Evaluating the Burn

The purposes of a burn evaluation are to determine how well the stated objectives of the burn were met and to gain information to be used in future burns. An initial evaluation should be made immediately after the burn, perhaps the following morning. A second evaluation should be made during or after the first postfire growing season.

Points to be Considered

- Was preburn preparation properly done?
- Were objectives met?
- Was burning plan adhered to? Were changes documented?
- Were weather conditions, fuel conditions, fire behavior, and smoke dispersion within planned limits?
- What were effects on soil, air, vegetation, water, and wildlife?
- Was fire confined to intended area; any escapes?
- Was burning technique correct?
- Were costs commensurate with benefits derived?
- How can similar burns be improved?

Indications and Guidelines

Needle Scorch

The best indicator of crop tree damage is percent foliage discoloration. Assuming that buds and branchlets are not heat-killed, even crown scorch approaching 100 percent generally will not kill trees unless secondary factors such as insect attack or drought materialize. If, however, loblolly pine stands are burned in the fall (September or October), after the trees have undergone their last needle flush of the growing season but prior to the onset of dormancy, research indicates that 100 percent crown scorch is likely to kill them. Slash pine appears to be more tolerant of severe crown scorch during the fall.

If more than 15 percent of a southern pine tree's needles are actually consumed by flames, the tree's chances of survival would be poor even if very little of the rest of the crown is scorched. Young vigorous trees are more likely to survive severe crown damage than are older individuals.

Magnitude and duration of growth responses in southern pines due to various levels and seasons of defoliation are not well documented. Both negative and positive responses have been observed, but the preponderance of evidence shows a direct relationship between diameter and height growth loss and crown scorch.

Providing no crown consumption took place, the following table will help in estimating potential growth loss in loblolly and slash pines over 3 inches dbh. These "ball park" estimates can be used for other southern pines as well, until more specific results become available.

A good indicator of hardwood control is a series of bark cracks extending into the cambium near ground level. This indicates sufficient heat was applied to penetrate the bark and kill the cambium. Although large hardwoods can be damaged by periodic fires they are difficult to kill.

Judge the success of burning for brownspot control by the number of longleaf seedlings with all infected needles burned off, but still having a protective sheath of green needles around the unharmed terminal bud.

Soil and Root Damage

Burning under prescribed conditions in the South generally does not expose bare soil. If duff remains after a burn, the physical properties of the soil probably were not harmed. If mineral soil is exposed, especially on steep slopes, soil movement and deterioration of site quality may occur.

Root damage is likely whenever the organic layer is completely consumed. It should also be expected whenever burns are conducted over dry soils (drought conditions) or when a deep litter layer is present, even though some duff remains. New root growth in vigorously growing pines can usually offset these losses, but older trees, having survived such fires without crown damage, often die six months to a year later for no apparent reason.

Air Quality

Smoke behavior must be continually evaluated from the time the fire is ignited until smoldering ceases. Unusual or unexpected smoke effects should be noted and correlated with other parameters of the burn for future use. Any public complaints should be recorded as part of the evaluation.

Percent Crown Scorch	Damage
0 to 33	Some volume growth loss may occur the first postfire growing season but it will be minor.
34 to 66	Volume growth loss usually less than 40 percent and confined to first postfire growing season.
67 to 100	Reduction may be as high as a full year's volume growth spread over 3 years.

Timing and Points to Evaluate

Evaluation should take place immediately after the burn and again during the first postfire growing season. In the case of late summer prescribed fires, the second evaluation should take place the following spring after the next growing season has begun.

Points in First Evaluation

- Amount of overstory foliage discoloration.
- Amount of consumption and top-kill of understory vegetation.
- Consumption of infected needles on longleaf seedlings without injury to terminal bud.
- Amount of litter remaining on forest floor.
- Smoke dispersion into upper atmosphere and success in avoiding smoke-sensitive areas.
- Protection of areas not to be burned.
- Any escape of fire.
- Any adverse public comment or reaction prior to, during, or immediately after the burn.

Points in Future Evaluation

Future evaluation can best be made after the start of the growing season to determine the following:

- Resin exuding from pine trees, an indicator of cambium damage or insect attack.
- Other signs of beetle attack.
- Mortality of timber or other desirable vegetation.
- Sprouting vigor of undesired vegetation.
- Recovery of longleaf seedlings free of brownspot.
- Remaining duff layer, mineral soil exposed, and any soil movement.
- Public expression for or against the burning program.

Evaluating a prescribed burn