected by the smoke (screening distance).

Type of Burn	Category Day				
	1	2	3	4	5
	Miles				
Backing fire	*	10	5	2.5	.75
Head fire	*	20	10	5	.75
+1000 acres	*	20	10	5	.75
Piles/windrows	*	30	15	8	.75

*No Burning

3. Determine Trajectory Of Smoke Plume

Locate burn area on map and draw a line representing the centerline of the path of the smoke plume for the distance. If the burn will last three hours or more, draw another line showing predicted wind direction at completion of the burn. To allow for horizontal dispersion of the smoke, as well as shifts in wind direction, draw two other lines from the fire at an angle of 30 degrees from the center line.



Nighttime smoke impact area can be determined by going down drainage in valleys or bottoms for $\frac{1}{2}$ the distance determined above. This impact area calculation is valid providing the burn will be completed at least 3 hours before sunset and the forecast night winds are light and variable.

4. Identify smoke sensitive and other impacted areas (targets)

Using the screening distance, plot all known smoke sensitive areas on the map. The sensitive areas will become smoke critical areas when the screening distance is:

- a. 5 miles – any sensitive area within $\frac{1}{2}$ mile of the fire, both downwind and down drainage
- b. 10 miles – any sensitive area within 1 mile
- c. 20 miles – any sensitive area within 2 miles
- d. 30 miles – any sensitive area within 3 miles

5. Evaluate the results

If any areas are identified as being potentially critically impacted by smoke from the burn, either change the burning plan for a more favorable wind direction or consider an alternative to burning. If no impacted areas are found in the screening process, then burning

may take place according to the category day guidelines.

For smoke originating during the day but with anticipated night residual smoke, take precautions to minimize the impact of smoke to sensitive areas in any direction to the burn.

For night burns, the following guidelines apply:

- Burn in light fuels.
- Use backing fire.
- Burn when humidity is 80% or less.
- Burn with surface wind speed of 4 MPH or more.

SAFETY

Safety is the **first** consideration in prescribed burning. NRCS must advise the client and designated fire boss to postpone the burn if unfavorable conditions exist. NRCS employees are required to inform the client and fire boss of any unsafe situation or act as soon as it is apparent. If an emergency situation develops, NRCS employees are to follow the direction of the fire boss and act responsibly to resolve the situation.

The landowner or designee must be on-site throughout the prescribed burn period. NRCS personnel will not serve as the client's designee.

All persons present on a fire will wear natural fiber clothing or "Nomex" clothing and leather boots.

In cases where the designated fire boss or client is unwilling to develop and implement an appropriate prescribed burning plan, NRCS employees will discontinue assistance on prescribed burning. When a designated fire boss or client is proceeding to ignite the fire under conditions outside the parameters of an appropriately developed prescribed burning plan, NRCS employees will inform the fire boss and client of the unsafe conditions and that NRCS participation is prohibited. If the fire boss or client continues to proceed with the

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burn, then NRCS will discontinue providing on-the-ground assistance, document the fire boss's or client's decision and the actions taken, and leave the area immediately.