

FACT SHEET

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Timber & Timber Harvesting in West Virginia

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Forest Fires

Fire has been a part of nature since the origin of forests on earth – whenever the relative humidity has been low, temperature high and lightning prevalent. There are layers of charcoal in geologic deposits showing that plants were being incinerated by natural fire hundreds of millions of years ago.

Fire, historically, has been the phenomena that has kept forests from becoming overstocked, stagnating, single species refuges. Our forests evolved with fire. When the European settlers first arrived, carelessness with and extensive use of fire often led to intolerable situations. Since the foresters from Europe had experience only with highly managed forests where fire was controlled from the seedling to harvest stages, they accepted fire as being always bad and acted to control it. This has been a guide ever since in our still very young country, although it may result in additional problems in the softwood forests of the western U S.

West Virginia forests have had a severe history of being burned. The most acreage ever burned in one year, since exact record keeping was inaugurated, was in 1952 when 637,882 acres were burned by 3,048 fires. The second worst year was in 1987 when 417,003 acres burned by 2273 fires. Nearly 350,000 acres were burned in 1991. Much of the burned acreage is located in the 10 southernmost counties and is due to arson. Although some acreage has been burned several times, the aggregate acreage burned in the last 50 years is more than 3.5 million acres.

Fire has several effects on forests. It kills trees and other plants, destroys litter and humus, creates changes which impede the infiltration of water, greatly reduces soil animal populations, reduces total soil nitrogen, temporarily raises soil pH, reduces wildlife habitat, causes air and water pollution and soil erosion and it initiates decay in hardwood trees, among others.

In 1944, an article in the Journal of Forestry indicated that up to 165 tons of soil per acre was lost after a forest fire. Due to the ongoing World War, little attention was directed to it, but in the Fall of 1987 it was observed in West Virginia that fires were resulting in a lot of erosion. Consequently, nearly 100 plots were established and monitored for the next two years*. In general, the fire-burned areas had erosion as high as 265.7 tons per acre or 11.8 pounds per square foot. All observations greatly exceeded

the amount that can be lost without severely damaging productivity. Since soil weighs about 125 tons per acre inch, some of the areas lost up to two inches of mineral soil. Since it is thought to take geologic weathering 10,000 years to manufacture a foot of soil, the damages that occurred in just four months will take nearly 1,700 years to replace.

Erosion results in the siltation of streams. In 1990, the West Virginia Division of Forestry conducted a study** of the 51 West Virginia streams listed by EPA as being the most heavily impacted by siltation in the State. The streams were located in 19 counties. Coal mining and state roads were the two top causes of siltation. These were followed by agriculture, oil and gas operations, construction, timber harvesting and forest fires. However, in areas of repeat forest fires, the impact of the fires increased to third place, just behind the erosion caused by mining and public use roads.

Hepting and others in 1935 (USDA Tech. Bull. 570) and Burns in 1955 (Mo. Expt. Sta. Bull. 642) both reported that sound hardwoods cannot be grown in the eastern U S if they are fire-scarred. Boyce, in his textbook*** on forest pathology says “ an analysis of fire damage in eastern hardwoods will show that the major fire loss is not the immediate effect of the fire, but the ultimate effect, expressed years later, when the stand is cut with the heavy cull owing to decay that entered through the fire scars” and in a later paragraph, “in eastern hardwoods adequate fire protection is essential for the production of reasonably sound timber.”

In West Virginia, Division of Forestry personnel have shown that fire-scarred trees develop a decay column that, in about 32 years, beginning with a sound tree 12” or larger in diameter, essentially removes the bottom eight-foot log as a merchantable product . Since the bottom eight feet approximates about 65% of the value, the tree has been occupying space with no return to the landowner. Such basal wounds are easily spotted in the forests of southern West Virginia. It is thought that there are approximately 600,000 acres of burned forested land in West Virginia on which the trees will never be valuable as fire-caused decay more or less equals growth. The landowner would be ahead to thin the stand by removing such trees and let regeneration occur. In such situations, the cost to the landowner is, at current prices, about \$60 per acre per year.

In the past, mined coal outcrops have sometimes been set on fire. These underground coal fires may burn for decades. They always result in air pollution, danger to the public and often result in additional forest fires. There are several dozen of these underground fires currently known in the State.

Decay in trees creates a hazard tree for anyone walking near it in the woods where it may fall or be blown over due to a lack of trunk strength. This is also a hazard for hunters that might locate a deer stand in such a damaged tree.

Finally, forest fires are an ever present danger to wooded subdivisions which have been created by the hundreds in the eastern part of the State. In such situations, the houses may be stacked on a slope with narrow roads, no central water supply, and with

dry leaves and tree litter present to the edge of the house. If a barbecue grill were to be upset near the base of such a slope, a catastrophe could result.

(Prepared by Matthew Dillon)

* Atkins, Jerry and Gerald Wimer. 1990. Severe soil erosion follows forest fires in southern West Virginia.

WV Div. of Forestry, WVDOP-TR90-1. Charleston, WV 16p.

** Whipkey, Robert D. 1990. A comparison of nonpoint source sediment impact from various contributing sources on the 51 most heavily sediment impacted streams in West Virginia. WV Div. of Forestry, WVDOP-TR90-5, Charleston, WV. 18p.

*** Boyce, John S.. 1961. Forest Pathology. McGraw Hill Book Co. NY 572 p.

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