

FROM THE WOODS

Wildfire

PENNSSTATE



College of Agricultural Sciences
Cooperative Extension

AN EDUCATIONAL SERIES ABOUT FORESTRY FOR YOUTH

Fire has been a part of the natural landscape since time began. It is viewed as both good and bad. Fire benefits nature by recycling plant nutrients into the soil. Some forest ecosystems need fire to sustain plant and animal communities. Extremely intense fires can damage ecosystems, and even small fires can destroy homes. To protect people, communities, and natural resources, we often try to prevent and stop forest fires. An out-of-control fire in a forest or natural area is a wildfire.

EASTERN FOREST FIRES

Wildfire frequency and intensity vary based on location, climate, and types of trees. The northeastern United States has a temperate climate with year-round precipitation. As a result, eastern wildfires are generally low in intensity and burn fuels on the forest floor. Fire risk is greater in the Northeast during the spring and fall months when leaves are off the trees. In the spring, after the snow melts and before the new foliage emerges, the sun warms and dries last year's fallen leaves. Similarly, in the fall the air is drier and the leaves fall and dry on the forest floor. These two times, fall and spring, are when most northeastern fires occur.



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Large, 3,000- to 10,000-acre fires occurred in the late 1800s when northeastern forests were extensively cut over. Large fires rarely occur now.

WILDFIRE SUPPRESSION

A history of wildfire suppression efforts, such as fighting every fire possible, has contributed to an accumulation of forest fuels and, thus, a higher risk of wildfires in some areas of the United States. In western forests where fuels have accumulated over time and do not rot because of dry conditions, fire is increasingly common. Tree species such as Douglas-fir and ponderosa pine common to western forests contain highly flammable resins that make fuels more volatile. The combination of accumulated flammable fuels, steep mountains, and hot, dry summers makes western forests prone to large, severe wildfires.

Most eastern wildfires tend to be small, burning an average of one acre per fire. However, areas of the Northeast and Midwest can still experience large wildland fires, which burn hundreds to several thousand acres when conditions are right. Because of population increases and development expansion, eastern wildfires have become more complicated to manage and suppress over the last one hundred years. The loss of houses and other structures and the need to evacuate residents during wildfire events have become more of a concern in some areas. According to wildfire statistics, lightning strikes account for 1 percent of

wildfires and human actions cause the majority of eastern wildfires. People burning debris and arsonists cause the greatest number of wildfires.



RICHARD DEFFEN, BUREAU OF FORESTRY

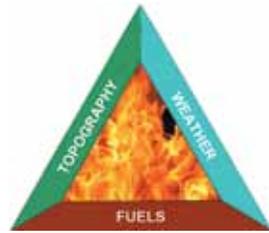
Ninety-eight percent of wildfires are caused by human activity such as this unsafe barrel burn.

THE FIRE TRIANGLE

All fires need three components: fuel, heat, and oxygen. These three compose what is called the fire triangle. In forests, live and dead vegetation, including dry leaves, twigs, logs, and grasses, are fuel. Heat sources such as sparks, campfires, trash burn barrels, or lightning strikes start fires. Oxygen is readily available in the air. Wind, the horizontal movement of air, increases the flow of oxygen, dries fuels, and helps increase fire spread and intensity. Remove one of the three sides of the triangle and fire cannot occur.

FIRE STAGES

Fire goes through several stages as it spreads. First, heat from the fire dries nearby fuels. Next, the nearby fuels release volatile gases. These volatile gases and nearby fuels ignite. Finally, as the fire intensifies, it rapidly preheats and dries surrounding materials, allowing them to ignite and carry the fire through the forest. This process of heat transfer only happens when there is fuel continuity (unburned material close to burning material). The fire continues the cycle with nearby fuels. Under certain conditions—for example, dry fuels and high winds—these steps are almost instantaneous. Importantly, as fuel moisture levels increase, more heat is required to evaporate moisture and ignite fuel. This is why it is easier to use dry wood in a campfire.



Fire behavior triangle.

The fuel, topography, and current weather conditions, including wind speed, determine the direction and the rate of fire spread. Fuel, topography, and weather compose what is called the fire behavior triangle. Topography is the slope of the land and the direction the slope faces. Fire moves up steep slopes more quickly as the flames preheat uphill fuels. South- and west-facing slopes are generally hotter and drier in the Northern Hemisphere. We can't alter topography or weather. However, reducing or eliminating fuels lowers wildfire risk.

NOT ALL FIRES ARE HARMFUL

Not all fires in a forest are harmful. Controlled fire—fire set by people for the purpose of vegetation management—is a tool used to achieve several different objectives. Some plants and trees need fires to grow. Jack pine cones and pitch pine cones need fire and heat to release seeds. Frequent low-intensity fires kill trees and plants, allowing fire-tolerant seedlings and species, such as oak, to capture full sunlight. In these fire-dependent ecosystems, controlled burns reduce fuels and prepare sites for tree regeneration and regrowth.

Controlled fires are done by trained professionals knowledgeable about fire behavior. Before conducting a controlled burn, these professionals

gather vegetation and terrain data in the burn area. Computer models assist in developing a fire plan based on vegetation, expected weather conditions, and desired outcomes. Firefighters with water and firefighting tools ignite, control, and extinguish the fire. Their goal is to make sure the fire only burns the designated area.

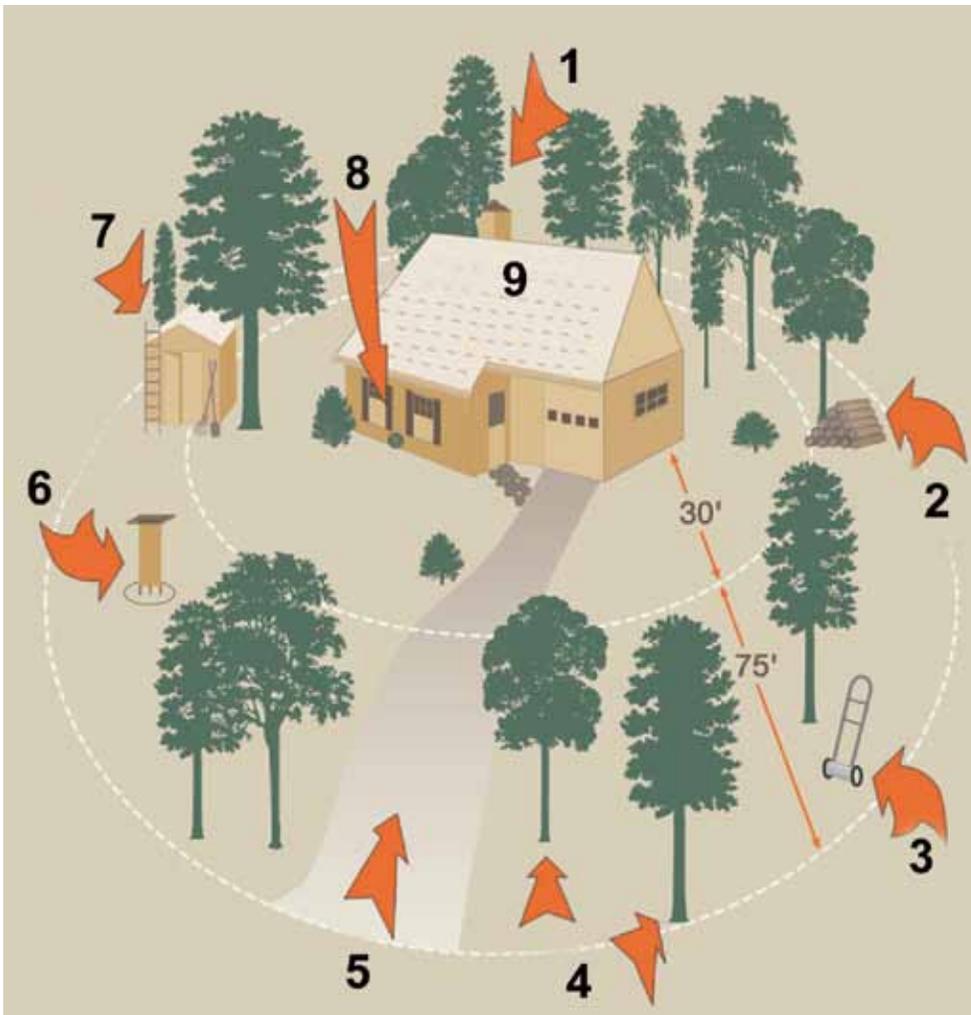
As you can see, fire is both beneficial and destructive to the environment. It is important to understand wildfire and do our part to prevent the unwanted, human-caused fires.



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Trained professionals conduct controlled burns, which benefit forests and wildlife. Controlled burns also remove fuels, thereby reducing future wildfire risks.



STEPS TO PROTECT YOUR HOME

Sometimes wildfires threaten homes, especially when the homes are close to natural areas like forests. As more homes are built in or near wild areas, those working to control fires and protect homes call this the wildland urban interface. Look at your home, your street, and your neighborhood. Do you live near natural places or small, wooded areas? If so, there are simple steps you and your family can take to make your home safe from wildfires:

1. Keep the chimney clean, install a spark-arresting screen, and keep trees 10 feet from the chimney.
 2. Keep wood piles 25 feet from the house and fuel tanks.
 3. Prune dead branches on trees to within 8 feet of the ground.
 4. Maintain and mow grass 30 feet around the house.
 5. Ensure the driveway is wide enough for emergency vehicles.
 6. Avoid outdoor burning; keep burnable materials away from all structures.
 7. Keep fire tools available (shovel, rake, ladder).
 8. Keep a 30-foot garden hose.
 9. Keep the roof and deck clear of leaves, needles, and debris.
- By following these simple steps and talking with your local fire company about safe debris burning, your family can reduce your wildfire risk.

Prepared by Laurie Schoonhoven, program specialist for the Sustainable Forests Partnership; James C. Finley, professor of forest resources; and Sanford S. Smith, extension specialist in natural resources and youth education

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