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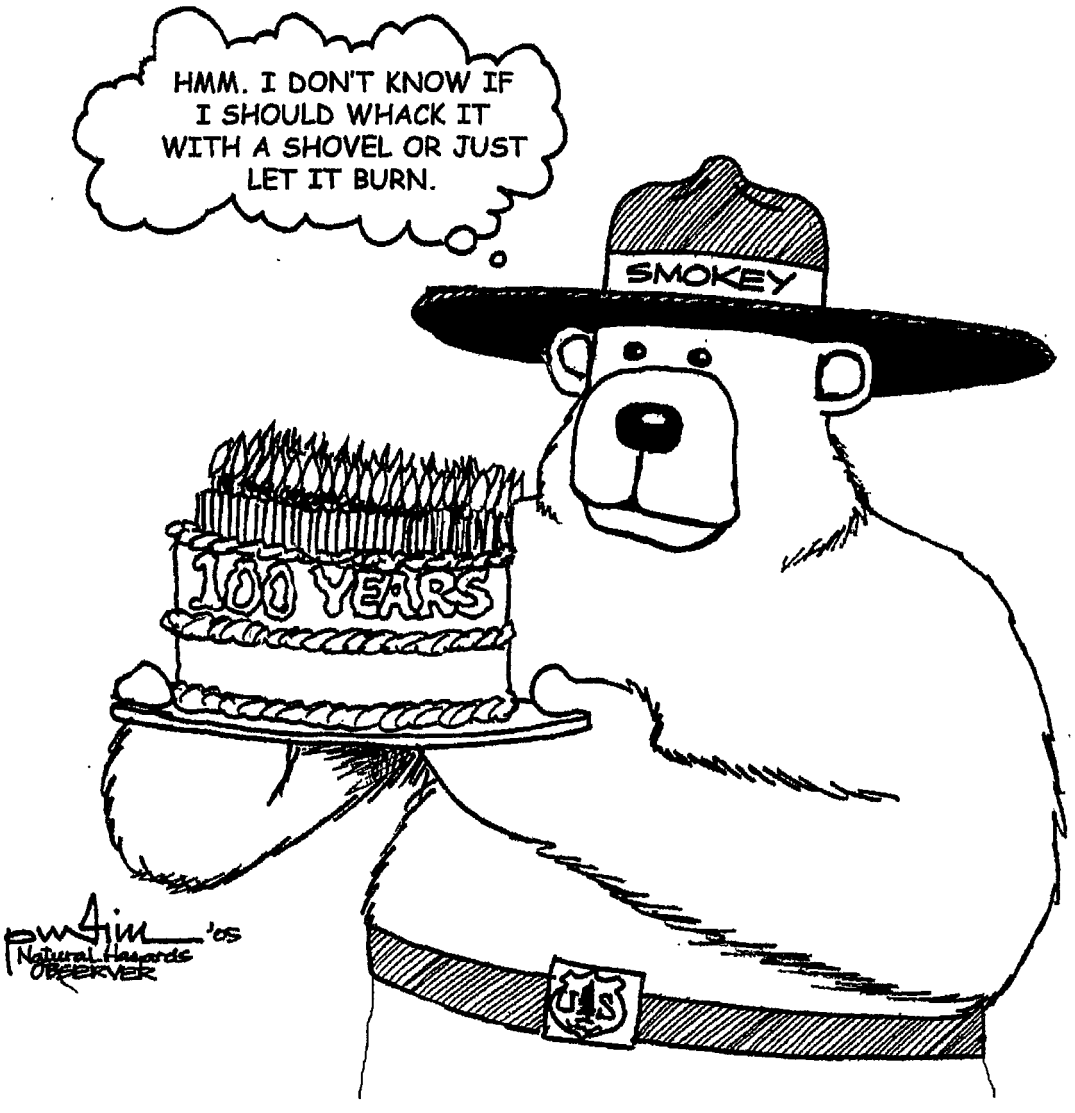
Wildfire Management in the U.S. Forest Service

A Brief History

- an invited comment

Editor's Note: In recognition of the U.S. Forest Services' centennial, the Natural Hazards Center thought it appropriate to reflect back upon the agency's 100 years of wildfire management.



Forest and rangeland fire was once a common land management tool. Native Americans as well as early settlers and prospectors used fire for various purposes. But as the country gradually filled with more settlers, and as forest resources became more precious, fire began to be viewed as more of a problem than a tool.

In the late nineteenth century, a series of severe fire seasons in the Northeast and the lake states, plus the failure of local efforts to adequately respond to these events, contributed to a call for the federal government to manage wildfire suppression on public land. This responsibility initially fell to the U.S. Department of the Interior, which received help from the U.S. Army. However, in 1905 President Theodore Roosevelt transferred responsibility for wildfire suppression to the U.S. Department of Agriculture's Bureau of Forestry, which soon became the U.S. Forest Service, headed by his friend Gifford Pinchot. Watershed protection and provision of a secure timber supply were the main missions of the new agency.

Managing the Risk

Although there was general agreement on the values at risk from wildfire, there was considerable debate about the best way to manage the risk. One approach, often referred to as light burning, advocated fire use to achieve a variety of objectives, including hazardous fuels reduction, land conversion for agriculture, and the improvement of game habitat. Light burning was particularly prevalent in the Southeast. A contrasting approach supported by Pinchot advocated a policy of fire control that emphasized fire suppression and had no place for fire use.

This debate over the role of fire on public lands might have continued for longer or resulted in a different outcome had it not been for the 1910 fire season, during which five million acres of national forest land burned and 78 people were killed. This extreme fire season impelled the Forest Service to adopt a policy of strict fire protection and influenced a generation of foresters.

A Policy Takes Shape

This new policy was principally intended to protect timber. Timber values therefore provided the basis for deciding which of the Forest Services' vast array of tim-

ber stands would be protected, as well as how much would be spent protecting them. The economic principle that suppression expenditures should be commensurate with values at risk-first formally presented by R. Headley of the Forest Service in 1916 and later refined by W. N. Sparhawk in 1925-became known as the "least-cost-plus-loss" model. Simply put, the most efficient level of fire management expenditure is the one that minimizes the sum of all fire-related costs and damages.

The late 1920s and early '30s saw more extreme fire seasons, the losses from which led fire managers to the conclusion that they had not been sufficiently aggressive in fighting fires. They reasoned that because the values at risk from wildfire were so high, a more aggressive fire suppression effort, with a focus on strong initial attack, would be consistent with the least-cost-plus-loss model.

This shift in attitudes might not have been sufficient to fundamentally alter wildfire management had it not coincided with the Great Depression and President Franklin D. Roosevelt's subsequent New Deal. The New Deal had two profound impacts on wildfire management. First, the Forest Service acquired significant new land holdings. Second, the Civilian Conservation Corp (CCC) provided a huge increase in manpower available for wildfire suppression, which allowed the Forest Service to extend fire protection to unprotected and newly acquired land. However, much of this land had little if any market value at the time, as it was often abandoned farmland or cutover forestland. Therefore, for the Forest Service to make use of the influx of manpower provided by the CCC, it often had to set aside the economic principal of protecting land commensurate with the values at risk. This example of the resource availability tail wagging the policy dog was succinctly summarized by Stephen Pyne: " ... the means at hand were often so powerful as to dictate to some extent the, ends to which they might be applied."[1]

This change of policy was codified in 1935 by the 10 AM policy:

> The approved protection policy of the National Forests calls for fast, energetic, and thorough suppression of all fires in all locations, during possibly dangerous fire weather. When immediate control is not thus attained, the policy calls for prompt calculating of the problems of the existing situation and probabilities of spread, and organizing to control every such fire within the first work period. Failing in this effort, the attack each succeeding day will be planned and executed with the aim, without reservation, of obtaining control before ten o'clock the next morning.

The new policy of aggressive suppression mentioned neither suppression costs nor resources at risk-the implicit assumption being that keeping fires small minimized costs and damages. This policy was embodied in 1944 by the successful Smokey Bear public education campaign and was accompanied by the authority to use emergency fire fighting funds to pay for presuppression. (Presuppression expenditures are those occurring prior to the start of a fire season including, for example, the purchase of a fire engine. The Forest Service had been granted the authority to use deficit spending to fund suppression in 1908.) A more emotive example of the prevailing attitudes to wildfire was provided by the death of Bambi's mother in the 1943 film.

The period following the Second World War provided an additional example of resource availability driving wildfire policy and practices. The Forest Service received numerous war-surplus vehicles and aircraft under the federal excess equipment program and was able to increase its use of fire engines and bulldozers. In 1955, converted aircraft were used to drop fire retardant for the first time. As with the earlier use of the CCC, this increased use of vehicles and aircraft was driven by resource availability, not by any formal analysis showing that these increased expenditures would result in a commensurate reduction in resource damages. As with the adoption of the 10 AM policy, there was a belief that any expenditures that kept fires small were justified.

Change Comes to the Forest Service

Not until the 1960s did the Forest Service waver from its policy of aggressive wildfire suppression. As indicated by the passage of the Multiple-Use Sustained-Yield Act (1960), the Wilderness Act (1964), and the National Environmental Policy Act (1970), attitudes concerning public land management had begun to shift. These changes in public attitudes mayor may not have been sufficient to change Forest Service suppression policies. However, the agency was also facing scrutiny for a more prosaic reason-decades of increasing suppression expenditures had not resulted in a decrease in resource damages. The inability of the agency to demonstrate a sufficient return on its investment in fire suppression resulted in a series of policy changes in the 1970s.

In 1971, the 10 AM policy was amended to contain all fires before they reached 10 acres. In 1978, the entire policy was scrapped. That same year, Congress eliminated emergency funding for presuppression. Although the agency still relied on emergency funds to pay for large fire suppression, the new protocol required the Forest Service to conduct a cost-benefit analysis on all future presuppression budget requests. This led to the 1979 development of the National Fire Management Analysis System (NFMAS), a computerized fire planning and budgeting tool. Other public land management agencies either adopted all or part of the NFMAS (Bureau of Land Management and the Bureau of Indian Affairs) or developed their own tools (National Park Service and the U.S. Fish and Wildlife Service). The NFMAS was the first widely adopted computerized fire management tool.

The realization that not all suppression expenditures could be economically justified, along with an increasing awareness of the ecological importance of wildfire, led the Forest Service to adopt the Wilderness Prescribed Natural Fire Program in 1972. Under the program, some wildfires in wilderness areas were allowed to bum. Four years earlier, in 1968, the National Park Service recognized the "natural role of fire," and adopted a wildfire use program that debuted in Sequoia Kings Canyon National Park. Since then, several high profile prescribed burns and wildfires that were managed for resource benefit escaped management control and became destructive wildfires (e.g., Yellowstone in 1988 and Los Alamos in 2000).

These well-publicized incidents have tempered enthusiasm for wildfire use both within the agency and among the public at large.

Fire Management in the Twenty-first Century

The success of decades of fire suppression has deprived fire-dependent forests of their natural fire cycle and has led to an accumulation of fuels in many locations. Furthermore, the country has seen a dramatic increase in the number of houses and other structures being built in the forest, expanding the extent of the wildland/urban interface. Both of these stresses have tended to make fires more difficult and expensive to control. And recently, a severe drought in the western United States exacerbated the situation. Forest Service wildfire suppression expenditures exceeded $1 billion in 2000, 2002, and 2003-not including the roughly $500 million spent each year on presuppression.

In recent years, appropriated dollars for fire suppression have fallen far short of total suppression expenditures. In addition, emergency appropriations, which take place after final appropriations bills have been released, often failed to make up the shortfall. As a result, agencies have often been forced to borrow money from other programs to fund their suppression activities.

Scientific evidence of the important role that fire plays in the healthy functioning of ecosystems and of the problems caused by continual fire suppression, has continued to accumulate. Responding to the mounting evidence, the Federal Wildland Fire Management Policy of 1995 emphasized the natural role of fire in wildland management and recognized the need for prescribed fire and for allowing some lightning fires to bum, and not just in wilderness areas. Fire management plans are now being written that will allow wildland fire use under specified conditions. Yet use of fire is still very uncommon, for obvious reasons: letting fires burn or setting prescribed fires is risky and the costs of a mistake are immediate and potentially acute, whereas the benefits occur largely in the future. In addition, air quality regulations and citizen concerns about smoke often limit the use of fire as a management tool.

In 2000, the National Fire Plan began a well-funded effort to, among other things, reduce hazardous forest fuels. The plan allows for prescribed burning but focuses on mechanical treatments, especially thinning. The Healthy Forest Restoration Act of 2003 expedited the planning and approval process for carrying out the work. There is also increased emphasis on the wildland/urban interface. Homeowners are being encouraged, albeit often with the help of federal grants, to accept some responsibility for fuel reduction near their houses, and some insurance companies are beginning to consider wildfire risk when deciding whether to insure or how much to charge.

The future remains unclear. While the recent efforts are helping to, address the wildfire problem facing U.S. forests, the need for fuels management is staggering and the limited funds available for fuel treatment and the difficulties of wildfire are hurdles the Forest Service must overcome. Much will depend on future weather conditions. The prospects of increased climatic extremes associated with global climate change suggest that wildfire risk will continue to present a formidable challenge to public land managers and the public they serve. Their work is far from done.

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[1] Pyne, S.J., P.L. Andrews, and R.D. Laven. 1996. *Introduction to wildland fire.* New York: John Wiley and Sons.

Internet Resources

http://www.fs.fed.us/fire/
U.S. Forest Service Fire and Aviation Management

http://www.fs.fed.uslpnw/
U.S. Forest Service Pacific Northwest Research Station

http://www.fs.fed.us/rm/
U .S. Forest Service Rocky Mountain Research Station

Natural Hazards Center Announces the Gilbert F. White Web Site

The Natural Hazards Center is pleased to announce an important new addition to its Web site: a site dedicated to Center founder Gilbert F. White and his continuing contributions to the improvement of the human condition and the preservation of the Earth's environment.

In the early 1970s, White was one of the principal investigators of a major National Science Foundation-funded assessment of the status of natural hazards research in the United States. The principal product of that study was the Natural Hazards Research and Applications Information Center, which White founded and subsequently directed from 1976 to 1984 and again from 1992 to 1994. Many friends and colleagues rightly associate Gilbert with the Natural Hazards Center, but his remarkable career-spanning eight decades-encompassed a far broader range of work.

The site provides a brief biography, curriculum vitae, a complete index of publications (along with a list of publications about White), an inventory of the many honors he has received, and more. To document his extraordinary career, to provide a portal through which scholars and other interested persons can access White's work, and simply to honor the man, the Natural Hazards Center and the Institute of Behavioral Sciences at the University of Colorado have established the Gilbert F. White Web site at *http://www.colorado.edu/hazards/gfw/.*