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Ecosystem Management in the Southeast United States: Interest of Forest Landowners in Joint Management Across Ownerships

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In the south-east United States, 70% of the forest area is privately owned, by an estimated 5 M landholders. If ecosystem or landscape-level management is to work, cooperation across private ownerships is essential. As a first step in garnering cooperation among landowners, a mail survey was carried out to understand their characteristics, attitudes, beliefs and interest in ecosystem management. A specific area of the Coastal Plain of South Carolina, typical of rural forest-dominated areas of this region, was chosen as the study site. Forestry-related uses, specifically timber production, are the main reasons why over half the respondents own their land. Only one-third of the respondents are familiar with the concept of ecosystem management. However, about 70% are interested in learning more about joint management with other landowners. The major concerns about participating in joint management are loss of land and timber values. Most of the landowners who would participate in a landscape corridor system, for example, want to maintain control of their land rights and limit outside intervention in the process.

INTRODUCTION

There is a call by scientists, resource managers and the public for new approaches to managing forests. One of the most discussed approaches is the concept of ecosystem management (EM). Although there are numerous definitions, the concept's emphasis is on restoring and maintaining the ecological processes and the condition of ecosystems to achieve desired goals. Key principles of EM include managing on broader temporal and spatial scales, adaptable and flexible institutions, collaborative decision-making, and an integrated holistic management approach that incorporates social goals (Grumbine 1994, Moote *et al.* 1994). Despite its new popularity, EM remains a fuzzy concept, and important issues remain unresolved. There is vagueness in defining an 'ecosystem' especially in terms of its spatial boundaries. Ecological boundaries are rarely consistent with human-defined administrative or legal boundaries. This begs the question: which spatial scale is an appropriate EM unit? Furthermore, there is difficulty in determining and establishing a mechanism to bring the various parties forward in collaborative decision-making. This is compounded by the considerations of private property rights and sovereignty issues.

Ecosystem management (EM) emerged in the forestry literature in recent years and has become a controversial symbol of the evolution of forest management. To some foresters EM is nothing new, merely a new name for old practices. To others, EM is an important step beyond traditional forestry techniques. One of EM's most important principles is for forest managers to address issues at a larger spatial scale. Forest management at the landscape scale requires the support of the landowners within that area. For EM to work in the forests of the southern United States one needs to address the multiplicity of objectives of the over 5 M private forest landowners (PFLs), owning 70% of the forestland (Birch 1997). Over 90% of these landowners own less than 20 ha, creating a fragmented and diverse landscape. This fragmentation of the landscape is recognized by scientists as one of the major causes of loss of biological diversity (National Research Council 1992).

Since PFLs play a dominant role in forestry, much has been written about their role in timber supply. However, little is known about their interest in non-market benefits from their land. Two key pieces of information are required prior to developing an EM plan on private forestland in the Southeast. One is PFLs' attitudes toward providing non-market or public goods, a key component of EM. The second is PFLs' interests in cooperation or joint management to carry out EM. This study asks PFLs about their interest and attitudes toward EM and joint management. There are a number of EM activities forest landowners can carry out such as timber harvests that mimic natural systems, using longer rotations, and creating buffer zones. In this study, the example used is PFLs establishing and having their part of a landscape corridor, which provides a conduit between fragmented habitats. A riparian corridor, for example, could provide wildlife habitat, prevent environmental degradation of water quality and soils, and contribute to regulating microclimates. Alternatively, a wildlife corridor may cut across upland habitat to enable wildlife to move from one forest area to another. Depending on the spatial location, a corridor may need to cut across landowners' properties. Participating in a corridor system may require the landowner to change current practices on their land. Gathering information from PFLs about their attitude toward and interest in joint management is viewed as a first step in the process of implementing EM on private lands. Results from this study will provide useful information to managers to develop more specific planning efforts.

PREVIOUS STUDIES OF PFL INTEREST IN ECOSYSTEM MANAGEMENT AND COOPERATION

The concept of managing natural resources at the landscape level is not new. Since the 1930s, ecologists have recognized the need to protect ecosystems as well as individual species (Shelford 1933). Until recently, landscape level efforts evolved in an ad hoc fashion, in response to local needs and pressures. EM is now becoming more coordinated as federal (and some state) land agencies are required to address it, and more encouragement is sought for private landowners to consider applying EM principles. One study reported over 600 EM projects underway in the USA, of which a few dealt specifically with forestland (Yaffee *et al.* 1996).

A number of public/private partnerships are implementing EM. These partnerships usually involve a combination of government agencies, large

landowners, and environmental groups such as The Nature Conservancy (Yaffee 1996). Collaboration between public and private landowners is occurring around the country, but is primarily driven by specific issues such as protecting unique habitats or endangered species. Partnership efforts may include PFLs but usually only the few largest landowners in the area are involved. This may be efficient if the larger landowners represent most of the land base. In 1994, American Forests¹ hosted a series of workshops to discuss opportunities for collaboration among multiple owners (Sample 1994). The workshop in the South concluded that there are special challenges for joint management among landowners in this region because of the enormous number of PFLs and the heterogeneity of the landscape. The workshop participants believed that cooperation among PFLs would most likely occur through local private initiatives with strong leadership from landowners themselves. Also, non-regulatory financial and technical incentives were mentioned as important tools to encourage participation. Unlike farmers, PFLs have seldom worked together cooperatively to increase revenues or meet mutual objectives. Historically, cooperative timber marketing efforts by landowners in the Southeast have not been successful (Sample 1994), mainly due to the periodic and uneven timber harvest among most landowners, and their propensity for independent decision-making.

Studies of PFLs have shown that non-timber attributes of their land such as wildlife, aesthetics and recreation are their primary reasons for owning land (Bliss *et al.* 1994, Jones *et al.* 1995, Birch 1997). To date there are few EM efforts targeted specifically at PFLs. Examples are found in Connecticut and Massachusetts (Broderick 1996, Campbell and Kitteridge 1996). In both cases these programs have built on expanding the stewardship concept embedded in the Forest Stewardship Program.² The objective was to develop stewardship awareness at the community level. There are very few surveys of PFLs and their interest in EM (Rickenbach *et al.* 1998). One notable study was carried out jointly in three regions, namely Utah, Indiana and nine southern states (Brunson *et al.* 1996). This survey revealed strong PFL interest in applying EM on their lands even though many knew little about the concept. The authors concluded that this reflects a deep-rooted attitude of environmental awareness among the PFLs. They suggested, as have other studies, that PFLs do not differ from the American public in general in terms of their environmental attitudes (Bliss *et al.* 1994, Bourke and Luloff 1994).

THE PFL SURVEY METHOD

The lower Coastal Plain of South Carolina chosen for this study area is typical of much of the south-eastern Coastal Plain where forests cover most of the landscape. Industrial forestry ownerships surrounded by PFLs, and a number of continuing conservation projects, made the study area attractive for EM-related research. These included a 140,000 ha Watershed Basin Initiative to protect valuable wetlands along the coast, and the Edisto River Basin Project, a GIS-based study to provide planners with values for a variety of landscape attributes. MeadWestvaco Corporation, owner

¹ American Forests was formerly known as the American Forestry Association.

² The Forest Stewardship Program is a government funded initiative that provides PFLs with cost-share funds to develop and implement forest-management plans based on multiple-use objectives.

of over 200,000 ha in this region, has developed an ecosystem management plan for its lands to enhance and protect unique areas and to improve biodiversity. Their plan involves zones accounting for about one-third of their land primarily in the form of landscape corridors. The remaining two-thirds of their land is intensively managed for fiber production. MeadWestvaco's landholdings are surrounded by numerous PFLs. The company is interested in promoting its landscape plan to neighboring landowners by connecting corridors across property lines. The MeadWestvaco plan together with the other activities in the region was a useful backdrop for the survey and for possible implementation of an EM plan.

Since the survey results were intended to contribute to actual EM plans, the objective was to sample all PFLs within an entire ecosystem or area, rather than take a random sample. Five blocks or areas within the region were chosen for their unique and different features (Figure 1). The location and distribution of MeadWestvaco lands was important in determining the five blocks. Once the areas were selected, tax maps were used to identify the landowners. All landowners owning over 10 ha were sent a questionnaire.

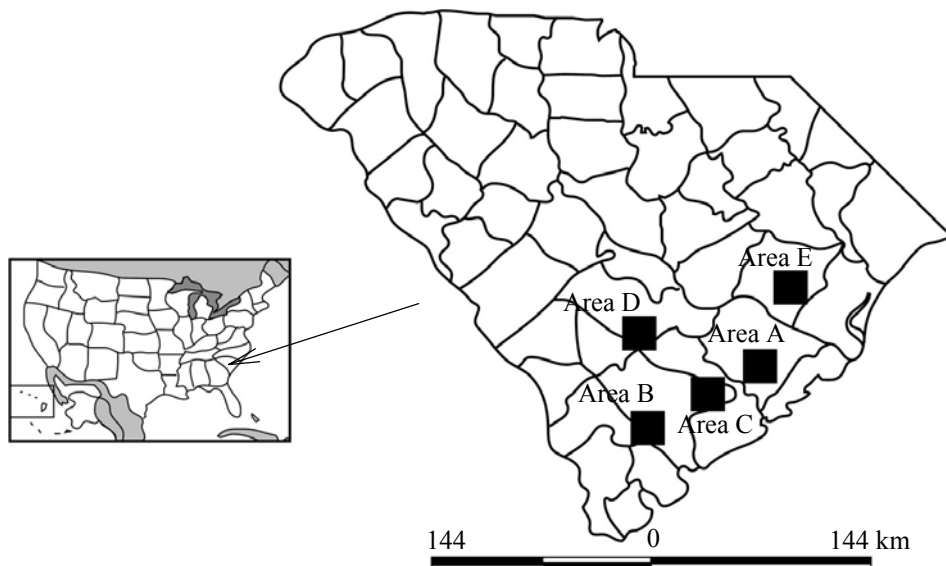


Figure 1. Map of South Carolina showing location of study areas

A mail survey process following the Total Design Method of Dillman (1978) was carried out. It was tested on a sample of landowners in North Carolina. Mailings were sent to 909 landowners in the five study areas. A postcard reminder followed the initial mailing after one week, and those who still did not respond were sent another survey form three weeks after the initial mailings. There were 373 questionnaires returned. In addition, MeadWestvaco Corporation sent the questionnaires to 250 landowners in the study area who participate in their Cooperative Forest Management Program, receiving 92 responses from their single mailing. In total, 424 usable survey responses were obtained, a 37% response rate. Frequency distributions, univariate and bivariate statistics were obtained using the

SAS statistical package. To check for non-response bias, a t-test was carried out on property size of respondents and non-respondents. Combining all the five study areas, respondents had significantly larger properties, suggesting survey bias towards larger landowners.

The landowners were told about the EM as a new approach to forest management, and asked about their attitudes and beliefs concerning the concept. They were also questioned about their interest in providing land for a landscape corridor system. In addition, traditional questions were included about PFL demographics, land-use and forest management. (A copy of the questionnaire is provided as Appendix 1).

PFL CHARACTERISTICS, ATTITUDES, AND INTEREST IN JOINT MANGEMENT AND CORRIDORS

Socioeconomic Characteristics

Land area owned is positively skewed, but with two-thirds of respondents owning more than 40ha (Table 1). Two-thirds said forest covers more than 60% of their land. The survey area is relatively close to urban areas, and suitable for commuters interested in country homes. The majority of respondents acquired their land in the last 30 years. It is also notable that 56% of the PFLs purchased (rather than inherited) their land and have professional (non-farmer) occupations or are retired people. Only 12% of the PFLs classify themselves as farmers. This suggests that although low ownership turnover characterizes the study area at present, there is a trend toward more typical patterns of land allocation found in the Southeast, i.e. high turnover of land and increased forest fragmentation. The influx of urbanites to the rural areas is also reflected by the income and education data. The mean annual income was \$66,000 but the distribution is relatively uniform among income brackets. Most respondents had completed high school and over half have a college degree. Relative to previous PFL surveys (e.g. of Marsinko 1987, Birch 1997), respondents in this survey tend to have larger holdings and longer tenures, and more acquired their land through inheritance. PFLs who inherited land, because of familial reasons, tend to keep land intact and are not as eager to sell or parcelize.

Land Management Characteristics

The majority of PFLs viewed timber production the most important reason for owning the land and the most valuable land-use (Table 2). Three-quarters of the respondents have at one time commercially harvested timber from their land, suggesting that forestry is comparatively important to them in financial terms. Although other studies of PFLs suggest non-timber reasons are more important for owning land, this area has a strong forest industry and many in the community depend on the industry for their livelihood.

Another important reason for owning land is for hunting. Over half the respondents allow their land to be used for hunting – either in the form of hunt clubs or for family-based hunting. One-third of the PFLs said ‘hunting and fishing’ is one of the top three reasons why they own their land. Only two other reasons, ‘timber production’ and ‘inherited the land’, received higher responses for this question. Although timber production is important financially, hunting, recreation and forestry practices can complement each other. Cross-tabulation analysis shows that over 80%

of those who indicated that they use their land for hunting nominated forestry as the most valuable use of the land. Landowners were asked if they had cooperated with other landowners. Cooperation for hunting and wildlife enhancement (probably

Table 1. Socio-economic and land characteristics

Characteristic	Category or range	Relative frequency (%)	Relation with interest in joint management (p value from χ^2 test)
AVERAGE AGE (YEARS)	Mean = 59 years		.01*
WHEN LAND WAS ACQUIRED	Before 1950	16	.77
	Between 1950 and 1969	24	.59
	Between 1970 and 1990	47	.53
	After 1990	14	.96
HOW LAND WAS ACQUIRED	Purchase	56	.99
	Lease	1	.33
	Inherit or Gift	43	.79
OCCUPATION	Professional	58	.03*
	Farmer	12	.01*
	Retired	45	.04*
EDUCATION	Less than high school	6	.01*
	Completed high school	21	
	Completed college	34	
	A graduate degree	18	
ANNUAL INCOME	Less than \$30,000	22	.15
	\$30,000-\$60,000	32	
	\$60,000-\$110,000	29	
	More than \$110,000	17	
ACRES OWNED IN STUDY AREA	10-40 ha	24	.71
	41-80 ha	24	
	81-200 ha	27	
	More than 200 ha	18	
PERCENT OF LAND FORESTED	1%-20%	6	.65
	21%-60%	28	
	More than 60%	67	

* Denotes significance at the 10% level.

Table 2. Land management characteristics

Characteristic	Range	Relative frequency (%)	Relation with interest in Joint management using χ^2 statistic (p value)
FOREST MANAGEMENT PLAN	Any	39	.03*
LAND AVAILABLE FOR OUTSIDE USE	Any	60	.01*
	Hunting only	38	.01*
	Family hunting, and other	14	.69
COOPERATE WITH OTHER LANDOWNERS	Any	28	.27
	Timber	5	.89
	Agriculture	5	.03*
	Hunting	15	.06*
	Wildlife	11	.48
MOST VALUABLE USE OF LAND	Crops	20	.93
	Livestock	3	.74
	Forestry	51	.58
	Recreation	10	.95
	Investment	12	.74
HARVESTED TIMBER FROM LAND		75	.55
MAIN REASON FOR OWNING LAND	Inherited it	41	.74
	Place of residence	30	.18
	Pass onto heirs	54	.44
	Part of farm	24	.11
	Timber production	57	.05*
	Investment	18	.69
	Hunting or fishing	35	.99
	Recreation	5	.09*
	Natural beauty	14	.01*
PROPERTY RIGHTS AFFECT MANAGEMENT	Any	55	.43
FAMILIAR WITH EM	Familiar with the concept	33	.65

* denotes significance at the 10% level.

hunting-related) received the highest frequency. Cooperation for commodity production (timber and-agriculture) was not common among these landowners.

A large percentage of the PFLs cited non-commodity uses as one of the main reasons for owning their land. All of these non-commodity related responses are compatible with timber production. This confirms that although timber is important they are also interested in the land for other uses.

Asked whether government laws or activities limited their private property rights, over half replied in the affirmative. Major concerns were trespassing and air and water regulations. Two-thirds of the respondents did not consider themselves familiar with the concept of EM.

Interest in Joint Management and a Corridor System

Almost three-quarters of PFLs responded positively to interest in participating in joint management (Table 3). However, only 9% would do so unconditionally. The other 61% would require specific conditions be met before they would consider participating. The most commonly requested condition was having more specific information about the benefits of joint management. Additionally, a number of those interested would want assurances that their commodity values are protected or that their neighbours also participated. Twice as many people said no to government involvement as a condition for participation compared as those who want government involvement.

Using the chi-squared (χ^2) statistic, the relation between individual characteristics and interest in joint management was analyzed. Individual characteristics were compared in pairwise fashion. In terms of socio-economic characteristics younger and better-educated landowners are significantly related to interest in joint management (Table 1). PFLs who have a written management plan, allow their land for hunting, or are already involved in an agricultural cooperative also appear to have relatively high interest in joint management (Table 2). Owning the land mainly for timber production, recreation or natural beauty was also significantly related with interest in joint management.

PFLs were provided with a list of incentives that might encourage them to participate in joint management and asked to tick their top three choices. Incentives that were most important were related to maintaining or increasing their current land and timber values, followed by tax relief and improved wildlife hunting habitat (Table 3). Incentives that increase land, timber, hunting and wildlife values are all significantly related to PFL interest in joint management.

Respondents were asked about their specific interest in participating in a corridor system that would run through their land and adjoining-lands. A diagram and an explanation of the corridor system were provided. The survey described how the corridor was an example of joint management that would enhance both market and non-market benefits. They were asked how they would like the corridor managed if they participated. Only a little more than one-third of the respondents indicated that they were not interested in participating in a corridor system.

The most preferred corridor management options were those where the PFL maintained ownership of the land. Receiving technical or financial assistance, managing the corridor with neighbours, managing it alone, and renting it for a fixed time period were other preferred corridor management options. Options related to selling or creating permanent conservation easements received the lowest response,

Table 3. Attitudes toward interest in joint management and corridor system

Characteristic	Range	Relative frequency (%)	Relation with interest in joint management (p value from χ^2 test)
INTEREST IN JOINT MGT.	Any	70	N/A
INTEREST IN JOINT MGT–CONDITIONS	Unconditional	9	N/A
	More Information	49	
	No to government involvement	11	
	Yes to government involvement	4	
	Protect commodities	19	
	Neighbours join	14	
	Not interested at all	30	
INCENTIVES THAT ENCOURAGES JOINT MGT	Increase timber	42	.00*
	Decrease mgt. costs	14	.00*
	Increase farm value	10	.40
	Increase land value	38	.00*
	Increase hunting value	18	.00*
	Increase wildlife value	21	.00*
	Increase regions' water quality	5	.36
	Decrease taxes	22	.64
	Decrease government regulations	15	.44
	No affect on current uses	33	.02*
CONDITIONS FOR INTEREST IN CORRIDOR SYSTEM	If manage it alone	21	.01*
	If manage with neighbours	25	.00*
	Receive technical and/or financial assistance	26	.00*
	For fixed time period	20	.00*
	Conservation easement with government agency	6	.01*
	Conservation easement with private organization	7	.07*
	Sell land	4	.09*
	Not interested in participating in corridor systems	38	.00*
COMPENSATION FOR SALE OF LAND FOR CORRIDOR SYSTEM	More than 100% of value	36	.40
	100% of value	42	
	Between 80-99% of value	6	
	Between 1%-89% of value	17	

* denotes significance at the 10% level.

probably in part due to lack of knowledge these options. As may be expected, all the characteristics related to corridor management were significantly related to joint management.

Finally, PFLs were asked what percent of fair market value they would require if they provided land for a corridor system (Table 3). For selling the land or providing conservation easement, 78% wanted at least 100% of fair market value. However 22% (or potentially about 100 landowners) would accept less than fair market value for providing land for a corridor system. When asked how much they would expect if they rented or leased the land for the corridor system almost 40% wanted more than the highest value provided on the questionnaire. None of these monetary values were significantly correlated with interest in joint management.

DISCUSSION

This survey is one of the few that has focused on questions about EM and PFL interest in joint management with neighbouring landowners. Forestry is highly important to the economy of the Southeast region surveyed and the dependence of timber makes many of the respondents wary of public opinion because of the perceived risks to timber production associated with environmental activities. Nevertheless, many landowners believe that by managing for timber they are also providing many other benefits such as wildlife habitat and natural beauty, and are favourably disposed to providing these benefits. There was substantial interest in joint management and corridors to provide more of these public benefits provided this does not interfere with their current management activities. About 20% of the respondents are willing to absorb some of the cost of providing a corridor system on their land. The results also suggest that younger landowners, more educated about forestry and ecosystem management and with an active interest in forestry, hunting and recreation, are the most likely to be interested in joint management.

There are a variety of approaches to garner PFL participation in EM. These include regulations, incentives and voluntary approaches. Regulations are difficult to implement due to costs and the fact that they restrict property rights. However, at the other extreme, achieving 100% voluntary participation is unrealistic, given the variety of landowner objectives and their independent spirit related to private property. According to Sample (1994), the most successful approaches involving landowners in EM are using technical assistance and financial incentives. The results of this study support the use of technical assistance and financial incentives. Regulations are regarded as government interference and respondents clearly displayed a negative attitude toward government telling them what to do with their land.

Perhaps the most important form of technical assistance is educating and informing PFLs about EM and the benefits from joint management. It is evident that PFLs lack information about EM. However, the fact that 70% expressed some interest in joint management suggests they are eager to learn more about EM and the benefits it provides. Furthermore, the better educated PFLs and those with forestry knowledge appear to be the more interested in joint management. Many studies show that one of the key barriers to PFL involvement in forestry is their lack of

knowledge. Prior to any EM initiative being developed, landowners must be informed and become knowledgeable about its means and objectives.

An example of where technical assistance and education could work is linking landholders interest in hunting with joint management objectives. Hunting activities are important in this region, and the provision of wildlife habitat for hunting can be improved by joint management. One example is that corridors across ownerships may increase the movement of wildlife between areas of improved habitat. Corridors also reduce the negative affects of land parcelization or fragmentation. Educating the PFLs about positive aspects of joint management that provide a benefit (hunting) that they already highly desire, may go a long way toward their participation. The relatively high percentage (38%) of PFLs with written forest management plans suggest that using and modifying these plans to address EM issues may be useful educational approach.

Using peers to provide forestry education is an approach that is gaining support. PFLs showed that they would prefer to manage a corridor by themselves or with neighbours, rather than with outsiders. This suggests the need for education by and from the landowners themselves. Recent work on PFL education suggests that PFLs are more interested in forestry when the information comes from a landowner or neighbour. Examples of this include the Pennsylvania Volunteer Initiative Program (VIP) or the Oregon Master Woodlands Manager Program where landowners are trained and then use that training to train their neighbours and peers about sustainable forestry (O'Donnell 1993, Fletcher and Reed 1996).

Although PFLs were wary of government involvement, the government can play a key role in providing needed financial assistance for landowners to implement joint management initiatives. Most respondents will require some form of payment for use of their land as a corridor. This could be in the form of lost opportunity costs of providing the corridor or payment for the rental value of the land. The government can facilitate cost-share, rental payments, or purchase of environmentally sensitive lands. However, training activities or incentive programs should emerge from community-based initiatives, either from landowners themselves or from forest industry or private organizations. Forest industry and private agencies such as land trusts can play a role in addressing incentives. The forest industry in this region is actively carrying out EM objectives on their land trust, and is involved in acquiring land for conservation purposes. Forest industries have developed landowner assistance programs. These programs could be expanded to address EM issues. For example, MeadWestvaco Corporation has already involved some landowners in its corridor system. These groups could develop partnerships and work with PFLs to provide financial incentives for PFLs interested in EM activities. They could also provide training to potential PFLs who would in turn educate their peers.

Cooperation among landowners could have revenue-generating potential. There could be economies of scale associated with pooling resources in marketing products and reducing harvest or management costs. Although timber cooperatives in the Southeast have not worked well in the past, new mechanisms and objectives and the new make-up of PFLs provide an opportunity to re-open the landowner association concept. Timber is extremely important to the economy of this region so landowners who become involved must see both the market and non-market benefits of cooperatives.

It was noted that the respondents tended to be larger landowners, which could bias the results. More responses from landowners with less than 10 ha and a higher response rate could have affected the results. Looking at the location of the respondent's land using GIS revealed they were relatively uniformly distributed across the landscape, indicating that respondents do represent the overall landscape. It is also arguable that the larger owners would probably play a greater role in a landscape planning process. This is not to say the smaller landowners are less important. Their land could play a critical role in a landscape management plan. For cost and efficiency reasons this study focused on landowners with tracts over 10 ha. Further research could examine the role of the smaller landowners since they make up the majority of owners.

CONCLUDING COMMENTS

Joint management and collaboration among owners within an ecosystem or landscape is a critical part of the process of developing EM on PFL lands. One of the first steps in the process is to evaluate landowner interest in such activities. The results of a survey of PFLs reported here provides the 'big picture', highlighting the need for further in-depth investigation in areas of specific location and participation of PFLs in EM activities. Since the questions about interest in corridors and joint management are hypothetical, one is not sure exactly what landholders' behavior would be if they actually were asked to participate. The descriptive results of this survey reveal some features that characterize the region and the type of landowner. This region is heavily forested and the PFLs here are a little atypical from results of surveys of other PFLs. These PFLs tend to have large acreages, longer tenures, and more land inherited relative to other surveys of PFLs in the area, suggesting lower turnover of land. Nevertheless, forest fragmentation and the influx of urbanites and professionals is occurring as it is in most of the Southeast. The PFLs seem hesitant to actively endorse EM and joint management because they are not sure of its benefits. However, PFLs do show an interest in learning more about the new management approaches.

Providing technical assistance and financial incentives appears critical for furthering this EM process. The lack of education about forestry in general, and EM specifically, obviously limits landholder interest in EM. More efforts and greater innovation are needed to reach the PFLs to inform them about EM and its benefits. Government has played a role in forestry activities in the past, but should be cautious in intervening in EM in this area. Government can take a role in facilitating educational resources and financial assistance. Results seem to suggest that landowners themselves, possibly with assistance from forest industry and private groups, should develop EM approaches with minimal government intervention. Once landowners recognize the benefits of cooperation, they may be willing to carry out such activities without financial assistance. For example, joint management may improve their hunting opportunities, and landowners may be willing to trade some productive land to improve hunting habitat. Also, cooperative harvesting arrangements may increase efficiency in timber production. The results provide useful information about potential key factors that need to be addressed for landowner cooperation across the landscape. Follow-up work may include

identifying critical areas for corridors, and using the survey results to devise plans to assist and compensate landowners for their participation.

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APPENDIX 1: Survey questionnaire

Please do not hesitate to qualify your responses with additional notes in the margins or in the space provided at the end of the survey.

Section 1. This part of the survey asks questions about your land in the Coastal Plain of South Carolina and your opinion about different ways of managing forest land.

1. Attached is a map of South Carolina counties. The shaded study area includes Berkeley, Dorchester, Colleton, Charleston, Orangeburg and Williamsburg counties, and is referred to as the study area.

Please indicate whether all of your land holdings are within the study area. (*Check one*)

ALL OF MY PROPERTY IS WITHIN THIS STUDY AREA

I ALSO HAVE PROPERTY OUTSIDE THE STUDY AREA.

2. Is the land you own within the study area all in one tract or parcel? (*Check one*)

YES

NO

(If **no**) How many tracts do you own in the study area?

_____ TRACTS

3. How many acres of land do you own within the study area? (*Check one*)

1-10 ACRES

11-49 ACRES

50-99 ACRES

100-199 ACRES

200-499 ACRES

500-999 ACRES

MORE THAN 1000 ACRES

4. What portion of your land within the study area is forested? (*Check one*)

BETWEEN 1% - 19%

BETWEEN 20% - 39%

BETWEEN 40% - 59%

BETWEEN 60% - 79%

BETWEEN 80% - 100%

5. Which of the following best describes the ownership of the forested portion of your land? (*Check one*)

- SOLE OWNER
 FAMILY OWNED
 PARTNERSHIP WITH OTHERS OUTSIDE IMMEDIATE FAMILY
 CORPORATION
 OTHER: *(Please specify)* _____

6. When did you acquire the **majority** of your forest land? *(Check one)*

- BEFORE 1950
 BETWEEN 1950 - 1969
 BETWEEN 1970 - 1989
 SINCE 1990

7. How did you acquire the **majority** of your forest land? *(Check one)*

- PURCHASE LEASE
 INHERITANCE GIFT
 OTHER: *(Please specify)* _____

8. Have you ever participated in forestry-related programs or activities with any of the following organizations? *(Check all that apply)*

- STATE OR LOCAL GOVERNMENT AGENCIES
 FEDERAL GOVERNMENT AGENCIES
 INDUSTRY SPONSORED LANDOWNER ASSISTED PROGRAMS
 PRIVATE CONSULTANTS
 OTHER: *(Please specify)* _____

9. Have you participated or applied for cost-share funds in any of the following programs? *(Check all that apply)*

- FOREST RENEWAL PROGRAM
 CONSERVATION RESERVE PROGRAM (CRP)
 FORESTRY INCENTIVES PROGRAM (FIP)
 STEWARDSHIP INCENTIVES PROGRAM (SIP)
 WETLANDS RESERVE PROGRAM (WRP)
 AGRICULTURAL CONSERVATION PROGRAM (ACP)
 FOREST LEGACY PROGRAM (FLP)
 WATER QUALITY INCENTIVES PROGRAM (WQIP)
 OTHER: *(Please specify)* _____

10. Do you have a current written management plan for your forest land? *(Check one)*

- YES
 NO (if no, go to question # 12)

11. Did you write this forest plan with any of the following? (*Check all that apply*)

- A GOVERNMENT AGENCY
 A FOREST INDUSTRY PROGRAM
 A CONSULTING FORESTER
 A CONSERVATION ORGANIZATION
 OTHER: (*Please specify*) _____

12. Have you ever commercially harvested timber from your land? (*Check one*)

- YES
 NO

13. Is your forest land available for recreation? (*Check all that apply*)

- NO ACCESS IS PROVIDED
 SPECIAL GROUPS SUCH AS HIKERS or SCIENTISTS HAVE ACCESS
 HUNTING CLUBS HAVE ACCESS
 GENERAL PUBLIC HAVE ACCESS
 OTHER: (*Please specify*) _____

14. Have you ever worked with neighboring landowners to carry out any of the following specific activities in some type of cooperative or group (*Check all that apply*)

- NO
 TIMBER MANAGEMENT
 AGRICULTURAL PRODUCTION
 HUNTING CLUBS
 GREEN WAYS
 WILDLIFE ENHANCEMENT
 UNRELATED TO LAND-USE ACTIVITIES (CHURCH GROUPS, LIONS CLUB, ETC.)
 OTHER: (*Please specify*) _____

15. Which of the following forestry groups are you a member of? (*Check all that apply*)

- NATIONAL WOODLAND OWNERS ASSOCIATION
 AMERICAN TREE FARM SYSTEM
 FOREST FARMER ASSOCIATION (FOREST LANDOWNERS ASSOCIATION)
 AMERICAN FORESTRY ASSOCIATION
 SOUTH CAROLINA FORESTRY ASSOCIATION
 OTHER: (*Please specify*) _____

16. What do you consider is the **most valuable** use of your land in the study area?
(*Check one*)

- CROPS
 LIVESTOCK
 FOREST PRODUCTS (Timber, Pine straw, Firewood, etc.)
 RECREATION or HUNTING
 INVESTMENT HOLDING
 OTHER: (*Please specify*) _____

17. Which of the following are the **three** most important **primary reasons** for owning your forest land?

- INHERITED LAND
 PERSONAL RESIDENCE
 TO PASS ON TO HEIRS
 PART OF FARM
 GROWING TIMBER OR OTHER WOOD PRODUCTS
 LAND INVESTMENT (REVENUE OTHER THAN FARMING OR TIMBER)
 HUNTING OR FISHING
 RECREATION SUCH AS BIRD WATCHING OR HIKING
 TO PRESERVE NATURAL BEAUTY
 OTHER: (*Please specify*) _____

18. Since you acquired your land do you believe that any of the following have limited your property rights? (*Check all that apply*)

- NO
 LAWS PROTECTING ENDANGERED SPECIES
 LAWS PROTECTING AIR, WETLANDS or WATER QUALITY
 LAWS GOVERNING FORESTRY PRACTICES
 PLANNING or ZONING REGULATIONS
 COMPLAINTS or ACTIONS OF NEIGHBORING LANDOWNERS
 ILLEGAL TRESPASSERS
 OTHER: (*Please specify*) _____

19. Landscape-level management is also referred to as ecosystem management. How would you classify your knowledge of ecosystem management? (*Check one*)

- I HAVE NOT HEARD OF IT BEFORE
 I HAVE HEARD OF THE TERM, BUT DON'T KNOW MUCH ABOUT IT
 I AM FAMILIAR WITH SOME ECOSYSTEM MANAGEMENT CONCEPTS

___ I AM FAMILIAR WITH ECOSYSTEM MANAGEMENT AND APPLY IT ON MY LAND

20. The following list contains some specific principles often included in ecosystem management. Ecosystem management is an approach that is being advocated by government agencies and private industries. Please indicate for each of the following principles whether you think such an approach is appropriate for people such as yourself, managing their **own private land**. (*Check all that you think are appropriate*)

___ LANDOWNERS SHOULD EMPHASIZE LONGER MANAGEMENT CYCLES, BEYOND THE NEXT SEASON OR TIMBER ROTATION

___ LANDOWNERS SHOULD TAKE INTO ACCOUNT HOW DECISIONS ON EACH TRACT IMPACT NEIGHBORING LANDS AND THE REGION

___ LANDOWNERS SHOULD CONSIDER MANAGING FOR WILDLIFE, WATER AND ENVIRONMENTAL BENEFITS AS WELL AS TIMBER

___ LANDOWNERS SHOULD CONSIDER PUBLIC DESIRES AND OPINIONS MORE FULLY IN DECISIONS

___ LANDOWNERS SHOULD PLAN ACTIVITIES JOINTLY BECAUSE ECOSYSTEMS AND WILDLIFE CROSS PROPERTY LINES

___ LANDOWNERS SHOULD BE WILLING TO ADAPT THEIR MANAGEMENT PRACTICES TO UNEXPECTED CHANGES

21. Some people are recommending cooperation among the many landowners within a specific region or landscape. For example, all landowners might be invited to join a partnership whose members would **jointly plan** their forestry activities to ensure sustainable management. How likely are you to be interested in joining? (*Check all that apply*)

___ I WOULD BE INTERESTED IN JOINING

___ I WOULD BE INTERESTED IN OBSERVING, BUT I WOULD NEED TO KNOW MORE BEFORE DECIDING WHETHER TO PARTICIPATE

___ I WOULD BE INTERESTED IN JOINING AN ASSOCIATION OF PRIVATE LANDOWNERS IF FEDERAL OR STATE AGENCIES ARE INVOLVED

___ I WOULD BE INTERESTED IN JOINING AN ASSOCIATION OF PRIVATE LANDOWNERS IF FEDERAL OR STATE AGENCIES ARE **NOT** INVOLVED

___ I WOULD BE INTERESTED IN JOINING IF THE PRIMARY OBJECTIVE IS TO PROTECT COMMODITY USES (TIMBER, HUNTING, GRAZING)

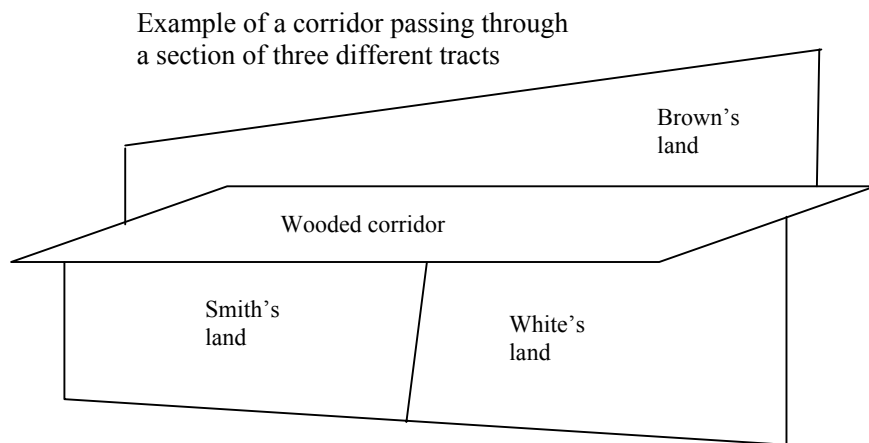
I WOULD BE INTERESTED IN JOINING IF MOST OF MY NEIGHBORING PRIVATE LANDOWNERS ALSO JOIN

 I WOULD BE UNLIKELY TO PARTICIPATE IN SUCH A PARTNERSHIP

22. Multi-owner partnerships or cooperatives evolve for a number of reasons. Which of the following are the ***three most important*** reasons that would encourage you to participate in a cooperative or partnership? (*Check your top three choices*)

- IT INCREASES MY TIMBER VALUE
- IT REDUCES THE COSTS OF MANAGING FOR TIMBER PRODUCTS
- IT INCREASES THE MY FARM or NON-TIMBER REVENUES
- IT INCREASES THE MY OVERALL LAND VALUE
- IT IMPROVES THE HUNTING and/or FISHING ON MY LAND
- IT IMPROVES WILDLIFE HABITAT, INCLUDING NON-GAME SPECIES
- IT IMPROVES THE REGION'S WATER QUALITY
- IT REDUCES MY PROPERTY, INCOME OR ESTATE TAXES
- IT HELPS REDUCE GOVERNMENT REGULATIONS ON MY LAND
- IT WOULD NOT AFFECT WHAT I CAN DO WITH MY LAND
- OTHER (*Please specify*) _____

23. Imagine a landscape-level management plan in your region that involves connecting separate parcels of land by creating pathways, called forest corridors. The corridors will provide a number of benefits. They will allow for the movement of wildlife, increase the diversity of habitats on your land, improve the hunting opportunities, and protect water quality if the corridor runs along a stream. The following diagram shows an example of such a situation in which a corridor runs through adjoining lands.



If a forest corridor plan were proposed for your region, which of the following **management options** would encourage you to participate by providing land? (Check all that apply)

MANAGE THE CORRIDOR MYSELF

MANAGE THE CORRIDOR IN COOPERATION WITH OTHER LANDOWNERS

USE TECHNICAL ASSISTANCE AND/OR FINANCIAL INCENTIVES

A FIXED TIME PERIOD AGREEMENT AFTER WHICH I CAN USE THE FOREST LAND AS I WISH

RENT OR LEASE PART OF MY FOREST LAND

ESTABLISH A CONSERVATION EASEMENT WITH A GOVERNMENT AGENCY

ESTABLISH A CONSERVATION EASEMENT WITH A PRIVATE ORGANIZATION

SELL PART OF MY FOREST LAND OUTRIGHT

I WOULD NOT PARTICIPATE

24. If you receive financial compensation to participate in the forest corridor partnership (for example, sale or permanent easement), what percentage of the land's fair market value would you require as a lump sum payment? (Check one)

MORE THAN 100% of FAIR MARKET VALUE

100%

BETWEEN 80% - 99%

BETWEEN 60% - 89%

BETWEEN 40% - 59%

BETWEEN 20% - 39%

BETWEEN 1% - 19%

25. For a fixed-term payment (for example a lease, subsidy, or incentive) to participate, how much would you require **per year**? (Check one)

BETWEEN \$1 - \$5 PER ACRE

BETWEEN \$6 - \$10 PER ACRE

BETWEEN \$11 - \$20 PER ACRE

BETWEEN \$21 - \$40 PER ACRE

BETWEEN \$41 - \$60 PER ACRE

MORE THAN \$60 PER ACRE

26. What is the estimated average value per acre of your land that is forested?
\$ _____ /ACRE

Section 2. For analytical purposes we need to know a little bit more about you. Your responses are strictly confidential. If you choose not to answer any one question, please go on to the next.

27. Your sex. (*Check one*)

MALE
 FEMALE

28. Your present age: _____ YEARS

29. What is your primary occupation? (*Check all that apply*)

FARMER
 RETIRED
 PROFESSIONAL
 FORESTRY-RELATED
 OTHER: (*Please specify*) _____

30. In what category was your total household income, from all sources in 1994, before taxes? (*Check one*)

LESS THAN \$10,000
 BETWEEN \$10,001 - \$19,999
 BETWEEN \$20,000 - \$29,999
 BETWEEN \$30,000 - \$49,999
 BETWEEN \$50,000 - \$59,999
 BETWEEN \$60,000 - \$75,000
 BETWEEN \$75,000 - \$110,000
 MORE THAN \$110,000

31. How much do you make annually on your land within the study area from the sale of forest products or forest-related activities, such as hunting, the sale of firewood or pine straw? If you do not receive income from your forests every year, please indicate how much you made the last time you did. (*Check one*)

NONE
 BETWEEN \$1 - \$499
 BETWEEN \$500 - \$999
 BETWEEN \$1,000 - \$4,999
 BETWEEN \$4,500 - \$9,999
 MORE THAN \$10,000

32. What is the highest level of education that you have completed? (*Check one*)

LESS THAN HIGH SCHOOL

SOME HIGH SCHOOL

COMPLETED HIGH SCHOOL

SOME COLLEGE

COMPLETED COLLEGE (*Specify major*)

A GRADUATE DEGREE

Comments

(Please use the space below to explain any questions that caused you confusion or to express other ideas)

Please return the completed questionnaire, by folding and enclosing it in the envelope provided and dropping it in the nearest mail box to the following address:

Mike Jacobson
North Carolina State University
Department of Forestry
Box 8002
Raleigh, NC 27695-8002

Thank you for participating in this survey.