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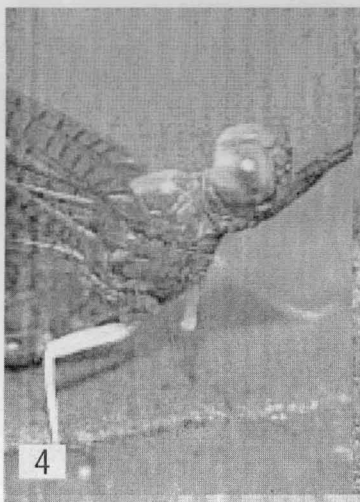
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WHERE THERE'S FUEL, THERE COULD BE FIRE

Too much fuel on the forest floor can lead to catastrophic fires.

By George Hartman
Photography by Cliff White

Forests have always burned, but large fires in the South and in the West recently have caused an exceptional amount of property damage and an unfortunate loss of lives. What made these fires burn so hot and with such intensity was an accumulation of brush and dead wood on the forest floor.

Heavy fuel loads that result in damaging fires don't happen by accident. Ironically, they are often a result of too much fire control. As we have built our roads, reservoirs, towns, private homes and developments, we've extinguished fire from the natural cycle of our urban and suburban woodlands. Whenever fires threaten our homes and towns, we put them out quickly and aggressively. Our roads and right-of-ways also serve as natural fire breaks. Without periodic burning, however, fuel loads on the forest floor keep increasing. Eventually the fuel load becomes so high that it can contribute to an uncontrollable fire.

We also brought in non-native species of plants for forage, landscaping and timber production. These plants (fescue, brome, old world bluestems) create more dead fuels, while multiflora rose and non-native pines are richer in oils and resins so they burn hotter than naturally occurring vegetation.

While battling the wildfires that our culture helped to create, government began trying to control the fuel buildups that make wildfires worse. State and federal agencies across the nation have increased the amount of land burned intentionally (called prescribed burning) to reduce the amount of fuels available for wildfires. They have also increased the amount of timber harvested to decrease fuel loading.

At the same time, a group of six federal agencies initiated the Joint Fire Sciences Program. The participating agencies are the U.S. Forest Service, Bureau of Land Management, Bureau of Indian Affairs, National Park Service, U.S. Fish and Wildlife Service, and the U.S. Geological Survey. The Joint Fire Sciences Program uses federal funds to gather scientific information about wild land fuels and fuel management from across the nation. Sound scientific information is necessary for land managers to make the right choices when faced with fuel management issues.

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Missouri is more fortunate than states to our west in our wildfire control efforts. Our climate is wetter, so we get a lot more rain each year than western states. The moisture helps our leaves and ground plants decay and return to the soil rather than accumulate as fuel. Also, when we have lightning storms here, they are generally accompanied by rain that puts out or limits the scope of fires started by the lightning strikes.

Southern states receive as much or more rain than we do. However, their wild land fuels are high in volatile compounds like resins and pitch, and many of their plants have waxy coatings that can catch fire with a lightning strike, even in the rain.

Drought makes woodlands especially vulnerable to burning. Add a strike from a dry, lightning storm, a carelessly thrown match, an escaped trash or brush pile fire or a deliberately set fire, and we can experience a forest fire disastrous to homes, property and people.

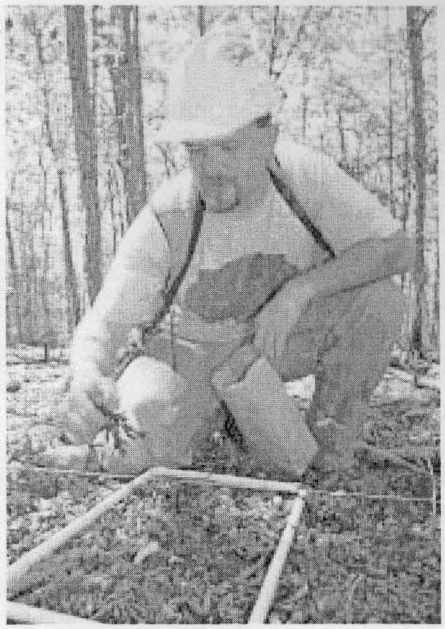
The Joint Fire Sciences Program is funding a research project in Missouri to determine just how much fuel we have in unburned and uncut forests, and how timber cutting and prescribed burning affect the fuel load.

Although we don't have the huge fuel loads that are typically found in the West, we also don't have accurate estimates on just how much fuel is on our forest floors. We know our woodlands have a mid-story of small trees that prevents sunlight from reaching the ground. We also know that our forest species have changed over the years toward a mix of species that thrives without any human disturbance.

The research project will tell us how much this new mixture of species and the altered stand characteristics affect the fuel load on the forest floor.

The Missouri Department of Conservation, the U.S. Forest Service North Central Research Station, the U.S. Geologic Survey (USGS) and the University of Missouri are working cooperatively on the project. The study is being conducted on Conservation Department lands.

Two graduate students from the university are gathering data as part of their degree program. They are assisted by fire ecologists from the USGS and the Conservation Depart-



Information gathered during prescribed burns on test areas helps determine how timber cutting and prescribed burns impact forest floor fuel loads.

ment. The U.S. Forest Service provides funding and support staff. It is organizing the study results to develop management practices that can be used by both public and private landowners throughout America's central hardwood region.

The study takes place on three different blocks of land on the Clearwater and Logan Creek conservation areas. These blocks have not been thinned or burned in at least 30 years. Stands in each block are on south and north slopes and on ridges. Within the blocks, some stands will be thinned only. Some will be burned. Others will be burned and thinned, and some will be left untouched.

In the thinned stands, commercial loggers who have been trained and certified for low-impact logging practices will cut the smaller and poorer quality trees marked for removal. The thinnings are competitively bid, and Conservation Department foresters oversee the logging. Non-commercial trees, those too small or poorly formed to be harvested, are cut but left on the forest floor.

Costs and the income generated by the thinning, as well as the resulting increase in value of the remaining trees, are carefully recorded so we can calculate the economic value of the various forest management practices.

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We conduct prescribed burns in the spring, just before the trees leaf out. Department fire crews build fire lines around the stands to be burned and ignite the fires from these fire lines. The burning removes the litter and some of the dead wood from the forest floor.

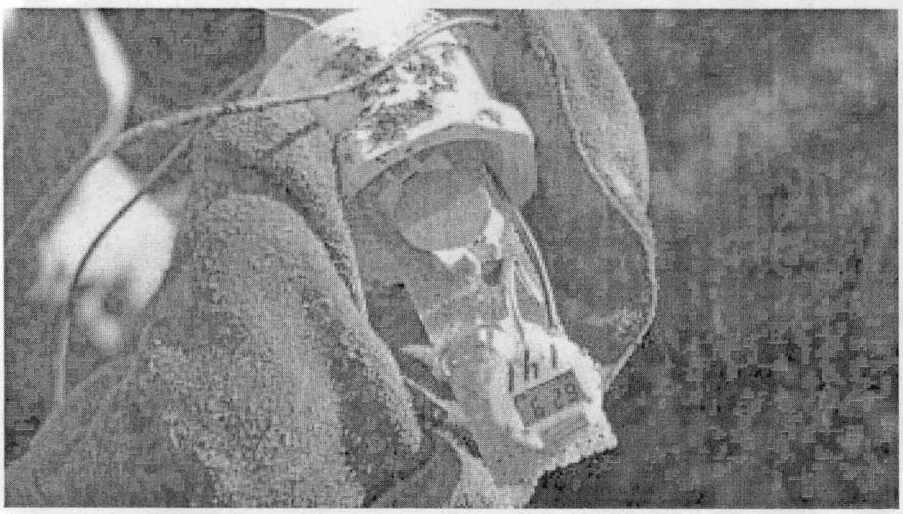
University of Missouri student Jeremy Kolaks is studying the effect of prescribed burns on forest floor fuel loads. He buries sensors that tell him when an advancing fire crosses his plots. He also constructs flame height sensors (cotton string that has been soaked in flame retardant). These sensors tell him how fast the fire traveled and the height of the flames.

Kolaks also conducts fuel transect surveys to determine what the fuel loads were before management, and what effect thinnings and prescribed burns have on the fuel load.

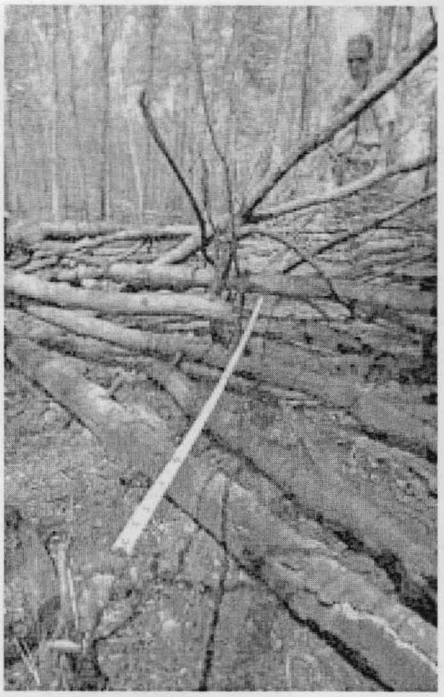
Graduate student Erin McMurry is studying the vegetation changes within the forest as a result of these management practices. She is compiling information on the trees before and after management, including any noticeable damage to the trees from either the fire or the timber thinning operation. McMurry is also gathering information on the ground vegetation following the treatments.

The work of both Kolaks and McMurry involves near constant, on-the-ground work during the summer growing season. The students endure hot/humid weather, lots of soot and plenty of seed ticks to collect their data.

The information from this study will help us assess the forest fuel loads we have here in the central hardwood forests and provide a scientific basis for future fuel management decisions. ▲



Calculating the value and effectiveness of various types of forest management should result in fewer devastating fires in the future.



Researchers monitor the heat and height of a test fire, as well as its impact on standing trees, downed logs and vegetation.