FIRE! A Fair Weather Friend

by Carol A. Heiser
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Forest Fire! The image conjures up great orange and amber flames crackling around the trunks of trees, shooting up high into the leaves and exploding into giant torches in the canopy. But not all fire is bad, nor is it always severely destructive. Historically, fire has been used by humans for thousands of years as a way of steering the course of nature to serve specific needs. Perhaps the most ancient fire tradition by Native Americans was fire for hunting. In the east, Native Americans burned large openings in forests, and in the Midwest they maintained the open prairies, because they knew that fire would facilitate succulent new growth which would then attract game animals that they could harvest for food. They set fires to chase game, to improve grazing or the growth of understory woodland plants like berries, and to open up brushy areas for easy access and travel. Early settlers in New England became accustomed to a haze of smoke in the woods each autumn, giving rise to the term "Indian summer." Today, land managers recognize the invaluable role that fire plays in structuring vegetation, and controlled fire is key to forest and wildlife management.

Ecological Benefits

Plant and animal communities are in a constant state of flux, a perpetual cascade of life, death, and complex interrelationships. Fire that results from natural causes is a vital part of healthy ecosystems, because it is an instrument of change that drives these natural processes. Fire helps turn the clock of succession back by wiping the canvas clean and starting with a new slate of plants. Here in the Southeast, this means that areas which experience frequent fire are maintained as open, grassy meadows, while areas with little fire gradually become forest.

Wildlife and forests derive many important benefits from the effects of fire. Fire removes dead trees and litter from the forest floor and creates openings that allow sunlight to reach areas that were previously shaded. Within a few seasons after a fire, one typically sees a flush of green, healthy regrowth, that in turn, provides food and cover for wildlife species which require those conditions. Fire unlocks nutrients like phosphorous and carbon that are held in plant tissue and recycles them as ashes back into the soil; the nutrients supply an improved growing medium for renewed plant growth.

The openings created by fire are also important to wildlife because the openings create more edge. An edge is the interface or place where two or more different habitats come together, such as where a forest meets a meadow or where a shrubby field meets a low-lying wetland. Wherever an edge occurs, you will find an overlap of one plant community with another, with a greater variety of food types available and, therefore, a greater diversity of wildlife species. This phenomena is referred to as the *edge effect*, and openings created by natural fire afford new habitat and additional places for wildlife to feed and travel. Some wildlife species, like the endangered red-cockaded woodpecker, depend on fire to maintain open pine stands. Because fire is an agent of change that creates or enhances habitat and improves food availability, wildlife species reap many benefits after fire.

Fruit and seed production of flowering plants also increases after a burn. Fire provides a mechanism for breaking the seed coat of many native grasses and legumes, which in turn helps to stimulate germination and successful growth. Other plant species, such as the longleaf pine in southeastern Virginia, are specially adapted to resist the effects of fire and require fire to eliminate competition with other hardwood species. The cones of table mountain pine, a species which grows in high elevations, require fire's heat to break them open and release their seeds.

Is All Fire Bad?

Generations of schoolchildren fondly remember Smokey Bear, that familiar icon of American forests known for his simple message, "Only YOU can prevent forest fires!" Smokey did such a good job of teaching about the negative effects of fire, that much of the public has unfortunately been left with the indelible but false impression that all fires must be bad. In fact, there are actually two types of forest fire, and Smokey's message is meant to focus on the destructive type, a hot *wildfire* that can threaten human life and property. The other type, called a *prescribed fire*, is carefully orchestrated to burn at a much lower intensity and is recognized as a valuable land management tool.

Fire is essential for maintaining open stands of forests, which improves habitat and food availability for many animals and birds, like the (previous page) Eastern cottontail rabbit *(Sylviagus floridanus)* and the endangered red-cockaded woodpecker *(Picoides borealis)*.

A wildfire is just what its name implies: a fire that runs "wild," raging out of control, made more unpredictable by the vagaries of the weather. Occasionally wildfires occur when lightning provides a spark to ignite dry leaves or other organic matter. This is one of nature's oldest phenomena and ensures the perpetuation of biological change in the environment. In Virginia, however, 99 percent of wildfires are caused by people, costing hundreds of thousands of dollars to control. Annually, about 1,000 fires burn 4,000 acres of forest land.

Many wildfires tend to occur in early spring and fall when conditions are ripe for high fire danger: low humidity and dry winds, combined with warm temperatures and dry material or very little green vegetation on the ground. Because of these conditions, it is not uncommon for a wildfire to burn with such feverish intensity that the flames reach well up into the canopy or upper layers of a forest, destroying everything within its path, including timber, wildlife habitat, and the protective covering on the forest forest floor that prevents erosion. An unwary homeowner or landowner who decides to burn an unattractive pile of leaves or brush when fire danger is high may be in for quite a surprise at how easily even a small fire can escape and become much larger, menacing, and potentially catastrophic.

Prescribed fire helps to clear away undesirable plant species and leaves larger trees intact.

A prescribed fire, in contrast, is the land manager's equivalent to a doctor's prescription: a custom-designed plan to fit a particular situation or need. Weather is a crucial factor in determining when and how a prescribed burn is done, and the burn is conducted only when wind, temperature, and humidity conditions are favorable for keeping the fire under control. Prescribed fires burn with lower intensity and heat than wildfires, and are, therefore, intended to cause much less damage.

Prescription for Fire

Just as a suburban homeowner might prepare a seedbed for a garden by removing the grass in the yard and working up the soil beneath it, a rural landowner uses prescribed fire to prepare an area for the management that will come next. For example, the goal in a woodland setting might be to remove the competition for growing space among the tree species present. Here, a pre-

scribed burn would creep across the forest floor, clearing away the undesirable species, but leaving the crop trees intact. Another example is a hayfield or pasture where the grass has built up a degree of thatch that can crowd out new grass seeds from germinating. A prescribed burn through the field helps to eliminate the thatch and return nutrients to the soil.

One of the most important uses of a prescribed burn, particularly in western states, is to reduce the amount of hazardous fuels on the ground. When fire is deliberately excluded from an area for many years, dead vegetation and other organic debris accumulates. This "fuel loading" on the ground can be a dangerous situation, because such conditions make it much more likely that when a natural fire finally does occur, it will be a hot, intense burn that will cause more damage than a low-intensity, planned burn. In the east, prescribed fire is commonly used in areas where a significant weather event like a summer hurricane or a winter ice storm has cast many branches and other leafy material onto the forest floor. Unattended, this fuel can dry out and increase the likelihood of wildfire. A prescribed burn circumvents this risk by removing the fuel on the ground.

Prescribed fire in Virginia has an excellent track record. Our forest industry and many private landowners frequently use fire as site preparation for pine management. After a harvest or clearcut, the site is burned to prepare a bed for planting pine seedlings. Prescribed fire is also used to keep open lands open, which helps sustain species like quail and songbirds that require grassland areas to survive.

Essential Ingredients

At least three key ingredients must be available for a prescription fire to burn correctly: fuel, oxygen, and heat. The fuel can be the thatch in the grass or the branches on the ground, as described above. A heat source is needed to ignite the fuel, and oxygen is needed for the combustion or rapid oxidation to continue. If any one of these three elements is removed, a fire cannot exist. Land managers can, therefore, influence the outcome of a fire by manipulating the elements to their best advantage. They use instruments that measure humidity in the air, which can affect how well the fuel will burn. They take into consideration the wind speed and wind direction, as well as the topography of the land, because fire behaves differently when it travels up or down a slope than across a flat field.

Fire lines or fire breaks must surround the area to be burned. A fire line is a wide strip or border of bare soil containing no fuel such as dead leaves and other plant litter; the line protects adjacent areas from being burned accidentally. For example, a gravel driveway might be used as a fire break between two fields. Or, in a heavily wooded area, workers construct a fire line by scraping away the vegetation down to bare soil with specially designed, sharp bladed fire rakes. Oftentimes a fire line is used as a starting point to begin a fire and provide it with a deliberate direction from which to burn.

Virginia Burning Law

To protect life and property, Virginia enforces a 4:00 p.m. burning law from February 15 through April 30. The law states that during this time period each year, which is referred to as *fire season*, no burning may occur in or within 300 feet of woodland, brushland, or fields that contain dry grass or other flammable material except between the hours of 4:00 p.m. and 12:00 midnight.

Because fire can quickly get out of hand prescribe burning should be left to the professionals.

The Northern bobwhite quail *(Colinus virginianus)* benefits from the use of prescribed burning. Fire helps to create open areas that were shaded from sunlight, which then promotes new growth.

Burning on Your Property

In order to conduct a prescribed fire on your property, you must have a burn plan on hand and must also notify the Virginia Department of Forestry (DOF) and your local sheriff's office that a burn will take place. To help improve your chances for a quality burn, DOF offers a three-day certification course in which participants learn the correct techniques for applying prescribed fire. To learn more about the course, contact Fred Turck, Forest Protection Coordinator, at the Virginia Department of Forestry office in Waverly, (804) 834-2300.

Fire is neither all good nor all bad. It is simply powerful. In the proper place and time, with the right conditions, and under the direction of trained and experienced professionals prescribed fire can be an indispensible method of land management and a very constructive technique for improving wildlife habitat.

Learning More

A Virtual Tour of the Forest: Teacher's Guide, a 50-page booklet and accompanying CD, are available from the Virginia Department of Forestry as a supplement to the Project Learning Tree (PLT) program. The guide includes sections on forests, harvesting trees, fire, water quality, and more. Look for the guide at the Forestry Web Store, **www.dof.state.va.us**, visit Virginia PLT at **www.cnr.vt.edu/plt/**, or call the DOF headquarters in Charlottesville at (434) 977-6555 for additional details. □

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Virginia Naturally