

Small-scale and Amenity Focused Forestry: Filling a Market Niche

By

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Abstract

Urbanization, changing forest landowner values, and restructuring forest industry are creating challenges for the active management of small parcels of forestland. Many traditional service providers are reluctant to service small acreage parcels due to economies of scale, shrinking profit margins for unprocessed stumpage, and changing landowner expectations. They do not understand traditional forestry operations and do not know where to look for service providers. A gap in our nation's forest system has emerged.

A new market opportunity exists for service providers willing to work with small-scale forest landowners. In this study, over sixty forest service providers working with small acreage or amenity oriented clients were interviewed to determine how their business is structured, how they charge for the services they provide, what reactions they get from their clients, and how successful they perceive themselves to be. Informants came from a wide variety of professional backgrounds, including forestry, logging, arboriculture, landscaping, and woodworking. In addition, about 20 public-forest professionals were interviewed to determine how they and their programs are changing in response to emerging conditions.

Successful service providers generally charge by some measure of time and materials rather than by commission. They exhibit a willingness to diversify their business to offer a bundle of services, and to cooperate with professionals in related industries. Value-added processing and creative marketing assist service providers in achieving a profit from small-scale tracts with traditionally low-value products. Lessons learned from these early adopters will assist other service providers interested in working with small acreage private landowners.

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Problem Statement

“I’ve seen numerous instances with people having 5 acres, it’s difficult to get their timber cut or even managed. It’s easy to plant it, but silviculturally, it’s very small and operations can be very expensive. Because of the small size, and I think the problem is going to be compounded because this area is next to some rapidly growing urban areas. There’re a lot of landowners moving in, buying 20 acre, what I call “ranches” that might have just a few acres of timber. And they want it managed, but it just can’t be done on a scale like industrial forestry... Another thing is, with the fragmentation with the new landowners, their expectations are a little different from in the past. They expect less disruptive operations.... I do a certain amount of work in [urbanizing areas], and typically, the small acreage problem there is compounded by city ordinances. So the problem there is local ordinances, especially problems with temporary logging roads. They generally see road entrances as a permanent structure, and with forestry, they’re usually a temporary, one-time use.”

This quote comes from a forester living in eastern Virginia. The area where he has always lived and worked is undergoing drastic changes. Urbanization is causing exponential increases in the amount of developed land, as well as fragmenting remaining parcels of forestland. Timber markets are declining, as both the price of timber drops and mill capacity falls. New, small acreage landowners are less interested in traditional forest management, and own land for reasons other than revenue production; as such, they are less likely to actively manage their land. Public forestry agents who work with the public interest are finding it increasingly difficult to reach these new landowners, as their number, diversity, and management objectives are changing such that agencies struggle to maintain relevancy. Together, all of these factors are making the active, sustainable management of fragmented, small-scale, forested ownerships increasingly difficult.

The traditional forest management industry is for the most part, not interested in working on these shrinking, suburbanizing forest lands. Most traditional foresters and loggers charge for their work on a commission basis, which is not profitable on small acre woodlots due to economies of scale. As nearby lands develop, traditional foresters and loggers face community or neighborhood ordinances against things such as noise levels or temporary roads. The proximity of neighbors can also limit management options.

However, the management needs on small, fragmented woodlots are creating an opportunity for an emerging small-scale forest management industry. Foresters are well-suited to fill this niche, but it will require that they make some changes in their way of thinking and their business structure, like the forester quoted above did. This volume addresses need for a new small-scale forestry service industry, and how some service providers are changing their attitudes and business practices to address this emerging niche.

Literature Review

This literature review addresses trends in changing land use, forest industry, timber markets, land management, and public forestry that are creating challenges for traditional forest management on the growing number of fragmented, small acreage, forested lands. It also looks at some emerging concepts that attempt to address this issue. Finally, it addresses why active forest management on small-scale acreages is necessary, and introduces the concept of a new, branded, small-scale forestry service industry as a way to meet the emerging land management needs of small acreage landowners.

Land Use Trends

Urbanization is occurring rapidly, and urban and exurban areas now cover 4 to 5 times the area they did in 1950 (Brown et al, 2005). Between 1980 and 2000, the population of the United States increased by 24 percent, but the amount of land devoted to urban and built-up use increased by 34 percent; populations are spreading out as they are increasing (Alig et al, 2004). Exurban growth increased most dramatically in the eastern United States, especially in the southeast, which had the largest increases in developed area between 1982 and 1997. The south also adds more developed area per additional resident than any other region of the United States (Alig et al, 2004). Between 1950 and 2000, cropland area decreased by one-fifth in the Eastern United States, though forest area provided the greatest amount of land to be converted to urban uses (Brown et al, 2005). Increasing development is related to increasing population densities and income levels, especially in the southern United States. With continued rising population levels, it is expected that this trend will continue. Alig et al (2004) project that urban land area will increase 79 percent nationwide by 2025. It is expected to increase 75 percent in the south, while the population density increases by only 49 percent. Of the total land area in the contiguous United States, urban area is expected to increase from 5.2 percent in 1997 to 9.2 percent in 2025. But even with this growth, the total land area affected is still modest.

Expanding urbanization affects surrounding, formerly rural lands as well. Fifteen percent of US farmland is expected to have its value increase due to nearby urbanization. This can increase a landowner's net worth, giving them more to borrow against, but it often increases taxes, perhaps leaving them unable to afford to keep the land. One of the impacts from urbanization will be a smaller rural land base and changing land use patterns within that land base (Alig et al, 2004). In fact, the area of timberland is expected to be about 3 percent smaller in 2050 than today. Even for land that remains in timber production, the nature of the timberland sometimes changes, a fact that is not reflected in the total forest cover statistics. Upland hardwoods are disappearing as pine plantations are planted (Alig and Planting, 2004).

In addition to having less available rural timberland as urbanization encroaches, the remaining land is becoming increasingly fragmented. About 70 percent of forest lands east of the Mississippi river are owned by non-industrial private landowners (NIPL). Larger land holdings are often divided and sold because of the higher price per acre for smaller land parcels (Wear and Newman, 2004). Two studies from New York indicated

that average parcel size is decreasing (Germain et al, 2007; Munsell and Germain, 2007). There are concerns that parcelization is decreasing both the quantity and quality of timber growing on non-industrial private lands. Theobald (2004) points out that exurban areas are understudied, but crucial to understand, as they occupy five times as much land as urban areas, and have a great impact on public lands and protected areas.

Another issue associated with urbanization and parcelization is decreasing economies of scale, especially for tracts below 25 acres. Sampson and DeCoster (2000) call tracts of this size “too large to ignore and too small to manage as a sustainable unit.” This makes sustainable forest land management difficult even for people with a desire to manage their land. Forest industry is adapting to smaller wood lot sizes, although they eventually become so small that traditional forest management, or even a one time harvest cannot be justified (Germain et al, 2007).

Forest Industry Trends

Changes in timber markets are another factor making traditional forest management difficult for landowners. Timber markets have undergone dramatic changes in recent decades. Clark (2001) stated that global wood production is growing, though slowly, while the economic significance of wood products is declining. Wood prices are decreasing relative to other goods and services. Markets for particleboard, medium density fiberboard, and oriented strand board are increasing, replacing much of the market for traditional solid wood products. These products allow more of the log to be utilized, decreasing waste. This trend is driven by the increasing scarcity of large logs compared to smaller ones. Demand for lower value, more readily available wood is increasing, while demand for higher value more scarce wood is decreasing. This is beneficial to lumber buyers, but maybe not to landowners and forestry service providers (Clark, 2001; Wear, Carter, and Prestemon, 2007).

Although global trade in forest products has grown in the past decade, that growth is not coming from the United States. Canada, Russia, and China are coming to play a larger role in the world timber markets. Demand for wood is flat in the developed world, but booming in Africa, Latin America, Asia, and Eastern Europe. These shifts in the global wood market have changed the role of the United States (Franklin, 2003; NCSSF, 2005; Collins et al, 2008).

In the wood products industry, demand for paper is the most rapidly growing and has the highest value. However, the amount of pulp made from wood is decreasing; non-wood pulp and recycled paper are making up the difference. Recycled paper now comprises almost 38 percent of paper content (Wear, Carter, and Prestemon, 2007; Clark, 2001). Improved pulping technologies, and the use of mechanical pulping rather than chemical, are also reducing the amount of raw wood needed for paper production. Demand for paper is growing, especially in developing countries, where it is used to increase health standards with wrapping and packaging for food (Clark, 2001).

Global wood consumption is stagnating in developed countries due to decreased demand relative to other goods and services, as well as the development of wood-saving technologies (NCSSF, 2005) for the wood products industry to continue to grow globally, increased demand from developing countries is needed. There is little information on the available global wood supply, but projections of wood consumption are often over-

estimated, because they do not take into account increases in wood-saving technology which change the product mix being consumed from sawn timber to wood-based panels, allowing more utilization of small logs and pulpwood rather than larger logs (Clark, 2001). If self-regenerating native forests have a higher ecological value, then those forests should be managed for ecological reasons, and timber production should occur through plantation silviculture on former agricultural lands (Clark, 2004).

Oliver (1999) suggests an alternative to wood production through intensive management of plantations; plantations provide high monetary yields only through high initial investment costs. They also require relatively short rotations, which produces innately week wood. As an alternative, they suggest integrated management, which involves initially investing less in stand establishment, and obtaining a lower final volume. However, a more diverse suite of silvicultural methods is applied, and more investments in information systems create a more diverse suite of timber and fiber products to market. This system allows the manager to avoid the two major problems of intensive plantations: high early investment costs and low-quality, short-rotation wood.

Wear, Carter, and Prestemon (2007) provide similar data in market trends pertaining specifically to the US South. Production of timber has grown relative to other areas of the country as well as in absolute terms. Many factors currently affect the southern timber market: land has changed ownerships with forest industry's divestiture of their land to Timber Investment Management Organizations (TIMOs) and Real Estate Investment Trusts (REITs), and demand has shifted with shifts in domestic consumption and international trade (Clutter et al, 2005). Many older processing facilities have closed, especially paper mills. Production of engineered wood products is growing, timber supplies are growing, and there is persisting potential for growth. Domestic demand is expected to increase in the long-term (Wear, Carter, and Prestemon, 2007).

Capacity to accept pulpwood in the south has decreased by about 16 percent between 1998 and 2003. Other countries such as Sweden, Chile, Finland, and Brazil expanded their capacity during that time. World demand for paper products is increasing, but that demand is being met in other locations with more competitive advantage in labor costs, raw materials costs, and closer proximity to final markets. Low costs and labor make paper from South America competitive in US markets, even with increased transportation costs. In fact, Franklin (2003) states that few if any forest sites in the northern hemisphere can directly compete with those of the southern hemisphere in terms of biological productivity, let alone cost of production. Softwood sawmill capacity, however, has not declined, and has in fact remained stable or increased in recent years. Demand for small diameter, less expensive timber is increasing compared to demand for veneer logs (Wear, Carter, and Prestemon, 2007).

Changing markets, along with other factors, are driving land use changes. Pine plantations have been expanding since the 1950s, and now make up about 16 percent of all timberland. These areas are intensively managed and can produce three times as much as naturally regenerated forests. Though hardwood pulpwood has increased in price steadily over the last few decades, little investment in hardwood plantations have been made, perhaps because plantation yield is not that much higher than the yield from natural stands (Wear and Newman, 2004).

Stagnant demand for wood products overall, increasing demand for smaller, cheaper logs relative to larger, more valuable logs, the increasing importance of non-

wood sources of fiber, and the increasing availability of maturing plantation timber are forces that are combining to decrease the cost of wood relative to other products and services (Wear, Carter, and Prestemon, 2007).

The supply side of this equation is affected by changing patterns of land use. As populations grow, millions of acres are being converted from forests to developed land uses, especially along the eastern seaboard, and in the suburbs of large metropolitan areas. In fact, Wear and Newman (2004) named urbanization the single most substantial threat to forest sustainability in the southern United States. Some suggest that 12 million acres of forest will be converted to non-timber producing purposes by the year 2020. It becomes more profitable for landowners to sell a property to developers than to continue practicing forestry on it. Wear and Newman (2004) examine the prices of timberland as an indication of predicted future land use. If the highest value of the land lies in timber production, then it will be priced accordingly, but if its highest value is in development, then prices will rise, signaling development before it occurs. They state that land prices reflect the property's highest value use, and not only its current value, but its expected future value as well, since land markets are forward looking. They found that timberland prices remain low and stable when forestry is the anticipated continued future use. After prices pass a certain threshold, they anticipate that the tract is likely to be developed in the next 10-15 years. They also indicate that higher household incomes and higher population densities in an area will increase timberland value, as it increases the likelihood of land conversion and development.

Some landowners who find that their land is unexpectedly and suddenly worth a great deal more than they had anticipated, decide to cash in and sell their land for development. Higher land values also mean higher property taxes, which creates an additional unexpected burden for landowners who wish to keep their land forested. Many may be forced to sell all or part of their land in order to pay taxes. Higher taxes also increase costs, making timberland management unprofitable (Wear and Newman, 2004).

Oliver and Mesznik (2005) state that because the global wood supply is greater than demand, investment in forestry will only be profitable for wood with below-average planting and harvesting costs, locations with lower transportation costs, high quality common woods, or highly prized rare woods. To stay profitable, they must diversify into high-quality niche markets, increase the demand, and manage forests for multiple assets for additional income.

Land Management Trends

Several studies (Kendra and Hull, 2005; Kluender and Walkingstick, 2000; Butler and Leatherberry, 2004) document the changing interests and motivations of new forest landowners. For instance, Kendra and Hull (2005) established through surveys to forest landowners and interviews with government and nongovernment organizations and service providers that landowners are interested in amenity values rather than the monetary value of their timber. However, landowners are willing to harvest to improve such things as wildlife habitat, forest health, and privacy. Most are willing to harvest and make a profit as long as amenity values are respected.

There are currently more landowners than ever before, but they own a smaller average number of acres. Once a forest reaches below a certain acreage, traditional

forestry service providers find it difficult to make a profit by harvesting on that site. Urbanizing areas lose management capacity as forestry service providers relocate due to decreasing revenues. Traditional sources in income for landowners, such as timber harvesting and hunting leases, become problematic in urbanizing landscapes (Sampson and DeCoster, 2000). Stands with high-quality, valuable timber may still be harvested profitably from small acreages, but stands that are high-graded or low quality often cannot. Landowners desiring a thinning operation or improvement cut on their small acre stand might find it impossible to find a traditional forestry service provider willing to work with them. Harvesting does still occur in small acreages, but there is a trend towards exploitive harvesting on these tracts, as well as on larger forested acreages (Munsell and Germain, 2007).

The motivations of forest landowners are changing. There is some concern because these landowners own pieces of forests and live in or near them, but seem to view them primarily as decorations, since they make their money from work unrelated to the lands on which they live. In their study of landowners in Virginia, Kendra and Hull (2004) found that their reasons for owning forestland are not only economic, but include a number of amenity values. The “traditional” forest landowners, whose primary objective is to manage timber for economic return, are only one group in a number of landowners that manage for a diversity of reasons (Kendra and Hull, 2004). However, many of them do have an increased environmental awareness, and would be willing to manage their land for environmental reasons. Many new landowners are affluent and less interested in traditional timber management, but still interested in management that improves amenity, environmental, and property boundaries.

Traditional forestry service providers are finding it difficult to work in suburban or urbanizing landscapes, even though such areas may have a great deal of unmanaged forest cover (Barlow et al, 1998). Many residents of these areas have very different expectations than traditional forestry service providers are accustomed to dealing with. In some areas, city and community ordinances prevent forestry work from happening. They may prevent the entrance of some of the necessary heavy equipment, or prevent the establishment of temporary logging roads (Egan and Luloff, 2000).

Forest management for timber production is also operating under a narrowing profit margin (Lewis, 1996). Forest products companies, such as paper mills, are leaving the responsibility of finding, purchasing, and arranging for the harvest of available timber to the loggers that supply them. They are pushing the pressure of organizing and financing access to trees down the supply chain. This reduces costs for the mills by pushing those costs to the logger (Sinclair et al, 2003). Increasing amounts of environmental regulation also raise the costs of logging. For instance, the median cost of implementing best management practices (BMPs) in Virginia was \$18.90 per acre in 1998, as compared to the cost of harvesting with no BMPs in place (Cubbage, 2004). Timber harvested with BMPs does not obtain a higher price on the market, so those additional costs are born by the landowner, as loggers must charge more to cover the cost of harvesting operations. Rising fuel costs and smaller acreages, meaning more transportation costs between sites for the same amount of wood, along with many of the above-mentioned factors are reducing profit margins such that many loggers can no longer afford to stay in business. Many contractors quit or move away from suburbanizing areas due to diminished activity (Sampson and DeCoster, 2000). For many

landowners, small acreages, high harvesting costs, and degraded standing timber might reduce profits such that they choose not to harvest or manage their land at all.

Public Forestry trends

Changing forest landowner demographics are also affecting members of the public forestry sector's ability to reach the public with assistance and management information about their land. There are now more forest landowners who own smaller parcels of land, and generally, landowners with small to mid-size tracts, women, and minorities that have less forestry knowledge and training, and are not using their land to the full advantage (Huges et al, 2005). Since there are often the same number of public forestry employees – or fewer, with decreasing budgets – they have an increasingly difficult job. A greater number of diverse people own land, including retirees, professionals, and white-collar workers. Society is demanding more forest products as well as amenity values. Public forestry employees are finding it increasingly difficult to reach forest landowners with traditional methods (Downing and Finley, 2005; Huges et al, 2005).

There has also been a trend towards the devolution of forestland decision making power from the federal level to state, local, or individual landowner levels (Kellerty, 2000). This involves placing decision making power in the hands of local people rather than a remote centralized government agency. The theory is that local people are more effective managers because they bring their local values and ecological knowledge. But the responsibility and cost of decision making is also placed on individuals or lower government levels, which they may not be equipped to handle. Devolution became popular in the 1970s as people became disenchanted with large scale, centrally planned conservation and development projects. This system is by no means perfect, and it does tend to work better in developed countries than in developing countries (Kellerty, 2000).

Emerging Responses

All of these challenges are leading to a crisis in maintaining forestland (Sampson and DeCoster, 2000). Land bases are fragmenting and converting to other uses due to urbanization and changing ownership patterns. Traditional forestry contractors and landowners are finding it difficult to continue operating as they always have. New landowners are not interested in forest management because they see it as irrelevant to their ownership objectives. Despite all of these pressures, forest management is still needed, perhaps more than ever. Sampson and DeCoster (2000) assert that maintaining private land in forests rather than development is crucial, since “once the forest gives way to asphalt, no forestry skill will fix it.” They assert that as a solution, we need to help people manage small forests, help governments plan growth patterns, and convince the conservation community that linking economic use to sustainably managed forests protects them.

Several concepts have arisen in recent years, both in the literature and on the ground, that attempt to address problems with forest land management. One is the concept of a working or multifunctional forest. Both terms operate on the concept that forests can fulfill multiple roles at the same time, including commodity and non-commodity uses (McCarthy, 2005). The terms are also somewhat ambiguous, and can

draw in multiple stakeholders who attach differing meanings to the term. This ambiguity lends power to the terms. For instance, some see the term “working forest” as meaning a forest which “works” to provide such things as ecosystem services, while others view the term as a forest in which work, such as timber production, takes place. Policy makers identify working forests as a middle ground, in which multiple, traditionally competing interests can be met (Wolf and Klein, 2007). The idea is to keep the working forest working, because working forests provide more vitally important benefits than developed land. Working forests can have a place in the suburbanizing landscape as well, though it is difficult, because capacity for management dwindles. Also, few recognize the ecological value of these lands, focusing only on “pristine” lands as worthy of conservation and investment. Gordon et al (2005) argue that working landscapes are superior to parks and natural preserves near urbanizing populations because they can be obtained at a lower cost and provide the same ecosystem services.

Concepts such as green infrastructure and smart growth integrate working forests and open spaces into the urban or suburban landscape. According to Benedict and McMahon (2002), green infrastructure is an interconnected network of green space that conserves natural ecosystem values and functions and provides associated benefits to human populations. As a planning concept, it takes conservation values into account as well as growth management, land development, and built infrastructure planning. It works by creating a system of ecologically important hubs, which may be working farms, parks, or residential forestland. These areas provide origins and destinations for ecological processes and wildlife. Hubs are then connected by links, which tie the system together. Incorporating open spaces into the urban or suburban environment is important, because they maintain wildlife habitat and biodiversity, natural landscape processes, cleaner air and water, recreation opportunities, better health, a connection to nature, and higher property values for the areas adjoining green spaces. Creating or maintaining green infrastructure can also reduce the cost of built infrastructure for a community (Benedict and McMahon, 2002).

Similarly, smart growth is an effort to reduce or curb urban sprawl by refocusing development with public and private subsidies. Development is redirected from the outer edge of suburbs to revitalized inner-cities, vacant lots within cities, older, closer suburbs, and cluster designed, compact new suburbs that are easy and cost effective to provide with water, electricity, and waste removal. It encourages mixing land uses, such as commercial spaces with single family residential and multi-family residential; such policies are often discouraged by current zoning laws, but would allow people to live near their place of work. Smart growth also reduces the amount of transportation needed for people to get from their homes to their workplaces as well as making public transportation more workable, and leaves the natural areas surrounding cities free to be protected and restored (Burchell et al, 2000).

Green infrastructure and smart growth both specifically plan for open green space within the urban/suburban landscape, which are sometimes filled by forests. They often specify that the purpose of this set-aside land is recreation, aesthetics, biodiversity, or wildlife corridors. Some are protected with conservation easements. However, these plans do not provide for the management of set aside lands. One source stated that the purpose of cluster development was to arrange open spaces so they created an interconnected open space network through urban and suburban areas. Cluster designs

provide natural cover for wildlife and allow them to move through the landscape in greenways. They create buffers of natural vegetation to help with storm water control and provide groundwater recharge. They mentioned planting unforested riparian corridors with trees and mowing wildflower fields once a year (Arendt, 1996), but they mentioned no forest management. Another source discussed how responsibility for the management of the neighborhood's open space was placed in the hands of the neighborhood's residents, which can be a daunting task with conflicting values, little land management experience, and low participation (Austin and Kaplin, 2003).

Little literature exists concerning what should be done with open spaces once they are preserved from development. The goal of these planning policies seems to be to ensure that open spaces are set aside. It is assumed that simply by protecting them from development, they will perform the tasks they were protected for. And perhaps they will; certainly open spaces are superior to developed areas for providing such benefits as air and water quality. Perhaps open spaces will be better suited for biological diversity with active management. Perhaps small-scale harvesting from wooded open spaces could provide enough income to pay for upkeep, or provide local raw materials for park benches or playground equipment for nearby parks.

Researchers have developed other approaches and plans to address the increasingly fragmented exurban forest landscape. Some suggest that cooperation in forest management among adjoining landowners is essential (Jacobson, 2002). Some landowners with similar goals join together to form forestry cooperatives, as described by Hull and Ashton (2008). Cooperatives eliminate competition between nearby landowners. They also emphasize amenity and environmental qualities over short-term profits, which match the objectives of many new forest landowners.

Other trends are encouraging forest industry to become independently certified. Advocates of forest certification say that it is a way to ensure sustainable forest management and a sustainable forest management industry in the future. They also say that forest certification is beneficial to the industry as well as the environment. Forest industry companies that are certified will have access to customers and investors that consider the environmental and social performance of the companies they work with (Howard and Stead, 2001).

Justification

A strategy is needed for servicing the urbanizing forest, and to keep land that would normally go unmanaged under active management. Of special concern to this study are owners of small and suburban woodlots.

As forestlands are parcelized and sold, there are a greater number of forest landowners from increasingly diverse backgrounds who have non-traditional motivations for owning their forestland, and own on average fewer acres than in the past. This means that a greater portion of the private land in this country is being parcelized into smaller holdings fragmenting, as adjacent landowners have different goals, motivations, and management strategies (or lack of management). Because of the reduction in the size of timber stands and the diversification of landowner motivations and goals, many traditional forestry service providers are finding it difficult to service forest landowners. Smaller tract sizes mean a higher cost per acre and less income from raw materials,

leading to decreasing profit margins. Some forestry service providers are finding it too difficult, and getting out of the business altogether.

Some small fragmented lots undergo a liquidation cut and are converted into developed sites. Many simply stand idle and go unmanaged because their owners have no knowledge of or interest in forest management, distrust loggers and foresters, or are unable to locate a service provider willing to work on their land. Other programs such as smart growth and cluster development that were designed to promote the ecological benefits of forestland in developed areas do not provide for the management of the lands they leave open.

It would be beneficial, both to the landowner and the surrounding community, if this land base were managed as a working landscape under a triple bottom line of ecological, economic, and social sustainability. The following review focuses on the benefits of active forest management. It addresses the economic, environment, and social impacts of these trends that justify the need for a small-scale forestry service industry.

Environmental

Evidence suggests that fragmented forest landscapes are not as healthy as larger, continuously forested landscapes. For instance, Germain et. al. (2007) found that the liquidation and diameter-limit cutting that often accompanies the organized parcelization of larger tracts of forestland into smaller, residential lots creates woodlots with a lower percentage of basal area in acceptable growing stock, a lower percentage of basal area in high-value species, and lower overall saw log volume. Anecdotal evidence presented by Germain et al (2007) suggest that before a property is sold for residential development, it undergoes a liquidation cut to capture merchantable timber value before selling the land; residual stands are often high graded. The study did not provide undisputable evidence that organized parcelization degrades timber quality, but did show that 5-10 acre lots had the lowest timber stocking and quality, which is the typical lot size for organized subdivisions in that region (Germain et al, 2007). Some small acreage woodlots have been high-graded to the point that they are no longer able to sustainably reproduce similar species composition and timber quality without active management.

The fragmentation of forestland has been shown to accelerate local species extinctions through the island biogeography theory, either by a decrease in the total forest area or the isolation between habitat patches created by fragmentation. An increase in forest edges have been shown to cause a change in species composition near forest edge. This can result in a decrease in the overall species diversity of a habitat (Jules, 1998). Fragmentation also impacts the rate of aggressive exotic species invasion. One study found a higher richness and frequency of alien species on forest edges, but that due to low disturbance levels, forest interiors were relatively free of aliens. Fragments with very little disturbance did not have the amount of light necessary to support alien species in interior forest habitats, but more highly disturbed forests have a much higher incidence of interior alien species occurrence (Brothers and Spingarn, 1992).

Roads often accompany fragmented landscapes, and can have a significant ecological impact. Plants, including invasive species, can be carried along roadways by vehicles or by vehicle-caused air turbulence. Roadside plants can be altered through mineral nutrient fertilization from roadway management or nearby agriculture, or from

atmospheric NOX. Mowing regimes can affect the population densities of nearby insects and small mammals. Roads are also a major cause of mortality for larger and mid-size animals as well as smaller mammals and insects. A greater number of species are affected by avoiding roads, due primarily to traffic noise. Roads create a barrier or a filter to animal movement, creating several metapopulations from one, continuous population. Smaller populations have a higher probability of extinction, and are more likely to experience changes in population genetics. Roads can change an area's hydrology through road runoff, all well as create and transport sediment, and introduce and transport chemicals (Forman and Alexander, 1998).

Fragmented landscapes and the development that often accompanies them, can have a significant negative effect on water quality. Nutrients from newly installed septic systems, lawn fertilizers and pesticides, road salts, and animal wastes can contaminate the water supply; at the same time working forests or open landscapes are removed and replaced with impermeable surfaces, so natural filtration capacity is lost (LaPierre and Germain, 2005). Removing vegetation near streams can lead to increased erosion and algal production, temperature changes, and reduced concentrations of dissolved oxygen. Additionally, development can reduce or change organic inputs in a stream, and alter the hydrologic regime. Water quality may be heavily influenced by the landscape changes accompanying development due to the increase in impervious service cover and the removal of vegetation, especially because of storm surges and increased pollutant levels (Wear et. al., 1998).

Economics

Increasingly fragmented landscapes have significant economic impacts as well, both positive and negative. One positive economic impact is the economic growth of the green industry, which is described by Hall et al (2005) as comprised of businesses involved in the production, distribution, and services associated with ornamental plants, landscape and garden supplies, and equipment. As former forestland and farms are converted to residential uses, markets for the green industry expand. The green industry is said to be one of the fastest-growing segments of the nation's agricultural economy. Sales from nurseries and greenhouses, retail nursery and garden stores, and landscape and horticultural services have increased steadily from 1987-2003. In total, the green industry in the United States in 2002 was worth \$147.8 billion in output, 1,964,339 jobs, \$95.1 billion in value added, \$64.3 billion in labor income, and \$6.9 billion in indirect business taxes (Hall et al, 2005).

In particular, sales from the landscape and horticultural services sector experienced dramatic growth, from near \$15 billion in 1987 to nearly \$40 billion in 2001, an average annual growth rate of 11.0 percent. In August 2004, business revenue was said to be up an average of 17.4 percent, service sales had increased in all categories, and net profits were expected to rise. These landscape companies are generally young, with an average age of 13.6 years in 2004, with 28 percent having been in business less than five years. However, they're generating more revenue than ever before. They're also offering a wider variety of services than landscape companies in the past, many diversifying only within the previous two years. Typical services offered include lawn maintenance, construction, chemical lawn care, arborist services, irrigation, and snow and

ice control. Other landscape companies are specializing rather than diversifying (Hall et al, 2005).

While the green industry is growing, traditional forestry practices are declining in the fragmenting landscape. One study found that aside from the required conversion harvests to make room for development, the probability of harvesting rapidly declined as distance to an urban center decreased. In fact, all active timber management decreases in areas prone to urbanization. Barlow et al (1998) believe this is because investment in timber has a relatively long payback period, so landowners choose not to invest in their timber if they believe the payback period is after the anticipated conversion horizon. Additionally, forestland near the urban fringe has greater worth for non-timber amenity value than for traditional timber value, and is therefore better managed for non-timber values. Both of these reasons reduce the occurrence of silvicultural harvests (Barlow et al, 1998). With the high population growth and disproportionately high rate of urban expansion and urban sprawl, less land is available to harvest.

In addition, loggers and other forest operators are finding it increasingly difficult to operate profitably. It has long been known that smaller forest tract sizes decrease profits, due to the higher per-acre administrative costs of smaller tracts (Row, 1978), and as parcelization and urbanization continue, there are more smaller tracts available. Other concerns are on the minds of loggers. Two surveys, one in Georgia and one in New England, asked loggers what issues they found most problematic for their businesses. Georgia loggers mentioned rising fuel prices, trucking concerns, insufficient labor, the logging rate, and general finances (Baker and Greene, 2008). New England loggers worried about the inability to attract new workers to logging. When asked if they expected to be in the logging business in 5 years, 24 percent said they would not, saying it was no longer profitable, the markets continue to get worse each year, wood and wood prices are no longer keeping up with increasing costs, stumpage is harder to find, the industry is becoming more mechanized and competitive, and there is a lack of benefits, insurance, and money (Egan and Taggert, 2004).

Social

Land parcelization, fragmentation, and urbanization cause changes in the social structure of a community as well. As an area begins to urbanize, new, generally affluent neighbors move in. Areas that were formerly working forests or farms are converted to residential developments. Fewer natural resources are available, and those that are often more valuable for amenity values rather than timber. With fewer timber resources available, traditional service providers leave as they can no longer make a living in the urbanizing landscape. Therefore, urbanizing landscapes lose their capacity to manage forestland, even if their landowners have the desire to do so (Vince et al, eds., 2005). There are simply fewer management options available. With lost infrastructure capacity comes lost knowledge capacity as well. Professionals are aging, and there is little recruitment of younger forest workers to whom they can pass their knowledge (Sampson and DeCoster, 2000).

Forest landowners that remain in an urbanizing area have higher costs, fewer market opportunities, and an uncertainty about future production. Therefore, they no longer invest in their forestland, and over time, it degenerates. Many of the new

neighbors have urban backgrounds, and have different expectations than long-time residents. They may complain about dust and smells generated by agriculture, large trucks on rural roads, and the aesthetic impact of timber harvests (Vince et al, eds., 2005).

New forest landowners cite a variety of reasons for owning forestland, the majority of which have nothing to do with supplementing economic income. In their study at a national scale, Butler and Leatherberry (2004) found that forest landowners owned land primarily to enjoy beauty/scenery, to protect nature and biological diversity, because the acreage is part of a farm or home site, for privacy, and to pass the land on to their heirs. In their study of landowners in Virginia, Kendra and Hull (2004) found that their primary reasons for owning forestland are not economic, but include such things as simple living, being in natural surroundings, living in a small community with neighbors they know, getting away from other people, and having a safe place for their children. Economic income from timber management is no longer a primary concern (Kendra and Hull, 2004). Many new landowners are therefore less interested in forest management.

Fragmentation and the urbanization that accompanies it have led to a decrease in the rural identity of the country. At the time of the creation of the United States, most citizens lived on family farms and extracted their living from the land. This has changed since, as of the 2000 census, more than half of the population lives in urban or suburban areas. Suburban areas also house most of the political power. Most suburbanites are not even migrants from rural to suburban areas, but have lived in suburban areas their entire lives. They have no personal memory of the rural past belonging to the country, although it is a major part of the cultural identity of the United States. People are increasingly disconnected from the land, and oftentimes do not make the connection between the commodities they use and the natural resources from which it was derived (Bliss, 2003).

The studies reviewed above suggest that exurban working forest poses significant challenges and opportunities for forestry. Challenges include that much of this changing forest landscape is going unmanaged, with significant ecological, economic, and social consequences. Forest landscapes fragmented into small acre, unmanaged stands generally have lower quality timber that may not be able to reproduce without management. Fragmentation can affect the rate of local species extinction, water quality, and the rate of invasive species encroachment. While the changing forest landscape has fostered the growth of the green industry with its significant positive economic impact on the United States, it has also made the work of traditional forestry service providers difficult or even impossible in some locations. These areas are losing the economic income that traditional forestry once provided as well as the knowledge capacity and rural cultural identity of these areas. However, the new forest landscapes allow many new suburbanites and exurbanites to gain beautiful scenery, privacy, the ability to live simply, and all of the other benefits for which they bought their land. The changing forest landscape also presents opportunities for the forestry discipline. Traditional forestry service providers find it increasingly difficult or impossible to work in the new forest landscape. There seems to be a need for management capacity, and demand for a different kind of forest management work, but the question of how will it be done, and by whom, is still up in the air.

The purpose of this study is to document the practices of forestry service providers currently working with small acreages or suburban woodlots in Virginia or the surrounding states, and discover how they are making their business work profitably within the current industry trends. I also investigate people who have considered or tried working with small acreages or suburban woodlots, and why they were not able to make it work. With this knowledge, I can present information about how successful forest service providers were able to profitably organize their business for potential service providers interested in business opportunities with small landowners. By identifying obstacles facing potential service providers, we can hopefully bring their concerns to the attention of groups with the resources assist them in getting started.

Methods

Information about the current business practices and perceived obstacles of forest service providers were collected through a series of semi-structured telephone interviews consisting of open-ended questions. This method was chosen because little information about the topic is present in the literature aside from anecdotal accounts, and detailed, nuanced answers are needed. Interviews were conducted over the phone rather than in person due to budget and time restrictions, and took place between June and December of 2008. Interviews were also recorded with a digital voice recorder and transcribed for later analysis.

Informants were chosen through a purposive sample, meant to identify and obtain information from a wide variety of service providers experiencing this phenomenon rather than be representative of the population (Babbie, 2007). Informants were chosen because of their knowledge of or interest in forest management on small and suburban woodlots. Initially, the participants of several workshops hosted by the Virginia Department of Forestry and Virginia Cooperative Extension concerning small and suburban woodlot management were contacted. Since phone numbers were not collected by the workshop organizers, workshop participants were emailed and asked to provide their phone numbers (the text of this email can be found in Appendix B). Those that replied with their phone numbers were then contacted by phone for a 20-30 minute interview. If any additional questions arose after the initial interview, they were contacted again with additional questions. I attempted a snowball sample (Babbie, 2007), but it was largely unsuccessful because most informants were unable to identify other people doing similar work.

A total of 18 informants were identified from the small and suburban woodlot management workshops, and interviewed during summer 2009. Additional informants were needed, and since the snowball sampling method did not work, I turned to the list of small woodlot service providers being put together by the Virginia Department of Forestry. Calls were made to those whose work was most relevant to the project, who did at least some vegetative management. Some additional informants were identified by the public agency personnel I interviewed, mentioned below. Some of these informants worked outside Virginia, but were included to gain the perspective of other successful small-scale forestry service providers operating outside the Virginia region. Thirty-four additional informants were interviewed between September and December 2008, for a total of 52 interviews with small-scale forestry service providers. Interviews were ended at this time both because of time constraints, and because I seemed to be receiving little new information with additional interviews.

Efforts were made to gain input from people with a diversity of backgrounds, including loggers, foresters, woodworkers, small sawmill operators, arborists, landscapers, and others. However, the informants seemed to come from two distinct groups: those with green industry backgrounds, and those with forestry/logging backgrounds.

The goal of these conversations was to determine how successful small-scale forestry management professionals conducted their business and what obstacles they faced. After speaking with a couple of small-scale forestry service providers and public forestry agency professionals, an interview guide was developed. Questions included

what the informant's professional background was, what small-scale forestry management activities the informant conducted, what payment structure was used, what reactions they got from clients and neighbors of clients, what methods they used to advertize their services, what obstacles they faced, and whether they perceived themselves as successful. This interview guide was tested on two or three interviews. A few small adjustments were made, then the remainder of service providers was interviewed using this guide. The service provider interview guide can be found in its entirety in Appendix A.

Public agency personnel were interviewed via telephone in November and December 2008 about their interactions with small-scale forest service providers and landowners. Since they work with both service providers and landowners on a regular basis, they have the opportunity to observe a large number of people over time, and can be expected to have insight on characteristics of small-scale landowners and small-scale forestry service providers, and trends regarding this issue. They were identified by initially contacting someone from the department of forestry in several states known to be actively addressing the small-scale forest management issue. I explained the project to these initial contacts via email (found in Appendix C), and they were either interviewed, or suggested someone within their department who was more knowledgeable on the subject to interview. At the conclusion of each interview, I once again attempted a snowball sample, and asked each informant to provide the names of other knowledgeable individuals I could contact, in either state or federal agencies, NGOs, or other groups working with the public on small-scale forest management issues. The snowball sampling method was much more successful with this group. A total of 16 people working with the public interests, primarily from NGOs or state agencies in Virginia, Maryland, New Hampshire, Texas, and Oregon were interviewed.

The interview guide for public agency professionals was developed after the majority of the service provider interviews had taken place. The goal of this interview was to determine what additional insights to the small-scale forestry management phenomenon these informants could provide, as well as determine what they are doing to reach small-scale landowners and service providers, and what obstacles they face. The text of this interview guide can be found in Appendix D.

Interview transcriptions and notes were analyzed using the grounded theory research paradigm (Strauss and Corbin, 1998), in which theories were formed from an analysis of patterns, themes, and commonalities found in observational data. Data was analyzed using the qualitative data analysis software NVIVO. From the results, a theory of what characteristics are necessary for a small-scale forestry services business was created, and detailed below.

From the group of service providers interviewed for the qualitative data analysis portion of the project, two that were particularly good examples of successful, profitable small-scale forestry service providers were chosen for case studies. The purpose of these case studies was to illustrate and provide specific, detailed examples of service providers who were able to adapt their businesses to successfully work on small-scale woodlots. The two cases were chosen for theoretical rather than for statistical reasons (Eisenhardt, 2002), and had to meet several criteria. They must first gain at least part of their income from working on small acreage woodlots, and have self-defined their businesses as fairly successful or profitable. They also must demonstrate the practices and attitudes found by

the interviewed service providers to be beneficial for working on small and amenity-oriented woodlots, such as charging with a non-traditional payment scheme, focusing on amenity values rather than timber production, demonstrating a concern for forest health, striving to maintain a good relationship with neighbors, utilizing all removed materials to prevent waste, and a willingness to be flexible and adapt their business to current market conditions. After those conditions were met, cases were chosen for their diversity, demonstrating that service providers from a wide variety of backgrounds and company sizes, and those utilizing a wide variety of equipment suites, advertising methods, and business plans can be successful.

The two case studies took place in April and May of 2009. Subjects were contacted by telephone, had the project explained to them, and asked if they would agree to participate. The subjects were then asked to identify one particularly successful small-scale forestry job that they were currently working on or had recently completed. The researcher visited the site and collected details and information about that particular job using the case study interview guide found in Appendix E. Pictures of the site were taken, and I talked with the landowners, asking why they chose this particular service provider, and how satisfied they were with the results. The collected information was written up to provide a specific example of a successful small-scale forestry job.

A survey conducted by Virginia Tech concurrent with this thesis project (Rasamoelina, 2008) intentionally included questions pertinent to this project; that data was analyzed to determine whether small acreage landowners differed from larger acreage landowners in several key questions. The information was included to corroborate the qualitative data presented here. The sampling frame consisted of private owners who owned land of 1ha or more in Virginia. These owners were included in the Virginia Forest Landowner Database compiled over a twelve year period, which includes landowners identified by random selection from county tax rolls, county property transfers, newsletter mailing lists, and educational program participants. Our study population represented a mix of owners of small to large, some with active management, and some with none. All of them had received information from our university forest extension program about educational programs and/or other sources of assistance.

The survey was administered to private forest owners throughout the state of Virginia using a slightly modified version of the tailored design method (Dillman, 2000). Questionnaire wording and face validity were improved using a pilot test; an invitation to participate was then sent to the study population in mid-April 2007. The first mailing of the questionnaire followed a week later, followed by a wave of reminder cards four weeks later, followed by a second wave of full questionnaires after another four weeks, and followed lastly by another wave of reminder cards after two weeks. 3,435 surveys were distributed, nearly half were returned and 35% (or 983 people) provided analyzable responses about WM management practices and thus could be used in this analysis. The response rate is within the range of response rates from previous and similar studies. The potential bias of non-response was evaluated, but considered to be minimal. I compared the responses of landowners owning less than 20 acres with those owning larger parcels on several key questions using a chi-squared test to determine whether small-scale landowners did less active management or faced different constraints.

Results

The results section summarizes both the quantitative survey results as well as the qualitative interview results. The first section examines the landowners, providing a summary of the survey results. The second section looks at landowners as seen through the eyes of service providers. The third section looks at landowners as seen through the eyes of public forestry professionals. The fourth section draws entirely from the interviews with service providers to summarize their self-perceptions, business practices and concerns. The fifth section parallels the fourth, but focuses on the self-perceptions, professional practices and concerns of public forestry professionals working on small acreage forest issues.

Landowner Characteristics: Survey

The survey had a total N of 1028 valid responses. The average acreage ownership was 172.7 acres, with a minimum of 2 acres and a maximum of 3,000. A total N of 149 landowners surveyed owned land under 20 acres, or 14.5% of the total. Respondents' average age was 62.45 years, the average respondent's highest education level was an associate or technical degree, and their income was between \$25,000 and \$ 49,999. Analyses of variance reveal that these socioeconomic characteristics were not significantly different for respondents owning less than 20, 20-50, or more than 50 acres. However, I did find a small but significant correlation between acreage and ownership length – a Pearson's correlation of only 0.159 ($p < 0.05$).

It is important to note that this data was from a previously existing survey, and was not collected specifically for this study. There is also a possible bias – the landowners contacted for this survey came from lists of landowner who had at least received information about forestland management from Virginia Cooperative Extension, so the small scale landowners surveyed might be biased towards more active and engaged, or at least more informed, landowners. This should be kept in mind when interpreting the following results.

Respondents who owned small acreages of forestland generally practice less active management than respondents owning larger acreages. For example, the chi-square test showed that owners of less than 20 acres were less likely to have harvested any trees in the 10 years previous to the survey than owners of more than 50 acres (48% versus 66%, see Table 1). However, the gap between groups was far wider when asked if they used professional help for managing any of their forestland. Sixty-four percent of landowners with over 50 acres used professional help, compared to only 35.1% of landowners with under 20 acres (Table 2), which suggests that far more small acreage landowners are harvesting without consulting a professional forester, perhaps leading to more exploitive harvesting on smaller acreages.

Table 1. Chi-square test comparing whether landowner had harvested or removed trees in the previous 10 years to size of ownership

% stating “Yes” to question: Have trees ever been harvested or removed from any of your forest land in the last 10 years (since 1997)? * <i>Italics indicate statistical significance at 0.05</i>				
Over 50 acres	20 to 50 acres	Under 20 acres	N	P-value
<i>66.2%</i>	<i>53.1%</i>	<i>47.6%</i>	<i>1011</i>	<i>.000</i>

Table 2. Chi-square test comparing whether landowner had used professional help for managing their forest land in the previous 10 years to size of ownership

% stating “Yes” to question: Since 1997, have you ever used professional help for managing any of your forest land? * <i>Italics indicate statistical significance at 0.05</i>				
Over 50 acres	20 to 50 acres	Under 20 acres	N	P-value
<i>64.5%</i>	<i>49.8%</i>	<i>35.1%</i>	<i>1015</i>	<i>.000</i>

Respondents who had harvested trees were asked to explain their motivations. A larger percentage of landowners from the group owning over 50 acres harvested their trees to achieve objectives in the management plan, because trees were mature, to generate a regular flow of income, to improve hunting opportunities, to improve marketability of remaining trees, and to allow for the creation of a new, young forest. A larger percentage of people from the group owning less than 20 acres harvested or removed trees to obtain products for personal use, to minimize risk of wildfire, and to remove trees damaged by natural catastrophe.

In all but one instance, owners of mid-sized forests (20-50 acres) were consistently between the large and small acreage owners in likelihood of managing their land actively. In that one instance, they were the least likely to manage their forests to minimize risk of wildfire (Table 3). For landowners with less than 20 acres, their land is often near their residence, so perhaps minimizing wildfire risk is important because of proximity to their home. For landowners with over 50 acres, a wildfire would cause significant economic damage, so perhaps these landowners are anxious to minimize risk for wildfire as well. Perhaps landowners falling in between these two groups are less affected by both reasons, and so fewer take steps minimize wildfire risk. It is important to note, however, that all of these percentages are very low, with the largest group of landowners at only 11.4%. The responses for other reasons for harvest did not show enough differences between landowner groups to be statistically significant. Responses are also sorted by importance to landowners owning less than 20 acres; reasons occurring higher in the table are more important to this landowner group than those occurring lower in the table.

Table 3. Chi-square test comparing why landowner had harvested or removed trees in the previous 10 years to size of ownership

	% stating “Yes” to question: Why were trees harvested or removed?		
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	<i>* Italics indicate statistical significance at 0.05</i>				
	Over 50 acres	20 to 50 acres	Under 20 acres	N	P-value
<i>To remove trees damaged by natural catastrophe</i>	34.9%	39.7%	51.4%	612	.027
<i>Trees were mature</i>	61.8%	47.9%	44.3%	612	.002
<i>To obtain products for personal use</i>	26.6%	44.6%	44.3%	612	.000
To improve forest health	41.1%	33.1%	42.9%	612	.239
<i>To allow for creation of a new, young forest</i>	33.7%	21.5%	21.4%	612	.009
To clear land for conversion to another use	18.8%	18.2%	15.7%	612	.829
<i>To improve marketability of remaining trees</i>	27.8%	17.4%	12.9%	612	.004
<i>To achieve objectives in my management plan</i>	33.5%	23.1%	11.4%	612	.000
<i>To minimize risk of wildfire</i>	6.9%	1.7%	11.4%	612	.021
Price was right	16.9%	18.2%	8.6%	612	.175
To improve scenery and recreational opportunities	8.6%	5.0%	7.1%	612	.418
Other	5.9%	5.0%	7.1%	612	.823
<i>To improve hunting opportunities</i>	15.9%	8.3%	4.3%	612	.006
To generate money for an emergency	6.9%	9.9%	2.9%	612	.181
<i>To generate a regular flow of income</i>	13.5%	5.8%	1.4%	612	.002

In the qualitative interviews portion of this project, many services providers reported that landowners requesting their services highly valued wildlife. The survey results suggest that many landowners who managed their land actively, regardless of acreage, managed for wildlife and that small acreage landowners were no more likely than other landowners to do so. (Table 4).

Table 4. Chi-square test comparing whether landowner had used any of their forestland for wildlife management purposes in the previous 10 years to size of ownership

% stating “Yes” to question: Do (did) you use any of your forestland for wildlife management purposes? <i>* Italics indicate statistical significance at 0.05</i>				
Over 50 acres	20 to 50 acres	Under 20 acres	N	P-value
79.1%	76.1%	74.3%	551	.596

For those landowners who were managing their forestland for wildlife, landowners with over 50 acres were more likely to protect habitat by creating fire lanes and place food plots. None of the other reasons for managing for wildlife showed a statistically significant difference between differently sized parcels (table 5). Responses were also sorted by the under 20 acres landowner group, so reasons occurring higher in the table are more important to this landowner group than those occurring lower in the table.

Table 5. Chi-square test comparing which wildlife management practices the landowner had used their forestland to manage wildlife habitat to size of ownership

	% stating “Yes” to question, Which of the following practices have you ever used on any of your forestland to manage wildlife habitat? * <i>Italics indicate statistical significance at 0.05</i>				
	Over 50 acres	20 to 50 acres	Under 20 acres	N	P-value
Management of certain tree species: those providing food for wildlife over others	46.2%	45.1%	47.1%	551	.963
Controlling invasive species (plant as well as animal)	29.1%	38.1%	34.3%	551	.174
Placing nesting boxes	32.6%	28.3%	34.3%	551	.627
Installing ponds or water holes	32.2%	23.0%	30.0%	551	.122
Protecting special places like springs and pools	42.1%	38.9%	30.0%	551	.160
<i>Placing food plots</i>	<i>57.9%</i>	<i>43.4%</i>	<i>28.6%</i>	<i>551</i>	<i>.000</i>
Protect vegetation against damages by noxious species(i.e. beaver, deer)	16.6%	13.3%	15.7%	551	.701
Remove habitat to discourage certain species (i.e. beaver, deer)	10.3%	4.4%	10.0%	551	.155
<i>Protection of habitat by creating fire lines</i>	<i>19.0%</i>	<i>10.6%</i>	<i>4.3%</i>	<i>551</i>	<i>.002</i>
Other	3.5%	6.2%	4.3%	551	.464

In addition to wildlife management practices, the survey asked respondents if they engaged in other forms of forest management. In general, forestland owners with over fifty acres were more likely to have engaged in forest management. Landowners with over 50 acres were more likely than owners of smaller acreages to have planted trees, done site prep work, applied herbicides, pesticides, or fertilizers, maintained roads and culverts, built or performed maintenance on roads and culverts, posted land to restrict public access, maintained painted boundary lines, put up gates, practiced prescribed burning, used fire lanes, and protected cultural features like cemeteries. For instance, 74.3

percent of landowners with over 50 acres post their land to restrict access, with 59.3 percent of landowners with between 20 and 50 acres, and the smallest number of landowners with fewer than 20 acres, 45.2%. However, there are several answers in this part of the survey that do not follow this logical, linear progression. The smallest percentage of landowners was from the group owning 20-50 acres under four responses: to prepare land for new trees, planting trees, applied chemicals such as fertilizers, pesticides, and herbicides, and prescribed burning. I am not quite sure why this is, but I suggest that for landowners with less than 20 acres, their land is often near their residence, they are more willing to manage actively because their management activities are highly visible because of proximity to their home. For landowners with over 50 acres, such management activities have a more significant economic impact, so these landowners are willing to perform these land management activities. Perhaps landowners falling in between these two groups are less affected by either reason, and so fewer are willing to perform these management activities on their land (table 6). Management activities have been sorted according to their importance to landowner with 20 acres or less.

Table 6. Chi-square test comparing which activities the landowner had used their forestland to size of ownership

	% stating “Yes” to question: Since 1997, have any of the following activities occurred on any of your forest land? * <i>Italics indicate statistical significance at 0.05</i>				
	Over 50 acres	20 to 50 acres	Under 20 acres	N	P-value
<i>Posted land to restrict public access</i>	74.3%	59.3%	45.2%	921	.000
Thinned trees	38.1%	32.0%	42.7%	921	.129
<i>Planted trees</i>	45.8%	35.1%	39.5%	921	.024
<i>Maintained roads and culverts</i>	59.5%	44.8%	33.1%	921	.000
<i>Built or performed maintenance on roads and culverts</i>	51.4%	38.7%	32.3%	921	.000
Conducted a boundary line survey	33.7%	27.3%	28.2%	921	.175
Pruned trees	19.4%	16.0%	25.8%	921	.097
<i>Applied herbicides, pesticides, or fertilizers</i>	31.3%	18.6%	23.4%	921	.001
<i>Put up gates</i>	41.5%	26.3%	21.0%	921	.000
<i>Prepared land for new trees (site preparation)</i>	27.2%	15.5%	18.5%	921	.001
Controlled exotic species	12.8%	14.9%	16.1%	921	.518
<i>Maintained painted boundary lines</i>	28.4%	27.3%	12.9%	921	.002
<i>Prescribed burning</i>	12.1%	5.2%	9.7%	921	.021
Reduced fire hazard	10.1%	9.8%	8.9%	921	.913
<i>Protected cultural features like</i>	19.9%	10.8%	5.6%	921	.000

<i>cemeteries</i>					
Other	1.2%	0.5%	1.6%	921	.625
<i>Used fire lanes</i>	<i>7.6%</i>	<i>3.1%</i>	<i>0.0%</i>	<i>921</i>	<i>.001</i>

According to our results, a larger percentage of landowners with fewer than 20 acres participate in cost-share programming than with the other two groups. The group of landowners with 20 to 50 acres had the lowest number of people participating in cost-share. However, still a relatively low portion of landowners participate in cost-share, only 25.7 percent in the highest instance (table 7).

Table 7. Chi-square test comparing whether the landowner had used any cost share program to help manage their forestland in the previous 10 years to acreage of ownership

% stating “Yes” to question: Since 1997, have you ever used any cost-share program to help manage your forest? * <i>Italics indicate statistical significance at 0.05</i>				
Over 50 acres	20 to 50 acres	Under 20 acres	N	P-value
22.9%	14.6%	25.7%	993	.015

I expected owners of small acreages to feel more strongly about the challenges in a parcelized and fragmented forest, but our results suggest they felt no more strongly than owners of larger holdings about their land being too small for management, about damage or noise from motorized vehicles operating on their woodlots, about environmental damage to their property, about complaints from neighbors, difficulty finding management advice, or difficulty locating a service provider to work on their property. None of these comparisons were statistically significant, but some of these issues were clearly a concern. For instance near 60-70 percent of Virginia landowners stated that a lack of time and labor limited them from managing their forestland, whereas things like neighbor complaints were not stated as a limiting factor, between 13 and 16 percent of landowners surveyed. This information can be found in Table 8. These management activities have also been sorted according to their importance to landowner with 20 acres or less.

Table 8. Chi-square test comparing what the landowner perceives as limiting them from doing what they want on their land to acreage of ownership.

	% stating “Somewhat Limiting” or “Very Limiting” to question: Things that limit you from doing what you want on your land. * <i>Italics indicate statistical significance at 0.05</i>				
	Over 50 acres	20 to 50 acres	Under 20 acres	N	P-value
Other	77.8%	90.9%	75.0%	33	.534

Not enough time to allocate to forest management tasks	64.3%	62.3%	71.6%	712	.221
Not enough labor to allocate to forest management tasks	62.0%	59.6%	69.9%	681	.131
Not enough financial means to support management costs	53.6%	56.9%	59.6%	700	.362
Insufficient profit from management or harvest	49.9%	54.2%	50.6%	621	.434
High property taxes	51.7%	52.5%	48.0%	715	.938
Concerns about environmental damages caused by harvesting equipments	43.6%	39.0%	47.4%	658	.600
To small to make management worthwhile	35.6%	43.2%	46.9%	645	.164
Difficulty finding logger or other service provider with equipment, time, and willingness to work on my property	33.5%	32.3%	40.0%	614	.509
Trespassing, poaching, dumping	47.5%	49.7%	39.8%	670	.611
No local market for the forest products I wanted to sell	29.9%	31.1%	36.1%	579	.381
Managing my land is not cost effective	42.9%	39.7%	35.5%	647	.555
Fear of lawsuits	28.8%	28.9%	33.0%	654	.563
Soil (poor soil or wet soil)	34.5%	38.2%	31.2%	654	.175
Difficulty finding professional forestry advice	23.6%	23.4%	31.2%	636	.443
Development of nearby lands	35.8%	38.0%	29.1%	622	.559
Regulations that restrict harvest	28.9%	34.3%	25.0%	630	.496
Dealing with endangered species	19.8%	23.6%	23.8%	575	.643
People stealing my trees	20.0%	16.5%	22.4%	551	.787
Damage or noise from motorized vehicles	17.9%	17.6%	18.0%	571	.652
Neighbors complain about forest management	13.5%	16.3%	13.2%	575	.315

In general, landowners owning less than 20 acres were less likely to actively manage their land than landowners with over 20 acres. However, these differences were modest. Some of the more interesting differences between owners of large acreage and small acreage forests are summarized here. Almost all landowners with over 50 acres who harvested trees also used professional help in managing their forestland. However, for landowners with fewer than 20 acres, many more landowners harvested trees than used professional help, which suggests that far more small acreage landowners are harvesting without consulting a professional forester, perhaps leading to more exploitive harvesting on smaller acreages.

I also found that reasons for harvesting differed by size of forestland ownership. Landowner with over 50 acres were more likely to manage for reasons such as to achieve objectives in the management plan, because trees were mature, to generate a regular flow of income, to improve hunting opportunities, to improve marketability of remaining trees, and to allow for the creation of a new, young forest. Landowners with fewer than 20 acres were more likely to harvest trees to obtain products for personal use, to minimize risk of wildfire, and to remove trees damaged by natural catastrophe. Wildlife management seemed to be a popular reason for land management regardless of acreage owned – we found few differences between landowners with different ownership sizes in their willingness to manage for wildlife, although landowners with over 50 acres were more likely to place food plot on their property than landowner with smaller properties.

When asked what activities besides wildlife management activities they had practiced on their land, owners with more than 50 acres were more likely to have practiced many of these activities than landowners with smaller acreages. Landowner with over 50 acres were more likely to have planted trees, done site prep work, applied herbicides, pesticides, or fertilizers, maintained roads and culverts, built or performed maintenance on roads and culverts, posted land to restrict public access, maintained painted boundary lines, put up gates, practiced prescribed burning, used fire lanes, and protected cultural features like cemeteries. I found no statistically significant, non-wildlife management activities that were more likely to be practiced by owners of less than 20 acres.

I did find that landowners with less than 20 acres were more likely to have used cost-share funds in their forest management activities, although differences between this group and the over 50 acres group were not that great.

Small acreage landowners did not feel more limited in managing their land than landowners with larger acreages, however in some cases, as many as 65-70 percent of landowners felt limited by reasons such as they did not have enough time to allocate to forest management. Although there are no statistically significant differences by ownership size, some of these reasons are significant limitations to forest management regardless of how much land the landowner has.

The following two sections contain observations from small-scale forestry service providers and public forestry agency personnel that expand on this information.

Landowners Characteristics: Perceptions of Service Providers

I asked the service providers I interviewed to share their observations about the small-scale forest landowners they work with, and how they differ from more traditional landowners. They characterized the new owner of small acreage forests as someone who buys land for reasons such as status or privacy, that doesn't know management is needed or even possible, and that are unaware of where to go for help or advice. They worry that this ignorance results in few requests for management services and a lack of respect for forestry. A detailed explanation of this characterization follows, illustrated with quotes from the interviews. In the Discussion section I compare this characterization with land owners' self-perceptions reported above and suggest that the service providers may be misunderstanding these landowners.

Service providers characterize their clients as unaware of management options for their land. One service provider stated, "We have a large influx of people from [urbanized] Northern Virginia that are becoming retirement age, or just done with the rat race up there, moving down here for the fact of quality living, that buy 20-30 acres, and they don't have a clue what they're doing." Another stated that, "the thing preventing me from doing more of this kind of work was essentially a lack of awareness. No one calls me to do that kind of work, and if they did, I would do more of it." One small sawmill operator cited the landowner's lack of awareness as a reason he didn't have as much work as he wanted; "Lots of the public don't know that there is an option other than Lowes for wood products. When they see a tree coming down, they think firewood. People don't connect the dots between their trees and the wood products they use everyday." Another service provider stated that if landowners knew the range of services he provided, they would be much more likely to have him come and work on their land. "People don't want to cut their forests down, but they do want to manage them for long term health and some income, and many times aesthetics and smaller agro-ecological and agro-forestry reasons, whether they want to put in some ginseng roots or mushrooms or whatever. If people know they can do this, they're much more likely to go that route." Many service providers are at a loss as to how they could increase the level of awareness of the services they provide. One service provider stated, "You can say, well maybe I don't advertize enough. Doggone, I don't know what I can do other than go to television or something. I haven't got the money to advertize so everyone knows the option. And when the opportunity arises, a lot of people just forget about it anyways... So that's a definite obstacle." Several service providers expressed that they believed the issue could be at least partially addressed by more landowner education programs, such as those hosted by university extension programs. Others do speaking engagements to increase awareness.

Unrealistic and Disconnected: Service providers with backgrounds in large scale forestry operations feel especially strongly that the new, small-scale landowners have unrealistic expectations about forestry compared to the traditional landowners they work

with. “We want to get in, get the timber, and get out. If it’s a tract that we’re making a lot of money from, we’ll make some concessions, such as planting a food plot, if it’s reasonable and won’t break the bank. But some pain-in-the-butt landowners have unreasonable expectations.” They lament landowners who expect to be paid for the removal of “junk” from their properties, who expect debris to be chipped and removed from their property, who expect their trees to be taken down for free in exchange for the lumber that is in them, or who think their trees are worth a great deal more than they actually are.

One service provider described how landowners don’t get why his expenses are so high, “So it seems like they sometimes don’t recognize ... the true expenses of being in business, I don’t think they recognize that a lot of the work is very physical, and if it’s a small job, you don’t have the opportunity to use mechanical equipment.” Another service provider tells of how, “people have looked at their timber and they think it’s worth thousands and it may just be worth \$1500. They want me to pay them more than it’s worth.

Green Consciousness: For many new small-scale landowners, the story of what is happening to the product removed from their property is important. For instance, many of the small-scale service providers I interviewed attempted to utilize the products removed from the very small acreage lots they worked with, rather than paying to dump the material or selling it as firewood. They reported that their clients were generally pleased with the idea that their trees would be used as lumber rather than dumped or burned. They liked the idea that the products from their property were going to be utilized rather than wasted. One service provider mentioned that, “it helps the homeowner to know that their tree is going to something useful instead of firewood. A lot of people around here cut a tree down and when they realize that something’s going to be made out of it, they say, oh, wow, that’s so cool.” In the same vein, another service provider stated that landowners he worked with were pleased their products were being utilized because, “A lot of people now a days feel happy if they’re recycling or reusing, or utilizing I guess is a better word, a natural resource.” A few service providers even made wooden furniture or keepsakes for the landowner out of wood harvested from their yards, with the landowner paying for that process. Other service providers reported that the landowners they worked with didn’t care that their products were being utilized; they just wanted the work done quickly and efficiently, and the debris taken off their property. For instance, one service provider stated, “They know [that the removed wood is being utilized], no one really asks, when you’re hired to remove a tree they just want the wood removed.” Similarly, “Most landowners don’t have an opinion about that. Most of the very rich communities don’t care, they just want it off their property.” A couple of service providers mentioned that landowners that knew they were selling very small batches of logs wanted a cut of the profits. One service provider dealt with the situation this way: “a lot of the time if a client knows I’m taking the lumber and reselling it, we’ll split [the proceeds] 50/50, but then if they don’t ask, I just... If they tell me to just get rid of the tree, I get rid of the tree, I do what I want to with it.”

Payment: One of the more contentious issues concerned whether landowners were willing to pay for small-scale forestry services. The service providers I spoke to were

split on this issue, but generally pessimistic. One service provider noted that “traditionally, forestry has been done so cheaply that I don’t know what people are willing to pay now.” A by-the-hour payment structure requires that landowners pay a lump sum out of pocket and wait for any income, as opposed to a commission basis, in which the service provider takes a certain percentage before the landowner is paid. The commission-based payment scheme is attractive to the landowner in the short term, as they do not have to pay anything out of pocket. One service provider stated that, “if I charge by the hour, I think it would be cost-prohibitive for some of these people. So as much as I can, I try to stick with the commission. But on some small tracts when it’s impossible, I may help the landowner arrange to get it cut and suffer the loss, particularly with advertisement, it may come back to me later on a referral.” This service provider also expressed concern that as his business was just starting, he disliked sending out invoices and waiting for payment – cash flow was much more reliable when he could simply take his percentage from the mill every week. He also stated that his clients preferred the commission method; he gave some of his clients the choice of a commission or hourly payment structure, and they usually choose commission.

Other service providers said that their landowners were willing to pay by the hour, although these service providers seemed to be in more urban/suburban areas. One stated that, “the clients around here are used to that sort of thing. From living near a city, they understand you pay for someone’s time.” Another service provider described the typical landowner that was willing to pay to have work done on their property; “They care about what their land is, or they have some alternate use, like recreation, or wildlife, ... These people have some kind of already set objective that they’re trying to get to, and they’re willing to pay for it... The people we’ve dealt with don’t live on the land, they live in town somewhere. They’ve got additional income.” Several service providers mentioned that when they charge by the hour, people are willing to pay as long as they have control over the situation. They said that it is important to give good estimates of cost prior to starting the job.

If the landowner is not going to make a profit from work on their property, or if they are going to break even, it is very important that they know that ahead of time. One service provider stated, “Well I think they come out pretty good, if there’s good timber on the land they make money. But if there’s not good timber, I’ll tell them up front. It’s not economically feasible, you’re not going to get enough out of the timber to pay for what I’m doing. ... But when I leave, I’m hoping they’ll really like what they have. They’ll have something they can enjoy and down the road, it’ll be profitable if that’s what they choose, or they’ll have a lot more wildlife if that’s what they want. They’ll have some control over it.” Other service providers work with their clients to make sure the price does not exceed an agreed upon price cap. They will specify in their contract that they will work until the job is finished or the price reaches the cap. And finally, one service provider, when describing to clients that they might have to pay to have some work done on their property, uses the illustration of a garbage man; “I’m the garbage man, I’m taking out the garbage... some of the landowners look at what we’ve done and say hey, this is expensive and we didn’t make any money on this but I tell them, I don’t know about you but every time I take out my garbage it costs me money, and what we took out was your garbage.”

Landowners Characteristics: Perceptions of Public Forestry Professionals

Many of the public forestry agency professionals I spoke with do a great deal of work with landowners, and they shared their observations with us. In many ways their observations parallel the observations made by service providers.

Unrealistic and Disconnected: Public forestry professionals also noticed a lack of awareness of management options among small-scale forest landowners. For the public forestry professionals, whenever this issue arose, it seemed to be accompanied by a strong emphasis on education as a solution. For instance, one public forestry professional stated, “I think a lot of it is the newer forest landowners aren’t aware of the possibilities on their land, and I think it will involve a little bit of educating the landowner on what can be done.”

Several public forestry agency professionals mentioned that landowners were not as easy to reach as in times past because they are not as connected to their land. Many of the “newer” forest landowners described by service providers and public forestry agency professionals grew up in more urban or suburban areas, and perhaps own their land for status reasons more than anything else. Many public forestry professionals believe that these landowners would benefit from active involvement in managing the natural resources on their property, which would give them a vested interest in the property for reasons other than economic value. One professional worried for the future of natural resource management; “A lot of people want these places and move to these places because there’s something that attracts them to it, they’ve chosen it. But if they don’t learn about it and interact meaningfully with their property, then we’ve lost an opportunity to engage their youth in the natural environment, engage them as advocates politically and socially for positive natural resource management on the public and private side of things.” Another worried that if the newer, small-scale landowners fell through the cracks; they were not reached by public forestry professionals and encouraged to manage their land, “they won’t connect with what they have, and it will be a quality of life issue. They won’t achieve their hopes and dreams for their property. If they were actively managing, they could get a bigger bang for their small woodlot buck. I think we can help them get to know their land better.”

Another stated that, “I think a lot of those folks really desire to do good management, and without those resources available to them, the land will continue to be subdivided into smaller units and there would be a lot of bad management, or no management. Because if people don’t have a vested interest in their property, if they don’t use it for recreation or something, if they don’t have that tie to the land, they lose interest and put it on the market.” Still another worried about the disconnect between many new landowners and their land; “The social costs of no longer viewing forests as part of our environment and our economy, and sort of viewing forests and something we have to set aside, and I think there’s a loss of the social license and appreciation of the forest and the things our forests provides, both in terms of wood products and ecosystem services. So there’s a cognitive gap in what we expect from our forests and what we perceive our forests as doing.” One public forestry agency professional had an opposite view; he thought the fact that there were more owners of forestland was a deterrent to

active management. He stated, “As more people are living in what you call a woody setting, even though it’s only a 20 acre forest, maybe they’re less receptive to conservation messages, because they have timber on their land or because they have some type of habitat on their land.” Because they live near a “natural” area, they don’t view conservation messages as urgent, and are less likely to have active management.

Although public forestry agency personnel report that the majority of small acreage landowners are currently unaware of management options, not very socially accepting of forestry practices on neighboring tracts, and not connected to their land, they also report that landowner groups are easily educated about forest management. It’s easy to get them excited about managing their forestland. Most professionals I spoke with reported that workshops and events aimed towards landowners were almost always well-attended, and that “a good percentage” of landowners also reported in follow-up surveys that they intended to go home and implement the practices they learned about; “Well, I think the landowner programs have been very successful, from the evaluations that we’ve done, most of them say from the evaluations that they’re going to go home and do this. And we’ve done a 6 month follow-up and a good percent of the people who said they would 6 months ago, are doing things.”

Green Consciousness: Changing views of what constitutes socially acceptable practices are encouraging some landowners to practice active management rather than just hands-off preservation. For instance one public forestry professional in the western United States stated that active management to protect homes from fire is becoming more socially acceptable to landowners, “If people knew what to do, I think a lot of them would do it. And if they knew the importance of it, I think they would do it up front just to protect their homes.” Another talked of how with the rising social acceptability of the “green” movement, forestry could align itself with those goals, and encourage active forest management in that way; “I think people are interested and I think most people want to do the right thing, and I think people are maybe interested in looking into some alternative functions ... But I think there’s this new cognizance of oh, there’s a better way to do things. And I think forestry could fit right in there, particularly with biomass, because if we could find a market for the small wood that’s coming out, I think we could do a ton of really good fire stuff, pre-commercial would no longer be pre-commercial. It would help their economic development, it would help the landowner, and it would help the whole sector. It’s just getting a few lynch pins in place to make that whole pipeline flow.”

Another public forestry professional stated that groups of landowners are managing their land, just not being recognized for it; “We find that a lot of small landowners, the ones that are managing their forests are managing them to quite high environmental standards, much higher than our standards in industrial forestry here. So if they can be recognized for doing that, many of them get very excited that they can plug in to this movement and meet others who are doing the same sort of thing. Once we find them, they get excited.”

Marketing and Demand for Services: Although it’s easy to get small acreage landowners excited about forest management, landowners must first be located and encouraged to attend workshops and events. Almost all of the public forestry agency

professionals I spoke with reported that new, small-scale forest landowners are very difficult to reach with information and conservation messages as compared to traditional landowners; “So we’re still trying to figure out what’s the best way, especially to reach those people who aren’t involved in any of those projects. Sometime I feel like we go for that low-hanging fruit. But still working on how we can go to those people who have absolutely no idea.” One public forestry professional talked about how it is difficult to specifically target small acreage landowners for workshop and program advertisements. He stated, “So we usually get pretty good turnout and interest in programs that help people manage their woodlots. At the same time, it’s kind of tricky. Because when I advertize, it just goes to a broad list of forest landowners or advertizing in the newspaper or things like that. So you get a very broad mix when it comes to acreage of people attending the program. So it’s kind of hard to tailor the program to a small acreage landowner or to a large acreage landowner because you’ll have people with several hundred acres and people with five acres.”

Compared to small-scale forestry service providers, the public forestry professionals I spoke to were much more optimistic when asked whether they perceived a demand from landowners for small-scale forestry services. Many stated that demand for these services was present in their area, or small but growing, or still developing but would definitely be in place with time. Some believed that there was a latent demand; the demand is not there currently, but if landowners were educated and were aware that small-scale forest management was an option, demand would grow. One public forestry professional stated, “I think the demand was out there, it would just be a matter of working with the media to get that information out to the people who need it more.” Another stated, “I think there’s a huge demand for it... I think a lot of it is the newer forest landowners aren’t aware of the possibilities on their land, and I think it will involve a little bit of educating the landowner on what can be done. They may want to more actively seek out that kind of work. I think there’s definitely a demand for that type of thing.” Another group of public forestry agency professionals stated that there wasn’t currently a huge demand in their area because the market for small-scale forestry services was not quite developed yet. One public forestry professional stated, “You’re already starting to see a little interest in [small-scale forestry services]. It’s not really developed to the point where our foresters can go out and work with the landowner that has 12 acres of forest, and you can provide a list of 8 people who do everything they want done. We’re not there yet, but it’s going to happen. The need is starting to show itself.” Another stated, “That’s definitely a market that’s maybe not quite there yet, but it’s going to be huge. It really has to be.” One public forestry professional I spoke to didn’t see a fully developed market for these services, and saw no need for service providers to change their businesses and begin filling this niche. She stated, “The market isn’t quite there, so a lot of those folks are earning a living. The bulk of our people are still doing fairly traditional forestry work on smaller acres. They have adapted, absolutely no doubt about it.”

Service providers’ views and observations about their work

The small-scale forestry service providers came from a variety of professional backgrounds, but most were from forestry, the green industry, or sawmilling/

woodworking. Work on small-scale woodlots takes place at a scale somewhere between where the green industry and foresters operate, so it requires that service providers moving into this niche change the scale at which they are working. Small-scale forestry service providers coming from the forestry industry tend to be moving from a larger scale to a smaller scale. Some of their biggest challenges include learning to focus on amenity values and changing their payment structure to be profitable at small-scales. Service providers with backgrounds in the green industry, such as arborists and landscapers, must scale up their operations to work on small woodlots. However, there is some concern from people working for the public interests that green industry professionals don't have the training required for small woodlot management; they're trained to take care of one tree at a time, but they're not trained in the holistic ecosystem thinking required for larger scale management. Woodworkers and small sawmill operators are a special case; they often move into this emerging industry as they look for a less expensive, more sustainable, or local source of raw materials.

A service providers' background often affects how he or she approaches the small-scale forest management industry. Service providers with different backgrounds come to this market niche with different skill sets and different ways of thinking. Both groups are trying to reach the same small scale forestry management niche, but approaching it from different directions. Table 9 details some of the differences between these two service provider groups.

Table 9. Typology explaining differences between service providers according to background.

	Green Industry Background	Forestry Background
Business Practices	Are accustomed to doing single tree removal or landscaping jobs	Are accustomed to doing large scale harvesting, planting, or management plan creation.
Technical Skills	Although they are already skilled at managing individual trees or plants, they may lack some of the holistic ecosystem management skills needed for small woodlot management	Already possess the holistic land management skills needed for small woodlot management
People skills	Skilled at working with small acreage landowners. They know to leave the work site neat when finished, and are already comfortable with things like neighborhood noise ordinances	Not accustomed to working on small sites, leaving work sites neat, or dealing with neighborhood or city ordinances.
Payment Structure	Generally charge by some measure of time and materials.	Generally still charge a percent commission.
Equipment Suite	Already possess a lot of manual, small scale equipment, such as chainsaws and trucks. May benefit from some mid-sized, mechanized equipment to help in	The equipment they already possess is often overkill on small woodlots – could benefit from equipment that could perform similar functions, but

	moving larger logs.	on a smaller scale.
Language	Most do not refer to themselves as foresters, though they may do some forestry jobs. Many are also careful of the language they use, such as “removing” trees, or “opening up” a small patch.	Are still referring to themselves as “foresters”. Some are using other terminology. Most also still use forestry language, such as “harvesting” trees, or “clearcutting” a small patch.

This table represents a generalization of the two groups; it is important to note that the service providers interviewed for this project were very diverse. They ranged from very traditional foresters with no desire to work with small woodlots, to very innovative foresters who were actively trying to discover how they might fit their business into this niche, to arborists doing small logging jobs, to green industry personnel who saw no need to look at small logging jobs. Some service providers were so diverse that they could not be placed into one of the two categories. This dichotomy is useful for understanding the two groups, but it is not comprehensive.

No matter their background, many of the service providers who perceived themselves as successful shared some of the same characteristics, which are detailed below.

Small-scale forestry service providers, especially those from traditional forestry backgrounds, are careful to emphasize how different the work they are doing is from traditional forestry. They emphasize that the clients and situations are different, and there are few precedents to which they can look for details; they are making things up as they go along. One stated, “We finally came to the conclusion that we’re going to have to shoot a horse while we ride it, because what we’re doing is so far afield from anything else that there’s no model to compare it to. So we’re just going to be writing a book as we go.”

Advertising and Marketing: Hull et al (2004) report that new owners are wary of forestry professionals; so I expected service providers to use some other name or professional affiliation when approaching small-scale landowners. This was not the case. Most service providers with a forestry background still refer to themselves as foresters, both in conversations and in advertizing or business cards. One service provider stated that he had never lost business because he referred to himself as a forester. However, some service providers have diversified the suite of services they offer to such an extent that the traditional categories of foresters, loggers, arborists, and landscapers no longer describe what they do. So, in effect, these businesses are creating a new niche, which many are struggling to label. When asked what he called himself, one service provider stated, “Well, I call myself all sorts of things, depending on the audience. To come up with a definition of yourself is a far braver approach than being defined by someone else.” Some of the descriptions and terms for small-scale forestry services I encountered include, “total resource management”, “environmental services”, a “forest resource manager”, a “biological woodsman,” “conservation services,” “agriculture and forestry

services”, “urban/interface forestry”, “woodscaping”, “land improvement”, a “fully vertically integrated wood processing company” and “forestry services”.

Many of the small-scale forestry service providers said it was difficult for them to find business because they have trouble getting word of their services to their clients. Clients wanting this kind of work didn’t know what to call it, and so didn’t know who to call or what kind of company to search out. One service provider lamented that small-scale forestry services did not have a category in the phone book. Many landowners who do find someone to work on their small-scale properties hear about their service provider through word of mouth, which is a useful, but somewhat inefficient and sporadic method of advertizing. Several service providers mentioned that a specific label for small-scale forestry services would increase visibility for their work and assist in advertizing.

Many small-scale forestry service providers also mention that they feel as if they are the only ones in their area who do this kind of work, and many of them probably are. One stated, “I’m really the only one in the area, if you’re talking about someone who does this full time.” Another said, “That’s the cool thing, I really feel like I’m out there by myself in the valley.” Still another mentioned that he doesn’t get a lot of competition for business in his area because he’s the only person doing this kind of work. One public forestry professional said that small-scale service providers are not networked with each other, perhaps because they are so focused on their business and making a profit that they do not believe they have time. He stated, “Service providers aren’t as networked... A lot of our members, I don’t know if it’s a personality thing, but it seems like an attitude of exceptionality. I don’t mean better than everyone, just that they’re the exception. It’s not the case, but it’s fascinating in that that’s the way they think. Lots of times they just have their nose to the grindstone and don’t have time for the larger conversation.”

Small-scale forestry service providers also cried out for more education for landowners. They said that the public needs to learn about its land; education is needed so that landowners can connect to their land. One service provider said, “People don’t really think about the overall ecological picture when it comes to natural resource conservation and management. It takes quite a bit of education to bring people up to speed.” Another stated, “They don’t have a clue as to what the potential is there. I think the more we can get in front of people and educate them on that, the better.”

Ethic: Successful service providers of all backgrounds espoused a strong stewardship ethic, which they emphasize when talking with clients, on websites, and in advertizing. Many followed this ethic to such an extent that they reported they would refuse jobs that went against the principles they held. One stated, “And so to us, how much in dollars and cents comes off this woodlot this time around isn’t our primary goal, and if it’s your primary goal, then maybe we’re not the people to be working on your woodlot, and we ought to know this right away, because this is wasting your time and our time.” Another said, “I won’t get into, say, a liquidation. I’ll refer them off to somebody else. For one, I have a big problem with site conversion.” Another said, “Yeah, I won’t go timber cruise a stand of old growth just to help them knock it down.”

Others explained that the long term health of the forest is more important than short-term profit for themselves or for their client. One service provider explained that they got into the small-scale forestry services industry because they were dissatisfied with

the stewardship ethic at their old job; “I went into this smaller scale stuff because of working with the Forest Service for many years, and not agreeing with how they did a lot of things. I think forestry should be done with very individualistic scenarios. The Forest Service will put 300 acres under the same prescription.” Some small sawmill operators and woodworkers operationalize their environmental ethic by utilizing waste wood from urban areas; “Utilizing hazard trees just seemed like the right thing to do environmentally. I use only the trees that are going to cause trouble in the future or are already on the ground. If homeowners can’t be convinced to leave the trees, I take advantage of the wood as best I can.” These service providers seem to receive support in their stewardship ethic from the landowners they work with. One service provider said, “I’ve had a couple of landowners that just believe in the cause and they didn’t want to be paid. I think they essentially donated it to me to keep the cause going.”

Other green industry professionals express their environmental ethic by encouraging their clients to save trees whenever possible rather than cutting them down. Several stated that they tried not to remove trees at all unless it was necessary for safety or health reasons. One service provider stated, “Unless the tree needs to come down, I try to encourage clients to keep them unless there’s an obvious reason. I don’t like just taking trees down to take it down.” Another said that he doesn’t do much tree removal; “We’re losing so much forest land, I tend to encourage people to keep the trees they do have.”

Several successful small-scale forestry service providers said that landowner education was a big part of what they do, both in the woods with individual clients and through speaking at group events. One service provider stated, “We do a fair amount of education until we’re happy to have people come out in the woods and talk to them about what we’re doing and why we’re leaving certain trees and what the purpose of coarse woody debris is, and why we’re leaving standing dead trees. And the importance of not damaging trees excessively and leaving diverse species and all that kind of stuff.”

Emphasize Amenity: Service providers say they focus more on the amenity values than on maximizing revenue from timber production. For instance, one service provider said, “Generally we sell them on aesthetics, wildlife, and forest production. But in this area, aesthetics and wildlife are probably top priority. Timber production is generally way down on the list for most landowners.” Another service provider stated, “Some people want their woods for wildlife, some for natural growth, some for screening, or shade, everyone has different values. I don’t see too many people who want to make money from the products. People want the land because that’s what they think they need to do to gain growth and wealth.” One service provider highlighted the different focus of small acreage clients: “The value for timber may not be the most important value on small woodlots, in fact, lots of times it isn’t. I don’t know, many times on a small woodlot, people bought the lot as a house lot, and they have 10-15 acres with it. And they want to know if there’s something they could be doing in the woods that came with the lot. So the timber may not be their primary goal, it may be wildlife or something, or recreation in the backyard. So if that’s the case, then your parameters change completely.” He goes on to mention that although timber revenue is not the primary goal, it can still be important to the job. He said, “Another thing, the trails and everything else you made in the woods could be the real value the landowners wanted, see. That might be what would pay for the job, the actual wood that went to market might be a by-product.” One service provider

mentioned that although revenue is often not the primary objective, it is still on the minds of most landowners; “So, in those situations, it’s usually not a money-making thing, yet at the same time, I find that most of them are pretty interested in economics, as far as not spending much money. So it’s kind of an odd situation. That’s what I see, and I think that even though they own the land, they don’t put much money into it. They want to leave it like it is. Some of them manage it with a few more wildlife-oriented objectives, aesthetics, so it’s different. It kind of makes you wonder about your forestry training when you’re managing for aesthetics.” I did notice that service providers with green-industry backgrounds seemed to be able to operate with this amenity-focus much more easily than service providers with forestry backgrounds.

Another service provider explained the emphasis on amenities this way: “The people I work with can pull some timber out to help offset or pay for all the costs of getting what they want. That’s a great thing.... If we pull some of the timber out of these smaller woodlots, we’ll have to do less foresting on the big tracts, less clear-cutting. And at the same time, the landowners get something that they like.... So I find out what they’re interested in, fall leaves, that kind of thing, and then release those trees to thrive.” Even for service providers who are doing harvesting, there is more of a demand from landowners to minimize damage and clean up any debris afterward, leaving the site neat. One service provider stated, “They like [my work], because it doesn’t look like what your average timber harvesters are doing. It’s pretty clean work, there’s not much damage... I end up getting a chance to do things with somewhat of an unorthodox approach.” Many service providers stated that their clients mentioned wildlife as a main reason for owning and managing forestland, but few mentioned what kinds of wildlife they desired to attract. One public forestry agency professional who works with issues commented on this, but noted that these landowners rarely get more specific than “wildlife”.

Low Impact: Successful service providers of all backgrounds say they emphasize to their clients that they are practicing sustainable, low impact, or “green” management. Thus, at least in their rhetoric, they emphasize that their work is different in this way from that of traditional foresters. The terms sustainable, low impact, and green are, to say the least, ambiguous and contentious. When pressed for explanations some service providers explained that they practice “worst-first” thinning to begin to repair stands that have been high-graded in the past. One service provider described his theory on how to address fragmentation; “Our position is that if you’re practicing restorative forestry on one side of the fence, and you’re practicing restorative forestry on the other side of the fence, then the fence doesn’t count.” Another service provider spoke to landowners and educated them about natural stand dynamics, then emphasized that his approach to forest management mimicked that natural process; “Yeah, it’s low impact, but it’s also modeled on actual stand dynamics, so instead of basically standing conventional forest management, we’re trying to mimic natural process and remove the trees that are already showing signs of decline or are already standing dead. Anything that’s suppressed. ... Essentially I’m just managing and looking for signs that the trees are in decline, and removing those trees. So I’m mimicking exactly what would happen and accelerating the successional transition.” It is important to note that I did not confirm with ecological assessments how these words translated into on-the-ground management practices, as this project did not include any on-site measurements.

Diversification: Small-scale forestry service providers of all backgrounds are willing to diversify their business. They provide a wide range of services, often outside the scope of what is traditionally attributed to their field, allowing them to reach a wider range of clientele. For larger companies, diversification might mean that they have a number of professionals with different areas of expertise on staff. One large land management firm in Texas described its structure; “The owner of this company has a very progressive approach with resource management, it’s a “Total Natural Resource Management” team. We have everyone on staff from foresters to landscape architects, to arborists, to marketing people, to wildlife biologists to urban planners. We work in urban, interface, and rural areas... We use that approach, we get everybody involved on every project.... So it just gives a little bit more of a broad approach, a broad spectrum of ideas as far as managing the property.” For smaller land management companies with only one or two employees, diversification means that they have a broad skill set. One service provider I spoke to says he performs a very diverse suite of services. He does everything from traditional forestry to Phase I environmental assessments, to managing a pine plantation on top of a toxic dump. Another stated, “You have to diversify to make money these days, because you can’t make a living doing just one thing.” Another service provider spoke about how he set up his business; “I purposely [diversified my business] when I started out. I thought, I’d done a little bit of everything, and I thought well, if I specialize in just sawmilling, how am I going to get the logs? And if I specialize in just urban tree removal, how am I going to get rid of those logs? ... So you’ve got to be as diverse and be willing to do as much as possible. If you get a phone call and it sounds like something you can do, you give them a price and see what happens.” Some say they’re only able to work on small-scale acreages part of the time; “I won’t switch over to small-scale management completely, but I’m diversifying. I think most of the income will still come from timber sales. The small-scale stuff will be additional income.”

One service provider explained why it was easier for a small landowner to work with his diversified company rather than multiple specialized companies; “I can go onto a place and accomplish two different tasks, and that’s a lot simpler for a client than hiring two specialized companies that really charge a lot because they’ve got the specialized crews. That allows me to get more business... I guess my niche would be smaller jobs. A lot of work is across a diverse range that’s maybe not worth it to a bigger company.” However, these service providers do hit limits as they diversify. One service provider with a forestry background who did a lot of work with small acreage landowners stated, “We would get into arborist work, but the problem is, as soon as you get into that, the insurance rates are really high. If we do any arborist work, it’s consulting, or something that’s not hazardous. We can’t go and take down trees next to houses and power lines because we don’t have the insurance to cover it. That would be the next logical step though.”

For those small-scale forestry service providers with backgrounds in the green industry, many focus on utilizing what would otherwise be waste lumber rather than paying to dump it or selling it as firewood. For this, many must take the time to learn about bucking and grading lumber and building a relationship with sawmills. Many

sawmill operators seem wary of the green industry. One service provider reported, “On buying [logs] from tree companies, the sawmill operator said I won’t let those guys near my gate.” Another service provider said that if green industry professionals take the time to educate themselves about logging, then the mills will agree to work with them; “I’ve found in past 5 years that if you can demonstrate some kind of knowledge base to the processing plant for lumber, they will listen to you. But if you’re not identifying your tree species and what type of cut you’re making when you’re dropping it, then they won’t do business with you for very long, or you won’t be profitable at it.”

Adaptability: Successful small-scale forestry service providers are able and willing to maintain an attitude of flexibility and adaptability in their business outlook. They keep an eye on current industry trends and landowner needs and expectations, and are willing to adapt their business structure or focus to meet these needs. For example, one service provider with a background in the green industry explained that he was taking Sharp Logger classes, not because he felt like he needed to learn the technical information, but because he wanted to learn about the logging industry so he could better adapt his skills and his business to meet the needs of his clients. He mentioned that he was not impressed with the flexibility of the loggers he encountered there. Many successful service providers are willing to learn new skills that are not traditionally considered part of their field. One stated, “There are some things I might take on that I haven’t done before, but through a combination of education, experience, and everything else, I can figure it out and do a good job. I can’t think of anything right now that I’ve had to turn down.” Another stressed the need to look outside jobs traditionally labeled as forestry. He stated, “Foresters are trained in environmental awareness, and that can be put to good use.” This service provider stressed the importance of being aware of current market trends, and being willing to mobilize his business to meet those trends. “We’re looking at doing environmental assessments, but it hasn’t been economic so far. We do try to be ahead of the curve as far as being prepared to fill a market niche, and that’s really key. If you don’t, you’re going to go out of business.”

Some service providers are not only remaining flexible and adaptable, but making changes in their whole business structure to address the needs of the emerging small-scale forest services industry and create their own niche in that industry. One service provider stated, “The demographics are revealing that the average forest land ownership conditions 10 acres or less... It was suggested that we use this data to support our niche in the industry. So this is when we began to refine our restorative forestry business to work on those partially sized parcels.” Another service provider said, “A lot of 100 acre tracts have been split up into 20-30 acre tracts. That’s one of the reasons why I’ve jumped into trying to expand my business. I’m thinking about it more for the future, it’s more of a long-term decision than a short-term decision.”

Payment Schedule: Service providers also charge for their services differently than traditional forestry professionals. Green industry professionals generally already charge for their services in this way, but it is more of a novel idea for service providers with forestry backgrounds. Rather than being paid on a commission basis, they usually charge by some measure of time and materials. One service provider explains why he switched

to an hourly payment structure: “I had always been told and taught to charge a percentage. The first couple of jobs I did were low grade, pulpwood thinning. And I determined that I made about \$3/hour. And I decided from that point out that I could not afford to do that, obviously. So I switched over to charging by the hour... If [landowners] know that up front, and they know how much money to expect, and they know the forest will be better off, then they’re okay.” Another service provider who charges by the acre explains how he came to that decision, “All around, it’s the best thing for the landowners. They know what they’re getting into. Otherwise, it’s hard to rate how hard the land will be sometimes, doing a job on a rocky, hard site versus a soft and wet site. I just do it by the acre.”

Several service providers stated that they prefer this method because the landowner knows they have little incentive to mark more of the valuable timber as a way to increase their commission. One stated, “Well, really, we’re not extracting timber ourselves and the landowner knows we’re not going to cut anything we shouldn’t cut. So we don’t have any reason to, we’re not seeing any of the revenue from it, which sets the landowner at ease.” Another service provider echoed this statement; “The overriding reason is that it takes away any incentive to cut the best and leave the rest. We’re going to get paid even if we’re cutting the ugliest white pine trees that need to come out to release some tree that’s only 6-8 inches, but straight as an arrow and really has a future... The goal that has been worked out, we’re not going to lose our shirt doing it... It gives us a feeling that we are not being chased by the market for one, to always be saying well, that tree really should be left, but we need it in order to make this job pay. ... So we’re not making those compromises there.” Another service provider explained why he didn’t like to charge by commission; “I feel it’s a conflict of interest, I always have. I don’t care much of an angel you think you are, it’s always in the back of your mind when you’re marking trees, if you paint the bigger trees you’ll make more money. So I’ve always thought it was a conflict of interest, although the industry usually goes that way. We provide a service just like a lawyer and should be paid for a professional service.”

Of course, both methods have pros and cons; “There’s risks in taking the job by the acre because often you don’t know how long it’s going to take. And the landowner is assuming some risk when he pays you by the hour for the same reason.” Another service provider said that an hourly payment scheme puts a cap on how much he can make, but it can also ensure he’s making enough.

Other service providers are happy with charging by commission for their services and don’t want to make a change to charging by time and materials. One service provider stated, “And I’ve tried to stick with [percent commission] as much as I can, otherwise I charge by the hour. But if I charge by the hour, I think it would be cost-prohibitive for some of these people.” Some service providers still charge on a percent commission, but on a sliding scale depending on the acreage and quality of the timber rather than a flat commission rate. One stated, “Since we are practicing restorative forestry based on worst-first, single tree selection, then obviously the value of the material that’s extracted is not going to be as high as someone that is high grading. So in order to justify the skilled laborer costs of practicing this kind of forestry, we tend to reduce the percentage that we pay according to the value of the material. In other words, the less the material is worth, the less we can pay for it, right to the point that we often don’t pay for it at all. In particular pulpwood and firewood quality material has so little value that we can’t pay the

landowner anything for it.” A few service providers, when working on small or low-value properties will not charge the landowner anything, but will not pay them anything either. They take all of the value from the extracted timber as payment for their services and the landowner receives only the improvement to their forestland.

One service provider stated that he had a system in which he paid for timber on a sliding scale, but the landowner received no money until the service provider had made a living wage; “If the timber is of sufficient quality, then the landowner is paid on a sliding scale. As the value of a log increases per thousand bd ft, once it crosses a certain threshold, say on a nice black walnut butt log, once the log is worth 40 cents or greater delivered price, the landowner is paid an increasing fraction of the value. At that point the landowner makes 30% of what that log would pay. Anything worth less than 40 cents per bd ft, I keep that as the cost of doing business. On a higher quality woodlot, the landowner could make between \$3-500 per acre on a nice woodlot in essentially just a thinning. If they have a junkier woodlot, they might not get any money, but their forest would be thinned and TSI would be conducted and there would be a healthier forest, with crop trees released.” He said that some landowners that would make money on their woodlot have foregone their payment because they believe in his cause.

Generally, according to the service providers I spoke with, most of the land owners contracting this type of work have to be fairly wealthy. One service provider stated, “The biggest obstacle is the cost. It’s hard to get people to pay so much for this, and it’s hard to get them to do the recommended work. Many of them are doing it for a tax break.” Another said, “Not many are willing to pay that much. We try to be real selective of our clients. We know if we can’t help them, or if there will be problems down the road, or if we think they’re not sure what they want or we might have trouble with paying or anything like that, we try to refer them on.” Another service provider lamented that although landowners of all incomes needed and wanted this kind of work, “Lots of the people we end up working for are wealthier. It would be nice if they could get funding for the people who had the bigger farms and have more severe invasive problems. But they can’t afford to pay for it. Unfortunately, they usually appeal to the wealthier clientele.” Another said, “It’s all really expensive to have done. People balk at that.”

Maximize Value not Volume: Service providers talk about the need to be smart and innovative in marketing for their products, sometimes utilizing the internet. One sawyer who was exceptionally good at this was able to exponentially increase his income by selling “art lumber” on eBay. He said, “ I had been book matching things, mirror image boards. I had been doing that for years with woods that had some small figure in them... I had a lot of that material sitting around that I particularly liked, so I decided let’s give this eBay thing a shot. That really turned into a rocket ship. I knew there was a good market out there for figured woods, and different colors and textures, but I had no idea what people would actually pay for that type of product... For four years in a row, we made quarter million a year, and it’s all on other people’s junk. 100 percent of what I cut came from tree services, excavators, anytime there was a new housing start we would get the trees off of that property ... Marketing is literally everything.”

Other service providers are just careful to direct the products they remove to the highest and best use for that product. One service provider broke down how the lumber he saws is marketed; “We retail wholesale lumber, we sell a lot of lumber to two flooring mills. We keep the higher grade lumber of all the species that we saw and dry that and retail that to local customers, furniture shops, cabinet shops, hobbyist, homeowners, and then the lower grade lumber, we sell to bigger lumber companies that will either export it or resell it.” Service providers with forestry backgrounds were generally more adept in marketing their products. Green industry professionals are accustomed to dumping their removed material or selling it as firewood. Marketing their logs as timber is sometimes a learning curve for this group.

Another marketing concept that several service providers mentioned is the current emphasis on “green” products. Many of the service providers I interviewed placed an emphasis on activities that are “green” whether they use this as a marketing ploy or a personal philosophy, or market their products toward the “green market” Several of these service providers sell local or urban lumber, and market these products to their clients as “green”. One stated, “You know the green market is ... a wave that hasn’t even begun to crest yet. This is rediscovered wood, this is local rediscovered wood, and we’re going to cut out a lot of transportation costs...” Another explained his opinion on urban “waste wood” utilization; “Instead of assuming that urban wood goes into mulch or firewood, what’s the highest use? If there really is a sawlog there, how do we get that sawlog to a small mill, who can then convert it into a usable product? And making it much more carbon neutral, which seems to be a big interest. To municipalities and everyone, that seems to be the buzzword of the day. So that’s a direction we’re just starting out in. And I think that’s just going to grow.”

Networked: Service providers of all backgrounds also networked with other companies who perform similar or complementary services. Many of them had mutually beneficial cooperative or referral arrangements and agreements between companies. One example is a small sawmill operator and a tree company that work together to take down and saw trees. Some companies have multiple disciplines represented in house. One small sawmill operator spoke about an arrangement he had with a number of local tree companies in which he receives free logs for his sawmill, and the tree company receives free removal of the bole of the trees they cut, and a marketing hook: “One of my tree companies has used this as a marketing ploy. He sold a job that was a blow down of a nice walnut tree in a neighborhood, and when the woman found out that, ‘I know a guy who can take this log and saw it into furniture’, he got the job right away.” Another service provider with a forestry background spoke about an arrangement he has with a local arborist and landscaper. Between the three of them, they can take care of almost any land management needs the landowner has on his or her property. He said, “They have a certified arborist and tree climber that if they need to do a pruning they’re not comfortable doing, or a tree takedown due to houses or power lines... also a landscaper that helps. They kind of do the same thing for us... It’s a certain landscaper that we like and a certain arborist, and we all kind of work together.”

Another small sawmill operator spoke about how tree companies have begun to call him and pay him to remove the bole of the trees they cut down because it saves them

a great deal of time. He stated, “There are more and more tree services using me simply to remove the big logs for them so they don’t have to stay there with several men making firewood for a long time. I can show up and be in and out of there in a half hour or an hour and save them a days’ worth of labor. I charge them hourly and I end up with a bunch of logs. It works out pretty well for me and them.”

Need Government Support: The small-scale forestry service providers I spoke to express a need for more government support of small-scale forestry. One service provider complained that government programs for the most part do not support small-scale forest management efforts, although it would make a lot of sense for them to do so. He stated, “This seems like the right thing to do, it should afford the people who are trying to do it a living ... The governments should encourage us. How to get them to think this is a good idea and should be supported, not just, Okay we’ll let them do it, but also how can we help them do it.” Another service provider complained of the government’s lack of support of small-scale landowners. He said, “Also, we have folks that are falling between the cracks, they don’t have enough land to qualify for some state programs, and they’re getting squeezed on taxes and crazy local ordinances and things like that. They need a voice, and it’s crazy, the state is only recognizing large property owners, when the majority now I think is falling in the hands of small landowners. I feel our state representatives haven’t been nimble enough to pick up on this. If we’re going to keep tree canopy coverage, we need to provide incentives for these small woodlot owners to keep the trees, and not say, we’ll, let’s forget it, let’s put it in turf... We need that tree canopy coverage.”

Several service providers expressed that there was a need for more cost-share funding to go towards small-scale forest management efforts. Some service providers from a state that formerly had cost share funding for small-scale forester but no longer did said that landowners were often only willing to work on their small-scale forested properties when cost share money was available, and cost-share funding was needed for small-scale forest management to happen. One service provider said, “I will say that an incentive for all of this has been the government cost-share program. ... Those have aided in giving the landowners an incentive to do the work. Right now, cost sharing money is limited to the forest stewardship plan writing and invasive species control. So I would like to see more cost share money.” A similar problem occurs with conservation easements. Another service provider noted that easement awards are somewhat biased against small acreage landowners. He said, “Lots of people he works for have land under easements, takes 40-50 acres to easily qualify for an easement in his county... Hard to get an easement on a property with 25 acres or less.”

Most successful small-scale forestry service providers share many of the same characteristics, no matter what their background is. However, service providers from different backgrounds interested in taking advantage of the opportunity to work in the newly-emerging small scale forestry industry will face different obstacles. Table 10, below, details some of these obstacles and opportunities.

Table 10. Obstacles and opportunities for transitioning to work in the small scale forestry industry by background.

	Green Industry Background	Forestry Background
People skills	Already possess many of the needed people skills	Need to learn how to work with small acreage landowners, such as how to meet their expectations of how the site will look when work is completed, and how to work around city or neighborhood ordinances
Equipment Suite	Need equipment capable of handling larger quantities than they are accustomed to, and larger pieces, such as moving whole logs without bucking them into firewood,	Need smaller equipment suitable for small scale woodlots and less damaging to residual trees and soil.
Language	For the most part, already use appropriate language	Some suggest that foresters need to use fewer forestry terms around landowners, such as “harvesting” trees or “stumpage” value
Technical Skills	Need some additional technical knowledge about holistic, ecosystem management rather than managing only for individual trees or at small scales	Need to learn how to manage for amenity values, such as aesthetics, wildlife, or forest health, rather than for the maximization of economic revenue.
Payment Structure	Most already use the needed payment structure	Need to charge in such a way that the service provider is assured enough money to make a living, either by charging for their time, or by commission on a sliding scale.
Business Practices	Need to diversify the suite of services they offer	Need to diversify the suite of services they offer

Public Forestry Professionals Views and Characterizations of Their Work:

Public forestry professionals reported that new trends in ownership have created challenges that are changing who they work with, what services they provide, and how those services are delivered. They work with both service providers and landowners on a regular basis, so they have the opportunity to see what works and what does not. They also see the need for a small-scale forest management industry, as they noted a number of negative consequences that are occurring and could continue to occur if small-scale woodlots continue to go unmanaged. They say that to get the small woodlot management industry growing we need landowner awareness, service providers from whatever

background with the skills and willingness to work with this clientele, niche markets for specialty forest products and better developed markets for ecosystem services, and more cost-share funding to encourage landowners to do this work on their land.

New Needs, Limited Resources: Public forestry professionals working in state agencies report that their jobs are becoming more difficult because budgets and funding are decreasing, but more is expected of them as this new clientele emerges and needs to be serviced. One agency professional stated that as they have begun to address new programming towards small-scale landowners, they are still expected to deliver traditional programming. “It’s just that this new role came out, but the old one didn’t go away either.” Another agency professional who deals with wildlife issues echoed that thought. He stated, “That money is not getting any bigger and the job is growing geometrically. We have more species to deal with than ever before, and hunter and angler numbers are holding stable at best, and declining in bad years. And quite honestly, the federal government is not flush with cash, and so we’re not seeing as much federal assistance as we have in the past. So it’s somewhat limited in the amount of money we can put towards these projects.” Agencies also have broad goals, and with their limited resources, aren’t able to address small-scale forestry issues to the full extent. One agency professional explained, “Well, my mission is broad. I would love to focus on this full time, but I can’t and that would also probably not be the best thing. In this position... I’d like to work on [small-scale forestry issues] more but I need to have a balanced program, with different audiences and different issues.” Another stated, “You have to do both, if you’re a forestry agency... and that’s going to mean managing the fragmented forest as well as the larger parcels. So I would say we try to achieve a good balance of things to do.”

Other agency professionals mention that although they are beginning to create programs geared towards small-scale landowners, progress is slow. One agency professional stated, “I feel like it’s progress. So in that sense, it’s successful, but it’s just slow. It would be great to be able to work on something like this for a year and see the end result and problem solved, but that doesn’t happen. It’s taken a long time to get to this point, and it will take some time to meaningfully address it.” Others observe that the slow process is okay, as it provides time to make meaningful changes to address a rapidly moving target. He stated, “there’s a good thing about things going slowly too. They’re less prone to make mistakes, and you’re less likely to get someone all excited about something and kind of crash the system with too many people getting into it at once. So I’m not discouraged by speed. Just as long as it’s moving, I feel good about that.”

Fragmentation and parcelization have increased the number and diversity of landowners seeking or needing assistance: “So they may be, maybe their acreage size isn’t as large as the typical landowners that we used to work with more, they’re probably not as interested in timber production but are more interested in aesthetics, and kind of having a natural piece of ground or something like that. Wildlife, those kinds of things. We are kind of getting up to speed on being able to be equipped to help those folks as our new customers.” One agency professional said, “Probably the most apparent, in your face thing is that there’s a whole lot more people we’re trying to reach with the message of sustainability and stewardship. They’re also turning over faster. Those owners don’t stay

the same.” Another echoed this statement; “it just becomes that much more difficult to educate them. It’s a lot easier to work with one landowner who owns 1000 acres than with 100 landowners owning the same land at 10 acres each. Just the nature of dealing with people, it’s a lot easier to work with one person.”

Another agency professional spoke about how the growing scope of the job is draining away their resources; “With large numbers of adjacent small landowners, it takes a lot more people-power to work with the same acreage. Resources then have to be put into personnel rather than conservation projects.” One agency professional talked about how lots of new landowners have a different background; “The land is just there and it’s not under active management. They haven’t thought it through and they’re not managing strategically, they don’t have a plan. They’re not plugged in to the extension system. There’s a new audience that doesn’t know where to go.” One agency professional stated, “So we’re still trying to figure out what’s the best way, especially to reach those people who aren’t involved in any of those projects. Sometimes I feel like we go for that low-hanging fruit. But still working on how we can go to those people who have absolutely no idea.” Aside from landowners’ lack of knowledge that these services are available, there is also a concern that some landowners think that their property is too small to manage. One agency professional stated, “I guess what I’m running into is that a lot of landowners just aren’t managing their forests. A lot of that is just with the size of the property they don’t feel like they can manage it effectively.”

Wither Forestry? Several public forestry agency professionals worried that professional forestry and forest management agencies would become irrelevant. The number of owners of small acreage forestland continues to increase and overwhelm the number of owners of larger properties. Forestry’s inability to reach and service this politically powerful and economically advantaged constituency could eventually make forestry agencies obsolete. Agencies traditionally worked with larger scale landowners, but as ownerships are subdividing and fragmenting, there are fewer landowners with large acreages. One agency professional stated that the ... “worst case scenario would be a shift to irrelevance for us, and we definitely don’t want to see that happen, so we are trying to meet the new landowner’s needs because we see it as a huge opportunity, and we are the agency for all matters pertaining to forestry within this state, and that’s one of our jobs.”

There exists sincere concern that future generations of landowners will value forests differently, perhaps in ways detrimental to forest conservation: “there are a lot of new landowners that may not have been living on the land and may not have the investment in maintaining that forestland or the knowledge of how to manage it. And that kind of feeds a trend of conversion, which is what my organization is most concerned with and the loss of that forestland, removal from forestry into real estate development or those sorts of things. So that’s our major concern.” One agency professional explains the common sentiment that landowners who interact with their land become personally invested in it and less likely to sell it for development: “No management results in subdivisions. Because if people don’t have a vested interest in their property, if they don’t

use it for recreation or something, if they don't have that tie to the land, they lose interest and put it on the market.”

As respect and appreciation for forests and forestry lessens, there will be less political will to conserve forests: “... if they don't learn about it and interact meaningfully with their property, then we've lost an opportunity to engage ... youth in the natural environment, engage them as advocates politically and socially for positive natural resource management on the public and private side of things.” Forests will change from being a thought of as a vital “part of our environment and our economy“ to something we just view and this will result in a “loss of the social license and appreciation of the forest and the things our forests provides, both in terms of wood products and ecosystem services. So there's a cognitive gap in what we expect from our forests and what we perceive our forests as doing.”

Thinking more optimistically, one public forestry agency professional stated that the current lack of landowner involvement and appreciation of forest management creates an opportunity for forestry to again become socially relevant. She argued that these new landowners would appreciate forests and forestry for increasing their quality of life: “We are able to help people... achieve their hopes and dreams for their property. ...So I think that people can really, if they work with us, get the bang for their woodlot buck, so to speak. They will enjoy it more. So that's a cost that I don't think landowners are always aware of until they perhaps get to know their land better, then they're like wow, this is great stuff. And I think we can help them get to know their land better.”

Emerging Solutions: Public forestry agencies are responding to these challenges in a variety of ways as they try to overcome resource limitations, reach the increasing number of new landowners with changing needs, and better coordinate to prevent duplicating efforts. One such response is an increase in networking and partnerships among agencies. Many agencies seem to be forming partnerships and alliances with each other to educate or share information and reach small acreage landowners and service providers. Many mention that they work with agency partners, such as a state forestry agency working with state extension, wildlife agencies, Natural Resource Conservation Districts, water conservation districts, and woodland owners associations. One state forestry agency mentioned that it held training workshops about changing landowner characteristics and needs for other agencies, such as NRCS, extension, wildlife, and parks as well as private loggers and foresters. Public agencies and NGOs are partnering when they need more experience in an area, such as a land trust working state forestry agency to prioritize forestland to put under conservation easements. Networking is often necessary, as most groups cannot do everything themselves, especially small agencies or NGO groups. One agency professional mentioned that his hope is that people would recognize their limitations and network. Agencies are also encouraging landowners to network and join together. One agency professional talked about a program they were implementing to encourage landowners to network with each other; “We've been trying to put together something we call natural resource neighborhoods, which responds to fragmentation by getting landowners to cooperate together. So they can manage a broader landscape. It's just getting started, and there is one working cooperative.”

New programming is emerging, geared towards new, small-scale landowners and service providers. Several public forestry agency professionals stated that most of their

workshops geared toward landowners have been well-attended, although one stated, “How much technology transfer, or how much practical implantation landowners have done as a result of the workshops I can’t really say right now. I know the interest has been there through the attendance.” Another agency professional viewed the workshops his agency conducted as successful judging by evaluations; “From the evaluations that we’ve done, most of them say from the evaluations that they’re going to go home and do this. And we’ve done a 6 month follow-up and a good percent of the people who said they would 6 months ago, are doing things. So that’s a good thing.” The Texas Forest Service is taking a somewhat innovative approach by throwing a huge event, the Texas Forest Expo, that attracted over 800 landowners and educated them in various aspects of forestry, wildlife, fire, non-timber products, and other natural resource management opportunities. They said the event has been successful enough that they plan to continue it for the next couple of years and are working on expanding it. Another agency professional said that the key to reaching new landowners was simply putting your information out there in a variety of ways. She stated that, “using multiple approaches to reaching people is the way to go. We wait for them to call us because we’ve got our name out there, we do web stuff, we post and communicate through towns, we connect with other groups. As we’ve done quite a bit in the past, we continue to work with more traditional news media, radio and newspaper in particular. So I’d say we have a multi-pronged approach.”

Several states are also attempting to put together lists of small-scale forestry service providers to distribute to landowners who are interested in having work done on their property.

Service Providers, A Critical Link: There are not enough service providers doing small-scale forestry work. Public foresters struggle finding service providers to refer interested landowners to. Some agency professionals report that they are hesitant to hold workshops for landowners and get them excited about managing their small acreage properties simply because there is no one in the area they could call to do the work. They hesitate to get them excited when no service providers are present. One agency professional stated, “When we do reach them and they are looking for professional assistance, that’s not available. I feel like there’s more pieces coming together, but it’s not very well defined and recognized and easily accessible source of assistance.” Another agency professional said that although there are only a few small-scale forestry service providers in their area. He said, “We could probably use more service providers, but we don’t always have a good selection, I guess, particularly depending on which little local area you’re in. Some are willing to travel and some are not. The bigger that you are in the bigger pool you have. Sometimes it’s hard for a landowner to find someone to do the work in a timely fashion.”

Service providers are not as easily excited about small-scale forestry as landowners: “Service providers seem to be a harder nut to crack.” One agency professional stated, “The hard thing is getting the vendors list together, and trying to assemble people or convince people that there’s markets and money to be made in small woodlot management. That’s the tough thing. Part of it is change, a lot of the traditional wood cutters have been those folks that move in and cut saw timber and pulpwood, they

want larger tracts, and trying to convince those folks that there's money to be made in some of the cultural practices like invasive species removal, or thinning small diameter hardwoods to create better stocked stands with more valuable species. It's hard to get people to change their production from volume of saw timber to some of these other practices. It's going to take time; it's not an overnight success story."

Most public agency professionals interviewed thought people with forestry backgrounds were the most able to switch into small-scale and amenity oriented forestry jobs. However, they thought the green industry was the most willing, though they lack some of the education and needed skills. Most seem to think the green industry will eventually fill this niche because foresters are not adapting quickly enough. One agency professional stated, "I think consulting foresters are best situated. They have the education, experience, and the contacts to move into this if they're willing to actually do some physical labor as well, and not just be a broker. But I think the most receptive industry is the green industry. But they lack a lot of the skills and systems thinking that natural resource professionals have. They can treat plants, a situation, but the interaction that occurs in the natural areas, that's something they don't have. So there will be more technical education to do with the green industry. The education for consultants is for them to imagine that they might be able to make a dollar besides selling timber." Another agency professional said, "I think arborists and landscapers are going to fill that niche. I think foresters have tried, and though it's very similar to forestry on larger parcels, I think the forestry community isn't going to adjust in time to take advantage of it. So I think arborists and landscapers are going to catch that market."

Other agency professionals suggested that a mix of service providers from various backgrounds was needed. They said that there's room for a variety of service providers depending on the nature of the job and the scale of the project. One service provider stated, "Probably a mix of all service providers will be needed. I'm not sure which is better to respond, it depends on a project, and depends on the scale of the project and the type of the project...I guess it depends on the project, the type of products the landowner has and how many acres is involved. I could see where all of them would have value to a landowner at a different point or a different project level. I think it's probably going to take all sectors, really." Other agency professionals mention the issue of scale. He said that small logging crews and smaller companies will be successful on small acreage jobs; "I would say the smaller and local side of the sector. Because most small owners, it's all about affordability. So I think the larger the industry, the harder it is for them to be able to travel and make it pay"

Neighbor Conflict: Because suburbanizing landscapes have more residents living in closer proximity than typical rural areas, forest management activities have the potential to have more impact on neighbors. Although certain management activities are needed on some small acreage parcels, they cannot be used because they are not socially acceptable. One public forestry professional stated, "It's also an issue with what's socially acceptable. If you have a 100 acre property subdivided into 10 acre lots, being able to do traditional forest management [is] really really hard, because you're infringing on a lot of different people's views of what good forestry is... And it becomes limiting what you can do, you can't obviously do aerial herbicide application any longer. You may have to resort to hand application of herbicide, you can't do prescribed burning because of smoke

management issues. So ... it's also the management practices that you're able to do." Another public forestry professional pointed out that social acceptability concerns are not limited to small, fragmented tracts. He stated, "In a way, it's not just small, it's also the newer constraint from a social point of view. We have a landowner that has 3000 acres, but in a way I almost put them into this, because they're ... not wanting to manage with a big cut to length processor and a big forwarder, they want to use some of the smaller scale equipment, even though the big guys can get on there and operate efficiently. ... So it's not just about size, it's also about other characteristics of the people."

Declining Forest Markets: Loss of forest industry, regional markets, skilled professionals, and timber traditions negatively impact the ability to profitably conduct forest management of any kind. "We've seen a lot of consolidation within the forest infrastructure, so even those small landowners who are actively managing their land have difficulty getting their wood products to market ... if you don't have enough logs to run the mill operation for a day or two, they're not really that interested, and they feel like they're doing landowners a favor if they buy these really small loads of logs." There is also often a lack of market for products coming from small-scale properties. One agency professional talked about how because of economies of scale, landowners can't find a market for their products; "Economies of scale make it difficult to market small volumes of traditional forest products." He said that he's run across a landowner with only a few acres who couldn't "give their wood away." Another agency professional stated, "Well, I think the biggest challenge right now is lack of market, so it's not really related to that, it's more infrastructure going down because of market conditions." One agency professional from New Hampshire said that she felt her state was in a better position than most because it did still have an existing forestry infrastructure. She stated, "New Hampshire truly has a woods tradition, and it makes us nimble when there's tornados and ice storm, there's still industry that works. But it's a very different industry today than 20 years ago. A very robust industry. It's changed. My biggest concern is that the industry isn't perhaps as strong as it was. But it's still there. There are loggers and sawmills. There's already an infrastructure of people that harvest wood. I don't see that in other states."

Forest Health Threatened by Fragmentation and Parcelization: Public foresters note that a lack of professional advice, increasing fragmentation, and less active management would degrade overall forest health by promoting the spread of invasive species, making it vulnerable to pest and disease because of overstocking, and increasing the likelihood of high-grading should harvesting occur.

Some informants worried that unmanaged, small acreage, forested lots would be particularly vulnerable to invasive species because of their great amount of edge compared to area. Invasives can also easily gain a hold on small acre forests following disturbance. Some public forestry agency professionals foresee a loss of natural regeneration capabilities after disturbance when aggressive invasive species are involved. One public forestry professional stated, "We won't see new growth without landowners investing in invasive species control. And a fragmented forest, when we fragment the landscape, it's increasing the prevalence of invasive species. They just are more

opportunistic with all of that tremendous amount of edge.” Another public forestry agency professional expressed similar concerns by invoking the broader concept of ecosystem resiliency; “And so I don’t really, other than the disturbance that fragmentation causes ecosystem services as far as resiliency, anytime you have a fragmented forest you begin to introduce invasive species and certain species do much poorer in fragmented forests, you lose ecosystem resiliency, And that’s going to be really important in the face of climate change.” In contrast, some public forestry professionals thought that the issue of invasive species is a little easier to address at small-scales; “Small acreages actually have a meaningful impact on invasive species, because it’s not the large-scale that becomes quickly overwhelming.”

Many agency professionals noted that fragmented forests receive less professional advice and less active management and therefore are more susceptible to becoming overstocked or high-graded. One agency professional stated, “. . . These woodlots are going to become degraded. I don’t think they’ll be as effective at being filters or cleaning air. . . if they’re not managed in some way.” Another stated, “The forest health situation will continue to deteriorate, and I think especially the fires in the urban-rural interface will continue to escalate.” One agency professional said, “Most of the land has been high-graded in the past. Those forests, as far as productivity from a timber standpoint as well as from an environmental or just forest health standpoint are degrading over time. If you’ve got a high grade and you don’t do anything about it, it’s just going to keep on degrading.” Another stated, “Lack of management leading to not terribly healthy, overstocked forests. The bigger one is just a loss of that forestland. And I think there are both environmental impacts from that.” Another public forestry agency professional stated that without management, land that has been exploited in the past will continue to be exploited. He said that without management, “I imagine a large percentage of [parcels] will just go untouched and they’ll just continue to grow, and an occasional buyer will approach landowners if it’s economically feasible to buy some timber or something.”

Case Studies

The purpose of these case studies was to illustrate some of the points made in the qualitative analysis portion of the project, and to provide specific examples of small-scale forestry service providers who are operating successfully. The two case studies that follow are from successful small-scale forestry service providers in Virginia. To collect this information, I asked the service provider to identify a particular job. I then interviewed the service provider and the landowner about that job.

Aaron Baumgartner and the Cross family

Background/Context: Stanley and Bonnie Cross live in Hannover, Virginia, which is a suburb of Richmond. Stanley is a sheep farmer, and Bonnie stays at home. They own property on both sides of a highway. They used to live on the same side of the highway as their sheep fields, but 2 or 3 years ago, Stanley's cousin passed away, and the cousin's wife decided to sell their property and move. Stanley bought the property on the other side of the road from his property, which includes the house they now live in, a small backyard garden, several outbuildings, some open land, and a small woodlot.

A 5 acre woodlot of planted loblolly pines lines one side of the property. It was planted more than 15 years ago on a site formerly used for agriculture by Stanley's cousin. It provides screening between the Cross's property and the adjoining property. Stanley inherited a management plan for the planted pines along with his property, which stated that the pines should be thinned when they were about 15 years old. When the time came, they put it off for a few years, because he had been around logging jobs before and didn't want someone to come in and "make a mess of the place". However, the Crosses soon began to notice that their trees were beginning to look stunted. Stanley reported that having been a farmer and been around growing things all his life, he could see that the trees just needed to be thinned out. So the Crosses called the Department of Forestry in their area.

Marketing: The Department of Forestry provided them with a list of service providers in the area who worked with small woodlots – which only contained one person, Aaron Baumgartner. Aaron was contacted and came immediately to look at the property, and determined that the trees needed to be thinned. He emphasized that he makes aesthetics and a lack of site disturbance primary. He will not work when it is raining to minimize soil disturbance. This fit in well with what the Crosses wanted for their property – they did not want the site to be torn up by big equipment. They agreed that Aaron would thin their woodlot and take out about half the trees, leaving the trees immediately adjacent to the house a little thicker to maintain a screen between them and the neighbors.

Aaron told the Crosses immediately that there would be no payment to them. Aaron would keep all of the income from the products he took off of their land. The Crosses were okay with this. They said that they knew when they decided to have their woodlot thinned that they were not going to make any money from it. Aaron also told them that in 20-25 years, they would have a unique opportunity to have their logs sold as telephone poles because they are so tall and straight, so by thinning now, they are investing in the future of their woodlot.

Aaron also expressed to the Crosses that his primary business is a tree-service company, and when he had a lot of tree-service work to do, that job would come first. But he works at the Cross's property when he can. Stanley noted that when they come, they make lots of progress each day.

Stanley knows what is being done with the products removed from the site. Aaron told him that he is chipping the logs and selling them as mulch rather than selling the whole logs as pulpwood. Stanley is alright with this – he takes the attitude that if Aaron can get more money this way, then good for him.

He hasn't heard of any problems with neighbors – he said he hasn't spoken to his nearest neighbor since work on his woodlot began. However, this neighbor is about 1/8 of a mile away.

Stanley expects to be pleased with the end result. He says it will probably take some getting used to see the trees thinned, but in the long run, he will be pleased with how it turns out. If they need more work done on their property in the future, it is very possible that they will have Aaron back, although for tree service jobs, they have a neighbor with a tree service business who will come and clean up blown down trees for free. Also, they do a lot of work on their property themselves. They have not yet recommended Aaron to anyone else, but have not yet had the opportunity. When the opportunity arises, they said they would be happy to recommend him, especially as he is the only service provider in the area willing to work on small acre woodlots.

Business: Aaron Baumgartner owns a tree service company and does primarily tree work, as it pays better, but also enjoys doing small logging jobs. He grew up in the green industry. His father did tree work and had a degree in forestry, and he was also involved in FFA in high school, and did forestry through that organization. He has a degree in marketing, but decided to go into the green industry after college. He stated that he thought it was easier to go to small woodlot logging from the tree service side of things, because he is used to working in people's front yards and leaving everything immaculate. He was contacted by the Crosses and agreed to thin their small woodlot. He came out to meet them and check out the site. He said he treats every site he works on as if it is his own. Aaron emphasized that aesthetics and eliminating disturbance to soil or residual trees are his primary concern. It is especially important at this site, since he must drive within 15 feet of their front door to access the woodlot. The Crosses agreed to hire Aaron to work on their property, and a contract was written and signed.

He said their site was easy to work on because the site was flat and had easy access. The pines are also planted in rows, making them easy to work with. He created an in-woods landing site, screened from view from the house by a fringe of trees as well as some outbuildings. This serves to keep the mess contained in the woods. He next proceeded to take out two rows of trees from the entire length of the stand to use to access trees in the rest of the stand. He plans to thin from the current 800-950 trees per acre to about 250 trees per acre. He stated that he will check density by taking 1/100 & 1/10 acres test plots as progress is made.

Most of the trees to be thinned were 7-10 inches in diameter. He estimated that 20% of the logs were 10 inches or larger. He would normally take logs of this size to a mill and sell them for pulpwood or chip-and-saw lumber, however, through his networking, he heard of a guy who was looking to buy mulch. He decided to chip all of the logs he could

and sell them for mulch, because he could get more for the mulch than he could get for whole logs at the mill. So he chips everything below 10 inches in diameter, and sells those over 10 inches as pulpwood. He stated that he would chip all of his logs, but his chipper can only handle logs 10 inches or less. With this method, he is also being paid for the tops of trees, which traditional loggers would leave in the woods as waste. He stated that it was important as a small-scale logger to think outside of the box as far as marketing removed products, which he feels that traditional loggers are not good at. When I visited the site, he had a truck, a trailer, a chipper, a small, tract skid steer, and various chainsaws. They fell trees by hand with the chainsaws, use the skid-steer to move them closer to the chipper, trim off the larger branches with chainsaws, and then chip the logs. He explained that he also has a mower that attaches to the front of the skid steer which can mow down 3-4 inch trees. He bought all of his equipment used because that was what he could afford. His equipment wish list includes a tree shear, which operates like a miniature feller-buncher.

Financial: Aaron chose not to give specific amounts for expenditures and incomes, so the following is a general discussion. The Crosses also applied for and received cost share money for this job, through funds for thinning for pine bark beetles. Aaron was the one that initiated the funding and did the legwork. He stated that there was honestly is not much involved with it, so it was not a big time expenditure. Aaron receives all of this money as well as all the income from the materials he sells, and the Crosses receive a free improvement to their woodlot. Aaron also said that location was key for this job – he is five miles away from the mill he takes his pulpwood to, and four miles from the man he sells his chips to. He said that if he had to travel 20 miles to take his products to market, then he would probably not be profitable. He also said that it was important to try to keep costs down and minimize overhead. He said that to stay in business on a small woodlot, it's very difficult to split proceeds. Cost-share money helps, but is not substantial.

Environmental impacts:

He stated that his way of operating has extremely light environmental impacts. He has been around a lot of larger scale logging jobs, and stated that he had even gotten a four-wheeler stuck in logging ruts before. With the way he operates, there are no ruts, because soil is the bottom line. Changing the soil changes the makeup of the environment. His goal is to operate in such a way that after a growing season, the landowners would never know that he had been there. I observed no timber damage, and only a couple of spots of extremely light soil impact on a low piece of ground. I would describe it as more of tire track imprints than rutting.

He said he utilizes all the material he removes, both in his small logging jobs and tree service jobs. He will either chip material and sell it for mulch, sell logs from front yards as firewood, or sell small batches to mills when possible. He stated that he had never paid a dump fee. He creates no waste, so his business is green. He's looking at how to market his business as green.

He stated that he does make an adequate amount of money from small woodlots, and he *would* be able to make a living if all of his jobs were like this one. When I asked if there was enough demand for this kind of work, his reply was "of course". I told him I had encountered some small woodlot loggers who were skeptical about demand, and he

said that they were not networking enough or properly. He said that if he sat home and watched TV and waited for calls, then of course they wouldn't get small woodlot jobs. He stated that networking was key. In fact, he was late in arriving at the Cross's property that day because he was at a networking meeting that lasted longer than expected.

I explained that I had spoken with some public forestry agents who worried about green industry professionals who do small woodlot logging because they are not trained in forestry. Aaron said that although he does not have a forestry degree, he has been around it all of his life through working with his father, his FFA team in high school, and through his experience in doing this work. He is self-educated and enjoys this work. He stated that he could probably go up against a recent VT forestry graduate and know just as much about the profession as they do, and probably more as he has more experience.

Trent Badgley and the Leatherwood family

Background/Context: The Leatherwoods called Trent Badgley for this job on their property because he had worked for them before – about three years ago, as they were beginning to build their house, he came and cleared their house lot. Jeff Leatherwood said that he did not remember how he originally found Trent, as it was 2-3 years ago. He thinks Trent was doing a job nearby and had a sign posted, and he saw it and stopped to speak to him. He originally had Trent come and work on his property two years ago when he was clearing part of his land to build his house. Jeff said that he liked his work – Trent was extra diligent and provided some education about the Ailanthus tress in his woodlot. He thought Trent's work would be very expensive, but found it to be pretty reasonable. Jeff was also happy that Trent hauled away and used the prime poplar and oak logs he removed. He liked Trent's work in part because he knew it was his passion to repopulate an area with trees after cutting them down.

When he bought the property, Jeff said he also noticed some unusual trees. The lot had mainly hardwoods, but no one knew what kind of trees these were. After talking with Trent and finding out that they were invasive Ailanthus trees, they discussed spraying and killing the small Ailanthus sprouts, then they had the idea of taking the big ones down and painting the stumps with an herbicide to prevent resprouting. He wanted them removed from his property because they are so invasive, and so they would not continue to take over his woodlot. He said he also owns another piece of property, which he refers to as his lower lot, which contains Ailanthus. He said that after he gets his house lot cleaned up, he hopes to have Trent back to cut the Ailanthis from his lower lot. There was a short wait before Trent had time to come look at his property – only about 2 weeks.

Business: Jeff is an insurance salesman who has done some landscaping in the past, and his wife studies medicinal plants, so both are fairly familiar with the plant world. They stated that after a while, they just couldn't stand to look at the Ailanthus trees anymore. They knew the trees were an invasive species. They called Trent and told them that they wanted the Ailanthus removed and native hardwoods planted in their place; they agreed to replant the area with hardwoods. Jeff wanted mostly oaks, with a few dogwoods thrown in for aesthetic reasons. Trent agreed to come and work on their

property. While he was there, the landowners also had Trent remove a few trees that he and the landowner deemed hazardous – particularly one that had fallen, but gotten caught in the top of an adjacent tree. The landowners wanted it removed as they have two 10 year old boys, and were afraid it might fall while the boys were playing and hurt someone.

The site is approximately 5 acres, and included a house, and a small forested tract of about 1/3 of an acre. Most of the Ailanthus was growing directly below the house, between the area cleared for the house and the gravel road at the bottom of a steep slope, in a fill area. Trent had already removed 50-60 of the Ailanthus trees and painted the stumps with a BK 800 basal mix to prevent re-sprouting. Approximately 40 red oak and dogwood trees had already been planted as well, with tree shelters placed around them due to deer browse pressure in the area (the wife stated that the deer had eaten her holly bush, and some of the ailanthus). When I visited, Trent was cutting down a few additional ailanthus trees that the landowners had located in another part of the yard, as well as picking up some of the ailanthus logs to saw into lumber on his Woodmizer sawmill. Normally he would chip any debris, but this landowner chose not to have it chipped because he did not want to pay for this service. He has a young family, and said that he and his sons would clean up the yard themselves. He said he would have to come back in the future to spray some small stems of ailanthus to kill it.

Financial: He was removing some of the debris to sell as firewood for outdoor wood stoves. He says he only charges them the cost to haul it to them, about \$25-\$30/load. He removed some of the larger Ailanthus logs to saw into 3x3 timbers, which are used by the steel company to separate steel and metal roofing during processing.

He charges by the hour. For tree work, he charges \$100 - \$125 per hour, depending on the risk assessment involved. For sawmilling, he charges \$65/hour. He mentioned that you don't find people anymore who are willing to take down a tree from someone's yard in exchange for the lumber, because insurance is so expensive. He also mentioned that it is difficult to find insurance – he had to go several towns away to find a company that would insure him. He said that he is always careful to never refer to himself as a logger, because if you do, people will expect you to pay them.

Jeff said that Trent told him his hourly basis, and Jeff trusted that price to be fair. He said he did not remember what the hourly basis was, but he ended up paying about \$700 in total. He took down some trees, hauled off the big logs from a few, and planted some additional hardwoods. While the job was in progress, Jeff thought they did pretty efficient work. Trent brought a helper, worked hard, and knocked out the job in about 2 days. Jeff said that he had originally wanted to do the work on his own, but it would have taken a year for him to do the work. He said it was worth it to pay Trent to come in and get the work done quickly.

Marketing: On marketing, Trent stated that he made sure he had a market for any trees before he cuts them down. He has a market for all of the low-grade lumber he can cut with a local steal mill. They formerly bought slats of wood to separate the steal beams during processing from a company in Hannover. Trent spoke with the steal mill operator and discovered that he could provide this material more cheaply and locally, while at the same time creating a market for his low-grade material, so they came to an agreement. He

says he will sell almost everything except the oak, cherry, and walnut to him. Other clients bring him logs and pay to have it cut into lumber. Most of the people who purchase the rest of his products are farmers or hobby woodworkers. For instance, he spoke of one client who brought him a single log of “spalted” maple. This client used the wood to make high-end turkey calls. Another client that I met had Trent cut several red oak trees from his property to clear some land for an outdoor storage shed and a swimming pool. He is having the logs milled into boards to create a wooden fence around his property.

Trent has several pieces of specialized equipment. He said that when choosing his equipment, he was careful to pick pieces that would function for a variety of tasks. He has a dump truck, a self-loading trailer which he can use to load logs into the trailer or debris into the dump truck, a chipper, a fetching arch to remove large, heavy logs from yards without disturbance, and a woodmizer sawmill. He hopes to soon get a charcoal smoker so he can make charcoal from the slab – waste from the sawmill. Right now, he just tries to give it away – anyone who wants it can come pick it up. I mentioned that I had heard of people tying it into small bundles and selling it as kindling in winter, but he says it wouldn’t be worth the time it would take to cut it into smaller pieces and bundle it.

He said there were no big problems with his neighbors while the work was being done, but they were curious. They asked if he was planning to cut all of his trees down. One of his neighbors who also has some Ailanthus on his property (who calls them stink trees) asked what he was doing. When Jeff explained that he was removing the Ailanthus and planting oaks and dogwoods, the neighbor seemed to approve.

Trent said that most of the time, his clients are very happy with his work, and happy that none of the materials removed from their property are wasted. He says he is efficient, but doesn’t get into a big rush – he works at a steady, efficient pace. Jeff said he’s fairly happy with the end result. He chose not to pay for Trent to chip all of the debris, so he says he has a mess on his hands, and has some work to do burning the tops, but he knew that’s what he was going to end up with before the job started. Jeff hopes he can get Trent to come back, both to spray some young Ailanthus sprouts and next year to remove some bigger trees in his lower lot. He said he is very happy with Trent’s work and has recommended him to the people who built his house – he thought they might run into more people who needed lots cleared, and they might pass along his recommendation of Trent to the landowners.

Environmental impacts: Trent states that he has very little impact on his work sites. He takes extra precautions around any type of water. He replants when possible, and removes any invasive species he encounters. He says that most small woodlots are difficult to manage for production, so he strives to manage for the landowner’s goals while keeping the health of the forest intact and making useful products from any trees harvested.

Summary:

These two case studies provide an example of two service providers who perceive themselves as successful. They seem to be operating according to the practices and characteristics of successful small-scale forestry service providers mentioned above, in the “Service Providers’ Views and Observations about Their Work” section.

Advertising and Marketing: Both of these service providers are innovative in finding ways to get word of the services they provide out to the public. Aaron talked about the importance of networking. He originally got in touch with the Crosses through the service provider list created by the Virginia Department of Forestry. Trent originally got in touch with the Leatherwoods through word of mouth, and a sign placed at the property where he was currently working. Both advertize themselves as tree service companies, and rely on word of mouth to let customers know what other services they perform.

Ethic: Both service providers have a strong and well-articulated stewardship ethic. Aaron talked of how he utilizes everything he removes from a property, and creates no waste. He said his business is green. Trent also utilizes everything he removes, mostly in his sawmill. In some cases, he is even able to remove timber from a landowners' property, process the logs into lumber, and then return that lumber to the landowner for use on their property. He also talked about the importance of local markets; he sells much of his low-grade lumber to a local steel mill to use to separate steel beams during processing.

Emphasize Amenity: Both Trent and Aaron do a lot of work managing for amenity values rather than timber production for economic revenue. When I visited a site Trent was working on, he was removing an invasive species and a few hazard trees and replanting native trees. When I visited the site Aaron was working on, he was thinning a 5 acre stand of pine for improved forest health and increased future economic value.

Low Impact: Both service providers emphasized that their work had very few environmental impacts. Aaron stated that there are very few environmental impacts with the way he operates. He talked at length about how the soil is the bottom line in a forest, and he is careful to leave no soil damage, such that he often refuses to work on a site when the ground is wet. He said he tries to operate in such a way that after a growing season, the landowners would never know he had been there. Trent has special equipment – a fetching arch and a knuckle-boom loader – that he uses to remove logs from yards and small woodlots without disturbing the ground.

Diversification: Both Trent and Aaron offer a diversified suite of services. Trent stated that one of the main strengths of his business is the fact that he's so diversified. If the economy dips and he can't get any tree work, then he can do some sawmilling for a while. He does everything from cutting and removing the trees to processing whole logs into lumber. Aaron also offers a diverse suite of services. He does everything from tree work to small woodlot logging.

Adaptability: Both service providers demonstrate a flexibility and adaptability in their business plans. Aaron started out doing only tree-service work, then moved into doing small woodlot logging jobs as her perceived a need for this service. Trent also works as a full-time forester, but began doing tree service and sawmilling on the side. Both stated that they are able to handle a wide variety of jobs, and are willing to try many jobs they have not tried before, as long as they believe they have the equipment, knowledge, and

insurance for such a job. Otherwise, they will usually refer the clients to someone who does.

Payment Schedule: Both service providers charge by some measure of time and materials. Aaron says he charges by the day for the most part, although of the job I visited, he kept all of the income from the products removed from the site and charged the landowners nothing. The landowners received the improvement to their woodlot in exchange for all the incoming revenue and cost-share money their property produced. Trent stated that he charges by the job, depending on what is involved. He has standard hourly rates for specific jobs he performs, such as hauling logs or sawmilling work. Both have found ways to ensure they are compensated for their time and materials, rather than for the material they remove from a site.

Maximize Value not Volume: Both Aaron and Trent are careful to sell or utilize any products in a way that will create the most revenue. Aaron sorts any removed logs and takes them to local mills. On the job I visited, he had found a market for wood chips, and so was chipping most of his small logs rather than selling the whole log, because he could get more money from the chips. Trent adds value to his logs before sale by processing them into lumber on his portable sawmill. He sells high grad lumber to woodworkers and hobbyists, and sells low grade material to a local steel mill, where they use beams to separate the steel during processing.

Networked: Both service providers are networked, with landowner, other service providers, and public forestry professionals. Trent says there are more and more tree services using me simply to remove the big logs for them so they don't have to stay there with several men making firewood for a long time. I can show up and be in and out of there in a half hour or an hour and save them a days' worth of labor. I charge them hourly and I end up with a bunch of logs. It works out pretty well for me and them. That's starting to be a little more popular as the word gets out to some of these medium sized tree guys, and even though they've spent a little more, they're saving lots of money vs. having to do with big pieces of wood and they don't have the equipment to deal with it and that sort of thing. So that service I see is definitely picking up for me. Aaron says that has a network of people to which he refers services he's asked to do that he doesn't think he can handle. He said that they refer work his way quite a bit as well.

Discussion and Implications:

A number of trends have been highlighted by the literature, and were corroborated by the informants interviewed here. Forested sites are being converted into residential developments. Parcel sizes are fragmenting and decreasing in both health and value. Service providers are operating on a narrowing profit margin due to such forces as globalization and the mechanization of harvesting operations. Processing facilities for forest products are closing or consolidating. Traditional forestry on private lands is becoming increasingly difficult to practice profitably. Forest health and resiliency are being stressed and threatened by things such as climate change, invasive species, fire, and high grading. Even with all of these factors making traditional forestry more difficult, funding for public forestry programs is shrinking, and the political influence of professional forestry and the forest industry is decreasing. On the other hand, the American public is becoming increasingly environmentally aware. Landowners are more concerned about and aware of things such as the importance of the ecosystem services their land provides. People are aware of the value of their land for reasons other than monetary revenue from timber.

All of these issues are creating challenges as well as opportunities for forest management. There are fewer mid-sized, forested tracts of around 100 acres as these lands are being parcelized and sold to homeowners. However, the emerging small-scale forestry sector needs experts, managers, and service providers. What does this all mean for forestry? Is the profession changing, or is a new small-scale suburban and exurban sector of forestry emerging, much like the urban forestry sector that has emerged in the last 25 years? A small number of forestry service providers have been working on small-scale woodlots, and others are interested in getting involved. Here I compile the lessons they have learned as well as comment on the potential implications for the forestry profession.

Framing and Advertizing Forestry:

A large number of forest landowners own small parcels and value their forests differently. In some cases they are disinterested in, or even wary of, traditional forestry. Perhaps, in order to remain relevant to the full spectrum of forest landowners, the way service providers frame, talk about, and understand forestry should shift as well.

So what is forestry? The textbook definition that all foresters-in-training learn early in their undergraduate programs states that forestry is the art and science of cultivating, maintaining, and developing forests. However, for many practitioners managing primarily for economic reasons, forestry has come to be understood as managing trees for maximum profit, best achieved through large economies of scale and highly mechanized operations. Small-scale service providers perform a suite of services that attempt to address new landowner objectives to improve forest health, aesthetics, wildlife habitat, and a host of other things. This is, perhaps, also forestry, though not forestry as it has been traditionally understood. It involves managing for a number of ownership objectives held by an diversifying group of landowners. In many cases, this work requires a forester's education and training. Since many forest landowner's

objectives have changed, it creates an opportunity for the forestry profession to address the needs of these landowners.

The forestry profession might find it beneficial to adapt to the needs of new landowners. First, the increasing number of small-scale landowners creates a potential new market for forest services. There are more and more owners of small acreage private forestlands; these landowners are potential new clients for foresters willing to work with this landowner type. Foresters might have more in common with these landowners than they think; landowners buy their forested properties because they want their own piece of forest to live in and take care of. Similarly, many foresters pursue this profession because they enjoy working in and taking care of the natural world. Foresters seem to share a similar stewardship ethic with small scale private forest landowners. The varied ownership objectives and values of these landowners also provides an opportunity for foresters to practice forestry for multiple uses and values, rather than managing predominately for economic revenue maximization. Several small-scale forestry service providers I spoke with mentioned that forestry as it is often currently practiced is not how they were taught in college. One service provider mentioned that when marking a tract of timber to be cut, he might encounter a tree that should stay for ecological, aesthetic, genetic, or future profit, but he will mark it to be cut because of the heavy emphasis on short-term profit that makes the job viable. However, he said that when he works on small-scale forested properties and is paid by the hour, he is not required to make those compromises. Therefore, small-scale forestry might provide a way for foresters to manage for a multitude of objectives and practice forestry without having to compromise environmental and social goals for economic necessity.

One possible reason that traditional forestry service providers might not be willing to work on small-scale properties is because it might threaten their identity as foresters. For the past 100 years of the forestry profession in the United States, and before that, the logging tradition, much of forestry has been dominated by the practice of timber management on large properties to provide fiber for forest industry—commodity production, economies-of-scale, and cost reduction through efficiency were norms and ideals. Practices on small-scale forested acreages are different, as are the clients. Silviculture, the principal forest science that gives forestry its claim to expertise, focuses mostly on maximizing revenue from timber rather than maximizing products that new owners value (i.e., scenery, solitude, and property value). Adopting new practices, questioning established science, and servicing new clients is understandably threatening to the self-identity of foresters and loggers that have made a living producing timber for industry. Colleagues engaged in traditional services might not believe that small-scale forestry practices are “real” forestry.

Maintaining relevancy was a topic of concern mentioned by public forestry agency professionals. Their mission is to assist forest landowners; if their programs are not useful to this segment of forest landowners, then they might be out of a job, as their purpose is to meet the land management needs of their constituents. One service provider said the, “worst case scenario would be a shift to irrelevance for us, and we definitely don’t want to see that happen, so we are trying to meet the new landowner’s needs because we see it as a huge opportunity, and we are the agency for all matters pertaining to forestry within this state, and that’s one of our jobs.” Service providers also mentioned that they were adapting to the needs of new small-scale landowners because if they

didn't, he worried that their agency would be left behind as the forestry profession changed.

Perhaps one way to make small-scale forest management relevant to new small-scale landowners is to reframe forest management for such reasons as ecosystem health and wildlife habitat as the “green” thing to do, especially in the urban/exurban context. Many new urban and exurban landowners already have a well-developed environmental ethic. Perhaps forestry service professionals could build on that by describing how another way to live “green” is to sustainably manage small-scale woodlots. Although some small forest owners are wary of forestry, perhaps by reframing sustainable small-scale forest management as “green”, it will become more desirable and make owners willing to pay for it.

In reframing forestry to new landowners, it is important to focus on the stewardship ethic of these service providers and the amenity values they produce. Successful service providers are not managing to maximize marketable trees and monetary income. They claim to practice worst-first harvesting; they remove damaged, dying, or inferior specimens, encouraging the continuation or development of a diverse, resilient forest. It is important to promote not just harvesting or activity on small woodlots, but active, sustainable management that will improve the health of the stand and increase amenity values.

A new term may be needed to use to refer to small-scale forestry. Most service providers stated that calling themselves a forester did not make them lose business by scaring clients. However, it probably did not help them either. In many cases the term “forester” no longer describes the wide suite of services performed by most small-scale forestry practitioners and many service providers and public forestry agency professionals agreed that a term is needed which will be more descriptive of the suite of services these practitioners perform, and increase visibility for the practitioners. In the brief sample performed here, there was a variety of terms that small-scale forestry service providers used for themselves, and that public forestry professionals used to refer to the sector. Some were slight rewordings of more traditionally used terms, and some were new and creative. There was little agreement on what the sector should be called. For the most part, I have chosen here to simply refer to it as “small-scale forestry”. The term “woodscaping” is also very evocative as it calls to mind the amenity focus and hourly pay scale of the landscaping industry while working on a slightly larger scale. It also utilizes the word “woods” rather than “forests”, which is beneficial; a couple of service providers mentioned that small-scale landowners identified more with the term “woods”. They imagine “forests” to be thousand-acre national forests, but they believe that they own “woods” in their 15 acre backyard. The term is more approachable. “Micro-forestry” was another term suggested by a public forestry professional which I thought might work well. One service provider mentioned that it is important to avoid calling yourself a “logger”, because then people expect to receive money rather than pay for a service. No matter which term is eventually used by the forestry profession, it is important that we have one. The small-scale forestry industry will be more likely to be written about, recognized, and growing if it has a descriptive, catchy name.

For some time, public forestry agencies have been aware of parcelization, fragmentation, and the relocating forest industry, and have attempted to develop strategies to slow or reverse these trends (Best, 2002; DeCoster, 1998). However, with a

population that is expected to continue to grow and spread out, public forestry agencies would do well to accept the new forest these trends create and begin to work with small-scale landowners. Some have begun to shift their focus to address the needs of small-scale landowners. In particular, the state forestry agencies and forestry extension personnel in some states are beginning develop programs to address the needs of small-scale landowners. For instance, Washington State's Small Forest Landowner office, and Vermont's Backyard Forest Stewardship program (Hull et al, 2004). Several states are also attempting to put together lists of small-scale forestry service providers to distribute to landowners who are interested in having work done on their property. The Virginia Department of Forestry is also organizing literature and workshops to address issues of working in fragmented landscapes for both service providers and new forest landowners. Two such workshops were hosted by the VDOF in September 2008 on small-scale forestry equipment, and woody bioenergy. Personnel in Maryland and Virginia worked together to develop a "Woods in your Backyard" program to teach small-scale landowners about forest management. Forestry extension in Maryland is also reaching out to the green industry as potential service providers in a burgeoning small-scale forestry industry. They are organizing workshops to educate them about the need for their services, and give them technical forest management skills to supplement the tree work or landscaping skills they already possess.

The Southern Group of State Foresters in conjunction with the US Forest Service developed a "Changing Roles" program as a response to this issue as a tool to train foresters who find themselves working in changed forest (interfacesouth.org). Texas held a Forest Expo in the last two years as an attempt to reach out to landowners and educate them about forest management for reasons other than timber revenue. In spring of 2009, more than 800 landowners attended and enrolled in one of the forest management classes. Personnel in Oregon are holding workshops for aging landowners to help them determine how to best pass on their land to the next generation. They're also working to develop an active biomass market to create an economic driver to thin stands that would have formerly been pre-commercial, as economic drivers are the biggest stimulus for getting work done in that area. These state forestry professionals are to be commended, because they are thinking hard about who their clients are and looking for new, innovative methods to effectively reach them, rather than relying solely on the traditional methods of landowner workshops. Although there has been some progress on this front, it is only a small effort when compared to the increasing number of landowners and their diversifying needs. More creative ways to promote the small-scale forest industry are needed, and more states need to recognize these trends and become involved.

Understanding the new forest owner

There is a sense of concern in the forestry literature that small-scale landowners are different from larger acreage landowners that foresters are traditionally accustomed to working with; they are more interested in amenities as reasons for land ownership, less interested in management services, and thus problematic for traditional forestry (Decoster, 1998; Best, 2002). However, our results suggest that although small acreage landowners have different motivations they may still manage their land actively. Moreover, they are no different than owners of large acreages in the obstacles they see as

preventing management. Thus, owners of large and small acreages need professional assistance.

Results indicate that owners of small were no less active in their management intentions and actions than owners of large forests. However, they did have different motivations for forest management, but sometimes in unexpected ways. Consistent with the characterization of service providers and public foresters, owners of large acreages were more motivated by a regular flow of income, by the benefits of timber stand improvement such as harvesting mature trees to allow for the creation of a new, young forest, by improving hunting opportunities, and by implementing a long term management plan. But owners of small acreage forests were also actively managing their land, just for different reasons. They were more likely to be motivated by reducing fire risk, using forest products for personal use, and removing storm damage. Large and small lots owners were equally motivated by concerns about scenery and land conversion or development.

The survey results further suggest that owners of smaller forests were *not* significantly different from owners of large acreages in 14 of 27 management activities the implemented on their property. And, even though they were less likely to practice 13 of the 27 activities, the differences were not large and many small acreage landowners still practice these management activities. Importantly, there were no statistical differences between large and small owners in the constraints perceived as preventing them from engaging in forest management, suggesting that owners of both large and small acreages feel limited by similar challenges, even those challenges that intuitively seem more likely to be problems in fragmented and urbanizing forests such as working with neighbors, finding competent professional assistance, worry about increasing regulations, worries about trespass, limited profitability, increased development on nearby lands, and increased concerns about environmental degradation.

Perhaps the forestry community needs to more carefully evaluate the opportunities and challenges small forests present. Rather than lamenting the changes taking place and waiting on landowners to become aware of their need for forest management, perhaps it is forestry professionals who need to reach out in ways that make professional forestry services appealing and respected. Rather than encourage small-scale landowners to educate themselves in the ways of traditional forestry and change their views and attitudes, perhaps the forestry community should educate itself about the emerging small scale forestry industry.

Given the inclination of both large and small forest owners towards management, the bigger challenges may be the ability to afford management. Without landowners being both willing and able to pay by some measure of time and materials for management services, small-scale forest management is difficult. It is perhaps possible for service providers to continue working on a commission basis if the landowner had very high quality timber, although small-scale properties are sometimes more likely to contain low quality, low value timber (Munsell and Germain, 2007). The forestry service providers I spoke to tend to think that landowners are generally not willing to pay. The public agency professionals generally thought landowners would pay. Part of this discrepancy could be explained by a difference of perspective; agency people are hearing

from landowners and service providers that contact them with requests, whereas service providers are looking for clients who are willing to hire them, sign a contract, and write a check. The service providers that seem successful at finding clients tend to be very proactive in searching for them. They don't just wait for calls. They network, they speak to groups, they find publicity wherever they can, and they're always looking for new ways to make their services appealing and necessary for landowners. For instance, Aaron Baumgartner, the service provider mentioned in the first case study, was initially late for our interview because he was attending a weekly networking meeting. He also stated that if he were to sit at home and wait for landowners to contact him, he would have very little work.

New business practices

More and more small acreage forests will require management as the average forestland acreage continues to decline. Forest stands less than 20 acres present some unique challenges for traditional forest management techniques. They are often too small for traditional loggers, but too large for many green industry professionals. For people with forestry backgrounds in particular, transitioning from traditional forestry practices to the emerging small-scale forestry industry will require service providers to change some of their business practices. In particular, there is an increased focus on amenities, safety, and property enhancement rather than on maximizing income from timber. Many newer landowners do not have income from timber production as a primary goal, so successful service providers' focus on improving property value and family safety.

First, successful small-scale forestry service providers portrayed a "green" stewardship ethic. These service providers were committed to improving and taking care of the land they worked with; sometimes to such an extent that they refused jobs that went against their principles. Service providers reported that small-scale landowners were generally comfortable dealing with service providers who expressed their high stewardship ethic. Landowners who agreed with this stewardship ethic knew that their property would be taken care of.

Successful service providers used a different payment structure; they generally charge by some measure of time and materials rather than by commission. This ensures that they receive adequate compensation for their time on a job regardless of what materials are or are not removed from the site. Although there are many examples of service providers doing small-scale forestry work, many seem only to do it part time, suggesting it does not pay enough money to make a living. In interviews several service providers mentioned that they make most of their money from timber sales, or from tree work, which allows them to do some small-scale forestry work where needed. Trent Badgley, the second case study mentioned above, stated that although he prefers to work on small woodlots, the tree service side of his business is where he makes most of his money; it would be difficult to make a living working only on the small-scale forestry work. He only works at his tree-service/ small-scale woodlot management business part-time. He also works full-time as a forester. Maybe no one can specialize in small-scale forest management work full-time.

Successful small-scale forestry professionals have diversified their businesses to offer a suite of related services. Diversification allows them to handle multiple tasks for a single client, creating more revenue streams. Also, if demand for one of their services slackens, they have other services they can fall back on. Some successful small-scale forestry service providers created mutually-beneficial cooperative agreements between themselves and other service providers so that together these companies offer a full suite of services. Larger companies might have multiple disciplines represented in house. This still allows them to reach a wide variety of clients with numerous service options. Some service providers also process harvested materials to generate value-added revenue. They have developed ways to process harvested material that create additional revenue streams. In addition to transporting round wood to traditional mills, they chip, saw, or even create furniture from wood products before sale. They also market their products creatively, sometimes selling through high-end, specialty niche markets. They appeal to green builders and hobbyists, marketing their sustainably managed products as “green”. They sometimes use the internet to expand their market to reach potential non-local customers.

Successful service providers also exhibit a high degree of adaptability – they look for market trends and make changes in their business practices in order to follow the client demands. They are constantly watching for new clients or new needs from their former clients, and developing their suite of services to cater to these needs.

Service providers sometimes use specialty small-scale equipment. Although some service providers maintain that the skill and care with which it is used is more important than the size of the equipment, others note that on small woodlots, certain large, expensive pieces of equipment are simply overkill. Small-scale equipment that creates little or no damage to the site and is less expensive than larger equipment is often desirable, though not entirely necessary. It is also important that service providers carefully consider the suite of services they perform and chose equipment that functions for a variety of tasks.

Next Steps

Public forestry professionals cannot adequately service and steward the new forest; there are not enough resources, far too many clients, and too many other priorities demanding their time. A functioning and vibrant private small-scale forestry service industry is needed to maintain this forested estate. These service providers must be profitable, respected, and invested with a forest stewardship ethic. Currently, there are some service providers working in this sector, some more successfully than others, but few that are operating in a sustainable fashion. These piecemeal efforts seem unlikely to have much impact. An integrated, self-reinforcing system must emerge, much like the traditional forest service industry that thrived on large-acreage woodlots when local mills were present and servicing local demand for wood products. Glimmers of a new small-scale forestry management industry are emerging. It has four components, which are detailed below.

First, a base of landowners with small forests is needed. They need to be aware of and favorable towards forest management. They need to be appreciative of the

environmental benefits of active management, such as ecosystem services, increased wildlife habitat, and the reversal of the effects of high grading; the social benefits, such as the creation of local jobs, and the increased amenity value of their property; and the economic benefits, such as current or future income from forest products. Suburban and urban landowners currently fuel a \$100 billion dollar lawn care, landscaping, and green industry service sector (Hall et al, 2005), so they are clearly willing to pay for the upkeep of their yards and land. If they can be convinced of the importance and made aware of the benefits of actively managing their forestland, perhaps they could be persuaded to turn some of those expenditures towards their forested backyards as well as their front yard.

These landowners still have to be reached, convinced of the importance of forest management, and made aware of its benefits. Everyone cites that landowners need more education and more workshops, provided by the public sector. This was mentioned in interviews numerous times by both service providers and public forestry professionals. They state this as if it will be a magic fix; more education will mean more demand for small-scale forestry services, which will mean more calls with jobs. But education is not enough – education does not change behavior (Kollmus and Agyeman, 2002). Innovative methods of reaching these landowners are needed.

Second, a small-scale forestry services industry must have an adequate number of service providers with equipment, skills, business models, and willingness to work with this clientele that will allow them to thrive and multiply. There may be no such service providers in an area. Service providers also vary in their willingness to travel to work in nearby areas. Ideally, landowners should be able to receive a list of small-scale forestry service providers working in their area and be able to choose the person best suited for their land and their needs, depending on the acreage and what they want done. Public forestry professionals in several states are working to create a list of small-scale forestry service providers in an attempt to connect landowners with service providers, but more are needed, as most areas still have few or no options.

Next, value must be added to the services provided and products harvested. Selling usable products rather than raw materials means they can be sold for a higher price. It also means lower transportation costs, as you are not paying to move what eventually becomes waste. These products can be marketed locally as sustainably managed, “green” products to niche markets for specialty forest products. A focus on selling locally harvested goods to local markets is also important. It provides a selling point as well as decreasing transportation costs. A better-developed market for ecosystem services would also be helpful, as it would create a source of income for landowners without requiring them to cut their timber. Active forest management would potentially increase their property value through amenity aspects, such as increased wildlife habitat and aesthetics. Active land management can also benefit public safety through the reduction of the likelihood of fire and hazard trees removal.

Finally, these forest products must have a market. A small-scale forestry industry will require an increased public and private demand for values and products produced by well managed local forests. A local woods market would provide a way for managers to sell wood products to other members of the community, as well as provide a way for community members to receive local, sustainably managed logs. Larger coordinated green infrastructure efforts would create a source of income for landowners that doesn't

require they exploit their forestland. More cost-share funding would encourage landowners to actively manage their land.

In order to make this transition to working with small-scale properties rather than the larger-scale properties they have traditionally worked with, forestry service providers face a variety of challenges and obstacles, depending on their professional background, education, and approach to the small-scale forestry industry. Service providers with backgrounds in the green industry who are looking to scale their operations up for small scale forestry operations on small woodlots already possess many of the needed people skills. They are also already accustomed to charging for their time and materials and leaving worksites neat when leaving. However, many are lacking in some of the technical skills needed for small woodlot management, such as forest ecology and silviculture, and how to cut, grade and market whole logs. Service providers with backgrounds in the forestry industry already possess many of the needed technical skills, but need to learn how to manage for amenity values rather than revenue maximization, how to charge so they can operate profitably on small properties, and how to work with the different expectation of small woodlot owners.

Conclusion

Trends in forestland parcelization, fragmentation and land conversion continue, and show no signs of slowing down. More new forest landowners are buying their dream house away from the suburbs with a small piece of forestland attached. Upon purchasing this land, they enter the ranks of forest landowners; how these people relate to the forestry profession remains to be seen. While some might be unaware of management options, many either are interested in managing their land or will be after learning about management possibilities. For many small acreage forest landowners, managing for economic revenue is not desirable or feasible; they are more interested in managing for amenity values such as aesthetics and wildlife. If these landowners are reached and have their land serviced by small-scale forestry professionals, they will hopefully have a healthier forest that contributes ecosystem services, and be more “connected to their land”, as described by one of the public forestry professionals I interviewed. They may view forestry as important and relevant to both their land and their lives. If they are not reached by land management professionals, landowners may believe that their land is too small for management and do nothing, and their land will most likely continue to decline in both health and economic value. They may view “forestry” as something that happens far away in large national forests; forestry will have little relevance for them, exert little influence on their lives.

This emerging small-scale forest management industry is creating a great opportunity for foresters. A large number of new small-scale landowners are here, and their numbers are growing. The increasing number of small-scale landowners creates a potential new market for foresters. Foresters also share a stewardship ethic with many of these landowners; landowners buy their forested properties because they want their own piece of forest to take care of. Similarly, many foresters pursue this profession because they enjoy taking care of the natural world. The varied ownership objectives and values of these landowners also provides an opportunity for foresters to practice forestry for generation of multiple values the way they were taught in school, rather than managing almost exclusively for maximization of short-term economic revenue. The green industry is poised and ready to work with this market. They already have the training and equipment to work with many of the services involved in small-scale woodlot management, and they can quickly learn the technical skills of forest management required. Some public forestry professionals believe that the green industry will eventually take over the small woodlot management sector. One agent said that he had given up on the forestry industry; they were unwilling to operate differently from the way they traditionally have. He now directs his small-scale forestry programming mostly towards the green industry. However, many public forestry professionals also stated that they thought foresters were certainly more qualified to manage small-scale woodlots. They already have all of the skills and experience needed. For foresters willing to adapt their business structure, such as managing for amenity values rather than revenue maximization, charging for their time and materials rather than by commission, and creatively marketing any removed products, then a wealth of new potential clients may be open to them.

The emerging small-scale forest management industry is also an opportunity for city planners to integrate concepts such as green infrastructure and smart growth into the rapidly expanding suburban landscape. More importantly, it can provide for the sustainable management of those areas, generate jobs, and sustain needed expertise within the region. Larger properties and parks can provide the “hubs” under the green infrastructure paradigm, but it often falls to smaller acreage, private lands to provide the “links”. Owners of small-scale private lands under management from a small-scale forestry industry can develop and implement land management plans for individual parcels that reflect larger green infrastructure goals and objectives. Regional green infrastructure goals often emphasize recreation, aesthetics, biodiversity, or wildlife corridors; these goals align well with the ownership objectives of many small scale private forestland owners. Involvement from a small scale forestry industry might also help neighborhoods in cooperatively managing their open space, which according to Austin and Kaplin (2003) can be a daunting task with conflicting values, little land management experience, and low participation. The small-scale forest industry also retains forest management in the region so that there is equipment and expertise able to respond to changing forest conditions generated by climate, invasive exotics, land use and other change agents. Additionally, revenue generated through harvesting and value-added processing can help make management of the green infrastructure affordable. Without management, the green infrastructure is susceptible to threats from change agents that will reduce ecosystem services, biodiversity, property value, and forest health.

As one public forestry agency professional stated, land management professionals from all sectors are going to be needed to address the challenges created by the changing context of forest and forestry. Forestry practices are slowly evolving to reflect the changing land ownership patterns and values. Entrepreneurs working in public and private enterprises are currently exploring this emerging market and developing tools to service the emerging forest. We will need to continue to track their progress as it may foreshadow professional forestry of the future.

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Appendix A: Interview Guide for Small-scale Forestry Service Providers

“Hi, I’m Katie Nelson from Virginia Tech and I’m following up on the Feb 8th workshop you participated in that was sponsored by the Department of Forestry and Virginia Cooperative Extension....”

We are developing a website and other promotional material to advertise your work and that of other professionals servicing small woodlots and urbanizing forests landowners, something landowners can use to find you. We wanted to get your permission to include you, make sure our information is correct, and collect some additional information. Is that OK?[pause]

Great! I need to ask you a couple of questions that will help promote this type of work, perhaps with articles in professional journals and news releases to local papers. Our entire conversation should take 20 to 30 minutes. Is now an OK time? [if not, schedule another, if no time is good, at least get list info]

Anonymity and confidentiality. Unless you agree otherwise, anything you tell me will be kept confidential. There may be some things that you specifically want your name associated with because it will promote business opportunities. But we will ask your permission before we do that.

Now, some of the questions require descriptive answers, and I want to make sure I get what you have to say exactly right and don’t forget anything important, so with your permission, I’d like to record our conversation. No one will listen to it but the project team, and then we will erase it. Is that OK?

Begin

- How would you describe your professional background: logging, lawncare, arboriculture, forestry, construction, some mix of all these, something else?...
- Could you describe some of your successes at working for clients who own small acreages or in urbanizing forests? Do any particular jobs stand out? [let them define “small” and “woodlot” and “success” any way they want]
 - Please explain what was done at the site.
 - What particular services were provided?
 - How long did it take
 - If you feel comfortable sharing, how much money did the job gross? How does that compare with other jobs you do?
 - That sounds fascinating! Can we follow up and learn more and perhaps develop a featured case study for the website?
- How do you charge for this type of work? By the hour or by the job or by raw material value (stumpage), or some combination of these and other methods

- Could you explain some of the pros and cons of different payment structures and where you see things heading? Ever considered switching to an hourly/daily payment scheme?
- What sort of contract do you form with landowners?
 - Is it written (and formal) or verbal (and informal)?
 - How specific do you get about what you will do? [i.e., residual stand damage, best management practices, equipment type, areas where roads or access points are located, etc.]
 - Would you be interested in seeing examples of other contracts?
 - Would you be willing to share some example contracts you use?
 - If yes, how can we get it?
- Do you have clients for whom you did repeat work?
 - What sort of work did you do? [was it the same service each time or different]
 - How often did you return?
 - Is this type of return work and long term service relationship becoming more or less common?
 - Explain
- Have you ever had problems/issues with neighbors of your clients or members of the local community before or during a job?
 - What are the issues you address with them?
- Do you have/use any specialized equipment for working on small acreage or urbanizing forests?
 - Describe it?
 - How does it help sell your services?
- What are the top two or three best ways to advertise and contact clients for this type of work?
 - What do you call this type of work?/Ever feel like there's no name for what you do, no category in the phone book?
 - Do you have promotional material you could share?
 - If yes, then ask how to obtain it
- Do you extract timber or other forest material from these jobs and sell it or process it?
 - Describe
 - Do you involve sawyer and sale of harvested products as part of your services?
 - Do clients know about this? Do they like this idea? Do they get reimbursed from sales of their timber?]

- Do you get requests for services you can't or don't want to provide?
 - Why don't you provide them?
 - What do you do in these cases? Recommend someone else? Do other people recommend you for jobs they can't or don't want to do?
 - Do you ever subcontract others to do parts of jobs?
 - Do you get subcontracted by others? Explain
 - What % of your work is organized or contracted by others?

- What is preventing you from doing more work with small acreage or urbanizing woodlots? What are some of the main obstacles you face to increasing this type of business
 - Describe. For each ask: what do you need to overcome these obstacles
 - If they say PROFIT: ask what it would take to make it more profitable? What would be 2 or 3 ways to increase the profitability of this type of work?
 - More public awareness that For. Mgt is needed?
 - Probes: Would it be helpful to have....
 - Training in services such as firewise landscaping, recreation trail development, exotic species treatment, etc.
 - Better equipment?
 - Less expensive equipment?
 - Low interest loans to buy equipment and get started
 - More reliable and better trained labor
 - Better advertising material and strategies
 - More service providers doing the same thing and building a critical mass (or is there already too many; i.e., is competition high)
 - Business plans or assistance for helping design and run such a business
 - Model contracts for clients
 - Ability to better process, sort, and get value from material you harvest from client property?
 - A stronger identity of the work you do, a brand you can market yourself under/a category in the phone book.

Conclusion

- About how much of your business involves working with these clients and providing these services?
 - % of profits, days per month, how every you want to describe it

- Do you know of anyone else who does similar work who might also be interested in being on this list, or talking to us? / anyone who works specifically with small landowners?

- How would you your company listed on our promotional material?
 - Name,
 - Email
 - Phone

- Website
- other
-
- What is the geographical area you want us to list? (i.e., city or county)
- What are the services you provide that you want listed?
- Do you have a valid business license?
- Do you have current liability insurance?
- Are there any other credentials or details you would like listed?
 - Professional licensure or certification,
 - Sharp logger, Society of Am For., International Society Arboriculture
 - education, other evidence that would help sell and promote your services
 - Special Equipment
- Can we email or mail you these details for your approval?

Would you like to mail or email information to us?

- ANY THING ELSE YOU WOULD LIKE TO SHARE TO HELP US UNDERSTAND AND PROMOTE THIS TYPE OF BUSINESS?
- MAY WE CONTACT YOU AGAIN TO FOLLOW UP ON SOME OF THESE ISSUES?

THANKS!!!

Appendix B: Letter to small-scale forestry service providers requesting participation

Dear Sir or Madam:

We're conducting an interview of service providers, such as arborists, loggers, foresters, sawmill operators, and others, who work on small acreage woodlots. We understand that you have an interest in this issue, as you decided to be included on the list of small woodlot service providers being created by the Virginia Department of Forestry.

As a courtesy, we wanted to let you know that you may receive a call from us sometime in the next month. We would like to make sure your information on the Virginia Department of Forestry's small woodlot service provider list is correct, as well as ask you a few questions about your experiences working with small acreage woodlots.

High rates of urban and exurban development in Virginia strain forests health, decrease woodlot acreages, and change landowner motivations. These conditions create challenges and opportunities for service providers as well as increase the need for and importance of skilled forest management.

We would greatly appreciate your insight in helping us understand how you and other entrepreneurs are responding to these challenges and opportunities. The information you provide can hopefully help us bring together expertise and resources to overcome barriers and promote the small/suburban woodlot management industry. If you have any questions, feel free to call or email at the number and email address provided below.

Thank you,

Katie Nelson
540-552-3852
knels07@vt.edu

Bruce Hull, Professor
540-231-7272
hullrb@vt.edu

Appendix C: Email to Public Forestry Agency Professionals requesting participation

I'm a graduate student at Virginia Tech working with a team of faculty, students, and agency professionals studying the fragmenting, urbanizing forest landscape. We've been working with businesses of forest-related services targeting small acreage forests, (such as foresters, loggers, arborists, landscapers, small sawmill operators, plant pathologists, and so on)... and now we want to understand the perspective of people working in state forestry programs, University extension, environmental nongovernmental organizations, federal agencies, and the like—people with public interests in mind.

I would like to phone you sometime in the next week or two to learn your perspective on the challenges and opportunities you see, and how you and your organization are responding. The interview should take approximately 30 minutes. Perhaps you could suggest two or three times that you would be available? I will get back to you as soon as possible via email to confirm one of them.

I understand that schedules are busy, but would greatly appreciate your insight in helping us understand the challenges and opportunities being created by a changing landscape. If you have any questions, feel free to call or email at the number and email address provided below.

Thank you, and I look forward to hearing from you soon.

Katie Nelson, Graduate Research Assistant	Bruce Hull, Professor
540-552-3852	540-231-7272
knels07@vt.edu	hullrb@vt.edu

Appendix D: Interview Guide for Public Forestry Agency Professionals

I'm Katie at VT. Hopefully you have received my email. I'm calling to talk about the urbanizing and fragmenting forest, the increasing number of owners of small forests (i.e., less than 20 acres in size) and the impacts these changes are having on forests and forestry. Over the past few months I've been talking with providers of forest-related services who are working on small acreage forests, (people such as foresters, loggers, arborists, landscapers, small sawmill operators, plant pathologists, and so on)... and now I want to get a bigger view from people such as you who are working for the public interest, so I'm calling people working in state forestry programs, University extension, NGOs, federal agencies, and the like.

We want to know how these changes in ownership and industry are affecting you and your organization? Let me start by asking you to explain what you think are the major challenges resulting from forest fragmentation and the increased number of owners of small-acreage forests. Why do these challenges matter to you and your organization?

Challenge: _____
Challenge _____
Challenge _____

We're interested in what your organization is doing to respond to the challenges you mentioned. Do you have any programs or other responses directed to these challenges?

- What are the program goals?
- Who do they target?
- What led to their development?
- How successful? Amt. participation?

Do you have any programs in development that will respond to these challenges? If none are in development, do you have any hopes and dreams for future programs?

- What are their goals?
- Who do they target?
- What will it take for them to be developed?

:

[RETURN TO NEXT "CHALLENGE" THAT PEOPLE MENTIONED. IF NONE, ASK IF THEY CAN THINK OF ANY OTHER PROGRAMS OR RESPONSES TO THE CHALLENGES OF FOREST FRAGMENTATION GEARED SPECIFICALLY TO LANDOWNERS? SERVICE PROVIDERS?]

What do you think would happen if the owners of small-acreage forests did not receive the knowledge and services we've been talking about? Why would that be good or bad?

What profession or industry do you think is best able to respond to owners of small-acreage forests?

- Loggers?
 - (Why or why not?)
 - If yes, how are you or your organization reaching out to this group (if not already discussed in answers above)
- Consulting foresters?
 - (Why or why not?)
 - If yes, how are you or your organization reaching out to this group (if not already discussed in answers above)
- Arborists
 - (Why or why not?)
 - If yes, how are you or your organization reaching out to this group (if not already discussed in answers above)
- Landscape firms?
 - (Why or why not?)
 - If yes, how are you or your organization reaching out to this group (if not already discussed in answers above)
- Lawn care firms?
 - (Why or why not?)
 - If yes, how are you or your organization reaching out to this group (if not already discussed in answers above)
- Others?
 - (Why or why not?)
 - If yes, how are you or your organization reaching out to this group (if not already discussed in answers above)

What kind of requests for services or information do you get from your constituents about the issues we've been discussing?

What is preventing you and your organization from doing more of this kind of work?

- Is there sufficient interest from landowners
- Is there sufficient interest from service providers?
- Are there institutional barriers?

How big is this issue within your organization? What percentage of your resources are going toward the issue of increasingly urbanizing/shrinking/amenity-oriented private forestland? What percentage of your organization's resources?

How has your organization changed over the last 10-15 years to respond to this new context of a fragmented forest?

Program names. Are you trying to push a new name for this kind of small woodlot management? It seems to us to be located between forestry and arboriculture and landscaping. We're calling it Landcare. Do you have a name for this phenomenon that you're pushing?

I'm especially interested in finding small woodlot service providers. Can you suggest people/ businesses that do work of this type?

Can you point us to other people within your organization who are responding to these issues?

Can you point us to other people in other organizations that are working with these issues (i.e., environmental groups, land trusts, National Forest Practitioners, ISA, other professional groups?)

[END]

Appendix E: Case Study interview guide for service providers and landowners

Service Providers:

Please explain how you got this job with this client:

- had you worked with them before
- - How did the landowner say they heard about you?
- was there a referral?
- Did they respond to any advertizing?
- Did you/How did you portray yourself as different from a traditional forester/arborist?

Please explain how the job got defined

- What did the landowner describe that he/she wanted done?
 - o What were the main concerns/
 - Aesthetics, safety, expense, environmental health....
- Did you talk to them/provide information/educate them about what you do?
- Did they change what they wanted done to the site afterwards? Why
- Did they request any services that you typically do not provide?

Please describe the work you did on site:

- How large was the site? How much of it did you work?
- What planning did you do?
 - o Site access
 - o Equipment travel routes
 - o Mark trees
 - o How did you plan to minimize soil disruption?
 - o How did you plan to minimize residual damage?
 - o Other planning?
- Describe exactly what you did on the site.
 - o What was removed?
 - o How?
 - o How much?
 - o What was done with it?
 - What was processed?
 - What was done with it
 - Why did you choose to do it this way?
 - o Innovative marketing? Have you made any changes in what you processed or what was done to the products in order to optimize revenue?

- How long did it take (hours/minutes/people each)?
 - o Time on site
 - o Time travel
 - o Planning, paperwork, billing, follow up
 - o Other tasks

- What were the final impacts on
 - o Aesthetics
 - o Envirometal health
 - o Safety (of operators , neighbors, land owner,..)
 - o Other

- Any surprises or unexpected outcomes of the on-site job

Let's talk about your equipment:

- What kind of equipment was used? Pictures?
- Explain why/how you decided to go with this equipment suite.
- What are some of its pros and cons?
- Would you change it if given another opportunity?
- What is on your equipment wish list?

What kind of interaction did you have with the landowner during the job?

Did they seem pleased with the results?

- did they discuss aesthetics, environment, safety or any other specific issue?

How did you charge for this particular job?

- how did you estimate the cost? (hour or job or???)
- How did you communicate that with client?
- How did you account for money you might make from extraction
- What was the clients reaction to the method of calculating your bill? Did they understand? Did they try to get you to charge differently?
- How much did you gross? How does this compare with other typical jobs?
- Was this job profitable? Would you be able to make a living if all of your jobs were like this one?

Is there additional work/follow up work to be done on this site in the future? Do you think the landowner will have you back to this site again to do work for him/her in the future?

Did you have any contact with neighbors before or during this job? If so, explain.

Have you gotten calls and/or work from recommendations made by this landowner?

Is this kind of job typical for you? If not, how do most of your jobs differ?

Landowners:

What did you want done on your land AND WHY?

- What aesthetics outcomes, if any, were you thinking about?
 - o Why?
- What safety issues were you thinking about
 - o Why?
- What environmental impacts were you thinking about
 - o Why?
- What money issues were you thinking about
 - o Why?

Did you have any special concerns when looking for someone to work on your land, such as price range, or finding someone who would try to disturb the land as little as possible?

Did you have any trouble finding someone to come do this work?

- did you contact other people?
- Why did you not chose some of these other people

How did you hear about Mr. ___?

What caused you to choose him to work on your property?

Was there a wait before you could get him to come work on your property?

- did this influence your choice

After talking with him about your property and his capabilities, did you change what you wanted done to your property? Explain?

How did you and he decide on a price?

- What did you want to do with the material removed?
- Did you expect that he would pay you for the material removed?
 - o If not, were you okay with that?
- Did you expect to pay him by hour or by job or by volume harvested?
- Did you ask for explanation and try to negotiate a better price?
 - o Why or why not
- How much did you pay/how much did you make?
- How did you feel about the final price? Reasonable?

What were your thoughts/concerns while the job was in progress?

- Did you enjoy seeing them out there,
- were you concerned about the noise
- were you concerned about the environment/disruptive,
- did they keep you informed of progress? Was this important?

Do you know what is being done with the products removed from your land?
If so, what is your opinion of this? Pleased, don't care...

Did you communicate with your neighbors about the work being done?

- before the job? What, when, why
- during the job/ What when why
- after the job? What when why

What did you think of the end result?

- aesthetics
- environment
- safety
- cost
- others
- How did the end result compare with your original expectations?

If you need work done on your property in the future, will you have Mr. ____ back?

Would you recommend Mr. ____ to someone else? Have you done so?

Your on-site observations of the environment and aesthetics and...

-?