

Prescribed Burning Perceptions Among Private Landowners: *An Annotated Bibliography of Relevant Literature*

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Introduction

Approximately 87% of the southern forests within the United States are owned by private companies (27%) and non-industrial private forest owners (60%) (Hanson, et al., 2010). Within these southern forests, more than 61% of longleaf pine, a fire-dependent species, is privately owned (America's Longleaf Restoration Initiative, 2014). With such a large holding, land management decisions made by the individuals who own these lands can significantly impact both the economic and environmental value of these lands. Since many of these forests provide ecosystem services that depend on frequent fire, building a positive network for private landowners that supports prescribed burning efforts is essential. An increase in prescribed burning on privately owned lands will achieve numerous desired land management goals, including restoration of longleaf pine ecosystems, reduction of wildfire risk, and the protection of natural, human, and economic resources (Burke, Steelman, & Gharis, 2012). To ensure that landowner perceptions support these objectives, significant efforts must be made to communicate the importance of and need for prescribed fire, while mitigating the negative perceptions of its use.

Perceptions play a critical role in the formation of opinions that can create barriers related to specific land management activities. In order to increase prescribed fire use on private lands in the Southeast, the attitudes and perceptions of these landowners must be understood to gain insights into the motivations and behaviors that drive their land management decisions. Private forest landowner perceptions of prescribed fire as a land management tool can have a significant impact in achieving a future increase in its use. Achieving widespread land management cooperation to meet broad scale landscape goals will depend on understanding current perceptions among these landowners, and will be essential in focusing future communications efforts. Furthermore, insights into landowner perceptions are essential to increase effectiveness of outreach programs, facilitate cooperation, and encourage best management practices. Much literature exists on public perceptions of prescribed fire and wildfire risk in the United States, but this annotated bibliography seeks to compile existing sources from within the last decade that have specifically targeted private industrial and private non-industrial forest landowner perceptions surrounding the use of prescribed fire. Suggestions for altering negative perceptions and encouraging positive perceptions of prescribed fire among landowners are included within this paper.

Keywords

Prescribed Fire, Southeast, Landowners, Perceptions, Barriers

Discussion of Findings

Eight studies were found regarding private industrial and private non-industrial forest landowner perceptions surrounding the use of prescribed fire. Table 1 depicts an outline of the known research that has been

Table 1. Summary of literature on landowner perceptions surrounding prescribed fire in the United States

<i>Study</i>	<i>State or Region</i>	<i>Factors of influence on perceptions and prescribed fire use</i>	<i>Major concerns for prescribed fire use</i>	<i>Proposed solutions to increase prescribed fire implementation</i>
Blanchard et al. (2007)	Mass.	<ul style="list-style-type: none"> • Level of knowledge • Perception of fire risk • Location • Age • Length of residency • Past experience with fire • Residency status 	<ul style="list-style-type: none"> • Uncontrolled fires • Detrimental to wildlife • Erosion • Aesthetics • Smoke impacts 	<ul style="list-style-type: none"> • Build community support • Citizen involvement in fire hazard reduction programs • Educational programs • Demonstrations
Fischer et al. (2011)	Oregon	<ul style="list-style-type: none"> • Proximity to their private forest land • Perception of fire risk • Past experience with fire 	<ul style="list-style-type: none"> • Risk to structures • Detrimental to wildlife • Economic barriers 	<ul style="list-style-type: none"> • Increase incentives • Build landscape-scale awareness • Expand markets
Harr et al. (2014)	Iowa, Missouri	<ul style="list-style-type: none"> • Past experience with fire • Emotional barriers • Historical management practices • Level of knowledge 	<ul style="list-style-type: none"> • Liability • Lack of resources • Economic barriers 	<ul style="list-style-type: none"> • Prescribed burn associations • Peer-to-peer networks • More technical assistance
Jarret et al. (2009)	Southern U.S.	<ul style="list-style-type: none"> • Race • Gender • Perception of fire risk • Program awareness • Past experience with fire • Proximity to their private forest land 	<ul style="list-style-type: none"> • Threat of wildfire • Need for assistance 	<ul style="list-style-type: none"> • Increase incentives • Increase collaboration and joint coordination • Audience specific messaging of sub-groups • Expand biomass and bioenergy markets
Kreuter et al. (2008)	Texas	<ul style="list-style-type: none"> • Residence on property • Property size • Annual income • Level of knowledge • Income generation from land • Membership in a Prescribed Burn Association 	<ul style="list-style-type: none"> • Lack of resources • Liability • Need for assistance 	<ul style="list-style-type: none"> • Prescribed Burn Associations • Reduce liability • Fire training • Cost-share programs for firebreaks • Assistance in writing burn plans
Kobziar et al. 2015	Southern U.S.	<ul style="list-style-type: none"> • Job title • Education • Agency affiliation • State where employed 	<ul style="list-style-type: none"> • Liability • Economic barriers • Lack of resources • Regulations • Wildland urban interface 	<ul style="list-style-type: none"> • Pursue fire science research that can be shared with the public • Continue extension outreach programs
Morton et al. (2010)	Iowa, Missouri	<ul style="list-style-type: none"> • Level of knowledge • Historical management practices 	<ul style="list-style-type: none"> • Liability • Threat to property • Smoke impacts • Erosion • Detrimental to wildlife 	<ul style="list-style-type: none"> • Cooperatives • Audience specific messaging of sub-groups
Piatek et al. (2010)	West Virginia	<ul style="list-style-type: none"> • Level of knowledge • Knowing a firefighter • Past experience with fire 	<ul style="list-style-type: none"> • Personal safety • Threat to property • Notification of planned burns • Lack of control 	<ul style="list-style-type: none"> • Keep public informed of fire activities • Increase cooperation • Use preferred communication outlets for messages

conducted on landowner perceptions surrounding prescribed fire use in the United States. Only a few studies, such as those by Jarret et al. (2009) and Kreuter et al. (2008), have been conducted in the Southeastern U.S. However, findings from studies conducted in other regions may also be applicable to the Southeast and have therefore been included.

Some studies, such as those conducted by Jarret et al. (2009) and Blanchard et al. (2007), explore private forest landowner perceptions of wildfire risk and hazardous fuel reduction programs. While these studies can be linked to prescribed fire use among private forest landowners, perceptions and behaviors contributing to its use are not exhaustively explored. Few insights into perceptions of southeastern U.S. landowners’ regarding prescribed fire exist.

Kreuter et al. (2008) found that perceptions were influenced by a variety of factors including property size, annual income, income generated from land, and membership in a Prescribed Burn Association (PBA). The concerns that hindered prescribed fire use were lack of resources, liability, and a need for more technical assistance. It was suggested that increasing the number of PBAs, reducing liability, and developing more cost-share programs could encourage more landowners to use prescribed fire on their lands. Responses from the Kreuter et al. (2008) survey could be used to aid in prioritizing efforts since these are likely problems that landowners are facing in the Southeast. Prescribed Burn Associations are thought to be most influential in altering perceptions and behavior when compared to publications, newsletters, or workshops. PBAs create a trusting peer-to-peer network that encourages and supports landowners in their pursuits to attain land management objectives.

Although social science inquiries into landowner perceptions in the United States surrounding prescribed fire are not well understood at this time, the limited literature explored for this bibliography suggest that a majority of private forest landowners lack the resources and knowledge needed to actively manage their lands with prescribed fire. Commonalities among the few studies that emerged from research efforts suggest that despite geographic locale, most private forest landowner perceptions in the United States are fueled by level of knowledge, past experiences with fire, and perception of wildfire risk. Table 2 depicts the factors that were found to contribute to negative landowner perceptions based on the existing literature.

Table 2. Factors contributing to negative private forest landowner perceptions of prescribed fire

<ul style="list-style-type: none"> • Aesthetics • Confusion with writing burn plans • Erosion • Financial concerns • Geographic location • Historical suppression campaigns • Lack of experience • Liability concerns 	<ul style="list-style-type: none"> • Perceived damage to wildlife and their habitat • Personal experience with wildfire • Preference for mechanical fuel reduction methods • Property damage from escaped fire • Safety and health concerns • Smoke and air quality concerns • Unknown benefits and use • Viewed as destructive and dangerous
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Suggestions for altering and encouraging positive perceptions of prescribed fire among private forest landowners were given among the studies explored. Many negative perceptions were found to have originated from negative experiences and historical educational campaigns that supported fire suppression. Providing more educational opportunities while increasing landowner support for prescribed fire are thought to be potential solutions to help restore longleaf pine ecosystems, reduce of wildfire risk, and protect natural, human, and

economic resources (Burke, Steelman, & Gharis, 2012). Table 3 provides a variety of approaches that could be used to address negative forest landowner perceptions surrounding prescribed fire use.

Table 3. Proposed solutions and suggested mechanisms to address negative landowner perceptions surrounding prescribed fire on private forest lands.

<ul style="list-style-type: none"> • Decrease liability • Increase collaboration • Create education programs targeted at specific audiences • Create more financial assistance programs • Involve the public in natural resource planning 	<ul style="list-style-type: none"> • Acknowledge values • Support peer-to-peer networks • Expand current message campaigns and programs • Suggest lower cost management alternatives to meet goals • Increase financial incentives
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Understanding the motivators, perceptions, and concerns of private forest landowners are essential in building effective communication messages and programs. The *Communicators Guide for Wildland Fire* (n.a. & Mullins, 2003 est.) and the social synthesis report on improving fuels management (Monroe, Pennisi, McCaffrey, & Mileti, 2006) in conjunction with the information contained herein this annotated bibliography may help to construct future communications strategies for reaching private forest landowners in the Southeast regarding prescribed fire.

Acknowledgements

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Annotated Bibliography

1. Blanchard, B., & Ryan, R. L. (2007, September). Managing the Wildland-Urban Interface in the Northeast: Perceptions of Fire Risk and Hazard Reduction Strategies. *Northern Journal of Applied Forestry*, *23*(3), 203-208.

This study sought to understand fire perceptions of both residents and landowners in the Plymouth Pine Barrens of Massachusetts. The pitch pine ecosystem found within the Plymouth Pine Barrens is a fire dependent community where local managers wish to increase forest treatments to promote ecosystem health. Individuals are moving into lands adjacent to forests and obtaining forest tract ownership with little land management experience. As a result, fire risk increases and ecosystem health declines within a growing wildland-urban interface.

Wildland fire experience, environmental knowledge, and length of residency proved to be important factors in contributing to individual perceptions. Individuals within this area were found to have perceptions of low wildfire risk that contributed to widespread support of prescribed fire and other hazard reduction strategies.

Respondents supported prescribed burning on public lands over private lands. This is thought to originate from a lack of trust in local landowner abilities to conduct prescribed fires safely when compared to public agencies. Overall, this study showed that increased knowledge on fire's role as a land management tool reflected on positive perceptions and acceptance of prescribed fire. It also found that demonstrations, public input on fire hazard reduction programs, and building community support will encourage landowners to participate in active land management using prescribed fire.

2. Fischer, A. P. (2011, July/August). Reducing Hazardous Fuels on Nonindustrial Private Forests: Factors Influencing Landowner Decisions. *Journal of Forestry*, 109(5), 260-266.

In order to achieve landscape-wide land management goals, non-industrial private landowners must be a target for communications efforts to help increase involvement and address perceptions. Factors that contributed to landowner decisions regarding fire risk and fuels management in the ponderosa pine ecosystem of Oregon were explored in this study. Fischer found that landowners living on or in close proximity to their forest tracts had a greater understanding of fire's role in their ecosystem and proved to be prime prospects for enhancing collaboration in achieving common land management goals.

Based on the landowners studied, it was found that incentives and increasing landscape-scale awareness could be beneficial at reducing hazardous fuels on private lands. Individuals with increased risk perception were more likely to be partaking in efforts to reduce hazardous fuels. Ultimately, Fischer suggested that providing incentives to lessen costs could encourage non-industrial private landowners to be involved in more fuel reduction treatments that would support a variety of land management goals.

3. Harr, R. N., Morton, L. W., Rusk, S. R., Engle, D. M., Miller, J. R., & Debinski, D. (2014). Landowners' Perceptions of Risk in Grassland Management: Woody Plant Encroachment and Prescribed Fire. *Ecology and Society*, 19(2), 13. Retrieved June 23, 2015, from <http://www.ecologyandsociety.org/vol19/iss2/art41/>

This article focused on landowners' perceptions of prescribed fire and woody plant encroachment in the Grand River Grasslands in Iowa and Missouri. In this area, eastern redcedar encroachment poses a threat to grasslands and can change prairie rangelands to closed canopy woodlands if not controlled. Prescribed fire proves to be a cost-effective land management tool to alleviate this problematic plant species, but not widely implemented in this area due to landowner perceptions.

Findings suggested that peer-to-peer networks and landowner associations could be used to combat preconceived notions surrounding prescribed fire. Individuals felt as though fire was risky and unnatural due to earlier suppression campaigns. Misguided historical communication efforts left landowners with perception barriers that prevented some from utilizing prescribed fire. Harr et al. found that emotional responses to risk, costs, inexperience, lack of knowledge, status quo, and institutional barriers were influential factors in forming fire use perceptions among landowners.

4. Jarrett, A., Gan, J., Johnson, C., & Munn, I. A. (2009, Apr/May). Landowner Awareness and Adoption of Wildfire Programs in the Southern United States. *Journal of Forestry*, 107(3), 113-118.

This study sought to identify the attitudes, perceptions, and experience of non-industrial private family forest owners in several southeastern states in implementing fuel reduction practices to mitigate wildfire risk. The researchers analyzed the effectiveness of wildfire programs while determining the role of demographics in the adoption of desired land management practices, perceptions, and knowledge surrounding wildfire.

Through mailed surveys, Jarrett et al. found that the majority of landowners in this study felt at risk from wildfires. They also found that many landowners were unaware of technical assistance opportunities, information, and incentive programs that could aid in their ability to mitigate wildfire risk. It was concluded that increased assistance, development of biomass and bioenergy markets, joint coordination, and more incentives could increase landowner involvement in wildfire mitigation efforts, including prescribed burning. The study also found that race and gender played a role in perceptions.

5. Kobziar, L. N., Godwin, D., Taylor, L., & Watts, A. C. (2015). Perspectives on Trends, Effectiveness, and Impediments to Prescribed Burning in the Southern U.S. *Forests*, 6, 561-580.

The effectiveness of prescribed fire application in southern U.S. forests was examined through the analysis of a 2011-2012 survey. The survey targeted individuals involved in prescribed fire application outside of agricultural use and included private landowners, contractors, scientists, land managers, and personnel within both government and non-government agencies. Kobziar et al. explored land characteristics, importance of objective type, demographics, and the relationship between wildfire and prescribed fire through survey questions.

Results from the data analysis showed primary objectives for prescribed fire and the top reasons that respondents attributed to the decline in prescribed fire use. Primary objectives included fuels reduction, restoration, and control of competition. The survey identified perceived impediments to prescribed fire use as financial limitations, liability, lack of trained personnel, and issues posed by proximity to the wildland urban interface. This study suggests that ensuring continual support of this land management tool relies on future extension efforts aimed at reaching the prescribed fire community and further documentation of the benefits fire provides to the southern landscape.

6. Kreuter, U. P., Woodard, J. B., Taylor, C. A., & Teague, W. R. (2008, July). Perceptions of Texas Landowners Regarding Fire and Its Use. *Rangeland Ecology & Management*, 61(4), 456-464.

This study sought to determine factors influencing the perceptions of Texas landowners surrounding prescribed fire use. In a grassland ecosystem, prescribed fire is a cost-effective land management tool that promotes environmental and economic value. Therefore, perceptions hindering its use must be identified and resolved. Mailed surveys were sent to both members of a local prescribed burn association [Edwards Plateau Prescribed Burn Association (EPPBA)] and non-members. The survey revealed that many landowners of this region are failing to implement fire management strategies to maintain grassland habitat due to lack of resources, legal concerns, high costs, and lack of knowledge.

Kreuter et al. suggested that the formation of more PBAs and increasing membership within the EPPBA could resolve negative perceptions of fire among landowners. Membership in the prescribed burning association showed increased support, knowledge, and acceptance of prescribed fire use when compared to non-member landowners. This can be attributed to the fact that PBAs provide resources, training, and help to address liability concerns. Respondents identified reducing liability, creating cost-share for firebreaks, training, and assistance in burn plan writing as factors that could encourage more fire use in this area of Texas.

7. Morton, L. W., Regan, E., Engle, D. M., Miller, J. R., & Harr, R. N. (2010, November). Perceptions of Landowners Concerning Conservation, Grazing, Fire, and Eastern Redcedar Management in Tallgrass Prairie. *Rangeland Ecology & Management*, 63(6), 645-654.

This study focused on the perceptions of landowners in the tallgrass prairie of Iowa and Missouri surrounding two land management practices: grazing and prescribed fire. Prescribed fire and grazing are two practices

needed to promote the proliferation of the grassland ecosystem and reduce redcedar encroachment. Although research supported the aforementioned fact, few landowners were inclined to use prescribed burning in conjunction with grazing to manage their land.

Survey results showed that landowners were not knowledgeable of prescribed burning and did not use it frequently. Although, majority felt that it was an important land management tool. Landowners in this region identified liability and property damage as leading concerns that prevented prescribed burning implementation. Morton et al. suggested that prescribed burn cooperatives could be a catalyst to support landscape changes and increased awareness into the benefits of active land management using prescribed burning. Cooperatives build a coalition of individuals that are able to address ecosystem concerns.

8. Piatek, K., & McGill, D. W. (2010). Perceptions of Private Forest Owners in West Virginia on the Use of Prescribed Fire in Forestry. *Small-scale Forestry*, 9, 227-241.

Piatek and McGill surveyed a West Virginia population of private landowners to determine how their attitudes on prescribed fire affected oak regeneration in the Appalachian Mountains. The researchers sought to determine the approval level of prescribed fire, likelihood of its implementation on private property, and acceptance level of fire use on public lands. Understanding the perceptions of West Virginia private landowners is essential in gaining support in using prescribed fire to regenerate oak species.

Mailed surveys revealed that landowners' acceptance and willingness to utilize prescribed fire on their private lands was directly attributed to level of knowledge. The majority of the surveyed landowners supported the idea of prescribed fire being utilized as a management tool. Implementation on private lands was hindered by perceptions surrounding fire control and safety. More educational opportunities and continual prescribed burning updates were desired to keep landowners informed and motivated.