

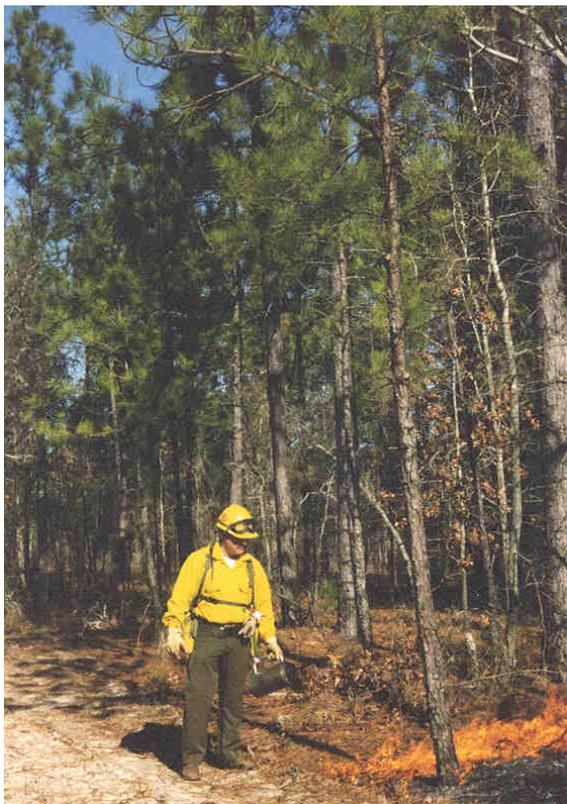
PRESCRIBED BURNING

North Carolina Practice Job Sheet 338

Prepared for: _____

Prepared by: _____

Farm: _____ Tract: _____ Date: _____



Prescribed burning reduces wildfire hazard and improves wildlife habitat.

DEFINITION

Controlled fire applied to a predetermined area.

PURPOSES

- Control undesirable vegetation.
- Prepare sites for harvesting, planting or seeding.
- Control plant disease.
- Reduce wildfire hazard.
- 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.

CRITERIA

Apply this practice on all lands where use of fire for management is appropriate.

All prescribed burns shall address the following items in a written burn plan prepared by a certified prescribed burner:

- Location and description of the burn area. Include a map of burn area and identify potential hazards (roads, residences, electrical power transmission lines and poles, fences, etc.)
- Location and construction of firebreaks. Refer to FIREBREAK – NC Practice Standard 394.
- Pre-burn vegetation cover/fuel conditions.
- Resource management objectives.
- Required weather conditions (relative humidity, winds, air temperatures, etc.) 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

See Appendix 1 NCDFR Form 4210 for an example of a Prescribed Burn Plan format that can be used in North Carolina.

Prescribed burns must be conducted under the supervision of a certified prescribed burner certified by the North Carolina Division of Forest Resources (NCDFR) and Prescribed Burn Certification Program. (A responsible landowner can conduct limited prescribed burns

on their own property; however, a written burn plan prepared by a certified prescribed burner is still required).

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

Personnel conducting the prescribed burn should be familiar with the burn plan and have adequate communication, transportation, and protective clothing.

Expected weather conditions, impact of heat and smoke on human/vehicular traffic, liability (e.g., utility lines) and safety and health precautions shall be integrated into the timing, location and expected intensity of the burn.

Obtain the latest weather forecast for the prescribed burn area. Monitor weather parameters and other data that affect fire behavior during the burn. Sources of current/expected weather conditions include:

- National Weather Service
- NC Division of Forest Resources
- Local Weather Reports/Observations
- Private Weather Forecast Services

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

Obtain an open burning permit from the NCDFR prior to conducting a prescribed burn.

Refer to Appendix 2-Table 1 for more specific criteria that the certified burner must consider when preparing a burn plan and conducting a prescribed burn. Appendix 2-Table 2 contains prescribed burning terminology to help in communicating with the certified prescribed burner.

Do not prescribe burn on organic soils unless the water table is at or near the ground surface.

Comply with applicable federal, state, and local laws and regulations during the installation, operation and maintenance of this practice, including North Carolina (NC) Forest Practices Guidelines.

CONSIDERATIONS

Prescribed burning is a highly technical job requiring knowledge of fire behavior, fire suppression techniques, and the environmental effects of fire.

“A landowner or the landowner's agent who conducts a prescribed burning in compliance

with NC GS 113-60.43 shall not be liable in any civil action for any damage or injury caused by or resulting from smoke.” (NC GS 113-60.42)

This provision applies only when the landowner or agent is a certified prescribed burner and established smoke management guidelines are followed.

Consider existing barriers to fire such as lakes, streams, wetlands, roads and firebreaks when planning this practice.

Consider wildlife needs (nesting, feeding, cover) when planning a prescribed burn. Smaller patches burned in a mosaic pattern area generally better for wildlife than one large burn.

Notify appropriate adjoining landowners, local fire departments, and public safety officials prior to burning.

Consider cultural resources and threatened and endangered (T&E) plants and animals when planning this practice.

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

The principal danger in the use of prescribed burning is smoke. Smoke impacts should be considered before the burn and monitored during the burn. High moisture creates more smoke than low moisture conditions. Carbon release can be minimized with proper timing and burn intensity.

This practice has the potential to affect National Register listed, or eligible, significant cultural resources (CULTURAL RESOURCES INFORMATION - NC, FOTG Section II). Follow NRCS state policy for considering cultural resources during planning.

PLANS AND SPECIFICATIONS

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 and the burn plan, or other acceptable documentation.

Note: NRCS responsibility is to communicate important conservation plan and case file information to the participant preparing the plan. This communication should include (but is not limited to) purpose of burn, expected extent, location of cultural resources, potential T&E in or near the proposed burn, natural features or sensitive areas that need protection, etc.

To achieve Class I job approval authority for Prescribed Burning; and, to be certified to include prescribed burning in a conservation plan, (no burn plan preparation, no on-ground participation), an NRCS employee must successfully complete the 2-day NC Forest Service (NCDFR) Prescribed Burner Certification Training (includes passing the required written test).

The 2-day NCDFR Prescribed Burner Certification Training reviews legal/liability issues related to prescribed burning in North Carolina; and, provides sufficient training to allow employees to evaluate natural resource conditions to determine where prescribed burning will accomplish landowner's resource objectives, complete prescribed burning feasibility determinations, recommend optimal timing of burning to accomplish the desired management objectives, provide specifications concerning design and installation of firebreaks, document conservation decisions in conservation plans, provide natural resource information on appropriate portions of burn plan forms and, if needed, review completed burns to assure that they comply with this standard and burn plan specifications .

Employees may choose to utilize their own resources to acquire a Certified Burner designation through NCDFR; however, NRCS employees are NOT AUTHORIZED to participate in prescribed burns as part of conservation plan implementation.

Minimum documentation for this practice includes (as applicable):

- Burn plan prepared by a certified prescribed burner. (See Appendices 1 and 2.)
- Map, generally the conservation plan map, showing fields to be burned; additionally the map should delineate:
 - Existing natural or constructed barriers to fire such as streams, water bodies, roads, etc.
 - Location of firebreaks.
 - Sensitive areas such as critical areas, cultural resources, wetlands, natural areas, power lines, etc. that need to be considered during the prescribed burn.
- Extent (acreage) of prescribed burn.
- Purpose of prescribed burn.
- Timing of prescribed burn.
- Forest management plan including forest land to be burned prepared by a registered forester or other professional if available.
- Statement requiring compliance with all federal, state and local laws.
- Required operation and maintenance instructions.

OPERATION AND MAINTENANCE

- The kinds and expected variability of site factors (e.g., fuel condition and moisture content, weather conditions, human and vehicular traffic 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.

- Monitor the burn site and adjacent areas until such time as ash, debris and other consumed material is at pre-burn temperatures.

Additional Operation and Maintenance requirements specific to this Plan:

Form 4210-1
Updated 6-2006

NCDFR Prescribed Burning Plan

District _____ County _____

Latitude _____ Longitude _____

Photo # _____

PART 1 GENERAL INFORMATION

Landowner: _____
 Address: _____

 Phone: _____
 Agent: _____
 Agent Phone: _____

Initial Estimates
 Acres to Burn: _____
 Miles to Plow: _____
 Miles Bladed Line: _____
 Hand Line: _____
 Other: _____
 Other: _____

Purpose of Burn
 Site Prep
 Silviculture
 Haz Reduction
 Wildlife Habitat
 Growing Season
 Other: _____

PART 2 PRE-BURN PLANNING

Specific Objectives: _____

Overstory Species: _____		Avg. Hgt. (ft): _____	Avg. DBH (in): _____
Age of Dominant Species: _____	Understory Species: _____		
Fine Fuels: _____	Litter Depth (in): _____	Fuel Type (Model):	<input type="checkbox"/> Continuous <input type="checkbox"/> Patchy
% Slope: _____	Aspect: _____	Elevation (ft): _____	Soil: <input type="checkbox"/> Mineral <input type="checkbox"/> Organic
For In-Stand Burning: Basal Area (sq ft): _____		Ht. to Live Crown (ft): _____	Allowable Scorch Height (ft): _____

Smoke Management: Direction to Smoke Sensitive Area (SSA)	N	NE	E	SE	S	SW	W	NW
	Distance to SSA (miles)							

Smoke Mngt./Tonnage: Estimated Acres _____ X Est. Total Available Tons/Acre _____ = _____ Est. Total Tons to be Burned

Acceptable Range of Weather parameters (To Be Completed By, Or in Consultation With, A Burn Boss):

Temp. (°F): _____ to _____ RH (%): _____ to _____ Wind Velocity (MPH): _____ to _____
 Wind Direction (Surface): N NE E SE S SW W NW
 Mix Height (ft): _____ to _____ Wind Direction (Transport) N NE E SE S SW W NW
 Nighttime Smoke Dispersion (minimum): _____ Acceptable Burn Categories: 1 2 3 4 5
 KBDI: _____ to _____ Fine Fuel Moisture (%): _____ to _____
 Other Weather Considerations: _____

Special Situations/Instructions (note on attached map): _____

Prepared By: _____ Title: _____ Certified Burner # _____ Date: _____
 Approved By: _____ Title: _____ Certified Burner # _____ Date: _____

PART 3 - PREPARATION FOR BURN

Resources needed:

Prior to ignition Burn Boss must confirm the following (circle Y for yes, N for no, or N/A for not applicable):

Burn Contract Signed: Y N N/A	Smoke Mngt Called in: Y N N/A	NFDRS Values Acceptable: Y N N/A	Area checked for new SSAs: Y N N/A
CostShare Approved: Y N N/A	Region Approval: Y N N/A	On-Site Weather within Parameters: Y N N/A	Fireline Installed & Cleaned: Y N N/A
VFD/Central Notified: Y N N/A	Adjoining LOs Notified: Y N N/A	Problem Areas Considered: Y N N/A	Smoke Signs Posted: Y N N/A
Known T&E Species, Cultural, Historic Res. Protected: Y N N/A	Burning Permit Obtained: Y N N/A	Point Forecast Evaluated: Y N N/A	Crew Briefed, Radios checked: Y N N/A

Burn Boss: _____ Title: _____ Certified Burner # _____ Date: _____

PART 4 BURN EXECUTION PLAN

Base Line Location: _____
 Base Line Width: _____ or # of fire lines: _____
 Firing Technique: _____ Aerial lg. Spacing (chains, ft): _____
 Test Fire Behavior: _____
 Ignition Started: Date: _____ Time: _____
 Ignition Completed: Date: _____ Time: _____
 Active Burning Completed: Date: _____ Time: _____

On-Site Weather Readings, etc.			
Time of Readings:			
Temp. (°F)			
RH (%)			
Wind Direction			
Wind Speed (MPH)			
Calculated FFM			
Trans. Wind Direction			
KBDI Value			

Part 5 MOP-UP Critical Areas/Special Instructions:

Distance Inside Line to be Mopped Up (ft): _____ Fireline to Rehab (ft): _____ Applicable BMPs Used: Y N N/A
 Follow Up Checks: Date: _____ Time: _____ By Whom: _____ Tract in FPG Compliance: Y N
 Follow Up Checks: Date: _____ Time: _____ By Whom: _____

PART 6 POST BURN EVALUATION

Acres Actually Burned: _____ Burn Objectives <input type="checkbox"/> Met <input type="checkbox"/> Partially Met <input type="checkbox"/> Unsatisfactory	Fire Effects	
	Scorch Height (ft)	
	Crop Tree Mortality (%)	
	Soil Exposure (%)	
	Slash Removed (%)	
Fireline Rehab Satisfactory:	Y N N/A	

Fuel Type	Total Tons Per Acre		
	Low	Medium	High
Pine Litter	3	6	12
Hardwood Litter	3	5	7
Mixed Litter	4	6	12
Brush < 2 ft.	4	7	10
Brush 2 - 4 ft.	6	8	15
Brush > 4 ft.	10	20	30
Light Slash	5	10	20
Medium Slash	10	20	40
Heavy Slash	30	40	60
Short Grass / Wire Grass	2	5	7
Tall Grass / Broomsedge, Marsh Grass	3	6	8

Emissions: Acres Actually Burned _____ X Actual Tons per Acre Burned _____
 = _____ Total Tons Actually Burned

Observations/Damage/Recommendations for Follow Up:

Evaluated By: _____ Title: _____ Date: _____

Burn Cat	Smoke Management Allowable Tonnage												
	1	2	2	3	3	4	4	4	4	5	5	5	5
Burn Type	None	Open	Understory	Open	Understory	Open	Understory	Open	Understory	Open	Understory	Open	Understory
Ngt. Time Smoke Dsp	Any	Any	Any	Any	Any	Poor to Very Poor	Poor to Very Poor	Good to Fair	Good to Fair	Poor to Very Poor	Poor to Very Poor	Good to Fair	Good to Fair
Time of Burn	Day	Day	Day	Day	Day	Day	Day	Day/Ngt	Day/Ngt	Day	Day	Day/Ngt	Day/Ngt
0<1/2 mi.	0	0	0	0	0	0	0	0	1030	0	0	0	1350
1/2 < 5 mi.	0	360	720	450	900	720	1440	1440	2160	900	1800	1800	2700
5<10 mi.	0	720	1440	900	1800	1400	2880	2880	4320	1800	3600	3600	5400
10<20 mi.	0	1080	2160	1350	2700	2160	4320	4320	6480	2700	5400	5400	8100
20<30 mi.	0	1200	2400	1600	3200	2500	5000	5000	7500	3000	6000	6000	9000
30+ mi.	0	1440	2880	1800	3600	2880	5760	5760	8640	3600	7200	7200	10800

Table 1. Factors Affecting Prescribed Burns

<u>FUEL</u>	Fine fuel moisture should be 10 to 20 percent. Burning when the fine-fuel moisture is below 6 or percent can result in damage to plant roots and the soil. When fine-fuel moisture approaches 30 percent, fires tend to burn slowly and irregularly, often resulting in incomplete burns that do not meet desired objectives. Debris from harvested areas should be burned when fuels are dry, provided soil moisture does not get too low.
<u>SOILS</u>	Sites with mineral soils can be burned so long as there is adequate soil moisture (Damp soil helps keep soil temperatures low during the burn, protecting tree roots and soil microorganisms). Soil on slopes up to 25 percent 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. Plan fires to burn downhill where possible. <u>Do not prescribe burn on organic soils unless the water table is at or near the ground surface!</u>
<u>WEATHER</u>	Preferred relative humidity is 30 to 55 percent. Burning at relative humidity below 30 percent is dangerous; burning at humidity above 60 percent may not burn hot enough. The preferred temperature for winter burning is below 60 degrees F. When the objective is to control undesirable species, growing season burns with air temperatures above 80 degrees F. are recommended. The preferred range in windspeed in the stand is 1 to 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-foot windspeed for burning is about 6 mph and the maximum is about 20 mph. Select actual humidity and wind range parameters based on purpose of prescribed burn and required property protection and smoke management concerns.
<u>TIME OF DAY</u>	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. Night-time burning is allowed only for reduced fuel levels when night smoke dispersion is rated fair or good; separate smoke management guidelines apply.
<u>SMOKE</u>	Smoke should be kept away from smoke-sensitive areas such as public roads, airports, and populated areas. A proper burning plan considers all aspects of smoke management. All burning should be done in accordance with applicable smoke management guidelines and regulations. Smoke can conduct electricity...winds should carry smoke away from power lines.

Table 2. Prescribed Burn Terminology

Fire Terms

Backfire: A fire set to spread against the wind to remove flammable material and thus help to stop or control the headfire. Backfires may be used for the entire burn in some circumstances.

Fire Boss: A person that supervises all phases of the application of a prescribed burn.

Firebreak: A space which is clear of flammable materials to stop or check fires. It also serves as a line from which to work and facilitate the movement of personnel and equipment. Firebreaks should be established before a prescribed burn is executed. See FIREBREAK – NC Practice Standard 394.

Flankfire: The sides of a fire between the head and the backfire.

Headfire: A fire, which is set to spread with the wind and is usually used with a backfire. They should be lit as rapidly as possible for the fire to be effective.

Mop Up: This is the process of checking the entire perimeter of the burn area to ensure all fires or smoldering materials are out or removed to a safe area. This includes cow chips, logs, dead trees, small areas still burning, and stumps.

Ring Fire: This technique requires a firebreak downwind that provides adequate width to prevent escape of the fire. Once the firebreak is secure, the remaining sides of the burn should be lit as rapidly as possible. The resulting headfire will spread rapidly across the area. Ring fires are the safest because once the ring is closed and the perimeter fires are extinguished there is little chance for the fire to escape.

Strip Headfire: A technique that requires setting a line or series of lines upward from a firebreak so no single line can develop enough heat or convection to escape or cross the firebreak. The width of the strips depends on fuel type, amount, slope, and uniformity. It is most useful to widen firebreaks and burn areas adjacent to hazards (controls size of fire and amount of smoke). Its disadvantages are the high heat concentration as the lines come together and the necessity of a well developed firebreak.

Fuel Terms

High Volatile Fuels: These fuels have large amounts of compounds such as fats, waxes, or oils that are highly flammable and can produce firebrands or windborne flaming debris. High volatile fuels can be burned safely with proper precautions. Low

Volatile Fuels: These fuels contain small amounts of highly flammable compounds and include most grasses and hardwood trees. These fuels can burn safely within a wider range of environmental conditions than high volatile fuels.