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Presenter Information

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Fighting Wildfire with Prescribed Fire in the Southern Great Plains, USA: Liability, Regulatory and Social Factors

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Abstract

Elevated fuel loads together with hotter and drier climatic conditions are expected to produce more frequent catastrophic wildfires in rangelands. This has led to calls for more prescribed fire to reduce fuel loads. However, perceptions that prescribed fire presents substantial legal liability risks hinder its use by landowners. Here we present research findings about the perceptions of landowners, county commissioners and district court judges regarding prescribed fire in the Southern Great Plains. The extent of liability incorporated in legal statutes pertaining to prescribed fire can affect the use of this land management tool, and the enactment of burn bans by county officials can prevent the use of prescribed fire during conditions under which invasive volatile woody plants are most effectively controlled by fire. In states with gross negligence standards for applying prescribed fire landowners burn more than in states with simple negligence standards. The findings highlight several foci for increasing the use of fire to better manage volatile woody plants. These include reformulating legal statutes affecting the use of prescribed fire; better informing county officials about the wildfire mitigation benefits of prescribed fire to reduce volatile fuels; and the widespread establishment of prescribed burning associations to provide training, equipment and labour for land managers to apply prescribed fire safely.

Introduction

Elevated fuel loads combined with hotter and drier climates are projected to lead to more frequent wildfires (Abatzoglou and Williams 2016). This has led to calls for the broader use of prescribed fire to reduce fuel loads and contain the expansion of volatile woody plants that have been linked to some regional increases in wildfire. However, landowners are often wary of using fire due to liability concerns (Haines et al. 2001). While the risk of an escaped fire is low, the cost can be substantial when it spreads rapidly (Weir et al. 2019).

Most states in the USA apply simple negligence liability standards to prescribed fire, which require the burner to practice reasonable care in applying fire, while states seeking to limit liability for escaped fire damages have adopted gross negligence liability standards, whereby a plaintiff must show reckless disregard of the duty of care that is specified by a set of codified regulations (Wonkka et al. 2015). District Court Judges preside over cases in which one party sues another for escaped fire damages and, therefore, the consequences for the burner are affected by the judge's opinions about fire use and interpretation of statutes and regulations governing prescribed fire. Uncertainty about the outcome of such cases can discourage landowners from applying prescribed fire (Weir et al. 2019). Dobbin et al. (2001) argue that researchers have an obligation to study judicial decision-making because of the consequences judges' decisions can have. An additional challenge to the use of prescribed fire is the enactment of burn bans by County Commissioners when wildfire risk is deemed to be high. While burn bans are a prudent measure for preventing accidental ignition of wildfires, they can also prevent prescribed fire use under conditions that maximize woody plant mortality (Twidwell et al. 2016). Concerns over costly liability for damages from escaped fire is the most commonly cited reason for landowners not using prescribed fire (Yoder et al., 2008; Twidwell et al. 2013; Kreuter et al. 2019; Weir et al. 2019). Wonkka et al. (2015) found that in states with lower liability gross-negligence standards for applying prescribed fire landowners burned significantly more land than in states with the more common simple-negligence standards. Additionally, Toledo et al. (2013) found that family members' and neighbours' perceptions about prescribed fire had an overriding effect on a landowner's decision whether or not to use this woody plant control tool.

Here we report results from three surveys conducted to understand perspectives of Judges, Commissioners and landowners in the Southern Great Plains (SGP) about the benefits, risks and liability standards associated with prescribed fire. The objective is to identify actionable factors that can enhance a pro-fire culture in the SGP.

Methods and Study Site

The three surveys were conducted in 202 Texas counties and 69 Oklahoma counties that are located in the Southern Great Plains (SGP). The surveys included 1,853 landowners with >40 ha of land that were randomly selected from 16 pre-selected counties, 398 County Commissioners and 192 District Court Judges that were randomly selected from all of these counties. The useable response rate for each survey was 37%, 31%, and 20%, respectively. Non-response bias analyses were conducted in the Commissioners and Judges studies, while the landowner survey response was considered high enough (>33%) not to necessitate such an assessment. Each survey was conducted using a standard five-phase mailing protocol (Dillman et al. 2009).

Results

Landowners

Of the respondents in the landowner survey, 54% reported they live on their property full-time, the largest proportion (40%) reported they generated 26-50% of their income from their property, and 32% indicated they were a member of a prescribed burn association (PBA). Full-time residents were 129% more likely than non-residents to burn on their own property, and respondents who obtained any proportion of income from their property were 136% to 365% more willing to assist with fire application on other properties. The survey data corroborated our first hypothesis that *the likelihood that a landowner will apply prescribed fire to their land is negatively correlated with their perception about the legal liability for an escaped fire*. Survey respondents who perceived a higher level of fire-related legal liability were 26% less likely to apply prescribed burns to their land. Additionally, burn bans were a significant barrier (43%) to willingness to apply prescribed fire. The data also corroborated our second hypothesis that *landowner perception of legal liability for applying prescribed fire is positively mediated by their social connectedness, such as membership in a prescribed burning association*. Respondents who belonged to a PBA were 281% more willing to apply fire on their own property and 578% more willing to assist in burns on another person's property. Additionally, respondents who reside in Oklahoma were 60% more likely than Texas respondents to apply prescribed burns on their land likely due to a greater pro-fire culture that is correlated with more PBAs in Oklahoma than in Texas.

County Commissioners

97% of the Commissioners reported some familiarity with prescribed fire, while 52% had been invited to participate in a prescribed fire mainly (70%) by private landowners. The most common prescribed fire information sources were the local fire department/emergency services (67%) and State Forest Services (40%). 84% of the Commissioners indicated some *level of comfort* with prescribed fire (2 = strongly agree ... -2 = strongly disagree), while *level of comfort* and *discomfort* were negatively correlated ($r = -0.52$, $p < 0.001$). The correlation matrix (Table 1) indicates that Commissioners' *level of comfort* with prescribed fire was positively associated with familiarity with prescribed fire and land ownership and negatively correlated with age. *Level of discomfort* was negatively associated with familiarity, and controlling brush on one's land but positively associated with awareness of local fire rules, being female, belonging to an ethnic minority, and age. Self-reported *familiarity* with prescribed fire was positively correlated with factors pertaining to participation in a prescribed fire, awareness of prevalence of prescribed fire and laws pertaining to them, as well as brush control on their own land, and it was negatively correlated with being female and age.

Table 1. Correlation matrix between level of *comfort*, *discomfort* and *familiarity* with prescribed fire and explanatory variables showing Pearson's correlation coefficients and p-values.

Factor	Comfort	Discomfort	Familiarity
Discomfort	-0.52 (p<0.001)		
Familiarity	0.22 (p=0.017)	-0.17 (p=0.057)	
Time Spent on Fire	0.07 (p=0.418)	0.01 (p=0.953)	0.23 (p=0.012)
Participation	0.10 (p=0.288)	-0.07 (p=0.460)	0.43 (p<0.001)
Awareness of Fire Presence	0.07 (p=0.441)	-0.12 (p=0.171)	0.27 (p=0.003)
Liability Awareness	0.06 (p=0.502)	-0.02 (p=0.790)	0.25 (p=0.005)
Fire Law Awareness	0.12 (p=0.172)	0.06 (p=0.499)	0.24 (p=0.007)
Local Rule Awareness	-0.05 (p=0.569)	0.19 (p=0.037)	0.08 (p=0.377)
Get Updates	0.01 (p=0.951)	0.15 (p=0.102)	0.11 (p=0.214)
Years as Commissioner	0.01 (p=0.972)	-0.02 (p=0.804)	0.05 (p=0.571)
Own Land	0.18 (p=0.045)	-0.06 (p=0.510)	0.23 (p=0.010)
Brush Control	0.12 (p=0.181)	-0.23 (p=0.010)	0.20 (p=0.025)
Gender	-0.10 (p=0.255)	0.18 (p=0.047)	-0.27 (p=0.003)
Ethnicity	-0.15 (p=0.102)	0.15 (p=0.098)	-0.07 (p=0.477)
Age	-0.20 (p=0.024)	0.16 (p=0.069)	-0.16 (p=0.081)
Years of Higher Education	0.06 (p=0.529)	-0.03 (p=0.781)	0.04 (p=0.664)

District Court Judges

53.8% of the responding Judges reported being at least somewhat familiar with prescribed fire, but 74.3% identified positive and negative aspects associated with its use. Texas judges saw more potential benefit in fire for wildfire reduction while Oklahoma judges considered control of invasive *Juniperus virginiana* most beneficial. The judges were also asked what factors would constitute evidence that a burner failed to exercise adequate care in the case of (a) simple negligence or (b) gross negligence (Figure 1). The responding Judges indicated that about 1.5 times more of the undisputed facts would constitute evidence of a failure to exercise ordinary care (simple negligence) than would constitute evidence of failure to exercise even slight diligence (gross negligence) ($z=-3.67, p<0.001$) (Figure 1). With respect to the simple negligence standard, Texas judges most frequently chose failure to create a firebreak and failure to cease ignition when the weather changed, while Oklahoma judges most frequently chose failure to check the weather during the burn or failure to notify a local fire department. With respect to the gross negligence standard, Texas judges most frequently chose failure to have a burn plan, while Oklahoma judges still picked the same two facts as before but at a lower rate.

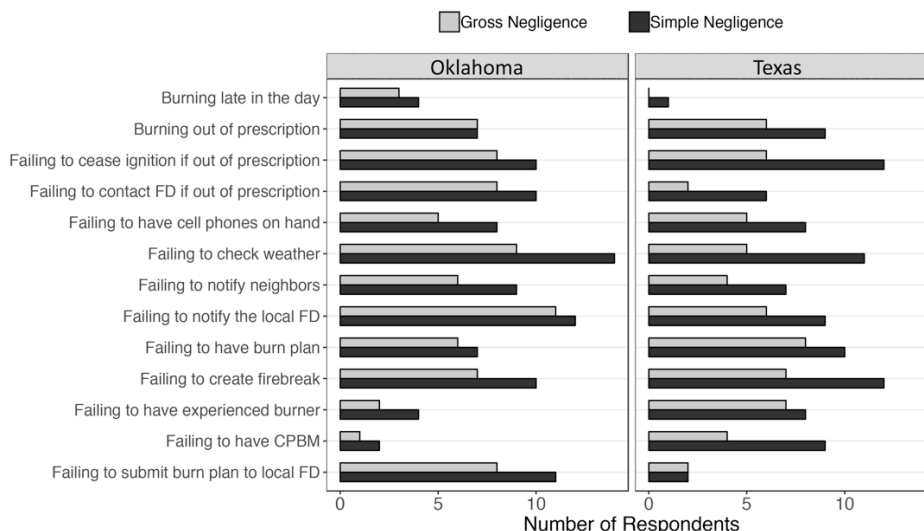


Figure 1. District judges’ selection of factors which constitute evidence that a burner failed to exercise adequate care in the case of (a) simple negligence or (b) gross negligence in the SGP.

Discussion and Conclusions

Our goal was to better understand the decision-making of authorities in order to identify ways to reduce barriers to prescribed burning on private lands located in historically fire driven ecosystems of the SGP. To realize the diverse benefits of prescribed fire, especially wildfire risk reduction, the increased adoption of prescribed fire by landowners is imperative. Liability concerns have been broadly cited as a major barrier to prescribed fire use in the USA (Haines et al. 2001; Kreuter et al. 2008, Miller et al. 2020). Our research corroborated these findings and also emphasized that burn bans negatively affect landowner the use of willingness to apply prescribed fire under conditions that produce high intensity fires, which are ideal for increasing the mortality of invasive woody plants. These findings suggest that the public benefits provided by periodic prescribed fire in reducing fuel loads may be outweighed on private land by the landowner’s concerns about legal liability for an escaped fire and that landowners are not always able to burn when it would be most beneficial for reducing invasive woody plants. It also suggests that those who are authorized to implement burn bans should be provided with accurate information about the benefits of periodically applying prescribed fire in the SGP.

Most Commissioners surveyed were comfortable with the use of prescribed fire. Familiarity with the practice influenced their perceptions most and was strongly correlated with an invitation from a private landowner to participate in a prescribed fire. Given Commissioners are elected officials, they usually have a strong sense of community with nearby landowners. Additionally, given that local fire departments or emergency services are the most common information sources used by Commissioners to decide whether or not to impose a burn ban, these services are key stakeholders in the application of prescribed fire and represent another important target group for outreach and education efforts about prescribed fire as a wildfire mitigation tool. In this way, Commissioners and stakeholders may then be more inclined to support burn ban exemptions.

Our research found high variability among Judges in answers pertaining to the application of simple negligence laws in Texas and Oklahoma for cases concerning an escaped prescribed fire, and that a pro-fire culture is likely to play an important role in how laws are interpreted and applied by Judges. They cited fewer factors as evidence of gross negligence than simple negligence, suggesting that a shift toward a gross negligence liability

standard might result in fewer findings of prescribed burner liability. Additionally, under the Oklahoma statute, burners must notify neighbors and the fire department when they conduct a prescribed fire, which can foster a stronger burn culture because it enables neighbors to reduce the risk of fire spreading onto their land and fire departments to be aware of the burn should concerned residents contact them. Some states have recently overcome variability in the interpretation of burner negligence by creating Right-to-Burn laws for prescribed fire that provide more easily interpretable statutes with clear regulatory requirements tied to specific levels of liability. This allows Judges to apply less stringent liability when burners have adhered to burning regulations.

One approach that has proved to be very effective for promoting more landowner engagement in the use of prescribed fire across the SGP is the establishment of prescribed burning associations (PBAs) (Twidwell et al. 2013; Toledo et al., 2014). Our study indicated that a large percentage of the landowners we surveyed were a member of a PBA. PBAs, whose members receive training, equipment and labour assistance to apply fire safely (Toledo et al. 2014), could also be beneficial for creating a pro-fire culture by informing officials who influence burning about the wildfire risk reduction benefits of safely applied prescribed fire and by seeking to engage Commissioners and Judges in prescribed fire events. Trust in the ability of PBAs and associated burn managers to apply fire safely, even during burn ban conditions, may enable Commissioners and Fire Chiefs to feel comfortable about granting burn ban exemptions under conditions that maximize invasive woody plant mortality and fuel load reduction. In addition, PBAs could help reduce the likelihood of findings against burners in an escaped fire law suit by engaging District Court Judges. Ultimately, greater engagement of PBAs with elected officials could lead to the adoption of a Right-to-Burn act or even a change of prescribed fire liability standards, encouraging more landowners to use prescribed fire. Pro-fire policies that shift the burden of liability for using fire more equally among landowners who burn their land and neighbours who should take actions to reduce their exposure to wildfire will encourage the wider use of this land management tool for containing woody plant invasion, reducing fuel loads, and decreasing the risk of catastrophic wildfire.

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