PRIVATE FORESTLAND PARCELIZATION IN NEW YORK: PATTERNS, DRIVERS, AND EFFECTS

A Thesis

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by

Andrew Walker Roe

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ABSTRACT

Parcelization, the division and ownership transfer of properties, produces significant changes for forested landscapes and the people that own them. Previous research has focused on the effects of parcelization on average forest parcel size and forest composition, but little has been done to examine parcelization's underlying causes and broader social effects. My thesis examines the scale of private forestland parcelization in New York, as well drivers of the phenomenon and reactions by foresters that work with private forest landowners. Quantitative analysis of property sales data was used to determine the rates of forest parcelization in eastern New York, the decision-making process of parcelizing landowners in three Hudson Valley counties was examined using a mixed-method approach, and qualitative methods were used to understand how parcelization affects the business practices of foresters across the state. My findings suggest that over seven percent of private woodlands were parcelized in the state over the last decade, that there are distinct types of parcelizing landowners, and that many foresters are adapting their practices in response to these changes.

BIOGRAPHICAL SKETCH

Andrew Walker Roe was born and raised in the rapidly changing area around Raleigh, North Carolina. His environmental passions were inspired first by his parents, then on Boy Scout camping trips, summer weeks at the Green River Preserve that were never long enough, and by wonderful environmental science and biology teachers. After high school, Andrew realized that he truly was a Tar Heel born and bred, and entered the University of North Carolina at Chapel Hill. During his four and a half years of attendance, he was blessed to have opportunities to study in the Sierra Nevada Mountains of California, the University of Otago in Dunedin, New Zealand, and biological stations in Highlands, North Carolina and Mountain Lake, Virginia. Near the end of this time he was lucky enough to reconnect with his former high school arch-nemesis, Jessica Long, this time on friendlier terms. Together they each earned Bachelors' of Science degrees in Environmental Science at the end of 2006.

After college, Andrew refused to settle down and jumped on every opportunity that came along. He travelled to Patagonia and Tierra del Fuego in the footsteps of Charles Darwin, drove cross-country for a job tracking animals in Olympic National Park, returned to South America and the jungles of Iquitos, Peru and spent a year working with The Nature Conservancy in Asheville and the mountains of western North Carolina. Fate took Andrew to Ithaca, New York and Cornell University where he embraced the Human Dimensions Research Unit in the Department of Natural Resources. He was fortunate enough to live within two blocks of the best breakfast

diner in town, the grungiest sports bar, a restaurant with a great beer selection, a superfluous laundromat and hair stylist, and to cap it off, a beautiful waterfall and calming creek to toss flies in. However, while Andrew was in Ithaca, Jessica was pursuing a master's degree at the University of Wisconsin-Madison and he missed her terribly. Therefore, Andrew has made plans to continue his education with a Ph.D. in Madison, in the Forest and Wildlife Ecology department, but looks forward to returning to Ithaca, which truly is "Gorges", whenever possible.

For Jess

and the hemlocks

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CHAPTER ONE: INTRODUCTION

New York State is blessed with an abundance of forests and a long tradition of forest stewardship. Over the last 150 years, forests have recovered from the height of the state's clearing of forestland for agriculture and nearly 63% of New York State, about 18.9 million acres, is now covered by forests (NYS Statewide Forest Resource Assessment and Strategy, 2010). The social landscape within and around these forests has also gone through periods of great change over recent decades. While forest acreage has increased, the number of forest owners has increased even more rapidly as a result of "Forest Parcelization", or the division and ownership transfer of forest properties. Over 14.4 million acres, or 76% of the state's total forestland, is currently owned by approximately 687,000 private landowners (NYS Statewide Forest Resource Assessment and Strategy, 2010). Private forestland parcelization is believed to have significant effects on the ecological health and societal functions of forested landscapes around the country. However, researchers and public policymakers are still learning about its effects on New York's forests, as well as the rates and underlying reasons for this landscape transition.

Understanding Landscape Change

As forest landscapes change, a large number of questions and related issues arise. Gobster et al. (2000) presented a conceptual model for understanding how the components of landscape change relate to one another and suggested how they might

be addressed through a program of research. This model has been adapted for use in studying forest parcelization (e.g. Gobster and Rickenbach, 2004) and will be used as a framework to organize this thesis (Figure 1.1).

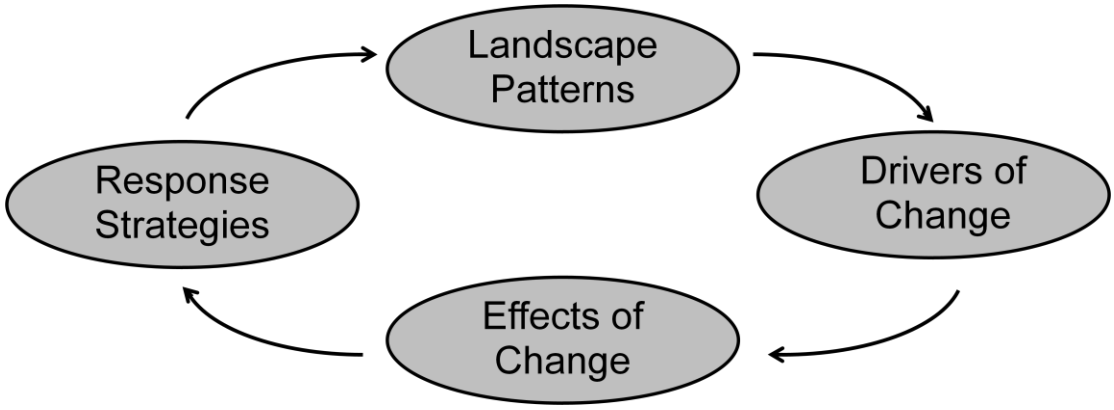

Figure 1.1 Framework for understanding landscape change, adapted from Gobster et al. (2000)

The model components each address distinct aspects of landscape change. The Landscape Patterns element is used to describe the physical, biological, and social character of the landscape at the regional or subregional level. It describes the rate and extent of landscape changes and improves predictions of the locations, extent, and timing of landscape changes. The Drivers of Change component focuses on the major social and economic forces of landscape change at various levels. Effects of Change is used to examine observable manifestations of landscape change and is the model component that usually draws the most attention from stakeholders who are concerned with the positive or negative aspects of change. Finally, Response Strategies examines actions to enhance or mitigate the effects of landscape change. To gain a more comprehensive understanding of forest landscape change in New York State I

examined each aspect of the landscape change model as they related to the phenomenon of private forest parcelization.

Parcelization as a Lens for Studying Forest Landscape Change

Parcelization is the process by which parcels of land are legally divided and transferred to new owners. This process results in smaller properties and a greater number of owners on the same total land area. The parcelization of forested properties has been shown to lead to a diverse range of economic, social, and environmental changes (Rickenbach and Gobster, 2003). Societal changes have included reduced recreation access, aesthetic changes, stresses to community infrastructure, influxes of people with new demographics, and shifts in local politics. Parcelization may be both an effect of and a precursor to increased economic development, rising land values and shifts in taxation rates (Gobster and Rickenbach, 2004). Parcelization is also associated with decreasing timber and agricultural production (Rickenbach and Gobster, 2003). Once properties are parcelized, they are rarely reconsolidated (Mundell et al., 2010) and in the rare instances that they are, it often precedes further parcelization (Donnelly and Evans, 2000).

The rates of forest parcelization and its effects have concerned natural resource managers for many years. While the parcelization of properties in agricultural use can lead to diversification of land use and may lead to increases in forest cover (e.g. Kleiman and Erickson, 1996), the parcelization of existing forest properties, especially in areas with natural resource amenities, is often a precursor to forest loss and

fragmentation as a result of residential development (Haines et al., 2011). In addition to changes in the amount and distribution of forest, parcelization can result in reduced water quality and long-term threats to forest health from reductions of natural disturbances such as wildfire (Rickenbach and Gobster, 2003). Increased fragmentation resulting from parcelization may also lead to increases in invasive species introduction and reductions in species that require contiguous forest (Rickenbach and Gobster, 2003).

In addition to physical and biological changes, several social and economic effects of forest parcelization have also been identified. Access to properties and recreation opportunities for previous local users are often restricted after parcelization (Dennis, 1992; Rickenbach and Gobster, 2003). The smaller parcels of forest land that result from parcelization lead to reduced timber volumes and harvesting, as well as decreased private landowner engagement in other forest management practices (Wear et al., 1999; Rickenbach and Steele, 2006; Germain et al., 2007; Vickery et al., 2009). Furthermore, the actions of greater numbers of private landowners are required to implement conservation projects across areas of concern. Together, these effects make parcelization a major force of change across forested landscapes.

Forest Parcelization in New York State

In several areas of upstate New York the total number of wooded properties increased substantially in the last three decades, and many acres of forestland have shifted to smaller parcel classes. However the timing and spatial patterns of this

parcelization have not been consistent. Using tax rolls from 1984 and 2000, LaPierre and Germain (2005) examined the degree of private property parcelization in four adjoining counties in the New York City watershed: Greene, Schoharie, Sullivan, and Ulster. They found that over that time period, over 20,000 acres of forest shifted from larger properties to parcels under 50 acres in size, increasing the total number of forest properties by more than 5,000 over the study time period. As a result, the average size of forest parcels decreased in each county, ranging from slight decreases in Ulster County (14.4 to 13.1 acres) and Sullivan County (13.5 to 12.1 acres), to significant drops in Greene (from 20.8 to 16.0 acres) and Schoharie (23.8 to 16.3 acres) counties. Using similar methods, Germain et al. (2006) found that in Oneida County of central New York the number of private forest parcels increased by over 6,000 and the average parcel size dropped from 36 acres to 24 acres between 1975 and 2000, despite a 9% decrease in the county population during the same period. These patterns are expected to continue, as more than 10% of rural New York landowners expect to sell their properties and over 15% of forest owners expect to sell or pass their land on to heirs within the next five to ten years (Kay and Bills, 2007; Connelly et al., 2007).

Despite the broad scale of parcelization and its demonstrated effects, very little research has been conducted to understand what influences landowner decisions to divide and sell land. Studies that have included property-selling landowners have focused on urban-fringe areas facing development pressure (Pyle, 1985; Hrabchak, 2005; Zhu and Bostic, 2009). However, Gruver (2010) used key informant, phenomenological, and semi-structured interview methods to explore Pennsylvania private forest landowners' motivations and decision-making processes as they planned

for the future ownership of their forestland. The only study that has explicitly focused on New York landowners who have sold forest land primarily examined their demographic characteristics, original land ownership motivations, and perceptions of external pressures (Stone and Tyrell, 2008). There are significant opportunities to build a better understanding of the dynamics involved in the parcelization of New York forests using the components outlined by the landscape change model (Gobster et al., 2000).

Thesis Objectives

This thesis examines the patterns, drivers, and effects of forestland parcelization currently occurring in New York State as well as some of the responses. In order to explore these subjects I conducted three research projects examining different processes and actors at different scales; forester adaptations to private forestland parcelization in a qualitative statewide study, parcelizing landowner decision-making in a regional study, and woodland parcelization rates using property records. Although the research projects were methodologically distinct and conducted at different spatial scales, they each integrated components of the landscape change model and the findings from each influenced the development of the others.

Chapter Two presents the results of a quantitative analysis of land transfer records occurring between 2001 and 2010. The objective of this research component was to describe the rate and extent of private forest property parcelization and to understand the broad-scale driving forces behind the phenomenon. To accomplish this

I acquired real estate transaction data from the New York State Office of Real Property for 31 counties, comprising the entire eastern half of New York State. Using these data I identified a subset of property classes most likely to contain forested land (Appendix A) and calculated the total number and acreages of properties transferred within each property class over the time period. I then identified the subset of parcels identified by the tax office as involving part of a previously existing property. Comparing these quantities with the original number of properties in these classifications that existed in the year 2000, I constructed a new metric of Woodland Parcelization Rate (WPR) and examined how the WPR is related to previously hypothesized drivers of parcelization. I also used the data to construct transition matrices to demonstrate how land use classifications show signs of shifting with parcelization over time.

In Chapter Three, I explore findings from a mail survey of landowners in three counties of eastern New York State. The objective of this research component was to understand the factors and processes driving private forest landowners to parcelize their land. The mail survey (Appendices B and C) was created using factors identified in Chapter Two and interview results from Chapter Four, as well as semi-structured interviews with local land trusts and landowners who had previously parcelized their forest properties. I combined information from the real estate transaction records in Chapter Two with current property records in order to identify a subsample of landowners known to have parcelized land in Rensselaer, Columbia, Dutchess, County, New York over the last ten years. From the survey responses I developed a typology of parcelizing landowners based on the economic and land-use factors that most influenced their decision to parcelize their land.

Chapter Four used qualitative methods to explore the perceptions of twenty foresters working with private landowners across New York State. The objective of this research was to understand whether forest parcelization is affecting foresters that work with private landowners and if so, how they are responding to the changes. Using semi-structured interviews (Appendices D and E) foresters described their perceptions of the rate of parcelization and the changes they had made to their business capacity and orientation in response to parcelization.

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CHAPTER TWO: FOREST PROPERTY PARCELIZATION IN EASTERN NEW YORK, TRANSITIONS AND CONTRIBUTING FACTORS

Abstract

Forest parcelization, the division and transfer of wooded property into smaller ownership parcels, is a phenomenon affecting private forests across the nation. Understanding parcelization requires the recognition of patterns and association with drivers at a regional scale. This research analyzed real estate transaction data across thirty-one counties of eastern New York State to quantify rates of intact and parcelized forestland transfer between 2001 and 2010. Woodland parcelization rates were quantified at the county level and examined with regard to population, demographic, and economic drivers of parcelization. I found that 7.1 % of the region's original woodland properties were parcelized and made up 16.1% of all woodland property transfers between 2001 and 2010. However, woodland parcelization rates decreased almost every year. The strongest predictors of increased woodland parcelization rates were higher overall property tax rates, shorter average commute times, lower initial population density, and a smaller percentage of the population between the ages of 45 and 54. There were no significant relationships with county level population growth, death rates, or unemployment rates. Furthermore, there were distinct transitions in the land uses of parcelized woodland properties versus those transferred intact. These findings indicate that parcelization actions are occurring at high rates and have implications for future ownership and use, but that the underlying factors driving the process are varied across the region.

Introduction

Many privately-owned forest properties have been divided into smaller parcels owned by an increasing number of people through a process known as "parcelization" (Mehmood and Zhang, 2001). While the total amount of private forestland acreage in the United States has increased slightly over the past three decades, as a result of parcelization average property size has dropped significantly and the total number of forest owners increased by over 30% over the same period (Birch, 1996; Butler and Leatherberry, 2004). Over nine million people now own forested parcels smaller than fifty acres, which comprise 78 million acres of the nation's privately owned forested land (Butler and Leatherberry, 2004). Similar patterns of private forestland parcelization have occurred in New York State, where nearly 90% of private forest owners now own properties of less than fifty acres, accounting for over 40% of the state's forested acreage (National Woodland Owner Survey, 2006). Decreases in average forest property size and increases in the total number forest properties have been documented in Greene, Schoharie, Sullivan and Ulster counties between 1984 and 2000 (LaPierre and Germain, 2005) and in central Oneida County from 1975 to 2000 (Germain et al., 2006). These changes are expected to continue, as more than 10% of rural New York landowners are planning to sell or pass on a portion of their land to heirs within a decade (Kay and Bills, 2007; Connelly et al., 2007).

Ecological changes, such as forest loss and physical fragmentation of remaining forest cover, occur at a greater rate after parcelization than properties that are transferred intact or do not undergo ownership transfer (Haines et al., 2011). In

Delaware County, New York, Germain et al. (2007) demonstrated that forested properties that underwent "organized" parcelization (division resulting in three or more properties of roughly equal size) had significantly less volume and basal area of high value hardwood trees, indicating that heavy timber cutting had occurred after parcelization but before any development. Other ecological effects of forest parcelization include changes in wildlife habitat and reductions in game species dependent on contiguous forests, threats to forest health from reduced management and increased invasive species, and reduced water quality (Rickenbach and Gobster, 2003).

The parcelization of forested properties has also been shown to produce a number of economic and community changes. These include reduced recreation access, aesthetic changes, stresses to community infrastructure, influxes of new people with new values, and shifts in local politics (Gobster and Rickenbach, 2004). In some areas forestland parcelization is associated with rises in property values, shifts in taxation rates, and decreasing timber production (Wear et al., 1999). Effects of parcelization on private forest management have been observed by foresters in central New York, where the likelihood of sustained yield forest management drops by half when wooded parcels are reduced to less than 20 acres in size (Vickery et al., 2009).

Given these recent trends of forest parcelization and demonstrated effects on human and ecological systems, it is important to understand how these changes are occurring and to examine possible causes. The goal of this study was to quantify the rate of forest property parcelization, examine connections to other social and economic changes, and examine indications of future forest use change in eastern New York State.

Measuring Parcelization

Given all of the changes that are linked to the parcelization of forestland, researchers have recognized the importance of understanding property size change in areas of rapid transition. Early research used state-level statistics to demonstrate that the number of forest properties was increasing while average parcel sizes were decreasing. (Birch, 1996; Butler and Leatherberry, 2004; Mehmood and Zhang, 2001). Later studies sampled property records over multiple time intervals to estimate changes in parcel sizes and characterize the extent of parcelization over time in a single county (Germain et al., 2006) or multiple counties (Drzyzga, 2000; LaPierre and Germain, 2005; Block-Torgerson et al., 2010). By moving beyond a single point in time, these studies provide retrospective analyses of parcelization in very focused geographic areas. Some researchers have quantified the extent of parcelization by measuring average property size change over time, but this metric has been criticized for not accurately portraying the distribution of parcels sizes and number (e.g. Block-Torgerson et al., 2010). Several studies have used other measures, including changes in the number of properties that fall within specific size classes (Germain et al., 2006), changes in the proportional sizes of individual parcels (Donnelly and Evans, 2008), Gini-coefficients of timberland distribution (Pan et al., 2009), and a percentage of properties that fall below a specified size threshold (Block-Torgerson et al., 2010). Many of these measures have all demonstrated that woodland properties are decreasing in size at varying rates, but have not been extremely effective in linking these changes to external factors.

While it is useful to understand the extent of forest property size change, it is also important to remember that these parcel size changes are the result of decisions by individual landowners to divide and sell forest properties. Land uses, market demands, and landowner preferences evolve over time (Kennedy and McFarlane, 2009), but once property boundaries are established, they limit future types of parcelization (Donnelly and Evans, 2008; Ko and He, in press). Furthermore, measures of parcelization that use property size may not accurately portray the distribution of parcel sizes and number of parcels across a landscape (Block-Togerson et al., 2010). Therefore, in addition to property size changes, it is also important to examine the rates at which individual landowners are dividing and selling their forested properties over a given time-period in order to understand where and how often the decision to parcelize is being made.

Increasing availability of digital tax and real estate records has contributed to the advancement of new methods of analyzing property transfers at broad spatial and temporal scales possible. Mundell et al. (2010) used modern and historic tax rolls, deed books and grantee books to identify the number of property splits within land-use classifications predominantly used as forested land that occurred over a seven year period in Itasca County, Minnesota. Furthermore, the availability of data on ownership characteristics can enhance analyses of forest parcelization beyond parcel size change (Zhang et al., 2009; Ko and He, in press). The New York State Office of Real Property Services maintains a detailed database of real estate transaction data at the county level that has been used to analyze trends in residential ownership change in a single county (Kay et al., 2010). This data also allows the quantification of forest parcelization over the last decade across multiple New York counties. These quantities can then be

examined in relationship to other factors that have been previously hypothesized as drivers of parcelization.

Drivers of Parcelization

Understanding parcelization at a large scale begins with the recognition of important drivers of parcelization (Block-Torgerson et al., 2010). Previous studies have demonstrated a number of drivers of parcelization, including physical characteristics of the property, local demographic and economic factors, and lifestyle desires that both push landowners to sell their land and provide a market demand for forested properties. The effects of these factors are varied, and demonstrate the desires of new owners as well as the motivations of original landowners that led to their decision to parcelize.

As populations increase, new residents seek to purchase land for homes and economic expansion (Nagubadi and Zhang, 2005). As a result, parcelization is often associated with overall population growth (Alig and Plantinga, 2004; Block-Torgerson et al., 2010), increasing urban population (Mehmood and Zhang, 2001; Zhang et al. 2009), and increasing population density at the state and county level (Zhang et al., 2009). Population growth in individual New York counties has been shown to increase the value of rural land for development (Plantinga and Miller, 2001), which provides greater incentives for existing owners to sell their land. However, Germain et al. (2006) demonstrated that forest parcel size in Oneida County, New York decreased over the last quarter of the twentieth century despite an overall decline in population size in the county. Between 1990 and 2000, only one New York county outside of New York City exceeded the national average growth rate of 13.2%, and 22 counties lost

population (Wing, 2003). Therefore population growth may not be the most important driving factor of private forestland parcelization.

Retirement, which occurs for most of the population around age 65, often leads to major lifestyle changes and may be an opportune time for landowners to sell or gift a portion of their property. As the percentage of a state's population over 65 years of age increases, the number of large forest properties (greater than 200 hectares in size) tends to decrease (Zhang et al., 2009). At the beginning of the century, the proportions of New York county populations made up by citizens over age 65 ranged from 9.5% to 20.0% and were projected to increase (Wing, 2003). In addition, residents of New York and other northeastern states may begin selling residential properties at a greater rate in the years just before their retirement (Myers and Rhu, 2007) so the population dynamics of younger age groups may also be linked to forest parcelization.

Another event that has been linked to parcelization is the death of a landowner. When older forest owners pass away, their properties are passed on to one or multiple heirs and are often divided and sold to pay estate or inheritance taxes as a result (DeCoster, 1998). Furthermore, aging landowners may begin selling or transferring portions of their property in anticipation of changing lifestyle needs or to avoid estate taxes after their own passing. Mehmood and Zhang (2001) showed that statewide death rates were significant predictors of parcelization and subsequent forest property size decrease over a sixteen year time period. Therefore, death rates of older New York residents may also be significantly connected to rates of forest parcelization.

Economic wealth and distribution may also play an important role in driving forest parcelization. Over the last half century the importance of forest amenities to landowners has increased relative to that of timber production (Mather, 2001), and individuals have become more willing to pay more for smaller parcels of forestland for residential purposes (Alig and Plantinga, 2004). As a result, declining property sizes have been shown to occur in conjunction with rising levels of income, both at the family (Mehmood and Zhang, 2001) and per capita level (Zhang et al., 2009). Furthermore, the concentration of wealth in a population may be important in determining how landholdings are distributed. Zhang et al. (2009) found that states with more income disparity had a greater percentage of large forest properties. New York residents have traditionally had relatively high incomes, ranking second highest among the states in median annual pay, but within the state there is a wide range of incomes. The state also has the greatest income disparity in the nation, with a Gini index of 0.502 (US Census, 2009). The highest incomes are in the suburbs of New York City, with relatively high incomes also found in the Capital District, whereas areas in the northern and western parts of the state tend to have lower average incomes (Wing, 2003). Other economic factors that have been linked to parcelization include job loss and unemployment, which may drive landowners to convert portions of their property into monetary income (Pyle, 1985).

According to many forest owners, one of the greatest economic challenges to maintaining ownership of their entire property is paying property tax costs (Rickenbach and Gobster, 2003). Many woodland owners believe that they do not benefit from local government services to the extent that they must pay in taxes

(DeCoster, 1998). In many cases tax rates greatly exceed the growth or appreciation of forest value and cannot be paid without income generated outside the property (Argow, 1996). One might expect high tax rates to cause landowners to subdivision or transfer of their woodlands to lower or pay for taxes. However, Mehmood and Zhang (2001) found that total tax collection rates were not significant predictors of decreasing forest property size, and Block-Torgerson et al. (2010) found no correlation between townships' net tax rates per and several measures of parcelization. In New York State, state and local tax rates have ranked among the nation's highest during the past three decades (Tax Foundation, 2011) and are levied at a uniform rate at the county, city and town or village, and school district level. These costs exert significant pressure on continued forest ownership and higher rates may lead to increasing number of landowners selling portions of their property.

Demand for residences by new residents may also play an important role in driving woodland parcelization. In recent decades more forest owners have earned income through work in urban areas and do not rely on their forestland as a primary source of income (DeCoster, 1998). As a result, proximity to areas of employment in urban areas leads to higher monetary values offered for land used for residential development (Plantinga and Miller, 2001). The higher the total estimated market value of an area is, the more parcelized it will be. (Block-Torgerson et al., 2010). Therefore, how far residents are willing to commute and how much they are willing to pay for residences should be positively related to rates of parcelization.

Finally, public policy may influence rates of forest parcelization. Mehmood and Zhang (2001) argued that planning at the local level may be the most important tool to

slow down the parcelization process. The New York State constitutional provisions for home rule specify that the primary authority for guiding community planning and development is vested in cities, towns and villages. Written comprehensive plans, zoning regulations, and subdivision regulations are tools that municipalities can use to guide where land use change can occur (NYS Land Use Report, 2008).

Research Objective and Research Questions

The objective of this research was to gain a more comprehensive understanding of the parcelization of forest lands in eastern New York State over the last decade. To do so, I addressed three main questions:

1. What number and acreage of privately-owned woodland properties have been parcelized compared to those transferred intact?
2. At what rates have privately-owned woodland properties been parcelized and how do these vary temporally and spatially?
3. How do demographic, economic, and land-use factors influence woodland parcelization rates?
4. Are there differences in how parcelized properties are transferred and how they are used after ownership transfer versus properties that remain intact?

Study Area

New York State is divided into 62 counties, including five counties coterminous with the boroughs of New York City and two counties on Long Island. I selected a study area of thirty-one counties in the eastern half of the state, including the entirety of the Hudson River watershed but excluding those on Long Island and New York City (Figure 1): Albany, Chenango, Clinton, Columbia, Dutchess, Delaware, Essex, Franklin, Fulton, Greene, Hamilton, Herkimer, Jefferson, Lewis, Madison, Montgomery, Oneida, Orange, Otsego, Putnam, Rensselaer, Rockland, Saratoga, Schenectady, Schoharie, St. Lawrence, Sullivan, Ulster, Warren, Washington, and Westchester counties.

Together these counties make up an area of just over 30,000 square miles or 19 million acres. According to the National Landcover Database (NLCD, 2001), about 11.6 million acres of this area were forested (60.12%), 3.1 million acres were in agricultural use (16.02%), 2.3 million acres are wetlands or riparian (12.09%), 925,000 acres were developed (4.79%), 768,000 acres were aquatic (3.98%), and most of the remaining area was recently disturbed or modified (2.95%). The Hudson and Mohawk Rivers, which join near the state capital in Albany County, drain the majority of the area and separate many of the counties as they flow south together to New York City.

The total population of the study area grew at a rate of 4.0% from 2000 to 2010, less than half the national rate (9.7%) but nearly twice the total state growth rate (2.1%) during that period (US Census 2000 and 2010). Total population in 2010 was highest in Westchester County (949,113), followed by Orange (372,813), Rockland

(311,687), and Albany (304,204) Counties. Similarly, population density is highest in the southernmost counties near New York City, along the Hudson River, and in the area around the capital area of Albany. Hamilton County in the Adirondack region had the lowest population (4,836), followed by Lewis (27,087), Schoharie (32,749) and Essex (39,370) counties (US Census 2010).

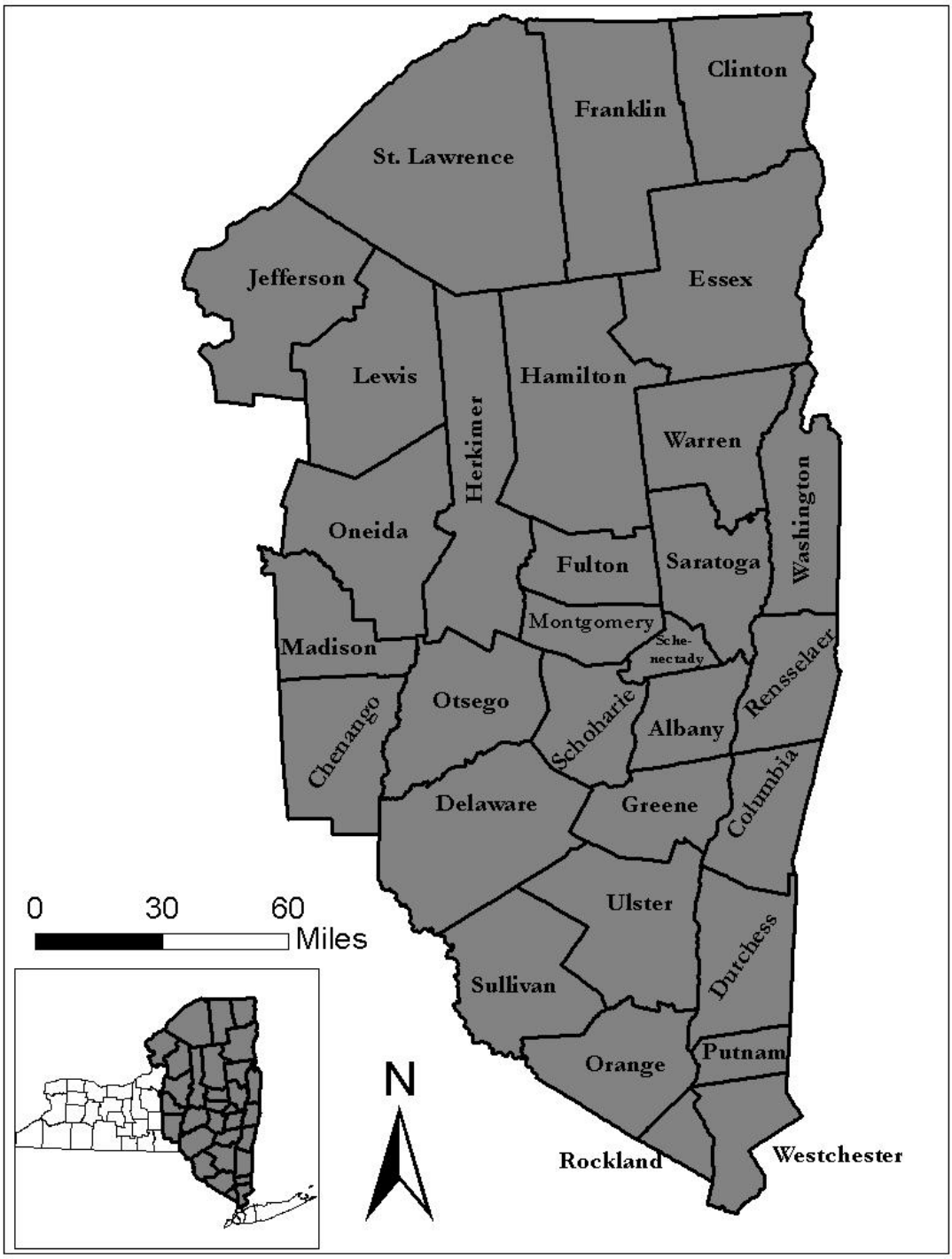

Figure 2.1 Study counties of eastern New York State

Data and Methods

Data

The primary source of data used in the study was real property sales information recorded by the New York State Office of Real Property Tax Services (NYS ORPS) and provided without charge to the public. The information was accessed through SalesWeb, an Internet application that provides sales data for all New York State properties for counties outside of New York City. The source of the sales data is the State of New York Real Property Transfer Report (RP-5217) which is completed by the buyer, seller, or their agent at the time of sale or property ownership transfer, then filed with the county clerk when the deed is recorded. Copies of this form are mailed to NYS ORPS, where the information is entered and then cross-checked against assessment roll files to ensure accuracy and then loaded to the NYS ORPS database within 60 days. Each record includes information about the date of the deed transfer, the size of the property, the official property use classification at the time of sale as well as the tax roll immediately prior to the sale, and an indication of whether the transferred property was split from a larger existing parcel. Properties transactions that met this final criterion were considered "Parcelized".

Sales data were downloaded for each of the thirty-one study counties, and then converted in Microsoft Office Excel 2007 to allow sorting and filtering. In order to ensure that all property transactions for the time period 2001 to 2010 were included, information was updated 90 days after the end of the study period (12/31/2010).

Multiple transactions of the same property were removed by eliminating transfer records with a duplicate tax identification number. Furthermore, records in which the buyer and seller had identical names, which occurred if deeds were merely corrected or changed use, were removed from the analysis.

In order to identify parcelization activity and transfer trends on wooded lands across the counties, the property tax classifications were used to select woodlands from the total sample of transactions. Of primary interest were the properties classified as "Wild and Private Forestland" on the tax roll immediately prior to the sale (NYS ORPS property class 910, 911, and 912). In addition to these properties, rural properties that are often significantly wooded were identified. These included all agricultural properties (Property classes 100 to199), rural residential properties (240 to 260), rural vacant lands (320 to 323), and private hunting and fishing clubs (920) (Appendix A). Agricultural properties were included because more than 65% of New York farm properties contain wooded land and just over 20% of all farmland acres are wooded (US Agricultural Census, 2007). Together, properties that had these classifications prior to ownership transfer were defined as "Woodland Properties."

Metric of Parcelization

Each measure of parcelization provides a different perspective on the issue and comes with its own set of challenges. For example, measuring parcelization through changes in average property size alone do not address the number of properties undergoing change and ignore the influence of factors that shaped properties prior to

the time period being analyzed. Total quantities of parcelization events alone does not incorporate the original number of properties, which may bias comparisons towards areas with more properties overall. In order to create a comparable measure of woodland parcelization for this analysis, I created a ratio comparing the total number of unique woodland properties that were parcelized over the study time period (2001 to 2010) to the total number of woodland properties that existed in the county at the beginning of the study time period (2000). The total number of unique parcelization transactions over the ten year period was calculated using data from NYS ORPS property transaction records described previously. Original quantities of woodland properties were obtained from county lists published each year by the New York State Office of Real Property (ORPS 2000). Using this information the following proportional parcelization measure was calculated for each county:

$$\text{Woodland Parcelization Rate (WPR)} = \frac{\text{\# of woodland properties parcelized (2001–2010)}}{\text{Original \# of woodland properties (2000)}}$$

Predictor Variables

To understand the relative effects of socioeconomic factors on woodland parcelization rates I quantified factors identified in previous parcelization research. In order to directly compare the relationship between predictor factors and WPR over the study period, I selected variables as they existed at the beginning of the time period

(2000) or as they changed from that time onward (2000 to 2010) or until the most recently available data. All values were calculated at the county level, and standardized across counties to allow comparison between counties of varying area and population size (Table 2.1).

To test the effects of population pressure, I measured initial population density and population density change over the time period. To determine whether population age influenced parcelization rates I included initial median population age, as well as the proportion of county population within ten year age classes. In order to determine the effect of death rates among older landowners, I calculated the percentage of county residents over age 65 that passed away. To capture the effects of property taxes I used three different methods of quantifying property tax pressure: the average overall property tax rate, the change in overall tax rates over the study period, and the number of times the property tax rate increased over the study period. To determine comparable values, I used overall property tax rates published by the New York State Comptroller (Calculated by dividing tax levies from all levels of government by the taxable full values of all properties in the county for a total tax rate for every thousand dollars of property value). To quantify the effects of incomes in each county I used median incomes and family income disparity at the beginning of the study period, as well as the percentage change in median individual incomes over the study period. As an additional economic measure I included the average unemployment rate over the study period. To measure distance from employment I used the average commute time of county residents, and to incorporate housing demand I calculated median residence price. Finally, to quantify the influence of municipal planning tools in each county I

calculated the percentage of each county's towns that had adopted comprehensive plans, zoning regulations and zoning regulations by 2008 (NYS Land Use Report, 2008). Cities and villages, which contained few woodland properties, were not included in the calculations of the extent of planning tool use.

Table 2.1 Predictive factor descriptions and data sources.

Category	Variable	Units	Data Source
Population Density	Initial population density (2000)	(Total population/100) /total land area	US Census 2000
	Population density change (2000-2010)	Population change/ total land area	US Census 2000, 2010
Age	Median resident age (2000)	Years	US Census 2000
	Population structure (2000)	% of total population in 10 year age classes	US Census 2000
Death Rate	Death rate for individuals over 65 (2001-2010)	Deaths of individuals 65 or older/total population over age 65	NYS Department of Health, US Census 2000
Property Taxes	Average overall property tax rate (2001-2010)	Overall tax rate per $1000 full value	NYS Office of Real Property, 2001-2010
	Property tax rate increases (2001-2010)	# years with overall tax rate increase	NYS Office of Real Property, 2001-2010
	Overall property tax rate change (2001-2010)	Overall tax rate per $1000 full value	NYS Office of Real Property, 2001, 2010
Income	Median household income (1999)	Thousands of dollars	US Census 2000
	Change in median individual income (2000-2008)	Thousands of dollars	IRS 2000, 2008
	Family income disparity (2000)	Gini score (0 to 1)	Volsho, 2004
Unemploy -ment	Average unemployment rate (2001-2010)	% working age population unemployed	Bureau of Labor Statistics, 2001-2010
Distance	Mean travel time to work (2000)	Minutes	US Census 2000
Housing Demand	Median residence price	Average median residential price (2008-2010)	NYS Office of Real Property, 2008-2010
Municipal Planning	Comprehensive plan use (2008)	% towns per county with comprehensive plans	NYS Land Use Report 2008

Analysis

Initial calculations were performed with Microsoft Office Excel worksheets (.xlsx). Further data analysis was conducted with the statistical programs R version 2.10.1 and SPSS version 19. To identify the best-fitting and most parsimonious linear model, I searched all combinations of independent variables for the best subsets of the variables in predicting a linear regression equation. The best-fitting linear model incorporating the least variables was identified as the model with the lowest Akaike Information Criterion (AIC). Hierarchical partitioning using the algorithm of Chevan and Sutherland (1991) was used to determine the independent contribution of each variable. To test for spatial autocorrelation, I calculated Moran's I and Geary's C statistics, comparing WPR values of each county to its adjacent neighbors using "rook" neighborhood contiguity to identify counties that share a common political boundary.

To examine differences in how land-use classifications changed with property transfer and parcelization I constructed transition matrices by calculating the total number and acreage of properties within each property classification on the prior tax roll that retained the same classification or acquired a new one at the time of transfer. Matrices were constructed for both parcelized woodland properties and woodland properties that remained intact through transfer.

Results

In the thirty-one counties of eastern New York State, 15,639 unique woodland parcelization events occurred between 2001 and 2010 (Table 2.2). These made up 16.12% of the total number of woodland property transfers occurring in the region in

that time period (N = 97,013). Of the original 220,540 woodland properties that existed in 2000, 7.09% underwent parcelization by 2010. The number of woodland parcelization events per year declined over the study period, starting at 2,224 properties in 2001 and declined to 952 in 2010 (Figure 2.2). The proportion of total transfers that involved divided properties dropped from 19.94% in 2001 to 13.73% in 2009 before rising slightly in 2010.

Table 2.2 Total and parcelized woodland property transfers, 2001 to 2010.

	All Counties	Individual County		
	Total	Median	Minimum	Maximum
Original woodland properties (2000)	220,540	7,365	48	16,875
Total number of woodland properties transferred	97,013	3,107	39	8,263
Total acreage of woodland properties transferred	4,194,443	113,083	566	531,703
Percentage of original woodland properties transferred	43.99%	45.67%	34.44%	81.25%
Number of woodland properties parcelized	15,639	428	2	1,713
Acreage of woodland properties parcelized	632,563	11,672	5	108,480
Percentage of original woodland properties parcelized	7.09%	6.82%	1.94%	12.19%

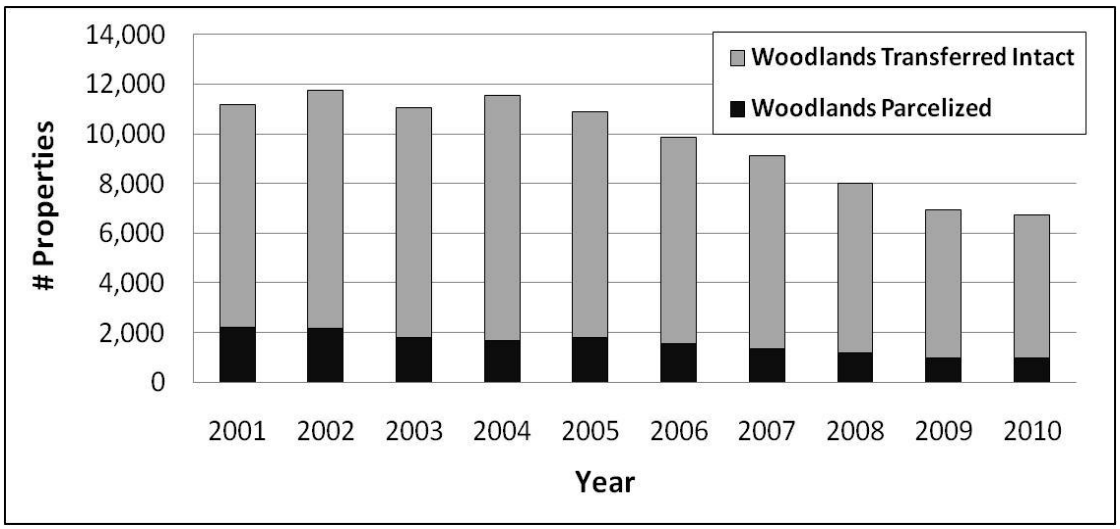

Figure 2.2 Woodland properties transferred and parcelized by year, 2001 to 2010.

The number of woodland parcelization events varied substantially across the thirty-one counties of the study area (Figure 2.3). The total number of woodland parcelization transfers was highest in northern St. Lawrence County (n= 1,713) and lowest in southern Rockland County (n= 2), corresponding to the counties with highest (n=16,875) and lowest (n=48) numbers of original woodland properties respectively. The Woodland Parcelization Rate (the ratio of the number woodland properties divided and transferred over the study period compared to the initial quantity of woodland properties) ranged from 1.94% in Sullivan County to 12.19% in Jefferson County. There appeared to be significant spatial associations of WPR (Figure 2.4), with the lowest rates occurring in the lower Hudson Valley and southern Adirondack counties. This spatial autocorrelation was confirmed by both a positive Moran I statistic (0.227, p= 0.009) and a Geary's C statistic of less than one (0.699, p= 0.007).

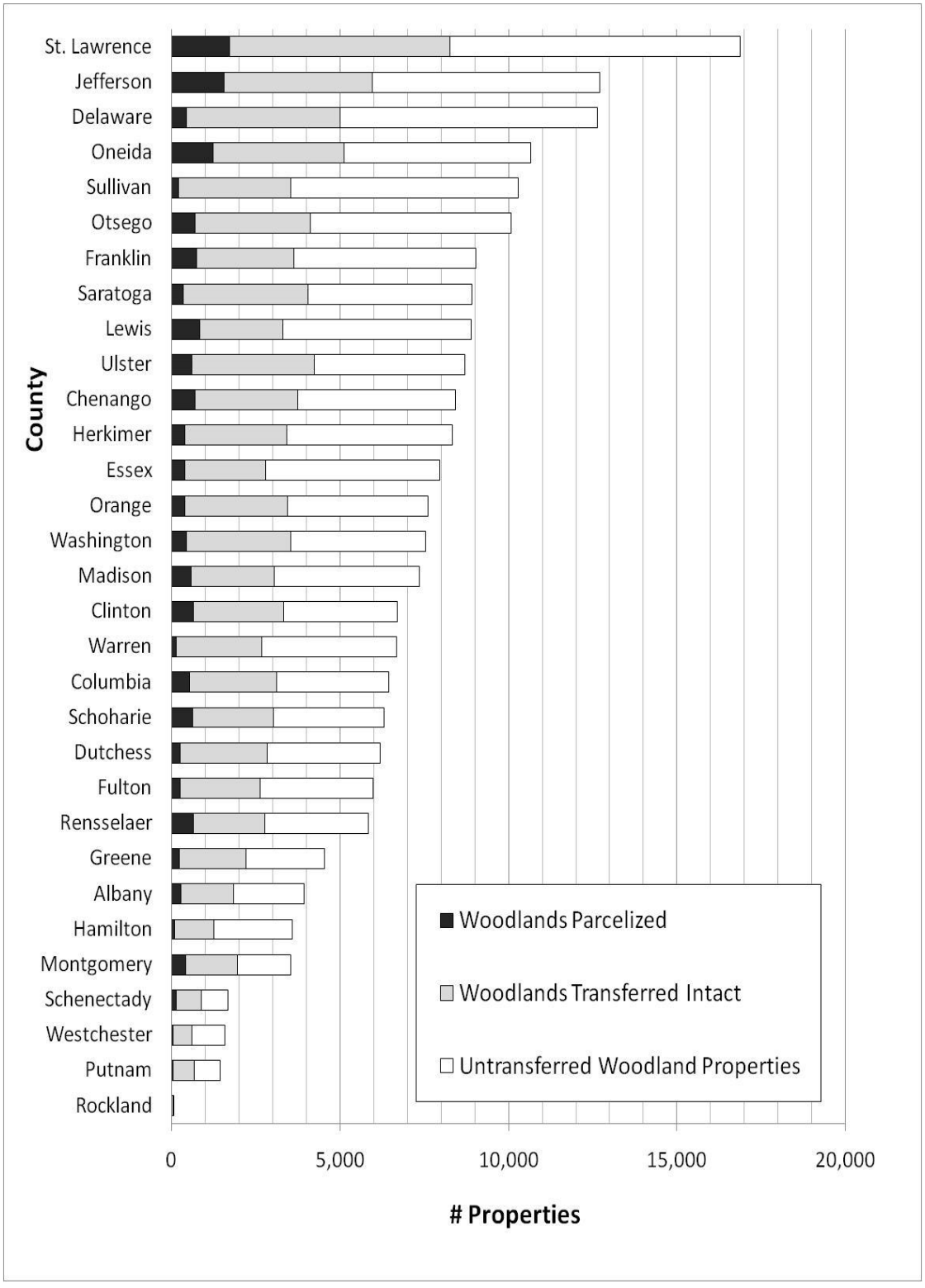

Figure 2.3 Woodland properties transferred and parcelized by county, 2001 to 2010.

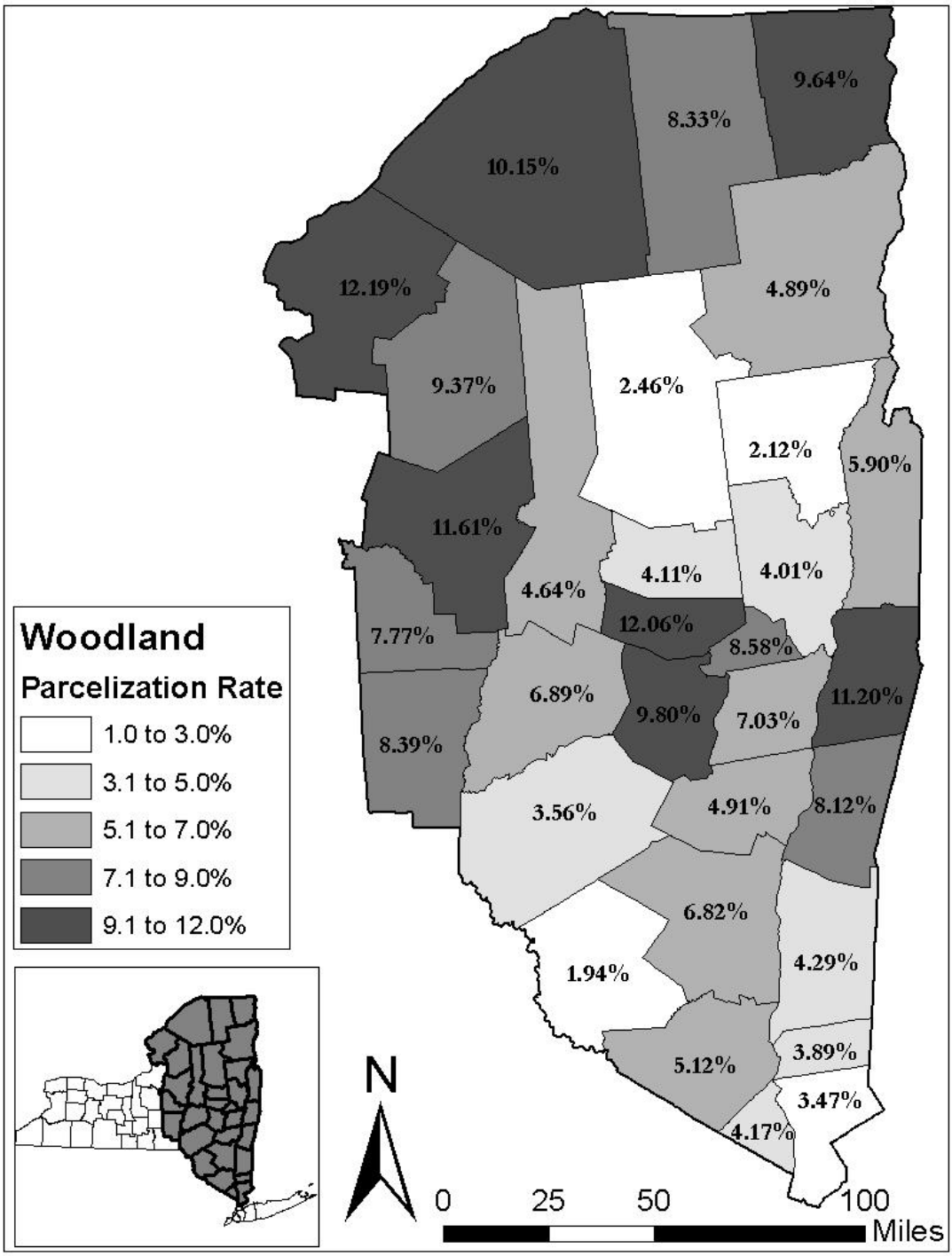

Figure 2.4 Woodland Parcelization Rates (WPR) of eastern New York, 2001 to 2010.

Predicting Parcelization

A seven variable model was found to be the best predictor of WPR, with a higher adjusted R-square value of 0.6519 and lower AIC value of 133.54 than linear regression models using more (8 variable model) or less variables (5 and 6 variable models) (Table 2.3). These seven variables included a mix of initial, average, and change values: the average property tax rate, the initial population density, the percentage of the county population between the ages of 45 and 54, average travel time to work for county residents, average residential price, tax rate change, and the average unemployment rate.

Two factors, overall property tax rates, and residential price had significant positive coefficients in the WPR model, and property tax rate change also had a positive effect. The two tax measures demonstrating the strongest bivariate correlations (Figure 2.5). County population density, the percentage of county population between ages 45 and 54, and average commuting time were significantly and inversely related to WPR. Although the average rate of unemployment had a positive bivariate correlation with WPR, it had a negative and insignificant relationship in the seven variable model. Hierarchical partitioning confirmed that average property tax rate had the greatest independent effect on WPR, followed by the percentage of population between 45 and 54 (Figure 2.6). Insignificant values for the Moran I statistic of (-0.019, p-value=0.446), and Geary's C statistic (0.952, p-value = 0.364), indicated that the residuals from the seven variable model no longer displayed spatial autocorrelation.

Table 2.3 Linear regression models of Woodland Parcelization Rates.

Variable	5-Variable Model	6-Variable Model	(Best Fit) 7-Variable Model	8-Variable Model
Population density (2000)	-0.690*	-0.791**	-0.770**	-0.878**
Population density change (2000-2010)				
Median resident age (2000)				
Population under 25 (2000)				
Population 25-34 (2000)				
Population 35-44 (2000)				
Population 45-54 (2000)	-1.200*	-1.490**	-1.487**	-1.791**
Population 55-64 (2000)				
Population 65-74 (2000)				
Population over 75 (2000)				0.305
Death rate over 65 (2001-2010)				
Average overall property tax rate (2001-2010)	0.453***	0.456***	0.434***	0.431***
Property tax rate increases (2001-2010)				
Overall property tax rate change (2001-2010)			0.176	0.221
Median household income (1999)				
Median individual income change (2000-2008)				
Family income disparity (2000)				
Average unemployment rate (2001-2010)		-0.954	-0.877	-0.825
Mean travel time to work (2000)	-0.436**	-0.489**	-0.466**	-0.443*
Mean residential price (2008-2010)	0.383*	0.409**	0.386*	0.438**
Comprehensive plans (2008)				
Constant	16.64	27.217	28.059	29.069
Adjusted R^2	0.606	0.633	0.652	0.649
F-statistic	10.210	9.611	9.025	7.919
Df	25	24	23	22
AIC	136.006	134.533	133.548	134.467
p-value	< 0.001	< 0.001	< 0.001	< 0.001
N	31	31	31	31

*** Significant at the p<.001 level, ** significant at the p< .01 level, * significant at the p<.05 level.

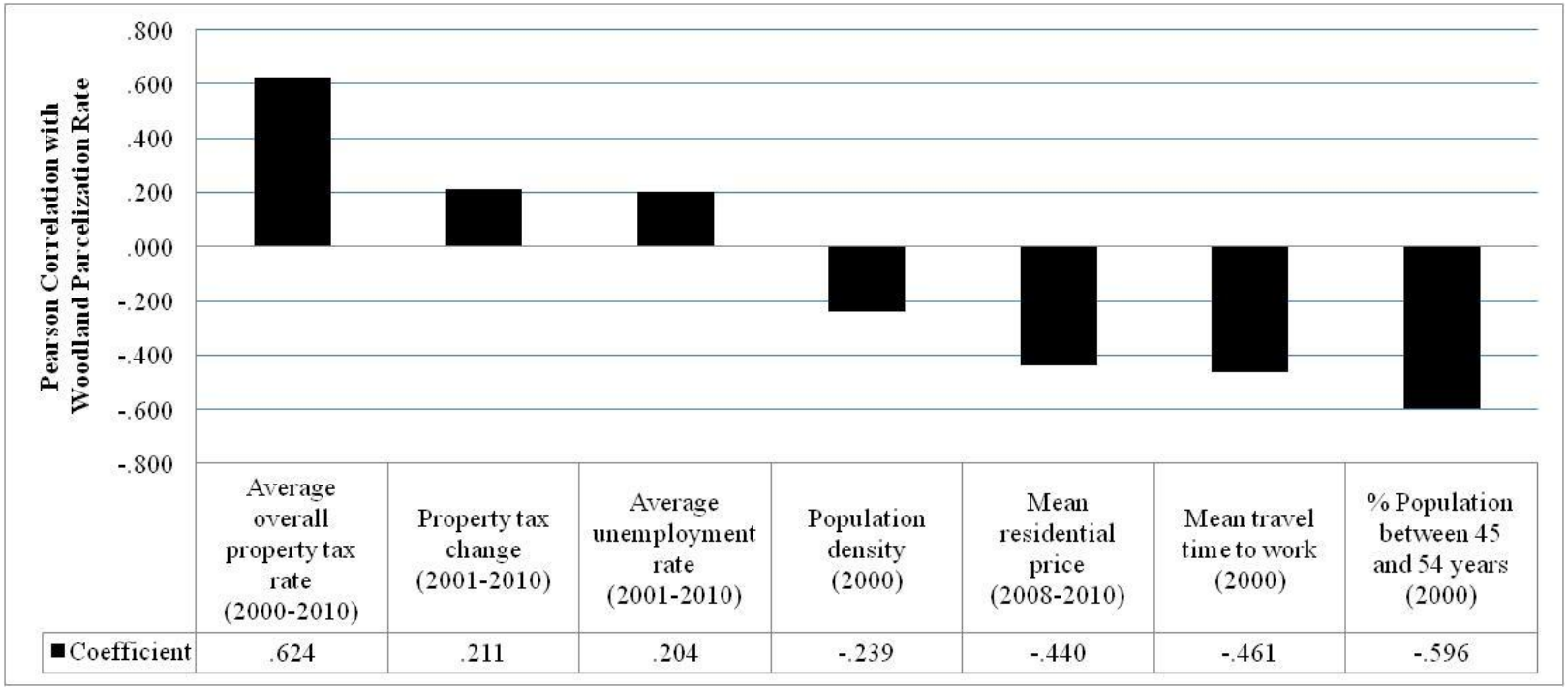

Figure 2.5 Pearson correlations of factors significantly correlated to woodland parcelization rates.

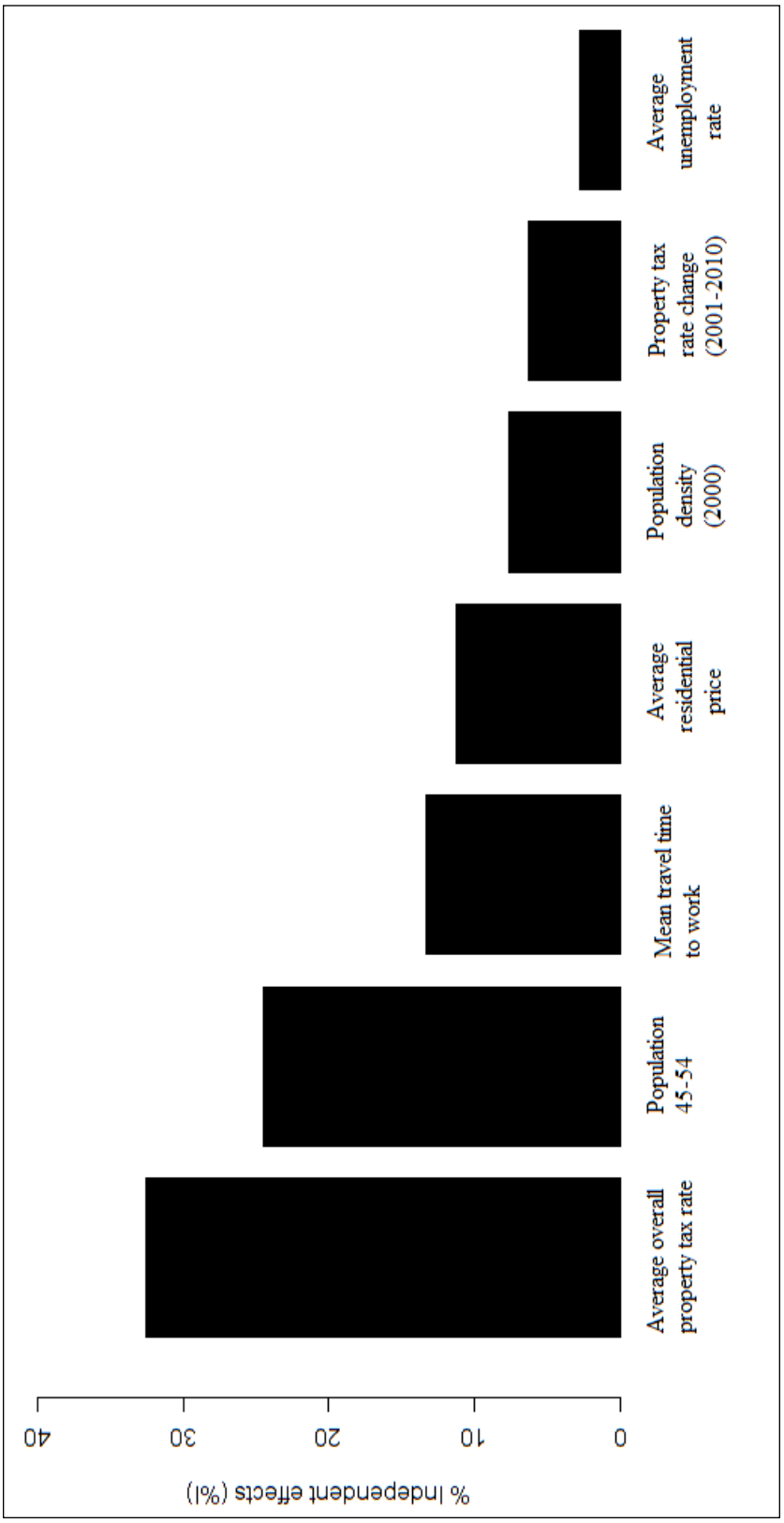

Figure 2.6 Independent effects of best model factors correlated to woodland parcelization transactions.

Land-Use Transitions

Woodland parcelization events and total woodland property transfers had slight differences between property use classes (Table 2.4). The greatest number of woodland properties transferred intact or parcelized occurred on properties originally classified for rural residential use, while private hunting clubs made up the least transferred property type, intact or parcelized. However, agricultural properties were the second most parcelized properties, while rural vacant properties were second most likely to be transferred intact.

Table 2.4 Property use classification of transferred woodlands, 2001 to 2010.

	Woodlands parcelized (*n* = 15,639)		Woodlands transferred intact (*n* = 81,374)	
Original property use classification	#	%	#	%
Private Hunting Club	28	0.18%	217	0.26%
Private Forest	651	4.09%	5,050	6.11%
Rural Vacant	4,015	25.25%	24,855	30.08%
Agriculture	5,114	32.17%	11,514	13.93%
Rural Residential	6,091	38.31%	41,001	49.62%

When woodland properties were transferred intact, about a fifth (20.27%) changed property use classification on the previous tax roll to the classification at the time of sale. Three-quarters of properties originally classified for Private Forest and Agricultural use retained the same classification when transferred intact (Table 2.5). Intact transfers were most likely to transition to the Rural Vacant classification Rural

Residential properties, including Rural Residences with more than 10 acres, Estate Residences, and Seasonal Residences, were more likely than the other property types to shift to other types of residential use. Properties that were already classified as Rural Vacant were extremely unlikely to shift to other property use classifications.

Table 2.5 Land-use matrix of woodland properties transferred intact, 2001 to 2010.

	New Use Classification (Proportion of original class)						
Previous Use Class	Private Forest	Private Hunt Club	Agri-cultural	Rural Res-idential	Rural Vacant	Other Res-idential	Other Use
Private Forest	0.75	0.00	0.00	0.01	0.14	0.01	0.08
Private Hunt Club	0.03	0.68	0.00	0.03	0.15	0.01	0.09
Agricultural	0.00	0.00	0.75	0.02	0.16	0.06	0.01
Rural Residential	0.00	0.00	0.01	0.70	0.07	0.21	0.01
Rural Vacant	0.00	0.00	0.00	0.01	0.93	0.03	0.02

However, when woodland properties were parcelized, there were significant differences in land-use transitions when compared to intact transfers. Over half of all parcelized woodland properties changed property use classification (55.92%). Outside of Rural Vacant properties, less than 40% of properties in any class maintained the same classification they had on the previous tax roll (Table 2.6). Nearly three times as many of the parcelized properties from each class were shifted to a Rural Vacant classification compared to properties that remained intact. Parcelized Rural Vacant properties, in turn, were twice as likely to shift to other residential use classifications. The percentage of properties that became other, smaller types of residential properties, was six times higher for parcelized woodland properties.

Table 2.6 Land-use change matrix of parcelized woodland properties, 2001 to 2010.

Previous Use Class	New Use Classification (Proportion of original class)						
	Private Forest	Private Hunt Club	Agri-cultural	Rural Res-idential	Rural Vacant	Other Res-idential	Other Use
Private Forest	0.36	0.00	0.11	0.02	0.38	0.05	0.08
Private Hunt Club	0.00	0.21	0.07	0.04	0.43	0.14	0.11
Agricultural	0.00	0.00	0.40	0.02	0.42	0.11	0.05
Rural Residential	0.00	0.00	0.04	0.22	0.46	0.23	0.04
Rural Vacant	0.00	0.00	0.00	0.01	0.85	0.06	0.08

Data concerning the recipients of land and the manner in which land was transferred revealed more characteristics about differences in the process for parcelized woodlands. While it was a small percentage of the overall transactions, nearly three times as many parcelized woodlands contained new construction on previously vacant land (Table 2.7). Parcelized woodland properties were slightly less likely to go to purchasers with addresses listed outside of New York State than woodland properties transferred intact. Although more than a quarter of parcelized properties were transferred to relatives, this was a smaller percentage than for woodlands that were transferred intact.

Table 2.7 Ownership and land use changes resulting from ownership transfer.

	Woodlands parcelized (*n* = 15,639)		Woodlands transferred intact (*n* = 81,374)	
Outcome of transfer	Total #	%	Total #	%
New construction on previously vacant land	75	0.48%	147	0.18%
Buyer located in different state	1,403	8.97%	10,725	13.18%
Recipients related by blood or marriage	4,054	25.92%	23,150	28.45%

Discussion

Study results demonstrate that a large portion of eastern New York woodlands have been transferred between owners: nearly 44% of all woodland properties that existed in 2000. Furthermore, over 7 % of all woodland properties were parcelized over the following decade (2000-2010). This is significantly higher than yearly woodland parcelization rate of 0.04% reported in Itasca County, Minnesota from 1999 to 2006 (Mundell et al. 2010). Even within this region of eastern New York, there were significant differences in WPRs between counties, with the highest rates occurring in the northern and western parts of the study area, and lowest in counties of the Adirondack and Lower Hudson Valley regions. The highest rate of woodland parcelization in Oneida County (11.61% of original properties) supports the results of Germain et al. (2006) and reveals that the county continues to have higher amounts of parcelization than much of the surrounding region. The heterogeneity of parcelization rates across the landscape indicates that there are important differences between

geographic regions that might be overlooked when measuring parcelization at a greater scale or just examining average parcel size.

The values linearly correlated with county WPR indicate that economic factors may be most important in driving the phenomenon of private forestland parcelization. The strongest positive predictor was the overall property tax rate, followed by increases in property tax rates over the study period. Additionally, as average residential price increased and commuting times decreased, woodland parcelization rates went up, indicating that real estate market demand and distance to areas of employment play a strong role in driving parcelization. However, unemployment rates exerted only slight influence on WPR, while income, income change, and income disparity had little predictive ability.

Population factors had mixed effects on WPR. While initial population density showed significant negative effects on parcelization rates, changes in density had no significant effects. This indicates that areas with lower populations are experiencing higher rates of forest parcelization, but overall changes in population do not appear to be driving immediate parcelization as was shown in previous research (e.g. Alig and Plantinga, 2004; Block-Torgerson et al., 2010).

Age characteristics of county populations also had varied effects on parcelization rates. While median age did not have a significant effect on WPR, an increasing proportion of individuals between the ages of 45 and 54 appeared to have a negative impact on woodland parcelization rates. This indicates that woodland owners in this age group may be less likely to parcelize their land, perhaps holding on to

properties in order to sell them in their entirety closer to retirement age as demonstrated by Myers and Rhu (2007). It may also indicate that people in this cohort are exerting less demand for pieces of woodland properties. In addition, death rates of older residents did not affect WPR, although increasing proportions of residents over the age of 75 did appear to have a slight positive impact.

The land-use transition results provide insights into the immediate changes occurring with woodland parcelization. The finding that parcelization changed official property use classifications 36% more often than sales where properties were transferred in their entirety provides very strong evidence that parcelization precedes land-use change and development. Furthermore, the greater likelihood of parcelized properties to be changed to a transitory "Rural Vacant" classification indicates that owners are splitting and transferring undeveloped portions of their property. A greater percentage of agricultural and private hunt club properties are being reclassified for residential use when they undergo parcelization, either indicating that these owners are dividing and selling portions of their land that already contain residential structures or may signal the intent of new landowners to develop the properties. Surprisingly, parcelized properties originally classified as wild and private forest were no more likely to be reclassified for residential use than properties transferred in their entirety.

Conclusion

The method of quantifying forest parcelization by the number of transaction events, rather than measures of property size change alone provides an alternative framework that will help advance the understanding of parcelization and associated issues. Transaction data of this type are often accurate and commonly maintained by state and county governments, providing a method of comparing ownership turnover comparable over broad geographic areas. This method provides an important means for triangulation with studies using spatially explicit records, and more extensive record-keeping and availability could facilitate studies at multiple scales. Future research of this type could explore regional or municipal differences in land-use transitions and examine specific changes in property classes. Furthermore, by identifying specific parcelization events, researchers can use these data as a tool to target future studies of individual landowner behavior and environmental changes.

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CHAPTER THREE: UNDERSTANDING THE DECISION-MAKING PROCESS OF PARCELIZING FOREST OWNERS

Abstract

Private forestland parcelization has resulted in decreasing forest parcel sizes across the United States with a variety of economic, social, and environmental effects. The objectives of this study were to (i) identify landowners known to have parcelized their land, (ii) identify distinct types of parcelizers with regard to the pressures, and (iii) compare these types of parcelizers in terms of their motivations for owning the property, encouragement from other individuals, actions associated with ownership transfer, and characteristics of the property and owner. A K-means cluster analysis of responses to a mail questionnaire distributed to known woodland parcelizers in eastern New York revealed parcelizers responding to three distinct types of or pressure. *Sellers Under Pressure* and *Opportunist Sellers* were reacting to primarily economic factors, but *Opportunist Sellers* were strongly influenced by receiving an offer for their land. *Legacy Planners* were not concerned with economic factors but were motivated to pass land on to their heirs or other family members. The types of pressures and opportunities that landowners were responding to resulted in differences in the physical changes to properties, choice of land recipients, and objectives landowners achieved by parcelizing their woodland.

Introduction

The ownership of rural forestland is changing dramatically across the United States, due in large part to parcelization, the division and transfer of land ownership into smaller properties with more owners (Mehmood and Zhang, 2001). These patterns are expected to continue nationally, as research has shown that one in every five acres of private woodland is owned by someone who plans to sell or transfer some or all of their forest land in the next five years (Butler, 2008). In New York State, where individuals privately own four-fifths of all rural land (Kay and Bills, 2007), a similar pattern of parcelization has been documented in many areas. The average sizes of forest properties have dropped at varying rates in several New York counties and shifted to a greater number of properties in smaller size classes (LaPierre and Germain, 2005; Germain et al., 2006). Decreases in average forest property size between 1984 and 2000 were documented in Greene, Schoharie, Sullivan, and Ulster counties of the Catskills (LaPierre and Germain, 2005). From 1975 to 2000, the average size of private non-industrial forest properties in central New York's Oneida County dropped significantly, from 36 acres to 24 acres, despite an overall decline in population size (Germain et al., 2006). Furthermore, in New York State, over 20% of total farmland acreage is forested and the average size of farm properties dropped from 2002 to 2007 (U.S. Agricultural Census, 2007). Parcelization often occurs when landowners sell their land or pass it on to their heirs, so these patterns of decreasing forest property size are expected to continue as more than 10% of rural New York landowners expect to sell their properties and over 15% of forest owners expect to sell or pass their land on to heirs in the next five to ten years (Kay and Bills, 2007; Connelly et al., 2007).

Land management and ownership transfer activities are often analyzed and predicted within an economic framework that treats landowners as rational actors who respond primarily to land values and the monetary costs of ownership (e.g. Plantinga and Miller, 2001; Alig and Plantinga, 2004). However, forest ownership and management have deep personal, familial, and cultural roots and contribute meaningfully to the creation of owner identity (Bliss and Martin, 1989) making landowner decisions to transfer ownership of their land a complex action by landowners. Little research has been conducted to understand what influences landowner decisions to sell all or part of their land. Determining the processes of individual decision-making and the many factors that affect continued land ownership is critical to understanding why the parcelization of forest properties is undertaken. This study was undertaken to understand the decision-making process of private forest landowners relative to parcelizing their land.

Parcelizing Landowners Literature

Little research has examined rural land sellers and even less has dealt specifically with owners who transferred just a portion of their property. Studies that have inspected selling landowners have focused primarily on urban-fringe areas facing development pressure. This research has demonstrated that landowners are not uniform in their reasons for selling their land. Four types of land sellers were described by Pyle (1985) in the area around Rochester, Minnesota: (i) *farmers*, who often owned their land for long periods of time and sold because of retirement, advanced age, or health

reasons; (ii) *speculators*, who were younger and more educated, often held their land for less than five years, and sold it primarily for financial gain; (iii) *crisis-managers*, who often sold their land in response to monetary needs not associated with the property as a way to overcome debt or financial difficulties; and (*iv*) *individualists*, who sold land for personal reasons not related to finances or retirement, such as a divorce, the need to move elsewhere, or to provide a family member with a residential plot, and often did so after being approached by a buyer. Pyle (1985) concluded that the differences in decision-making by different types of landowners led to development patterns that were not predicted with landuse models based on distance and monetary land values.

More recent studies have examined the actions and characteristics of landowners and sellers in other metropolitan fringe areas. Both Hrabchek (2005) and Zhu and Bostic (2009) examined the responses of suburban landowners around four metropolitan areas, including landowners who had recently sold land. They found that the majority of metropolitan fringe landowners who had sold or given away land had done so more than once previously and often did so in order to assist a friend, neighbor, or family member (Hrabchak, 2005). Landowners often cited economic demands, public policy controls on landuse, such as zoning and landuse restrictions, and access to public infrastructure such as roads and sewers as important in influencing their property decisions (Zhu and Bostic, 2009).

Only two extant studies in the published literature have explicitly focused on landowners who parcelized their forestland. In four Catskill counties of eastern New York, Stone and Tyrell (2008) compared owners of intact properties and owners of

properties that had been reduced in size during the previous eight years (1996-2004). They found that parcelizing landowners were older, had lower incomes, and were more likely to be retired. While parcelizers gave many of the same reasons for owning their forestland as non-parcelizers, they were less concerned about environmental protection, forest health, or providing land for their family. For owners who had parcelized, property taxes far outweighed all other factors in their decision, but they were not very concerned about estate taxes. Other reasons parcelizing landowners gave included financial strains, increasing age or physical limitations, and the desire to give lots to other family members. Stone and Tyrell (2008) concluded that parcelization decisions were influenced by personal circumstances and economic hardship, and that both parcelizing landowners and those who anticipated parcelizing in the future felt financial pressure to do so.

In Pennsylvania, Gruver (2010) conducted detailed interviews with parcelizing forest owners. He found two major themes specific to landowner decision to subdivide and sell: (i) the perception of no alternative; and (ii) an outside impetus related to income or family relationships. Landowners often made the decision to parcelize as a way to stabilize or regulate a relationship or a life event, such as divorce or income loss, or in order to live closer to their family or their place of employment. They usually involved other parties in their decision, but were often less emotionally connected to their land than were owners who had not parcelized their land. Gruver (2010) concluded that an individuals' decision to divide and sell forestland was based primarily on the combination of a utilitarian relationship with the land, a lack of alternatives, and the influence of others.

The previously described research provides detailed insights into the parcelization behavior of landowners, especially the external pressures they perceived as the impetus of their decisions. Research concerning forest management behavior has demonstrated differences due to the landowner's original acquisition method (Majumdar et al., 2009), the length of their land tenure (Kaiser et al., 1968), the parcel size (Kaiser et al., 1968; Hrabchek, 2005) and the distance from the property to the owner's place of residence (Rickenbach and Kittredge, 2009) and these findings may provide insights into factors that are also important in influencing landowner decisions to parcelize. The attitudes of landowners towards selling their land are likely influenced by the reasons they originally acquired the land and their motivations for continued ownership. Like many family forest owners in the northern part of the U.S., most New York woodland owners own their land to enjoy its beauty or scenery, for privacy, and to protect nature and biological diversity (Butler et al., 2011; Connelly et al., 2007). One-third of New York farm owners hold their land primarily because it is the site of a primary or second home, while using the land for farming is the next most common reason for ownership (Kay and Bills, 2007). Furthermore, rural landowners often have multiple reasons at any given time for owning their properties, and these interests change over time (Hrabchak, 2005). If a landowner reaches a point in their life in which these interests change and parts of their property are no longer ideal for their needs, they may decide to divide and transfer the land.

Forest owner attitudes towards subdividing their land may also be strongly shaped by their Sense of Place for the property. An individual's Sense of Place for a particular spatial setting is composed of three components: (i) *Place Identity*, their

beliefs that they are invested in the setting; (ii) *Place Attachment*, their affective or emotional connection to the setting; and (iii) *Place Dependence*, their perceptions of the behavioral advantage of the setting relative to other locations (Jorgensen and Stedman 2001). Each of these components has been shown to have independent effects on landowner willingness to engage in behaviors that maintain or enhance the valued attributes of a setting (Stedman, 2002). Landowners who choose to parcelize their land may have a lower Sense of Place regarding the original property than those who maintain ownership of their entire property, but may demonstrate a stronger connection than those who sell their land entirely.

The physical characteristics of a property may influence demand for the land as well as the owner's relationship with it. Natural features of an individual's property and nearby areas, play an important role in forming the basis of landowners' symbolic meanings for a place, which, in turn, affect their sense of place (Stedman, 2003), as well as increasing their community attachment (Matarrita-Cascante et al., 2010). However, amenity-rich locations also attract individuals searching for places to recreate, live, or retire, increasing market demand for smaller parcels of land (Matarrita-Cascante et al., 2006). These physical characteristics may include scenic views (Harrison 2005) or proximity to other features, including roads (King and Butler, 2005), expanding metropolitan areas (Plantinga and Miller, 2001), or bodies of water and protected natural areas (Mundell et al., 2010). As a result, physical features of forest properties and neighboring areas can drive both owners' attachment to an area and real estate demand for those same areas, interacting to influence the amount and types of land that landowners choose to transfer and retain.

Social pressures on landowners to sell their land may come from a variety of sources. Parcelizing forest owners in Pennsylvania involved their spouses, heirs, and other family members in their planning decisions (Gruver, 2010). Other land management intentions of forest owners, such as those towards timber harvesting, are affected by the support of family, friends, neighbors, government agencies, and private conservation groups (Young and Reichenbach, 1987) and landowners often trust their neighbors and turn to them as land management examples (Schaaf et al., 2004; Rickenbach and Kittredge, 2009). More than a third of New York landowners who planned to sell their idle farmland had talked about it to two or more sources, especially realtors, neighbors, or lawyers, while less than a quarter had not talked to anyone (Kay and Bills, 2007). However, many community members in areas facing increasing parcelization expect negative economic, social, and ecological outcomes to occur (Rickenbach and Gobster, 2003) and may not support the decisions of other landowners to divide and sell their land.

Forest owner decisions to parcelize their land may be influenced by their gender, ethnic identity, or socioeconomic status, each of which has been used to understand and predict other types of landowner behavior. Owners of parcelized land are also older and more likely to be retired than are owners whose land was not parcelized (Stone and Tyrell, 2008). Landowner education and wealth levels may contribute significantly to their decisions to sell land. Landowners with greater income and wealth demand significantly higher prices for their forest land (Aronsson and Carlén, 2000) and are less likely to have recently parcelized their land (Stone and Tyrell, 2008). This may be because owners with high educational attainment and

higher income levels are less likely to need to undertake activities that provide monetary benefits (Koontz, 2001).

Finally, landowner decisions to parcelize may also signal a lack of knowledge about alternatives (Gruver, 2010) or a perception that their alternatives have been exhausted. Alternatives to selling land may include finding new ways to produce income from the property, such as harvesting timber, leasing the land, enrolling in a government conservation program, or implementing conservation easements. However, while economic factors were found to be critical in New York landowners' decisions to parcelize, most were unaware of the availability of financial assistance for forest management. Those for whom finances were most important were the least informed about cost-share assistance (Stone and Tyrell, 2008).

Research Questions

The goal of this research was to broaden the investigation of individual decision-making behavior specific to parcelizing landowners. To do so I pursued three main research questions:

1. Do meaningful types of parcelizing landowners exist based on the factors influencing their decisions?
2. Are these types of parcelizers identifiable by initial demographic or ownership motivation characteristics?
3. Do these groups differ in their behaviors or interactions with others during the process of parcelization?
4. How do landowners perceive their decision to parcelize after carrying it out?

By examining the influencing factors of known forest parcelizers, as well as their interactions and associated actions during and after the ownership transfer process, this investigation will expand the understanding of parcelizing landowners in New York State and the implications of their actions.

Study Area

The study was conducted in three New York counties located contiguously along the eastern side of the Hudson River: Rensselaer, Columbia, and Dutchess counties (Figure 3.1). All three study counties are predicted to see dramatic increases in the amount of land classified as urban by 2050 (Nowak and Walton, 2005), with the highest percentage of urbanized land occurring in Dutchess County (estimated to reach 40-60% of the total county area), followed by Rensselaer (20-40%), and Columbia (10-20%). As a result, the Middle Hudson watershed was recently identified as one of the nation's watersheds with the highest number of private forest acres projected to be affected by increased housing density in the next two decades (Stein et al., 2005).

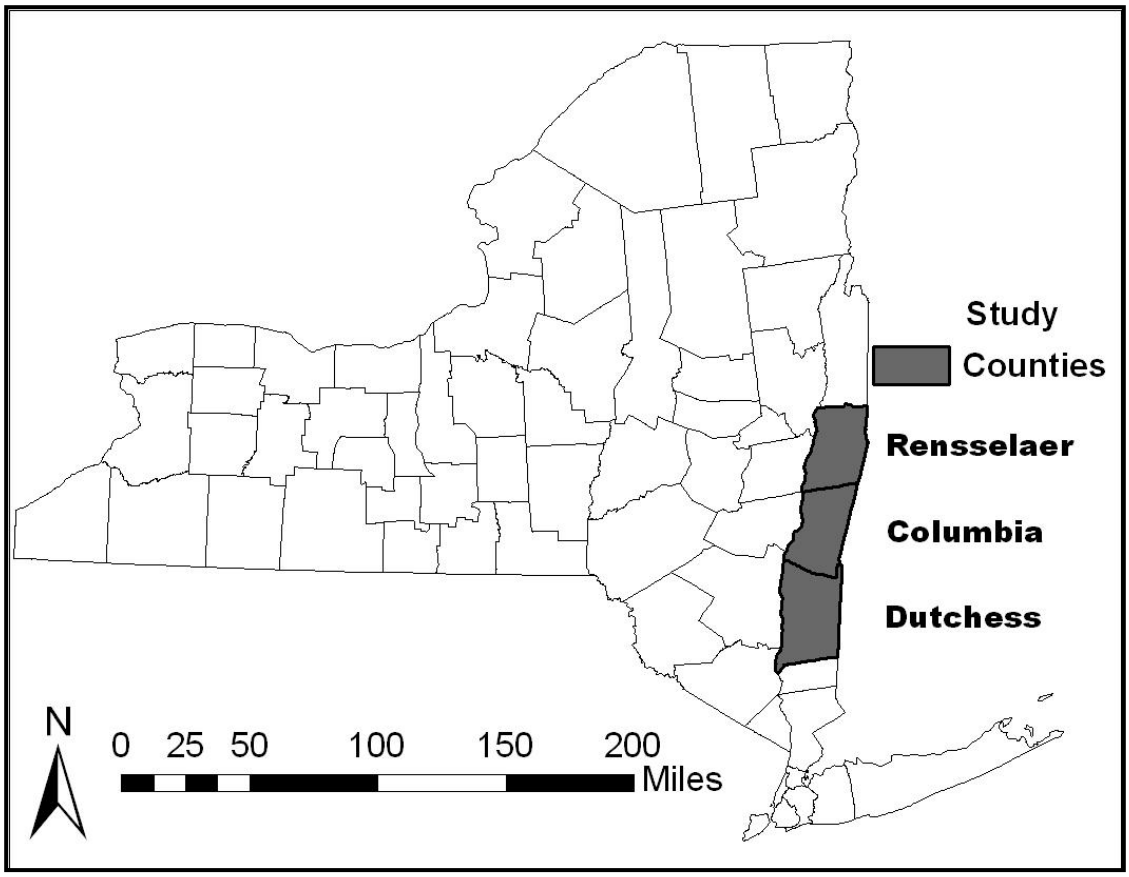

Figure 3.1 Study Area of Rensselaer, Columbia, and Dutchess Counties, New York

Methods

Questionnaire Design

In order to ground the questions contained in the survey to local experiences, I conducted preliminary interviews with a small group of landowners that sold or placed a conservation easement on their land in the last five years (*n*= 6). Respondents were solicited through an email request to members of the New York Forest Owner's Association in the study area. Ideas and themes from these interviews informed the survey questions (Appendix II).

An initial survey question determined whether the survey recipient had transferred ownership of property in Rensselaer, Columbia, or Dutchess County, New York during the last ten years. Qualifying respondents were then asked about characteristics of their original land ownership, referring to the original piece of land in its entirety, before ownership of it was transferred. This was followed with questions about the landowner's most recent experience transferring land. This included questions about how specific groups of people, economic factors, and land use factors influenced their decision to transfer ownership of the property. Next, recipients were asked whether transferring ownership of the property allowed them to achieve specific outcomes, and were also asked to rate their current level of satisfaction with the decision to transfer ownership. The survey instrument concluded with background demographic questions about the respondent's gender, age, marital status, number of children, employment status, and income.

Survey Implementation

The study targeted landowners identified as having sold a portion of their land in Rensselaer, Columbia, and Dutchess counties in the period from 2001 to 2010. The landowners were identified from county sales records available from the New York State Office of Real Property. These records include a variable for property classification on the property tax roll immediately prior to the sale (Column AH, "prop_class_last_roll"). Using this classification I selected privately owned properties that were most likely to include wooded land, including properties owned primarily for forest use and large residential properties. Furthermore, over 65% of New York farms

contain woodland (U.S. Agricultural Census, 2007) and a large proportion of woodland parcelization is likely a secondary effect of a decline in agriculture and family farms (Stone and Tyrell, 2008). I therefore selected all ownership transfers of parcels previously classified as agricultural properties, rural residences with more than ten acres of property, estates, seasonal residences, rural vacant properties, and private wild and forest lands (see Appendix I). Original property size was not taken into consideration, as the sales records only report the acreage of property transferred. I did not consider transactions of properties previously classified for other residential or vacant classifications, or those classified for commercial, industrial, or public use.

The sample of private parcelized ownership transfers was further limited to sales of properties that were part of a previously existing parcel (ORPS SalesWeb records, Column AW, "part_parcel_flag"=1). The name of each seller in the remaining group (Columns K and L, "seller_last_name" and "seller_first_name") was then compared with the name of landowners (Column Y, "OWNER1") in the most recent available county tax rolls (2009) for the county in which the sale took place. Current owners and previous sellers with identically matching names and complete addresses were selected to yield a sample of 707 landowners (372 in Rensselaer, 227 in Columbia, and 108 in Dutchess).

Following the methods of Dillman (2009) I implemented a modified 4-mailing survey sequence in the Spring of 2011, including an initial mailing with cover letter and questionnaire, a reminder letter to non-respondents, followed by two final rounds of letters and questionnaires to remaining non-respondents. Mailings were sent at one week intervals and responses were accepted until a month after the last mailing.

Of the 707 surveys that were sent to landowners who parcelized their properties between 2001 and 2010, a total of 228 surveys were returned, producing a response rate of 34.9% after adjusting for undeliverable surveys. Survey respondents were proportional to the distribution of surveys sent by county: 121 were returned from Rensselaer County, 70 were from Columbia County and 37 were from Dutchess County. However, only 159 of the 228 survey respondents (67.5%) indicated that they had actually transferred land over the 10 year time period. Of these survey respondents, 23 exhibited high levels of item non-response and were excluded from analysis, leaving data from the remaining 136 complete survey respondents.

Response Bias

A telephone survey to 50 non-respondents was conducted by the Survey Research Institute of Cornell University to identify possible bias in key attributes between the parties that responded to the mail survey and those who failed to do so. The non-response bias analysis revealed that the population of survey respondents differed somewhat (3 of 8 variables) from non-respondents contacted by phone. Respondents and non-respondents were significantly different in terms of their current age, as well as their age and level of employment at the time of property transfer. At the time of property transfer non-respondents were significantly younger (mean = 57 years) than respondents (mean = 62 years), and were less likely to be retired (19% vs. 40%) at the time of transfer. However, there were no significant differences between respondents and non-respondents in terms of their gender, marital status, number of children, current income, or level of education.

Cluster Analysis

In order to identify meaningful groups of landowners based on their parcelization decisions, a cluster analysis was performed. Cluster analysis is used to group distinct cases based on similarity of responses and has often been used to identify distinct groups of forest land owners (Ross-Davis and Broussard 2007). Survey responses to fourteen questions about the perceived influences of economic and land use pressures (Questions 22 and 24 from the mail survey, Appendix C) were used to develop landowner typologies. Each respondent quantified the importance of each factor on their decision to parcelize using an ordinal scale from 1 to 4 (1= "Not at All Important", 2 = "Slightly Important", 3= "Moderately Important", and 4= "Very Important"). In order to retain all 136 cases, missing data was imputed using the mean.

A K-means cluster analysis was used to divide the responses into three distinct groups. Pearson's chi-square tests were used to compare the clusters with respect to landowner characteristics, alternatives to parcelizing, transferred land characteristics, and goals achieved from parcelizing. Landowner types were compared with regard to property characteristics, ownership motivations, sense of place items, economic and land use pressure, modifications to) via analysis of variance (ANOVA) followed by Scheffe's post-hoc tests. All analyses were conducted using SPSS version 19.

Results

Types of Parcelizing Landowners

The cluster analysis model placed produced three distinct groupings of parcelizing forest owners based on the importance they report for factors influencing their decisions to parcelize their property: *Legacy Planners*, *Opportunist Sellers*, and *Sellers Under Pressure* (Table 3.1). The largest groups were the *Opportunist Sellers* (n=52, 38%) and *Legacy Planners* (n=47, 35%), while 27% (n=37) of respondents were assigned to the *Sellers Under Pressure* cluster.

For members of the *Opportunist Sellers* and *Sellers Under Pressure* clusters, economic factors, such as high property taxes and recent property tax increases were highly important (Table 3.1). The primary distinguishing factor between the groups was having received an offer for the land, which *Opportunist Sellers* were much more likely to have experienced and rated as highly important to their parcelization decision. In contrast, *Legacy Planners* were significantly less motivated by economic factors and also ascribed little importance to having received an offer for their land. They were, however, much more likely to place high importance on the desire of family members to use the land and their own plans to transfer land to heirs as major influences in their decisions to parcelize. All three groups reported low importance for divorce settlements, unexpected major expenses, and pressure from nearby development as influencing their decision, although a small number of respondents in each group listed these as very important factors in their decisions.

Table 3.1 Comparison of landowner types with regard to importance of factors influencing parcelization.

Influencing Factors	Overall (*n*=136)	Opportunist Sellers (*n*= 52)	Sellers Under Pressure (*n*= 37)	Legacy Planners (*n*= 47)
High property taxes**	2.62	**3.35** [a]	**3.51** [a]	**1.21** [b]
Recent increases in property taxes**	2.46	**3.12** [a]	**3.16** [a]	**1.04** [b]
Receiving an offer to buy land**	2.22	**3.56** [a]	**1.05** [b]	**1.36** [b]
High monetary value of land**	2.08	**2.65** [a]	**2.24** [a]	**1.30** [b]
The way the new owner intended to use the land**	2.03	**2.31** [a]	**1.92**	**1.36** [b]
Desire of family members to use the land**	1.90	**1.37** [b]	**1.84**	**2.15** [a]
Local land use zoning**	1.68	**2.00** [a]	**1.68**	**1.00**
Planning a land transfer to heirs**	1.64	**1.17** [b]	**1.54**	**2.09** [a]
Estate tax planning	1.55	1.31	1.59	1.57
Little time to use the property**	1.48	**1.67** [a]	**1.19** [b]	**1.28**
Heirs had little interest in the property*	1.47	**1.62**	**1.24**	**1.28**
Changes in their physical ability to use land	1.44	1.37	1.41	1.36
Loss of all or a portion of income	1.43	1.56	1.38	1.17
Job retirement	1.43	1.46	1.51	1.19
Financial productivity of the land**	1.39	**1.62** [a]	**1.32**	**1.09** [b]
Had the opportunity to buy other land	1.37	1.46	1.32	1.13
A family death or a medical emergency*	1.33	**1.10**	**1.38**	**1.45**
The need to move to a different place**	1.29	**1.54** [a]	**1.14** [b]	**1.00** [b]
Pressure from nearby development**	1.25	**1.37** [a]	**1.24**	**1.00** [b]
An unexpected major expense	1.17	1.17	1.16	1.13
A divorce settlement	1.13	1.06	1.24	1.06

Mean values are reported where 1 = Not at All Important and 4 = Very Important
ANOVA: Statistically significant differences between clusters are bold (* indicates $p < 0.10$ and ** indicates $p < 0.05$)
Scheffe post-hoc test: Letters represent significant mean differences ($p < 0.05$) between clusters where a > b

Initial Characteristics

Demographically, the three groups were similar to each other Most respondents were male (79%) and had children (86%), although a larger proportion of *Legacy Planners* were female (Table 3.2). While the average number of children did not vary between groups, *Legacy Planners* were significantly more likely to have children. Across all groups, the mean age of landowners at the time of transfer was 62 and ranged from ages 39 to 99. A large proportion of each group was retired, and not surprisingly due to their higher average age, *Legacy Planners* were more likely to be retired. There were also indications that differences in marital status and family dynamics may play a role in parcelization decisions for some individuals: *Sellers Under Pressure* were significantly less likely than the other groups to be married at the time of transfer, and a higher proportion of that group was single or divorced, while there were more widows among *Legacy Planners* (22%) than in the *Opportunist Sellers* (4%) and *Sellers Under Pressure* (17%) groups.

Table 3.2 Comparison of landowner types with regard to respondent characteristics.

Characteristic	Overall (*n*=136)	Opportunist Sellers (*n*= 52)	Sellers Under Pressure (*n*= 37)	Legacy Planners (*n*= 47)
Owner gender (Male)	78.5%	84.6%	80.0%	69.8%
Have children**	85.7%	**76.9%**	**86.1%**	**95.6%**
Mean # children**	2.96	**2.48** [b]	**3.19**	**3.26** [a]
Owner age at transfer	62.31	60.02	62.85	64.82
Employment status during transfer:				
Employed	58.9%	70.0%	58.8%	46.7%
Retired	40.3%	30.0%	41.2%	51.1%
Marital Status:				
Married/living w/Partner	73.7%	**82.7%**	**55.6%**	**77.8%**
Widowed	13.5%	**3.8%**	**16.7%**	**22.2%**
Single	6.8%	**7.7%**	**13.9%**	**0.0%**
Divorced/Separated	6.0%	**5.8%**	**13.9%**	**0.0%**

Statistically significant ANOVA or Chi-Square differences between clusters are bold (* indicates $p < 0.10$ and ** indicates $p < 0.05$)
Scheffe post-hoc test: Letters represent significant mean differences ($p < 0.05$) between clusters where a > b

There were few differences among the groups with regard to ownership and use characteristics of their original property. Nearly half of all respondents (44.9%) indicated that their property had been owned by a previous generation of their family, and 41.2% indicated that they had initially intended to sell all or a portion of the property when it was first acquired. A majority (58.2%) of respondents spent time daily on the property and nearly all (86.6%) owned the property individually or in conjunction with immediate family. Although almost half earned some form of income from their original property (47.8%), less than a quarter (22.1%) had attended an educational program about their land, and less than a tenth (9.9%) had a written forest management plan.

Similarly, there were few differences among the clusters in terms of their motivations for owning the original property that was later parcelized. The highest mean land ownership motivations for nearly all respondents were for non-utilitarian reasons: for enjoying beauty and scenery, for privacy, enjoying it with their family, and for protecting nature or wildlife (Table 3.3). For all three groups, growing up on the property, selling forest products, using it for a secondary residence or as a rental property were all ranked less than slightly important. However, *Sellers Under Pressure* were significantly more interested in the land for their primary residence, while *Legacy Planners* were significantly more motivated to own the land to pass it on to their heirs and *Opportunist Sellers* were significantly more concerned for the land as an investment. However, overall there were few differences in the major motivations for landownership by parcelizing landowner groups.

Table 3.3 Comparison of landowner types with regard to ownership motivations.

Motivation	Overall (*n*=136)	Opportunist Sellers (*n*= 52)	Sellers Under Pressure (*n*= 37)	Legacy Planners (*n*= 47)
To enjoy beauty/scenery	3.21	3.04	3.43	3.20
For privacy	3.08	3.04	3.34	2.89
To enjoy with family	3.00	2.92	3.12	2.98
To protect nature/wildlife	2.98	2.88	3.11	2.98
For primary residence**	2.73	**2.49** [b]	**3.23** [a]	**2.60** [b]
For recreation	2.63	2.72	2.45	2.64
To pass on to heirs**	2.56	**2.14** [b]	**2.50**	**3.07** [a]
For investment**	2.31	**2.65** [a]	**2.33**	**1.91** [b]
For hunting/fishing	2.25	2.04	2.28	2.45
To live close to family	2.17	2.18	1.84	2.41
For commercial farming	2.13	2.13	2.13	2.13
To use forest products	2.09	1.98	2.21	2.11
Because they grew up there	1.94	2.02	1.94	1.84
To sell forest products	1.63	1.71	1.75	1.45
For secondary residence	1.41	1.55	1.10	1.47
As a rental property	1.25	1.33	1.27	1.14

Mean values are reported where 1 = Not at All Important and 4 = Very Important
ANOVA: Statistically significant differences between clusters are bold (* indicates $p < 0.10$ and ** indicates $p < 0.05$)
Scheffe post-hoc test: Letters represent significant mean differences ($p < 0.05$) between clusters where a > b

Furthermore, respondent groups reported only slight differences in their sense of place for the original properties and these attitudes were only slightly positive overall (Table 3.4). The strongest agreement by all groups was with the statement that the original property was their favorite place to be (an indication of place attachment). Parcelizing landowner clusters did have significant differences in feelings of happiness on the property, with *Sellers Under Pressure* reporting significantly higher levels of agreement with that sentiment. Measures of place dependence ("It was the best place to

do the things I enjoyed", "For the things I enjoyed most, no other place could compare") for the original property were two of the three least supported concepts by all respondents, although *Sellers Under Pressure* again showed greater levels of support for place dependence.

Table 3.4 Comparison of landowner types with regard to sense of place for property, before and after sale

Sense of Place Item for Original Property:	Overall (*n*=136)	Opportunist Sellers (*n*= 52)	Sellers Under Pressure (*n*= 37)	Legacy Planners (*n*= 47)
It was my favorite place to be	3.77	3.71	4.03	3.64
I felt that I could really be myself there	3.76	3.65	4.00	3.69
I felt happiest when I was there**	3.61	**3.49** [b]	**4.03** [a]	**3.42** [b]
It was the best place to do the things I enjoyed	3.59	3.39	3.94	3.53
Everything about it was a reflection of me	3.53	3.43	3.86	3.38
For the things I enjoyed most, no other place could compare*	3.49	**3.35**	**3.89**	**3.33**

Mean values are reported where 1 = Strongly Disagree to 5 = Strongly Agree
ANOVA: Statistically significant differences between clusters are bold (* indicates $p < 0.10$ and ** indicates $p < 0.05$)
Scheffe post-hoc test: Letters represent significant mean differences ($p < 0.05$) between clusters where a > b

Parcelization Behaviors and Normative Influences

The clusters displayed many similar attributes in the basic details of their parcelization actions. The area of land involved in the parcelization transactions did not vary significantly by group, with respondents transferring a mean of 50.80 acres and retaining a mean of 80.58 acres (Table 3.5). Most kept the adjoining property (81% overall) and still live on the adjoining property (93% overall). However, there were

significant differences in how the respondents transferred ownership. *Opportunist Sellers* were much more likely to transfer ownership of their land by means of a sale, whereas *Legacy Planners* where much more likely to gift the parcel of land. Furthermore, *Legacy Planners* were significantly more likely to transfer the parcelized property to a family member than were *Opportunist Sellers* of *Sellers Under Pressure*.

Table 3.5 Comparison of landowner types with regard to property transfer characteristics

Transfer Characteristic	Overall (*n*=136)	Opportunist Sellers (*n*= 52)	Sellers Under Pressure (*n*= 37)	Legacy Planners (*n*= 47)
Size of property transferred (mean)	50.80	57.81	57.42	38.00
Size of land retained (mean)	80.58	88.43	78.47	72.96
Method of land transfer:				
Sold	65.4%	**93.9%** [a]	**61.3%**	**38.3%** [b]
Gifted	25.2%	**2.0%** [b]	**29.0%**	**46.8%** [a]
Traded	1.6%	2.0%	3.2%	0.0%
Transferred to family member	30.1%	**9.6%** [b]	**27.0%**	**55.3%** [a]
Kept adjoining property	80.9%	80.8%	75.8%	84.8%
Still live on adjoining property if kept	93.0%	94.7%	92.0%	91.9%

ANOVA: Statistically significant differences between clusters are bold (* indicates $p < 0.10$ and ** indicates $p < 0.05$)
Scheffe post-hoc test: Letters represent significant mean differences ($p < 0.05$) between clusters where a > b

Respondents reported receiving encouragement to parcelize their woodland from a variety of family members and other community members (Table 3.6). Over half of all respondents received some level of encouragement for the decision to parcelize from their spouse. *Legacy Planners* were significantly more likely to have received encouragement from their children and from siblings. A small number of

respondents mentioned high levels of encouragement received from "other" parties, including lawyers and surveyors, church members, and family beyond the given categories (spouse, children, siblings, parents) including cousins and older family members. Over two-thirds of all respondents indicated that they knew other landowners who had sold their land, indicating that selling is a practice with which many parcelizing landowners are acquainted.

Table 3.6 Comparison of landowner types with regard to encouragement from parties involved in decision.

	Overall M (n)	Opportunist Sellers *M* (n)	Sellers Under Pressure *M* (n)	Legacy Planners *M* (n)
Spouses	4.21 (85)	4.20 (35)	4.06 (17)	4.30 (33)
Other Interested Buyers	3.78 (27)	3.69 (13)	3.86 (7)	3.86 (7)
Children	3.69 (52)	**3.21 [b] (14)**	**3.00 [b] (10)**	**4.18 [a] (28)**
Co-Workers	3.69 (16)	3.60 (5)	3.40 (5)	4.00 (6)
Realtors/Developers	3.68 (28)	3.79 (14)	3.43 (7)	3.71 (7)
Siblings	3.62 (29)	**3.38 (8)**	**3.11 [b] (9)**	**4.17 [a] (12)**
Neighbors	3.61 (33)	3.41 (17)	3.50 (6)	4.00 (10)
Friends	3.56 (27)	3.64 (11)	3.33 (9)	3.71 (7)
Parents	3.40 (30)	3.31 (13)	3.25 (8)	3.67 (9)
Other Landowners	3.38 (24)	3.10 (10)	3.57 (7)	3.57 (7)
Local Government Officials	3.32 (22)	2.91 (11)	3.80 (5)	3.67 (6)
Others	4.00 (13)	2.67 (3)	4.33 (3)	4.43 (7)

Mean values are reported where 1 = Greatly Discouraged and 5 = Greatly Encouraged
Statistically significant differences are bold, * indicates $p < 0.10$ and ** indicates $p < 0.05$
Letters represent significant differences ($p < 0.05$) among groups where a > b

Respondents attempted a number of alternatives before eventually parcelizing their properties (Table 3.7). Nearly a fifth of both *Opportunist Sellers* and *Sellers*

Under Pressure harvested timber as an alternative to parcelizing, but *Legacy Planners* were significantly less likely to have done so. *Sellers Under Pressure* were more likely than members of the other groups to have enrolled in conservation easements, but they were also more likely to modify the property by clearing new areas. *Opportunist Sellers* were most likely to construct a road on the parcelized property, but they were significantly less likely than the other groups to construct new buildings.

Table 3.7 Comparison of landowner types with regard to activities before transfer.

Actions	Overall (*n*=136)	Opportunist Sellers (*n*= 52)	Sellers Under Pressure (*n*= 37)	Legacy Planners (*n*= 47)
Alternatives attempted before transfer:				
Harvested timber**	15.9%	**17.3%** [a]	**16.2%** [a]	**8.1%** [b]
Leased property	10.6%	9.6%	5.4%	13.5%
Enrolled in a government conservation program	7.0%	9.6%	2.7%	5.4%
Enrolled in conservation easement*	6.1%	**5.8%**	**8.1%**	**2.7%**
Attempted other alternative	6.9%	1.9%	2.7%	2.7%
Modifications to property before transfer:				
Cleared new areas	15.3%	13.5%	18.8%	14.9%
Constructed new roads	13.7%	19.2%	15.6%	6.4%
Constructed new buildings**	9.9%	**1.9%** [b]	**15.6%** [a]	**14.9%** [a]
Conducted final timber harvest	9.2%	5.8%	15.6%	8.5%
Made other modifications	13.7%	13.5%	12.5%	14.9%

Statistically significant ANOVA or Chi-Square differences between clusters are bold (* indicates $p < 0.10$ and ** indicates $p < 0.05$)
Scheffe post-hoc test: Letters represent significant mean differences ($p < 0.05$) between clusters where a > b

Outcomes of Parcelizing

In examining attitudes and outcomes associated with the parcelization decision, important differences emerged between parcelizing landowner groups. Respondents overall were only slightly likely to state that they missed the property after the sale, although *Legacy Planners* were significantly more willing than the other groups to disagree with that statement. Over four-fifths of respondents (83%) indicated that they had achieved one of their intended goals for parcelizing their property (Table 3.8). *Opportunist Sellers* were significantly more likely to indicate that they had come out ahead financially, while *Legacy Planners* were significantly more likely to have achieved goals of helping a friend or family member or giving them land directly. Nearly half of respondents indicated that they believed that parcelizing their property had allowed them to maintain their land's traditional use or to protect nature. *Opportunist Sellers* were more than twice as likely as *Legacy Planners* to believe that parcelization had allowed them to protect nature. *Sellers Under Pressure* were least likely to report having achieved any of their goals from the land transfer. Perhaps as a result, *Sellers Under Pressure* were least likely (29.0%) to report plans to transfer another piece of property in the future, while over half of *Opportunist Sellers* (51.0%) indicated that they planned to do so again.

Table 3.8 Outcomes and satisfaction from property transfer.

Post-Sale Outcomes	Overall (*n*=136)	Opportunist Sellers (*n*= 52)	Sellers Under Pressure (*n*= 37)	Legacy Planners (*n*= 47)
Transferring land allowed respondent to:				
Come out ahead financially**	57.7%	**83.0%** [a]	**51.9%**	**29.7%** [b]
Maintain the land's traditional use	42.9%	52.2%	33.3%	38.5%
Protect nature*	42.1%	**52.3%**	**48.1%**	**25.0%**
Help a friend or family member**	40.4%	**22.2%** [b]	**40.7%**	**62.2%** [a]
Give land to family**	29.9%	**7.1%** [b]	**34.6%**	**51.3%** [a]
Pay for a large expense	26.2%	37.8%	15.4%	19.4%
Achieve desired new land use	16.4%	20.0%	11.5%	15.4%
Dissolve a joint holding	10.8%	6.7%	14.8%	12.8%
Other	8.7%	16.7%	0.0%	9.1%
Respondent achieved ANY goals with land transfer	83.1%	90.4%	78.4%	78.7%
Respondent is planning to transfer land again*	39.5%	**51.0%**	**29.0%**	**33.3%**

Statistically significant ANOVA or Chi-Square differences between clusters are bold (* indicates $p < 0.10$ and ** indicates $p < 0.05$)
Scheffe post-hoc test: Letters represent significant mean differences ($p < 0.05$) between clusters where a > b

Discussion

Parcelizing forest owners in eastern New York clustered into three distinct types based on the factors driving their decisions to parcelize their property: *Sellers Under Pressure*, *Opportunist Sellers*, and *Legacy Planners*. These groups did not differ with regard to owner demographics, time spent on the property or use of educational programs and management plans, sense of place, or characteristics of land transferred, and showed few differences in their original ownership motivations. They did differ, however, with regard to their behavior during land transfer, and the types of goals they

believed had been achieved from parcelizing. Previous studies have acknowledged the heterogeneity of landowner motivations and the external pressures they respond to, but this study is the first to quantitatively demonstrate the differences between these groups of parcelizing landowners.

Sellers Under Pressure

This group of parcelizers is most strongly under pressure from property taxes and other economic constraints. They are analogous to the parcelizers facing a strong outside economic impetus described by Gruver (2010) and to models that predict land values and parcelization rates based on economic thresholds (e.g. Mehmood and Zhang, 2001). *Sellers Under Pressure* were least likely to know other landowners who had sold their land, and were less likely to receive encouragement from family members, such as spouses, children, or siblings. By responding primarily to economic factors and monetary needs the group shares some aspects of Pyle's (1985) *individualists* and *crisis-managers* types of rural land sellers, and support the findings of economic influence importance for many parcelizing landowners by Stone and Tyrell (2008).

Opportunist Sellers

Like *Sellers Under Pressure*, *Opportunist Sellers* are also responding primarily to economic pressures. They share some characteristics with the *individualist* and *speculators* identified by Pyle (1985), having parcelized primarily for financial gain, but usually after being approached by a buyer. They demonstrated the lowest Sense of

Place measures for the original property, and were most likely to be motivated to own the land as an investment. Having received an offer for their land appears to have created the opportunity for them to achieve personal and economic goals through land transfer, usually as a sale, and to quickly move to parcelize their land. As a result they were less likely to modify the property before the transfer of ownership, and were also more likely to miss the land afterwards.

Legacy Planners

It many ways, this group stands in contrast to the other two. Unlike the findings of Stone and Tyrell (2008), these parcelizers were not operating in response to economic hardship, but seem to be responding primarily to the desire to pass land on to their children or heirs. They were similar in some ways to the *farmers* and *individualists* described by Pyle (1985) as they were less interested in their land as an investment. They received little support in their decision from people outside their immediate families, but were strongly supported by their children. *Legacy Planners* were much less likely to use government conservation programs or conservation easements, indicating that they are likely not responsive to efforts that focus on offering monetary returns. They are also the least likely to miss the property after the transfer, likely because they still have access to it through the new owners, who, in most cases, are family members.

Despite their differences, in many ways parcelizing landowner groups shared similar characteristics. They did not significantly differ across most demographic

characteristics, indicating that it may be hard to predict landowner behavior based purely on landowner characteristics. There were also few differences in their attitudes towards sense of place or their primary motivations to own land, and groups showed no significant differences in their ability to produce income from the land or their intentions to transfer the property when they first acquired the land. Less than a quarter of respondents had attended educational programs concerning their land, and very few had written management plans for their land, implying that it may be difficult to reach these landowners with information about the process of parcelization and the consequences of doing so. Differences that did occur in the methods of ownership transfer and actions implemented in conjunction with parcelization may have important implications for conservation and natural resource management professionals. The implementation of timber harvests and some types of pre-transfer construction were higher among the groups responding to economic concerns (*Opportunist Sellers* and *Sellers Under Pressure*), while *Legacy Planners* were much more likely to retain land within family ownership but less likely to participate in traditional conservation programs.

Strengths and Limitations

The method I developed for this project made it possible to conduct a detailed investigation of parcelizing landowners and avoid the expense and complications of surveying landowners who had not acted on intentions to parcelize their land. Unlike methods that survey all existing landowners and ask the subset that have parcelized to identify themselves, using publicly available property transaction and ownership data

allows more efficient identification and contact of recent rural property parcelizers. There were still some significant challenges in using this method, however. A large proportion of survey recipients did not respond, and some of those who responded still claimed not to have sold land, indicating that transfer records may be inaccurate or inclusive of ownership modifications that landowners do not perceive as transfer events. Furthermore, the subject of parcelization itself also has inherent limitations. Landowners may have some reluctance to answer a survey that touches upon financial matters and emotional attachment to personal property, and any questions about past actions may invoke recall bias. Despite these challenges, this method of identifying landowners known to have decided and actually carried out the division and transfer of their land is a promising avenue for further research to explore the causes of forest parcelization.

Conclusion

Many New York landowners who have recently undertaken forest parcelization were strongly motivated to do so by economic concerns. If these pressures reach high levels, some landowners may seek to divest themselves of a portion of their properties. If landowners receive an offer for a property when they are already under some economic and land use pressure, they may anticipate their future economic and personal needs and decide to preemptively parcelize of their property. However, another segment of landowners may be unconcerned with economic pressures and turning to parcelization, instead, to pass the land on to family members. This makes predicting where parcelization will occur a difficult and nuanced process. Planners and

educators attempting to slow or direct the occurrence of forest parcelization must be aware of both the economic and familial reasons for landowner decisions and incorporate them into the development of programs and policies aimed at directing ownership change or resource use.

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CHAPTER FOUR: THRIVING OR SURVIVING? FORESTER RESPONSES TO PRIVATE FORESTLAND PARCELIZATION IN NEW YORK STATE

Abstract

Consulting foresters provide services that enhance the ecological health and financial productivity of many private forests. However, ongoing private forest parcelization, which results in decreasing property sizes and new owners with more diverse landownership goals, has challenged foresters' traditional business practices. In recent years, researchers have discussed how entrepreneurial foresters can adapt to these new ownership patterns and landscape dynamics, but the actual responses by foresters working in parcelizing landscapes are largely undocumented. In-depth interviews were conducted with twenty foresters working with private landowners in New York State to determine (i) how parcelization is affecting the properties and owners they work with, (ii) what challenges are associated with forestry projects on decreasing property sizes, and (iii) whether foresters are changing their consulting practices and business philosophy to adapt to decreasing property sizes. Findings revealed that foresters across the state had observed decreasing sizes of forest properties and forest owner values focused on forest aesthetics, recreation, and wildlife. Foresters linked those changes to other urgent challenges to sustainable forestry and profitable forest consulting. While some foresters were trying new approaches to adapt to a changing landscape, others were more interested in maintaining their traditional practices and roles. These findings indicate that relying on entrepreneurial responses by private foresters may not be sufficient for reaching the expanding number of new forest owners in a parcelized landscape.

Introduction

Private ownership makes up the majority of many forested landscapes in the U.S. and owners have a diverse set of motivations and objectives for their forest properties. For many private forest owners, advice and activities provided by natural resource managers improves forest health and ecological services while producing long-term sources of income for the owners (Henly et al., 1990; Hull and Nelson, 2011). However, the ongoing process of parcelization has divided many large single ownership forest tracts into smaller parcels with diverse ownerships, often preceding increased forest habitat fragmentation (Haines, 2011), as well as development and a reduction in forest area (Best and Wayburn, 2001). As a result, the forestry community has been challenged to find new ways to help private landowners manage small properties in order to maintain private land as forests rather than being converted to development (Sampson and DeCoster, 2000).

There is increasing consensus that both the forest products industry and the forestry profession must be realigned to the declining size of forest parcels and focus on the majority of landowners who value their forests for reasons other than timber production (Germain et al., 2006; Hull, 2011). However, little is known about how New York foresters perceive the changes associated with forest parcelization and whether they are adapting their business practices in response to new owners and smaller forest properties. The purpose of this study is to explore how parcelization of forest property is affecting the practices of professional foresters working with private

landowners in New York State. To do so I examined forester responses to the following research questions:

1. How are foresters experiencing parcelization the areas in which they work?
2. What are the challenges associated with forestry projects on smaller properties?
3. Is there evidence that foresters are changing their consulting practices and business philosophy to adapt to smaller property sizes? If so, how?

Parcelization Background

Across the U.S. privately owned forest properties are being divided into smaller acreages and transferred through the process of parcelization (Birch, 1996; DeCoster, 1998; Butler and Leatherberry, 2004). New York State is no exception to this pattern, where an increasing number of forest properties in smaller ownerships have been documented in several counties over the last quarter of the twentieth century (Germain et al., 2006; Lapierre and Germain, 2005). According to the 2006 National Woodland Owner Survey, nearly 65% of New York State forestland is now owned in properties of less than 100 acres, and over 40% of forest acreage is divided into properties of less than 50 acres. Additionally, 88% of woodland owners in New York own less than 49 acres of woodland (Butler et al., 2011).

The parcelization of private forests reduces their capacity to sustain forest management activities. Parcelization results in smaller properties, reduces recreation

access, makes forest management activities less economically feasible, and occurs at higher rates in areas closer to roads and with lower slopes (Row, 1978; King and Butler, 2005). When forested properties drop to sizes below 30 acres, management for a continuous supply of income-producing timber becomes extremely unlikely (Vickery et al., 2009). In parts of the northeastern United States, rising land values and property taxes have made it nearly impossible for landowners to pay property taxes from timber revenue alone (D'Amato, 2010). In addition, the process of organized subdivision for the construction of multiple residences may be accompanied by heavy or premature harvests of valuable timber species, often referred to as "high-grading" or "liquidation cuts", reducing overall timber quality and significantly limiting management options for the subsequent owners (Germain et al., 2007, p.406). As ownership patterns shift, these changes may have a significant impact on professional foresters who work with private landowners.

The Role of Professional Foresters

Many landowners are interested in improving their forests, but lack the scientific and logistic knowledge required to do so (Hull et al., 2004). Because they often have little knowledge of appropriate techniques, landowners may turn to a variety of information sources when they decide to take on management projects (Sagor, 2006; Broussard et al., 2008a). However, one of the most important and effective types of assistance that can be provided to private forest owners is personal contact with a professional forester in order to "walk the land" and discuss

management alternatives (Kilgore et al., 2007). Along with logging contractors, consulting foresters they are the primary sources of professional advice to forest owners (Butler, 2008). While less than 20% of New York landowners have sought any kind of professional forester advice for activities beyond forest product harvesting or management (Broussard et al., 2008a), more than 45% of landowners have indicated that they found advice from consulting foresters to be very useful (Broussard et al., 2008b). The benefits of forestry assistance to landowners include higher payments for timber, healthier residual stands, and increased tree regeneration (Hubbard and Abt, 1989; Henly et al., 1990).

Foresters have traditionally offered many services to private landowners, including preparing forest management plans, increasing the productivity of timber stands, harvesting and marketing forest products, and implementing reforestation projects (Field, 1986). They also conduct projects to achieve other landowner goals, such as increasing desired wildlife species, providing recreation opportunities, and improving the aesthetic qualities of a property. However, management activities aimed at improving other forest functions are often supported by income from timber harvesting activities (Hull et al., 2004). New York forest owners are most likely to involve resource professionals when conducting management activities such as harvesting sawlogs, firewood, and non-timber forest products for sale, but professional involvement has been much lower for other operations, including improving wildlife habitat and scenic values and conducting road or trail maintenance (Broussard et al., 2008b). In New York State there are about 250 individuals employed as foresters who provide management advice to private landowners (US Bureau of Labor Statistics,

2009). Examples of the types of foresters include those working either as independent private consultants, with state and federal agencies, (primarily the New York State Department of Environmental Conservation (NYS DEC)) and industrial foresters who, in some cases, work with private landowners to procure timber for their companies.

Through their professional activities and direct interactions with private property owners, foresters are knowledgeable about the dynamics of local forest ownership and current methods of management. Furthermore, while foresters are not directly involved in landowner decisions to buy or sell land, their business practices are directly affected by the characteristics of forest properties and may be shifting in response to changes created by parcelization. As a result, foresters have detailed knowledge about local social, economic, and ecological conditions that is useful in understanding broader changes across forested landscapes (e.g. Knoot et al., 2009).

Working in an Increasingly Parcelized Landscape

In the last fifteen years, researchers posit several approaches that foresters can adopt for working in an increasingly parcelized landscape. One potential solution to difficulties created by smaller properties has been to combine projects on neighboring properties, eliminating the constraining effects of property boundaries and providing timber management benefits to multiple small landowners, similar to those enjoyed by large landowners. This coordination increases timber volume and minimizes the difficulty and expense of moving equipment and labor (Hull et al., 2004; Kittredge, 2005). In surveys of foresters in Wisconsin, Rickenbach and Steele (2006) found that 65% had coordinated cross-boundary forestry practices for private forest owners in the

previous two years and that over 90% were likely to do so again. However, over a third of foresters responded that they had not taken on cross-boundary projects because they or their clients had no interest, foresters believed it would take too much time or be unprofitable, or they were simply unsure of how to do so (Rickenbach and Steele, 2006). Furthermore, only a relatively small segment of private forest owners have expressed interest in developing these kinds of cooperative planning and management strategies (Kittredge, 2005; Broussard Allred et al., 2010).

Another strategy for foresters working on small forestland parcels is incorporating landscaping principles into existing forest management practices in order to enhance natural beauty, wildlife habitat, and recreational opportunities of small forest properties (Tyson et al., 1998). Expanding on these suggestions, Hull et al. (2004) recommended that foresters collaborate with other professions (such as landscapers and arborists), consider forest management practices beyond traditional timber production, develop new methods of reaching small landowners and shift away from fee structures tied only to the value of harvested timber. Hull and Nelson (2011) recently found that some private forestry-service providers working on small and suburban woodlots in Virginia and several other states are adapting to increasing urbanization by using diversified and adaptable management practices. They also found that foresters were using increased networking and referrals, adding value to forest products, and incorporating terminology on sustainability, stewardship, and amenities in their marketing and communications. The question remains as to whether foresters in other areas are making similar changes to their business strategies in reaction to these changes in woodland parcel sizes.

Small Business Reactions to Change

A key determinant of the competitive advantage and organizational survival of any business is its ability to cope with gradually or episodically changing contextual forces (D'Aveni, 1994), including parcelization. Forest parcelization is a force that does not occur as a single event, but as a gradual change across a landscape. The ongoing parcelization of forestland reduces property sizes, and leads to new forest owners with less ownership experience. This may lead to conditions that affect forester returns, such as increased travel distance, more interaction time with landowners, and decreased timber volumes. If parcelization creates only minor instability in landowner demand and the traditional harvesting system, it may gradually lead to small adaptations by foresters that emerge from local improvisation and learning (Plowman et al., 2007). In the gradual change trajectory, the responses by foresters to the widespread instability of a fragmenting resource base and new owner values will likely occur through small, continuous, changes, rather than through single episodic reactions (Greenwood and Hinings, 1996). However, if parcelization reaches a level where it causes major instability in business conditions, it might pull forester operations in different directions and result in radical, system-wide changes in forestry approaches and practices as these adaptations accumulate.

Private forestry consultants have traditionally operated as sole, independent proprietors of their businesses (Field, 1986) and nearly all consulting foresters work for organizations with employee numbers that qualify as small businesses (Headd, 2000). Small businesses have several qualities that allow them to adapt to changing environmental conditions. Greater independence in setting business goals, methods of

production, and hours and conditions of their work can lead to multiple advantages in the marketplace, including the motivation and commitment to make the business succeed, greater flexibility and capacity for customization, unique competencies, and original initiatives (Nooteboom, 1994). Keeble et al. (1992) showed that the ability of small service firms to compete effectively was dependent on greater flexibility to take on different types of projects. In addition, smaller, more localized firms are able to provide tailored services to customers in their geographic area and adapt to fit the needs of the changing market by specializing in their services (Hillman, 2003). The direct interactions and relationships of foresters with landowners are critical to an owner's faith in a consultant's usefulness and value (Merilainen et al., 2004). As parcelization creates smaller forest properties with owners increasingly interested in management for objectives beyond timber production, successful small forestry businesses may be able to take advantage of more personal interaction and relationships with landowners by focusing on specialized projects tailored to landowner objectives.

However, the characteristics of small businesses can also contribute to weaknesses in a competitive marketplace (Nooteboom, 1994). For independent foresters, these challenges may include limited expertise to take on new types of projects, the inability to take on large projects and capitalize on irregular economies of increased scale, financial risk if individual projects do not prove profitable, and inefficient marketing of services. In their study of forestry organizations and forestry service providers working on small forest acreages, Hull et al. (2004) found that foresters are also limited by a lack of contractors and suitable equipment to implement

management recommendations on small forest tracts. They (Hull et al., 2004) argued that foresters will have to develop new practices to address these challenges. If parcelization creates more forest owners with increasingly diverse objectives, independent consulting forestry businesses may have difficulty offering a wider variety of specialized services to landowners.

Furthermore, even if a small business can offer high quality knowledge and services, it cannot survive without clients, which usually requires marketing of services and increasing visibility. Most private consulting forester business has traditionally come through referrals from other landowners, public foresters, and industry foresters (Field, 1986) and advertising was not generally a factor in creating new projects (Walsh, 1986). Hull and Nelson (2011) found that a group of successful forestry entrepreneurs increasingly used referral agreements with other companies, but were also engaging in creative marketing with new messages and using new media (e.g. promoting "sustainability" and "green" services, using the Internet to reach customers). While some forestry service providers may be filling niches created by urbanization and forest fragmentation, other independent foresters may not have the time or resources to develop new marketing and communications techniques.

A recent study of small and medium-size forestry enterprises in Canada (St-Jean et al., 2010) raised a distinction made in business theory that may be equally applicable to foresters working with private forest owners in the United States. St-Jean et al. (2010) showed that while about 80% of forestry enterprises were primarily concerned with their continued existence and were not very diversified, the remaining

20% were pursuing growth and taking on additional risks. These two small business philosophies have been termed “small business orientations” and “entrepreneurial orientations” (Stewart and Roth, 2001; Runyan et al., 2008). Owners with a small business orientation often view their company as an extension of their personality and, in addition to generating income, use it to fulfill both short and long-term personal goals, (Carland, et al. 1984). Such firms generally remain small in size and are unwilling to take major risks, but often act as a stabilizing presence in markets (Headd, 2000). In contrast, an entrepreneurial orientation is distinguished by autonomy, innovativeness, risk-taking, pro-activeness, and competitive aggressiveness (Lumpkin and Dess, 1996). In many economic sectors, small business owners are more likely to hold a small business orientation than an entrepreneurial orientation (Stewart et al., 1999; Stewart and Roth, 2001). However, firms that adopt an entrepreneurial orientation, especially younger firms and firms with reduced access to capital, may significantly enhance their financial performance (Wiklund and Shepherd, 2005; Rauch et al., 2009). As parcelization continues in New York State and many other parts of the United States, the economic success of consulting foresters and their relevancy to forest landowners with smaller properties may depend on whether they choose to maintain small business orientations, using traditional methods of offering services, or if they adopt entrepreneurial orientations to try new strategies and innovative practices.

Methods

To gain an in-depth understanding of foresters' experiences working with private landowners across New York State, I adopted a qualitative research framework. Semi-structured interviews (n=20) were conducted with active private consulting foresters, industrial foresters, and public foresters. The participation of foresters was solicited through the email lists of the state chapter of the Society of American Foresters and the Cooperating Forester List maintained by the NYS DEC. The recruiting message specifically requested feedback from foresters working with "small-scale" forestry projects in the New York State.

Qualitative inquiry was chosen because I wanted to explore this subject in depth, from the perspective of those individuals directly experiencing it. An inductive approach can yield rich, nuanced information from the perspectives of a defined set of informants sharing their own experiences (Patton, 2002). When little is known about a topic, qualitative information can provide fundamental insights into activities and processes (Strauss and Corbin, 1990).

Interviews were conducted in person (n= 2) or by phone (n= 18), between April and August of 2010. Interviews were recorded with a digital voice recorder and transcribed for analysis. The open-ended questions followed an interview guide approach and explored perceptions of parcelization, if and how the practice of forestry was changing due to parcelization, and how their business practices addressed small-scale forestry. For the purposes of the interview, I defined "small-scale forestry" as forest management activities on small parcel woodlands of 50 acres or less. Interview

transcripts were coded in Atlas.ti version 6.2 based on inductive themes that emerged during transcript analysis. Open coding was used to label similar concepts in the transcripts. After concepts in the interviews were categorized, axial coding was used to make connections between categories and link related ideas. To offer readers a sense of the strength of the agreement among the interviewees, in some cases I provide the proportion or number of interviewees that shared a particular perspective.

Findings

The twenty responding foresters had a diversity of perspectives and backgrounds in forestry operations. Interviewees had a combined experience across all nine geographic regions of the state (as established by NYS DEC). Two of the respondents worked for NYS DEC, two worked for large, multi-state consulting forestry firms, one worked for a large industrial company that produced timber from privately owned land as well as its own properties, one worked for an arboriculture company, and the other fourteen worked as consultants independently or in businesses that employed less than a half-dozen people. Of the fourteen independent and small firm foresters, two concurrently held other jobs in addition to being a consulting forester, three mentioned previous experience working as a logger, two had worked for industrial forestry companies at an earlier point in their careers, and two had worked for NYS DEC in the past. The professional activities of these individuals demonstrated the diversity of private forestry operations in the state, and included individuals working at all levels described by previous forester research.

While all of the foresters were responding to a request to speak with foresters engaged in "small-scale forestry," the projects that they worked on were not limited to small-scale forestry and ranged in size from less than an acre to over a thousand acres in size. However, the majority of their recent projects were on properties with areas between 10 and 500 acres. The services provided by the private consulting foresters interviewed included writing forest management plans, marking timber, conducting and supervising timber harvesting projects, thinning and timber stand improvement projects, posting boundaries, invasive species control, conducting timber appraisals for landowners and insurance companies, and monitoring for forest certification. The industrial forester conducted forest inventories marked timber, administered logging crews, and identified private properties to purchase for forest management activities while the arborist's projects involved single tree pruning and removals, wood chipping, and forest inventory plans. The state foresters were both involved in writing stewardship plans for private properties and working with other foresters to supervise implementation of the state forest tax law program.

Perceptions of Parcelization

All of the foresters interviewed believed that parcelization of forest properties was occurring, to some extent, in the areas in which they worked. The majority said that these changes are noticeably affecting the sizes of properties they work on (16 out of 20), as expressed succinctly by one independent forester who now does part-time consulting work:

"I tried to maintain my business, but throughout the years all the jobs kept getting smaller."

Only a small number of foresters (3 out of 20) mentioned working with any landowners that had purchased neighboring properties for consolidation or were managing multiple forest properties. Most of the foresters interviewed believed that forestland parcelization would continue over the next decade (18 out of 20), though several of them (6 out of these 18) thought that the rate of parcel size decreases would slow in the future, primarily because of slowing residential demand. Many of the interviewees explained that their clients were nearly evenly split between absentee owners that lived more than a mile away from their woodland and owners that lived on the property.

Foresters also described ongoing changes in landowner values they had observed in conjunction with changes in forest property size. While landowner change can occur without parcelization, the division and subsequent transfer of forest properties often increases in the number of landowners and results in owners with different motivations for using their land. The forestry professionals believed that in many areas landowners were purchasing forestland for reasons other than income generation (e.g. for scenery, second home development, and recreation rather than timber production or agriculture) and were able to fulfill those objectives with smaller properties. In the eastern part of the state, foresters observed these properties being purchased as part of a primary or secondary residence, or as an investment based on increasing property values. In the central and western parts of the state, the reasons

foresters perceived for people buying forested properties were more evenly split between residential use and hunting or recreational use. These changes in ownership through new purchases were accompanied with increasing values for the aesthetic, recreational, and wildlife characteristics of these properties rather than timber production value. Foresters also believed that ownership turnover resulted in landowners with less knowledge about forest succession and less experience with and acceptance of management activities.

While most foresters acknowledged that parcelization was not their biggest concern for the future, many mentioned that parcelization was exacerbating other major changes. Interviewees were varied in how they portrayed their concern about parcelization in relation to other issues. Most agreed that parcelization was occurring, and that it was a challenge to their business:

> *"I think in general we're seeing a lot of parcelization, and I think that's a risk to our forestry service and forest industry."*

One issue foresters frequently mentioned as a major concern was the sustainability of a commercially viable timber supply, especially in the face of declining timber quality and little demand from local timber markets. This was linked to the foresters' most consistently expressed concern: the perception of widespread occurrences of exploitative and unsustainable harvesting of large, valuable trees through practices known as "high-grading":

"The most noticeable problem is the amount of high-grading that is taking place. Second to that would probably be the parcelization and subdivision of forested properties"

High-grading was directly linked to the economic sustainability of forestland ownership. Foresters recognized that cutting all valuable timber was sometimes done as a last resort to pay property taxes, but they recognized that such actions would further increase pressure on landowners to divide and sell their property:

"Once the forest has been exploited and it's not going to support itself by growing, well then you might as well subdivide it and sell."

Several foresters were also concerned about biological threats to forest health throughout the state. The main sources of these concerns were invasive insects currently threatening several tree species across the state, as well as reduced regeneration of tree species due to increasing browse pressure by high deer populations. Successful management responses to these threats were seen as becoming less likely due to the greater number of owners created by parcelization:

"There's a lot of issues for forest health that become much more difficult to deal with because of the number of parcels and the number of landowners"

Finally, several foresters mentioned concerns unrelated to property size, including the perception that fewer young people are choosing to work in forestry and logging professions, concerns about increased forestland acquisition by the state

government, and the declining political power of foresters and the forest products industry in the state.

Challenges in working with small properties

Interviewees mentioned multiple challenges due to working on increasingly smaller forest property sizes (Table 4.1). The challenges cited most were inherent to working on multiple smaller properties instead of fewer large ones. These concerns included increased time and fuel expenses needed for foresters to travel to different properties in order to meet with landowners, carry out marking and planning activities, and oversee management operations. Increased travel distances also contributed to increased costs and time necessary for moving harvesting equipment by the logging contractors needed to carry out most management activities. Furthermore, working with more landowners increased the amount of time needed to work out each owner's objectives for their property and construct plans and contracts for forest management projects.

Table 4.1 Challenges associated with working on small forest properties.

Challenge	Interviewees that discussed the issue (n)	Associated Concerns	Example Quotation
Travel/moving costs for foresters and harvesters	11	Along with increasing fuel costs, reduces profit margins; Results in longer time needed for projects and extra charges to landowners.	*"It's very hard for us to get someone in to do the work because just the moving of their equipment is so expensive that there isn't much to be made there that's in the timber."*
Difficulty finding harvesting contractors willing to do small project	10	Fewer logging contractors are available Some contractors seem to be biased against small projects.	*"You know a lot of times I've put out bids for you know open bids and I won't even have any respons from them, just because it's lower quality and the size it's just, it'll actually cost them money to come harvest it."*
Declining timber quality	10	Results in lack of management and little regeneration; Decreasing timber prices.	*"For the industry you know the resource has to come from somewhere and I think there's less of it available. Certainly there's less managed resource available and less quality available."*
Inability of properties under 50 acres to qualify for NY State 480-A Forest Tax Law	10	Lack of incentives to practice small-scale forestry; Zoning regulations, especially in the Adirondack Mountains, have created large number of forest properties just under size threshold.	*"I've worked with some people who wanted to get into 480-A, but didn't have enough qualifying timberland so they didn't do it."*

Table 4.1 (continued). Challenges associated with working on small forest properties

Challenge	Interviewees that discussed the issue (n)	Associated Concerns	Example Quotation
Not enough room for log landings	6	Challenges aesthetic desires of landowners; Makes it harder to find harvesting contractors.	*"Usually you don't want a large landing so it limits you down to smaller contractors."*
Limited access for timber harvest	6	Leads to difficulties working with neighbors and within environmental regulations.	*"The land broken up into many parcels makes it tougher to get to trees."*
Reduced timber volume and no economies of scale	5	Leads to overharvesting and high-grading.	*"Since we have the ability to do some of the work ourselves, scale isn't as much of an issue, but to try to put together a commercially viable project would be difficult"*
Increased number of contracts and paperwork	4	Increases the amount of time to do individual projects and makes trying to put together a number of projects substantially more difficult.	*"When your properties keep getting smaller, instead of one contract on one property now you have two contracts ... Everything is compounded as the woodlots get smaller."*
Lack of timber stand diversity	2	Results in fewer options for timber cutting rotations and providing regular income.	*"[Landowners] don't have as much diversity so there's just not as many things that they can do."*

One group of major challenges to forestry on small properties related to physical limitations of small properties (Table 4.1). Smaller properties often have limited or no access to roads for the equipment needed in harvesting operations. Furthermore, foresters working on small properties noted that they were more likely to be limited by regulations that prevented roads on steep grades and crossing streams or wetlands. In addition, small properties limit the locations available for landings- the cleared, level areas necessary for gathering, sorting, and loading logs for transport. Adequate landings were often incompatible with landowner aesthetic objectives, especially on smaller residential parcels where they were more likely to be visible from frequently used areas.

Another set of challenges described by foresters related to the characteristics of forest resources found on small properties (Table 4.1). For example, several foresters noted that smaller properties generally had less diversity of tree species and ages, which made it difficult to do rotational cuts in different stands at regular intervals. As a result, implementing management projects that would provide regular harvesting returns to landowners required changing rotation periods in ways that that did not fit landowner timeframes or objectives. Many foresters stated that the ability to do financially viable projects on small properties was highly dependent on the quality of available timber at the site. Higher quality timber in New York State is generally produced by large diameter hardwood species, especially black cherry, hard or sugar maple, and red or white oak. Low quality species, such as pine and beech, required higher volumes that were generally not available on smaller properties. If the quality of timber was high then the total volume and size of the property mattered much less,

and several foresters remarked that projects harvesting high-value trees on properties between one and five acres could be profitable. However, most foresters said that the availability of higher quality timber was declining on most of the properties they worked with. Several foresters asserted that this was due to increased high-grading of large, valuable trees by other foresters and logging contractors, especially by previous owners extracting timber value from properties before selling the property. Furthermore, prices for many hardwood species had dropped significantly in recent years and several foresters stated that at the time of the interview they were advising landowners not to harvest their high quality trees but to wait until prices rose. While some foresters conducted forest thinning and timber stand improvement cuts, they noted that most small landowners were not interested in investing money into improving their forestland by increasing the growth of higher value species through intermediate forest treatments like thinning. The general decline in timber quality was seen as a major obstacle in conducting management activities on small properties and the lack of investment in the future growth of hardwood species was seen as perpetuating this challenge.

Foresters also frequently mentioned having difficulty finding harvesting contractors willing to work on small projects (Table 4.1). Nearly half of the foresters interviewed mentioned projects being delayed or cancelled because logging contractors were not available or did not respond to bid solicitations for small properties. A few foresters perceived this to be a bias against small projects by logging contractors. However most agreed that it was more likely due to an increasingly difficult financial situation for their colleagues. One forester explained that even if

small forest owners were willing pay consulting foresters to take on management projects that would not bring any financial returns, the project still might not occur because the logging contractors' expenses wouldn't be covered:

> *"You have to balance the other side of the equation which is the logger. Even if your landowner says 'oh, I don't care if I make any money on my 3 acre pine cut, go ahead and take it,' the logger can't afford to move on your site."*

Some foresters said that logging contractors were increasingly likely to be restricted by regulations on heavy trucks, such as those used for moving timber, enacted in areas with larger residential populations and smaller properties. Finally, a decreasing pool of logging contractors and declining number of young people entering the logging business added to concerns about future contractor availability for small property harvesting projects.

Several foresters also believed that the lack of state sponsored tax incentives for small property owners was a challenge to involving them in forest management activities (Table 4.1). The major state tax incentive program for forest lands is section 480-a of New York State's 1974 Real Property Tax Law, which grants tax reductions for qualifying forest land that consists of at least 50 contiguous acres. Beyond this program, there are few tax incentives for forest owners with less than 50 acres to keep their properties in forest production, although sustainable forest management can occur on smaller properties. For many landowners, getting the forest management plan created by a consulting forester needed to qualify for the 480-A tax law is a first step

towards understanding the possibilities of what they own and conducting future management activities, whether or not they end up enrolling in the tax program. There was also frustration expressed by foresters working primarily in the northeastern part of the state that the 50-acre forest tax law requirement did not match the zoning restrictions enacted by the Adirondack Park Agency, which allows properties zoned for Resource Management to be divided to 42.7 acres in size. Furthermore, the interviewees that currently work for the state, or had done so in the past, mentioned that the Forest Tax Law was an unfunded mandate to the NYS DEC, in that more enrollees increased the amount of time needed to administer the program without increasing the resources available to the department. These requirements, along with reductions in NYS DEC forestry staff over recent years, have left few staff available to work with small property owners.

Changes in Forester Approach

Results revealed that foresters are changing their business approaches to accommodate owners with smaller parcel sizes and non-timber motivations. These changes in approach revolved around two major categories: 1) Orientation of services to new landowner values, and 2) Changes in forester capacity to take on small projects. Some foresters working individually or in small businesses believed that the increasing number of smaller properties would not be served by larger or industrial forest companies and created potential opportunities, or niches:

"I'm not going to say it's a wide open spot with no competition but it's, most of the contractors now are looking for bigger pieces and they're just not messing with the smaller lots."

Furthermore, despite the major challenges created by decreasing forest property sizes, several interviewees expressed optimism toward working with owners of smaller forest properties:

"Smaller woodlots make [forestry consulting] more difficult, but it's not insurmountable and it takes a little bit of a change in paradigm, I think, of those people working in the woods."

Orientation of Services to Landowner Values

Foresters described a variety of ways that they were incorporating landowner objectives beyond timber production into their management activities (Table 2). Nearly all of the foresters described meeting with landowners in person, usually on their property, to determine their long-term goals and objectives for their forestland:

"Some of them know [their objectives], others you go for a walk with them and try and find out and it's not always what they tell you, it's always what you figure out."

The most commonly mentioned adaptations of forest management activities for landowner goals involved improving property aesthetics, managing for wildlife, and increasing recreation opportunities on smaller woodland properties. However, several

foresters mentioned that most landowners with newly acquired land know very little about the existing resources on their property, what could be done, or even what they want to gain from their forestland. Thus, determining the appropriate management activities was often described as a time-consuming and challenging process.

Improving property aesthetics was mentioned as a major goal for small forest owners, especially for those who had purchased forest properties as a location for their primary or secondary residence (Table 4.2). Foresters mentioned cutting individual trees near residences and considering scenic views in planning harvesting activities. Others described thinning forested areas near residences to allow more light into the area, and removing trees and brush from the forest perimeter to allow owners to look into the woods. A couple of foresters mentioned that they went so far as removing all branches and tree tops that remained after timber harvest, and went back after timber harvesting to “manicure” areas to make them more park-like in appearance.

Table 4.2 Orientation of consulting forestry services for landowner objectives beyond timber production

Activities	Interviewees that mentioned (n)	Example Quotation
Managing for with multiple forest uses	10	*"I do see an intensification of and a variety of interests. You know people want to do more. Whereas before you know when, I first came here, people had these woodlots that they never went to."*
Providing timber revenue as a mechanism for achieving objectives	7	*"They're looking at generating income to help them with some of their projects on their property…They're interested in getting income to use for other projects which are related to the property usually."*
Managing for improved wildlife habitat	6	*"I try to consider wildlife, I mean as far as leaving snags, creating edge. I try to explain to them that you know the forest isn't just the trees, it's the whole ecosystem."*
Managing to improve forest aesthetics	5	*"Usually if it's a smaller woodlot, it's a higher end place that they're living in, they want a very nice quality job done. Like tops lopped and maybe some stuff chipped along the edge that they can look into it and see."*
Managing for recreational improvements	5	*"There's more recreational interest as far as trails. And actually making use of a piece of forestland, doing something with it."*
Providing landowners opportunities to do part of management work themselves	2	*"There's all kinds of people out there and they have varying degrees of experience with this sort of thing. Some landowners say, "Well, I get a lot of satisfaction out of going out and cutting trees down."*

A few foresters stated that a major challenge is that unsustainable forestry can look very neat, and that most harvesting projects are not aesthetically pleasing, especially at first. Several interviewees noted that it was difficult to do timber harvests on small properties because these projects were visible from regularly used parts of the property. Some foresters tried to take the aesthetic concerns of neighbors into account when planning activities that would significantly affect the appearance of the forest. A few interviewees explained that they asked logging contractors to keep their equipment and landings clean and professional looking when working on small properties in order to maintain aesthetic qualities throughout the management process.

The majority of foresters interviewed stated that they were observing more interest by small property owners in increasing wildlife populations and that they were taking steps to incorporate this focus as part of other management activities (Table 4.2). Most interviewees mentioned wildlife primarily in the context of landowner desires to increase species for hunting and for recreational wildlife viewing. The species mentioned most frequently by foresters were deer and grouse, although a few foresters also mentioned working to increase interior forest song birds and overall bird diversity. In efforts to maintain or increase the number of these animals, foresters incorporated a range of activities that included creating forest openings, diversifying habitat types, creating early successional habitat for bird and small mammal cover, creating and leaving snag and drumming trees for woodpeckers and grouse, and leaving coarse woody debris on the ground as cover for a variety of small animals. One forester mentioned difficulties working in regions that were thought to have rare species of wildlife and plants, especially when the locations of these organisms were

unknown and when neither he nor landowners were able to identify them. The majority of foresters interviewed observed more interest by small property owners in increasing wildlife populations and interviewees were taking steps to incorporate this focus as part of other management activities.

Another major set of activities that foresters were including with management services to small landowners included increasing recreational opportunities for owners (Table 4.2). Several foresters mentioned creating open shooting areas for hunting, and increasing management for sugar maples, which landowners could use for small-scale syrup production. The majority of the activities mentioned involved the creation of trails and trail systems that the landowners could use for walking, snow-shoeing, cross-country skiing, 4-wheeling, and horse riding. A few foresters mentioned that landowners valued the skid trails created for access by timber harvesting equipment because they could be used to facilitate landowners' desires to observe wildlife and appreciate the beauty and solitude of their property.

Several foresters also mentioned providing landowners the opportunity to be involved in conducting the management activities instead of leaving it solely to contractors (Table 4.2). These activities involved thinning trees that foresters had marked, harvesting firewood for sale or personal consumption, and in a small number of cases, harvesting sawtimber for personal use. A key to these forest management activities were discussions to determine the experience and capabilities of landowners, for instance, whether they owned small tractors or all-terrain vehicles that could be used for transporting logs. Several foresters noted that farmers often had the tools to

do forest management activities themselves, but residential owners often lacked tools and skills to do so. A few foresters expressed concerns about landowners taking an active role in management and related stories about the dangers in doing so. For example, landowners misidentifying tree species, cutting timber in ways that destroyed its value or cost them significantly more to remove it from the property, and creating physically dangerous situations. However, involving landowners in projects was seen by some foresters as a potential strategy for creating small-scale forest management projects if done carefully and under the right circumstances.

Most foresters acknowledged that small landowners usually approached foresters when they were interested in making income and were unlikely to invest money into their forest properties, even if they were primarily interested in improving aesthetics, wildlife habitat, or recreation opportunities. As a result, foresters often felt that they needed to incorporate harvesting activities to provide some revenue or support for the costs of management activities. The most commonly mentioned projects involved harvesting some timber and cutting firewood for sale, but several foresters expressed optimism about growing markets for biofuels as a way to increase revenue from small properties.

Changes in Forester Capacity to Take on Small Woodlots

The other major forester adaptation to parcelization involved actions to increase their own capacity to conduct smaller scale forest management projects (Table 4.3). The methods of increasing capacity included a variety of strategies,

including working with neighboring landowners, investing in harvesting equipment, working with other contractors, obtaining new professional development tools to connect with landowners, and adopting new payment methods for services.

Several foresters had done projects on neighboring properties to increase timber volume, reduce access difficulties, and minimize travel time for the foresters and logging contractors (Table 4.3). One forester described incorporating existing landscape features on neighboring properties into wildlife components of management planning. However, most foresters indicated that they did not approach landowners directly and that most of these partnerships were based on neighbors observing timber marking or harvesting operations and expressing interest in joining the harvest. Several foresters articulated difficulties in working with neighbors, especially in managing access and expectations, and a small number refused to take on projects that spanned more than one property. These evaluations indicated that some foresters were willing to coordinate projects involving adjacent landowners, but very few were actively seeking them out in order to overcome challenges created by smaller property size and economies of scale.

Table 4.3 Forester changes in capacity to work on small forest parcels

Actions	Interviewees that mentioned (n)	Example Quotation
Basing payment on fixed or hourly rates instead of commissions on timber sales.	9	*"Very seldom do I deal with commission sales. I generally work by the hour in order to help them meet their objectives."*
Combining projects on neighboring properties	6	*"Sometimes the small ones, I'll combine 3 or 4 of them you know. Usually it was like a subdivision or you know they're all next to each other. And I'll combine 2 or 3 or 4 of them to make it worth my while."*
Developing new contexts of connecting with landowners	4	*"I took a course on birds in forest settings: which birds like which type of forest settings, how can you manage silviculture and bird populations at the same time. It was really interesting. You realize that it's just another tool and it's probably a very good one to talk to landowners about, that a lot of them are interested in birds."*
Investing in small harvesting equipment	3	*"I've skidded with a 4-wheel drive tractor. I've got a log loader mounted on a truck and I've got a small feller buncher."*
Working with other contractors to help achieve landowner values	2	*"Now I have a fellow that follows the loggers. Anything that is left on the ground or needs to come out, dead trees, damaged trees, that sort of thing, I go in and mark, then he goes in...and he manicures the area."*

All of the foresters interviewed worked with a variety of equipment in the field, including chainsaws, tree measuring and marking tools, computers and GPS units. Several of the independent consultants interviewed had recently purchased small scale harvesting equipment or were considering doing so in the near future (Table 4.3). These investments included small tractors and skidders, small log-loaders and feller bunchers, all-terrain vehicles, and trailers that made it possible for them to carry out projects harvesting and moving small amounts of timber. This allowed the foresters to fill the harvesting role on smaller properties in addition to their consulting services and several mentioned that these types of projects would continue to gain importance as the availability of logging contractors to work on small properties declined.

A few foresters also indicated that they had been actively seeking new skills in order to connect with and offer services to smaller property owners (Table 4.3). The use of technological tools such as GPS and GIS has been implemented by much of the forest industry and large firms, but these adoptions are not universal among independent private consultants. Foresters working for larger consulting companies indicated that they had an entire department of the company devoted to technical support and used GPS technology for navigation and data collection, as well as mapping existing and recommended trails, boundary lines of sales and areas for herbicide application. These tools may provide the most gains from efficiency in work on large properties, but were also described as methods of communicating and appealing to younger owners of small forest properties as well as for planning efficient management operations on small dispersed parcels. While a few independent foresters used handheld computers and GPS units in the field for timber inventory, several

indicated having difficulty keeping up with and effectively using the technology, while others did not use any digital mapping tools at all. Another set of skills pursued by foresters was certification in new aspects of forest management. This included training in forest sustainability certification as well as courses on methods of managing for different types of species to appeal to the wildlife objectives of small landowners. Several mentioned that they wanted New York State to require licensing for professional foresters in order to maintain professional standards for the industry.

Several independent consulting foresters described experiences working with other contractors in order to achieve landowner values beyond financial returns (Table 4.3). A few mentioned regularly working with a specific set of logging contractors who used smaller equipment in order to perform projects on smaller properties that required more "finesse". Others mentioned hiring contractors to come behind harvesters to remove tree tops and branches in order to improve the aesthetic appearance desired by landowners from management, as well as providing slightly more income to landowners through firewood sales. One forester mentioned working with wildlife biologists to create management plans that created more suitable habitat for bird species. Relationships such as these allowed independent foresters to take on projects and to meet landowner objectives that might have otherwise been outside their abilities. Furthermore, several foresters mentioned contracting work to assist with projects on larger properties. Doing so allows them to expand their service offerings while maintaining their flexibility to take on small projects in the future.

Many foresters said that they no longer charged landowners commission or percentage of returns from timber sales. Instead, nearly all foresters were charging fees for their time or set rates for specific projects, such as management plan creation or firewood harvesting, on small properties (Table 4.3). This allowed them to be less focused on maximizing revenue from timber harvesting projects and to take on small projects that landowners were willing to pay for. Some foresters described difficulties with this approach however, including landowners being unwilling to pay for services in the absence of timber income to cover those costs.

Finally, the foresters also mentioned several other businesses practices they had tried with varying levels of success (Table 4.3). All of the foresters interviewed relied predominantly on word-of-mouth referrals through projects with clients they had previously worked with. Most said that they had little success with mass-market advertising. Older foresters (i.e. 50 years or older) and those retired from other jobs did not seem to have as much trouble with this, as they had a network of relationships with landowners and other foresters who provided a consistent stream of referrals. However several foresters in the early and middle part of their careers expressed a continuous struggle to find new clients. Some of these foresters mentioned trying other methods of reaching new clients, including websites and direct mailings to landowners. Larger consulting companies had greater resources to do direct advertising through newsletters, magazines, and direct mailings to thousands of potential landowner clients.

Discussion

The interviews conducted during the course of this study indicated a wide variety of perceptions about the extent to which forest parcelization is affecting the practices of professional foresters. Parcelization was acknowledged as an issue by foresters working across the state, although they believed the process has slowed in recent years. Interviewees also described landowner values changing in conjunction with parcelization, primarily the turnover in ownership resulting in new landowners with less knowledge about forest management and a varied set of management interests. Few foresters viewed parcelization as the greatest challenge to sustainable forest production; they were more concerned about dwindling markets for wood products, increasingly tight profit margins due to fuel costs and regulations, the high-grading of valuable timber species, and biological threats posed by invasive species and large deer populations. However, these concerns are tightly linked to parcelization in many ways—for example, owners "high-grading" their forests to pay for property taxes, which can be a precursor to subdividing and selling the property. Furthermore, despite the increasing challenges of working with smaller properties, no foresters expressed bias against taking on small projects, a concern expressed by Hull et al. (2004). In fact, several foresters expressed a desire to become more involved in small-scale forestry projects that were less focused on timber production. Related concerns noted by foresters were both the perception that fewer young people are entering the forestry and logging professions—a finding echoed by Broussard's (2009) study about logging firm succession –and the lack of logging contractors to work on small scale

projects. The availability of service providers to work on small woodlots is essential as they are key partners of professional foresters.

There was also evidence that forestland parcelization was a force leading to the shift to an entrepreneurial orientation. Many independent foresters indicated that they were taking steps to adapt their business practices for projects on small properties, primarily through changes in orientation of services and capacity to carry out small scale projects. Changes in orientation of forester services included management for multiple objectives, focusing on recreation, aesthetic, and wildlife enhancement, as well as some efforts to involve landowners in conducting some forest management activities as appropriate. Similar to the findings of Rickenbach and Steele (2006), few of the foresters interviewed had coordinated cross-boundary forest management projects with private woodland owners. Furthermore, they indicated that they had observed little initiative by landowners themselves to develop coordination partnerships. Those foresters in our study that had coordinated management across boundaries were unlikely to do so again unless the project benefits would be significantly improved, primarily because of experiences with landowner misunderstandings and disputes about proceed sharing. As noted by Hull et al. (2004) the capacity of foresters to work on small-scale forestry projects is often limited by the lack of contractors and suitable equipment to implement management recommendations on small forest tracts. Some foresters in New York have increased their capacity to work on small woodlots by investing in small-scale harvesting equipment. Other changes foresters were making to their capacity to carry out small scale projects were collaborating with other contractors/service providers, obtaining

new professional development tools, such as technological training and certification, and basing payment on set fees and hourly rates. These strategies were used by foresters to shift away from management purely for timber production and toward achieving other landowner objectives.

While most foresters described multiple modifications to their business strategies, some were doing little to change their service orientation or capacity in order to work on small properties, choosing instead to maintain traditional small business orientations. This is similar to the recent findings of St-Jean et al. (2010). This may be occurring because some foresters retired from other positions or currently working in other jobs have continued their involvement with private landowners primarily as an extension of their personal commitment to sustainable forest management rather than as a means of generating maximum income and adapting their practices to a changing landscape (Carland et al. 1984). Foresters' willingness to make business changes may also be a reflection of their age, past experience, and current employment situation. Several foresters working other part-time jobs or working as consultants after retiring from other positions expressed having more flexibility to take on small projects. However, because they have less pressure to support themselves with returns from small properties, they were not as engaged in experimenting with new approaches. In contrast, several of the younger foresters expressed frustration at the difficulty of making a living in forestry and were doing more to invest in new small-scale technology and equipment, provide a wider range of services, and experiment with advertising techniques in order to find new clients and establish their business.

It appears that many New York foresters are considering forest management orientations beyond traditional timber production and shifting away from payment tied only to the value of harvested timber, as proposed by Hull et al. (2004). Furthermore, while some New York foresters may be adopting new practices, they do not appear to be shifting to the extent of entrepreneurial forestry-service providers in other areas (e.g. Hull and Nelson 2011). Foresters who are unable to find other ways of adapting their services to smaller properties may find it increasingly difficult to avoid unsustainable management projects. As parcelization across the forested landscape continues, it will become even more vital for policy makers and conservation professionals to support capacity-building strategies to help foresters adapt to working with small woodlot owners to achieve their goals.

Conclusions

The future of US forested landscapes is highly dependent on the actions of an increasing number of private landowners. Shifting ownership conditions will require consulting foresters to go beyond traditional timber production techniques to appeal to new owners with smaller properties. Parcelization is resulting in smaller forest properties and new landowners with less interest in production forestry, but there are still opportunities for private foresters to engage the owners and enhance the properties. Our interviews suggest that many foresters working with New York private landowners have begun making a number of changes in their service orientation and capacity, but that not all have pursued these changes. The recognition of parcelization

appears to be playing a role in spurring these shifts to entrepreneurial orientations, but further tools, training, and support may be necessary to help them continue to adapt and to engage those who have not been able to change their approach. As parcelization continues, anticipating its patterns and implications will be important in ensuring the economic survival of consulting forestry businesses that are critical for the health and value of private forests.

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CHAPTER FIVE: DISCUSSION

In this concluding chapter I summarize the methods and results from the three research studies and explore the interrelationships between them and previous research. I explore some of the key lessons that emerged from the projects. I then describe the strengths and limitations of these research methods and conclude by describing the potential for further research in these areas.

Summary of Methods

In the research project described in Chapter Two, I developed a method of quantifying forest ownership change, based on the number of unique ownership transfers and parcelization events rather than as a measure of property size change. In Chapter Three I examined landowner decisions to parcelize their land by developing a typology of private landowner behavior. Finally, Chapter Four illustrated the findings from qualitative, grounded theory research to examine the perspectives of consulting foresters whose work is directly affected by changes in private forest ownership and forest composition. Together these components revealed important insights about the patterns of parcelization and ownership change in eastern New York State, the effects of this change on forests, landowner behavior and resource dependent entrepreneurs, and the range of factors facilitating landowner decisions to divide and sell their land.

Discoveries

Patterns

The results from Chapter Two demonstrate that a large number of eastern New York woodlands have been transferred between owners and that a significant portion of these were parcelized. Within the region, there were significant differences in Woodland Parcelization Rates between counties, with the highest rates occurring in the northern and western counties of the study area, and the lowest in counties of the Adirondack and Lower Hudson Valley regions. In counties within my study area where previously published measurements of forest property size change had been conducted (i.e. LaPierre and Germain, 2005; Germain et al., 2006) we discovered comparable woodland ownership dynamics, with high rates of woodland parcelization continuing in Oneida and Schoharie counties and low to moderate rates in Sullivan, Ulster, and Greene counties.

Transaction data also demonstrated a declining number of woodland property transfers over the decade and decreasing proportions of parcelization transactions. This was confirmed by forester observations of slowing parcelization rates among the private landowners they worked with as well as in the areas surrounding their management projects. While pressure from nearby development was not considered by many survey respondents to be an important influence on their parcelization decision, nearly 70% of responding landowners knew someone who had sold all or part of their property, so there does exist amongst landowners a high level of a personal familiarity

with others who have made the decision and who might serve as a facilitating guide through the process.

Effects

As expected, we found evidence of a several ecological changes occurring due to forestland parcelization. Although few foresters viewed parcelization as the greatest challenge to sustainable forestry, many of the concerns they did express were related to or exacerbated by the process. These concerns included timber high-grading, which was frequently recognized as a symptom of rapid property ownership turnover and as a short-term financial strategy by landowners that resulted from pressures similar to those driving parcelization and tended to precede parcelization events. Significant alterations of natural forest composition were also linked to parcelization. Concern over increasing numbers of invasive species, may be a result of introduction and transport by a growing number of private forest owners. Furthermore, high deer populations and understory browsing pressure may be the result of private forest parcelization increasing disturbed and forest edge habitat, and reducing hunting pressure by new landowners.

Additional land use changes resulting from parcelization were apparent from survey responses of landowners. I found that that over 35 percent of respondents had implemented one or more significant physical changes to their properties in tandem with parcelization. These actions included final timber harvests, construction of roads and buildings, and clearance of new areas. However, these actions varied between

groups of landowners responding to different pressures. *Sellers Under Pressure*, responding to high pressure from economic and land use factors, were much more likely to undertake a timber harvest, construct new roads, or clear new areas, while *Legacy Planners* were much more likely to construct buildings on the transferred property. This indicates that in many cases, the physical changes to forest cover and habitat composition may be immediate, rather than lagging, effects of parcelization.

While the effects of New York private forest parcelization have primarily been explored in the context of their ecological effects (e.g. Germain et al. 2007), each of my three research projects also demonstrated that there are broader social implications of the phenomenon as well. Land use transition matrices from woodland property transaction records demonstrated that whereas most properties transferred in their entirety remained classified for the same land use, a greater number of parcelized transfers became reclassified for a new land use. Moreover, the majority were reclassified to Rural Vacant status, indicating that landowners were splitting and transferring undeveloped portions of their land. In addition, a greater number of parcelized properties were reclassified for residential use or to property classes beyond woodland categories. This is a sign that parcelization not only increases the likelihood of future development, but leads to immediate changes in the utilization of the land.

Furthermore, the effects of parcelization were also apparent in the evolving business practices of foresters. A majority of independent foresters indicated that they were taking steps to adapt their own business practices for projects on small properties, primarily through adjustments in the orientation of their services and

modifications to improve their capacity to carry out small-scale management projects. Younger foresters were more likely to describe feeling squeezed by the increasing parcelization of the private forest base and to indicate that they were making changes in response. However, the increasingly difficult business landscape is leading to declining returns of traditional timber production models and concerns that fewer young people are entering the forestry profession.

Drivers

The analysis of property transactions on a multi-county scale revealed that areas with increased woodland parcelization rates corresponded most strongly with increasing higher property tax rates. Many survey respondents themselves ranked high property taxes and recent tax increases as important influences on their decisions to parcelize their land. This was corroborated by forester descriptions of the private landowners they interacted with, who they believed were responding primarily to tax-related-expenses and other economic pressures. The New York State Legislature and Governor have just reached an agreement to cap annual increases in the amount of property taxes collected annually by school districts and towns at 2 percent a year in order to shift the burden of government expenses away from property owners (NY Bill S.5856-2011). If this measure goes into effect, it may slow the rate of parcelization events for a subset of landowners.

Property taxes do not appear to be the only economic driver of woodland parcelization. County woodland parcelization rates also increased linearly with

declining individual and household incomes, and many survey respondents rated monetary value and financial productivity as important influences on their parcelization decisions. Furthermore, coming out ahead financially was the goal that most landowners remarked that they had achieved by selling land. Together, these economic drivers appeared to have the greatest influence on one subset of parcelizing landowners in particular: *Sellers Under Pressure*.

In addition, several foresters described their belief that there are increasingly more landowners who are interested in residing in forested areas while they hold jobs in urban areas, and who have no interest in owning large pieces of property. This qualitative result was reinforced by the quantitative finding that smaller average commute times were correlated to increased parcelization rates. It may be that areas closer to employment opportunities create demand increased for smaller residential properties. If this demand coincides with forest property owners who are beginning to feel economic pressures, do not have a very strong Sense of Place for their property and are approached with an offer, parcelization may quickly result- particularly among *Opportunist Sellers*.

However, parcelization also appears to be influenced by non-economic factors. After property tax rates, the most significant contributors to increased parcelization rates across the eastern half of the state were lower proportions of populations between the ages of 45 and 64, indicating that working age landowners play a significant role in slowing the occurrence of parcelization. Family members also appear to play a significant role in the decision-making process to parcelize, especially for *Legacy*

Planners, who are significantly more likely to be interested in selling or giving land to a child. However, the majority of all landowner groups were encouraged in their decision by spouses

There were some surprising findings concerning factors that did not seem to be correlated with parcelization rates or landowner decisions to parcelize. Neither population nor household density change were correlated with parcelization rates, indicating that housing pressure is not driving ownership change. Parcelizing landowners did not rank nearby development pressure as an important pressure. Nor were death rates or higher percentages of older county residents strong predictors of parcelization rates, signifying that landowner death and retirement are not the overriding cause either. Correspondingly, few respondents gave high ratings to family deaths or medical emergencies, estate tax planning, or changes in their own physical ability as important influences on their decisions to divide and sell their land.

Key Lessons

By examining the phenomenon of forest parcelization at several scales and from the perspectives of several groups of actors, some key lessons emerged from this research: Landowners parcelize their land because of a diverse set of motivations, including their landownership attitudes, the other people they interact with, and the external factors that can restrict or compel ownership changes. These motivations may come into play depending on the timing and intensity of pressures faced by

landowners. One way of understanding landowner decision-making is to divide them into distinct groupings: those responding primarily to economic pressures, opportunities to sell their land, or children interested in acquiring it. This conceptualization provides a new and useful way of understanding landowners that reveals insights into the decision-making process and may provide new avenues for modifying their behavior to help them and the parties affected by their decisions, to achieve greater benefits.

The spatial and temporal rates of private woodland parcelization have been moderately variable across eastern New York over the last decade. It appears that economic, demographic, and lifestyle factors are differentially associated with parcelization rates, but no single variable is sufficient for predicting where the activity is most likely to occur. This reinforces my findings of landowner complexity and differential motivations. While woodland transfers and parcelization declined along with the economy and real estate demand in the late 2000's, a significant number of these transactions continued to occur. This may be partly explained by a reduced number of landowners responding to financial opportunities for parcelizing their land, but economic pressures and familial desires continuing to draw other landowners to parcelize their properties.

Finally, the process of parcelization has a large range of biological and political effects. Parcelization is accompanied by physical changes implemented by landowners during transfer and these changes are noticeably affecting actors who work with forest resources. Furthermore, with parcelization land use often transitions

and results in owners with values and small properties that challenge the traditional business models of foresters. However, the effects of parcelization are not entirely negative. Many foresters are responding to these changes by modifying the orientation of their services to include values beyond timber production and they are increasing their capacity to take on smaller projects with less intensive harvesting methods and more efficient strategies of cooperation. Many landowners were satisfied with their decision to sell the land and felt that not only had they benefitted financially, but that their action had protected the natural characteristics of the property or allowed it to remain within their family. Furthermore, landowners and foresters also indicated that many of the same pressures forcing landowners toward property division and sale also resulted in participation in government conservation programs, conservation easements, and participation in state forestry programs.

Research Strengths

The ability to pursue an iterative, mixed methods research approach allowed this research to examine new issues and incorporate ideas as they arose. Starting with a broad-scale quantitative analysis I was able to identify a broad range of factors that had been used in other parcelization prediction and quantification studies. While I was unable to test all of these factors at the county level of my first research project (Chapter Two), I was able to incorporate several of them into my later interview and survey questions (Chapters Three and Four). Furthermore, in the course of examining the property and sales data I was using for the quantitative analysis in detail, I was

able to determine of method of utilizing the addresses of landowners who had sold a portion of their land but still lived within the surrounding county. By pursuing a qualitative, grounded theory approach in interviewing foresters I was able to allow conversational themes to develop and proceed to new directions. This led me from my original topic of parcelization to deeper explorations of business practices and tensions occurring within the professional forestry community. Finally, the private landowner mail survey allowed me to assess some of the lessons that emerged from my interviews with foresters, and a small number of landowners, to a broader population. The parcelizing landowner typology and the concept of Sense of Place provided important frameworks to expand my questions to landowners beyond previous models of economic and land use factors determining landowner behavior.

Future Research

The research projects described previously provide new questions and starting points for further in-depth, systematic studies. The quantification of woodland parcelization rates and identification of specific parcelization events continues to be supported by increasingly accurate and complete data. An interesting possibility for expansion of the multi-county model would be to examine the same variables at smaller scales, especially at the township and census block level, in order to determine whether the factors identified demonstrate the same effects. In addition, the information concerning the increasing number and shifting proportions of properties in an area could be linked to more detailed quantification of ecosystem processes, either

through remote sensing or measurements of local water quality, habitat and development changes. The combination of property records and transaction records allows further subsets of landowners to be identified, which has the potential to allow new research explorations that combine owner characteristics with varying land use properties and ownership histories.

Conclusions

As parcelization continues, the future of New York's forests will continue to be dependent on the actions of an increasing number of private landowners. It is critical to understand how private landowners make management and ownership decisions, as well as the implications of these decisions upon others who have traditionally benefitted from forest resources and services. The research presented here provides important insights and new approaches for examining the patterns, drivers, and effects of forestland parcelization that will be useful to academics, resource managers, and planners who want to guide the prospects of New York's forest landscape.

REFERENCES

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APPENDICES

Appendix A. Property classifications used to define Woodland Properties
(Full list available at
http://www.orps.state.ny.us/assessor/manuals/vol6/ref/prclas.htm)

ORPS Code	Property Classification	ORPS Description
Agricultural Properties (100 – 190)		
Rural Residential Properties		
240	Rural Residence with Acreage	A year-round residence with 10 or more acres of land; it may have up to three year-round dwelling units.
241	Primarily residential, also used in agricultural production	(*no description*)
242	Recreational use	(*no description*)
250	Estate	A residential property of not less than 5 acres with a luxurious residence and auxiliary buildings.
260	Seasonal Residences	Dwelling units generally used for seasonal occupancy; not constructed for year-round occupancy (inadequate insulation, heating, etc.). If the value of the land and timber exceeds the value of the seasonal dwelling, the property should be listed as forest
Vacant Land		
320	Rural	(*no description*)
321	Abandoned Agricultural Land	Nonproductive; not part of an operating farm.
322	Residential Vacant Land Over 10 Acres	Located in rural areas.
323	Other Rural Vacant Lands	Waste lands, sand dunes, salt marshes, swamps, rocky areas, and woods and brush of noncommercial tree species not associated with forest lands.
Private Wild and Forest Land		
910	Private Wild and Forest Lands except for Private Hunting and Fishing Clubs	This division includes all private lands which are associated with forest land areas that do not conform to any other property type classification, plus plantations and timber tracts having merchantable timber.
911	Forest Land Under Section 480 of the Real Property Tax Law	(*no description*)
912	Forest Land Under Section 480-a of the Real Property Tax Law	(*no description*)
Private Hunting and Fishing Clubs (920) *		

*Not used to calculate sample for mail survey

Appendix B. Mail survey correspondence to survey sample

(IRB Protocol ID #100-300-1324)

February 23, 2011

Dear Landowner:

Cornell University's Human Dimensions Research Unit is conducting a survey of landowners to learn about your recent experiences transferring ownership of land in Rensselaer, Columbia, or Dutchess County, New York. When we say "transferring ownership" of a piece of land we are referring to selling, trading, or other methods of giving it to a new owner.

Information from this survey will help us better understand the process you went through in transferring ownership of your land and clarify some of the factors and concerns that played into your decision. Your participation in this survey will help Cornell Cooperative Extension and its partners develop new educational materials, services and programs to help landowners who are considering selling their land.

Your name was selected for this survey from the New York State property tax records because it was indicated that you have transferred ownership of a part of your land in Rensselaer, Columbia, or Dutchess County, New York during the last 10 years. If we have contacted you in error, please answer just the first question and return the survey to us so that we don't bother you with unnecessary reminders.

Please complete the enclosed questionnaire as soon as possible, seal it, and drop it in the nearest mailbox. Postage has been provided. Your participation in this survey is voluntary, but we sincerely hope you will take just a few minutes to answer our questions. Your identity will be kept confidential and the information you give us will never be associated with your name.

Thank you in advance for your help with this study.

Sincerely,

Shorna Broussard Allred, Ph.D.
Associate Professor
Human Dimensions Research Unit
Cornell University

Andrew W. Roe
Masters Student
Dept. of Natural Resources
Cornell University

March 2, 2011

Dear Landowner:

Last week we mailed you a questionnaire asking about your experience transferring ownership of land in Rensselaer, Columbia, or Dutchess County, New York. If you have already completed and returned the questionnaire, please accept our sincere thanks for your help. If you have not yet completed it, please take a few minutes now to fill it out. We are very interested in your opinions and would greatly appreciate your response.

If you have not transferred ownership of land in Rensselaer, Columbia, or Dutchess County, New York over the last ten years, please answer just the first question and return the survey to us. Postage has been provided, so just seal the questionnaire and drop it in the nearest mailbox so that we don't bother you with unnecessary reminders.

Thanks again for your help.

Sincerely,

Shorna Broussard Allred
Associate Professor
Human Dimensions Research Unit
Cornell University

Andrew W. Roe
Masters Student
Dept. of Natural Resources
Cornell University

March 16, 2011

Dear Landowner:

We are writing again to request your participation in our survey of landowners in New York State. The study is collecting information to help us learn more about your experience transferring ownership of land in Rensselaer, Columbia, or Dutchess County. Information from this survey will help Cornell Cooperative Extension and its partners develop new educational materials, services and programs to help landowners who are considering selling their land.

It is important that we hear from as many landowners as possible so that our survey results accurately reflect the diversity of experiences selling land in New York State. To date, we have not heard back from you. We have enclosed another copy of the questionnaire for you to fill out. When you're done completing the questionnaire, simply seal it with the white seal provided, and drop it in any mailbox. Return postage has been provided.

Thank you for your time and effort.

Sincerely,

Shorna Broussard Allred, Ph.D.
Associate Professor
Human Dimensions Research Unit
Cornell University

Andrew W. Roe
Masters Student
Dept. of Natural Resources
Cornell University

March 23, 2011

Dear Landowner:

We are writing to you once more to encourage you to participate in our survey of landowners in New York State. Information from this survey will help us better understand the process you went through in transferring ownership of your land and identify some of the factors and concerns that played into your decision. Landowners will benefit from your participation in this survey because the results will help Cornell Cooperative Extension and its partners develop new educational materials, services and programs to help landowners who are considering selling their land.

It is important that we hear from as many landowners as possible so that our survey results accurately reflect the diversity of experiences selling land in New York State. To date, we have not heard back from you and we are very interested in your opinions. If you have not yet completed the survey, please take a few minutes now to fill it out. When you're done completing the questionnaire, simply seal it with the white seal provided, and drop it in any mailbox. Return postage has been provided.

Thank you again for your help.

Sincerely,

Shorna Broussard Allred, Ph.D.
Associate Professor
Human Dimensions Research Unit
Cornell University

Andrew W. Roe
Masters Student
Dept. of Natural Resources
Cornell University

Appendix C. Parcelizing Landowner Mail Survey Questions
(IRB Protocol ID #100-300-1324)

In this survey, "transferring ownership of property" refers to selling, trading, giving away, or in some other way reassigning ownership of a piece of land.

1. In the last 10 years, have you transferred ownership of property in Rensselaer, Columbia, or Dutchess County, New York?

□ Yes □ No

If you answered "No" to this question, thank you for your time. Please seal this questionnaire and return it to us, so we don't bother you with unnecessary reminder letters.

If you answered "Yes", please continue with Question 2

(If you have transferred ownership of more than one piece of land, we would like to hear about the land and your experiences from the most recent transfer)

Original Land Ownership
The following questions refer to the original piece of land in its entirety, before you transferred ownership of it.

2. When did you first acquire ownership of this property? _____ (*year*)

3. Prior to your ownership, was the property owned by a previous generation of your family?

□ Yes □ No

4. Which of the following best describes your original form of ownership of the property?

□ Individual or immediate family □ Partnership

□ Family-held corporation □ Other (*please specify*):

5. How often did you spend time on the property? *(Please select one)*

□ Full-time- it was your primary residence □ Once per week

□ Monthly □ One to several times per year □ Never

6. Did you earn income from this property? □ Yes □ No

7. To what extent do you agree or disagree with the following statements about your original property? *(Please check one box per line.)*

Thoughts about your property:	**Strongly Disagree**	**Disagree**	**Neither Agree nor Disagree**	**Agree**	**Strongly Agree**
It was my favorite place to be.	□	□	□	□	□
For the things I enjoyed most, no other place could compare.	□	□	□	□	□
Everything about it was a reflection of me.	□	□	□	□	□
I felt happiest when I was there.	□	□	□	□	□
It was the best place to do the things I enjoyed.	□	□	□	□	□
I felt that I could really be myself there.	□	□	□	□	□

8. How important were the following as reasons for why you owned the original property? *(Please check one box per line.)*

Reasons for owning this property:	**Not at all Important**	**Slightly Important**	**Moderately Important**	**Very Important**	**N/A**
As your primary residence	□	□	□	□	□
For a second home or vacation home	□	□	□	□	□
It is where you grew up	□	□	□	□	□
To live close to your family	□	□	□	□	□
To enjoy it with your family	□	□	□	□	□
To pass the land on to your children or other heirs	□	□	□	□	□
To enjoy natural beauty or scenery	□	□	□	□	□
To protect nature and wildlife	□	□	□	□	□
For privacy	□	□	□	□	□
For hunting or fishing	□	□	□	□	□
For recreation	□	□	□	□	□
As an investment (i.e.to sell in the future)	□	□	□	□	□
As a rental property	□	□	□	□	□
For commercial farming	□	□	□	□	□
For forest products to sell (e.g. timber, maple syrup, etc.)	□	□	□	□	□
For forest products for your family's use (e.g. firewood, maple syrup, etc.)	□	□	□	□	□
Other (please specify):	□	□	□	□	□

9. Have you ever attended educational programs about forestry or land management for this property?

□ Yes □ No

10. Did you have a written forest management plan for this property?

□ Yes □ No □ N/A

Your Experience Transferring Land

If you have transferred (sold, gifted, traded) more than one property, please refer to the most recent transaction.

11. How did you transfer ownership of the property?

□ Sold it □ Gifted it

□ Traded it for a different piece of property □ Other (please specify):

12. When did you transfer ownership of the property? _____ *(year)*

13. Who received the land you transferred ownership of? *(Please choose all that apply)*

□ Spouse □ Child (or children) □ Sibling(s) □ Other family member

□ Personal friend □ Neighbor at the time □ Co-worker □ Land developer

□ Another Individual □ A company □ A government agency (please specify):

□ A non-profit organization (please specify): □ Other (please specify):

14. How large was the property you transferred ownership of? _____ acres

15. In how many separate parcels was the property you transferred? _____ parcels

16. Did you earn income from the piece of land you transferred? □ Yes □ No

17. A. Before you transferred ownership of this property, had you previously transferred ownership of other land? □ Yes □ No

B. If yes, how many other times had you previously transferred ownership of property?

_____ times

18. Did you intend to transfer ownership of this property when you originally acquired it?

□ No □ Yes, all of it □ Yes, but only part of it

19. How did the following people influence your decision to transfer ownership of the property? *(Please check one box per line.)*

Groups of People:	**Greatly Discouraged**	**Moderately Discouraged**	**Neutral**	**Moderately Encouraged**	**Greatly Encouraged**	**Not Involved in Decision**
Parents	□	□	□	□	□	□
Siblings	□	□	□	□	□	□
Spouse	□	□	□	□	□	□
Children	□	□	□	□	□	□
Friends	□	□	□	□	□	□
Co-workers	□	□	□	□	□	□
Neighbors	□	□	□	□	□	□
Other landowners	□	□	□	□	□	□
Realtors or Developers	□	□	□	□	□	□
Other Interested Buyers	□	□	□	□	□	□
Local government officials	□	□	□	□	□	□
Others (please specify):	□	□	□	□	□	□

20. A. Have any landowners you know or have known transferred ownership of their land? □ Yes □ No

B. If yes, were they any of the following? *(Please choose all that apply)*

□ Family □ Friends □ Co-workers □ Neighbors □ Other landowners in your area

21. Were you approached by loggers or foresters interested in harvesting timber from your land before the sale? □ Yes □ No

22. How important were the following economic factors in influencing your decision to transfer ownership of the property? (*Please check one box per line.)*

Factors:	**Not at all Important**	**Slightly Important**	**Moderately Important**	**Very Important**	**N/A**
High property taxes	□	□	□	□	□
Recent increases in property taxes	□	□	□	□	□
High monetary value of the land	□	□	□	□	□
Financial productivity of the land	□	□	□	□	□
Receiving an offer to buy the land	□	□	□	□	□
Loss of all or a portion of your income	□	□	□	□	□
A divorce settlement	□	□	□	□	□
Retirement from your job	□	□	□	□	□
A death in the family or medical emergency	□	□	□	□	□
An unexpected major expense	□	□	□	□	□
Planning a land transfer to heirs	□	□	□	□	□
Estate tax planning	□	□	□	□	□
Other economic factor (please specify):	□	□	□	□	□

23. Before transferring ownership of the property, did you do any of the following things to modify the property? *(Please choose all that apply)*

□ Constructed new buildings □ Constructed new roads

□ Created new cleared areas

□ Conducted final timber harvest □ Other modifications (please specify):

24. How important were the following land-use factors in influencing your decision to transfer ownership of the property? *(Please check one box per line.)*

Factors:	**Not at all Important**	**Slightly Important**	**Moderately Important**	**Very Important**	**N/A**
Little time to use the property	□	□	□	□	□
Changes in your physical ability to use the property (e.g. due to age)	□	□	□	□	□
The desire of family members to use the land (e.g. for home lots, farms, etc.)	□	□	□	□	□
Little interest in the property by your heirs	□	□	□	□	□
Local land use zoning guidelines	□	□	□	□	□
A need to move to a different place	□	□	□	□	□
The opportunity to buy a different piece of land more aligned with your interests	□	□	□	□	□
Pressure from nearby development	□	□	□	□	□
The way the new owner intended to use the land	□	□	□	□	□

25. What alternatives to transferring ownership of the property did you consider? *(Please check one box per line.)*

Alternatives	**Did not Consider**	**Considered but did not do**	**Did but still sold land**
Leasing all or part of the property	□	□	□
Enrolling all or part of the property in a government conservation program	□	□	□
Harvesting timber from the property	□	□	□
Placing a conservation easement on the property	□	□	□
Other (*please specify*):	□	□	□

26. Did transferring ownership of the property allow you to achieve any of the following outcomes? *(Please check one box per line.)*

Transferring ownership of my land allowed me to…	**Yes**	**No**	**This was not one of my goals**
Come out ahead, financially	□	□	□
Pay for a large expense	□	□	□
Help a friend or family member	□	□	□
Dissolve joint holdings	□	□	□
Maintain the land's traditional use	□	□	□
Achieve a desired new land use	□	□	□
Protect nature	□	□	□
Give a lot of land to a family member	□	□	□
Other (*please specify*):	□	□	□

27. How satisfied are you now with your decision to transfer (sell, gift, or trade) your land? *(Please check one box per line.)*

Extremely Dissatisfied	Somewhat Dissatisfied	Neutral	Somewhat	Extremely Satisfied
□	□	□	□	□

28. To what extent do you agree or disagree with the following statement about the property you transferred? *(Please check one box)*

Statement:	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
I really miss the property now that I no longer own it	□	□	□	□	□

29. Are you currently planning to transfer ownership of other pieces of land in the future?

□ Yes □ No

30. Was the land you transferred divided from a property you owned, or adjacent to another property you owned at the time? □ No □ **Please skip to Question #34**
□ Yes

31. How large was the adjacent property you retained? _____ acres

32. How did the property that you transferred compare to the property that you kept? *(Please check one box per line.)*

	Compared to the part you kept, the transferred property had…			
Features:	**Less**	**The Same Amount**	**More**	**Don't Know**
Woods	□	□	□	□
Cleared areas	□	□	□	□
Agricultural fields	□	□	□	□
Bodies of water	□	□	□	□
Number of buildings	□	□	□	□
Road frontage	□	□	□	□
Steep slopes	□	□	□	□
Scenic qualities	□	□	□	□
Recreational opportunities	□	□	□	□
Solitude	□	□	□	□
Wildlife habitat	□	□	□	□
Monetary value per acre	□	□	□	□

33. Do you currently own any part of the original property or land adjacent to the property you sold?

□ Yes □ No

Background Information

34. What is your gender? □ Male □ Female

35. In what year were you born? _____

36. What is your current marital status?

□ Single, never married □ Married/living with a partner

□ Divorced/separated □ Widowed

37. A. Do you have children? □ Yes □ No

B. If yes, how many children do you have? _____

38. What is the highest level of education you have completed?

□ Some high school □ High school graduate/GED

□ Some college or other post-high school education

□ Completed a 4-year college degree □ Graduate work or graduate degree

39. Which of the following best describes your work situation at the time of the property ownership transfer?

□ Self-employed □ Employed full-time □ Employed part-time

□ Not employed, but looking for work □ Not employed, not looking for work

□ Retired

40. What was the total income of your household (pre-taxes) last year?

□ Less than $25,000 □ $25,000 to $49,999 □ $50,000 to $99,999

□ $100,000 to $199,999 □ $200,000 or more

Appendix D. Forester Interview Contact Email (IRB Protocol ID #100-300-1324)

Hello,

I am a graduate student in the Department of Natural Resources at Cornell University conducting a study on the effects of forestland parcelization in New York. As part of my research and extension project, I am interested in talking with NY foresters that practice “small scale forestry” (i.e. small volumes or small parcel woodlands). The goal is to learn about professional foresters' perspectives on small scale forestry and forestland parcelization in general.

If you're interested in talking with me, please email awr45@cornell.edu or call 607-255-3146 to work out a particular day and/or time that might work best for you. Interviews will be conducted in person if possible or over the phone. If possible, I would also like to join you on a visit to a site you are have recently worked on. If you have any questions about the project or interview, please don't hesitate to contact me. Thanks and I look forward to hearing from you.

Andrew W. Roe

Master's Student
Dept. of Natural Resources
Cornell University

Appendix E. Forester Interview Guide (IRB Protocol ID #100-300-1324)

Interview Stage	Goal	Question	Probes
Introductory	*To learn about the work of forester*	What type of forest management work are you involved in?	What counties/DEC Region do you work in?
			Can you describe some of the projects you have recently been doing?
Introductory	*To learn about the work of forester*	Who is your clientele?	Do you work with Private Landowners primarily?
			Are many of your clients second home owners?
			How do you approach them?
Key	*Determine Forest Parcel Size Distribution*	What are the sizes of the private parcels you work with?	What is the distribution of the sizes (percentages)?
			Has this changed over the last 10 years?
			Do you think it will change over the next 10 years?
Key	*Determine perceptions of small scale forestry*	How would you define/What comes to mind when you hear "Small Scale Forestry" , "Woodscaping", or "Boutique forestry"?	What activities would these types of management entail?

Interview Stage	Goal	Question	Probes
Key	*Determine how Management Activities relate to Parcel Size*	Have you seen differences in owner objectives based on their parcel size?	How do you determine what objectives the forest owners have?
Key	*Determine how Management Activities relate to Parcel Size*	Are there differences in management options between different sizes of properties?	Does parcel size influence how you interact with loggers, other forestry professionals?
			What are the biggest challenges in small woodlot/small acreage projects?
Key	*Determine how Management Activities relate to Parcel Size*	Have you worked with clients that have recently purchased land or are planning to sell their land?	Why were they buy or selling their land?
		How did this affect their management options and objectives?	Does the way people obtained their land, or whether they are new vs. long-time owners affect the management options they choose?
Key	*Determine how Management Activities have changed*	Have your forest management activities changed over the last 10 years?	
Key	*Economic Feasibility:*	Is it economically feasible to work on small woodlots/parcels when the harvest volume is small?	How do you make it feasible? Do you ever aggregate volume or services across multiple ownerships? (for example, pooling the resources of multiple private woodlot owners in a harvest)

Interview Stage	Goal	Question	Probes
Key	*Determine how Management Activities have changed/Business model*	Have you had to change the way you do business to adapt to smaller parcel size?	What equipment do you currently use?
		What kind of changes have you made?	Have you made changes in the types of equipment you have invested in?
			Have you made changes in Staff Size?
			Do you plan to make changes?
Key	*Determine perceptions of parcel size changes*	What factors do you think are affecting changes in parcel size?	
Key	*Determine perceptions of parcel size changes*	Are there factors slowing these changes?	Are there programs that are helpful in keeping landowners involved in forest management activities and keeping people from selling off parts of their land?
			Do you think the 480-a forest tax law is effective? Do you think the minimum size requirement should be lowered?
Key	*Determine perceptions of parcel size changes*	What are your main concerns for forestry over the next 10 years?	How is this affected by parcel size?
Concluding	*Determine directions of future work*	Do you know of any other foresters or loggers that work in small scale forestry?	
Concluding	*Determine directions of future work*	Do you have anything else that you would like to add?	