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## Woodlots in the rural landscape: landowner motivations and management attitudes in a Michigan (USA) case study

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### Abstract

Woodlots provide important environmental benefits in the Midwestern (USA) landscape, where they are undergoing rapid change. An increasingly diverse farm and non-farm population owns these non-industrial private forests (NIPFs). It is essential to understand what motivates NIPF landowners to retain and manage their forests. We describe a study of NIPF owners in an agricultural watershed where forest cover is increasing. What motivations and management practices might be contributing to this increase? The results of a survey of 112 NIPF owners suggest that aesthetic appreciation is the strongest motivator for retaining woodlots, especially by non-farmers. Protecting the environment also seems to be important for both farmers and non-farmers, while economic motivations are significantly less important. Landowners indicated that they are primarily taking a “hands-off” approach to management. This study provides insights for those interested in understanding NIPF landowners’ motivations and for developing effective programs. © 2002 Elsevier Science B.V. All rights reserved.

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### 1. Introduction

Wooded patches are dynamic, vital ecosystems in the fabric of the rural Midwestern (USA) landscape. This paper describes non-industrial private forest (NIPF) landowners’ motivations for retaining and protecting woodlots in a rural area of southeastern Michigan, USA. In addition, it explores owners’ approaches to management that might have an effect on the pattern of woods in the landscape. A comparison of farm and non-farm owners is made along these dimensions.

### 2. Background

Forestlands provide a number of important ecological, economic, and aesthetic benefits. The distribution, size, and structure of wooded patches have been studied extensively (Levenson, 1981; Usher et al., 1992; Foster et al., 1992; Forman and Godron, 1981). Increasingly, small woodlands in private ownership are recognized for their contribution to the landscape fabric and to ecological health. For instance, the composition, pattern and movement of wildlife species in woodlot patches have been well-documented (Ylönen et al., 1991; Middleton and Merriam, 1983).

Much research has focused on NIPFs and their owners. NIPFs comprise 57% of the nation’s commercial forestland (Bliss et al., 1994). However, many NIPFs are not well-managed (Jones et al., 1995). For

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example, as ecosystem management approaches are being implemented and tested, there is little experience with applying these approaches to the country's 93 million ha of NIPF land (Rickenbach et al., 1998). Woodlots are changing dramatically in some regions and it is critical that we understand the direction and causes of these changes. Timberland in the US is projected to decline by 4% by the year 2040 and private owners are likely to make the most changes to forested land. These changes include conversions to urban and developed land uses, causing a net loss of over 18 million acres of forest by 2040 (Alig et al., 1990).

One contributing factor is the changing pattern of ownership. There are 10 million NIPF owners in the US, an increase of 20% over the last 15 years (Argow, 1996). The trend is toward new, non-farm NIPF owners on smaller parcels. This ownership fragmentation may lead to ecological fragmentation, with impacts on wildlife habitat, water quality, and other resources. For instance, only 6% of Pennsylvania NIPF owners have a written management plan (covering just 10% of the state's privately-held wooded acreage) and only 20% of timber harvests involve a forester. "Today's NIPF owners are not necessarily rural nor land connected. Instead, the multigenerational, farm-based owner of the 1950s has yielded to a well-educated, white-collar or retired owner, who is either non-resident or of urban, non-farm origin" (Jones et al., 1995, p. 42). In Michigan, where NIPFs comprise 34.7% of the forest land (2.4 million ha), the diversity of forest owners presents challenges to good management of the forest resource (Woiwode, 1991).

A changing land ownership base has profound implications for wooded landscapes and for the development of NIPF programs. Newman et al. (1996) found that owners in Georgia who have recently purchased timberland differ markedly from traditional landowners. "They are wealthier, better educated, and have a better understanding of the investment opportunities associated with their land" (p. 214). Likewise, a study in northern Minnesota (Fleury and Blinn, 1996) found that ownership fragmentation is associated with a change from traditional land-use practices toward uses that focus on other amenities, such as recreation, aesthetics and water access.

Given these changes, it is important to understand the underlying motivations for owning, protecting and

managing woodlots, especially across different types of owners. NIPF landowners have been surveyed for a number of purposes, especially to gauge management behavior, management needs, and future intentions. Less so, these landowners have been queried to understand their unique motivations, attitudes and values. According to Bliss and Martin (1989), who assessed Wisconsin NIPF owners' motivations, few studies have focused on landowner attitudes, beliefs and motivations over several decades of gathering descriptive statistics on NIPF owners.

A small body of literature has asked why NIPF owners own woodlots and found that ownership is strongly related to non-tangible, non-economic motivations (Ticknor, 1993; Hodge and Southard, 1992; Williams et al., 1996; Kingsley and Finley, 1975; Bliss and Martin, 1989). Jones et al. (1995) found that most NIPF owners are not timber oriented, even though many occasionally do sell timber. Ticknor (1986) conducted a survey of Indiana owners and found that a primary reason for woodlot ownership was "rebuilding the spirit". Similarly, a study of Virginia NIPF owners (Hodge and Southard, 1992) found that the top three reasons for owning woodlots was preserving nature, maintaining scenic beauty and viewing wildlife. In unstructured interviews with woodlot owners in the Piedmont region of South Carolina, Haymond (1988) found that lifestyle enhancement was the primary benefit of forest ownership. This dimension included pride of ownership, stewardship, privacy, recreation/pleasure, and family. Furthermore, she found a separation between farm and non-farm owners, where farmers were more interested in timber production and economics while non-farmers were more interested in the lifestyle enhancement values.

Given that a growing number of NIPF owners are new to woodlot ownership, some researchers have asked if their motivations are distinct from the longer-term owners. Newman et al. (1996) found that many of the new owners have the same objectives as the broad class of NIPF owners, but place higher values on recreation and hunting opportunities. In fact, some (Bourke and Luloff, 1994; Bliss et al., 1994) claim that the concerns and attitudes of NIPF owners actually mirror those of the general public, and that non-economic concepts are an important aspect for both.

Management styles differ among woodlot owners and the literature has generally categorized these as

active versus passive styles. Active managers use more deliberate silvicultural methods to maintain their woodlots. What factors predict active versus passive management among NIPF owners? Active management has been related to ethnicity (Bliss, 1992), beliefs (Gramann et al., 1985), education, parcel size, age, and residence (Greene and Blatner, 1986), family and personal identity (Bliss and Martin, 1989) and aesthetic motivations (Erickson and De Young, 1994). However, there is considerable ambiguity among these predictors; these relationships are not direct or clear. For example, Bourke and Luloff (1994) found that socio-demographic characteristics, use of the forest, and ownership status have little influence on attitudes toward management. Similarly, Egan and Jones (1993) question the link between management and ethics. They evaluated the level of stewardship practiced by NIPF owners, characterized owners' personal expressions of a land ethic, then examined the relationship between their words and their actions. They found that most landowners already embrace a land ethic, but that the relationship between woodlot owner articulations about ethics and their actual actions are tenuous.

Cooperative woodlot management across private property lines is an emerging area for study and program implementation (Stevens et al., 1999; Rickenbach et al., 1998; Campbell and Kittredge, 1996; Sample, 1994; Washburn, 1996). There appears to be a need for greater collaboration among adjacent landowners to offset the effects of landscape fragmentation. In a Massachusetts community, Campbell and Kittredge (1996) found that woodlot owners were interested in working cooperatively to manage small clusters of four or five wooded parcels. In contrast, Stevens et al. (1999) found that landowners rated cooperative management programs slightly below independently managed ones. However, little is known about NIPF landowners' attitudes and preferences toward cooperative management. Given this, public programs that effectively promote cooperative management have generally not been developed (Rickenbach et al., 1998).

US government agencies, for over four decades, have tried to motivate NIPF landowners to improve management on their lands. They have provided mainly technical assistance and financial incentives. However, these programs have had limited success. Recent literature is exploring this gap by identifying

the factors that predict adoption of government programming (Graesser and Force, 1996; Mills et al., 1996; Race and Curtis, 1996; Lorenzo and Beatty, 1996). Considering the limited success of government programs to motivate NIPF owners, it is vital that government agencies begin to understand woodlot owners' motivations for owning and managing their woodlots. This study builds on these themes. The study focuses on two Michigan townships where non-farmer ownership is increasing. Site analyses and a survey instrument are used to gain insights into the motivations and management attitudes of NIPF owners.

### 3. Study context

#### 3.1. Tecumseh-Clinton and Fairfield Townships

Two townships in the River Raisin watershed examined in this study—Tecumseh-Clinton Township and Fairfield Township in Lenawee County, MI. The River Raisin (Fig. 1) is located in southeastern Michigan and flows into the western basin of Lake Erie. The watershed is dominated by agricultural land use; over 70% of the land is used for agriculture and Lenawee County is one of the highest cash crop-producing counties in Michigan (Allan et al., 1997).

The headwaters of the River Raisin originate in a farming and resort area known as the Irish Hills of Lake District, comprised primarily of forested lands interspersed with small farms. Hilly moraines, moderate to steep gradients, and glacial lakes characterize this western highlands region, where Tecumseh-Clinton Township is located. A mixed pattern of woodlot and riparian forests is spread across the landscape. The lower half of the watershed is in the former lake plain of Lake Erie and is characterized by flat topography. The lake plain landscape is primarily farmland with scattered woodlots. Fairfield Township is typical of this part of the watershed.

The River Raisin watershed and Lenawee County are facing development pressure from the cities of Ann Arbor, Monroe and Detroit. It is foreseen that as the Detroit Metropolitan Region grows over the next 20 years, the study area will see increased urbanization and suburbanization. Currently, residential development is mostly clustered around the river and tributaries, but is increasing throughout former

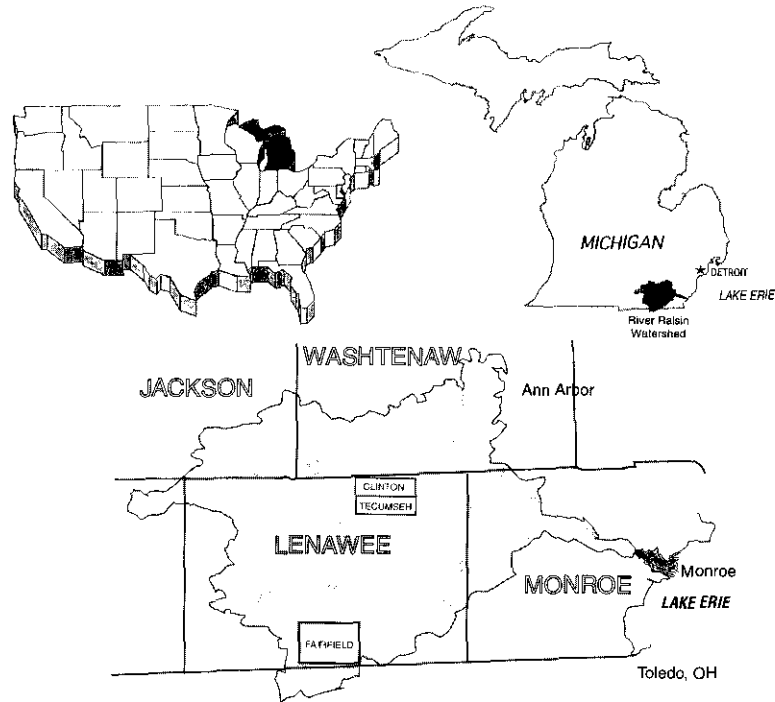


Fig. 1. The location of Clinton-Tecumseh and Fairfield Townships within the River Raisin Watershed in southeastern Michigan (USA).

farmed land. Outside of the towns and villages, agricultural and rural residential zoning predominates.

Tecumseh-Clinton and Fairfield Townships have been the focus of detailed analyses of land use change (Erickson, 1995; Allan et al., 1997), landscape ecology (Roth et al., 1996), landowner perceptions (Tecumseh-Clinton) (Ryan, 1998), and land parcelization (Kleiman and Erickson, 1996). While the two townships are only 116 km apart, they vary by level of urbanization, distance from large urban centers, and political structures. Tecumseh-Clinton is more urban and growing rapidly, whereas Fairfield's population has decreased since the 1960s. Although both townships are primarily agricultural, both saw increasing development from the 1960s to 1990s. Tecumseh-Clinton has a balanced mixture of urban, rural residential and agricultural land uses. Fairfield has no incorporated cities or villages and is removed from the rapid rural residential development of other southeastern Michigan townships that are closer to urban centers.

Previous studies of land use and environment change have shown that the amount of woodlands is increasing in the River Raisin watershed, especially

along riparian corridors (Erickson, 1995; Allan et al., 1997). These townships are primarily in agricultural land use; however, from 1968 to 1988, the woodland area in Tecumseh-Clinton Township increased by 17.5% and Fairfield's increased by 8.5%. The two townships had similar increases in forest cover along riparian areas: 37 and 42%, respectively. In addition, the woodlands in both townships have become more contiguous during this same period, particularly during the 1970s. Tecumseh-Clinton experienced a 14-fold increase in connectivity, while this measure was 150% greater in Fairfield Township. A greater degree of this forest consolidation occurred in the upland forests rather than in the riparian forests and it occurred more on multiple-owner, rather than single-owner forest patches. Approximately one-half of the woodlots in each township are in multiple ownership (three or more owners).

### 3.2. Research questions and hypotheses

While these previous land cover analyses describe the location and rate of forest cover change, they have

not answered why these changes have occurred. Subsequently, five research questions helped frame this study.

1. What is motivating NIPF landowners to allow an increase in these forests? We hypothesized that non-economic motivations are stronger than economic ones.
2. What management practices do these woodlot owners undertake? We expected that a more passive type of management is being practiced and that much of the increase in woodlot area is due to natural revegetation as land is taken out of production.
3. Where are these new forests occurring? On marginal lands? In addition to the human factors that may influence forest regeneration, it was also hypothesized that natural landform conditions are influencing the rate and location of new forest cover.
4. Since many of the woodlots that are increasing in size span multiple ownership boundaries, might there be cooperative management strategies that owners are involved in to aid this forest increase?
5. Is there a difference between farm and non-farm owners in regard to NIPF motivations and management approaches? We expected farm owners to be more motivated by economic considerations and to have a more active type of management in place for their forested lands.

## 4. Methods

### 4.1. Sample

An analysis of woodlot ownership for the study area was done as an introductory step to understand and describe the patterns of change. The following process was used. (1) All wooded patches were identified for the two townships by updating 1978 data from the Michigan Resource Inventory System (MIRIS) with 1988 black and white aerial photographs. Resolution was 1 ha. (2) Wooded patches were drawn on 1994 Plat (ownership) maps in order to overlay the NIPF lands onto ownership boundaries. (3) Property assessor maps were used to find names and addresses for all NIPF owners who owned parcels of 4 ha or more in size. (Under Michigan law, landowners are allowed to subdivide land into 4 ha parcels outside the purview of

subdivision regulation. Therefore, 4 ha is a common parcel size.)

### 4.2. Survey instrument

A survey instrument was developed, pre-tested and mailed. The survey included items measuring seven factors. Four factors measured the importance of wooded land and focused on natural area constraints, economic constraints, aesthetic reasons, and environmental protection. Three factors measured the management of woodlots and focused on new tree planting, cooperative management and hands-off management. Background questions, measuring such things as percent of farm income, were also included. Surveys were mailed to 178 and 136 NIPF owners in Tecumseh-Clinton and Fairfield Townships, respectively, for a total of 314. Of these, 67 responses were from Tecumseh-Clinton Township and 45 from Fairfield Township. A total of 112 responses were received, for a response rate of 35%.

### 4.3. Profile of respondents

The background questions on the survey revealed that an equal number of non-farmer and part-time farmers responded (42.2%), while only 15.6% were full-time farmers. The sample is split roughly in half between those who own more than and less than 17 ha. In addition, a majority of the landowners comprise the first generation in the family to own their property (63.6%), while 15% are the second generation and 21.5% are the third generation, or higher, on the land.

Only about one-third of the respondents report that they have a conservation plan for their land. Of the responding farmers, about one-third participate in the federal Agricultural Conservation Program, while another fourth of the farmers reported familiarity with this, and other US Department of Agriculture (USDA) conservation incentive programs. Fifteen percent of farmers participate in two other USDA programs—Conservation Reserve Program and Stream Protection Practice Program.

### 4.4. Data analysis

Dimensional analysis was used in this study to examine the structure of the data. All items used a

5-point Likert rating scale (Likert, 1932). Some individual items were worded in the negative with their data reversed before analysis so that a score of five always indicates positive endorsement for an item. The procedure used to identify categories from among the items was a metric factor analysis program. Kaplan (1974) has suggested three criteria useful in interpreting the output from such programs. The criteria stipulate that any particular questionnaire item should be included in no more than one category, each category should “hang together” statistically as indicated by Cronbach’s coefficient of internal consistency,  $\alpha$  (Cronbach, 1951; Nunnally, 1978) and the category should make sense, having face validity. The output of the factor analysis program was used to identify highly coherent and stable categories. Following the identification of these categories, scales were constructed for each by calculating a respondent’s average rating of the items that formed each category. This resulted in a single score on each category for each respondent. These scores were used in exploring the differences among farmer and non-farmer respondents.

## 5. Results

### 5.1. Motivations for retaining and protecting wooded patches

Aesthetic appreciation was reported as the strongest reason for owning and protecting woodlots, as shown in Table 1. In fact, one of the highest rated individual items was “add beauty”. The character of the rural landscape and the seasonal beauty are strong forces among NIPF owners. The highest rated item, “wildlife habitat”, relates both to aesthetic appreciation and to environmental protection. Woodlots were also reported as important for the continuity they give to the landscape. While both farmers and non-farmers were quite motivated by aesthetics for retaining their woodlots, non-farmers rated this factor significantly higher than did the farmers (see Table 2).

Second to aesthetics, environmental protection was a strong motivator for retaining and protecting woodlots. Items in this category referred to the benefits of woodlots for preventing soil erosion, protecting native plants and/or windbreaks. There was no significant difference between farmers and non-farmers (Table 2).

Table 1  
Benefits of woodlots<sup>a,b</sup>

|  | Mean    | S.D. | $\alpha$ |
|--|---------|------|----------|
| Aesthetic reasons                            | 4.19 a  | 0.78 | 0.74     |
| Add beauty                                   |         |      |          |
| Enhance the rural landscape                  |         |      |          |
| Show change of seasons                       |         |      |          |
| Wildlife habitat <sup>c</sup>                |         |      |          |
| Environmental protection                     | 3.48 b  | 1.09 | 0.73     |
| Protect native plants                        |         |      |          |
| Give a sense of permanence                   |         |      |          |
| Protect soil from erosion                    |         |      |          |
| Wet ground                                   |         |      |          |
| Windbreak                                    |         |      |          |
| Economic benefits                            | 2.33 c  | 0.96 | 0.58     |
| Identify field boundaries                    |         |      |          |
| Source of firewood                           |         |      |          |
| Shelter for livestock                        |         |      |          |
| Valuable for timber and lumber               |         |      |          |
| Natural area constraints                     | 2.19 c  | 0.96 | 0.84     |
| Difficult to clear                           |         |      |          |
| Difficult to plant for crops                 |         |      |          |
| Land is only good for growing trees          |         |      |          |
| Not profitable to clear for fields           |         |      |          |
| Too near stream or river                     |         |      |          |
| Steep slopes                                 |         |      |          |
| Individual items                             |         |      |          |
| Save for future development                  | 2.11 c  | 1.49 |          |
| Divide the open landscape                    | 2.35 c  | 1.49 |          |
| Receive government compensation <sup>d</sup> | 1.18    | 0.71 |          |
| Familiar landmarks                           | 2.85 e  | 1.32 |          |
| Inherited woods; plant to keep them intact   | 2.91 de | 1.74 |          |
| Hunting                                      | 3.33 bd | 1.59 |          |
| Always been part of the property             | 4.24 a  | 1.19 |          |
| Part of conservation plan                    | 2.00 c  | 1.38 |          |

<sup>a</sup> Woodlots can be important for many reasons. Please indicate how well the following describe your reasons for retaining woods on your property: 1, not at all; 2, a little; 3, some; 4, a lot; 5, a very great deal.

<sup>b</sup> All pairwise comparisons of means are significant at  $P < 0.05$  except those sharing different letters.

<sup>c</sup> Highest rated individual item.

<sup>d</sup> Lowest rated individual item.

Economic reasons for retaining woodlots received a low endorsement (Table 1). Farmers indicated that economic factors, such as using woodlots as a source of firewood or timber, were more important than did the non-farmers (see Table 2). However, farmers still did not rate these economic constraints as highly as they did the aesthetic or environmental issues. Low

Table 2  
Mean scores on reasons for retaining woodlots by percentage of farm income

|                          | Mean scores     |                          |                            | F    | d.f. | Significant |
|--------------------------|-----------------|--------------------------|----------------------------|------|------|-------------|
|                          | Non-farmer (0%) | Part-time farmer (1–49%) | Full-time farmer (50–100%) |      |      |             |
| Aesthetic reasons        | 4.44            | 4.06                     | 3.96                       | 4.02 | 2,10 | $P < 0.01$  |
| Environmental protection | 3.59            | 3.40                     | 3.29                       | –    | –    | n.s.        |
| Economic constraints     | 2.06            | 2.46                     | 2.91                       | 5.43 | 2,99 | $P < 0.01$  |
| Natural area constraints | 1.93            | 2.31                     | 2.70                       | 2.98 | 2,97 | $P < 0.05$  |

<sup>a</sup> Significant difference at the  $P < 0.05$  level was found when comparing farmers to non-farmers.

rated individual items also reveal a number of factors that do little to motivate NIPF owners; “receiving government compensation for retaining one’s woodlots” (i.e. USDA and other government programs) was by far the least likely to motivate protection.

The natural constraints of woodlot areas emerged as the weakest motivator for maintaining wooded areas (category mean = 2.19); they were reported as significantly less important than aesthetics and environmental protection. Examples of these motivations include “not profitable to clear for fields”, “too near stream or river” and “difficult to plant for crops”. These constraints may make the land more difficult to use for farming, as evidenced by farmers rating these higher than did non-farmers (Table 2).

### 5.2. Management of woodlands

Actively planting new trees is not a management strategy that occurred frequently among these NIPF owners, as shown in Table 3 (category mean = 1.94). Furthermore, a separate item indicated that very little selective logging was being done (item mean = 1.81). These findings indicate that a more passive type of woodlot management is being practiced. Hands-off management was significantly rated as the most important type of management (category mean = 3.22), with “letting nature take its course” as the highest rated item with a mean of 4.06. Other items include “allow young trees to remain on edge of woods” and “allow fields to revert to brush and woods”. Non-farmers were significantly more apt to practice this hands-off approach to management (Table 4). Part-time farmers and non-farmers were more likely to maintain trails on their land, which suggests that management for recreation is important

for these groups. Farmers, however, were more likely to engage in selective logging and less involved maintaining trails on their land.

We hypothesized that since woodlot patches in multiple ownership were increasing in size and connectivity possibly due to cooperative management across property lines, we tested for this effect. We used measures such as, for example, “jointly manage land with adjacent land owners”, “influenced by the management of adjacent land”, and “help neighbors identify resources on their land”. The results of this study do not support this idea. Cooperative management received a significantly lower rating than the other management approaches (Table 3). Cooperative management was rated equally low for farmers and non-farmers.

About half of the NIPF owners indicated in another survey question that they had allowed part of their fields or other cleared land to revert to woods. This finding lends support to the “hands-off” management approach discussed above. The results described in Table 5 (top part) suggest that conversion of farmland to large-lot residential use actually encourages the conversion of farm fields back to shrubland and eventually to forests although the long-term ecological impact of such conversion is unknown. Resident landowners were significantly more likely to allow land to revert to woods than were part-time or full-time farmers. While part-time farmers were equally likely to keep their land cleared as to allow it to revert to woods, full-time farmers were very likely to keep land from reverting to woods. This makes very good sense given that farmers use cleared land for its productive potential more directly than do non-farmers or part-time farmers.

Where are these new woods growing? Participants indicated that about half of this new growth

Table 3  
Woodlot management<sup>a,b</sup>

|  | Mean    | S.D. | $\alpha$ |
|--|---------|------|----------|
| Hands-off, no management                                       | 3.22 a  | 0.90 | 0.65     |
| Allow young trees to remain on edge of woods                   |         |      |          |
| Let nature take its course <sup>c</sup>                        |         |      |          |
| Allow fields to revert to brush and woods                      |         |      |          |
| Maintain views from my land                                    |         |      |          |
| Actively plant new trees                                       | 1.94 b  | 0.92 | 0.80     |
| Plant harvestable trees  |         |      |          |
| Manage land with larger impacts in mind                        |         |      |          |
| Plant trees and shrubs native to this area                     |         |      |          |
| Plant new trees in my woods                                    |         |      |          |
| Designate land as a tree farm <sup>d</sup>                     |         |      |          |
| Plant new windbreaks and hedgerows                             | 1.84    |      |          |
| Cooperative management   | 1.69 c  | 0.70 | 0.64     |
| Influenced by the management of adjacent land                  |         |      |          |
| Maintain hedgerow with neighbor                                |         |      |          |
| Encouraged by seeing neighbors retain their hedgerows/woodlots |         |      |          |
| Help neighbors identify resources on their land                |         |      |          |
| Jointly manage land with adjacent landowners                   |         |      |          |
| Individual items   |         |      |          |
| Selectively log my land  | 1.81 bc | 1.16 |          |
| Cut down dead trees  | 3.20 a  | 1.35 |          |
| Maintain trails across my land (to be used by my family)       | 3.28 a  | 1.47 |          |

<sup>a</sup> Please indicate how well each of the following describe the management of your woodlots: 1, not at all; 2, a little; 3, some; 4, a lot; 5, a very great deal.

<sup>b</sup> All pairwise comparisons of means are significant at  $P < 0.05$  except those sharing different letters.

<sup>c</sup> Highest rated individual item.

<sup>d</sup> Lowest rated individual item.

occurring adjacent to existing woods or at the edge of existing fields (see bottom of Table 5). The leading environmental condition that aided this growth was related to poor drainage. Corridors along streams and

rivers were also the location of about one-third of these field conversions. Seasonal flooding was an important environmental constraint described by owners. Land speculation was reported as unimportant

Table 4  
Differences in attitudes toward management by percentage of farm income

| Categories                  | Mean scores     |                          |                            | F    | d.f. | Significance |
|-----------------------------|-----------------|--------------------------|----------------------------|------|------|--------------|
|                             | Non-farmer (0%) | Part-time farmer (1–49%) | Full-time farmer (50–100%) |      |      |              |
| Actively plant new trees    | 2.08            | 1.85                     | 1.73                       | –    | –    | n.s.         |
| Cooperative management      | 1.63            | 1.80                     | 1.54                       | –    | –    | n.s.         |
| Hands-off, no management    | 3.50            | 3.16                     | 2.44                       | 7.43 | 2.96 | $P < 0.001$  |
| Individual items            |                 |                          |                            |      |      |              |
| Selectively log my land     | 1.60            | 1.80                     | 2.64                       | 4.65 | 2.96 | $P < 0.05$   |
| Cut down dead trees         | 3.30            | 3.21                     | 2.88                       | –    | –    | n.s.         |
| Maintain trails across land | 3.58            | 3.36                     | 2.31                       | 4.06 | 2.97 | $P < 0.05$   |
| n                           | 46              | 46                       | 17                         |      |      |              |



Table 5  
Relationship of field conversion to woods and percentage of farm income<sup>a</sup>

|     | Non-farmer<br>(0%) | Part-time<br>farmer (1–49%) | Full-time<br>farmer (50–100%) | Total <i>n</i> (%) | Statistical significance  |
|-----|--------------------|-----------------------------|-------------------------------|--------------------|---------------------------|
| Yes | 29                 | 22                          | 2                             | 54 (50.9)          | $\phi = 0.337, P < 0.005$ |
| No  | 16                 | 22                          | 13                            | 52 (49.1)          |                           |

If yes, please describe where this new growth occurs

| Description                    | <i>n</i> (%) <sup>b</sup> |
|--------------------------------|---------------------------|
| Near existing woods            | 30 (56)                   |
| Edge of existing woods         | 30 (56)                   |
| Wet ground                     | 28 (52)                   |
| Strips along streams or rivers | 21 (39)                   |
| Steep slopes                   | 18 (33)                   |
| Seasonally flooded             | 16 (30)                   |
| Entire fields                  | 15 (28)                   |
| Dry ground                     | 12 (22)                   |
| Level land                     | 11 (20)                   |
| Poor soil                      | 10 (19)                   |
| Rocky ground                   | 6 (11)                    |
| Parcels which you plan to sell | 1 (2)                     |

<sup>a</sup> Sometimes it makes sense to allow fields and other cleared areas to revert to shrubs and trees. Have you *allowed* this to occur on any of your property?

<sup>b</sup> Participants could indicate as many boxes as were pertinent in their situation, so percentage of conditions exceeds 100%.

overall; allowing fields to convert to woods because of future plans to sell parcels was actually the least likely reason for land cover change.

## 6. Discussion

This study reveals a number of implications for the rural landscape and for those who own and manage woodlands. No longer are these places set aside for economic reasons alone; they are now recreational and quality of life amenities in the countryside. This is consistent with the literature on woodlots and their owners (Ticknor, 1993; Williams et al., 1996; Haymond, 1988). Furthermore, it is consistent with the literature in conservation behavior that explores intrinsic versus extrinsic motivations (De Young, 1996). These findings are optimistic in that they speak to peoples' affective connections to land. We have only begun to understand the implications of these connections in terms of planning and management. For woodlands, this finding is optimistic for it implies that people are able to take a "landscape perspective", to see beyond their own economic interests and to do

what makes sense for visual quality, environmental health and recreational potential. One respondent wrote on his/her survey, "we need to preserve as much of our natural fields and woodlots as possible in order for our children and grandchildren to look at and experience". At a theoretical level, this contributes to the notion that self-interest extends far beyond economic gain.

Non-farm owners control an increasing percentage of private forested land and may be a particularly good group to target in terms of restoring previously cleared land. They are particularly motivated by non-economic factors. Farm owners face different pressures, especially to keep land cleared for crops. However, this study illustrates that farmers are still concerned with woods for pleasure—for views of changing seasons and wildlife, as previous studies have shown (Erickson and De Young, 1994). Thus, farmers still appear to be valuable stewards of forest land, despite economic pressures.

For NIPF owners who are taking a hands-off approach to woodlot management, the link between actively managing their wooded land and the non-economic benefits that they enjoy may need to be

made explicit. Many are probably unaware of the opportunities that exist for creative management. Therefore, management assistance programs could not only be geared to non-farm owners on small tracts, but to helping them develop non-economic outcomes like wildlife habitat, visual quality and recreation. These goals are not always overt in most existing programs.

The information on motivations for owning and managing woodlands is important for those who create programs to protect these landscapes. Program planners need to be aware of what landowners really perceive and value in their woodlands. Programs might be constructed to target newer owners and non-farm owners, particularly to reverse the effects of fragmentation and to maximize recreational, environmental and aesthetic factors. For instance, the Forestry Incentives Program (FIP), authorized in the 1996 Farm Bill (United States Congress, 1996), provides cost-share assistance to NIPF owners for tree planting, timber stand improvements and related practices. FIP is intended to assure future demand for timber products.

The results of this study suggest that FIP and other federal programs might focus more on the aesthetic and environmental benefits of good woodlot management and target a broader base of NIPF owners, including rural non-farm residents. Programs might be more clearly tailored to different types of forest owners. While farmers appreciate the aesthetic value of their woodlots, they are also more likely to log these woods and see other economic value in them. Therefore, programs such as FIP that aid in active management planning are more likely to be successful with farmers. On the other hand, programs that specifically address wildlife habitat, scenic quality, and recreational values might be more appropriate for non-farm NIPF owners. Similarly, it will be increasingly important to convey to the general public the importance of these lands. "Continuing to concentrate our education efforts on forest owners alone will do little to improve the acceptance of forest management by the American public. And it is in the public arena that the future of American forestry is being determined" (Bliss et al., 1994, p. 10).

Finally, there may be important potentials for collaborative management across private boundaries. In this study, NIPF owner collaboration was minimal. Even though we did not see conscious cooperation among landowners in our study area, we did find

patterns on the landscape that show increased forest cover across ownership lines. This suggests that NIPF owners, especially non-farmers and part-time farmers, are allowing marginal lands to revert to woods. Contrary to what we might expect, the conversion of this rural agricultural landscape to smaller residential holdings may have some positive consequences for landscape connectivity.

There may be barriers to cooperative management, as discussed by Washburn (1996); mistrust of government; reluctance to sacrifice individual sovereignty; disinterest based on lack of time; or the perception that group interaction necessitates following some externally determined protocol. Further research will be needed to understand these issues. Some researchers have promoted various methods and programs for overcoming these barriers to cooperative NIPF management (Washburn, 1996; Campbell and Kittredge, 1996; Sample, 1994).

## **7. Conclusion**

Clearly, NIPF owners are motivated by a powerful set of non-economic motives. This research corroborates previous results where aesthetics and environmental protection were found to be more significant motivations for maintaining woodlots than were economic motives, especially among non-farm residents. Landowners, particularly non-farm owners, are increasingly managing woodlands in a hands-off way, and allowing land to revert to woods near streams and at the edges of fields. We hypothesized that cooperative management accounted for some of the increase in forest cover. However, it appears that increased woodlot area has more to do with changes in types of ownership than with cooperation among neighbors. In addition, this research supports the notion that different categories of NIPF owners are motivated in different ways. Government programs for woodlands in rural US landscapes need to be shaped in ways that address the complex nature of woodlot ownership.

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