

# Forest Management on Parcelized Landscapes: Private Forest Owners Assessments of Cross-Boundary Alternatives

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## SUMMARY

The majority of Wisconsin's forests are owned by private individuals and families where the existing forest management paradigm focuses on individual ownerships with little regard for the activities on the surrounding landscape. Changing ownership patterns, often the result of parcelization, are reshaping the forest management landscape and the potential to manage it sustainably. Cross-boundary coordination of forest planning and management has been proposed as a means to overcome the challenge of parcelization, but there is scant guidance as to how it might occur in the United States. To address this gap, we investigated private owner preferences toward alternative scenarios that coordinate forestry practices across multiple ownerships.

In five focus group interviews, forest owners evaluated three alternative scenarios that differed based on who coordinated the prescribed timber harvests. While the majority of participants preferred to have a forester arrange the coordination, it is the range of sentiments and opinions that are of interest in this study. Certain factors such as available knowledge and information, neighbor relationships and shared objectives played an important role in what they preferred or opposed in each approach. Principal-agent theory is presented as a potential framework to understand how private forest owners' relationships with forestry professionals guide their preferred approach to coordination.

## INTRODUCTION

Nearly 60% of forestland in the conterminous United States is owned by private forest (PF) owners. Their management plays a key role in the economic, social, and ecological conditions well beyond their individual boundaries. Between 1993 and 2003, the number of PF owners grew by nearly 11%, while the average ownership size decreased (Butler and Leatherberry 2004). Healthy landscape patterns and processes depend on large scale ecosystem dynamics that transcend highly parcelized landscapes (Kohm and Franklin 1997). Despite the potential benefits of landscape-scale coordination, current management of private forests is on a parcel by parcel basis. This disconnected, piecemeal approach hinders landscape-scale opportunities for and reduces economic returns to PF owners seeking to manage their forests.

Boundaries are constructed for societal goals that are often unrelated to important ecological arrangements and processes that natural resource management seeks to protect and enhance. In order to achieve desirable ecological and economic outcomes (e.g. large mature tracts of deciduous forest to promote Cerulean Warbler (*Dendroica cerulea*) habitat, reduced costs for noncommercial thinning) private forest management must account for parcelization and its often negative effect on forests and their management. However, coordinating management across landscapes of PF owners and their varied, primarily non-commodity objectives is a challenge (Erickson et al. 2002, Kluender and Walkingstick 2000, Kendra and Hull 2005, Jones et al. 1995). While parcelization does not decrease the overall area of forestland, it does

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divide the forest into more parcels with more owners making decisions (Luloff et al. 2000). The concern and uncertainty among many is the extent to which these different and varied decisions will affect the long-term sustainability of both the forests and the communities and industries that depend on them (Rickenbach and Gobster 2003).

Cross-boundary coordination offers one potential approach to achieve the ecologically desirable outcomes inherent to ecosystem management and overcome the negative scale effects of reduced parcel sizes. In the context of this study, cross-boundary coordination can be defined as forest management that spans and accounts for forest management plans and activities on adjacent and nearby properties. Previous studies indicate that PF owners are interested in and predisposed toward ecosystem management and cross-boundary coordination (Rickenbach et al. 1998, Jacobson et al. 2000). Finley et al. (2006) found that such “cooperative predisposition” varies and is dependent on attitudes, values, and demographic characteristics. When presented with similar management options, PF owners are as likely to manage collaboratively as they are to do so independently (Stevens et al. 1999). However, such coordination might require working models (Brunson et al. 1996) or economic incentives ((Klosowski et al. 2001) to foster widespread adoption.

Despite predisposition toward coordination, few operative examples of voluntary cooperation among PF owners exist in the US—despite considerable public effort and expense (Rickenbach et al. 2006). In seeking to understand the future potential for cross-boundary coordination, two theoretical perspectives seem relevant, but have been overlooked in previous work: collective action and principal - agent theory.

## 1. Theoretical Perspectives

In the seminal work, *The Logic of Collective Action*, Olson assumes that people are rational actors and, hence, make decisions in their own best interest (Olson 1971). Central to his argument is that without meaningful benefits, coordination will (does) not occur: independent action will dominate.

Collective action is the result of individuals working together to further a common interest. Often, individuals see the benefit as reductions in their individual costs. Several factors in the literature have direct consequences on the likelihood of collective action by PF owners. In small, rural communities, strong social ties within the group may help strengthen coordination by enabling information sharing and assistance. Critical mass plays a crucial role in the success of collective action. The role of the organizer(s) to identify parties likely to contribute the most resources will affect the involvement of others (Marwell and Oliver 1993). PF owners may perceive more benefits to collective action if they know what strengths and resources others will bring to the coordination of management. Of particular importance, given the myriad objectives that owners have for their land, is the positive relationship between preference heterogeneity and operational complexity (Libecap 1994, Gardner et al. 1993). In short, collective action by forest owners will likely require more complex organizational schemes. Taken together, these factors influence how PF owners view collective action alternatives and will likely govern their decision to join.

Principal-agent theory explores which factors play a role in how principals choose and work with an agent, and can explain how PF owners might work in groups if an agent were present. Principal-agent theory defines a relationship between a principal (a PF owner in this case) who contracts with an agent (e.g., forester, logger) to perform some work on the principal's behalf. Given that most US PF owners do not complete forestry practices on their own (Kittredge 2005), this theory provides a useful lens through which to understand PF owner interactions with such agents as professional foresters (public and private), loggers, and others. Notably, this theory focuses on the relationship between parties as opposed to the individual characteristics and intentions of those parties and hence, may offer a clearer understanding of PF owner behavior than previous studies.

While principal-agent theory assumes individuals are risk averse, self-interested and operate under bounded rationality, its emphasis is

on several relational factors that affect behavior and how behavior might be manipulated through contracts (Eisenhardt 1989). First, there is goal conflict. The principal and agent's goals are not always aligned. For example, a principal might want the maximum effort, while the agent might seek the path of least resistance. Second, it is often difficult for the principal to oversee and ensure the agent accomplishes the work in the most beneficial manner to the principal (Wright et al. 2001). In a traditional principal-agent arrangement, a principal can overcome agent opportunism by monitoring them and seeking information sources to apprise them of the task; however, in a principal-professional relationship, professionals are hired specifically for their knowledge and experience that are unfamiliar to the principal. As such, this knowledge asymmetry places the professional in a position of power over the principal and is the third main factor that influences their relationship (Sharma 1997).

## 2. Research Questions

Under the current private forestry paradigm in the US, PF owners do not work in coordinated group efforts; they individually work with a logger and occasionally with a forestry professional. Few studies either explain (1) how PF owners would like to accomplish voluntary cross-boundary coordination (Stevens et al 1999, Klosowski 2001, Finley and Kittredge 2006) or (2) have analyzed a specific approach to coordination (Campbell and Kittredge 1996, Dedrick et al. 2000). This study sought PF owners' opinions on three alternatives to coordination based on the type of agent involved in the coordination. Our objective was to develop a practical and theoretically driven framework to explain the range of social factors associated with how private forest owners might coordinate. In this paper we present preliminary results that address two research questions.

1. What is the range of PF owners' opinions regarding the three approaches to cross-boundary coordination?
2. Which factors are most salient in PF owners' preferred approach to cross-boundary coordination?

## METHODS

This study is part of a larger project assessing the individual and landscape implications of cross-boundary coordination. The first phase of the project, currently on-going, will identify the ecological and economic opportunities of cross-boundary coordination over a 20-year horizon using PF management plans in the study area. Preliminary results from the first phase (Schulte et al. 2006) are used to describe the study context below. The second phase, the focus of this paper, assesses opinions and views toward three cross-boundary coordination scenarios: 1) independent coordination by multiple owners, 2) forester as coordinator, and 3) an organization as coordinator.

### 1. Study Context (see Figure 1: Study Area)

Similar to the US as a whole, PF owners own the majority of Wisconsin's forestland. Southwest Wisconsin, the region that comprises this study, has the highest proportion of privately-owned timberland in the state, at 93% (Wisconsin DNR). This area is primarily agrarian, but forests still comprise roughly 40% of the landscape (Wisconsin DNR). Parcelization is a concern: farms and woodlands alike are being divided and purchased as recreation property by residents of nearby metropolitan areas. Many individuals or families purchase land here because of its topographically complex landscape, rural charm, trophy whitetail deer, and superb trout fishing. Development of these lands is occurring: 8-10% of the housing units in this region were built in the last five years (US Census 2005). The study sites, each roughly 1,600 ha, are located in three counties in southwestern Wisconsin: Iowa, Richland, and Vernon (Figure 1).

We selected the study sites based on their high concentrations of PF owners enrolled in Wisconsin's forest tax law program, the Managed Forest Law (MFL). MFL is a deferred tax incentive program that significantly reduces annual property taxes until commercial timber harvest when a severance tax is imposed. In exchange for this substantial tax benefit, forest owners commit to a contractual forest management plan that includes a

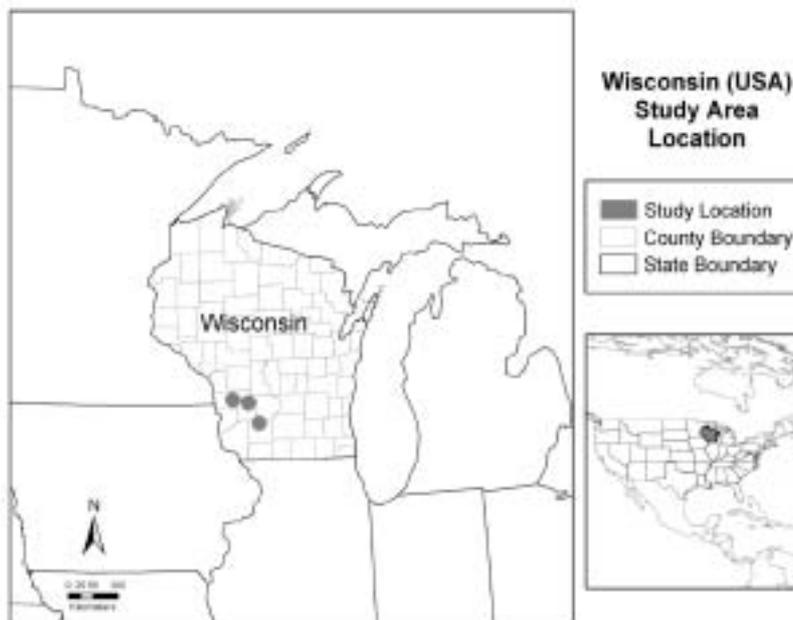


Figure 1: Wisconsin Study Area

significant emphasis on timber production. Each study site encompasses 60 to 100 parcels enrolled in the MFL (see Figure 2, each outlined plan is a parcel enrolled in the MFL). Absentee owners account for almost 40% of the MFL parcels. The average MFL parcel is 55 acres and the average stand size within a parcel is 10 acres. Steep bluffs and hillsides found in southwest Wisconsin hamper accessibility. Historically, this area suffered from improper silvicultural practices, including high grading, and substantial grazing that has degraded forest productivity (Heasley and Guries 1998). Despite the predominance of individual, parcel-based management, preliminary results from phase one suggest that there are significant opportunities to coordinate forestry practices both spatially and temporally (Schulte et al. 2006). In addition, conversations with local foresters suggest that given the typical timber sale and stand sizes in the area, coordination would likely increase management options and returns to PF owners.

## 2. Data Collection

We conducted five focus groups with 31 MFL enrollees who owned forestland within the three study landscapes. PF owners have limited knowledge of and experience with cross-boundary coordination. Hence, focus groups were the appropriate methodology to identify the range of

sentiments regarding coordination and the process by which it might occur (Krueger and Casey 2000). Focus groups allow participants to share differing views and provide rich, collective understanding of the topic under discussion. We selected participants to represent the range of MFL enrollees found within the region and state. Participants included a mix of resident and absentee owners and those active in the Kickapoo Woods Cooperative (KWC), one of the state's several PF owner organizations.

Focus group discussions were semi-structured and built around three hypothetical cross-boundary coordination scenarios that differed primarily by the type of agent/professional involved: 1) PF owners working together (i.e., no agent), 2) forester or other professional, and 3) organization. In each scenario, coordination offered the potential to overcome scale effects and allow PF owners to complete forestry practices that might otherwise not occur. As well as discussing key aspects of each scenario and its relative strengths and weaknesses, participants were also asked to identify their preferred scenario and their rationale for its selection. Participants also completed a brief questionnaire that asked for basic demographic information, forest management experience and objectives, and again asked which approach to coordinating forest management practices they preferred with room to explain why. Focus group interviews (i.e., our data) were recorded and transcribed to facilitate analysis.

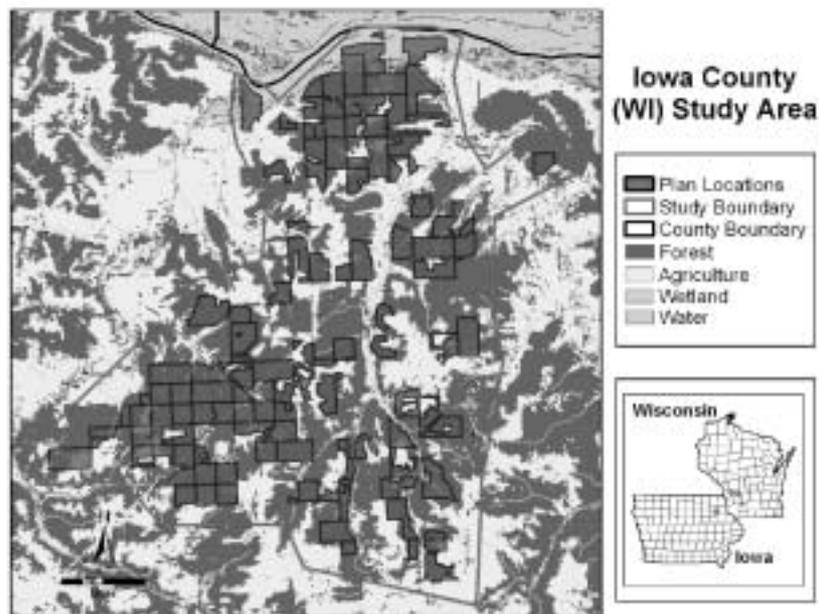


Figure 2: Example Study Site - Iowa County

### 3. Analysis

We used the traditional qualitative approach of coding textual fragments to inform our understanding of the data. The transcribed text was first coded by topic and reflected the three scenarios presented to the participants (Richards 2005). For example, “preferences for approach 1” was a code. These first broad-brush strokes were based on the different approaches to coordination and allowed comparison between them. The next phase of coding, which is still in process, seeks to identify overarching factors that control a PF owner’s opinion regarding the type of agent and approach. This coding scheme is theory-driven (as opposed to grounded in the data) and reflects the influential factors of principal-agent/professional theory (Eisenhardt 1989; Sharma 1997). In this paper, we will focus on our preliminary findings that relate to the participants’ opinions of the three alternative scenarios. Coding and analysis were aided through the use of N\*Vivo version 2.0, a qualitative data analysis software (QSR 2005).

## RESULTS

Our results are organized by the three hypothetical approaches to cross-boundary coordination presented to focus group participants. Participants were similar in their demographic profiles (Table 1) as has been reported in other studies that

Table 1. Basic demographic characteristics of focus group participants

Total Participants: 31 (27 men, 4 women)
• Average age: 55 years old
• Education: 14 college or advanced degree
• Residence: 7 absentee, 24 resident
• Retired: 13
• Written Management Plan: 25

consider active managers (Rickenbach et al. 2006). Notably, participants identified non-commodity ownership objectives despite their tendency to be more active managers than typically found in southwest Wisconsin.

#### *Approach 1: Independent coordination*

Participants identified the ability to share information and knowledge with their neighbors as the primary benefit of independent coordination (i.e., owners working directly with their neighbors to initiate and complete forestry practices). Whether it is a neighbor loaning a piece of equipment and teaching others how to use it, free advice on which trees to cut, or just learning about forestry in general; participants felt their neighbors were a wealth of information and saw connecting with them as a way to increase their own knowledge. For one male participant, approach 1

increased this shared knowledge and reduced the risks associated with forestry operations: “You’d feel better about your timber sale because you’re saying there’s five minds together and we can all kind of agree that this guy should buy it at this price and stuff. You’d probably feel better than just making the decision yourself.”

Even though the primary benefit of this approach was to tap into a collective knowledge base, participants identified three drawbacks. First, as one participant acknowledged, the group of forest owners coordinating a harvest would lack professional knowledge: “I think the smart thing is to know what you don’t know and know where to stop and then ask the people who really know what they’re doing to come in to do it.” Second, many participants said they didn’t have the equipment, ability, or time to do the work themselves. The majority of PF owners are older and “your time becomes more valuable to do... the easy kinds of fun things like walking through the woods instead of lugging a chainsaw with you.” Third, many expressed concern that the approach would take a lot of volunteer time to coordinate, make decisions, and arrange activities. In general, most participants suggested that they were not willing to expend such effort. We did not explicitly state whether PF owners would actually conduct the harvesting themselves or hire a professional for any aspect of the coordination. Some participants assumed the former, while others, the latter. As such, it is difficult to determine whether more participants would prefer this approach if a professional was implicitly stated to be involved at a certain point.

Participants identified four secondary benefits of this approach. While these were consistently heard, they were less important compared to accessing collective knowledge. First, participants identified the potential for more control over the forestry practices implemented on one’s property. They appreciated that this approach allowed neighbors to make choices amongst themselves, rather than someone from outside their group telling them what to do. Second, earning higher returns from this approach interested some: “You make more money probably. I mean, that would be the primary motivator because then you cut out the middle people.” Lastly, participants identified (3) the enjoyment from the social interaction and (4) the satisfaction of working in their own woods.

### *Approach 2: Forester as agent*

Of the three alternatives, the majority of participants preferred to use a professional forester to arrange cross-boundary coordination (From the questionnaire results, 17 chose approach 2). The overwhelming reason cited related to the intimate involvement of a trained professional who would bring education, local contacts, and market knowledge to the endeavor. One PF owner described the benefit of a forester like this, “Detail, you know, this is a guy, this is his profession and maybe not our profession. He’s a professional and should know what he’s talking about, and he should give you some relief on those lines.” PF owners understood the boundaries of their own knowledge and acknowledged that which professionals possess: “There’s a lot I don’t know... especially if you’re going to have a large sale, like everything else, a professional is probably worth paying for.” A second benefit of a forester was convenience. “Well, after the meetings are done and you’ve agreed with your neighbors and so forth, it’s handled for you from that point on.”

Approach 2 resonated with many PF owners because they were working with a forester but gaining the benefit of also working with neighbors. Participants wanted to be aware of the process and the other PF owners involved. Specifically, they wanted to be party to the decision-making as opposed to actually completing the work or coordinating the process as presented in approach 1. For example, they wanted to meet with the other forest owners to ensure that everyone heard the same thing from the forester: “We want to be on the same page with the forester.” “Yeah, we want to be on the same team.” This was their opportunity to check references with their neighbors and make sure the forester was not acting opportunistically.

In considering whether a public or private forester would arrange the coordination, opinions varied based on their perceptions of the goals of the forester. “Personally, I would trust the [state forester] more than I would trust the private forester because I think that the [state forester] is more objective because they don’t have commitments to other people.” Yet, another participant felt the opposite, “When they [state forester] do your forest plan, they say ‘what do you

want for your forest?’ I think it’s like they have an agenda and you fit in. And when they go mark the timber, I don’t think they pull your plan out and look at your [objectives].” Other participants recognized how different foresters viewed the bottom line, “The [state forester]... don’t have that financial stake to get that last tree over there, you know.” But another man wanted that: “I think they (state foresters) have a role. But when they start looking at my timber, I’d rather have somebody that’s working for me”. Several participants were skeptical of private foresters: “Well, when they approach me, to me it’s another telemarketer. I would rather be making calls to them.” Participants questioned who influenced the state foresters. “To what extent is that pulp industry up north drive decisions that are made in Madison for the rest of us? We may not be in agreement with that.”

### *Approach 3: Organization as agent*

Private forestry organizations are not common in the US and most focus group participants were unable to name one. In southwestern Wisconsin, there are two forestry cooperatives (a third went bankrupt five years prior) and one forestry education and outreach organization. As such, participants struggled with and had wide ranging ideas on what it meant for an organization to arrange cross-boundary coordination. As opposed to the other approaches that were within their range of experience, the initial discussion questioned how the structure of the organization could remain viable, flexible, and responsive to their needs: “There might be some discord in the organization.” “It just seems like a lot of bureaucracy.” “Organizational leadership changes come into mind. Their philosophies could change overnight... in a quick hurry.” Issues over retaining control and independence of their properties surfaced:

*“I feel like they’d be telling me more than listening to me. I don’t know that I would be comfortable with an organization if I, you know, I’m selfish. If they had my motives in mind, fine. But if they didn’t have, or if my motive changed in two or three years, what am I going to do, just drop out because my particular ideas have changed?”*

Uncertainty existed over whether an organization could be flexible enough to address each owner’s particular needs and detail of their land. It was difficult for participants to see how they retained their independence with an organization: “So you have to be able to, you’re in the group that’s doing this practice; you still have to be able to have your own separateness or something.”

As discussion continued, the primary benefit of this approach emerged. First and foremost, participants identified the ability to share a common forestry philosophy. They saw the organization as a place where all members would have a shared set of values: “I would prefer to use the organization, I would rather work with people who share some of the same goals that I do and some of the same beliefs about it and it always doesn’t boil down to making a buck.” Based on previous experiences, three PF owners saw the organization as fostering the owners’ objectives that stood in contrast to their previous experiences working with a state forester who disregarded their objectives.

Most participants thought of organizations as helpful clearinghouses of information and as independent knowledge sources, not as an organizer of forestry practices. One participant captured this sentiment in reflecting on why he joined the KWC, “I’m hoping... to get a number of expert opinions besides just the government, the commercial, or the scholarly.” Participants felt the organization would provide a more structured version of approach 1, where owners appreciated sharing information. The organization would allow them to cultivate relationships with the forestry professionals in the community. As one participant put it, referring to the KWC, “the co-op is sort of a Better Business Bureau in the trade... whereas the one-time log seller is liable to get took. The co-op can make sure that reputable people are bidding and doing the work, protecting them that way, make sure you get your value out of the lumber.”

## **DISCUSSION AND PRELIMINARY CONCLUSIONS**

Participants expressed a range of opinions, but our preliminary analysis suggests that certain factors

will emerge as most influential to their choice of approach. Across the three approaches, information and knowledge asymmetries and compatibility of forest owner objectives (i.e., reduce goal conflicts) appeared most salient.. Both reflect the underlying theoretical perspectives (i.e., collective action and principal-agent/profession), which inform our understanding the potential for cross-boundary coordination and also suggest continued investigation.

PF owners expressed a desire for greater access to knowledge from reliable and trusted sources. From principal-agent/professional theory, it is in a principal's best interest to understand and know the agent's actions. Approach 1 provided participants with the combined knowledge of their neighbors and approach 3 encompassed an organization that would provide an independent source of information that was working just for them. Approach 2, the preferred option, leveraged collective action and knowledge as a check on professional opportunism and, as a result, lowered their perceived risk. In some ways, this last point is a response to an ill-defined professional relationship that pervades most of US private forestry. The specific allegiances of foresters are not immediately evident to forest owners and the profession, in many states, has yet to clearly address this. As a result, participants saw coordination (i.e., collective action) as a way to minimize their exposure of misjudging the credentials and experiences of those they hire.

Yet, collective action, as our participants noted, is difficult. A primary concern, regardless of approach, was how to work with neighbors who had different management objectives. Cross-boundary coordination requires working directly or indirectly with neighbors and/or an agent. Goal conflict, as principal-agent theory states is inherent in these relationships. Most had no knowledge of their neighbors' goals, but made rather stark assumptions of their neighbors' intentions: "They don't want to do nothing. They strictly want to use it for deer hunting." Participants were wary of engaging with neighbors that had different objectives, and saw this as an impasse for cross-boundary coordination. They questioned from the start why they should get involved if there were conflicts they couldn't conceive resolving. This is

interesting given that much of the research on forest owners suggests that their overall general objectives tend to be aligned. While potential reasons for this are present in the literature (e.g., exurbanization), processes and methods (or more importantly incentives) for such cross-boundary conversations are not well developed.

The focus groups exposed the range of thoughts and opinions PF owners hold regarding what they like or dislike about approaches to cross-boundary coordination and there is much yet to be gleaned from our analysis and that of future research and practice. Our continued analysis will further explore the theoretical and practical dimensions. For example, many perceived multiple benefits from approaches 1 and 3, but they seemed less desirable on the whole. This suggests that certain factors are more important than others and that the relative weights need to be investigated further. Furthermore, do individual property characteristics, landowner objectives, or personal preference influence their choice of agent? We will continue to analyze the focus group data based on principal-agent/professional theory and collective action to better understand these questions and explain why PF owners prefer one type of agent versus another when coordinating practices.

In short, there is much that remains unexplored about the potential for cross-boundary coordination in the US (and elsewhere). However, parcelization and emerging ecological threats (e.g., wildfire protection, invasive species control, fragmentation mitigation) will require a greater need for such tools. It is our belief that continued research and practice can inform the forestry community and government agencies can use these results to craft policy mechanisms that provide coping mechanisms for the continued ecological and economic benefits of private forests, their owners, and society.

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