Introduction to Prescribed Fire

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Naturally occurring fire has shaped Southern ecosystems. It was the major ecological process in the development and dominance of longleaf pine forests, which once covered more than 90 million acres of land in the region. Longleaf pine developed several of its unique characteristics, i.e. the fall germination of its seed and a seedling grass stage because of naturally occurring fires, started by lightning. Over much of the South, thunderstorms, along with lightning, were most prevalent during the growing season, especially from May through August.

Historically, fires occurred in longleaf stands as often as every 1-3 years. These fires would start in longleaf forests and burn into adjacent ecosystems, depending on the moisture gradient. Consequently, these fires influenced adjacent ecosystems such as canebrakes, where it is estimated that fires occurred every 5 to 7 years, slope pine-hardwoods (every 8-12 years) slash pine flatwoods (every 5 to 10 years) and swamp forests (every 25 to 33 years, during extreme drought).

With the arrival of Native Americans to the South, some 12,000+ years ago, fire occurrence changed from fires set during the lightning season. Native Americans used fire to drive game for hunting purposes; clear land for farming, keep vistas open around their villages, manage habitat for favored wildlife and reduce ticks and snakes around their villages. As a result, they burned when it suited them. European settlers quickly adapted the use of fire, primarily to clear land for agriculture and to stimulate the greening up of grass in the woods for cattle grazing. The settlers used fire more in the late winter-early spring and then later if “freshening up the grass” for the open-range grazing of their cattle was important.

This custom of burning the woods off for livestock grazing persisted into the first part of the 20th Century. At that time, the forestry profession was just catching on in the South and most foresters had a strong anti-fire bias as a result of their training either in Europe or in northern forestry schools. The profession campaigned vigorously to stamp out all woods burning through programs such as the Dixie Crusaders. Later, Smokey the Bear added to the anti-fire campaign with his famous “Only you can prevent forest fires” slogan. Gradually, the profession came to accept fire as a vegetation management tool but advocated dormant-season prescribed fire as the best and safest method.

Today, prescribed fire is accepted as a legitimate forest management tool. Prescribed fire allows land managers to mimic natural fire systems and perform the burning under conditions that favor societal wants and needs. Fire in the forest allows natural forest development and the return of natural ecosystems that once dominated our landscape. Fire is the most cost-effective way to manage both desirable and undesirable vegetation in pine forests.

Historically, natural resource managers have used prescribed fire primarily during the dormant season. During this time, weather patterns are more predictable and prescribed fires and associated smoke are more easily controlled. With the use of prescribed fire down dramatically from just a generation ago, the frequency of use of prescribed fire is more important than the season of use. Prescribed fire needs to be applied periodically to southern pinelands.

Prescribed fire is used to accomplish several primary objectives in forest management that nature accomplished with frequent fires. They are:

**Hazard Reduction:** Fuels such as grasses, weeds, pine needles and hardwood brush accumulate rapidly in unburned pine stands of all ages. These fuels increase the chances stands may be destroyed by a wildfire and can hinder regeneration in older stands. The regular presence of fire is a cost-effective means of reducing this hazard.

**Hardwood Control:** Low-value, off site and often poor quality hardwoods encroach in pine stands from an early age. They follow pines because they can grow in shade. These off-site hardwoods compete with pines for moisture and nutrients, reduce visibility and access through...
the stand and, most importantly, interfere with pine regeneration. The regular application of fire is often the most economical way to maintain natural species distribution.

**Site Preparation:** Pines do not regenerate very well in shade or on seedbeds covered with forest litter and debris. Both artificial and natural pine regeneration depend on bare mineral soil, adequate overhead sunlight and freedom from hardwood competition for establishment and growth. The use of prescribed fire to reduce hardwoods and expose mineral soil prior to seedfall is desirable for natural seeding. Fire can also be used to remove logging slash and undesirable hardwoods to prepare sites for direct seeding or planting of seedlings.

**Wildlife Habitat Improvement:** In Southern pines, prescribed burning is used to improve the habitat for white-tailed deer, wild turkey, bobwhite quail and mourning doves as well as a whole host of nongame wildlife species. Prescribed fire can increase the yield and quality of forbs, legumes and hardwood browse; and create openings for feeding, travel and dusting. Multiple benefits are realized by any burn, regardless of the primary objective. For example, burns to control hardwoods in immature stands bring on succulent sprout growth within reach of browsing deer. Quail and turkey benefit from fuel reduction burns that open up the woody understory and encourage the growth of native grasses, forbs and legumes.

**Disease Control:** Brown-spot needle blight infects the needles of longleaf pine seedlings in the low ‘grass stage.’ Unchecked, it delays growth and kills seedlings. Prescribed burning will scorch the needles and kill the fungus without harming the seedlings. Infestations of *Annosus* root rot occur less frequently on areas where periodic burning reduces litter, probably destroying some of the fruiting bodies of the fungus.

**Forage Production:** In pine stands of the Coastal Plain, prescribed burning improves the quantity and quality of grasses and other plants used for grazing. Burning removes dead material that is low in nutrient value and promotes succulent, new growth, which in the spring is high in protein, phosphorus and calcium.

**Improving Accessibility and Appearance:** Periodic prescribed fire keeps understory vegetation low and helps maintain a park-like appearance, improving a forest’s aesthetic and recreational value. The reduction of the understory also increases accessibility, improves visibility and facilitates timber marking and harvesting. This often lowers harvesting costs and results in a greater financial return for the landowner.

For most of the above uses, dormant season fire has become the norm. Dormant season fire, or fire applied from November through March in our climate, has several advantages. First, after a killing frost, there is more fine vegetation that is dry and pine needles on the ground that make it easier to carry a fire through the stand; second, weather patterns, moisture and wind are more predictable during the winter, making it easier to plan and carry out a burn; and third, dormant season fire is perceived to be less damaging to wildlife, since it isn’t the nesting season.

A landowner wishing to use prescribed fire should proceed cautiously. Pine forests that have not been subject to regular prescribed fire will need to undergo several ‘cool’ dormant season fires with the objective of gradually reducing fuels. “Hot” fires reintroduced in pine stands that have no recent fire history can kill even mature pines! This is because the pines send their feeder roots up into the nutrient and moisture-rich humus layer that develops under large accumulations of litter. Several “cool” dormant season fires that gradually reduce the litter layer will train the tree’s feeder roots to go down into the mineral soil, reducing the chance of pine mortality.

In addition to necessary fuel reduction burns, dense pine stands should be thinned in order to open up the canopy. Open-canopy stands are better able to disperse the heat generated with prescribed fires and have less crown scorch than densely-stocked stands. Less crown scorch means less growth loss in the pines, less stress and less of a chance of a pine bark beetle infestation in weakened pines.

Prescribed fire should be carefully planned. A burn plan with specific objectives should be developed for each tract, taking into account...
specified weather and fuel conditions needed to burn, fuel loads, smoke-sensitive areas, the firing pattern to be applied to meet the objectives and equipment and manpower required to execute the plan. These items will vary from stand to stand. The firing pattern will depend on specific burn objectives and current and expected fire behavior.

In addition, landowners should follow the South Carolina Forestry Commission Smoke Management Guidelines to minimize any possible negative impacts associated with smoke.

Prescribed fire is not a practice to be used by the inexperienced! If you don’t have experience, contract with someone experienced with the use of prescribed fire, either with the South Carolina Forestry Commission, a consulting forester or wildlife biologist (many perform burns for their clients) or an individual or firm on the list of Prescribed Fire Contractors maintained by the South Carolina Prescribed Fire Council at www scpfc.net. Work with these professionals. Over time, you can gain enough experience through helping them burn to do your own.

Finally, frequency and use of fire on the landscape is critical in order to maintain these fire-dependent ecosystems. Hubert Stoddard, a pioneer in the use of prescribed fire in the South once said that, “It takes the same number of years fire was withheld from a forest to restore it with prescribed fire.”