

## “When to Use Prescribed Burning”



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Historically, much of Virginia burned on a regular basis and many natural vegetative communities (groups of herbaceous species often found in association with one another) are fire dependent. Some natural communities require burning for establishment and maintenance. Many management practices will not work as well as intended unless prescribed fire is included in the long term management plan.

“Prescribed burning” is applying a controlled fire to a predetermined area to achieve a specific goal. The Natural Resources Conservation Service (NRCS) of Virginia supports and encourages the use of Prescribed Burning (Practice Code 338), Section IV of the Field Office Technical Guide. This document is not intended to provide detailed guidance on how to prescribe burn, but instead provides information that can be used to determine when burning would be an appropriate management technique. For more information on burn processes, consult the Guide for Prescribed Fire in Southern Forests, Technical Publication R8-TR11, USDA Forest Service, 1989.

This practice can be used on many types of land to achieve the following goals:

- Control, promote or improve vegetation - Knowledge of the target species life cycle (phenology) and proper timing is important when using prescribed burns to manage vegetation. Time treatment when plant carbohydrate reserves are low. Generally, hot, growing season burns will have the greatest effect on controlling vegetation. Sometimes fire will not give complete control but can reduce seed stocks of undesirable species. Often a properly timed application of herbicide, followed by burning can give more complete control. Low intensity burns can increase the quality and quantity of grasses and forbs. Livestock and other wildlife will graze recently burned new growth so prescribed burning can help distribute animals and prevent overgrazing. Some plant/animal communities depend on fire to become established and thrive. To restore or maintain these communities, specific characteristics of the target species or community of species must be understood, along with historical understanding of fire in the geographic area being managed. Prescribed burning should be planned and applied at an intensity, interval and season that the site would have historically experienced.

For Pine Forest Land – Unwanted hardwood encroachment in pine stands is best controlled with summer burns when hardwoods are small diameter. Winter burns result in less pine root kill than spring and summer burns, but hardwood resprouting can occur. Resprouts can be controlled by repeated burns over several consecutive years while diameters are small.

For native warm season grass production – Burn every 3-5 years in the spring when plants have initiated 1 1/2 -3 inches of new growth.

For forbs – Burn every 2-4 years in the late fall and early winter.

For cool season grasses – Burn every 2-4 years in the spring when plants have initiated less than 2 inches of new growth.

- Prepare sites for harvesting, planting or seeding –

Harvest – high-moisture burns should be used to prevent destruction of organic duff, conserve moisture, and prevent erosion. High-moisture burns may be conducted 2-3 days after summer showers.

Natural regeneration – Burning should be done August-September during a good seed year.

Burning for several successive years prior to harvest cutting may be necessary. Longleaf pine regenerates best on a light litter cover, so burning up to a year in advance of desired regeneration time is desirable. Longleaf pine should be burned in the spring of the year in which seeding is expected. Loblolly pine does not need litter cover, so burning just prior to seed production is satisfactory.

Site preparation and planting – A hot fire is usually required to kill unwanted woody competition prior to planting. Burn in late summer to reduce understory and other debris. When burning slash, protect surrounding trees/structures/habitats from fire and scorching using firebreaks and proper slash pile placement.

- Control plant disease – Winter burning of Longleaf pine is known to reduce spread of Brown Spot Needle Disease.
- Reduce wildfire hazards – A systematic application of prescribed or ‘hazard reduction’ burns can reduce fuel loading in a forest and reduce the risk of wildfire, particularly in southern pine stands. The type/intensity of a hazard reduction burn must be carefully designed and executed based on fuel type/amount and tree characteristics for a specific site, along with weather conditions. Hazard

reduction burns should not significantly damage existing trees but should remove enough fuel to provide an appropriate level of wildfire protection. The interval between hazard reduction burns varies based on fuel accumulation, past fire exposure, value of the resource protected and risk of fire. For pine stands this is usually every 3-4 years but can be necessary annually.

- Improve wildlife habitat – Deer, dove, quail and turkey are wildlife species that benefit from prescribed burning, especially in loblolly, shortleaf or longleaf pine stands. Often, it is more cost effective and beneficial to manage existing vegetation than to plant a “food plot”. Some threatened/endangered species such as the red-cockaded woodpecker prefer more open habitats maintained by fires. Burn prescriptions should recognize the biological requirements (life cycle, nesting times, etc...) of the preferred wildlife species. Generally, the best season to burn for wildlife benefits is late February or early March. Frequency of burning varies; but usually is required about once every 3 years. Rotating burns on approximately one-third of the managed area each year helps maintain consistent habitat availability. For deer and quail, strips or blocks within the burned area can be left unburned to increase the “edge” effect and provide thickets for quail cover. These should be at least 25’ x 50’ and well distributed.



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### **SEASONS TO BURN** (see Table 1)

Winter – Most understory burning is done during the winter dormant season (December-February)

Spring – Variable weather and higher fire danger occur in the spring. Spring is generally the best season to burn for wildlife. Burn by April 1 to avoid harming most species. February – March is best for open land burning.

Summer – Summer burns are used to kill undesirable hardwoods. Mid to late summer is a good time to burn logging debris because the high ambient temperatures help dry out the larger materials. Site prep burning for pine planting is best in summer.

Fall – Loblolly pines are more likely to die if crowns are severely scorched or roots are damaged at this time.

## **OPTIMAL BURNING CONDITIONS** (but NOT limited to)

- Fuel condition – Burn when fine fuel moisture is from 10-20%. Burning when the fine-fuel moisture is below 6-7% can result in damage to plant roots and the soil (which may be a goal). When fine-fuel moisture approaches 30%, fires tend to burn slowly and irregularly, often resulting in incomplete burns (which may be beneficial). Debris from harvested areas should be burned when fuels are dry, provided soil moisture does not get too low. For proper smoke management, minimize the amount of soil in slash piles.
- Suitable soils, slopes, and soil moisture conditions – Sites with mineral soils can be burned so long as there is adequate soil moisture (Damp soil protects tree roots and microorganisms). Slopes up to 25% can be burned with minimum danger of soil movement. Slopes greater than 25% can be burned for site preparation if a high moisture burn is used. Prescribed burning should not be conducted on organic soils under most situations. Burning should not be conducted on severely eroded forest soils where the average litter layer is less than one-half inch deep. Water bars should be constructed in firebreak lines to keep surface runoff from entering directly into streams.
- The Cumulative Severity Index (CSI) or Keetch-Byram Drought Index (KBDI) is a continuous reference scale for estimating the dryness of the soil and duff layers. This mathematical system for relating current and recent weather conditions to potential or expected fire behavior results in a drought index number ranging from 0 to 800. High values of the KBDI are an indication that conditions are favorable for the occurrence and spread of wildfires, but drought is not by itself a prerequisite for wildfires. Other weather factors, such as wind, temperature, relative humidity and atmospheric stability, play a major role in determining the actual fire danger.
- Humidity, temperature, and wind conditions – Preferred relative humidity is 30-55%. Burning at relative humidities below 30% is dangerous; burning at humidities above 60% percent may not burn hot enough to achieve the desired result (or it may prevent a fire from burning too hot). The preferred temperature for winter burning is below 60°F. When the objective is to control undesirable species, growing season burns with air temperatures above 80°F are recommended. The preferred windspeed range in the stand is 1-3 mph (measured at eye level). Windspeed readings for most fire weather forecasts are taken 20 feet above ground at open locations. The minimum 20-ft windspeed for burning is about 6 mph and the maximum is about 20 mph.
- Time of day – Prescribed fires should normally be ignited between 10 a.m. and noon. Ground ignition should be stopped before 3 p.m. and aerial ignition before 4 p.m. to allow adequate time for the fire to burn out before atmospheric dispersion conditions deteriorate. Be sure to observe burning restrictions from February 15 through April 30 (no burning from 12 a.m until 4 p.m.).
- Precautionary measures – The principal danger in the use of prescribed fire is smoke. High fuel moisture creates more smoke than low moisture conditions. A proper burning plan considers all aspects of smoke management. All burning should be done in accordance with applicable smoke management guidelines and regulations. Safety measures for personnel include being familiar with the burning plan and having adequate communication, transportation, and protective clothing. Avoid smoke inhalation where poison ivy is burned. Mow native warm

season grasses before burning to reduce flame height and intensity, especially near fire lines and other fuels.

Table 1. Coordination of Burning. These guidelines are general and will not fit all situations. Copied from "A Guide for Prescribed Fire in Southern Forests", Technical Publication R8-TR11, USDA Forest Service, 1989.

<i>PURPOSE</i>	<i>TIME OF BURN</i>	<i>SIZE OF BURN</i>	<i>TYPE OF FIRE</i>	<i>FREQUENCY</i>	<i>REMARKS</i>
REDUCE FUELS	Winter	Large enough to break fuel continuity	Not critical. Do not ring fire.	2 to 4 years	Use line-backing fire, or point-source fires under moist conditions for initial burn. Grid-firing technique excellent for maintenance burns.
IMPROVE WILDLIFE HABITAT					General – Protect transitional or fringe areas. Do not burn stream bottoms.
Deer	Winter preferred	Small or leave unburned areas	Backing fire or point-source fires	2 to 4 years	Want to promote sprouting and keep browse within reach. Repeat summer fires may kill some rootstocks.
Turkey	Winter preferred; summer burns in July - August	Small or leave unburned areas	Backing fire or point-source fires	2 to 4 years	Avoid April through June nesting season.
Quail	Late winter	25+ acres	Not critical. Do not ring fire	1 to 2 years	Avoid April through June nesting season. Leave unburned patches and thickets.
Dove	Winter	Not critical	Not critical. Do not ring fire	Not critical	Leave unburned patches and thickets.
Waterfowl	Late fall or winter	Not critical	Heading fire	2+ years	Marshland only. Do not burn in hardwood swamps.
CONTROL COMPETING VEGETATION	Heavy roughs in winter, otherwise not critical	Not critical.	Not critical. Do not ring fire.	2 to 8 years	Summer burns result in higher rootstock kill and affect larger stems. Exclude fire from desirable hardwoods in pine-hardwood type.
IMPROVE FORAGE FOR GRAZING	Winter through late spring for most situations	Not critical but will be damaged by overuse if too small for herd.	Not critical. Do not ring fire.	3 years	Split range and burn one-third each year. Individual herbs and grasses respond differently to fire and season of burn. Consult expert.
IMPROVE ACCESSIBILITY	Will vary with understory and desired use	Varies with individual situation	Depends on amount of fuel present	As needed	Coordinate with other resource objectives. They will dictate size, timing and frequency of burn.
CONTROL DISEASE	Brownspot, winter	Depends on size of infected area. Include a buffer strip	Strip-heading or heading fire	2 to 3 years	Burn when humidity is above 50%. Avoid leaving unburned pockets of infected seedlings within or adjacent to burn.

Table 1. Continued.

<i>PURPOSE</i>	<i>TIME OF BURN</i>	<i>SIZE OF BURN</i>	<i>TYPE OF FIRE</i>	<i>FREQUENCY</i>	<i>REMARKS</i>
ENHANCE APPEARANCE	Late fall through late winter	Varies with each situation	Backing fire or point-source fire	1 + years	Requires precise prescription to protect vegetative type changes. Know effect of fire frequency and season of burn on both annual and biennial flowering plants. Provide pleasing visual lines.
PERPETUATE FIRE DEPENDENT SPECIES	Will vary with species	Will vary but usually fairly small	Will vary with fuel conditions and species requirements.	Will vary with species	Fire intensity, timing and frequency all dictated by species requirements.
YOUNG PINE STANDS	Winter	Varies with size of stand	Backing fire	2 to 4 years	Pine diameter 3 inches or more at ground. Pine height above 10 ft. Burn only after a strong cold front with rain.
DISPOSE OF LOGGING DEBRIS	Not critical	Small areas mean fewer nighttime smoke problems	Center firing with helitorch preferred	--	Smoke management is a must! Take care not to damage soil or water resources with these hot fires. If a broadcast burn will not meet objectives, pile - do not wind-row debris.
PREPARE SITES FOR SEEDING	Natural seeding, summer to early fall prior to seed fall.	Large enough to prevent concentrations of birds & rodents (usually 10 acres or more).	Not critical. Do not ring fire	--	Be careful not to kill seed trees. If logging debris present, manage your smoke.
	Direct seeding, fall to late winter for spring sowing. Previous winter for fall sowing of longleaf.	Large enough to prevent concentrations of birds & rodents (usually 10 acres or more).	Not critical. Center firing with helitorch preferred if slash present.	--	If logging debris present, smoke management is a must! Take care not to damage soil or water resources with these hot fires
PREPARE SITES FOR PLANTING	Growing season for hardwood control.	Large enough to prevent concentrations of birds & rodents (usually 10 acres or more).	Not critical. Center firing with helitorch preferred if slash present.	--	If logging debris present, smoke management is a must! Take care not to damage soil or water resources with these hot fires