

# Cross-Boundary Coordination on Forested Landscapes: Investigating Alternatives for Implementation

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Received: 10 October 2007 / Accepted: 27 July 2008 / Published online: 6 September 2008  
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**Abstract** Cross-boundary coordination is a tool for ecosystem management whereby landowners voluntarily coordinate management practices toward economic and/or ecological landscape-scale outcomes (e.g., fiber, invasive species control, habitat). Past research indicates that it may be particularly applicable on landscapes that include small forest landholdings. To explore alternatives by which coordination might occur, we conducted seven focus groups with landowners ( $n = 51$ ) who actively manage their forests in southwest Wisconsin and northeast Iowa. Focus group participants were presented with three hypothetical alternatives to coordinate with their neighbors; landowners could self-organize, work with a natural resource professional (i.e., forester), or work with an organization to complete a cross-boundary practice. In this article, we focus on the latter two alternatives and the role of two social theories—principal-agent and cooperation—in explaining landowners' evaluations of these alternatives. Key findings are that (1) cross-boundary coordination has the potential to alleviate problems between landowners and

resource professionals inherent to their typical working relationship, and (2) social relationships are a major factor contributing to landowners' willingness to participate. We posit that cross-boundary coordination offers a non-economic incentive for landowners to work together as it may reduce the uncertainty associated with hiring a resource professional. At the same time, professionals can provide a bridging function among landowners who are unacquainted. To achieve these outcomes and expand the adoption of cross-boundary coordination, we suggest four guidelines. First, foster dialogue among landowners toward shared cognition and oversight. Second, match landowners' practices and objectives such that there are clear benefits to all. Third, develop relationships through low risk activities where possible. Fourth, do not expect on-going commitments.

**Keywords** Forest landowners · Cross-boundary coordination · Cooperation · Principal-agent · Agency theory · Private forestry · Private forest ownerships

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## Introduction

Successful ecosystem management depends on the capacity of social actors to effectively address landscape and other ecological changes. In examples of successful ecosystem management, these social actors are seen as using social relationships to successfully protect or maintain some ecosystem services or ecological functions (e.g., Olsson and others 2004; Bodin and others 2006). Another characteristic of this approach is that existing social relationships may create capacity to address related issues in the future (Bodin and Crona 2006). However, on landscapes that are predominantly in small private

landholdings, as is common in much of the eastern United States of America (USA) and elsewhere, applications of ecosystem management can face significant hurdles to implementation. Under the existing management paradigm, small landholdings are managed on an ownership-by-ownership (i.e., ownership-centric) basis that often limits the inclusion of landscape perspectives in either planning or management. Decisions ranging from land-use conversion and timber harvesting to habitat improvement and invasive species eradication are made largely independent of activities in the surrounding landscape and with resulting unintended and challenging consequences (e.g., Schulte and others 2008; Gustafson and others 2007; Crow and others 1999; Turner and others 1996).

One potential strategy to overcome the challenges of small parcel management and integrate landscape-scale considerations is cross-boundary coordination (Kurttila and Pukkala 2003; Bergmann and Bliss 2004; Kittredge 2005; Goldman and others 2008). As a general definition, cross-boundary coordination is land planning and management that spans and accounts for plans and practices on adjacent and/or nearby properties. At a minimum, this would entail information sharing among landowners, but could extend to coordinating specific practices or plans. Mechanisms to encourage cross-boundary coordination may or may not include incentives, but we do not see it as a centralized planning approach that depends on “lock-step” management. Rather, it seeks to alleviate and, in some cases, reverse negative ecological and economic effects of an ownership-centric approach by fostering multi-ownership (i.e., landscape-scale) activities that participating landowners are interested in or can be enticed into accomplishing. For example, landowners may collectively act to reduce fire hazard or remove invasive species. In other instances, landowners may be enticed or compelled to improve or maintain socially important ecosystem services (e.g., water quality, wildlife habitat, etc.). In the broadest sense, cross-boundary coordination has the potential to reduce the cumulative effects of ownership fragmentation (i.e., parcelization) and increase the local adaptive capacity to address ecological issues at landscape scales.

Hypothetical models indicate that ecological and economic benefits might emerge from cross-boundary coordination (Öhman and Lämås 2003; Kurttila and Pukkala 2003; Schulte and others 2008). Surveys indicate that landowners are interested in and predisposed toward coordination and, when presented with similar management options, are as likely to manage collaboratively as they are to do so independently (Finley and others 2006; Stevens and others 1999). Moreover, trust among landowners and other stakeholders (Bergman and Bliss 2004; Rickenbach and Reed 2002) and financial incentives (Klosowski and others 2001) may increase the likelihood of

coordination. While predisposition, interest, and potential benefits exist, the practice of cross-boundary coordination is a sporadic and haphazard affair (Rickenbach and Jahnke 2006; Campbell and Kittredge 1996).

## Research Questions

Here we seek to understand how cross-boundary coordination could become more commonplace. In developing this understanding, we use two theoretical perspectives—principal-agent and cooperation—to inform our study design and data analysis toward answering two research questions.

1. To what extent are the concepts of principal-agent and cooperation theories present in landowners' evaluation of cross-boundary coordination alternatives?
2. What are the implications of the evaluation and the theories for widespread application of cross-boundary coordination?

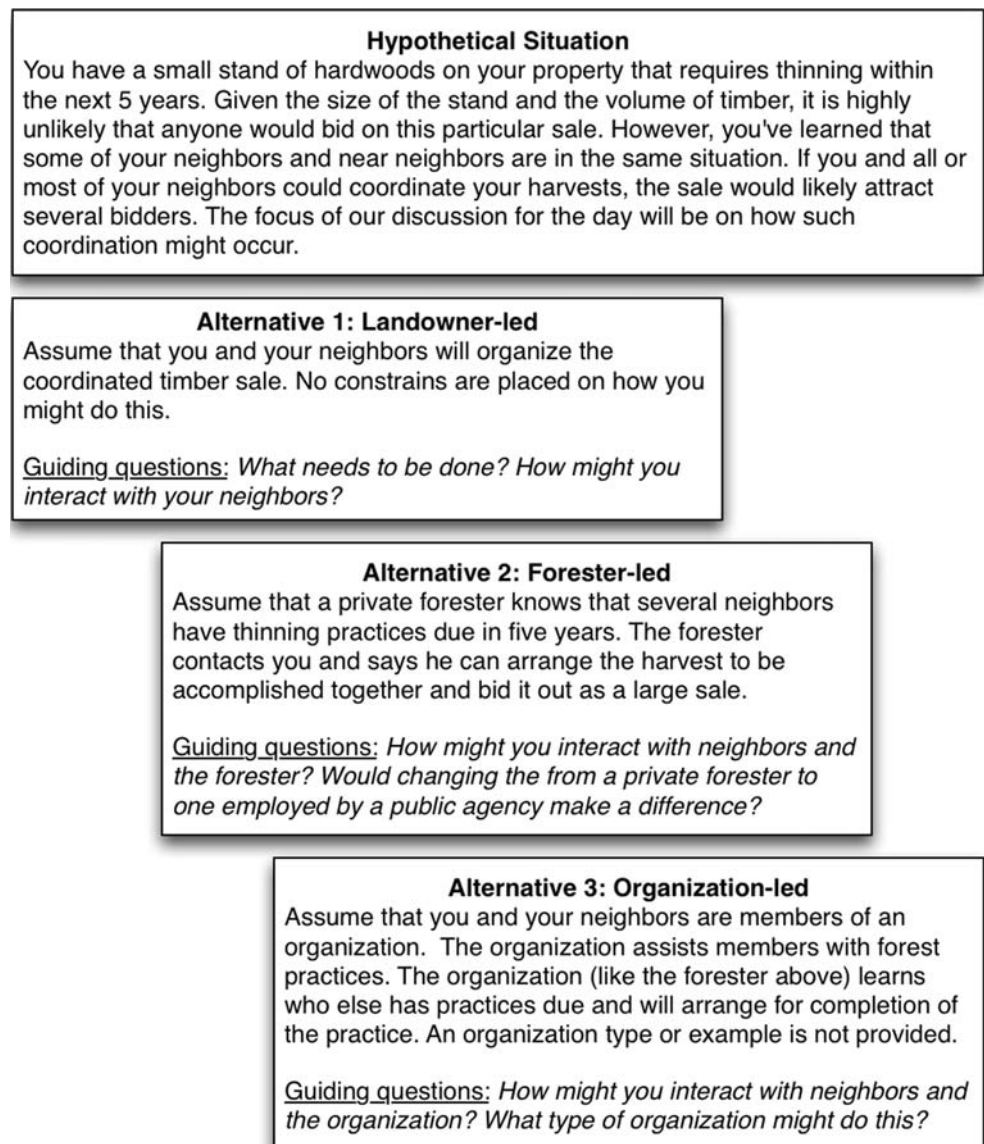
Our study differs from past work in that we ask landowners to consider different approaches by which they might coordinate forest practices as opposed to their predisposition toward or interest in coordination. Through focus group interviews, landowners were presented with a hypothetical (but realistic) scenario in which coordination provides an opportunity for a specific practice (i.e., thinning) to occur; we then presented three alternative approaches by which the practice may be carried out (Fig. 1). The interplay between two of these approaches—forester-led and organization-led coordination—generated the most dialogue among participants. As this dialogue also offered the greatest potential for typical landowners, we focus on these two alternatives in this manuscript. Our findings address how relationships between landowners and resource professionals and among landowners shape the potential for cross-boundary coordination.

## Conceptual Framework

### Principal-Agent Theory

In nearly all situations, forest landowners (i.e., principals) in the USA work with natural resource professionals (i.e., agents) of one kind or another to complete practices on their land. This arrangement reflects a fundamental dyad of economic exchange that is the subject of principal-agent theory (Eisenhardt 1989). Central to this relationship is that landowners usually engage foresters, loggers, and/or other resource managers for their technical knowledge and/or expertise (Gass 2006). For example, a landowner might contract with a logger to more efficiently harvest and

**Fig. 1** The hypothetical scenario we presented to landowners in focus groups and the alternatives they were asked to explore



market timber products, or consult a wildlife biologist on the best location for a habitat restoration project. These relationships can and do greatly benefit many landowners, but not universally (Rickenbach and others 2005). Principal-agent theory posits that these relationships have two inherent problems: (1) misaligned objectives between the principal and agent and (2) asymmetric information that can diminish the principal's desired outcome. We briefly review each below.

1. Misaligned objectives occur when the motivations of the landowner and the resource professional are at odds. Misalignment is assumed in principal-agent theory as both actors are seen as pursuing their own self-interests (Eisenhardt 1989). Misalignment often results from differing financial incentives that emerge from the task. For example, loggers or log-buyers may

seek to limit timber-harvesting costs at the expense of environmental standards important to the landowner. However, misalignment may also arise from other less-obvious sources: a public agency forester may allow agency goals and priorities to override landowner goals (Rickenbach and others 2005).

2. Asymmetric information results from the difference in knowledge and experience between landowners and resource professionals. Landowners generally have limited knowledge related to forests and their management in comparison to professionals (Egan 1999; Kurttila and Hanninen 2004; Kendra and Hull 2005). While this is often the precise reason that landowners work with them, resource professionals can exert significant influence over landowner decision-making and practice implementation. In addition, landowners

may not be aware of this influence as their limited knowledge prevents them from asking key questions or exploring alternatives.

In many principal-agent relationships, the principal can develop contracts or monitoring schemes to better align the agent's behavior with her/his own objectives. However, oversight of natural resource professionals is very difficult due to asymmetric information (Sharma 1997). Contracts often require specific practice-based knowledge and field-based assessment skills that landowners typically lack. For example, Egan (1999) found that timber sale contracts alone are insufficient to ensure that loggers meet environmental standards on private forests.

### Cooperation

In addition to resource professionals, cross-boundary coordination necessitates some degree of interaction between adjoining or nearby landowners (i.e., neighbors). Despite their importance, few studies have considered the neighborly relationships that might allow coordination to occur. Ecological and ownership configurations, landholding size, and operational efficiencies limit cross-boundary practices to, perhaps, 2–5 landowners (Schulte and others 2008; Rickenbach and Jahnke 2006). While such coordination occurs at a smaller scale than what might be needed to sustain broader collective action (Olson 1965; Ostrom 1990), it is no less important when attempting to promote place-dependent ecosystem services within landscapes (Goldman and others 2008). Given this focus, we adopt a social-psychological perspective employed by Rickenbach and Reed (2002), who studied emergent cross-boundary cooperation by landowners to restore endangered species. The antecedent roles of shared cognition (i.e., perceived consensus), group identity (i.e., shared identity), and legitimacy—as reviewed below—grounded their study.

1. Shared cognition reflects the degree to which cooperators share a similar perspective on the task at hand (Swaab and others 2007). For example, neighbors who might remove invasive plants must share a belief that removal is desirable and potentially effective. Shared cognition is comparable to (but not the same as) the objective alignment described under principal-agent theory.
2. Group identity is the extent to which individuals within the group share common norms and beliefs (Swaab and others 2007; Tyler 2002). In essence, one would expect that neighboring landowners with different political and environmental values might be less likely to cooperate than those who share similar values. Group identity “encourages cooperation...because

people merge their sense of themselves in the group, and the welfare of the group becomes indistinguishable from personal welfare” (Tyler 2002, p. 774).

3. Legitimacy is the extent to which those acting on the group's behalf are seen as fair, capable, and empowered to do so (Tyler 2006). For example, one landowner may advocate for coordination among her/his neighbors, but because s/he is seen as lacking in some way, cooperation may not occur.

Lack of any one of these three antecedents lessens the likelihood of successful cooperation. Shared cognition and group identity reflect the convergence of task-specific and landowner characteristics, while legitimacy assesses the capacity to translate this convergence into outcomes.

## Methods

### Study Context

The location for this study was the Upper Midwest, specifically NE Iowa and SW Wisconsin. Agricultural land-use is dominant, but forests comprise roughly 40% of the landscape. Private landowners, as opposed to public agencies or industry, own over 90% of these forests. Typical ownerships are small (<35 ha) and landowner objectives tend to be aesthetic and recreational (Rickenbach and others 2006). Despite the predominance of small landholdings, results from a related study suggest that there are significant opportunities to coordinate forestry practices both spatially and temporally (Schulte and others 2008). Within this study region and within the context of that related study, we selected four study sites based on high concentrations of landowners participating in Iowa's forest stewardship planning and Wisconsin's property tax incentive program for forestland. Each study site encompassed 40 to 100 parcels.

As is typical in the USA, most landowners are passive managers that react to market, forest, and/or personal circumstances as opposed to actively planning and acting. As a result, they may have limited interactions with natural resource professionals prior to a timber sale, but may have extensive interactions with loggers or mill representatives who may or may not be trained natural resource professionals at the time of their harvest. In a minority of cases, landowners will seek out additional professional services either in terms of advice (e.g., from a public agency) or management (e.g., consulting forester). Although our study area includes two forest landowner cooperatives, this business form is not a common feature of forestry in the USA (Kittredge 2005; Blinn and others 2007), nor is forest cooperative membership widespread in our study area.

## Data Collection and Analysis

We conducted seven focus groups (five in Wisconsin and two in Iowa) with 51 “active” landowners. Focus groups were the appropriate methodology to identify the range of sentiments regarding coordination and the process by which it might occur as most landowners have a limited sense of what cross-boundary coordination entails (Krueger and Casey 2000). Focus groups allow participants to share differing views to produce a richer, collective understanding of the topic under discussion. The number of focus groups was not predetermined but rather guided by the following factors. First, we wanted to attain redundancy (i.e., when subsequent focus groups do not yield appreciable new perspectives) in the spirit of Lincoln and Guba (1985). Second, we wanted to represent perspectives across the 4 study sites.

Our preference was for active landowners because we wanted participants with some forest management experiences with which to judge the alternatives. The selection of these participants allowed us to quickly direct the conversation to comparing the alternatives rather than explaining basic forestry concepts. For this study, we define active landowners as those enrolled in their state’s forest landowner assistance program. A requirement of these programs is that all landowners have a forest management plan. These programs provided the most cost-effective approach of selecting active landowners and meeting larger project’s goals (see Schulte and others 2008). Selection was also intended to achieve a mix of resident and absentee landowners. In addition, 11 were members of one of two forest landowner cooperatives in the study area. When more than one person in a household was listed as a program enrollee, we asked for the individual most involved in forest management to attend the focus group.

The focus group interviews were structured around three hypothetical cross-boundary coordination alternatives related to the joint sale of timber. The alternatives differed in the type of agent involved in the process of bringing landowners together and planning the harvest: landowner-led (i.e., no agent), forester-led, and organization-led (Fig. 1). The organization was presented as a private group, either not-for-profit or for-profit that provided leadership to the coordinated timber sale. For all alternatives, coordination offered the potential to overcome the negative economic scale effects of small properties and allowed landowners to complete forest practices that might otherwise not occur. However, no reference was made to the level of interaction that might be expected by landowners. Both principal-agent and cooperation theories informed the structure of the hypothetical situation and the three alternatives, but were not a part of the focus group script. The script focused on the participants’ vision on how each

alternative might play out and the relative strengths and weaknesses of each. Participants also completed a brief questionnaire that provided basic demographic information, and forest management experience and objectives. Focus group interviews were recorded and transcribed to facilitate analysis.

We used theory-based coding to analyze the transcripts. These data were first coded by topic and organized around the three alternatives (Richards 2005). This initial step allowed us to distinguish opinions on the different alternatives and make comparisons among them. The next phase of coding identified theory-driven themes that influence a landowner’s evaluation of the alternatives and relied on the theoretical perspectives described above. Coding and analysis were aided through the use of N\*Vivo version 2.0 (QSR 2005).

## Results and Discussion

Focus group participants were predominately male, over 50, and heterogeneous in terms of educational attainment and income level (Table 1). The average ownership size was 26 ha and 43 of the 51 participants had written forest management plans. Participants identified non-commodity ownership objectives as primary, which is consistent with

**Table 1** Demographic characteristic of focus group characteristics ( $n = 51$ )

Characteristics	Count	Percent
Gender		
Female	7	14
Male	44	86
Educational attainment <sup>a</sup>		
Did not complete high school	2	4
High school diploma or GED	16	31
Some college/associate or technical school degree	9	18
Bachelor’s degree	7	14
Advanced or professional degree	10	20
Residency		
Absentee	14	27
Resident	37	73
Retired		
Yes	20	39
No	31	61

<sup>a</sup> Percentages do not equal 100% for the educational attainment characteristic because five participants did not fill out the demographic questionnaires that captured these data and two spouses jointly filled out questionnaires reporting their husbands’ information, although demographic information was included for these seven participants if they verbally provided the information during the focus groups

those held by other landowners in the region (Rickenbach and others 2006) and the USA as a whole (Butler and Leatherberry 2004). Although participants discussed all three alternatives, the most meaningful discourse and the basis for this article emerged from the interplay of ideas between the forester- and organization-led alternatives. We do not wish to discount the landowner-led alternative, but this discussion centered on landowners conducting the entire operation on their own. They envisioned harvesting and marketing the timber without assistance. This is in stark contrast to typical practice on private lands where landowners will employ at least a logger, if not also a forester, to assist them.

Participants' statements on the forester- and organization-led alternatives, as viewed through our two theoretical lenses, provide a range of perspectives that identified potential benefits and challenges for both alternatives. Specifically, our analysis showed that misaligned objectives and asymmetric information are a concern when working with a forester, but participants posited a collective monitoring scheme to overcome these issues (Fig. 2). However, any such monitoring scheme relies on some degree of landowner cooperation, the antecedents for which participants recognized, but did not view as necessarily existing. Notably, legitimacy spanned participants' evaluations of both landowner cooperation and their relationships with resource professionals. Taken together, their insights and the theories suggest ways to design optimal cross-boundary coordination alternatives and natural resource policy. The remainder of this section is organized in terms of the two theories that ground the study findings.

## Principal-Agent

### *Misaligned Objectives*

Participants were well aware of the potential for misaligned objectives when working with a forester. Such concerns were evident in their perceptions of foresters and the nature of their relationships with them. Not surprisingly, participants preferred a forester who appeared to share their goals (i.e., had aligned objectives), but pragmatically understood that this was not always possible. For many, an initial consideration was knowing who employed the forester and what potential conflicts of interest might exist. They relied on a simple dichotomy between foresters employed in the private sector versus those in the public sector. The exchange between Tim<sup>1</sup> and Alex was typical in establishing the difference:

Tim: ...your professional [private] forester is liable to high grade<sup>2</sup> you, whereas the [public agency] forester is more likely doing a timber stand improvement harvest. Alex: [The public agency forester has] the whole ecosystem in mind, not just the timber harvesting.

Perceptions of misalignment usually reflected the belief (and reality) that a private-sector forester's personal income is determined either directly or indirectly by the management practices that s/he recommends. Participants made references to different types of private sector foresters (e.g., consulting foresters, foresters employed by sawmills), but a clear distinction did not emerge from the interviews. These perceptions often reflected personal experiences such as that shared by Jeff in describing his exchange with a private forester:

I walked through and told [the private forester], "I don't want every elm tree killed because down the road we want some elms to die naturally." And he said, "They're going to die anyway, you should take them." Everything we did, I wanted to try and lean toward wildlife, and they're not used to doing that. Every place they step into, they see dollar signs and want to kill [trees].

Even after describing to the forester his intentions for the elm trees on his land, Jeff still felt there was a disconnect.

In contrast, participants saw the public-sector foresters as being more concerned about the environment and the landowner. "I wouldn't make a move to anybody else without talking to [the public-sector forester]. And, I trust him" (Jason). However, a subset of participants felt that public-sector foresters also presented potential misaligned objectives. As Phil notes:

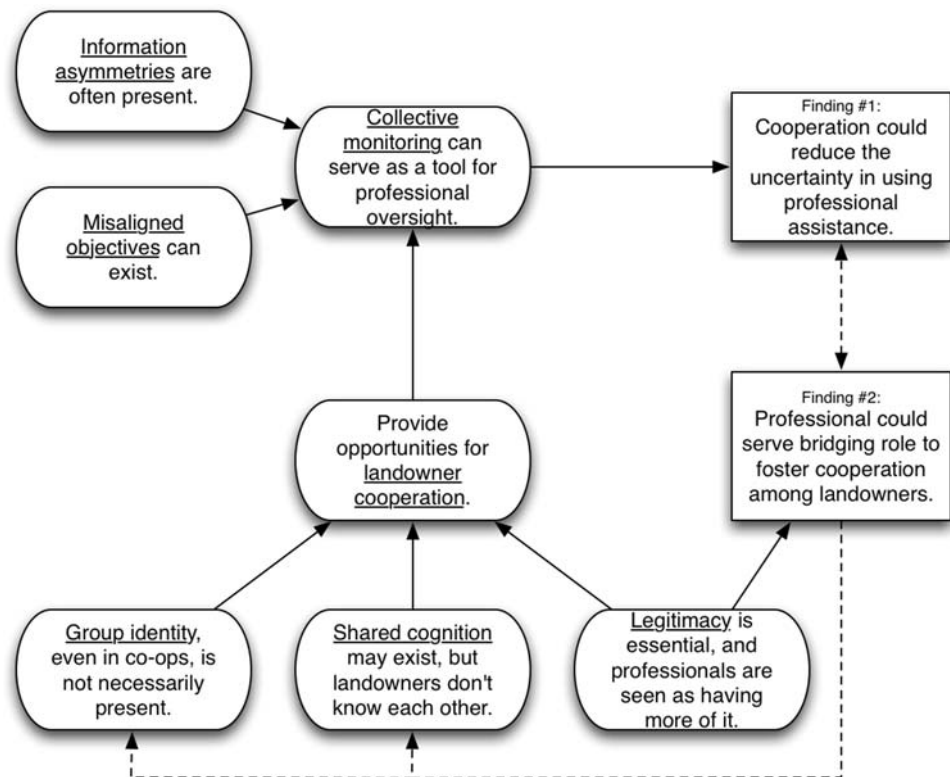
When they do your forest plan, they say, "What do you want for your forest?" ...I wanted a climax forest. "Oh, but you care about wildlife and you care about..." and I got the feeling that if I took my plan and looked at yours, you know what I mean? They're not really saying what do *you* really want? I think it's like they have an agenda and you fit in. (emphasis added to reflect intonation)

These landowners were concerned that public agency goals and directives would override their objectives and intentions.

<sup>1</sup> All focus group participants are referred to using pseudonyms.

<sup>2</sup> High grading is a form of timber harvesting whereby the highest quality and value trees are removed with little or no concern for the future growth of the forest. Many view it as an unsustainable practice.

**Fig. 2** Conceptual diagram of the connections between theory-driven study results (solid lines) and the potential for expanding the adoption of cross-boundary coordination (dashed lines)



### Asymmetric Information

Participants recognized that they benefited from working with a forester: “I think the private consulting foresters provide a service. It’s like hiring a plumber to fix a plumbing problem in your house instead of doing it yourself and spending three days screwing something up totally” (Brian). This sentiment was echoed by Don in his assessment of the forester-led alternative, “It puts the responsibility where it belongs, in the hands of a professional forester who can coordinate the whole thing. The rest of us are just amateurs”. Participants also acknowledged their limitations in overseeing a forester. David noted, “I know nothing about this [log] grading stuff. And [the foresters] always offer us an opportunity to be there when they’re grading.” He explained, “I don’t have a clue,” reflecting his lack of knowledge related to log scaling techniques. When objectives were aligned and even in some cases when they were not, participants saw the inclusion of a forester, with her/his experience and knowledge, as positive and either explicitly or implicitly tied it to their own limitations in this regard.

### Collective Monitoring

Asymmetric information and misaligned objectives were evident in the experiences of our participants, yet most preferred working with a professional forester in

coordinating cross-boundary practices. In discussing the forester-led alternative, participants saw a logical, but innovative extension: the potential for collective monitoring of the forester (Fig. 2, Finding #1). Participants envisioned a forester-led alternative where landowners were involved in some type of process. “The [forester] comes and says, ‘Hey, your neighbors and I are getting [together]’, then let’s all get together in a meeting and talk about it so we’re all hearing the same thing from the same person” (David). As the end of David’s comment indicates, participants saw an opportunity to better monitor the professional’s behavior. Collectively, participants saw landowner communication as a way to reduce the risk of misjudging the credentials, experiences, and promises of the forester with whom they work. Matt explored this idea in greater detail and focused specifically on reducing asymmetric information and enhancing transparency:

I would want to know who the other landowners were, just so that I could check up on the guy [forester] and make sure they’re [landowners] satisfied and that their needs are being met and that he’s not playing one against the other. That cooperative thing, sense of community, is still going to benefit everybody.

Participants saw sharing experiences and knowledge as a potential way to reduce the uncertainty and risk of engaging foresters and loggers. Nearly every participant saw the

potential benefits of discussing alternative management activities and arrangements with other landowners. The strength of this shared experience might reside in the fact that the social interaction is centered on a specific activity in which all the landowners are jointly involved. Through this interaction, we speculate (and commend to future research) that three benefits or a combination thereof emerge. First, risk and uncertainty are distributed. In coordination, an individual landowner isn't "going it alone;" s/he has others with whom to commiserate or celebrate depending on the outcome. Second, landowners share their experiences in the context of a specific cross-boundary practice as opposed to generic forestry discussions. This sharing may reduce information asymmetries between the landowners involved and the resource professional(s) with whom they are working. Third, discussion is likely to foster shared cognition among landowners, and between landowners and the forest manager.

## Cooperation

### *Shared Cognition*

The idea of collective monitoring was intriguing to participants, but they clearly understood that its effectiveness and the potential for cross-boundary coordination in general would depend on the relationships among neighboring landowners. In essence, some level of cooperation among landowners would be necessary and all three antecedents (i.e., shared cognition, group identity, legitimacy) were evident in the participants' discussions. Shared cognition was most evident and all participants realized that coordination among several landowners would be difficult, if not impossible, unless they had common objectives—at least for the specific harvest activity. For example, Sarah stated:

You'd have to start with similarities, what is a common goal for everyone? And then work from there, to see if you could even put this thing together. If there weren't enough similarities, if everybody had totally opposing goals for their property, you might as well forget it.

However, the greater challenge lies in that most participants had no knowledge of their neighbors' goals, but made rather stark assumptions of their neighbors' intentions, which transcended both shared cognition and group identity: "They don't want to do nothing. They strictly want to use it for deer hunting" (Gary). Participants were wary of engaging with neighbors who had different objectives and apparent lifestyles, and saw this as an impasse for cross-boundary coordination in general. And while participants were generally willing to consider such cross-boundary coordination, they saw their current

neighbors, whom they often did not know, as too different and disinterested:

I think the people are too independent and they don't want people on their property. Thirty years ago, we all neighbored. Now people move in all around me. I don't know them. I think they'll look at you like what's he up to and what does he want (Jason).

### *Group Identity*

Group identity received little attention from most participants, who had difficulty in identifying the type of organization that might facilitate coordination. However, cooperative members and at least one non-member articulated group identity as a clear strength of the organizational alternative. Greg, a cooperative member, stated, "You've got people that you can trust, who know something, and, therefore, that's an advantage." Another member added, "And there's a real sense that [the cooperative] is a real local organization and dealing with very local issues rather than a statewide blanket group that you're going to have to try and fit into" (Steve). Kristen, a non-member, noted, "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." Even when participants were not in favor of an organization, they argued their position in terms of group identity and how objectives must be aligned or else an organization could fall into the same agency problems that single professionals do:

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? (Ed)

Ed is concerned that the organization leading coordination will change over time and no longer share his long-term interest.

### *Legitimacy*

Legitimacy was evident in assessments of the two alternatives. For the forester-led alternative, it is most evident in the earlier quote by Don under asymmetric information that using a forester "...put the responsibility where it belongs..." In essence, most participants saw foresters as legitimate leaders of cross-boundary coordination. Legitimacy was tied to their forestry-specific knowledge as several other quotes have indicated (e.g., Brian, Don). However, legitimacy increased as oversight increased.



Participants saw foresters as powerful agents with potentially misaligned objectives and felt that collective oversight might yield benefits.

Participants had different legitimacy concerns about the organization-led alternative. They were uncertain if the leaders and the structure would coalesce to reflect their interests and meet their individual forestland objectives. Ed voiced this concern in some ways echoing the concerns over misaligned objectives with foresters: “I feel like they’d be telling me more than listening to me” (Ed). However, this was less of a concern than the actual capacity of the organization to facilitate cross-boundary coordination. Even a member of one of the local cooperatives questioned an organization’s capacity to deliver: “And I don’t think they’ve quite reached the right recipe yet for coordinating this kind of an activity and how to get it efficiently done...provide the service without making it expensive for the co-op members” (Tim). Inherent for many participants, even those familiar cooperatives, was the substantial investment and risk required to create an organization with a somewhat uncertain idea of what it would do for them. As Sarah noted:

I would join a cooperative, if it had a good track record, had been around awhile. I like the cooperative idea, but it’s always risky. I’ve been involved a couple of times with cooperatives that just couldn’t keep going. And then you lose whatever you have invested.

By transcending both alternatives (i.e., forester-led and organization-led), legitimacy provides a potential pathway to support the cooperation necessary to achieve collective monitoring (Fig. 2, Finding #2). Participants in our study clearly valued the contribution that a forester, and likely most natural resource professionals by extension (e.g., wildlife biologists, water resource specialists, etc.), brings to their management activities, despite the potential challenges in aligning objectives. Given their technical expertise, participants expanded the professional’s role to include enabling cooperation (i.e., fostering group identity and shared cognition). In one sense, foresters, loggers, and other natural resource professionals are well positioned to provide this bridging role given their broad knowledge of local landowners, conditions, and markets. In addition, they may have financial incentives (i.e., more business, higher volume sales, etc.) to approach adjacent landowners. However, this may be a particularly odd role for the professional in that they would be facilitating an increased level of scrutiny of their behavior.

While organizations were not the preferred alternative for our study participants, they may represent a viable alternative in other settings to serve a facilitating role. This has been and could be a potential role for landowner

associations to advance the interest of members (e.g., Kittredge 2005; Rickenbach and others 2005; Blinn and others 2007). One could also imagine situations where a particular interest group (e.g., Trout Unlimited, Ruffed Grouse Society, land trust) might advance organizational goals (e.g., habitat enhancement, land protection) through facilitating cross-boundary activities.

## Conclusions

By presenting different alternatives of cross-boundary coordination, participants were placed in a different social context than past studies of hypothetical cross-boundary coordination. Instead of comparing the status quo (i.e., ownership-centric management) with a collective alternative, our participants were asked to evaluate different cross-boundary alternatives. This yielded an interesting dialogue about the different relationships that shaped the alternatives. In discussing the role of foresters and neighbors, participants explored the basic tenets of principal-agent and cooperation theories. Not surprisingly, these theories applied to the social relationships they seek to explain, but in doing so, illustrate that cross-boundary coordination is inherently more socially complex than traditional forester-logger-landowner models of private forest management.

Two significant findings—particularly as they relate to our second research question—emerged from this study (Fig. 2). First, cross-boundary coordination could reduce the risk and uncertainty associated with hiring a forester or other natural resource professional individually. Second, natural resource professionals could provide a bridging function among unacquainted neighboring landowners (Olsson and others 2007; Hahn and others 2006). However, by combining the results and discussions, we embedded several assumptions that would see cross-boundary coordination as a relatively simple “next step.” Clearly this is not the case and we would be seriously remiss in not exploring these assumptions and other constraints to our findings.

First, cross-boundary cooperation is more complicated than individual property management. Hence, it is potentially more costly and time consuming to all parties involved and may lead to unintended strategic behavior (e.g., holdouts) (Elmendorf 2003). As we noted in the introduction, several studies address the economic incentives (e.g., Klosowski and 2001; Goldman and others 2007)—through either increased revenue or subsidies—that might be associated with cross-boundary coordination. Perhaps because incentives were implied in our description of the hypothetical situation, these were not topics of discussion by our focus group participants. Additional costs need to be set off against potential benefits, but increasing demands for landscape-dependent ecosystem services and

on-going parcelization may shift market and/or other incentives for cross-boundary coordination. As such, cross-boundary coordination is not likely the next “status quo” in land management, but offers a useful approach when and where ecological opportunities present themselves and landowners are willing.

A second important assumption is that resource professionals are interested or even capable of facilitating cooperation among landowners. Interest will likely follow opportunity in that those interested in timber may be attracted when economies of scale are sufficient, while those interested in habitat or other ecological considerations will be drawn to places important to those outcomes. It is unclear whether potential professional actors (e.g., foresters, loggers, wildlife biologists, conservationists, etc.) possess the communication and interpersonal skills necessary to effectively manage a sufficiently transparent process. It is difficult for a landowner to monitor a professional and so perhaps a more fruitful direction would be the development and institutionalization of recommended guidelines for coordinated management. These guidelines could (and are being) based on past experience and on-going experimentation as “best management practices” similar to those for water quality. These could be provided to all involved and include a range of options that inform planning by landowners and resource professionals considering a specific cross-boundary practice. For example, the guidelines might include the benefits and limitations of each landowner signing a separate contract with the logger versus a single overall contract. The guidelines could even recommend when cross-boundary practices might be problematic to one or more parties. So, what elements might be included in cross-boundary guidelines? From this study, we recommend four.

1. Foster communication among landowners to develop shared cognition and to provide oversight.
2. Match landowners’ practices and objectives so all participants clearly benefit. For example, anecdotal evidence suggests that a coordinated harvest that combines widely divergent site characteristics or potential timber values may be inappropriate as it may be quite difficult to insure an outcome that is equitable or perceived as such.
3. If possible, develop relationships through low risk activities. Although not analyzed directly, focus group participants often mentioned that cooperating on invasive species removal or fence repair might serve as an antecedent to more complex coordination. Timber sales often hold sufficient uncertainty and risk for a single landowner without adding more people to the mix.
4. Do not expect on-going commitments. Engaging landowners in specific practices that clearly advance

their interest is entirely different than soliciting long-term commitment to landscape planning and management. Landowners tend to focus on specific practices, and are less interested in fostering organizational development (Rickenbach and Reed 2002). That said, positive experiences in coordinating cross-boundary practices should reap positive sentiments toward neighbors and joint action that facilitate future coordination.

Lastly, this study was not intended to estimate the potential for cross-boundary coordination. We leave that to actual practice and future studies that build on this and other work. However, it does offer both practical and theoretical considerations that should expand the potential for practice and further understanding in two ways. First, it serves to reinforce the notion that some landowners are receptive to new ideas that might drive policy innovations. It ties that receptivity to concerns with the status quo relationship between landowner and natural resource professionals. Second, it connects an alternative to the status quo (i.e., cross-boundary coordination) with broad theories of social interaction (i.e., agency theory and cooperation) that posit specific actions and relationships that can be further tested through both research and practice (Fig. 2).

The application of both agency theory with its emphasis on dyadic (i.e., paired) relationships and cooperation with its emphasis on group relationships places landowners and other actors in a social and interactive landscape that has real and tangible links to ecological landscapes. Both theories considered here (and other theories that consider interpersonal and small-group dynamics) inform localized decisions that provide opportunities to manage both across ownerships toward landscape outcomes and at the individual parcel scale. Indeed, resource managers and policymakers are often concerned about those who do not seek professional assistance in managing their lands. Further understanding the social dynamics related to landowner decision-making might provide meaningful insights into how these lands are managed and who might influence outcomes on those lands. At broader social and landscape scales, these theories are likely less applicable than others that deal with larger group sizes and/or interacting organizations. As a result, applying appropriately scaled social theories to their complementary ecological landscapes could go a long way in formulating new research questions and, eventually, policy interventions that extend far beyond cross-boundary coordination.

**Acknowledgments** Funding has been provided for this research from the USDA Cooperative State Research, Education and Extension Service project WIS04905; USDA Forest Service Northern Research Station Joint Venture Agreement 04-JV-11231300-018; and the Kickapoo Valley Reforestation Fund. We thank Ryan Atwell, Gary Beyer, Carol Nielsen, and Wisconsin DNR foresters for their technical and professional assistance in completing this study. We further

acknowledge the thoughtful insights and comments of Raymond Guries, Tricia Knoot, Jeffrey Steir, and four anonymous reviewers on earlier drafts. All remaining errors and omissions are ours.

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