



Forest Stand Improvement To Reduce Wildfire Hazard

Alabama Job Sheet No. AL 666B



Definition

Forest Stand Improvement (sometimes called timber stand improvement, or TSI) is the manipulation of species composition, stand structure, and stocking by cutting or killing selected trees and understory vegetation.

Purposes and Principles of Forest Stand Improvement to Reduce Wildfire Hazard

The practices used in forest stand improvement can also be beneficial in lowering the wildfire hazard and improving the overall health of the forest stand. Forest stands become high risk to wildfire damage due to numerous reasons such as storm-damage, over stocking, heavy fuel build-up from the exclusion of prescribed fire, insect and disease epidemics, and close proximity to high risk areas like railway rights-of-way.

The purpose of this job sheet is to assist with the implementation of management practices that will lower the risk of future damage from wildfires.

The wildfire risk is lowered when:

- The amount of flash fuel is lowered using a prescribed burn
- The amount of coarse woody debris is removed or treated (effective treatments include chipping, mulching, disk, shearing, and piling, or other)
- Fuel is removed in a strip using a plowed or disked firebreak
- Fuel load is lowered in a 30 foot-wide strip using a fuel break

Methods

Firebreaks

A firebreak is a strip of bare land or vegetation that slows down fire. Firebreaks help protect soil, water, air, plant, animal, and human resources by preventing the spread of wildfire or controlling prescribed fires. ([Refer to Firebreak, Alabama Guidesheet AL394.](#))

Fuel Break

A strip or block of land (minimum of 30' wide) on which the vegetation, debris, and detritus have been reduced and/or modified to control or diminish the risk of the spread of fire crossing the strip or block of land.

Prescribed Burning

Prescribed burning is the deliberate use of fire to help manage a forest. It is a complex management tool and should be used by only those who are trained and experienced in its use. ([Refer to Prescribed Burning, Alabama Guidesheet AL338.](#))



Methods for Treating Heavy Fuel Loads

When large amounts of leaning or downed timber are present, prescribed burning may be too hazardous to the residual trees. The best alternative is to have the timber salvaged if possible.

In the event the timber/material is not salvageable, the following treatment methods are recommended. Remember, the idea is to lower the fuel load and, thus, lower the wildfire risk, not to create a park-like setting.

Mulching

Wildfires in the western United States and Florida over the last several years have highlighted the vulnerability of dense overstocked stands to fire. Mechanical reduction of understory and midstory fuels by mulching or chipping is an option for reducing stand density to allow the reintroduction of prescribed fire into forest stands.



Shearing and Piling

Shearing is used to prepare sites where the vegetation is generally large (6 inches or more dbh). Shearing is done with shearing blades that are either angled or V-shaped. Blades with serrated edges have the best cutting action. The blade should be kept out of the soil to minimize soil disturbance.

Root Raking

Root raking usually follows shearing and is used to push the felled vegetation and other debris into windrows. Windrows should be placed on the contour at intervals of 100 to 300 feet depending on the slope and erodibility of the soil.



Skidding

A rubber-tired skidder can effectively drag woody debris to a central location for burning. In order to grind smaller tops and debris into the top soil, the skidder operator should use multiple haul routes to increase the amount of tops and debris crushed by the skidder.

In the southern pine region of the United States, activity by insects and fungi is at a high level because of higher humidity and temperatures. Consequently, logging slash crushed by the skidder decays rapidly and ceases to be a wildfire hazard.



Chainsaw Felling

On a small scale, a landowner may choose to fell leaning trees and tops to bring them in contact with the ground. This will increase the rate of decay and the amount of material consumed in a prescribed burn.

Benefits

Hazard Reduction

Prescribed burning helps to eliminate fuels such as pine needles, hardwood leaves, fallen branches, and herbaceous vegetation that accumulate on the forest floor. These fuels increase the chance of destruction of young stands if a wildfire erupts.

Control of Understory Vegetation

Prescribed burning helps control low-quality hardwoods and shrubs. Understory vegetation competes with pines for moisture and nutrients, and may interfere with regeneration.

Site Preparation

Pines require a clean and open seedbed to regenerate. Prescribed fire helps prepare sites by exposing the mineral soil and controlling undesirable vegetation for natural regeneration and direct seeding.

Wildlife Habitat

Burning helps increase the yield of herbs, legumes, and hardwood sprouts beneficial to wildlife. Wildlife areas are also opened up, encouraging feeding, travel, and dusting. This increases the “edge” effect that wildlife like. Quail, turkey, deer, and dove benefit the most from prescribed burning.

Disease Control

Longleaf seedlings are severely weakened and sometimes killed by brownspot disease. This is a disease that prolongs the grass stage, reducing height growth.

Prescribed burning scorches the needles and kills the fungus without killing the seedlings. Annosus root rot infestations are also reduced by prescribed burning.

Improved Access and Aesthetics

Reducing the amount of understory prior to harvest improves visibility and makes timber marking and cutting easier. Prescribed burning helps control the understory, improving accessibility for hunters or other recreational purposes. A wide variety of plants, including many flowering annuals, will increase in number.

Fire-dependent Species

Some species of animals and plants are dependent on fires. These species include the gopher tortoise, indigo snake, red-cocked woodpecker, wire grass, and pitcher plants. When an area is burned regularly, these species may increase in numbers.

Preparation for Burns

1. Obtain a permit to burn from the Alabama Forestry Commission.
2. Get a two-day weather forecast from the U.S. Weather Service.
3. Prepare necessary firebreaks. ([Refer to Guidesheet AL394.](#))
4. Have on hand the help, tools, and equipment needed to keep fires under control.
5. Thoroughly inspect fuel (burnable vegetation) conditions.
6. Prior to burning, notify adjacent landowner(s) of your intent to burn.
7. Have a professional certified in prescribed burning to develop a prescribed burning plan and provide onsite supervision while burning is done.

Optimal Weather Conditions

In most cases, the surface fuels should be dry and the soil should be moist to help protect roots. Therefore, it is a good idea to burn one to three days after a good rainfall (1/2 to 1 inch). Damage is caused to trees when the fuel is too dry. The humidity level should be between 30 and 55 percent. When the humidity is above 60 percent, the fire may not get hot enough or may not burn the area completely.

The air temperature should range from 20 to 50 degrees F in the winter and 80 to 95 degrees F in the summer. A moderate, steady wind from the north or northwest is best. This usually happens after a cold front has passed through.

Easterly winds are not recommended because they are often erratic. The preferred wind speed is 1 to 3 miles per hour (within the stand) and 6 to 15 miles per hour in the open.

Safety

Safety precautions must always be used when performing a prescribed burn. You must also have an experienced crew leader, an adequate number of people to conduct the burn, and the correct tools and equipment.

There is potential liability and the loss of human life and property if burning is not conducted properly. You must follow all applicable laws.

References

USDA-NRCS Alabama Conservation Practice Standard Code 338 - Prescribed Burning. January 1999.

Prescribed Burning in Alabama Forests. Circular ANR-331. Alabama Cooperative Extension System, Alabama A&M, and Auburn University.

A Guide for Prescribed Fire in Southern Forests. U.S. Department of Agriculture Forest Service. 1978.

Smoke Management Guidelines for Prescribed Burning in the Southeast. Hugh E. Mobley, Forestry Consultant. 1996

Prescribed Burning for In-experienced Burners, PRECEDA Education and Training. April 1998.

Definitions:
Detritus - loose material (as rock fragments or organic particles) that results directly from disintegration
Understory – all forest vegetation growing under an overstory
Additional Specifications and Notes:

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Revised April 2006