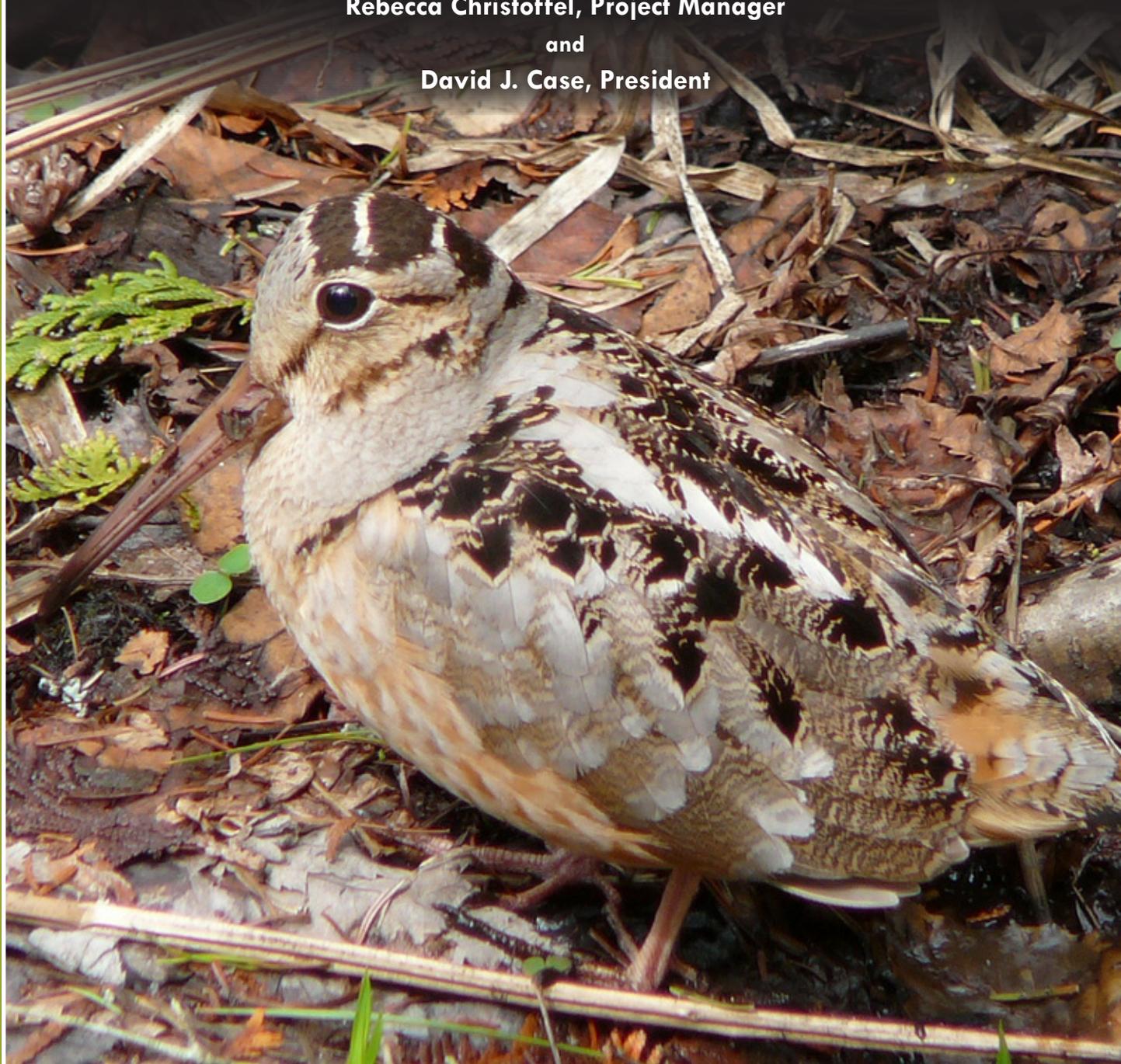


**Investigating Communication Strategies to Support Implementation of the
American Woodcock Conservation Plan**

Annotated Bibliography

**Submitted by
Rebecca Christoffel, Project Manager
and
David J. Case, President**



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Cover image of woodcock by Garelvirat, flickr.com

Brooks, R.T. 2003. Abundance, distribution, trends and ownership patterns of early-successional forests in the northeastern United States. *Forest Ecology and Management* 185: 65-74.

“Early successional forests are ephemeral and distinct forest communities, maintained by disturbance and dominated by small-sized trees and shrubs. These structural and compositional conditions form a unique habitat that is preferred by many wildlife species. Various sources have indicated that there have been declines in early-successional forest area and in the populations of many wildlife species associated with these habitats across the northeast. Results of the Forest Inventory and Analysis (FIA) Program from four survey occasions were summarized for 11 states in the northeastern United States to identify recent trends in the area of early-successional forests. Early-successional forests were defined as sapling/seedling-size and non-stocked-size timberland. The area of total forest land has remained relatively constant in the northeast; however, the area of early-successional forests has declined since the first forest surveys (ca.1950). Losses were greater in the coastal states than among interior states. The area of early-successional forest among coastal areas is approaching or below conditions that are estimated to have existed under disturbance regimes occurring prior to European settlement of the northeast; for interior areas, the current area of early-successional forest still exceeds estimated historic conditions. The majority of forest land in the northeastern United States have been privately owned by individuals since European settlement; this ownership pattern has affected forest change more than natural disturbances. Population increases in the northeast over the last 50 years have not resulted in the loss of forest land to residential and associated developments. However, the fragmentation of forest ownerships (i.e. parcelization) into ever smaller ownerships has imposed social and logistical restrictions on forest management options. The creation and maintenance of sufficient early-successional forests to sustain wildlife populations dependent on this habitat will require active intervention and management.

Forest land ownership patterns were surveyed by FIA using questionnaires mailed to the owners of forest land where the forest survey plots occur. Ownership surveys were conducted less frequently than forest surveys, and were first conducted between 1972 and 1983 in the 11 northeastern states (Table 1). Private forest ownerships were re-surveyed in 1994 as part of a national survey (Birch, 1996). Private forested ownership constituted 88% of all timberland in the northeastern states in 1997 (Smith et al. 2001).

Forest land covered 66% of the 45 million ha of the 11 northeastern states in the most latest national forest survey summary of 1997 (Smith et al., 2001). During the first forest survey period (1948-1959) early-successional forests accounted for about 22% of total timberland in the northeast, or approximately 5.8 million ha. Early successional forests increased in area by about 3.2 million on ha by the second survey period (1968-1976) to about 33% of timberland. It then decreased dramatically to about 4.7 million ha, or 17% of timberland, by the third survey period (1978-1987). The area of these forests remained at these levels during the most recent surveys.

In Southern New England, early-successional forests comprised only 5% of total timberland area (92,000 ha) in the most recent survey period. This is down from 36% reported in the first survey period. The area of early-successional forests also declined precipitously in the coastal mid-Atlantic states, from 29% of timberland in the initial survey period to 12% in the most recent surveys, a loss of some 200,00 ha.

In the most recent national summary of forest surveys, individuals (non-industrial private forest (NIPF) owners) owned the timberland of the northeast, with only 12% in public ownership and 15% owned by forest industries (Smith et al., 2001). This pattern of ownership was essentially unchanged since the early 1950s (Smith et al., 2001). The number of NIPF owners increased from less than 1.7 million to almost 2 million between the first forest ownership surveys of the 1970s and 1980s and the national ownership survey in 1992 (Table 3). The majority of NIPF owners own less than 10 acres (0.4 ha; the smallest reported size-of-ownership) and their number increased from 56 to 60% of all NIPF owners between surveys. Despite the large number of owners of small forest parcels, their collective ownership comprised only of 5% of all NIPF timberland at both ownership survey occasions. Almost three-quarters of all NIPF timberland in the northeast was in ownerships of 50 acres (20 ha) or larger in both surveys. In Southern New England, the number of owners of the smallest forest parcels (<0.4 ha) increased from 57 to 82% of all NIPF ownerships between surveys, whereas the number of owners of all larger ownerships decreased. In the coastal mid-Atlantic states, the pattern was the same. Between 1950 and 2000, the human population of the coastal mid-Atlantic states increased 93%, to a population density of 2.9 persons/ha in 2000; in southern New England the increase was 44%, to an average density of 3/ha. The human population of northern New England also increased considerably, 71% over the 50 years, but population density in the region was still only 0.2/ha in 2000.

It is likely that regenerating and young forests were most abundant in the northeast during the first half of the 20th century. The loss of early-successional forest in the northeast was caused by the maturation of the forest, not by the loss of timberland to other land uses. Forest land in the northeastern United States is and has been a resource owned and controlled by individual private forest (NIPF) owners. The dominance of NIPF ownership of forest land has been the major determinant of the extent and distribution of early-successional forests in the northeast (DeGraaf and Yamasaki, 2001). While the actual area of forest lost to residential development remains small, parcelization results in the loss of wildlife habitat to homes, lawns, roads, and other developed land covers and negative impacts of residential use on the remaining, adjacent forest habitat. The parcelization of large forest ownerships into numerous smaller ones precludes the efficient use of silviculture to manage forest for wildlife resources (Kittredge et al., 1996). Additionally, recent arrivals to rural landscapes often are opposed to timber harvests, and are more likely to support local restrictions on timber harvesting (Dennis, 1992).

Other than natural disturbance, the most efficient means to create and maintain these habitats are through the use of silviculture (Thompson and Dessecker, 1997; Thompson and DeGraaf, 2001; DeGraaf and Yamasaki, 2003). Programs to manage for early-successional forest habitat will require the use of incentives such as voluntary tax savings programs with management stipulations (Dennis, 1992), the promotion of non-timber objectives for forest management (Roberts and Parker, 1998), and the aggregation of small parcels into more operable units (Dedrick et al., 2000; Barten et al., 2001). Throughout the Northeast, the maintenance of sufficient early-successional forest habitat to sustain populations of early-successional wildlife will require active intervention. Programs for this purpose are occurring in Connecticut and Massachusetts (Rothbart, 1999; Oehler, 2003).”

Butler, B.J. 2008. Family Forest Owners of the United States, 2006. Gen.Tech.Rep. NRS-27, Newtown Square, PA: U.S. Department of Agriculture, Forest Service, Northern Research Station. 72 p.

This report summarizes results from the U.S. Forest Service's National Woodland Owner survey of the estimated 10 million family forest owners who own 264 million acres (35 percent) of forest land in the United States. His team collected information between 2002 and 2006 on family forest owners' forest holding characteristics, ownership histories, ownership objectives, forest uses, forest management practices, preferred methods for receiving information, concerns, future intentions, and demographics. National, regional and state summary tables are included.

What is perhaps most relevant to the North American Woodcock Conservation Initiative is the link to the database for state-specific information on family forest owners, and the associated behaviors, demographics, etc. A second very useful bit of information is that Brett Butler co-leads the Family Forest Research Center located with the University of Massachusetts-Amherst in Amherst, MA.

Key definition: Family forest owner – Families, individuals, trusts, estates, family partnerships, and other unincorporated groups of individuals that own forest land. This group is a subset of nonindustrial private forest owners.

Highlights pertinent to the Woodcock project:

- “Family forest owners account for 92% of the private forest owners and 62% of the private forest land in the United States.
- Sixty-one percent of family forest owners in the United States own <10 acres of forest land, but 53% of the family forest land is owned by people with 100 or more acres.
- Most family forest owners own their forest land for multiple reasons, most commonly: beauty/scenery, to pass land on to their heirs, privacy, nature protection, and part of home/cabin.
- Issues most commonly rated as major concerns by family forest owners are insects and plant diseases, keeping land intact for their heirs, fire, trespassing and property taxes.
- Compared to the general population, there are a greater proportion of family forest owners who are older, white, male, more educated and wealthier.”

Butler, B.J., M. Tyrrell, G. Feinberg, S. VanManen, L. Wiseman, and S. Wallinger. 2007. Understanding and reaching family forest owners: lessons from social marketing research. Journal of Forestry 2007: 348-357.

This article explores the applicability of social marketing to family forest land owners across the United States and presents a typology of family forest land owners in terms of marketing efforts. The authors used a hierarchical, multivariate analysis based on landowners' attitudes to reveal four groups of owners to whom programs can be tailored: woodland retreat, working the land, supplemental income, and ready to sell. They further used a prime prospect analysis to segment landowners according to their level of engagement and interest in land management to improve the efficiency of program implementation. The authors conclude that landowners who show low levels of engagement but high levels of interest are of special interest because they are likely to be receptive to a social marketing message and therefore should be a priority target for such efforts. The authors used the

demographic profile of the average family forest owner (white male, > 55 years old, traditional, not an innovator) to identify newspapers and television as important means for mass communication to these groups. This article contained a great table with a synopsis of characteristics of family forest owners with 1 – to 999-acre forest holdings in the coterminous United States by attitudinal group. This table is based on the NWOS survey that Brett Butler leads. The response rate to that survey was 49%, and is based on 8,051 family forest owners who participated in the NWOS from 2002- 2004. Most of the owners who own most of the family forestland are conservation minded or appear to be interested in protecting their land from development, but few have taken the concrete step of placing a conservation easement on their land. In general, the plurality of family forest owners are woodland retreat owners; they own smaller parcels and live on their land. They are very likely to indicate amenity values as the most important reasons for owning their forestland and are unlikely to indicate financial motivations. Another useful insight was that the target population is likely to be involved with civic groups, particularly religious, veterans, charitable, and fraternal organizations. This indicates a willingness to “get involved” and thus, the audience might be receptive to messages about land stewardship, particularly if pitched as a community effort and disseminated through one of these types of organizations. It is suggested that a conservative icon might be an effective celebrity spokesman in many parts of the country. Family legacy is both a major objective and a great concern for many of these owners. Messages related to inheritance and legacies will be well received. In addition, because the audience consists primarily of followers rather than leaders, messages should emphasize becoming part of a venerable tradition rather than forging a new solution.

Butler, B.J., E.C. Leatherberry and M.S. Williams. 2005. Design, implementation and analysis methods for the National Woodland Owner Survey, Gen. Tech, Rep. NE-336, USDA, Northeastern Research Station: Newtown Square, PA.

The National Woodland Owner Survey (NWOS) is conducted by the USDA Forest Service, Forest Inventory and Analysis program to increase our understanding of private forest landowners in the United States. The information is intended to help policy makers, resource managers, and others interested in the forest resources of the United States better understand the social context of forests and formulate more informed opinions and decisions. Every year, a different set of approximately 6,500 private forest-land owners from across the country were asked to participate in the NWOS. This document describes the design, implementation, and processing of data for the NWOS from 2002 through 2006. The primary focus of the NWOS is private forest-land owners, especially family and individual owners. Data collected by the National Woodland Owner Survey fall into eight groups: (1) forest land characteristics, (2) ownership objectives, (3) forest use, (4) forest management, (5) sources of information, (6) concerns and issues, (7) future intentions, and (8) demographics. One insight offered by this report is that it is useful to know if a person lives on the forest land or is an absentee forest-land owner because the two groups tend to behave differently. Also, agencies generally lack information regarding people who do NOT participate in cost-share programs. The NWOS asks about participation in programs and allows for the comparison of individuals who participate versus individuals who do not participate. The NWOS also investigates the sources people turn to for advice and information about their land and its management. Telephone calls were used to augment response rates. They have not yet dealt with non-response errors/bias but will investigate in future iterations.

DeGraaf, R.M. and M. Yamasaki. 2003. Options for managing early-successional forest and shrubland bird habitats in the northeastern United States. *Forest Ecology and Management* 185:179-191.

“Historically, forests in the northeastern United States were disturbed by fire, wind, Native American agriculture, flooding, and beavers (*Castor Canadensis*). Of these wind and beavers are now the only sources of natural disturbance. Most disturbance-dependent species, especially birds, are declining throughout the region whereas species affiliated with mature forests are generally increasing or maintaining populations. Disturbance must be simulated for conservation of early-successional species, many of which are habitat specialists compared to those associated with mature forests. Both the maintenance of old fields and forest regeneration are needed to conserve brushland species. Regenerating forest habitats are more ephemeral than other woody early-successional habitats. The types and amounts of early-successional habitats created depend on the silvicultural system used, patch size selected, time between regeneration cuts, and rotation age. We recommend that group selection and patch cuts should be at least 0.8 ha, and patches should be generated approximately every 10-15 years depending on site quality. Regeneration of intolerant and mid-tolerant tree species should be increased or maintained in managed stands. Also, frost pockets, unstocked, or poorly-stocked stands can provide opportunities to increase the proportion of early-successional habitats in managed forests.”

Finley, J.C. and M.G. Jacobson. 2001. Extension in Pennsylvania: Diverse Partners Working Together. *Journal of Forestry*, March 2001: 9-11.

Finley and Jacobson present Pennsylvania’s statewide commitment of diverse partners who are working together to support private forest landowners and sustain the state’s hardwood forests. Less than 20% of private landowners have a forest management plan. Pennsylvania’s forests cover nearly 60% of the state’s 28 million acres. Penn State Extension uses the “diffusion of innovation” model (Rogers 1971), focusing on three of its principal elements: awareness, knowledge and adoption. Penn State’s extension program provides materials and training for agencies and cooperatives to assume an active role in knowledge dissemination. The Natural Resources Extension Institutes (NREI) immerse county agent participants in a specific subject or programming area. New York adopted the NREI model in 1999; New York and Pennsylvania jointly conducted an NREI in fall 2000 and plan another in spring 2001. Another partnership program is Pennsylvania’s VIP/Coverts that has contributed to the establishment of 14 county and multicounty forest landowner associations, covering nearly a third of the state’s 67 counties. Cooperative Forest Management (CFM) is a partnership between the USDA Forest Services and state government that provides landowner assistance to improve forest resource management on private land. In 1995, the American Forest & Paper Association (AF&PA) initiated the Sustainable Forestry Initiative (SFI), with the stated objective “to perceptibly improve the performance of member companies.” Another education program under development for SFI by extension and supported by the Audubon Society of Pennsylvania and the Proctor and Gamble Foundation matches forest conditions to wildlife inventory data. In Pennsylvania, people at the local level are becoming the educators and leaders of forest-based activities in their communities, while extension specialists facilitate and prepare educational materials on request.

Finely, A.O., and D.B. Kittredge, Jr. 2006. Thoreau, Muir, and Jane Doe: different types of private forest owners need different kinds of forest management. Northern Journal of Applied Forestry 23 (1): 27-34.

The authors present a three-phase segmentation and analysis designed to highlight the heterogeneity of forest ownership values and attitudes toward government control, privacy and environmental protection held by a sample of Massachusetts private forest owners. They conclude that the key to increasing landowner participation in forest management programs is to (1) recognize the heterogeneity of the target population, and (2) tailor the program to meet segment specific needs and desires. One statement that might help in garnering participation has to do with the numerous social benefits that private forests produce including clean water and air, biodiversity, lumber/wood fiber, wildlife for consumptive and non-consumptive uses, recreation and a scenic backdrop for a rural tourism industry. The authors used three types of multivariate analysis to segment private forest owners based on their management objectives. This included principal components analysis (PCA) for data reduction, followed by a clustering analysis (CA) to identify discrete segments and finally a multiple discriminant analysis (MDA) was used to identify the clustering variables that best exemplify differences among segments. The authors also caution that private forest owners mean different things by "privacy" and so this is something to be aware of when trying to use this as a marketing theme. In this study, they identified a segment known as Thoreau, of which about 2/3 of their survey respondents belonged. This group highly valued privacy and contemplative values of the forest, but were not opposed to timber harvest. This group consisted of people who had a mean age of 58 years and mean parcel size of 70 acres, and greater than 4/5 (83%) lived on their properties. The Muir segment was opposed to timber harvest and though more than 3/4 (77%) lived on their properties, they wanted to leave their lands unmanaged. They were slightly older than the Thoreau's (mean age = 60 years) and their parcel size was somewhat smaller (54 acres). The authors suggest that some Muir's can be convinced to harvest wood with the argument that environmental protection is not necessarily incompatible with forest management and the production of timber, through existing outreach efforts like the Forest Stewards program or the Coverts program. The authors further suggest that the ability to maintain privacy and scenery, while concurrently undertaking harvest, should be emphasized, and they specifically recommend Jones, G. (1993) as a publication that can be used to demonstrate this.

Fredericksen, T.S., B.D. Ross, W. Hoffman, E. Ross, M.L. Morrison, J. Beyea, M.B. Lester, and B.N. Johnson. 2000. Journal of Forestry 2000: 4-10.

Seeing and conserving wildlife are among the most important management objectives for non-industrial private landowners in the eastern United States. Landowners want profitable timber harvests but also want to know how harvesting will affect their wildlife. This study examined associations between stand characteristics and wildlife abundance on 40 stands receiving different logging intensities in northeastern Pennsylvania and found that landowners have some choices when harvesting their stands for retaining or attracting different types of wildlife. Regression analysis was used to test for relationships between wildlife abundance or diversity and vegetation or other stand characteristics across all stands. They have an interesting figure showing how the species richness of birds, small mammals, amphibians and reptiles is related to tree basal area remaining after harvest (stand size ranged 20 – 300 hectares). Time constrained searches were conducted for reptiles and amphibians in July/August and September. As a whole, bird and reptile species richness increased with increased logging intensity, whereas small mammal and amphibian species richness decreased with increased

logging intensity. Logging intensity and forest types were the primary determining factors of wildlife abundance, species richness, and species composition following harvesting on the private woodlands in this study. This study had a couple of great pieces of information cited from work done by Hassinger 1989 – 1) regardless of harvesting rates, retaining snags and cavity trees is important, as 20 species of mammals and 35 species of birds require them, and 2) 19 species of salamanders and 26 species of reptiles make use of logs, stumps, bark, and slash piles in Pennsylvania forests.

Fuller, T.K. and S. DeStefano. 2003. Relative importance of early-successional forests and shrubland habitats to mammals in the northeastern United States. *Forest Ecology Management* 185: 75-79.

“The majority of 60 native terrestrial mammal species that reside in the northeastern United States utilize resources from several habitats on a seasonal basis. However, as many as 20 species demonstrate some preference for early-successional forests, shrublands, or old-field habitats. A few of these (e.g. lagomorphs) can be considered obligate users of these habitats, and the specialist carnivores (e.g. felids) that prey on them may consequently also prefer such habitats. Other mammal species that prefer these habitats certainly depend on them to lesser and varying degrees; thus, the consequences of reducing or eliminating early-successional forests, shrublands, or old-field habitats across the landscape will likely have varying demographic consequences, and thus importance, to those species.

Litvaitis (2001) identified three species of mammals as obligate users of early-successional habitats in the Northeast; the eastern cottontail rabbit (*Sylvilagus floridanus*), the New England cottontail (*S. transitionalis*), and the bobcat (*Lynx rufus*). Populations of New England cottontails, in particular, rise and fall with land clearing and subsequent regrowth of forests, and in recent years have been eliminated from much of their range in the Northeast because of maturing forests (Litvaitis and Litvaitis, 1996).

DeGraaf and Yamasaki (2001) conducted a recent and exhaustive review of the literature, and provide updated natural history profiles of all terrestrial and semi-aquatic vertebrate species in New England. In addition, they presented habitat associations in the form of habitat matrices for all vertebrates endemic to the region, one for forested and one for non-forested cover-types. For the forest matrix, we considered only the “regeneration through seedling” size class (which includes stems <2.5 cm dbh) of each forest type as (very) early-successional habitat. We did not include the sapling through pole size class, even though sapling-sized trees (<12.7 cm dbh) often are included in such categorizations (e.g. Trani et al., 2001).

Of the 60 native terrestrial mammal species that occur in New England (DeGraaf and Yamasaki, 2001), 56 (93%) were identified as using or preferring ≥ 1 seedling/shrub matrix cell (out of 180 forest + 56 non-forest = 236 total cells) at some time of the year. The lagomorphs used early-successional habits more exclusively than any other species. For cottontails, in particular, more than half their used and preferred cells were in such habitats.”

Gobster, P.H. 2001. Human dimensions of early successional landscapes in the eastern United States. *Wildlife Society Bulletin* 29(2): 474-482.

There are three key ways that people perceive, use and value forest landscapes: production and consumption of timber and nontimber forest products, visual and aesthetic perceptions, and recreational uses and choices. Gobster reviews what is known in regards to human dimensions of early succession landscapes and suggests some research directions to increase our knowledge about the human dimensions of early succession landscapes. Along with preferences for early successional species types, timber harvesting and other human and natural disturbances keeps about 23% of all eastern U.S. timberlands in an early successional, seedling-sapling stage (Powell et al. 1994), though this percentage can vary greatly with location within the region (Trani et al. 2001). Nontimber forest products generally include all wildlife and nontimber vegetation in forest and other natural landscapes and can be used for food, wildcraft, medicinal, cosmetic, religious and other purposes. The land area of important early successional forest types is declining in the eastern U.S. This includes a 31% decrease in the area of aspen-birch, a 15% decrease in loblolly-shortleaf pine, and a 46% decrease in the area of longleaf-slash pine timberlands between 1963 and 1992. The timberlands of the eastern U.S. are getting older, especially in the northern half of the region. Sight is by far the most important sensory perception of humans, and thus the appearance of a landscape plays a major role in how it is appreciated and used by people (Bell 2000). Bioevolutionary theories of Appleton (1984) and others maintain that our preferences are at least in part geared genetically to favor landscapes that provide a prospect and a refuge – i.e., allow people to see without being seen. Informational theories of Kaplan and Kaplan (1989) and others coincide with bioevolutionary theory. Oak-savanna landscapes of the eastern U.S. are good examples of early successional landscapes that might be preferred in the context of these theories. A large number of landscape perception studies have examined forest environments in the context of timber-harvesting alternatives (see Ribe 1989). Of the different forest-harvesting alternatives, clear cutting has generally been found to have the greatest negative visual impact on forest aesthetics, especially if large amounts of slash are visible. Knowledge provided to lay people about the purposes of forest management practices can help increase their tolerance of practices such as clear cutting. The recreational orientation of a user can also affect how forest management practices are perceived and evaluated (e.g., Brunson and Shelby 1992, Ribe 1994). Wildlife-related recreation perhaps bears the closest correspondence to the type and structural characteristics of forest landscapes of all recreational activities; wildlife-oriented recreation is often where recreation habitat is synonymous with wildlife habitat. The greatest regional drop in hunting participation was for hunting in the Northeast, which experienced an 18% decrease in the number of residents ages 6 years and up who hunted, whereas the greatest rise in participation was for nonresidential wildlife watching in the South, which saw an 81% increase from 1980 to 1995. Gobster offers up some general recommendations for forest planning and design, communications to stakeholder groups, and research directions for advancing our understanding of the human dimensions of early successional landscapes with respect to wildlife and wildlife habitat. Gobster describes the idea of an “ecological aesthetic” which might help to expand people’s appreciation for some types of landscapes, such as prairies, which are not thought of as scenic in the conventional sense. On-site information such as signs, interpretive nature trails, stewardship programs, and the like can help communicate messages to the public. Habitat guides and brochures can be particularly useful for off-site communication. On-the-ground experience and involvement can go far in helping people better understand and appreciate early successional landscapes, such as self-guided nature tours and nature-oriented recreation such as birding, plant identification, hunting, and

nature photography. Directed activities, such as participation in ecosystem restoration, are particularly valuable ways through which forest users can gain experience and appreciation of early successional systems and processes. There is currently little information on how people respond to different types of early successional landscapes and natural disturbances that create and maintain such habitats (research needs).

Greene, J.L. and K.A. Blatner. 1986. Identifying woodland owner characteristics associated with timber management. *Forest Science* 32(1): 135-146.

This article investigates the use of discriminant analysis, a multivariate procedure, to build an integrated model by which to classify individuals and predict their behavior in terms of timber management. A simple classification scheme was used whereby landowners who engaged in two or more listed practices were deemed managers and those individuals who reported one or none were classified as non-managers. The authors did conduct a non-response analysis and determined that respondents only differed from non-respondents in one respect – that of education. Respondents tended to have higher levels of education than non-respondents. However, respondents and non-respondents did not differ in terms of woodland size class, primary objectives of woodland ownership, whether the owner had been contacted by a professional forester, whether the owner had sold timber in the past five years, and owner age, occupation, and sex. This study was conducted in Arkansas. Contact with a forester, the owner being a farmer and the owner being well-educated were associated with timber management in models for both regions, as were variables related to large woodland size and some non-timber objectives of ownership. In more urban areas of the state, wage earners, older owners, and those who live on their tracts were likely to be timber managers or to have a high propensity to manage. Non-managers tended to be real estate speculators, retired owners, and multiple heirs. The models also indicated that management assistance programs aimed toward developing non-timber forest outputs, specifically grazing and wildlife and recreation, might yield more managed acres than strictly timber-oriented programs. Moreover, they suggest that a personal contact by a forestry professional might be enough to influence many woodland owners to become timber managers.

Hodgdon, B. and M. Tyrrell. 2003. Literature review: an annotated bibliography of the published and grey literature on family forest owners. *GISF Research Paper 002*. New Haven: Yale University School of Forestry & Environmental Studies, Global Institute of Sustainable Forestry.

The authors present an annotated bibliography on family forest owners across the United States with the aim of presenting salient works from both the published and grey literature on family forests. The literature they reviewed centered around 4 broad themes: (1) Who are non-industrial private forest owners? (2) What are their motivations for owning forest and how are they currently managing their land? (3) What kinds of extension work is being done to help them? And (4) What needs to be done to improve extension and management practices? At the end of the bibliography, the authors provide a list of Forest Service publications about non-industrial private forest owners that are generally state-specific and dated, but that may prove useful. The summary points brought out by the authors include:

- “the number of family forest owners is increasing annually, with greater parcelization of forestlands throughout the U.S. (though there is variance with regard to growth of different parcel sizes regionally)

- family forest owners tend to be older, better educated and more wealthy than the general population
- the values, motivations, and objectives for owning forest vary widely, reflecting the huge diversity of family forest owners,
- generally, however, it appears that family forest owners in much of the country share a greater affinity with the general public than they do with professional foresters in terms of their views on environmental issues and their knowledge of forests and forestry
- most family forest owners rank things like aesthetics, recreation, wildlife viewing and part of residence as the most important reasons for owning forestland; timber production is usually a low priority, although many owners surveyed in the various studies reviewed have harvested timber
- most family forest owners do not have written management plans
- most have not sought professional advice from a forester or utilized public assistance program for forest management — owners of larger tracts of land are more likely to seek assistance
- the importance of commercial timber production is positively correlated with acreage of holding, as it is with the likelihood that the owner has used professional forestry advice and/or public assistance programs
- there is a need to mix qualitative and quantitative methods in carrying out research on family forests, especially for those undertakings that aim to analyze the values and motivations of such owners
- many of the papers reviewed make statements about demographics or motivations of forest owners that are not backed up by data
- state and regional studies are not comparable due to differing questions and methods,
- there are apparently substantial regional (state to state; within states; within the US) differences with respect to the propensity to use forestry services, attitudes towards regulation, and reasons for owning forestland.”

Hoover, W.L., W.L. Mills, Jr. and S. Vasan. 1997. Nonindustrial private forest landowners in Indiana: are their objectives and attitudes consistent with ecosystems management? In Proceedings of Integrating Social Science and Ecosystem Management: a National Challenge, USDA Forest Service Southern Research Station, General Technical Report SRS-17, pp. 150-155.

A mail survey and focus group discussions profile non-industrial forest landowners of Indiana. The mail survey indicates most owners support conservation and environmental objectives. Focus group discussions indicate they don't connect their actions with the landscape. They're leery of government programs and protective of private property rights. Public goods and property rights aspects should be addressed before implementing programs. Landowners' desire to be good stewards, however, provides a basis for program development.

The primary focus of this research was to target assistance programs to the “consumer's needs.” Why do some landowners participate in programs, while others do not? We must define our “consumers”

and understand them to successfully market programs. Increasing participation may require alternative marketing strategies and changes in programs.

The questionnaire was mailed to 574 landowners. A second mailing was made to non-respondents. Valid responses were received from 319 landowners, a response rate of ~ 56%. The researchers did a second mailing to 215 individuals to increase the evenness of participants versus non-participants for comparison. A valid response was received from 117 landowners, 54.4% response rate. Total effective sample size was 436 landowners.

Categories of questions were description of wooded land, wooded land use and management, management assistance, and demographic information. Questions were included to provide a profile of participants and non-participants, to develop a logit model characterizing participants.

Respondents differed in their attitudes toward forest management. Nonparticipants were more strongly oriented toward multiple use management. Non-commercial values were considered a more important reason for owning a woodland than commercial values. Aesthetic enjoyment was at least somewhat important for 88% of respondents (no difference between participants and non-participants). Over 75% of the 49% not living on the woodland lived within 60 miles of it. This situation contrasts sharply with Pennsylvania, where most landowners are absentee landowners.

Nonparticipant landowners showed more interest in participating in noncommercial activities, including construction of erosion control improvements, ponds, wildlife habitats, enhancements for family recreation, establishment of food plots for wildlife, harvesting timber for personal or family/friend use, and planting trees. Participants in government programs have consistently done more of the commercial and non-commercial activities on their land. More than half of non-participants clearly have no current interest in commercial activities on their land.

Future expectations of both groups showed the same trend. Both expected the importance of non-commercial values of their woodland, such as aesthetics, farm and domestic use, and recreation, would remain the same in the future or become more important. Participants were more likely to expect an increase in the value of the property than were non-participants.

Non-participants were less aware of the services offered by district foresters, the major source of technical forestry information in Indiana. Overall, nonparticipants were less likely to take advantage of any of the available sources of information. Non-participants generally had less education, lower incomes, and smaller tracts of woodland.

Data generally support the view that NIPF landowners are stewardship oriented, and do not own forest land simply for timber production. Hunting leases are very uncommon in Indiana. All NIPF landowners looked to district foresters mainly for technical assistance, rather than for help with forest stewardship.

General interest in non-commercial values provides a reason to be optimistic about implementing ecosystem management strategies. Overall, only about 5% of respondents both knew about and were willing to consider selling a conservation easement. Twenty-nine percent of respondents believed they had lost options or rights to manage their woodland. About 66% of those reporting a loss of options or rights indicated that their major concern was trespass. Twelve percent expressed concerns related

to wetlands, 10% were concerned with farm operations, and 11% with other factors, including deer damage, requirements for Soil Conservation Service farm plans, dumping of garbage, and others.

Changes that would make respondents less likely to participate in programs included: allowing public access (91%); being told what to do (80%); increased bureaucracy, paperwork and documentation (86%); and restricting management options (69%). There appeared to be inconsistencies between what respondents desired to see happen and their concept of what accomplishing these goals might mean in terms of how they use their properties. Indiana tested this with a voluntary “best forest practices” program (it was in development at the time this article was written).

The data show that a majority of landowners are not positioned to make informed choices about the direction ecosystem management should take and their role in the process. Also, a majority of the current generation is less inclined to acknowledge their possible contribution to ecosystem health.

Jones, S.B., A.E. Luloff, and J.C. Finley. 1995. Another look at NIPFs: facing our “myths.” *Journal of Forestry*, September 1995: 41-44.

Jones et al. address a critical question in this paper: Can the forestry community jettison historical mythic perceptions and empower NIPF owners to practice forest stewardship? “Only 6% of Pennsylvania’s NIPF owners have a written management plan, accounting for just 10% of NIPF acreage (Birch and Stelter 1993). Less than 20% of NIPF timber harvests involve a forester. In PA, about 70% of commercial forestland is in NIPF ownership (Birch and Stelter 1993). The proportion of PA landowners who are either white-collar workers or retirees has increased by 50% since 1978 – from 18% to 27% and from 17% to 26%, respectively. The multi-generation, farm-based owner of the 1950s has yielded to a well-educated, white-collar or retired owner, who is either nonresident or of urban, nonfarm origin.”

In the Pennsylvania Forest Stewardship survey (Luloff et al. 1993), it was found that the “typical” PA landowner is apparently an environmental “activist.” Most landowners are not particularly timber-oriented. The top three reasons that VA respondents (Hodge and Southard 1993) gave for owning forestland were “preserving nature,” “maintaining scenic beauty,” and “viewing wildlife.” The VA survey found that 56% of NIPF owners have harvested timber. Fifty-five percent of PA NIPF owners have harvested timber; 37% of owners intend to harvest (Birch and Stelter 1993).

NIPF owners do not generally view clear cutting with favor. PA respondents : 62% of NIPF owners and 66% of the general public believe that clear cutting should be banned (Luloff et al. 1993). Why the opposition? PA landowners and the general public believe that cutting trees usually results in wildlife habitat destruction, residential and commercial development, muddy streams, soil erosion, loss of recreation space, and permanent loss of forests (Luloff et al. 1993).

A fifth myth is that large landowners are different from small landowners. In PA, this was not true. Egan and Jones (1995) found limited correlation between landowner attitude and actual practices associated with harvesting, but substantial correlation between knowledge and site effects. The 150 invited landowners attending the first national Forest Stewardship Conference (1994) developed recommendations for increasing the number of forest stewards. The list included improving the tax climate, educating landowners and the general public, and fostering a friendly regulatory environment. The Forest Stewardship Program is a good start, encouraging landowners to develop plans that integrate multiple values.

Jones, S.B., G.R. Glover, J.C. Finley, M.G. Jacobson and A.S. Reed. 2001. Empowering private forest landowners. *Journal of Forestry*, March, 2001: 4-7.

“About 80% of privately owned forestland in the US (278 million acres) is in nonindustrial private forests. At the same time, private forest landowners themselves and an increasingly urbanizing population are placing greater demands on private forests for non-commodity benefits. Literature supports the premise that informed and knowledgeable landowners make better decisions toward both maximizing their own forest satisfaction (financial and amenity benefits) and providing the greatest net economic and environmental benefits to society (Egan and Jones 1993; Adams 1996; Harmon et al. 1997; National Association of Professional Schools and Colleges [NAPFSC] and USDA Cooperative State Research, Education, and Extension Service [CSREES] 1999). A 1995 Extension Forest Resources Action Plan indicated that 400,000 private forest landowners are reached annually with extension education. Hamilton and Biles (1998) reported that 268 of 644 full-time positions devoted to RREA programming between 1992 and 1997 were focused on forestland, and this effort has resulted in improved practices on nearly 90 million acres. Jones et al. (1995) found that forest landowners are increasingly absentee, and therefore are disconnected from their land. The authors present observations and recommendations based on their work in Pennsylvania, Oregon and Alabama.”

Kluender, R.A. and T.L. Walkingstick. 2000. Rethinking how nonindustrial landowners view their lands. *Southern Journal of Applied Forestry* 24(3): 150-158.

This study explores the diversity of landowner groups by developing landowner typologies (groups of individuals with similar characteristics) based on grouped responses to a mail questionnaire. Fifteen stated management objectives were listed. Cluster factors were based on previous studies and included: (1) whether the land was used as a primary home site or a second home site, or neither, (2) the owner's management objectives, (3) whether the landowner planned to sell timber in the future, (4) whether the landowner had sold timber in the past, (5) where the landowner had lived most of his or her life, (6) landowner's education level and (7) landowner's total household income level. K-means clustering splits a set of cases into a selected number of groups by maximizing between-cluster variation (intercluster distances) and minimizing intracluster variation. In the four cluster analysis, all seven selection variables had highly significant chi-square values ($P < 0.001$) and case assignments were consistent. Clusters were identified as Timber Managers, Resident Conservationists, Affluent Weekenders, and Poor Rural Residents. Timber Managers were most likely to have sold timber in the past and maintained plans to sell again in the future. Resident Conservationists tended to live on their properties and displayed strong aversion to harvesting. Affluent Weekenders held their property as second homes or weekend retreats and were generally averse to timber harvest. Poor Rural Residents were raised in a rural environment, tended to be at or below national poverty levels, were poorly educated, and would consider using their land or timber to produce revenue if they could. Ownership objectives are key determinant factors in identifying and grouping landowners interested in forest management (Hoge 1997, Gramann et al. 1985, Young et al. 1984, Young and Reichenback 1987). Although a landowner's primary objective might be creating wildlife habitat, he or she might consider harvesting timber if it enhanced that primary objective. Many landowners not primarily concerned with producing timber are concerned about sustaining forest health and productivity of their forest land for other important forest outputs. These amenity value attitudes are held by a growing number of landowners (Bliss et al. 1997). Although the question “what motivates landowners” is an old one, our education, outreach, and procurement strategies need to be brought into the 21st century to be compatible with landowners' ownership objectives.

Kruger, L.E. and P.J. Jakes. 2003. The importance of place: advances in science and application. *Forest Science* 49(6): 819-821.

This is the introductory piece to a special issue of *Forest Science* that focuses on “place.” Following the introduction, an overview is given of the papers in the special issue; they are a collection of papers presented at the 2000 International Symposium on Society and Resource Management in Bellingham, Washington. *Sense of place* involves individual or group identification with a place resulting from interaction with it. In the first article, Stedman presents an overview of the place-based research and proposes a compendium of quantitative research that could help develop sense of place as a useful management tool. Williams and Vaske focus on the measurement theme as they evaluate psychometric properties of a place attachment measure and examine the validity and generalizability of place attachment. The authors found that attachment increased in relation to increasing frequency of visitation, perceived familiarity, and the belief that the place was special. Cheng and Daniels address the interactions between geographic scale, stakeholder participation, and individual stakeholder ways of knowing. They support Williams and Vaske in a call for additional research to further understanding of place attachment, factors that influence attachments, and attachments that influence attitudes toward land management and participation in planning processes. Yung, Freidmund, and Belsky demonstrate that there can be multiple and conflicting meanings and many senses of place for the same place. By examining discourse about place names, they explore how place meanings are connected to ideas about property, conservation and governance. Managers need to be aware of both shared and contested meanings of place among stakeholders as a way to lead to more productive dialogue. Clark and Stein combine measures of place attachment and sense of place with measures of community attachment to examine attitudes and behavior of residents toward nearby areas. The authors suggest that residents view public lands as part of the overall community rather than something separate from the community. In the final paper, Moore and Scott examine the relations people develop with a nearby area. They focus on the extent to which people become attached to a specific site versus its larger setting. Moore and Scott suggest that managers identify special places and manage them carefully in order to improve user satisfaction and community relations.

Litvaitis, J.A. 2003. Shrublands and early-successional forests: critical habitats dependent on disturbance in the northeastern United States. *Forest Ecology and Management* 185: 1-4.

“Our group intentionally focused on shrub-dominated and early-successional forests (sites dominated by persistent shrubs or seedling to sapling-sized trees) because these habitats have structural similarities and are usually a response to some form of disturbance. Collectively, shrublands and early-successional forests can be referred to as “thickets.” Coastal areas experienced regular and often large-scale disturbances that resulted in extensive stands of seedling-sapling forests, barrens, and shrublands (Latham, 2003; Lorimer and White, 2003). Here, populations of many thicket-dependent animals probably reached their greatest densities (Confer and Pascoe, 2003; Wagner et al., 2003). The 11 northeastern states that were represented at this conference (ME, NH, VT, MA, CT, RI, NY, PA, NJ, MD and DE) are occupied by nearly 60 million people (according to 2000 census: <http://www.census.gov>). Within this region, a wide range of human densities and land uses are present. For example, population densities range from less than 16 km⁻² in Main to 438 km⁻² in New Jersey (<http://www.census.gov>). Extensive suburban/urban developments and associated road networks have substantially altered landscape continuity and composition in some regions.

In addition to the challenges presented by current land uses, public perceptions of some management techniques (prescribed fire, herbicides, and clear-cutting) are often negative. As a result, there is an obvious need to educate the public on the range of habitats that are needed in our forests, from recently disturbed to old-growth, and how these habitats can be managed. As advocates for biodiversity, we have been reasonably successful in informing the public on the need for old-growth stands. Promoting the management of native shrublands and early successional forests will likely require a larger effort.”

C.G. Lorimer, White, A.S. 2003. Scale and frequency of natural disturbances in the northeastern US: implications for early successional forest habitats and regional age distributions. *Forest Ecology and Management* 185: 41-64

“Recent declines in the amount of habitat suitable for early successional wildlife in the northeastern U.S. have prompted public land managers to consider establishing minimum levels of young forest, based on the natural range of variation, in order to maintain viable populations of these species. In this paper, we review evidence on the frequency, severity, and scale of natural disturbances in four major forest regions of the northeastern U.S. Using six independent lines of evidence, we examined the influence of natural disturbances in presettlement and modern times. In situations where estimates of annual disturbance rates were available, we estimated the regional age distribution of forest stands based on the assumption of random spatial pattern of disturbance. Available evidence suggests a gradient of generally decreasing disturbance frequency from coastal regions to the interior uplands and mountains. The proportion of the presettlement landscape in seedling-sapling forest habitat (1-15 years old) ranged from 1 to 3% in northern hardwood forests (*Fagus-Betula-Acer-Tsuga*) of the interior uplands to possibly >10% in coastal pine-oak (*Pinus-Quercus*) barrens. Within a region, variability in the amount of young forest is not well known, but upper slopes and ridges generally had the highest disturbance frequency and severity. Comparison of line transect data of the presettlement land surveys with modern plot surveys suggests that present-day amounts of young forests in northern hardwood and spruce-hardwood forests in some regions may be several times higher than in presettlement times. In coastal oak forests and pine-oak barrens, the amount of young forests and open woodlands may be less because of reduced fire frequency.”

Mater, C.M. 2008. Understanding the next generation of family forestland owners: getting it right.....(at least for starters). *Pinchot Institute for Conservation Newsletter, Fall 2008.*

This article reports on interviews with the offspring of forestland owners in Pennsylvania and Wisconsin. In Pennsylvania, of the 8.9 million acres of family forestlands in the state, over 11% (~1,035,000 acres) of the entire family forestland base will either be sold, subdivided or converted to non-forested use in the next five years, and another 12-13% (~1.1 million acres) will be given to heirs of the forestland owners in that same time period. These heirs ranked “stewardship” as one of the least important reasons to own the family forest (it ranked last in both states). The author recommends that the development of outreach strategy, messaging and employment of messenger that may be effectively used in one state may not at all work well in another state — even if the states are in the same geographic regions. Payment for woody biomass was not of interest with offspring in Pennsylvania, but payments for ecosystem services, was. Only tax relief ranked higher. According to the author’s results, the next generation of WI and PA family forestland owners tune out verbiage like the term ‘stewardship.’ She suggests looking to higher powers for what does grab their intention. In both states,

religious giving ranked higher than all other charitable giving. She suggests that spirituality and nature have never been far apart, and that perhaps messaging to the next generation should revisit this fundamental tenet to see what emerges.

Mitchell, M.Y., J.E. Force, M.S. Carroll, and W.J. McLaughlin. 1993. Forest places of the heart: incorporating special spaces into public management. *Journal of Forestry* April 1993: 32-37.

The authors use grounded theory and empirical data to explore the emotional attachments between recreation visitors and specific places in forests. Clark and Downing (1984) found that a grounded theory approach was of greater assistance initially in representing the complexity of social behavior. The authors separated visitors to the Chiwawa River drainage in central Washington into two major orientations – use and attachment. Use-oriented visitors expressed the importance of the environment in relation to the activities pursued and the experiences derived from their activities. Periodic users returned periodically to the site in order to pursue a particular activity or group of activities and often introduced new users to the site. Exploratory users found a location for a particular activity through a personal contact with outside information sources or through exploration. Attachment-oriented visitors had an emotional bond to places. The place itself was at least as important a reason for visiting a location as the activities pursued. They had a “high investment” or concern for the condition of the places that were important to them. Visitors often used the word “respect” to describe their relationship to places or others’ lack of concern. One of the most consistent characteristics was their stewardship of the area, cleaning campsites and doing minor repairs or improvements – “we take care of this place” as one respondent put it. Attachment-oriented visitors expressed a strong desire to introduce or share with others the places of their affections, often without realizing that introducing more people to the area might cause further changes in the setting. Attachment-oriented visitors were subdivided into intimately associated, dependent and generalized visitors. No data collected in this study suggested that new visitors tended to adopt the same relationship with the environment as those who brought them to the site. As people attach meaning to public places, they form secondary territories that are perceived as “belonging” to certain users. Feelings of possession often lead to stronger definitions of appropriate behavior (Lee 1972) and can lead to conflict (Jacob and Schreyer 1980). The relationship of intimately associated visitors with settings was one of “kinship” rather than ownership or territoriality in this study. Uses are easier to plan for than feelings or attachments for places. Attachment-oriented users’ needs are ignored in planning systems that strive for the “greatest good.” As Schreyer and Knopf (1984) suggested, attachment-oriented persons may be more sensitive barometers for change and indicators of quality places for all users. GIS holds much promise for incorporating sense of place concerns. Recreation Opportunity Spectrum (ROS) can also incorporate sense-of-place interests. The limits-of-acceptable-change (LAC) system (Stankey et al. 1985) has largely been used in wilderness planning, and was developed to define acceptable recreation resource conditions. Affection thresholds are certainly no harder to determine than encounter level or acceptable levels of wildlife behavior modification. The LAC process holds great promise for application outside wilderness. Hester’s (1980) sensitivity to the “sacred places” of a town transitioning to a tourist economy illustrates how development can be accommodated and still respect the symbols by which the community defines itself. Transactive planning (Friedmann 1973, 1987) emphasizes the need for dialogue between planners and citizens throughout the planning process. The transactive planning process emphasizes mutual learning: the planner learns from the client’s attitudes, desires, and knowledge; and the client learns from the planner’s technical expertise. At the heart of today’s forest management issues is

emotion. The “felt” perceptions of the forest are as real and as important as “scientific facts.” Both should be incorporated into public land management planning. To do this, public land managers need to follow a process that integrates rational, objective science with the “felt” perceptions of the forest.

Oehler, J.D. 2003. State efforts to promote early-successional habitats on public and private lands in the northeastern United States. *Forest Ecology and Management* 185:169-177.

The author investigated the extent to which 11 state agencies in the northeastern region of the US are creating and maintaining early-successional habitats on public and private lands. Mowing was the most commonly used technique throughout the Northeast. Only five state agencies in the northeast performed habitat management on private lands and no state affected more than 113 ha per year. Timber harvesting was infrequently used to create early-successional habitats and did not exceed 1.5% of eligible harvest area in nine of 11 states surveyed. A lack of sufficient resources was the most frequent explanation for little activity. Author recommended that agencies consider expanding technical assistance to private landowners.

Reed, A.S. 2001. Extension in Oregon: Educational leadership for sustainability. *Journal of Forestry* March, 2001, 18-21.

“Numerous public and private forestry organizations in Oregon work in educational partnership. Through its extension program, Oregon State University provides educational leadership statewide through more than 25 faculty members who collectively implement goals resulting from a comprehensive, strategic planning process. New annual initiatives emerge from needs-based assessments that frequently use innovative tools and strategies leading to durable core programs. Sustainable forestry on private land continues to be a major goal through development of new policies and organizations. Among the faculty’s many audiences, private woodland owners are dominant, although they receive less than half of the direct overall time spent on extension projects. Core programs include: Basic Forestry Shortcourse, Master Woodland Manager and Woodland workbook. A recent addition is the Sustainable Forestry Partnership which involves 3 universities and the USDA, and is fostering and applying innovations in sustainable forestry practice and policy.”

Rickenbach, M.G., D.B. Kittredge, D. Dennis and T. Stevens. 1998. Ecosystem management: capturing the concept for woodland owners. *Journal of Forestry*, April, 1998, 18-24.

“The sheer numbers of forest landowners complicates the task of designing educational programs to encourage them to adopt an ecosystem-based approach, and even if they could be reached, their high turnover, diverse objectives, and varied participation would present barriers. Regulatory solutions raise similar hurdles, such as enforcement (Sample 1994). More than 75% of southern New England is owned by NIPF (Brooks et al. 1993). More than half of the federally listed threatened and endangered species can be found only on private lands (Ireland 1994). In a pilot study in one rural MA community, Campbell and Kittredge (1996) found that participants were interested in working cooperatively to manage small clusters of four or five ownerships. The authors identified three dimensions of ecosystem management that were consistent with ideas already familiar to NIPF owners (Kittredge and Rickenbach 1996). This included: (1) Landscape perspective: their property fits into the larger ecosystem surrounding it, (2) Small-scale sensitivity: their property includes smaller parts that influence and sustain both their property and the greater ecosystem, and (3) Temporal vision: their

property has use today and in the future. These dimensions formed the basis for their assessment of landowners' attitudes in Franklin County, Massachusetts. Mail survey conducted and results discussed. Key: When confronted with the tradeoffs of actual management, respondents moderated their views to some extent. Landowners held favorable attitudes toward the three dimensions of an ecosystem-based approach to management. Research should further focus on understanding how landowners choose among alternatives. Education will be crucial in implementing ecosystem management on NIPF lands."

Ross-Davis, A., S.R. Broussard, D.F. Jacobs, and A.S. Davis. 2005. Afforestation motivations of private landowners: an examination of hardwood tree plantings in Indiana. Northern Journal of Applied Forestry 22(3): 149-153.

"Landowners were found to value their land for the privacy it provides, as a place of residence, and as a legacy for future generations. They afforested primarily to provide for future generations, to supply food and habitat for wildlife, and to conserve the natural environment. Objectives of this research were to: (1) examine ownership characteristics and values of landowners in Indiana who had planted trees between 1997 and 2001; (2) examine their motivations for planting trees, and (3) relate these ownership characteristics, values and motivations to seedling survival during the critical establishment phase. Generally IN NIPF owners value their land for the privacy associated with rural life (70%), as a place of residence (70%), as a legacy for future generations (64%), and for land preservation (62%). The majority of respondents strongly agreed that providing for future generations (72%), providing habitat and food for wildlife (59%), and conserving the natural environment (54%) motivated them to plant trees. This current study focused on an actively managing subgroup of NIPF owners – those who plant trees. Correspondingly, 77% of respondents agreed that the availability of CRP and other such programs motivated them to afforest their land. Only 27% of respondents agreed that availability of tax credits and tax deductions motivated them to plant trees. Seedling survival was not correlated with plantation size. There were no significant differences in seedling survival between sites for which the landowner had or had not: (1) used a cost-share program, (2) used a management plan, (3) subdivided or had parcels of their land sold for development or (4) previously planted hardwood trees. Seedling survival was lowest on sites owned by landowners who did not value their land as a legacy for future generations ($P=0.031$). The majority of afforesting NIPF owners in Indiana are planting trees primarily for conservation-related reasons. The percentage of landowners in this study who have a written management plan for their forestland is ten times the national average (Birch 1996). Afforesting NIPF owners in IN are engaging in many of the requisite behaviors to ensure successful plantation establishment. Landowners are using a professional forester (75%) with a mechanical tree planter (87%) to plant seedlings, and applying herbicide subsequent to planting (87%). Plantation establishment success was highest on sites owned by landowners who valued their land as a legacy for future generations."

Stevens, T.H., D. Dennis, D. Kittredge, and M. Richenbach. 1999. Attitudes and preferences toward cooperative agreements for management of private forestlands in the northeastern United States. *Journal of Environmental Management* 55: 81-90.

“NIPF in the northeastern US are as likely to undertake collaborative management programs as they are to undertake the same management programs independently. However, the probability of undertaking any of the management programs examined in this study was low, suggesting that incentives for cooperative management between landowners may be needed. Regardless of whether management is cooperative or independent, the estimated probability of program adoption is higher when management focuses on amenities, such as wildlife habitat, compared to timber harvests. Nearly $\frac{3}{4}$ of the forest land in the US is privately owned. More than half (55%) of the forest land held by individuals in the Northeast is in parcels that are less than 100 acres or approximately 40.5 hectares (Birch 1996). In regions such as this, landowner cooperation is a key component in accomplishing many management objectives. Most NIPF owners want to see a demonstration area before deciding whether to participate (Brunson et al. 1996). In this study, landowners were partitioned into two groups. Each received an identical questionnaire except that one group was asked about cooperative management options for a hypothetical set of adjacent privately owned parcels while the other was asked about the same options for a single equivalent parcel owned by the individual. Respondents were asked to rate four management scenarios consisting of one timber and four non-timber attributes: extent of timber harvest, establishment of a recreational trail system, maintenance of apple trees for wildlife habitat, preservation of a rare species of fern and cost. Conjoint analysis was used to measure an individual's propensity to participate in collaborative forest management. There are some problems with the method. Individual responses are made in the context of a hypothetical situation; actual behavior may differ. Other problems include: (1) some respondents may not be very familiar with the attributes or activities being valued, (2) results depend in part on the info which is (or is not) provided in the survey and (3) results may be very sensitive to the format of the questionnaire, attributes or activities excluded, etc. The average respondent owned 60 acres of forestland, about 19% had filed a formal forest management plan, and 54% had owned their land less than 20 years. Only about 10% of respondents indicated that they would definitely undertake one of the management programs presented in the conjoint survey. Low cost management programs which focus on non-timber outputs have the highest likelihood of adoption. Program ratings and the probability of program adoption were not statistically related to the number of acres owned, or whether a management plan had been prepared. Educational programs or management incentives should target a broad spectrum of landowners while focusing on amenities such as wildlife habitat, rather than timber harvests. Further research is needed to identify the types of programs that might have a more substantial impact on landowner cooperation and program adoption.”

Straka, T.J., H.W. Widsom and J.E. Moak. 1984. Size of forest holding and investment behavior of nonindustrial private owners. Journal of Forestry August, 1984: 495-496.

“Correlation analysis of MS data confirms the positive relationships between size of forest holding, a landowner’s financial position, and management intensity. Owners of small tracts often do not have the option of harvesting a portion of their entire holdings and retaining the remainder for nontimber uses, and, thus, are little interested in investing for increased timber output. As income and asset position improves, the owner is more likely to consider forestry investments with progressively lower rates of return and the intensity of management should increase. Relationship was as expected. Landowner associations partly overcome the diseconomies of small holdings.”

Wagner, D.L., M.W. Nelson, D.F. Schweitzer. 2003. Shrubland Lepidoptera of southern New England and southeastern New York: ecology, conservation, and management. Forest Ecology and Management 185: 95-112.

“Fifty-six species of conservation concern representing 11 families of Lepidoptera are recognized as dependent on shrubland habitats in this region, including 23% of Connecticut’s state-listed Lepidoptera and 41% of state-listed moths and butterflies in Massachusetts. Sixteen (27%) of these 56 species utilize scrub oak as larval host and eight species (14%) use lowbush blueberries (*Vaccinium angustifolium* and *V. pallidum*). Pine barrens and other shrublands in the northeastern United States are threatened by destruction and fragmentation, as well as fire exclusion and other alterations of natural disturbance regimes. Active management, including the application of prescribed fire, mechanical cutting, or a combination of the two, is critical to the maintenance of habitat structure and species composition in barrens and other shrublands within human-dominated landscapes of the northeastern United States.

We discuss 56 rare species of Lepidoptera associated with shrubland habitats in a portion of northeastern United States: southern New England (Connecticut, Rhode Island, Massachusetts, and southern portions of Vermont, New Hampshire, and Maine) and southeastern New York (long Island and the Albany Pine Bush). The 56 species of conservation concern are associated with five shrubland communities in particular: sandplain pitch pine (*Pinus rigida*)— scrub oak barrens, scrub oak shrublands, hearthlands, and maritime shrublands.”

Young, R.A. and M.R. Reichenbach. 1987. Factors influencing the timber harvest intentions of nonindustrial private forest owners. Forest Science 33(2): 381-393.

Intentions of woodland owners to harvest timber were examined in this study with a goal to increase our understanding of the factors that influence wood production on nonindustrial private forests. Six-hundred twenty-one randomly selected woodland owners were interviewed by telephone to determine their attitude and beliefs about harvesting timber, and the influence of “important others” in making harvest decisions. Responses were compared for those owners who intended to harvest timber within the next 10 years with those who had no intention to harvest. Attitudes and subjective norms accurately predicted intentions to harvest ($R = .75$). Standard regression coefficients indicate that intentions were more influenced by the owner’s attitude than by the influence of social groups. Differences in beliefs and in the influence of social groups were observed between those who intended to harvest and those respondents who did not. Recommendations are made that would increase the number of owners who intend to produce wood products from their private woodlands. In the vast

majority of studies, forest owners did not believe that the production and sale of timber was a major reason for owning forestland. This paper is based on the the Theory of Reasoned Action (Fishbein and Ajzen 1975). Turner, Finley and Kingsley (1977) found that over a four-year period, 65% of owners' intentions remained constant when considered individually, and that the intentions of forest owners remain even more stable when analyzed as a group. In the current study, 53% of respondents indicated that it was unlikely that their "important others" wanted them to use their land to produce timber. This measure of the subjective norm is significantly related to intention ($R = 0.61$, $P < 0.01$) and those forest owners who believe others do not want them to produce timber tend not to intend to do so. However, the authors found that the beta weight of attitudes was greater than of subjective norms, and so conclude that communications or educational programs would have the greatest impact on intentions to harvest if they were aimed at changing attitudes. Beliefs underlie attitudes and subjective norms, and thus, by changing beliefs, you can influence both attitudes and subjective norms and be more effective. The authors recommend that to increase favorable attitudes, and thus harvest, the association between harvest and strong belief outcomes with positive evaluations should be stressed. Owners who intended to harvest timber within the next 10 years had significantly stronger beliefs associating timber harvest with : providing for personal wood needs, increasing the amount of wildlife, and providing a supplementary income. This article has a powerful table for reference in terms of beliefs and evaluations for intentions to harvest on page 388. Since increasing the amount of wildlife was evaluated as a positive outcome, positive attitude change could be expected from efforts to strengthen the association between this outcome and timber production. Another key point was that incentives using the promise of additional incomes will not encourage non-intenders to harvest unless their evaluation of this belief (providing supplementary income) is changed from negative to positive. Since beliefs are a reflection of past experiences, new information or new experiences are required to cause changes in old beliefs or the formation of new salient beliefs. In general, efforts should be most successful when trying to decrease the strength of the beliefs with negative (or bad) evaluations and increase the strength of the beliefs with positive evaluations. Recommendations provided:

- "increase the strength of the association between producing timber and providing for personal firewood and timber needs
- increase the strength of the association between producing timber and increasing the abundance of wildlife
- decrease the strength of the association between producing timber and "disrupting" nature
- increase the strength of the association between producing timber and providing a supplementary income while simultaneously changing the evaluation of this outcome from bad to good
- change the evaluation of the effect of timber production on natural scenery from bad to good
- increase the positive (good) opinion about providing for personal firewood and timber needs
- decrease the negative (bad) opinions about damaging the forest through logging practices and about reducing recreational opportunities, and
- decrease the negative opinion about interfering with other land uses"

