

PRESCRIBED FIRE PUBLIC PERCEPTION AND EDUCATION

PERCEPTIONS OF OKLAHOMA RESIDENTS TO PRESCRIBED FIRE

R. Dwayne Elmore,¹ Terrence G. Bidwell, and John R. Weir

Department of Natural Resource Ecology and Management, Oklahoma State University, 008C Ag Hall, Stillwater, OK 74078-6013, USA

ABSTRACT

The failure to implement historic fire regimes on Oklahoma landscapes is threatening ecological integrity, human health, and public safety. To understand public attitudes and perceptions toward fire and the associated encroachment of eastern redcedar (*Juniperus virginiana*), we designed two questionnaires targeting general Oklahoma residents and agricultural producers. The response rate for the general survey was 25%, while the response rate for the agricultural producer survey was 36%. We found high support for prescribed fire, with 72% of agricultural producer respondents and 74% of general resident respondents believing it was necessary to manage the land. Respondents also viewed the increase of eastern redcedar as a threat to urban areas due to volatile fuels. Despite this, 18% of urban residents indicated they had eastern redcedar within 50 feet (15 m) of their homes. When asked what specific concerns respondents had regarding prescribed fire, both groups indicated damage to private property, risk to human safety, and soil erosion as most important. Smoke, scenic quality, and timber production were the lowest concerns for both groups. Only 28% of the agricultural respondents were aware of the Oklahoma Prescribed Fire Associations and a mere 5% of them were members. These results indicate high support of prescribed fire in Oklahoma. Concerns regarding prescribed fire indicate that more effort is needed to address liability issues within the state. As the Oklahoma Prescribed Fire Associations have been identified by the Oklahoma Prescribed Fire Council as a top priority, significant effort should be made to address the low knowledge regarding the associations' existence.

Keywords: attitudes, eastern redcedar, *Juniperus virginiana*, Oklahoma, perceptions, prescribed fire, respondent, survey.

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INTRODUCTION

Invasion of eastern redcedar (*Juniperus virginiana*) into Oklahoma and the southern Great Plains represents a significant alteration to historic plant and animal communities. As eastern redcedar has become a dominant plant throughout Oklahoma, fire frequencies have decreased and the potential for catastrophic fire and personal property damaged by wildfires has substantially increased due to buildup of heavy fuels. Additionally, the spread of eastern redcedar increases the likelihood of further declines of at-risk grassland bird species.

Numerous studies have documented the effects that woody plant invasion has on biodiversity of native prairies within both the tallgrass and mixed-grass prairies (Owensby et al. 1973, Bragg and Hulbert 1976). Both eastern redcedar (Briggs et al. 2002) and post oak/blackjack oak (*Quercus stellata*/*Q. marilandica*) forests have increased in area and canopy cover resultant from fire suppression activities since European settlement of the Great Plains (Engle et al. 2006). Historic fire frequencies for portions of Oklahoma have been reported at 3.5 to 5.6 years, while current fire frequencies on the same sites are now 30 to 547 years (Masters et al. 1995). Eastern redcedar has been shown to affect grassland species composition within as little as 20 years (Gehring and Bragg 1992, Chapman et al. 2004). Current structure of post oak and blackjack oak forests in the eastern three-fourths of Oklahoma, shortleaf pine (*Pinus echinata*) forests in eastern

Oklahoma (Masters et al. 1995), and shinnery oak (*Quercus havardii*) in western Oklahoma (Boyd and Bidwell 2002) have resulted from these changes in fire regimes. Changes of the vegetation structure of this magnitude have had significant impacts to the ecological integrity of the region (Fuhlendorf et al. 2006).

Prescribed fire is recognized as a useful tool for wildlife habitat improvement, wildfire prevention, elimination of woody encroachment, and improved forage production. However, liability laws and risk can create significant barriers, despite the fact that prescribed fire is often the most economical alternative for management of eastern redcedar and other woody species. Much effort has been expended to educate Oklahomans on land management practices, such as prescribed fire, that would limit the effect eastern redcedar has on native plant succession, forage production, increased fire threats, and wildlife populations. However, we lack key information regarding attitudes and perceptions of Oklahoma residents regarding fire and eastern redcedar upon which to base more effective educational and extension programs. Additionally, with the expansion of urban areas in Oklahoma and the increased dominance of eastern redcedar within many portions of the state, the potential for catastrophic wildfires presents a growing risk to communities statewide. Little information exists on the knowledge level of homeowners regarding preventive measures to reduce wildfire risk in wildland–urban interface within the state.

There have been numerous research projects that examined fire acceptability and constraints in the wildland–urban interface. Firewise planning generally appears to be acceptable to most people living in the wildland–urban interface

¹ Corresponding author (dwayne.elmore@okstate.edu).

(Bright and Burtz 2006a), but the decision-making process is often complex (Brenkert-Smith et al. 2006) and the specific beliefs vary within a population based on residency (Bright and Burtz 2006a) and value orientation (Bright and Burtz 2006b). Research has found that open dialogue leading to an educated public may increase acceptability of fire (Weisshaupt et al. 2005). Jacobson et al. (2001) determined that experience with prescribed fire was correlated with positive attitudes about its use. Therefore, due to the complex set of social factors that have been identified as related to beliefs on fire, and the large division that exists in general regarding fire use (Manfredo et al. 1990), it is risky to generalize across regions or areas (Brunson and Shindler 2004). Information specific to Oklahoma is lacking. Data are even more limited regarding impediments to prescribed fire on private lands across largely rural landscapes. Recent research in Texas has found that insufficient resources, liability concerns, and lack of assistance decreased use of prescribed fire (Kreuter et al. 2008). The authors concluded that prescribed fire associations offered hope for increased prescribed fire. While we agree with this conclusion, social information specific to this region is needed before an effective large-scale outreach program can be delivered to address fire regime concerns in Oklahoma.

Therefore, the objectives of this study were to assess attitudes and perceptions to prescribed fire and the associated changes in woody plant communities in Oklahoma. We anticipated that the public will be largely positive about the use of fire (Brunson and Shindler 2004) and fully recognize eastern redcedar as a growing problem. Further, we wished to identify the amount of prescribed fire currently being used in Oklahoma and what impediments exist to additional use of prescribed fire. The results of this work will be used to modify existing extension programming within our state, with the aim of increasing knowledge levels as needed and attempting to increase the desired behavior (i.e., increase the use of prescribed fire). We will design a follow-up survey in 5 years to evaluate outreach effectiveness at meeting our goals.

METHODS

Our survey was designed to examine attitudes of landowners and the general public toward fire and eastern redcedar, the potential for cooperative action such as the establishment of prescribed fire associations, and willingness to adopt prescribed fire. Because of the concern over liability for adjacent ownerships, we examined what respondents believed were concerns regarding prescribed fire and whether this influenced decisions regarding its use.

We designed two questionnaires (Appendix): one for agricultural producers and another for the general public. These were mailed to 1,000 agricultural producers and 1,000 general residents. This sample size was chosen based on the population of Oklahoma and assuming a 30% return rate to ensure the results of the survey were representative of the populations sampled. Names and addresses for the general population were obtained from Survey Sampling Inc. (Fairfield, CT) to ensure a random and unbiased population. We obtained the names for the agricultural producers from the USDA–Farm Service Agency. While this is not a complete list of all agricultural producers in the state, it is

the most complete list available and likely represents landowners most willing to use management actions upon their land. Thus, as our final objective is to design outreach programs to increase use of prescribed fire, this was a sufficient data source to use to sample this population of Oklahoma residents.

Survey methodology generally followed the Dillman method (Dillman 2000) with approval of the Oklahoma State University Institutional Review Board (IRB No. AG084). The questionnaires were developed by review and test with graduate students, researchers, and the general public to ensure clarity. The general public questionnaire consisted of 34 questions with multiple sub-questions. These questions were designed to examine respondents' knowledge, attitudes, and perceptions regarding fire; views of nature; and general demographics. The agricultural producer survey consisted of the same questions with an additional seven questions that evaluated the use and impediments to prescribed fire on their lands. An initial introductory letter was mailed to all survey recipients in early March 2008. This month was chosen because research has shown that general public surveys mailed in late winter tend to have higher response rates than surveys mailed at other times of the year (Connelly et al. 2003). The letter informed recipients that a mailback questionnaire would follow, the reasons for the survey, and contact information. A questionnaire and a self-addressed, postage-paid envelope with a cover letter were mailed 1 week later. The cover letter again described the survey purpose. A few weeks later a reminder postcard was sent to all survey recipients. A second questionnaire was then sent to all nonrespondents. We anticipated a survey response rate between 30 and 40%. In order to evaluate whether nonrespondents had differing views on key issues or whether their demographics differed from respondents, we attempted to get 10% of the nonrespondents to complete a telephone survey. A subset of the original questions was chosen to examine potential bias.

We used descriptive statistics and cross tabulations to examine responses. Questions involving a scale generally used a 5-point Likert scale, as this has been shown to be an appropriate gradation (Likert 1932). Tests for differences between frequency distributions were made using the Mann–Whitney test (Conover 1999). SAS was used to generate all statistics (SAS Institute 1999). Responses of “not sure” and “no opinion” were excluded from calculations of means or inferential tests involving means. We considered all inferential tests with $P < 0.05$ to be significant.

RESULTS

Response Rate

General residents (general respondents) returned 176 usable surveys (with an additional 67 undeliverable and 6 unusable), resulting in an adjusted response rate of 25%. Agriculture producers (ag respondents) returned 349 usable surveys (with an additional 9 undeliverable and 6 unusable), resulting in an adjusted response rate of 36%.

Perceptions and Attitudes to Prescribed Fire

The majority of ag respondents (77%) were familiar with the term “prescribed fire,” while just over half (56%) of

the general respondents were familiar with the term ($U_1=55,787, P<0.001$). Nearly all (90%) of the general respondents and 96% of the ag respondents ($U_1=48,878, P=0.003$) believed that fires historically occurred in Oklahoma. Additionally, both general (74%) and ag respondents (72%) believed fire was necessary to manage the Oklahoma landscape ($U_1=46,861, P=0.605$).

The general respondents felt that annual (10%), every other year (7%), every third year (14%), every 4–5 years (23%), and >5 years (10%) were acceptable fire intervals. Only 10% believed fire should not be used at all, with another 27% not sure. The ag respondents held similar views ($U_1=28,005, P=0.236$), with annual (10%), every other year (13%), every third year (18%), every 4–5 years (24%), and >5 years (11%) being acceptable. Only 7% of this group believed fire should not be used at all, with another 18% not sure.

Both the general and ag respondents were less concerned about smoke, reduced scenic quality, loss of forage production, and loss of timber production (Table 1). The general respondents were more likely to be concerned with damage to private property, risk to human safety, death of wildlife, loss of wildlife habitat, and soil erosion, while the ag respondents were concerned with damage to private property, risk to human safety, loss of forage, and soil erosion (Table 1).

We found that mowing was the most accepted management practice for both groups (Table 2). Felling trees was the

next most acceptable practice for both the general and ag respondents; however, the ag respondents tended to be more supportive of this practice (Table 2). Prescribed fire was also supported highly, but the shift toward “select areas” became apparent (Table 2). Herbicides were highly supported by ag respondents, but much less so for the general respondents (Table 2).

Perception and Control of Eastern Redcedar

The general respondents believed it was important to reduce woody plants such as eastern redcedar that can add fuel to wildfire near urban areas ($\bar{x}=3.8, SE=0.08, n=177$). However, the ag respondents statistically differed ($U_1=36,134, P<0.001$) from the general respondents in believing it was even more important an issue ($\bar{x}=4.26, SE=0.06, n=331$). Furthermore, we found that 57% of the general respondents thought that eastern redcedar was a problem in Oklahoma, while 90% of the ag respondents believed that it was ($U_1=51,496, P<0.001$). We found that approximately the same levels of the general (18%) and the ag (20%) respondents had eastern redcedar within 50 feet (15 m) of their homes ($U_1=45,127, P=0.7$). The general respondents largely (19%) had not seen increases of eastern redcedar on their property within the previous decade, while half (53%) of the ag respondents had ($U_1=52,318, P<0.001$). Additionally, only 32% of the general respondents had taken actions to control eastern redcedar, while 77% of the ag respondents indicated they had controlled this plant ($U_1=55,624, P<0.001$).

Use of Prescribed Fire

Our next series of questions was presented to only the agricultural producers as it pertained to the use of fire and assistance programs. We found that 57% of them were interested in technical assistance to help with a prescribed fire. Only 28% of them were aware of the Oklahoma Prescribed Fire Associations and only 5% were actually members of an association within Oklahoma. Half (49%) of the ag respondents had conducted a prescribed fire on their land. Most of these had used prescribed fire multiple times (18% annually, 21% every 2–3 years, 34% every 4–5 years, 16% >5 years, and only 12% had only burned once). Fires were typically small, with < 50 acres (28%) and 50–160 acres (44%) being the most common responses. Less common were fires of 160–320 acres (17%) and >320 acres (12%). We found

Table 1. Perceptions of agricultural producer and general population respondents in Oklahoma to a 2008 survey regarding potential prescribed fire effects.

Effect	Agriculture ^a		General ^b	
	\bar{x} ^c	SE	\bar{x}	SE
Smoke	2.60	0.05	2.85	0.07
Reduced scenic quality	2.46	0.05	2.81	0.08
Loss of forage	2.95	0.07	3.04	0.05
Loss of timber	2.76	0.07	2.38	0.05
Damage to property	3.34	0.06	3.35	0.05
Risk to human safety	3.39	0.07	3.35	0.05
Death of wildlife	3.17	0.06	2.93	0.05
Loss of wildlife habitat	3.12	0.06	2.87	0.05
Soil erosion	3.19	0.06	3.21	0.05

^a n=332.

^b n=181.

^c Scale was 1–4, with 1 being very unconcerned and 4 being very concerned.

Table 2. Perceptions of agricultural producer and general population respondents in Oklahoma to a 2008 survey regarding the use of various habitat management tools.

Tool	1 ^a		2		3		4		5	
	A ^b	G	A	G	A	G	A	G	A	G
Prescribed fire	51 ^c	41	25	37	7	5	4	4	13	14
Mowing	71	67	12	18	7	3	4	2	7	11
Felling	61	45	17	26	9	9	4	8	9	12
Herbicide	53	29	24	24	9	17	5	12	9	18

^a 1 = This practice is a legitimate tool that land managers should be able to use whenever they see fit; 2 = should be done only infrequently, in carefully selected areas; 3 = should not be considered because it creates too many negative impacts; 4 = unnecessary practice; 5 = don't know.

^b A = agricultural producer respondents; G = general population respondents.

^c All data are reported in percentages.

that only 20% of our respondents had received any type of training (thus less than half of those that used fire).

When asked why they used prescribed fire, we found that improving forage for livestock (76%) and controlling eastern redcedar (60%) were the most indicated reasons. Controlling pests such as ticks (30%), reducing hazardous fuels (28%), and improving wildlife habitat (21%) were less frequently indicated reasons. We further found that most ag respondents had a tractor or other heavy equipment (87%) and labor (66%) to use for prescribed fires. Nearly half had a water truck (45%) and firelines established (43%).

We found that liability, damage to structures, concerns about neighbors, and laws and regulations were the most important factors influencing use of prescribed fire (Table 3). Other factors cited in decreasing order of importance were lack of equipment, lack of knowledge, lack of labor, concern about forage damage, concern about soil damage, lack of money, and concern about timber damage (Table 3).

Demographics

Most demographics were similar between the survey groups. Both the general respondents and the agricultural respondents tended to be male. Respondents were generally well educated and older individuals (Table 4). The agricultural respondents were more likely to have grown up in a rural area and had lived in the same area longer than the general respondents (Table 4).

Nonresponse Bias

We found no significant difference between agricultural respondents and nonrespondents on the necessity of fire whether eastern redcedar was a problem, whether they had conducted a prescribed fire, age of respondent, or education of respondent (Table 5). We were only able to acquire phone questionnaires for 5% of the general population due to lack of participation. Additionally, many of these respondents answered “don’t know” for most questions. Thus, it appears that lack of knowledge or interest was a primary reason for not completing the original mail questionnaire. For this group we found no significant difference between respondents and nonrespondents on whether eastern redcedar was a

Table 3. Factors preventing Oklahoma agricultural producer respondents to a 2008 survey from using prescribed fire.

Factor	$\bar{x}^{a,b}$	SE
Damage to structures	3.27	0.05
Concerns about neighbors	3.43	0.05
Laws and regulations	3.49	0.04
Liability	3.44	0.05
Lack of equipment	2.95	0.05
Lack of knowledge	2.93	0.05
Lack of labor	2.91	0.05
Concern about forage damage	2.83	0.05
Concern about soil damage	2.80	0.05
Concern about timber damage	2.25	0.06
Lack of money	2.61	0.06

^a Scale was 1–4, with 1 being very unimportant and 4 being very important.

^b $n = 324$.

Table 4. Demographic data for Oklahoma agricultural producer and general population respondents to a 2008 survey.

Demographic	Agriculture ^a	General
Gender		
Male	84	70
Female	16	30
Age (years)		
<20	<1	<1
20–40	9	11
>40	90	88
Education		
High school	31	25
College	52	59
Advanced degree	18	17
Size of hometown (no. of persons)		
<2,500	78	45
2,500–25,000	14	21
25,000–100,000	6	15
>100,000	2	19

^a All data are reported in percentages.

Table 5. Differences between survey respondents and nonrespondents for both general population and agricultural producer respondents in Oklahoma, 2008, to determine if a nonresponse bias existed.

Question	Agriculture		General	
	U_1^a	P^b	U_1	P
Is fire necessary?	14,311	0.352	3,527	<0.001
Is redcedar a problem?	14,022	0.075	3,030	0.079
Have you conducted a burn?	13,937	0.691	NA ^c	NA
Age	14,334	0.7	2,796	0.006
Education	13,319	0.091	3,296	0.55

^a Test statistic from the Mann–Whitney nonparametric test.

^b We considered all inferential tests with $P < 0.05$ to be significant.

^c General population respondents were not asked this question.

problem or education of respondent (Table 5). We did find that mean age of the nonrespondents was 51 as opposed to 58 for the original respondents (Table 5). However, we do not feel this demographic difference is varied enough to invalidate the sample. Additionally, we found that the nonrespondents were more likely to not view fire as necessary to manage the landscape (Table 5).

DISCUSSION

We found that Oklahoma residents generally had favorable attitudes toward fire. More than 70% of both the agricultural and general respondents thought it was a necessary practice to manage landscapes. Most respondents felt that prescribed fire was an acceptable practice for landowners to use, although the general public tended to favor careful selection of where these fires take place. Additionally, public perceptions about historic fires in Oklahoma were accurate, with the vast majority believing fires occurred within the state prior to European settlement. This is not surprising considering the state’s Native American ancestry and highly rural and agrarian background. Additionally, prescribed fire is still a fairly common management action in Oklahoma and, as Jacobson et al. (2001) found, use of fire tends to increase

acceptance of it as a tool. Residents also tended to favor fairly frequent fire intervals that concur with desirable fire frequencies in this region (Boyd and Bidwell 2002, Fuhlendorf et al. 2006). It would appear from the results of this survey, further education addressing the need and acceptability of fire as a general practice is unwarranted in Oklahoma at this time. This does not mean that the attitudes of Oklahomans will not change in the future; in fact, it almost certainly will as the state becomes more urbanized and less attached to a rural and pastoral heritage. However, at present resources for outreach should be directed at other concerns regarding fire.

Based on previous studies, we anticipated that liability and concerns about neighbors would be barriers to prescribed fire (Haines et al. 2001). In fact, we found liability was consistently a concern for both ag and general residents. This issue, along with associated issues such as structure damage and human health and safety, were top concerns regarding the use of fire. Our results are consistent with Kreuter et al. (2008), who found liability to be a primary deterrent to prescribed fire in Texas. If increasing the amount of prescribed fire is a management goal, these findings are troubling as liability fears often hinder the use of prescribed fire as a management tool (Yoder et al. 2004). Agricultural producers specifically indicated that liability, laws and regulations, potential damage to structures, and concerns about neighbors were the primary reason they did not use prescribed fire. This again emphasized that education about the benefits of fire is not the issue, but rather making fire safer and easing fear regarding liability should be our primary focus.

Oklahoma has a strict liability law where landowners are liable for all damage if a fire escapes. But if a prescribed fire notification form is filed and they take reasonable precautions to control the fire, they are only responsible for actual damages. Based on our findings, most landowners that practice prescribed fire do file burn plans and have adequate equipment. However, the low reported amount of fire training that agricultural producers have received should be addressed. Oklahoma does additionally have a new law that established an indemnity fund. This indemnity fund allows landowners to pay a small fee for each prescribed fire and receive \$1,000,000 liability coverage. The fund would likely ease many landowner concerns about liability and therefore increase the use of prescribed fire. However, this program is yet to be funded and most landowners are likely not aware of its existence, making it a priority outreach program in the future to address liability concerns.

Ag respondents indicated various reasons for using prescribed fire, but the majority used it for increasing forage quality and reducing eastern redcedar on their property. While the use of prescribed fire creates habitat suitable for many native grassland species within this region (Fuhlendorf et al. 2006), few landowners use fire for this purpose. We found about half of our ag respondents do use prescribed fire. Encouragingly, most agricultural producers that have used prescribed fire have done so on multiple occasions. Therefore, it appears that if a landowner uses fire initially, the likelihood of continued acceptance and use increases (Jacobson et al. 2001). This is consistent with our observations. Thus, a primary outreach component should be increasing the number of new landowners that are using prescribed fire. From the results of this survey it appears addressing the liability issue would be the primary mecha-

nism to achieve this. However, the need for training is still apparent, as we found low levels of training and more than half of ag respondents indicated they desired more technical assistance. Further encouraging is that the frequency of fire reported is largely within historic intervals for Oklahoma. Yet, even with these fairly frequent fire intervals, half of these respondents indicated that eastern redcedar had increased on their property within the previous decade.

We feel that the use of prescribed fire associations is one of the primary ways to provide training and assistance and thus to increase the use of fire. This has also been identified as a high priority in Texas (Kreuter et al. 2008). While Oklahoma currently has 16 associations with >350 members covering portions of 30 counties in the state, <30% of ag respondents had even heard of the associations and only 5% were members of one. While not all counties have associations, most counties have an association adjacent. Many of these associations are very active, and it was assumed that a large majority of landowners were aware of their existence. Clearly, this is an area where we need to spend considerable time connecting people to the associations and making them aware of the benefits while continuing the work of forming new associations across the state.

The encroachment of eastern redcedar represents a significant alternation to the plant and animal community in the southern Great Plains (Gehring and Bragg 1992, Chapman et al. 2004). Addressing this issue will take a large increase in the amount and frequency of prescribed fire. Thus, we were interested to see how the public viewed this plant species. We found that the overwhelming majority of ag respondents viewed it as a problem and more than half of the general respondents agreed. Beyond the threats to biodiversity, eastern redcedar is altering fuel dynamics adjacent to urban and suburban areas. Thus, we would expect that homeowners would be concerned about this fuel accumulation (Bright and Burtz 2006a). They were concerned, but surprisingly not as concerned as were the ag respondents who primarily live far removed from these urban areas. It is likely that the ag respondents have a higher concern due to their experience with the volatility of eastern redcedar in a wildfire setting. However, despite the level of concern about fuels, we found about 20% of all respondents had eastern redcedar within 50 feet (15 m) of their homes. Based on our personal observations, this response is accurate. Firewise education efforts need to be expanded to address this problem. This represents an opportunity to work with community planners in Oklahoma with the shared goal of reducing fuel levels adjacent to urban settings.

A final interesting finding was that both surveyed populations felt that soil erosion was a concern regarding the use of prescribed fire. This is a response we hear repeatedly and is likely a long-held belief dating back to the Dust Bowl days of Oklahoma. While we expected residents in western Oklahoma to hold this view as sandy soils show some soil movement (Blaisdell 1953), it appears that Oklahomans as a whole believe soil erosion is an issue following fire despite data to the contrary for grasslands (Anderson 1965) or on moderate slopes (Wright et al. 1976).

Persons willing to take time to respond to a survey are those most likely to take political action to influence decisions with respect to that survey topic (Groves et al. 1992). Therefore, while responses may not completely represent the population on all aspects, they likely represent those

most willing to impact policy or resources. Our follow-up phone survey would indicate that for the ag respondents the sample is unbiased. However, there may be a bias in the data for the general respondents to view fire more favorably than the Oklahoma population as a whole.

MANAGEMENT IMPLICATIONS

From the results of this study, we plan on adapting our outreach and extension efforts through the Oklahoma Cooperative Extension Service and the Oklahoma Prescribed Fire Council to address major problem areas identified. Significant effort needs to be expended to increase the number of prescribed fire associations but also to increase awareness of the existing associations. Furthermore, the new prescribed fire indemnity fund in Oklahoma should be funded and promoted to address liability concerns. Firewise outreach to reduce the risk of wildfire to urban and suburban communities should additionally be increased, as we found unacceptable levels of the volatile eastern redcedar in close proximity to homes.

After 5 years, we plan on designing a follow-up survey with a subset of the original survey questions to evaluate overall effectiveness of our outreach programming. Ongoing extension activities such as mass media outreach, field days, and support of fire cooperatives will continue but will be adapted as needed based on survey findings. This process will enable us to employ an adaptive management system that supplies information back to cooperative extension so that programs continue to evolve to meet needs as determined by data.

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Appendix. Survey instrument for Oklahoma Prescribed Fire Survey, 2008.

1. How well informed do you consider yourself to be about the management and condition of natural environments in your region of Oklahoma? *Circle one number.*

Not informed- 1-----2-----3-----4-----5- Very informed
 Moderately informed

2. In general, how would you rate the overall condition of natural environments in your region? *Circle one number.*

Very Unhealthy- 1-----2-----3-----4- Very Healthy Don't Know
 Somewhat Unhealthy Somewhat Healthy

3. Oklahoma landscapes are managed for various purposes. How important are each the following management goals to you? *Please rate the items below.*

Items of Concern	Very Unimportant	Unimportant	Important	Very Important	Don't Know
Soil erosion	1	2	3	4	DK
Wildlife habitat	1	2	3	4	DK
Prairie/Grassland restoration	1	2	3	4	DK
Forest restoration	1	2	3	4	DK
Water conservation	1	2	3	4	DK
Control of cedars	1	2	3	4	DK
Wildfire control/prevention	1	2	3	4	DK
Pollen level reduction	1	2	3	4	DK
Protecting scenic beauty	1	2	3	4	DK
Increasing water yields	1	2	3	4	DK
Grazing/Forage production	1	2	3	4	DK

4. Many land management issues involve difficult trade-offs between natural environmental conditions and economic considerations. Please indicate your preference on the following scale. *Circle a number from 1-7.*

1<-----2-----3-----4-----5-----6----->7
 Highest priority should be given to maintaining natural environmental conditions, even if there are negative economic consequences. Both environmental and economic factors should be given equal priority. Highest priority should be given to economic considerations, even if there are negative environmental consequences.

5. Before this survey had you heard of the term "prescribed fire"? *Circle one.* **Yes / No**

6. Do you believe that fires historically occurred on the Oklahoma landscape prior to European settlement? *Circle one.* **Yes / No**

7. Do you believe that fire is necessary today to manage the landscape in your region of Oklahoma? *Circle one.*
Yes / No

ID# _____ (for mailing purposes only)

21. In which Oklahoma county(ies) do you own land? _____
Rent/lease? _____

22. How many acres of land do you own in Oklahoma? *Check the best answer.*

_____ Less than 50 acres _____ 50–200 acres _____ 201–500 acres
_____ More than 500 acres _____ I don't own land in Oklahoma

23. If you rent land, how many acres do you rent? *Check the best answer.*

_____ Less than 50 acres _____ 50–200 acres _____ 201–500 acres
_____ More than 500 acres _____ I don't rent land in Oklahoma

24. What is the **primary** purpose of the land you own? *Check the answer that describes the land use that is most important to you.*

_____ Residence _____ Crop production _____ Livestock production
_____ Timber production _____ Family inheritance _____ Personal recreation
_____ Investment _____ Open space _____ Mineral rights
_____ Recreational leasing (e.g. hunting, fishing, etc.)

25. Are you currently engaged in farming, ranching, or timber production? *Circle one.* **Yes / No**

If so, which of the following describes your operation? *Check all that apply.*

_____ Cattle Ranching _____ Dairy _____ Crops
_____ Hay _____ Timber
_____ Other (*please specify*): _____

How many years have you been involved in agricultural production? _____ Years

26. What percentage of your total household income is derived from land you own or lease? *Check the best answer.*

_____ Less than 10% _____ 10–50% _____ More than 50%

27. Have you ever experienced wildfire on your land? *Circle one.* **Yes / No**

* Denotes a question that was only present on the agricultural producer questionnaires.

*28. Have you heard of the Oklahoma Prescribed Fire Associations? *Circle one.* **Yes / No**

*29. Are you a member of a prescribed fire association? *Circle one.* **Yes / No**

If yes, which one? _____

*30. Have you ever conducted a prescribed fire on your land? *Circle one.* **Yes / No**

If yes, how often? *Check one.*

_____ Every year _____ Occasionally (every 4–5 yrs)
_____ Often (every 2–3 yrs) _____ Rarely (>5 yrs between burns)
_____ I've only done it once

How often do you conduct a prescribed fire *over the same area*? _____

What is the average size of prescribed fires you have conducted? *Check the best answer.*

_____ Less than 50 acres _____ 50–160 acres _____ 160–320 acres _____ >320 acres

Have you ever received any training on prescribed fire use? *Circle one.* **Yes / No**

If yes, who conducted the training? *Circle all that apply.*

NRCS ODWC USFWS Extension Burn Association Other

*31. What reasons do you conduct prescribed fires? *Check all that apply.*

- Improve wildlife habitat Reduce hazardous fuels Increase scenic beauty
 Improve forage for livestock Control invasive species such as eastern red cedar
 Control insects, ticks, or other animal pests
 Other (please specify): _____

Do you prepare a burn plan prior to conducting a prescribed fire? *Circle one.* **Yes / No**

Which of the following resources do you have available to conduct prescribed fires? *Check all that apply.*

- Labor Water truck Drip torch
 Fire lines Tractor/heavy equipment Other _____

*32. What is the predominant plant cover type on your land? *Check only one.*

- Introduced pasture grasses Native prairie grasses Open woodland
 Forest Red cedar Croplands
 Shrublands Other (*please specify*): _____

*33. How important are each of the following goals when deciding how to manage your land? *Circle the best answer.*

Decision Factors	Very Unimportant	Unimportant	Important	Very Important	Don't Know
Livestock production	1	2	3	4	DK
Hay/crop production	1	2	3	4	DK
Timber production	1	2	3	4	DK
Opportunities to lease to recreation users	1	2	3	4	DK
Personal recreation	1	2	3	4	DK
Real estate investment/Increased property values	1	2	3	4	DK
Conserving land for possible future income-producing opportunities	1	2	3	4	DK
Leaving land for your family	1	2	3	4	DK
Maintaining family farming tradition	1	2	3	4	DK
Being a good steward of the land	1	2	3	4	DK

*34. There are many factors that can influence whether landowners use a particular practice on their properties. For each of the following, please indicate how important it is to you as a reason *not* to use prescribed fire in every situation where it might be helpful? *Check all that apply.*

Decision Factors	Very Unimportant	Unimportant	Important	Very Important	Don't Know
Lack of money	1	2	3	4	DK
Lack of labor	1	2	3	4	DK
Liability concerns	1	2	3	4	DK
Lack of equipment	1	2	3	4	DK
Lack of knowledge	1	2	3	4	DK
Concern about damage to structures	1	2	3	4	DK
Concern about damage to soil	1	2	3	4	DK
Concern about damage to timber	1	2	3	4	DK
Concern about damage to forage	1	2	3	4	DK
Concern about neighbors	1	2	3	4	DK
Laws or regulations	1	2	3	4	DK

Questions in this section help us more fully understand people's views and opinions. All responses are strictly confidential.

1. What is your gender? *Circle one.* **Male / Female**
2. What is your age? _____
3. Are you retired? *Circle one.* **Yes / No**
4. What is the highest level of formal education you have completed? Check one.

<input type="checkbox"/> Some High School	<input type="checkbox"/> Bachelor's Degree
<input type="checkbox"/> High School Graduate/GED	<input type="checkbox"/> Some Graduate School
<input type="checkbox"/> Some College	<input type="checkbox"/> Graduate Degree
5. Which of the following best describes the residence where you are currently living?
 - Farm or ranch - more than 1000 acres
 - Farm or ranch - 10 to 1000 acres
 - Rural residence - fewer than 10 acres
 - Suburban residence
 - Urban residence
6. Which of the following best describes where you grew up? *Check one.*
 - Town/Rural area with a population less than 2,500
 - Town/City with a population of 2,500 to 25,000
 - Town/City with a population of 25,000 to 50,000
 - City with a population of 50,000 to 100,000
 - City with a population of 100,000 to 250,000
 - City with a population greater than 250,000
7. How long have you lived in the community where you live now? _____ years

Is there anything else you would like to tell us about how you feel concerning prescribed fire?

Thank you for completing this survey. To send it to us, simply discard the cover letter, fold the survey, place the survey in the prepaid envelope, and put it in the mail. Thanks!