



The head strip burning technique for wildlife habitat improvement on the Sumter National Forest in South Carolina.

PRESCRIBED BURNING TECHNIQUES ON THE NATIONAL FORESTS IN SOUTH CAROLINA

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Many of the effects of prescribed burning on Forest lands are well known. More and more is being learned as researchers study these effects. However, little has been done in the study of technique of burning to achieve specific results under specific conditions of weather, fuel, and topography. This discussion will deal primarily with the prescribed burning techniques employed on the National Forests in South Carolina.

Prescribed burning has been utilized as a management tool on the National Forests in South Carolina for over 20 years. Initially the purpose for burning was for the reduction of fuels to reduce fire hazard. Later on prescribed burning was conducted for the control of undesirable species, brown spot disease control, planting site preparation, seedbed preparation, range improvement and wildlife habitat improvement.

Fortunately, the even aged timber management plans for the forest permitted extensive use of fire. Today over 43,000 acres are prescribed burned annually on the National Forests in South Carolina.

Burning for wildlife habitat improvement is keyed to obtain specific results. Some of these are—

- removal of leaf and needle litter which has a smothering effect on desirable forbs and legumes.
- stimulate quail indicator species such as Tick Trefoil (*Desmodium* sp) and partridge pea (*Chamaecrista* sp).
- increase deer browse.
- encourage fruiting of ground oak (*Quercus pumila*) and huckleberries (*Vaccinium* sp).
- maintain openings for deer and turkey.
- reduce basal area of non-commercial understory species.

Prescribed burning activities are entirely dependent upon weather. If the weather is right—BURN, if the weather is not right—DON'T BURN. Here is the weather in South Carolina that permits prescribed burning—this also applies to most of the Southeastern United States:

	Winter	Summer
Relative humidity	20% - 45%	20% - 55%
Wind velocity	3 - 10 MPH	3 - 10 MPH
Wind direction	*any reasonably constant direction	*any reasonably constant direction
Temperature range	34° - 75°F	85° - 100°F
Build Up Index	3 - 30	6 - 40
Soil Condition	damp humus layer in A ₀ horizon	damp humus layer in A ₀ horizon

* the most unreliable wind directions are in the easterly quadrats.

A special fire danger weather station is not necessary. Any local weather bureau can supply this information (except for Build Up Index). Soil moisture conditions will have to be field checked.

There are five different firing techniques developed through the years that are now employed on the National Forests in South Carolina.

- (1) Backfire
- (2) Headstrip
- (3) Spot or Checkerboard
- (4) Flank
- (5) Head Fire

These techniques are employed on specific occasions for accomplishment of specific purposes. Most burns are a combination of two or more of these techniques.

BACKFIRE METHOD

This technique consists of establishing a base line, perimeter lines and interior lines approximately 10 chains apart. These may be plowed lines or natural barriers such as creeks, roads or swamps. On slopes, the base line should be the top of the ridge and the perimeter lines on flanks. Interior lines should be as close to the contour as possible.

The fire is started on base line first—after base is safeguarded the interior lines are fired.

This method—

- works well with heavy fuel.
- gives a minimum of scorch.
- applies heat at ground line level for longer periods.
- recommended for summer burning under severe conditions.
- the most popular, easiest to apply, and the safest.

This method needs—

- steady wind from constant direction.
 - plenty of time.
 - interior lines prepared in advance.
 - continuous and uniform fuels—at least one ton per acre of fuel.
- This technique is employed in slope burning, burning in relatively young timber stands and results in a minimum of scorch. This method is recommended to beginners just starting to learn prescribed burning.

HEADSTRIP METHOD

This technique consists of running short head fires with the wind into a prepared base line or burned area. The strips will vary in width depending upon density and distribution of fuel. This technique is combined with a backing fire to initially secure the base line. After the base is secured strip burning is begun.

This technique has following advantages—

- can be conducted when relative humidity is comparatively high.
- has flexibility from the standpoint of wind direction changes.
- can be conducted in scattered and light fuels.
- needs a minimum of prior preparation.
- relatively inexpensive.
- cheaper from the standpoint that few plowed lines are required.
- rapid.

SPOT OR CHECKERBOARD

This technique is also called "Area Ignition." It consists of starting a series of small spot fires uniformly disturbed in such a manner that all spots converge before any one spot can gain momentum. The closer the spots are located the less is the possible damage to residual stands.

The advantages of this method are—

- can be employed with variable winds.
- fast, large areas can be burned rapidly.
- cheaper.
- works well in spotty light fuels.
- can be used where numerous small wet pockets are located.
- used for quail habitat burns.

This technique requires a skilled crew well versed in fire behavior and familiar with the objectives of burn. This technique should be employed primarily for winter burning when the air temperatures are low. When conditions are too hot for headstrip burning, the spotting technique can be used.

FLANK FIRE

This technique consists of treating an area with a fire that spreads perpendicularly to the prevailing wind direction. The line of fire is started directly into the wind. The fire then spreads laterally at right angles to the established line. This technique is frequently used to secure the edges of the prescribed burn when a backfire, strip head or checkerboard fire progresses.

Flanking requires a steady wind, a trained crew, uniform and preferably light fuels, cool temperatures and this method is the cheapest and fastest procedure to burn an area.

HEAD FIRE

On special occasions the head fire is employed. This consists of permitting the fire to run with the wind into a prepared fire break that will stop the spread. This is a dangerous and specialized method employed primarily to kill all aerial vegetation. Under certain conditions this technique is used to maintain a wildlife opening—this technique is used in brownspot disease control and whenever a hot, fast fire is needed. If not carefully used, this technique could result in a wild fire with spotting, crowning and other undesirable characteristics.

All five of these techniques are used in South Carolina. Each or a certain combination is best for a specific condition of desired results, weather, fuel and topography. These techniques may be combined or modified to counteract an unexpected change in weather conditions.

To determine which is the preferable technique the burning crew leader, prior to burning, carefully checks his weather report and starts a small circular test fire. He watches fire behavior of the test fire, paying special attention to wind direction and speed, height of flame, rate of spread of head, flanks and back. Based on these observations, he selects a combination of techniques compatible with the objective assigned. As the day progresses, relative humidity, temperatures and even wind direction and velocity may change. This may call for a change in techniques. On some occasions prescribed burning fires have to be extinguished.

The art of prescribed burning is tricky. We advise Wildlife Management Specialists to work closely with the Specialists in Fire Control.

SUMMARY

Five basic firing techniques are employed for prescribed burning on the National Forests in South Carolina. Each technique or a combination of techniques is best under certain conditions of fuel, weather, topography, and desired results.

Prescribed burning is an art requiring experience and knowledge of fire behavior. Anyone working with prescribed burning should learn to appreciate the potential constructive and destructive power of fire. Managers of Wildlife lands should work closely with Specialists in Fire Control to achieve desired results in prescribed burning.