

fire

Challenges and Motivations behind Sustaining a Volunteer-Based Forest Management Organization: A Case Study of the Southeastern Illinois Prescribed Burn Association

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Fire frequency far below historic norms is threatening eastern oak ecosystem integrity. Increasingly, private family forest landowners are interested in using prescribed fire as a tool for maintaining oak dominance and associated wildlife habitat and wildfire protection. The Southeastern Illinois Prescribed Burn Association (SIPBA) empowers landowners to apply prescribed burning as a management tool. Prescribed fire use is consistent with the established land ethic expressed by members and serves as a means of modeling the practice for nonmember neighbors. SIPBA members regard dependence on outside funding as a limit to both the capacity and, potentially, the sustainability of this novel cooperative land management organization.

Keywords: community forestry, land management, family forest, *Quercus*

A large gap exists between the vast areas of the eastern oak-dominated forests where managers believe burning is needed to sustain the ecosystem integrity and the present extent of forest fire incidence. Specific functions of prescribed fire include controlling forest diseases or insects, maintaining early successional habitat, and reducing excessive buildup of biomass in wildland areas (Shindler and Toman 2003). Historical ecologists have characterized the eastern oak-dominated landscape as

dependent on regular incidence of fire to foster the maintenance of oak domination (Haines et al. 2001, Parker and Ruffner 2004, Ruffner 2006, Nowacki and Abrams 2008). Mustering the human and material resources needed to safely and effectively reintroduce fire is a daunting challenge to sustaining this ecosystem (Ruffner and Groninger 2006).

Southeastern Illinois is typical of the eastern oak region in that many stands of mature oak presently are being encroached

by competing species that had previously been suppressed by frequent burning (Parker and Ruffner 2004). Future timber value and other important ecosystem services are expected to decrease as mesophytic species invade and eventually replace the oak overstory (Fralish and McArdle 2009). Diminished oak regeneration is also of paramount concern. The reintroduction of a 5- to 20-year fire interval approximates pre-suppression historic norms and is a useful component of management regimes designed to establish and maintain oak regeneration (Van Lear and Watt 1992, Nowacki and Abrams 2008, Carril 2009, Hutchinson et al. 2012). Prescribed fire is often coupled with harvest or other partial cutting practices to achieve the appropriate level of disturbance needed to initiate regeneration (Brose 2010, Arthur et al. 2012, Brose et al. 2013).

In rural southeastern Illinois, using fire as a landscape management tool is a deeply

Received December 10, 2012; accepted February 7, 2014; published online March 13, 2014.

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Acknowledgments: We thank Richard Johnson and all of the members of the Southeastern Illinois Prescribed Burn Association for their time and generous contributions to this project. We also thank Charles Ruffner and Logan Park as well as John Groninger and the faculty of the SIU Department of Forestry.

ingrained tradition for some (Putz 2003, Ruffner and Groninger 2006, Nelson et al. 2008). Family forest owners increasingly appreciate the importance of fire as a management tool, although these individuals are often reluctant to conduct prescribe burns despite the predicted benefits (Arvai et al. 2006). Southeastern Illinois' geography, topography, native species, history of land usage, and the natural fire regime are factors that make prescribed burning a challenging endeavor needing planning, coordination, and highly trained prescribed burn crews (Parker and Ruffner 2004). However, the knowledge and even some equipment are in place; coordination and funding are the remaining barriers to implementation and maximizing fire effectiveness (Ruffner and Groninger 2006). Over the past decade or so, increasing numbers of motivated landowners have formed prescribed burn associations (PBA) for the purpose of reintroducing fire on private land, most notably to manage rangelands on the US Great Plains (Twidwell et al. 2013). However, PBAs are uncommon in oak-dominated eastern forests. This distinction is noteworthy, given the need to coordinate fire and other forest regeneration practices in eastern oak ecosystems compared to the relative simplicity of burning solely for woody vegetation suppression in rangelands. The smaller, more complicated burn units that make up a mosaic of native prairie and oak-hickory communities characterizing eastern ecosystems may require unique burn plans that incorporate a wider variety of equipment and techniques. This may partially explain prescribed fire's relatively late reintroduction to eastern oak ecosystems.

Volunteer-based PBAs appear to be a growing phenomenon. However, PBAs have received little attention in the literature, with the exceptions of Taylor 2005 and Twidwell et al. 2013. PBAs can be expected to increase in states where land management agencies have consistently declining resources to address private forest issues, as the perceived need for prescribed fire becomes more pressing. In Illinois, the Southeastern Illinois Prescribed Burn Association (SIPBA) allows family forest owners to incorporate fire into their management plans and actively participate in the implementation of these plans. Members report that SIPBA success has encouraged landowners in adjacent portions of Illinois to seek funding and expand the concept geographically.

The purpose of this study was to under-

stand member motivations and organizational challenges faced by the SIPBA. Specific objectives were to (1) outline the most salient issues driving landowners and stakeholders to form and support a PBA dedicated to the use of prescribed fire on their land and to identify the associated challenges they face and (2) provide a conceptual model to guide future prescribed burning activities on private lands where these are consistent with management objectives.

Methods

This study followed established procedures of ethnographic research (specifically participant-observer procedures) to develop grounded theory based on a key case epitomizing the emerging phenomenon of volunteer not-for-profit PBA (Neuman 2007, Babbie 2012). Grounded theory development relies on sampling of key informants embedded within the phenomenon under study, via semistructured interviews (Babbie 2012, Bryant 2013). Context is provided surrounding the phenomenon and its formative influences as a key case description.

The key case, SIPBA, was founded as a nonprofit group in 2006 with a grant from the Illinois Department of Natural Resources Conservation 2000 Program. The association was awarded a State Wildlife Grant in 2008. A recent extension of the original State Wildlife Grant and funds from the National Wild Turkey Federation continue to support the association until 2014. SIPBA operates within Pope, Hardin, Saline, and Gallatin counties, as well as portions of the surrounding counties, and is the only PBA in its area of operation. Five individuals act as coordinators, including a salaried regional coordinating forester who performs planning and development duties and

four paid crew coordinators who manage burn crews consisting of SIPBA members and equipment. This leadership, combined with risk-management, networking, and regulatory support from the Illinois Department of Natural Resources (IDNR), helped the association membership grow to a total roster of 110 individuals, including approximately 70 individuals participating with prescribed fires in the first 6 years. SIPBA members own 22,777 acres in southeastern Illinois, most of which have a natural resource management plan. To date, SIPBA has carried out prescribed burns on nearly 5,900 acres, reflecting over 160 burns completed since inception in 2006. Virtually all members, including coordinators, are landowners. All SIPBA landowners pay annual dues of \$25 and are required to furnish proof of property liability insurance. A comprehensive priority point system was developed to help encourage member participation in the association and to prioritize the location of future burns. This system awards points for participation in SIPBA activities such as training and burns, as well as for serving on the board of directors and for having their fire breaks prepared for the upcoming burn season. All members are required to attend a minimum amount of training, often including both classroom sessions and field days to give members broader stewardship training while developing operational skills. No physical ability requirements exist, but involvement in at least one burn per year is required, or members can alternatively buy off their participation with a \$100 donation to support replacement contractors.

Field data were collected via semistructured in-depth interviews intended to identify salient issues concerning the use of pre-

Management and Policy Implications

- Owners of private lands presently dominated by upland oak forests within southeastern Illinois are aware of the deteriorating condition of their stands due in part to the long-standing absence of fire as an ecosystem driver. Landowners' desire to restore fire has been hampered by the lack of means to safely conduct prescribed burns.
- PBAs are member driven and enable individual private landowners to address prescribed burning on their own terms, thereby avoiding trust issues associated with public land management agency-driven management initiatives.
- Members view the loss of funding as a primary threat to the sustainability of PBAs.
- Formal coordination with public land management agencies could increase efficiency of existing funding while strengthening cooperation and trust between public agencies and local communities.
- The organization may also serve as a model for family forest landowners seeking to cooperatively address emerging management challenges, including forest pest and invasive species issues.

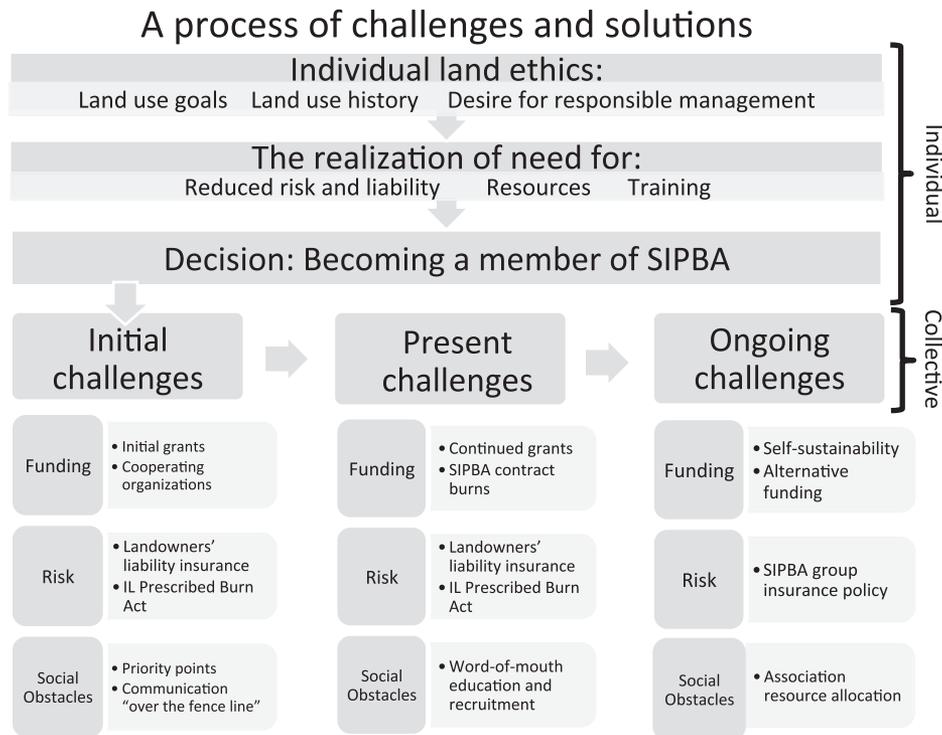


Figure 1. Conceptual model of challenges and solutions over time.

scribed fire on privately owned land in southeastern Illinois generally and SIPBA operations specifically (Creswell 2009, Bryant 2013). Interviews averaged one hour in length. The roles played by landowners and stakeholders in the formation and future of the association were explored (i.e., structured query) alongside emergent data (open-ended query). In addition, interviews examined landowners' perceptions of the roles of SIPBA in managing their land. Finally, members were asked to identify challenges faced by SIPBA, and, in their opinion, the potential limiting factors to its success. This method has successfully identified perceptions and attitudes and provides suitable input for conceptual modeling across a wide range of research questions (Winter et al. 2002, Shindler et al. 2009).

The research sample was obtained by the snowball method until conceptual saturation was reached (i.e., no novel data obtained) and began with the SIPBA coordinator and key members. Interviews were designed to identify as many attitudes and concerns as possible (Charmaz 2008b, Merriam 2009). A total sample of 28 ($n = 28$) individuals were interviewed, consistent with other research studies employing this methodology (e.g., Nohl 2009, Baumgartner and Pahl-Wostl 2013). Interviews were conducted during the spring of 2011 when total active membership was identified as 66

individuals (Dan Price, SIPBA Treasurer, pers. comm., Mar. 15, 2012). Membership tenure of interview participants ranged from less than 1 year to the entire 6-year history of SIPBA. Interviews were recorded and transcribed manually and using semiautomated speech-to-text processing software (Nuance 2012). Raw transcript data were processed for transcription errors and were thematically coded into hierarchical categories along the procedures of Bryant (2013) and similar. Iterative assignment of codes and subcodes via transcript review and triangulation with project staff were used to develop validity and transferability of this research (Charmaz 2008a, Charmaz 2008b, Merriam 2009, Bryant 2013).

The final coding report totaled 3,338 coded entries across 28 participants' usable transcribed interviews. An additional report revealed the multiple relationships between themes and between participants that were described by the data. This network was visualized as a "web" that revealed one-way relationships sorted by type, e.g., "x causes y" and "x contributes to y." Two-way relationships such as mutual benefits, e.g., "x and y are mutually beneficial" were also identified. The resulting relationships were distilled into three main categories: mutually beneficial, additive, and reflexive relationships. Modeling these interconnected relationships served as basis for the final conceptual

models. The result was plotted as contextual word frequency and relationship frequency diagrams using NVivo 9 modeling software (QSR International PTY, Limited).

Results and Discussion

Interviews illustrated a common conservation-based interest among members who see active management as a positive element of their relationship to their property. This initiates the decisionmaking process leading to membership in SIPBA and culminates in a series of challenges and subsequent solutions collectively faced by the landowners. Though there is still a remnant of the policy of fire-exclusion present among members and their neighbors, prescribed fire conducted by trained crews is now accessible to the private forest owner. A conceptual model illustrating the constructs and their relationships driving the process was developed to illustrate the power of organization among landowners with a common goal (Figure 1).

The decision to pursue SIPBA membership begins with stakeholders sharing a common land ethic; landowners are known to be aware of the landscape-scale implications of their actions and can be open to a cooperative effort to attain their goals, especially when it is likely to increase the safety and effectiveness of prescribed fire (Piatek and McGill 2012). Members commonly ex-

pressed an understanding that a landscape-level management solution necessarily starts on their own property (as coded in this study from wildlife habitat or invasive species control data), articulated by an SIPBA member who is also employed in the natural resource arena: "If you're going to do anything meaningful, you have to take the whole landscape into account." This understanding was common across respondents, even among non-natural resource professionals, e.g., family forest owners. (Rickenbach et al. 1998).

The do-it-yourself forest management tool that interviewees identified as most accessible to the individual landowner is partial overstory removal. This practice can either be performed by the landowner or by one of many available contractors. However, this option functions best to facilitate oak regeneration when coupled with prescribed burning, a larger-scale operation requiring several individuals to implement safely and effectively (Carril 2009, Arthur et al. 2012, Brose et al. 2013). Here, the landowner is faced with a limited number of possibilities to pursue forest regeneration practices; either seek the help of neighbors and assume the perceived risk of conducting their own prescribed burns or, more commonly, wait for another entity to perform management activities on their behalf (Taylor 2005).

Members identify the need for organizational support to defend against potential legal threats to their family stemming from use of prescribed fire on their land. Informants report that SIPBA has filled this role. The association obtained support from insurance companies, partially solving their liability problem. As landowners become aware of SIPBA, they see a cost-effective solution to their land management needs. With the support of grants and each other, they gain access to the equipment and crew that alleviate two of the primary obstacles to effective use of prescribed fire, safety and logistical support. Furthermore, members turned to one another for specialized skills, including accounting, organization, fabrication, and machine operation needed to overcome programmatic budget limitations.

Challenges

During interviews, a three-stage timeline construct was developed to organize obstacles identified by each participant. Founding members reported the initial challenges faced by SIPBA, while most participants identified the current obstacles that the association faces. Additionally, inter-

views often identified future challenges that will face the association. Three central themes were identified from codes throughout SIPBA's timeline data: funding, risk, and social obstacles. This study suggests that the existential need for funding remains constant but that its purpose shifts from equipment compilation to administrative costs as SIPBA matures. Additionally, risks and liability concerns appeared at all stages but were perceived to be decreasing in significance due in part to SIPBA's safety record and the members' growing confidence in one another. Conversely, social obstacles that challenged the charter members of the fledgling PBA became more pressing as the association matured: e.g., finding an acceptable way to divide the burn activities fairly among members with differing acreage and assuring equitable contributions by members. In this instance, regular meetings of the board of directors proved valuable.

Funding

Funding was identified as being both essential and difficult to secure. Specific uses include administrative services, organization of the workforce, and specialized equipment to augment the typical equipment resources that are often volunteered by landowners, such as farm equipment. This issue appeared to be temporarily mitigated by grant funding in the early stages of the association.

"For \$25 you have access to a hundred thousand dollars' worth of equipment, you have people who come and help you burn, so you are getting a bargain." (SIPBA founding member/landowner).

However, funding requirements changed slightly following association establishment. An initial investment in equipment was followed by ongoing tool and machinery upkeep as well as training and administrative needs. This stage in the SIPBA timeline represented the largest expense but also saw the emergence of a critical sustaining resource, leadership.

"The coordinator is the biggest part of the budget after equipment purchase. That means funding is essential." (SIPBA founding member/landowner).

Risk

The risk of escaped fire is particularly worrisome to private landowners potentially responsible for damages, injuries, and losses on their own, and neighbors', land (Twidwell et al. 2013). Additionally, smoke produced by prescribed burns can

create dangerous visibility and air quality conditions. SIPBA members expressed concern for their neighbors' health and safety.

"You don't want to start a fire that they're going to name after you." (SIPBA founding member/landowner).

The SIPBA inventory contains special-purpose equipment like drip torches and fire-resistant personal protective equipment associated with professional and safe fire management. Other critical resources cited by informants were a trained labor force and organizational support obtained through volunteer and contractual sources. Member training was provided by local agency personnel and SIPBA's own coordinators and, when necessary, contracted through grant funding. Two membership training sessions per year were offered just before the fall and spring burn seasons and included seminars by natural resource professionals as well as field trips and demonstrations. Like other PBAs, SIPBA has adopted state natural resource agency prescribed burning standards and practices wherever possible to minimize risk while planning and executing prescribed fires (Twidwell et al. 2013). The Illinois Prescribed Fire Act (2009) provides further guidance for SIPBA's Certified Prescribed Burn Managers, who are responsible for the appropriate permits and burn plans. Citing these training and operational standards, SIPBA members expressed confidence in the association and one another. The association relies on landowners' individual liability insurance coverage but was actively seeking group coverage during the study period. Liability was seen as a threat to organizational sustainability in discussions about the future of the association. More than the reputation of SIPBA and its membership are at stake.

Social Obstacles

Harmon (1997) stated that land management techniques must appeal to the public because, ultimately, they are the decision-makers regarding private forests. The need for skills and education in the field of safe prescribed fire use is an obstacle to be overcome in the future. Among other partial solutions, the association's commitment to training helps to alleviate these concerns.

Just as SIPBA members expressed concern for the well being of their neighbors, they recognized that neighbors' perceptions of prescribed burning could affect the future of SIPBA. Educating affected landowners and the general public about fire's role in the associated ecosystem is a valuable outreach

tool and also serves to mitigate opposition to prescribed burning (McCaffrey 2004, Shindler et al. 2009, Twidwell et al. 2013). This study supports the assertion that public education is a wise, if self-serving, investment among landowners who seek to use prescribed fire. Public land management agencies have played an important role in shaping public opinion regarding natural resources stewardship, including planned use of fire. However, restoring public trust in land management agencies is a difficult task (Cvetkovich and Winter 2003, McCaffrey 2004). This study suggests that aiding PBAs and their landowner-to-landowner approach may be a productive avenue of outreach for agencies wishing to improve public perceptions of their land management practices.

Neighbors' negative attitudes toward prescribed burning, when noted, were perceived by informants as remnants of Smokey Bear campaigns ingrained in rural communities during the campaign's heyday and stubborn remnants of the "antifire" attitude remain an impediment to the PBA mission (Twidwell et al. 2013).

"We kind of have to undo a little bit of this Smokey Bear training and got to educate more people in realizing that, sure, you can have some fires. Maybe some fire is more beneficial than you might think." (6-year SIPBA member/landowner).

For SIPBA, this challenge is addressed primarily through informal neighbor-to-neighbor communication or "over the fence line" as it was commonly referred. Volunteers are integral in propagating the use of fire as a management tool and spreading the wisdom gained by their personal experiences. Nearly all advertisement and recruitment comes from word of mouth.

"Once they talk to us or talk to a neighbor and they see it will not only look better but you'll have less invasive species and more wildlife, they see there are ecological benefits as well." (SIPBA crew coordinator and member/landowner).

These results corroborate studies of western PBAs, which suggest that the experience of membership fostered a positive attitude about fire as a management tool, strengthening support for the activity (e.g., Krueter 2008). Further, this study supported previous research showing that citizens do not respond as well as predicted to traditional "town hall" meetings but rather prefer personal contacts and neighbors as a source of information (Petty et al.

1983, Shindler and Toman 2003, McCaffrey 2004).

Future Challenges

Concerns persist regarding potential future expansion of the association and the increased resources required. At the time of the study, respondents perceived SIPBA as operating at maximum capacity. Growth of the association could overwhelm already overworked crews. Coordinating with neighboring public land agencies when management objectives are mutually compatible may alleviate perceptions of overwhelming workload within the agencies. For instance, SIPBA leaders have noted cases where private lands lie adjacent to public lands where agency coordination is possible. Expanding the burn plan to natural barriers such as streams or roads within public land may render unnecessary some fire line construction while, at the same time, building public trust in a state or federal agency. Such collaboration between SIPBA and other agencies has already successfully overcome procedural discrepancies. This success is likely due to SIPBA's policy of deferring to IDNR standards regarding prescribed fire.

Another perceived constraint to growth related to aging members physically incapable of performing duties necessary during prescribed burns. Members generally agreed that the association would have to tap additional resources if growth was desired.

"We are basically burning 1,000 acres in 15 days. With four crews. With four crews and 15 days you could have 60 fires. To grow beyond that you have to add another crew and then you would need membership to match that." (SIPBA founding member/landowner).

Recruitment to expand membership was perceived by informants as relatively easy during the formation of SIPBA, but high importance continued over time to be placed on the membership's involvement and collective expertise, "This [opportunity] spread from neighbor to neighbor and also from managers to landowners. Managers will refer members or potential members to (the coordinator)." (Newer SIPBA member/landowner).

Conclusion

This case study suggests that SIPBA members possess an advanced understanding of the role of fire on the landscape and that this understanding is shared more effectively among landowners over the fence line

than agencies may be capable of achieving through conventional public engagement. The most significant challenges faced by SIPBA were identified as funding, risk, and a variety of social obstacles. The formation of SIPBA is evidence that family forest owners can successfully attract funding necessary to begin restoring a more natural disturbance regime. Further, the additional challenges faced by private landowners who seek to use prescribed fire can be largely overcome by a PBA, as long as funding may be secured for adequate equipment and coordination. This research suggests that the PBA model embodied by SIPBA may help family landowners safely and effectively reintroduce fire as a management tool to perpetuate oak hickory forests on their properties. Furthermore, their example may increase awareness among a broader public of the positive impacts of active forest management.

As with any nonprofit organization, SIPBA may certainly benefit from any natural resource avenue that attracts funding, the loss of which is the most direct of threats to the association. The aggressive spread of invasive species combined with the current successional trends in this region suggests that a failure of funding for any branch of land management could mean reversing the progress already made by PBAs.

PBAs like SIPBA can also serve as a vehicle for landowners to address complex and emerging landscape-level challenges, including forest pest and invasive species issues. This study suggests that the fading of the "Smokey Bear phenomenon" would be a likely benefit and aligns messaging shifts from "forest fires" to "wildfires."

State and federal agencies seeking to improve prescribed fire management across boundaries may consider partnerships with nearby PBAs to do so. Management of the first two challenges, risk and funding, may be addressed more efficiently by PBA staff via accessing agency expertise and also by standardizing appropriate practices across PBAs nationally. Government agencies may see significant return for a modest investment in "seeding" these developing PBAs in a climate where relatively high costs are realized by federal wildfire operations. In these cases, PBAs may be effectively fighting fire (even preventing wildfires) at a more economical cost/benefit ratio.

Future research on this or other prescribed burn associations may help managers and policymakers better understand the potential and constraints of volunteer-based

forest management organizations as a mechanism to address fire and potentially other labor-intensive ecosystem management issues important to family forest owners. Additionally, it will inform those pursuing funding support for similar fledgling PBAs who are enabling family forest owners to fulfill their land management objectives.

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