Department of Forestry
Southern Illinois University
Carbondale, Illinois
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Mr. Ted Woodbury
P.O. Box 22
Godfrey, Illinois 62035

Dear Mr. Woodbury:

In response to your request, I have examined the area of Pere Marquette State Park which was burned in 1974 and in which the Department of Conservation, Division of Forestry, is preparing a "salvage-sanitation" operation. Unfortunately, I was able to examine only the northern portion of the area; however, since aerial photographs and topographic maps indicate relatively uniform forest and topographic conditions, I believe my comments will apply to the entire burned area. My conclusions are prefaced by general information on fire in the Central Hardwood Forest.

Fire in the oak-hickory forest is confined to the surface of the forest floor and never "crowns" as in a conifer forest where it may consume the entire tree. Depending on the tree species, and fire duration and intensity, individual stems may not be injured, sustain moderate damage, or be killed. Some oak species are not injured because of their thick bark, and others may be damaged near the base of the tree with damage extending less than 16 or 18 inches above the ground. There is usually no way to immediately determine the extent of the damage, but within a year, the dead bark in the area where the cambium was killed will fall off exposing the wood underneath. On trees where damage occurs, this scar is triangular in shape with the base of the triangle at about ground level and on the uphill side of the tree. On smaller, more vigorous trees, callous tissuse will rapidly form and the wound will heal within a few years. Where the fire was intense, the cambium may have been killed around the entire stem and the tree will eventually die because food manufactured in the leaves cannot reach the root system. Often, the tree will leaf-out the year after the fire but this process drains the roots of food and the tree is dead by the second year.

When healthy oak and hickory trees are cut down, the stumps will sprout to produce new stems. This phenomenon of sprouting is often used to "regenerate" or start a new forest as the stems develop quickly and grow rapidly from the fully developed parent root system. If the tree is weakened as in a fire prior to cutting the amount of sprouting is substantially reduced, thus cutting a stand several years after a fire frequently yields disappointing results because few new stems develop.

Generally seedlings (stems less than 1-inch diameter at a height of 4.5 feet) and saplings (stems 1.0 to 4.5 inches in diameter at a height of 4.5 feet) are more severely damaged by a fire than the large trees. Usually these stems have a well developed root system and sprouts also develop. However, both sprouts and stems grown from seed will not grow well in the shade created by the overstory canopy. Because black & white oak seedlings and sprouts do not grow well but may survive in shade for a period of time, foresters refer to these species as "shade intermediates" as opposed to "shade tolerant" or "shade intolerant".

The characteristics of fire resistance, stump sprouting, and shade tolerance are pertinent to the present situation.

My assessment after viewing the burned area is that there is no sound ecological reason for harvesting the damaged timber. There are widely scattered dead trees which have not been marked for removal but which may be cut if the sale contract so stipulates. I suspect that these dead trees would provide some good habitat for wildlife populations if left -- habitats that are absent in most forests. The effect would be highly beneficial for wildlife. Their removal would be of little consequence to "rehabilitating" the area as the root systems are dead and no new sprouts would develop from the stumps. It is doubtful that they are sufficiently numerous to stimulate a disease or insect epidemic. While wood borers are known to cause damage, to my knowledge, there have been no serious outbreaks within Illinois for decades.

A number of large trees have sustained some damage at the base (typical triangular scars). Many of these trees have been marked for cutting. The marking pattern indicates a system of "selection" harvesting where the trees to be cut are separated from one another. This is a good system for sugar maple and other shade tolerant species whose seedlings can grow and develop in heavy shade, but it is not a good system for white, black, red, and scarlet oak which exclusively dominate the forest in Pere Marquette State Park. The selection system will repress the development and growth of oak sprouts and seedlings because insufficient light will reach the forest floor.

Under the selection system in oak-hickory forests, an understory of "weed species" such as sassafras, persimmon, winged elm, dogwood, and others is likely to develop. Work on the selection system in oak forests at Dixon Springs Agricultural Research Station in southern Illinois has shown that an extremely heavy understory of "brush" develops and eliminates the young oak stems. I can only conclude that the removal of the marked trees will contribute to the rapid degradation of the forest. While the fire of 1974 caused some minor damage to the larger trees, fire has been a part of the oak-hickory ecosystem from early times and there is little or no damage from it. The correct method for harvesting and regenerating oak forest is through removal of small groups of trees so there is a high light level at the forest floor. Oak seedlings and sprouts then can develop quickly and grow unrestricted.

A consideration of logging within the area of dissected topography brings an additional problem into focus. The timber is located in relatively narrow and often steep valleys and draws. A portion of the marked trees are located on steep slopes (greater than $45^{\circ}$ or 100%) thus substantial soil erosion and deterioration of water quality may be expected for some years after logging. Simply, it will be impossible to avoid tearing up the soil or knocking chunks of the bank into the stream beds. Degrading the ecosystem was once an accepted part of timber harvesting but under present standards and particularly in a state park, they are not acceptable and should be avoided regardless.

In general, the trees within the burned area are relatively young and seldom exceed 12 to 14 inches in diameter at a height of 4.5 feet; many are less than 10 inches in diameter. Oak is not considered mature until it reaches 18 to 20 inches in diameter so there is no reason to consider maturity or over-maturity in the decision to harvest. Moreover, the Central States region is in no danger of running out of wood for any purpose. The Shawnee National Forest in southern Illinois has not been able to sell much timber in the last few years; if wood were scarce sales would have been more brisk.

In summary, I would like to emphasize that fire is an integral part of the oak-hickory forest ecosystem, regardless of how it is started. Many of the adaptations of oak species may have evolved because fire and trees have been together for so long. For instance, the oaks have thick bark and sprout prolifically from the root system. The fire of 1974 did very little damage to the

area in question. The proposed cutting may destroy the woods because a heavy understory of brush will develop, and insufficient light will reach the forest floor.

Apart from the ecological considerations, the concept of a "park" implies protection, a hands-off attitude on the part of the resource manager. Conceivably, a park is to remain in a natural state (and fire is natural) for the purposes of education, recreation, protection of plants and animals, and research. Following this reasoning, the term "salvage" used by the Department of Conservation is inappropriate because it implies that they are going to recover timber that was being managed for wood fiber. Such is not the case and I hope that such activities will not be construed as a precedent for active forest management, mineral or coal mining or other specialized consumptive uses of public park land.

Very truly yours,

James S. Fralish

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