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Motivations for the forestry industry to participate in collaborative ecosystem management initiatives

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Abstract

The role of industry participation in collaborative ecosystem approaches to management initiatives has received limited attention. We first review the literature describing the role of industry in ecosystem management (EM) collaborations, and present a framework for investigating the motivations for industry participation. In order to better understand the incentives for forest industry companies to participate in EM projects, we also conducted a survey of the 38 largest U.S. forestry companies. These companies collectively own or control over 50 million acres of land. Our survey results indicate that companies' efforts to more effectively manage their resources, a desire for positive public relations that may result from EM collaborations, and the building of partnerships with other stakeholders are the most significant motivating factors. Personal satisfaction on the part of involved individuals and a perception that EM is an attractive alternative to litigation are also important incentives. Moreover, companies with larger resource management staffs are more likely to participate in EM collaborations, whereas the size of land holdings appears to be inversely related with the likelihood of participation.

Keywords: Ecosystem management; Sustainable forestry practices; Timber and paper industries; Stakeholder participation; Public–private partnerships

1. Introduction

In the United States, environmental managers and planners are abandoning the traditional species by species approach to regulation and instead are embracing the emerging paradigm of ecosystem management. Ecosystem management represents a departure from traditional management approaches by addressing the interaction between biotic and abiotic components within a land or seascape, while at the same time incorporating human concerns through stakeholder collaboration (Szaro et al., 1998). Because ecosystem management is by definition a transboundary, interdisciplinary, multi-party issue, the participation of key parties becomes an

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important component of a successful outcome (Grumbine, 1994; Westley, 1995; Yaffee et al., 1996; Duane, 1997).

In recent years, resource-based industries (e.g., forestry, agricultural operations, etc.) have been identified as key stakeholders in effective ecosystem planning initiatives, since they not only have a large impact on critical natural resources, but also because much of the critical habitat in the United States is located on privately held land (O'Connell, 1996; Hoffman et al., 1997). While the impacts of industry participation on the quality of local ecosystem-oriented plans have been examined (Brody, 2003), an understanding of what motivates large resource-intensive corporations to engage in ecosystem management and the perceived benefits to these organizations has never been clearly articulated.

This study seeks to improve our understanding of why resource-based industry chooses to engage in collaborative ecosystem management initiative and how this business sector can be more effectively incorporated into the process of ecosystem planning in the future. Based on a telephone survey of the largest U.S. forestry companies, as measured by landholdings, we examine why certain companies are more receptive to collaborative ecosystem approaches to management than others and identify some of the major factors driving resource-based industry to participate in ecosystem planning efforts. Results enable us to make conclusions about the motivations for or perceived benefits and costs of industry participation in ecosystem management planning projects. Given the importance of industry actors in managing ecological systems, a thorough examination of their role, interests, and impacts makes a significant contribution to understanding how ecosystem management projects can be more effective in the future.

The following section examines the importance of stakeholder participation and collaboration throughout the ecosystem planning process. The role of industry in collaborative ecosystem management and the motivations for industry to participate in ecosystem management projects is also discussed. Next, sample selection, variable measurement, and data analysis procedures are described. Results based on zero-order correlation and probit analyses identify the motivations for industry participation in ecosystem management and quantitatively analyze the effects of these motivators on actual participation. Based on the results, we make recommendations for more effectively incorporating large landholding resource-based industries into the management of transboundary ecological systems.

2. Stakeholder involvement in ecosystem management

The involvement of multiple interests, including industry, is often considered a key element to successful ecosystem management and planning. Participation of stakeholders from the beginning of a project increases trust, understanding, and support for ecosystem-based protection (Yaffee and Wondolleck, 1997). Furthermore, including key parties in the decision-making process helps to build a sense of ownership over a proposal and ensures that all interests are reflected in the final management plan (Innes, 1996; Daniels and Walker, 2001). Organizations and individuals often bring to the process valuable knowledge and innovative ideas about their community that can increase the quality of adopted plans (Moore, 1995; Beierle and Konisky, 2001). Innes (1996) examined the role of consensus building through case studies of environmental problems involving multiple issues that cut across jurisdictional boundaries. All the cases involved shared power across agencies and levels of government, and between private and public sectors. Innes found that collaboration not only increased trust, communication and the development of public–private networks, but also resulted in stronger outcomes or plans that were beneficial to the resource or to the natural system as a whole. In a comprehensive survey of ecosystem management in the United States, Yaffee et al. (1996) found that participation and collaboration of key stakeholders was the single most important factor (cited by 61% of respondents) that enabled projects to reach a quality outcome. Specifically, collaboration within and among public agencies and businesses was an important mechanism for increasing cooperation and communication, fostering trust, and allowing for a more effective outcome that met a greater set of interests.

2.1. Role of industry in ecosystem management

Most of the literature on stakeholder participation in planning and ecosystem management is written primarily from a public sector perspective where the influence of government or nongovernment organizations is examined. The participation of industry does not receive a great deal of attention in arguments for collaborative ecosystem management, despite the fact that industry has a significant impact on our natural resource base and that much of the critical habitat in the U.S. is located on industry-owned lands (Wondolleck and Yaffee, 2000). Industry land holdings (a subset of privately held lands in the U.S.) include many important elements of ecosystem diversity, particularly in the eastern part of the country, and comprise approximately two-thirds of the land base of the continental U.S. For example, 57% of forests in the U.S. are privately owned. In regions such as the southeast, private ownership comprises up to 90% of the land base. Furthermore, 90% of the more than 1200 listed endangered and threatened species occur on nonfederal lands and more than 5%, including nearly 200 animal species, have at least 81% of their habitat on nonfederal lands (Wondolleck and Yaffee, 2000). As a result, government should encourage industry participation in order to adequately protect biodiversity (O'Connell, 1996; Vogt et al., 1997).

Consistent with these findings, Cortner and Moote (1994) argue that a fundamental requirement for effective ecosystem management is the coordination of public and private interests. Hoffman et al. (1997) suggest that because much of the critical habitat in the U.S. lies on business-owned land, the inclusion of this key stakeholder in the decision-making process is necessary to achieve successful management of ecological systems. They further assert that involving business-related stakeholders is the best way to foster joint gains in environmental protection and economic growth over the long term.

These arguments are supported by data from Beyer et al. (1997), who found that the informal participation of industrial forest stakeholders was one of the keys to the present and future success of the Eastern Upper Peninsula (EUP) of Michigan Ecosystem Management Project. A partnership composed of eight public and private landholders collectively manage 2.6 million acres of land in the EUP. Despite varying resource management goals and activities, group members have formed a collaborative venture to facilitate the sustainable management of the EUP ecosystem over the long term. Most recently, Brody (2003) tested the impact of resource-based industry on the quality of local plans associated with managing ecological systems over the long term in Florida. Results from this study show that the presence of industry during the planning process significantly raises the quality of adopted plans associated with managing ecological systems.

2.2. Industry motivations to participate in ecosystem management projects

While past research documents the benefits of industry participation in ecosystem management, little research has been done to articulate the perceived benefits or costs of engaging in such efforts from an industry perspective. The concept that corporations should look beyond their organizational and property lines when conducting business goes back to Freeman (1984) who introduced the "stakeholder approach." This approach involves not just one, but multiple stakeholders to solve complex problems. Freeman's thesis is that an organization or corporation must consider the interests of nongovernment organizations (NGOs), government, and community groups in its planning. It calls for a problem-solving approach that includes the input of many groups. Jennings and Zandbergen (1995) build on Freeman's theory when examining the role of firms with respect to ecological sustainability. They offer an alternative to the traditional view focusing on the single organization by proposing that a system or network of multiple organizations is the only way to facilitate sustainability over the long term. A network approach is required because managing natural systems requires addressing problems and places that extend beyond the domain of a single institution. Thus, "individual organizations do not contribute to sustainability as much as regional networks or organizations or industries that target ecosystems" (p. 1023).

Researchers in the field of strategy and management have also begun to indicate reasons for corporate involvement in environmental activities (Arora and

Carson, 1996; King and Lenox, 2000; Welch et al., 2000). Sharma and Vredenburg (1998), for example, argue that proactive corporate environmental strategy can lead to firm competitiveness. Financial profitability has also been linked to ecologically sustainable practices (Porter and van der Linde, 1995; Klassen and McLaughlin, 1996; Judge and Zandbergen, 1998;). Hartman and Stafford (1997) take this concept one step farther by arguing for "market-based environmentalism" where industry and business integrate environmental activities with market-driven goals. For example, eco-labeling is one technique that may lead to improved financial performance (Amacher et al., 2004).

Darnall (2002) identifies both external and internal drivers for participation in voluntary environmental initiatives (VEI). External pressures comprise all factors outside an organization that influence its routines and competencies and include regulations (Hart, 1995; Henriques and Sadorsky, 1996; Hoffman, 2000), market pressures such as costumer preferences (Arora and Gangopadhyay, 1995; Hoffman, 2000), improving stakeholder relations (Khanna and Anton, 2002), and the media (Fineman and Clarke, 1996; Rajan, 2001). Internal VEI participation drivers refer to the specific capabilities of an organization to sustainable manage natural resources (Sharma and Vredenburg, 1998). These capabilities include both human capital characteristics such as managerial attitudes and individual environmental champions (Sharma et al., 1999; Cordano and Frieze, 2000; Anderson and Bateman, 2000) as well as basic proficiency in environmental management practices (Hart, 1995; Christmann, 2000). Darnall found that external regulatory pressures were the primary motivator for organizations to adopt an environmental management system (EMS). Finally, the concept of leadership associated with sustainability has emerged out of recent discussions on the "greening of industry" (Hartman et al., 1999). By steering U.S. industries down the path of environmental sustainability, firms can gain a competitive edge on markets that may emerge in the future as natural resources become scarcer.

While literature exists on the growing importance of corporations looking beyond their boundaries and engage in environmental activities, nothing to date has been published on a clear rationale for resource-intensive industries to pursue ecosystem management when it is not part of their core business. Ecosystem management involves a unique set of issues and problems related to sustainability that needs to be addressed more thoroughly in the scholarly literature. We build on the research related to environmental strategy and management to identify a series of motivators (both external and internal) that will help explain the reasons for industry participation in collaborative ecosystem management initiatives. Based on the literature review above, we suggest the following 10 motivating dimensions for participation: (1) effective resource management; (2) direct financial gain; (3) good public relations; (4) good partnerships with stakeholders; (5) acquisition of data; (6) technical assistance; (7) employee satisfaction; (8) reduction of media criticism; (9) an attractive alternative to litigation; and (10) an attractive alternative to command-and-control regulations (Brody and Cash, 2004). These motivating characteristics serve as a conceptual framework to quantitatively assess what is driving major forestry landholders to engage in collaborative, transboundary ecosystem management initiatives.

3. Research methods

3.1. Sample selection

To analyze the effect of the 10 motivating factors listed above, we surveyed large forestry companies and obtained responses related to each factor. A sampling frame was generated based on a Bank of America listing of the 50 largest forestry and timber corporations in North America based on land ownership (Slaybaugh and Gates, 2003). The size of land ownership ranged from 6000 to 10.4 million acres and included both forestry product companies and Timber Investment Management Organizations (TIMOs). From this list, we were able to contact and interview 38 companies corresponding to a response rate of 76%. These companies directly engaged in forestry and timber resources activities represent approximately 60 million acres of ownership, or over 12% of all commercial forestland in the United States (Holt and Warren, 1998). We focused on the largest landholders because large forestry operations may own significant portions of ecological systems and there-

fore have the ability to impact critical natural resources at the landscape level. Understanding their motivations to participate in collaborative ecosystem management initiatives is thus essential to protecting biodiversity and improving the effectiveness of management outcomes.

3.2. Data collection

We conducted in-depth telephone interviews with each participating company in the sample, lasting an average of approximately 1 hour each. The identification of the interviewee for each company was based on several steps to maintain consistency and eventual comparability among answers. First, we examined each company's website to collect basic ecosystem management and contact information. Second, we sent an inquiry email to each company providing them an overview of the study and asking for specific contact information within the timberland management department. Third, email inquiries were followed by phone calls to confirm or further narrow down an appropriate corporate representative to administer the survey. Once the interviewee was identified and willing to participate in the study, the survey instrument was sent to the respondent before the telephone interview was conducted (see Appendix A). This method helped us obtain more accurate, detailed, and thoughtful responses to our questions.

Because the composition and structure of each company is slightly different, we interviewed several types of corporate positions, although all shared certain relevant responsibilities. The majority of these positions included managers, vice presidents, or directors of forestry or environmental operations. We avoided interviewing marketing or public affairs officials within each company and instead focused on individuals with direct expertise in daily operations.

3.3. Concept measurement

Key concepts were measured through the survey instrument, which included a mix of exploratory and directed questions requiring a quantitative answer. Whether or not a company has been involved in collaborative ecosystem management projects over the last 5 years was measured as a dichotomous ("yes" or "no") variable. We used Likert-type scales to measure a company's motivation for engaging in ecosystem management projects for each of the 10 dimensions listed above where 1 indicates strongly disagree and 7 indicates strongly agree. Open-ended questions were also included in the survey regarding specific ecosystem management activities to allow us to obtain more in-depth contextual data regarding each company's particular management practices. For example, we asked questions about organizations owning land adjacent to the respondent's company, the specific nature of resource management initiatives, and why a particular company may have chosen not to participate in collaborative ecosystem management activities (Appendix A).

3.4. Data analysis

Analysis of the survey data focused primarily on quantitative explanatory techniques following two major phases of analysis. First, we conducted Spearman rank correlation coefficients (due to the ordinal nature of the variables) for respondent's motivation to participate and whether or not companies actually engaged in collaborative ecosystem management initiatives. Through this procedure, we identified the most important motivations relating to participation in ecosystem management.

Second, we analyzed a probit model using the most statistically significant ($p<0.01$) participation motivators along with several contextual control variables to gain addition insight into the factors driving large forestry companies to participate in collaborative ecosystem management projects (since the dependent variable is dichotomous, ordinary least squares estimators would not be an appropriate approach to analysis). Although the use of Likert-type scale variables as control variables in a probit analysis is not ideal due to the possible ordinal, rather than cardinal, interpretation of the scale, the relatively small sample size makes more appropriate analytical techniques infeasible here. Furthermore, a comparison of all pairwise Spearman's rank correlation coefficients to the parametric Pearson's correlation measures (not shown) lends support to the necessary assumption that respondents were treating the scale as interval in nature, as there were no notable differences between the two measures for any of the variable pairs. Due to the presence of

heteroskedasticity in our model, we used robust standard errors to analyze significance in our probit model results.

4. Results

4.1. Overview

The sample consisted of large forestry and timber corporations with significant landholdings. These companies own or control an average of approximately 1.4 million acres (much of it in large blocks) and have an average of 251 employees engaged in resource management activities. Ninety-two percent of the sample perceives that their management of natural resources plays an important role in the ecological well being of the region. The majority of respondents cite the implementation of both internal and third party (e.g., Sustainable Forestry Initiative) environmental or resource stewardship programs to ensure sustainable and environmentally responsible forestry practices. Seventy-one percent of the companies surveyed discussed the importance of internal initiatives within their company, with membership in the Sustainable Forestry Initiative (SFI) ranking as the most popular certification system. Internal initiatives consisted of company stewardship programs, sustainable forestry principles and guidelines, and overall environmental management systems. In addition to participation in certification systems such as SFI, many companies were also involved in other sustainable forestry certification systems such as the Forest Stewardship Council (FSC), International Standards Organization (ISO 14001), and the Canadian Standards Association (CSA). In total, 87% of the companies surveyed are participating in some type of forestry certification system and 13 of these companies were certified in more than one certification system due to owning land in multiple locations.

Because these companies play such an important role in resource management in their ecological region, they are extremely aware of adjacent property owners and their activities. Each company in the sample is part of a fragmented pattern of land ownership that includes government, NGOs, other timber companies, and individuals. Over half of respondents reported that adjacent lands are held by government organizations and approximately 37% have individual private landowners as neighbors.

Of the companies surveyed, 74% chose to participate in collaborative ecosystem management initiatives over the last 5 years. This result indicates an overall commitment to the principles and value of ecosystem approaches to management, at least on the part of the largest timber companies in North America. However, 52% of the sample said they also decided not to participate in at least one ecosystem management project. These firms cited a variety of reasons, including unclear objectives of the project, projects not meeting company management philosophies, excessive time commitment associated with involvement, and the types of players involved in the project. When companies chose to participate in an ecosystem management initiative, it was usually in a formal planning or decision-making process (72% of the sample), resulting in an adopted plan or some similar agreement (78% of the sample).

For the majority of the sample, participation in collaborative ecosystem management resulted in important benefits for the company, including such factors as relationship building with other stakeholders, better management practices, regulatory predictability and stability, and economic incentives. Perceived benefits also accrued to other stakeholders and to the health of the natural resource itself. While 96% of participants indicated they incurred costs, only 19% believed these costs outweighed the long-term benefits of involvement in collaborative initiatives. Additionally, all participating companies responded they would participate in another ecosystem management project in the future. Of all the respondents in the sample, whether they participated in ecosystem management or not, 89% believe it is a useful process for industry–government relations because of reciprocal relationships and trust developed through collaboration and decreased regulations resulting from stakeholders working together on common resource management problems.

4.2. Correlation analysis

Correlation analysis (Table 1) helped us form a better understanding of the motivations for the

Table 1
Background on companies and contextual information

Average number of employees engaged in resource management activities	250.97
Company believes landholdings possess characteristics that distinguish it from other firms	34%
Company management plays an important role in the region	92%
There has been publicity regarding the company's role in resource stewardship in the last 5 years	92%
Publicity overwhelmingly positive or negative	8% no publicity 16% about equal positive and negative publicity 58% mainly positive 18% mainly negative
Company involvement in controversial resource management issues	63%
Company participation in an official certification system	87%
The company benefited by participating	87%
The project was successful	87%
The company incurred costs by participating	96%
Company believed costs outweigh the benefits of participating	19%
Company believed other participants benefited by company's participation	95%
Company believed initial goals and objectives were met by collaborating parties	88%
Company believed any agreement reached by collaborating parties has been or will be implemented	98%
Company believed the health of natural resource/ecosystem has improved as a result of the initiative	81%
Company would participate in a collaborative ecosystem management project again or in the future	100%

forestry industry in North America to participate in collaborative ecosystem management projects over the last 5 years. Of the 10 motivating dimensions analyzed, three are statistically significant at the 5% level of significance. More effective resource management was the motivating factor most strongly correlated with the decision to participate in collaborative ecosystem management initiatives. This result demonstrates recognition that the critical natural resources upon which these companies' core business rests are regional in nature and may require collective efforts to maintain economic value well into the future. The decision to participate seems based in a desire to collaborate with other parties to manage resources more effectively and build a solid base of natural capital.

Positive public relations is also a statistically significant motivation for participating in ecosystem management projects. Over 90% of the sample has received publicity regarding their role in resource stewardship over the last 5 years, most notably on sustainable forest management practices and the management of wildlife. Sixty-three percent reported they have been involved in controversial resource management issues in the recent past. Engaging in high profile, environmentally sustainable practices often results in favorable media attention and broad level public support. Positive press can reduce public opposition to commercial harvesting operations, increase a customer base, and make it easier to conduct core business practices (Rajan, 2001).

Finally, establishing good partnerships with stakeholders is another significant motivator at the 5% level. As mentioned above, firms are increasingly recognizing that they lie within a broader network of interests and interaction with these outside interests is essential to effective management (Hoffman, 2000). Developing relationships based on trust and reciprocity with neighboring landholders can help a company attain its resource management and financial goals. There are strong links between the levels of trust individuals have in others, the investment others make in trustworthy reputations, and the probability participants will use reciprocity norms (Ostrom, 1998). In sum, by forming relationships with other interests, there is a good chance that those interests will collaborate with each other to reach common goals down the line. Reciprocity is particularly important for corporate landholders whose neighbors are controlling and impacting what can often be considered the same natural system (Table 2).

Other statistically notable motivators for participating in collaborative ecosystem initiatives (where $p \leq 0.1$) are personal satisfaction and because this resource management approach may serve as an attractive alternative to litigation. Several respondents

Table 2
Correlations between motivating factors and forest industry participation in collaborative ecosystem management

Variable name	Spearman rank correlation coefficient	*P*-value
Good partnerships	0.434	0.00
Public relations	0.411	0.01
Effective resource management	0.401	0.01
Personal satisfaction	0.272337	0.094
Alternative to litigation	0.256	0.10
Alternative to command and control regulation	0.202	0.22
Technical assistance	0.182	0.27
Reduce media pressure	0.130	0.44
Financial gain	0.117	0.45
Data	0.111	0.50

commented that ecosystem management "is the right thing to do" and instills employees with a great deal of personal satisfaction. Collaboration and consensus building is becoming a more desirable approach to dealing with stakeholder conflict than pursuing traditional legal avenues. Conflict management techniques can be less expensive, less time consuming, and yield outcomes that maximize all parties' interests (Bacow and Wheeler, 1984; Crowfoot and Wondolleck, 1990; Wondolleck and Yaffee, 2000).

4.3. Probit analysis

We utilized a probit model to gain further insights on the decision of forestry corporations to participate in collaborative ecosystem management initiatives. The probit model estimated here describes firms' decisions to participate in at least one EM project as a function of the motivating factors investigated in the survey. We included the three most significant motivation variables described above along with the following contextual control variables: the number of employees engaged in resource management activities, the number of acres owned or controlled by each corporation, and whether or not a corporation thinks ecosystem management is a useful process regardless of their experiences (yes or no). Even when controlling for other variables in the model, effective resource management remains the most significant predictor of participation in ecosystem management initiatives. Not surprisingly, the number of employees devoted to resource management also has a statistically significant impact on participation. Companies with a large staff of resource managers may be more receptive to the concept of ecosystem health and their property's ecological connection to a large natural system. Another explanation may be that larger firms are probably just better able to cope with collaborative initiatives or may be more concerned with activities that will result in positive public relations. Finally, companies with larger land holdings may be less likely to participate in collaborative ecosystem management projects (although the coefficient on acreage is small, it is measuring the impact of a small unit of measurement. A small effect per acre of land can add up to a meaningful difference when summed up over thousands of acres). This may be because large landholding companies own and control more of an ecological system and therefore feel less of a need to collaborate with neighbors to achieve resource management goals. Furthermore, these companies may own less fragmented blocks of acreage with a correspondingly lower number of adjacent landholders, thereby reducing the opportunity to engage in collaborative efforts (Table 3).

Table 3
Factors explaining forest industry participation in collaborative ecosystem management initiatives

Variable	Coefficient	Robust standard error	*z*-Value	Significance
Effective resource management	0.368	0.177	2.07	0.038
Public relations	0.579	0.461	1.26	0.209
Good partnerships	−0.060	0.296	−0.20	0.838
Employees engaged in resource management	0.022	0.011	2.01	0.045
Ecosystem management considered a useful process	0.728	1.345	0.54	0.589
Acreage of ownership	−0.001	0.000	−1.86	0.063
Constant	−5.208	3.091	−1.68	0.092
Number of observations	38			
Wald $\chi^2(6)$	10.81			
Prob $>\chi^2$	0.0945			
Log likelihood	−12.001			
Pseudo R^2	0.4520			

5. Discussion

Given the evidence supporting resource-based industry as a key participant in generating effective ecosystem management outcomes, the involvement of firms in collaborative initiatives may be vital to protecting the long-term health and economic viability of forestlands. The results of this study provide guidance on how best to engage the forest industry in these planning and management processes.

First, it is apparent that there is no one single factor motivating the forest industry to participate in collaborative ecosystem management. Engaging industry thus should rely on a multi-strategic approach using various avenues of influence as opposed to focusing on one aspect of corporate receptiveness. A combination of external pressure and internal capacity building may be the most effective policy for encouraging industry participation.

Second, results indicate a strong perceived linkage between collaborative ecosystem management and effective resource management within corporate land holdings. This linkage needs to be more thoroughly studied and articulated among industry players. If it is confirmed that collaborative ecosystem management may enable a company to more effectively obtain its resource management goals, thus resulting in increased financial performance and corporate competitiveness, then the forestry industry as a whole may be more willing to participate.

Third, positive public relations and strong relationships with outside stakeholders appear to be an important motivation for companies in the sample to participate in ecosystem management. Companies are increasingly more receptive to media coverage and the expectations of their stakeholders (Fineman and Clarke, 1996; Rajan, 2001). Pressure exerted through these outside channels may be a viable policy option for influencing corporate decisions. Finally, collaborative ecosystem management seems to be most relevant for companies owning acreage within a more fragmented pattern of land ownership. As mentioned above, a greater number of landholders can translate into a more fragmented ecosystem containing more neighbors. The need and desire for collaboration is increased in these cases. Given this result, strategies to engage the forestry industry should focus in regions where land ownership and land use patterns are more diverse, such as in southeastern United States.

6. Conclusion

This study identifies some of the most important factors motivating the forestry and timber industry to participate in collaborative ecosystem management initiatives. Results can provide guidance to planners, managers, and corporate executives interested in engaging industry in collaborative resource management efforts. The participation of industry can lead to a stronger ecosystem management outcome as well as assist corporations in attaining their resource management goals. While this study increases our understanding of what motivates resource-based industries to participate in ecosystem management projects, it should be considered only a starting point for more extensive research on the topic. Future research should involve larger samples to increase statistical power and validity of results. In addition, a range of industries (i.e., agriculture, mining, marine, etc.) should be examined to offer a comparative and more robust aspect to the analyses. Finally, case studies examining specific companies could yield detailed contextual information and further insight not captured through survey methods.

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Appendix A. Industry and Ecosystem Management Survey

A.1. Company background and resource management

1. How many employees are engaged in resource management activities?

2. What are the major natural resources on your property? Do your landholdings have any characte-

ristics that distinguish it from landholdings of other firms (for example, certain species, slopes, climates, etc.)?

3. Does your management of these resources have an important role in your region?

4. Has there been publicity or public discussion regarding your role in resource stewardship in the last 5 years? If so, what has the publicity been on? Has this publicity been overwhelmingly positive or negative? Can you identify the source the of this media coverage?

5. What type of organizations own land adjacent to your property? Business, individual, government, NGO, other?

6. What environmental or resource stewardship initiatives exist at your company?

7. Has your company been involved in any particularly controversial resource management issues? If so, what efforts has your company been making to resolve them?

A.2. Participation in ecosystem management and collaborative decision-making

I would like to ask you a few questions about collaborative ecosystem management. By this term, I mean a resource management approach that: (1) adheres to ecological boundaries (such as, watersheds, ecological communities, and ecoregions) as opposed to human defined boundaries; (2) simultaneously focuses on the interaction of multiple abiotic and biotic factors; and (3) involves collaboration among multiple land holders, organizations, agencies, and other interested parties.

8. Are you familiar with what we mean by collaborative ecosystem management planning?

9. Has your company been involved in collaborative ecosystem management projects/initiatives in the past 10 years?

10. Has your company been involved in collaborative ecosystem management projects/initiatives in the past 5 years? What project(s)?

Please answer the following questions, by referring to the project(s) you just identified in the last question:

- What was your firm's role (initiator, collaborator, respondent, observer, etc.)?
- Did your involvement in ecosystem management entail collaboration with other landholders, or was it solely within your property's boundaries?
- What were the primary motivating factors that caused you to participate in an ecosystem project/initiative?

11. In the past 10 years, has your organization decided not to participate in a collaborative ecosystem management program that it had the opportunity to participate in?

- If yes, what project(s)?
  - Why did the company choose not to participate?
- If no, has the company ever declined an opportunity to participate in a collaborative ecosystem management program?
  - Why?

I want to read you a series of statements regarding what might be motivating factors that motivate your firm to participate in collaborative ecosystem management projects or initiatives. Please tell me the extent to which you agree or disagree with each statement by using the following scale where 1=strongly disagree; 2=disagree; 3=somewhat disagree; 4=neither agree nor disagree; 5=somewhat agree; 6=agree; and 7=strongly agree:

- Participation allows us to more effectively manage our resources
- Participation provides us with a financial gain
- Participation is good public relations
- Participation helps us establish good partnership with our stakeholders (Who are your stakeholders?)
- Participation provides us with data we might otherwise not collect
- Participation provides us with technical assistance we might otherwise not develop
- Participation provides employees with a great deal of personal satisfaction
- Participation tends to reduce media pressure
- Participation is a more attractive alternative to litigation
- Participation is a more attractive alternative to command-and-control regulations

○ Finally, do you think there are other motivations for participating that companies find important that I have not mentioned?
■ If so, what are those motivations?

A.3. Results of ecosystem management participation

12. Was the ecosystem management project part of a formal planning process or more informal in nature?

13. Did your participation in an ecosystem management project result in an adopted plan, memorandum, or some other agreement? Please explain.

14. Do you believe that your company benefited by participating? If so, why?

15. Do you believe that the project was successful?

16. Do you believe that your company incurred costs by participating? Did those costs outweigh the benefits of participating? Why?

17. Do you believe that other participants benefited by your company's participation?

18. Do you think initial goals and objectives were met by collaborating parties?

19. Do you believe that any agreement reached by collaborating parties has been or will be implemented?

20. Do you think the health of natural resource/ecosystem has improved as a result of the initiative?

21. Would you participate in a collaborative ecosystem management project again or in the future? Why or why not?

A.4. Conclusions and opinions

22. Regardless of your company's experiences with ecosystem management, do you think that it is a useful process for industry–government relations? Why or why not?

23. What do you see as the critical resource management issues for your company over the next 25 years? Are these different than for the industry as a whole?

24. Have you been certified by or participated in a third party sustainable forestry certification process (for example, the Sustainable Forestry Initiative)? If so, which one(s)?

25. Are there other people within your firm or other companies you think would be helpful to talk with?

26. What do you see as the role of academia in resource management disputes?

27. Do you have anything else you would like to add?

References

Amacher, G., Koskela, E., Ollikainnen, M., 2004. Environmental quality competition and eco-labeling. Journal of Environmental Economics and Management 42, 284–306.

Anderson, L.M., Bateman, T.S., 2000. Individual environmental initiative: championing natural environmental issues in U.S. business organizations. Academy of Management Journal 45, 548–570.

Arora, S., Carson, T., 1996. Why do firms volunteer to exceed environmental regulations? Understanding participation in EPA's 33/50 program. Land Economics 72 (4), 413–432.

Arora, S., Gangopadhyay, S., 1995. Toward a theoretical model of voluntary overcompliance. Journal of Economic Behavior and Organization 28 (3), 289–309.

Bacow, L., Wheeler, M., 1984. Environmental Dispute Resolution. Plenum, New York.

Beierle, T.C., Konisky, D., 2001. What are we gaining from stakeholder involvement? Observation from environmental planning in the Great Lakes. Journal of Environmental Planning C: Government and Policy 19, 515–527.

Beyer Jr., D., Hofman, L., Ewert, D., 1997. Ecosystem management in the eastern upper peninsula of Michigan: a case history. Landscape and Urban Planning 38, 199–211.

Brody, S.D., 2003. Evaluating the role of resource-based industries in ecosystem approaches to management. Journal of Society and Natural Resources 16 (7), 625–641.

Brody, S.D., Cash, S.B., 2004. Why resource-based industries should participate in collaborative ecosystem approaches to management: a conceptual framework. Hazard Reduction and Recovery Center Technical Report No. 04-01R. Texas A&M University: College Station, TX.

Christmann, P., 2000. Effects of 'Best Practices' of environmental management on cost advantage: the role of complimentary assets. Academy of Management Journal 43, 663–680.

Cordano, M., Frieze, I.H., 2000. Pollution reduction preferences of U.S. Environmental Managers: applying Ajzen's theory of planned behavior. Academy of Management Journal 43 (4), 627–641.

Cortner, H., Moote, M., 1994. Trends and issues in land and water resources management: setting the agenda for change. Environmental Management 18 (2), 167–173.

Crowfoot, J., Wondolleck, J., 1990. Environmental Disputes: Community Involvement in Conflict Resolution. Island Press, Washington, DC.

Daniels, S.E., Walker, G., 2001. Working Through Environmental Conflict: The Collaborative Learning Approach. Praeger, Westport, CT.

Darnall, N., 2002. Motivations for participating in a U.S. Voluntary Environmental Initiative: the Multi-State Working Group and EPA's EMS Pilot Program. In: Sharma, Sanjay, Starik, Mark (Eds.), Research in Corporate Sustainability: The Evolving

Theory and Practice of Organizations in the Natural Environment. Edward Elgar, Northampton, MA.
Duane, T., 1997. Community participation in ecosystem management. Ecology Law Quarterly 24 (4), 771–797.
Fineman, S., Clarke, K., 1996. Green stakeholders: industry interpretations and response. Journal of Management Studies 33 (6), 71–82.
Freeman, E., 1984. Strategic Management: A Stakeholder Approach. Pitman, Boston, MA.
Grumbine, E., 1994. What is ecosystem management? Conservation Biology 8 (1), 27–38.
Hart, S.L., 1995. A natural resource-based view of the firm. Academy of Management Review 20, 874–907.
Hartman, C., Stafford, E., 1997. Green alliances: building new business with environmental groups. Long Range Planning 30 (2), 184–196.
Hartman, C, Hofman, P., Stafford, E., 1999. Partnerships: a path to sustainability. Business Strategy and the Environment 8, 255–266.
Henriques, I., Sadorsky, P., 1996. The determinants of an environmental responsible firm: an empirical approach. Journal of Environmental Economics and Management 30, 381–395.
Hoffman, A., 2000. Competitive Environmental Strategy: A Guide to the Changing Business Landscape. Island Press, Washington, DC.
Hoffman, A., Bazerman, M., Yaffee, S., 1997. Balancing business interests and endangered species protection. Sloan Management Review, 59–73.
Holt, B., Warren, S., 1998. Integrated Planning Across Ownerships. Forest Management into the Next Century: What Will Make It Work? Forest Products Society, Madison, WI.
Innes, J., 1996. Planning through consensus building: a new view of the comprehensive planning ideal. Journal of American Planning Association 62, 460.
Jennings, P.D., Zandbergen, P., 1995. Ecologically sustainable organizations: an institutional approach. Academy of Management Review 20 (4), 1015–1052.
Judge, W.Q., Zandbergen, P.A., 1998. Performance implications of incorporating natural environmental issues into the strategic planning process: an empirical assessment. Journal of Management Studies 35 (2), 241–262.
Khanna, M., Anton, W.R., 2002. What is driving corporate environmentalism: opportunity or threat? Corporate Environmental Strategy 9 (4), 409–417.
King, A., Lenox, M., 2000. Industry self-regulation without sanctions: the chemical industry's responsible care program. Academy of Management Journal 43 (4), 698–716.
Klassen, R.D., McLaughlin, C.P., 1996. The impact of environmental management on firm performance. Management Science 42 (8), 1199–1214.
Moore, N.C., 1995. Participation Tools for Better Land-Use Planning: Techniques and Case Studies. Local Government Commission, Sacramento, CA.
O'Connell, M., 1996. Managing biodiversity on private lands. In: Szaro, R., Johnston, D. (Eds.), Biodiversity In Managed Landscapes: Theory and Practice. Oxford Univ. Press, Oxford, pp. 665–678.
Ostrom, E., 1998. A behavioral approach to the rational choice theory of collective action: presidential address, American Political Science Association, 1997. American Political Science Review 92 (1), 1–22.
Porter, M.E., van der Linde, C., 1995. Green and competitive. Harvard Business Review 120–134, 196. (September–October).
Rajan, R., 2001. What disasters tell us about environmental violence: the case of Bhopal. In: Watts, M., Peluso, N. (Eds.), Violent Environment. Cornell Univ. Press, Ithaca, NY, pp. 380–398.
Sharma, S., Vredenburg, H., 1998. Proactive corporate environmental strategy and the development of competitively valuable organizational capabilities. Strategic Management Journal 19, 729–753.
Sharma, S., Pablo, A., Vredenburg, H., 1999. Corporate environmental responsiveness strategies: the role of issue interpretation and organizational context. Journal of Applied Behavioral Science 35 (1), 87–109.
Slaybaugh, C., Gates, E., 2003. Wood and Building Products Quarterly. Bank of America Industry Research, Jackson, MS.
Szaro, R., Sexton, W., Malone, C., 1998. The emergence of ecosystem management as a tool for meeting people's needs and sustaining ecosystems. Landscape and Urban Planning 40, 1–7.
Vogt, J., Gordon, C., Wargo, J., Vogt, D., 1997. Ecosystems. Springer-Verlag, New York.
Welch, E., Mazur, A., Bretschneider, S., 2000. Voluntary behavior by electric utilities: levels of adoption and contribution of the climate change program to the reduction of carbon dioxide. Journal of Public Policy Analysis and Management 19 (3), 407–425.
Westley, F., 1995. Governing design: the management of social systems and ecosystems management. In: Gunderson, L., Holling, C.S., Light, S.S. (Eds.), Barriers and Bridges to the Renewal of Ecosystems and Institutions. Columbia Univ. Press, New York, pp. 391–427.
Wondolleck, J., Yaffee, S., 2000. Making Collaboration Work: Lessons from Innovation in Natural Resource Management. Island Press, Washington, DC.
Yaffee, S., Wondolleck, J., 1997. Building bridges across agency boundaries. In: Kohm, K.A., Franklin, J.F. (Eds.), Creating A Forestry for the 21st Century. Island Press, Washington, DC.
Yaffee, S., Phillips, A., Frentz, I., Hardy, P., Maleki, S., Thorpe, B., 1996. Ecosystem Management in the United States: An Assessment of Current Experience. Island Press, Washington, DC.