Electronic Theses and Dissertations   Fogler Library

2005

Forestry Cooperatives for Diverse Management Goals: An Assessment of Interest Levels among Maine's Nonindustrial Private Forest Owners Enrolled in the Tree Growth Tax Program

Brian Jonathan Schneider

Follow this and additional works at: http://digitalcommons.library.umaine.edu/etd

Part of the Forest Management Commons

Recommended Citation

FORESTRY COOPERATIVES FOR DIVERSE MANAGEMENT GOALS:

AN ASSESSMENT OF INTEREST LEVELS AMONG MAINE'S NON-

INDUSTRIAL PRIVATE FOREST OWNERS ENROLLED IN THE TREE

GROWTH TAX PROGRAM

By

Brian Jonathan Schneider

B.S. University of Vermont, 2003

A THESIS

Submitted in Partial Fulfillment of the

Requirements for the Degree of

Master of Science

(in Forestry)

The Graduate School

The University of Maine

December, 2005

Advisory Committee:

David B. Field, Ph.D, E. L. Giddings Professor of Forest Policy, Advisor

Alan J. Kimball, M.S, Associate Professor of Forest Resources

Kathleen P. Bell, Ph.D, Assistant Professor, Resource Economics and Policy

ACKNOWLEDGEMENTS

ii

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

FORESTRY COOPERATIVES FOR DIVERSE MANAGEMENT GOALS: AN ASSESSMENT OF INTEREST LEVELS AMONG MAINE'S NON-INDUSTRIAL PRIVATE FOREST OWNERS ENROLLED IN THE TREE GROWTH TAX PROGRAM

By Brian Jonathan Schneider

Thesis Advisor: Dr. David B. Field

Owners of small, non-industrial woodland parcels in the United States maintain heterogeneous management goals for their individual parcels. Research has shown that timber harvesting is becoming less of a priority for this landowner group. In addition, average parcel size for these ownerships has decreased noticeably over the past 20 years. Parcelization, forest fragmentation and the presence of varied landowner goals complicate the matter of conducting ecologically sound, financially feasible forest management.

The purpose of this study was to present three forestry cooperative models to small, non-industrial woodland owners in Maine and to ascertain interest levels. Cooperative models were based on existing organizations and have been designed to facilitate ecologically sensitive forest management. The cooperatives are focused on

endorsing active timber production in an ecological context while addressing the multitude of landowner objectives.

A survey was sent to 1500 landowners in the organized townships of Maine with a response rate of 31.3 percent (470 total useable returns). Questions were designed to explore landowner management priorities, landowner satisfaction with their current management regime, and interest in the three cooperative models. Chi-square analysis was used and logistic regression models were created to test the impact of various landowner characteristics on interest in the three cooperatives.

Of the three models, landowner interest was highest for the "Network", followed by the "Marketing Cooperative". Least popular was the "Woods Bank" in which landowners relinquish property rights for an annual dividend based on the fair-market value of their land. Interest in cooperatives in general was positively correlated with the desire to protect nature and biological diversity, an interest in cooperation for the purposes of ecosystem management, the desire to collectively own wood processing facilities for the purposes of retaining more of the value-added from wood harvested, and a long planning horizon for recreation activities. Some differences were evident regarding interest in the three individual cooperative organizations.

CHAPTER 1

INTRODUCTION AND PURPOSE OF RESEARCH

The focus of this research rests on the notion that cooperative management regimes, while combating the ecological effects of forest fragmentation and allowing landscape-scale ecosystem management, may allow non-industrial, private forest (NIPF) landowners to profitably realize all of the goals they have for their individual property. The landowners in this study were presented with examples of cooperative programs designed to endorse timber production on non-industrial, private forestland in a way that maximizes the benefit to the larger forest ecosystem, local community, and individual landowner.

Overall landowner satisfaction with current forest management and reaction to the spectrum of cooperative opportunities were analyzed to determine the overall potential for forestry cooperatives throughout the state. The extent to which interest in cooperatives is explained by landowner management priorities, parcel characteristics, and other demographic information is discussed. Furthermore, the implications of forest parcelization and fragmentation in the context of forest ecosystem management will be addressed.

Currently, the forest management paradigm of multiple-use, sustained yield is being challenged by the new archetype of ecosystem management. The goals of protecting biodiversity and focusing management at a scale more adequate to encompass natural processes are implicitly stated within the current definitions of ecosystem management (Franklin, 1989; Gordon, 1994; Grumbine, 1994; Irland,

1

1994; Salwasser, 1994) but reaching these goals is hindered by increasing fragmentation of private forestland (Sample, 1994; Sampson and Decoster, 2000). Furthermore, the flow of forest products from these private forests is reduced as timber income becomes less of a priority for small woodland owners (Birch, 1994; Dennis, 1989; 1992; Stevens et al., 1999; Young and Reichenbach, 1987) and as a result of the economy of scale needed for a profitable timber sale (Row, 1978; Straka, Wisdom, and Moak, 1984; Thompson and Jones, 1981) .

A variety of State and Federal cost-share programs have been created for the purposes of facilitating reforestation, timber stand improvement (TSI), and taking some of the financial burden off of responsible forest managers in the face of development pressure (Haines, 1995; Moulton, 1999). Though reforestation and TSI cost-share programs have been utilized, landowner involvement does not necessarily translate into sustainable timber harvesting when those trees are mature (Kluender, Walkingstick, and Pickett, 1999). Those current-use tax programs that are designed to encourage timber management and harvesting (Maine Revenue Service, 2003) may not appeal to landowners who do not see timber management as a primary reason for owning forestland (Young, Reichenbach, and Perkuhn, 1985).

The idea of a forest landowner cooperative is not a new one. In Sweden, landowner cooperatives have operated for decades, successfully obtaining market influence and in some cases even owning paper processing facilities (Kittredge, 2003). Forestry cooperatives based on the model of those for agricultural purposes have been present in the United States since the early 1900's. Virtually all of the forestry cooperatives in the United States have failed due to insufficient interest and

2

member support, inadequate capital, lack of sufficient business volume, or inadequate management (Dempsey and Markeson, 1969). Full marketing cooperatives have suffered the same fate as those established earlier in the century, encountering managerial problems, lack of loyal membership, and a lack of capital in the absence of government subsidy funding (Hancock County Planning Commission, 1999; Sustainable Woods Cooperative, 2003). Several cooperatives currently being developed in the United States offer landowners a full spectrum of involvement, risk and reward. The cooperative programs currently being managed and developed range from loose-knit networks of foresters, landowners, extension agents, and value-added processors to full scale processing arrangements in which members of the cooperative eventually market products from wood grown on their land, milled and dried with cooperative equipment.

In the United States, landowner networks with looser involvement requirements have been more successful (Barten et al., 2001; Small Woodland Owners Association of Maine, 2004; Vermont Family Forests, 2004). These arrangements allow landowners to gain access to, and share costs of management, which may entail some form of "green" certification. Landowners in some instances also share the cost of production and marketing of traditionally lower value material removed in precommercial thinning treatments and other silvicultural procedures designed to enhance the future value of the forest. Educational workshops organized by resource professionals for landowners and others in the forestry community are administered through the network as well.

Aside from the economic gain realized through cooperation, cooperative organizations may allow adjacent landowners to collaborate on management with the larger landscape and ecosystem processes in mind. While an individual parcel can be successfully managed for a sustainable flow of timber, an ecosystem based approach, focused on wildlife habitat, watershed characteristics, and natural disturbance patterns would require a larger land-base. Programs have been developed focusing on organizing landowners within a watershed context (Rickenbach and Reed, 2002) and within areas of particular environmental sensitivity, as in the case of The Nature Conservancy's Forest Bank program (Dedrick et al., 2000).

Given the extent of forestland held by private owners, and the small fraction of owners who actively manage their land for timber purposes (Birch, 1994), the impact of forest landowners who do not manage is extensive. If the goal of ecosystem management is to be worked toward within the state of Maine, and the holding of private land for forest resource production is desired, then it is clear that collaboration must occur across political and ownership boundaries. As landowners begin to place non-timber benefits, e.g. aesthetics, wildlife, and recreation, as higher priorities than timber management, it may become necessary to incorporate timber production into non-timber management strategies.

CHAPTER 2

A NEW FORESTRY PARADIGM

Landowner Attitudes

The apparent shift in NIPF landowner priorities has been well documented (Alig, Lee, and Moulton, 1990; Dennis, 1992; Egan, 1997). Perhaps the most consequential of recent findings is that timber harvesting is becoming less important as a primary motivation for timber holdings among NIPF landowners (Brunson et al., 1996; Stevens et al., 1999). Increasingly, landowners are concerned with non-timber related benefits from their forests including recreational opportunities, aesthetic enjoyment, and solitude.

According to the State of Maine Silvicultural Activities Report (2000-2004) the total number of harvested acres, from parcels under 1,000 acres, has declined steadily since 1999. Statewide harvest levels have remained steady due to increased production from the industrial forest.

As a result of the growing concern regarding the amount of land held by NIPF landowners, and the changing landowner priorities, it makes sense to develop management regimes around heterogeneous ownership objectives (Kline, Alig, and Johnson, 2000).

Though many landowners do not actively harvest on their land, they may not be ethically opposed to the practice (Jones, Luloff, and Finley, 1995). As implied by Egan and Jones (1993), in order to facilitate active management among NIPF landowners, the focus must be placed on forest amenities important to landowners

Ecosystem Management

In conjunction with the shift in landowner attitudes towards forest management, there has been a steady shift in the way scientists and resource professionals are viewing proper management. The term "ecosystem management" is slowly replacing the idea of "multiple-use" management. The concept of ecosystem management, as Grumbine (1994) states, is a "fundamental reframing of how humans may work with nature." Gordon (1994) suggests that ecosystem management marks a change in forestry thinking from the focus on stable wood flow and output production, to a focus on environmental inputs, interactions, and processes.

Although the specific components to include in individual ecosystem management plans are continually debated, there has been some consensus regarding the general focus of such endeavors. Within the context of ecosystem management, it is implied that management boundaries are defined by natural processes for the purposes of maintaining biodiversity, wildlife habitat, water quality, and natural disturbance patterns. NIPF management will be crucial to any ecosystem management program due to the patchwork appearance of those lands within ecological boundaries (Sample, 1994). The need to manage across political and property boundaries due to increasing land fragmentation (Egan and Luloff, 2000; Sample, 1994; Sampson and DeCoster, 2000) is a common concern, as is an overall focus on landscape level function and resource protection (Rickenbach et al., 1998).

The implementation of ecosystem management principles relies on the participation of NIPF landowners. A forestry cooperative could be an effective way to organize landowners who wish to operate under such a philosophy. Past research has

demonstrated that landowners in certain instances would be responsive to collaborative agreements for the purposes of ensuring environmentally sound management. Rickenbach et al. (1998) demonstrated in their survey of landowners in Franklin County, Massachusetts that there is favorable interest in collaborating with neighbors as a means of managing at a landscape level, however, participation extent and involvement costs were not examined in the survey. Brunson et al. (1996), in their survey of landowners residing in Indiana, Utah, and various Southeastern states, established that a majority of survey respondents would like to see a similar partnership at work before deciding if they would become involved in one themselves. Rickenbach and Reed (2002) identified a stewardship ethic among landowners as the primary catalyst for involvement in an Oregon Watershed Council program. Aversion to program encroachment on property rights and uncertainty regarding the effectiveness of the Council were principle deterrents to the program. Jacobson, Abt, and Carter (2000) suggest that a likely target for the creation of a successful collaborative management program would be landowners who believe not only in managing land for timber but for amenities including wildlife and water quality, further stressing the need for a plan that encompasses more than just profitable timber harvesting.

Though the potential for collaborative ecosystem management is encouraging, such a program is unlikely to be adopted merely because it addresses a wide range of landowner considerations. Though it has been shown that timber harvesting is decreasing as a priority for small woodland owners, management programs still must ensure a certain level of profitability to encourage involvement. Private landowners

have little financial incentive to cooperate due to the fact that non-timber amenities have little, if any, market value. (Stevens et al., 1999).

A cooperative management program, with a focus on ecologically sound harvesting of wood products, may be successful in maintaining a sustainable flow of forest resources while maintaining the ecological integrity of private land. Under the umbrella of the cooperative, landowners would have access to resources allowing them to profitably reach their individual, non-timber goals.

Parcelization, Fragmentation and The Effect on Community Stability

As described by Best (2002), fragmentation is defined as a reduction of contiguous forestland, creating smaller, isolated patches. Fragmentation may occur naturally through disturbance or it may be human induced, through the creation of roads, residential and agricultural development, and timber harvesting. The term parcelization refers to the division of single ownership tracts into smaller parcels with multiple owners. Though the two terms have often been used interchangeably, it is important to recognize that fragmentation refers to a forest's ability to maintain ecological function; parcelization is a land ownership pattern. The pattern of parcelization, marked by an increase in the number of landowners with varying objectives, may lead to fragmentation as forestland is converted for other uses (Mehmood and Zhang, 2001).

In their study of forest parcelization in the United States, Mehmood and Zhang (2001) found several contributing factors. The authors divided the causes of parcelization into two groups, supply factors and demand factors. The supply factors

9

of significance included death and regulatory uncertainty. Death often results in parcelization as land is divided among heirs, or land is sold to pay for estate and inheritance taxes. Though Mehmood and Zhang found the death rate variable to be significantly correlated to parcel size in states throughout the U.S., the variable meant to account for the effects of estate and inheritance taxes was not significant. The authors warn that the tax variable should be acknowledged with caution as the estate and inheritance tax information for individual woodland parcels was not available. Instead, taxes collected on all property types were used as a proxy. The death rate variable was independent of the tax variable. A state's political environmental friendliness, as discerned from legislative voting records, was used as the measure of regulatory uncertainty. On the demand side, income levels, availability of financial assistance, and level of urbanization were found to be significantly correlated to the number of NIPF parcels within each state.

Similarly, Best (2002) acknowledges the impact of an aging forestland owner base. In her estimation, 93 million acres of forest, owned by individuals 65 years old or greater is currently undergoing some form of intergenerational transfer. Best further adds that over the next decade, 54 million more acres will begin to undergo this process. In situations where there are multiple heirs, heirs with competing values, or perhaps no heirs with an interest in maintaining a forest property, the contiguous forest resource is often at risk. Similar to Mehmood and Zhang's (2001) hypothesis, Best points to the need for heirs to pay estate taxes as an important factor in the liquidation or sale of forest parcels.

The shift in industrial forest ownership is another factor described by Best as possibly influential to the parcelization of large forestland tracts. The previous decade has witnessed a restructuring of large pulp and paper companies for the purposes of remaining competitive in the global market and increasing financial return for shareholders. Best estimates that some 20 million acres of industrial forestland throughout the country have changed hands in this fashion in the past decade alone. The implication for parcelization is curious given the fact that, at least in the state of Maine, large parcels have remained intact with ownership transfer and in some cases land has been consolidated, though management priorities often change with a shift in landowner.

The problems associated with parcelization, and the subsequent forest fragmentation that is often a result, are exacerbated by what Egan and Luloff (2000) term "the exurbanization of America's forests". Exurbanization refers to the migration of urban residents to rural environments. The population shift and demographic change in exurban areas may result in conflict regarding resource use and protection as natural resource values differ among new and old residents. The meeting of urban and rural interests is often referred to as the urban-rural interface. As Vaux (1982) describes, the urban-rural interface cannot be regarded as only the geographic region where forest management meets urban development, it should be considered a political arena for the discussion of competing forestland values.

In their study of the effect of urban sprawl on timber harvesting activity in Mississippi and Alabama, Barlow et al. (1998) found a variety of factors associated with the urban-rural interface as detrimental to the amount of wood available for

harvest. Close proximity to urban land uses, higher population densities, and close proximity to urban centers were identified as factors that reduced harvest levels. The authors further commented that as more land at the interface is physically converted to an urban use, the non-timber amenity value of the remaining forestland increases. The increased value of the remaining timberland results in less management for timber production and more management for non-timber values.

Sampson and DeCoster (2000) suggest several reasons contributing to fragmentation. Off-balance taxation, a situation in which developed areas receive benefits which often exceed taxes paid while rural land is taxed at levels too high for sustainable timber management income to offset, is cited as a detriment to the conservation and management of forestland. Rural areas surrounded by urban centers are often at risk of a demographic shift. As urban individuals, likely wealthier and younger than the current rural inhabitants, move into rural areas, productive land is at risk of being converted into smaller parcels maintained for non-forestry, non-farming practices. The authors essentially describe a chain-reaction in which more rural land becomes urbanized, pushing out the infrastructure needed to maintain forestry operations. As timber product markets and opportunities for foresters and logging contractors diminish, those individuals, and the businesses that support them are forced to move away. Thus, the remaining forested area that would be available for management is left idle, further reducing the number of acres of working forest. Sampson and DeCoster suggest three challenges for foresters in light of increasing urbanization. First, foresters must help people manage very small properties well. Second, resource professionals must help local governments plan growth patterns to

aid in the conservation of productive land. Lastly, it is important for foresters to convince the conservation community that forest sustainability is linked to long-term economic stability.

The flight of urban residents to more rural areas has created what Shands (1991) termed the "interaction edge effect." The interaction edge effect results as more people occupy smaller parcels, resulting in more instances of conflict among landowners with competing land values. New residents who desire accessible forestland for the purposes of non-timber uses are more likely to clash with long-term residents who value more consumptive uses. In light of the land expectations of new residents, Shands declared the need for not only an adjustment in management practice but in the thinking of managers themselves. A rising challenge for foresters over time will be the process of balancing the needs of all residents and maintaining a flow of forest products while remaining sensitive to the needs of non-traditional forest users.

Lowe and Pinhey (1982) demonstrated that environmental sensibility differs between rural and urban residents. Based on their nationwide survey, the authors found significant data to suggest that urban individuals show a greater concern for environmental issues. The survey relied on evaluating respondent support for environmental protection based on the relative stated amount of money respondents felt the government should allocate to several national problems. Problems included the nation's crime rate, education systems, and improving and protecting the environment. The study further established that respondents raised in metropolitan areas showed the highest level of environmental support.

In their comparative study of permanent and seasonal residents in a Wisconsin vacation community, Green et al. (1996) discovered a higher level of support for local economic development among full-time residents. Seasonal residents were more likely to support land use planning measures for environmental protection. Forest products has traditionally been the major industry for the county, roundwood being the principal raw material. The county, at the time of the study, was approximately 50 percent occupied by vacation homes. Since the 1950's, tourism has grown in importance as an income source for the area. Focus group discussions revealed full-time residents as more concerned with the tax base and economic development. Recreational homeowners were more concerned with environmental protection and the availability of services. Survey results showed full-time residents as supportive of wood processing and manufacturing for maintaining economic stability. Seasonal residents generally felt wood processing should not be an important aspect of the county's economic growth.

Local community stability is often an implied goal of forest management in resource dependent regions. As described by Waggener (1977), community stability is not a concept easily defined. The earliest definitions of community stability assumed a linear relationship between the amount of forest products produced locally and the subsequent amount consumed. This assumed relationship evolved into the notion that a resource dependent community is most stable when buttressed by a sustained, non-declining flow of forest products from the local land base. However, in an industrialized society, local production is not necessarily required to satisfy the needs of consumers.

The inherent difficulty in defining what is community stability complicates the matter of shaping specific forest management techniques around such a goal. Machlis and Force (1988), in their review of literature on timber-dependent communities, state that most generally, community stability can be considered a "form of dynamic equilibrium and can best be discerned relative to specific situations." Measures of community stability have included employment, income, price levels, timber-company profits, property valuations, and the level of non-market goods and services. Machlis and Force (1988) emphasize that community stability cannot be judged in economic terms only, pointing to the need for socio-cultural indicators as well.

In their study of forest dependent areas in Alabama, Bliss, Walkingstick, and Bailey (1998) discovered that concentrated resource ownership and highly specialized products were detrimental to resource dependent communities. The authors found concentrated resource owners contributed much to the economic stability of the area, though negative impacts on the environmental and social well-being of the communities outweighed those economic benefits. These findings are somewhat in contrast to the notion that a reduction in parcelization would result in a healthier resource dependent community. It becomes apparent that the forces of parcelization are not inherently detrimental to ecological integrity nor is a concentrated resource base inherently beneficial. What is detrimental is the physical fragmentation that results as new owners convert the forest resource into a non-forest entity or as management is hindered by competing landowner goals. Concentrated ownerships may also be destructive if the long term health and stability of both the land base and

social environment are not considered. Cooperative management programs may provide incentives for landowners to maintain forestland as such, and to organize these smaller parcels towards sound forest management. What could result from cooperation is a resource base managed with a greater amount of continuity, and a landowner base whose individual objectives are recognized.

CHAPTER 3

THE ROLE OF COST SHARE PROGRAMS AND FINANCIAL INCENTIVES

Federal cost sharing programs, designed with the productivity of private forests in mind, were meant to stimulate reforestation and timber stand improvement activities by covering the up-front costs. (Haines, 1995). The Agricultural Conservation Program (ACP), established in 1936, was the first federal incentive program with tree planting as the primary forestry concern. Under the ACP, total tree planting had reached 7.1 million acres by 1994 (Moulton, 1999). The birth of the Forestry Incentives Program (FIP) occurred in response to declining funding for forestry practices in the 1960's, as most landowners utilized the ACP program for agricultural purposes such as soil and water conservation activities. FIP was developed to stimulate forest management including timber stand improvement, reforestation, and afforestation practices on NIPF lands (Kluender, Walkingstick, and Pickett, 1999). The FIP program contributed to 188,000 acres of reforestation plantings in 1994 alone. (Moulton, 1999).

Other federal programs included the Conservation Reserve Program (CRP) and the Wetlands Reserve Program (WRP) The Stewardship Incentives Program (SIP) required a comprehensive multi-resource plan for all contiguous acres within the forest ownership (Haines, 1995). The SIP was established within the 1990 Farm Bill and allowed the Forest Service to provide both financial and technical assistance on private lands. The multi-resource plan, or Forest Stewardship Plan, for a given

parcel had to be prepared and reviewed by resource professionals approved by the state (Moulton, 1999).

As part of the 2002 Farm Bill, The Forest Land Enhancement Program (FLEP) replaced the SIP as an optional cost-sharing program for individual states. In the program's inaugural year, 20 million dollars were allocated to individual state forestry agencies. State-administered FLEP assistance is similar to that of the SIP and is dictated by seven principles. FLEP principles focus specifically on protecting and enhancing the NIPF land-base while protecting ecological processes, as well as sustaining the long-term production of timber and non-timber forest resources (Brockman, 2005). In the State of Maine, FLEP assistance is administered through the WoodsWISE program of the Maine Forest Service. Landowners statewide who own 10 to 1,000 forested acres may be eligible for WoodsWISE services, which usually entail financial and technical assistance to landowners adhering to the standards set by the Maine Forest Service. Enrollees must have a written management plan for the area in which work will be carried out, administered by a Maine Forest Service District Forester, or another private Maine Licensed Professional Forester eligible to provide services under the program. Under the WoodsWISE FLEP program, landowners may receive up to a 50% reimbursement for forestry activities.

The increasing need for NIPF timber production, and the subsequent focus on cost-share incentives, can be attributed partially to the decreasing amount of timber harvested annually from federally owned forests due to the desire to maintain old-growth forests and wildlife habitat, particularly in the Pacific Northwest (Shindler, List, and Steel, 1993; Wear and Greis, 2003). Unfortunately, cost share programs

designed to induce investment in forestry production may be doing little to increase the amount of timber harvested from NIPFs. Kluender et al. (1999), in their study of private, non-industrial landowners in Arkansas, found that direct cost share programs for reforestation do little to increase the amount of timber harvested. They found that federal assistance programs merely subsidize the investment cost for timber managers who, in turn, realize a higher rate of return while producing the same amount of timber from their land, implying federal cost-share funds merely replace private investment capital. These findings are in contrast to de Steiguer's (1984) findings. De Steiguer demonstrated that government-induced investment did not replace autonomous landowner investment based on response to market conditions. Though the de Steiguer findings are in contrast to the conclusions of Kluender et al. (1999), he provided evidence showing that government cost-share funding had no significant effect on private forestry investment. The two studies offer different evidence as to why government cost-share programs may not be stimulating increased forestry investment, but both studies imply that the programs have likely been ineffective.

Another approach to spurring interest in active forest management among NIPF landowners is the favorable taxation of forested land. The State of Maine's Tree Growth Tax program, established in 1972, was developed to help private woodland owners maintain their property as productive forest in the face of development pressure. Under the Tree Growth Tax program, landowners are required to conduct planned, periodic harvests through consultation with a forester and an established management plan (State of Maine Revenue Service, 2003). There are no specific management considerations regarding landscape scale issues required under Tree

Growth, which does not address issues of fragmentation. A key objective of this study is to uncover the extent to which landowner objectives are reached by the Tree Growth Tax program given the breadth of landowner objectives aside from timber income, and to determine if a cooperative model of forest management would allow landowners to achieve their goals to a greater degree.

CHAPTER 4

COOPERATIVE MODELS FOR FOREST MANAGEMENT

This research, designed to examine interest levels among Maine's small woodland owners regarding cooperative management, utilized three organizations as cooperative models. This section provides an overview of the three models (Vermont Family Forests, The Nature Conservancy's Forest Bank Program, and Timbergreen Forestry of Wisconsin), followed by a brief examination of similar cooperative enterprises in the State of Maine.

Vermont Family Forests (The Network)

A grassroots organization, Vermont Family Forests (VFF) is dedicated to educating woodland owners regarding ecologically sound forestry principles and stewardship responsibilities. As outlined by the program's informational website (www.familyforests.org, last accessed June 21, 2005), the organization recognizes the complementary role of public and private forest land in providing for the resource and economic needs of the local community and facilitates communication among landowners and resource professionals as a means of providing for those needs. VFF has served as model for other regional programs of a similar nature including Massachusetts Family Forests in Western Massachusetts (Barten et al., 2001).

The organization began with a collaboration between David Brynn, Addison County Forester, and the Lewis Creek Association, also located in Addison county. The collaboration resulted in a series of successful stewardship workshops for private

woodland owners. The educational outreach program was later titled Vermont Family Forests. In 1996, a total of 11 workshops were held based on the guiding conservation principles outlined by VFF. By 1997, a pool of 32 landowners, holding approximately 5,000 acres, had been organized based on past demonstrations of strong forest stewardship. The organization received a grant through the Vermont Sustainable Jobs Fund, allowing funding for "green certification" through the Forest Stewardship Council (FSC). VFF was incorporated as a non-profit organization in 1998 and currently maintains a small, part-time staff in Bristol, VT.

The framework of a "community supported forestry system" has been developed by VFF to combat the challenges faced by small private woodland owners with a desire to harvest timber in an ecologically sustainable way while remaining profitable. Major challenges confronted by small woodland owners often result from issues of economic scale. Traditionally, small private woodland owners are at a distinct disadvantage regarding prices received for stumpage (Row 1978). More recently, small landowners are at a disadvantage for receiving green certification through organizations like FSC. Small scale timber harvests are unlikely to be profitable if the landowner must cover the costs associated with management as well as those costs associated with certification and periodic auditing (Rickenbach and Reed, 2002).

The network, facilitated by VFF, allows woodland owners to coordinate management with neighboring landowners to share harvest cost and pool timber resources. Without coordination, it is difficult for owners of small parcels to conduct a profitable timber sale involving low volumes of a wide assortment of species.

Landowner collaboration allows many owners to participate in a single sale, raising volumes enough for a profitable harvest. Under the umbrella of VFF, small woodland owners also have discounted access to FSC certification, though it is not required to participate in the organization.

Keeping the value added during timber processing within the local community is also a focal point for VFF. The organization provides landowners with contact to local resource consultants, loggers, sawmills, craftsmen, and other wood buyers. Products initiated by a landowner who has adhered to all VFF principles throughout management planning, harvesting, and processing are distinguished in the marketplace by the VFF brand name. The goal of VFF is to attract consumers who will pay premium prices for locally grown, ecologically sustainable wood products. The premium compensates landowners for higher management costs and the lower quality wood typically removed during timber stand improvement.

The Nature Conservancy "Forest Bank" (The Woods Bank)

Still in the early stages of development, the Forest Bank was developed by the Nature Conservancy as a means of collaborating with private woodland owners to protect the ecological integrity of a given region in a way that would be economically worthwhile for landowners. A pilot project is underway in the Clinch River Valley of Virginia with initial steps being taken to establish the amount of interest in the project within that region (Dedrick et al., 2000).

Involvement requires landowners to permanently "deposit" the harvesting and timber management rights for all or part of their woodland with TNC. In exchange,

the landowner would receive, regardless of what harvest activities have been undertaken on the parcel, an annual dividend of approximately 4% of the fair market value of the initial deposit. The overarching goal of TNC is to consolidate an area of land large enough to manage at an ecosystem level, protecting water quality and wildlife habitat requirements. The Clinch River Valley was pinpointed by TNC specifically because of the current threat of fragmentation within the area and the importance of protecting an area of rich biodiversity.

According to Dedrick et al. (2000), in their pilot study, 8% of survey respondents said they would immediately enroll their land in the program, 15% indicated that they may enroll in the future after observing the working program, while 77% indicated they would not enroll in the program. The reputation of TNC was a strong point for the program, but most landowners were unwilling to permanently give up the timber and land management rights to their land.

Timbergreen Forestry (The Marketing Cooperative)

Timbergreen Forestry, located in Spring Green, Wisconsin, integrates forest management services and the processing and direct retail of locally produced wood products. Owned and operated by Forester Jim Berkmeier, Timbergreen was an influential model for the now defunct Sustainable Woods Cooperative of Southwestern Wisconsin (Sustainable Woods Co-op, 2003). The Timbergreen model, as outlined by Birkemeier (2003), is designed to target non-industrial small woodland owners in a specific community or watershed who desire more control regarding the

harvesting and processing of wood from their lands and who wish to make low impact logging and ecologically based harvesting a financially viable option.

Organized as cooperating investors, interested landowners in a particular community or watershed pool financial resources for the purchase of wood processing equipment. Equipment could include a portable sawmill, edging equipment, a solar dry-kiln, sorting yard, and storage warehouse. Landowners then elect a Board of Directors responsible for representing the interests of the investors. The Board of Directors would select a General Manager, knowledgeable in all aspects of the business. The General Manager is charged with hiring, or contracting all necessary resource professionals (i.e. foresters, ecologists, loggers) for the purposes of carrying out management tasks. Landowners are encouraged to participate in all aspects of processing and marketing. If skilled labor is required, landowners must then invest in capable workers or in the expertise needed for training unskilled workers.

A primary function of the cooperative is to consolidate individual parcels into a single management unit with specific ecological goals. Through cooperation and landowner communication, the goal is to effectively manage each parcel with the greater landscape in mind. An added benefit to a larger management unit is an increased ability of foresters and loggers to move equipment and manpower into place for efficient and cost effective harvesting. Coordinated harvests on individual parcels may also increase trucking and processing efficiency.

Wood is not sold as stumpage. Harvested timber is brought to a log yard maintained by the cooperative, and landowners are paid fair market value for their

wood. Roundwood is processed into the product that would add the most value when resold. Given the prevalence of valuable hardwood species in the region, Timbergreen endorses the production of flooring as the primary value-added material. Wood that cannot be processed with co-op equipment, including pulpwood and veneer, are sold to other processing facilities.

Ideally, landowners receive, in addition to the fair market value of their timber, a stock percentage of the value added through processing and resale of the finished product. The hope is that the greater financial return for landowners will make low-impact, ecologically sensitive forestry more profitable than the more traditional stumpage sale system. The loggers and processors are compensated through the cooperative's payroll and would have an opportunity to earn stock as well.

CHAPTER 5

COOPERATIVE MANAGEMENT PROGRAMS IN MAINE

The Small Woodland Owners Association of Maine, Augusta, Maine

The Small Woodland Owners Association of Maine (SWOAM) is akin to the

Vermont Family Forests Program. SWOAM, as stated on their website

(www.swoam.com, last accessed June 21, 2005), was incorporated as a non-profit

organization in 1975 by a group of small woodland owners interested in designing a

program to assist each other in the management of their own lands. Early meetings

rotated from woodlot to woodlot where landowners would discuss and learn from the

successes and failures of their peers.

The association has grown over the years to include more than 2,750 active

members including not only landowners, but a variety of other individual

stakeholders with interest in the Maine woods. The primary function of SWOAM

remains landowner education and outreach. SWOAM currently employs an executive

director, a forester, and an office assistant. Like VFF, SWOAM enlists the expertise

of resource professionals throughout the state to conduct workshops on responsible

and effective forest management, and to assist landowners in achieving their

individual goals. There are nine regional chapters throughout Maine and all members

receive a monthly newsletter. As of 1990, SWOAM had developed a land trust

program accepting land gifts and conservation easements. Management of the land

held in trust acts as a model of sound forestry to complement the landowner assistance and outreach efforts of the association.

The Small Woodland Owners Association of Maine also offers group green certification to interested members. For certification, the organization has aligned with the American Tree Farm System. Certification through the Tree Farm System is similar to that of FSC as landowners must adhere to a set of sustainability standards. Land is audited by a certifier who measures compliance through designated field indicators and an analysis of the individual management plans. SWOAM currently has no brand label for products produced by their members and there are no chain-of-custody requirements for certification under the Tree Farm System, reducing costs in comparison to FSC.

The Forest Products Marketing and Management Association, Dover-Foxcroft, Maine

The Forest Products Marketing and Management Association/Cooperative began much like SWOAM as a landowner initiated group for the purposes of becoming more knowledgeable and involved in the management of their own woodlands. Initially there where 20 members, who each paid dues of 20 dollars per year. The Association was incorporated as a non-profit in September of 1977 and a board of directors was selected.

Members of the Association initially participated in educational programs, networking, and advocacy for other forest owners. Membership grew to 150 members, and eventually the Association received a 3 year U.S. Forest Service grant

through the Maine Forest Service for the purposes of paying a salary to a manager and to aid in the achievement of financial self-sufficiency (Brusilla, 1983).

Initially 15 members joined the cooperative arm of the Association. At the cooperative's peak, 85 members holding 12,000 acres of forestland in the Dover-Foxcroft area were involved. The goals of the cooperative were similar to those of the traditional forestland owner cooperatives in Quebec (Brunette, 1992) and Sweden (Kittredge, 2003). The FPM &MA cooperative was most interested in increasing market power to improve the landowners' ability to negotiate prices, pooling resources for harvesting, processing and transporting, and identifying new value-added products (Hancock Planning Commission, 1999).

Brusila's (1983) thesis study, conducted while the FPM & MA was still in operation, highlighted difficulties that eventually led to the decline and collapse of the organization. The cooperative was formed as the 45,000 dollar U.S. Forest Service grant money began to run out. The hope of organizers was to create a cooperative that would be financially independent, self-sufficient, and capable of paying the manager's salary while still supporting the educational and informational activities of the Association. A forester was hired in 1981 for the purposes of focusing on income-producing operations, including management activities and timber sales.

Unfortunately, by 1981, as the grant money ran out, wood markets were slow and prices dropped. Both the manager and forester were put on part-time salaries and eventually found work elsewhere. Another factor in the decline of the cooperative, associated with a sluggish wood market, was the fact that cooperative members were not obligated to sell their wood through the organization. The cooperative could not

match market prices and the number of timber transactions that occurred through the

cooperative was not adequate to cover expenses of the organization.

CHAPTER 6

RESEARCH METHODS

Experimental Design

This study was designed to elicit a statewide response from small (less than 500 acres), non-industrial, private forestland owners in the State of Maine who were at the time enrolled in the Maine Tree Growth Tax Program. To realize a response of statistical significance, a stratified random sample of private woodland owners throughout the state was developed with the intent of receiving, at the minimum, 601 returned mail surveys. The minimum response rate was chosen to achieve 95% confidence that sample results would be within a 4% margin of error of the true population (Rea and Parker, 1992). Mail surveys, as opposed to telephone surveys or personal interviews, were chosen to achieve a large enough response rate utilizing the resources available for this study.

The survey structure and mailing procedure were modeled after Dillman's Total Design Method (1978). Based on the response rate of similar studies and the desired number of survey participants, a total of 1500 surveys were mailed to individual landowners. Approximately one month later, on March 9, 2005, a reminder postcard emphasizing the importance of participation was mailed to all participants. On April 13, 2005, 5 weeks after the initial mailing, a second survey was mailed to a randomly selected sub-sample from all three population strata. All postage costs were supplied by the researchers.

Sample Selection

For sample selection, the State of Maine was stratified through a Geographic Information System (GIS) utilizing MapInfo Professional software and GIS data layers obtained through the Maine Office of GIS. Stratification was to be based on two factors likely to influence the harvest behavior of small non-industrial woodland owners. First, land holdings were stratified based on the population size and the population density of the town in which they were located. Secondary stratification was based on the proximity of each parcel to major wood processing facilities. Proximity to mills was used as a surrogate for opportunity for the landowner to sell timber.

The data layers "metwp100" and "cnty100" were utilized for base information, displaying political town and county boundaries respectively, as well as town and county names and geocodes. The two base layers were joined with layer "mcdccd00", which contains year 2000 census information for minor civil divisions (MCD) throughout the state.

Unorganized townships were queried and removed from the GIS due to the lack of small, non-industrial parcels throughout those regions. The remaining areas, 484 civil divisions total, were stratified based on overall population numbers and population density per square mile utilizing information linked with the mcdccd00 layer. Through a series of queries, areas with an overall population of 10,000 or greater, or a population density greater than or equal to 1,000 individuals per square mile were designated as urban. Areas with a population less than 10,000 and a density of 100 – 1,000 individuals per square mile were designated as urban fringe. Areas

with a population less than 10,000 and a density less than 100 people per square mile were designated as rural.

The secondary stratification, planned to group towns based on proximity to major primary wood processing facilities, was not effective. For the purposes of this research, a major processing facility was defined as any softwood or hardwood mill with an annual processing capacity of at least 10,000 MBF. Upon the creation of this data layer within the GIS, utilizing mill locations and capacity information made available by the Maine Forest Service (Maine Forest Service, 2000) it was discovered that no town within the state of Maine is further than 50 miles from a major processing facility as defined by the study.

Non-industrial, private forest (NIPF) landowners were identified based on their enrollment in the Maine Tree Growth (TG) tax incentive program. The TG roster provided an expedient way to achieve a statewide sample of forestland owners and to gather contact information for each survey recipient. Given the requirements for enrollment in TG (State of Maine Revenue Service, 2003), it was assumed that NIPF landowners selected from the list own at least 10 contiguous acres of forestland, possess management plans for their property, and have some amount of contact with a licensed professional forester. Once each town was placed in the appropriate population stratum, each TG enrolled parcel within the town was assigned a number. In total, based on year 2002 enrollment, there were 797 urban parcels enrolled, 3,381 parcels within the urban fringe enrolled, and 16,888 parcels classified as rural for a total of 21,066 enrolled parcels.

Based on the desire to achieve a total of 601 responses, the expected proportional sample population for the urban, urban fringe, and rural groups were 23, 96, and 482 respectively. Given the desire within this study to analyze landowner response not only at the state level but within population strata as well, the expected proportional sample populations were not adequate. In order to achieve a margin of error of at least 10% within the strata, a minimum of 100 landowner responses was needed for each group. If the proportional sample size of the urban group was increased to 100 to achieve at least a 10% margin of error, the entire sample population size would have to be increased to 2646, with 425 and 2122 responses required for the urban fringe and rural groups respectively.

Since a sample population of 2122 was beyond the scope of this research project, a disproportionate stratification procedure was used. To achieve the desired sample size of 601, the minimum of 100 samples was chosen from both the urban and urban fringe groups while the remaining 401 samples were chosen from the rural stratum. Given significant differences between the strata regarding key questions in the survey, results were to be weighted appropriately prior to analysis to avoid skewing the data toward the urban stratum. For analysis of the entire statewide sample, the goal was to maintain a margin of error of 4%. The margins of error for analyzing data within the urban, urban fringe and rural strata were to be 10%, 10% and 5% respectively, assuming the achievement of the desired sample sizes.

Initially, once each town was placed in the appropriate population stratum, every enrolled TG parcel was assigned a number. Parcels were selected at random utilizing random numbers generated in Microsoft Excel and individual town offices

were contacted by phone to secure landowner addresses given the fact that contact information was not present in the original data set. The process of securing contact information through individual town offices proved to be quite time consuming and inefficient. Therefore, a comprehensive statewide Tree Growth Program enrollment roster was requested from the Maine Forest Service. The Maine Forest Service roster listed 15,911 enrolled parcels as of October 13, 2004. The final sample was reselected at random utilizing the same procedure as above with the contact information provided within the new roster. In total, 1000 surveys where sent to landowners of rural parcels, 250 surveys were sent to landowners of both urban and urban fringe respectively.

Response Rate

Following the initial mailing of 1500 surveys, a total of 326 useable surveys were returned. In regards to the individual strata, 64 of the initial replies were from urban respondents, 61 were from landowners of urban fringe parcels, and 294 replies were from owners of rural lands. Following the March 9, 2005 reminder postcard, 71 additional responses were acquired. Of those 71 responses, 8 came from the urban stratum, 11 from the urban fringe, and 52 from the rural stratum. From the time of the second survey mailing to the stop date of May 13, 2005, 73 final responses where acquired. Of the last set of survey responses, 23 were from urban respondents, 9 were from urban fringe respondents, and 41 were from rural respondents.

Of the 1500 surveys mailed, 52 were sent back as undeliverable mail. Of the remaining 1448 surveys, 541 were completed to varying degrees and returned. There

35

was no acreage listed for 7 of the returned surveys, 54 ownerships were in holdings of greater than 500 acres, and 10 responses were either inadequate or unusable for other reasons. In total, 470 useable surveys were received. Of the useable surveys, 95 were from the urban stratum for a response rate of 38 percent, 81 were from the urban fringe group for a response rate of 32 percent, and 294 were from the rural stratum for a response rate of 29 percent and a margin of error of 6 percent. These response rates are comparable to those of similar studies. Since the minimum of 100 responses was not reached for both the urban and urban fringe groups, the groups were combined to form one urban class with an 8 percent margin of error at a 95 percent confidence.

Data Analysis

Initial correlations were tested utilizing a standard chi-square test for significance in SAS (Statistical Analysis Software). Given the limitations of chi-square tests regarding the examination of simultaneous effects of several explanatory variables on a given dependent variable, regression models were developed for this study. Logistic regression models were created in SAS based on the conceptual model outlined in the Results section. Logistic regression allowed for the examination of simultaneous effects of a multitude of explanatory variables.

Logistic regression was selected for its effectiveness at modeling categorical dependent variables against both quantitative and categorical explanatory variables. It has been successfully utilized for similar studies (Salkie, Luckert, and Phillips, 1995; English et al. 1997; Potter-Witter, 2005).

36

The logistic regression model utilizes odds ratios as opposed to event probabilities. The relationship between the odds ratio and the probability of an event occurring can be illustrated this way:

$$O=P/1-P$$

The odds of an event equal the ratio between the probability of an event occurring and the probability of no event occurring. Odds inherently have no upper bound. Odds less than 1 have probabilities below .5, those above 1 correspond to probabilities greater than .5, making odds ratios an efficient way to measure the relationship between two dichotomous variables.

The logistic regression equation transforms the standard linear probability model of:

$$P_i = a + \beta x_i$$

to an equation where the linear function of the explanatory variable equals the logarithm of the odds:

$$\log[P_i/1-P_i] = a + \beta x_i$$

The coefficients of the logistic regression model can be interpreted as odds of an event occurring.

The logistic regression models for this study were estimated by a Maximum Likelihood (ML) procedure in SAS. An ML procedure chooses as estimates the parameter values that would maximize the probability of observing what was observed through an iterative process. An expression for the probability of the data as a function of the unknown parameters is chosen first. With a binary dependent

variable, a binomial distribution is utilized. It is then assumed that the probability distribution is dependent on the explanatory variables. The second step is to find the values of the unknown parameters that make the probability expression as large as possible through repeated approximations in SAS. Once the model is fit, the effectiveness of the explanatory variables at accounting for the variation in the model can be analyzed. With a large sample, as is the case in this study, chi-square equations utilizing the ratio between parameter coefficients and their associated standard errors are utilized to evaluate how well the variation in the models was accounted for. The assumption that the probability distribution is dependent on the explanatory variables is either accepted or rejected at an alpha level of .01.

The population and population density stratification was abandoned for reasons addressed at the end of the Results section. All results represent owners of small, non-industrial forestland throughout the organized townships of the State of Maine who are currently enrolled in the Tree Growth Tax Program.

CHAPTER 7

RESULTS

The Conceptual Model

Based on both the review of literature presented in Chapters 1 through 5 regarding the characteristics and priorities of small, nonindustrial woodland owners throughout the country, and the apparent differences between the three cooperative organizations, a conceptual model was developed to predict what factors are likely to affect a woodland owner's desire to join a forestry cooperative.

The three organizations will likely be supported on a gradient determined by the level of time and financial investment required for each, the ability of landowners to retain property rights, and overall commitment required for participation. For these reasons, it is likely that the Network will be most popular, followed by the Marketing Cooperative with greater time and financial investment required. Least popular will likely be the Woods Bank in which property rights are relinquished.

Several landowner characteristics are likely to influence the desire to join. Older landowners are less likely to be interested given the time and energy requirements for involvement. Older residents may also be considering the transfer of ownership and management responsibilities to their heirs. It seems logical that affluent individuals, with the capacity for upfront financial investment, would be more likely to express interest in the cooperative models.

Given the long-term management focus of the three forestry cooperative models, individuals with longer management planning horizons are more likely to

express interest as well. Landowners interested in cooperating with neighbors for the purposes of ecosystem management are likely to be more interested in the three cooperative management programs. Landowners who desire to have greater control over how their wood is processed will more likely be interested in the Marketing Cooperative, as will landowners who desire to collectively invest in processing equipment as a means of achieving higher profits for their wood products. An owner who is the sole owner of the property is more likely to express interest in a cooperative management program as he or she currently makes all the management decisions.

If a landowner was unhappy with the residual state of his or her woodland after a harvest, he or she may be more likely to participate in a program dedicated to responsible forest management focusing on diverse landowner goals. An owner with strictly financial goals may view the cooperatives less favorably than a landowner who maintains non-financial goals for his or her property. Lastly, involvement interest is likely to change based on specific landowner management priorities. A landowner who is more concerned with privacy and the scenic beauty of his or her land may view the cooperatives differently than a landowner more interested in maintaining and harvesting timber as a financial investment.

Based on the above framework, all anticipated correlations between landowner interest in the cooperative models and explanatory variables provided by the survey were tested through chi-square analysis. Logistic regression models were created to examine correlations between interest in forestry cooperatives in general, and those landowner characteristics and values that would likely have an effect on a

landowner's desire to become involved. Three similar models were created to examine the correlations between landowner characteristics and the three individual cooperative models. A regression model testing the correlation between forester involvement in harvesting and landowner satisfaction regarding a variety of residual forest conditions was included as well. In order to avoid omitted variable bias, the final regression models included all variables reflecting landowner characteristics and attributes.

The results section follows the format of the survey. General response information, chi-square statistics, and logistic regression models are included as survey sections are addressed. Implications of these research findings are stated in the Discussion section.

Interpreting Logistic Regression Results

The first statistics of interest are those referring to the global null hypothesis. The global null hypothesis states that the coefficients of all the explanatory variables of the regression equation equal 0. If the null hypothesis is not rejected it can be assumed that the chosen variables do not explain the variation among landowners regarding interest in the cooperative programs. SAS provides three chi-square statistics for testing the global null hypothesis. If the given p-values for all three statistics are lower than .01, we reject the global null hypothesis and assume that at least one of the explanatory coefficients does not equal 0.

The Wald Chi-square statistics under the Maximum Likelihood Estimates are the test statistics for each individual explanatory variable in the model. Wald statistics

are calculated by dividing each parameter coefficient by its estimated standard error and squaring the result. The p-values for each Wald test statistic are displayed for each parameter. An important part of each parameter coefficient estimate is the sign describing the parameter's relationship to the dependent variable. The odds ratio estimate indicates the extent to which the likelihood of being interested in a cooperative is dictated by the explanatory variables.

Population and Population Density Stratification Results

The landowner stratification, based on overall population and population density of the town in which the parcel was located, was unsuccessful at accounting for sample population variation with regards to cooperative interest and desire to cooperate with other landowners for the purposes of ecosystem management. Given that those topics were of the highest interest to the survey, the population stratification scheme was abandoned for the remainder of the analysis. There was a moderately significant correlation (p-value .0198) between population strata and the desire to keep value added in the local community. There was also a significant correlation between population strata and the desire to have greater control regarding how wood products are processed once harvested. Both significant correlations were positively correlated to rural parcels. Results for the stratification correlations are displayed in Table 1.

Table 1: Chi-square correlations between population strata and primary study variables.

Variable	Degrees of freedom	Chi-square value	P-value
Interest in cooperatives	1	1.4775	.2242
Interest in ecosystem management	4	11.2845	.0235
Desire to keep value added in the local community	4	11.6935	.0198
Desire to collectively own processing facilities	4	4.7915	.3094
Desire to have greater control over products once harvested	4	16.2419	.0027

Section I: Why do you own woodland?

The first section of the survey was designed to explore the primary reasons for ownership of non-industrial, private woodland in the State of Maine. Twelve probable reasons for ownership were identified based on previous research (Birch, 1994; Dennis, 1989; 1992; Stevens et al., 1999; Young and Reichenbach, 1987) and presented to survey recipients. Each ownership priority was followed by a Likert Scale range of 1-7. Within the survey, it was explained that the respondent should mark 1 to indicate a priority of little importance. An answer of 7 would indicate a high priority to the landowner. The average importance of the given priorities and the associated standard deviations are presented in Table 2.

Table 2: Indicated importance of woodland ownership priorities.

Ownership Priority	Average Level of Indicated Importance	Standard Deviation from the Mean	General Importance
Solitude and scenic enjoyment	6.03	1.55	Important
For wildlife habitat	5.67	1.59	Important
As part of my home or vacation home	5.54	2.01	Important
To protect nature and biological diversity	5.42	1.75	Important
Estate to pass on to children or other heirs	5.00	2.04	Important
For recreation other than hunting or fishing	4.94	2.03	Important
For land investment	4.31	2.04	Moderately important
For sale of sawlogs, pulpwood, or other timber products	3.97	2.06	Moderately important
For production of firewood	3.89	2.03	Moderately important
For hunting or fishing	3.81	2.34	Moderately important
To supply wood for my business	2.24	1.87	Not important
For collection of non-timber forest products	2.02	1.52	Not Important

In addition to the ownership priorities provided by the survey, respondents were given the opportunity to specify any other management priority they felt was important. In total, there were 52 free response answers. It was common for free response answers to be specific variations on provided priorities. An example would be landowners who wrote in "snowmobiling", or "cross country skiing" as free response variations on the provided priority of "recreation other than hunting or

fishing." Several landowners expressed pride in the length of tenure of their family owned property. As a variation on the provided priorities "as part of my home or vacation home" and "estate to pass on to children or other heirs," a common free response was to indicate the year in which the family acquired the property, in some cases generations ago. Other answers included a desire to "preserve open space" or maintain a "buffer" against urban development.

Landowners were also asked to indicate the **most important** reason for owning their woodland. Responses were tallied for each ownership priority and percentages are presented in Figure 1. In instances where landowners marked more than one reason as most important, each reason was counted as a separate response and added to the total for each category.
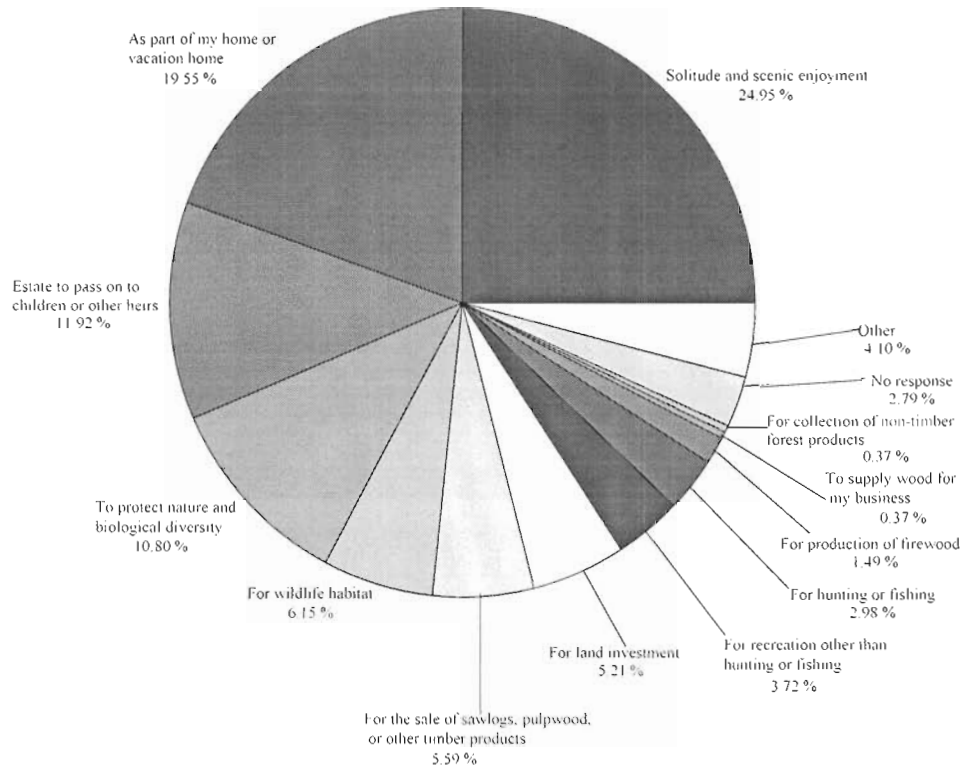
Figure 1: The most important reason for owning woodland in Maine as stated by survey respondents.

As illustrated by Figure 1, almost 25 percent of the sample population acknowledged solitude and scenic enjoyment as the most important reason they own woodland. In general, non-timber related reasons were stated most frequently as most important for ownership. At 5.59 %, the sale of sawlogs, pulpwood, and other timber products was marked as most important by a relatively small fraction of people. These percentages corroborate the data displayed in Table 2. It is apparent that reasons including the protection of nature and biological diversity, and wildlife habitat are more important to the landowners in this survey.

The conclusion, however, that the production of wood products is unimportant to small woodland owners in the state of Maine, or that those woodland owners in general would be opposed to harvesting would be untrue. Furthermore, it would be wrong to consider land investment, hunting and fishing, and other recreation opportunities as unimportant reasons for land ownership. Based on the average indicated importance scores in Table 2, the only two reasons for owning woodland that fell below the neutral category were, "to supply wood for my business," and "the collection of non-timber forest products." The low score for the former reason is likely due to the maximum area of 500 acres set for respondent eligibility. Individuals who produce wood products as a business on a large scale with raw material harvested from land they own are likely to own more than 500 acres. The latter reason is a specialty interest and more likely to be a secondary consideration for most woodland owners.

Section II: Forest Management and Harvesting

Questions concerning management activities and satisfaction regarding harvesting were presented in the second section of the survey, given that one objective of this study was to understand the extent to which landowner goals are being reached under the Maine Tree Growth Tax program and the associated management plan that is required. Survey questions examined the primary sources of forestry advice respondents have utilized, the frequency with which landowners are in contact with a Maine Licensed Professional Forester, and the landowners' desire to maintain a management plan in the absence of the Tree Growth Tax program.

Percentage results for the question regarding sources of advice are displayed in Figure 2. Figure 3 displays the results from the question designed to determine the frequency with which landowners were in contact with foresters for the purposes of management or advice.
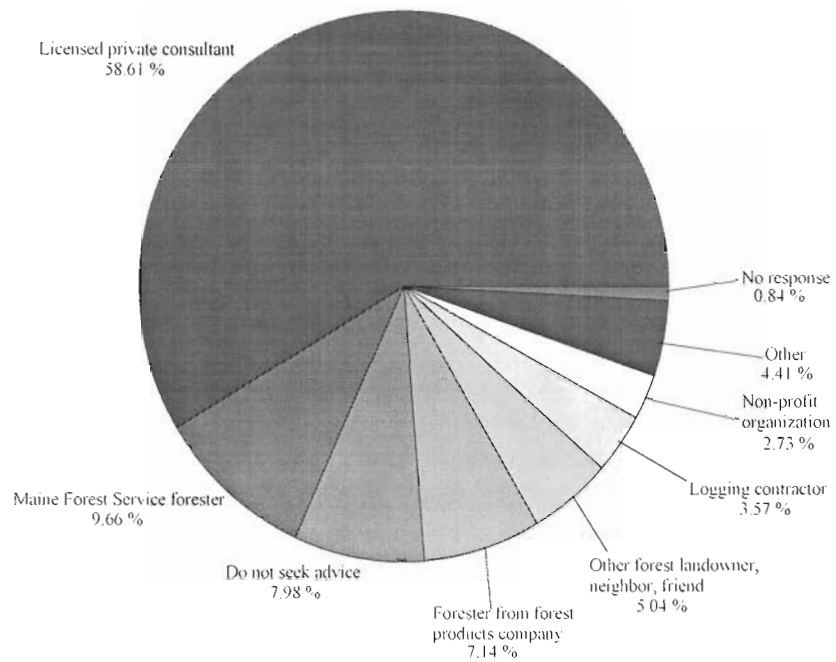
Figure 2: Sources of forestry advice for woodland owners.
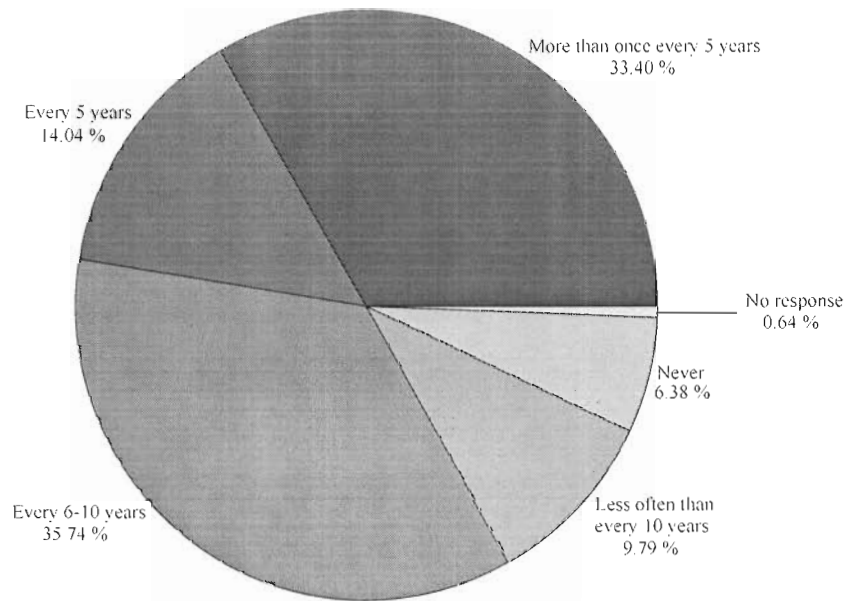
Figure 3: Frequency of contact between landowners and professional foresters.

Survey results revealed that most landowners are either in contact with a private forestry consultant or utilize the services of a Maine State Forest Service forester. Furthermore, most survey respondents are in contact with a forester at least once every 10 years, a logical finding given that a management plan update is required every 10 years under the Tree Growth Tax program. According to the survey, 54.47 percent of landowners (256 individuals) would maintain a management plan for their property in the absence of the Tree Growth Tax program. In contrast, 41.49 percent (195 individuals) declared they would not maintain a management plan in the absence of the program. Nineteen individuals, about 4 percent of the sample, had no response. Based on these survey results, the Tree Growth Tax program has had a significant impact, requiring management plans for properties that would otherwise go without in the absence of the program.

A series of questions within Section II of the survey was designed to quantify the number of landowners who have harvested wood from their land within the past 20 years and to rate the satisfaction level of landowners regarding various aspects of the harvest. A broader objective regarding this line of questioning was to see how the levels of interest in cooperatives fluctuated among landowners based on personal satisfaction with past harvests on their land. Figure 4 displays the harvesting activities of small woodland owners under the Maine Tree Growth Tax program. As illustrated in Figure 5, respondents were asked to indicate for whom the forester was working regarding harvests in which a forester was involved .

51
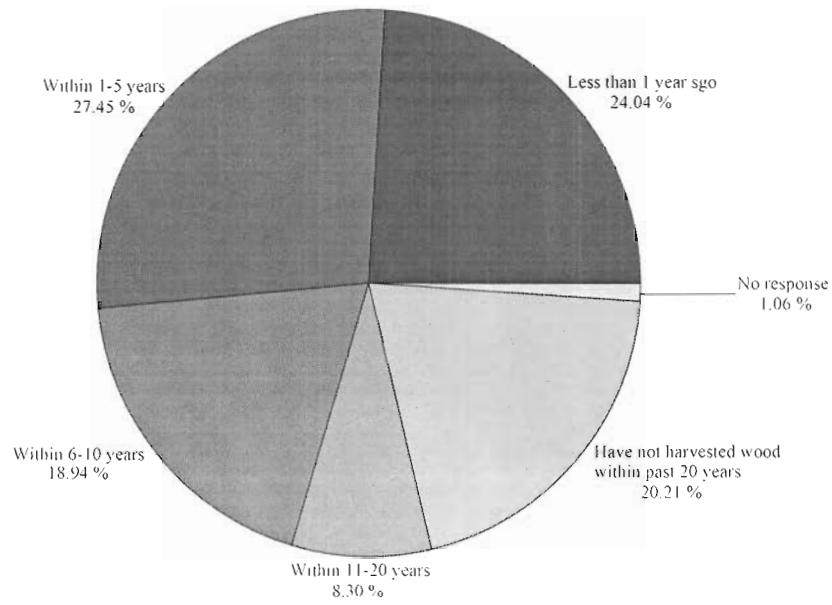
Figure 4: The amount of time since the most recent harvest on individual properties.
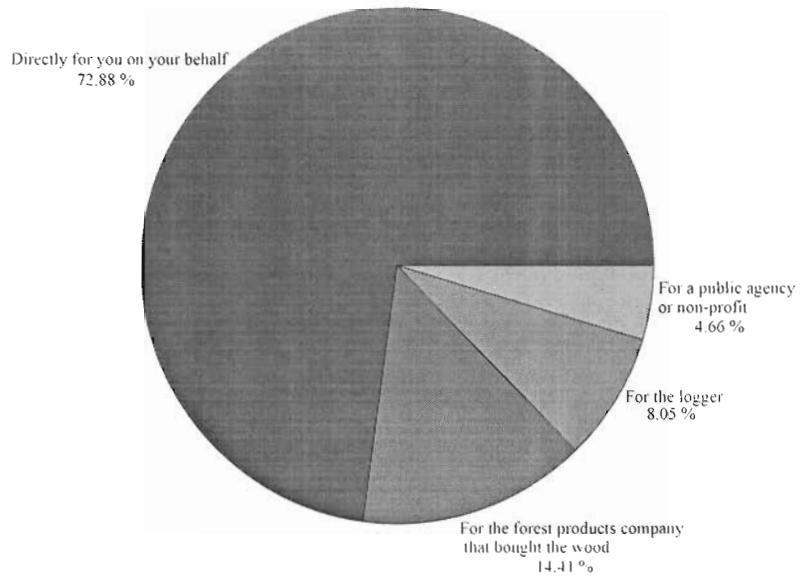
Figure 5: For whom the forester was working in the most recent harvest on individual properties.

As illustrated by Figure 4, slightly less than 80 percent of survey respondents have harvested within the past 20 years.

Of the reported harvests, a forester was involved in 60.27 percent, there was not a forester involved in 37.87 percent, and 1.87 percent of landowners who had harvested did not respond to the question. Of those harvests in which a forester was involved, over 70 percent of the time the forester was working directly for the landowner. The next most common situation, occurring 14.41 percent of the time, was a forester working for a forest products company, likely in a procurement situation.

For comparison, questions regarding personal satisfaction with past harvests were posed to respondents. Satisfaction responses were sought regarding the amount of compensation secured by the landowner for harvested products, the physical appearance of the woodlot, the remaining forest structure and composition, and the degree to which harvesting matched up with the management intentions outlined in the plan. Figures 6-10 display the responses to questions regarding satisfaction with harvesting.
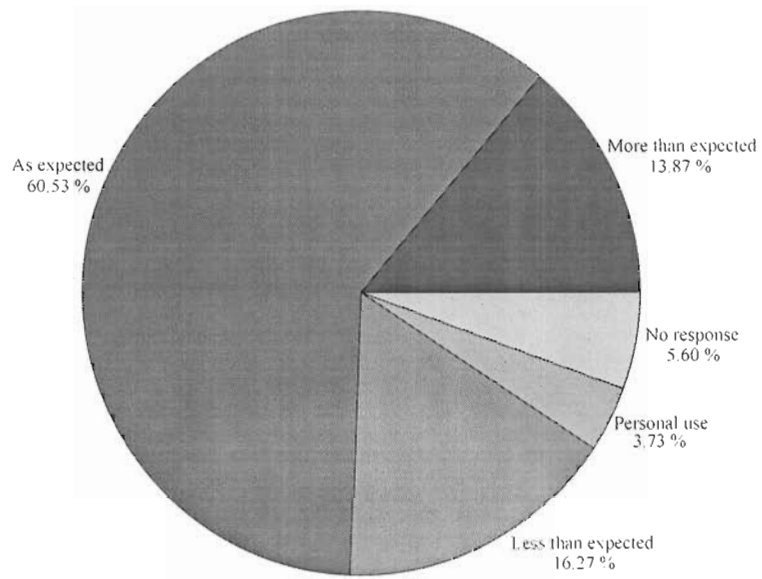
Figure 6: Price received for forest products in the most recent harvest in comparison to landowner expectations.
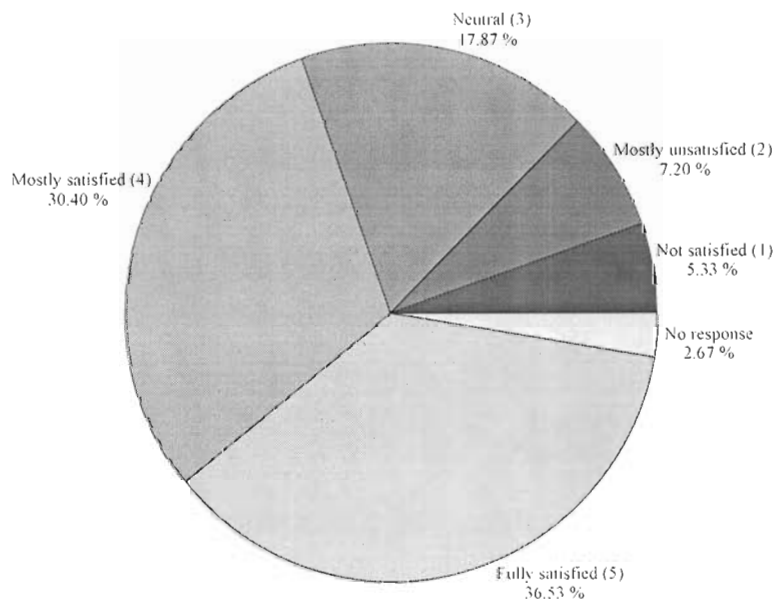
Figure 7: Landowner satisfaction with the physical appearance of the woodlot following the most recent harvest.
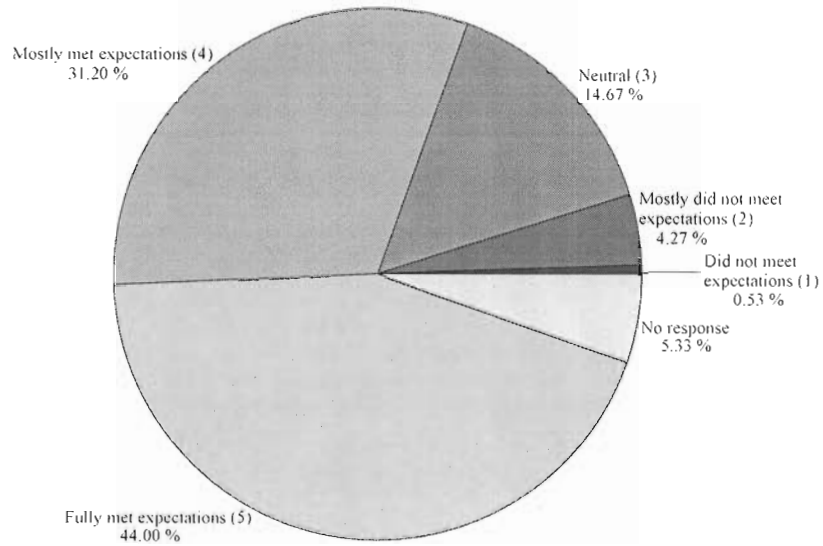
Figure 8: Landowner satisfaction with forest composition following the most recent harvest.
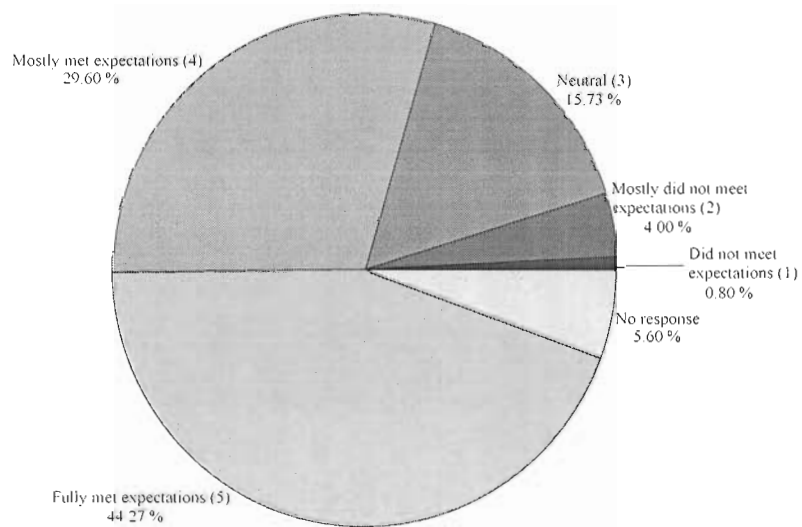
Figure 9: Landowner satisfaction with the forest structure following the most recent harvest.

Mostly matched intentions (4)
32 80 %

Neutral (3)
12.53 %

Mostly did not match
intentions (2)
3.47 %

Did not match
intentions (1)
2.93 %

No response
7 20 %

Fully matched intentions (5)
41.07 %
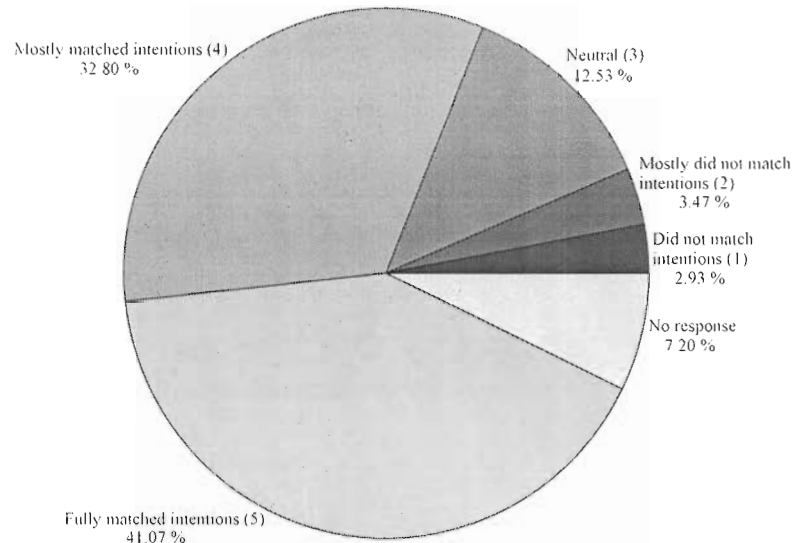
Figure 10: The extent to which landowners felt their most recent harvest matched with the intentions outlined in the management plan.

In general, small woodland owners were satisfied with the harvesting performed on their properties. Only 6.4 percent of the harvests performed did not match, or mostly did not match the intentions outlined by the landowner's management plan. Approximately 5 percent were unsatisfied or mostly unsatisfied with the residual forest structure and composition following harvest. Less than 1 percent indicated that residual structure and composition completely did not meet expectations. Of landowners surveyed, 12.53 percent were mostly or completely unsatisfied with the physical appearance of their woodlot following harvesting, a reasonable percentage for small woodland owners who may harvest infrequently and are not used to the immediate on-the-ground impact of harvesting. Regarding price

56

received, slightly more than 16 percent of landowners indicated that they received less compensation for their wood than they had anticipated.

For analysis, the results of all questions in which landowners ranked their level of satisfaction with harvesting were tested for correlations with the presence of a forester during harvest through chi-square analysis. Surprisingly, no significant correlations, as viewable in Table 3, were found between the levels of satisfaction indicated by landowners and forester involvement. Table 4 displays the results from a logistic regression model created to determine if frequency of forester contact accounts for landowner satisfaction regarding the price received for harvested products. No significant correlations were found in the regression model either.

An explanation as to why no correlations were found between landowner satisfaction and the frequency of forester contact or extent of forester involvement may be the requirements of the Tree Growth Tax program. The non-significant results may be attributed to the existence of comprehensive, high quality management plans required under the program. If landowner intentions and management prescriptions are easily ascertained from the management plan, harvests are likely to be compatible with landowner goals and expectations, resulting in high landowner satisfaction levels. Non-significant results may also be attributed to a knowledgeable and informed landowner base, as is exemplified by their involvement in Tree Growth Tax program, or perhaps due to the fact that a large portion of the sample population was satisfied, making it difficult to account for the feelings of a relatively small number of individuals.

Table 3: Chi-square correlation between landowner satisfaction with harvest and forester involvement.

Satisfaction Variable	Degrees of Freedom	Chi-square Value	P-value
Price expected for harvested products	2	2.2528	0.3242
Physical appearance of woodlot	4	7.4333	0.1147
Residual forest composition	4	8.8559	0.0648
Residual forest structure	4	5.8214	.2129

Table 4: Logistic regression testing the correlation between the frequency with which landowners are in contact with a forester and satisfaction with the price received for products harvested.

Model Fit Statistics						
	Intercept only	Intercept and Covariates				
AIC	592.3	592.996				
SC	599.958	615.97				
"-2 Log L"	588.3	580.996				
Global Null Hypothesis Test						
	Chi-Square	DF	Pr>Chisq			
Likelihood Ratio	7.3035	4	0.1207			
Score	7.1342	4	0.129			
Wald	7.2931	4	0.1212			
Maximum Likelihood Estimate						
Parameter	DF	Estimate	Std Error	Wald Chisq	Pr>Chisq	
More often than once evry 5 yrs	1	-0.859	0.5995	2.0532	0.1519	
Once evry 5 yrs	1	-0.8261	0.6478	1.626	0.2023	
Once evry 6-10 yrs	1	-0.3277	0.5969	0.3014	0.583	
Less than once evy 10 yrs	1	0.0735	0.6724	0.0119	0.913	
Odds Ratio Estimate						
Effect	Point Estimate	95% Wald CI				
More often than once evry 5 yrs	0.424	0.131	1.372			
Once evry 5 yrs	0.438	0.123	1.558			
Once evry 6-10 yrs	0.721	0.224	2.321			
Once evy 10 yrs	0.929	0.249	3.471			
Never						

* The category "no contact" was omitted as it is a linear combination of the other variables

To understand the extent to which landowner interests and priorities are being addressed under the Tree Growth Tax program, respondents were asked questions regarding the effectiveness of their management plan. Landowners were asked to rate the effectiveness of their plan regarding the achievement of both financial goals and

non-financial goals. An area on the survey was provided for landowners to indicate if they had no particular financial or non financial goals. Responses for the two questions concerning management plan effectiveness are summarized in Figure 11 and Figure 12.
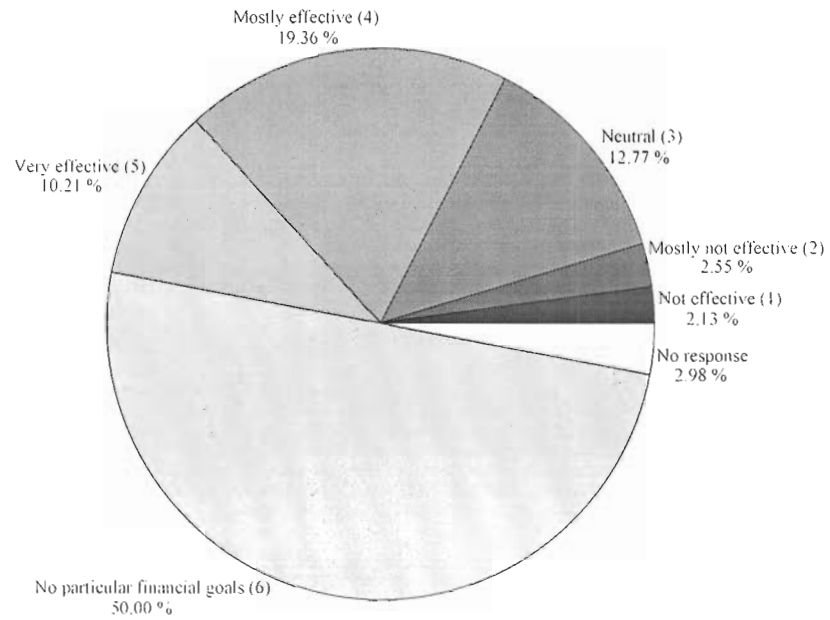
Figure 11: The effectiveness of management plans regarding the specific financial goals of landowners.
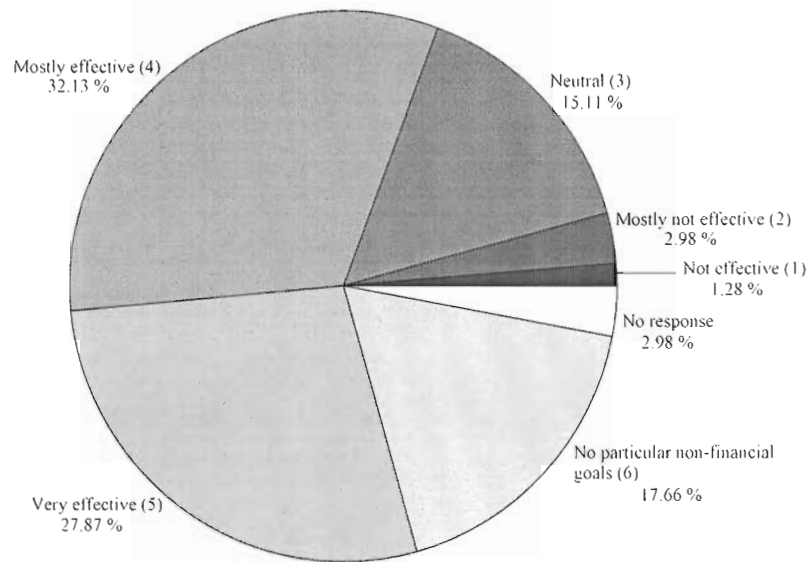
Figure 12: The effectiveness of management plans regarding the specific non-financial goals of landowners

As evident in Figure 11, a small percentage of landowners feel that the financial goals they have set for their property are not addressed by their current management plan. Similar results are found in Figure 12 regarding non-financial goals. Just under 5 percent of landowners feel, regarding both financial and non-financial goals, that their management plans are inadequate. The most striking finding however is the discrepancy between the percentage of landowners who have specific financial goals and the number of landowners who have specific non-financial goals. A full 50 percent of small woodland owners surveyed claim that they have no specific financial goals. A far smaller percentage, just under 18 percent, of woodland owners state that they have no particular non-financial goals.

Given the hypothesis, subsequently supported by other sections of this research, that small woodland owners are currently concerned more with benefits not directly related to the sale of forest products, it would not be surprising for the presence of non-financial goals to be an indicator of interest for the models of cooperative management presented in this study. As displayed in Table 5, the presence of non-financial goals among landowners was strongly correlated with interest in the cooperative models based on chi-square analysis. The presence of specific financial goals was not correlated to interest in the cooperative models.

Table 5: Chi-square correlation between types of landowner goals and interest in models of cooperative management.

Goal type	Degrees of freedom	Chi-square value	P-value
Non-financial	1	24.0148	<.0001
Financial	1	1.7908	.1808

Chi-square analysis, as displayed in Table 6, indicated that no correlation was present between the ability of the management, as perceived by the landowner, to achieve financial and non-financial goals and interest in the cooperative models.

Table 6: Chi-square correlation between the effectiveness of management plans at achieving financial and non-financial goals, and interest in cooperative models.

Goal type	Degrees of freedom	Chi-square value	P-value
Ability to achieve financial goals	4	8.916	.06322
Ability to achieve non-financial goals	4	8.3780	.0787

Section III: Ownership Profile

Section III of the survey contained demographic questions related to such characteristics as gender, age, occupation, and annual income. Questions were also included to explore the characteristics of each parcel including size and location, as well as how far in advance landowners were planning specific activities on their woodland. Responses to questions in Section III allowed for the creation of an average ownership profile. Landowner and land base characteristics were also tested for correlation with interest in cooperatives.

The average number of acres owned by surveyed landowners, though not necessarily contiguous, was 111. Landowners were instructed to answer planning horizon questions and parcel location questions based on their largest contiguous parcel. Acreage information for the largest contiguous parcel in each ownership is displayed in Figure 13. As shown, individual parcel sizes were spread relatively evenly across the categories.
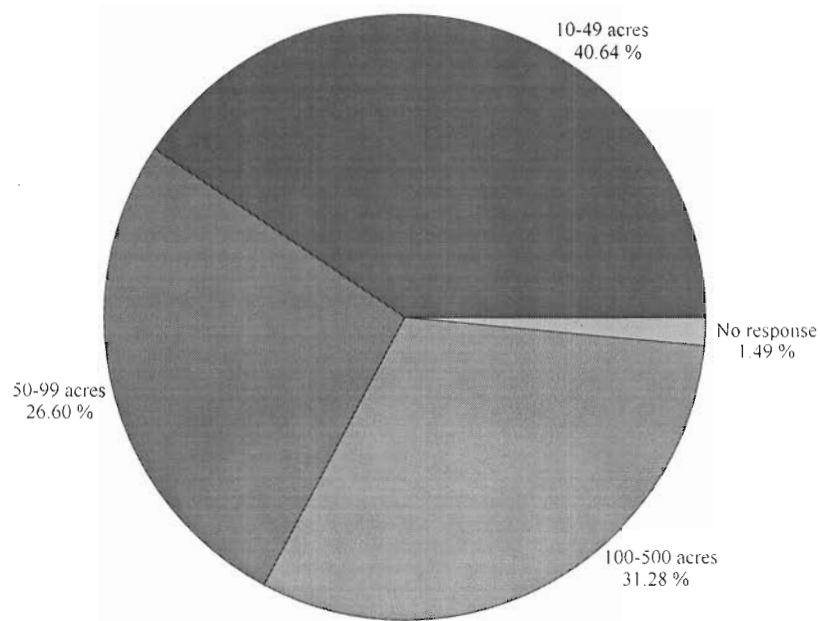
Figure 13: Acreage of landowners' largest contiguous forest parcel.

Economies of scale play an important role in the managing of forestland. Small non-industrial woodland owners are at a significant disadvantage when it comes to harvesting and marketing wood products for a profit. Government cost share programs, as discussed in Chapter 1, were created for the purposes of aiding small woodland owners in the responsible and profitable management of their land. Current-use tax programs, including the Tree Growth Tax program, were designed in part, as incentives for small landowners to maintain their property as forest in the face of development pressure. Similarly, the models of cooperative management presented in this study were developed to function as ecologically sound, profitable management alternatives for smaller landowners.

For these reasons, an important correlation tested by this study was between interest in cooperatives and total acreage. The expected result was for interest in cooperative management models to increase as parcel size decreased. As shown in Table 7, there was no correlation between parcel size and interest in cooperatives. This study, however, focused only on small woodland ownerships of 500 acres or less. To truly test this correlation, a sample of woodland owners would also have to include larger landowners controlling more than 500 acres within the state of Maine. As this study was organized, the correlation was tested only among those landowners who would most likely be correlated to interest in cooperatives already.

Table 7: Chi-square correlation between parcel size and interest in cooperative models.

Ownership characteristic	Degrees of freedom	Chi-square value	P-value
Parcel size	1	1.3554	.2443

Ownership structure was investigated as a possible influencing factor regarding interest in cooperatives. The anticipated result was that the more complicated the ownership structure, the less likely those owners would be to participate in a cooperative organization where even more management coordination and compromise would be necessary. Figure 14 displays the percentages of different ownership structures across the survey.
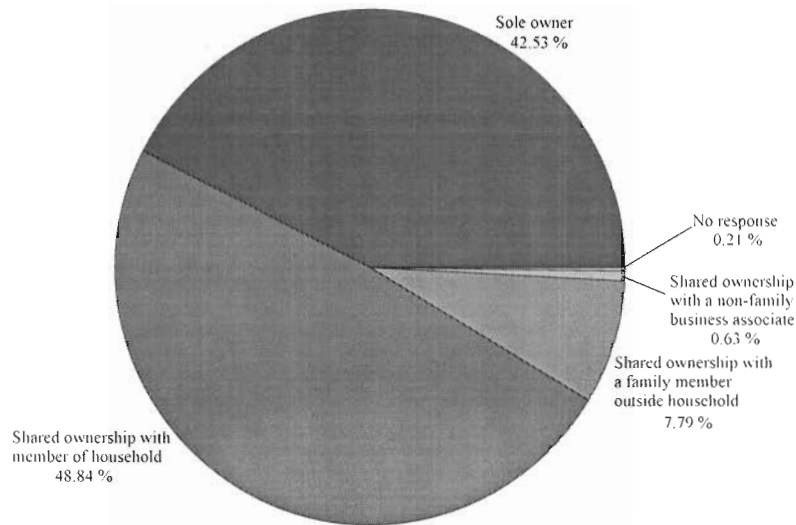
Figure 14: Ownership structures of woodland parcels.

Location of residence in relation to location of parcel was expected to be influential in management decisions, including interest in cooperatives, as local, permanent residents may view land management and the goal of local economic stability in different terms than a part-time temporary resident would. The majority of individuals surveyed, 80.85 percent, stated Maine as their primary residence. Another 13.62 percent of landowners claim a northeastern state as his or her primary residence. Massachusetts had the second highest number of respondents, represented by 33 landowners. New Hampshire, and surprisingly, Florida were next, each represented by 10 landowners. Other states represented by 5 or fewer residents were Rhode Island, Connecticut, New Jersey, New York, Washington D.C., Vermont, Pennsylvania, Washington State, Virginia, Illinois, Wyoming, Colorado, and Texas. There was 1 international response by a landowner currently residing in Turkey.

Of landowners surveyed, 66.60 percent indicated they lived within 1 mile of their woodland parcel, 30.43 percent indicated they had a vacation home within 1 mile of their woodland. Chi-square analysis was performed to examine if any correlation existed between landowner presence and interest in cooperatives. As a binary variable, a landowner was coded as "present" if he or she indicated a residence or vacation home within 1 mile of their woodland parcel. A correlation between Maine residence and interest in cooperatives was also examined. The results for the landowner presence variable and the Maine residence variable are displayed in Table 8.

Table 8: Chi-square correlation between landowner presence and Maine residency on interest in cooperative models.

Landowner characteristic	Degrees of freedom	Chi-square value	P-value
Landowner presence	1	.5428	.4613
Maine residency	1	3.9603	.0466

No correlation was found between landowner presence and interest in cooperatives. A p-value of .0466 indicates that the Maine residency characteristic is nearly significant but not at the .01 alpha level set for this study.

Questions related to planning horizon were presented to landowners in three parts. Landowners were asked to indicate how far in advance they plan for timber harvesting activities, wildlife habitat management activities, and the development of trails and other recreation development. Average responses are displayed in Figures 15-17.
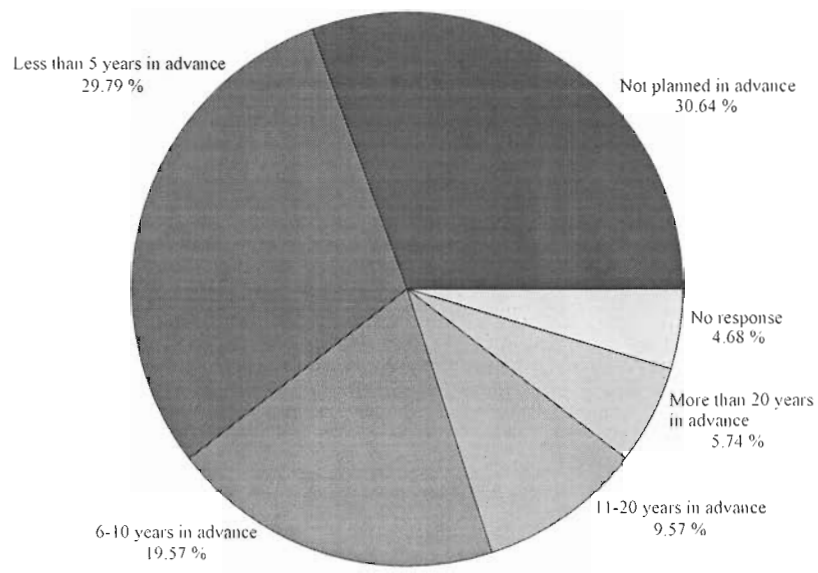
Figure 15: The extent to which harvesting activities are planned in advance.
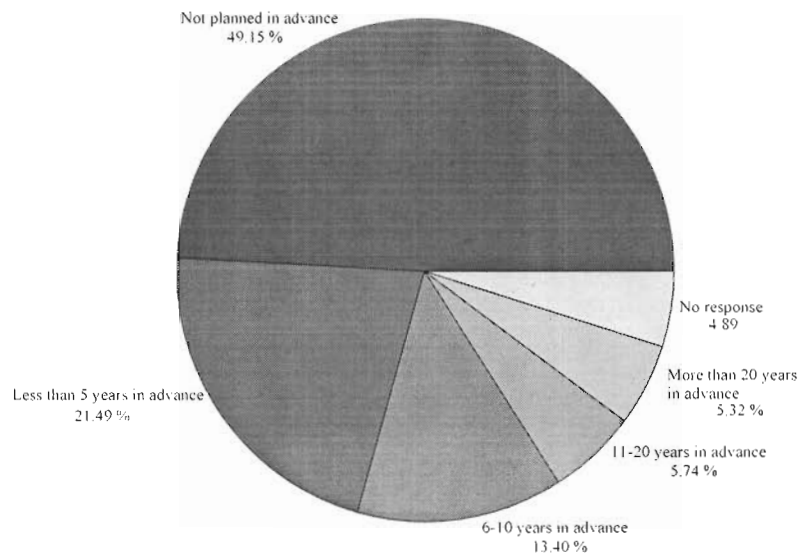
Figure 16: The extent to which wildlife management activities are planned in advance.
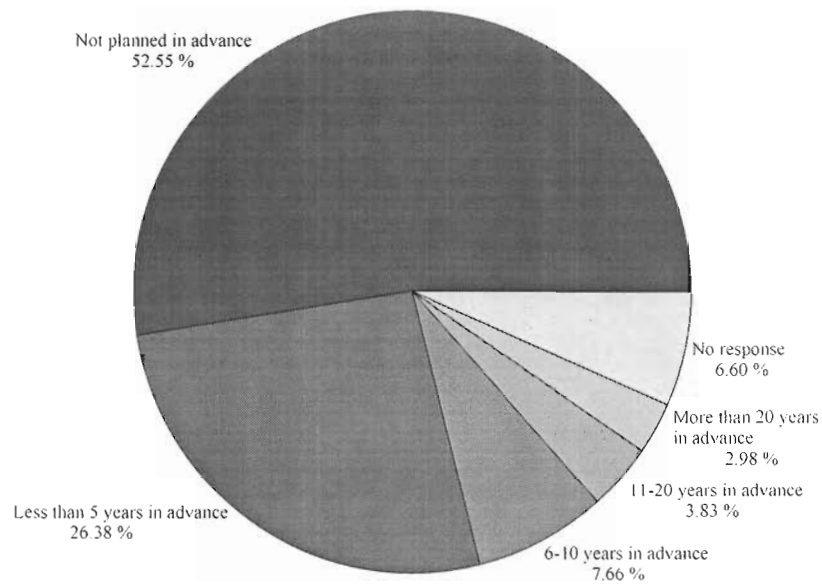
Figure 17: The extent to which trails and other recreation management activities are planned in advance.

Of the three management categories, timber harvesting appears to be the one planned most in advance, with only 30.64 percent of landowners stating they do not plan harvesting at all. With regard to timber harvesting, 15.31 percent indicate that they plan activities over 10 years in advance. With 52.55 percent of landowners indicating no advance planning, recreation development appears to be the most infrequently addressed management priority. Only 6.81 percent of landowners stated they plan for recreation activities more than 10 years in advance. The planning horizon for wildlife management falls in the middle with 49.15 percent of landowners indicating that wildlife management is not planned in advance on their land and 11.06 percent indicating a planning horizon greater than 10 years.

Chi-square analysis was utilized to determine any correlations between planning horizon and interest in the cooperative organizations. The anticipated correlation was that a longer planning horizon might be positively correlated to interest in cooperatives for all three management categories. A longer planning horizon would perhaps indicate an understanding of the temporal scale of ecosystem processes and perhaps a desire to participate in a group where long-term planning was a primary goal. As displayed in Table 9, all three planning horizon variables were individually correlated with interest in the cooperative programs.

Table 9: Chi-square correlation between planning horizon and interest in cooperative models.

Management category	Degrees of freedom	Chi-square Value	P-Value
Timber harvesting	4	25.5837	<.0001
Wildlife management	4	17.7304	.0014
Recreation development	4	30.1580	<.0001

Basic demographic information was gathered for the purposes of creating a profile of the average small woodland owner in the survey. The average age of survey respondents was 59. Of the 470 landowners who returned surveys, 20 chose not to indicate their age. The minimum age was 28, the maximum was 101. Landowner age proved to be an interesting indicator of interest in cooperatives. As shown in Table 10, landowner age is correlated with interest in cooperatives. The expected finding, as will be examined in the final logistic regression model, is that as a landowner becomes older, he or she is less likely to be interested in the cooperative programs.

This expectation is based on qualitative data gathered in the free response area following the questions regarding interest in cooperatives. Several landowners indicated that involvement in a cooperative program required more time and energy than they cared to expend at their age. Other landowners indicated that they would soon be leaving the land to heirs and any decision regarding management would soon be up to the inheriting party.

Table 10: Chi-square correlation between landowner demographic characteristics and interest in the cooperative models.

Demographic characteristic	Degrees of freedom	Chi-square value	P-value
Age	1	15.3183	<.0001
Gender	1	1.6453	.1996
Attainment of college degree	1	16.6673	<.0001
Income	9	16.5820	.0557

Survey respondents were predominantly male. Of 470 respondents, 76.6 percent were male, 22.13 percent were female, and 1.28 percent did not respond. As displayed in Table 10 there was no correlation between gender and cooperative involvement.

The education level of survey respondents is presented in Figure 18. A small percentage, only 5.32 percent, had not finished high school. A significantly larger percentage, 51.07 percent, had at least a Bachelor's degree with another 14.47 percent receiving at least an Associates degree. Table 10 shows that attainment of a college degree is significantly correlated to interest in cooperatives.
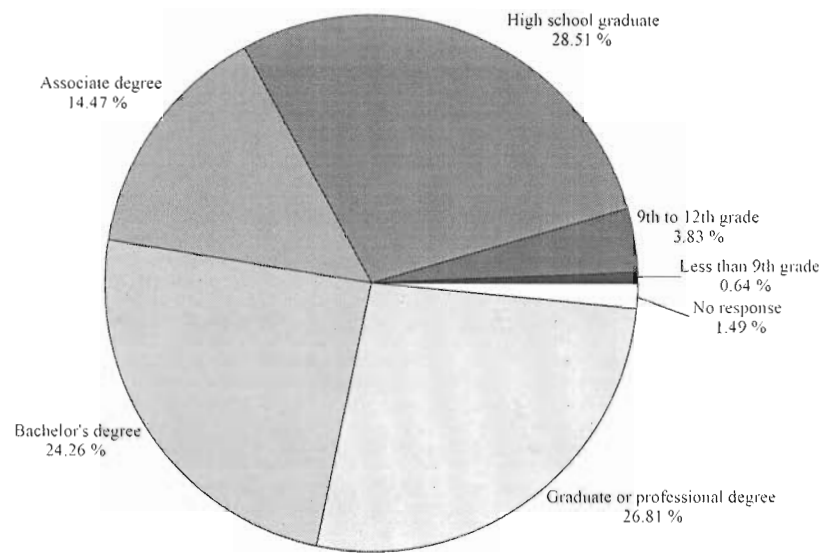
Figure 18: Education level of landowners.

Responses to the question of occupation were varied and diverse. Six categories were provided based on those listed in the year 2000 United States Census. In addition, landowners were given the opportunity to write in a free response in the case of their occupation falling outside the provided categories. Figure 19 displays the percentages for the established categories. Other occupations, as established by free response answers, included academic/teacher, artist/author, government, non-profit employee/land conservation, military, and other self employed workers.
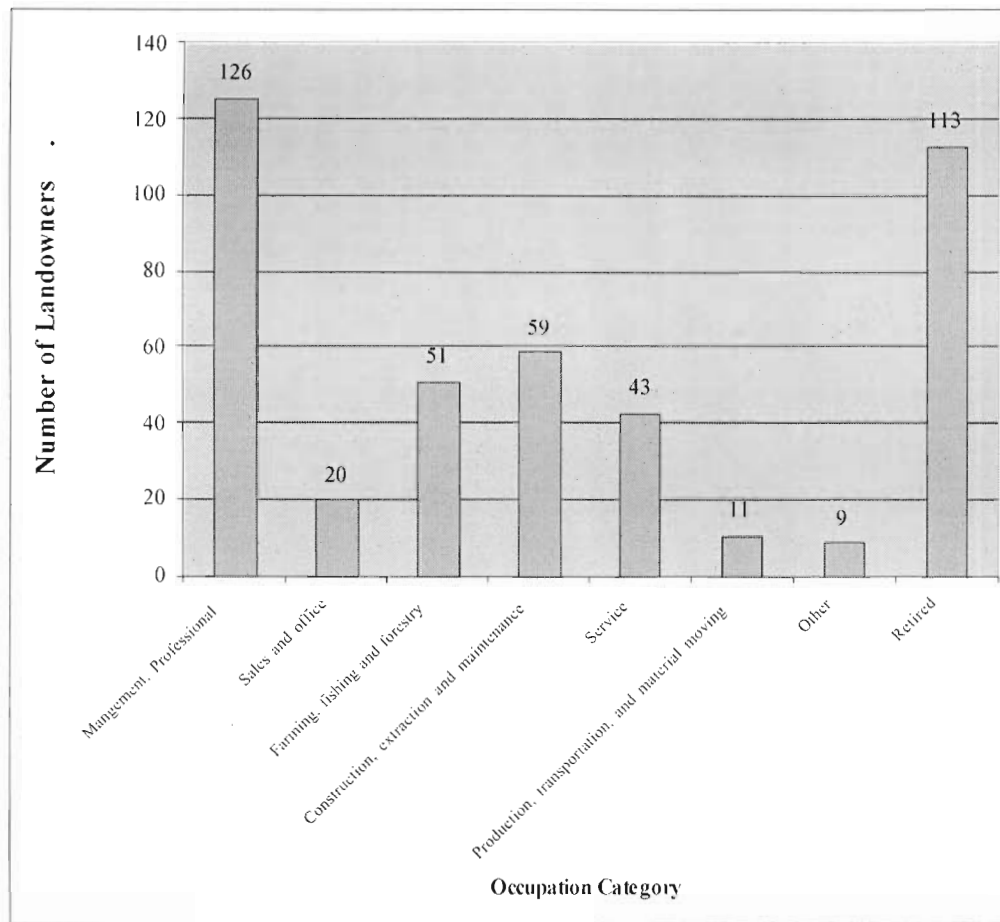
Figure 19: Occupations of survey respondents.

There was no significant correlation between occupation and interest in cooperatives as displayed in Table 11. For the purposes of examining expected differences, occupation categories were grouped into 4 larger categories including "farming, fishing, and forestry", "other blue-collar", "retired," and "other." The group "other blue collar" included construction, extraction, and maintenance occupations, production, transportation and material moving occupations, and some service professions. The "other" category included occupations usually classified as "white-collar", including management, professional and related occupations, sales and office

occupations, and some service occupations. The free-response occupations were grouped accordingly.

Table 11: Chi-square correlation between landowner occupation and interest in the cooperative models.

Occupation	Degrees of freedom	Chi-square value	P-value
Farming, fishing, forestry	1	.2720	.6020
Blue collar	1	1.5167	.2181
White collar	1	2.0004	.1573
Retired	1	4.5239	.0334

The final demographic question inquired about income levels. The income distribution is displayed in Figure 20.
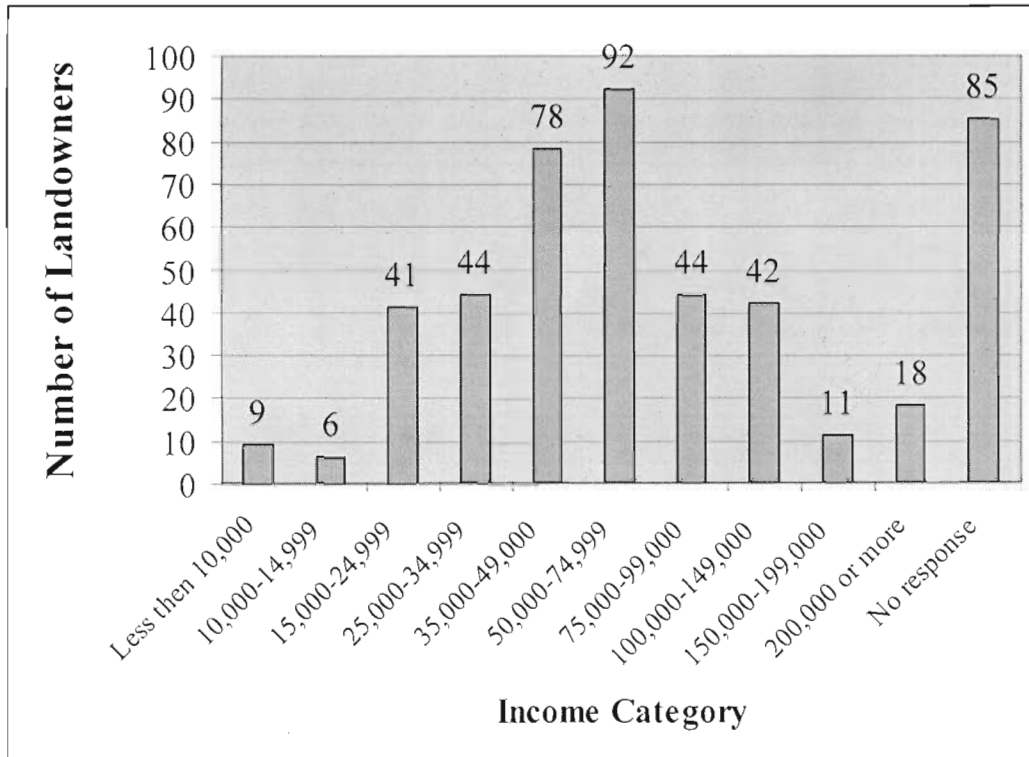
Figure 20: Combined annual household income for survey respondents as of 2004.

The income distribution was normal with 85 individuals out of the 470 respondents choosing not to answer the question. As displayed previously in Table 10, there was no apparent correlation between the income level of landowners and their interest in the forestry cooperatives.

Section IV: Participation in Management programs

In the final section of the survey, participants were asked to read three short

descriptions of hypothetical cooperative models based on those described earlier.

Landowners were then asked to rank their opinion of each organization. A value of 1

would indicate that the landowner would definitely not join the specified cooperative;

a value of 5 would indicate he or she would definitely join. There was an option for

the landowner to indicate that he or she had no interest in any of the cooperative

organizations, following which they were given a free response space to indicate why.

If a respondent marked a response for at least 1 program, and failed to mark a

response for the others, it was assumed that the landowner had no interest in those left

blank and a score of 1 was assigned. The ranking results are displayed in Figure 21.
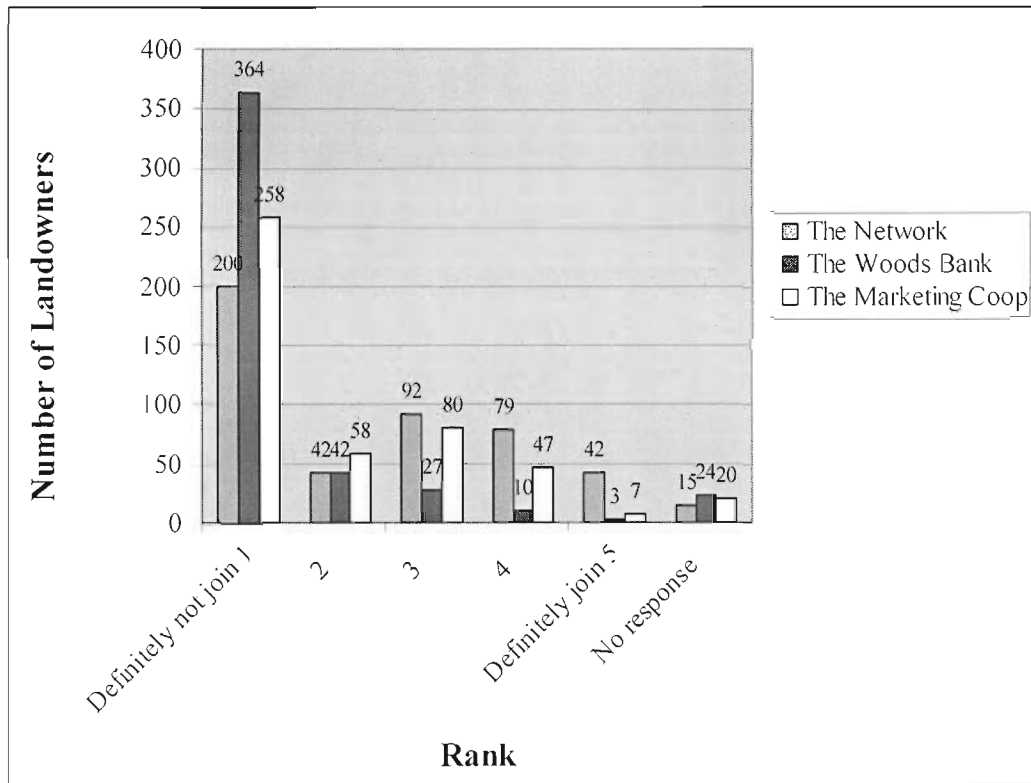
Figure 21: Landowner ranking scores for individual cooperative programs.

Based on response rankings, the Network model appears to be the most popular, followed by the Marketing model. The Woods Bank was the least popular of the three. Out of 470 respondents, 186 individuals or 39.57 percent indicated that they had no interest in any of the models described. Response percentages for the three models are presented in Figures 22, 23, and 24.
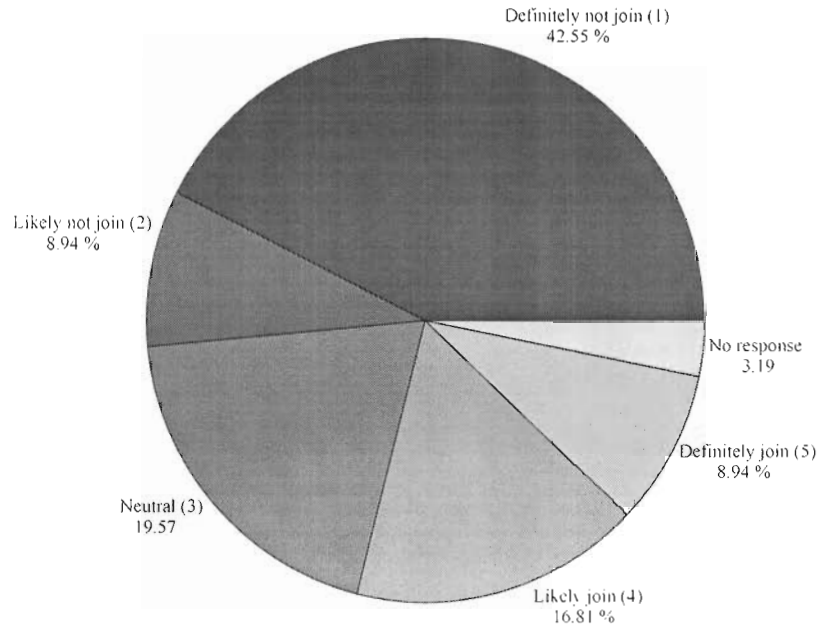
Figure 22: Landowner likeliness of joining the Network cooperative.
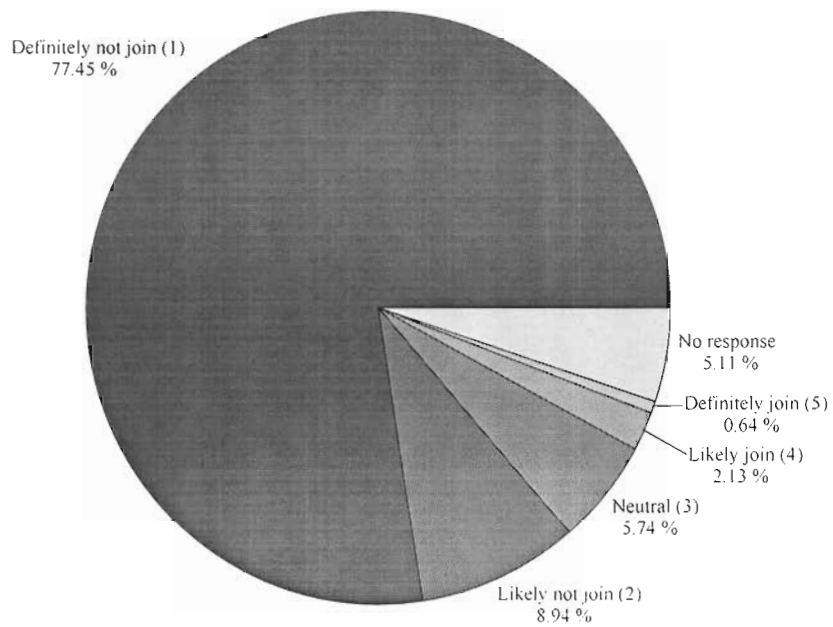
Figure 23: Landowner likeliness of joining the Woods Bank cooperative.
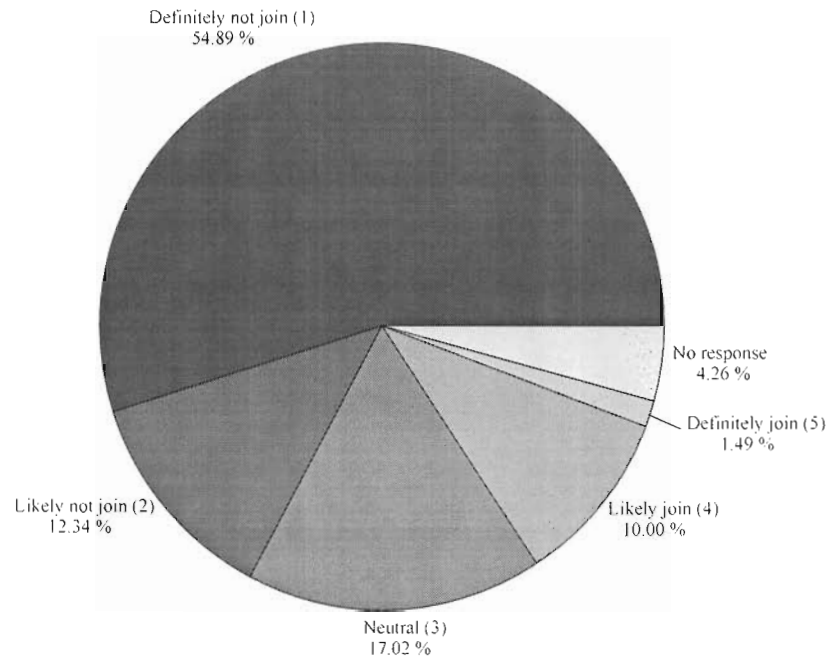
Figure 24: Landowner likeliness of joining the Marketing cooperative.

Following the ranking question for each cooperative, respondents were asked
to indicate the extent to which their likelihood of joining would increase if they had
the opportunity to observe an established cooperative in operation for at least 5 years.
Percentage results for each cooperative model are displayed in Figures 25, 26, and 27.
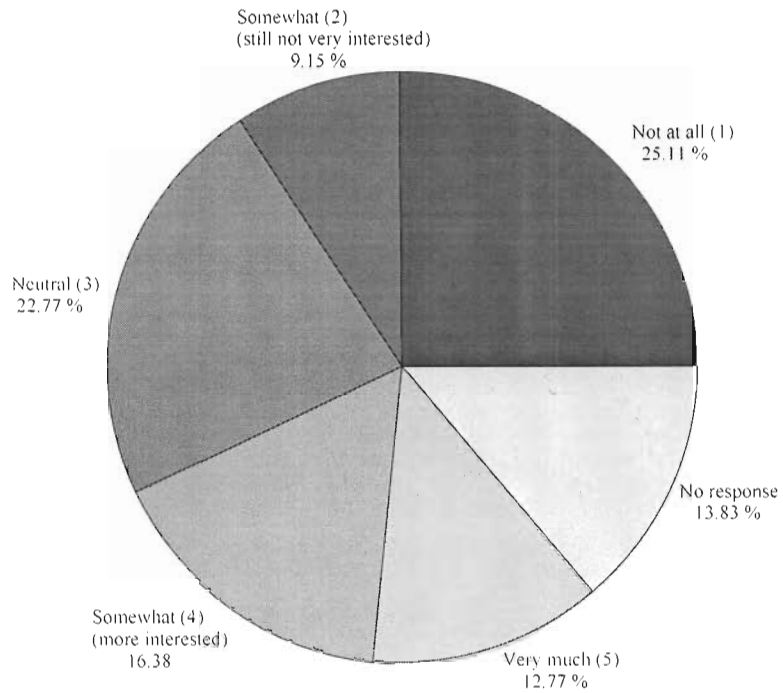
Figure 25: Increase in landowner willingness to join the Network after viewing it in operation.
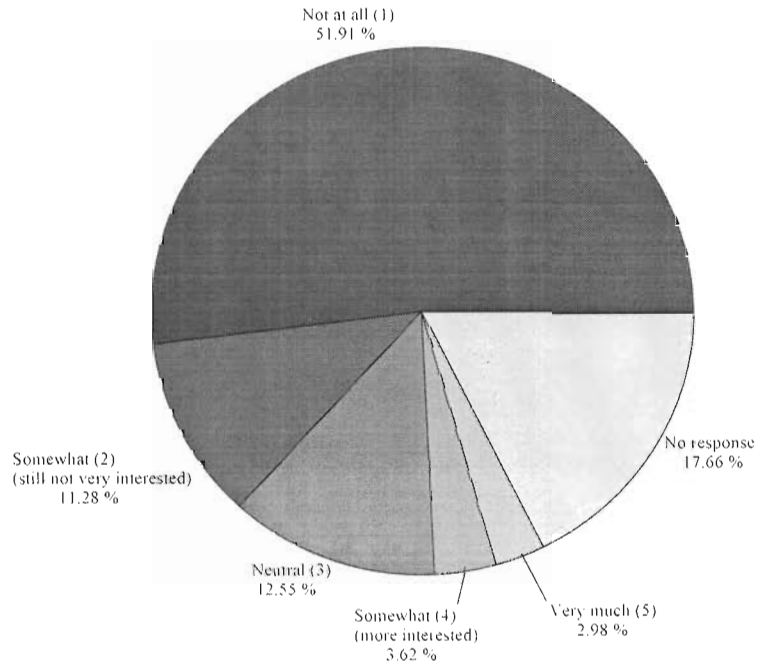
Figure 26: Increase in landowner willingness to join the Woods Bank after viewing it in operation.
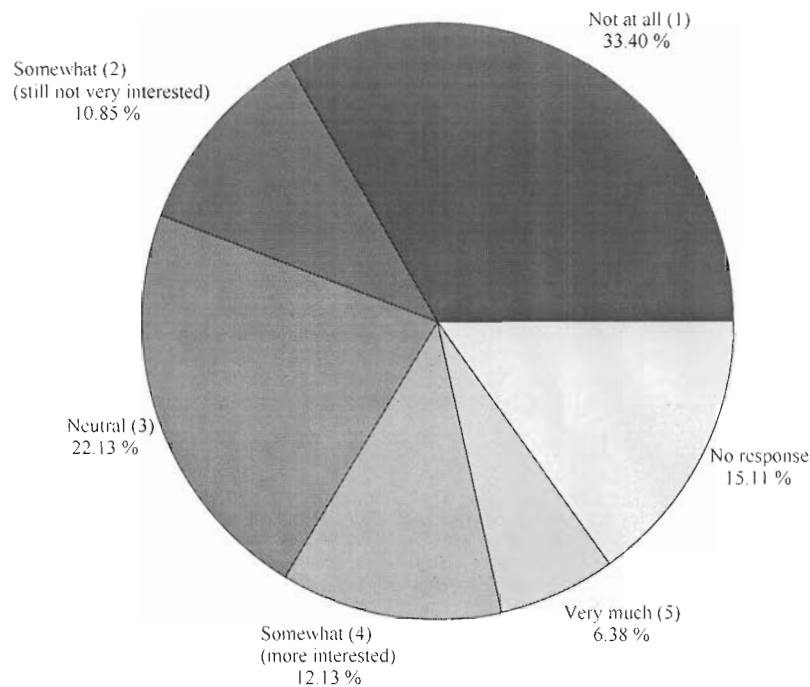
Figure 27: Increase in landowner willingness to join the Marketing Cooperative after viewing it in operation.

The percentage of landowners who felt their level of interest would increase after viewing an established cooperative varied by model. Still the least popular, 51.19 percent of respondents stated their interest level would likely not rise at all even if given the opportunity to view a Woods Bank program in operation. Only 6.6 percent of landowners stated a likely increase in Woods Bank interest following viewing. Remaining the most popular, 29.15 percent of landowners stated their interest level would further increase following observation of a landowner Network. Furthermore, 25.11 percent stated their interest in a Network would not at all increase

percent stated their interest in a Network would not increase at all following viewing. In regards to the Marketing Cooperative, 30.40 percent of landowners stated their level of interest would not increase at all after viewing an existing operation, while 18.51 percent stated their interest level would likely increase.

Landowners were also asked to indicate their participation in any organizations similar to the models presented in the survey. In total, 37 individuals were active participants in similar organizations. The majority, 32 individuals, were members of SWOAM. Three individuals indicated they were part of other forestry cooperatives similar to the models with locations in Maine, the greater New England area and in New Mexico. In addition, landowners were asked if they were active participants in any other environmental or sporting organization. There was a free response space to indicate the group to which the landowner belongs. A variety of organizations were identified by the 106 landowners, (22.55 percent of the sample population), who are active participants in the groups. The most popular organization was SWOAM, as 48 other individuals identified that organization as a group dissimilar from the models presented. Other popular organizations were the Sportsman's Alliance of Maine, the National Rifle Association, several conservation land trusts, and recreation groups mostly associated with snowmobiling.

Survey respondents were also asked if they had ever participated in any of the government cost-share programs available to woodland owners in the State of Maine. Landowners were to indicate if they had participated in the Agricultural Conservation Program, the Stewardship Incentive Program, the Forestry Incentives Program, the Forest Stewardship Assistance Program, or the WoodsWISE Incentives Program.

Figure 28 displays the number of landowners who have participated in each available program.
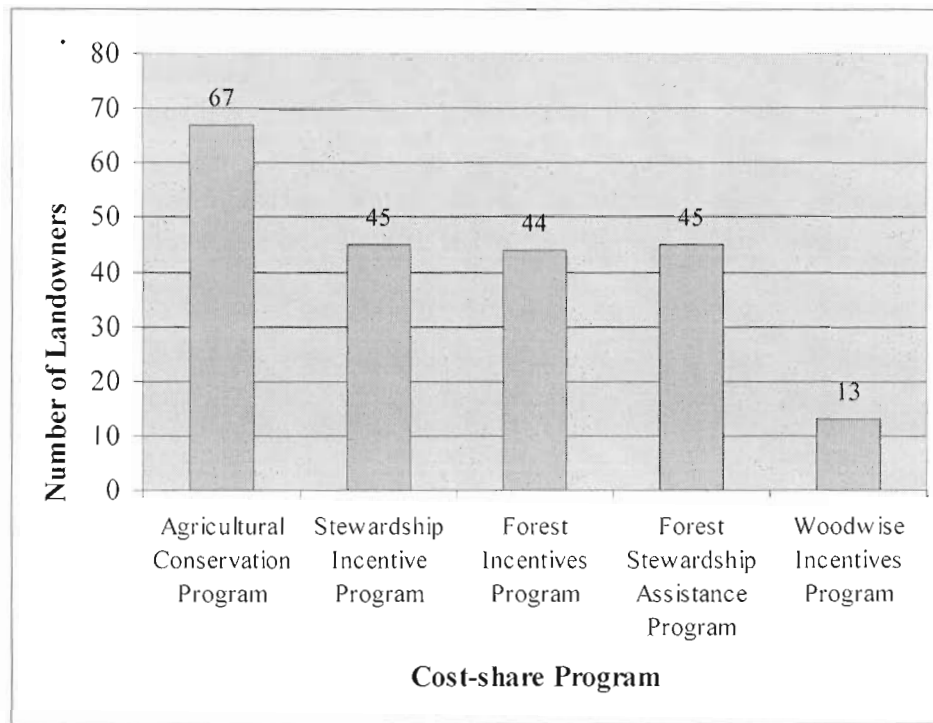
Figure 28: Landowner involvement in government cost-share programs.

In total 147 landowners, 31.28 percent of the total sample, had participated in one of the programs with 52 of those landowners participating in more than one.

As displayed in Table 12, there was a significant correlation between both involvement in other sporting and environmental groups and involvement in government cost-share programs and interest in a cooperative. The correlation may be attributed to the fact that those landowners involved in sporting clubs, environmental groups, and cost-share programs represent the most active of all woodland owners and therefore the most likely to join and participate in another program if it suits their individual goals.

Table 12: Chi-square correlation between landowner involvement in other sporting, or governmental cost share programs, and interest in the cooperative models.

Organization type	Degrees of freedom	Chi-square value	P-value
Sporting / Landowner group	1	6.9432	.0084
Government cost-share	1	17.5731	<.0001

The final questions of the survey ask respondents to agree or disagree on a 5 point scale with a series of questions designed to further examine landowner priorities. Landowners were first asked if they would be interested in working with neighboring landowners for the benefit of the larger ecosystem. It was stated in the ecosystem management question that such an operation would require cooperation, and perhaps a reduction in the volume of periodic harvests to achieve broader goals. Landowners were asked their opinion on the importance of keeping timber sale, logging, processing, and product sale income within the local community.

Furthermore, landowners were asked if they desired to have greater control over the processing and sale of logs harvested from their land, and if they desired to jointly own a portable sawmill and other processing equipment as a means of achieving higher profits from the sale of value added materials. The question regarding joint ownership of processing facilities presented the realities of up-front investment costs, and time commitments related to those activities. The percentage of responses are presented in Figures 29, 30, 31, and 32.

Disagree (2)
13.19 %

Strongly disagree (1)
18.30 %

Neutral (3)
33.19 %

No response
5.11 %

Strongly agree (5)
11.49 %

Agree (4)
18.72 %
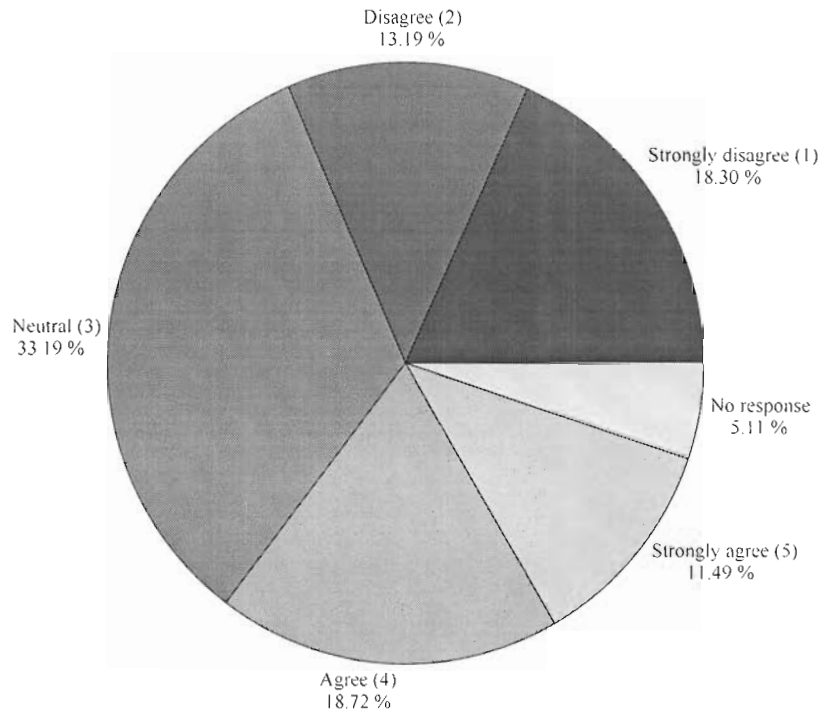
Figure 29: Landowner interest in working with neighboring landowners to benefit the larger forest ecosystem.

Neutral (3)
23.67 %

Disagree (2)
9.59 %

Strongly disagree (1)
7.25 %

No response
5.54 %

Agree (4)
30.28 %

Strongly agree (5)
23.67 %
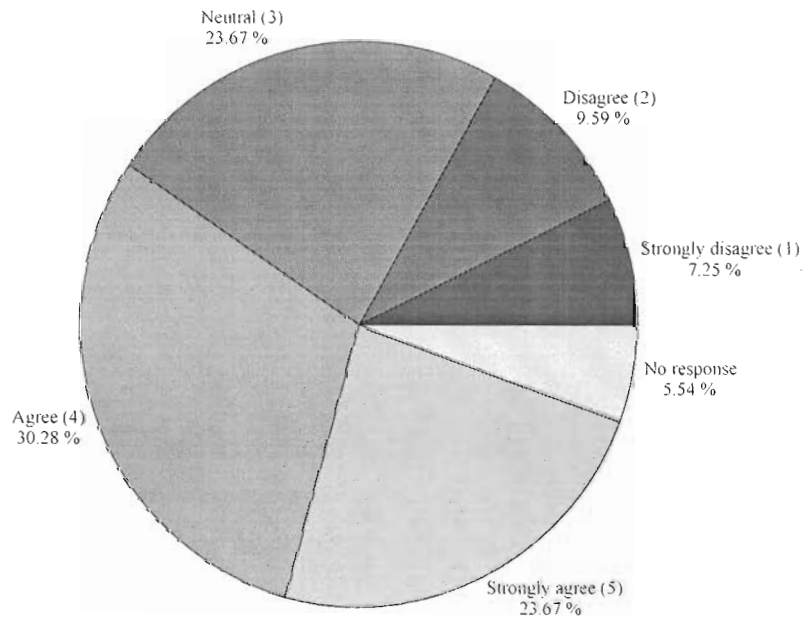
Figure 30: Landowner desire to keep as much timber sale, logging, processing, and product sale income as possible in the local community.
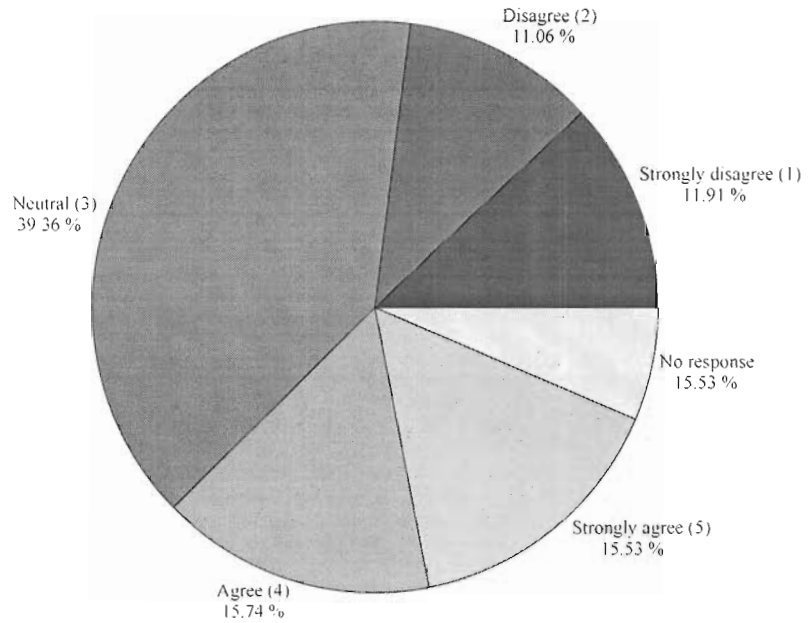
Figure 31: Landowner desire to have greater control regarding how logs are processed and sold after they are removed from their land.
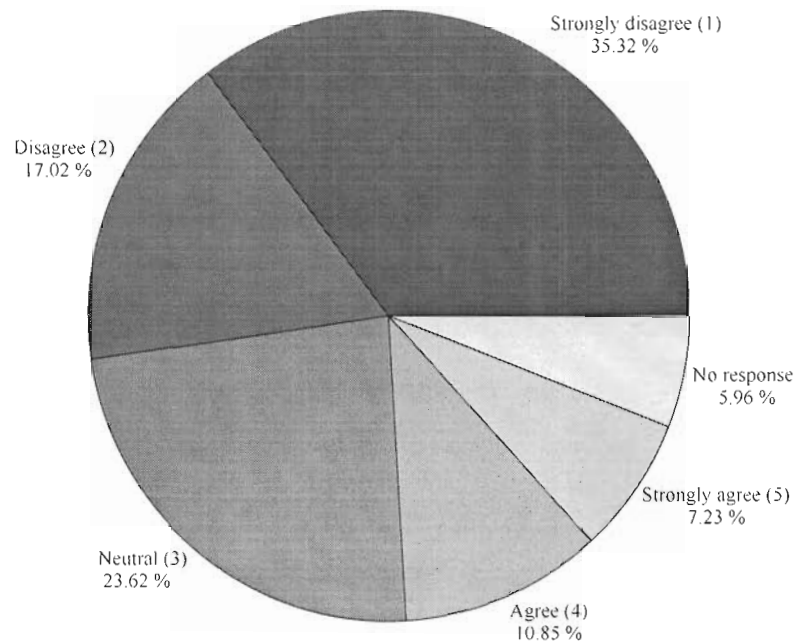
Figure 32: Landowner interest in joint ownership of processing equipment and facilities.

In total, 30.20 percent of the sample population agreed they would be interested in cooperating for the purposes of ecosystem management even if it meant a reduction in harvest volumes. A similar proportion, 31.49 percent, disagreed and would not be interested in cooperation for purposes of ecosystem management. A large percentage, 53.95 percent, agreed that as much timber sale and processing income as possible should stay within the local community, 16.84 percent disagreed. With regards to the handling of products following harvesting, 33.27 percent expressed interest in achieving greater control while 22.97 did not. A small but not inconsequential proportion, 18.08 percent, of landowners agreed that they would be interested in joint ownership of milling and processing facilities. A stronger proportion, 52.34 percent, expressed no interest in joint ownership and investment in equipment.

The final questions were also designed to complement the questions regarding the three cooperative models. It was expected that interest in the Network would be correlated with a desire to cooperate for the purposes of ecosystem management, and the desire to keep value added within the local community. Likely interest in the Woods Bank would also be correlated to the desire to cooperate for the purposes of ecosystem management. It was anticipated that interest in the Marketing Cooperative would be correlated to interest in owning processing facilities, the desire to have greater control over wood products once harvested, keeping value added within the local community, and cooperating for the purposes of ecosystem management. Results from the logistic regression models testing those correlations are displayed in Tables 13 to 18.

The variables present in the regression models testing interest in the cooperative organizations were abbreviated to make the tasks of data entry and analysis easier. The variables displayed include the possible reasons one would own forestland, including solitude and scenic enjoyment (SSE), the protection of nature and biological diversity (NTBD), land investment (INVST), as part of a home or vacation home (HOME), for an estate to pass on to heirs (ESTATE), as a source of wood for personal business (WDFBUS), as a source for non-timber forest products (NTFP), for the production of firewood (FIREWD), for the sale of sawlogs, pulpwood, and other timber products (SAW), for wildlife habitat (WLDHAB), for hunting and fishing (HUNT), and for recreation other than hunting or fishing (REC).

The planning horizon of landowners regarding timber production, wildlife habitat management, and recreational management and trail development are abbreviated as (PH_tmbr), (PH_wld), and (PH_rec) respectively. The age of the landowner was entered as (Age). The education level of landowners, in the case of this analysis a binary variable separating those with college degrees from those who did not have one, was abbreviated as (Educa). The variable of whether a landowner holds residence within 1 mile of his or her woodlot was abbreviated as (Res1mi_prcl). The variable of ownership structure, a binary variable separating those ownerships with one sole owner from those with more complicated structures, was listed as (OwnStruc). The variable (Urban) refers to whether the landowner was placed in the urban or rural stratum.

Interest in ecosystem management, interest in keeping value added within the local community, interest in maintaining more control of harvested wood once cut,

and interest in the collective ownership of processing facilities were abbreviated as (Int_ecomgt), (Int_local_inc), (Int_log_cntr), and (Int_pro_equip) respectively. The binary variable of whether or not a landowner had participated in a government cost-share program in the past was abbreviated as (Prt_Govt). The presence of financial goals and non-financial goals within the management plans of landowners were abbreviated as (Plan_have_fingoals), and (Plan_have_nonfingls) respectively.

Table 13: Parameter estimates of logistic regression testing the correlation between Network interest and landowner characteristics.

Model Fit Statistics					
	Intercept only	Intercept and Covariates			
AIC	1116.156	997.504			
SC	1131.949	1123.841			
"-2 Log L"	1108.156	933.504			
Global Null Hypothesis Test					
	Chi-Square	DF	Pr>Chisq		
Likelihood Ratio	174.6523	28	<.0001		
Score	136.6618	28	<.0001		
Wald	130.6186	28	<.0001		
Maximum Likelihood Estimate					
Parameter	DF	Estimate	Std Error	Wald Chisq	Pr>Chisq
SSE	1	0.0776	0.0978	0.6301	0.4273
NTBD	1	0.2402	0.0904	7.0587	0.0079
INVST	1	-0.0553	0.0551	1.0071	0.3156
HOME	1	-0.0453	0.0591	0.5869	0.4436
ESTATE	1	-0.0148	0.0566	0.0682	0.7939
WDFBUS	1	-0.0389	0.0715	0.2965	0.5861
NTFP	1	-0.2177	0.0802	7.3589	0.0067
FIREWD	1	0.0893	0.0651	1.8793	0.1704
SAW	1	0.0877	0.0661	1.7599	0.1846
WLDHAB	1	-0.169	0.0936	3.2573	0.0711
HUNT	1	-0.0774	0.0502	2.3816	0.1228
REC	1	0.0879	0.0662	1.7613	0.1845
PH_timbr	1	-0.0519	0.106	0.2396	0.6245
PH_wld	1	-0.00863	0.1106	0.0061	0.9378
PH_rec	1	0.2092	0.1221	2.9355	0.0867
Age	1	-0.00846	0.00946	0.7998	0.3712
Education	1	0.453	0.2328	3.7875	0.0516
Res1mi_prcl	1	0.2229	0.2341	0.9061	0.3411
Ownership Structure	1	-0.0997	0.2115	0.2224	0.6372
Urban	1	-0.0626	0.2323	0.0726	0.7876
Acres	1	0.000507	0.000973	0.271	0.6027
Int_ecomgt	1	0.552	0.0963	32.8348	<.0001
Int_local_inc	1	0.4912	0.1069	21.1268	<.0001
Int_log_cntrl	1	0.00831	0.1004	0.0069	0.934
Int_pro_equip	1	0.1806	0.0877	4.2419	0.0394
Prt_gov_prg	1	0.6576	0.2267	8.4165	0.0037
Have_financial_gls	1	0.2707	0.2329	1.3513	0.245
Have_nonfinancial_gls	1	0.208	0.3381	0.3786	0.5384

Table 14: Odds ratio estimates of logistic regression testing the correlation between Network interest and landowner characteristics.

Odds Ratio Estimate					
Effect	Point Estimate	95% Wald CI			
SSE	1.081	0.892	1.309		
NTBD	1.272	1.065	1.518		
INVST	0.946	0.849	1.054		
HOME	0.956	0.851	1.073		
ESTATE	0.985	0.882	1.101		
WDFBUS	0.962	0.836	1.106		
NTFP	0.804	0.687	0.941		
FIREWD	1.093	0.962	1.242		
SAW	1.092	0.959	1.243		
WLDHAB	0.845	0.703	1.015		
HUNT	0.925	0.839	1.021		
REC	1.092	0.959	1.234		
PH_timbr	0.949	0.771	1.169		
PH_wld	0.991	0.798	1.231		
PH_rec	1.233	0.97	1.566		
Age	0.992	0.973	1.01		
Education	1.573	0.997	2.482		
Res1mi_prcl	1.25	0.79	1.977		
Ownership Structure	0.905	0.598	1.37		
Urban	0.939	0.596	1.481		
Acres	1.001	0.999	1.002		
Int_ecomgt	1.737	1.438	2.098		
Int_local_inc	1.634	1.325	2.015		
Int_log_cntrl	1.008	0.828	1.228		
Int_pro_equip	1.198	1.009	1.423		
Prt_gov_prg	1.93	1.238	3.01		
Have_financial_gls	1.311	0.83	2.069		
Have_nonfinancial_gls	1.231	0.635	2.389		

As indicated by Table 13, interest in the Network model was positively correlated to interest in ecosystem management, interest in keeping value added income within the local community, the ownership priority of protecting nature and biological diversity, and past participation in a government cost-share program. As shown in Table 14, the point estimate indicates that as a landowner indicated 1 Likert

Scale increment higher regarding the protection of nature and biological diversity, he or she is approximately 27 percent more likely to be interested in the Network. Similar relationships are apparent regarding the other positive variables and are displayed in the table.

A surprising find, as displayed in Table 13, was that landowners who expressed interest in non-timber forest products were less likely to be interested in the cooperative models. No previously published literature was found to support this finding. Given the small number of landowners who ranked the production of non-timber forest products as a high priority, this finding is likely a statistical artifact of the model.

Tables 15 through 17 display the results for similar regression models dealing with the correlations between the listed landowner characteristics and the other two cooperative programs. As displayed, the resulting correlations are logical given the nature and underlying goals of each organization.

Table 15: Parameter estimates of logistic regression testing the correlation between Marketing cooperative interest and landowner characteristics.

Model Fit Statistics					
	Intercept only	Intercept and Covariates			
AIC	943.62	880.589			
SC	959.402	1006.843			
"-2 Log L"	935.62	816.589			
Global Null Hypothesis Test					
	Chi-Square	DF		Pr>Chisq	
Likelihood Ratio	119.0312	28		<.0001	
Score	99.8733	28		<.0001	
Wald	91.3696	28		<.0001	
Maximum Likelihood Estimate					
Parameter	DF	Estimate		Std Error	Wald Chisq	Pr>Chisq
SSE	1	-0.0807	0.1021	0.6242	0.4295
NTBD	1	0.1868	0.0949	3.8779	0.0489
INVST	1	0.0304	0.0593	0.2624	0.6085
HOME	1	-0.1009	0.0618	2.6662	0.1025
ESTATE	1	-0.116	0.0614	3.5736	0.0587
WDFBUS	1	-0.023	0.0719	0.1026	0.7487
NTFP	1	0.1047	0.0788	1.7653	0.184
FIREWD	1	0.0811	0.0677	1.4332	0.2312
SAW	1	0.1066	0.0697	2.342	0.1259
WLDHAB	1	-0.1572	0.1007	2.4384	0.1184
HUNT	1	-0.0285	0.0533	0.2866	0.5924
REC	1	0.2099	0.0754	7.7568	0.0054
PH_timbr	1	-0.0905	0.1115	0.6593	0.4168
PH_wld	1	-0.0673	0.1156	0.3389	0.5605
PH_rec	1	0.327	0.1264	6.695	0.0097
Age	1	-0.0116	0.01	1.3495	0.2454
Education	1	0.2282	0.2453	0.8657	0.3522
Res1mi_prcl	1	0.3617	0.2491	2.1081	0.1465
Ownership Structure	1	0.045	0.2229	0.0407	0.8401
Urban	1	0.0446	0.2445	0.0332	0.8554
Acres	1	0.00049	0.00103	0.2274	0.6334
Int_ecomgt	1	0.1569	0.1004	2.446	0.1178
Int_local_inc	1	0.319	0.111	8.2596	0.0041
Int_log_cntrl	1	-0.1019	0.1086	0.881	0.3479
Int_pro_equip	1	0.4156	0.094	19.5622	<.0001
Prt_gov_prg	1	0.4885	0.2361	4.2803	0.0386
Have_financial_gls	1	0.1858	0.2462	0.5692	0.4506
Have_nonfinancial_gls	1	0.0713	0.363	0.0386	0.8443

Table 16: Odds ratio estimates of logistic regression testing the correlation between Marketing cooperative interest and landowner characteristics.

Odds Ratio Estimate					
Effect	Point Estimate	95% Wald CI			
SSE	0.922	0.755	1.127		
NTBD	1.205	1.001	1.452		
INVST	1.031	0.918	1.158		
HOME	0.904	0.801	1.02		
ESTATE	0.89	0.79	1.004		
WDFBUS	0.977	0.849	1.125		
NTFP	1.11	0.951	1.296		
FIREWD	1.084	0.95	1.238		
SAW	1.112	0.971	1.275		
WLDHAB	0.855	0.701	1.041		
HUNT	0.972	0.876	1.079		
REC	1.234	1.064	1.43		
PH_timbr	0.913	0.734	1.137		
PH_wld	0.935	0.745	1.173		
PH_rec	1.387	1.083	1.777		
Age	0.988	0.969	1.008		
Education	1.256	0.777	2.032		
Res1mi_prcl	1.436	0.881	2.339		
Ownership Structure	1.046	0.676	1.619		
Urban	1.046	0.647	1.688		
Acres	1	0.998	1.003		
Int_ecomgt	1.17	0.961	1.424		
Int_local_inc	1.376	1.107	1.71		
Int_log_cntrl	0.903	0.73	1.117		
Int_pro_equip	1.515	1.26	1.822		
Prt_gov_prg	1.63	1.026	2.589		
Have_financial_gls	1.204	0.743	1.951		
Have_nonfinancial_gls	1.074	0.527	2.187		

Interest in the Marketing Cooperative model is correlated to both recreation as a management priority, and a long-term planning horizon for recreational development. This finding implies that landowners may view this type of an organization as a way to expand recreational opportunities, likely trail development rather than hunting or fishing opportunities. A similar correlation was discovered

regarding cooperative forestry programs in general, and will be presented following the analysis of the Woods Bank model.

Other logical correlations were found regarding this particular cooperative model. Interest in the Marketing Cooperative was positively correlated to interest in both, keeping value added within the local community, and joint, collective ownership of wood processing facilities. These two priorities are implied in the mission and overall goals of the Marketing Cooperative. The findings, therefore, are logical.

Interestingly, interest in the Marketing Cooperative was not correlated to the priority of protecting nature and biodiversity, nor was it correlated to the desire to cooperate for the purposes of ecosystem management. These priorities were positively correlated to interest in the other two cooperative organizations and cooperatives in general, as will be shown. These findings are an illustration of the fundamental differences among the three model organizations, specifically between the Marketing Cooperative and the other two model organizations, and the variable priorities of landowners who may be interested in one cooperative organization and not the others.

Table 17: Parameter estimates of logistic regression testing the correlation between Woods Bank interest and landowner characteristics.

Model Fit Statistics						
	Intercept only	Intercept and Covariates				
AIC	552.52	537.123				
SC	568.26	663.039				
"-2 Log L"	544.52	473.123				
Global Null Hypothesis Test						
	Chi-Square	DF		Pr>Chisq		
Likelihood Ratio	71.3971	28		<.0001		
Score	62.1917	28		0.0002		
Wald	56.5053	28		0.0011		
Maximum Likelihood Estimate						
Parameter	DF	Estimate		Std Error	Wald Chisq	Pr>Chisq
SSE	1	-0.1309		0.1549	0.714	0.3981
NTBD	1	0.4148		0.1536	7.2987	0.0069
INVST	1	0.1549		0.0797	3.778	0.0519
HOME	1	-0.1104		0.0799	1.9093	0.167
ESTATE	1	-0.1683		0.0778	4.6786	0.0305
WDFBUS	1	-0.00518		0.1022	0.0026	0.9596
NTFP	1	0.1105		0.1058	1.0897	0.2965
FIREWD	1	-0.0644		0.0913	0.4977	0.4805
SAW	1	-0.1054		0.0917	1.3213	0.2504
WLDHAB	1	-0.0991		0.1388	0.5097	0.4753
HUNT	1	-0.093		0.0697	1.7822	0.1819
REC	1	0.2006		0.1023	3.8427	0.05
PH_timbr	1	0.0163		0.1485	0.0121	0.9124
PH_wld	1	0.0262		0.154	0.029	0.8648
PH_rec	1	0.1138		0.1734	0.4303	0.5119
Age	1	-0.0117		0.0131	0.8047	0.3697
Education	1	-0.0985		0.3258	0.0914	0.7624
Res1mi_prcl	1	0.4527		0.3188	2.0164	0.1556
Ownership Structure	1	-0.1622		0.3002	0.2918	0.5891
Urban	1	-0.0921		0.3264	0.0797	0.7777
Acres	1	0.00268		0.00128	4.3569	0.0369
Int_ecomgt	1	0.4716		0.1359	12.044	0.0005
Int_local_inc	1	-0.0241		0.142	0.0288	0.8653
Int_log_cntrl	1	-0.17		0.1478	1.3233	0.25
Int_pro_equip	1	0.1393		0.1224	1.2948	0.2552
Prt_gov_prg	1	-0.00209		0.3175	0	0.9947
Have_financial_gls	1	0.2311		0.3235	0.5106	0.4749
Have_nonfinancial_gls	1	0.0646		0.4979	0.0168	0.8967

Table 18: Odds ratio estimates of logistic regression testing the correlation between Woods Bank interest and landowner characteristics.

Odds Ratio Estimate					
Effect	Point Estimate	95% Wald CI			
SSE	0.877	0.648	1.189		
NTBD	1.514	1.121	2.046		
INVST	1.168	0.999	1.365		
HOME	0.896	0.766	1.047		
ESTATE	0.845	0.726	0.984		
WDFBUS	0.995	0.814	1.216		
NTFP	1.117	0.908	1.374		
FIREWD	0.938	0.784	1.121		
SAW	0.9	0.752	1.077		
WLDHAB	0.906	0.69	1.189		
HUNT	0.911	0.795	1.044		
REC	1.222	1	1.493		
PH_timbr	1.016	0.76	1.36		
PH_wld	1.027	0.759	1.388		
PH_rec	1.12	0.798	1.574		
Age	0.988	0.963	1.014		
Education	0.906	0.479	1.716		
Res1mi_prcl	1.572	0.842	2.937		
Ownership Structure	0.85	0.472	1.531		
Urban	0.912	0.481	1.729		
Acres	1.003	1	1.005		
Int_ecomgt	1.603	1.228	2.092		
Int_local_inc	0.976	0.739	1.29		
Int_log_cntrl	0.844	0.631	1.127		
Int_pro_equip	1.149	0.904	1.461		
Prt_gov_prg	0.998	0.536	1.859		
Have_financial_gls	1.26	0.668	2.375		
Have_nonfinancial_gls	1.067	0.402	2.831		

Similar to the Network model, interest in the Woods Bank was positively correlated to a desire to protect nature and biological diversity, and an interest in cooperating for the purposes of ecosystem management. The likelihood of a landowner expressing interest in the organization increased approximately 50 percent and 60 percent respectively as that landowner rated the priorities of protecting nature and biological diversity, and ecosystem management 1 Likert Scale increment higher.

Tables 19 and 20 display the results from the final regression model of the study. The final model attempted to examine how the variability regarding interest in any of the cooperative models can be explained by the full array of landowner characteristics. For the purposes of this final model, the level of interest in a cooperative model was coded as a binary variable. If a landowner indicated an interest level of 3 or higher for any of the described models, he or she was considered interested to some degree in one or more if the cooperatives presented and was coded accordingly.

Table 19: Parameter estimates of logistic regression testing the correlation between landowner interest in cooperatives and ownership characteristics.

Model Fit Statistics					
	Intercept only	Intercept and Covariates			
AIC	518.818	425.156			
SC	522.781	540.099			
"-2 Log L"	516.818	367.156			
Global Null Hypothesis Test					
	Chi-Square	DF		Pr>Chisq	
Likelihood Ratio	149.6621	28		<.0001	
Score	124.8338	28		<.0001	
Wald	86.8428	28		<.0001	
Maximum Likelihood Estimate					
Parameter	DF	Estimate	Std Error	Wald Chisq	Pr>Chisq
SSE	1	0.0794	0.1138	0.4874	0.4851
NTBD	1	0.2761	0.1048	6.9359	0.0084
INVST	1	-0.0803	0.0711	1.2742	0.259
HOME	1	-0.0808	0.0768	1.107	0.2927
ESTATE	1	-0.0202	0.0741	0.074	0.7856
WDFBUS	1	0.0923	0.0937	0.9705	0.3246
NTFP	1	-0.1021	0.1034	0.9753	0.3234
FIREWD	1	0.0761	0.0841	0.8184	0.3656
SAW	1	0.1133	0.0863	1.7263	0.1889
WLDHAB	1	-0.2185	0.1174	3.4652	0.0627
HUNT	1	-0.1522	0.0668	5.1956	0.0226
REC	1	0.1699	0.0835	4.1373	0.0419
PH_timbr	1	-0.2116	0.1341	2.4898	0.1146
PH_wld	1	-0.1512	0.1452	1.0835	0.2979
PH_rec	1	0.483	0.1758	7.5504	0.006
Age	1	-0.0183	0.0119	2.3539	0.125
Education	1	0.3298	0.2897	1.296	0.2549
Res1mi_prcl	1	0.3417	0.3026	1.275	0.2588
Ownership Structure	1	0.1988	0.2717	0.5355	0.4643
Urban	1	0.3872	0.3103	1.5567	0.2122
Acres	1	0.0016	0.00134	1.4085	0.2353
Int_ecomgt	1	0.56	0.1241	20.373	<.0001
Int_local_inc	1	0.3992	0.1313	9.2436	0.0024
Int_log_cntrl	1	-0.0675	0.1284	0.2765	0.599
Int_pro_equip	1	0.318	0.1168	7.4103	0.0065
Prt_gov_prg	1	0.6893	0.3053	5.0958	0.024
Have_financial_gls	1	0.3229	0.3087	1.0935	0.2957
Have_nonfinancial_gls	1	0.313	0.3971	0.6214	0.4305

Table 20: Odds ratio estimates of logistic regression testing the correlation between landowner interest in cooperatives and ownership characteristics.

Odds Ratio Estimate					
Effect	Point Estimate	95% Wald CI			
SSE	1.083	0.866	1.353		
NTBD	1.318	1.073	1.618		
INVST	0.923	0.803	1.061		
HOME	0.922	0.794	1.072		
ESTATE	0.98	0.848	1.133		
WDFBUS	1.097	0.913	1.318		
NTFP	0.903	0.737	1.106		
FIREWD	1.079	0.915	1.272		
SAW	1.12	0.946	1.326		
WLDHAB	0.804	0.639	1.012		
HUNT	0.859	0.754	0.979		
REC	1.185	1.006	1.396		
PH_timbr	0.809	0.622	1.053		
PH_wld	0.86	0.647	1.143		
PH_rec	1.621	1.149	2.288		
Age	0.982	0.959	1.005		
Education	1.391	0.788	2.454		
Res1mi_prcl	1.407	0.778	2.547		
Ownership Structure	0.82	0.481	1.396		
Urban	1.473	0.802	2.706		
Acres	1.002	0.999	1.004		
Int_ecomgt	1.751	1.373	2.233		
Int_local_inc	1.491	1.152	1.928		
Int_log_cntrl	0.935	0.727	1.202		
Int_pro_equip	1.374	1.093	1.728		
Prt_gov_prg	1.992	1.095	3.625		
Have_financial_gls	1.381	0.754	2.529		
Have_nonfinancial_gls	1.368	0.628	2.978		

Overall, the ownership priority of protecting nature and biological diversity was positively correlated to the interest in the models of cooperative forest management. This finding may indicate that the models presented offer what those landowners view as an environmentally friendly, or ecologically sound method of forest management.

Interest in the cooperative models was correlated to landowners who have a relatively long planning horizon for the development of recreation activities. This could be a characteristic of landowners who desire to manage their woodland for more than just timber. Landowners interested in recreation may also desire cooperation with neighbors to expand recreation activities and join trail networks.

Past participation in government cost-share programs was positively correlated to interest in the cooperative models. It may be that those who have utilized cost-share programs in the past are those landowners who are actively involved in the management of their land and desire even greater control, or cooperation with neighboring landowners.

Again, interest in ecosystem management was correlated to interest in the cooperative models, as was interest in collective ownership of processing facilities. The ecosystem management variable was likely correlated for much of the same reasons the priority of protecting nature and biodiversity was positively correlated. It is further apparent that landowners view a cooperative structure as a possibly effective way to jointly invest in, and utilize wood processing facilities.

CHAPTER 8

DISCUSSION AND CONCLUSION

Small woodland owners in the State of Maine own forestland for a multitude of reasons. This study found that the most acknowledged reason for ownership is the solitude and scenic enjoyment associated with a forest setting. Other non-timber-related reasons, such as the maintenance of an estate to pass on to children, the protection of nature and biological diversity, the maintenance of wildlife habitat, and recreation other than hunting or fishing were stated as important reasons as well for owning forestland. These findings are in line with past research conducted on small woodland ownerships elsewhere in the country (Brunson et al., 1996; Stevens et al., 1999). Timber production was one of a few priorities, (others included hunting and fishing, and land investment) that were stated as moderately important to woodland owners though rarely stated as the primary reason for ownership.

Landowners interested in the cooperative programs presented in the survey, specifically those interested in the Network and Woods Bank models, were likely to rate the protection of nature and biological diversity as an important reason for woodland ownership. This correlation was not found regarding interest in the Marketing Cooperative. Landowners who utilize long-term planning to accomplish recreation goals were also likely to be interested in forestry cooperatives. These correlations advance the notion that landowners have diverse goals for their woodlands (Alig et al., 1990; Dennis, 1992).

In general, landowners receive the majority of advice regarding their woodland from Maine licensed private consulting foresters working on their behalf. A moderate percentage utilized the assistance offered by Maine Forest Service Foresters. Most landowners are in contact with a forester at least once in every 10 years and have harvested some amount of wood within the last 20 years. The sample population for this study is likely more active regarding management and harvesting due to the requirements under the Maine Tree Growth Tax Program. Most landowners received the expected amount of compensation for their timber. In general, harvesting matched up with the goals outlined in the management plan and most landowners were content with the residual composition, structure, and physical appearance of their woodlot following the harvest. There was no correlation between forester involvement in the harvest or frequency of communication between the landowner and forester and landowner satisfaction with harvesting.

Half of the survey respondents indicated they had no particular financial goals, while more than 80 percent indicated that they had non-financial goals. This finding may indicate that for a large portion of survey respondents, financial benefits are a secondary consideration to non-financial goals, a finding similar to Brunson et al., (1996) and Stevens et al. (1999). This finding does not suggest, however, that landowners are willing to reduce income for the sake of other woodland benefits. The majority of landowners felt their plan was adequate at addressing their financial and non-financial goals. Landowners who felt their plan failed to address their particular goals were not more likely to consider the cooperative programs. Therefore, the

cooperative models were not seen as a better alternative by landowners who may be unsatisfied with their plan under the Tree Growth Tax Program.

The average size ownership in this study was 111 acres. Though past research has indicated the importance of economies of scale to forest management (Row, 1978; Straka et al., 1984; Thompson and Jones, 1981), landowners of smaller parcels were not significantly more interested in cooperative management than larger landowners. The lack of correlation may likely be attributed to the 500 acre maximum land holding size for survey eligibility. It is also possible that landowners did not see the cooperative programs as effective ways of combating the difficulties associated with the management of small forest parcels. Furthermore, landowners may believe that management on a parcel of 111 acres is feasible without the addition of other parcels.

A small percentage of landowners plan for timber, wildlife habitat, and recreational development more than 10 years in advance. In general, timber harvesting is planned furthest in advance, followed by wildlife habitat. Recreational development had, on average, the shortest planning horizon. Consequently, long term planning for recreation management was significantly correlated with cooperative interest, indicating further the ability of cooperative programs to appeal to landowners with woodland priorities aside from traditional timber and wildlife management. As previously addressed in the Results section, landowners interested in recreational development may view cooperative management as a means of joining trail systems, and expanding recreational opportunities.

Most land holdings were sole ownerships or family partnerships. There was no correlation between ownership structure and interest in cooperatives. The majority of landowners surveyed are Maine residents, though there were respondents from as far away as Washington State, with 1 international response. There was no correlation between proximity of residence to a woodland parcel and interest in the cooperative models.

The average landowner was male and 59 years of age, close to the age of 65 Best (2003) indicated as an age at which inheritance issues become apparent regarding parcelization. Interestingly, no significant negative correlation was found between landowner age and interest in the cooperative models. Over 50 percent of landowners had achieved at least a Bachelor's degree. The education variable was not significantly correlated to interest in the models. Income levels followed a normal distribution and were not significant indicators of interest in cooperatives. Furthermore, there was no significant correlation between occupation and interest in the cooperative models.

In general, landowners approached the idea of a cooperative with skepticism. Nearly 40 percent of those surveyed had no interest in cooperative management at all. Based on free response answers, the most common reason for not wanting to join was fear of losing independence and autonomy in management decisions. The most popular of the three programs was the Network, followed by the Marketing Cooperative, and then the Woods Bank. Specifically, landowners objected to the relinquishment of property rights under the Woods Bank program, making it highly unpopular, a finding similar to that reported by Dedrick et al., (2000).

106

Network interest was correlated with a desire to work cooperatively for the purposes of ecosystem management and the desire to keep value added within the local community. Landowners who held the protection of nature and biodiversity as a high priority were also more likely to express interest in the Network. Lastly, an individual landowner who had previously participated in a government cost-share program was more likely to be interested in the Network.

The Woods Bank was also correlated with a desire to cooperatively manage in an ecosystem context. The Marketing Cooperative was significantly correlated to the desire to own wood processing facilities, the desire to keep value added within the local community, a long-term planning horizon for recreational development, and the ownership priority of recreation other than hunting or fishing.

To summarize, the cooperative programs appealed to a small percentage of woodland owners whose ownership interests go beyond traditional timber management. If resource managers hope to implement such a program on a large scale in Maine, property rights issues and individual management concerns must be addressed first. Based on the results of this study, the majority of small woodland owners enrolled in the Maine Tree Growth Tax program are content with their current management regime.

In regards to small, private forest ownerships in Maine, the desire to retain property rights and the widespread streak of independence possessed by those landowners are likely the two factors that most influence current management decisions. Based on both quantitative and qualitative data gained through the survey,

many landowners in Maine own forestland because they value privacy and desire to manage free from outside interference.

Though the cooperative programs were not overwhelmingly popular, a significant amount of interest was apparent, especially regarding the Network model. The programs appear to be desirable for a small sub-population of niche landowners who view cooperation as the optimal way to achieve their own goals for resource management. If a cooperative forestry organization were to develop within the state of Maine, organizers would first have to outline which management goals they are specifically hoping to endorse through cooperation. The second step would be to find neighboring landowners with similar management goals and priorities.

REFERENCES

Alig, R. J., Lee, K. J., Moulton, R.J. 1990. Likelihood of timber management on nonindustrial private forests: Evidence from research studies. General Technical Report SE-60, USDA Forest Service - Southeast Forest Experiment Station.

Barlow, S. A., Munn, I.A., Cleaves, D.A., Evans, D.L. 1998. The effect of urban sprawl on timber harvesting: A look at two southern states. Journal of Forestry **96**:10-14.

Barten, P. K., Damery, D., Catanzaro, P., Fish, J., Campell, S., Fabos, A., Fish, L. 2001. Massachusetts Family Forests: Birth of a landowner cooperative. Journal of Forestry **99**:22-30.

Best, C. 2002. America's private forests: Challenges for conservation. Journal of Forestry **100**:14-17.

Birch, T. W. 1994. Private forest-land owners of the northern United States. Resource Bulletin NE-136, USDA Forest Service: Northeastern Forest Experiment Station, Randor, PA.

Birkemeier, J. 2003. Full Vigor Forestry: Sustainable forest management from the forest owner's point of view, 2nd edition, Spring Green, WI.

Bliss, J. C., Walkingstick, T.L., Bailey, C. 1998. Development or dependency? Sustaining Alabama's forest communities. Journal of Forestry **96**:24-30.

Brockman, H. 2005. Forest Land Enhancement Program (FLEP): Briefing paper. USDA Forest Service: State and Private Forestry, Cooperative Forestry.

Brunette, V. 1992. The role of woodlot owners' organizations in Quebec: Efficient marketing of primary forest products. *in* Proceedings of the 1992 Society of American Foresters National Convention, Richmond, VA.

Brunson, M. W., Yarrow, D. T., Roberts, S. D., Guynn, D. C., Kuhn, M. R. 1996. Nonindustrial private forest owners and ecosystem management: Can they work together. Journal of Forestry **94**:14-21.

Brusila, B. 1983. A Procedure For Projecting Marketings of Forest Cooperative Members. University of Maine, Orono, ME.

de Steiguer, J. E. 1984. Impact of cost-share programs on private reforestation investment. Forest Science **30**:697-704.

Dedrick, J. P., Hall, T. E., Hull, R. B., Jr., Johnson, J. E. 2000. The Forest Bank: An experiment in managing fragmented forests. Journal of Forestry **98**:22-25.

Dempsey, G. P., Markeson, C. B. 1969. Guidelines for establishing forestry cooperatives. Research Paper NE-133, USDA Forest Service Northeastern Experiment Station, Upper Darby, PA.

Dennis, D. F. 1989. An economic analysis of harvest behaivior: Integrating forest and ownership characteristics. Forest Science **35**:1088-1104.

Dennis, D. F. 1992. Parcelization and affluence: Implications for nonindustrial private forests. Northern Journal of Applied Forestry **9**:33-35.

Dillman, D. A. 1978. Mail and Telephone Surveys: The Total Design Method. Wiley-Interscience Publishers, New York, NY.

Egan, A., Jones, S. 1993. Do landowner practices reflect beliefs?: Implications of an extension-research partnership. Journal of Forestry **91**:39-45.

Egan, A. F. 1997. From timber to forests and people: A view of nonindustrial private forest research. Northern Journal of Applied Forestry **14**:189-193.

Egan, A. F., Luloff, A. E. 2000. The exurbanization of America's forests: Research in Rural Social Science. Journal of Forestry.

English, B. C., Bell, C.D., Wells, G.R., Roberts, R.K. 1997. Stewardship incentives in forestry: Participation factors in Tennessee. Southern Journal of Applied Forestry **21**:5-10.

Franklin, J. 1989. Toward a new forestry. American Forests **95**:37-44.

Gordon, J. C. 1994. From vision to policy: A role for foresters. Journal of Forestry **92**:16-19.

Green, G. P., Marcouiller, D., Deller, S., Erkkila, D., Sumathi, N.R. 1996. Local dependency, land use attitudes, and economic development: Comparison between seasonal and permanent residents. Rural Sociology **61**:427-445.

Grumbine, R. E. 1994. What is ecosystem management? Conservation Biology **8**:27-38.

Haines, T. 1995. Federal and State Forestry Cost-Share Assistance Programs: Structure, Accomplishments, and Future Outlook. Research Paper so-295, USDA Forest Service Southern Forest Experiment Station.

Hancock Planning Commission 1999. Options for small landowner forestry cooperative organizations for Eastern Maine.

Hyberg, B. T., Holthausen, D. M. 1989. The behaivior of nonindustrial private forest landowners. Canadian Journal of Forest Research 19:1014-1023.

Irland, L. C. 1994. Getting from here to there: Implementing ecosystem management on the ground. Journal of Forestry 92:12-17.

Jacobson, M. G., Abt, R. C., Carter, D. R. 2000. Attitudes toward joint forest planning among private landowners. Journal of Sustainable Forestry 11:95-112.

Jones, S. B., Luloff, A. E., Finley, J. C. 1995. Another look at NIPFs: Facing our "myths". Journal of Forestry 93:41-44.

Kittredge, D. B. 2003. Private forestland owners in Sweden: Large-scale cooperation in action. Journal of Forestry 101:43-47.

Kline, J. D., Alig, A. J., Johnson, R. L. 2000. Fostering the production of nontimber services among forest owners with heterogeneous objectives. Forest Science 46:302-311.

Kluender, R. A., Walkingstick, T. L., Pickett, J. C. 1999. The use of forestry incentives by nonindustrial forest landowner groups: Is it time for a reassessment of where we spend our tax dollars? Natural Resources Journal 39:799-818.

Lowe, G. D., Pinhey, T.K. 1982. Rural-urban difference in support for environmental protection. Rural Sociology 47:114-128.

Machlis, G. E., Force, J.E. 1988. Community stability and timber-dependent communities. Rural Sociology 53:220-234.

Mehmood, S. R., Zhang, D. 2001. Forest parcelization in the United States: A study of contributing factors. Journal of Forestry 99:30-34.

MFS. 2000. 2000 Primary Processor Mill List: Year Round Sawmills. Maine Forest Service, Augusta, ME.

Moulton, R. J. 1999. An update: Changes abound in forestry cost-share assistence programs. Tree Farmer.

Maine Revenue Service. 2003. Property Tax Bulletin No. 19.

Newman, D. H., Wear, D. N. 1993. Production economics of private forestry: A comparison of industrial and nonindustrial forest owners. American Journal of Agricultural Economics **75**:674-684.

Potter-Witter, K. 2005. A cross-sectional analysis of Michigan nonindustrial private forest landowners. Northern Journal of Applied Forestry **22**:132-138.

Rea, L. M., Parker, R.A. 1992. Designing and Conducting Survey Research. Jossey-Bass Publishers, San Francisco, CA.

Rickenbach, M. G., Kittredge, D. B., Dennis, D., Stevens, T. 1998. Ecosystem mangement: Capturing the concept for woodland owners. Journal of Forestry **96**:18-24.

Rickenbach, M. G., Reed, A. S. 2002. Cross-boundary cooperation in a watershed context: The sentiments of private forest owners. Environmental Management **30**:584-594.

Row, C. 1978. Economies of tract size in timber growing. Journal of Forestry **76**:576-582.

Salkie, F. J., Luckert, M.K., Phillips, W.E. 1995. An economic analysis of landowner propensity for woodlot management and harvesting in northwestern Saskatchewan. The Forestry Chronicle **71**:451-458.

Salwasser, H. 1994. Ecosystem management: Can it sustain diversity and productivity. Journal of Forestry **92**:6-10.

Sample, V. A. 1994. Building partnerships for ecosystem management on mixed ownership landscapes. Journal of Forestry **92**:41-44.

Sampson, N., DeCoster, L. 2000. Forest fragmentation: Implications for sustainable private forests. Journal of Forestry.

Shands, W. 1991. Problems and prospects at the urban-forest interface. Journal of Forestry **89**:23-26.

Shindler, B., List, P., Steel, B. S. 1993. Managing federal forests: Public attitudes in Oregon and nationwide. Journal of Forestry **91**:36-43.

Stevens, T. H., Dennis, D., Kittredge, D., Rickenbach, M. 1999. Attitudes and preferences toward co-operative agreements for management of private forestlands in the North-eastern United States. Journal of Environmental Mangement **55**:81-90.

Straka, T. J., Wisdom, H. W., Moak, J. E. 1984. Size of forest holding and investment behaivior of nonindustrial private owners. Journal of Forestry **82**:495-496.

Sustainable Woods Cooperative. 2003. Sustainable Woods Cooperative: Lessons Learned in its 5 Years.1-22.

Thompson, R. P., Jones, J. G. 1981. Classifying nonindustrial private forestland by tract size. Journal of Forestry **79**:288-291.

Vaux, H. J. 1982. Forestry's hotseat: the urban/forest interface. American Forests **88**:37; 44-46.

Waggener, T. R. 1977. Community stability as a forest management objective. Journal of Forestry **79**:710-714.

Wear, D. N., Greis, J.G. 2003. The Southern Forest Resource Assessment Report: Chapter 13. USDA Forest Service Southern Research Station.

Young, R. A., Reichenbach, M. R. 1987. Factors influencing the timber harvest intensions of non-industrial private forest owners. Forest Science **33**:381-393.

Young, R. A., Reichenbach, M. R., Perkuhn, F. H. 1985. PNIF management: A social-psychological study of owners in Illinois. Northern Journal of Applied Forestry **2**:91-94.

ELECTRONIC REFERENCES

Vermont Family Forests. 2004. www.familyforests.org

Small Woodland Owners Association of Maine. 2004. www.swoam.com

APPENDICIES

APPENDIX A
INITIAL COVER LETTER

December 14, 2004

Dear Maine Woodland Owner,

As a private woodland owner in the state of Maine you are invited to participate in a research project I am conducting as a graduate student in the Forest Management Department at the University of Maine, Orono. The purpose of this research is to determine the amount of interest among Maine forestland owners regarding cooperative forestry associations and landowner assistance programs. The goal of this study is to provide information to forest managers that would allow them to better serve the specific needs of private forest landowners throughout the state..

Enclosed is a brief survey that should take approximately 10 minutes to fill out. Participation is voluntary and you may skip questions you do not wish to answer. Your name will not appear directly on any documents during the study and the data will be kept locked in my office. The only other individual who will have access to the survey responses is Dr. David Field, my faculty advisor and Chair of the Forest Management program at the University of Maine, Orono. All survey data will be destroyed following the conclusion of the study which will last no longer than 1 year. Business reply envelopes with postage have been provided for your convenience. A summary of the research results are available upon request. If you have any questions about the study feel free to contact me at the number or address below. All questions regarding your rights as a survey participant should be directed to Gayle Anderson, Assistant to the University of Maine's Protection of Human Subjects Review Board, at (207) 581-1498 or e-mail Gayle.Anderson@umit.maine.edu.

Sincerely,

Brian Schneider
Department of Forest Management
University of Maine
5755 Nutting Hall
Orono, ME 04469-5755
(207) 581-3794
Brian.Schneider@umit.maine.edu

APPENDIX B
SECOND COVER LETTER

April 1, 2005

Dear Maine Woodland Owners,

Enclosed is a second, and final copy of the survey regarding management alternatives for private woodland owners in the state of Maine. Many of you have filled out and returned the survey included in the original February mailing. Some individuals have contacted me directly requesting another copy of the survey.

It is important to note that if you have sent the survey back already, or you are unsure whether or not you have, please DO NOT fill it out again.

To protect confidentiality the surveys come back without names attached and it is impossible to determine who has sent the survey back and who has not. In order to avoid recording the same answers twice, it is important that you send only one survey. Again, this second survey copy is for those who have not previously filled one out and would still like the opportunity to do so. If you have sent a survey in already, or you are still uninterested in participating I apologize for this inconvenience and thank you all for your patience and cooperation. If you have any further questions please do not hesitate to contact me directly.

Sincerely,

Brian Schneider
Department of Forest Management
University of Maine
5755 Nutting Hall
Orono, ME 04469-5755
(207) 581-3794
Brian.Schneider@umit.maine.edu

APPENDIX C
SURVEY INSTRUMENT

WOODLAND OWNER COOPERATIVE MANAGEMENT SURVEY

Please fill out the following questionnaire as accurately as you can and return your completed questionnaire in the enclosed envelope.

SECTION I: Why do you own woodland?

Q-1 Please indicate how important each of these reasons for land ownership is to you as a woodland owner in Maine. Circle **ONE** response on the scale of 1 to 7 for **EACH** reason, where 1 indicates "not important" and 7 indicates "very important".

		NOT IMPORTANT					VERY IMPORTANT	
A	Solitude and scenic enjoyment	1	2	3	4	5	6	7
B	To protect nature and biological diversity	1	2	3	4	5	6	7
C	For land investment	1	2	3	4	5	6	7
D	As part of my home or vacation home	1	2	3	4	5	6	7
E	Estate to pass on to children or other heirs	1	2	3	4	5	6	7
F	To supply wood for my business	1	2	3	4	5	6	7
G	For collection of non-timber forest products	1	2	3	4	5	6	7
H	For production of firewood	1	2	3	4	5	6	7
I	For sale of sawlogs, pulpwood or other timber products	1	2	3	4	5	6	7
J	For wildlife habitat	1	2	3	4	5	6	7
K	For hunting or fishing	1	2	3	4	5	6	7
L	For recreation other than hunting or fishing	1	2	3	4	5	6	7
M	Other (please specify)	1	2	3	4	5	6	7

_____

Q-2 Which of the above reasons (*A-M*) do you consider to be the most important reason for owning your woodland? (Please enter one letter (A,B...-M).) _____

SECTION II: Forest management and harvesting

Q-3 From which source do you receive the **majority** of advice regarding the management of your woodland? (Please check one box.)

- ☐ LICENSED PRIVATE CONSULTING FORESTER
- ☐ MAINE FOREST SERVICE FORESTER
- ☐ FORESTER FROM A COMPANY THAT PRODUCES FOREST PRODUCTS
- ☐ LOGGING CONTRACTOR
- ☐ A NON-PROFIT ORGANIZATION
- ☐ OTHER FOREST LANDOWNER, NEIGHBOR, OR FRIEND
- ☐ OTHER (PLEASE SPECIFY)_____
- ☐ DO NOT SEEK ADVICE

Q-4   How often are you in contact with a Maine Licensed Professional Forester to seek information or management services? (Please check one box.)

- ☐ MORE THAN ONCE EVERY 5 YEARS
- ☐ EVERY 5 YEARS
- ☐ EVERY 6 TO 10 YEARS
- ☐ LESS OFTEN THAN EVERY 10 YEARS
- ☐ NEVER

Q-5   In the absence of the Maine Tree Growth Tax Program, would you still maintain a management plan outlining the specific goals for your property?

- ☐ YES
- ☐ NO

Q-6   When is the last time you harvested or had someone else harvest sawlogs, pulpwood, or any other forest product from your land? (Please check one box.)

- ☐ LESS THAN 1 YEAR AGO
- ☐ WITHIN 1 TO 5 YEARS
- ☐ WITHIN 6 TO 10 YEARS
- ☐ WITHIN 11 TO 20 YEARS
- ☐ I HAVE NOT HAD WOOD HARVESTED WITHIN THE PAST 20 YEARS

⟶ *If you have NOT HAD WOOD HARVESTED within the past 20 years skip to* ***Q-14***

Q-7   Was a Maine Licensed Professional Forester involved in your most recent harvest?

- ☐ YES
- ☐ NO

⟶*If NO, skip to* ***Q-9***

Q-8   If YES, whom was the Maine Licensed Professional Forester working for? (Please check all that apply.)

- ☐ WORKING DIRECTLY FOR YOU ON YOUR BEHALF
- ☐ WORKING FOR THE LOGGER
- ☐ WORKING FOR THE FOREST PRODUCTS COMPANY THAT BOUGHT WOOD DURING THE SALE
- ☐ WORKING FOR A PUBLIC AGENCY OR NON-PROFIT

Q-9   Was the price you received for the forest products produced from this harvest more than you expected, as you expected, or less than you expected? (Please check one box.)

☐ MORE THAN YOU EXPECTED

☐ AS EXPECTED

☐ LESS THAN YOU EXPECTED

For question 10 please circle one response on the scale of 1 to 5, where 1 means "not satisfied" and 5 means "very satisfied".

Q-10   Following your most recent timber harvest, how satisfied were you with the physical appearance of your woodlot? (Please circle one response.)

NOT				VERY
SATISFIED				SATISFIED
1	2	3	4	5

For questions 11 and 12 please circle one response on the scale of 1 to 5, where 1 indicates that the harvest "did not meet expectations" and 5 indicates that the harvest did "fully meet expectations".

Q-11   Following your most recent timber harvest, did the remaining forest composition (different tree species) meet your expectations? (Please circle one response.)

DID NOT MEET				FULLY MET
EXPECTATIONS				EXPECTATIONS
1	2	3	4	5

Q-12   Following your most recent timber harvest, did the remaining forest structure (different tree sizes and ages) meet you expectations? (Please circle one response.)

DID NOT MEET				FULLY MET
EXPECTATIONS				EXPECTATIONS
1	2	3	4	5

For question 13 please circle one response on the scale of 1 to 5, where 1 indicates that the harvest " did not match intentions" described in your management plan and 5 indicates that the harvest "fully matched intentions ".

Q-13   Overall, to what extent did the harvesting that was conducted on your property match up with the intensions described in your management plan? (Please circle one response.)

DID NOT MATCH				FULLY MATCHED
INTENTIONS				INTENTIONS
1	2	3	4	5

If you circled 1 or 2 in response to Question 13, briefly explain any mismatch between the objectives and procedures described in your management plan and what was carried out during your most recent harvest.

_____

_____

_____

Q-14   Overall, how would you rate the effectiveness of your management plan at achieving the *financial* goals you have set for your woodlot? Please circle one response on the scale of 1 to 5, where 1 indicates that your management plan is "not effective" at achieving the *financial* goals you have set for your property and 5 indicates that your management plan is "very effective" at achieving the *financial* goals you have set.

NOT				VERY
EFFECTIVE				EFFECTIVE
1	2	3	4	5

☐ I HAVE NO PARTICULAR FINANCIAL GOALS

Q-15   Overall, how would you rate the effectiveness of your management plan at addressing your *non-financial* goals, such as wildlife habitat or scenic beauty? Please circle one response on the scale of 1 to 5, where 1 indicates that your management plan is "not effective" at achieving the *non-financial* goals you have set for your property and 5 indicates that your management plan is "very effective" at achieving the *non-financial* goals you have set.

NOT				VERY
EFFECTIVE				EFFECTIVE
1	2	3	4	5

☐ I HAVE NO PARTICULAR NON-FINANCIAL GOALS

SECTION III: Ownership profile

Q-16   In total, how many acres of woodland do you own in Maine? _____

Q-17   Which category best describes the ownership of your woodland? (Please check one box.)

☐ I AM THE SOLE OWNER
☐ I SHARE OWNERSHIP WITH SOMEONE IN MY IMMEDIATE HOUSEHOLD
☐ I SHARE OWNERSHIP WITH A FAMILY MEMBER OUTSIDE MY IMMEDIATE HOUSEHOLD
☐ I SHARE OWNERSHIP WITH A NON-FAMILY BUSINESS ASSOCIATE

Q-18   What is the total acreage of your largest woodland parcel ? *(If you own connected parcels, please indicate the combined acreage)* (Please check one box.)

- ☐ 10 TO 49 ACRES
- ☐ 50 TO 99 ACRES
- ☐ 100 TO 500 ACRES
- ☐ MORE THAN 500 ACRES

Q-19   In what state is your primary residence?_____

Q-20   Is your primary residence within 1 mile of any of your woodland parcels?

- ☐ YES
- ☐ NO

Q-21   Do you have a vacation home or camp within 1 mile of any of your woodland parcels?

- ☐ YES
- ☐ NO

Q-22   How long have you owned woodland in Maine? (Please check one box.)

- ☐ 1 YEAR OR LESS
- ☐ 2 TO 5 YEARS
- ☐ 6 TO 10 YEARS
- ☐ 11 TO 20 YEARS
- ☐ MORE THAN 20 YEARS

Q-23   How far in advance do you typically plan for the following activities on your largest woodland parcel? (Please check one box for each category.)

TIMBER HARVESTING
- ☐ NOT PLANNED IN ADVANCE
- ☐ LESS THAN 5 YEARS IN ADVANCE
- ☐ 6 TO 10 YEARS IN ADVANCE
- ☐ 11 TO 20 YEARS IN ADVANCE
- ☐ MORE THAN 20 YEARS IN ADVANCE

WILDLIFE HABITAT MANAGEMENT

☐ NOT PLANNED IN ADVANCE
☐ LESS THAN 5 YEARS IN ADVANCE
☐ 6 TO 10 YEARS IN ADVANCE
☐ 11 TO 20 YEARS IN ADVANCE
☐ MORE THAN 20 YEARS IN ADVANCE

RECREATIONAL TRAILS OR OTHER RECREATIONAL DEVELOPMENT

☐ NOT PLANNED IN ADVANCE
☐ LESS THAN 5 YEARS IN ADVANCE
☐ 6 TO 10 YEARS IN ADVANCE
☐ 11 TO 20 YEARS IN ADVANCE
☐ MORE THAN 20 YEARS IN ADVANCE

Q-24 What is your age?

_____ YEARS OLD

Q-25 What is your gender?

☐ MALE
☐ FEMALE

Q-26 What is the highest level of education you have received? (Please check one box.)

☐ LESS THAN 9TH GRADE
☐ 9TH TO 12TH GRADE, NO DIPLOMA
☐ HIGH SCHOOL GRADUATE (OR EQUIVALENCY)
☐ ASSOCIATE DEGREE
☐ BACHELOR'S DEGREE
☐ GRADUATE OR PROFESSIONAL DEGREE

Q-27 Which of the following categories best describes your occupation? (Please check one box.)

☐ MANAGEMENT, PROFESSIONAL AND RELATED OCCUPATIONS
☐ SALES AND OFFICE OCCUPATIONS
☐ FARMING, FISHING, AND FORESTRY OCCUPATIONS
☐ CONSTRUCTION, EXTRACTION AND MAINTENANCE OCCUPATIONS
☐ SERVICE OCCUPATIONS
☐ PRODUCTION, TRANSPORTATION, AND MATERIAL MOVING OCCUPATIONS
☐ OTHER _____

Q-28   What was your combined annual household income in 2004? (Please check one box.)

☐ LESS THAN $10,000
☐ $10,000 TO $14,999
☐ $15,000 TO $24,999
☐ $25,000 TO $34,999
☐ $35,000 TO $49,999
☐ $50,000 TO $74,999
☐ $75,000 TO $99,999
☐ $100,000 TO $149,000
☐ $150,000 TO $199,000
☐ $200,000 OR MORE

SECTION IV: Participation in management programs

For the following section, please read the short description given for each of the three hypothetical cooperative forest management organizations. The answers given to the questions following the descriptions are to be used to better understand the interests and priorities of small woodland owners throughout Maine, and to better meet the management needs of those landowners.

Organization A: "The Network" would consist of a network of small woodland owners, professional foresters, loggers, truckers, sawmills and craftsmen. The organization, a non-profit group, would serve to connect professionals with local landowners as a means of keeping as much timber sale income as possible in the local community. The organization would recommend foresters and conduct education programs for landowners to raise awareness regarding environmental concerns and responsible harvesting practices. Landowners would sustain higher management costs and usually harvest lower volumes of wood based on lower impact, ecologically sensitive forestry designed to improve the overall condition of your woodlot. The organization would rely on receiving a higher price for products, produced locally in an ecologically responsible way, which would be marketed under the brand name of the organization.

Organization B: "The Woods Bank" would essentially require you as a landowner to permanently "deposit" your right to grow and manage timber on your land. In exchange you would be guaranteed an annual dividend of 3-5 percent of the market value of your timber. A non-profit conservation organization would manage the land, along with adjacent lands at a larger, ecologically sensitive landscape scale, harvesting as they see fit. You would retain all other land rights so long as those rights do not interfere with timber management on the land.

Organization C: "The Marketing Co-Op" would be a for-profit organization comprised of landowners in your geographic area. Landowners would have the opportunity to invest in the infrastructure and expertise necessary to manage, harvest, process, and sell a full range of wood products from their lands. The Co-Op would employ resource professionals, own processing and drying facilities, and be responsible for finding markets for products. An elected board of directors and a General Manager would facilitate Co-Op decision making in which all landowners would have 1 vote. Adjacent landowners could time harvests to share logging and associated costs. Landowners would receive the full profit from timber sales and

added income from the sale of "finished" products through the Co-Op, and possibly a dividend from the Co-Op as determined by the board of directors.

Q-29 If all three organizations were to start up in your area, how likely would you be to join each of them? Circle one response for each organization on the scale of 1 to 5 where 1 means "definitely not join" and 5 means "definitely join".

	DEFINITELY NOT JOIN				DEFINITELY JOIN
ORGANIZATION A THE NETWORK	1	2	3	4	5
ORGANIZATION B THE WOODS BANK	1	2	3	4	5
ORGANIZATION C THE MARKETING CO-OP	1	2	3	4	5

☐ NONE OF THE ABOVE (NOT INTERESTED IN ANY OF THE DESCRIBED ORGANIZATIONS)

If you checked NONE OF THE ABOVE (NOT INTERESTED IN ANY OF THE DESCRIBED ORGANIZATIONS) please explain your primary reason for lack of interest.

_____

_____

_____

Q-30 Assume that all three organizations were established in your area and have been operating for at least 5 years. As a result, you have had the ability to observe how they operate and learn how they function. To what extent do you believe your willingness to join these organizations would increase after observing the organizations directly. Circle one response for each organization on the scale of 1 to 5 where 1 means your willingness to join would "not at all" increase and 5 means your willingness would "very much" increase.

	NOT AT ALL				VERY MUCH
ORGANIZATION A THE NETWORK	1	2	3	4	5
ORGANIZATION B THE WOODS BANK	1	2	3	4	5
ORGANIZATION C THE MARKETING CO-OP	1	2	3	4	5

Q-31   Are you currently part of an organization similar to those mentioned above?

    ☐ YES

    ☐ NO

    ⟶ *If NO skip to Q-33*

Q-32   The organization I participate in is most like:

    ☐ A, THE NETWORK

    ☐ B, THE WOODS BANK

    ☐ C, THE MARKETING CO-OP

    NAME OF ORGANIZATION:

Q-33   Are you an **active** member of other landowner environmental or sporting organizations? If YES, please record the name(s) of the organization(s) in the space below.

    ☐ YES _____

              _____

    ☐ NO

Q-34   Have you ever used or participated in any of the following government sponsored programs or events related to forest management? (Check all that apply)

    ☐ AGRICULTURE CONSERVATION PROGRAM (ACP)

    ☐ STEWARDSHIP INCENTIVE PROGRAM (SIP)

    ☐ FOREST INCENTIVES PROGRAM (FIP)

    ☐ FOREST STEWARDSHIP ASSISTANCE PROGRAM (FSA)

    ☐ WOODSWISE INCENTIVES PROGRAM

Please answer the following statements by circling one response to each question on the five point scale, where 1 means "strongly disagree" and 5 means "strongly agree".

STRONGLY DISAGREE		NEUTRAL		STRONGLY AGREE
1	2	3	4	5

Q-35 I would be interested in working with neighboring landowners to benefit the larger forest ecosystem even if it meant coordinating management activities and perhaps a reduction in the volume harvested during periodic cutting operations on my land.

1   2   3   4   5

Q-36 Keeping as much timber sale, logging, processing, and product sale income within the local community should be an important consideration in forest management.

1   2   3   4   5

Q-37 I would like to have greater control regarding how my logs are processed and sold after they are removed from my land.

1   2   3   4   5

Q-38 I would be interested in joint ownership of a small, portable sawmill, and kiln drying facility which would allow me and my neighbors to achieve higher profits than usual from our timber sales even if it meant an upfront investment for equipment, and would require time or money to hire or train equipment operators.

1   2   3   4   5

Thank you for taking the time to complete this survey. Your assistance is very much appreciated. If there is anything else you would like to tell us about this survey or cooperative forest management, please do so in the space provided.

BIOGRAPHY OF THE AUTHOR

Brian Schneider was born in Tarrytown, New York on June 6, 1981. He graduated from Ossining High School in 1999. Brian moved to New England to attend the University of Vermont and graduated from the School of Natural Resources earning a Bachelor of Science degree in Forestry with a concentration in Terrestrial Ecosystem Management. Upon graduation he worked as a Forestry Technician in Jericho, Vermont. He currently works as a Forester in Montpelier, Vermont and is a member of the Society of American Foresters.

Brian is a candidate for the Master of Science Degree in Forestry from the University of Maine in December, 2005.