

AN OVERVIEW OF PRESCRIBED FIRE IN ARKANSAS AND OKLAHOMA OVER THE LAST 40 YEARS

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Abstract.—Over the last 40 years, prescribed fire programs on National Forest lands have grown from relatively insignificant to a major emphasis area of natural resource management. During this same period, social, economic, and cultural values have greatly changed. The public’s environmental awareness has likewise grown. How prescribed fire programs in Arkansas and Oklahoma have fared during this time is a subject of some interest. Scientific research in fire ecology and fire history has aided managers, enabling them to better explain the need for prescribed fire programs.

INTRODUCTION

While prescribed fire objectives can vary, restoring, enhancing, or maintaining ecosystem health has been of primary importance over the last decade. Research in the use of fire by people prior to and after European settlement and scientific discussions regarding the regenerative and restorative ecological effects of fire have aided fire managers in obtaining public confidence and support for burning programs. Today, prescribed fire in Arkansas and Oklahoma represents a large part of prescribed fire operations in the southeastern United States. The objective of this paper is to explore the history of prescribed fire programs. This comparison can provide a context and perspective into how the public perception of prescribed fire has found relatively wide acceptance where other vegetation treatment practices, such as clearcutting and herbicide use, have not.

The link between timely, pertinent research providing key rationale for why wildland fire is needed and resultant positive public perception remains key to seeing prescribed fire programs continue to grow in the future.

The utilization of prescribed fire was a small part of ecological restoration and management in Arkansas and Oklahoma 40 years ago. However, the next four decades witnessed a dramatic increase in the practice. Publicity surrounding historic natural catastrophic events such as Mount St. Helens and the Yellowstone fires may have helped the public to better understand ecosystem disturbance dynamics, resiliency, and the role of fire in forests. These natural catastrophic events provided a contrast to the many man-made disasters that occurred during the same time frame (e.g., Three-mile Island, Times Beach, Bhopal, Chernobyl, and Exxon Valdez). The man-made disasters were perceived by the public as “unnatural” and the result of mistakes in the imprudent use of science and technology. Natural catastrophic events were often perceived differently and lent themselves to use as “teachable moments” for scientists to better explain how the natural world works. Major fire seasons with wildfires affecting the urban interface, particularly in the West and in Florida, led scientists and politicians to address why wildfires seemed to be causing so much more damage than in previous decades. Ultimately, these assessments led to the National Fire Plan, and

shortly afterward came the President's Healthy Forest Initiative (USDOJ and USDA 2011). After that, a bipartisan led Congress passed the Healthy Forest Restoration Act (United States 108th Congress 2003). This Act focused on treatments to vegetation designed to restore "reference" ecological conditions and lower the threat of catastrophic wildfires in fire-adapted ecosystems. Prescribed fire was recognized as a primary vegetation management tool to accomplish these goals. The Fire Regime Condition Class (FRAMES 2011) and LANDFIRE (USDA and USDOJ 2011) projects soon became available to help land managers identify and rank how degraded ecosystems had become, comparing reference conditions to current conditions.

HISTORY OF PRESCRIBED FIRE IN THE REGION

The Ouachita and Ozark-St. Francis National Forests in Arkansas and Oklahoma are within the Interior Highlands and are the focus for a significant amount of prescribed fire for ecological restoration, maintenance, and enhancement. Public land within this geographic area contains a high percentage of fire dependent plant communities. Shortleaf pine-bluestem and oak woodlands are two representative fire-dependent plant communities common in this area. Natural fire regimes for these communities are generally characterized by frequent, periodic fire of low to moderate severity. Current conditions are far removed from the reference condition with most lands in condition class three (the most highly departed). Federal agencies, (e.g., U.S. Department of Agriculture, Forest Service; U.S. Department of Interior, National Park Service, and Fish and Wildlife Service) state agencies, and private land trusts (e.g., The Nature Conservancy [TNC]) have developed large prescribed fire and fuel management programs. TNC provides key leadership and a clear voice to the public on prescribed fire issues. Research is conducted by universities, the Forest Service, the Fish and Wildlife Service, and National Park Service. Technology and information transfer is accomplished

through a variety of means including Joint Fire Science Projects, The Fire Learning Network, research publications, Fire Effects Information System, Smoke Management Portals (e.g., Forest Consortium for the Advanced Modeling of Meteorology and Smoke [FCAMMS]), and various ad hoc councils, committees and planning efforts. A summary of some of this work is documented in Spetich (2004). These findings provided rationale for decisions in Land Management Plans for the National Forests and help guide development of reference condition descriptions in both Fire Regime Condition Class (FRCC) and LANDFIRE efforts.

There are a number of private citizen groups with a variety of views regarding prescribed fire. Some groups such as Audubon, Quail Unlimited, and The National Wild Turkey Federation serve as strong advocates for burning. Others such as Sierra Club and Wilderness Society vary in views, with some local chapters advocating the prudent use of fire while others are resistant to burning.

During the 1970s, most burning objectives for the National Forests in the southeast were tied directly to range or game habitat improvement, with programs averaging a few hundred acres to a few thousand acres annually. Management of habitat for the federally endangered red-cockaded woodpecker (RCW) led to an increase in prescribed fire and an affirmation by scientists (and the courts) that RCW was a fire dependent species whose optimal habitat required frequent burning. While normally dynamic enough to sustain themselves in the face of natural biotic and abiotic events, forest insect and disease outbreaks in Arkansas and Missouri have lent credence to the idea that disturbance driven forest ecosystems could not be sustained as host tree density rapidly increased. The resulting epidemics may have created ecologically unsustainable conditions along with both biological and economic loss. To much of the public, prudent but active management (rather than a "hands-off" approach) may have become more popular.

Few prescribed fires were occurring on federal lands in the 1970s and into the early 1980s. The hiring of wildlife biologists to work at the district level on the National Forests in the late 1970s resulted in a significant growth in prescribed fire programs. Some of the first landscape-scale burns were conducted in the late 1970s.

On private land, timber companies managed land primarily for timber production in the 1970s but began leasing lands for hunting in the late 1970s (Arkansas). Some of these leases were burned specifically to improve habitat for deer and upland birds. The burning had positive effects in maintaining fire-adapted plant and animal species. Prescribed fire by industry began diminishing as liability concerns (escapes and smoke) caused companies to rethink vegetation management alternatives. Consequently, herbicide use increased on many industrial forested lands.

In the 1980s, burning for RCW began in earnest. “New Perspectives” initiatives merging research efforts at landscape-scale projects took root in the late 1980s and 1990. Arkansas occupies a unique and important place in the history of new perspectives and ecosystem management. A historic visit to the Ouachita National Forest by Senator David Pryor (D-Arkansas) in August 1990, thereafter called the walk in the woods, served as an opportunity to shift the Ouachita’s style of management in a manner that has served as a model for other national forests in the Nation (Guldin 2004). Eventually “new perspectives” was replaced with ecosystem management as the byword for how U.S. Forest Service lands were to be managed.

The 1990s saw significant growth in prescribed fire programs on all Federal lands as the National Fire Plan emerged and additional funding was made available. The size of programs along with increases in prescribed fire incidents led to more agency oversight and policies, and state regulation of prescribed fire. In 1999 the Ozark-Ouachita Highlands Assessment was done as a prelude to forest planning efforts. Findings regarding the role of fire in that assessment mirrored

historical references by early explorers that described vegetation. They concluded that both pine and oak woodlands benefited from fire (USDA FS 1999).

The year 2000 marked the third year of drought in Arkansas thought to have contributed to a historic outbreak of red oak borer that affected thousands of acres in the national forests of Arkansas, Oklahoma, and Missouri. The prevailing low-disturbance fire suppression regime was cited as likely leading to oak forests being replaced by shade tolerant hardwood trees (Starkey 2004).

The Land and Resource Management Plans for both the Ouachita and Ozark-St. Francis National Forests were approved in 2005 (USDA FS 2005a, 2005b). Both plans called for an increase in prescribed fire as compared to former plans, with burning recommended for managing, restoring, and sustaining old-growth shortleaf pine, enhancing federally endangered RCW habitat and Indiana bat habitat, and responding to other ecological and social issues.

The surprising growth in prescribed fire (Table 1) can be largely attributed to how the practice has been perceived as a land management tool. Timely and pertinent research findings coupled with the relative absence of significant mishaps (escaped burns or smoke-related incidents) have also helped. Key research documenting mean fire return intervals generated through tree ring chronologies and General Land Office descriptions of pre-European settlement vegetation have greatly aided managers.

Symposia such as this and others provided a forum for the presentation of such research findings (Dickinson 2005, Powers 2007, Spetich 2004). Reference condition descriptions and modeling generated by Fire Regime Condition Class (FRAMES 2011) and LANDFIRE (USDA and USDOJ 2011) programs further provided a scientific basis for rationale supporting the role of fire in ecological communities found throughout the Ouachita, Boston, and Ozark Mountains.

Table 1.—Prescribed Burning on the Ouachita and Ozark-St. Francis National Forests 1986-2010

Year	Acres burned	Year	Acres burned
1986	27,754	1999	135,041
1987	33,278	2000	132,859
1988	49,785	2001	79,653
1989	28,885	2002	120,854
1990	30,561	2003	180,644
1991	33,202	2004	202,490
1992	31,726	2005	134,957
1993	44,928	2006	116,118
1994	37,643	2007	215,483
1995	43,732	2008	187,895
1996	59,139	2009	183,163
1997	107,552	2010	197,259
1998	155,181		

The ability of fire managers to clearly articulate to the public the need to burn and to demonstrate the effectiveness of burning have greatly assisted in program acceptance by the public and subsequent growth. The Forest Service Land and Resource Management Plans of 2005 used a “best-science” approach to describe the role of fire in the ecosystem and need to do prescribed fire in an effort to accomplish specific ecological restoration. Catastrophic events of national significance captured both the public and political interest in the need to better reduce the risk of catastrophic wildfire and understand the role of fire in fire-adapted ecosystems. The National Fire Plan and Healthy Forest Initiative (USDOJ and USDA 2011) and Healthy Forest Restoration Act (United States 108th Congress 2003) have further provided impetus to the need to burn.

THE FUTURE OF PRESCRIBED BURNING IN THE REGION

The future for increased burning in the Ozark/Ouachita Highlands may well depend on the ability of managers to conduct burns without incident (nuisance smoke, escapes and/or negative press from other adverse impacts). Political oversight and the public will continue to need added and ongoing evidence that

burning programs are lowering the risk of catastrophic fire, resulting in the restoration of ecosystems and their fire dependent species. Such evidence could be depicted in updates in LANDFIRE mapping (LANDFIRE 2011) or other assessments. Partnerships among federal, state, and nongovernmental organizations (NGOs) will be critical for the continued and perhaps increased use of fire for ecological restoration. Today, annual burning represents a relatively small percentage of federal ownership (less than 10 percent) but is an important program area for federal agencies and is a major source of funding. Public acceptance and/or support for prescribed fire are important to any program’s growth. Strong partnerships between research, state and federal agencies, and conservation groups will undoubtedly help burners to accomplish program goals.

The future growth in burning programs is likely to be less in this decade than in the past two decades. More stringent prescribed fire parameters, smoke issues, liability risks from escapes, and potential regulation of emissions could cloud the future for any significant program growth. Nevertheless, more pertinent research showing the continuing need for prescribed fire along with focused technology transfer and key partnerships could help alleviate many of the potential roadblocks.

There is a compelling logic to nature. Form really does follow function. Technology transfer from scientist to resource manager is partially dependent on the individual researcher's ability to publish. There are opportunities to leverage discoveries and findings among researchers delving into similar projects. There must be ways for managers to provide feedback to researchers to ensure there is a focus to what is being studied, i.e., that some of the questions scientists are studying have direct applicability to help program managers accomplish resource goals and objectives. There are opportunities to use natural events as a means to examine, explain, or demonstrate ecological processes to the public. There are new and/or emerging technologies that can greatly enhance technology transfer. The public has shown an amazing interest for several decades to better understand how things work in an ecological sense. Better public knowledge of ecosystem function promotes the potential "buy-in" to projects and programs that otherwise might be so controversial as to be impossible to implement. Consequently, a key message and challenge to researchers is to help managers better describe to the public why burning is important and how prescribed fire can be used to restore, enhance, or maintain fire-adapted ecosystems. Engaging the public by seeking input on both programmatic and site-specific projects can have a very positive effect. Using forums like the Fire Learning Network, Prescribed Fire Councils, and symposia like these can foster partnerships and meld diverse groups to a common goal.

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LITERATURE CITED

- Dickinson, M.B., ed. 2005. **Fire in eastern oak forests: delivering science to land managers.** Gen. Tech. Rep. NRS-P-1. Newtown Square, PA: U.S. Department of Agriculture, Forest Service, Northern Research Station. 303 p.
- FRAMES. 2011. **Fire research and management exchange system.** Available at <http://www.frames.gov>. [Date accessed unknown].
- Guldin, J.M., tech. comp. 2004. **Ouachita and Ozark Mountains symposium: ecosystem management research.** Gen. Tech. Rep. SRS-74. Asheville, NC: U.S. Department of Agriculture, Forest Service, Southern Research Station. 321 p.
- Powers, R.F., tech. ed. 2007. **Restoring fire-adapted ecosystems: proceedings of the 2005 national silviculture workshop.** Gen. Tech. Rep. PSW-GTR-203. Albany, CA: U.S. Department of Agriculture, Forest Service, Pacific Southwest Research Station. 306 p.
- Spetich, M.A., ed. 2004. **Upland oak ecology symposium: history, current conditions, and sustainability.** Gen. Tech. Rep. SRS-73. Asheville, NC: U.S. Department of Agriculture, Forest Service, Southern Research Station. 311 p.
- Starkey, D.A.; Oliveria, F.; Mangini, A.; Mielke, M. 2004. **Oak decline and red oak borer in the Interior Highlands of Arkansas and Missouri: natural phenomena, severe occurrences.** Gen. Tech. Rep. SRS-73. Asheville, NC: U.S. Department of Agriculture, Forest Service, Southern Research Station: 217-222.
- United States 108th Congress. 2003. **Healthy forests restoration act of 2003.** H.R. 1904. Washington D.C: Government Printing Office. Available at http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=108_cong_bills&docid=f:h1904enr.txt.pdf.

- U.S. Department of Agriculture, Forest Service. 1999. **Ozark-Ouachita highlands assessment: terrestrial vegetation and wildlife.** Gen. Tech. Rep. SRS-35. Asheville, NC: U.S. Department of Agriculture, Forest Service, Southern Research Station. 201 p.
- U.S. Department of Agriculture, Forest Service. 2005a. **Revised Land and Resource Management Plan, Ouachita National Forest, Arkansas and Oklahoma.** Manage. Bull. R8-MB 124A. Atlanta, GA: U.S. Department of Agriculture, Forest Service. 175 p.
- U.S. Department of Agriculture, Forest Service. 2005b. **Revised Land and Resource Management Plan, Ozark-St. Francis National Forests.** Manage. Bull. R8-MB 125A. Atlanta, GA: U.S. Department of Agriculture, Forest Service. 296 p.
- U.S. Department of Agriculture and U.S. Department of the Interior. 2011. **LANDFIRE. Landscape fire and resource management planning tools.** Available at <http://www.landfire.gov>. [Date accessed unknown].
- U.S. Department of the Interior and U.S. Department of Agriculture. 2011. **Forests and range-lands. Previous wildland fire management initiatives.** <http://www.forestsandrangelands.gov/resources/overview/index.shtml>. [Date accessed unknown].

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